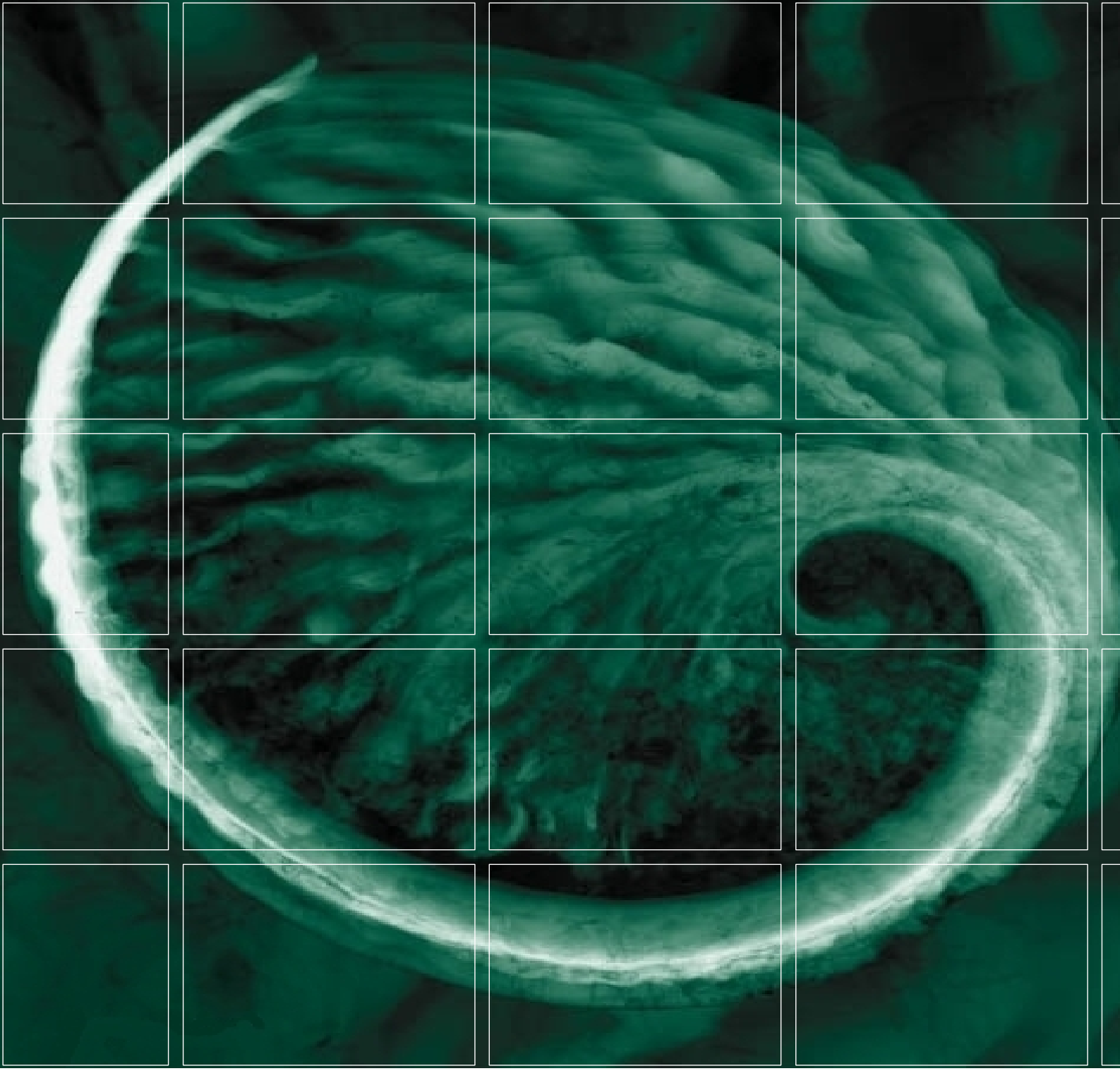

Integra Underground Project

(MP 8_0101)

Collated Response to Submissions

Integra Coal Operations Pty Ltd

March 2010

0061887 Final

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Integra Underground Project

(MP 8_0101)

Collated Response to Submissions

Integra Coal Operations Pty Ltd

March 2010

Approved by:	*Mike Shelly*
Position:	Partner
Signed:	
Date:	*29 March, 2010*

Environmental Resources Management Australia Pty Ltd Quality System

Quality-ISO-9001-PMS302

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1 INTRODUCTION

An environmental assessment (EA) was prepared by Environmental Resources Management Australia Pty Ltd (ERM) on behalf of Integra Coal Operations Pty Ltd (ICO) (the proponent) for the proposed extension of mining activities at the Integra underground operation at Glennies Creek, approximately 12 kms north-west of Singleton. The Integra Underground was previously known as the Glennies Creek Colliery.

The EA was prepared in accordance with the Director-General's Requirements (DGRs) issued on 20 July, 2008 and publicly exhibited from Monday, 20 July, 2009 to Thursday, 20 August, 2009.

This report responds to the submissions lodged by Government departments and the community. A revised statement of commitments is reproduced in Annex A.

1.1 PROPOSED DEVELOPMENT

The Integra Underground Coal Project (the Project) seeks approval for:

- the progressive development and longwall extraction of coal from the Hebden and Barrett Seams;
- first workings within areas of the Hebden, Barrett and Middle Liddell Seams which are not amenable to mining by longwall methods;
- the ongoing use of the existing surface facilities at the Integra Underground;
- the long-term use of the existing surface facilities at the Integra Open Cut (Coal Handling and Preparation Plant (CHPP) and train loader and associated facilities); and
- construction of a 1.4 km diversion for Bettys Creek.

The proposal also seeks to replace all current consents and approvals pertaining to the Integra Underground with a single Project Approval, including those for:

- longwall mining in the Middle Liddell Seam (MP 06_0213);
- use of surface facilities at the Integra Underground (PA 06_0057); and
- use of the CHPP, train loader and associated facilities (DA 105/90).

1.2 *PROJECT AREA*

The Integra Underground Project Area is located in the Hunter Coalfield of the Sydney Basin, approximately 12 kms north-west of Singleton, within the Singleton Local Government Area. Access to the existing underground operation is from Middle Falbrook Road, which is accessed from the New England Highway via Bridgman and Stony Creek Roads.

The Project Area incorporates:

- all areas of the proposed but as yet unapproved underground mining within Hebden and Barrett Seams and direct mining-related surface impact;
- the Glennies Creek Surface Facilities Project Site identified in PA 06_0057;
- areas of previously approved underground mining (approved under DA 105/90 and MP 06_213); and
- the Development Application Area identified in DA 86/2889.

Additionally, for administrative purposes, the Project Area incorporates the access corridor between the DA 86/2889 boundary and Bridgman Road.

1.3 *PUBLIC EXHIBITION*

The EA was placed on public exhibition for a period of 32 days from Monday, 20 July, 2009 to Thursday, 20 August, 2009 inclusive, during which time it was available for public viewing at three public locations, namely: Department of Planning, Information Centre, 23-33 Bridge Street, Sydney; Singleton Shire Council Offices, Queen Street, Singleton; and Nature Conservation Council, Level 2, 301 Kent Street, Sydney; and available to read or download from Integra's website. Copies were also made available to local landholders who had made such a request during the project consultation phase.

Copies of the EA were also provided to the following agencies for review:

- Department of Planning (DoP);
- Department of Environment and Climate Change (DECC) (now Department of Environment, Climate Change and Water - DECCW);
- Department of Primary Industries (DPI) (now Industry and Investment NSW – I&I NSW);
- Department of Water and Energy (DWE) (now NSW Office of Water);
- NSW Roads and Traffic Authority (RTA); and
- Singleton Shire Council.

Comments were received from three Government departments or agencies, five members of the local community and the CFMEU. Integra's response to each of these submissions is presented in the following sections.

2 DECCW SUBMISSION

Responses to each of the issues raised by the Department of Energy Climate Change and Water (DECCW) are provided below.

2.1 COMMENTS PERTAINING TO NOISE

A brief chronology of documentation and authority submissions pertaining to noise from the Integra Underground Project is as follows:

- Environment Assessment prepared July 2009 (ERM);
- correspondence from DECCW dated 20 August 2009 that noted

  "The Noise Impact Assessment for the Integra Underground Coal Mine relies almost entirely on the noise assessment carried out for the Open Cut Mine development. DECCW has provided comments to the Department of Planning (DoP) regarding the assessment undertaken for the Integra Open Cut Project.

  DoP will need to require the proponent to revise the noise assessment for the underground component of the mine operation once issues with the noise assessment for the open-cut mine are resolved."
- a response (including an updated Noise Impact Assessment) was issued to DOP by ERM on November 2009 that considered those issues identified by both DECCW and the Department of Planning (DoP) following their review of the Open Cut Noise Impact Assessment. The detail of this response is repeated in Sections 2.1.1 t o2.1.14 of this current report and the updated Noise Impact Assessment of that time is included in Annex B of this report;
- on 23 December 2009, DECCW provided additional comments; and
- on 28 January 2010, ERM issued a response to these comments by way of a letter and assessment tables as referred to in Section 2.1.15 and reproduced in Annex C.

2.1.1 Comment 1: Noise Assessment Groups

Comment

One hundred and ten surrounding private (non-mine owned) residences potentially affected by noise from the proposal have been identified in the[Open Cut] Noise Impact Assessment (NIA). The [OC]NIA has also considered mine owned premises and private vacant land. DECCW review has only considered existing private residences. The residences have been grouped into 18 Noise Assessment Groups (NAG) with a representative residence selected for the purposes of defining the noise environment of each NAG. DECCW has not attempted to confirm the accuracy or completeness of the identified noise sensitive receiver locations.

Response

Noted.

2.1.2 Comment 2: Background monitoring

Comment

Unattended existing ambient noise monitoring was undertaken in 2005 and 2007 at 8 locations. Operator attended monitoring was also undertaken at the 18 unattended monitoring locations for the day, evening and night periods. The results are presented in the [OC]NIA in Tables 8 and 9.

Response

Noted.

2.1.3 Comment 3: Rating Background Levels

Comment

The ambient monitoring results representing NAGs 1, 2, 3, 4, 6, 9, 10, 11, 12, A, B, C, D, and F exhibit higher evening and night-time Rating Background Levels (RBLs) than the corresponding daytime RBLs. The Industrial Noise Policy (INP) Application Notes generally recommend that the intrusive limit for evening and night be set no higher than for the daytime. However the application note indicates that; "Alternative approaches to these recommendations may be adopted if appropriately justified". Section 4.4 of the [OC]NIA presents justification, stating that this trend is indicative of the area over all seasons. This argument appears well supported, however, it is recommended that excursions above daytime RBLs be capped at the overall median of the data set, as expressed in Table 18 in the [OC]NIA. This results in RBLs for evening being no higher than 3 dB than daytime, and RBL for night-time being no higher than 1 dB than daytime, for NAGs exhibiting the trend.

Response

In the revised noise impact assessment (*Annex B*), ERM has adopted DECCW's and DOP's recommendation that where the ambient monitoring results exhibit higher evening and night-time Rating Background Levels (RBLs) than the corresponding daytime RBLs, RBLs be capped for evening no higher that 3 dBA above daytime and for night, no higher than 1 dBA daytime.

2.1.4 Comment 4: Assessment Criteria

Comment

DECCW supports… the adopting of NAG B ambient noise monitoring results to derive assessment criteria for NAG C due to the large variation in noise levels for NAG C when compared to adjoining areas.

Response

Within the revised NIA (Annex B), ERM has adopted NAGB ambient noise monitoring data to be representative of NAG C.

2.1.5 Comment 5: Industrial Noise Levels

Comment

DECCW notes and supports the approach of calculating "existing industrial noise levels" based on approved noise limits for existing industrial premises/development.

Response

Noted.

2.1.6 Comment 6: Criteria Derivation

Comment

The project specific noise level for a particular receiver is the more stringent of the intrusive and amenity criteria. The approach adopted in the [OC]NIA has been to undertake both an intrusive and amenity assessment separately. DECCW does not object to this approach, but does not necessarily agree with aspects of both the intrusive and amenity criteria derivation process, as outlined below.

Response

In both the exhibited UGNIA and within Annex B, ERM has adopted the more stringent of the 'maximum' amenity noise levels and intrusive levels in accordance with the INP.

2.1.7 Comment 7: Intrusiveness Criterion

Comment

DECCW accepts evening intrusive criteria that are no greater than 3 dB above the corresponding daytime criteria; and night-time criteria that are no greater than 1 dB above the corresponding daytime criteria. However, this approach is only relevant to NAGs where ambient noise monitoring suggests a positive trend from day to evening to night that exceeds the 3/1dB margins outlined above. Additional assessment against these recommended intrusive criteria is required.

Response

The RBLs identified in *Annex B* are consistent with the above approach and have been applied within the ERM noise impact assessment.

2.1.8 Comment 8: Amenity Criteria

Comment

DECCW generally accepts the presented amenity criteria derived using the "acceptable noise levels" from Table 2.1 in the INP. However, the amenity criteria have not been used to inform an assessment of noise impacts. The number of receivers predicted to experience noise levels above the amenity criteria should be identified. DECCWs assessment would indicate that upwards of 40 private residences will experience predicted noise levels[from the Open Cut Project] that exceed the night-time amenity criteria.

Response

ERM have adopted 'maximum' amenity levels where they are more stringent than the intrusive levels. Additionally, the ERM assessment has adopted the more conservative of the day or evening period for its assessment.

2.1.9 Comment 9: Noise Management Zones

Comment

DECCW does not fully accept the approach presented in the [OC]NIA to assign receivers into noise management and noise affectation zones with respect to PSNL informed by the amenity criteria. Whilst DECCW does not become involved in determining affectation (acquisition) thresholds, DECCW does rely on Department of Planning (DoP) to manage impacts above levels that DECCW would normally license to. Therefore, it is logical that DECCW's upper EPL limits align with DoP acquisition approaches. Table 1 below outlines DECCW's recommended approach for assigning receivers into noise management and noise affectation zones, with the affectation zone representing levels that DECCW would not normally consider licensing to.

Table 1 Noise Management and Noise Affectation

Criteria	***Noise Management Zone***		***Noise Affectation Zone***
	Minor exceedance	*Marginal exceedance*	*Significant exceedance*
Intrusive	*1-2 dB noise intrusive criteria*	*3-5 dB above intrusive criteria*	*>5 dB above intrusive criteria*
Amenity	*Where project related noise results in a total industrial noise exceeding the INP Table 2.1 acceptable noise level by up to 2 (dB)A)*	*Where project related noise results in a total industrial noise exceeding the INP Table 2.1 acceptable noise level by between 3 to 5 dB(A)*	*Where project related noise results in a total industrial noise exceeding the INP Table 2.1 maximum noise level*

Response

Noise modelling for the Underground Project identified some noise emissions above the relevant PSNL for particular periods. However, as noted in Section 4.6 of the ERM Noise Impact Assessment Report as exhibited and the revised noise assessment (*Annex B*) for all but one privately-owned residence, the exceedances were <3 dBA above the PSNL and therefore lie in the 'Minor Exceedance' category within the Noise Management Zone.

One privately owned residence (Receptor 80 – G Donnellan) was predicted to experience noise levels up to <4 dBA above the relevant PSNL and hence falls into the 'Marginal Exceedance' category within the Noise Management Zone.

No privately owned residences are predicted to fall into the Affection Zone as a result of proposed Integra Underground Project.

2.1.10 Comment 10: Mitigation Measures

Comment

The INP requires that feasible and reasonable noise mitigation measures be considered to attempt to satisfy the PSNL. In this case [ie the OCNIA], approximately 25 sensitive receivers are predicted to exceed the night-time intrusive criteria and 40 sensitive receivers are predicted to exceed the night-time amenity criteria. Given the number of receivers predicted to exceed the PSNL, the assessment of feasible and reasonable noise mitigation measures needs to be rigorous in order to satisfy regulatory authorities that the predicted levels are the best achievable outcome. The [OC]NIA provides limited text on page 45 relating to Noise Mitigation Measures.

Additional and detailed justification is required to demonstrate that all "feasible" mitigation measures have been identified and considered, and that those measures found to be "reasonable" have been included in the noise modelling, and committed to as part of the project.

Response

Reasonable and feasible mitigation has been incorporated into the Underground assessment, via adoption of best management practice (BMP) and best available technology economically achievable (BATEA) as per Section 7 of the INP.

Examples associated with surface facilities include a range of ventilation facility combinations, gas drainage boreholes that adopt the BATEA ideology including placement, orientation, noise emissions and screening.

2.1.11 Comment 11: Sleep Disturbance

Comment

The [OC]NIA acknowledges the current screening level sleep disturbance assessment criteria contained in the "Application Notes - NSW Industrial Noise Policy". However, a specific and quantitative assessment of the potential for sleep disturbance has not been undertaken[as part of the OCNIA] on the basis that; "A review of noise events from comparable coal mining operations shows that the LA1(1minute) levels from mobile equipment (i.e. dozers, haul trucks, trains etc) are typically no greater than 10 dB(A) above the LAeq(15minute),dB(A) intrusive level".

This approach essentially suggests that sleep disturbance assessments are not required for mining activities. DECCW does not accept this position and recommends that the screening levels sleep disturbance criteria are applied as recommended limits.

Response

Sleep disturbance was not considered as part of the underground assessment due to the static/constant nature of noise sources associated with the surface facilities. Noise emissions associated with in pit sources associated with the underground are significantly shielded and were acoustically insignificant contributors to the overall combined noise emissions from the Underground Project.

Notwithstanding, a review of potential sleep disturbance associated with rail loading activities at the nearest receptors situated to the east of the CHPP and Rail Loader identifies that a conservative LAmax emission from impact noise of 130 dBA SWL would result in Lmax at receptors that would remain below the relevant NAG's RBL + 15 dBA and, furthermore, would remain below 55 dBA (external noise level).

2.1.12 Comment 12: Meteorological Data

Comment

[In the OCNIA]An assessment of existing wind and inversion conditions was undertaken based on meteorological information from the Camberwell Mine Weather Station for the period 2001-2004. The assessment has indicated that light winds (0.5-3 m/s) are not a significant feature of the area in accordance with the guidelines in the INP.

The assessment has demonstrated that temperature inversions are a significant feature of the area, i.e. greater than 30% of winter nights. Therefore temperature inversions have been included in the noise modelling. However a 2 m/s drainage wind flow has not been included in the modelling of inversion conditions on the basis that light winds are not a significant feature of the area for winter nights.

The noise limits that DECCW are likely to recommend will apply under all meteorological condition except for any one of the following:

(a) Wind speeds greater than 3 m/s at 10 metres above ground level; or

(b) Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 metres above ground level; or,

(c) Stability category G temperature inversion conditions.

Therefore the proponent will need to revise its predictive noise assessment to include the following meteorological conditions:

- *3m/s source to receiver winds; and*
- *F stability class at night with a 2 m/s source to receiver wind.*

Note:
At a meeting held on 19 August 2009 between representatives from ICO, URS, Heggies DoP and DECCW, it was agreed that remodelling and assessment under the default (and non-prevailing) weather conditions was not required. However, DECCW

requested additional analysis of the weather data set obtained from the adjoining Ashton Coal Mine operation as a mechanism to confirm (or otherwise) the finding in the Open Cut Project NIA that light winds (0.5 m/s to 3 m/s) are not a significant feature of the area in accordance with the guidelines in the INP.

Response

ERM have adopted the same meteorological conditions as Heggies, and believe the response prepared by Heggies and reproduced as *Annex B* adequately addresses any issues relating to the appropriateness of the adopted meteorological conditions.

2.1.13 Comment 13: Modelling Scenarios

Comment

Noise modelling has been undertaken [in the OCNIA] using suitable noise modelling software; "Environmental Noise Model" (ENM) produced by RTA Technology. The noise modelling has looked at two basic mining scenarios identified as part pit (without Dulwich) and full pit (with Dulwich). The following operational scenarios were further considered for each mining scenario.

- *Part Pit: Part Pit Year 3 and Part Pit Year 6.*
- *Full Pit: Full Pit Year 1, Full Pit Year 4, Full Pit Year 6 and Fu l Pit Year 8.*

Although DECCW has not undertaken a detailed assessment of the noise modelling for this proposal, the following basic checks were however performed;

- *The sound power levels used appear reasonable, and in some cases conservatively high (see [OC]NIA Table 2).*
- *The placement of noise sources in the model does not appear to be unreasonable. DECCW notes that in early operating stage scenarios, that plant has been located on the surface to represent a reasonable worst case (see [OC]NIA, Appendix E).*
- *DECCW is however concerned that no operating stage scenarios have included the operation of locomotives (train sets) when operating off the NSW Rail network, and within the project area. DECCW recommends that the proponent be required to amend the modelling scenarios to include train operating/loading activities.*
- *The noise modelling has been limited to the open cut extension area. Noise emissions for the remainder of the project have been taken from the North Open Cut (Glennies Creek) EA. DECCW's review of the Glennies Creek EA included the following;*

"The text in the NIA indicates that the operational noise modelling includes the Camberwell CHPP and the rail load out facility. However the diagram in Appendix B5 -"Noise Emission Sources" does not show noise sources at the CHPP or the rail load out facility. DECCW has undertaken the assessment on the basis that all noise sources identified in the NIA have been considered i.e. consistent with the text".

Revised modelling of the project is required before the predicted noise levels can be used to assess the impacts of the proposal, and develop recommended noise limits.

Response

Similarly to the Heggies assessment, ERM used ENM noise modelling software to complete the noise assessment. Additionally, all sound power levels were measured on site and are deemed to be representative of mobile and static surface facilities. When assessing the cumulative noise associate with the Underground Project and adjoining industrial noise, ERM adopted the Full Pit Year 1 scenario for the Integra Open Cut Project, as it was potentially the worst case scenario for open cut mine noise emissions. Furthermore it should be noted that ERM adopted Heggies sound power levels for relevant sources pertaining to the underground operations including, haul trucks, the coal load out FEL, locomotives and CHPP. It is noted that the locomotives were included in the Open Cut assessment but inadvertently excluded from the operational scenario drawings.

2.1.14 Comment 14: Blasting

Comment

The predicted blast emission levels are likely to significantly exceed DECCW blast criteria in NAG 7. However the residences in NAG \ 7 are within the noise affectation zone for operational noise, and are therefore likely to be subject to an offer of acquisition.

The NIA indicates that; "due to blasting restrictions imposed by ARTC when blasting in the vicinity of the Main Northern Railway Line (typically permitted on one day per fortnight only), a maximum of five blasts per day may be required during the scheduled track possessions or as a consequence of extended adverse weather conditions".

The ANZECC guidelines recommend that blasting generally be limited to once per day. However the constraints noted in the EA, such as the need for a main line track possession, the frequency that track possessions may be granted, the limited window of opportunity that a track possession provides and the increased potential for weather to be an issue when the opportunity to blast is constrained by these other factors, may represent compelling arguments for alternative blast frequency requirements.

It is recommended that Integra be invited to supply additional justification to support blast frequencies of greater than once per day, and that they also be invited to provide conceptual measures to mitigate/ manage impacts associated with multiple blasts per day.

Response

This issue pertained to blasting and the current ANZEC Guidelines regarding numbers of blasts per day at the Open Cut and as such is not relevant to the Underground Project.

2.1.15 Submission received 23 December 2010

Comment

I refer to your email received by the Department of Environment, Climate Change and Water (DECCW) on 1 December 2009, regarding the Integra Underground Coal Project Response to Submissions − Noise Impact Assessment (NIA) prepared for Integra Coal Operations Pty Ltd (ICO), by ERM dated November 2009.

The noise modelling scenario for the Integra Underground Coal Project proposal includes noise sources that are also considered in the Integra Open Cut Coal Project proposal, for example the Coal Handling Processing Plant (CHPP) and haul truck movements on the RL100 haul road.

Given the commonality in operations, in both a geographical and infrastructure sense, and hence noise emissions, it is appropriate for the Integra Underground and Integra Open Cut operations to be considered cumulatively. The noise modelling results presented in the Integra Underground Coal Project − Noise Impact Assessment does not enable DECCW to extract the noise contribution from only Integra Underground Operations. That is, one cannot simply add (logarithmically) the noise emissions from the 'Open Cut proposal' to the 'Underground proposal' as that will result in common noise sources being considered twice.

It is recommended that the proponent be required to identify what impact, if any, the operation of the Integra Underground will have on the predicted noise levels for the Integra Open Cut (all non−mined owned residences should be considered and presented). In considering the noise emissions from the Open Cut Project, the current status of the Dulwich property should be considered, as full pit and part pit noise emission predictions vary.

DECCW suggests that the proponent provide the cumulative intrusive and cumulative LAeq(period) noise emission levels from the Integra Open Cut and Underground Projects and where inclusion of the Underground Project results in an increase in noise levels predicted for the Open Cut Coal project, the change in noise levels should be clearly reported.

DECCW also recommends that NSW Planning consider noise emissions from the Open Cut and Underground projects cumulatively and issue common noise requirements across both project approvals (if issued). This approach would require the proponent to effectively manage both projects to reach common performance requirements in each project approval. The information requested above is designed to facilitate such an outcome.

Response

ERM have under taken additional assessments of noise as recommended by DECCW and a response was submitted in a letter to DoP dated 28 January 2010. This letter is included as Annex C.

2.2 COMMENTS PERTAINING TO ECOLOGY

2.2.1 Comment 1: Central Hunter Swamp Oak Forest

Comment

The EA states that the proposal will result in alterations to surface flows, in particular the diversion of a section of Bettys Creek channel and abandonment of approximately 2500m of the existing Bettys Creek channel. This diversion falls within the recently approved Glendell Coal Mine Habitat Management Area.

The Project Area falls within the Camberwell (9133) Indicative Coastal Floodplain Endangered Ecological Community Map Series. In accordance with its position on the coastal floodplain and dominance of Casuarina glauca (Swamp Oak), Angophora floribunda (Rough-barked Apple) and Eucalyptus tereticornis (Forest Red Gum) this vegetation community may also be associated with the Coastal Floodplain Wetlands being a vegetation formation associated with the Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC.

The Central Hunter Swamp Oak Forest is considered to be a groundwater dependent ecosystem (GDE) which will be negatively impacted upon by the proposal.

Response

Endangered Ecological Community

It is noted that Bettys Creek, Glennies Creek and Main Creek are mapped as 'Indicative Coastal Floodplain' on the Camberwell (9133) Indicative Coastal Floodplain Endangered Ecological Community Map Series and that these areas may potentially support Coastal Floodplain Wetland EECs as identified for the Sydney Basin Bioregion, including Swamp Oak Floodplain Forest EEC. Consideration of whether the Central Hunter Swamp Oak Forest is associated with the Swamp Oak Floodplain Forest EEC needs to account for location in the landscape, soil type and vegetation floristics and structure as defined in the NSW Scientific Committee Final Determination for Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions EEC (NPWS 2005).

The NSW Scientific Committee Determination describes the Swamp Oak Floodplain Forest EEC as an ecological community:

- associated with grey-black clay-loams and sandy loams, where the groundwater is saline or brackish;
- on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains;
- generally occurs below 20 metres elevation and rarely above 10 metres.

It is acknowledged that Bettys Creek and Main Creek are tributaries of the Hunter River and are therefore associated with the Hunter River coastal floodplain as mapped. The creeks are characterised by low permeability clay to sandy sediments overlying basal clayey gravels (GeoTerra 2009) and groundwater quality monitoring identifies that the alluvial groundwater is very brackish to saline (GeoTerra 2009). However the area being discussed is not on grey-black clay loams or sandy loams. Furthermore, geomorphically, while the areas are ephemerally inundated, they are neither generally waterlogged nor lake margins, and Bettys Creek and Main Creek are both located at approximately 80 metres AHD, ie, well above the 20 metre AHD elevation defined in the EEC determination.

The NSW Committee determination identifies that structurally the Swamp Oak Floodplain Forest EEC may vary from an open forest to low woodlands, scrubs or reedlands with scattered trees, with the floristic composition determined by the frequency and duration of waterlogging and the level of salinity in the groundwater. The determination also notes that the canopy is dominated by *Casuarina glauca* (Swamp Oak) with subdominant species including *Acmena smithii* (Lilly Pilly), *Glochidion* spp. (Cheese Tree) and *Melaleuca* spp. (paperbarks) and that the understorey is characterised by a sparse cover of shrubs, vines and a continuous groundcover of forbs, sedges, grasses and leaf litter (NPWS 2005).

The EA identifies that Bettys Creek and Main Creek supports Central Hunter Swamp Oak Forest as described by Peake (2006). In this community within the Project Area *Casuarina glauca* (Swamp Oak), *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple) dominate the canopy layer, and the shrub layer and groundcover layer species are similar to those identified within the adjoining woodland. Peake (2006) does not identify that this community is listed as an Endangered Ecological Community, rather Peake identifies that the Central Hunter Swamp Oak Forest is equivalent in part to the Central Hunter Riparian Forest as described in the Lower Hunter and Central Coast Regional Environmental Management Strategy (NPWS 2000), a community which is not identified in the Scientific Committee Determination as being representative of the Swamp Oak Floodplain EEC: vegetation studies in the Hunter Valley draw a distinction between the Central Hunter Swamp Oak Forest (MU28) as described in Peake (2006) and those communities in the Lower Hunter and Central Coast Region (NPWS 2000) that are identified as being representative of the Swamp Oak Floodplain EEC as identified in the Scientific Determination, namely Swamp Oak-Rushland Forest and Swamp Oak Sedge Forest.

The determination notes that the Swamp Oak Floodplain Forest EEC is distinguished from other coastal floodplain EECs by the dominance of Swamp Oak or more rarely *Melaleuca ericifolia*, the relatively low abundance of *Eucalyptus* species, the prominent groundcover of forbs and graminoides and soils which show some influence of saline groundwater (NPWS 2005). In addition, to the difference in soil type, geomorphological setting, and elevation, it is noted that the predominance of *Eucalyptus tereticornis* and

Angophora floribunda in the upper strata is not in keeping with the determination. Notwithstanding, it is acknowledged that the Central Hunter Swamp Oak Forest is a regionally significant community.

As noted in the EA, and to the extent practicable, either the project has avoided the requirement to disturb vegetation or ICO has committed to avoiding disturbance of vegetation where the precise locations of specific activities or infrastructure would be determined on the basis of future operational requirements and/or operational experience. Furthermore, rehabilitation associated with the drainage lines (in particular Bettys Creek) is also recognized as an integral component of the proposal and long term management of the Project Area and overlapping Glendell Habitat Management Area. As a consequence, the EA has identified that the modification and potential longer term loss of Central Hunter Swamp Oak Forest will be offset by the protection and enhancement of 33.4 ha of Central Hunter Swamp Oak Forest, near Glennies Creek, ie within the Northern Biodiversity Offset Area (see Comment 4).

Groundwater Dependent Ecosystems

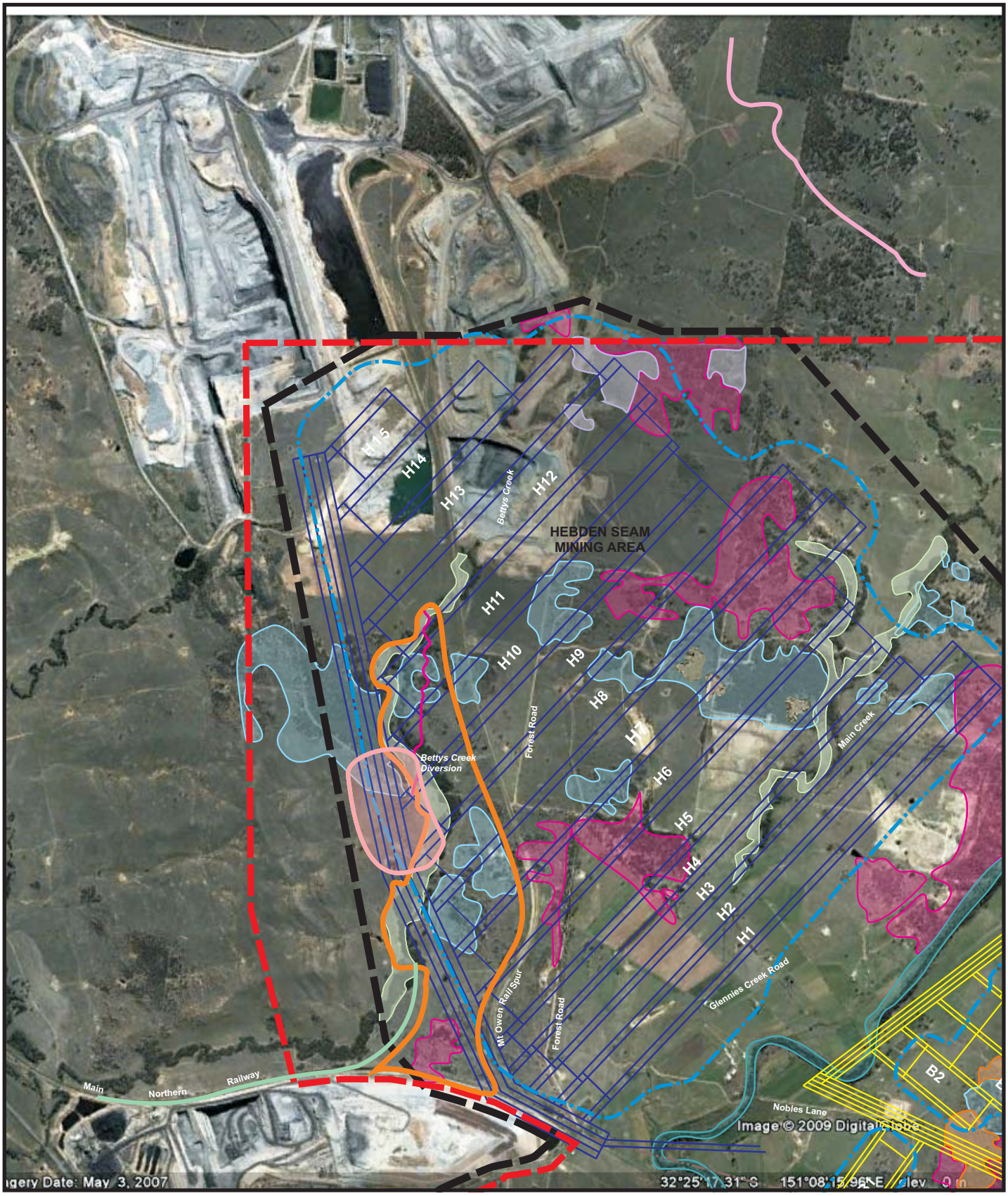
Groundwater assessments by GeoTerra (2009) have identified that there are two aquifer systems within the Project Area namely:

- unconsolidated alluvium along the channels of Glennies Creek, Bettys Creek and Main Creek; and
- shallow and deep basement coal measures (Foybrook Formation).

