

# Amenity Management Plan

## Hunter Valley Gliding Club

October 2012

Final V8.0

## Contents page

1.	Introduction	7
1.1	Background	7
1.2	Scope	9
1.3	Approach to the development of the AMP	10
1.4	Purpose of the AMP	11
1.5	Report structure	11
2.	Risk assessment	13
3.	Changes to mine plan	15
4.	Potential impacts on the Hunter Valley Gliding Club	16
4.1	Obstacle Limitation Surface	16
4.2	Acoustics	18
4.2.1	Noise approval limits	18
4.2.2	Modelling approach	18
4.2.3	Operational noise level predictions	18
4.2.4	Conclusion	19
4.3	Air Quality	19
4.3.1	Air Quality approval limits	19
4.3.2	Modelling approach	20
4.3.3	Operational air quality predictions	21
4.3.4	Conclusion	23
4.4	Infrastructure	23
5.	Management and monitoring measures	25
5.1	Obstacle Limitation Surface	25
5.2	Alternative Accommodation	25
5.3	Noise	25
5.3.1	Management measures	25
5.3.2	Monitoring measures	26
5.4	Air Quality	27
5.4.1	Management measures	27
5.4.2	Monitoring measures	28
6.	Notification procedures	29
6.1	OLS impingement permission procedure	31
6.2	Procedure to advise that a noise limit has been exceeded	31
6.3	Procedure to advise if air quality limits has been exceeded	32
6.4	Gliding activities and occupancy advice procedure	32

6.5	Blast notice procedure	33
7.	Audits and reviews	36
8.	References	37
<b>Appendix A</b>	<b>Mine Progression Plans for Permitted Mining</b>	<b>39</b>
<b>Appendix B</b>	<b>Acoustic Assessment (EMGA, October 2009)</b>	<b>41</b>
<b>Appendix C</b>	<b>Air Assessment (PAEHolmes, August 2009)</b>	<b>43</b>
<b>Appendix D</b>	<b>Superseded Mine Progression Plans (Historical reference only)</b>	<b>44</b>

## Figures

Figure 1-1 – HVGC within the Project Approval boundary of HVO South .....	8
Figure 4-1 – OLS for mining in close proximity to the HVGC.....	17
Figure 4-2 – Location of modelled receivers .....	21
Figure 4-3 – Predicted average 24-hour PM <sub>10</sub> concentrations receiver D due to mining emissions with no special controls .....	22
Figure 4-4 – Predicted average 24-hour PM <sub>10</sub> concentrations receiver D due to mining emissions with dragline operations suspended .....	22
Figure 6-1 – Notifiable activities .....	30
Figure 6-2 – Coal & Allied notification procedures flowchart.....	34
Figure 6-3 - HVGC notification procedures flowchart.....	35

## Tables

Table 4.1- HVGC Air Quality Impact Assessment Criteria .....	20
--------------------------------------------------------------	----

## Acronyms

<b><i>Abbreviation</i></b>	<b><i>Description</i></b>
<i>AMP</i>	Amenity Management Plan
<i>CASA</i>	Civil Aviation Safety Authority
<i>Coal &amp; Allied</i>	Coal & Allied Operations Pty Limited
<i>DA</i>	Development Application
<i>dB(A)</i>	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
<i>DoP</i>	NSW Department of Planning
<i>ENM</i>	Environmental Noise Model
<i>ERM</i>	Environmental Resources Management Australia Pty Limited
<i>g/m<sup>2</sup>/month</i>	grams per square metre per month
<i>HVGC</i>	Hunter Valley Gliding Club
<i>HVO South</i>	Hunter Valley Operations South
<i>INP</i>	Industrial Noise Policy
<i>ISCMOD</i>	modified version of the United States Environmental Protection Agency ISCST3 model
<i>km</i>	kilometres
<i>L<sub>10,15minute</sub></i>	A noise level which is exceeded 10% of the time (in this case 15-minutes). It is approximately equivalent to the average of maximum noise levels.
<i>L<sub>90,15minute</sub></i>	Commonly referred to as the background noise, this is the level exceeded 90% of the time (in this case 15-minutes).
<i>Leq(15 minute)</i>	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period (in this case 15-minutes).
<i>L<sub>max</sub></i>	The maximum root mean squared (RMS) sound pressure level received at the microphone during a measuring interval.
<i>LCPP</i>	Lemington Coal Preparation Plant
<i>m</i>	metres
<i>NSW</i>	New South Wales
<i>OLS</i>	Obstacle Limitation Surfaces
<i>PM<sub>10</sub></i>	Particulate Matter of 10 microns in diameter or smaller
<i>TEOM</i>	tapered element oscillating microbalance monitor
<i>TSP</i>	Total Suspended Particulates
<i>µg/m<sup>3</sup></i>	micrograms/cubic metre

## **1. Introduction**

### **1.1 Background**

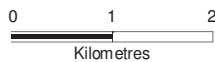
The Hunter Valley Operations South (HVO South) Coal Project (06\_0261) was approved by the Director-General of the New South Wales (NSW) Department of Planning (DoP) on 24 March 2009.


Condition 49 of the approval requires the proponent, Coal & Allied Operations Pty Limited (Coal & Allied), to prepare an Amenity Management Plan (AMP) for the Hunter Valley Gliding Club (HVGC) which owns land and operates within the HVO South project approval boundary.


The HVGC operates from a single grass airstrip approximately 1.6 kilometre (km) long and oriented along the vector 2900 to 1100 (west-north-west to east-south-east). In addition to the airstrip, HVGC facilities comprise a clubhouse, hangar/workshop buildings, glider trailer storage area, and caravan site. Although the HVGC site has no approval for permanent residential dwelling nor is it used for this purpose, it is occupied most weekends and on less frequent occasions it is occupied continuously for 1 to 2 weeks. Figure 1.1 depicts HVGC within the HVO South project approval boundary.

Coal & Allied and the HVGC entered into a Deed of Agreement (Deed) for the 'Warkworth Airstrip' on 11 April 2002. The Concessions and Mitigation Agreement between Coal & Allied and HVGC (the Concessions and Mitigation Agreement) was subsequently prepared to replace the Deed. This AMP is an annexure to the Concessions and Mitigation Agreement. Coal & Allied has developed the Concessions and Mitigation Agreement to record concessions and mitigations made by Coal & Allied to the Gliding Club in consideration for the Gliding Club agreeing to the AMP. The Concessions and Mitigation Agreement also acts as negotiated noise agreement and a negotiated written air quality agreement (See conditions 2 and 19 of PA 06-0261).

This AMP has been developed in consultation with HVGC, PAEHolmes air quality consultants and EMGAMM acoustic engineers. Representatives from Coal & Allied and HVGC have held a series of meetings during the development of this AMP to discuss AMP matters.



 HVO South project approval boundary

 Indicative footprint of Hunter Valley Gliding Club

Narooma

rii tt ii

h ii

III ii II

s

is ii

iv ii

ii

ii tt

iii  
wort

Figure 1.1

HVGC within the HVO South project approval boundary

Hunter Valley Gliding Club Amenity Management Plan



## 1.2 Scope

Consultation between Coal & Allied and HVGC has led to the decision to broaden the scope of the HVGC AMP to not only address amenity issues but to also encompass other approval conditions that relate to the HVGC. The relevant conditions are given below.

### *Condition 47*

*While HVGC continues to use its facilities within the site, the Proponent shall maintain an agreement with HVGC to address the potential impact of the mine on the use and operation on HVGC's facilities, including the potential impact to the flight paths from dragline operations. This agreement shall take into consideration the impacts of the dragline position on:*

- Useable length of the runway;*
- Interference with flight paths; and*
- Guidelines of the Department of Aviation.*

*Note: This condition shall cease to operate if both parties agree to terminate the agreement and the need for an agreement.*

### *Condition 48*

*The Proponent shall not conduct any activity associated with the Project above the obstacle limitation surface (OLS) as shown in Figure 2.3 of the HVO South Coal Project Response to Submissions Report (July 2008) unless agreed with HVGC. Figure 2.3 has been included within this report as Figure 4.1.*

### *Condition 49*

*The Proponent shall develop an Amenity Management Plan for HVGC's facilities within the site. This Plan shall:*

- a) be prepared in consultation with the Hunter Valley Gliding Club;*
- b) be submitted to the Director-General for approval 6 months prior to the commencement of mining in the Riverview South East Extension Area, or otherwise agreed by the Director-General;*
- c) include a risk assessment to identify those circumstances most likely to generate impacts from mining operations on gliding activities and use of the club's residential facilities;*

- d) include details of any proposed modifications to the HVO South mine plan to exclude land owned by the Hunter Valley Gliding Club;*
- e) provide for additional air quality and noise monitoring of the potential impacts of modified mining activities; and*
- f) identify and implement management measures for mining activities to ensure that air quality and noise emissions meet respective impact assessment criteria, or obtain written agreement from the Hunter Valley Gliding Club to exceed these criteria*
- g) to the satisfaction of the Director-General.*

*If the Proponent and HVGC cannot agree on the level or composition of the Amenity Management Plan, then either party may refer the matter to the Director-General for resolution.*

*Should the Hunter Valley Gliding Club cease to operate its facilities at the site, the Proponents obligations under this condition shall cease.*

In addition, the AMP covers the management of additional HVGC infrastructure including access roads, services, drainage, and fencing.

### **1.3 Approach to the development of the AMP**

The following tasks were undertaken in the development of the AMP:

- a risk assessment to identify those circumstances most likely to generate impacts from mining operations on gliding activities and use of the HVGC's residential facilities;
- modification to the existing mine plans to minimise the potential for impact of the identified risks;
- assessment of the modified mine plan to identify the potential impacts to amenity and the Obstacle Limitation Surface\* (OLS);
- development of management and monitoring measures and notification procedures to manage potential impacts; and
- report development.

It is noted that a parcel of land located to the south-west of the airstrip is owned by United Collieries Pty Limited (United).

For the purposes of this AMP, the "revised mine plan" or "revised Glider Pit mine plan" is indicated generally in Attachment D and assumes a scenario of Coal & Allied acquiring that United owned land and encroaches on this land.

Attachment D mine progression plans are superseded and included as a historic reference point only to indicate generally the extent of mining on which the impacts assessments in this AMP were primarily based.

For the purposes of this AMP, the “Permitted Mining” Coal & Allied is proceeding with is generally described in Appendix A and excludes mining on the United owned land.

The revised Glider Pit mine plan has formed the basis of air quality, noise, air safety and infrastructure assessments presented in this AMP. This plan outlines the greatest predicted impact on the Gliding Club. Given the permitted mine plan does not utilise the United-owned land, it would be possible for the level of impact to be less than that outlined due to the disturbance footprint being smaller.

A mine plan progression schematic, that illustrates the progression of mining associated with the Permitted Mining mine plan, is presented in Appendix A.

It is noted that, during the course of operational implementation, minor alterations to these mine plans may occur. However, consistent with the above, in all cases the potential environmental and safety impacts would remain within the envelope of effects reported in this AMP and managed through the measures included herein.

\* CASA 2003 defines an OLS as “*conceptual (imaginary) surfaces associated with a runway, which identify the lower limits of the aerodrome airspace above which objects become obstacles to aircraft operations*”.

#### **1.4 Purpose of the AMP**

As an annexure to the Concessions and Mitigation Agreement, the purpose of this AMP is to set out the detailed measures that will be put in place to properly manage noise, air quality and OLS impacts on the HVGIC resulting from mining operations within HVO South. The AMP may be subject to change. Triggers for modification may include, for example, the results of AMP auditing and review.

In preparing and submitting this document, Coal & Allied will be satisfying Conditions 47, 48 and 49 and complying with Conditions 2 and 19 of Schedule 3 of the Project Approval.

#### **1.5 Report structure**

The AMP is structured as follows.

Chapter 1 – Introduction; provides an introduction and background to the AMP and identifies the scope and purpose of the report.

Chapter 2 – Risk assessment; identifies those circumstances most likely to generate impacts from mining operations on gliding activities and use of the club’s residential facilities.

Chapter 3 – Changes to the mine plan; comprises a description of the amendments to the mine plan(s) as presented in the HVO South environmental assessment report, ERM 2008.

Chapter 4 – Potential impacts on the HVGC; describes the potential impacts on the HVGC resulting from the modified mine plan.

Chapter 5 – Management and monitoring procedures; provides an overview of the management and monitoring measures that will be implemented during operations that have the potential to impact the HVGC.

Chapter 6 – Notification procedures; provides the notification process for dragline activities within the OLS, any noise and air quality limits exceeded, and planned gliding activities and residential occupancy at the HVGC.

Appendix A – Mine plan progression schematic; illustrates the progression of Permitted Mining within the land around the HVGC site. The land to be mined has been titled the Glider Pit.

Appendix B – Hunter Valley Operations South – Revised Mine Plan, Acoustic Assessment, EMGA 2009; the acoustic assessment prepared to assess the potential impacts associated with the revised mine plan constitutes Appendix B.

Appendix C - Dust Amenity Plan for Mining in the vicinity of the Hunter Valley Gliding Club, PAEHolmes 2009; the air quality assessment prepared to assess the potential impacts associated with the revised mine plan constitutes Appendix C.

Appendix D - For historic reference only, mine plan progression schematic for the revised Glider Pit mine plan.

## 2. Risk assessment

Risks to HVGC arise from safety, environmental amenity and infrastructure considerations, specifically:

- the potential intrusion of the dragline above the OLS, an air safety issue;
- loss of amenity due to unacceptable air quality;
- loss of amenity due to excessive noise; and
- disruption to HVGC infrastructure from mining activities.

The risk to safety has been dealt with straightforwardly by imposing on Coal & Allied a condition that it can only have the dragline above the OLS with the permission of the HVGC; i.e. removing the possibility of the dragline interfering with HVGC aircraft. This issue is dealt with in more detail in Sections 4.1, 5.1 and Chapter 6.

The risk to disruption of HVGC's infrastructure has been addressed by looking at the specific items of infrastructure involved, assessing the potential of mining activities to interfere with the infrastructure item, then devising means of ensuring the satisfactory use and maintenance of the item if required. This issue is dealt with in more detail in Sections 4.4 and 5.4.

In regards to air quality and noise, risk assessments were undertaken by acoustic engineers, air quality specialists and Rio Tinto Coal Australia to identify those circumstances most likely to generate impacts from mining operations on gliding activities and use of the club's residential facilities.

Preliminary modelling was undertaken to determine the operation and weather conditions that combined to result in varying levels of impact from both noise and dust emissions.

The risk for noise and dust is whether operational noise and air quality limits are exceeded, as defined in the Project Approval. The probability of exceeding approval limits is a function of the simultaneous occurrence of the following:

- HVGC being used or occupied;
- dragline and associated plant operating in the south eastern area of the Glider Pit (referred to as the Riverview South East Extension in the HVO South Coal Project Environmental Assessment, ERM 2008); and
- the presence of westerly winds or winds having a westerly component.

The use of the HVGC is generally limited to between Friday and Sunday, with gliding operations only likely in reasonably good weather conditions.

Based on the mine design and schedules in place at the time of the development of the Concessions and Mitigation Agreement, the dragline and associated plant is estimated to be operating in the south eastern area of the Glider Pit for a period of approximately 76 weeks. After this time, the risk of exceeding Project Approval limits for noise will be negligible and significantly lower for air quality. The duration of operation may change over time as the design and schedules are further developed with the goal of reducing any potential impacts on the Gliding Club at which time discussion with the club regarding those changes will be incorporated into an updated plan.

The noise and air quality risk assessments have led to modifications to the mine plan (see Chapter 3) and management and monitoring measures for dealing with the residual risks (See Sections 5.2.1, 5.2.2, 5.3.1 and 5.3.2 ).

### **3. Changes to mine plan**

Mine plans presented within the HVO South Coal Project Environmental Assessment, ERM 2009, included the extension of the Riverview Pit to the south-east to the western edge of the HVGC strip. These plans were developed on the assumption that the HVGC would be either reconfigured or relocated. Reconfiguration or relocation of the HVGC is no longer proposed. Accordingly, the mine plan(s) have been amended to take account of potential impacts on the HVGC.

Multiple mine plan options were considered during the AMP development phase. Consultation between mine planners, acoustic engineers, air quality specialists and the HVGC was fundamental in modifying the mine plan to meet AMP objectives.

Key features of the revised mine plan included:

- mining will occur to within 50 m of the western boundary of HVGC land subject to conditions to be satisfied including relocation of Comleroi Road, airstrip extension and land transfer from Coal & Allied to the Club;
- eleven strips will be mined, with mining periods ranging from 2 to 12 weeks. Indicatively, mining within the Glider Pit will be undertaken over a period of approximately 76 weeks;
- truck and shovel prestrip operation will be used at all times to minimise the interaction of the dragline and the OLS by minimising pad heights; and
- modified ramping systems and dig methods allow more material to be dumped further to the west.

The indicative mine plan progression for that now superseded revised mine plan is shown graphically in Appendix D.

As reported in Section 1.3:

- only the Permitted Mining (Appendix A) mine plan is proceeding, and
- detail of the revised Glider Pit mine plan (Appendix D) is included for historic reference only.

## **4. Potential impacts on the Hunter Valley Gliding Club**

### **4.1 Obstacle Limitation Surface**

Some mining activities and equipment on Coal & Allied owned land at HVO South have the potential to encroach on air space near the HVGC airstrip. When the HVGC is in use, and if not appropriately managed, this could pose an air safety hazard for aircraft during take-off and landing, i.e. when they are low-flying. In particular, the dragline, which is 53.7m high, has been identified by the HVGC as a concern for air safety.

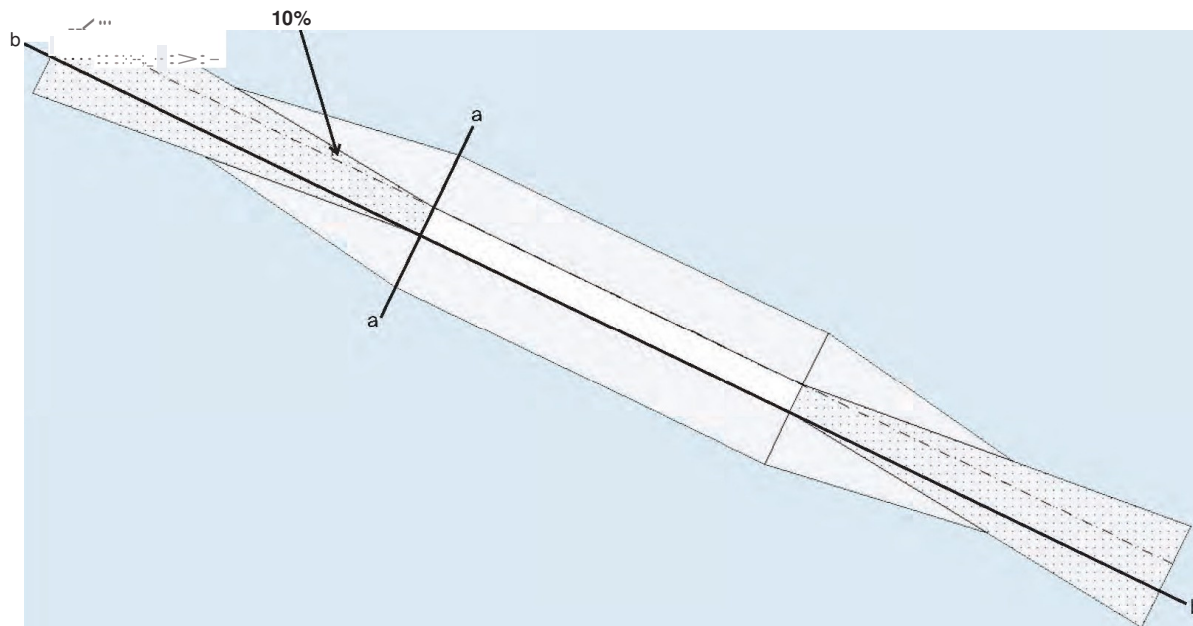
No guidelines have been developed for air space protection around glider runways. However, the Civil Aviation Safety Authority (CASA) has developed equivalent guidelines for aerodromes, which have some application to this project. Regarding protection of airspace, CASA identifies the need to maintain OLS surrounding runways. Obstacle Limitation Surfaces are defined by CASA (2003) as “*conceptual (imaginary) surfaces associated with a runway, which identify the lower limits of the aerodrome airspace above which objects become obstacles to aircraft operations*”. The OLS have been defined for the HVGC runway, in accordance with CASA guidelines, as shown in Figure 4.1.

In keeping with Condition 48 (see Section 1.2), design of the pit and overburden dumps and mine planning in the proximity of the HVGC has sought to avoid breaching the OLS where possible. Pre-strip mining operations using trucks and electric shovels/excavators or loaders will be undertaken to lower the final dump surface to below the OLS. No permanent structures spoil dumps or final landform will be above the OLS. Breaches of the OLS will be restricted to short-term intrusions by equipment and dragline spoils.

Coal & Allied has undertaken a simulation of dragline operation, to better define its interaction with the OLS. This simulation found that the dragline would periodically be above the OLS during mining in 11 strips, located immediately north, south and west of the runway. Of the estimated 76 weeks of dragline operation required for these 11 strips, the OLS would be breached for a total of approximately 50 weeks. The duration of each breach would vary from approximately 1.7 weeks during work on Strip 1, to 7.7 weeks during removal of Strip 8.

Some of the OLS breaches would coincide with use of the HVGC. However, Coal & Allied would only breach the OLS subject to implementation of strict management and notification protocols, as set out in Section 5.1 and Chapter 6, and subject to prior agreement with the HVGC. The measures proposed will protect the safety and continuity of gliding activities at the HVGC, whilst allowing Coal & Allied to optimise resource recovery from its land.





Gliding airstrip

5% or 1:20 gradient from the ground surface level of the airstrip at line a to a maximum height of 80m

20% or 1:5 gradient from the ground surface level of the airstrip at line b to a maximum height of 45m

Figure 4.1

**OLS for mining in close proximity to the HVGC**

Hunter Valley Gliding Club Arrenity Management Plan

## **4.2 Acoustics**

An assessment of the potential noise impacts resulting from the revised mine plan was undertaken by EMGA, 2009. Potential impacts are summarised below. The full report constitutes Appendix B.

### **4.2.1 Noise approval limits**

The Project Approval stipulates noise limits in Schedule 3 Condition 2. The noise criterion for the HVGC during the day, evening and night is 55 dB(A) Leq(15 minute). The condition notes that *“Noise impacts at HVGC are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Noise impact assessment limits are only applicable during times of use that have been notified by HVGC to the Proponent”*.

### **4.2.2 Modelling approach**

Noise modelling was undertaken to assess the potential impacts resulting from the revised mine plan using the Environmental Noise Model (ENM) noise prediction software. ENM takes into account distance, ground effects, atmospheric absorption and topographic detail.

In the model, mining equipment was placed at various locations and heights, representing potential operating conditions that could result in the greatest noise impacts for the HVGC. The model also incorporated a 2m high mound east of the dragline area. Significantly, the relative ground level of the dragline area will be 5m below the current surrounding natural ground level prior to the dragline commencing night time operations. This will effectively facilitate a 7m high barrier differential.

The noise model predicts Leq noise levels, based on equipment sound power levels. For noise modelling consistency, the current study has adopted the sound power levels reported in HVO South Coal Project Environmental Assessment (ERM 2008). The results assume that all plant and equipment operate simultaneously. In practice, such an operating scenario would be unlikely to occur. The results are therefore considered conservative.

### **4.2.3 Operational noise level predictions**

The noise levels under calm weather typify the noise received at locations surrounding the mine during the day in the absence of adverse Industrial Noise Policy (INP – DECC 2000) assessable weather conditions. The predicted noise level under calm weather conditions is 44dB(A) Leq(15 minute), which is significantly less than the stipulated criterion of 55 dB(A).

Received sound levels increase when the wind blows from source to receiver or under temperature inversion conditions and decrease when the wind blows from receiver to source or under temperature lapse conditions. A three degrees Celsius per 100m elevation temperature inversion was used in the model, as well as the prevailing winds identified in the HVO South Coal Project Environmental Assessment (ERM 2008).

The predicted noise level under adverse or INP weather conditions is 52 dB(A) Leq(15 minute), which is less than the stipulated criterion of 55 dB(A).

#### 4.2.4 Conclusion

The noise modelling has shown that under calm and INP assessable weather conditions the HVGC is predicted to experience noise levels below the operational noise Project Approval limits. Coal & Allied's existing environmental management plans and procedures, which include ongoing noise monitoring, will be used to assess the performance of the mining operations against the Project Approval noise limits. These are addressed in Chapter 5.

A negotiated written noise agreement (Concessions and Mitigation Agreement) as outlined in condition 2 of the project approval allows for HVO to exceed the noise limits consistent with the management provided in the AMP.

### 4.3 Air Quality

An assessment of the potential air quality impacts resulting from the modified mine plan was undertaken by PAEHolmes, 2009. Potential impacts are summarised below. The full report constitutes Appendix C.

#### 4.3.1 Air Quality approval limits

Condition 19 of the Project Approval stipulates air quality assessment criteria for the HVGC when in use. These criteria are presented in Table 4.1 below.

The condition notes that *"Air Quality impacts at HVCG are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Air Quality limits are only applicable during times of use that have been notified by HVGC to the Proponent"*.

The condition also notes that *"if the Proponent has written negotiated air quality agreement with any landowner or HVGC to exceed the air quality limits in Table 8, 9 and/or 10 (as consolidated and presented in Table 4.1 below), and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the air limits in Table 8, 9 and/or 10 in accordance with the negotiated air quality agreement"*.

Formatted: Highlight

Table 4.1– HVGC Air Quality Impact Assessment Criteria

Pollutant	Averaging period	Concentration	
NSW DECC Impact assessment criteria for pollutants (for use in modelling)			
PM <sub>10</sub>	24-hour	50 µg/m <sup>3</sup>	
	Annual	30 µg/m <sup>3</sup>	
NSW DECC amenity based criteria for dust concentrations - TSP			
TSP	Annual	90 µg/m <sup>3</sup>	
NSW DECC amenity based criteria for dust fallout – Deposited Dust			
		Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

#### 4.3.2 Modelling approach

The air quality approval limits presented above establish the assessment criteria, but specify that they only apply when the airfield is in use. For the long-term criteria this creates a minor problem in interpretation because the annual average standards for PM<sub>10</sub>, TSP and dust deposition would normally be the averaged over a year (8,760 hours). The annual average has been interpreted as the average concentration when the HVGC is active during the year. As such, if for example, the club were to only operate on the weekends, the annual average would be the average of all the weekends in the calendar year. This may be a lower concentration than would be the case if the actual annual average was calculated because the mine could apply management controls (e.g. suspend or relocate dust generating activities when the HVGC was operating).

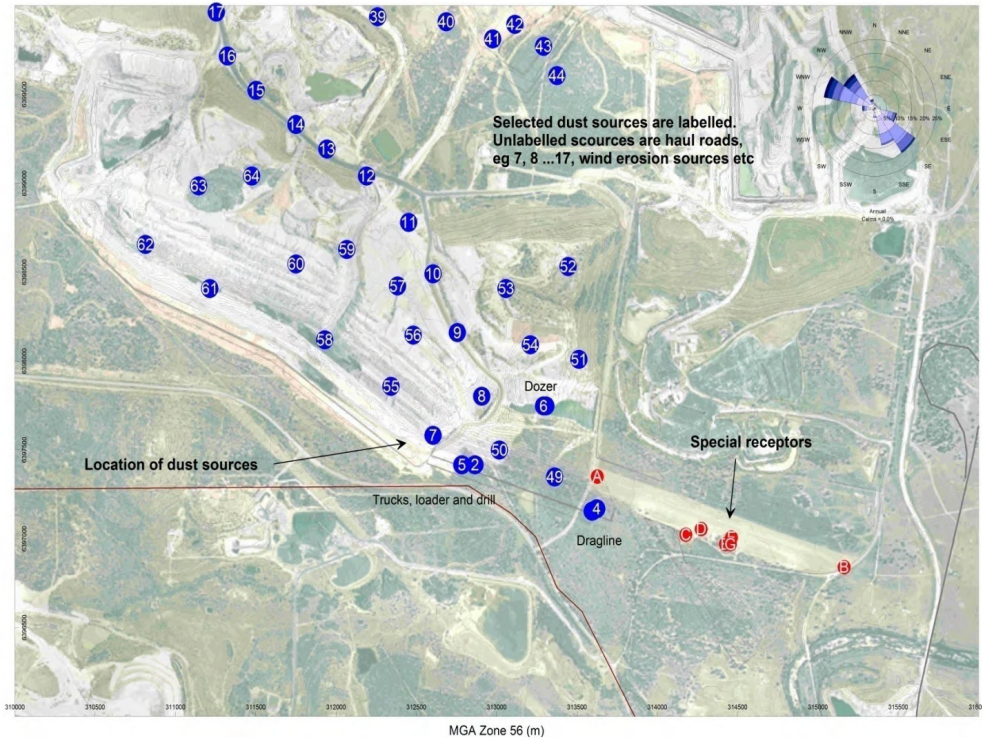
Thus, the approach to the preparation of the AMP has been to develop a dust emissions inventory for the modified mine plan that protects the physical assets of HVGC and then to use the ISCMOD dispersion model and 2002 meteorological data set (i.e. the same model and met data set as used in the HVO South Coal Project environmental assessment), to predict a time-series of 24-hour PM<sub>10</sub> for the selected receptors of interest (A to G as identified on Figure 4.2), identified on HVGC land. The model was run for:

- mining with no special controls other than those normally applied, i.e. watering of haul roads; and

- mining with the dragline operations suspended.

