PETER O'BRYAN & Associates
consultants in mining geomechanics

TECHNICAL NOTE 18092A

Calidus Resources Limited
Warrawoona Gold Project

05 April 2019

WARRAWOONA PROJECT – KLONDYKE DEPOSIT GEOTECHNICAL REVIEW OF BLASTING REPORT

Attention: **Paul Brennan**

Task Geotechnical review of Klondyke Queen blasting assessment

Requested Paul Brennan, Mining Manager, Calidus Resources Limited

Performed Liam O'Bryan, 05 April 2019

Introduction

This note summarises the findings of a geotechnical review of the Blast It Global Pty Ltd (Blast It) assessment of the impact of blasting activities at the Klondyke deposit on the long-term stability of a nearby bat roost at Klondyke Queen [1].

The review was performed at the request of Paul Brennan, Mining Manager, Calidus Resources Limited (Calidus), on 28 March 2019.

Review

The Blast It report recommends designing blasts such that the maximum vibration velocity experienced at the Klondyke Queen workings would be ≤ 10 mms^{-1}.

Australian Standard AS2187.2-2006 [2] does not list a prescribed limit for the habitats of protected fauna, but does recommend a peak velocity of 10 mms^{-1} to not be exceeded to minimise disturbance to humans living or working near blast sites. The standard typically adopted within the mining industry for the protection of heritage rock structures (e.g. caves) is a peak velocity of 30 mms^{-1}.

A peak velocity of 10 mms^{-1} is unlikely to lead to generation of new fractures in the rock mass in which the Klondyke Queen workings have been excavated, although metastable blocks (e.g. semi-detached rocks, or zones of weak material) may detach. This effect may not be immediate, as the metastable blocks destabilise progressively over time. It is expected, however, that this will not compromise the integrity or stability of the bat roost.

Accordingly, the Blast It recommendations, which aim to preserve the long-term stability of the Klondyke Queen excavation, are endorsed.

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Closure

We trust that the information provided in this report is adequate for your current requirements. Please contact the undersigned if there is any need for clarification or further discussion on any aspect.

PETER O'BRYAN *& Associates*
per:

Liam O'Bryan
BSc (Geology & Resource Economics) (Hons)
Geotechnical Geologist

Reference

1. Martin, D., 2018
Assessment of Blasting on Klondyke Queen. A roost site for Pilbara-Leaf-nosed Bat and Ghost Bat (sic)
Blast It Global Pty Ltd report to Calidus Resources Limited (unpublished)

2. Standards Australia, & Standards New Zealand, 2006
Explosives – Storage and Use. Part 2: Use of Explosives
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