The alluvium and shallow basement aquifers in the Bettys Creek, Main Creek and Glennies Creek catchment are hydraulically separated and generally respond differently to rainwater recharge (GeoTerra 2009).

Bettys Creek and Main Creek are both ephemeral fourth order streams which are without flows for prolonged periods of time, but support small semi-permanent waterholes that typically exhibit moderate to high salinity (GeoTerra 2009). Conversely, Glennies Creek has a perennial, variable flow depending on rainfall/runoff and releases from Glennies Creek Dam which is located approximately 25km upstream of the Project Area.

The creeks' alluvial aquifers are defined as 'shallow upriver' aquifers characterised by low permeability clay to sandy sediments overlying basal clayey gravels (GeoTerra 2009). Alluvial deposits are up to six metres deep under Bettys Creek, 12 m under Main Creek and up to 14 m deep under Glennies Creek, with monitoring identifying variable saturation levels depending on the rainfall recharge and stream flow in the catchments (GeoTerra 2009).



Legend

- Project Area
- Proposed Hebden Seam Mine Workings (Mains and Gateroads)
- Proposed Barrett Seam Mine Workings (Mains and Gateroads)
- Subsidence Impact Zone
- Coal Lease (CL) 382
- Central Hunter Bulloak Forest
- Central Hunter Ironbark-Spotted Gum-Grey Box Forest
- Central Hunter Swamp Oak Forest
- Regenerating Native Woodland/Shrubland
- Revegetated Areas
- Hunter Valley River Oak Forest
- Grassland
- Glendell Biodiversity Offset Area Boundary
- Potential Additional Vent Shaft Location
- Mt Owen Diversion to Main Creek (Diversion 3)
- Glendell Mine Proposed Diversion

Client:	Integra Coal Operations Pty Ltd		
Project:	Integra Underground Coal Project Environmental Assessment - Response to Submissions		
Drawing No:	0061887hv_re-sub_01		
Date:	19/11/09	Drawing size:	A4
Drawn by:	JD	Reviewed by:	MS
Source:	Google Earth		
Scale:	Refer to Scale Bar		

N

0 500 1000m

Figure 1

Vegetation Communities and Proposed Ventilation Shaft Locations

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53 Bonville Avenue, Thornton, NSW 2322
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ERM

Main Creek and Bettys Creek are generally 'losing' streams where the stream discharges into the underlying groundwater system because the stream channel is elevated above the underlying alluvial piezometric surface (GeoTerra 2009).

As shown in *Figure 15.1* in the EA (reproduced in part as *Figure 1* attached) the banks of Bettys Creek and northern and central sections of Main Creek both support Central Hunter Swamp Oak Forest. It is also noted that there are some generally dry shallow reed beds in Main Creek where water may persist for a few weeks after rain.

Riparian vegetation has been altered by past clearing associated with agriculture and mining within and up to the riparian corridor. In addition, surface flows along Bettys Creek and Main Creek have been altered by works in the Mount Owen Coal Mine upstream of the Project Area, including the diversion of approximately 425 ha in the upper catchment of Bettys Creek to the Main Creek catchment and a second diversion around Mount Owen's Eastern Rail Pit in the north of the Project Area (see *Figure 2*). These diversions are anticipated to generate a cumulative reduction in alluvial recharge downstream of the diversions.

Based on the principles established in Eamus (2009), "Identifying Groundwater Dependent Ecosystems, A Guide for Land and Water Managers", the Swamp Oak Forest along Bettys Creek and Main Creek is expected to have some dependency on the shallow alluvial zone in that roots extend into this area, although the reliance or dependence of individual species may vary: unlike the Swamp Oak, the canopy species Forest Red Gum and Rough Barked Apple are not dependent on groundwater. Vegetation is expected to be dependent on soil moisture sourced from direct rainfall infiltration, ephemeral creek flows and groundwater with the relative importance of these depending on seasonal variation in all three sources.

GeoTerra (2009) has identified that, even in the absence of the planned underground mining and associated activities, the alluvial groundwater systems have been, and will continue to be, affected by the mining at adjacent open cut mines and Bettys Creek diversions in the Mount Owen Coal Mine. Furthermore, GeoTerra (2009) anticipates that the cumulative effect of drawdown in the shallow coal measures from adjacent mining operations will be greater than any reduced stream flow recharge or groundwater level drawdown imposed solely through subsidence over the proposed underground workings.

Modeling predicts that the underground proposal may result in 1.8 m drawdown in the alluvial aquifer of Bettys Creek and Main Creek (GeoTerra 2009). However, this is only marginally more than the variability in the alluvial groundwater levels of at least 1.67 m recorded in Bettys Creek and less than the variability in alluvial groundwater levels of up to 6.43 m recorded in Main Creek since January 2002 (GeoTerra 2009). GeoTerra (2009) notes that there may also be some minor loss of stream flow in Main Creek and Bettys Creek due to subsidence cracking but that this will be difficult to

distinguish from other variables affecting stream flow, such as the existing stream diversions (GeoTerra 2009). Accordingly, the direct impact of the proposal on groundwater is not anticipated to significantly adversely impact on the Central Hunter Swamp Oak Forest community.

2.2.2 *Comment 2: Bettys Creek Diversion*

Comment

Section 5.1.2 of the Flora and Fauna Assessment states that 'only minimal vegetation clearing or loss is expected as a consequence of the project, being restricted to changes to riparian vegetation along the abandoned Bettys Creek channel and rectification of indirect subsidence impacts such as ponding'. DECCW does not consider that the 'potential loss of up to five hectares of regionally significant Hunter Swamp oak Forest' as a result of the diversion to be minimal. Peake (2006) describes this community as having a high significance because it is restricted in distribution, very highly cleared, highly threatened and extremely poorly reserved. DECCW accepts that vegetation will be progressively planted within the abandoned channel, however the proponent accepts that the floristic structure of this vegetation community within the 2500m abandoned channel is likely to change.

DECCW considers that the significant change in floristic composition which is likely to occur does ultimately represent a loss of this regionally significant community (and potential EEC). It is also considered that the success of this revegetation cannot be assured and therefore it is highly likely that this vegetation will be permanently modified. This modification therefore has the potential to impact on habitat connectively for arboreal threatened species such as the Squirrel Glider and Brush-tailed Phascogale which have been recorded in the northern portion of the Project Area.

In addition, the impact of the diversion on the immediate loss of Central Hunter Bulloak Forest and Central Hunter Swamp Oak Forest has not been recognised….. The area (ha) of this vegetation loss is unclear however is expected to be at least 0.7 hectares. DECCW notes that this vegetation has already been set aside to offset the impacts of vegetation loss on the adjacent Glendell Mine site.

Response

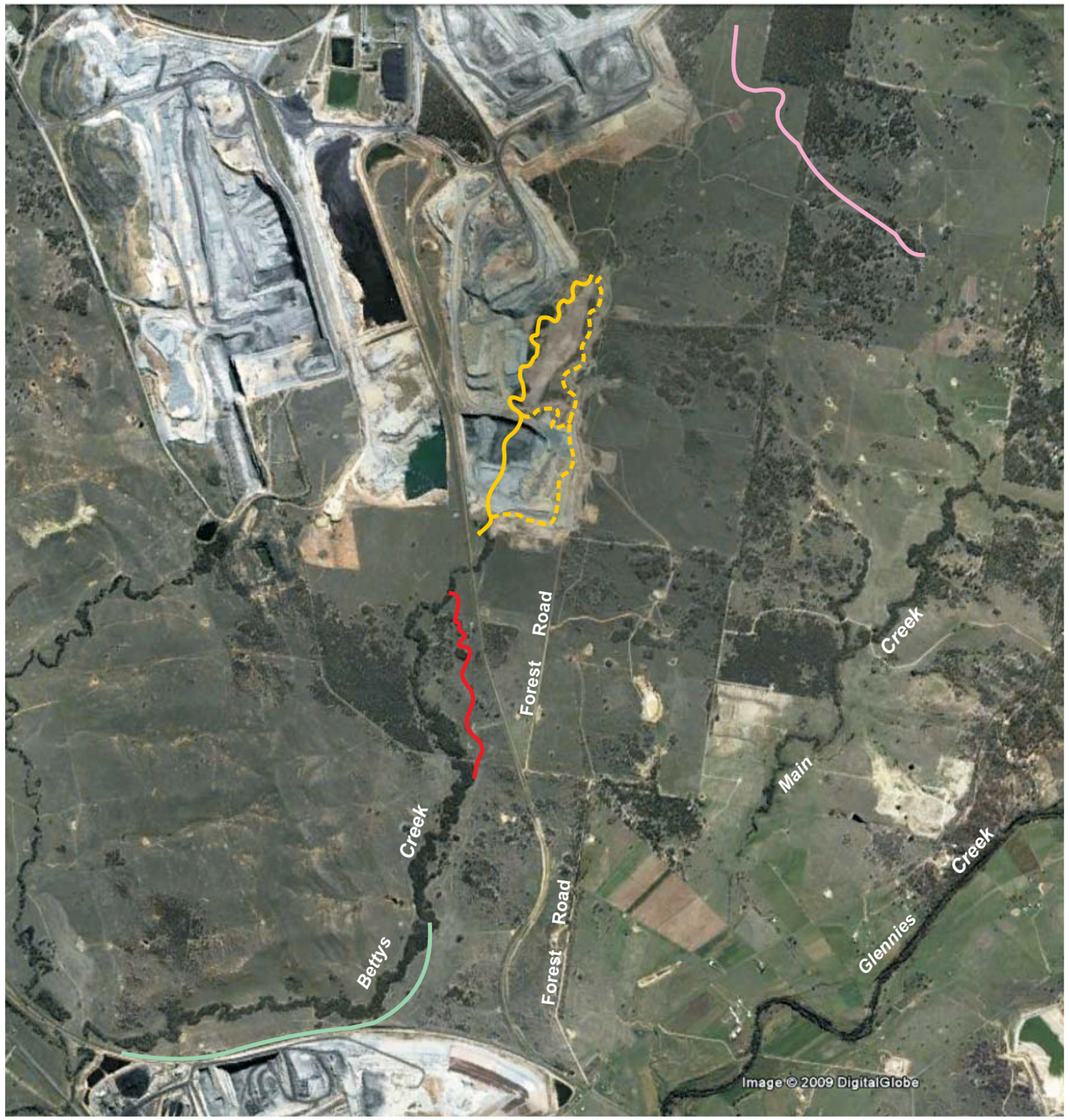
As discussed in *Section 5.1* of the Integra Underground Coal Project Flora and Fauna Assessment (ERM 2009) (Annex K of the EA report), the proposed Bettys Creek diversion will extend some 1400 metres and will meander within the confines of a constructed floodplain.

Construction of the diversion will be a dynamic process and may involve pre-emptive works as well as earthworks at the same time as or following mining However, although limited diversion construction activities may commence prior to or following the completion of Hebden Longwall 9 (ie around 2019) in order to drain any areas of local subsidence-induced ponding, and be undertaken progressively as mining advances through Longwalls 10-12, the south to north progression of the longwalls would mean that the diversion is unlikely to be fully functional prior to the cessation of mining in Hebden Longwall 14, ie around 2022 or some eight years following the commencement of Hebden Seam longwall extraction. Prior to that time, some flows would continue down the existing alignment.

Species composition within the section of Bettys Creek cut off from natural surface flows may alter over time and, as a worst case, may ultimately comprise a suite of species more suited to the new environment and the resultant loss of up to five hectares (ha) of the *Casuarina glauca* component of the Central Hunter Swamp Oak Forest. However, Rough-barked Apple and Forest Red Gum are not dependent on free groundwater and no losses in these species are predicted: as noted previously, these species are ubiquitous across the local landscape including on ridges and flats. It should also be noted that while underground coal extraction is predicted to lower the alluvial groundwater table (albeit generally within the natural variability range experienced since January 2002), the magnitude of the predicted loss is such that the alluvial groundwater may well continue to provide some water resource for *Casuarina glauca*. Even should the entire *Casuarina glauca* component of the community along the bypassed section of channel decline in the long term: the likely replacement of these by other species, the predicted retention of the non-groundwater dependent Forest Red Gum and Rough-barked Apple, and the growth in the Glendell Habitat Management Zones and new channel are expected to provide habitat connectivity for arboreal threatened species.

DEECCW correctly notes that the proposed diversion works would directly disturb an area of Central Hunter Swamp Oak Forest within the existing Bettys Creek channel where the diversion joins the original creek alignment. However, this area was included in the identified potential five hectare loss calculation. The proposed works will also directly disturb approximately 0.26 ha of Central Hunter Bulloak Forest although the flora and fauna assessment in the EA notes that this community is not recognised as being of regional significance, albeit restricted in its extent.

Alignment of Bettys Creek 2005



Current Alignment of Bettys Creek

Legend

- Original Alignment
- Existing XMO Diversions
- Proposed Integra Diversion
- Mt Owen Diversion to Main Creek (Diversion 3)
- Glendell Mine Proposed Diversion

Figure 2

Bettys Creek Alignment

Client:	Integra Coal Operations Pty Ltd		
Project:	Integra Underground Coal Project Environmental Assessment - Response to Submissions		
Drawing No:	0061887hv_re-sub_02		
Date:	19/11/09	Drawing size:	A3
Drawn by:	JD	Reviewed by:	MS
Source:	Google Earth		
Scale:	Refer to Scale Bar		

N

0 500 1000m

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The diversion works are proposed to occur within a creek system that currently experiences altered surface flows and connectivity as result of two diversions in the Mount Owen Mine upstream of the Project Area as discussed in *Section 5.3* of the Flora and Fauna Assessment. *Figure 2* (attached) shows the alignment of Bettys Creek in early 2005 and the existing and proposed alignments and diversions, highlighting the extent to which the creek's original hydraulic and ecosystem function has been modified. The Mount Owen Mine diversions have included diversion of flows from approximately 425 ha in the upper catchment of Bettys Creek to the Main Creek catchment and a second diversion around the Mount Owen Eastern Rail Pit in the north of the Project Area. In addition, a 2750 m diversion of Bettys Creek has been approved downstream of the Project Area for the Glendell Mine as shown in *Figure 2*. These diversions, to enable open cut coal mining, have and will remove further riparian vegetation, thereby disrupting wildlife corridor functions of Bettys Creek upstream and downstream of the Project Area. By comparison, the planned diversion of Bettys Creek identified as part of the Integra proposal will lead to minimal direct disturbance and, while some changes may occur to the flora composition over time, the corridor functionality would most likely remain. It should also be noted that at the commencement of diversion construction, the vegetation within the Glendell Habitat Management Area will be a minimum of 10 years older than now and by the time that the Integra diversion becomes fully functional, the vegetation would be at least 13 years older, thereby enhancing its ability to act as a fauna corridor.

Section 6.2 of the Flora and Fauna Assessment identifies that Integra Coal Operations will develop a management plan for the diversion channel and abandoned section of Bettys Creek in conjunction with the Mt Owen Complex Landscape Management Plan for the Glendell Habitat Management Area. As noted by DECCW in their comments, the management plan includes revegetation of the diversion channel and adjacent areas. While the success of revegetation is not assured, Integra (ICO) have committed to monitoring the success of such works and to monitoring changes in species composition and managing the riparian vegetation. This commitment also extends to the remediation of any areas where revegetation works are not successful. Based on the ephemeral nature of the existing Bettys Creek channel, ICO has also previously identified that it would consider blocking off the abandoned channel at the downstream end to act as a billabong to retain any surface flows, thereby potentially reducing any impacts on groundwater dependent species.

2.2.3 Comment 3: Vent Shaft Location

Comment

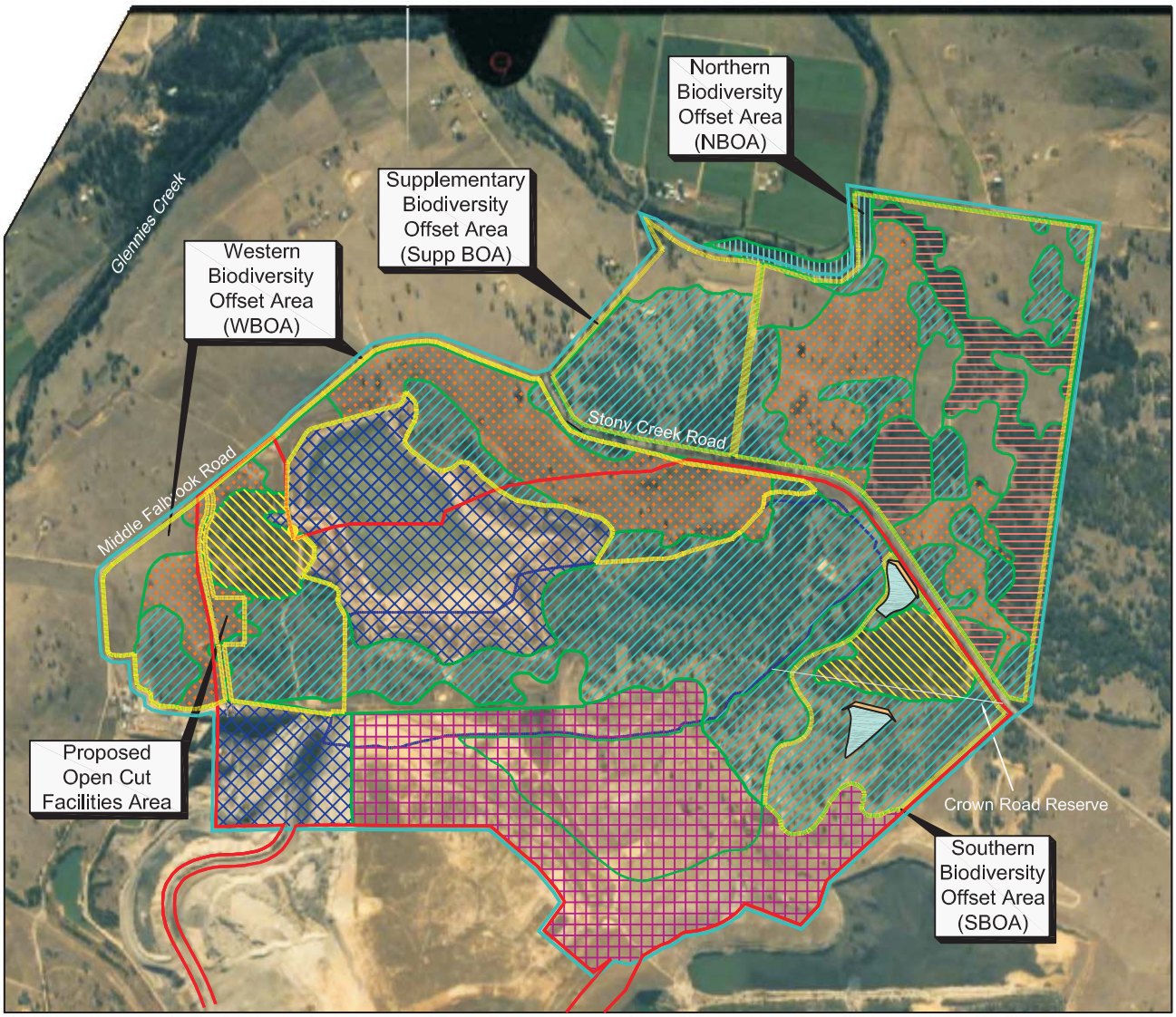
Figure 3.4 of Volume 1 of the EA depicts potential additional ventilation shaft locations to the north-west and south-east of the existing Forest Road Ventilation Shaft Area (ML 1525). The potential area proposed to the north-west is overlayed on both the Central Hunter Swamp Oak Forest and Central Hunter Bulloak Forest as well as the Glendell Biodiversity offset Area. ERM states that 'to the greatest extent practical, infrastructure will be sited to avoid impacts to vegetation'. However this is not considered to be a solid commitment by the proponent and leaves DECCW unable to assess the actual impact of progressive vegetation clearing.

Response

The Integra Underground Mine currently operates an existing ventilation shaft near Forest Road. The proposal identifies that an additional ventilation shaft may be required to enable Hebden seam mining activities. Two potential locations for the additional ventilation shaft are identified on *Figure 3.4* of Volume 1 of the EA as envelopes within which this disturbance may occur. A review of *Figure 3.4* shows that the envelope to the northwest of the existing Forest Road site approximates 50ha whereas the actual area of disturbance required for a new shaft and associated infrastructure would, based on the existing facility, be unlikely to exceed two hectares.

Figure 1 (attached) overlays the proposed ventilation site envelope over EA *Figure 15.3* (updated to reflect the presence of the Eastern Rail Pit and associated diversion of Bettys Creek) and shows that extensive areas within the identified envelope are available for ventilation shaft installation which would impact on neither the Glendell Habitat Management Area nor mapped Swamp Oak or Bulloak communities.

The potential for the new ventilation shaft site to impact upon the Glendell Habitat Management Area has also been the subject of discussions between ICO and Xstrata and it has been agreed that both parties would work together in determining the final location of the facility. As a consequence ICO commits to locating the ventilation shaft within existing cleared grassland, avoiding clearance of Central Hunter Swamp Oak Forest and Central Hunter Bulloak Forest.



REFERENCE

- Project Site Boundary
- Flora Survey Area (offset for clarity)
- 7.7Mt Open Cut Pit Shell
- Out-of-Pit Waste Rock Emplacement
- Dirty Water Containment Dam
- Proposed Biodiversity Offset Area Boundary

VEGETATION COMMUNITIES

- 1: (Remainder) Tussock Grassland
- 2: Regenerating Native Woodland / Shrubland
- 3: Narrow-leaf Ironbark - Spotted Gum - Forest Red Gum
- 4: Rehabilitated Disturbed Land
- 5: Bull Oak
- 6: Disturbed Land
- 7: Swamp Oak
- 8: River Oak

		Vegetation Community Areas (ha)							
		1	2	3	4	5	6	7	8
Part 4b Flora Study Area		**51.6**	**77.5**	**180.1**	**93.8**	**21.1**	**76.3**	**33.4**	**1.5**
Biodiversity Offset Areas	NBOA	28.4	30.9	26.9	0	0	0	33.4	1.5
	SBOA	0	0	27.8	0	11.1	0	0	0
	WBOA	10.2	43.1	30.8	0	9.8	0.4	0	0
	Sub Total within Project Related Land	**38.6**	**74.0**	**85.5**	**0**	**20.9**	**0**	**33.4**	**1.5**
	Supplementary BOA	5.8	0	27.6	0	0	0	0	0
	Total - (BOAs)	**44.4**	**74.0**	**113.1**	**0**	**20.9**	**0.4**	**33.4**	**1.5**
Area To be Disturbed		**6.1**	**0.7**	**68.3**	**47.6**	**0**	**12.3**	**0**	**0**

Figure 3

North Open Cut Offset Plan

Client:	Integra Coal Operations Pty Ltd
Project:	Integra Underground Coal Project Environmental Assessment - Response to Submission
Drawing No:	0061887hv_res-sub_03
Date:	18/11/09 Drawing size: A4
Drawn by:	JD Reviewed by: MS
Source:	URS 1/10/09 -43177678.003.wor
Scale:	Refer to Scale Bar

0 250 500m

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2.2.4 Comment 4: Offsets

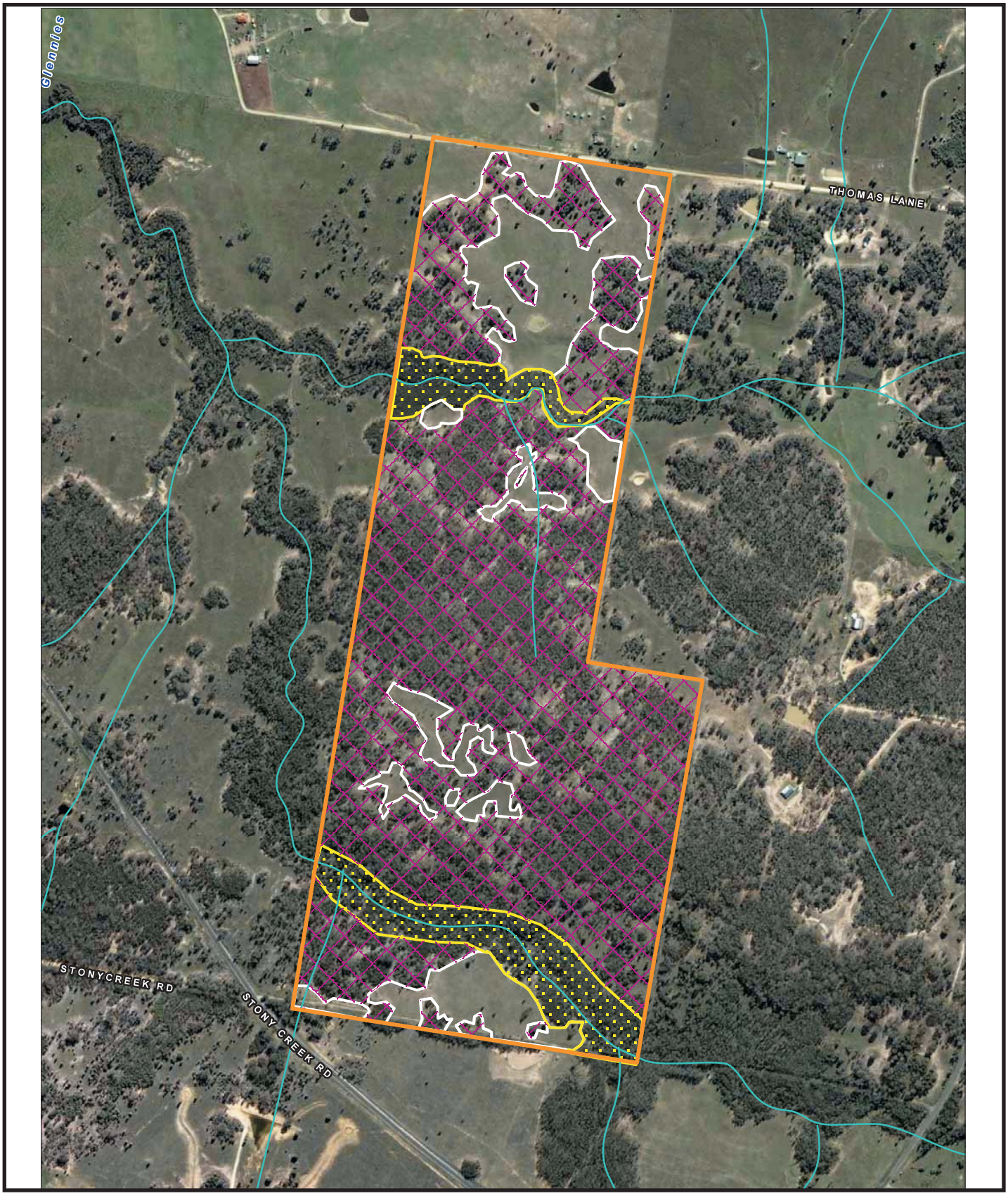
Comment

The current version of the Ecological Assessment does not propose any offset or compensatory measures for the loss of vegetation as a result of the Bettys Creek diversion or potential additional ventilation and bore hole location, instead relying on previous offsets relating to the Integra North open Cut. As stated in DECCW's 'Principles for the use of Biodiversity Offsets in NSW', offsets must be supplementary. They must be beyond existing requirements and not already funded under another scheme.

Due to the lack of certainty relating to the impacts of subsidence, as well as the potential loss/significant modification to a regionally significant vegetation community and threatened species habitat, the precautionary principle should be applied. Future offsetting of the long term impacts on biodiversity therefore needs to be addressed.

Response

As stated in *Section 6.3* of Annex K of the EA, ICO proposes that the potential loss of five hectares of the regionally significant Central Hunter Swamp Oak Forest be offset within the 33.4 hectares of this community in the Northern Biodiversity Offset Area negotiated for the Glennies Creek (North) Open Cut proposal (see *Figure 3* attached). Although the proposed area lies within the previously nominated offset area, adoption of this approach is not inconsistent with the Principles for Use of Biodiversity Offsets in NSW: the requirement for an offset associated with the North Open Cut was primarily a consequence of the planned clearing of 68ha of Narrow-leaved Ironbark-Spotted Gum–Forest Red Gum Community. (Note that the North Open Cut mine does not clear any Swamp Oak community). That the clearing of this community was the basis for the North Open Cut Mine offset is also demonstrated by the specific reference in PA 06-0073 *"…to acquire additional lands to supplement the offset strategy to ensure provision of as least 140ha Narrow-leaved Ironbark–Spotted Gum–Forest Red Gum (or a suitable equivalent to be agreed with DECC)"*. The fact that 33.4 ha of Central Hunter Swamp Oak Forest was included in the offset area was purely a consequence of the manner in which ICO defined the offset area, ie rather than pockets of the Narrow-leaved Ironbark–Spotted Gum–Forest Red Gum community for the offset, it was considered more appropriate to define the area using a cadastral boundary. This 33.4 hectare area of Central Hunter Swamp Oak Forest as shown on *Figure 3* will be retained as an offset to the potential loss of 5 hectares along the bypassed section of Bettys Creek.



Legend

Study Area

Vegetation Communities

Narrow-leaf Ironbark – Grey Box Forest

Swamp Oak Forest

Cleared

Figure 4

Vegetation Communities - Open Cut Project Offset Strategy

Client:	Integra Coal Operations Pty Ltd		
Project:	Integra Underground Coal Project Environmental Assessment - Response to Submission		
Drawing No:	0061887hv_res-sub_05		
Date:	13/11/09	Drawing size:	A4
Drawn by:	JD	Reviewed by:	MS
Source:	URS 1/10/09 -43177678.003.wor		
Scale:	Refer to Scale Bar		

0 100 200m

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In addition, ICO have been advised verbally that the owners of the property immediately to the east of the Northern Biodiversity Area and identified as subject to acquisition on request in Schedule 3, Condition 1 of PA 06-0073 propose to exercise their rights to acquisition. This property, which has been examined by URS and Geoff Cunningham Natural Resource Consultants and, subject to acquisition would (in part) be used as an offset for clearing associated with the Integra Open Cut Project, also includes some nine hectares of the Swamp Oak Community which extends east from the Northern Biodiversity Offset Area. This area of Swamp Oak community is shown on *Figure 4* (attached from the URS Integra Open Cut Offset Plan).

Examination of the habitat and vegetation descriptions offered by URS (2009) and Geoff Cunningham Natural Resource Consultants suggests that the areas of Central Hunter Swamp Oak forest identified in the Northern Biodiversity Offset Area and within the adjoining eastern property, are similar in structure and floristics and are expected to support a similar suite of threatened species as in the Integra Underground Project Area.

Ongoing management of the Central Hunter Swamp Oak Forest component of the Northern Biodiversity Offset Area will be required to comply with DECCW guidelines and to maintain or improve biodiversity. Management actions would include exclusion of cattle through fencing, weed removal and control, and control of feral animals where appropriate. Provision of full management details for the Northern Biodiversity Offset Area (and other offset areas identified within PA 06-0073) is a requirement under the conditions of that approval.

2.2.5 *Comment 5: Recommended Conditions*

Comment

DECCW recommends the following conditions:

1. *Longwall panels H9, H10, H11 and H12 are to be restricted in the length of the heading so as to reduce the possible subsidence impacts and therefore the need for the Bettys Creek diversion.*

2. *A long term monitoring program is to be established in consultation with DECCW which monitors and assesses the long term impacts of subsidence on vegetation and threatened species habitat values within and adjacent to the Subsidence Impact Zone as depicted on Figure 3.3 of ERM (2009b).*

3. *Should the proposal result in any immediate, or future, loss of vegetation or threatened species habitat then this loss is to be compensated in accordance with DECC guidelines 'principles for the use of biodiversity offsets in NSW'.*

4. *The potential additional ventilation shaft and bores as well as their associated infrastructure are to be located outside of all remnant vegetation areas. No vegetation clearing is to be undertaken for these facilitates.*

Response

Various options were considered when formulating a preferred project. With specific regard to the western extent of the longwalls in the vicinity of Bettys Creek, the following four options were considered.

Option 1 involved reducing the length of longwalls by approximately 1475m to avoid major ponding or diversion of water from Bettys Creek. Option 1 would have resulted in the failure to mine some 1.6 Mt ROM coal; a loss of some 1.1Mt product coal and direct revenue in excess of $100M, and a loss of income to the State of more than $18M in royalties, freight and port charges.

Option 2 involved reducing Longwall (LW) panel 11 by 400m: a failure to mine some 440,000t ROM coal; a loss in direct revenue of some $275M and a loss of income to the State of some $5M. For this option, the existing Bettys Creek channel needed to be excavated for about 700m to drain the depression created by the subsidence and to reduce the overflows across LW11 and, as such, would have resulted in the removal of the existing creekside vegetation in order to develop a stable creek cross-section. Another channel also needed to be created to drain the depression caused by the subsidence of LW9 and LW10 back to Bettys Creek.

Option 3 was a subset of Option 2 but included subsiding the mains and the remainder of LW12 to lower Bettys Creek by subsidence. This option had obvious mine safety issues but it was included as it would prevent the need for the excavation works in the Bettys Creek channel outlined for Option 2. The difficult–to-resolve mine safety issues ultimately precluded detailed consideration of this option.

Option 4 involved the existing mine plan and the construction of a new channel along the depression. Given the ability to create a stable diversion channel, and to manage potential vegetation and habitat connectivity impacts in the long term in a system already disturbed by multiple diversions, this option was preferred. This option also maximised coal recovery and overall economic benefits.

As discussed in Section 6.2 of Annex K of the EA, as part of the Management Plan to be developed for the diversion channel and abandoned section of Bettys Creek, ICO have committed to annual surveys along the revegetated diversion channel to record significant loss of planted seedlings as well as monitoring the use of the areas by native fauna. The program will also monitor any changes in the floristics and structure of the Central Hunter Swamp Oak Forest along the abandoned section of Bettys Creek.

As stated in the response to comment 3, ICO commit to location of the ventilation shaft within existing cleared grassland avoiding clearance of Central Hunter Swamp Oak Forest and Central Hunter Bulloak Forest.

As stated in the response to comment 4, ICO has offset the potential loss of five hectares of Central Hunter Swamp Oak Forest by the inclusion of 33.4 hectares of this community in the Northern Biodiversity Offset Area.

3 INDUSTRY AND INVESTMENT NSW SUBMISSION

Responses to each of the issues raised by Industry and Investment NSW are provided below.