Management and monitoring measures are presented in Chapter 5.

Figure 4-2 – Location of modelled receivers



- A – Eastern end of runway
- B – Western end of runway
- C - Main Hanger
- D – Fuel Installation
- E - Club House
- F - Second Hanger
- G - Machine Shed

#### 4.3.3 Operational air quality predictions

Figures 4.3 and Figure 4.4 provide time series plots of predicted average 24-hour PM<sub>10</sub> concentrations at receiver D with and without dragline operations. It should be noted that the scale bar is different on Figures 4.3 and Figure 4.4.

Figure 4-3 – Predicted average 24-hour  $PM_{10}$  concentrations receiver D due to mining emissions with no special controls

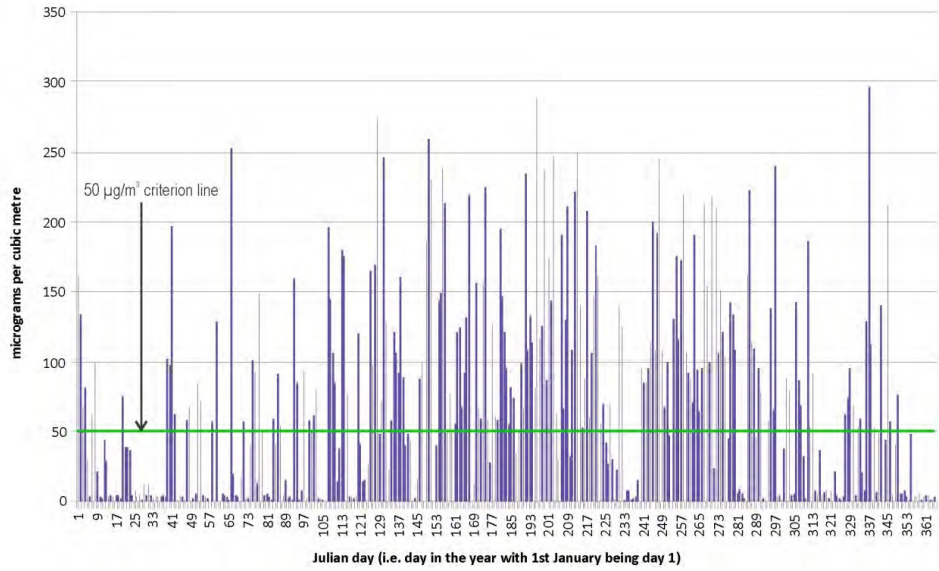
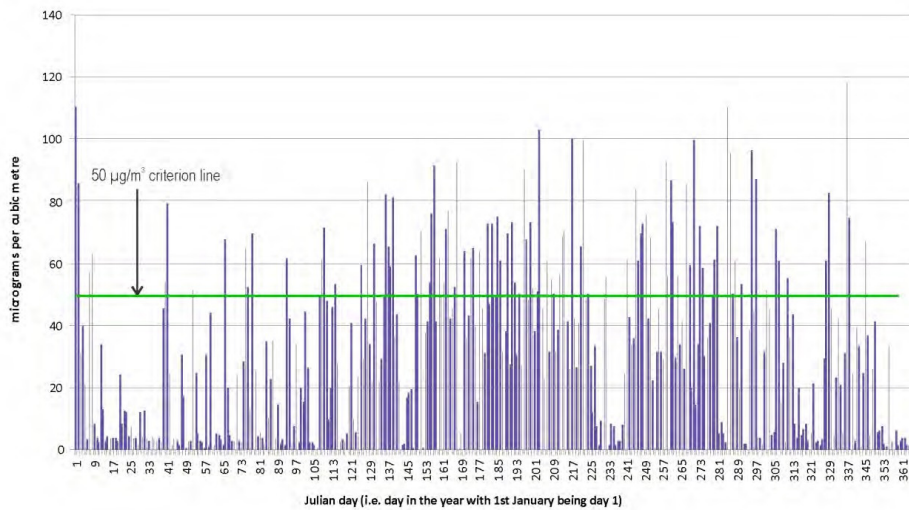


Figure 4-4 – Predicted average 24-hour  $PM_{10}$  concentrations receiver D due to mining emissions with dragline operations suspended



Modelling shows that the approval criteria of the 50 microgram/cubic metre concentration will be exceeded and most often in winter. The plots show that wind direction relative the line joining the source and receptor is critical. Modelling also suggests that the 24-hour PM<sub>10</sub> would be reduced significantly by suspending dragline operations but not enough to guarantee compliance with 50 micrograms/cubic metre. For example, for receiver D there are still 96 days when 24-hour PM<sub>10</sub> concentrations are predicted to exceed 50 micrograms/cubic metre due to emissions from the operation.

Accordingly a written agreement is required with the HVGC as per condition 19 of the Project Approval.

It should be noted however that the US EPA criterion for 24-hour average PM<sub>10</sub> concentrations is 150 µg/m<sup>3</sup>. The criterion for 24-hour PM<sub>10</sub> was retained after review in 2006, however the criterion for annual average PM<sub>10</sub> of 50 µg/m<sup>3</sup> was revoked “due to lack of evidence linking health problems to long-term exposure....”

#### **4.3.4 Conclusion**

The air quality assessment has shown that the dragline is the largest single emission source and has the greatest potential to influence PM<sub>10</sub> concentrations at the HVGC. Modelling has shown that the approval levels of 50 micrograms/cubic metre would be exceeded if no specific attempt was made to mitigate emissions. Suspending dragline operations significantly reduces PM<sub>10</sub> but does not bring the predicted concentrations to below 50 micrograms/cubic metre.

It should be noted that the predicted concentrations are generally less than 90 micrograms/cubic metre which is modest given that the US EPA Standard for 24-hour PM<sub>10</sub> was recently retained at 150 micrograms/cubic metre.

Management and monitoring measures are proposed that include notification protocols that will implemented to minimise the potential for mining to adversely impact the HVGC. These measures are addressed in Chapter 5.

A written negotiated air quality agreement (Concessions and Mitigation Agreement) as outlined in condition 19 of the project approval allows for HVO to exceed the air quality limits consistent with the management provided in the AMP.

#### **4.4 Infrastructure**

Infrastructure matters are discussed below:

- access roads

Access roads will continue to provide 24 hour/7 days per week access for vehicles including cars towing glider trailers and semi-trailer fuel trucks. The all weather road will be constructed with sufficient load capacity for occasional use by fuel trucks. The road will be

maintained over the life of the mine and will be constructed with no spoon drains that would provide a problem for long glider trailers.

- power and telephone services

Unrestricted 24 hour/7 days per week power and telephone services will be maintained. Power and phone lines will be relocated within the Gliding Club Land

- protection of structures

Reasonable and feasible protection of structures such as the new club house and accommodation wing will be undertaken as outlined in section 5 of the Compensation and Mitigation Agreement such as:

- additional water filtering and/or flush facilities,
  - extra water to wash sheds and gliders,
  - air conditioning with suitable dust filters for the new Club house including accommodation facilities,
  - sealing around doors and windows where reasonably feasible, and
  - window and roof insulation.
- drainage of surface runoff

If any earthworks have the potential to interfere with existing surface water drainage then the design and implementation of those earthworks will include facilities to ensure that surface water continues to be drained at least to the existing standard. Temporary earthworks will be maintained to be effective throughout the duration of earthworks. Permanent surface water drainage will be designed and constructed so that they remain effective during and beyond the mine life.

- fencing construction

Crash safe fencing and gates will be provided. The design and materials used will be considered in consultation with the club.



## **5. Management and monitoring measures**

### **5.1 Obstacle Limitation Surface**

As discussed in Section 4.1, the project design was selected to minimise interactions with the OLS, including ensuring that no permanent structures, spoil dumps or final landform are above the OLS. Management measures to address the proposed breaches of the OLS are as follows:

- implementation of notification protocols between Coal & Allied and the HVGC, regarding the timing of gliding activities and the nature of proposed OLS breaches by Coal & Allied (see Chapter 6 for further detail);
- implementation of dust control measures set out in Section 5.3, to minimise the potential for dust to breach the OLS; and
- lighting and/or marking of obstacles, in accordance with CASA guidelines, to improve the safety of unannounced aircraft.

### **5.2 Alternative Accommodation**

- Consideration may be given to provide alternative nearby night accommodation to club users during times when only accommodation for limited numbers is required. Consultation on the suitability and location of alternative night accommodation would be undertaken with the club.

### **5.3 Noise**

#### **5.3.1 Management measures**

Detailed noise management procedures currently govern the management of noise across HVO South as detailed in Coal & Allied EMS Procedure – Noise and Vibration Control, the HVO Noise Management Plan, and the HVO Blast and Vibration Management Plan. These plans have been updated to reflect changes resulting from the HVO South Coal Project.

Management measures relating specifically to the HVGC include:

- adoption of vigilant planning for night operations in the area identified for dragline and associated plant nearest the HVGC. Analysis of wind data identifies the night period as when prevailing westerly winds are prominent and will cause mining noise levels at the HVGC to be elevated. A schedule of times the HVGC will be used at night for recreation should be maintained with the proponent, as required by the Project Approval. Planned night time mining activities within the dragline area will need to consider prevailing winds for the coming evening and night by real-time scrutiny of the site's Cheshunt East weather station data;

- when working in the dragline area of the Glider Pit, the relative height differential between the pit and surrounding surface must be at least 7m before night operations can commence if the HVGC is being used. This can be achieved by a combination of lower pit level and mounding at the surface; and
- whilst construction or demolition may occur, the Lemington Coal Preparation Plant (LCPP) will not be reactivated.

### 5.3.2 Monitoring measures

Ongoing noise monitoring will be used to assess the performance of the mining operations against the Project Approval noise limits. Coal & Allied's noise monitoring programme includes a combination of real-time and supplementary attended monitoring measures and noise monitoring protocol for evaluating compliance with the noise impact assessment and land acquisition criteria in the Project Approval. Additional measures relating specifically to the HVGC are:

- confirm mining noise levels from the Glider Pit dragline area by undertaking monitoring initially on nights the HVGC is not being used, and regularly thereafter as part of Coal & Allied's quarterly monitoring program. This monitoring is to continue whilst ever the HVGC is being used at night and until such time the Glider Pit is completed. Monitoring will also be triggered by any complaints from the HVGC occupants. Features of the monitoring to be undertaken include:
  - monitoring will be undertaken within 1m of the club house or the overnight accommodation areas (whichever is the more exposed location to mining noise). If this is not possible, intermediate monitoring locations will be used such that mining noise can be calculated back to the club facilities;
  - the monitor must capture noise metrics such as L90,15minute, Leq,15minute, L10,15minute and Lmax both as a total value and as determined as a sole contribution from HVO South, where possible;
  - observations made during monitoring must include descriptions of the source of noise to such detail that the source's direction can be confirmed and its character and nature be identified, with a view to maximising the potential of positively identifying any source that may be breaching limits or is otherwise dominant; and
  - if monitoring shows that mining noise levels at the HVGC breach the Project Approval, an investigation into the source of the breach must be undertaken within one week of the identified breach or prior to the next use of the club facilities. All reasonable and feasible mitigation of such breaches must be considered and adopted to ensure noise levels are minimised and reduced to below approval limits, unless an alternate agreement is obtained from the HVGC.
- if occupiers experience nuisance noise during the use of accommodation, the club may call the mine using the protocol in Section 6 and request that the mine review its

activities to identify and mitigate the offensive source. This may require assessment at the club to verify whether the noise is creating a nuisance using hand held monitoring. A mine representative would assess the noise and if required implement operational controls such as change to dumping or shutting down of appropriate equipment.

## 5.4 Air Quality

### 5.4.1 Management measures

Reasonable and feasible protection of existing and future structures and their contents will be undertaken. This would include contributions to the air conditioning with suitable dust filters for the new club house and accommodation facilities. Contributions would also be made to sealing around doors and windows where reasonably feasible.

Detailed air quality management procedures currently govern the management of air quality across HVO South, as detailed in Coal & Allied EMS Procedure – Dust Management and the HVO Air Quality Management Plan.

Flexibility in activities is key in the development of management options. Options that will be considered should unacceptable dust be interfering with negotiated HVGC activities on negotiated days include equipment used, location of operations and the potential for campaign mining. For example, winds are predominately from the north-west during winter and the south-east during summer. In winter, activities may be required to be modified when mining several hundred metres to the west of the HVGC facilities (i.e. moved further west or in a location where dust will not be transported to the HVGC). In summer, activities may need to be modified when mining to the south of HVGC facilities.

The approach to management will take advantage of the fact that there will be many days when mining in the Glider Pit will have almost no effect on air quality at HVGC. This will be the case when winds are from the south-east. This will be the case mostly in summer. Under these conditions mining can proceed with no controls other than those normally applicable.

If a complaint is received by the club regarding air quality or should the day be one nominated by HVGC as a “gliding day” and the monitoring (see Section below) indicates that the running 24-hour PM<sub>10</sub> concentration has reached 50 micrograms/cubic metre (or an alternative “action level”) then the environmental officer should assess the situation and determine if, based on an analysis of wind direction, activities in the Glider Pit are responsible. If they are, then the environmental officer should ensure a progressive reduction in activities leading to dust emissions as follows:

- check with HVGC whether the culpable source(s)/operation(s) can be identified;
- progressively suspend equipment operations and evaluate the effect on the PM<sub>10</sub> concentrations using the monitoring data;

Formatted: Highlight

- if the next 1-hour shows concentrations below 50 micrograms/cubic metre then no further action is required;
- if the 1-hour average PM<sub>10</sub> levels remain above 50 micrograms/cubic metre then the potential contributing source(s) should be reassessed and likely contributing operations suspended;
- suspend other operations including out-of-pit dozer operations, coaling operations and drilling operations until PM<sub>10</sub> concentrations fall below 50 micrograms/cubic metre; and
- recommence normal operations only after weather conditions change sufficiently to avoid reproducing the limit being exceeded.

#### 5.4.2 Monitoring measures

Ongoing air quality monitoring will be used to assess the performance of the mining operations against the Project Approval air quality limits. The existing HVO air quality monitoring system includes depositional dust gauges, high volume air samplers and monitors to measure PM<sub>10</sub> concentrations in real-time. Additional requirements relating specifically to the HVGC are:

- ~~a real time dust monitor to enable measurement of PM<sub>10</sub> concentrations will be established at the club house or other location to be identified by HVGC as a sensitive representative point; and~~
- ~~should the running 24-hour PM<sub>10</sub> concentration exceed 50 micrograms/cubic metre, operations will be reviewed and modified (as per Section 5.3.1).~~
- HVO will utilise existing real-time monitors (Warkworth, Knodlers Lane) coupled with the triggers defined in Table One to manage air quality impacts on the Club.
- Monitoring will occur on a six day cycle at the HVGC PM<sub>10</sub> monitor.

**Formatted:** List Paragraph, Bulleted + Level: 1 + Aligned at: 0.63 cm + Indent at: 1.27 cm

Table 1 - Real Time Air Quality Alarms

Monitoring	Trigger Level	Response actions
------------	---------------	------------------

Location		
Knodlers Lane	<b>Stage One</b> <ul style="list-style-type: none"> <li>10 min average <math>PM_{10} &gt; 150 \mu g/m^3</math>; and/or</li> <li>1 hour average <math>PM_{10} &gt; 50 \mu g/m^3</math> for three consecutive hours;</li> </ul> <b>Stage Two</b> <ul style="list-style-type: none"> <li>Rolling 24hr average <math>PM_{10} &gt; 50 \mu g/m^3</math> for six consecutive hours (with prevailing winds in arc of “mine to monitor”); and/or</li> <li>10 min average <math>PM_{10} &gt; 150 \mu g/m^3</math> for three consecutive hours (with prevailing winds in arc of “mine to monitor”);</li> </ul>	<ul style="list-style-type: none"> <li>Validation of alarm (verify monitors functioning correctly and review meteorological conditions);</li> <li>Notify relevant Open Cut Examiner;</li> <li>Response as per flowchart below</li> </ul>
Warkworth		

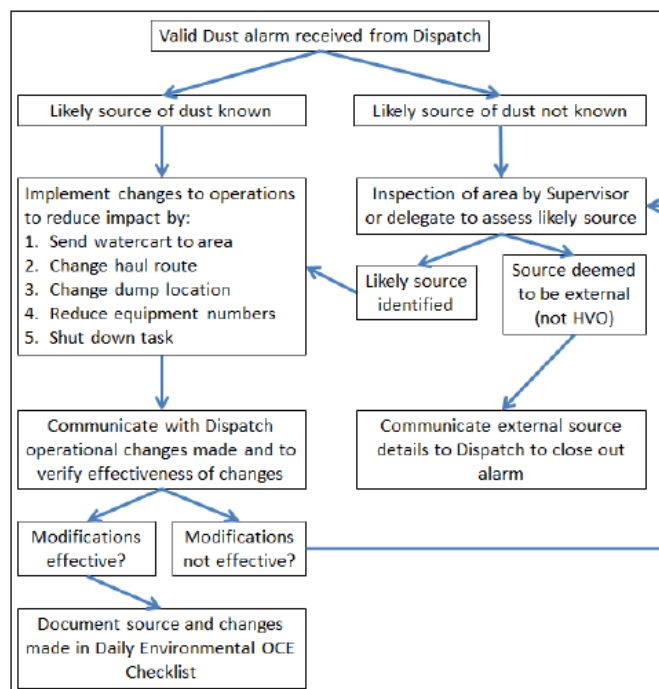


Figure 1 - Response to real-time dust alarm

## 6. Notification procedures

There will be both mining and gliding activities that can occur where there will be no or negligible impacts on either parties' interests and no need for either party to notify of them. However, there will also be activities where safety and environmental amenity issues are involved and formal notification would be in the interests of both parties. These activities have been identified as follows:

- proposing to have a dragline above the OLS;
- exceeding noise limits;
- exceeding air quality limits;
- planned gliding activities and residential occupancy at the HVGC.

Figure 6.1 demonstrates the 'notifiable activities' concept.

A notification process has been determined for each of the above activities. Figures 6.2 and 6.3 illustrate the process graphically.

One of the purposes of this AMP is formalise notification procedures. Accordingly, the following procedures have been established for each notifiable activity.

Figure 6-1 – Notifiable activities

## Mining Activities

## HVGC Activities

### Notifiable Activities

1. Proposing to have equipment above the OLS
2. Exceeding AMP noise limits
3. Exceeding AMP air quality limits
4. Planned gliding activities and residential occupancy at the HVGC
5. Blast notification

Note- If the Club believes that noise or dust levels are approaching levels where the impact is not acceptable the Club's President or Secretary may phone the mine direct to have these concerns addressed. A review of operations and monitoring will be undertaken and appropriate action implemented if required.

In the event that the Club's President or Secretary are not at the airfield at the relevant time, then the responsible Club officer at the airfield at that time may give the notification.

For the purposes of this AMP email notification will be given at the following addresses until advised otherwise in writing:

Club to HVO:

HVO to Club:  
KYRWRKYJF#KYJF FRP DX

## **6.1 OLS impingement permission procedure**

### *Purpose*

By obtaining permission from the HVGC to breach the OLS at nominated times and locations, Coal & Allied will ensure that aircraft safety will not be compromised through having an unknown obstacle in an airspace that could reasonably be entered by aircraft operating out of the HVGC facility.

### *Procedure*

The Manager, Land and Property for Coal & Allied's HVO, will advise in writing that the company wishes to operate plant/equipment which extends above the OLS. Coal & Allied will provide the following details:

- nature of the obstacle which will enter the OLS (e.g. dragline);
- distance and bearing of the obstacle from the runway;
- height of the obstacle in relation to the runway elevation; and
- length of time it will be an obstacle.

The correspondence will be addressed to the Secretary of the HVGC. The Club will be obliged to indicate permission or otherwise within four days of the receipt of the correspondence. Copies of the correspondence are to be retained for the duration of mining operations being in the vicinity of the airstrip. Correspondence by email will be satisfactory.

## **6.2 Procedure to advise that a noise limit has been exceeded**

### *Purpose*

The provision of this information by Coal & Allied will enable the HVGC to gauge the efficacy of the measures that are to be put in place to deliver acceptable noise levels at the site and to respond if the organisation deems it is warranted.

### *Procedure*

The Environmental Services for Coal & Allied's HVO will advise the HVGC if noise set out in the approval conditions are exceeded within four days of the receipt of the final report. The correspondence will be addressed to the Secretary of the HVGC. Copies of the correspondence are to be retained for the duration of mining operations being in the vicinity of the airstrip. Correspondence by email will be satisfactory.



### **6.3 Procedure to advise if air quality limits has been exceeded**

#### *Purpose*

The provision of this information by Coal & Allied will enable the HVGC to gauge the efficacy of the measures that are to be put in place to deliver acceptable air quality at the site and to respond if the organisation deems it is warranted.

#### *Procedure*

The Environmental Services for Coal & Allied's HVO will advise the HVGC of any of the air quality limits set out in the AMP are exceeded within four days of the receipt of the final report. The correspondence will be addressed to the Secretary of the HVGC. Copies of the correspondence are to be retained for the duration of mining operations being in the vicinity of the airstrip. Correspondence by email will be satisfactory.

### **6.4 Gliding activities and occupancy advice procedure**

#### *Purpose*

An understanding of HVGC's planned activities and residential occupancy would assist Coal & Allied with the planning of its mining operations. For example, if a major gliding event was planned for a certain date, the mining operations for that day or days could be conducted to minimise impacts in terms of dust and noise for the club and its patrons.

#### *Procedure*

The Secretary of the HVGC will advise in writing the club's planned quarterly activities. The advice will highlight major events. The advice will be furnished again at the start of the second twelve months of the operation of this AMP. The HVGC will advise Coal & Allied of any changes to major event plans as soon as practical after such changes become known to the HVGC. Coal & Allied will acknowledge receipt of the HVGC's advice within one week of receiving it. Correspondence by email will be satisfactory. The correspondence should be addressed to Coal & Allied's Manager Mine Planning.

Should use of the site be scheduled at short notice and that use is not part of the annual planned activities already advised to Coal & Allied, the HVGC needs to advise Coal & Allied of these activities. This is to occur with at least two days notice. The same correspondence details as in the preceding paragraph apply.

Irrespective of the notifiable activities, good communications between the parties can only help with the effective management of safety and amenity issues. Both Coal & Allied and the HVGC are committed to maintaining good relations and communicating regularly.

## 6.5 Blast notice procedure

Coal & Allied will apply the following procedure to proposed blasting by HVO Mine within 500 metres of the Gliding Club Land.

1. HVO Mine to provide the Gliding Club notice of the proposed blast on the Friday in the week prior to the blast.  
That notice will be in writing and emailed to: hvotohvgc@hvgc.com.au  
The blast notification will include a map setting out the proposed location of the blast and the 500 metre exclusion zone from it.
2. A second notice will be given on the morning of the day of the blast.  
The second notice will be given in the same manner and to the same personnel as the first notice in 1.
3. In addition to the notice in 1 and 2, on the morning of the day of the blast HVO personnel will place the following sign at the entrance to the Gliding Club:

Blast Notification

A blast is scheduled for [time] am/pm on [date].

The blast will impact for approximately [ ] minutes,

4. In addition to the notice requirements above, in the hour prior to the blast, HVO personnel will physically inspect the Gliding Club Clubhouse and the areas about the caravans and hangers to confirm that there are no individuals within the blast exclusion zone. Once cleared, a blast sentry will be placed either at the entrance to the Gliding Club or along Comleroi road in both directions of travel.
5. This procedure will apply to all proposed blasts within 500 metres of the Gliding Club Land and the purpose of the notification is to ensure the following exclusion zones:
  - No person within 500 metres of the proposed blast location once sentries have been put in place.
  - No person within 500 metres of the proposed blast until the “all clear” given and sentries are removed from their post.
6. This blast notification procedure is subject to review at any time if reasonably requested by Coal & Allied or the Gliding Club.
7. Except in the case of emergency where a blast is required to proceed for mine safety, blasting within 500 metres will not be scheduled to take place on days when the Gliding Club has advised Coal & Allied that gliding operations are scheduled.

