Appendix L

Blasting

Blast Management & Consulting

Scoping Report:

Exxaro Leeuwpan Coal

Ref. No.: GCS~Leeuwpan Coal~120418Scoping.docx

Date: 18/04/2012

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1. Introduction

Blast Management & Consulting was contracted as part of Environmental Impact Assessment (EIA) to perform an initial review of possible impacts with regards to blasting operations in the proposed opencast mining operation. Blast Management & Consulting as a company concentrates on the monitoring, prediction, analysis, audit and consulting on all aspects of blasting operations. Specifically are aspects such as ground vibration, air blast, fly rock, fumes and other influences evaluated.

2. Legal Context

The protocols applied in this study are based on the author's experience, guidelines from literature research, client requirements and general indicators from the various acts of South Africa. There is no direct reference in the following acts with regards to requirements and limits on the effect of ground vibration and air blast specifically and some of the aspects addressed in this report. The acts consulted are: National Environmental Management Act No. 107 of 1998, Mine Health and Safety Act No. 29 of 1996, Mineral and Petroleum Resources Development Act No. 28 of 2002.
The guidelines and safe blasting criteria are according to international accepted guidelines and specifically applied in this document is the United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration and recommendations on air blast. There are no specific South African standard and the USBM is well accepted as standard for South Africa.
However it is sure that the protocols and objectives will fall within the broader spectrum as required by the various acts.

3. Receiving Environment

The source area is located at Exxaro Leeuwpan Colliery south east of town Delmas in Mpumalanga. The receiving environment is considered the area expected to be influenced. This influence is divided into damage causing influence and nuisance or perception type influence. The site will be visited to observe and record typical structures, installations and obtain an understanding of people's perception and tolerance to possible influence.

The possible effects that could be considered contributing to damage of structures / installations in the area cannot be determined at this stage. The geology and expected drilling and blasting operations to be done with the possible influence with regards to the human perceptions of ground vibration and air blast is considerede. Humans are sensitive to even very low level effects of ground vibration and air blast. In order to take this into consideration and area of 3500m is identified as area that could observe influence. This is in view that people will experience ground vibration at levels as low as 0.75mm/s. The objective is to outline the expected environmental effects that blasting operations could have on the surrounding environment. The study will investigate the related levels and possible influences of expected ground vibration, air blast, fly rock and noxious fumes on the area of 3500m surrounding the blast areas. Figure 01 shows area of study.