3.1.1 Comment 1: Subsidence of Mt Owen Rail Line

Comment

Mt Owen Rail Line: The *proponent has not demonstrated that it is feasible to manage impacts to the rail line resulting from the predicted subsidence. It is suggested that the proponent be required to undertake feasibility studies to identify management measures for the Mt Owen rail line, including relocation.*

Response

The Mt Owen Rail Line, owned by Xstrata Mount Owen Pty Limited (Xstrata), is a single track spur line branching off the Main Northern Railway Line with a rail loop and coal loading facility at its northern end. The Mt Owen Rail Line is required to be operational until all Xstrata mines in the area close, currently anticipated being prior to 2024.

A strategy will be adopted with Xstrata to manage impacts on the Mt Owen Rail Line during mining of the Hebden Seam in accordance with the legal Deed of Settlement for the Mt Owen Rail Line (April 2007) between Xstrata, Integra Coal Operations Pty Limited (ICO) and other parties. The strategy will ensure that that the Rail Spur remains serviceable and safe during underground mining in the CL 382 area. The issue of the potential for the relocation of the Mt Owen Rail Line is also specifically identified in the Deed of Settlement. In accordance with the Deed of Settlement, the decision to relocate the rail line will be made wholly by Xstrata.

A Safety Interface Agreement with the aim of maintaining the rail spur in a safe and serviceable condition during undermining, and managing the interaction between the parties will be formulated between Integra and Xstrata. The agreement will address the following:

- Longwall Mining Plan;
- Longwall Mining Schedule;
- Predicted Subsidence;
- Subsidence Monitoring;
- Predicted Subsidence Impact on Rail;
- Rail Monitoring;
- Rail Management TARP; and
- Communications.

The aim of the Safety Interface Agreement will be to maintain the rail spur in as safe and serviceable condition during undermining. It will include 'relocation of rail spur' as a contingency.

3.1.2 Comment2: Main northern Railway

Comment

Main Northern Railway: It is important that any mining under the Main Northern Railway is adequately designed to provide the required level of protection taking into consideration site conditions, particularly multi-seam affects. It is suggested that the proponent be required to design any proposed workings within the abovementioned rail protection zone to be long term stable taking into consideration the site conditions.

Response

Integra has recognised the importance of the Main Northern Railway from the outset and it was with this and the presence of alluvium in mind that it committed to designing its cut and flit operations such that subsidence would remain less than 20mm. This will be achieved by designing pillars to be stable in the long-term, taking into account site conditions. This is outlined in the revised Statement of Commitments (refer to *Annex A*).

3.1.3 Comment 3: Glennies Creek Alluviums

Comment

Glennies Creek and Associated Alluvium: It is suggested that the proponent be required to design any proposed workings below the Glennies Creek and associated alluvium to be long term stable taking into consideration the site conditions, particularly fault structures.

Response

Integra previously recognised the importance of the alluviums, which is one of the reasons it committed to designing its cut and flit operations such that subsidence in this area would remain less than 20mm. This will be achieved by designing pillars to be stable in the long-term, taking into account site conditions. This is outlined in the revised Statement of Commitments (refer to *Annex A*).

Integra will adhere to the 40m separation buffer distance between the 20mm subsidence line and the connected alluvium of Glennies Creek as outlined in "*Management of Stream/Aquifer Systems in Coal Mining Developments in the Hunter Valley, 2005*". This is outlined in the revised Statement of Commitments (refer to *Annex A*).

3.1.4 Comment 4: Ponding on Low-lying Land

Comment

Low-Lying land: Low Lying areas subject to multi-seam longwall mining may be impacted by inundation, ponding and erosion, particularly where this is already an issue arising from previous mining. This may affect some agricultural land and potentially one residence owned by other colliery.

Response

As detailed in Chapter 10 and Annex F of the EA, modelling was conducted to define the pre and post mining hydraulic characteristics of both the Bettys Creek and Main Creek channels. The model was run for a bank full flow (1 year ARI) and large (100 year ARI) event.

The modelling of Bettys Creek showed that the installation of proposed drop structures identified in Section 10.4 of the EA would mitigate the impacts of increased bed shear, stream power and channel velocities in the upper and middle reaches of Bettys Creek and that the erosion potential of the Bettys Creek diversion is expected to be similar to that of the existing lower reach channel.

Findings of the pre-mine and post-mine conditions flood modelling for Bettys Creek showed that:

- the Mt Owen Rail Spur bridge does not get overtopped for existing or predicted conditions;
- under both existing and predicted conditions, the rail bridge will divert some of the 100 Year ARI flow along the upstream (eastern) side of the rail in a southerly direction. The diverted flows drains back to Bettys Creek approximately 1 km to the south;
- the 100 Year ARI flow is confined to the Mt Owen Diversion under the post-mine conditions; and
- in the lower reach, the 100 Year ARI flood extent changes dramatically between the pre- and post-mine conditions with all of the flood flow now draining between the rail and the existing Bettys Creek channel in the location of the proposed diversion. The existing Bettys Creek channel adjacent to the diversion will receive no flood flows and only local catchment runoff.

The modelling of Main Creek showed that the installation of proposed drop structures identified in Section 10.4 of the EA will mitigate the effects of increased bed shear, stream power and channel velocities in the upper reach of Main Creek, while no change in erosion potential is expected for the middle reach. The erosion potential of the Main Creek and the Trib 1 Diversions are expected to be lower than for existing conditions.

The pre-mine and post-mine conditions flood modelling of Main Creek found that:

- the 100 Year ARI flood extent in the upper reach is mostly unaffected by mine subsidence;
- the proposed mine subsidence will decrease the likelihood of flooding at the existing house (receptor 83) from the middle reach of Main Creek which runs around the south-eastern side of the property;
- the Glennies Creek Road crossing does not get overtopped for existing or predicted conditions by the 100 Year ARI flood;
- the ponded areas that develop along Trib 1, behind the existing fish ponds and within the Main Creek channel are effectively drained by the proposed diversions; and
- the 100 year ARI flood inundation extent along Main Creek would reduce as a result of mine subsidence. However, flood depths and the duration of inundation would increase, particularly along the Trib 1, due to the increased dominance of Glennies Creek flood flows. The inundation times are only expected to increase by up to 6 hours and this is not expected to impact on the grazing potential of the area.

Subsidence-related ponding and breakout of flow from the creek channel is anticipated along both Bettys and Main Creeks within the Hebden Seam subsidence footprint. Ponding depths on the floodplain will be up to 0.8 m in places. As prolonged ponding may substantially affect any vegetation growing in the area concerned, ICO propose to drain any such pond in areas outside of Bettys Creek and Main Creek. Assuming that this drainage occurs soon after ponding, few long term effects are predicted. Some minor disturbance to vegetation may occur in the area re-profiled to drain any pond.

The diversion channels have been designed to drain low lying lands and no additional overbank ponding is expected and therefore no impacts on agricultural lands are expected.

3.1.5 Comment 5: House Damage

Comment

Houses: The application identifies up to three residences over proposed longwalls in the Barrett Seam which are expected to be damaged structurally. It is understood that two of these are to be purchased by the proponent prior to any subsidence impacts. At this stage the third property will remain privately owned in the foreseeable future. The subsidence impacts may result in damage that is beyond what is regarded as safe, serviceable and repairable.

Response

One of the three residences has already been acquired by Integra, and one is awaiting settlement. The third is residence 47.

It should also be noted that the mine plan for the Barrett Seam as presented in the EA is preliminary at this time (longwall mining in this seam is not planned to commence until 2025) and was presented to enable an assessment of the maximum area and magnitude of likely impacts. Prior to mining this area, Integra will undertake detailed investigations to develop a firm mine plan within the EA footprint. As part of the investigation, a risk assessment will consider amongst other things, the impact of mining on residence 47.

Integra acknowledges that the owners of residence 47 have indicated no desire to sell their property to Integra at this stage, but remains optimistic that, with longwall mining in the vicinity of this residence scheduled to commence in late 2030, that this situation may change. Integra has also informally suggested that it be given first option to purchase if and when a sale might be proposed.

Over the life of the project, Subsidence Management Plan (or Extraction Plan) applications will be submitted to I&I NSW (previously DPI) which will include further assessments of the potential risks of subsidence, their likelihood and consequences. It will also include detailed strategies to manage subsidence impacts, inclusive of measures referenced in the EA. Management of impacts will be achieved through prevention, mitigation and/or remediation of subsidence impacts as appropriate.

Compensation, repair, or replacement will be provided under the provisions of the *Mine Subsidence Compensation Act 1961* where improvements are damaged by mine subsidence resulting from the extraction of coal.

3.1.6 Comment 6: Subsidence Performance Measures

Comment

In addition to the above issues, specific performance measures or limits on subsidence impacts should be developed for each of the features / domains identified above.

Response

Integra acknowledges that such measures or limits form an integral component of the subsidence management plans developed for specific features.

This is outlined in the revised Statement of Commitments (refer to *Annex A*).

3.1.7 Comment 7: Rehabilitation Objectives

Comment 7

Rehabilitation: I&I NSW has identified the following domains for which clear rehabilitation performance objectives should be developed (even if the predicted impact is likely to be minimal):

- *Bettys Creek;*
- *Main Creek;*
- *other land overlying or affected by underground mining operations comprising:*
  - *land used for crop production or where vegetation is predominately exotic species;*
  - *land supporting vegetation communities identified in section 15.3 of the EA; and*
- *underground mining pit top and associated surface facilities and the coal handling and preparation plant area.*

Where relevant, the rehabilitation strategy will need to identify how each domain will be integrated with biodiversity offset areas and approved rehabilitation strategies for adjoining projects (rather then simply stating that such integration will occur).

Response

Under the terms of mining tenements, prior to the commencement of any mining operations, the mine operator is required to submit a Mining Operations Plan (MOP) to I&I NSW (previously DPI) which addresses environmental and rehabilitation outcomes and provides management systems to integrate these outcomes, mine planning and production. Rehabilitation associated with proposed mining will be undertaken in accordance with the relevant MOP, Rehabilitation and Environmental Management Process (REMP) or Extraction Plans. This has been added to the revised Statement of Commitments (refer to *Annex A*).

A rehabilitation and decommissioning strategy has been prepared to support the Integra Open Cut Coal Project Application. This document, entitled *Rehabilitation and Decommissioning Strategy for the Integra Coal Open Cut Project and Extended South Pit* (GSS Environmental 2009), contains some principals and objectives that are equally applicable to the Integra Underground Coal Project, including:

- creation of stable post-disturbance landform;
- achievement of acceptable post-disturbance land use capability/suitability; and
- preservation of downstream water quality.

To achieve these objectives, rehabilitation of disturbed land at both the Integra Underground and Open Cut will be conducted so that:

- suitable species are planted and established to achieve the nominated post-mine land uses;
- the potential for water and wind induced erosion is minimised, including the likelihood of environmental impacts being caused by the release of dust;
- the quality of surface water and seepage released from the site (if any) is such that releases of contaminants are not likely to cause environmental harm;
- the water quality of any residual water bodies is suitable for the nominated use and does not have the potential to cause environmental harm; and
- the final landform is stable and not subject to slumping or erosion which will result in the agreed post mining landform not being achieved.

The principal objectives of mine closure planning include:

- providing an overall framework for mine closure including rehabilitation and decommissioning strategies that are consistent with the current mine closure plan and I&I NSW –Minerals and Energy Division expectations;
- establishing clear and agreed criteria which can be used to provide the standard against which the final mine rehabilitation and post mining land use can be assessed;
- reducing or eliminating adverse environmental effects once the mine ceases operation;
- ensuring closure is completed in accordance with good industry practice; and
- ensuring the closed mine does not pose an unacceptable risk to public health and safety.

As detailed in Section 3.3.11 of the EA, the key aspects related to the decommissioning and closure of the site infrastructure, plant and buildings once the CHPP and associated infrastructure is no longer required include:

- *Site Services* - All ICO-owned services including power, water, data and telephone lines on the site will be isolated, disconnected and terminated to make them safe. The inspection pits and junction boxes for underground services will be sealed. Generally, all ICO-owned underground services will be made safe and left buried in the ground. ICO-owned powerlines will be removed and the materials (ie poles and wire) recovered for potential re-sale or recycling as applicable. Management of non ICO-owned assets will be negotiated with the owners at the time;

- *Infrastructure and Buildings* - All buildings, including the administration buildings, workshop, CHPP and fixed plant (including stacker/ reclaimers, conveyors and gantries, transfer points, thickener tank, coarse reject hopper, vehicle wash, etc) will be demolished and removed from the site. Where possible, assets will be re-used or sold to other mines. Gas bores, vent shafts, portals and the like will be demolished and made safe to the standards relevant at that time;

- *Roadways, Car Parks and Hardstands* - The bitumen roadways, car parks and hardstand areas around the CHPP, workshop and administration areas will be ripped up and the inert waste material placed in available voids and buried, or recycled where feasible. All areas will then be reshaped, deep ripped, topsoiled and seeded;

- *Fuel Farms and Chemical Storage Areas* - Leading up to closure, a preliminary sampling and analysis program (Phase 1) will be implemented over the fuel and chemical storage areas to determine whether a more detailed assessment (Phase 2 – detailed investigation of contamination involving drilling) should be conducted. This will quantify the amount of contaminated material that will need to be bio-remediated on site or sent off-site for disposal at a licensed facility; and

- *Dams and Surface Water Features* - All sedimentation dams which assist in the management /control of water flows from the final rehabilitated surface, would provide fauna habitat or represent an asset to the future land use will be retained following mine closure. All dams to be retained will be assessed for structural integrity and any required upgrading or maintenance works completed.

A commitment to undertaking rehabilitation in accordance with the rehabilitation strategies defined in the MOP, REMP or Extraction Plans has been included in the revised Statement of Commitments (*Annex A*).

4 NSW OFFICE OF WATER SUBMISSION

Responses to each of the issues raised by the NSW Office of Water are provided below.

4.1.1 Comment 1: Recommendations

Comment

DWE has reviewed the accompanying Environmental Assessment (EA) dated July 2009 and ***must recommend refusal of the project*** *in its current form based on the impacts of the proposal and the associated implications with DWE legislation and policy.*

Response

In a meeting with NOW (Fergus Hancock) on the 8 September 2009, NOW indicated that the bolded section in the above text was originally drafted in italics as an internal departmental "draft discussion point" and was not intended to be included in the final NOW response on the basis that the issues of concern in the remainder of the letter were addressed by Integra Coal.

4.1.2 Comment 2 (Barrett Seam Longwall Extraction)

Comment

The Barrett seam extraction footprint is located so that subsidence is not anticipated to the Glennies Creek connected alluvium. However, the separation between Glennies Creek alluvium and the boundary to predicted subsidence draw is not explained, and it is uncertain how limits to mining footprint and the null line to subsidence expression has been derived. NOW has prescribed a 40 metre separation buffer between the 20mm line of subsidence and boundary to alluvium for coal extraction projects in the Hunter Valley, as set out in Management of Stream/Aquifer Systems in Coal Mining Developments in the Hunter Valley 2005. This separation distance has been developed to minimise alluvial depressurisation and potential reversal of connected alluvial groundwater flow; the boundaries to setback distances for longwall operations have been incorporated into existing development consents and project approvals in the Hunter Valley. In addition, verification of depressurised aureole of groundwater in response to mining activities acting under the guideline has been carried in several longwall mining projects in the Hunter Valley. NOW advises its position is consistent with the principles of the WMA, has been verified for existing longwall operations, and should be consistently applied to longwall operations in the Hunter Coalfield.

Therefore, the mine plan for the Barrett seam longwall blocks must be configured to provide a minimum 40 metre separation between the boundary to connected alluvium and the 20mm line of subsidence. This is necessary to minimise the interaction of fracture pathways which are anticipated to develop as a result of the predicted tensile strains and the alluvium.

Response

The EA document did not clearly explain the separation distance between Glennies Creek alluvium and the predicted 20mm subsidence line. Integra will adhere to the 40m separation buffer distance between the 20mm subsidence line and the connected alluvium of Glennies Creek as outlined in "*Management of Stream/Aquifer Systems in Coal Mining Developments in the Hunter Valley, 2005*". This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.3 Comment 3 (Hebden Seam Longwall Extraction)

Comment 3

NOW is aware of significant geological structure trending along the axis of the Camberwell Anticline to the east of the multi-seam longwall footprint; this does not appear within the SCT subsidence assessment, nor GeoTerra's groundwater assessment of extraction from the Hebden seam. Therefore, subsidence response due to extraction in the Hebden seam is uncertain in the eastern-most longwall blocks; criteria as to acceptable subsidence levels on natural and built structures should be incorporated into project approval, along with remedial measures and compensation should impacts on existing water users exceed nominated limits, including alteration of base flows in Main Creek or changes in water quality and potential use of water for basic landholder rights or agricultural use.

Response

Axial fold related strain fracturing and faulting within the hinge of the Camberwell Anticline in the Barrett mining area is not significant enough to adversely affect the overburden permeability in the subsidence area. More significant folding and faulting is present to the west of the subsidence area, in association with the Hunter Thrust.

The subsidence report prepared by SCT that accompanied the EA identified the predicted magnitude of subsidence and associated tilts and strain. It also identified management measures for each aspect of the natural and built environment. With the adoption of these measures, or as refined by monitoring, it has been assessed that the magnitude of impact will be manageable.

4.1.4 *Comment 4: Main Creek Response Strategy*

Comment

NOW requires a response strategy to address any destabilisation of Main Creek, and a programme to install any necessary remedial works in Main Creek should subsidence expression initiate incision and headward erosion due to steepening. NOW requires an expansion of piezometric monitoring in the Main Creek alluvium, and development of trigger action response mechanisms to address alterations of channel form, surface water baseflow maintenance and shallow groundwater integrity.

Response

The response strategy, remedial works programming, an outline of expansion of piezometric monitoring and development of a trigger action response plan (TARP) for Main Creek will be undertaken as part of revision of the existing surface water and groundwater monitoring and management program. It will be undertaken prior to undermining the Hebden Seam. Integra will consult with NOW regarding the department's expectations and specific content of this plan.

4.1.5 *Comment 5: Bettys Creek Diversion Rectification*

Comment

NOW requires an agreed process to monitor and remediate damage to the Bettys Creek diversion caused by Integra Coal operations resulting from extraction of longwalls 10-17 in the Middle Liddell seam. No agreement has been supplied to NOW, and no response mechanism has been nominated by Integra Coal to changes in channel morphology, or riparian ecosystem maintenance, nor has any monitoring data relating to diversion integrity has been provided for review to NOW as the State statutory regulator.

Response

Since the meeting on 8 September 2009, Integra has supplied NOW with correspondence between Xstrata and Integra indicating that the former had no objection to the project. A deed of agreement between the two companies exists to allow co-operative mining.

A response mechanism was developed by Integra for Panels 10-17 as part of the Integra Underground Site Water Management Plan in March 2007.

Monitoring data for the Xstrata diversion's integrity will be collected by an independent consultant agreed to by both parties prior to the diversion being undermined. The study has not been conducted as yet as there is still a significant period of time before the diversion is undermined in which it can

respond to Xstrata managed erosion, compaction subsidence and vegetation stabilisation initiatives prior to Integra having any effect on the diversion.

The EA details that subsidence will increase the bed slope of the diversion where it drains into the mine subsidence footprint, although much of the channel grade will remain unaffected. At the lower end of the diversion, some ponding in the channel is expected.

It also should also be noted that Integra already has approval to mine the Middle Liddell Seam by longwall methods under Xstrata's Bettys Creek diversion.

4.1.6 Comment 6: Longwalls 9 To 12 Revisions

Comment 6

NOW recommends that longwall panels 9-12 be shortened to mitigate impacts upon Bettys Creek, and avoid increasing regulatory imposts upon Xstrata Coal, acting under statutory licence to NOW under Part of the Water Act 1912 (now converted to a controlled activity approval under the Water Management Act 2000 (WMA)). NOW does not recognise that Integra holds any right to limit Xstrata Coal's ability to stabilise and reconfigure the diversion to Bettys Creek, which is governed under NOW's statutory responsibilities under the WMA. Therefore, NOW requests Department of Planning consider amendment to the mine layout, to provide further protection to Bettys Creek, and consider the statutory impost on Xstrata Coal's activities and need to satisfactorily resolve finalisation of the Bettys Creek diversion.

Response

Integra Coal will not restrict Xstrata Coal's ability to stabilise and reconfigure the diversion to Bettys Creek, and will develop an updated Site Water Management Plan to manage any adverse impacts from extraction of the Hebden Seam panels.

Integra acknowledges that, on subsiding Xstrata's Bettys Creek diversion under the Middle Liddell approval, responsibility for the diversion's ongoing maintenance and stabilisation rests with Integra where the adverse impacts are caused by Integra's subsidence effects. Integra acknowledges that this obligation would extend to adverse impacts from its proposed Hebden Seam mining. Given that the Hebden Seam mining beneath the channel is not programmed to start until after 2021, Xstrata's ability to reconfigure the diversion as identified in the Mt Owen EIS would not be compromised. Recent discussions with Xstrata indicate the completion of mining in this area by 2019. Mining in the Eastern Rail Pit is complete.

The EA details that subsidence will increase the bed slope of the diversion where it drains into the mine subsidence footprint, although much of the channel grade will remain unaffected. At the lower end of the diversion, some ponding in the channel is expected.

As noted under the response to Comment 5, Integra already has approval to mine the Middle Liddell Seam by longwall methods under Xstrata's Bettys Creek diversion.

4.1.7 Comment 7 (Cut and Flit Extraction - Barrett Seam & Middle Liddell Seam)

Comment

NOW advises that the intensity of sub-regional geological structure in the area adds to the complexity of hydrogeological response to mining-induced depressurisation of strata underlying the Glennies Creek floodplain. In addition to the apex of the Camberwell Anticline and its associated fracturing of strata, one major and a number subsidiary minor faults are located within the proposed cut and flit footprint. NOW understands the limit to cut and flit extraction between the Barrett and Middle Liddell seams as proposed in the EA is defined by an identified thrust fault, which was identified in the Integra Open Cut proposal EA and included, but not identified, in the Integra Underground EA (Dwg 4 of Appendix G), and in the Underground Extension EA (Dwg 3, Appendix G). This does not appear to have been considered in the assessment of cut and flit extraction in the underground EA.

Response

Although there is faulting within the bord and pillar area, the mining method and mine plan has been developed so that if a significant fault is encountered that has the potential to initiate an adverse response in the alluvium of Glennies Creek, then that structure will not be mined through with secondary extraction, and the integrity and stratigraphic support of the overburden will be maintained in the vicinity of the fault.

4.1.8 Comment 8: Groundwater Modelling

Comment

Appendix G indicates the FEFLOW model developed to predict groundwater response does not include structural geological influence on groundwater migration, whilst SCT subsidence assessment (Appendix E) has not included the cut and flit area due to lack of pillar configuration details for the proposal. As a result, NOW considers the groundwater impact assessment to be inadequate in terms of interaction with in-situ groundwater and geological structure, and risks of subsidence occurring due to pillar failure.

NOW has previously opposed any subsidence of regulated rivers, including the Glennies Creek floodplain, due to unquantified risks of subsidence and impacts upon alluvial storage capacity and maintenance of river flows. At the same time, failure modes of remnant pillars for partial extraction may be exacerbated due to saturation, which has not been assessed in the EA. Should subsidence occur as a result of partial extraction for the Integra underground operation, the complex situation of proposed cut and flit extraction beneath the Glennies Creek regulated river and connected alluvium requires intensive scrutiny of any proposed cut and flit extraction beneath the Glennies Creek floodplain.

Response

NOW correctly notes that the FEFLOW model and the subsidence assessment did not directly address potential permeability changes due to subsidence of major faults. However, given the uncertainty as to the occurrence of such changes, the appropriate hydraulic parameters associated with the faulting, the remediation measures available and the ability to amend the mine plan and mine layout, the non-inclusion of these aspects does not represent a deficiency in the modelling.

The mine plan has been developed so that no more than 20mm of subsidence will be generated in the alluvial floodplain of Glennies Creek.

4.1.9 Comment 9: Hydraulic Connections

Comment

No hydraulic connection must occur between subsurface mining operations and surface water sources and connected alluvium to Glennies Creek, Main Creek or Bettys Creek.

Response

The mine plan will be developed and operated such that no detectable ingress from surface water sources and the Quaternary alluvium into the mine workings will be generated that cannot be rehabilitated. This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.10 Comment 10: Impacts of Water Users

Comment

No impacts must occur to licensed water users, basic landholder rights or minimum baseflows in Glennies Creek regulated river or environmental water requirements.

Response

This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.11 Comment 11: Subsidence of Glennies Creek

Comment

No subsidence of Glennies Creek or its connected alluvium must occur as a result of either partial or full extraction, and a setback of 40 metres from the agreed edge of alluvium to the 20 mm line of subsidence to the Glennies Creek alluvium for all full extraction operations must be specified for the proposal.

Response

Integra will adhere to the 40m separation buffer distance between the 20mm subsidence line and the connected alluvium of Glennies Creek as outlined in "*Management of Stream/Aquifer Systems in Coal Mining Developments in the Hunter Valley, 2005*". This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.12 Comment 12: Stream Flow Erosivity

Comment

No increase to erosivity of stream flows in the Bettys Creek diversion must occur, or destabilisation of diversion structures or degradation of the river or its connected alluvium as a result of mine induced subsidence.

Response

The mine plan will be developed and operated such that no increase in erosivity of the Bettys Creek diversion or degradation of Glennies Creek or its associated alluvium will occur, and that any subsidence effects that may occur on the diversion will be managed within the outline of a site water management plan. This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.13 Comment 13: Xstrata Bettys Creek Diversion

Comment

Integra Coal must not impede Xstrata Coal operations to finalise the Bettys Creek diversion, and must provide written evidence of agreement with Xstrata Coal with regard to the finalised layout and rehabilitation of the Bettys Creek diversion.

Response

Integra will not impede Xstrata in finalising the Bettys Creek diversion and, Integra has supplied NOW with correspondence between Xstrata and Integra indicating that the former had no objection to the project. A deed of agreement between the two companies exists to allow cooperative mining.

This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.14 Comment 14: Water Sharing Plans

Comment

All displacement of surface or ground waters governed under the HRRWSP or HURAWSP must be accounted for under the operating rules of the two water sharing plans; Integra Coal must provide evidence that this accounting procedure complies with dealings rules as prescribed under the water sharing plans.

Response

This is outlined in the revised Statement of Commitments (refer to *Annex A*).

4.1.15 Comment 15: Water Supply Reliability

Comment

Integra Coal must ensure it has sufficient water to meet mine operational demands, in accordance with the statutory rules of the Hunter Regulated River Water Sharing Plan and/or Hunter Unregulated River and Alluvium Water Sharing Plan, and any other statutory instruments in force under the Water Act 1912, and Water Management Act 2000. Should insufficient water be available to continue mining operations, mining operations must be scaled back to meet water supply requirements.

Response

This is outlined in the revised Statement of Commitments (refer to *Annex A*).

5 COMMUNITY SUBMISSIONS

Six community submissions were received by the Department of Planning following the public exhibition of the Integra Underground Coal Project Environment Assessment. These are elaborated below.

5.1 PAULA HEDGES (RECEPTORS 65 AND 66)

5.1.1 Comment

I believe Integra's proposal will have significant effects on my property and land, including subsidence, noise and dust. I believe that there is no doubt my home and land should be in the acquisition zone should this proposal be approved. The associated haulage and treatment of increased coal production will also increase the already unacceptable dust and noise impacts on my land and home. The fact that mining will commence under my land will have a significant detrimental impact on the value and saleability of both my land and home. I also have concerns regarding the undermining of Glennies Creek by this significant increase in mining under the area. I request that should the current proposal by Integra to mine under my home be approved, that I be placed in the acquisition area.

I request that the findings of the independent study into the cumulative effects of mine related dust on the Camberwell village be considered as part of my objection to Integra's expansion plans.

5.1.2 Response

Predicted subsidence, noise and dust impacts on receptors 65 and 66 (Paula Hedges) are detailed within the EA and summarised herein.

Rate of mining: there will be no increase in the rate of mining nor in the rate of coal haulage from that currently approved at the Integra Underground.

Subsidence: Receptors 65 and 66 lie above the Hebden Seam cut and flit areas where the maximum predicted subsidence at the completion of mining is less than 20mm (refer to *Figure 8.1* in the EA). As detailed in Section 8.3 of the EA, a number of recommendations for subsidence monitoring will be undertaken by ICO to confirm the levels of subsidence and enable refinements of subsidence predictions.

Rectification of subsidence-induced damage is the responsibility of the Mine Subsidence Board and associated compensation, repair or replacement will be provided under the provisions of the *Mine Subsidence Compensation Act 1961*.

Noise: Modelling of operational noise levels (refer to Chapter 14 of the EA) indicates that emissions will remain below the relevant Project Specific Noise Criteria (PSNC) for calm and inversion conditions for the majority of

receptors, including receptors 65 and 66. As receptors 65 and 66 do not fall within the noise management or noise affectation zones, a request to be placed in the acquisition area on this basis is not justifiable. A range of control procedures will be implemented to manage noise on site as detailed in Table 14.18 of the EA.

Cumulative noise modelling predicts that residence 65 and 66 shows that the increase in noise from both Integra underground and open cut operations will be less than one dB(A).

Dust: DECC criteria for PM_{10} (Annual), TSP (Annual) and Deposited Dust are not predicted to be exceeded at receptors 65 and 66 when taking into account emissions from the project in conjunction with emissions from the proposed Integra Open Cut, approved Integra North open Cut and five other local mines, as detailed in Chapter 12 of the EA. The request to be placed in the acquisition area cannot be justified on the basis of air quality impacts. A range of control procedures will be implemented to manage dust on site as detailed in Table 12.6 of the EA.

Integra acknowledges that residents within or surrounding the Project Site perceive that the Project and other existing and proposed coal mining operations in the vicinity have adversely affected property values in the vicinity. However, property values, and perceptions of property values, are influenced by many factors including soil fertility, water supplies, road access, aesthetic appeal, access to services and schools, distance from shopping centres and employment... Residences 65 and 66 are located in an area where one of the principal land uses is coal mining and the proposed Underground Project is simply a continuation of this land use.

The findings of the independent study into the cumulative effects of mine related dust on the Camberwell village is not publically available and a response regarding the findings of the report is not able to be provided.

5.2 GRAEME AND KAY CHEETHAM (RECEPTORS 44, 48 AND 49)

5.2.1 Comment 1

It is stated in the EA that the bore or well on our property could drop by 0.5m. We rely on this water totally for stock water and also for domestic supply for the three houses on our property. No one knows where this stream runs so there is a possibility of completely draining the system into the disrupted ground structure.

5.2.2 Response to Comment 1

The Cheetham submission indicates that their well is not connected to Glennies Creek, but is "fed" from an underground stream. The well is located approximately 50m from the edge of Glennies Creek and is within a major sedimentary depositional "point bar" alluvial terrace on a major bend in Glennies Creek.

However, monitoring data indicates that Glennies Creek salinity at the Middle Falbrook Bridge ranges from 250-800uS/cm and the well water is approximately 1000uS/cm. As the well is located in a "point bar" sedimentary alluvial terrace, the data indicates the well is installed within the Glennies Creek alluvial groundwater system. However it may not be directly or highly connected to the actual stream flow of Glennies Creek. The water level in the well would be primarily influenced by groundwater levels within the east bank of Glennies Creek that does not overly the proposed longwall or cut and flit workings. As the well has a salinity of approximately 1000uS/cm, it is not interpreted to be "spring" fed, as any springs emanating from the underlying basement would have a significantly higher salinity. The well has a similar salinity to GCP25, and is slightly higher than GCP9 and GCP10, all of which are completely within the Glennies Creek alluvium (refer Drawing 4 in Annex G for monitoring site locations).

A survey conducted for the EA indicated the well was 10.1m deep with a standing water level of 8.2m below surface, giving an available water depth of around 1.9m. A 0.5m reduction in water level could therefore be significant; however, as the well has probably silted up, any loss of available water depth could be rectified by digging the well deeper, or by installing a new well or replacement bore.

In regards to Glennies Creek alluvial system "disappearing" into the underground workings, this will not eventuate as the mine plan has been designed to minimise loss of water from the Glennies Creek alluvium and from the creek channel itself. The quantum of potential loss of flow from the stream will not be discernible from the current percentage variability experienced due to climate and licensed extraction.

5.2.3 Comment 2

The EA states that cracking of up to 100 to 150mm could develop in Stony Creek Road as a result of subsidence. This is totally unacceptable on a public road possibility putting our lives at risk.

5.2.4 Response to Comment 2

Stony Creek Road is a sealed road that passes directly over the proposed Barrett Seam longwall panels with longwall mining in the Barrett Seam predicted to result in vertical subsidence of between 1.5m and 2m. This would result in significant disturbance to the road surface and vertical alignment with sharp changes in grade and development of compression bumps likely to occur and reduce ground clearance during mining and surface cracks between 100 and 150mm in width potentially developing over a period of one to two weeks as each longwall face passes under the road. Changes to the road surface are likely to be temporary in the direction of longwall retreat and permanent where the road surface crosses the panel edges. Integra acknowledges that, in the absence of appropriate and expeditious

remediation, cracks of 100mm to 150mm could pose a safety issue for road traffic and, accordingly has committed to maintaining it in a safe and serviceable condition with regrading and resurfacing to be undertaken on an as required basis. Integra has committed to a Road Management Plan, which will advise on issues such as public use and safety.

5.2.5 Comment 3

We are concerned about the future of Glennies Creek Hall as a result of structural and social damage by the mines.

5.2.6 Response to Comment 3

The infrequently used Glennies Creek Community Hall is located approximately 10m to 30 m from the goaf edge of the proposed Barrett Seam Longwall 6. The building is on a concrete slab, with lightweight timber construction and tin cladding. A brick toilet is located at the rear of the Hall.

Vertical subsidence in the vicinity of the Hall is expected to be in the range of 100mm to 500 mm, with the predicted subsidence-induced movements are expected to cause perceptible damage to the building. Integra acknowledges that rebuilding, considerable rectification (potentially including structural work, and re-levelling) along with remedial work to surface water drainage and sewerage systems, would be required to remediate the anticipated damage. This is detailed in the revised Statement of Commitments (refer to *Annex A*).

Rectification of subsidence-induced damage is the responsibility of the Mine Subsidence Board and associated compensation, repair or replacement will be provided under the provisions of the *Mine Subsidence Compensation Act 1961*.

5.2.7 Comment 4

We are concerned that if we wish to sell that our property's value will be diminished by having coal companies as our neighbours.