Figure 6-2 – Coal & Allied notification procedures flowchart

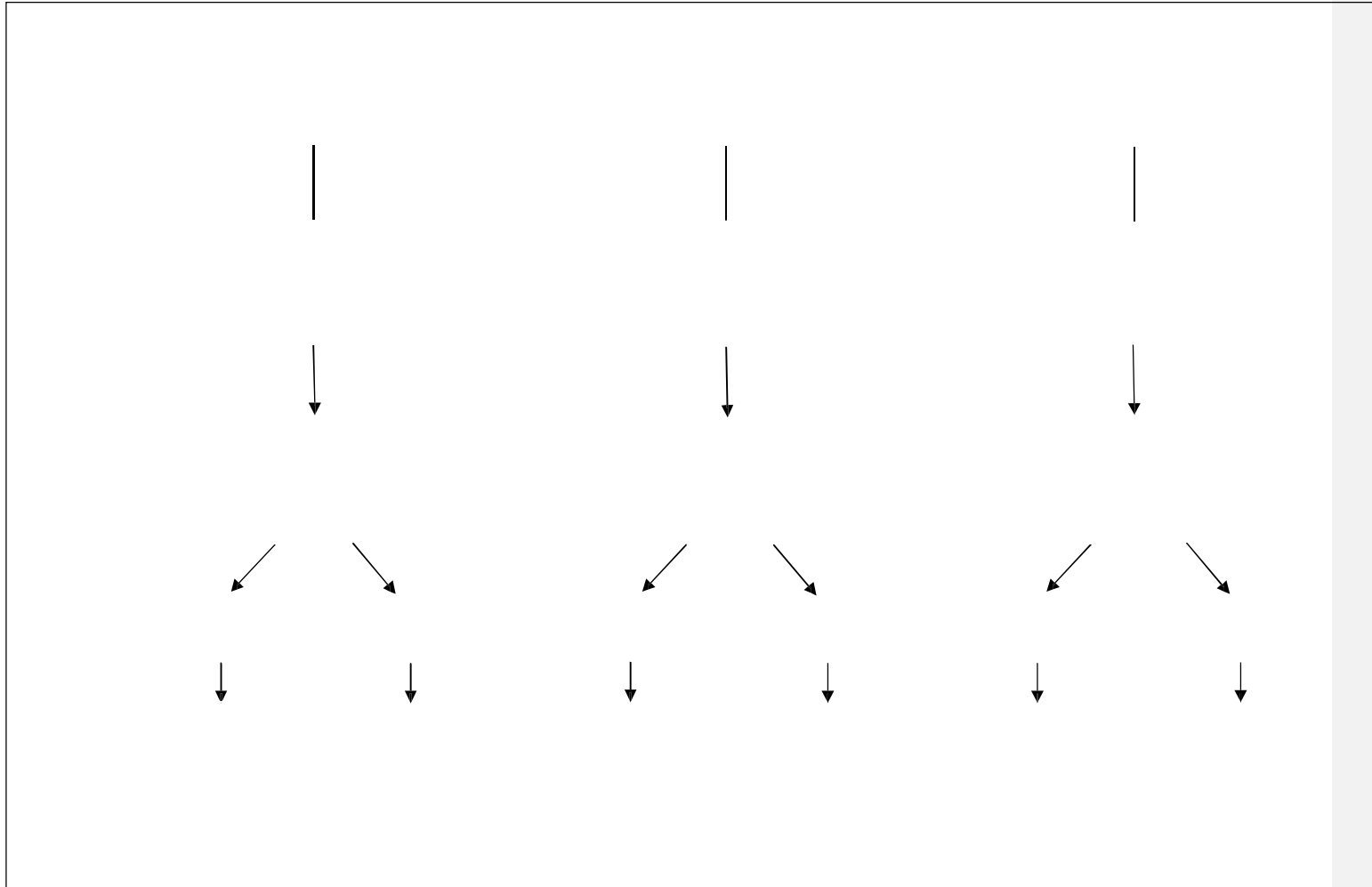
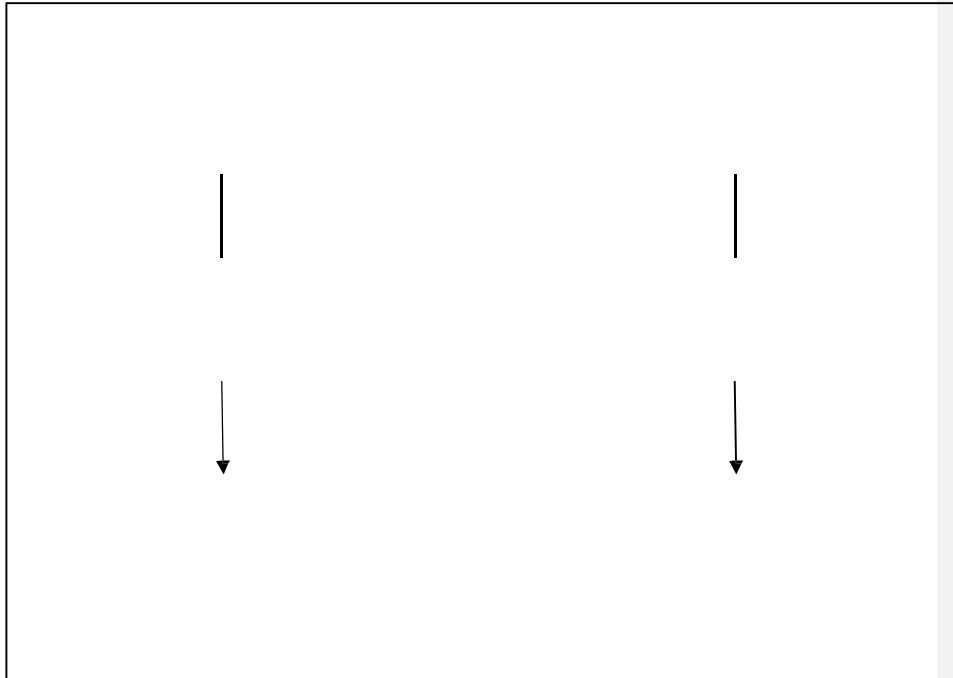


Figure 6-3 - HVGC notification procedures flowchart



## **7. Audits and reviews**

An audit will be undertaken by Rio Tinto Coal Australia after two months of the operation of this AMP. The audit will be against the provisions of this AMP. A second audit will be conducted after six months of the operation of this AMP. This audit will be against the provisions of the AMP as they stand at that time, given that changes might have occurred to the AMP as result of the previous audit and review. Any further audits will be at the direction of Coal & Allied, in consultation with the HVGC.

A review of the AMP will be undertaken after three months of the AMP's operation. The review will take account of the first audit's findings and the effectiveness of the AMP to that point in time. The AMP will be amended if the review so directs. Any further reviews will be at the direction of Coal & Allied, in consultation with the HVGC.

## 8. References

Civil Aviation Safety Authority Australia (CASA) (2003) **Manual of Standards Part 139 – Aerodromes** CASA, Canberra

ERM (2008) **Hunter Valley Operations South Coal Project Environmental Assessment Report** Prepared for Coal & Operations Pty Ltd, January 2008

ERM (2008) **Hunter Valley Operations South Coal Project Response To Submissions Report** Prepared for Coal & Operations Pty Ltd, July 2008

DECC 2000 **NSW Industrial Noise Policy**

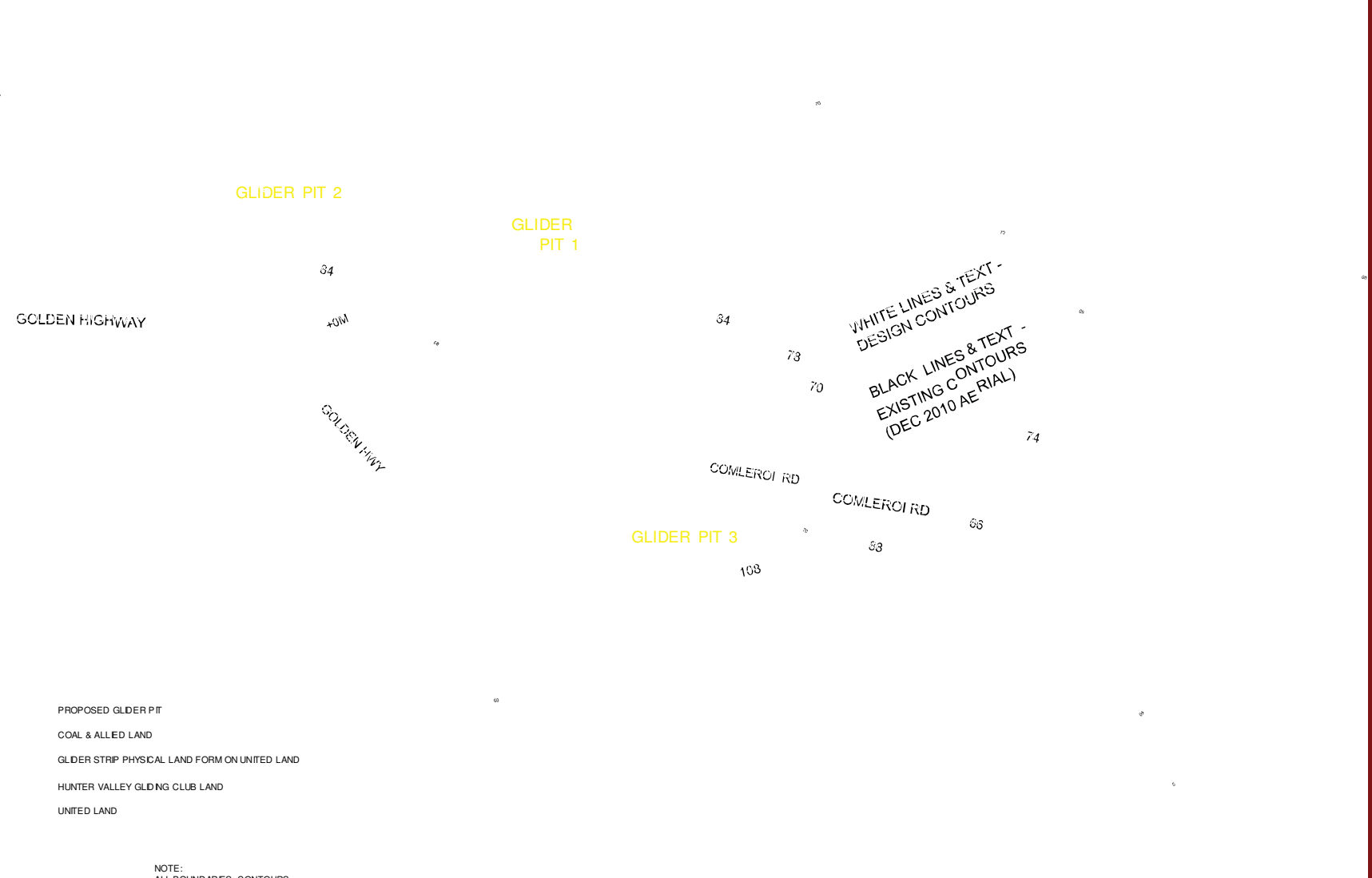


## **Appendix A Mine Progression Plans for Permitted Mining**



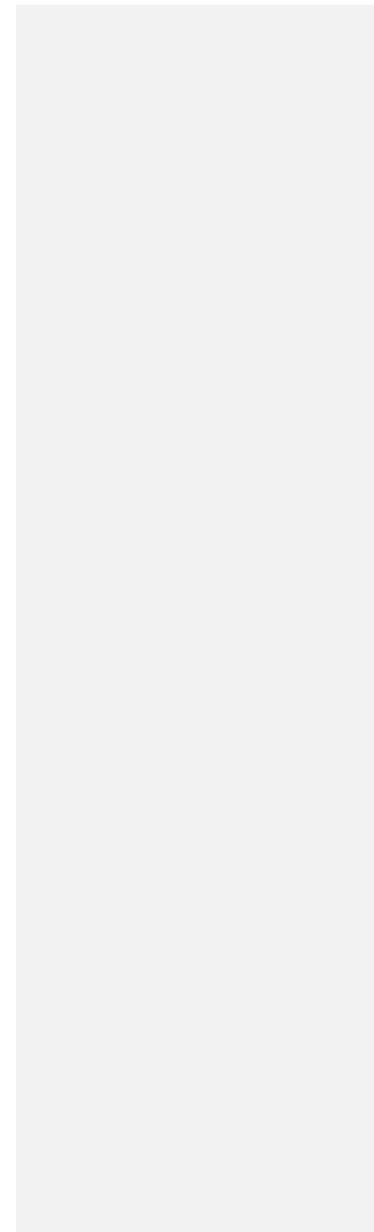


Annexure 3 Permitted Mining (generally described)	Location:	Lemington	Projection:	MGA Z56	Date:	16/10/12	Project:	HVO
	Council:	Singleton	Contour Interval:	N/A	Plan By:	SC	Layout:	A3
			Source:	N/A	Version:	02	Our Ref:	P_HVO_Glider Club Agreement 120910.wor