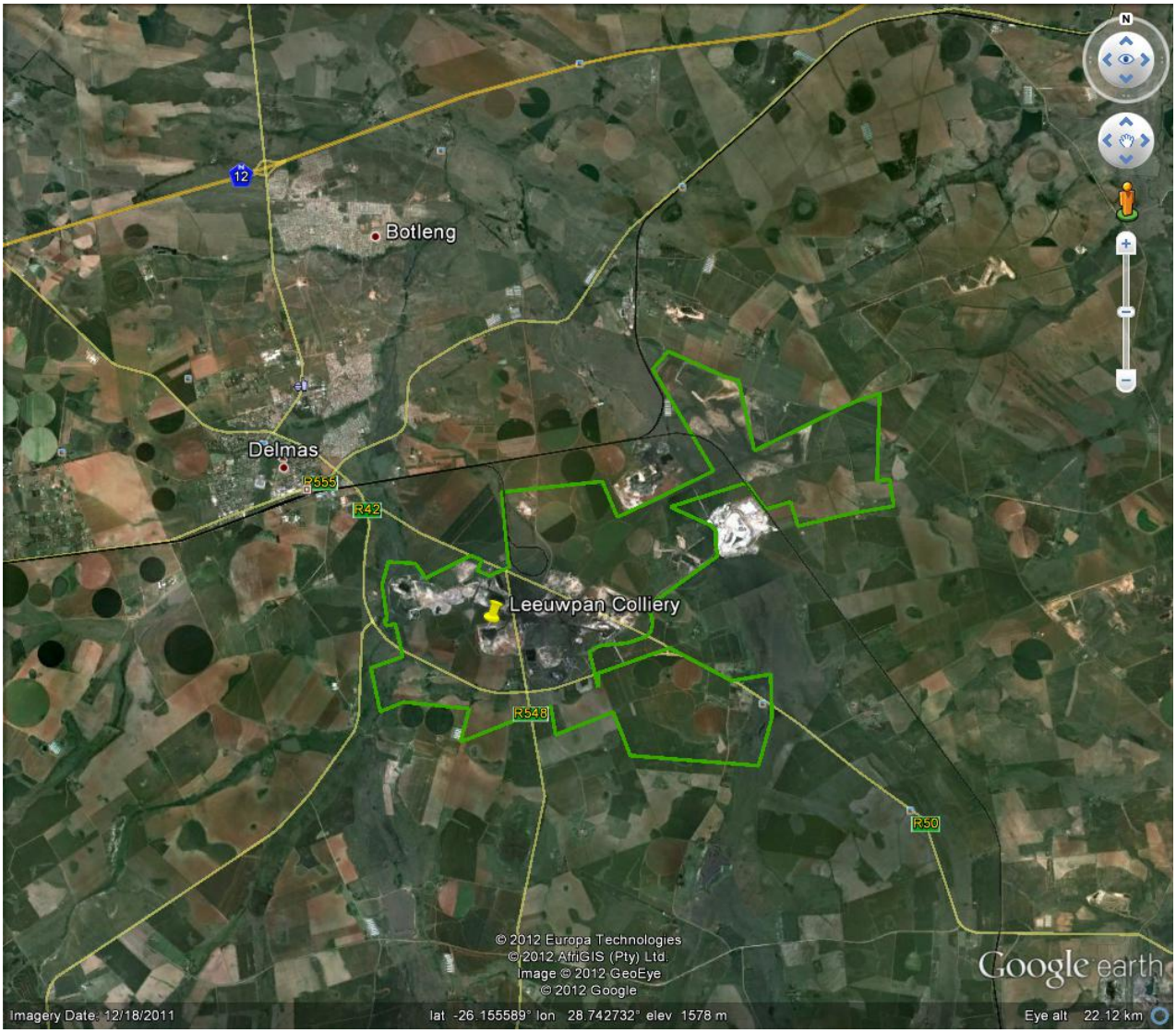

Figure 01: Study Area

4. Methodology/Approach to assessment

The methodology consists of modelling the expected influences based on expected drilling and blasting information.
Various accepted mathematical equations are applied to determine the attenuation of ground vibration, air blast and fly rock. These values are then portrayed over distance from site as level contours. Overlay of these contours with the location of the various receptors then give indication of the possible influences and expected result of impact. Evaluation of each receptor according to the predicted levels will then give indication of possible mitigation measures to be done or not. The possible environmental or social impacts are then addressed in the final report with the following chapters.

- Ground vibration expected from future blasting operations
- Ground Vibration and human perception
- Vibration impacts on productivity of farm animals (cattle, chickens, pigs, etc.);
- Vibration impact on national and provincial roads

- Vibration to communication towers and equipment in the area sensitive to vibration
- Vibration will upset adjacent communities
- Cracking of houses and consequent devaluation
- Borehole collapse
- Muddying and pollution of borehole water
- Air blast expected from future blasting operations
- Fly-rock expected
- Noxious fumes

5. Key Assumptions/Constraints

It can be accepted that there is possibility of influence and possible increased influence. Blasting operations are currently being done with future operations west of the existing oprations. Blasting operations do have influence on its surrounding environment. The level of impact is determined by the actual blasting operation and management thereof. No other specific key assumptions are yet possible due to modelling that needs to be completed.

6. Potential Impacts and Mitigation Measures

As indicated it is expected that there will be impact due to blasting operations. The prediction outcomes will determine the extent of mitigation that will be required. Mitigation will be indicated on two levels: one what is considered safe blasting criteria with regards to structures and secondly what is considered acceptable levels with regards to human perception.