5.2.8 Response to Comment 4

The environmental assessments undertaken and presented in the EA identified that:

- receptors 44, 48 and 49 (Cheetham) are located outside of the 20mm maximum predicted subsidence at the completion of mining in the Hebden, Barrett and Middle Liddell Seams;

- DECC criteria for PM_{10} (Annual), TSP (Annual) and Deposited Dust are not predicted to be exceeded at receptors 44, 48 and 49 when taking into account emissions from the project in conjunction with emissions from the proposed Integra Open Cut, approved Integra North open Cut and five other local mines; and

- noise emissions will remain below the relevant Project Specific Noise Criteria (PSNC) for calm and inversion conditions for receptors 44, 48 and 49. Receptors 44, 48 and 49 do not fall within the noise management or noise affectation zones.

Integra acknowledges that residents within or surrounding the Project Site perceive that the Project and other existing and proposed coal mining operations in the vicinity have adversely affected property values in the vicinity. However, property values, and perceptions of property values, are influenced by many factors including soil fertility, water supplies, road access, aesthetic appeal, access to services and schools, distance from shopping centres and employment.. Residences 44, 48 and 49 are located in an area where one of the principal land uses is coal mining and the proposed Underground Project is simply a continuation of this land use.

5.2.9 Comment 5

It is stated that more water will flow from Glennies Creek into disturbed workings. This could be an environmental disaster. This should not be allowed as Glennies Creek is a controlled stream which is used for town water supply, irrigation and the environment. Water is to scarce to be allowed to disappear into mine workings.

5.2.10 Response to Comment 5

As noted in the response to Comment 1, in regards to Glennies Creek alluvial system "disappearing" into the underground workings, this will not eventuate as the mine plan has been designed to minimise loss of water from the Glennies Creek alluvium and from the creek channel itself. The quantum of potential loss of flow from the stream will not be discernible from the current percentage variability experienced due to climate and licensed extraction. The EA identifies a loss of flow from Glennies Creek of 27.4ML/year due to the proposed mining activities. This is compared to the mean annual flow of 65,335 ML and so it can be seen that the reduction is very small.

5.2.11 Comment 6

Increased pollution of the air we breathe, increased water pollution, increased noise pollution.

5.2.12 Response to Comment 6

The environmental impacts of the proposed development are detailed in the EA and specifically discuss air quality. Modelling of the incremental air quality impacts from the underground mine shows that deposited dust, total suspended particulate, and PM10 would be below the relevant criteria.

Notwithstanding the minimal contribution of the underground mine to local air quality, ICO will implement a number of management measures to ensure that emissions to the atmosphere are minimised and an air quality monitoring program will be implemented which can be used to verify the accuracy of the modelling results presented in this report. Monitoring will also be used to inform and develop operational controls to minimise impacts to local air quality.

Modelling of operational noise levels associated with the surface activities for the Integra Underground Coal Project indicates that emissions will remain below the relevant Project Specific Noise Criteria (PSNC) for calm and inversion conditions for the majority of assessed receptors. The underground mine will remain a minor contributor to the local noise environment.

A range of management procedures will be implemented to ensure potential impacts on receptors from operational noise generated by the Project are minimised. Existing general site noise management and monitoring procedures will continue as part of the Integra Underground management program to mitigate potential adverse noise impacts resulting from the proposal.

It is not anticipated that the surface or alluvial groundwater quality of Glennies, Bettys and/or Main Creek will be reduced as a consequence of the proposed underground workings.

5.2.13 Comment 7

The decreased usefulness of the mined land for future generations.

5.2.14 Response to Comment 7

Under the terms of mining tenements, prior to the commencement of any mining operations, the mine operator is required to submit a Mining Operations Plan (MOP) to Industry and Investment (I&I) NSW (previously DPI) which addresses environmental and rehabilitation outcomes and provides management systems to integrate these outcomes, mine planning and production. Rehabilitation associated with proposed mining will be undertaken in accordance with the relevant MOP and Subsidence Management Plan (SMP) or Extraction Plan. However it should also be noted that the proposal is to extend underground mining, and as such potential impacts on future land capability would be restricted to the limited areas of

direct surface disturbance. With the implementation of appropriate management and mitigation measures as identified in the EA, the potential land capability post-subsidence would be generally unchanged.

5.3 DR AND MK BRIDGE (RECEPTOR 50)

5.3.1 Comment 1

Cumulative effect of pollution – dust, noise gas and the general environment.

5.3.2 Response to Comment 1

Cumulative impacts associated with the Integra Underground Project were considered in the EA, specifically impacts associated with noise and dust. Cumulative noise modelling shows that residence 50 will experience an insignificant and not perceptible(less than 1 dB(A)) increase in received noise from the underground operation .

Modelling of operational noise levels associated with the surface activities associated with the Integra Underground Coal Project indicates that emissions will remain below the relevant Project Specific Noise Criteria (PSNC) for calm and inversion conditions for the majority of assessed receptors.

A range of management procedures will be implemented to ensure potential impacts generated by the Project are minimised. Existing general site noise management and monitoring procedures will continue as part of the Integra Underground management program to mitigate potential adverse noise impacts resulting from the proposal.

The air quality assessment concluded that when taking into account emissions from the Project in conjunction with emissions from the proposed Integra Open Cut, approved Integra North Open Cut and five other local mines, the maximum ground level concentrations at receptor 50 would not exceed the relevant DECC criteria.

The Project will continue to liberate gas in approximately the same quantities as currently produced, although an agreement with the gas-fired Glennies Creek Power Station is expected to see the beneficial reuse of the majority of this valuable resource, thus reducing the amount of gas vented into the atmosphere.

5.3.3 Comment 2

Although it is stated no extra traffic – inevitably there always has been.

5.3.4 Response to Comment 2

As identified in Section 18 of the EA the project largely involves the continuation of current activities on site. The inflow of traffic associated with support activities and maintenance will also remain relatively stable in relation to current numbers. There will be periodic spikes in daily traffic flows, due to drivage and other development activities, much as occurs now during longwall moves and major development works. As a result traffic for the project will be readily supported by the existing local road network as outlined in the EA.

5.4 BW AND RA CHERRY (RECEPTOR 47)

5.4.1 Comment

Our main objection is the mine subsidence under our family home. Mine subsidence will tilt our house (predicted at 0.2mm) and cause complete destruction of all the underground pipes under the slab of the house, including sewage, water electricity and phone. They have predicted up to 1 metre subsidence where our family home is situated. We have been told that Mine Subsidence Board will repair any damage. This is totally unacceptable. We would like the Planning Department to add a clause that mining under our family home not go ahead. If this approval goes through we will require our house and associated buildings to be re-built, not repaired.

5.4.2 Response

Maximum predicted vertical subsidence at receptor 47 is expected to be between 0.1 to 0.5m 0.2m and experience significant structural damage. Over the life of the project, Subsidence Management Plan (or Extraction Plan) applications will be submitted to Industry and Investment (I&I) NSW (previously DPI) which will include further assessments of the potential risks of subsidence, their likelihood and consequences. It will also include detailed strategies to manage subsidence impacts, inclusive of measures referenced in this EA. Management of impacts will be achieved through prevention, mitigation and/or remediation of subsidence impacts as appropriate.

Compensation, repair or replacement will be provided under the provisions of the *Mine Subsidence Compensation Act 1961* where improvements are damaged by mine subsidence resulting from the extraction of coal.

It should also be noted that the mine plan for the Barrett Seam as presented in the EA is preliminary at this time (longwall mining in this seam is not planned to commence until 2025) and was presented to enable an assessment of the maximum area and magnitude of likely impacts. Prior to mining this area, Integra will undertake detailed investigations to develop a firm mine plan within the EA footprint. As part of the investigation, a risk assessment will consider amongst other things, the impact of mining on residence 47.

Integra acknowledges that the owners of residence 47 have indicated no desire to sell their property to Integra at this stage, but remains optimistic that, with mining in the vicinity of this residence scheduled to commence in late 2030, that this situation may change. Integra has also informally requested that it be given first option to purchase if and when a sale might be proposed.

5.5 JH AND MR MOORE (RECEPTOR 63)

5.5.1 Comment

We object strongly to the mines proposal to long wall mine and cut and flit under our family home. The amount of damage that would cause to our family home and under ground mains, we do not accept. We would require a new residence to be erected no repairs on our house.

5.5.2 Response

Figure 9.1 in the EA clearly shows that there will be no mining directly underneath residence 63. The assessment predicts mine subsidence at receptor 63 will be less than 20mm and as a consequence, there would be negligible potential for adverse impacts on either the family home or any associated underground services.

Over the life of the project, Subsidence Management Plan (SMP) or Extraction Plan applications will be submitted to Industry and Investment (I&I) NSW (previously DPI) which will include further assessments of the potential risks of subsidence, their likelihood and consequences. It will also include detailed strategies to manage subsidence impacts, inclusive of measures referenced in this EA. Management of impacts will be achieved through prevention, mitigation and/or remediation of subsidence impacts as appropriate.

Compensation, repair or replacement, if required, will be provided under the provisions of the *Mine Subsidence Compensation Act 1961* where improvements are damaged by mine subsidence resulting from the extraction of coal.

5.6 CONSTRUCTION FORESTRY MINING AND ENERGY UNION (CFMEU)

5.6.1 Comment 1

Provided the proponent continues consultation throughout the life of the project to ensure the community remains informed of the mine's progress and outcomes of the EA and to provide a clear and transparent forum for addressing questions, issues, concerns or complaints the Union supports this criterion.

5.6.2 Response to Comment 1

Ongoing consultation will be undertaken throughout the life of the project to ensure the community remains informed of the mine's progress and to provide a forum for addressing questions, issues, concerns or complaints. Such consultation, as detailed in the Statement of Commitments, includes:

- biannual meetings of the Community Consultative Committee; and
- preparation of a community newsletter following Project Approval.

5.6.3 Comment 2

Provided subsidence is managed in accordance with DPI approved subsidence management plans, the union supports this criterion.

5.6.4 Response to Comment 2

Integra will develop and implement the relevant plans required by Industry and Investment NSW (formerly DPI) to manage subsidence impacts.

Annex A

Revised Statement Of Commitments

Table A.1 Revised Statement of Commitments

Desired Outcome	Existing or Proposed Actions	Timing
STATUTORY REQUIREMENTS		

Compliance with all conditional requirements in all approvals, licences and leases.	• The development will be carried out as outlined in the following:
	  • this Environmental Assessment Report (EA);
	  • Project Approval;
	  • Environment Protection Licence;
	  • Subsidence Management Plans (SMPs);
	  • Mining Lease(s); and
	  • any other approvals, licences or leases.
		• Continuous and as required.

All operations conducted in accordance with all relevant documentation.	• Undertake all activities in accordance with the accepted Mining Operations Plan; environmental procedures; safety management plan and/or site-specific documentation in force at that time.	• Continuous and as required.
STAKEHOLDER CONSULTATION		
That effective communication/consultation is undertaken throughout the life of the Project.	• Preparation of a community newsletter following Project Approval.	• Within three months from the date of Project Approval.
	• Biannual meetings of the Community Consultative Committee.	• Continuous and as required.
	• Ongoing communication with the management of Xstrata and provision of subsidence monitoring data.	• Continuous and as required.
	• Conduct a more detailed assessment of the potential impacts of subsidence on items of Xstrata infrastructure.	• Prior to longwall mining under areas containing Xstrata owned infrastructure.
SUBSIDENCE **Potential adverse impacts from subsidence are managed, monitored and remediated where necessary.**		

Desired Outcome	Existing or Proposed Actions	Timing
Subsidence management	• Subsidence Management Plan applications will be submitted to the DPI detailing strategies to manage subsidence impacts, inclusive of measures referenced in this EA.	• Prior to the commencement of proposed longwall mining in the affected area.
	• The mine plan for the Barrett seam longwall blocks will be developed and operated to provide a minimum 40 metre separation between the boundary to the connected alluvium and the 20mm subsidence line.	• Prior to the commencement of longwall mining in the affected area and ongoing.
	• In addition to the overarching SMPs, specific management plans will be developed which will address potential subsidence impacts on specific items or areas of sensitivity, roads and associated infrastructure, transmission lines, communication infrastructure, Bettys Creek, farm fences, farm buildings and farm dams.	• Prior to the commencement of proposed longwall mining in the affected area.
	• Subsidence monitoring involving cross lines, longitudinal lines and three dimensional surveying will be undertaken to confirm the levels of subsidence occurring and enable refinements to subsidence predictions.	• Prior to, during and after mining in the Barrett and Hebden Seams.
	• Temporary remediation works will progress during mining, with permanent remediation works completed following full subsidence impacts in an area.	• Continuous and as required.
Management of subsidence impacts on surface infrastructure.	• The new Forest Road Subsidence Management Plan to be built upon the existing management plan to reflect the expected subsidence and associated impacts.	• Prior to the commencement of proposed longwall mining in the affected area.
	• As part of Hebden SMP development, a management plan for Glennies Creek Road and associated infrastructure will be prepared.	• Prior to the commencement of proposed longwall mining in the affected area.
	• As part of Barrett SMP development, a management plan for Middle Falbrook Road and associated infrastructure will be prepared.	• Prior to the commencement of proposed longwall mining in the affected area.

Desired Outcome	Existing or Proposed Actions	Timing
	• Possum Skin Dam will be decommissioned.	• Prior to the commencement of longwall mining which would potentially affect the stability or integrity of the dam wall.
	• The current Electricity Transmission Lines Subsidence Management Plan will be revised for inclusion in the new SMPs and will detail management of subsidence effects on powerlines.	• Prior to the commencement of proposed longwall mining in the affected area.
	• The existing management plan for the Forest Road communications/Telstra line will be reviewed and updated in consultation with Telstra to reflect changes resulting from this proposal.	• Prior to the commencement of proposed longwall mining in the affected area.
	• Stakeholder consultation and monitoring of the existing communication cable adjacent to the Mt Owen Rail Spur will be carried out to ensure the cable remains serviceable during subsidence.	• As required.
	• Should XMO's mine plan change, any potential subsidence effects on its tailings dams or highwalls will be addressed in the relevant SMPs at that time.	• Prior to the commencement of proposed longwall mining in the affected area.
	• ICO will undertake a more detailed assessment of potential impacts on the Ravensworth East / XMO and Glendell Open Cuts.	• Following finalisation of the surface mine layout and prior to mining within these areas.
	• ICO will provide stakeholders such as Singleton Shire Council and landowners who border roads with a monthly update of the location of the longwall face relative to the road, and the estimated progress of the longwall during the following month.	• Monthly.
	• Signs will be erected by ICO at points on the road at the edge of the longwalls subsidence impact zone.	• Prior to the commencement of proposed longwall mining in the affected area.

Desired Outcome	Existing or Proposed Actions	Timing
	• Approval will be sought from DPI and ARTC prior to any mining within the Main Northern Railway protection zone. • Any proposed workings in the Main Northern Railway protection zone will be designed to be long term stable – taking site conditions into consideration.	• Prior to mining within the protection zone.
	• A subsidence management plan will be devised in consultation with the MSB and the owners of houses above Barrett Seam Longwall 7.	• Prior to the commencement of proposed longwall mining in the affected area.
	• Surveys will be conducted prior to, during and after mining, to confirm the levels of subsidence movements and impacts, and identify if triggers for implementation of management measures have been reached.	• Prior to the commencement of proposed longwall mining in the affected area.
	• ICO and the MSB will undertake rebuilding, rectification of structural work, re-levelling and remedial work to surface water drainage and sewerage systems at the existing Glennies Creek Community Hall as required to remediate anticipated subsidence damage.	• As required.
Ensure minimal subsidence impacts on natural features.		
	• The Hebden SMPs to be developed will incorporate and build upon the existing Surface Drainage Management Plan.	• Prior to the commencement of proposed longwall mining in the affected area.
	• A Bettys Creek Diversion Management Plan will be prepared as part of the Hebden SMPs.	• Prior to the commencement of proposed longwall mining in the affected area.

Desired Outcome	Existing or Proposed Actions	Timing
	ICO will prepare: • a response strategy to address any destabilisation of Main Creek; • a works programming for any necessary remedial works in Main Creek should subsidence expression initiate incision and headward erosion; • an outline of expansion of piezometric monitoring; and • a TARP as part of a surface water and groundwater monitoring and management program.	Prior to Hebden Seam longwall mining undermining Man Creek.
Ensure minimal subsidence impacts on farm infrastructure.		
	• The Hebden SMPs and Barrett SMPs to be developed will incorporate and build upon the existing Farm Fences, Farm Buildings and Farm Dams Subsidence Management Plans, as appropriate.	• Prior to the commencement of proposed longwall mining in the affected area.
	• In consultation with the relevant landowner, ICO will remediate any dam that is damaged by subsidence (or has its storage capacity reduced by more than 10 percent) to a condition similar to that prior to subsidence.	• As required.
ECOLOGY		
Operations are managed such that adverse impacts to native flora and fauna are prevented, minimised and/or offset.	• ICO will implement the following flora and fauna management procedures. • Revegetate the planned Bettys Creek diversion channel and adjacent areas; • Undertake surveys along the creek diversion and revegetated areas to record any significant loss of planted seedlings and monitor the use of revegetated areas by native fauna. • Revegetation design, weed management, exclusion of cattle and ongoing monitoring in the area of the Bettys Creek diversion will be coordinated in consultation with Glendell. • The abandoned Bettys Creek channel will be managed (ie weed control and exclusion of cattle) in conjunction with the ongoing management	• Continuous, as required.

Desired Outcome	Existing or Proposed Actions	Timing
	and monitoring of the proposed diversion. • Based on the ephemeral nature of the existing channel, consideration will be given to blocking off the abandoned channel at the downstream end to act as a billabong to retain any surface flows. • Undertake pre-clearance inspections of borehole sites. Where possible, the inspections will be undertaken during the summer flowering period to optimise detection of Bothriochloa biloba and to avoid impacting directly on any individual plants.	
HERITAGE		
Operations are managed such that adverse impacts to significant Aboriginal and Historical heritage items are avoided, minimised and/or offset.	• Artefact scatters (sites 37-3-0597, 37-3-0595 and 37-3-0027) that will be destroyed by the proposed Bettys Creek diversion will be salvaged and involve the following. • During clearing works in the areas where surface earthworks will occur, a qualified archaeologist will undertake field work with assistance from the Aboriginal community. • Artefacts will be recorded individually and, once any site is salvaged, all materials and list of details collected for each artefact will be provided to the Local Aboriginal Land Council.	• Prior to the diversion of Bettys Creek.
	• Monitoring of excavation works along the banks of Bettys Creek will be undertaken by a representative of the Aboriginal community.	• During excavations works undertaken for the diversion of Bettys Creek.
	• The area to be impacted by the realignment of Main Creek will be re-surveyed with the assistance of the local Aboriginal community and any sites fully recorded and logged prior to the confirmation of the channels' locations and designs.	• Prior to the diversion of Main Creek.

Desired Outcome	Existing or Proposed Actions	Timing
	• Should the additional survey works in the area to be impacted by the realignment of Main Creek highlight any areas of high cultural or scientific significance, the alignment of the proposed works will be altered and / or subsurface investigations will be undertaken in consultation with DECC and DoP.	• Prior to the diversion of Main Creek.
	• Sites 37-3-0682, 37-3-0683 and any additional sites recorded during the survey will be salvaged prior to construction commencing and all activities requiring soil removal associated with the realignment of Main Creek will be monitored by representatives of the Aboriginal community. The salvage will: • be undertaken by a qualified archaeologist during clearing works in the areas where surface earthworks will occur with assistance from the Aboriginal community; and • include recording of individual artefacts. Once any site is salvaged, all materials and list of details collected for each artefact will be provided to the Local Aboriginal Land Council.	• Prior to the diversion of Main Creek
	• Monitoring of excavation works along the banks of Main Creek will be undertaken by a representative of the Aboriginal community.	• During excavations works undertaken for the diversion of Main Creek.
	• Infrastructure will be sited to avoid impacts to known heritage sites. Should impacts be unavoidable, DECC and the local Aboriginal community representatives will be consulted.	• Continuous, as required.
	• The Aboriginal community will be given the opportunity to collect any surface artefacts from the planned surface (remediation) activities.	• Prior to ground disturbing works in an area.
	• In consultation with the local Aboriginal community, the existing Aboriginal Cultural Heritage Management Plan (ACHMP) will be revised and built upon to detail management of project induced effects.	• Prior to the commencement of ground disturbing works.

Desired Outcome	Existing or Proposed Actions	Timing
Ensure minimal subsidence impacts on archaeology.	• DECC and the Local Aboriginal Community Representatives will be consulted should there be impacts to potential Aboriginal deposits as a result of remediation works along creeks and works to rehabilitate cracks.	• Prior to any remediation that may be required.
	• A qualified archaeologist will assess the potential impact of the planned works.	• Prior to any subsidence remediation works.
	• Should subsidence levels be greater than predicted, archaeological sub - surface testing may be undertaken in affected areas with the involvement of the Aboriginal stakeholders and DECC.	• As required.
	• The Hebden SMPs to be developed will incorporate and build upon the existing Archaeology Subsidence Management Plan.	• Prior to the commencement of proposed longwall mining in the affected area.
SURFACE WATER		
Operations are managed such that adverse impacts to surface water are prevented, minimised and/or offset.	• ICO will maintain the existing surface water monitoring program, and undertake additional monitoring including collection of grab samples during or immediately after surface runoff events along ephemeral watercourses; monthly water quality sampling of major water major storages on the site; collection of data on water quantity and at least weekly collection of underground mine dewatering and raw water supply volume data.	• Continuous, as required.
	• ICO will maintain a photographic record of the creeks and dam walls to determine historical (baseline) rates of erosion.	• Continuous, as required.
	• As part of the erosion and flood studies, ICO will assess whether rapid changes in channel or floodplain form occur in the aftermath of runoff events.	• Continuous, as required.
	• Monitoring results will be reported in the AEMR and distributed to the relevant Government agencies, CCC members and other relevant stakeholders.	• Annually.

Desired Outcome	Existing or Proposed Actions	Timing
	ICO will prepare: • a response strategy to address any destabilisation of Main Creek; • a works programming for any necessary remedial works in Main Creek should subsidence expression initiate incision and headward erosion; • an outline of expansion of piezometric monitoring; and • a TARP as part of a surface water and groundwater monitoring and management program.	Prior to Hebden Seam longwall mining undermining Man Creek.
	• No impacts will occur to licensed water users, basic landholder rights or minimum baseflows in Glennies Creek regulated river or environmental water requirements.	• Continuous.
	• A Site Water Management Plan will be prepared outlining management measures associated with potential erosivity of the Bettys Creek diversion or degradation of Glennies Creek and any subsidence effects that may occur on the diversion or Glennies Creek and its associated alluvium.	• Prior to the commencement of proposed longwall mining in the affected area.
	• The mine plan will be developed and operated such that no detectable or measureable ingress of surface water into the mine workings will be generated that can't be reversed.	• Prior to the commencement of proposed longwall mining in the affected area.
	• Integra Coal will not restrict Xstrata Coal's ability to stabilise and reconfigure the diversion to Bettys Creek, and will develop an updated Site Water Management Plan to manage any adverse impacts from extraction of the Hebden Seam panels, including the collection of monitoring data by an independent consultant agreed to by ICO and Xstrata prior to the diversion being undermined.	• Prior to the commencement of proposed longwall mining in the affected area.
	• Integra Coal will provide evidence that their water accounting procedure complies with dealings rules as prescribed under the Hunter Regulated River Water Sharing Plan (HRRWSP) and/or Hunter Unregulated River and Alluvium Water Sharing Plan (HURAWSP).	• Continuous, as required.

Desired Outcome	Existing or Proposed Actions	Timing
	• Integra Coal will ensure it has sufficient water to meet mine operational demands in accordance with the statutory rules of the Hunter Regulated River Water Sharing Plan (HRRWSP) and/or Hunter Unregulated River and Alluvium Water Sharing Plan (HURAWSP), and any other statutory instruments in force under the Water Act 1912, and Water Management Act 2000. Should insufficient water be available to continue mining operations, mining operations will be scaled back to meet water supply requirements. • any proposed workings under Glennies Creek and its associated alluvium will be designed to be stable in the long term, taking site conditions into consideration	• Continuous, as required.
GROUNDWATER		
Operations are managed such that adverse impacts to local and regional groundwater resources are prevented, minimised and/or offset.	• The current groundwater monitoring program will continue with ongoing review and possible modification of the program as further data is obtained and interpreted. Annual reports documenting and interpreting the collected data will be prepared.	• Continuous, as required.
	• Groundwater samples will be collected annually from selected piezometers and analysed at a NATA registered laboratory for major ions and selected metals. The groundwater program will be maintained in its current form, with a review of the program after interpretation of the first 12 months' data.	• Annually, as required.
	• A private well monitoring program will be initiated to determine its pre mining yield if requested by a private bore owner. • Should a reduction in groundwater availability be detected, remedial action will be undertaken by Integra to offset the measured losses. Such actions may include digging the well deeper, installing a new well or installing a replacement bore.	• 12 months prior to extraction of the Barrett Seam (subject to the timing of any request). • Subsequent to detecting a loss of groundwater availability due to mining.

Desired Outcome	Existing or Proposed Actions	Timing
	• Performance indicators will be identified and a statistical assessment will be undertaken to detect when, or if, a significant change has occurred in the groundwater system and to benchmark the natural variation in groundwater quality and standing water levels.	• Prior to longwall mining in the Hebden Seam.
	• Contingency procedures will be developed. Activation of contingency procedures will be linked to the assessment of monitoring results.	• As required.
	• Following the completion of extraction of each longwall panel, a report will be prepared that summarises relevant monitoring data. Relevant monitoring and management activities for each year will also be reported in the AEMR.	• Following the completion of extraction of each longwall panel and in the AEMR.
AIR QUALITY		
Operations are managed to minimise potential adverse impacts to the environment, residences and the community.	• Implement the following air quality control procedures. • Coal handling areas, stockpiles, roads and trafficked areas will be maintained in a moist condition using water carts and / or water sprays to minimise wind-blown and traffic-generated dust. • Water sprays will be used at the longwall and development face to control particulates. • All haul roads will have edges clearly defined with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas. • Obsolete roads will be ripped and re-vegetated; • Development of minor roads will be limited and the locations of these will be clearly defined. • Minor roads used regularly for access etc will be watered/treated to control dust. • Due to OHS regulations regarding underground air quality, dust generated underground will be minimised. Currently this includes the application of water and/or use of dust suppressants.	• Continuous, as required.

Desired Outcome	Existing or Proposed Actions	Timing
	• ICO will continue air monitoring in accordance with the Integra Underground EMS Procedure 002-2, Air Quality Monitoring Program, including monitoring weather conditions, TSP, PM_{10} (using HVAS), real time PM_{10} (using TEOM) and dust fallout.	• Continuous.
	• The results of the ongoing air quality monitoring program will be communicated to residents in the Local Community.	• Continuous, as required.
GREENHOUSE GASES		
Manage operations such that greenhouse gas emissions on the environment are minimised and beneficial use of methane is maximised.	• Fugitive methane emissions will be captured for energy generation where possible. If not feasible, flaring will be adopted, where practicable.	• Continuous.
	• Greenhouse gas emissions will be estimated and reported annually.	• Following commencement of proposed mining.

	• Energy and greenhouse gas emission reduction initiatives will be implemented throughout the life of the development, including the following.
	  • The efficiency of all new and upgraded mobile and fixed equipment will be considered during procurement for fuel powered equipment.
	  • Ensuring equipment will be maintained to retain high levels of energy efficiency.
	  • The inventory of emissions developed for this environmental; assessment will be maintained.
	  • Emissions and abatement strategies will be reported annually as part of the internal environmental reporting and National Greenhouse and Energy Reporting obligations and in the AEMR.
		• Continuous, as required.

Desired Outcome	Existing or Proposed Actions	Timing
NOISE AND VIBRATION		
Operations are managed to minimise potential adverse impacts on the environment, residences and the community.	• ICO will implement the following noise management procedures and monitoring programs. • Use of conveyors instead of haul roads where approved. • Construction of acoustic bunds adjacent to haul roads where recommended by an acoustic consultant. • Use of routine monitoring results to refine on-site noise mitigation measures and operating procedures. • Undertake noise audits at boundary positions to static sources to verify potential change in overall sound emissions. • Undertake regular discussions with potentially affected residents to proactively identify noise related issues of concern. • Undertake quarterly monitoring at identified representative receivers. • Implement acoustic mitigation at residences where exceedances of the project specific criteria are demonstrated via the monitoring program and requested by the landowner. • Consideration of negotiated agreements with landowners where exceedances of the project specific criteria are substantiated by monitoring. • Informing residents that the existing community information line for Integra Underground would apply to this proposal. • Existing and / or additional real time noise monitoring will be utilised to manage, assess and control potential emissions from the Integra Open Cut and Underground operations.	• Continuous, as required.
	• A blast management protocol will be developed in conjunction with XMO to manage potential impacts from other mine's blasting on the underground mining activities.	• Prior to the commencement of proposed mining in the vicinity of open cut mining operations.

Desired Outcome	Existing or Proposed Actions	Timing
	• Integra will investigate the feasibility of installing an overland conveyor to transport coal from the Integra Underground to the Integra CHPP and provide the outcomes of that investigation to the Director-General.	• Prior to 30 June 2010
TRANSPORT		
Management of rail infrastructure.	• A new Mt Owen Rail Spur Management Plan will be prepared in consultation with XMO, and will include monitoring, stakeholder consultation and mitigation measures.	• Prior to the commencement of proposed longwall mining in the affected area.
Management of roads.	• Current traffic and transport management measures will continue. In addition, linemarking of Stony Creek Road and Middle Falbrook Road will be undertaken if requested by Council.	• Continuous.
WASTE		
Avoidance of unnecessary resource consumption; reuse, reprocessing, recycling and energy recovery wherever possible and, where this is not possible, disposal of wastes in an environmentally responsible manner.	• Wastes will continue to be managed in accordance with the Integra Underground Procedure PRO_0381 - Waste Management, including the following. • Reuse of mine water for dust suppression at the Integra Underground and Open Cut, in the CHPP and at neighbouring mines. • All waste oils will be pumped into on site storage tanks for subsequent transfer to a registered waste disposal company. • Old batteries will be stored in a designated bin prior to collection by a licensed contractor. • All scrap steel will be stored in dedicated skips and sold to scrap steel merchants for recycling. • Bulk chemical containers will be returned to suppliers for reuse as part of the supply agreement. • Pallets will be collected by a recycling contractor. • Colour-coded recycling containers will be placed in identified areas for collection of cardboard and paper products and collected regularly by licensed contractors / recyclers. • Sewerage waste from site offices, administration building, maintenance	• Continuous, as required.

Desired Outcome	Existing or Proposed Actions	Timing
	areas and bath houses will be treated using an aerated wastewater treatment system before being discharged to an anaerobic and aerobic dam system. The water will then be irrigated onto adjacent land. • Sludge from the aerated wastewater systems will be pumped out as required by contractors and disposed of to a licensed facility. • Hazardous materials will be stored in accordance with Australian Standards. • Old paints /preservatives, disused chemicals, solvents and coolants will be stored in allocated areas prior to being removed by a licensed hazardous water contractor. • Liquid waste from parts washers will be stored in 200L containers for removal by licensed waste contractors. • Waste oil filters will be taken to a recycling facility by a registered waste disposal contractor. • Materials containing liquids will be removed by a licensed contractor for recycling or disposal at a licensed waste management facility. • Domestic wastes and maintenance consumables will be separated and collected by waste contractors.	
REHABILITATION		•
That effective rehabilitation is undertaken at the completion of mining.	• Rehabilitation associated with proposed mining will be undertaken in accordance with the relevant MOP, REMP, Extraction Plans and SMPs.	• Following the completion of mining in the affected area.
SOCIO-ECONOMIC Net benefits of the proposal sufficiently outweigh potential adverse impacts.	• A social impact monitoring strategy will be developed that quantifies impacts and the effectiveness of minimisation strategies..	• Following commencement of proposed longwall mining in the affected area.

Annex B

Revised Noise Impact Assessment November 2009

ADDENDUM TO ANNEX B – REVISED NOISE IMPACT ASSESSMENT

In correspondence dated 23 December, DECCW provided comments on the Integra *Underground Coal Project Response to Submissions – Noise Impact Assessment (NIA)* prepared for Integra Coal Operations Pty Ltd (ICO), by ERM dated November 2009. ERM provided a response to these additional issues raised by the DECCW in a letter to the Department of Planning dated 28 January 2010 and reproduced here.

Annex C

Revised Noise Impact Assessment January 2010

Environmental Resources Management Australia

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28 January 2010

Department of Planning
GPO Box 39
SYDNEY NSW 2001

Our Reference: *0061887 L01 RE COMBINED NOISE.DOC*

Attention: **Nicholas Hall**

Dear Mr. Hall,

RE: INTEGRA UNDERGROUND PROJECT NOISE IMPACT ASSESSMENT

Further to the letter from the Department of Environment, Climate Change and Water (DECCW) received by the Department of Planning on 23/12/2009, Environmental Resources Management (ERM) has reviewed the results for the Integra Open Cut and Integra Underground Noise Assessments and provided a combined summary of results which is presented in this letter response.

The noise emissions from the four full-pit and two part-pit open cut scenarios have been combined (logarithmically added) with emissions for the underground noise assessment for calm (day, evening and night) and inversion meteorological conditions (night only) for non-mine owned receivers.

The calculations exclude the duplicated noise sources between the two mines such as the CHPP, coal load out and locomotives, for Noise Assessment Groups (NAG's) 9 and 10. In a review of the noise modelling output ranking files for the remaining groups, the duplicated sources did not make any significant acoustical difference and were consequently not removed.

Table 1 to *Table 6* present the results of the combined emissions for all scenarios and relevant meteorological conditions. The results include the combined noise emissions, the overall change in decibels, relevant criteria (intrusive) and the exceedance above the criteria Noise assessment groups that fall into a management zone which are not highlighted in *Tables 1* to *6* is due to rounding of decibel differences.

Table 7 presents a summary of the scenarios that create the maximum emissions along with the relevant criteria. Please note that the Dulwich property is only

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A.B.N. 12 002 773 248

Offices worldwide

presented in *Tables 1, 5* and *6* as these are the only modelled scenarios relevant to this receiver; in other scenarios, i.e where the pit is developed to its full extent, Dulwich would no longer be present. Intrusive LAeq(15minute) project specific assessment criteria have been used for comparison, as requested by DECCW.