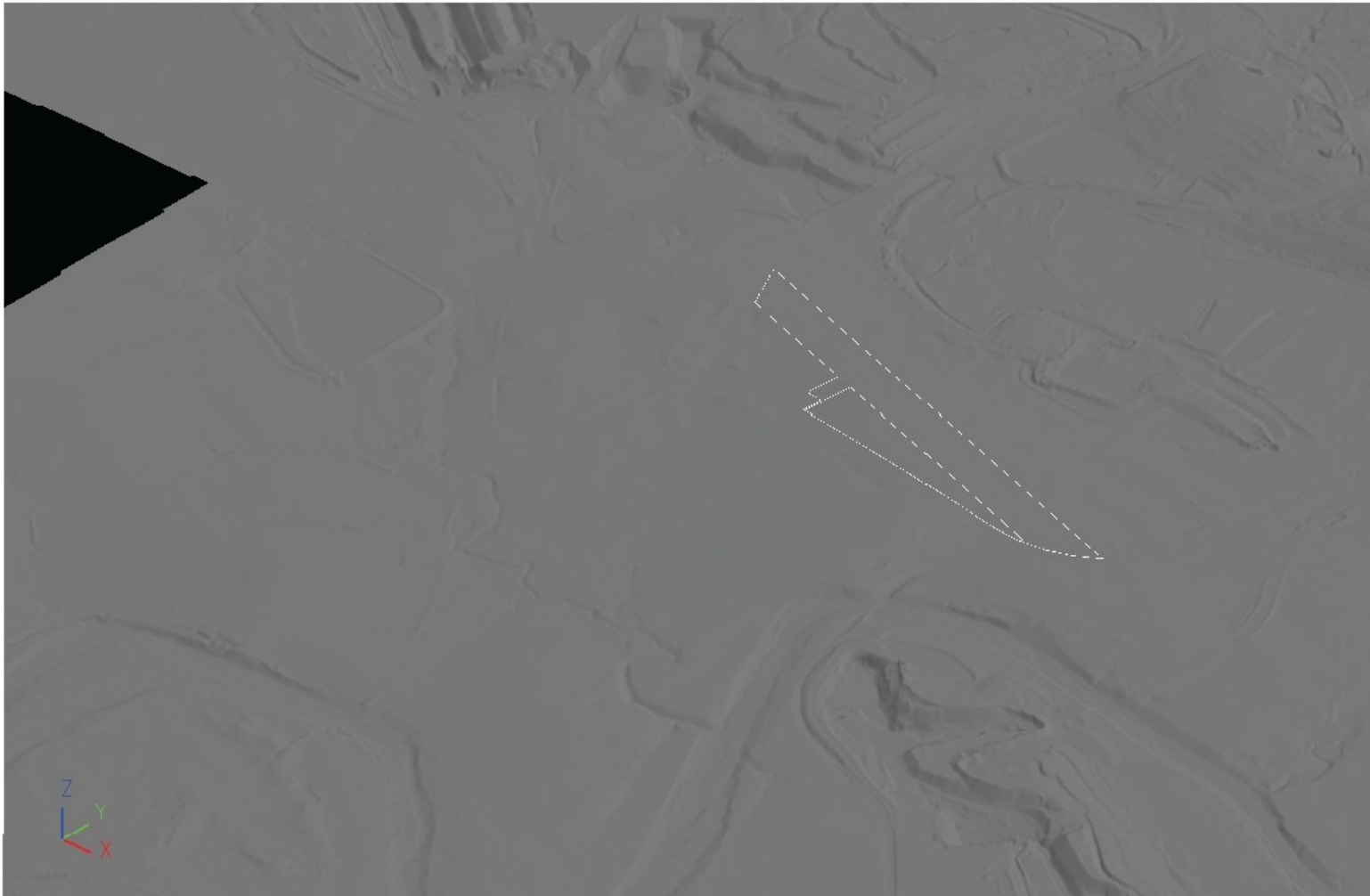


SHOWN ARE INDICATIVE ONLY

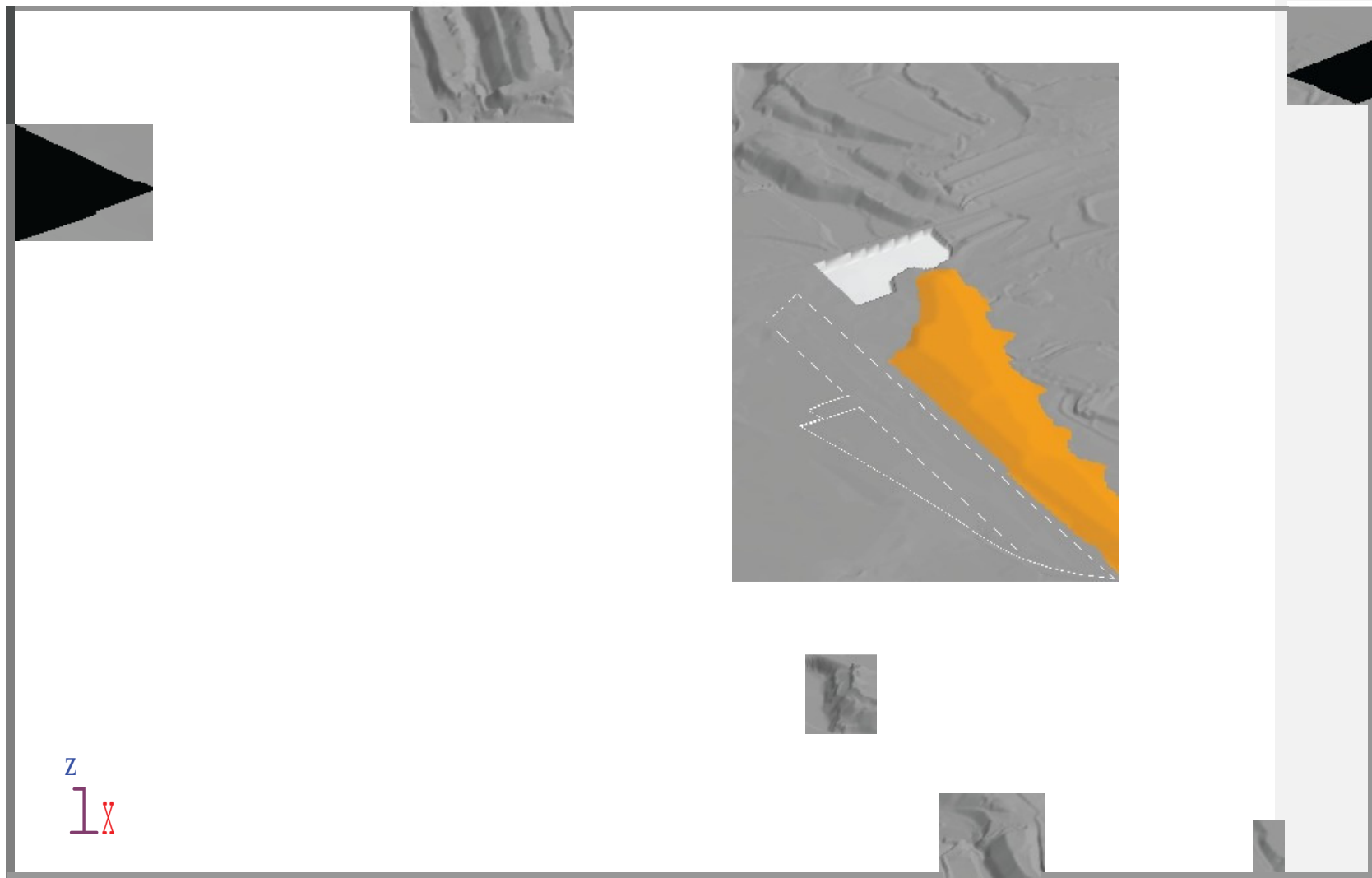
25



Current TOPO

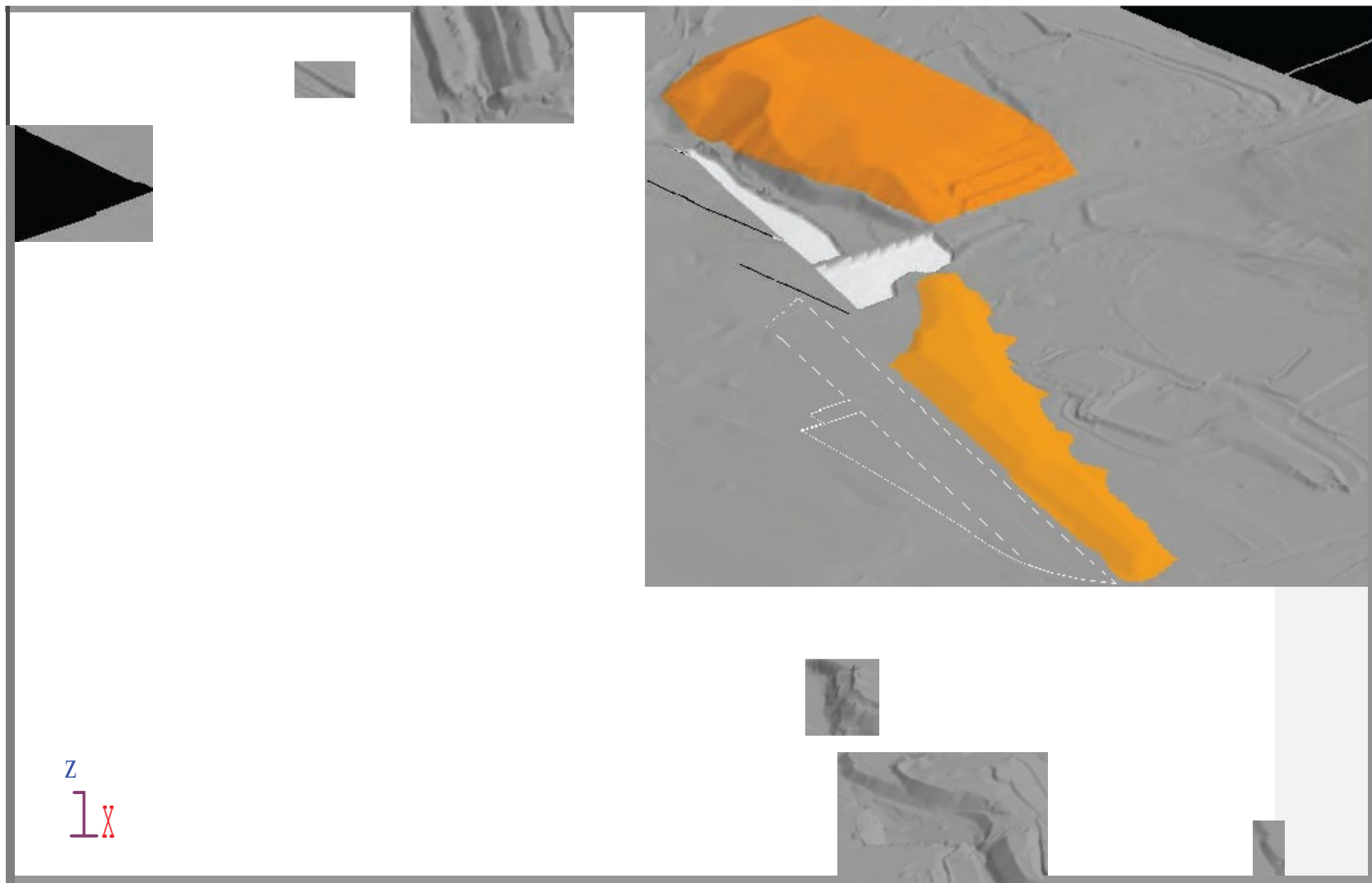


# 1 - Glider pit 1



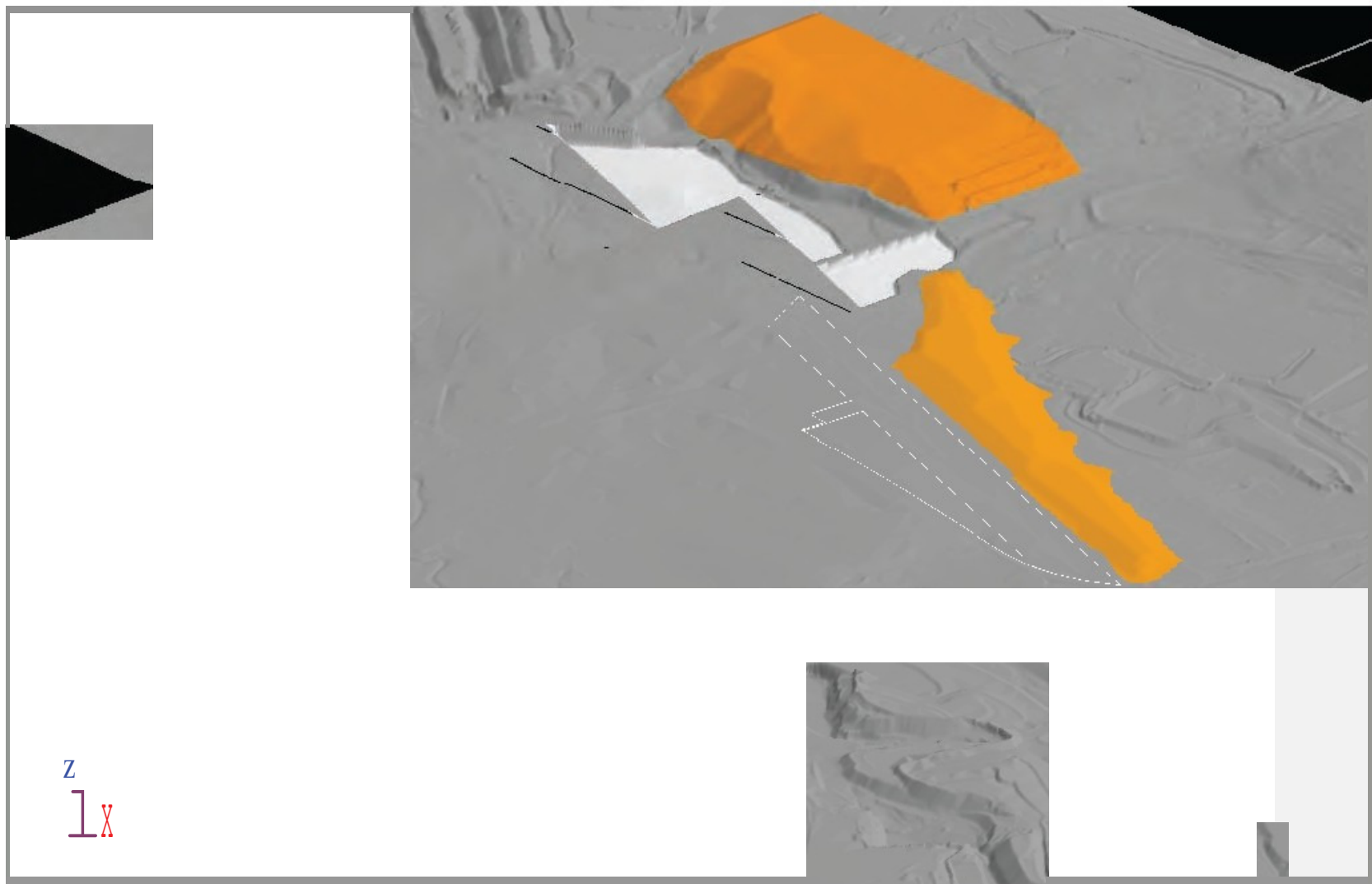
1 months

2 Glider pit 2



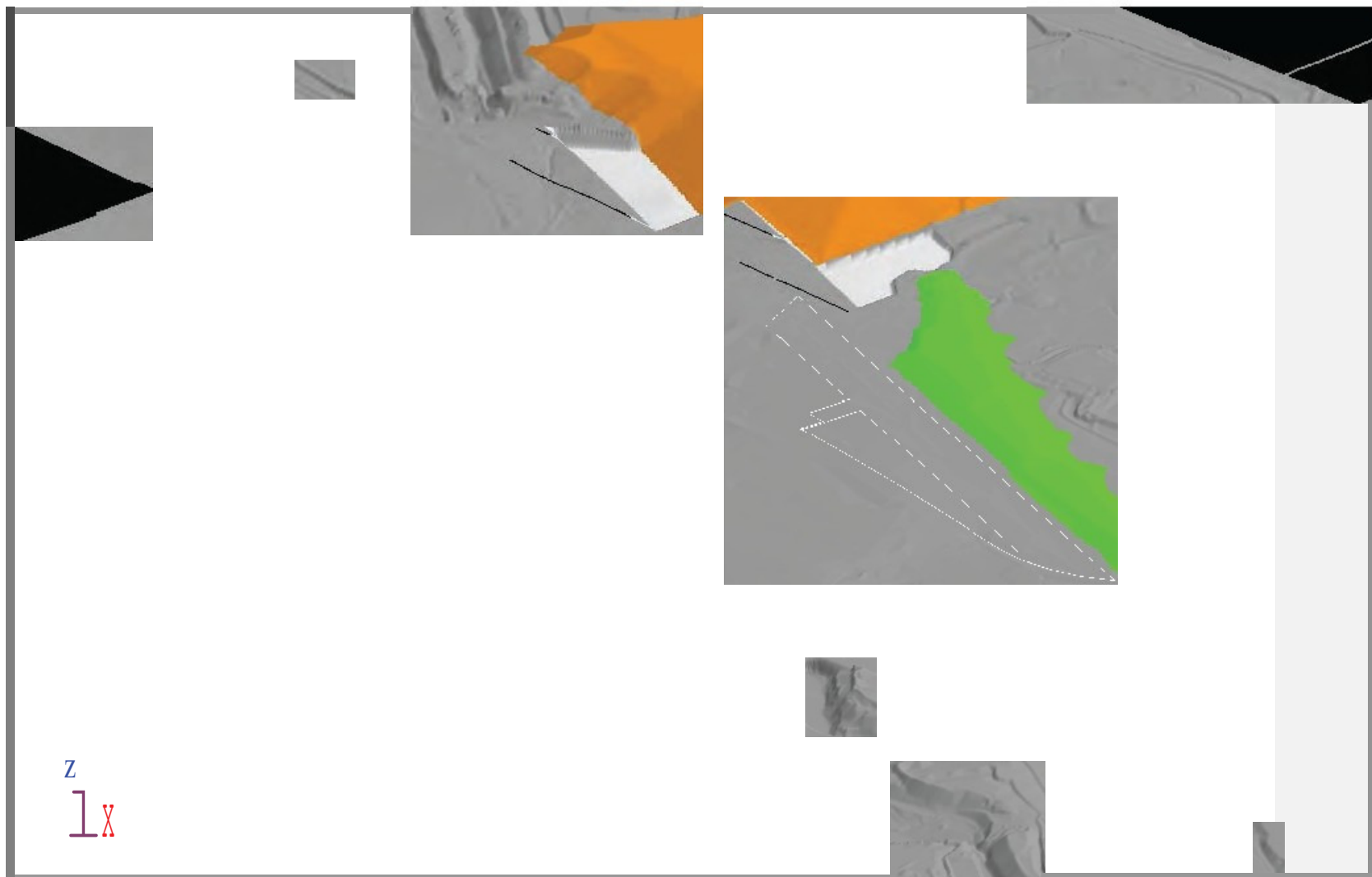
2 months

### 3 Glider pit 2



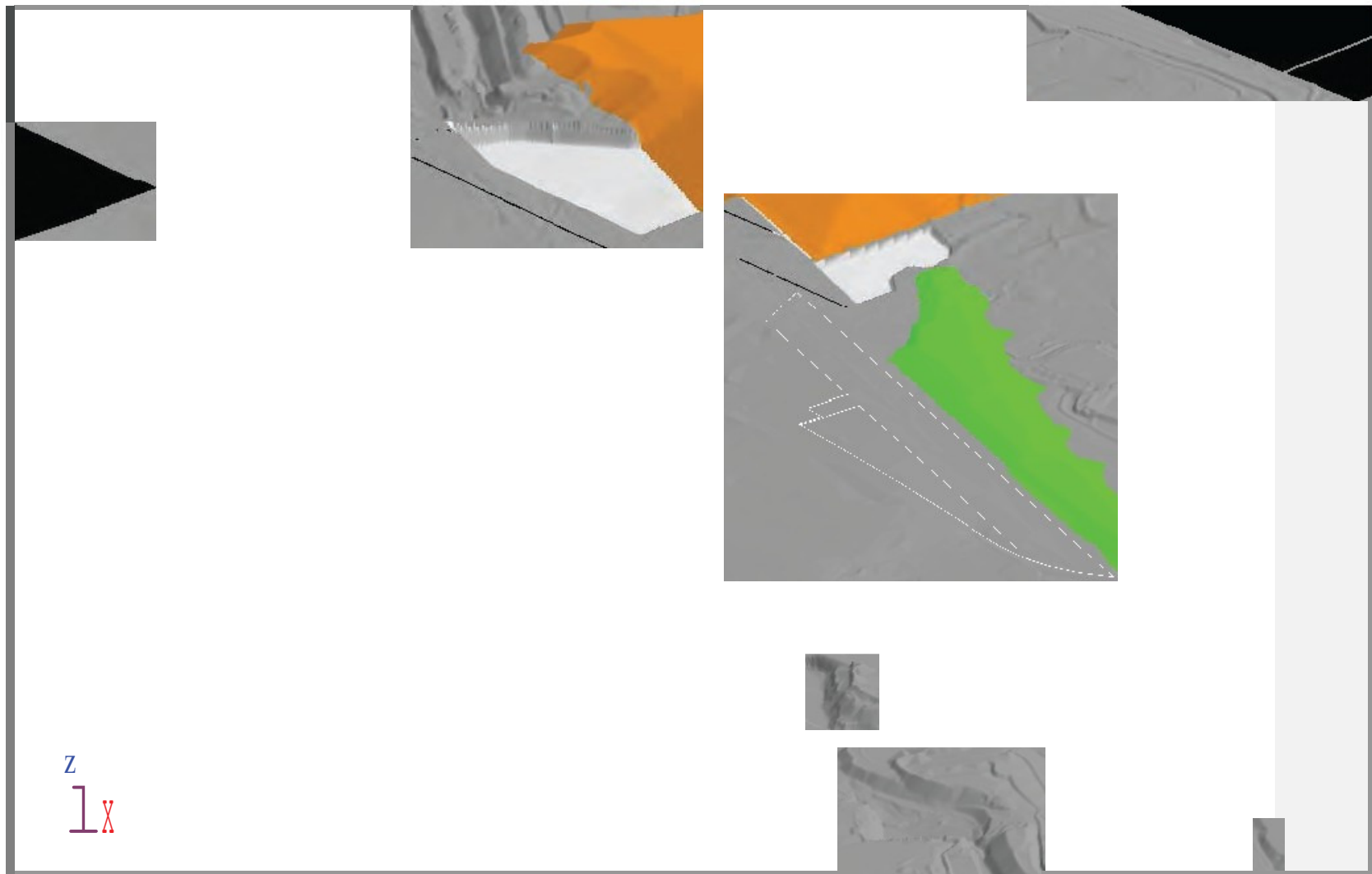
7 months

#### 4 Glider pit 2



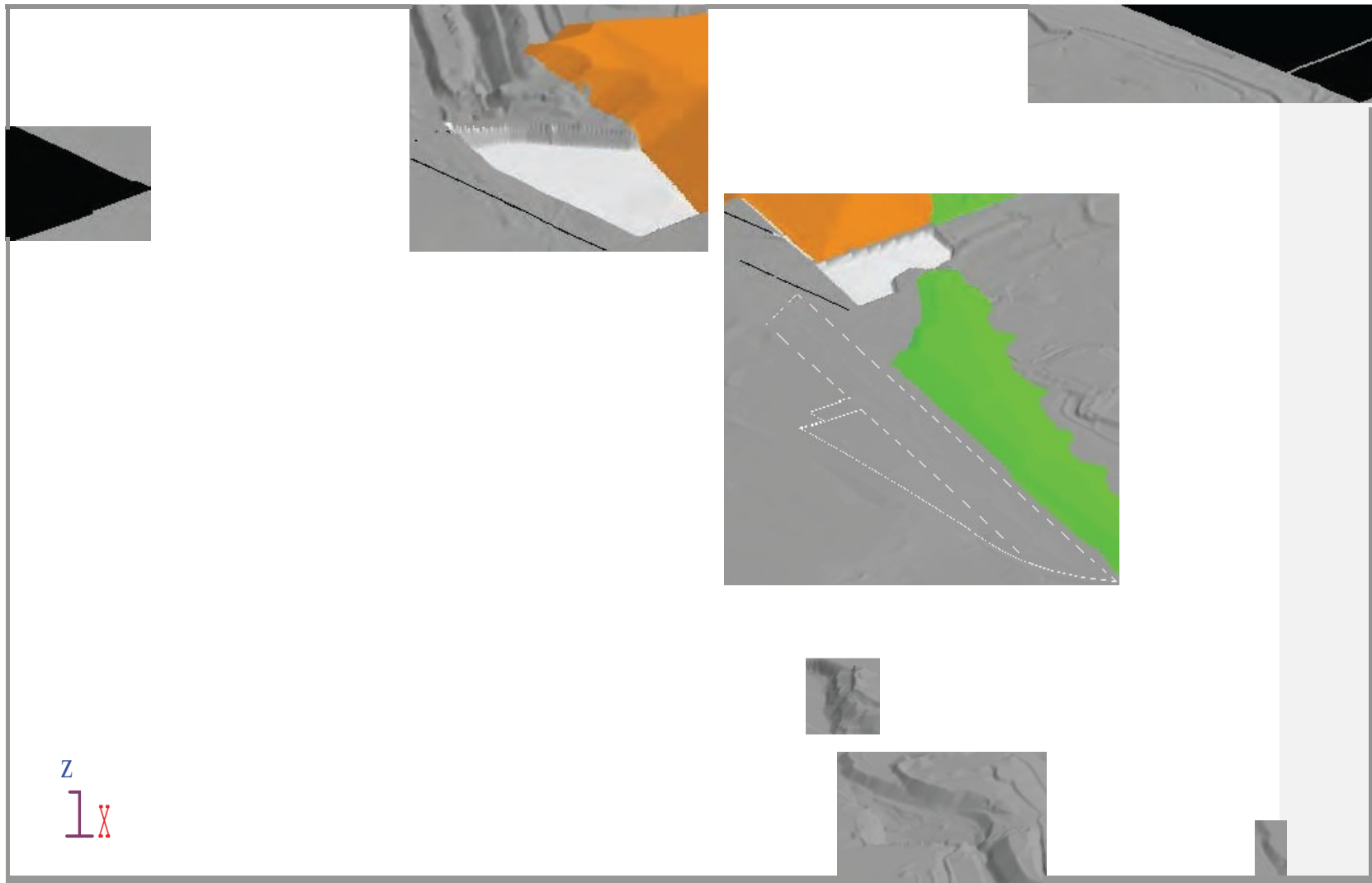


## 5 Glider pit 2

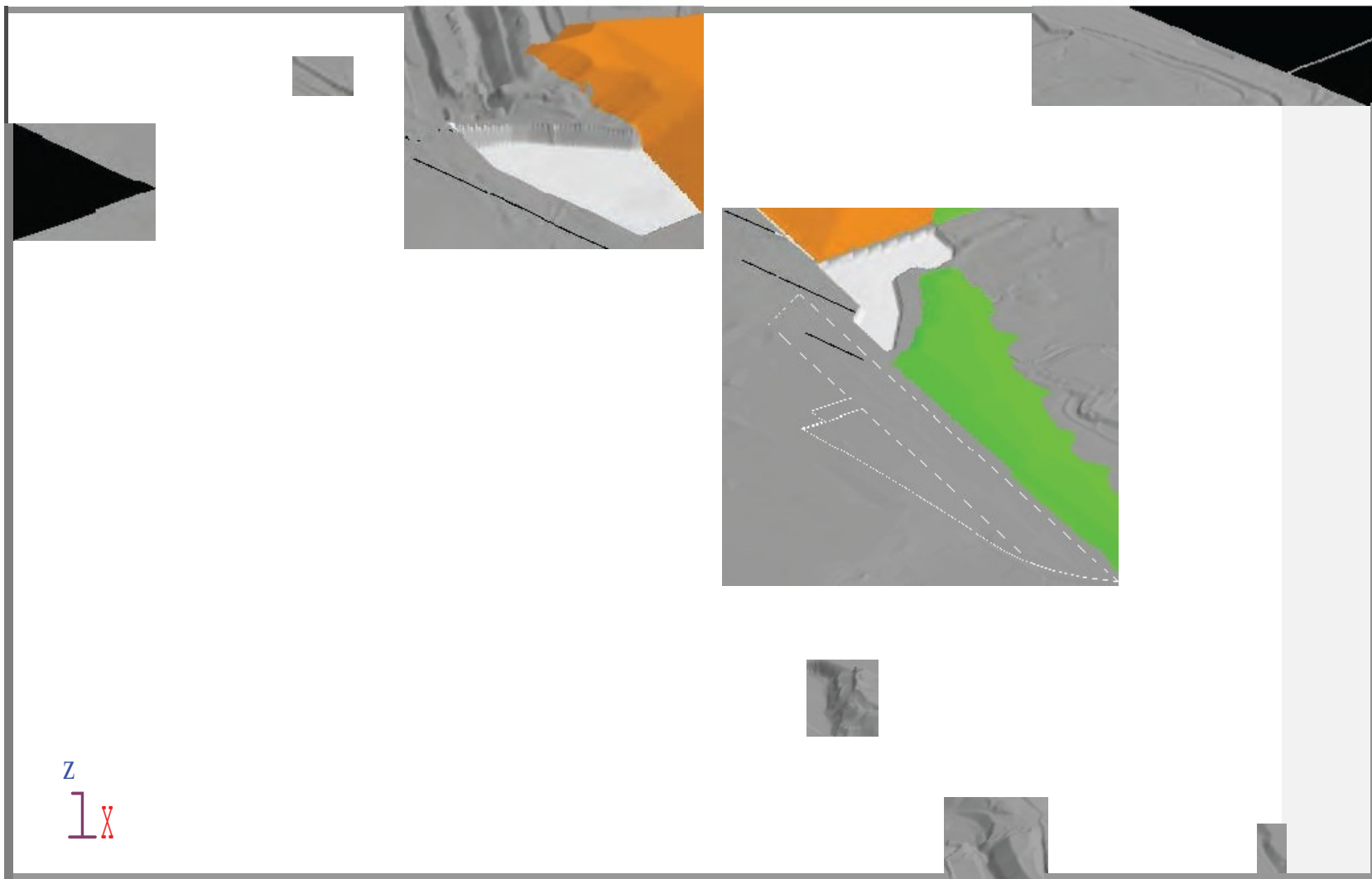


9 months

## 6 Glider pit 2

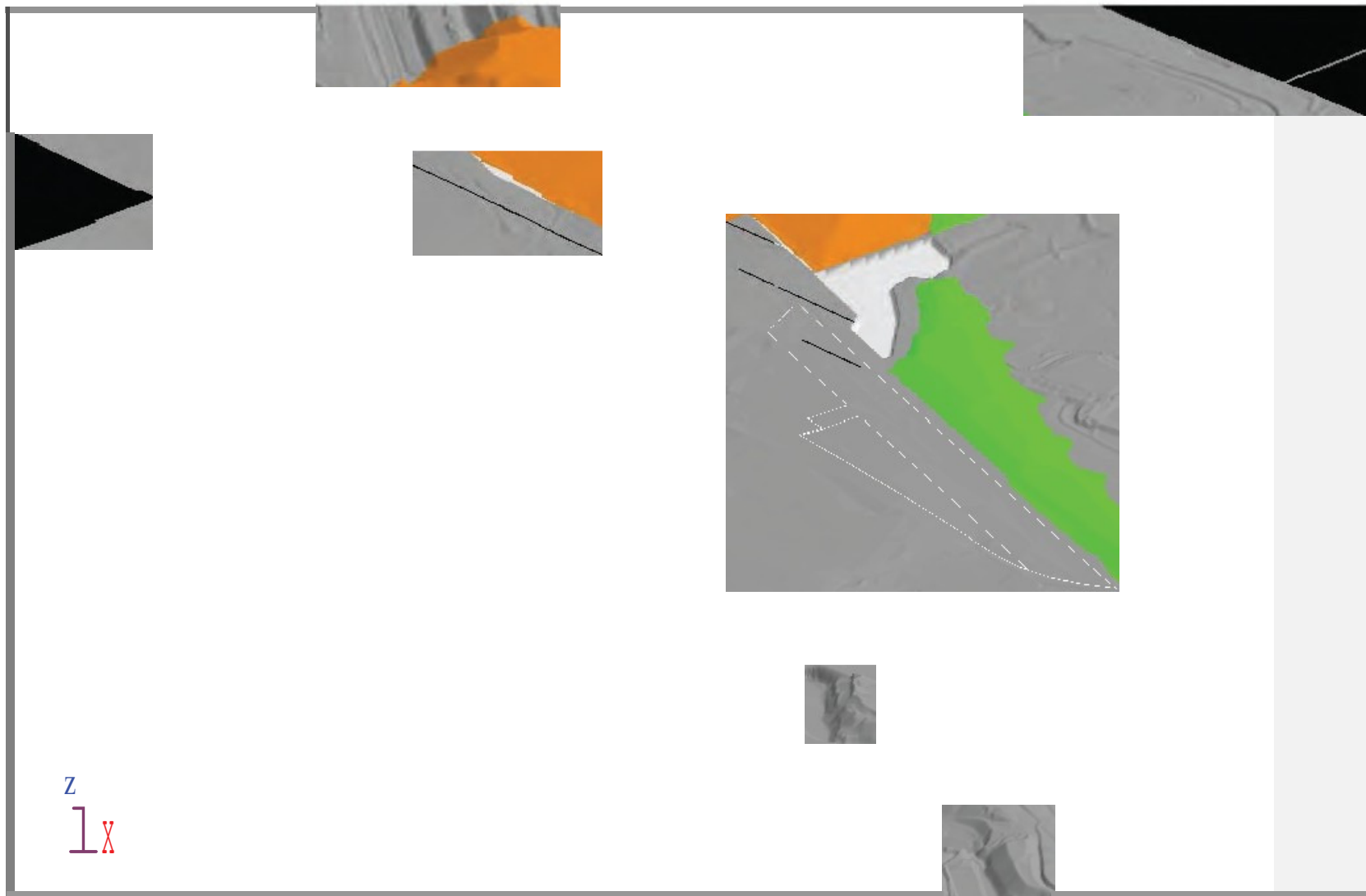


7 Glider pit 1 remaining

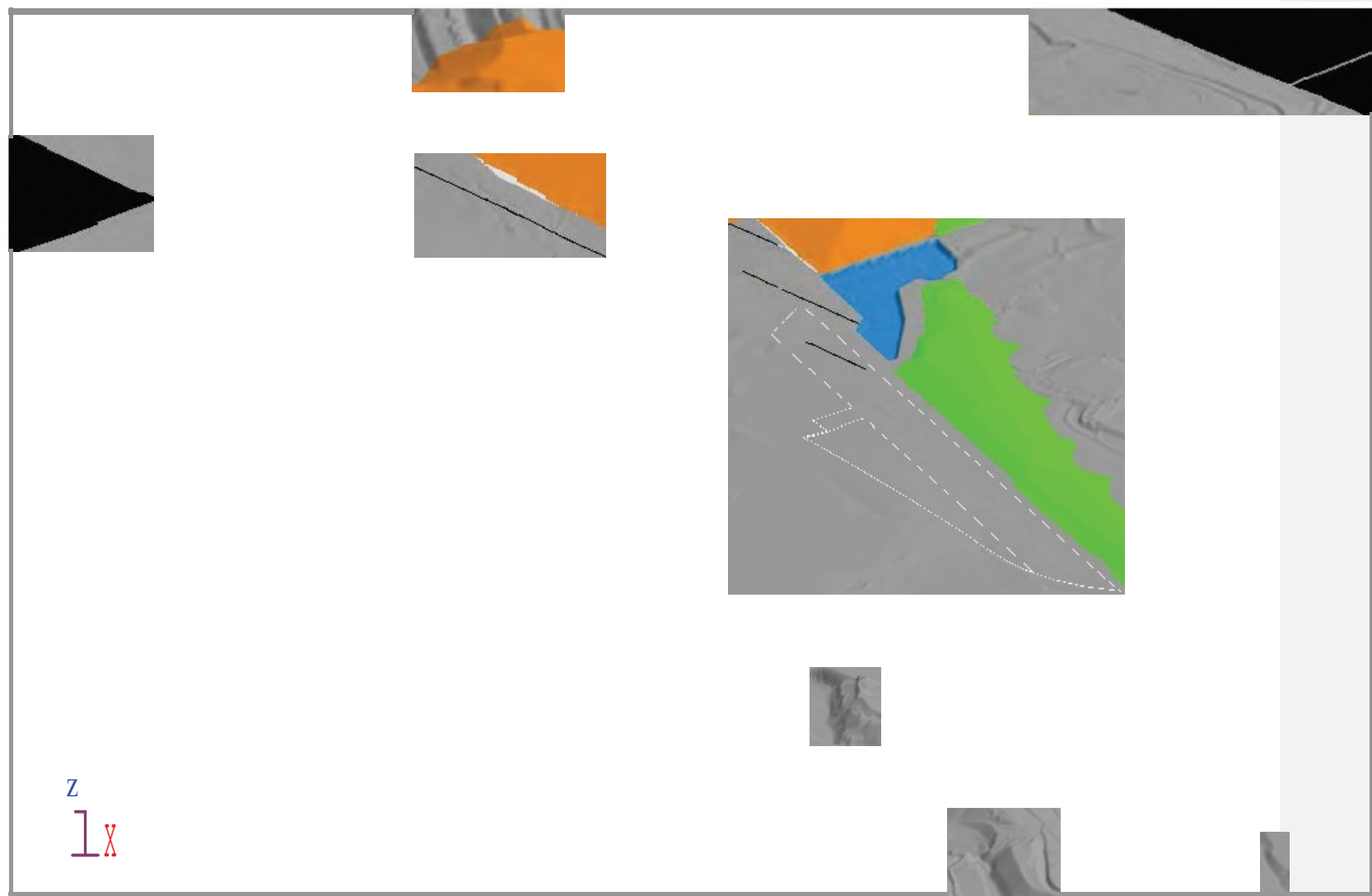


1 month

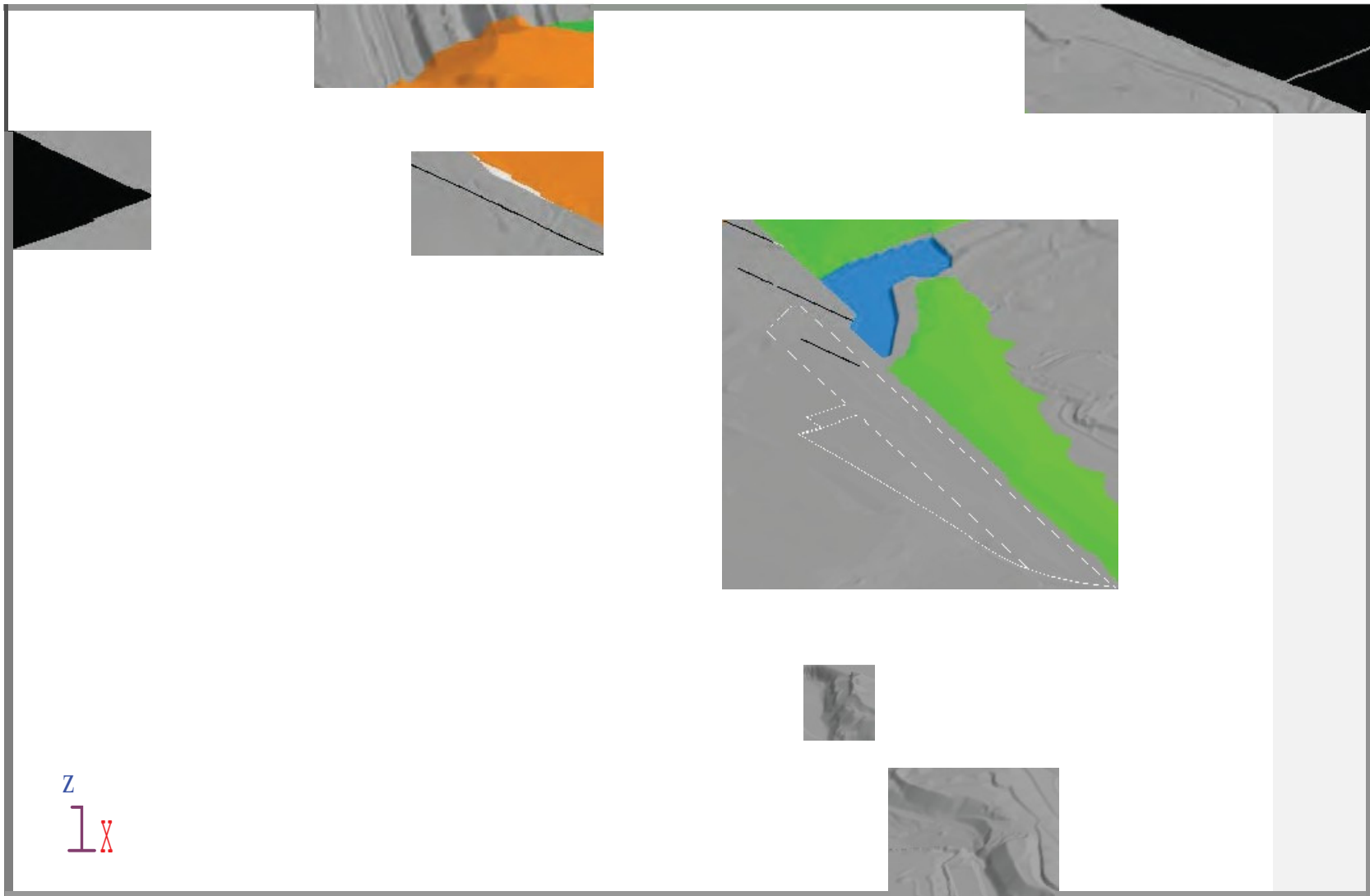
## 8-Glider pit 2



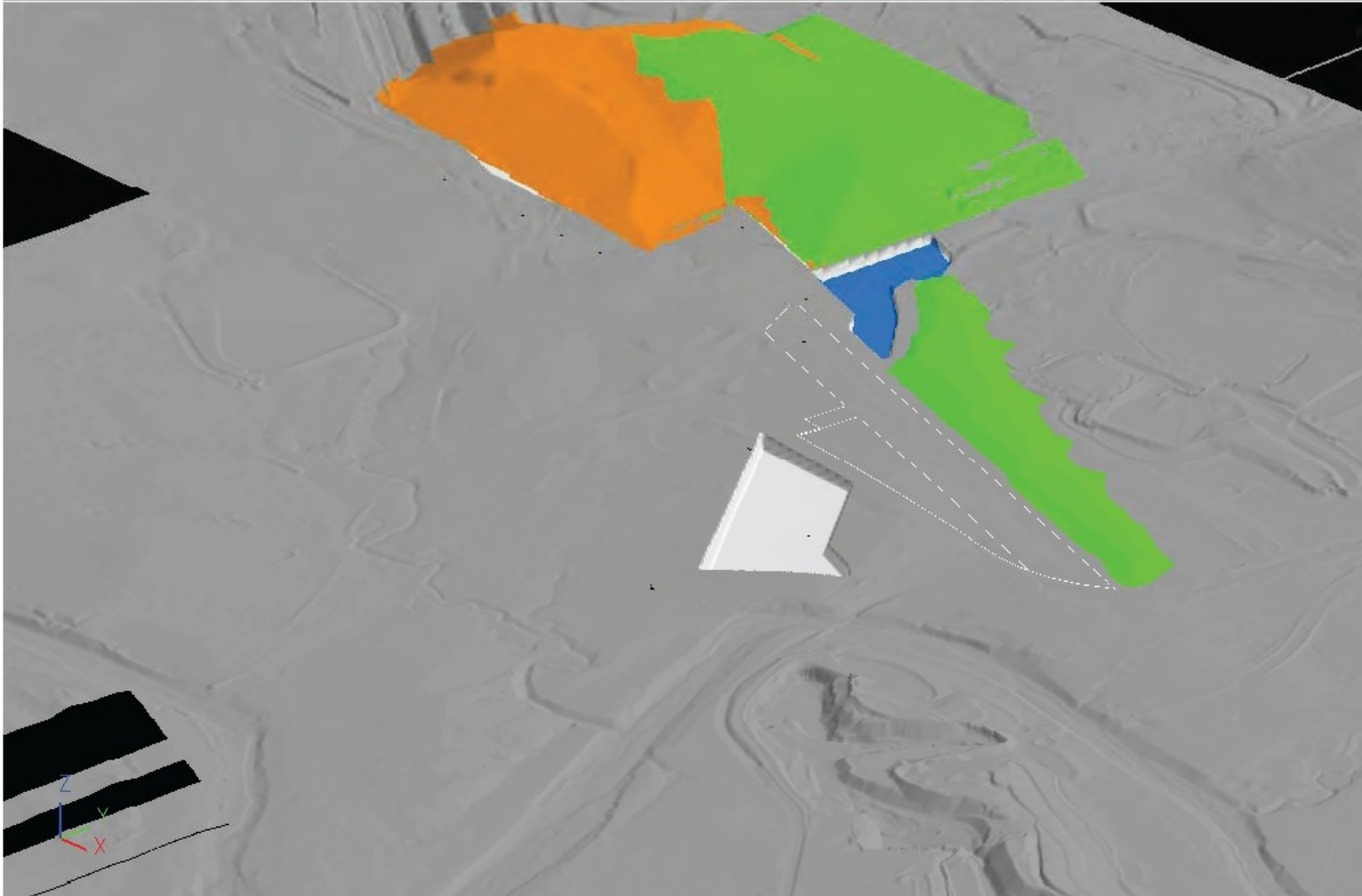
9- Glider pit 1 dam constructed



## 10-Glider pit 2

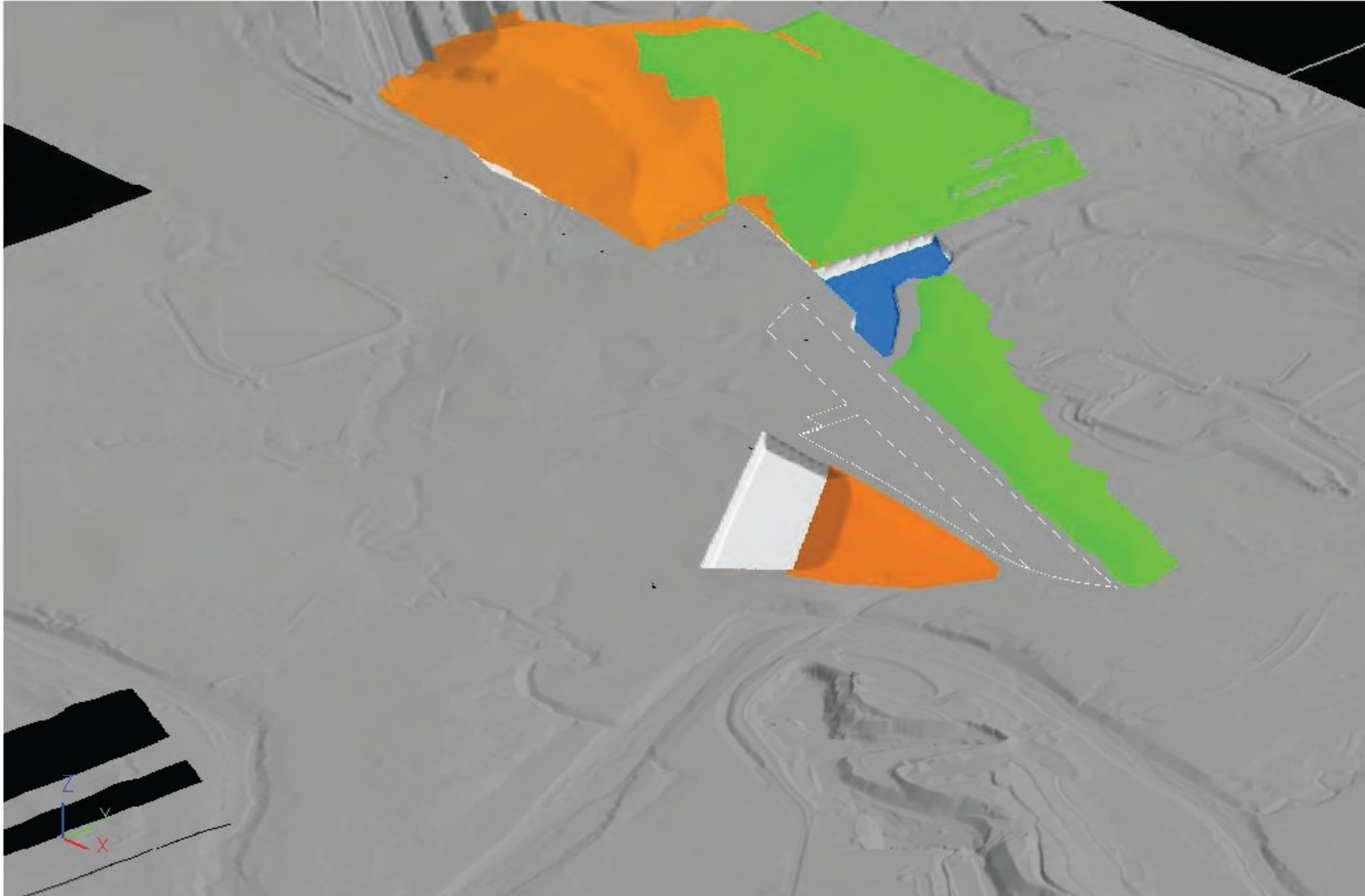


1 1 Glider pit 3 boxcut



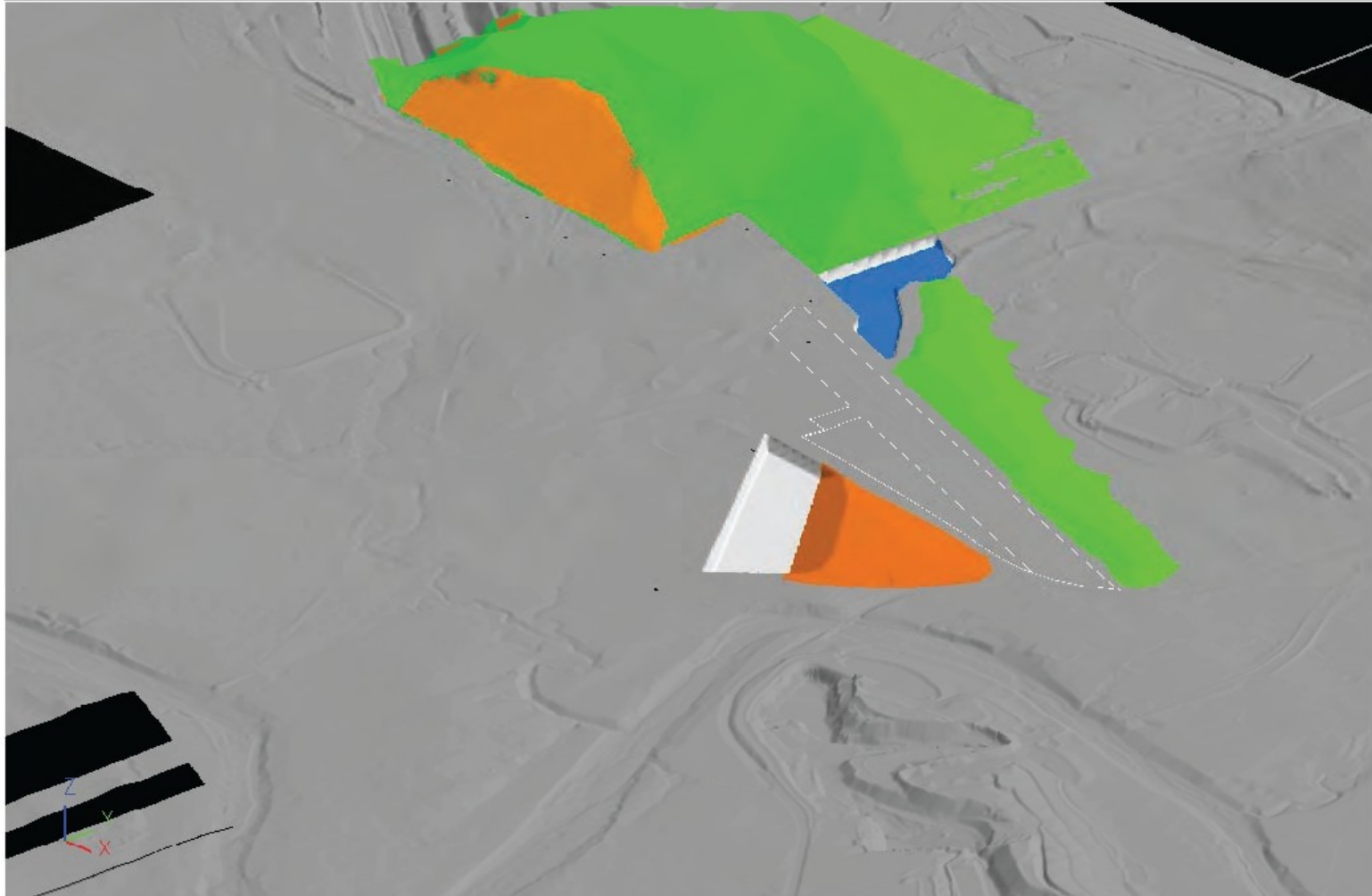
7 months

## 12 Glider pit 3





### 13 Glider pit 2

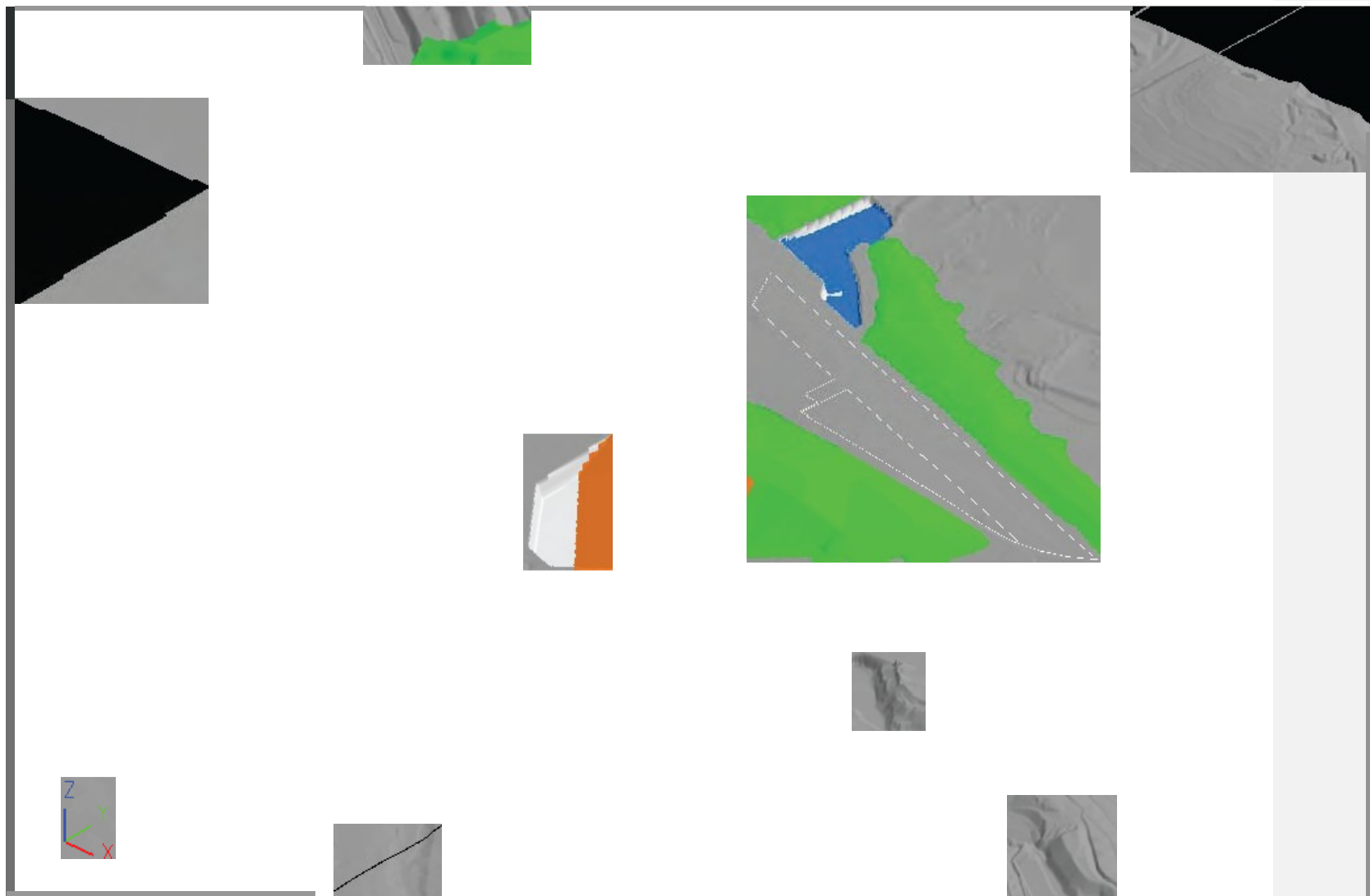


## 14 Glider pit 2



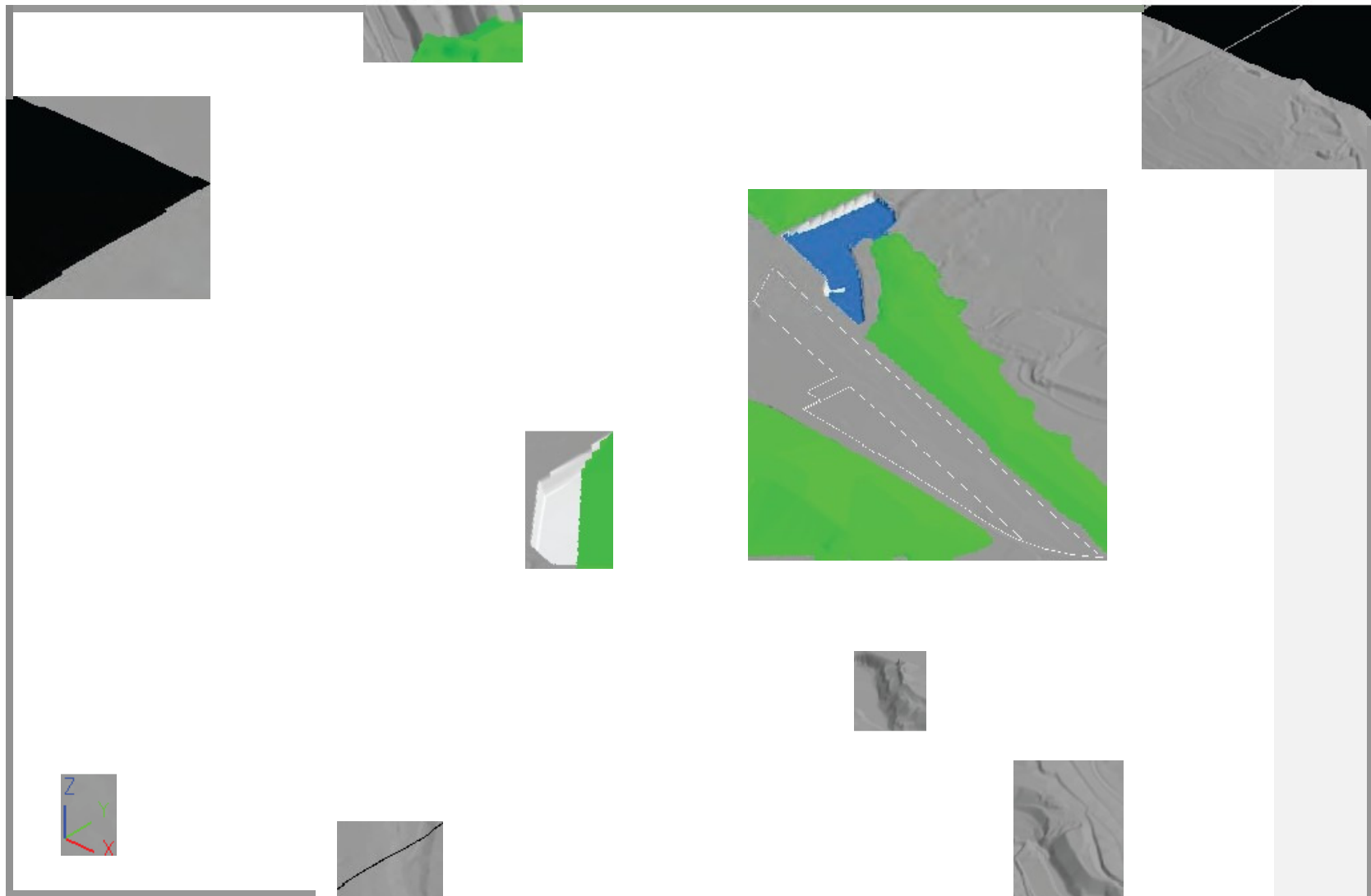
14 months

## 15-Glider pit 2



12 months

## 16-Glider pit 3 complete



## **Appendix B Acoustic Assessment (EMGA, October 2009)**





Environmental Management  
Group Australia

# Hunter Valley Operations South - Revised Mine Plan Acoustic Assessment

Prepared for Coal & Allied (Rio Tinto Coal Australia) - October 2009



Report No. J09011RP1 Draft

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances.

Approved by: Najah Ishac

Position: Director - Acoustic Services

Signed:

Date: 1 October, 2009

Environmental Management Group Australia Pty Limited  
PO Box 6399  
Parramatta BC, Parramatta NSW 2150  
[www.emga.com.au](http://www.emga.com.au)



# Table Of Contents

1	INTRODUCTION	
1.1	Glossary	1.2
2	NOISE IMPACT ASSESSMENT	
2.1	Project Approval Limits	2.1
2.2	Approach to Modelling	2.3
i.	Operational Noise Modelling	2.3
ii.	Noise Model Equipment Inventory	2.3
2.3	Operational Noise Level Predictions	2.4
i.	Calm Weather Conditions	2.4
ii.	Prevailing Weather Conditions	2.6
3	NOISE MANAGEMENT AND MONITORING	
4	CONCLUSION	

# List of Tables

1.1	GLOSSARY	1.2
2.1	MODELLED PLANT INVENTORY	2.4
2.2	PREDICTED CALM WEATHER NOISE LEVELS	2.5
2.3	ASSESSABLE INP WIND CONDITIONS	2.6
2.4	PREDICTED ADVERSE WEATHER NOISE LEVELS	2.7

---

# 1 Introduction

This report was prepared for Rio Tinto Coal Australia - Coal & Allied by Environmental Management Group Australia Pty Limited (EMGA) to assess environmental noise associated with proposed mining operations for the revised mine plan developed with the expectation that the Hunter Valley Gliding Club (HVGC) and grass air strip would remain in its current location. The revised mine plan has been developed to take into consideration, amongst other things, amenity impacts on the HVGC.

This document is a supplement to the Noise and Vibration report prepared for the environmental assessment titled *Hunter Valley Operations South Coal Project Environmental Assessment Report*, dated January 2008. On 24 March 2009 the Minister for Planning granted approval (06\_0108) for the broader project, which included a requirement to develop an Amenity Management Plan for the HVGC and its recreational area. The information herein assesses potential impacts on the HVGC with a view to informing this plan.

This assessment is provided to demonstrate compliance with the Hunter Valley Operations South (HVO South) Project Approval conditions on noise.

## 1.1 Glossary

Table 1.1 provides a glossary of noise related and other terms used in this assessment.

Table 1.1 GLOSSARY

Term	Definition
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured $L_{90}$ statistical noise levels.
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(LinPeak)	The peak sound pressure level (not RMS) expressed as decibels with no frequency weighting.
DECC	Department of Environment and Climate Change NSW.
HVGC	Hunter Valley Gliding Club.
HVO	Hunter Valley Operations.
INP	Industrial Noise Policy.
$L_1$	The noise level exceeded for 1% of a measurement period.
$L_{10}$	A noise level which is exceeded 10% of the time. It is approximately equivalent to the average of maximum noise levels.
$L_{90}$	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
$L_{eq}$	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
$L_{max}$	The maximum root mean squared (RMS) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
SI	Still isothermal (SI) refers to calm weather conditions (defined as no wind and standard temperature gradients).
sigma-theta ( $\sigma_\theta$ )	The standard deviation of horizontal wind fluctuation.
Sound power level	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment.
Temperature inversion	A positive temperature gradient. A meteorological condition where atmospheric temperature increases with altitude to some height.

## 2 Noise Impact Assessment

### 2.1 Project Approval Limits

The HVO South Project Approval stipulates noise limits in Schedule 3 Item 2, which are reproduced below.

The table presented below has been extracted from the Project Approval:

“The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 2 at any residence on privately-owned land, or on more than 25% of any privately-owned land.

*Table 2: Noise impact assessment criteria dB(A)*

<b>Land Number / Receiver</b>	<b>Day</b> <i>L<sub>Aeq</sub>(15 minute)</i>	<b>Evening</b> <i>L<sub>Aeq</sub>(15 minute)</i>	<b>Night</b> <i>L<sub>Aeq</sub>(15 minute)</i>	<b>Night</b> <i>L<sub>A1</sub>(1 minute)</i>
<i>Hunter Valley Gliding Club (when in use)</i>	55	55	55	
7– Stapleton (Cheshunt East)	41	41	41	45
10 – Moses (Wandewoi)	37	37	37	45
<i>Maison Dieu residences</i>				
16 – Algie	42	42	42	45
32 – Algie (Curlewis)				
5 – Bowman, 47 – Moxey, 61 – Shearer and all other land on Shearer's Lane	41	41	41	45
17 – Algie	40	40	40	45
34 – Ernst				
24 – Clifton and Edwards and residences located within 250 metres of this residence, not otherwise listed in this table	39	39	39	45
Maison Dieu residences within 1 kilometre of Shearers Lane, not otherwise listed in this table	37	37	37	45
All other Maison Dieu residences	35	35	35	45
<b>Jerrys Plains Road Residences</b>				

<b>Land Number / Receiver</b>	<b>Day</b>	<b>Evening</b>	<b>Night</b>	<b>Night</b>
	<b>L<sub>Aeq</sub>(15 minute)</b>	<b>L<sub>Aeq</sub>(15 minute)</b>	<b>L<sub>Aeq</sub>(15 minute)</b>	<b>L<sub>A1</sub>(1 minute)</b>
36 – Smith (ex Garland)	36	36	36	45
All Jerrys Plains Road residences other than Smith	35	35	35	45
Jerrys Plains village residences	35	35	35	45
Warkworth residences				
38 - Henderson	48	48	48	45
23 – Hawkes (Springwood)	43	43	43	45
45 – Kelly and all other privately-owned land in Warkworth village	43	43	43	45
All other privately-owned land	35	35	35	45

The Director-General may require the Proponent to consider, assess and implement measures to achieve compliance with these limits.

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 2, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 2 in accordance with the negotiated noise agreement.

**Notes:**

- Noise impacts at HVCG are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Noise impact assessment limits are only applicable during times of use that have been notified by HVGC to the Proponent.
