



## Considering mining impacts

Environmental, social and governance considerations drive mine planning for a small scale miner in the historical goldfields of eastern Australia.

Dunolly Gold Development Pty Ltd holds a mining licence in the goldfields of Victoria, which covers an underground mine at Burkes Flat that operated in the 1880s.

The gold resources are not large but are sufficient for small scale mining, providing local skilled employment and boosting the regional economy.

Maptek™ solutions helped in planning an efficient and safe mining operation.

When planning the small shallow open cut mine, ESG considerations were foremost. Topsoil will be stored near the operation for post-mining restoration. Overburden waste rock will be stored adjacent to the pit to form a bund wall to shield noise from mining activity.

No blasting is required and the earthmoving equipment will generate limited noise. A water truck will be used to suppress dust and a mobile jaw crusher will crush the mineralised ore at the mine site.

The crusher will be on tracks, set 5 m below the land surface and surrounded by bund walls at least 5 m above the natural surface. These walls will act as a visual shield as well as a noise and dust barrier around the crusher. This set-up is good practice for mine safety and also for minimising fuel use.

Three residences lie within a radius of 385 to 650 m around the mine. There are no industrial buildings between the mine and the residences and no stands of large trees to impede propagation of sound from the operation.

Victorian EPA guidelines indicate a maximum noise level for mining of 45 decibels during the day when an occupied rural residence is nearby.

The mobile crusher was assigned a maximum of 110 dB at the origin site, and a model was created to understand the impact of the crusher noise. The iNOISE modelling software is published by a leading Netherlands industrial noise analysis company, DGMR Software BV.

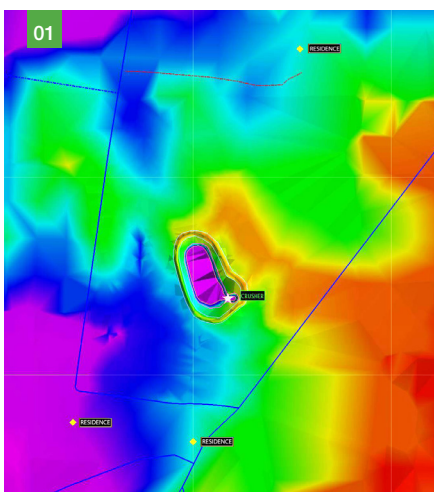
A detailed land surface is required to build an accurate noise propagation model.

Maptek laser scanning hardware and software was used to create an accurate mine topography. Other elevation data was added to extend the model over a larger area.

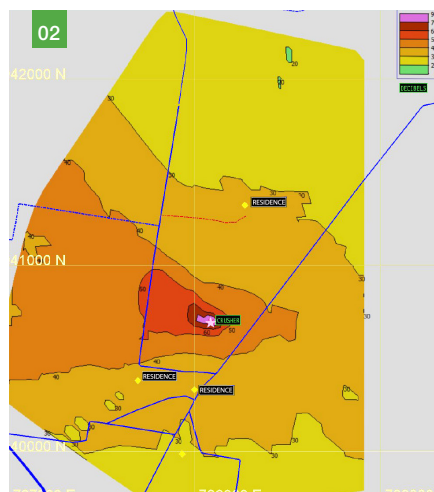
This data combined to create a very detailed terrain model, which was also used to design the excavation and bund walls in Maptek™ Vulcan™ mine planning software.

The terrain and noise models are shown below. Comparing the noise levels with and without the bund walls and recess demonstrates the significant dampening effect of siting the crusher below the ground surface, bringing a reduction of around 25 dB. The predicted noise levels for the nearby residences is between 33 and 35 dB, well under the EPA figure.

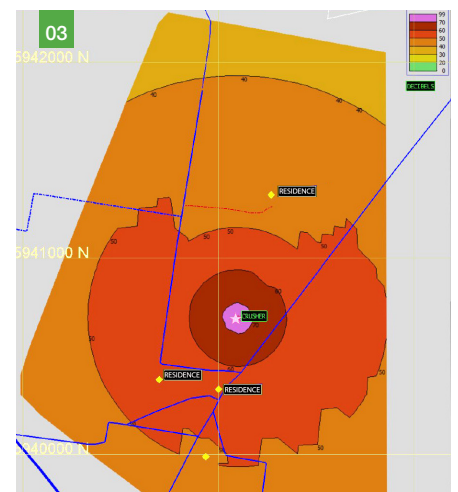
*Thanks to  
Dunolly Gold Development*



01 Digital Elevation Model showing bund wall location, mobile crusher site and nearby residences



02 Modelled Noise Envelope from the crusher shielded by the bund and recess



03 Modelled Noise Envelope without shielding