Please also note that the combined noise levels presented in each of *Tables 1* to *7* identify the maximum impact from all Integra operations and should, therefore, be used only to assign Project Specific Noise Levels (PSNLs) for each residence against which compliance by the Integra Underground and/or Integra Open Cut Projects can be determined, i.e. as a management tool which avoids the potential issues arising when adjacent operations have different limits. As such, they should not be used to identify what receivers fall into management and/or affectation zones. The identification of what residences fall into each zone for each Project should be derived via analysis of the individual modelled levels from the respective assessments.

We trust this information is suitable for your requirements. However if you have any further questions, please contact the undersigned.

Yours sincerely,
for Environmental Resources Management Australia Pty Ltd

Oliver Muller
Team Leader, Acoustics

Mike Shelly
Partner

Table 1. Non Mine Owned: Full Pit Year 1

DAY TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	32	-3	36	1	37	2
3	87	38	41	3	38	0	43	5
	106	38	39	1	32	-6	40	2
4	88	39	25	-14	24	-15	28	0
	91	39	27	-12	26	-13	30	0
	94	39	27	-12	26	-13	30	0
	95	39	28	-11	27	-12	30	0
	96	39	29	-10	28	-11	32	0
	99	39	26	-13	25	-14	29	0
	100	39	26	-13	25	-14	28	0
	105	39	27	-12	28	-11	30	0
	161	39	29	-10	28	-11	32	0
5	103	50	26	-24	26	-24	29	0
	104	50	26	-24	24	-26	28	0
	111	50	38	-12	32	-18	39	0
	112	50	36	-14	30	-20	37	0
	118	50	32	-18	29	-21	34	0
	120	50	32	-18	28	-22	34	0
	121	50	29	-21	27	-23	31	0
	123	50	26	-24	25	-25	29	0
	125	50	29	-21	27	-23	31	0
	126	50	27	-23	25	-25	29	0
	129	50	28	-22	28	-22	31	0
	139	50	21	-29	19	-31	23	0
	154	50	35	-15	20	-30	35	0
	156	50	35	-15	20	-30	35	0
	157	50	32	-18	20	-30	32	0
	159	50	32	-18	20	-30	32	0
6	132	39	22	-17	23	-16	26	0
	133	39	24	-15	24	-15	27	0
	137	39	20	-19	22	-17	24	0
7	108	45	43	-2	32	-13	43	0
	109	45	44	-1	33	-12	44	0
	110	45	43	-2	32	-13	43	0
	Dulwich	45	51	6	47	2	52	7
8	142	42	16	-26	9	-33	17	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

DAY TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	37	29	-8	24	-13	30	0
	3	37	27	-10	22	-15	28	0
	4	37	28	-9	23	-14	29	0
	143	37	18	-19	22	-15	23	0
	144	37	20	-17	15	-22	21	0
	145	37	21	-16	17	-20	22	0
	146	37	19	-18	17	-20	21	0
	147	37	20	-17	17	-20	22	0
	148	37	20	-17	17	-20	22	0
	149	37	21	-16	17	-20	23	0
	150	37	21	-16	18	-19	23	0
	151	37	21	-16	17	-20	23	0
	152	37	24	-13	22	-15	26	0
10	5	36	29	-7	25	-11	30	0
	6	36	30	-6	26	-10	32	0
	8	36	30	-6	29	-7	32	0
	9	36	29	-7	31	-5	33	0
	10	36	29	-7	33	-3	34	0
	11	36	29	-7	30	-6	33	0
	13	36	30	-6	30	-6	33	0
11	7	38	30	-8	25	-13	31	0
	12	38	29	-9	23	-15	30	0
	14	38	31	-7	27	-11	32	0
	15	38	30	-8	26	-12	31	0
	16	38	31	-7	29	-9	33	0
	17	38	27	-11	27	-11	30	0
	18	38	27	-11	26	-12	29	0
	19	38	34	-4	17	-21	34	0
	20	38	36	-2	20	-18	36	0
	21	38	36	-2	20	-18	36	0
12	50	35	31	-4	28	-7	33	0
	51	35	31	-4	28	-7	33	0
	52	35	28	-7	26	-9	30	0
	53	35	30	-5	28	-7	32	0
	54	35	29	-6	30	-5	32	0
	55	35	29	-6	27	-8	31	0
	56	35	28	-7	29	-6	32	0
	57	35	29	-6	28	-7	32	0
	62	35	29	-6	30	-5	32	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

DAY TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	36	0	22	-14	36	0
	23	36	36	0	23	-13	36	0
	24	36	30	-6	19	-17	30	0
	25	36	31	-5	19	-17	31	0
	26	36	30	-6	19	-17	30	0
	27	36	29	-7	18	-18	29	0
	28	36	26	-10	17	-19	27	0
	29	36	28	-8	19	-17	28	0
	30	36	32	-4	20	-16	32	0
	31	36	35	-1	21	-15	35	0
	32	36	36	0	21	-15	36	0
	34	36	38	2	23	-13	38	2
	35	36	38	2	22	-14	38	2
	36	36	28	-8	22	-14	29	0
	37	36	23	-13	21	-15	25	0
	38	36	28	-8	23	-13	29	0
	39	36	24	-12	20	-16	26	0
	40	36	23	-13	18	-18	24	0
	41	36	18	-18	14	-22	20	0
	42	36	29	-7	23	-13	30	0
	43	36	33	-3	25	-11	34	0
C	47	35	31	-4	31	-4	34	0
	63	35	29	-6	30	-5	32	0
	64	35	31	-4	32	-3	35	0
D	44	37	32	-5	25	-12	33	0
	48	37	29	-8	27	-10	31	0
	49	37	29	-8	28	-9	31	0
F	65	39	29	-10	32	-7	34	0
	66	39	29	-10	30	-9	33	0
	67	39	31	-8	31	-8	34	0
	68	39	33	-6	35	-4	37	0
	71	39	34	-5	38	-1	39	0
	72	39	34	-5	38	-1	40	1
	73	39	34	-5	38	-1	40	1
	76	39	34	-5	39	0	40	1

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

EVENING TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	32	-3	36	1	37	0
3	87	40	42	2	38	-2	43	3
	106	40	40	0	32	-8	41	1
4	88	42	26	-16	24	-18	28	0
	91	42	27	-15	26	-16	30	0
	94	42	27	-15	26	-16	30	0
	95	42	29	-13	27	-15	31	0
	96	42	29	-13	28	-14	32	0
	99	42	27	-15	25	-17	29	0
	100	42	26	-16	25	-17	28	0
	105	42	28	-14	28	-14	31	0
	161	42	29	-13	28	-14	32	0
5	103	46	26	-20	26	-20	29	0
	104	46	26	-20	24	-22	28	0
	111	46	39	-7	32	-14	40	0
	112	46	37	-9	30	-16	38	0
	118	46	33	-13	29	-17	35	0
	120	46	33	-13	28	-18	34	0
	121	46	29	-17	27	-19	31	0
	123	46	26	-20	25	-21	29	0
	125	46	29	-17	27	-19	31	0
	126	46	27	-19	25	-21	29	0
	129	46	29	-17	28	-18	31	0
	139	46	21	-25	19	-27	23	0
	154	46	36	-10	20	-26	36	0
	156	46	36	-10	20	-26	36	0
	157	46	33	-13	20	-26	33	0
	159	46	33	-13	20	-26	33	0
6	132	41	22	-19	23	-18	26	0
	133	41	24	-17	24	-17	27	0
	137	41	20	-21	22	-19	24	0
7	108	42	43	1	32	-10	43	1
	109	42	44	2	33	-9	44	2
	110	42	44	2	32	-10	44	2
	Dulwich	42	51	9	47	5	52	10
8	142	42	16	-26	9	-33	17	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

EVENING TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	40	30	-10	24	-16	31	0
	3	40	28	-12	22	-18	29	0
	4	40	28	-12	23	-17	29	0
	143	40	19	-21	22	-18	24	0
	144	40	21	-19	15	-25	22	0
	145	40	21	-19	17	-23	22	0
	146	40	20	-20	17	-23	22	0
	147	40	21	-19	17	-23	23	0
	148	40	21	-19	17	-23	22	0
	149	40	21	-19	17	-23	23	0
	150	40	22	-18	18	-22	23	0
	151	40	22	-18	17	-23	23	0
	152	40	25	-15	22	-18	27	0
10	5	39	30	-9	25	-14	31	0
	6	39	30	-9	26	-13	32	0
	8	39	30	-9	29	-10	32	0
	9	39	30	-9	31	-8	34	0
	10	39	29	-10	33	-6	34	0
	11	39	29	-10	30	-9	33	0
	13	39	31	-8	30	-9	33	0
11	7	41	30	-11	25	-16	31	0
	12	41	30	-11	23	-18	31	0
	14	41	32	-9	27	-14	33	0
	15	41	31	-10	26	-15	32	0
	16	41	32	-9	29	-12	34	0
	17	41	28	-13	27	-14	31	0
	18	41	28	-13	26	-15	30	0
	19	41	35	-6	17	-24	35	0
	20	41	37	-4	20	-21	37	0
	21	41	37	-4	20	-21	37	0
12	50	38	32	-6	28	-10	33	0
	51	38	32	-6	28	-10	33	0
	52	38	29	-9	26	-12	31	0
	53	38	31	-7	28	-10	33	0
	54	38	29	-9	30	-8	32	0
	55	38	30	-8	27	-11	32	0
	56	38	29	-9	29	-9	32	0
	57	38	30	-8	28	-10	32	0
	62	38	29	-9	30	-8	32	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

EVENING TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	39	37	-2	22	-17	37	0
	23	39	37	-2	23	-16	37	0
	24	39	30	-9	19	-20	30	0
	25	39	32	-7	19	-20	32	0
	26	39	31	-8	19	-20	31	0
	27	39	31	-8	18	-21	31	0
	28	39	27	-12	17	-22	27	0
	29	39	29	-10	19	-20	29	0
	30	39	33	-6	20	-19	33	0
	31	39	36	-3	21	-18	36	0
	32	39	37	-2	21	-18	37	0
	34	39	39	0	23	-16	39	0
	35	39	39	0	22	-17	39	0
	36	39	28	-11	22	-17	29	0
	37	39	24	-15	21	-18	26	0
	38	39	29	-10	23	-16	30	0
	39	39	25	-14	20	-19	26	0
	40	39	23	-16	18	-21	24	0
	41	39	18	-21	14	-25	20	0
	42	39	30	-9	23	-16	31	0
	43	39	34	-5	25	-14	35	0
C	47	37	31	-6	31	-6	34	0
	63	37	30	-7	30	-7	33	0
	64	37	32	-5	32	-5	35	0
D	44	40	33	-7	25	-15	34	0
	48	40	29	-11	27	-13	31	0
	49	40	29	-11	28	-12	31	0
F	65	40	30	-10	32	-8	34	0
	66	40	30	-10	30	-10	33	0
	67	40	32	-8	31	-9	35	0
	68	40	34	-6	35	-5	38	0
	71	40	35	-5	38	-2	40	0
	72	40	35	-5	38	-2	40	0
	73	40	35	-5	38	-2	40	0
	76	40	35	-5	39	-1	40	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

NIGHT TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	33	-3	36	0	38	2
3	87	39	42	3	38	-1	43	4
	106	39	41	2	32	-7	42	3
4	88	37	26	-11	24	-13	28	0
	91	37	28	-9	26	-11	30	0
	94	37	28	-9	26	-11	30	0
	95	37	29	-8	27	-10	31	0
	96	37	30	-7	28	-9	32	0
	99	37	27	-10	25	-12	29	0
	100	37	27	-10	25	-12	29	0
	105	37	28	-9	28	-9	31	0
	161	37	30	-7	28	-9	32	0
5	103	42	27	-15	26	-16	30	0
	104	42	27	-15	24	-18	29	0
	111	42	40	-2	32	-10	41	0
	112	42	37	-5	30	-12	38	0
	118	42	34	-8	29	-13	35	0
	120	42	34	-8	28	-14	35	0
	121	42	29	-13	27	-15	31	0
	123	42	27	-15	25	-17	29	0
	125	42	30	-12	27	-15	32	0
	126	42	27	-15	25	-17	29	0
	129	42	29	-13	28	-14	31	0
	139	42	22	-20	19	-23	24	0
	154	42	37	-5	20	-22	37	0
	156	42	36	-6	20	-22	36	0
	157	42	34	-8	20	-22	34	0
	159	42	34	-8	20	-22	34	0
6	132	38	22	-16	23	-15	26	0
	133	38	24	-14	24	-14	27	0
	137	38	21	-17	22	-16	24	0
7	108	39	44	5	32	-7	44	5
	109	39	45	6	33	-6	45	6
	110	39	44	5	32	-7	44	5
	Dulwich	39	51	12	47	8	52	13
8	142	35	16	-19	9	-26	17	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

NIGHT TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	30	-8	24	-14	31	0
	3	38	27	-11	22	-16	28	0
	4	38	29	-9	23	-15	30	0
	143	38	19	-19	22	-16	24	0
	144	38	21	-17	15	-23	22	0
	145	38	21	-17	17	-21	22	0
	146	38	20	-18	17	-21	22	0
	147	38	21	-17	17	-21	23	0
	148	38	21	-17	17	-21	22	0
	149	38	21	-17	17	-21	23	0
	150	38	21	-17	18	-20	23	0
	151	38	22	-16	17	-21	23	0
	152	38	25	-13	22	-16	27	0
10	5	37	30	-7	25	-12	31	0
	6	37	30	-7	26	-11	32	0
	8	37	31	-6	29	-8	33	0
	9	37	30	-7	31	-6	34	0
	10	37	30	-7	33	-4	35	0
	11	37	30	-7	30	-7	33	0
	13	37	32	-5	30	-7	34	0
11	7	39	30	-9	25	-14	31	0
	12	39	30	-9	23	-16	31	0
	14	39	32	-7	27	-12	33	0
	15	39	31	-8	26	-13	32	0
	16	39	32	-7	29	-10	34	0
	17	39	26	-13	27	-12	30	0
	18	39	24	-15	26	-13	28	0
	19	39	22	-17	17	-22	23	0
	20	39	22	-17	20	-19	24	0
	21	39	22	-17	20	-19	24	0
12	50	35	25	-10	28	-7	30	0
	51	35	25	-10	28	-7	29	0
	52	35	23	-12	26	-9	28	0
	53	35	25	-10	28	-7	30	0
	54	35	26	-9	30	-5	31	0
	55	35	24	-11	27	-8	28	0
	56	35	26	-9	29	-6	31	0
	57	35	26	-9	28	-7	30	0
	62	35	26	-9	30	-5	31	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

NIGHT TIME - CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	24	-12	22	-14	26	0
	23	36	24	-12	23	-13	27	0
	24	36	21	-15	19	-17	23	0
	25	36	21	-15	19	-17	23	0
	26	36	20	-16	19	-17	22	0
	27	36	20	-16	18	-18	22	0
	28	36	19	-17	17	-19	21	0
	29	36	21	-15	19	-17	23	0
	30	36	21	-15	20	-16	23	0
	31	36	22	-14	21	-15	24	0
	32	36	21	-15	21	-15	24	0
	34	36	22	-14	23	-13	25	0
	35	36	21	-15	22	-14	25	0
	36	36	21	-15	22	-14	25	0
	37	36	19	-17	21	-15	23	0
	38	36	21	-15	23	-13	25	0
	39	36	19	-17	20	-16	23	0
	40	36	18	-18	18	-18	21	0
	41	36	15	-21	14	-22	18	0
	42	36	22	-14	23	-13	26	0
	43	36	22	-14	25	-11	27	0
C	47	35	26	-9	31	-4	32	0
	63	35	26	-9	30	-5	31	0
	64	35	28	-7	32	-3	34	0
D	44	38	22	-16	25	-13	27	0
	48	38	24	-14	27	-11	29	0
	49	38	24	-14	28	-10	29	0
F	65	38	28	-10	32	-6	33	0
	66	38	27	-11	30	-8	32	0
	67	38	28	-10	31	-7	33	0
	68	38	31	-7	35	-3	37	0
	71	38	33	-5	38	0	39	1
	72	38	33	-5	38	0	39	1
	73	38	33	-5	38	0	39	1
	76	38	34	-4	39	1	40	2

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

NIGHT TIME - INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	41	5	42	6	45	9
3	87	39	46	7	42	3	47	8
	106	39	46	7	39	0	47	8
4	88	37	37	0	35	-2	39	2
	91	37	39	2	34	-3	40	3
	94	37	37	0	34	-3	39	2
	95	37	38	1	35	-2	40	3
	96	37	39	2	35	-2	41	4
	99	37	36	-1	34	-3	38	1
	100	37	36	-1	33	-4	38	1
	105	37	40	3	35	-2	41	4
	161	37	39	2	33	-4	40	3
5	103	42	33	-9	34	-8	36	0
	104	42	36	-6	33	-9	38	0
	111	42	46	4	37	-5	47	5
	112	42	44	2	36	-6	45	3
	118	42	41	-1	39	-3	43	1
	120	42	40	-2	35	-7	41	0
	121	42	38	-4	34	-8	40	0
	123	42	37	-5	34	-8	39	0
	125	42	38	-4	34	-8	40	0
	126	42	37	-5	34	-8	39	0
	129	42	40	-2	34	-8	41	0
	139	42	35	-7	26	-16	36	0
	154	42	42	0	36	-6	43	1
	156	42	42	0	35	-7	43	1
	157	42	40	-2	33	-9	41	0
	159	42	41	-1	34	-8	42	0
6	132	38	37	-1	31	-7	38	0
	133	38	35	-3	30	-8	36	0
	137	38	34	-4	30	-8	35	0
7	108	39	49	10	39	0	49	10
	109	39	49	10	39	0	49	10
	110	39	48	9	38	-1	48	9
	Dulwich	39	53	14	50	11	55	16
8	142	35	27	-8	22	-13	28	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

NIGHT TIME - INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	36	-2	32	-6	37	0
	3	38	38	0	30	-8	39	1
	4	38	38	0	31	-7	39	1
	143	38	34	-4	30	-8	36	0
	144	38	35	-3	27	-11	36	0
	145	38	35	-3	29	-9	36	0
	146	38	34	-4	29	-9	35	0
	147	38	35	-3	29	-9	36	0
	148	38	34	-4	29	-9	35	0
	149	38	32	-6	29	-9	34	0
	150	38	34	-4	29	-9	35	0
	151	38	35	-3	29	-9	36	0
	152	38	35	-3	31	-7	36	0
10	5	37	39	2	33	-4	40	3
	6	37	40	3	34	-3	41	4
	8	37	41	4	35	-2	42	5
	9	37	41	4	38	1	43	6
	10	37	40	3	39	2	43	6
	11	37	40	3	35	-2	41	4
	13	37	42	5	36	-1	43	6
11	7	39	38	-1	33	-6	39	0
	12	39	39	0	30	-9	40	1
	14	39	41	2	33	-6	42	3
	15	39	39	0	32	-7	40	1
	16	39	41	2	35	-4	42	3
	17	39	35	-4	34	-5	38	0
	18	39	32	-7	32	-7	35	0
	19	39	36	-3	28	-11	37	0
	20	39	35	-4	27	-12	36	0
	21	39	35	-4	28	-11	36	0
12	50	35	35	0	36	1	38	3
	51	35	34	-1	35	0	37	2
	52	35	27	-8	32	-3	34	0
	53	35	35	0	35	0	38	3
	54	35	36	1	35	0	39	4
	55	35	30	-5	33	-2	35	0
	56	35	33	-2	34	-1	36	1
	57	35	35	0	35	0	38	3
	62	35	37	2	37	2	40	5

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 1. Non Mine Owned: Full Pit Year 1

NIGHT TIME - INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	35	-1	31	-5	36	0
	23	36	36	0	32	-4	37	1
	24	36	31	-5	30	-6	33	0
	25	36	33	-3	29	-7	34	0
	26	36	32	-4	28	-8	33	0
	27	36	32	-4	27	-9	33	0
	28	36	31	-5	27	-9	32	0
	29	36	33	-3	29	-7	34	0
	30	36	33	-3	29	-7	34	0
	31	36	33	-3	29	-7	35	0
	32	36	33	-3	30	-6	35	0
	34	36	33	-3	31	-5	35	0
	35	36	32	-4	30	-6	34	0
	36	36	32	-4	28	-8	33	0
	37	36	23	-13	23	-13	26	0
	38	36	33	-3	31	-5	35	0
	39	36	23	-13	22	-14	26	0
	40	36	21	-15	19	-17	23	0
	41	36	18	-18	19	-17	22	0
	42	36	33	-3	32	-4	36	0
	43	36	34	-2	31	-5	36	0
C	47	35	31	-4	36	1	37	2
	63	35	34	-1	37	2	39	4
	64	35	34	-1	38	3	40	5
D	44	38	31	-7	32	-6	35	0
	48	38	29	-9	34	-4	35	0
	49	38	34	-4	36	-2	38	0
F	65	38	35	-3	37	-1	39	1
	66	38	33	-5	37	-1	38	0
	67	38	34	-4	39	1	40	2
	68	38	38	0	39	1	42	4
	71	38	40	2	42	4	44	6
	72	38	40	2	42	4	44	6
	73	38	40	2	42	4	44	6
	76	38	41	3	43	5	45	7

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	32	-3	36	1	37	0
3	87	38	40	2	38	0	42	4
	106	38	37	-1	32	-6	38	0
4	88	39	24	-15	24	-15	27	0
	91	39	26	-13	26	-13	29	0
	94	39	26	-13	26	-13	29	0
	95	39	26	-13	27	-12	29	0
	96	39	27	-12	28	-11	31	0
	99	39	26	-13	25	-14	29	0
	100	39	25	-14	25	-14	28	0
	105	39	26	-13	28	-11	30	0
	161	39	27	-12	28	-11	31	0
5	103	50	24	-26	26	-24	28	0
	104	50	24	-26	24	-26	27	0
	111	50	35	-15	32	-18	37	0
	112	50	35	-15	30	-20	36	0
	118	50	30	-20	29	-21	33	0
	120	50	30	-20	28	-22	32	0
	121	50	26	-24	27	-23	29	0
	123	50	24	-26	25	-25	28	0
	125	50	27	-23	27	-23	30	0
	126	50	24	-26	25	-25	28	0
	129	50	27	-23	28	-22	30	0
	139	50	20	-30	19	-31	22	0
	154	50	33	-17	20	-30	33	0
	156	50	32	-18	20	-30	32	0
	157	50	30	-20	20	-30	30	0
	159	50	30	-20	20	-30	30	0
6	132	39	21	-18	23	-16	25	0
	133	39	23	-16	24	-15	26	0
	137	39	18	-21	22	-17	23	0
7	108	45	39	-6	32	-13	40	0
	109	45	39	-6	33	-12	40	0
	110	45	39	-6	32	-13	40	0
	Dulwich			0			0	
8	142	42	14	-28	9	-33	15	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	37	28	-9	24	-13	29	0
	3	37	27	-10	22	-15	28	0
	4	37	28	-9	23	-14	29	0
	143	37	17	-20	22	-15	23	0
	144	37	19	-18	15	-22	20	0
	145	37	19	-18	17	-20	21	0
	146	37	18	-19	17	-20	20	0
	147	37	19	-18	17	-20	21	0
	148	37	19	-18	17	-20	21	0
	149	37	20	-17	17	-20	22	0
	150	37	20	-17	18	-19	22	0
	151	37	20	-17	17	-20	22	0
	152	37	23	-14	22	-15	26	0
10	5	36	29	-7	25	-11	30	0
	6	36	30	-6	26	-10	32	0
	8	36	30	-6	29	-7	32	0
	9	36	30	-6	31	-5	34	0
	10	36	29	-7	33	-3	34	0
	11	36	30	-6	30	-6	33	0
	13	36	31	-5	30	-6	33	0
11	7	38	29	-9	25	-13	31	0
	12	38	29	-9	23	-15	30	0
	14	38	31	-7	27	-11	32	0
	15	38	30	-8	26	-12	31	0
	16	38	31	-7	29	-9	33	0
	17	38	25	-13	27	-11	29	0
	18	38	24	-14	26	-12	28	0
	19	38	23	-15	17	-21	24	0
	20	38	24	-14	20	-18	25	0
	21	38	24	-14	20	-18	25	0
12	50	35	31	-4	28	-7	33	0
	51	35	30	-5	28	-7	32	0
	52	35	27	-8	26	-9	30	0
	53	35	30	-5	28	-7	32	0
	54	35	31	-4	30	-5	33	0
	55	35	27	-8	27	-8	30	0
	56	35	29	-6	29	-6	32	0
	57	35	28	-7	28	-7	31	0
	62	35	33	-2	30	-5	35	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	25	-11	22	-14	27	0
	23	36	26	-10	23	-13	28	0
	24	36	23	-13	19	-17	24	0
	25	36	22	-14	19	-17	24	0
	26	36	22	-14	19	-17	24	0
	27	36	21	-15	18	-18	23	0
	28	36	20	-16	17	-19	22	0
	29	36	23	-13	19	-17	24	0
	30	36	23	-13	20	-16	25	0
	31	36	24	-12	21	-15	26	0
	32	36	24	-12	21	-15	26	0
	34	36	26	-10	23	-13	28	0
	35	36	27	-9	22	-14	28	0
	36	36	25	-11	22	-14	27	0
	37	36	21	-15	21	-15	24	0
	38	36	25	-11	23	-13	27	0
	39	36	22	-14	20	-16	24	0
	40	36	20	-16	18	-18	22	0
	41	36	16	-20	14	-22	18	0
	42	36	25	-11	23	-13	27	0
	43	36	26	-10	25	-11	29	0
C	47	35	34	-1	31	-4	36	1
	63	35	32	-3	30	-5	34	0
	64	35	33	-2	32	-3	36	1
D	44	37	27	-10	25	-12	29	0
	48	37	30	-7	27	-10	32	0
	49	37	31	-6	28	-9	33	0
F	65	39	33	-6	32	-7	35	0
	66	39	33	-6	30	-9	35	0
	67	39	33	-6	31	-8	35	0
	68	39	36	-3	35	-4	39	0
	71	39	38	-1	38	-1	41	2
	72	39	38	-1	38	-1	41	2
	73	39	39	0	38	-1	42	3
	76	39	38	-1	39	0	42	3

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	32	-3	36	1	37	0
3	87	40	41	1	38	-2	43	3
	106	40	38	-2	32	-8	39	0
4	88	42	24	-18	24	-18	27	0
	91	42	26	-16	26	-16	29	0
	94	42	26	-16	26	-16	29	0
	95	42	27	-15	27	-15	30	0
	96	42	28	-14	28	-14	31	0
	99	42	26	-16	25	-17	29	0
	100	42	25	-17	25	-17	28	0
	105	42	26	-16	28	-14	30	0
	161	42	28	-14	28	-14	31	0
5	103	46	24	-22	26	-20	28	0
	104	46	25	-21	24	-22	28	0
	111	46	35	-11	32	-14	37	0
	112	46	35	-11	30	-16	36	0
	118	46	30	-16	29	-17	33	0
	120	46	31	-15	28	-18	33	0
	121	46	27	-19	27	-19	30	0
	123	46	24	-22	25	-21	28	0
	125	46	27	-19	27	-19	30	0
	126	46	25	-21	25	-21	28	0
	129	46	27	-19	28	-18	30	0
	139	46	21	-25	19	-27	23	0
	154	46	34	-12	20	-26	34	0
	156	46	33	-13	20	-26	33	0
	157	46	31	-15	20	-26	31	0
	159	46	30	-16	20	-26	30	0
6	132	41	22	-19	23	-18	26	0
	133	41	24	-17	24	-17	27	0
	137	41	18	-23	22	-19	23	0
7	108	42	40	-2	32	-10	41	0
	109	42	40	-2	33	-9	41	0
	110	42	40	-2	32	-10	41	0
	Dulwich			0			0	
8	142	42	15	-27	9	-33	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	40	29	-11	24	-16	30	0
	3	40	27	-13	22	-18	28	0
	4	40	29	-11	23	-17	30	0
	143	40	17	-23	22	-18	23	0
	144	40	19	-21	15	-25	20	0
	145	40	20	-20	17	-23	22	0
	146	40	18	-22	17	-23	20	0
	147	40	19	-21	17	-23	21	0
	148	40	20	-20	17	-23	22	0
	149	40	20	-20	17	-23	22	0
	150	40	20	-20	18	-22	22	0
	151	40	21	-19	17	-23	23	0
	152	40	24	-16	22	-18	26	0
10	5	39	30	-9	25	-14	31	0
	6	39	30	-9	26	-13	32	0
	8	39	31	-8	29	-10	33	0
	9	39	30	-9	31	-8	34	0
	10	39	30	-9	33	-6	35	0
	11	39	30	-9	30	-9	33	0
	13	39	32	-7	30	-9	34	0
11	7	41	30	-11	25	-16	31	0
	12	41	30	-11	23	-18	31	0
	14	41	32	-9	27	-14	33	0
	15	41	31	-10	26	-15	32	0
	16	41	32	-9	29	-12	34	0
	17	41	26	-15	27	-14	30	0
	18	41	24	-17	26	-15	28	0
	19	41	24	-17	17	-24	25	0
	20	41	25	-16	20	-21	26	0
	21	41	24	-17	20	-21	25	0
12	50	38	32	-6	28	-10	33	0
	51	38	31	-7	28	-10	33	0
	52	38	28	-10	26	-12	30	0
	53	38	30	-8	28	-10	32	0
	54	38	32	-6	30	-8	34	0
	55	38	28	-10	27	-11	30	0
	56	38	30	-8	29	-9	33	0
	57	38	29	-9	28	-10	32	0
	62	38	34	-4	30	-8	35	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	39	26	-13	22	-17	28	0
	23	39	27	-12	23	-16	28	0
	24	39	23	-16	19	-20	24	0
	25	39	23	-16	19	-20	25	0
	26	39	22	-17	19	-20	24	0
	27	39	22	-17	18	-21	24	0
	28	39	21	-18	17	-22	23	0
	29	39	24	-15	19	-20	25	0
	30	39	24	-15	20	-19	25	0
	31	39	25	-14	21	-18	26	0
	32	39	24	-15	21	-18	26	0
	34	39	26	-13	23	-16	28	0
	35	39	28	-11	22	-17	29	0
	36	39	26	-13	22	-17	28	0
	37	39	22	-17	21	-18	24	0
	38	39	26	-13	23	-16	28	0
	39	39	23	-16	20	-19	25	0
	40	39	20	-19	18	-21	22	0
	41	39	17	-22	14	-25	19	0
	42	39	26	-13	23	-16	28	0
	43	39	26	-13	25	-14	29	0
C	47	37	35	-2	31	-6	36	0
	63	37	33	-4	30	-7	35	0
	64	37	34	-3	32	-5	36	0
D	44	40	28	-12	25	-15	30	0
	48	40	30	-10	27	-13	32	0
	49	40	32	-8	28	-12	33	0
F	65	40	34	-6	32	-8	36	0
	66	40	34	-6	30	-10	36	0
	67	40	34	-6	31	-9	36	0
	68	40	37	-3	35	-5	39	0
	71	40	39	-1	38	-2	41	1
	72	40	39	-1	38	-2	42	2
	73	40	40	0	38	-2	42	2
	76	40	39	-1	39	-1	42	2

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	32	-3	36	1	37	0
3	87	39	41	2	38	-1	43	4
	106	39	38	-1	32	-7	39	0
4	88	37	24	-13	24	-13	27	0
	91	37	26	-11	26	-11	29	0
	94	37	27	-10	26	-11	30	0
	95	37	27	-10	27	-10	30	0
	96	37	28	-9	28	-9	31	0
	99	37	27	-10	25	-12	29	0
	100	37	26	-11	25	-12	28	0
	105	37	27	-10	28	-9	30	0
	161	37	28	-9	28	-9	31	0
5	103	42	24	-18	26	-16	28	0
	104	42	25	-17	24	-18	28	0
	111	42	36	-6	32	-10	38	0
	112	42	36	-6	30	-12	37	0
	118	42	31	-11	29	-13	33	0
	120	42	31	-11	28	-14	33	0
	121	42	27	-15	27	-15	30	0
	123	42	25	-17	25	-17	28	0
	125	42	28	-14	27	-15	30	0
	126	42	25	-17	25	-17	28	0
	129	42	28	-14	28	-14	31	0
	139	42	21	-21	19	-23	23	0
	154	42	34	-8	20	-22	34	0
	156	42	34	-8	20	-22	34	0
	157	42	31	-11	20	-22	31	0
	159	42	31	-11	20	-22	31	0
6	132	38	22	-16	23	-15	26	0
	133	38	24	-14	24	-14	27	0
	137	38	19	-19	22	-16	24	0
7	108	39	41	2	32	-7	42	3
	109	39	40	1	33	-6	41	2
	110	39	40	1	32	-7	41	2
	Dulwich			0			0	
8	142	35	15	-20	9	-26	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	29	-9	24	-14	30	0
	3	38	28	-10	22	-16	29	0
	4	38	29	-9	23	-15	30	0
	143	38	17	-21	22	-16	23	0
	144	38	19	-19	15	-23	20	0
	145	38	20	-18	17	-21	22	0
	146	38	18	-20	17	-21	20	0
	147	38	19	-19	17	-21	21	0
	148	38	19	-19	17	-21	21	0
	149	38	20	-18	17	-21	22	0
	150	38	20	-18	18	-20	22	0
	151	38	21	-17	17	-21	23	0
	152	38	24	-14	22	-16	26	0
10	5	37	30	-7	25	-12	31	0
	6	37	30	-7	26	-11	32	0
	8	37	31	-6	29	-8	33	0
	9	37	30	-7	31	-6	34	0
	10	37	29	-8	33	-4	34	0
	11	37	30	-7	30	-7	33	0
	13	37	32	-5	30	-7	34	0
11	7	39	30	-9	25	-14	31	0
	12	39	30	-9	23	-16	31	0
	14	39	32	-7	27	-12	33	0
	15	39	32	-7	26	-13	33	0
	16	39	32	-7	29	-10	34	0
	17	39	25	-14	27	-12	29	0
	18	39	23	-16	26	-13	28	0
	19	39	21	-18	17	-22	22	0
	20	39	22	-17	20	-19	24	0
	21	39	22	-17	20	-19	24	0
12	50	35	25	-10	28	-7	30	0
	51	35	25	-10	28	-7	29	0
	52	35	23	-12	26	-9	28	0
	53	35	26	-9	28	-7	30	0
	54	35	27	-8	30	-5	32	0
	55	35	24	-11	27	-8	28	0
	56	35	26	-9	29	-6	31	0
	57	35	26	-9	28	-7	30	0
	62	35	28	-7	30	-5	32	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	24	-12	22	-14	26	0
	23	36	24	-12	23	-13	27	0
	24	36	21	-15	19	-17	23	0
	25	36	21	-15	19	-17	23	0
	26	36	20	-16	19	-17	22	0
	27	36	20	-16	18	-18	22	0
	28	36	19	-17	17	-19	21	0
	29	36	21	-15	19	-17	23	0
	30	36	21	-15	20	-16	23	0
	31	36	22	-14	21	-15	24	0
	32	36	22	-14	21	-15	25	0
	34	36	22	-14	23	-13	25	0
	35	36	21	-15	22	-14	25	0
	36	36	22	-14	22	-14	25	0
	37	36	19	-17	21	-15	23	0
	38	36	22	-14	23	-13	25	0
	39	36	19	-17	20	-16	23	0
	40	36	17	-19	18	-18	20	0
	41	36	15	-21	14	-22	18	0
	42	36	22	-14	23	-13	26	0
	43	36	22	-14	25	-11	27	0
C	47	35	27	-8	31	-4	32	0
	63	35	27	-8	30	-5	32	0
	64	35	29	-6	32	-3	34	0
D	44	38	23	-15	25	-13	27	0
	48	38	25	-13	27	-11	29	0
	49	38	24	-14	28	-10	29	0
F	65	38	28	-10	32	-6	33	0
	66	38	26	-12	30	-8	32	0
	67	38	28	-10	31	-7	33	0
	68	38	31	-7	35	-3	37	0
	71	38	34	-4	38	0	39	1
	72	38	34	-4	38	0	40	2
	73	38	35	-3	38	0	40	2
	76	38	36	-2	39	1	41	3