- The land numbers and receiver references are as described in the EA, and shown in Appendix.
- To determine compliance with the L<sub>Aeq</sub>(15 minute) noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- To determine compliance with the L<sub>A1</sub>(1 minute) noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).
- The noise emission limits identified in the above table apply under meteorological conditions of:
  - ❖ wind speeds of up to 3 m/s at 10 metres above ground level; or
  - ❖ temperature inversion conditions of up to 3°C/100m, plus a 2 m/s source-to-receiver component drainage flow wind at 10 metres above ground level for those receivers where applicable in accordance with the NSW Industrial Noise Policy."

## 2.2 Approach to Modelling

### *i. Operational Noise Modelling*

The Environmental Noise Model (ENM) noise prediction software was used for modelling purposes. ENM takes into account distance, ground effects, atmospheric absorption and topographic detail. ENM is a DECC accepted noise prediction model and it gives consistently reliable predictions of environmental noise. Initial calculations were performed with no wind or temperature gradients, which are termed calm weather conditions. Assumed night air temperature and relative humidity were 10 °C and 80% respectively. Noise level predictions are provided in *Section 2.3*.

The model incorporates three-dimensional digitised ground contours for the surrounding land and the proposed mine plan for the HVGC area. Contours of the mine were superimposed on surrounding base topography. Equipment was placed at various locations and heights, representing potential operating conditions that could result in the greatest noise impacts for the HVGC. The model also incorporated a 2m high mound east of the dragline area. Significantly, the relative ground level of the dragline area will be 5m below the current surrounding natural ground level prior to the dragline commencing night time operations. This will effectively facilitate a 7m high barrier differential.

The noise model predicts Leq noise levels, based on equipment sound power levels. For noise modelling consistency, the current study has adopted the sound power levels reported in the 2008 EA Noise Assessment. The results assume that all plant and equipment operate simultaneously. In practice, such an operating scenario would be unlikely to occur. The results are therefore considered conservative.

### *ii. Noise Model Equipment Inventory*

The revised mine plan considers the HVGC and aims to minimise impacts thereon. The area known as the Glider Pit has three working areas being the dragline, drill and dozer or overburden emplacement. The other active area during mining at the Glider Pit will be in the Cheshunt Pit only. The current study adopts the inventory and pit configuration used for the Cheshunt Pit night scenario identified in the EA as Scenario B2. The Lemington Coal Preparation Plant (LCPP) will not operate at this time and therefore associated transportation options considered in the EA will not apply to the current study. Similarly, plant to be used in the Glider Pit will be sourced from other parts of the mine, rendering the Riverview Pit inactive. *Figure 2.1* shows the location of modelled equipment and these areas. *Table 2.1* lists the likely equipment inventory that was modelled.

Table 2.1 MODELLED PLANT INVENTORY

Item	Quantity
Glider Pit	
Emplacement Area	
Dozer	1
Haul Truck - Waste	1
Drill Area	
Drill	1
Haul Truck – Coal	2
Loader	1
Dragline Area	
Dragline	1
Shovel	1
Haul Truck Waste	2
Cheshunt Main	
Haul Truck - Coal	10
Haul Truck - Waste	25
Dozer	8
Drill	2
Front-End-Loader	5
Grader	4
Scraper	1
Rubber-Tyred-Dozer	2
Water Cart	3
Shovel	1

## 2.3 Operational Noise Level Predictions

### *i. Calm Weather Conditions*

Table 2.2 summarises calm weather noise modelling results for the subject mine plan along with the Project Approval limits for comparison. The noise levels under calm weather typify the noise received at locations surrounding the mine during the day in the absence of adverse Industrial Noise Policy (INP) assessable weather conditions. This was ascertained in the EA Noise Assessment report.

The predicted noise levels under calm weather conditions are below the Project Approval limits at all assessment locations.

Table 2.2 PREDICTED CALM WEATHER NOISE LEVELS

Assessment Location	Predicted Noise Level, dB(A)		Project Approval Limits	
	L <sub>eq,15min</sub>	L <sub>1,1min</sub>	Day, Evening & Night L <sub>eq,15min</sub>	Night L <sub>1,1min</sub>
<i>Hunter Valley Gliding Club (when in use)</i>	44	-	55	-
7– Stapleton (Cheshunt East)	23	30	41	45
10 – Moses (Wandewoi)	23	22	37	45
<i>Maison Dieu residences</i>				
16 – Algie	24	29	42	45
32 – Algie (Curlewis)	25	31		
5 – Bowman,	24	31	41	45
47 – Moxey,	21	24		
61 – Shearer	24	30		
17 – Algie	24	31	40	45
34 – Ernst	24	30		
24 – Clifton and Edwards and residences located within 250 metres of this residence, not otherwise listed in this table	23	30	39	45
Maison Dieu residences within 1 kilometre of Shearers Lane, not otherwise listed in this table (Knodlers Ln used)	23	29	37	45
<i>Jerrys Plains Road Residences</i>				
36 – Smith (ex Garland)	14	10	36	45
All Jerrys Plains Road residences other than Smith	Up to 16	Up to 14	35	45
Jerrys Plains village residences	11	9	35	45
<i>Warkworth residences</i>				
38 - Henderson	25	32	48	45
23 – Hawkes (Springwood)	24	31	43	45
45 – Kelly and all other privately-owned land in Warkworth village	29	36	43	45



## **ii. Prevailing Weather Conditions**

Received sound levels increase when the wind blows from source to receiver or under temperature inversion conditions and decrease when the wind blows from receiver to source or under temperature lapse conditions. A 3°C per 100m elevation temperature inversion was used as well as the prevailing winds identified in the EA Noise Assessment. The wind speeds and directions assessed are listed in *Table 2.3*.

Table 2.3 Assessable INP Wind Conditions

Wind (Origin) Direction, degrees	Upper 10% Night Wind Speed, m/s
90	1.9
112.5	2.4
135	2.7
157.5	2.7
180	2.6
202.5	2.3
225	2.1

There is a premise that if the criterion is met under calm conditions, higher noise under strong winds (>3m/s) is generally acceptable. This is because the ambient noise at receivers also increases during such weather conditions and mine noise is masked (for example, by wind induced vegetation noise). However, at wind speeds below 3 m/s and under temperature inversions, noise levels are assessable under the DECC's INP. These conditions are referred to as *INP weather conditions*.

The predicted noise levels under INP weather conditions are provided in *Table 2.4*. The results are also presented in the form of noise contours in *Figure 2.1*. These contours represent the outer envelope of noise levels assuming all assessable weather conditions (ie 3°C/100m temperature inversion and winds identified in Table 2.3) occurred concurrently for the subject mine plan. It is therefore an artificial representation of actual noise levels since winds of differing speeds and directions cannot exist at one point in time.

The predicted noise levels under INP assessable weather conditions satisfy the Project Approval limits at all assessment locations.