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	32	-3	42	7	42	0
3	87	39	45	6	42	3	47	8
	106	39	43	4	39	0	44	5
4	88	37	37	0	35	-2	39	2
	91	37	37	0	34	-3	39	2
	94	37	37	0	34	-3	39	2
	95	37	37	0	35	-2	39	2
	96	37	38	1	35	-2	40	3
	99	37	35	-2	34	-3	37	0
	100	37	36	-1	33	-4	38	1
	105	37	38	1	35	-2	40	3
	161	37	38	1	33	-4	39	2
5	103	42	33	-9	34	-8	36	0
	104	42	35	-7	33	-9	37	0
	111	42	42	0	37	-5	43	1
	112	42	41	-1	36	-6	42	0
	118	42	38	-4	39	-3	41	0
	120	42	36	-6	35	-7	39	0
	121	42	35	-7	34	-8	38	0
	123	42	34	-8	34	-8	37	0
	125	42	35	-7	34	-8	38	0
	126	42	34	-8	34	-8	37	0
	129	42	37	-5	34	-8	39	0
	139	42	32	-10	26	-16	33	0
	154	42	42	0	36	-6	43	1
	156	42	42	0	35	-7	43	1
	157	42	40	-2	33	-9	41	0
	159	42	41	-1	34	-8	42	0
6	132	38	33	-5	31	-7	35	0
	133	38	33	-5	30	-8	35	0
	137	38	30	-8	30	-8	33	0
7	108	39	45	6	39	0	46	7
	109	39	44	5	39	0	45	6
	110	39	45	6	38	-1	46	7
	Dulwich			0				
8	142	35	27	-8	22	-13	28	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	35	-3	32	-6	37	0
	3	38	37	-1	30	-8	38	0
	4	38	38	0	31	-7	39	1
	143	38	33	-5	30	-8	35	0
	144	38	34	-4	27	-11	35	0
	145	38	34	-4	29	-9	35	0
	146	38	33	-5	29	-9	34	0
	147	38	34	-4	29	-9	35	0
	148	38	34	-4	29	-9	35	0
	149	38	32	-6	29	-9	34	0
	150	38	34	-4	29	-9	35	0
	151	38	35	-3	29	-9	36	0
	152	38	34	-4	31	-7	36	0
10	5	37	38	1	33	-4	39	2
	6	37	40	3	34	-3	41	4
	8	37	41	4	35	-2	42	5
	9	37	41	4	38	1	43	6
	10	37	40	3	39	2	43	6
	11	37	40	3	35	-2	41	4
	13	37	42	5	36	-1	43	6
11	7	39	38	-1	33	-6	39	0
	12	39	39	0	30	-9	40	1
	14	39	40	1	33	-6	41	2
	15	39	39	0	32	-7	40	1
	16	39	41	2	35	-4	42	3
	17	39	35	-4	34	-5	38	0
	18	39	32	-7	32	-7	35	0
	19	39	36	-3	28	-11	37	0
	20	39	35	-4	27	-12	36	0
	21	39	35	-4	28	-11	36	0
12	50	35	35	0	36	1	38	3
	51	35	33	-2	35	0	37	2
	52	35	28	-7	32	-3	34	0
	53	35	34	-1	35	0	38	3
	54	35	34	-1	35	0	38	3
	55	35	31	-4	33	-2	35	0
	56	35	31	-4	34	-1	36	1
	57	35	33	-2	35	0	37	2
	62	35	36	1	37	2	40	5

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 2. Non Mine Owned: Full Pit Year 4

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	35	-1	31	-5	36	0
	23	36	36	0	32	-4	37	1
	24	36	31	-5	30	-6	33	0
	25	36	32	-4	29	-7	34	0
	26	36	31	-5	28	-8	33	0
	27	36	31	-5	27	-9	33	0
	28	36	29	-7	27	-9	31	0
	29	36	31	-5	29	-7	33	0
	30	36	31	-5	29	-7	33	0
	31	36	32	-4	29	-7	34	0
	32	36	32	-4	30	-6	34	0
	34	36	33	-3	31	-5	35	0
	35	36	33	-3	30	-6	35	0
	36	36	32	-4	28	-8	33	0
	37	36	23	-13	23	-13	26	0
	38	36	32	-4	31	-5	34	0
	39	36	24	-12	22	-14	26	0
	40	36	21	-15	19	-17	23	0
	41	36	23	-13	19	-17	25	0
	42	36	32	-4	32	-4	35	0
	43	36	33	-3	31	-5	35	0
C	47	35	35	0	36	1	39	4
	63	35	37	2	37	2	40	5
	64	35	38	3	38	3	41	6
D	44	38	33	-5	32	-6	36	0
	48	38	31	-7	34	-4	36	0
	49	38	35	-3	36	-2	39	1
F	65	38	35	-3	37	-1	39	1
	66	38	33	-5	37	-1	38	0
	67	38	34	-4	39	1	40	2
	68	38	37	-1	39	1	41	3
	71	38	39	1	42	4	44	6
	72	38	39	1	42	4	44	6
	73	38	40	2	42	4	44	6
	76	38	41	3	43	5	45	7

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	34	-1	36	1	38	3
3	87	38	39	1	38	0	42	4
	106	38	39	1	32	-6	40	2
4	88	39	28	-11	24	-15	29	0
	91	39	29	-10	26	-13	31	0
	94	39	27	-12	26	-13	30	0
	95	39	29	-10	27	-12	31	0
	96	39	31	-8	28	-11	33	0
	99	39	26	-13	25	-14	29	0
	100	39	26	-13	25	-14	28	0
	105	39	29	-10	28	-11	31	0
	161	39	31	-8	28	-11	33	0
5	103	50	24	-26	26	-24	28	0
	104	50	25	-25	24	-26	28	0
	111	50	38	-12	32	-18	39	0
	112	50	33	-17	30	-20	35	0
	118	50	31	-19	29	-21	33	0
	120	50	31	-19	28	-22	33	0
	121	50	28	-22	27	-23	30	0
	123	50	25	-25	25	-25	28	0
	125	50	28	-22	27	-23	30	0
	126	50	25	-25	25	-25	28	0
	129	50	26	-24	28	-22	30	0
	139	50	22	-28	19	-31	24	0
	154	50	33	-17	20	-30	33	0
	156	50	32	-18	20	-30	32	0
	157	50	31	-19	20	-30	31	0
	159	50	31	-19	20	-30	31	0
6	132	39	22	-17	23	-16	26	0
	133	39	23	-16	24	-15	26	0
	137	39	19	-20	22	-17	24	0
7	108	45	46	1	32	-13	46	1
	109	45	48	3	33	-12	48	3
	110	45	46	1	32	-13	46	1
	Dulwich						0	
8	142	42	15	-27	9	-33	16	0
9	2	37	28	-9	24	-13	29	0
	3	37	27	-10	22	-15	28	0
	4	37	28	-9	23	-14	29	0
	143	37	18	-19	22	-15	23	0
	144	37	20	-17	15	-22	21	0
	145	37	20	-17	17	-20	22	0
	146	37	19	-18	17	-20	21	0
	147	37	19	-18	17	-20	21	0
	148	37	20	-17	17	-20	22	0
	149	37	21	-16	17	-20	23	0
	150	37	21	-16	18	-19	23	0
	151	37	21	-16	17	-20	23	0
	152	37	23	-14	22	-15	26	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
10	5	36	30	-6	25	-11	31	0
	6	36	30	-6	26	-10	32	0
	8	36	30	-6	29	-7	32	0
	9	36	30	-6	31	-5	34	0
	10	36	29	-7	33	-3	34	0
	11	36	29	-7	30	-6	33	0
	13	36	31	-5	30	-6	33	0
11	7	38	29	-9	25	-13	31	0
	12	38	29	-9	23	-15	30	0
	14	38	31	-7	27	-11	32	0
	15	38	30	-8	26	-12	31	0
	16	38	31	-7	29	-9	33	0
	17	38	25	-13	27	-11	29	0
	18	38	24	-14	26	-12	28	0
	19	38	23	-15	17	-21	24	0
	20	38	24	-14	20	-18	25	0
	21	38	24	-14	20	-18	25	0
12	50	35	31	-4	28	-7	33	0
	51	35	30	-5	28	-7	32	0
	52	35	27	-8	26	-9	30	0
	53	35	30	-5	28	-7	32	0
	54	35	32	-3	30	-5	34	0
	55	35	28	-7	27	-8	30	0
	56	35	29	-6	29	-6	32	0
	57	35	29	-6	28	-7	32	0
	62	35	33	-2	30	-5	35	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	26	-10	22	-14	28	0
	23	36	26	-10	23	-13	28	0
	24	36	23	-13	19	-17	24	0
	25	36	22	-14	19	-17	24	0
	26	36	22	-14	19	-17	24	0
	27	36	22	-14	18	-18	24	0
	28	36	20	-16	17	-19	22	0
	29	36	23	-13	19	-17	24	0
	30	36	23	-13	20	-16	25	0
	31	36	24	-12	21	-15	26	0
	32	36	24	-12	21	-15	26	0
	34	36	26	-10	23	-13	28	0
	35	36	28	-8	22	-14	29	0
	36	36	26	-10	22	-14	28	0
	37	36	22	-14	21	-15	24	0
	38	36	25	-11	23	-13	27	0
	39	36	23	-13	20	-16	25	0
	40	36	20	-16	18	-18	22	0
	41	36	17	-19	14	-22	19	0
	42	36	26	-10	23	-13	28	0
	43	36	26	-10	25	-11	29	0
C	47	35	34	-1	31	-4	36	1
	63	35	32	-3	30	-5	34	0
	64	35	33	-2	32	-3	36	1
D	44	37	27	-10	25	-12	29	0
	48	37	30	-7	27	-10	32	0
	49	37	31	-6	28	-9	33	0
F	65	39	33	-6	32	-7	35	0
	66	39	33	-6	30	-9	35	0
	67	39	33	-6	31	-8	35	0
	68	39	36	-3	35	-4	39	0
	71	39	38	-1	38	-1	41	2
	72	39	38	-1	38	-1	41	2
	73	39	38	-1	38	-1	41	2
	76	39	38	-1	39	0	42	3

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	38	35	-3	36	-2	39	1
3	87	40	40	0	38	-2	42	2
	106	40	40	0	32	-8	41	1
4	88	42	28	-14	24	-18	29	0
	91	42	29	-13	26	-16	31	0
	94	42	28	-14	26	-16	30	0
	95	42	30	-12	27	-15	32	0
	96	42	32	-10	28	-14	34	0
	99	42	27	-15	25	-17	29	0
	100	42	26	-16	25	-17	28	0
	105	42	30	-12	28	-14	32	0
	161	42	32	-10	28	-14	33	0
5	103	46	25	-21	26	-20	29	0
	104	46	25	-21	24	-22	28	0
	111	46	39	-7	32	-14	40	0
	112	46	34	-12	30	-16	35	0
	118	46	32	-14	29	-17	34	0
	120	46	31	-15	28	-18	33	0
	121	46	29	-17	27	-19	31	0
	123	46	26	-20	25	-21	29	0
	125	46	29	-17	27	-19	31	0
	126	46	26	-20	25	-21	29	0
	129	46	27	-19	28	-18	30	0
	139	46	23	-23	19	-27	24	0
	154	46	33	-13	20	-26	33	0
	156	46	33	-13	20	-26	33	0
	157	46	31	-15	20	-26	31	0
	159	46	32	-14	20	-26	32	0
6	132	41	22	-19	23	-18	26	0
	133	41	24	-17	24	-17	27	0
	137	41	19	-22	22	-19	24	0
7	108	42	46	4	32	-10	46	4
	109	42	48	6	33	-9	48	6
	110	42	47	5	32	-10	47	5
	Dulwich						0	
8	142	42	15	-27	9	-33	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	40	29	-11	24	-16	30	0
	3	40	27	-13	22	-18	28	0
	4	40	28	-12	23	-17	29	0
	143	40	18	-22	22	-18	23	0
	144	40	21	-19	15	-25	22	0
	145	40	21	-19	17	-23	22	0
	146	40	19	-21	17	-23	21	0
	147	40	20	-20	17	-23	22	0
	148	40	21	-19	17	-23	22	0
	149	40	21	-19	17	-23	23	0
	150	40	21	-19	18	-22	23	0
	151	40	21	-19	17	-23	23	0
	152	40	23	-17	22	-18	26	0
10	5	39	30	-9	25	-14	31	0
	6	39	30	-9	26	-13	32	0
	8	39	30	-9	29	-10	32	0
	9	39	30	-9	31	-8	34	0
	10	39	29	-10	33	-6	34	0
	11	39	29	-10	30	-9	33	0
	13	39	31	-8	30	-9	33	0
11	7	41	29	-12	25	-16	31	0
	12	41	29	-12	23	-18	30	0
11	14	41	31	-10	27	-14	32	0
	15	41	30	-11	26	-15	31	0
	16	41	31	-10	29	-12	33	0
	17	41	25	-16	27	-14	29	0
	18	41	23	-18	26	-15	28	0
	19	41	22	-19	17	-24	23	0
	20	41	24	-17	20	-21	25	0
	21	41	24	-17	20	-21	25	0
12	50	38	30	-8	28	-10	32	0
	51	38	29	-9	28	-10	31	0
	52	38	26	-12	26	-12	29	0
	53	38	29	-9	28	-10	32	0
	54	38	30	-8	30	-8	33	0
	55	38	27	-11	27	-11	30	0
	56	38	28	-10	29	-9	32	0
	57	38	28	-10	28	-10	31	0
	62	38	31	-7	30	-8	33	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	39	27	-12	22	-17	28	0
	23	39	28	-11	23	-16	29	0
	24	39	23	-16	19	-20	24	0
	25	39	24	-15	19	-20	25	0
	26	39	23	-16	19	-20	24	0
	27	39	23	-16	18	-21	24	0
	28	39	21	-18	17	-22	23	0
	29	39	25	-14	19	-20	26	0
	30	39	25	-14	20	-19	26	0
	31	39	26	-13	21	-18	27	0
	32	39	26	-13	21	-18	27	0
	34	39	28	-11	23	-16	29	0
	35	39	25	-14	22	-17	27	0
	36	39	24	-15	22	-17	26	0
A	37	39	21	-18	21	-18	24	0
	38	39	25	-14	23	-16	27	0
	39	39	22	-17	20	-19	24	0
	40	39	19	-20	18	-21	21	0
	41	39	16	-23	14	-25	18	0
	42	39	26	-13	23	-16	28	0
	43	39	26	-13	25	-14	29	0
C	47	37	34	-3	31	-6	36	0
	63	37	31	-6	30	-7	33	0
	64	37	33	-4	32	-5	36	0
D	44	40	27	-13	25	-15	29	0
	48	40	30	-10	27	-13	32	0
	49	40	30	-10	28	-12	32	0
F	65	40	32	-8	32	-8	35	0
	66	40	32	-8	30	-10	34	0
	67	40	32	-8	31	-9	35	0
	68	40	36	-4	35	-5	39	0
	71	40	38	-2	38	-2	41	1
	72	40	39	-1	38	-2	42	2
	73	40	39	-1	38	-2	42	2
	76	40	37	-3	39	-1	41	1

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	34	-2	36	0	38	2
3	87	39	41	2	38	-1	43	4
	106	39	41	2	32	-7	42	3
4	88	37	29	-8	24	-13	30	0
	91	37	30	-7	26	-11	31	0
	94	37	28	-9	26	-11	30	0
	95	37	30	-7	27	-10	32	0
	96	37	33	-4	28	-9	34	0
	99	37	27	-10	25	-12	29	0
	100	37	27	-10	25	-12	29	0
	105	37	30	-7	28	-9	32	0
	161	37	33	-4	28	-9	34	0
5	103	42	25	-17	26	-16	29	0
	104	42	26	-16	24	-18	28	0
	111	42	40	-2	32	-10	41	0
	112	42	34	-8	30	-12	35	0
	118	42	32	-10	29	-13	34	0
	120	42	32	-10	28	-14	34	0
	121	42	29	-13	27	-15	31	0
	123	42	26	-16	25	-17	29	0
	125	42	29	-13	27	-15	31	0
	126	42	26	-16	25	-17	29	0
	129	42	27	-15	28	-14	30	0
	139	42	23	-19	19	-23	24	0
	154	42	34	-8	20	-22	34	0
	156	42	34	-8	20	-22	34	0
	157	42	32	-10	20	-22	32	0
	159	42	32	-10	20	-22	32	0
6	132	38	23	-15	23	-15	26	0
	133	38	24	-14	24	-14	27	0
	137	38	20	-18	22	-16	24	0
7	108	39	47	8	32	-7	47	8
	109	39	49	10	33	-6	49	10
	110	39	47	8	32	-7	47	8
	Dulwich						0	
8	142	35	16	-19	9	-26	17	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	30	-8	24	-14	31	0
	3	38	27	-11	22	-16	28	0
	4	38	29	-9	23	-15	30	0
	143	38	18	-20	22	-16	23	0
	144	38	21	-17	15	-23	22	0
	145	38	21	-17	17	-21	22	0
	146	38	19	-19	17	-21	21	0
	147	38	20	-18	17	-21	22	0
	148	38	21	-17	17	-21	22	0
	149	38	21	-17	17	-21	23	0
	150	38	22	-16	18	-20	23	0
	151	38	22	-16	17	-21	23	0
	152	38	24	-14	22	-16	26	0
10	5	37	31	-6	25	-12	32	0
	6	37	31	-6	26	-11	32	0
	8	37	31	-6	29	-8	33	0
	9	37	30	-7	31	-6	34	0
	10	37	29	-8	33	-4	34	0
	11	37	30	-7	30	-7	33	0
	13	37	31	-6	30	-7	33	0
11	7	39	30	-9	25	-14	31	0
	12	39	30	-9	23	-16	31	0
	14	39	32	-7	27	-12	33	0
	15	39	31	-8	26	-13	32	0
	16	39	31	-8	29	-10	33	0
	17	39	25	-14	27	-12	29	0
	18	39	23	-16	26	-13	28	0
	19	39	21	-18	17	-22	22	0
	20	39	22	-17	20	-19	24	0
	21	39	22	-17	20	-19	24	0
12	50	35	26	-9	28	-7	30	0
	51	35	25	-10	28	-7	29	0
	52	35	24	-11	26	-9	28	0
	53	35	27	-8	28	-7	31	0
	54	35	27	-8	30	-5	32	0
	55	35	25	-10	27	-8	29	0
	56	35	26	-9	29	-6	31	0
	57	35	26	-9	28	-7	30	0
	62	35	28	-7	30	-5	32	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	24	-12	22	-14	26	0
	23	36	25	-11	23	-13	27	0
	24	36	22	-14	19	-17	24	0
	25	36	21	-15	19	-17	23	0
	26	36	21	-15	19	-17	23	0
	27	36	21	-15	18	-18	23	0
	28	36	19	-17	17	-19	21	0
	29	36	22	-14	19	-17	24	0
	30	36	22	-14	20	-16	24	0
	31	36	22	-14	21	-15	24	0
	32	36	22	-14	21	-15	25	0
	34	36	23	-13	23	-13	26	0
	35	36	22	-14	22	-14	25	0
	36	36	22	-14	22	-14	25	0
	37	36	19	-17	21	-15	23	0
	38	36	23	-13	23	-13	26	0
	39	36	20	-16	20	-16	23	0
	40	36	18	-18	18	-18	21	0
	41	36	15	-21	14	-22	18	0
	42	36	23	-13	23	-13	26	0
	43	36	24	-12	25	-11	28	0
C	47	35	27	-8	31	-4	32	0
	63	35	27	-8	30	-5	32	0
	64	35	29	-6	32	-3	34	0
D	44	38	23	-15	25	-13	27	0
	48	38	25	-13	27	-11	29	0
	49	38	25	-13	28	-10	30	0
F	65	38	28	-10	32	-6	33	0
	66	38	27	-11	30	-8	32	0
	67	38	28	-10	31	-7	33	0
	68	38	32	-6	35	-3	37	0
	71	38	34	-4	38	0	39	1
	72	38	34	-4	38	0	40	2
	73	38	34	-4	38	0	40	2
	76	38	35	-3	39	1	40	2

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	39	3	42	6	44	8
3	87	39	44	5	42	3	46	7
	106	39	44	5	39	0	45	6
4	88	37	38	1	35	-2	40	3
	91	37	38	1	34	-3	39	2
	94	37	38	1	34	-3	39	2
	95	37	38	1	35	-2	40	3
	96	37	39	2	35	-2	41	4
	99	37	36	-1	34	-3	38	1
	100	37	36	-1	33	-4	38	1
	105	37	40	3	35	-2	41	4
	161	37	39	2	33	-4	40	3
5	103	42	34	-8	34	-8	37	0
	104	42	34	-8	33	-9	36	0
	111	42	46	4	37	-5	47	5
	112	42	43	1	36	-6	44	2
	118	42	40	-2	39	-3	42	0
	120	42	40	-2	35	-7	41	0
	121	42	36	-6	34	-8	38	0
	123	42	35	-7	34	-8	37	0
	125	42	36	-6	34	-8	38	0
	126	42	35	-7	34	-8	37	0
	129	42	36	-6	34	-8	38	0
	139	42	33	-9	26	-16	34	0
	154	42	41	-1	36	-6	42	0
	156	42	40	-2	35	-7	41	0
	157	42	40	-2	33	-9	41	0
	159	42	40	-2	34	-8	41	0
6	132	38	34	-4	31	-7	36	0
	133	38	35	-3	30	-8	36	0
	137	38	31	-7	30	-8	33	0
7	108	39	51	12	39	0	51	12
	109	39	52	13	39	0	52	13
	110	39	51	12	38	-1	51	12
	Dulwich						0	
8	142	35	27	-8	22	-13	28	-7

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	36	-2	32	-6	37	-1
	3	38	37	-1	30	-8	38	0
	4	38	38	0	31	-7	39	1
	143	38	33	-5	30	-8	35	-3
	144	38	34	-4	27	-11	35	0
	145	38	35	-3	29	-9	36	0
	146	38	33	-5	29	-9	34	0
	147	38	34	-4	29	-9	35	0
	148	38	34	-4	29	-9	35	0
	149	38	32	-6	29	-9	34	0
	150	38	35	-3	29	-9	36	0
	151	38	35	-3	29	-9	36	0
	152	38	34	-4	31	-7	36	0
10	5	37	39	2	33	-4	40	3
	6	37	40	3	34	-3	41	4
	8	37	41	4	35	-2	42	5
	9	37	41	4	38	1	43	6
	10	37	40	3	39	2	43	6
	11	37	40	3	35	-2	41	4
	13	37	41	4	36	-1	42	5
11	7	39	38	-1	33	-6	39	0
	12	39	39	0	30	-9	40	1
	14	39	41	2	33	-6	42	3
	15	39	39	0	32	-7	40	1
	16	39	41	2	35	-4	42	3
	17	39	35	-4	34	-5	38	0
	18	39	32	-7	32	-7	35	0
	19	39	36	-3	28	-11	37	0
	20	39	35	-4	27	-12	36	0
	21	39	35	-4	28	-11	36	0
12	50	35	34	-1	36	1	38	3
	51	35	33	-2	35	0	37	2
	52	35	30	-5	32	-3	34	0
	53	35	34	-1	35	0	38	3
	54	35	34	-1	35	0	38	3
	55	35	31	-4	33	-2	35	0
	56	35	32	-3	34	-1	36	1
	57	35	33	-2	35	0	37	2
	62	35	**36**	1	37	2	40	5

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 3. **Non Mine Owned: Full Pit Year 6**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	35	-1	31	-5	36	0
	23	36	35	-1	32	-4	37	1
	24	36	31	-5	30	-6	33	0
	25	36	32	-4	29	-7	34	0
	26	36	31	-5	28	-8	33	0
	27	36	31	-5	27	-9	33	0
	28	36	30	-6	27	-9	32	0
	29	36	31	-5	29	-7	33	0
	30	36	31	-5	29	-7	33	0
	31	36	32	-4	29	-7	34	0
	32	36	32	-4	30	-6	34	0
	34	36	34	-2	31	-5	36	0
	35	36	33	-3	30	-6	35	0
	36	36	32	-4	28	-8	33	0
	37	36	25	-11	23	-13	27	0
	38	36	32	-4	31	-5	34	0
	39	36	24	-12	22	-14	26	0
	40	36	24	-12	19	-17	25	0
	41	36	24	-12	19	-17	25	0
	42	36	32	-4	32	-4	35	0
	43	36	33	-3	31	-5	35	0
C	47	35	34	-1	36	1	38	3
	63	35	**36**	1	37	2	40	5
	64	35	**36**	1	38	3	40	5
D	44	38	33	-5	32	-6	36	0
	48	38	32	-6	34	-4	36	0
	49	38	34	-4	36	-2	38	0
F	65	38	35	-3	37	-1	39	1
	66	38	34	-4	37	-1	39	1
	67	38	35	-3	39	1	40	2
	68	38	37	-1	39	1	41	3
	71	38	39	1	42	4	44	6
	72	38	38	0	42	4	43	5
	73	38	39	1	42	4	44	6
	76	38	40	2	43	5	45	7

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	26	-9	36	1	36	1
3	87	38	33	-5	38	0	39	1
	106	38	33	-5	32	-6	36	0
4	88	39	23	-16	24	-15	27	0
	91	39	24	-15	26	-13	28	0
	94	39	24	-15	26	-13	28	0
	95	39	25	-14	27	-12	29	0
	96	39	25	-14	28	-11	30	0
	99	39	23	-16	25	-14	27	0
	100	39	23	-16	25	-14	27	0
	105	39	25	-14	28	-11	30	0
	161	39	25	-14	28	-11	30	0
5	103	50	26	-24	26	-24	29	0
	104	50	33	-17	24	-26	34	0
	111	50	33	-17	32	-18	36	0
	112	50	23	-27	30	-20	31	0
	118	50	24	-26	29	-21	30	0
	120	50	24	-26	28	-22	30	0
	121	50	25	-25	27	-23	29	0
	123	50	25	-25	25	-25	28	0
	125	50	23	-27	27	-23	28	0
	126	50	23	-27	25	-25	27	0
	129	50	25	-25	28	-22	30	0
	139	50	20	-30	19	-31	22	0
	154	50	30	-20	20	-30	30	0
	156	50	29	-21	20	-30	30	0
	157	50	27	-23	20	-30	28	0
	159	50	27	-23	20	-30	28	0
6	132	39	25	-14	23	-16	27	0
	133	39	23	-16	24	-15	26	0
	137	39	20	-19	22	-17	24	0
7	108	45	38	-7	32	-13	39	0
	109	45	40	-5	33	-12	41	0
	110	45	38	-7	32	-13	39	0
	Dulwich						0	
8	142	42	13	-29	9	-33	14	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	37	28	-9	24	-13	29	0
	3	37	25	-12	22	-15	27	0
	4	37	27	-10	23	-14	28	0
	143	37	16	-21	22	-15	23	0
	144	37	18	-19	15	-22	20	0
	145	37	19	-18	17	-20	21	0
	146	37	17	-20	17	-20	20	0
	147	37	18	-19	17	-20	21	0
	148	37	19	-18	17	-20	21	0
	149	37	20	-17	17	-20	22	0
	150	37	20	-17	18	-19	22	0
	151	37	20	-17	17	-20	22	0
	152	37	22	-15	22	-15	25	0
10	5	36	28	-8	25	-11	30	0
	6	36	28	-8	26	-10	30	0
	8	36	29	-7	29	-7	32	0
	9	36	28	-8	31	-5	33	0
	10	36	28	-8	33	-3	34	0
	11	36	28	-8	30	-6	32	0
	13	36	30	-6	30	-6	33	0
11	7	38	28	-10	25	-13	30	0
	12	38	28	-10	23	-15	29	0
	14	38	30	-8	27	-11	32	0
	15	38	29	-9	26	-12	31	0
	16	38	29	-9	29	-9	32	0
	17	38	23	-15	27	-11	29	0
	18	38	21	-17	26	-12	27	0
	19	38	18	-20	17	-21	21	0
	20	38	19	-19	20	-18	23	0
	21	38	19	-19	20	-18	22	0
12	50	35	21	-14	28	-7	29	0
	51	35	19	-16	28	-7	28	0
	52	35	18	-17	26	-9	27	0
	53	35	20	-15	28	-7	29	0
	54	35	20	-15	30	-5	30	0
	55	35	18	-17	27	-8	27	0
	56	35	19	-16	29	-6	30	0
	57	35	20	-15	28	-7	29	0
	62	35	22	-13	30	-5	31	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	22	-14	22	-14	25	0
	23	36	23	-13	23	-13	26	0
	24	36	19	-17	19	-17	22	0
	25	36	19	-17	19	-17	22	0
	26	36	18	-18	19	-17	21	0
	27	36	18	-18	18	-18	21	0
	28	36	16	-20	17	-19	20	0
	29	36	19	-17	19	-17	22	0
	30	36	19	-17	20	-16	22	0
	31	36	19	-17	21	-15	23	0
	32	36	19	-17	21	-15	23	0
	34	36	20	-16	23	-13	25	0
	35	36	18	-18	22	-14	24	0
	36	36	18	-18	22	-14	24	0
	37	36	15	-21	21	-15	22	0
	38	36	19	-17	23	-13	24	0
	39	36	15	-21	20	-16	21	0
	40	36	14	-22	18	-18	19	0
	41	36	11	-25	14	-22	16	0
	42	36	18	-18	23	-13	25	0
	43	36	19	-17	25	-11	26	0
C	47	35	21	-14	31	-4	31	0
	63	35	21	-14	30	-5	30	0
	64	35	22	-13	32	-3	33	0
D	44	37	17	-20	25	-12	26	0
	48	37	19	-18	27	-10	28	0
	49	37	20	-17	28	-9	29	0
F	65	39	21	-18	32	-7	32	0
	66	39	19	-20	30	-9	31	0
	67	39	20	-19	31	-8	32	0
	68	39	23	-16	35	-4	35	0
	71	39	25	-14	38	-1	38	0
	72	39	25	-14	38	-1	38	0
	73	39	26	-13	38	-1	39	0
	76	39	27	-12	39	0	39	0

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	38	27	-11	36	-2	37	0
3	87	40	34	-6	38	-2	39	0
	106	40	34	-6	32	-8	36	0
4	88	42	23	-19	24	-18	27	0
	91	42	25	-17	26	-16	29	0
	94	42	24	-18	26	-16	28	0
	95	42	25	-17	27	-15	29	0
	96	42	26	-16	28	-14	30	0
	99	42	24	-18	25	-17	28	0
	100	42	23	-19	25	-17	27	0
	105	42	25	-17	28	-14	30	0
	161	42	26	-16	28	-14	30	0
5	103	46	22	-24	26	-20	27	0
	104	46	23	-23	24	-22	27	0
	111	46	38	-8	32	-14	39	0
	112	46	31	-15	30	-16	34	0
	118	46	28	-18	29	-17	32	0
	120	46	28	-18	28	-18	31	0
	121	46	26	-20	27	-19	29	0
	123	46	24	-22	25	-21	28	0
	125	46	26	-20	27	-19	29	0
	126	46	24	-22	25	-21	28	0
	129	46	31	-15	28	-18	33	0
	139	46	21	-25	19	-27	23	0
	154	46	31	-15	20	-26	31	0
	156	46	30	-16	20	-26	30	0
	157	46	28	-18	20	-26	29	0
	159	46	28	-18	20	-26	29	0
6	132	41	25	-16	23	-18	27	0
	133	41	24	-17	24	-17	27	0
	137	41	20	-21	22	-19	24	0
7	108	42	39	-3	32	-10	40	0
	109	42	40	-2	33	-9	41	0
	110	42	39	-3	32	-10	40	0
	Dulwich						0	
8	142	42	13	-29	9	-33	14	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	40	28	-12	24	-16	29	0
	3	40	26	-14	22	-18	27	0
	4	40	28	-12	23	-17	29	0
	143	40	16	-24	22	-18	23	0
	144	40	19	-21	15	-25	20	0
	145	40	19	-21	17	-23	21	0
	146	40	17	-23	17	-23	20	0
	147	40	18	-22	17	-23	21	0
	148	40	19	-21	17	-23	21	0
	149	40	20	-20	17	-23	22	0
	150	40	20	-20	18	-22	22	0
	151	40	20	-20	17	-23	22	0
	152	40	22	-18	22	-18	25	0
10	5	39	29	-10	25	-14	30	0
	6	39	29	-10	26	-13	31	0
	8	39	30	-9	29	-10	32	0
	9	39	29	-10	31	-8	33	0
	10	39	28	-11	33	-6	34	0
	11	39	29	-10	30	-9	33	0
	13	39	30	-9	30	-9	33	0
11	7	41	29	-12	25	-16	31	0
	12	41	29	-12	23	-18	30	0
	14	41	31	-10	27	-14	32	0
	15	41	30	-11	26	-15	31	0
	16	41	30	-11	29	-12	32	0
	17	41	24	-17	27	-14	29	0
	18	41	22	-19	26	-15	27	0
	19	41	19	-22	17	-24	21	0
	20	41	20	-21	20	-21	23	0
	21	41	20	-21	20	-21	23	0
12	50	38	22	-16	28	-10	29	0
	51	38	19	-19	28	-10	28	0
	52	38	18	-20	26	-12	27	0
	53	38	21	-17	28	-10	29	0
	54	38	21	-17	30	-8	30	0
	55	38	19	-19	27	-11	27	0
	56	38	20	-18	29	-9	30	0
	57	38	20	-18	28	-10	29	0
	62	38	23	-15	30	-8	31	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	39	23	-16	22	-17	26	0
	23	39	23	-16	23	-16	26	0
	24	39	20	-19	19	-20	23	0
	25	39	19	-20	19	-20	22	0
	26	39	19	-20	19	-20	22	0
	27	39	19	-20	18	-21	22	0
	28	39	17	-22	17	-22	20	0
	29	39	20	-19	19	-20	22	0
	30	39	20	-19	20	-19	23	0
	31	39	20	-19	21	-18	23	0
	32	39	20	-19	21	-18	24	0
	34	39	20	-19	23	-16	25	0
	35	39	18	-21	22	-17	24	0
	36	39	19	-20	22	-17	24	0
	37	39	15	-24	21	-18	22	0
	38	39	19	-20	23	-16	24	0
	39	39	16	-23	20	-19	22	0
	40	39	15	-24	18	-21	19	0
	41	39	12	-27	14	-25	16	0
	42	39	19	-20	23	-16	25	0
	43	39	20	-19	25	-14	26	0
C	47	37	22	-15	31	-6	31	0
	63	37	22	-15	30	-7	31	0
	64	37	23	-14	32	-5	33	0
D	44	40	18	-22	25	-15	26	0
	48	40	20	-20	27	-13	28	0
	49	40	20	-20	28	-12	29	0
F	65	40	22	-18	32	-8	32	0
	66	40	20	-20	30	-10	31	0
	67	40	21	-19	31	-9	32	0
	68	40	24	-16	35	-5	35	0
	71	40	26	-14	38	-2	38	0
	72	40	26	-14	38	-2	38	0
	73	40	27	-13	38	-2	39	0
	76	40	28	-12	39	-1	39	0

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	28	-8	36	0	37	1
3	87	39	35	-4	38	-1	40	1
	106	39	35	-4	32	-7	37	0
4	88	37	24	-13	24	-13	27	0
	91	37	26	-11	26	-11	29	0
	94	37	25	-12	26	-11	29	0
	95	37	26	-11	27	-10	29	0
	96	37	27	-10	28	-9	31	0
	99	37	24	-13	25	-12	28	0
	100	37	24	-13	25	-12	27	0
	105	37	26	-11	28	-9	30	0
	161	37	27	-10	28	-9	31	0
5	103	42	22	-20	26	-16	27	0
	104	42	24	-18	24	-18	27	0
	111	42	38	-4	32	-10	39	0
	112	42	32	-10	30	-12	34	0
	118	42	29	-13	29	-13	32	0
	120	42	29	-13	28	-14	32	0
	121	42	26	-16	27	-15	29	0
	123	42	24	-18	25	-17	28	0
	125	42	27	-15	27	-15	30	0
	126	42	25	-17	25	-17	28	0
	129	42	31	-11	28	-14	33	0
	139	42	21	-21	19	-23	23	0
	154	42	32	-10	20	-22	32	0
	156	42	31	-11	20	-22	31	0
	157	42	29	-13	20	-22	30	0
	159	42	29	-13	20	-22	30	0
6	132	38	26	-12	23	-15	28	0
	133	38	25	-13	24	-14	27	0
	137	38	21	-17	22	-16	24	0
7	108	39	39	0	32	-7	40	1
	109	39	40	1	33	-6	41	2
	110	39	39	0	32	-7	40	1
	Dulwich						0	
8	142	35	14	-21	9	-26	15	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	29	-9	24	-14	30	0
	3	38	27	-11	22	-16	28	0
	4	38	28	-10	23	-15	29	0
	143	38	17	-21	22	-16	23	0
	144	38	20	-18	15	-23	21	0
	145	38	20	-18	17	-21	22	0
	146	38	18	-20	17	-21	20	0
	147	38	19	-19	17	-21	21	0
	148	38	20	-18	17	-21	22	0
	149	38	21	-17	17	-21	23	0
	150	38	21	-17	18	-20	23	0
	151	38	21	-17	17	-21	23	0
	152	38	23	-15	22	-16	26	0
10	5	37	30	-7	25	-12	31	0
	6	37	30	-7	26	-11	32	0
	8	37	31	-6	29	-8	33	0
	9	37	29	-8	31	-6	33	0
	10	37	29	-8	33	-4	34	0
	11	37	29	-8	30	-7	33	0
	13	37	31	-6	30	-7	33	0
11	7	39	29	-10	25	-14	31	0
	12	39	30	-9	23	-16	31	0
	14	39	31	-8	27	-12	32	0
	15	39	31	-8	26	-13	32	0
	16	39	31	-8	29	-10	33	0
	17	39	24	-15	27	-12	29	0
	18	39	22	-17	26	-13	27	0
	19	39	19	-20	17	-22	21	0
	20	39	21	-18	20	-19	24	0
	21	39	20	-19	20	-19	23	0
12	50	35	23	-12	28	-7	29	0
	51	35	20	-15	28	-7	28	0
	52	35	19	-16	26	-9	27	0
	53	35	22	-13	28	-7	29	0
	54	35	22	-13	30	-5	31	0
	55	35	19	-16	27	-8	27	0
	56	35	21	-14	29	-6	30	0
	57	35	21	-14	28	-7	29	0
	62	35	24	-11	30	-5	31	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	23	-13	22	-14	26	0
	23	36	24	-12	23	-13	27	0
	24	36	20	-16	19	-17	23	0
	25	36	20	-16	19	-17	23	0
	26	36	19	-17	19	-17	22	0
	27	36	20	-16	18	-18	22	0
	28	36	18	-18	17	-19	21	0
	29	36	21	-15	19	-17	23	0
	30	36	21	-15	20	-16	23	0
	31	36	21	-15	21	-15	24	0
	32	36	20	-16	21	-15	24	0
	34	36	21	-15	23	-13	25	0
	35	36	19	-17	22	-14	24	0
	36	36	20	-16	22	-14	24	0
	37	36	16	-20	21	-15	22	0
	38	36	20	-16	23	-13	25	0
	39	36	17	-19	20	-16	22	0
	40	36	15	-21	18	-18	19	0
	41	36	12	-24	14	-22	16	0
	42	36	20	-16	23	-13	25	0
	43	36	21	-15	25	-11	26	0
C	47	35	23	-12	31	-4	32	0
	63	35	23	-12	30	-5	31	0
	64	35	24	-11	32	-3	33	0
D	44	38	19	-19	25	-13	26	0
	48	38	21	-17	27	-11	28	0
	49	38	21	-17	28	-10	29	0
F	65	38	23	-15	32	-6	32	0
	66	38	21	-17	30	-8	31	0
	67	38	22	-16	31	-7	32	0
	68	38	25	-13	35	-3	36	0
	71	38	27	-11	38	0	38	0
	72	38	27	-11	38	0	39	1
	73	38	28	-10	38	0	39	1
	76	38	29	-9	39	1	39	1

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	35	-1	42	6	43	7
3	87	39	40	1	42	3	44	5
	106	39	41	2	39	0	43	4
4	88	37	33	-4	35	-2	37	0
	91	37	33	-4	34	-3	37	0
	94	37	32	-5	34	-3	36	0
	95	37	33	-4	35	-2	37	0
	96	37	34	-3	35	-2	38	1
	99	37	31	-6	34	-3	36	0
	100	37	31	-6	33	-4	35	0
	105	37	34	-3	35	-2	38	1
	161	37	30	-7	33	-4	35	0
5	103	42	31	-11	34	-8	36	0
	104	42	42	0	33	-9	42	0
	111	42	37	-5	37	-5	40	0
	112	42	35	-7	36	-6	39	0
	118	42	37	-5	39	-3	41	0
	120	42	33	-9	35	-7	37	0
	121	42	32	-10	34	-8	36	0
	123	42	34	-8	34	-8	37	0
	125	42	32	-10	34	-8	36	0
	126	42	36	-6	34	-8	38	0
	129	42	32	-10	34	-8	36	0
	139	42	30	-12	26	-16	32	0
	154	42	38	-4	36	-6	40	0
	156	42	37	-5	35	-7	39	0
	157	42	37	-5	33	-9	38	0
	159	42	35	-7	34	-8	38	0
6	132	38	33	-5	31	-7	35	0
	133	38	33	-5	30	-8	35	0
	137	38	30	-8	30	-8	33	0
7	108	39	44	5	39	0	45	6
	109	39	45	6	39	0	46	7
	110	39	44	5	38	-1	45	6
	Dulwich						0	
8	142	35	27	-8	22	-13	28	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	35	-3	32	-6	37	0
	3	38	37	-1	30	-8	38	0
	4	38	37	-1	31	-7	38	0
	143	38	32	-6	30	-8	34	0
	144	38	33	-5	27	-11	34	0
	145	38	34	-4	29	-9	35	0
	146	38	33	-5	29	-9	34	0
	147	38	34	-4	29	-9	35	0
	148	38	34	-4	29	-9	35	0
	149	38	32	-6	29	-9	34	0
	150	38	34	-4	29	-9	35	0
	151	38	34	-4	29	-9	35	0
	152	38	34	-4	31	-7	36	0
10	5	37	38	1	33	-4	39	2
	6	37	39	2	34	-3	40	3
	8	37	40	3	35	-2	41	4
	9	37	41	4	38	1	43	6
	10	37	39	2	39	2	42	5
	11	37	40	3	35	-2	41	4
	13	37	41	4	36	-1	42	5
11	7	39	37	-2	33	-6	38	0
	12	39	38	-1	30	-9	39	0
	14	39	40	1	33	-6	41	2
	15	39	37	-2	32	-7	38	0
	16	39	40	1	35	-4	41	2
	17	39	34	-5	34	-5	37	0
	18	39	31	-8	32	-7	35	0
	19	39	35	-4	28	-11	36	0
	20	39	35	-4	27	-12	36	0
	21	39	34	-5	28	-11	35	0
12	50	35	32	-3	36	1	37	2
	51	35	32	-3	35	0	37	2
	52	35	25	-10	32	-3	33	0
	53	35	31	-4	35	0	36	1
	54	35	31	-4	35	0	37	2
	55	35	28	-7	33	-2	34	0
	56	35	29	-6	34	-1	35	0
	57	35	31	-4	35	0	36	1
	62	35	32	-3	37	2	38	3

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 4: **Non Mine Owned: Full Pit Year 8**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	33	-3	31	-5	35	0
	23	36	34	-2	32	-4	36	0
	24	36	30	-6	30	-6	33	0
	25	36	30	-6	29	-7	32	0
	26	36	29	-7	28	-8	32	0
	27	36	28	-8	27	-9	31	0
	28	36	28	-8	27	-9	30	0
	29	36	30	-6	29	-7	32	0
	30	36	29	-7	29	-7	32	0
	31	36	30	-6	29	-7	33	0
	32	36	31	-5	30	-6	33	0
	34	36	31	-5	31	-5	34	0
	35	36	31	-5	30	-6	33	0
	36	36	28	-8	28	-8	31	0
	37	36	23	-13	23	-13	26	0
	38	36	29	-7	31	-5	33	0
	39	36	22	-14	22	-14	25	0
	40	36	22	-14	19	-17	24	0
	41	36	20	-16	19	-17	23	0
	42	36	30	-6	32	-4	34	0
	43	36	31	-5	31	-5	34	0
C	47	35	29	-6	36	1	37	2
	63	35	32	-3	37	2	38	3
	64	35	31	-4	38	3	39	4
D	44	38	31	-7	32	-6	35	0
	48	38	27	-11	34	-4	35	0
	49	38	29	-9	36	-2	37	0
F	65	38	31	-7	37	-1	38	0
	66	38	31	-7	37	-1	38	0
	67	38	31	-7	39	1	39	1
	68	38	34	-4	39	1	40	2
	71	38	35	-3	42	4	43	5
	72	38	35	-3	42	4	43	5
	73	38	35	-3	42	4	43	5
	76	38	36	-2	43	5	44	6

This assessment focuses on noise emissions from the proposed northerly extension of the existing open cut. Development alternatives are considered; the Full Pit Extent includes mining through the "Dulwich" property.

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	33	-2	41	6	42	7
3	87	38	40	2	38	0	42	4
	106	38	40	2	32	-6	41	3
4	88	39	26	-13	24	-15	28	0
	91	39	29	-10	26	-13	31	0
	94	39	27	-12	26	-13	30	0
	95	39	29	-10	27	-12	31	0
	96	39	31	-8	28	-11	33	0
	99	39	27	-12	25	-14	29	0
	100	39	26	-13	25	-14	28	0
	105	39	28	-11	28	-11	31	0
	161	39	31	-8	28	-11	33	0
5	103	50	25	-25	26	-24	29	0
	104	50	26	-24	24	-26	28	0
	111	50	40	-10	32	-18	41	0
	112	50	36	-14	30	-20	37	0
	118	50	33	-17	29	-21	35	0
	120	50	33	-17	28	-22	34	0
	121	50	28	-22	27	-23	30	0
	123	50	26	-24	25	-25	29	0
	125	50	29	-21	27	-23	31	0
	126	50	26	-24	25	-25	29	0
	129	50	28	-22	28	-22	31	0
	139	50	21	-29	19	-31	23	0
	154	50	36	-14	20	-30	36	0
	156	50	34	-16	20	-30	34	0
	157	50	33	-17	20	-30	33	0
	159	50	33	-17	20	-30	33	0
6	132	39	22	-17	23	-16	26	0
	133	39	24	-15	24	-15	27	0
	137	39	19	-20	22	-17	24	0
7	108	45	48	3	32	-13	48	3
	109	45	49	4	33	-12	49	4
	110	45	47	2	32	-13	47	2
	Dulwich	45	49	4	47	2	51	6
8	142	42	15	-27	9	-33	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	37	29	-8	24	-13	30	0
	3	37	27	-10	22	-15	28	0
	4	37	28	-9	23	-14	29	0
	143	37	18	-19	22	-15	23	0
	144	37	20	-17	15	-22	21	0
	145	37	20	-17	17	-20	22	0
	146	37	19	-18	17	-20	21	0
	147	37	20	-17	17	-20	22	0
	148	37	20	-17	17	-20	22	0
	149	37	20	-17	17	-20	22	0
	150	37	21	-16	18	-19	23	0
	151	37	21	-16	17	-20	23	0
	152	37	24	-13	22	-15	26	0
10	5	36	29	-7	25	-11	30	0
	6	36	30	-6	26	-10	32	0
	8	36	31	-5	29	-7	33	0
	9	36	30	-6	31	-5	34	0
	10	36	29	-7	33	-3	34	0
	11	36	30	-6	30	-6	33	0
	13	36	31	-5	30	-6	33	0
11	7	38	29	-9	25	-13	31	0
	12	38	29	-9	23	-15	30	0
	14	38	31	-7	27	-11	32	0
	15	38	30	-8	26	-12	31	0
	16	38	31	-7	29	-9	33	0
	17	38	26	-12	27	-11	30	0
	18	38	24	-14	26	-12	28	0
	19	38	23	-15	17	-21	24	0
	20	38	24	-14	20	-18	25	0
	21	38	24	-14	20	-18	25	0
12	50	35	31	-4	28	-7	33	0
	51	35	29	-6	28	-7	31	0
	52	35	27	-8	26	-9	30	0
	53	35	29	-6	28	-7	32	0
	54	35	31	-4	30	-5	33	0
	55	35	27	-8	27	-8	30	0
	56	35	29	-6	29	-6	32	0
	57	35	28	-7	28	-7	31	0
	62	35	32	-3	30	-5	34	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	26	-10	22	-14	28	0
	23	36	26	-10	23	-13	28	0
	24	36	23	-13	19	-17	24	0
	25	36	22	-14	19	-17	24	0
	26	36	22	-14	19	-17	24	0
	27	36	22	-14	18	-18	24	0
	28	36	20	-16	17	-19	22	0
	29	36	23	-13	19	-17	24	0
	30	36	23	-13	20	-16	25	0
	31	36	24	-12	21	-15	26	0
	32	36	24	-12	21	-15	26	0
	34	36	26	-10	23	-13	28	0
	35	36	27	-9	22	-14	28	0
	36	36	25	-11	22	-14	27	0
	37	36	21	-15	21	-15	24	0
	38	36	25	-11	23	-13	27	0
	39	36	22	-14	20	-16	24	0
	40	36	20	-16	18	-18	22	0
	41	36	16	-20	14	-22	18	0
	42	36	25	-11	23	-13	27	0
	43	36	25	-11	25	-11	28	0
C	47	35	34	-1	31	-4	36	1
	63	35	32	-3	30	-5	34	0
	64	35	32	-3	32	-3	35	0
D	44	37	27	-10	25	-12	29	0
	48	37	29	-8	27	-10	31	0
	49	37	31	-6	28	-9	33	0
F	65	39	33	-6	32	-7	35	0
	66	39	33	-6	30	-9	35	0
	67	39	33	-6	31	-8	35	0
	68	39	36	-3	35	-4	39	0
	71	39	38	-1	38	-1	41	2
	72	39	38	-1	38	-1	41	2
	73	39	38	-1	38	-1	41	2
	76	39	37	-2	39	0	41	2

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	38	34	-4	41	3	42	4
3	87	40	40	0	38	-2	42	2
	106	40	41	1	32	-8	42	2
4	88	42	27	-15	24	-18	29	0
	91	42	30	-12	26	-16	31	0
	94	42	28	-14	26	-16	30	0
	95	42	30	-12	27	-15	32	0
	96	42	31	-11	28	-14	33	0
	99	42	27	-15	25	-17	29	0
	100	42	27	-15	25	-17	29	0
	105	42	29	-13	28	-14	31	0
	161	42	31	-11	28	-14	33	0
5	103	46	26	-20	26	-20	29	0
	104	46	26	-20	24	-22	28	0
	111	46	41	-5	32	-14	42	0
	112	46	37	-9	30	-16	38	0
	118	46	33	-13	29	-17	35	0
	120	46	34	-12	28	-18	35	0
	121	46	29	-17	27	-19	31	0
	123	46	26	-20	25	-21	29	0
	125	46	29	-17	27	-19	31	0
	126	46	27	-19	25	-21	29	0
	129	46	28	-18	28	-18	31	0
	139	46	22	-24	19	-27	24	0
	154	46	36	-10	20	-26	36	0
	156	46	35	-11	20	-26	35	0
	157	46	34	-12	20	-26	34	0
	159	46	33	-13	20	-26	33	0
6	132	41	23	-18	23	-18	26	0
	133	41	24	-17	24	-17	27	0
	137	41	19	-22	22	-19	24	0
7	108	42	49	7	32	-10	49	7
	109	42	50	8	33	-9	50	8
	110	42	48	6	32	-10	48	6
	Dulwich	42	50	8	47	5	52	10
8	142	42	15	-27	9	-33	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	40	29	-11	24	-16	30	0
	3	40	27	-13	22	-18	28	0
	4	40	29	-11	23	-17	30	0
	143	40	18	-22	22	-18	23	0
	144	40	20	-20	15	-25	21	0
	145	40	21	-19	17	-23	22	0
	146	40	19	-21	17	-23	21	0
	147	40	20	-20	17	-23	22	0
	148	40	21	-19	17	-23	22	0
	149	40	21	-19	17	-23	23	0
	150	40	21	-19	18	-22	23	0
	151	40	21	-19	17	-23	23	0
	152	40	24	-16	22	-18	26	0
10	5	39	30	-9	25	-14	31	0
	6	39	31	-8	26	-13	32	0
	8	39	31	-8	29	-10	33	0
	9	39	30	-9	31	-8	34	0
	10	39	30	-9	33	-6	35	0
	11	39	30	-9	30	-9	33	0
	13	39	32	-7	30	-9	34	0
11	7	41	30	-11	25	-16	31	0
	12	41	30	-11	23	-18	31	0
	14	41	32	-9	27	-14	33	0
	15	41	31	-10	26	-15	32	0
	16	41	32	-9	29	-12	34	0
	17	41	26	-15	27	-14	30	0
	18	41	25	-16	26	-15	28	0
	19	41	24	-17	17	-24	25	0
	20	41	25	-16	20	-21	26	0
	21	41	25	-16	20	-21	26	0
12	50	38	31	-7	28	-10	33	0
	51	38	30	-8	28	-10	32	0
	52	38	28	-10	26	-12	30	0
	53	38	30	-8	28	-10	32	0
	54	38	32	-6	30	-8	34	0
	55	38	28	-10	27	-11	30	0
	56	38	29	-9	29	-9	32	0
	57	38	29	-9	28	-10	32	0
	62	38	33	-5	30	-8	35	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	39	26	-13	22	-17	28	0
	23	39	27	-12	23	-16	28	0
	24	39	23	-16	19	-20	24	0
	25	39	23	-16	19	-20	25	0
	26	39	22	-17	19	-20	24	0
	27	39	22	-17	18	-21	24	0
	28	39	21	-18	17	-22	23	0
	29	39	24	-15	19	-20	25	0
	30	39	24	-15	20	-19	25	0
	31	39	25	-14	21	-18	26	0
	32	39	24	-15	21	-18	26	0
	34	39	26	-13	23	-16	28	0
	35	39	28	-11	22	-17	29	0
	36	39	26	-13	22	-17	28	0
	37	39	22	-17	21	-18	24	0
	38	39	26	-13	23	-16	28	0
	39	39	23	-16	20	-19	25	0
	40	39	20	-19	18	-21	22	0
	41	39	17	-22	14	-25	19	0
	42	39	25	-14	23	-16	27	0
	43	39	26	-13	25	-14	29	0
C	47	37	35	-2	31	-6	36	0
	63	37	33	-4	30	-7	35	0
	64	37	33	-4	32	-5	36	0
D	44	40	28	-12	25	-15	30	0
	48	40	30	-10	27	-13	32	0
	49	40	32	-8	28	-12	33	0
F	65	40	34	-6	32	-8	36	0
	66	40	34	-6	30	-10	36	0
	67	40	34	-6	31	-9	36	0
	68	40	37	-3	35	-5	39	0
	71	40	39	-1	38	-2	41	1
	72	40	38	-2	38	-2	41	1
	73	40	39	-1	38	-2	42	2
	76	40	38	-2	39	-1	42	2

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	31	-5	41	5	41	5
3	87	39	41	2	38	-1	43	4
	106	39	40	1	32	-7	41	2
4	88	37	27	-10	24	-13	29	0
	91	37	31	-6	26	-11	32	0
	94	37	28	-9	26	-11	30	0
	95	37	30	-7	27	-10	32	0
	96	37	32	-5	28	-9	34	0
	99	37	28	-9	25	-12	30	0
	100	37	27	-10	25	-12	29	0
	105	37	28	-9	28	-9	31	0
	161	37	32	-5	28	-9	33	0
5	103	42	25	-17	26	-16	29	0
	104	42	25	-17	24	-18	28	0
	111	42	40	-2	32	-10	41	0
	112	42	36	-6	30	-12	37	0
	118	42	33	-9	29	-13	35	0
	120	42	33	-9	28	-14	34	0
	121	42	28	-14	27	-15	30	0
	123	42	26	-16	25	-17	29	0
	125	42	29	-13	27	-15	31	0
	126	42	26	-16	25	-17	29	0
	129	42	28	-14	28	-14	31	0
	139	42	21	-21	19	-23	23	0
	154	42	36	-6	20	-22	36	0
	156	42	34	-8	20	-22	34	0
	157	42	33	-9	20	-22	33	0
	159	42	33	-9	20	-22	33	0
6	132	38	22	-16	23	-15	26	0
	133	38	23	-15	24	-14	26	0
	137	38	18	-20	22	-16	23	0
7	108	39	48	9	32	-7	48	9
	109	39	49	10	33	-6	49	10
	110	39	47	8	32	-7	47	8
	Dulwich	39	49	10	47	8	51	12
8	142	35	15	-20	9	-26	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	30	-8	24	-14	31	0
	3	38	27	-11	22	-16	28	0
	4	38	29	-9	23	-15	30	0
	143	38	17	-21	22	-16	23	0
	144	38	20	-18	15	-23	21	0
	145	38	20	-18	17	-21	22	0
	146	38	19	-19	17	-21	21	0
	147	38	19	-19	17	-21	21	0
	148	38	20	-18	17	-21	22	0
	149	38	20	-18	17	-21	22	0
	150	38	20	-18	18	-20	22	0
	151	38	20	-18	17	-21	22	0
	152	38	23	-15	22	-16	26	0
10	5	37	30	-7	25	-12	31	0
	6	37	31	-6	26	-11	32	0
	8	37	31	-6	29	-8	33	0
	9	37	30	-7	31	-6	34	0
	10	37	30	-7	33	-4	35	0
	11	37	30	-7	30	-7	33	0
	13	37	32	-5	30	-7	34	0
11	7	39	30	-9	25	-14	31	0
	12	39	30	-9	23	-16	31	0
	14	39	32	-7	27	-12	33	0
	15	39	31	-8	26	-13	32	0
	16	39	32	-7	29	-10	34	0
	17	39	25	-14	27	-12	29	0
	18	39	23	-16	26	-13	28	0
	19	39	21	-18	17	-22	22	0
	20	39	22	-17	20	-19	24	0
	21	39	22	-17	20	-19	24	0
12	50	35	23	-12	28	-7	29	0
	51	35	23	-12	28	-7	29	0
	52	35	22	-13	26	-9	28	0
	53	35	24	-11	28	-7	30	0
	54	35	24	-11	30	-5	31	0
	55	35	23	-12	27	-8	28	0
	56	35	25	-10	29	-6	31	0
	57	35	25	-10	28	-7	30	0
	62	35	25	-10	30	-5	31	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	24	-12	22	-14	26	0
	23	36	25	-11	23	-13	27	0
	24	36	21	-15	19	-17	23	0
	25	36	21	-15	19	-17	23	0
	26	36	20	-16	19	-17	22	0
	27	36	20	-16	18	-18	22	0
	28	36	19	-17	17	-19	21	0
	29	36	22	-14	19	-17	24	0
	30	36	22	-14	20	-16	24	0
	31	36	22	-14	21	-15	24	0
	32	36	22	-14	21	-15	25	0
	34	36	22	-14	23	-13	25	0
	35	36	21	-15	22	-14	25	0
	36	36	21	-15	22	-14	25	0
	37	36	18	-18	21	-15	22	0
	38	36	21	-15	23	-13	25	0
	39	36	18	-18	20	-16	22	0
	40	36	17	-19	18	-18	20	0
	41	36	14	-22	14	-22	17	0
	42	36	20	-16	23	-13	25	0
	43	36	21	-15	25	-11	26	0
C	47	35	25	-10	31	-4	32	0
	63	35	25	-10	30	-5	31	0
	64	35	27	-8	32	-3	33	0
D	44	38	22	-16	25	-13	27	0
	48	38	23	-15	27	-11	29	0
	49	38	23	-15	28	-10	29	0
F	65	38	27	-11	32	-6	33	0
	66	38	26	-12	30	-8	32	0
	67	38	27	-11	31	-7	33	0
	68	38	29	-9	35	-3	36	0
	71	38	32	-6	38	0	39	1
	72	38	32	-6	38	0	39	1
	73	38	32	-6	38	0	39	1
	76	38	32	-6	39	1	40	2

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	38	2	41	5	43	7
3	87	39	46	7	42	3	47	8
	106	39	46	7	39	0	47	8
4	88	37	38	1	35	-2	40	3
	91	37	39	2	34	-3	40	3
	94	37	38	1	34	-3	39	2
	95	37	39	2	35	-2	40	3
	96	37	40	3	35	-2	41	4
	99	37	37	0	34	-3	39	2
	100	37	37	0	33	-4	39	2
	105	37	40	3	35	-2	41	4
	161	37	40	3	33	-4	41	4
5	103	42	33	-9	34	-8	36	0
	104	42	36	-6	33	-9	38	0
	111	42	47	5	37	-5	47	5
	112	42	43	1	36	-6	44	2
	118	42	40	-2	39	-3	42	0
	120	42	40	-2	35	-7	41	0
	121	42	37	-5	34	-8	39	0
	123	42	36	-6	34	-8	38	0
	125	42	38	-4	34	-8	40	0
	126	42	37	-5	34	-8	39	0
	129	42	39	-3	34	-8	40	0
	139	42	33	-9	26	-16	34	0
	154	42	42	0	36	-6	43	1
	156	42	42	0	35	-7	43	1
	157	42	40	-2	33	-9	41	0
	159	42	40	-2	34	-8	41	0
6	132	38	36	-2	31	-7	37	0
	133	38	36	-2	30	-8	37	0
	137	38	33	-5	30	-8	35	0
7	108	39	52	13	39	0	52	13
	109	39	54	15	39	0	54	15
	110	39	53	14	38	-1	53	14
	Dulwich	39	51	12	50	11	54	15
8	142	35	27	-8	22	-13	28	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	36	-2	32	-6	37	0
	3	38	38	0	30	-8	39	1
	4	38	38	0	31	-7	39	1
	143	38	33	-5	30	-8	35	0
	144	38	34	-4	27	-11	35	0
	145	38	35	-3	29	-9	36	0
	146	38	34	-4	29	-9	35	0
	147	38	35	-3	29	-9	36	0
	148	38	34	-4	29	-9	35	0
	149	38	32	-6	29	-9	34	0
	150	38	35	-3	29	-9	36	0
	151	38	35	-3	29	-9	36	0
	152	38	35	-3	31	-7	36	0
10	5	37	39	2	33	-4	40	3
	6	37	40	3	34	-3	41	4
	8	37	41	4	35	-2	42	5
	9	37	41	4	38	1	43	6
	10	37	40	3	39	2	43	6
	11	37	40	3	35	-2	41	4
	13	37	41	4	36	-1	42	5
11	7	39	38	-1	33	-6	39	0
	12	39	39	0	30	-9	40	1
	14	39	41	2	33	-6	42	3
	15	39	39	0	32	-7	40	1
	16	39	41	2	35	-4	42	3
	17	39	35	-4	34	-5	38	0
	18	39	32	-7	32	-7	35	0
	19	39	36	-3	28	-11	37	0
	20	39	35	-4	27	-12	36	0
	21	39	35	-4	28	-11	36	0
12	50	35	33	-2	36	1	38	3
	51	35	33	-2	35	0	37	2
	52	35	26	-9	32	-3	33	0
	53	35	33	-2	35	0	37	2
	54	35	33	-2	35	0	37	2
	55	35	30	-5	33	-2	35	0
	56	35	31	-4	34	-1	36	1
	57	35	33	-2	35	0	37	2
	62	35	35	0	37	2	39	4

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 5. **Non Mine Owned: Part Pit Year 3**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	34	-2	31	-5	36	0
	23	36	35	-1	32	-4	37	1
	24	36	31	-5	30	-6	33	0
	25	36	32	-4	29	-7	34	0
	26	36	31	-5	28	-8	33	0
	27	36	30	-6	27	-9	32	0
	28	36	29	-7	27	-9	31	0
	29	36	31	-5	29	-7	33	0
	30	36	31	-5	29	-7	33	0
	31	36	32	-4	29	-7	34	0
	32	36	32	-4	30	-6	34	0
	34	36	33	-3	31	-5	35	0
	35	36	32	-4	30	-6	34	0
	36	36	30	-6	28	-8	32	0
	37	36	23	-13	23	-13	26	0
	38	36	32	-4	31	-5	34	0
	39	36	23	-13	22	-14	26	0
	40	36	21	-15	19	-17	23	0
	41	36	19	-17	19	-17	22	0
	42	36	31	-5	32	-4	35	0
	43	36	32	-4	31	-5	35	0
C	47	35	31	-4	36	1	37	2
	63	35	34	-1	37	2	39	4
	64	35	34	-1	38	3	40	5
D	44	38	32	-6	32	-6	35	0
	48	38	29	-9	34	-4	35	0
	49	38	33	-5	36	-2	38	0
F	65	38	34	-4	37	-1	39	1
	66	38	32	-6	37	-1	38	0
	67	38	33	-5	39	1	40	2
	68	38	36	-2	39	1	41	3
	71	38	38	0	42	4	43	5
	72	38	37	-1	42	4	43	5
	73	38	38	0	42	4	44	6
	76	38	39	1	43	5	45	7

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	35	31	-4	36	1	37	2
3	87	38	34	-4	38	0	39	1
	106	38	34	-4	32	-6	36	0
4	88	39	25	-14	24	-15	28	0
	91	39	26	-13	26	-13	29	0
	94	39	25	-14	26	-13	29	0
	95	39	26	-13	27	-12	29	0
	96	39	27	-12	28	-11	31	0
	99	39	24	-15	25	-14	28	0
	100	39	24	-15	25	-14	27	0
	105	39	27	-12	28	-11	30	0
	161	39	27	-12	28	-11	31	0
5	103	50	22	-28	26	-24	27	0
	104	50	22	-28	24	-26	26	0
	111	50	34	-16	32	-18	36	0
	112	50	30	-20	30	-20	33	0
	118	50	28	-22	29	-21	32	0
	120	50	29	-21	28	-22	32	0
	121	50	26	-24	27	-23	29	0
	123	50	24	-26	25	-25	28	0
	125	50	27	-23	27	-23	30	0
	126	50	24	-26	25	-25	28	0
	129	50	25	-25	28	-22	30	0
	139	50	22	-28	19	-31	24	0
	154	50	31	-19	20	-30	31	0
	156	50	30	-20	20	-30	30	0
	157	50	29	-21	20	-30	30	0
	159	50	28	-22	20	-30	29	0
6	132	39	22	-17	23	-16	26	0
	133	39	23	-16	24	-15	26	0
	137	39	17	-22	22	-17	23	0
7	108	45	40	-5	32	-13	41	0
	109	45	41	-4	33	-12	42	0
	110	45	39	-6	32	-13	40	0
	Dulwich	45	32	-13	47	2	47	2
8	142	42	14	-28	9	-33	15	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	37	29	-8	24	-13	30	0
	3	37	27	-10	22	-15	28	0
	4	37	28	-9	23	-14	29	0
	143	37	17	-20	22	-15	23	0
	144	37	20	-17	15	-22	21	0
	145	37	20	-17	17	-20	22	0
	146	37	18	-19	17	-20	20	0
	147	37	19	-18	17	-20	21	0
	148	37	20	-17	17	-20	22	0
	149	37	21	-16	17	-20	23	0
	150	37	21	-16	18	-19	23	0
	151	37	20	-17	17	-20	22	0
	152	37	22	-15	22	-15	25	0
10	5	36	29	-7	25	-11	30	0
	6	36	29	-7	26	-10	31	0
	8	36	30	-6	29	-7	32	0
	9	36	29	-7	31	-5	33	0
	10	36	29	-7	33	-3	34	0
	11	36	29	-7	30	-6	33	0
	13	36	31	-5	30	-6	33	0
11	7	38	29	-9	25	-13	31	0
	12	38	29	-9	23	-15	30	0
	14	38	31	-7	27	-11	32	0
	15	38	30	-8	26	-12	31	0
	16	38	31	-7	29	-9	33	0
	17	38	25	-13	27	-11	29	0
	18	38	24	-14	26	-12	28	0
	19	38	23	-15	17	-21	24	0
	20	38	24	-14	20	-18	25	0
	21	38	24	-14	20	-18	25	0
12	50	35	30	-5	28	-7	32	0
	51	35	29	-6	28	-7	31	0
	52	35	26	-9	26	-9	29	0
	53	35	29	-6	28	-7	32	0
	54	35	31	-4	30	-5	33	0
	55	35	26	-9	27	-8	29	0
	56	35	28	-7	29	-6	32	0
	57	35	27	-8	28	-7	31	0
	62	35	32	-3	30	-5	34	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