Table 2.4 PREDICTED ADVERSE WEATHER NOISE LEVELS

Assessment Location	Predicted Noise Level, dB(A)		Project Approval Limits	
	L <sub>eq,15min</sub>	L <sub>1,1min</sub>	Day, Evening & Night	Night
			L <sub>eq,15min</sub>	L <sub>1,1min</sub>
<i>Hunter Valley Gliding Club (when in use)</i>	52	-	55	-
7– Stapleton (Cheshunt East)	41	44	41	45
10 – Moses (Wandewoi)	36	31	37	45
<i>Maison Dieu residences</i>				
16 – Algie	36	35	42	45
32 – Algie (Curlewis)	37	36		
5 – Bowman	38	36	41	45
47 – Moxey	38	37		
61 – Shearer	38	36		
17 – Algie	37	35	40	45
34 – Ernst	37	34		
24 – Clifton and Edwards and residences located within 250 metres of this residence, not otherwise listed in this table	37	34	39	45
Maison Dieu residences within 1 kilometre of Shearers Lane, not otherwise listed in this table (Knodlers Ln used)	37	33	37	45
<i>Jerrys Plains Road Residences</i>				
36 – Smith (ex Garland)	33	31	36	45
All Jerrys Plains Road residences other than Smith	up to 32	Up to 31	35	45
Jerrys Plains village residences	27	24	35	45
<i>Warkworth residences</i>				
38 - Henderson	31	34	48	45
23 – Hawkes (Springwood)	38	32	43	45
45 – Kelly and all other privately-owned land in Warkworth village	32	37	43	45

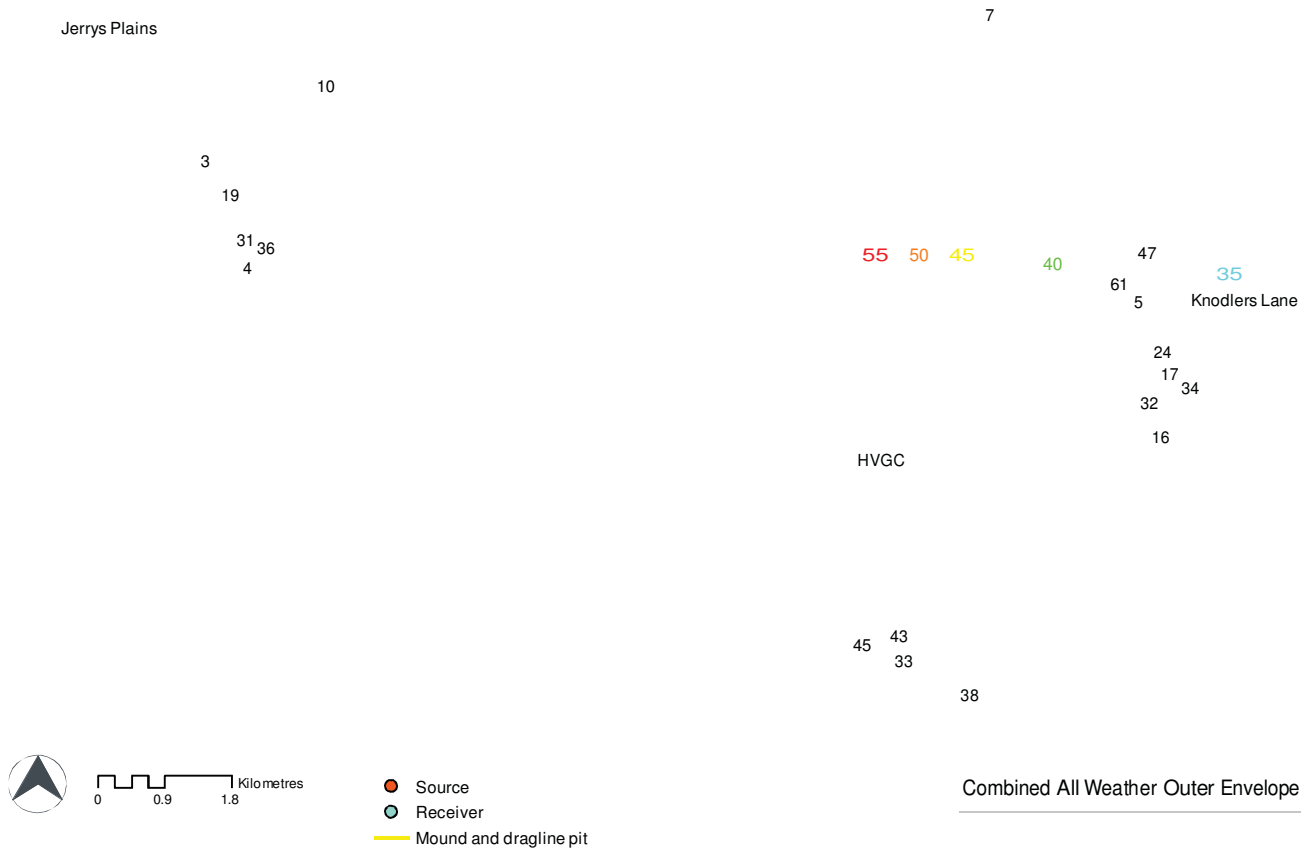


Figure 2.1  
Combined All Weather Outer Envelope Leq,15min Noise Levels, dB(A)

Hunter Valley Operations



### 3 Noise Management and Monitoring

Detailed noise management procedures currently govern the management of noise across HVO South. These are part of Coal & Allied's procedures for blasting, noise monitoring and assessment as detailed in the EA Noise Assessment.

In addition, this study will provide input to the Amenity Management Plan for the HVGC. The plan will include the following considerations:

- Adopt vigilant planning for night operations in the area identified for dragline and associated plant nearest the HVGC. Analysis of wind data identifies the night period as when prevailing westerly winds are prominent and will cause mining noise levels at the HVGC to be elevated. A schedule of times the HVGC will be used at night for recreation should be maintained with the proponent as required by the Project Approval. Planned night time mining activities within the dragline area will need to consider prevailing winds for the coming evening and night by real-time scrutiny of the site's weather station data.
- When working in the dragline area of the Glider Pit, the relative height differential between the pit and surrounding natural surface must be at least 5m before night operations can commence if the HVGC is being used. A 2m high mound at the surface and to the east of the Glider Pit must also be constructed prior to dragline night operations in this pit.
- Confirm mining noise levels from the Glider Pit dragline area by undertaking monitoring initially on nights the HVGC is not being used, and regularly thereafter as part of Coal & Allied's monitoring program. This monitoring should continue whilst ever the HVGC is being used at night and until such time the Glider Pit is completed.

## 4 Conclusion

This study considers the potential noise impacts of the revised mine plan, which incorporates mining operations in the Cheshunt and Glider Pit as described in *Section 2.2*. The acoustic assessment includes modelling of all major mining equipment at representative operational locations.

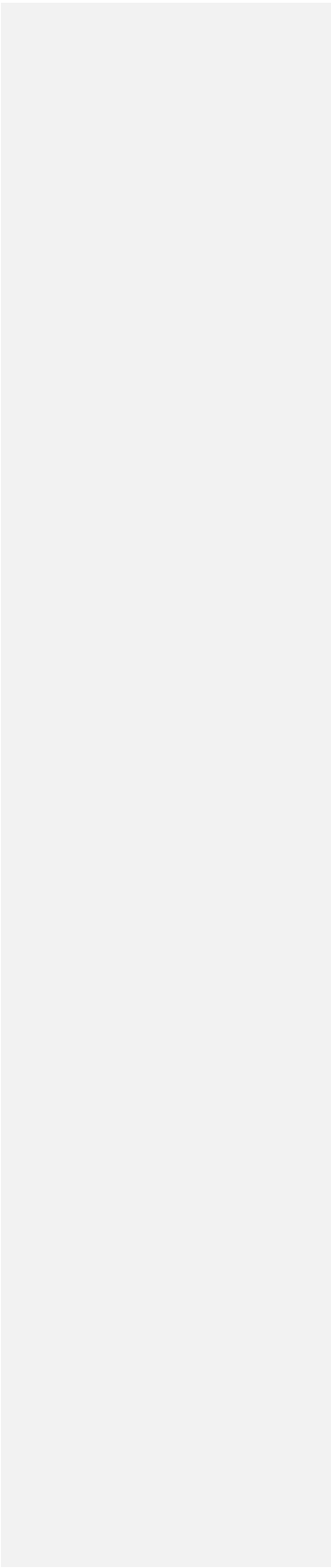
The noise modelling has shown that under calm and INP assessable weather conditions all assessment locations experience noise levels below the operational noise Project Approval limits.

Coal & Allied's existing environmental management plans and procedures, which include ongoing noise monitoring, will be used to assess the performance of the mining operations against the Project Approval noise limits.

In conclusion, noise levels from the revised mine plan are unlikely to result in impacts on the nominated assessment locations. Hence, the noise impact of the proposal is of minimal environmental concern.



Environmental Management  
Group Australia



## **Appendix C Air Assessment (PAEHolmes, August 2009)**



## AIR QUALITY REPORT

### DRAFT DUST AMENITY PLAN FOR MINING IN THE VICINITY OF THE GLIDER PIT

Coal & Allied

Job No: 3403

30 July 2009



PROJECT TITLE: DRAFT DUST AMENITY PLAN FOR MINING IN THE VICINITY OF THE GLIDER PIT

JOB NUMBER: 3403

PREPARED FOR: Trudie MacDonald  
COAL & ALLIED

PREPARED BY: N E Holmes

QA PROCEDURES CHECKED BY:

APPROVED FOR RELEASE BY: Draft for discussion (A Todoroski)

DISCLAIMER & COPYRIGHT: This report is subject to the copyright statement located at [www.paeholmes.com](http://www.paeholmes.com) © Queensland Environment Pty Ltd trading as PAEHolmes ABN 86 127 101 642

#### DOCUMENT CONTROL

VERSION	DATE	PREPARED BY	REVIEWED BY
01	15 May 200	N E Holmes	
03	30 July 2009	N E Holmes	K Holmes, A Todoroski
04	13 August		A Todoroski

Queensland Environment Pty Ltd trading as  
PAEHolmes ABN 86 127 101 642

SYDNEY:  
Suite 2B, 14 Glen Street  
Eastwood NSW 2122  
Ph: +61 2 9874 8644  
Fax: +61 2 9874 8904

BRISBANE:  
Level 1, La Melba, 59 Melbourne Street South Brisbane Qld 4101  
PO Box 3306 South Brisbane Qld 4101  
Ph: +61 7 3004 6400  
Fax: +61 7 3844 5858

Email:

[info@paeholmes.com](mailto:info@paeholmes.com)

Website: [www.paeholmes.com](http://www.paeholmes.com)

---

## TABLE OF CONTENTS

1	INTRODUCTION	1
2	BACKGROUND AND IDENTIFICATION OF ISSUES	2
3	APPROACH TO THE ASSESSMENT AND DISCUSSION	4
4	MODELLING RESULTS AND ANALYSIS OF OPTIONS	7
5	AMENITY MANAGEMENT PLAN BASED ON REACTIVE MANAGEMENT	15
6	SUMMARY AND CONCLUSIONS	16
7	REFERENCES	17

---

## LIST OF TABLES

Table 1 - Summary of major dust generating activities relevant to impacts at HVGC6

## LIST OF FIGURES

Figure 2.1 : HVGC facilities and surrounding land use.....	3
Figure 3.1: Location of dust sources and dust sensitive areas (special receptors) ..	5
Figure 4.1: Predicted 24-hour average PM10 concentrations at Site A due to mining emissions (with no special controls) .....	8
Figure 4.2: Predicted 24-hour average PM10 concentrations at Site A due to mining emissions (with dragline operations suspended).....	8
Figure 4.3: Predicted 24-hour average PM10 concentrations at Site B due to mining emissions (with no special controls) .....	9
Figure 4.4: Predicted 24-hour average PM10 concentrations at Site B due to mining emissions (with dragline operations suspended).....	9
Figure 4.5: Predicted 24-hour average PM10 concentrations at Site C due to mining emissions (with no special controls) .....	10
Figure 4.6: Predicted 24-hour average PM10 concentrations at Site C due to mining emissions (with dragline operations suspended).....	10
Figure 4.7: Predicted 24-hour average PM10 concentrations at Site D due to mining emissions (with no special controls) .....	11
Figure 4.8: Predicted 24-hour average PM10 concentrations at Site D due to mining emissions (with dragline operations suspended).....	11
Figure 4.9: Predicted 24-hour average PM10 concentrations at Site E due to mining emissions (with no special controls) .....	12
Figure 4.10: Predicted 24-hour average PM10 concentrations at Site E due to mining emissions (with dragline operations suspended).....	12
Figure 4.11: Predicted 24-hour average PM10 concentrations at Site F due to mining emissions (with no special controls) .....	13
Figure 4.12: Predicted 24-hour average PM10 concentrations at Site F due to mining emissions (with dragline operations suspended).....	13
Figure 4.13: Predicted 24-hour average PM10 concentrations at Site G due to mining emissions (with no special controls) .....	14
Figure 4.14: Predicted 24-hour average PM10 concentrations at Site G due to mining emissions (with dragline operations suspended).....	14
Figure 5.1: Flow chart summarising the logic of decisions to be made in managing Glider Pit Operations.....	16

## 1 INTRODUCTION

This report has been prepared by PAEHolmes for Coal & Allied. Its purpose is to analyse the air quality effects of mining in the vicinity of the Hunter Valley Gliding Club (HVGC) on the operation of the club.

In 2008 an environmental assessment (EA) (including an Air Quality Assessment) was prepared for Coal & Allied to assess the effects of Coal & Allied's Hunter Valley Operations South (HVO South) Coal Project (ERM, 2008). The HVO South Coal Project (06\_0261) was approved by the Director-General of the New South Wales (NSW) Department of Planning (DoP) on 24 March 2009. Condition 19 of the Project Approval requires that the proponent comply with certain conditions at the HVGC. The original EA did not anticipate that Condition 19 would apply and to comply with Condition 19, the project mine plan has been modified.

The report reviews the revised mine plan and determines strategies that will minimise air quality effects on HVGC operations and will allow compliance with the Project Approval.

The relevant condition is reproduced below.

### Impact Assessment Criteria

#### Condition 19

The Proponent shall ensure that dust generated by the project does not cause additional exceedances of the air quality impact assessment criteria listed in Tables 8, 9, and 10 at any residence on privately-owned land, the Hunter Valley Gliding Club (when in use) or on more than 25 percent of any privately-owned land.

Table 8: Long term impact assessment criteria for particulate matter

<i><b>Pollutant</b></i>	<i><b>Averaging period</b></i>	<i><b>Criterion</b></i>
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

Table 9: Short term impact assessment criterion for particulate matter

<i><b>Pollutant</b></i>	<i><b>Averaging period</b></i>	<i><b>Criterion</b></i>
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>

Table 10: Long term impact assessment criteria for deposited dust

<b>Pollutant</b>	<b>Averaging period</b>	<b>Maximum increase in deposited dust level</b>	<b>Maximum total deposited dust level</b>
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

**Notes:**

- Air quality impacts at HVGC are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Air quality limits are only applicable during times of use that have been notified by HVGC to the Proponent.
- Deposited dust is assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method, or its latest version.

However, if the Proponent has a written negotiated air quality agreement with any landowner or HVGC to exceed the air quality limits in Table 8, 9 and/or 10, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the air limits in Table 8, 9 and/or 10 in accordance with the negotiated air quality agreement.

## 2 BACKGROUND AND IDENTIFICATION OF ISSUES

The HVGC operates from a single grass airstrip approximately 1.6 km long and oriented along the vector 290° to 110° (west-northwest to east-southeast). Apart from the airstrip, HVGC facilities comprise a clubhouse, hangar/workshop buildings, glider trailer storage area and caravan site.

Figure 2.1 shows the airstrip and club facilities described above and the neighbouring land use. Neighbouring land use includes the open cut mine pits known as:

- Cheshunt to the north;
- Riverview to the northwest;
- Wambo to the southwest;
- United to the southwest; and
- South Lemington to the southeast.

HVGC operates on weekends and public holidays.



Figure 2.1 : HVGC facilities and surrounding land use

Mining operations give rise to the following potential air quality/safety issues.

- Dust emissions from wind erosion, equipment operations and blasting have the potential to affect visibility.
- Dust emissions have the potential to soil exposed surfaces and equipment such as gliders, motor vehicles, caravans, club facilities, etc.
- Fly rock from blasting could endanger aircraft.
- TSP emissions and associated deposited dust have the potential to cause nuisance effects.
- PM<sub>10</sub> emissions have the potential to give rise to health effects.
- Dragline booms have the potential to intrude into airspace required by the gliders and other aircraft on final approach and during takeoff.

The report focuses primarily on air quality issues. Potential impacts due to fly rock, dust clouds from blasting and intrusion of dragline booms into air space used by the HVGC will be relatively easily managed by simply timing these events to coincide with times when the HVGC is not operating, e.g. week days. It is assumed that this degree of coordination and cooperation is possible.

Work undertaken in the EA assumed that the HVGC would be acquired by the proponent and the area would be part of the mine. This would cause the airfield to be unserviceable, at least until such time as it had been rehabilitated. Under this assumption, air quality at the club facilities would not need to be protected by any special measures other than those routinely used by the mine to suppress dust for operational reasons and to protect non-mined owned residences located several kilometres away.

To avoid closure of the airfield, the mine plan has been revised so that mining will now proceed around the airfield. While this will protect the HVGC's physical assets, it by itself, will not

guarantee protection of amenity at the HVGC. To promote the protection of amenity and ensure the health of people who might use the club, it is necessary to develop an amenity management plan. This type of assessment is not a simple task. Amenity effects caused by poor air quality are subjective and depend on the context of the exposure.

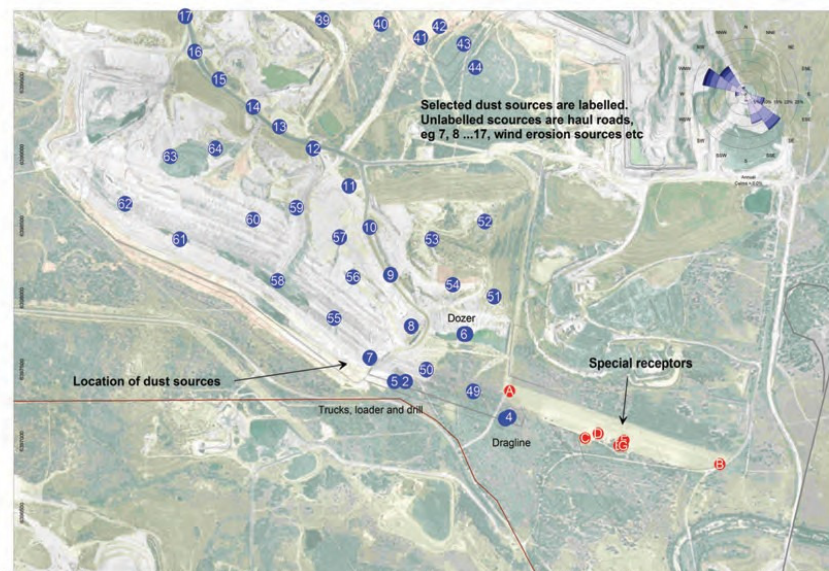
### 3 APPROACH TO THE ASSESSMENT AND DISCUSSION

Air quality impacts are likely to arise when the separation distance between dust generating activities associated with mining take place in proximity to dust sensitive areas on the airfield and when meteorological conditions are such as to carry dust towards the dust sensitive areas on the airfield. The dust sensitive parts of the airfield will change with time depending on what activities are occurring. For the purposes of this analysis, the air strip itself has been considered to be insensitive to dust levels unless it is actually in use. Hangars, the club house, the caravan area, the glider storage areas and permanent structures have been considered to be dust sensitive and may either need to be treated and made insensitive to dust and/or protected from dust by controls on mining.

For assessment purposes, we have identified seven parts of the airfield for which we have provided estimates of 24-hour  $PM_{10}$  under various operating scenarios. Not all of these seven areas are of equal sensitivity, but the predictions are useful in developing an amenity management plan. They are shown as points A, to G on Figure 3.1, which shows the airfield and immediate surrounds. They include the club house, the hangars and the area where the caravans are parked and points at either end of the airfield.

The amenity management plan makes the tentative assumption that when gliding operations are taking place, personnel are likely to be located at the downwind end of the airfield so that tugs, winches and aircraft movements will be into the wind on take-off or landing. This will mean that people associated with take-off and landing operations are generally as far from dust generating sources on the mine as is practicable. It is noted that the airfield has a slight downward slope towards the southeast. This might favour the use of the northwest end of the airfield for the operating end.

Aircraft and gliders taking off towards the northwest will approach the end of the airfield and will approach mining equipment. On occasions they will pass through increasingly high concentrations of any dust clouds that may be generated by mining equipment. So long as these dust clouds are not so dense as to affect visibility, we have taken the view that the existence of dust will not create a significant impact.



A - Eastern end of runway, B - Western end of runway, C - Main hanger, D - Fuel installation, E - Club house, F - Second hanger, G - Machine shed

The Project Approval conditions (see Section 1) establish the assessment criteria to be used. They specify that the criteria only apply when the airfield is in use. For the long-term criteria this creates a minor problem in interpretation because the annual average standards for  $PM_{10}$ , TSP and dust deposition would normally be the averaged over a year (8,760 hours). We have used the following interpretation of the term "annual average" as the average concentration when the HVGC is active during the year. Thus, if for example, the club were to only operate at the weekends the annual average would be the average of all the weekends in the calendar year. This may be a lower concentration than would be the case if the actual annual average was calculated because the mine could apply management controls (e.g. suspend or relocate dust generating activities when the HVGC was operating). We believe this is a reasonable interpretation of the Project Approval.

The amenity management plan has been developed by using the dust emissions inventory for the modified mine plan (based on the EA mine plan) and using the ISC-MOD dispersion model and 2002 meteorological data set (i.e. the same model and met data set as used in the EA) to predict a time-series of 24-hour  $PM_{10}$  concentrations for the selected receptors of interest (Sites A to G) (see Figure 3.1).

The placement of equipment was chosen to consider the dragline operating as close to the end of the airfield as it is ever likely to be. This is the scenario that will result in worst case impacts on the selected Sites. The equipment involved includes a drill, dozer, shovel, trucks and the dragline. The dragline has been assumed to be working at a rate that would allow it to handle 29,195,100 bcm of material in a year and this is estimated to result in the production of 927,613 kg of dust. This is similar, but slightly less, than the rate assumed in the EA. The main difference in the scenario assumed for developing the amenity management plan and the EA case, is in the location of the dragline. Similarly the truck and shovel operations and haulage of coal and overburden have been assumed to proceed at the same rate as envisaged in the EA except that the sources of dust associated with these activities have been relocated to give rise to maximum impacts at Sites A to G (see Figure 3.1).



To assess the potential impacts on the HVGC, the model has been re-run with the new equipment positions but with no attempt to reduce impacts, i.e. this run shows the effect of worst-case impacts with no attempt being made to reduce impacts.

To assess the effect of reducing impacts the emissions inventory has been examined to identify the largest sources and to rank them in terms of potential impact on the HVGC. This means examining both the magnitude of the emission and the locations of the emission sources relative to the dust sensitive areas associated with HVGC. Table 1 shows the emission rates and Figure 3.1 shows where the emissions are assumed to come from and the locations of the dust sensitive locations.

Table 1 - Summary of major dust generating activities relevant to impacts at HVGC

Activity	Estimated annual emission of TSP – kg/year
<b>Overburden operations</b>	
Drilling	16153
Blasting	18557
Dragline	927613
Dozers	325111
Wind erosion – spoil piles	934166
Wind erosion – pit	325872
Loading overburden to trucks	341
Emplacing overburden	341
<b>Coaling operations</b>	
Drilling	2972
Blasting	3414
Dozers	309830
Loading coal	287101
Hauling coal	318750

The dragline is clearly the largest individual source of dust emission and is located closer to the HVGC facilities than any of the other sources. Emissions from wind erosion are also large but because these are distributed over a large area, their effect on PM<sub>10</sub> concentrations at any particular site will be much less significant than emissions from a point source such as the dragline. Similarly, haulage of coal is a distributed source.

To assess the effect of suspending dragline operations the model has been re-run with the dragline emissions switched off.

The results are presented in the next section.

## 4 MODELLING RESULTS AND ANALYSIS OF OPTIONS

The results of the model simulations discussed in Section 3 are presented as Figure 4.1 to Figure 4.14 for PM<sub>10</sub>.

The effects of suspending dragline operations on 24-hour average PM<sub>10</sub> concentrations at Site A can be seen by comparing Figure 4.1 and Figure 4.2. With the dragline operating, 24-hour PM<sub>10</sub> concentrations close to 1000 micrograms/cubic metre are predicted to occur on a number of occasions. With the dragline operations suspended, the maximum 24-hour average PM<sub>10</sub> concentrations are reduced significantly to approximately 235 micrograms/cubic metre. Site A is at the northwest end of the airfield and is unlikely to be occupied on a long-term basis.

The effects of suspending dragline operations on air quality at Site B (at the south eastern end of the airfield) are shown in Figure 4.3 and Figure 4.4. Even without suspending dragline operations, the predicted 24-hour PM<sub>10</sub> concentrations are not predicted to exceed 150 micrograms/cubic metre<sup>a</sup>, but are predicted to exceed 50 micrograms/cubic metre frequently. With the dragline operations suspended, the number of exceedances of 50 micrograms/cubic metre is reduced to 24 occasions.

Sites C, D, E, F and G show the predicted 24-hour PM<sub>10</sub> concentrations at sites closer to the centre of the southern side of the airfield. These sites are arguably likely to be more sensitive to the effects of dust than the ends of the airfield as they are the areas where people would spend the most time. Examination of Figure 4.5 to Figure 4.14 show that the effects of suspending dragline operations provides significant reductions in the 24-hour PM<sub>10</sub> concentrations, but at Site D for example there are still 96 days when 24-hour PM<sub>10</sub> concentrations are predicted to exceed 50 micrograms/cubic metre due to emissions from the operation.

These results indicate that it is not likely to be feasible to guarantee compliance with the criteria set by the Project Approval under all conditions without effectively taking measures that effectively suspend all mining operations in the Glider Pit. There are unfortunately an infinite number of combinations of operational scenarios and weather conditions that would result in compliance and a similar number that would result in exceedances. Modelling cannot be used to identify all of these, but it can give some indication as to the effect of suspending particular operations. For example, suspending dragline operations leads to substantial reductions in 24-hour PM<sub>10</sub> concentrations, although not enough to take the 24-hour average concentrations below the 50 micrograms/cubic metre level. It is suggested that the approach to management takes advantage of the fact that there will be many days when mining in the Glider Pit will have almost no effect on air quality at HVGC. This will be the case when winds are from the southeast. This will be the case mostly in summer. Under these conditions mining can proceed with no controls other than those normally applicable.

---

<sup>a</sup> The current US EPA criterion for 24-hour average PM<sub>10</sub> concentrations is 150  $\mu\text{g}/\text{m}^3$ . The criterion for 24-hour PM<sub>10</sub> was retained after review in 2006, however the criterion for annual average PM<sub>10</sub> of 50  $\mu\text{g}/\text{m}^3$  was revoked "due to lack of evidence linking health problems to long-term exposure..." See [www.epa.gov/particles/standards.html](http://www.epa.gov/particles/standards.html), but note that US EPA refer to PM<sub>2.5</sub> as fine particles and PM<sub>10</sub> as coarse particles.