DAY CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	25	-11	22	-14	27	0
	23	36	26	-10	23	-13	28	0
	24	36	22	-14	19	-17	24	0
	25	36	22	-14	19	-17	24	0
	26	36	21	-15	19	-17	23	0
	27	36	21	-15	18	-18	23	0
	28	36	20	-16	17	-19	22	0
	29	36	23	-13	19	-17	24	0
	30	36	23	-13	20	-16	25	0
	31	36	24	-12	21	-15	26	0
	32	36	24	-12	21	-15	26	0
	34	36	25	-11	23	-13	27	0
	35	36	27	-9	22	-14	28	0
	36	36	25	-11	22	-14	27	0
	37	36	21	-15	21	-15	24	0
	38	36	24	-12	23	-13	26	0
	39	36	22	-14	20	-16	24	0
	40	36	19	-17	18	-18	21	0
	41	36	16	-20	14	-22	18	0
	42	36	24	-12	23	-13	27	0
	43	36	25	-11	25	-11	28	0
C	47	35	34	-1	31	-4	36	1
	63	35	31	-4	30	-5	33	0
	64	35	32	-3	32	-3	35	0
D	44	37	27	-10	25	-12	29	0
	48	37	29	-8	27	-10	31	0
	49	37	31	-6	28	-9	33	0
F	65	39	33	-6	32	-7	35	0
	66	39	33	-6	30	-9	35	0
	67	39	32	-7	31	-8	35	0
	68	39	35	-4	35	-4	38	0
	71	39	37	-2	38	-1	40	1
	72	39	37	-2	38	-1	41	2
	73	39	37	-2	38	-1	41	2
	76	39	37	-2	39	0	41	2

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	38	31	-7	36	-2	37	0
3	87	40	34	-6	38	-2	39	0
	106	40	35	-5	32	-8	37	0
4	88	42	25	-17	24	-18	28	0
	91	42	27	-15	26	-16	30	0
	94	42	25	-17	26	-16	29	0
	95	42	27	-15	27	-15	30	0
	96	42	28	-14	28	-14	31	0
	99	42	25	-17	25	-17	28	0
	100	42	24	-18	25	-17	27	0
	105	42	27	-15	28	-14	30	0
	161	42	28	-14	28	-14	31	0
5	103	46	23	-23	26	-20	28	0
	104	46	23	-23	24	-22	27	0
	111	46	35	-11	32	-14	37	0
	112	46	31	-15	30	-16	34	0
	118	46	29	-17	29	-17	32	0
	120	46	29	-17	28	-18	32	0
	121	46	26	-20	27	-19	29	0
	123	46	24	-22	25	-21	28	0
	125	46	27	-19	27	-19	30	0
	126	46	25	-21	25	-21	28	0
	129	46	25	-21	28	-18	30	0
	139	46	23	-23	19	-27	24	0
	154	46	31	-15	20	-26	31	0
	156	46	31	-15	20	-26	31	0
	157	46	29	-17	20	-26	30	0
	159	46	29	-17	20	-26	30	0
6	132	41	23	-18	23	-18	26	0
	133	41	23	-18	24	-17	26	0
	137	41	18	-23	22	-19	23	0
7	108	42	40	-2	32	-10	41	0
	109	42	41	-1	33	-9	42	0
	110	42	39	-3	32	-10	40	0
	Dulwich	42	32	-10	47	5	47	5
8	142	42	14	-28	9	-33	15	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	40	29	-11	24	-16	30	0
	3	40	27	-13	22	-18	28	0
	4	40	28	-12	23	-17	29	0
	143	40	17	-23	22	-18	23	0
	144	40	20	-20	15	-25	21	0
	145	40	20	-20	17	-23	22	0
	146	40	19	-21	17	-23	21	0
	147	40	20	-20	17	-23	22	0
	148	40	21	-19	17	-23	22	0
	149	40	21	-19	17	-23	23	0
	150	40	21	-19	18	-22	23	0
	151	40	21	-19	17	-23	23	0
	152	40	23	-17	22	-18	26	0
10	5	39	29	-10	25	-14	30	0
	6	39	30	-9	26	-13	32	0
	8	39	30	-9	29	-10	32	0
	9	39	29	-10	31	-8	33	0
	10	39	29	-10	33	-6	34	0
	11	39	29	-10	30	-9	33	0
	13	39	31	-8	30	-9	33	0
11	7	41	29	-12	25	-16	31	0
	12	41	29	-12	23	-18	30	0
	14	41	31	-10	27	-14	32	0
	15	41	30	-11	26	-15	31	0
	16	41	31	-10	29	-12	33	0
	17	41	24	-17	27	-14	29	0
	18	41	23	-18	26	-15	28	0
	19	41	22	-19	17	-24	23	0
	20	41	23	-18	20	-21	25	0
	21	41	23	-18	20	-21	25	0
12	50	38	29	-9	28	-10	32	0
	51	38	28	-10	28	-10	31	0
	52	38	25	-13	26	-12	29	0
	53	38	27	-11	28	-10	31	0
	54	38	28	-10	30	-8	32	0
	55	38	25	-13	27	-11	29	0
	56	38	26	-12	29	-9	31	0
	57	38	26	-12	28	-10	30	0
	62	38	29	-9	30	-8	32	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

EVENING CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	39	27	-12	22	-17	28	0
	23	39	27	-12	23	-16	28	0
	24	39	23	-16	19	-20	24	0
	25	39	24	-15	19	-20	25	0
	26	39	23	-16	19	-20	24	0
	27	39	23	-16	18	-21	24	0
	28	39	20	-19	17	-22	22	0
	29	39	24	-15	19	-20	25	0
	30	39	25	-14	20	-19	26	0
	31	39	26	-13	21	-18	27	0
	32	39	26	-13	21	-18	27	0
	34	39	28	-11	23	-16	29	0
	35	39	24	-15	22	-17	26	0
	36	39	23	-16	22	-17	26	0
	37	39	19	-20	21	-18	23	0
	38	39	23	-16	23	-16	26	0
	39	39	20	-19	20	-19	23	0
	40	39	18	-21	18	-21	21	0
	41	39	15	-24	14	-25	18	0
	42	39	25	-14	23	-16	27	0
	43	39	25	-14	25	-14	28	0
C	47	37	33	-4	31	-6	35	0
	63	37	29	-8	30	-7	32	0
	64	37	32	-5	32	-5	35	0
D	44	40	26	-14	25	-15	29	0
	48	40	29	-11	27	-13	31	0
	49	40	30	-10	28	-12	32	0
F	65	40	31	-9	32	-8	34	0
	66	40	31	-9	30	-10	34	0
	67	40	31	-9	31	-9	34	0
	68	40	34	-6	35	-5	38	0
	71	40	37	-3	38	-2	40	0
	72	40	37	-3	38	-2	41	1
	73	40	38	-2	38	-2	41	1
	76	40	33	-7	39	-1	40	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	24	-12	36	0	36	0
3	87	39	34	-5	38	-1	39	0
	106	39	35	-4	32	-7	37	0
4	88	37	26	-11	24	-13	28	0
	91	37	27	-10	26	-11	30	0
	94	37	25	-12	26	-11	29	0
	95	37	27	-10	27	-10	30	0
	96	37	28	-9	28	-9	31	0
	99	37	25	-12	25	-12	28	0
	100	37	24	-13	25	-12	27	0
	105	37	27	-10	28	-9	30	0
	161	37	28	-9	28	-9	31	0
5	103	42	23	-19	26	-16	28	0
	104	42	23	-19	24	-18	27	0
	111	42	35	-7	32	-10	37	0
	112	42	31	-11	30	-12	34	0
	118	42	29	-13	29	-13	32	0
	120	42	30	-12	28	-14	32	0
	121	42	27	-15	27	-15	30	0
	123	42	24	-18	25	-17	28	0
	125	42	27	-15	27	-15	30	0
	126	42	25	-17	25	-17	28	0
	129	42	25	-17	28	-14	30	0
	139	42	23	-19	19	-23	24	0
	154	42	32	-10	20	-22	32	0
	156	42	31	-11	20	-22	31	0
	157	42	30	-12	20	-22	30	0
	159	42	29	-13	20	-22	30	0
6	132	38	23	-15	23	-15	26	0
	133	38	24	-14	24	-14	27	0
	137	38	18	-20	22	-16	23	0
7	108	39	41	2	32	-7	42	3
	109	39	41	2	33	-6	42	3
	110	39	40	1	32	-7	41	2
	Dulwich	39	33	-6	47	8	47	8
8	142	35	15	-20	9	-26	16	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	30	-8	24	-14	31	0
	3	38	28	-10	22	-16	29	0
	4	38	29	-9	23	-15	30	0
	143	38	18	-20	22	-16	23	0
	144	38	21	-17	15	-23	22	0
	145	38	21	-17	17	-21	22	0
	146	38	19	-19	17	-21	21	0
	147	38	20	-18	17	-21	22	0
	148	38	21	-17	17	-21	22	0
	149	38	22	-16	17	-21	23	0
	150	38	22	-16	18	-20	23	0
	151	38	22	-16	17	-21	23	0
	152	38	23	-15	22	-16	26	0
10	5	37	30	-7	25	-12	31	0
	6	37	30	-7	26	-11	32	0
	8	37	31	-6	29	-8	33	0
	9	37	30	-7	31	-6	34	0
	10	37	29	-8	33	-4	34	0
	11	37	30	-7	30	-7	33	0
	13	37	31	-6	30	-7	33	0
11	7	39	30	-9	25	-14	31	0
	12	39	30	-9	23	-16	31	0
	14	39	32	-7	27	-12	33	0
	15	39	31	-8	26	-13	32	0
	16	39	31	-8	29	-10	33	0
	17	39	24	-15	27	-12	29	0
	18	39	23	-16	26	-13	28	0
	19	39	20	-19	17	-22	22	0
	20	39	21	-18	20	-19	24	0
	21	39	21	-18	20	-19	24	0
12	50	35	20	-15	28	-7	29	0
	51	35	20	-15	28	-7	28	0
	52	35	19	-16	26	-9	27	0
	53	35	21	-14	28	-7	29	0
	54	35	21	-14	30	-5	30	0
	55	35	20	-15	27	-8	27	0
	56	35	21	-14	29	-6	30	0
	57	35	21	-14	28	-7	29	0
	62	35	21	-14	30	-5	30	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

NIGHT CALM

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	24	-12	22	-14	26	0
	23	36	24	-12	23	-13	27	0
	24	36	21	-15	19	-17	23	0
	25	36	20	-16	19	-17	23	0
	26	36	20	-16	19	-17	22	0
	27	36	20	-16	18	-18	22	0
	28	36	18	-18	17	-19	21	0
	29	36	21	-15	19	-17	23	0
	30	36	21	-15	20	-16	23	0
	31	36	21	-15	21	-15	24	0
	32	36	21	-15	21	-15	24	0
	34	36	21	-15	23	-13	25	0
	35	36	19	-17	22	-14	24	0
	36	36	20	-16	22	-14	24	0
	37	36	17	-19	21	-15	22	0
	38	36	19	-17	23	-13	24	0
	39	36	17	-19	20	-16	22	0
	40	36	16	-20	18	-18	20	0
	41	36	13	-23	14	-22	17	0
	42	36	18	-18	23	-13	25	0
	43	36	19	-17	25	-11	26	0
C	47	35	22	-13	31	-4	31	0
	63	35	21	-14	30	-5	30	0
	64	35	23	-12	32	-3	33	0
D	44	38	19	-19	25	-13	26	0
	48	38	20	-18	27	-11	28	0
	49	38	21	-17	28	-10	29	0
F	65	38	21	-17	32	-6	32	0
	66	38	21	-17	30	-8	31	0
	67	38	22	-16	31	-7	32	0
	68	38	23	-15	35	-3	35	0
	71	38	25	-13	38	0	38	0
	72	38	25	-13	38	0	38	0
	73	38	25	-13	38	0	39	1
	76	38	25	-13	39	1	39	1

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
1	80	36	36	0	42	6	43	7
3	87	39	41	2	42	3	44	5
	106	39	42	3	39	0	44	5
4	88	37	34	-3	35	-2	37	0
	91	37	34	-3	34	-3	37	0
	94	37	32	-5	34	-3	36	0
	95	37	33	-4	35	-2	37	0
	96	37	35	-2	35	-2	38	1
	99	37	32	-5	34	-3	36	0
	100	37	32	-5	33	-4	36	0
	105	37	35	-2	35	-2	38	1
	161	37	35	-2	33	-4	37	0
5	103	42	31	-11	34	-8	36	0
	104	42	31	-11	33	-9	35	0
	111	42	40	-2	37	-5	42	0
	112	42	38	-4	36	-6	40	0
	118	42	35	-7	39	-3	40	0
	120	42	36	-6	35	-7	39	0
	121	42	33	-9	34	-8	37	0
	123	42	32	-10	34	-8	36	0
	125	42	33	-9	34	-8	37	0
	126	42	32	-10	34	-8	36	0
	129	42	34	-8	34	-8	37	0
	139	42	33	-9	26	-16	34	0
	154	42	31	-11	36	-6	37	0
	156	42	30	-12	35	-7	36	0
	157	42	28	-14	33	-9	34	0
	159	42	28	-14	34	-8	35	0
6	132	38	33	-5	31	-7	35	0
	133	38	33	-5	30	-8	35	0
	137	38	31	-7	30	-8	33	0
7	108	39	45	6	39	0	46	7
	109	39	45	6	39	0	46	7
	110	39	44	5	38	-1	45	6
	Dulwich	39	39	0	50	11	50	11
8	142	35	27	-8	22	-13	28	0

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
9	2	38	36	-2	32	-6	37	0
	3	38	37	-1	30	-8	38	0
	4	38	37	-1	31	-7	38	0
	143	38	32	-6	30	-8	34	0
	144	38	34	-4	27	-11	35	0
	145	38	34	-4	29	-9	35	0
	146	38	33	-5	29	-9	34	0
	147	38	34	-4	29	-9	35	0
	148	38	34	-4	29	-9	35	0
	149	38	32	-6	29	-9	34	0
	150	38	34	-4	29	-9	35	0
	151	38	35	-3	29	-9	36	0
	152	38	34	-4	31	-7	36	0
10	5	37	38	1	33	-4	39	2
	6	37	39	2	34	-3	40	3
	8	37	40	3	35	-2	41	4
	9	37	41	4	38	1	43	6
	10	37	40	3	39	2	43	6
	11	37	40	3	35	-2	41	4
	13	37	41	4	36	-1	42	5
11	7	39	37	-2	33	-6	38	0
	12	39	39	0	30	-9	40	1
	14	39	40	1	33	-6	41	2
	15	39	38	-1	32	-7	39	0
	16	39	40	1	35	-4	41	2
	17	39	34	-5	34	-5	37	0
	18	39	31	-8	32	-7	35	0
	19	39	35	-4	28	-11	36	0
	20	39	35	-4	27	-12	36	0
	21	39	35	-4	28	-11	36	0
12	50	35	32	-3	36	1	37	2
	51	35	32	-3	35	0	37	2
	52	35	24	-11	32	-3	33	0
	53	35	32	-3	35	0	37	2
	54	35	32	-3	35	0	37	2
	55	35	28	-7	33	-2	34	0
	56	35	30	-5	34	-1	35	0
	57	35	31	-4	35	0	36	1
	62	35	33	-2	37	2	38	3

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 6. **Non Mine Owned Part Pit Year 6**

NIGHT INVERSION

Noise Assessment Group	Residence Reference	Criteria	Open Cut Total dBA	OC Diff	Underground Total dBA	Underground Diff	Logarithmic Total dBA	Combined Vs Criteria
A	22	36	33	-3	31	-5	35	0
	23	36	34	-2	32	-4	36	0
	24	36	30	-6	30	-6	33	0
	25	36	30	-6	29	-7	32	0
	26	36	29	-7	28	-8	32	0
	27	36	29	-7	27	-9	31	0
	28	36	28	-8	27	-9	30	0
	29	36	30	-6	29	-7	32	0
	30	36	30	-6	29	-7	33	0
	31	36	30	-6	29	-7	33	0
	32	36	31	-5	30	-6	33	0
	34	36	31	-5	31	-5	34	0
	35	36	31	-5	30	-6	33	0
	36	36	29	-7	28	-8	32	0
	37	36	21	-15	23	-13	25	0
	38	36	30	-6	31	-5	33	0
	39	36	22	-14	22	-14	25	0
	40	36	20	-16	19	-17	23	0
	41	36	18	-18	19	-17	22	0
	42	36	30	-6	32	-4	34	0
	43	36	31	-5	31	-5	34	0
C	47	35	27	-8	36	1	37	2
	63	35	31	-4	37	2	38	3
	64	35	31	-4	38	3	39	4
D	44	38	30	-8	32	-6	34	0
	48	38	25	-13	34	-4	34	0
	49	38	29	-9	36	-2	37	0
F	65	38	32	-6	37	-1	38	0
	66	38	31	-7	37	-1	38	0
	67	38	30	-8	39	1	39	1
	68	38	34	-4	39	1	40	2
	71	38	35	-3	42	4	43	5
	72	38	35	-3	42	4	43	5
	73	38	36	-2	42	4	43	5
	76	38	36	-2	43	5	44	6

Note 1: Marginal Management Zone 1 to 2 dBA (Green)
Note 2: Moderate Management Zone 3 to 5 dBA (Blue)
Note 3: Noise Affection Zone >5 dBA (Red)

Table 7. Summary: Maximum Emissions and Criteria Exceedances per Time Period and Scenario

Noise Assessment Group	Residence Reference	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria
		Day Time Calm		Evening Time Calm		Night Time Calm		Night Time Inversion	
1	80	38.1[2,3]	3.1	38.5[2,3]	0.5	38.1[2]	2.1	44.4[1,2]	8.4
3	87	42.8[1]	4.8	43.5[1]	3.5	43.5[1]	4.5	47.3[1,5]	8.3
	106	40.7[5]	2.7	41.6[5]	1.6	41.6[1,3]	2.6	46.8[1,5]	7.8
4	88	29.5[3]	0.0	29.5[3]	0.0	30.2[3]	0.0	39.6[3,5]	2.6
	91	30.8[5]	0.0	31.5[5]	0.0	32.2[5]	0.0	40.2[1,5]	3.2
	94	29.5[1,3,5]	0.0	30.1[3,5]	0.0	30.1[5]	0.0	39.5[3,5]	2.5
	95	31.0[3,5]	0.0	31.7[3,5]	0.0	31.7[3,5]	0.0	40.4[5]	3.4
	96	32.9[3,5]	0.0	33.6[3]	0.0	34.3[3]	0.0	41.3[5]	4.3
	99	29.3[5]	0.0	29.3[1,6]	0.0	29.9[5]	0.0	38.7[5]	1.7
	100	28.4[3,5]	0.0	29.0[5]	0.0	29.0[1,3,5]	0.0	38.5[5]	1.5
	105	31.5[3]	0.0	32.1[3]	0.0	32.1[3]	0.0	41.3[1,3,5]	4.3
	161	32.8[3,5]	0.0	33.5[3]	0.0	34.2[3]	0.0	40.8[5]	3.8
5	103	29.0[1,4]	0.0	29.0[1,5]	0.0	29.6[1]	0.0	37.0[3]	0.0
	104	33.6[4]	0.0	28.3[1,5]	0.0	28.9[1]	0.0	42.5[4]	0.5
	111	40.7[5]	0.0	41.6[5]	0.0	40.7[1,3,5]	0.0	47.4[5]	5.4
	112	37.0[1,5]	0.0	37.8[1,5]	0.0	37.8[1]	0.0	44.7[1]	2.7
	118	34.5[5]	0.0	34.5[1,5]	0.0	35.3[1]	0.0	43.0[1]	1.0
	120	34.2[5]	0.0	35.0[5]	0.0	35.0[1]	0.0	41.3[1]	0.0
	121	31.0[1]	0.0	31.0[1,3,5]	0.0	31.0[1,3]	0.0	39.6[1]	0.0
	123	28.5[1,5]	0.0	28.5[1,3,5]	0.0	29.1[1]	0.0	38.7[1]	0.0
	125	31.0[1,5]	0.0	31.0[1,3,5]	0.0	31.6[1]	0.0	39.6[1,5]	0.0
	126	29.1[1]	0.0	29.1[1,5]	0.0	29.1[1]	0.0	38.6[1,5]	0.0
	129	31.0[1,5]	0.0	32.7[4]	0.0	32.7[4]	0.0	41.0[1]	0.0
	139	23.6[3,6]	0.0	24.3[3,6]	0.0	24.3[3,6]	0.0	35.6[1]	0.0
	154	36.1[5]	0.0	36.1[1,5]	0.0	37.1[1]	0.0	43.0[1,2]	1.0

Footnote = 1: Full Pit Year 1, 2: Full Pit Year 4, 3: Full Pit Year 6, 4: Full Pit Year 8, 5: Part Pit Year 3, 6: Part Pit Year 6

Noise Assessment Group	Residence Reference	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria
		Day Time Calm		Evening Time Calm		Night Time Calm		Night Time Inversion	
	156	35.1[1]	0.0	36.1[1]	0.0	36.1[1]	0.0	42.8[2,5]	0.8
	157	33.2[5]	0.0	34.2[5]	0.0	34.2[1]	0.0	40.8[1,2,3,5]	0.0
	159	33.2[5]	0.0	33.2[1,5]	0.0	34.2[1]	0.0	41.8[1,2]	0.0
6	132	27.2[4]	0.0	27.2[4]	0.0	27.8[4]	0.0	38.0[1]	0.0
	133	26.9[1,5]	0.0	26.9[1,2,3,4,5]	0.0	27.5[4]	0.0	36.9[5]	0.0
	137	24.0[1,4]	0.0	24.0[1,4]	0.0	24.4[1,4]	0.0	35.3[1]	0.0
7	108	48.1[5]	3.1	49.1[5]	7.1	48.1[5]	9.1	52.2[5]	13.2
	109	49.1[5]	4.1	50.1[5]	8.1	49.1[3,5]	10.1	54.1[5]	15.1
	110	47.2[5]	2.2	48.1[5]	6.1	47.2[3,5]	8.2	53.1[5]	14.1
	Dulwich	52.5[1]	7.5	52.5[1]	10.5	52.5[1]	13.5	54.8[1]	15.8
8	142	16.8[1]	0.0	16.8[1]	0.0	16.8[1]	0.0	28.2[1,2,3,4,5,6]	0.0
9	2	30.1[1,5,6]	0.0	30.9[1]	0.0	30.9[1,3,5,6]	0.0	37.4[1,3,5,6]	0.0
	3	28.2[1,2,3,5,6]	0.0	28.9[1]	0.0	28.9[2,6]	0.0	38.7[3,5]	0.7
	4	29. 2[1,2,3,5,6]	0.0	29.9[2,5]	0.0	29.9[1,2,3,5,6]	0.0	38.8[1,2,3,5]	0.8
	143	23.3[1,2,3,5,6]	0.0	23.6[1]	0.0	23.6[1]	0.0	35.5[1]	0.0
	144	21.2[1,3,5,6]	0.0	22.0[1,3]	0.0	22.0[1,3]	0.0	35.7[1]	0.0
	145	22.4[1]	0.0	22.4[1,3,5]	0.0	22.4[1,3,6]	0.0	35.9[1,3,5]	0.0
	146	21.0[1,3,5]	0.0	21.6[1]	0.0	21.6[1]	0.0	35.1[1,5]	0.0
	147	21.9[1,5]	0.0	22.5[1]	0.0	22.5[1]	0.0	36.0[1,5]	0.0
	148	21.7[1,3,5,6]	0.0	22.4[1,3,5,6]	0.0	22.4[1,3,6]	0.0	35.1[1,2,3,4,5,6]	0.0
	149	22.6[1,3,6]	0.0	22.6[1,3,5,6]	0.0	23.3[6]	0.0	33.7[1,2,3,4,5,6]	0.0
	150	22.8[1,3,5,6]	0.0	23.4[1]	0.0	23.4[3,6]	0.0	35.9[3,5]	0.0
	151	22.6[1,3,5]	0.0	23.3[1]	0.0	23.3[1,3,6]	0.0	35.9[1,2,3,5,6]	0.0
	152	26.3[1,5]	0.0	26.9[1]	0.0	26.9[1]	0.0	36.4[1]	0.0
10	5	31.1[3]	0.0	31.1[1,2,3,5]	0.0	31.9[3]	0.0	39.9[1,3,5]	2.9
	6	31.6[1,2,3,5]	0.0	32.3[5]	0.0	32.3[3,5]	0.0	41.0[1,2,3,5]	4.0
	8	33.1[5]	0.0	33.1[1,5]	0.0	33.1[1,2,3,4,5,6]	0.0	41.9[1,2,3,5]	4.9
	9	33.8[2,3,5]	0.0	33.8[1,2,3,5]	0.0	33.8[1,2,3,5,6]	0.0	42.8[1,2,3,4,5,6]	5.8

Footnote = 1: Full Pit Year 1, 2: Full Pit Year 4, 3: Full Pit Year 6, 4: Full Pit Year 8, 5: Part Pit Year 3, 6: Part Pit Year 6

Noise Assessment Group	Residence Reference	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria
		Day Time Calm		Evening Time Calm		Night Time Calm		Night Time Inversion	
	10	34.4[1,2,3,5,6]	0.0	34.7[2,5]	0.0	34.7[1,5]	0.0	42.6[1,2,3,5,6]	5.6
	11	33.2[2,5]	0.0	33.2[2,5]	0.0	33.2[1,5]	0.0	41.1[1,2,3,4,5,6]	4.1
	13	33.4[2,3,5,6]	0.0	34.0[2,5]	0.0	34.0[1,2,3]	0.0	43.0[1,2]	6.0
11	7	31.3[1]	0.0	31.3[1,2,5]	0.0	31.3[1,2,3,5,6]	0.0	39.1[1,2,3,5]	0.1
	12	30.1[1,2,3,5,6]	0.0	30.9[1,2,5]	0.0	30.9[1,2,3,4,5,6]	0.0	39.6[1,2,3,5,6]	0.6
	14	32.4[1,2,3,5,6]	0.0	33.2[1,2,5]	0.0	33.2[1,2,3,5,6]	0.0	41.7[1,3,5]	2.7
	15	31.4[1,2,3,5,6]	0.0	32.1[1,2,5]	0.0	32.9[2]	0.0	39.7[1,2,3,5]	0.7
	16	33.0[1,2,3,5,6]	0.0	33.7[1,2,5]	0.0	33.7[1,2,5]	0.0	42.1[1,2,3,5]	3.1
	17	30.1[1]	0.0	30.6[1]	0.0	29.6[1]	0.0	37.6[1,2,3,5]	0.0
	18	29.4[1]	0.0	30.0[1]	0.0	28.0[1]	0.0	35.1[1,2,3,5]	0.0
	19	34.1[1]	0.0	35.1[1]	0.0	23.2[1]	0.0	36.7[1,2,3,5]	0.0
	20	36.1[1]	0.0	37.1[1]	0.0	24.2[1,2,3,5]	0.0	35.6[1,2,3,4,5,6]	0.0
	21	36.1[1]	0.0	37.1[1]	0.0	24.1[1,2,3,5]	0.0	35.8[1,2,3,5,6]	0.0
12	50	32.7[1,2,3,5]	0.0	33.4[1,2]	0.0	30.1[3]	0.0	38.5[1,2]	3.5
	51	32.6[1]	0.0	33.3[1]	0.0	29.5[1,2,3]	0.0	37.4[1]	2.4
	52	30.2[1]	0.0	30.8[1]	0.0	28.2[3]	0.0	34.4[3]	0.0
	53	32.3[1,2,3]	0.0	32.9[1]	0.0	30.7[3]	0.0	38.0[1]	3.0
	54	34.1[1]	0.0	34.1[2,5]	0.0	31.7[2,3]	0.0	38.6[1]	3.6
	55	30.9[1]	0.0	31.6[1]	0.0	28.8[3]	0.0	35.1[2,3]	0.1
	56	32.1[1,2,5]	0.0	32.6[2]	0.0	30.9[1,2,3]	0.0	36.5[1]	1.5
	57	31.6[1,3]	0.0	32.2[1]	0.0	30.2[1,2,3]	0.0	37.8[1]	2.8
	62	34.7[2,3]	0.0	35.4[2]	0.0	32.1[2,3]	0.0	40.0[1]	5.0
A	22	36.2[1]	0.2	37.1[1]	0.0	26.2[1,2,3,5,6]	0.0	36.5[1,2,3]	0.5
	23	36.2[1]	0.2	37.2[1]	0.0	27.1[3,5]	0.0	37.4[1,2]	1.4
	24	30.3[1]	0.0	30.3[1]	0.0	23.8[3]	0.0	33.3[1,2,3,5]	0.0
	25	31.3[1]	0.0	32.2[1]	0.0	23.3[1,2,3,5]	0.0	34.4[1]	0.0

Footnote = 1: Full Pit Year 1, 2: Full Pit Year 4, 3: Full Pit Year 6, 4: Full Pit Year 8, 5: Part Pit Year 3, 6: Part Pit Year 6

Noise Assessment Group	Residence Reference	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria	Maximum dBA emission	Maximum dBA exceedance above criteria
		Day Time Calm		Evening Time Calm		Night Time Calm		Night Time Inversion	
A	26	30.3[1]	0.0	31.3[1]	0.0	23.0[3]	0.0	33.4[1]	0.0
	27	29.3[1]	0.0	31.2[1]	0.0	22.8[3]	0.0	33.3[1]	0.0
	28	26.6[1]	0.0	27.5[1]	0.0	21.3[1,2,3,5]	0.0	32.4[1]	0.0
	29	28.5[1]	0.0	29.4[1]	0.0	23.7[3,5]	0.0	34.4[1]	0.0
	30	32.2[1]	0.0	33.2[1]	0.0	24.0[3,5]	0.0	34.4[1]	0.0
	31	35.2[1]	0.0	36.1[1]	0.0	24.3[1,2,3,5]	0.0	34.6[1]	0.0
	32	36.1[1]	0.1	37.1[1]	0.0	24.5[2,3,5]	0.0	34.7[1]	0.0
	34	38.1[1]	2.1	39.1[1]	0.1	25.9[3]	0.0	35.7[3]	0.0
	35	38.1[1]	2.1	39.1[1]	0.1	25.1[3]	0.0	34.7[2,3]	0.0
	36	29.1[1]	0.0	29.1[1]	0.0	25.2[2,3]	0.0	33.5[1,2,3]	0.0
	37	24.9[1]	0.0	25.6[1]	0.0	22.8[1,2,3]	0.0	27.3[3]	0.0
	38	29.2[1]	0.0	29.9[1]	0.0	25.9[3]	0.0	35.1[1]	0.0
	39	25.6[1]	0.0	26.3[1]	0.0	23.2[3]	0.0	26.3[2,3]	0.0
	40	24.1[1]	0.0	24.1[1]	0.0	20.8[1,3]	0.0	25.3[3]	0.0
	41	19.5[1]	0.0	19.5[1]	0.0	17.6[1,2,3]	0.0	25.3[3]	0.0
	42	30.1[1]	0.0	30.9[1]	0.0	26.3[3]	0.0	35.6[1]	0.0
	43	33.6[1]	0.0	34.5[1]	0.0	27.5[3]	0.0	35.9[1]	0.0
C	47	35.7[2,3,5,6]	0.7	36.4[5]	0.0	32.4[2,3]	0.0	38.6[2]	3.6
	63	34.1[2,3,5]	0.0	34.7[2,5]	0.0	31.7[2,3]	0.0	40.2[2]	5.2
	64	35.6[2,3]	0.6	36.2[2]	0.0	33.9[2,3]	0.0	41.2[2]	6.2
D	44	32.8[1]	0.0	33.7[1]	0.0	27.3[2,3]	0.0	35.5[2,3]	0.0
	48	31.9[2,3]	0.0	31.9[2,3,5]	0.0	29.3[2,3]	0.0	36.1[1]	0.0
	49	32.7[2,3,5,6]	0.0	33.4[2,5]	0.0	29.7[3]	0.0	38.7[2]	0.7
F	65	35.4[2,3,5,6]	0.0	36.0[2,5]	0.0	33.3[1,2,3]	0.0	39.0[1,2,3]	1.0
	66	34.9[2,3,5,6]	0.0	35.5[2,5]	0.0	32.0[1,3]	0.0	38.6[3]	0.6
	67	35.3[2,3,5]	0.0	35.9[2,5]	0.0	33.0[1,2,3]	0.0	40.2[3]	2.2
	68	38.6[2,3,5]	0.0	39.2[2,5]	0.0	36.9[3]	0.0	41.7[1]	3.7
	71	40.9[2,3,5]	1.9	41.4[2,5]	1.4	39.3[2,3]	1.3	43.9[1]	5.9
	72	41.1[2,3,5]	2.1	41.6[2,3]	1.6	39.6[2,3]	1.6	44.0[1]	6.0
	73	41.7[2]	2.7	42.3[2]	2.3	40.0[2]	2.0	44.2[1,2]	6.2
	76	41.5[2,3]	2.5	42.0[2]	2.0	40.8[2]	2.8	45.4[1,2]	7.4

Footnote = 1: Full Pit Year 1, 2: Full Pit Year 4, 3: Full Pit Year 6, 4: Full Pit Year 8, 5: Part Pit Year 3, 6: Part Pit Year 6

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