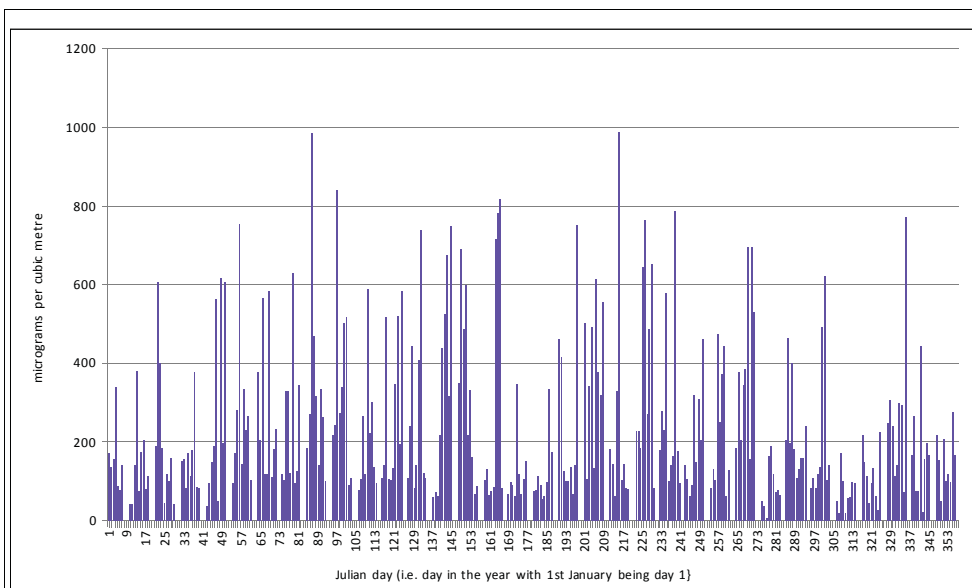


Figure 4.1: Predicted 24-hour average PM10 concentrations at Site A due to mining emissions (with no special controls)

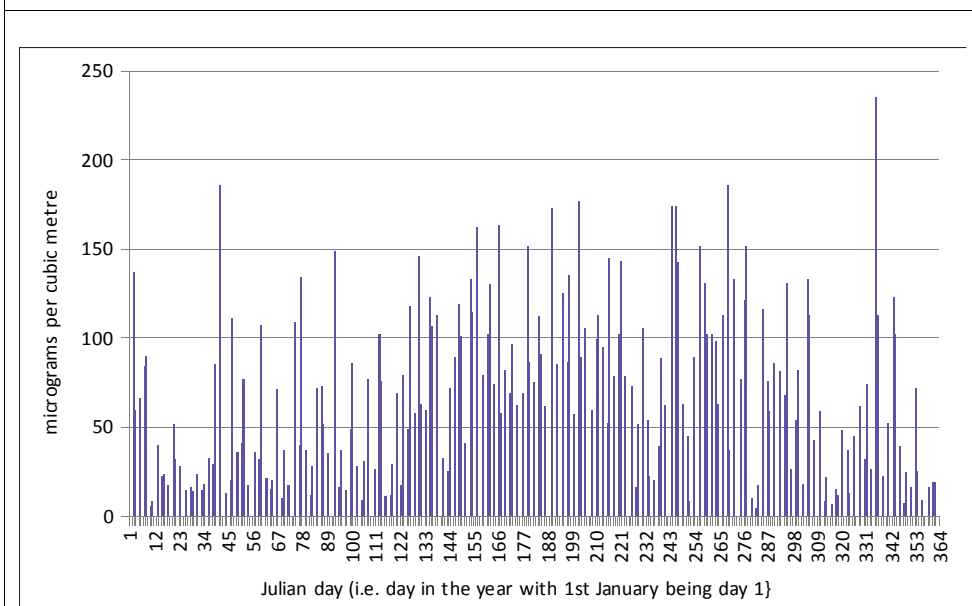


Figure 4.2: Predicted 24-hour average PM10 concentrations at Site A due to mining emissions (with dragline operations suspended)

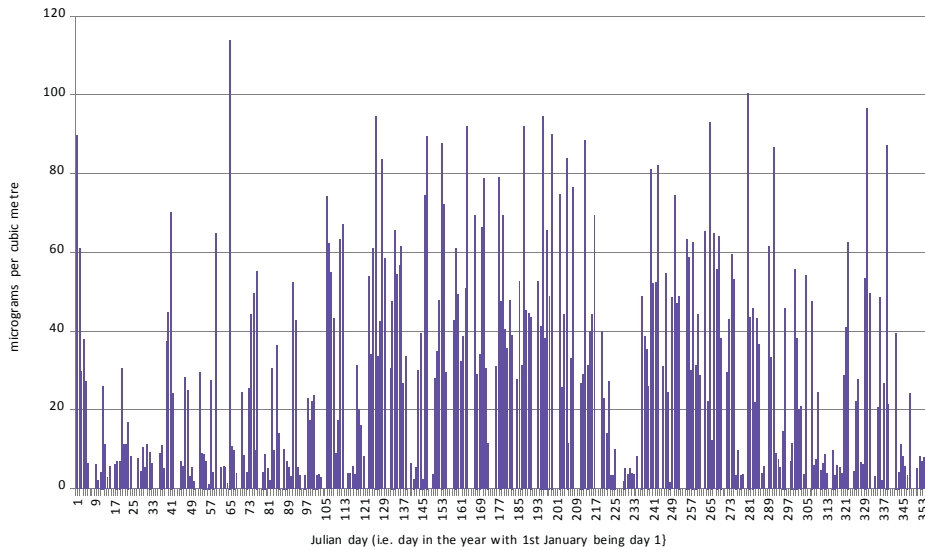


Figure 4.3: Predicted 24-hour average PM10 concentrations at Site 8 due to mining emissions (with no special controls)

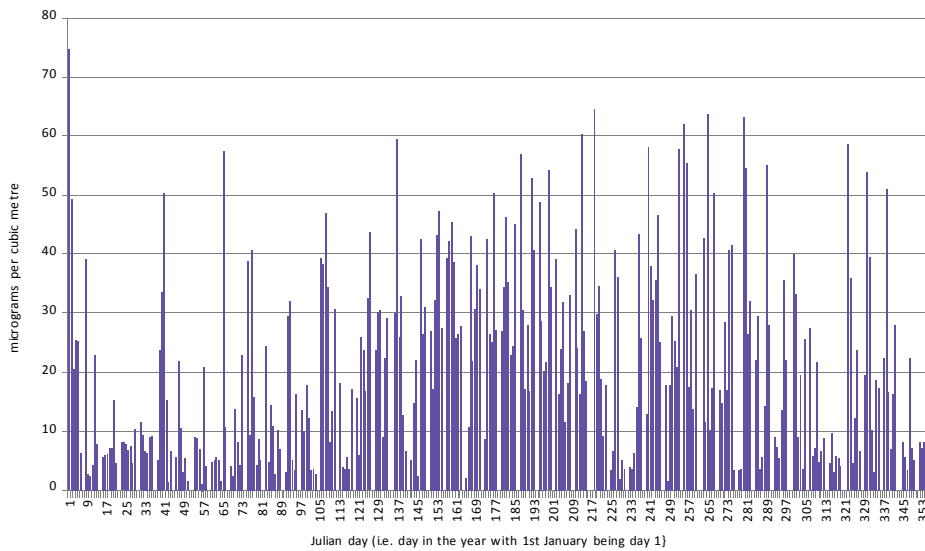


Figure 4.4: Predicted 24-hour average PM10 concentrations at Site 8 due to mining emissions (with dragline operations suspended)

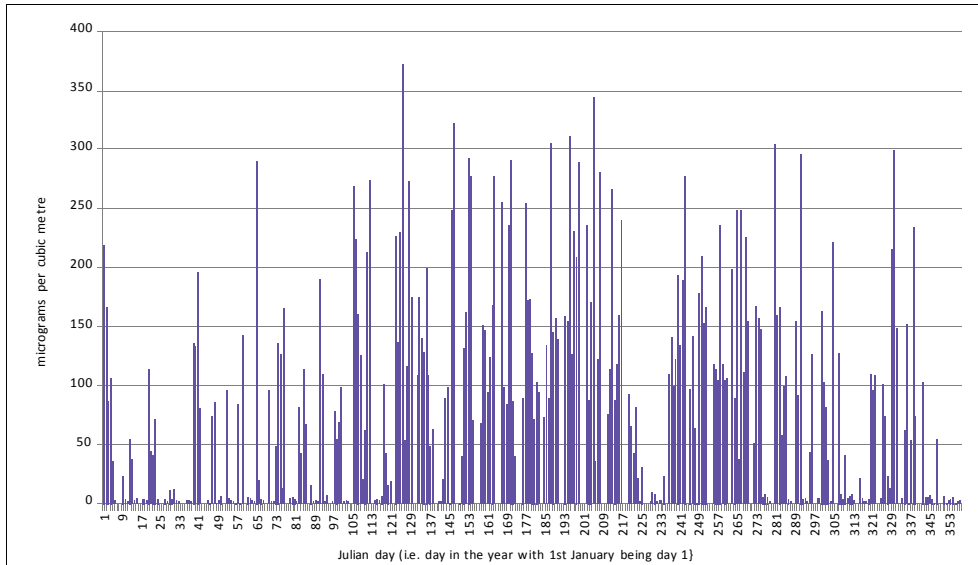


Figure 4.5: Predicted 24-hour average PM10 concentrations at Site C due to mining emissions (with no special controls)

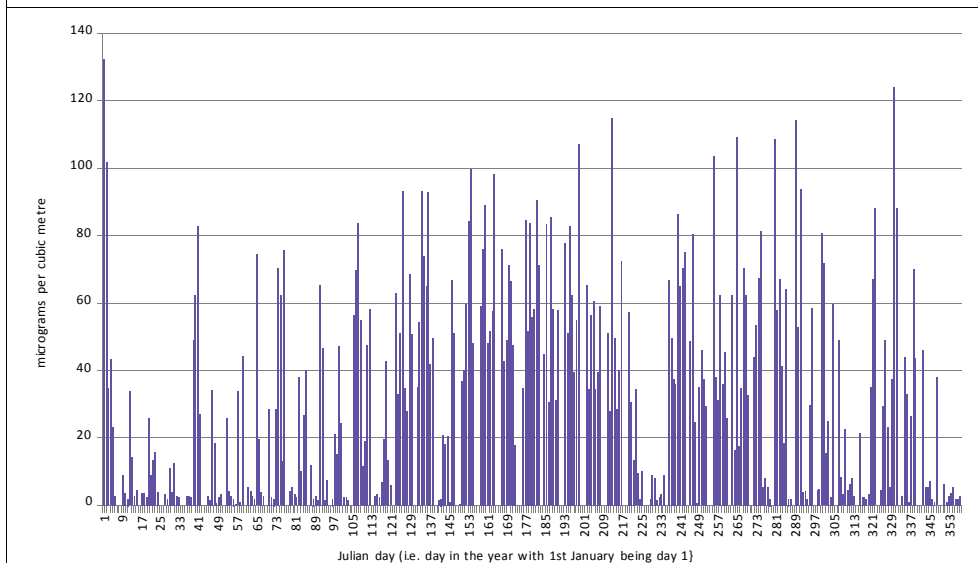


Figure 4.6: Predicted 24-hour average PM10 concentrations at Site C due to mining emissions (with dragline operations suspended)

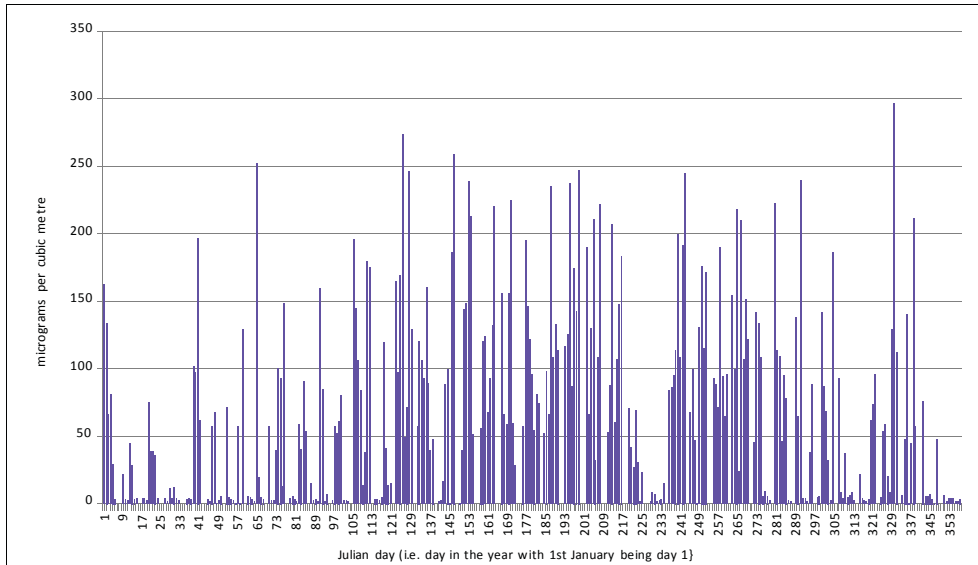


Figure 4.7: Predicted 24-hour average PM10 concentrations at Site D due to mining emissions (with no special controls)

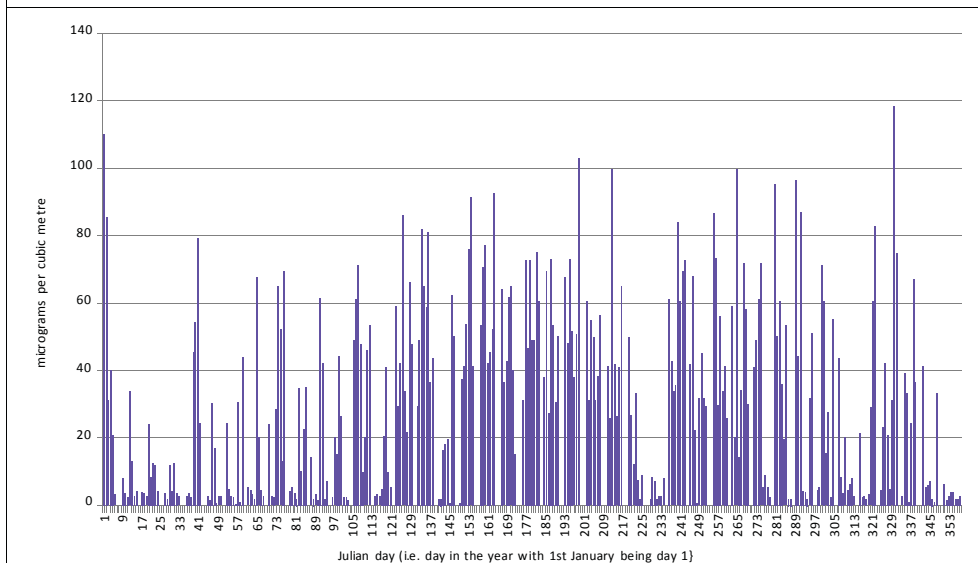


Figure 4.8: Predicted 24-hour average PM10 concentrations at Site D due to mining emissions (with dragline operations suspended)

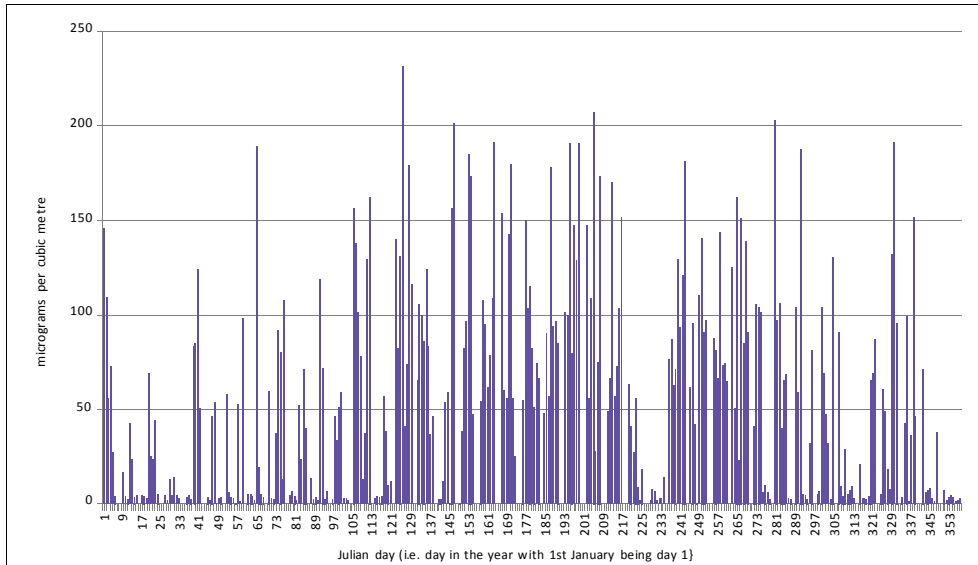


Figure 4.9: Predicted 24-hour average PM10 concentrations at Site E due to mining emissions (with no special controls)

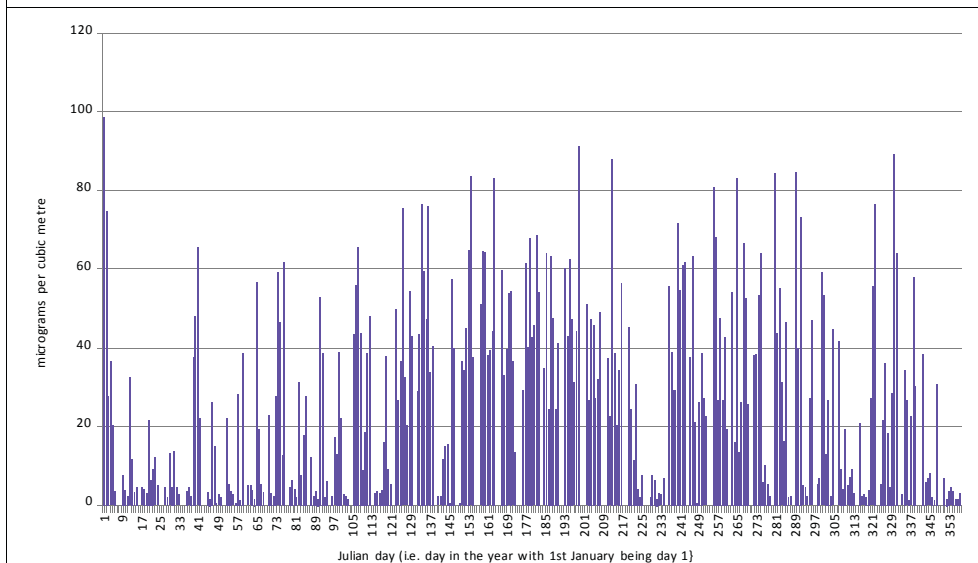


Figure 4.10: Predicted 24-hour average PM10 concentrations at Site E due to mining emissions (with dragline operations suspended)

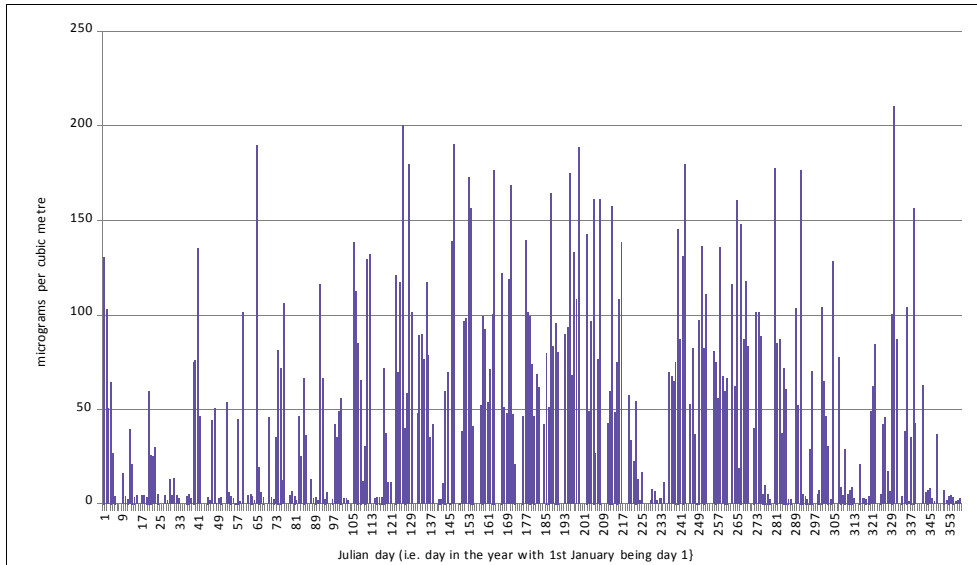


Figure 4.11: Predicted 24-hour average PM10 concentrations at Site F due to mining emissions (with no special controls)

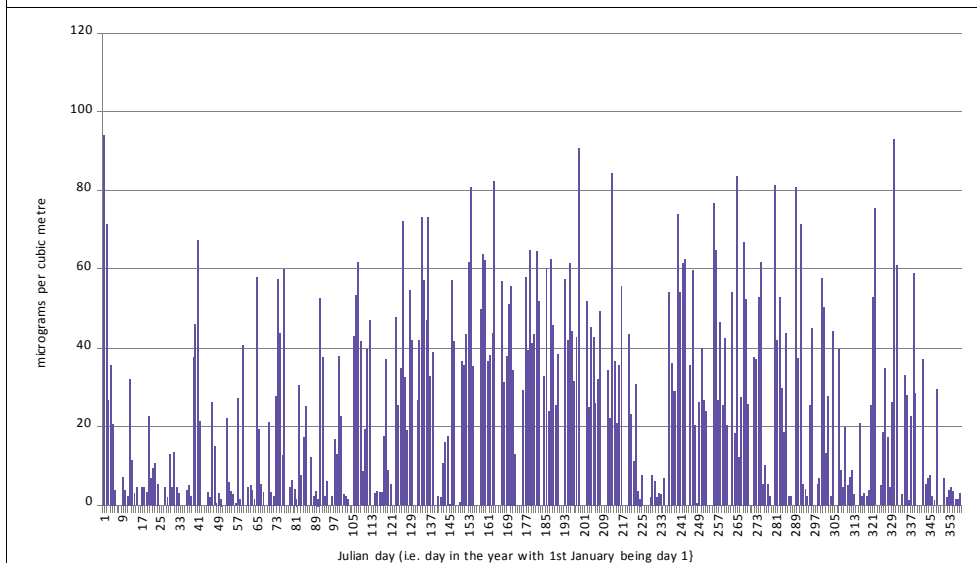


Figure 4.12: Predicted 24-hour average PM10 concentrations at Site F due to mining emissions (with dragline operations suspended)



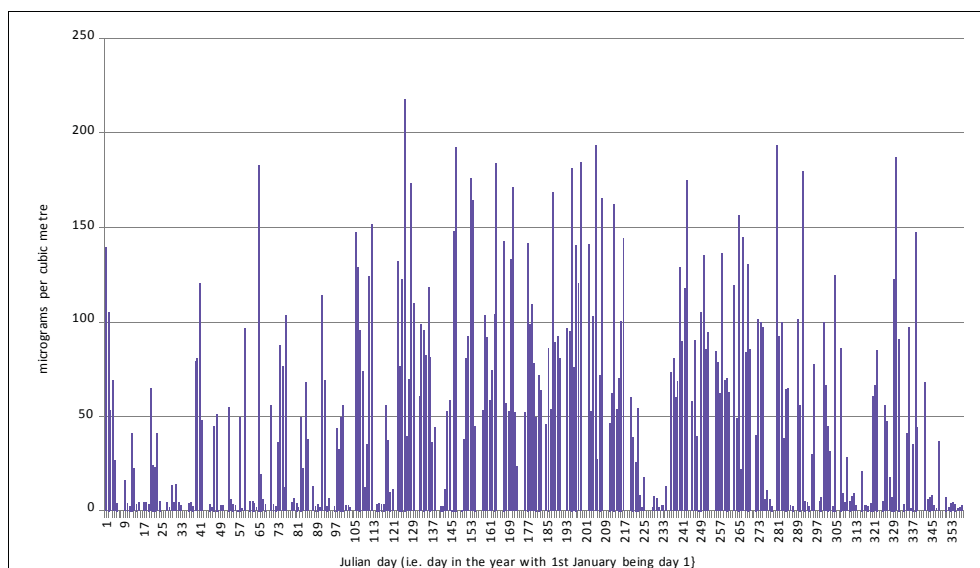


Figure 4.13: Predicted 24-hour average PM10 concentrations at Site G due to mining emissions (with no special controls)

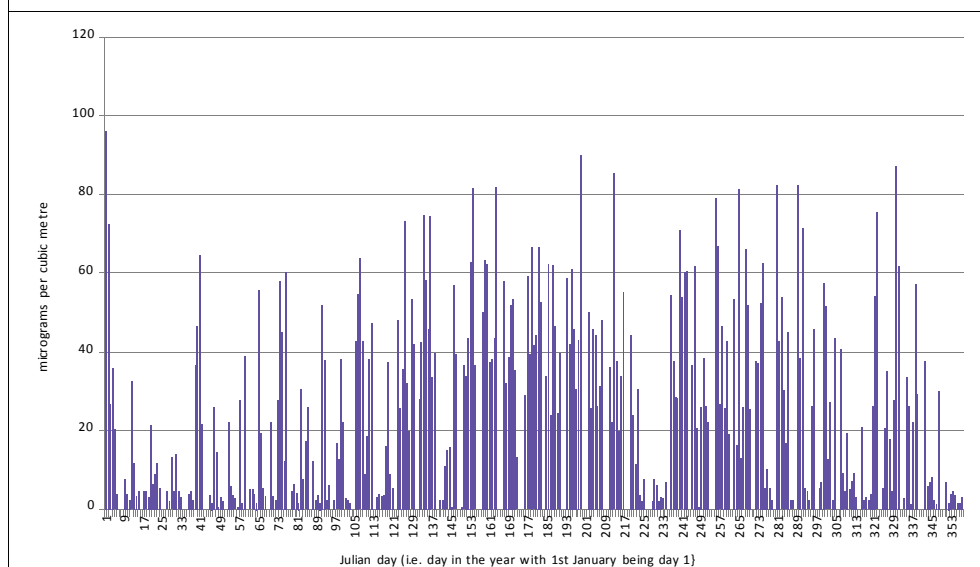


Figure 4.14: Predicted 24-hour average PM10 concentrations at Site G due to mining emissions (with dragline operations suspended)

To deal with the days when this is not the case and when HVGC nominates they will be operating, an appropriate approach may be to adopt a reactive management strategy. This is described in the next section.

## 5 AMENITY MANAGEMENT PLAN BASED ON REACTIVE MANAGEMENT

The basis of the amenity management plan would be the continuous management of mining operations using the results of a TEOM PM<sub>10</sub> monitor (or equivalent) to continuously monitor PM<sub>10</sub> concentrations and to calculate the running 24-hour concentration of PM<sub>10</sub>. This monitor should be located at one of the Sites B to F, or at a site nominated by the HVGC. Should the day be one nominated by HVGC as a "gliding day" and the TEOM indicate that the running 24-hour PM<sub>10</sub> concentration has reached 50 micrograms/cubic metre (or an alternative "action level") then the environmental officer should assess the situation and determine if, based on an analysis of wind direction, activities in the Glider Pit are responsible. If they are, then the environmental officer should ensure a progressive reduction in activities leading to dust emissions as follows:

- check with HVGC whether culpable source/operation can be identified;
- suspend dragline operations and evaluate the effect on the PM<sub>10</sub> concentrations using the TEOM data;
- if the next 1-hour shows concentrations below 50 micrograms/cubic metre then no further action is required;
- if the 1-hour average PM<sub>10</sub> levels remain above 50 micrograms/cubic metre then the potential contributing source should be reassessed and likely contributing operations suspended;
- suspend other operations including out-of-pit dozer operations, coaling operations and drilling operations until PM<sub>10</sub> concentrations fall below 50 micrograms/cubic metre, and;
- recommence normal operations only after weather conditions change sufficiently to avoid reproducing the exceedance condition.

The basic concept is summarised in the flow chart below.

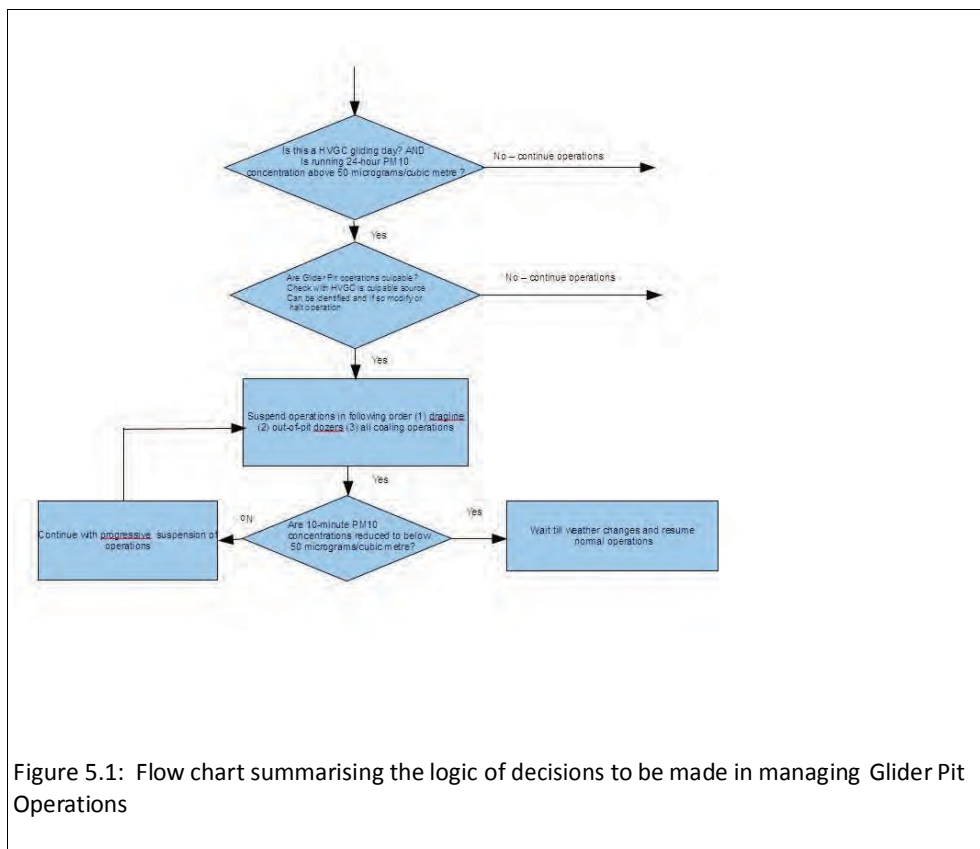


Figure 5.1: Flow chart summarising the logic of decisions to be made in managing Glider Pit Operations

## 6 SUMMARY AND CONCLUSIONS

This report has reviewed the proposed mine plan for mining close to the HVGC. The plan has been used to generate an emissions inventory that has been merged with the emissions inventory presented in the EA. The inventory has then been used with the meteorological data used in the EA and the same model as used in the EA (ISCMOD) to predict the 24-hour concentrations of PM<sub>10</sub> at seven sites on the HVGC facilities. Examination of the inventory shows that emissions from the dragline are the largest single source of emissions and because of the proximity of this source to the airfield and facilities, these are likely to have the largest impact on the PM<sub>10</sub> concentrations.

ISCMOD has been run to show the effect of unmodified operations on 24-hour PM<sub>10</sub> concentrations at the seven selected receptors for two scenarios: (1) with the mine plan operated without any specific actions to reduce impacts at the HVGC, and (2) with the dragline operations suspended. These two model runs show that exceedances of 50 micrograms/cubic metre would be very common if no specific attempt was made to mitigate emissions. Suspending dragline operations significantly reduces PM<sub>10</sub> but does not bring the predicted concentrations to below 50 micrograms/cubic metre, however the predicted concentrations are generally less than 90 micrograms/cubic metre which is modest given that the US EPA Standard for 24-hour PM<sub>10</sub> was recently retained at 150 micrograms/cubic metre.

A reactive amenity management plan has been proposed that envisages monitoring PM<sub>10</sub> concentrations on a continuous basis at the most sensitive site on the airfield (to be nominated by HVGC). A progressive suspension of dust generating mining activities would be commenced once the 24-hour PM<sub>10</sub> reached 50 micrograms/cubic metre. Mining would not be recommenced until such time as measured PM<sub>10</sub> was below 50 micrograms/cubic metre, or the weather had changed to prevent dust travelling from the mine to the HVGC facilities, or HVGC was no longer using the airfield.

Given that HVGC operate primarily on weekends and public holidays and the winds are generally favourable for mining on most days in summer, this amenity management plan should allow mining to proceed while still protecting amenity at the HVGC facilities.

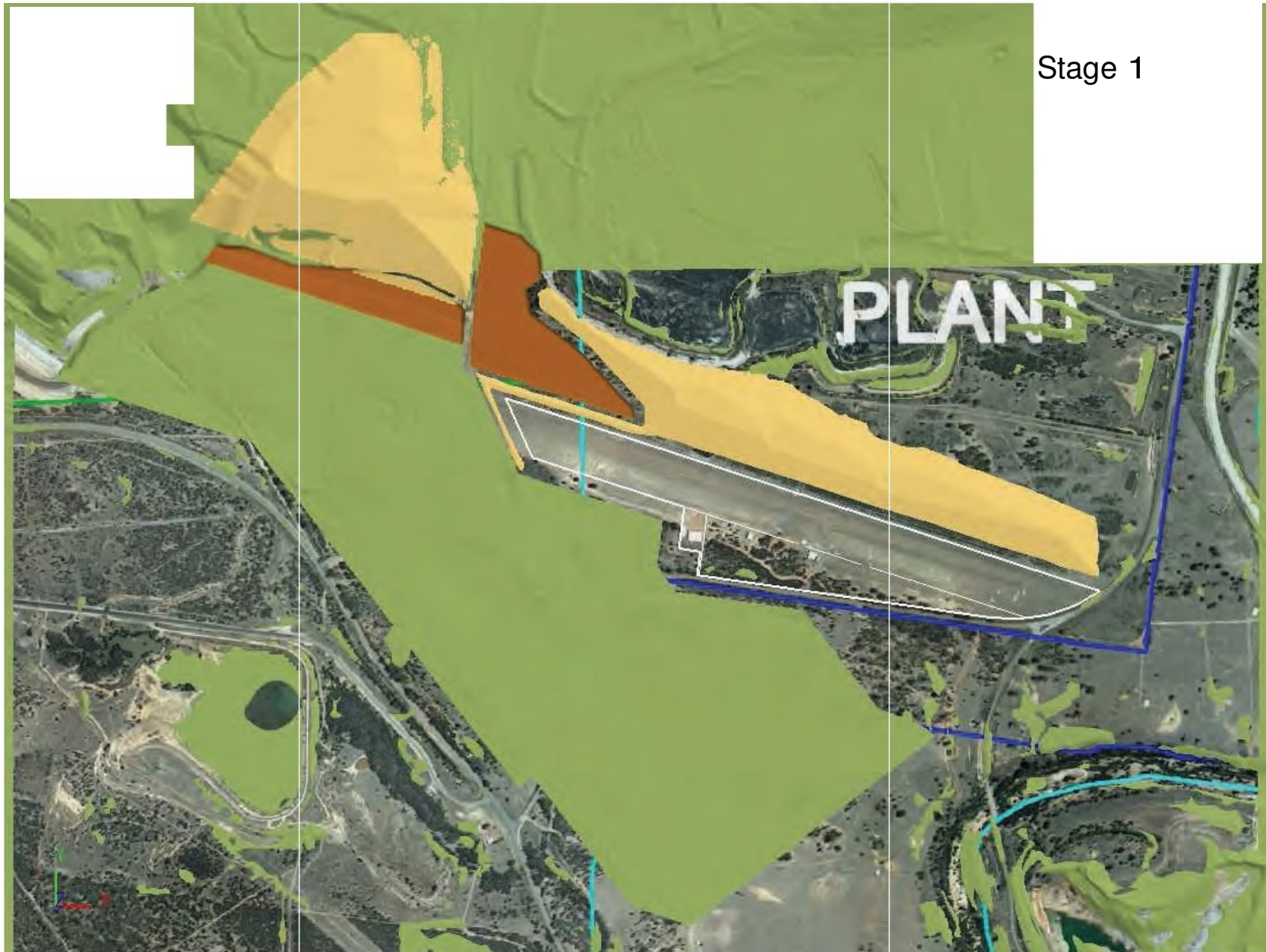
## 7 REFERENCES

ERM (2006) – Hunter Valley Operations South Coal Project, Environmental Assessment Report.

US EPA (2004) - U.S. EPA. Air Quality Criteria for Particulate Matter (Final Report, Oct 2004).  
U.S. Environmental Protection Agency, Washington, DC, EPA 600/P-99/002aF-bF, 2004.

## **Appendix D Superseded Mine Progression Plans (Historical reference only)**

Stage 1





Stage 2



Stage 3





Stage 4





Stage 5





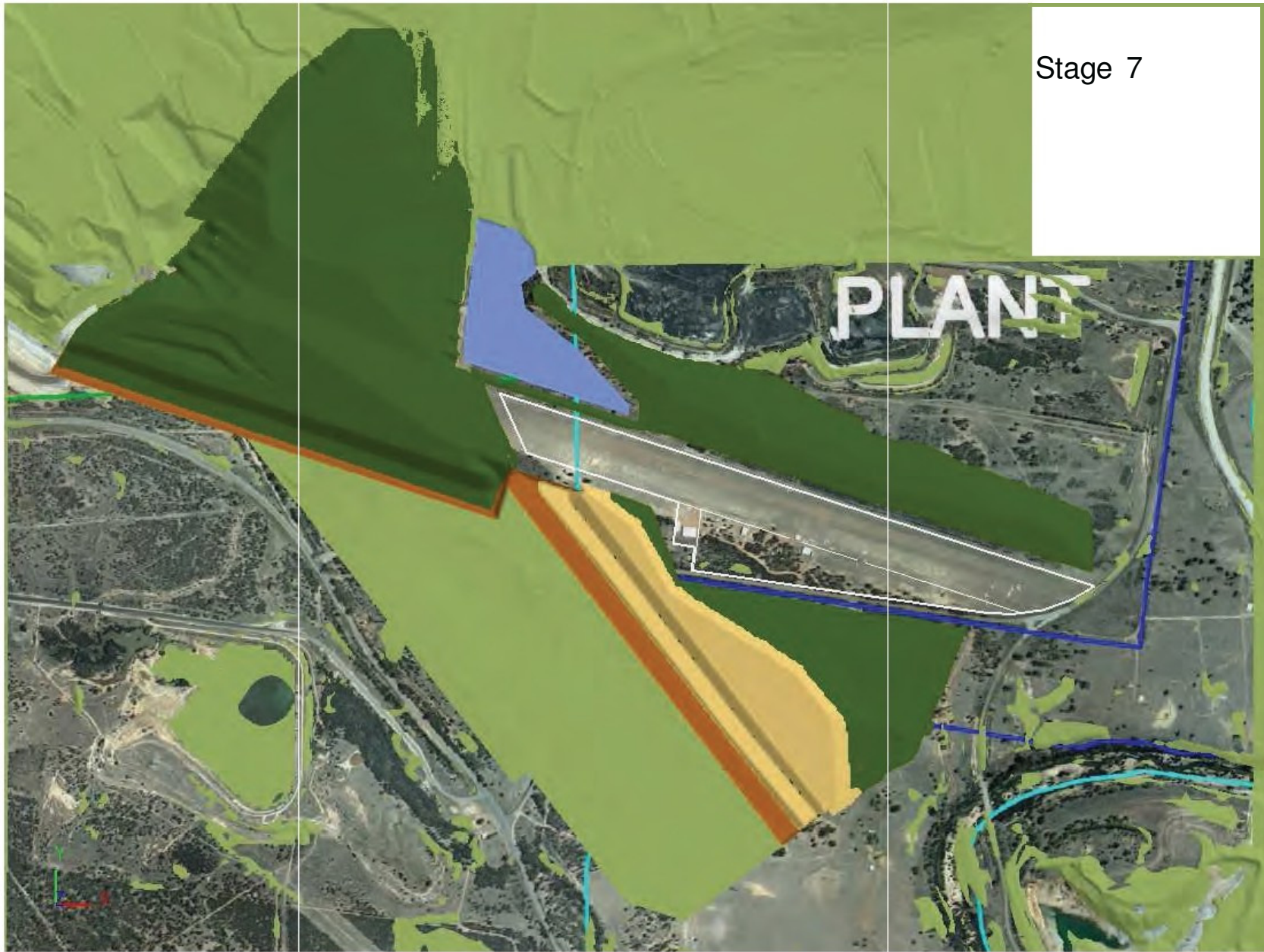
Stage 6

PLANT



Stage 7

PLANT





Stage 8

PLANT



The image is an aerial photograph overlaid with a 3D map model. The map shows a large, irregularly shaped area outlined in white, labeled 'PLANT' in large white capital letters. This area is surrounded by green terrain. To the left of the plant area, there is a blue body of water. A yellow line runs along the left side of the plant area, and an orange line runs along the bottom left. A blue line runs along the right side of the plant area. The map is divided into three vertical sections by thin white lines. In the bottom left corner, there is a small red and green crosshair symbol.

Stage 9





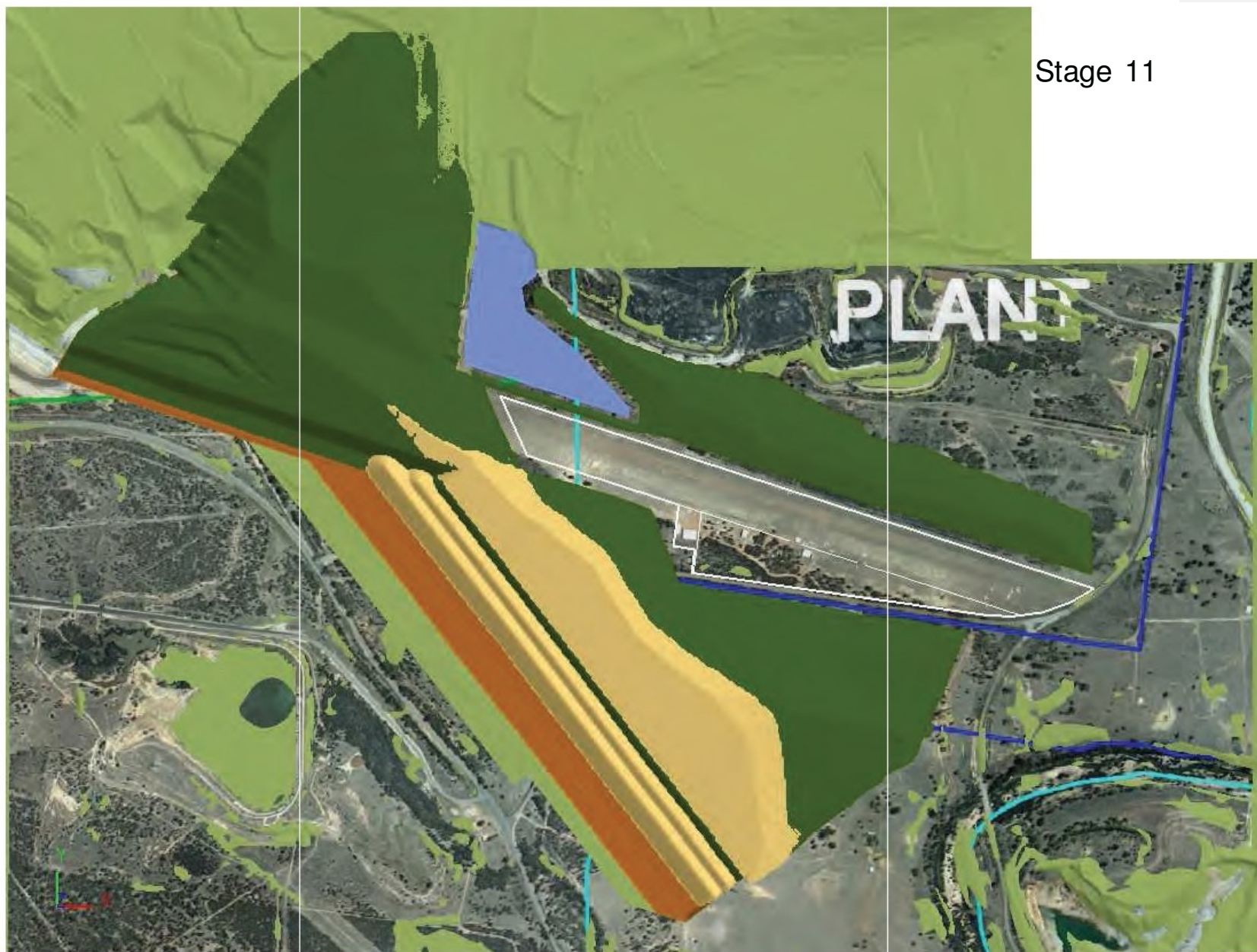
Stage 10

PLANT

An aerial photograph of a landscape with various 3D overlays. A large green area covers the top and right portions of the image. A blue area is located in the upper center. A yellow and orange 3D structure, resembling a dam or embankment, is positioned in the lower center. A white rectangular outline is visible in the middle. A blue line runs along the right side. The word 'PLANT' is written in large white letters in the upper right. The word 'Stage 10' is in the top right corner. A small red and green line is in the bottom left corner.



Stage 11





Stage 12

PLANT



Stage 13

PLANT

An aerial photograph of a landscape with various overlays. A large, irregular green area covers the upper and central portions of the image. To the left of this green area is a blue-shaded region. A road or path runs horizontally across the middle. A blue line outlines a specific area on the right side of the road. The word 'PLANT' is written in large, white, bold letters across the center-right of the image. In the bottom left corner, there is a small red and blue line segment.

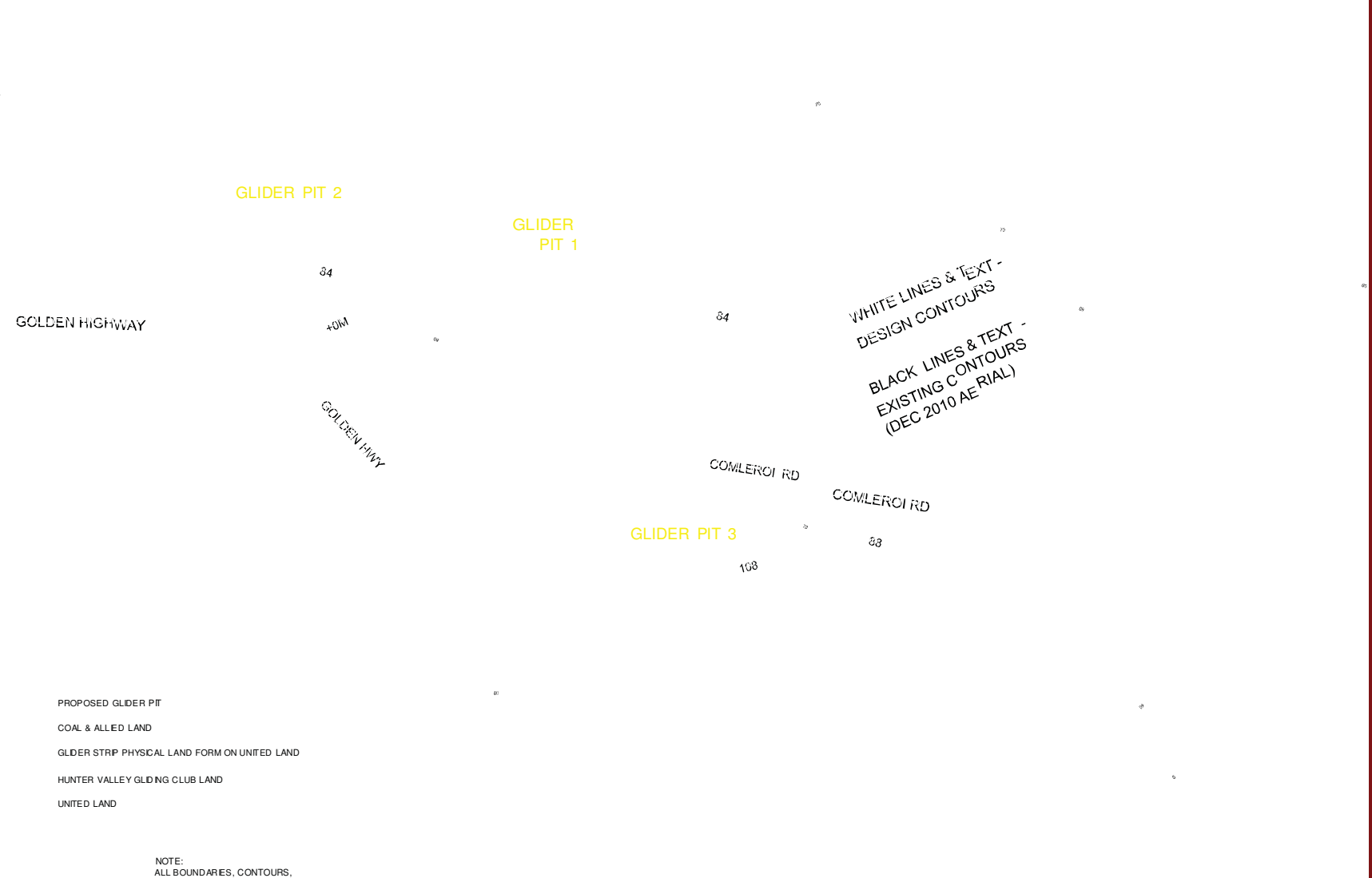


Stage 14

PLANT



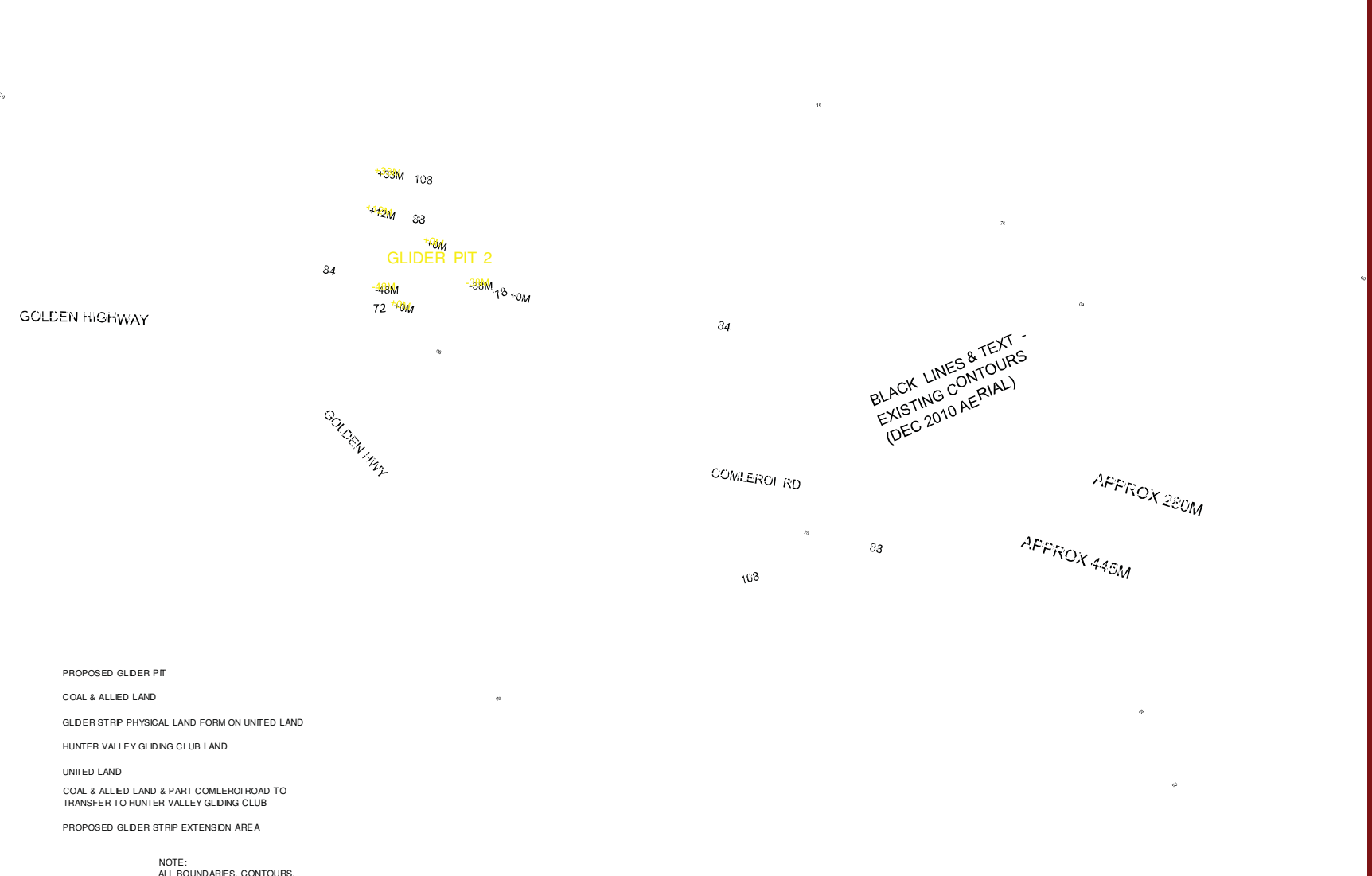
Annexure 4 - Stage 1 Mining (assumes United land not acquired)	Location:	Lemington	Projection:	MGA Z56	Date:	10/09/12	Project:	HVO
	Council:	Singleton	Contour Interval:	N/A	Plan By:	SC	Layout:	A3
			Source:	N/A	Version:	01	Our Ref:	P_HVO_Glider Club Agreement 120910.wor



NOTE: ALL BOUNDARIES, CONTOURS, RES AND ALL RIGHTS SHOWN ARE INDICATIVE ONLY



Annexure 5 - Stage 2 Mining (assumes United land not acquired)	Location:	Lemington	Projection:	MGA Z56	Date:	10/09/12	Project:	HVO
	Council:	Singleton	Contour Interval:	N/A	Plan By:	SC	Layout:	A3
			Source:	N/A	Version:	01	Our Ref:	P HVO Glider Club Agreement 120910.wor





## Appendix E Consultation





# Hunter Valley Gliding Club Co-operative Limited

216 Waldo Cres.  
Peakhurst NSW 2210  
29 November 2012

Department of Planning and Infrastructure  
GPO Box 39  
Sydney NSW 2001

Attention: Mr David Kitto

Dear Sirs,

## **HVO South Project Approval 06-0261**

We refer to condition 49 of the Project Approval which requires development of an Amenity Management Plan ("AMP") by Coal & Allied Operations Pty Ltd ("Coal & Allied.") in consultation with the Hunter Valley Gliding Club Co-Operative Limited ("Gliding Club").

This letter is to advise the Department that the enclosed AMP was prepared by Coal & Allied in consultation with the Gliding Club and that the Gliding Club endorses and supports the terms of the AMP.

By this letter the Gliding Club consents to Coal & Allied seeking approval of the AMP from the Department.

Yours faithfully

Colin Gross  
Hon Secretary

Hunter Valley Gliding Club Co-operative Limited ABN 36 104 071 896  
Web: [www.hvdc.com.au](http://www.hvdc.com.au) Email: [secretary@hvdc.com.au](mailto:secretary@hvdc.com.au)  
Secretary- Colin Gross (Home) 02 9534 2884

HVGC 1205 Confirmation of AMP

Page 1 of 1

## **Appendix F Director General's Approval of this Amenity Management Plan**

Contact: Ben Harrison  
Phone: 02 6575 3402  
Fax: 02 6575 3515  
Email: [benjamin.harrison@planning.nsw.gov.au](mailto:benjamin.harrison@planning.nsw.gov.au)  
Our ref: 10/10491

Mark Nolan  
Manager Project Approvals, NSW  
Coal & Allied Operations  
PO Box 315  
Singleton NSW 2330

Dear Mark

**HVO South – Amenity Management Plan**

Thank you for forwarding the HVO South - Amenity Management Plan for Hunter Valley Gliding Club Co-operative Limited required under Schedule 3, Condition 49 of Project Approval 06\_0261 for the Department's consideration

The Department has reviewed the plan and is satisfied that it generally address the requirements set out in the relevant condition of the project approval. Consequently, I would like to advise you that the Director-General has approved the plan.

Could you please forward a finalised copy, preferably in **PDF** format (inclusive of proof of consultation and this approval letter), of the above plan for the Department's records at your earliest convenience.

If you require further information please contact Ben Harrison on 6575 3402 or by email to [benjamin.harrison@planning.nsw.gov.au](mailto:benjamin.harrison@planning.nsw.gov.au).

y

Scott Books  
**Team Leader Compliance**  
[L.,\\_'\).\\_\\_-I-I\)](#)  
As Nominee for the Director-General