BIOSCIENCE PTY LTD ABN 26 547 517 746

488 NICHOLSON ROAD FORRESTDALE WA 6112
PO BOX 5466 CANNINGVALE SOUTH WA 6155
PHONE (08) 9397 2446 FAX (80) 9397 2447
EMAIL bioscience@biosciencewa.com
WEB www.biosciencewa.com

Resource Group WA
Grass Valley Quarry
Human (Public) Health Impact Report

Background:
Resource Group WA Pty Ltd have applied to the Shire or Northam to obtain an extractive industries licence to operate a quarry recovering and crushing quartzite into aggregates and road-base material of various sizes.

The Shire of Northam notified the proponent that they required a Public Health Impact Report "on any impact the site may have on the health and wellbeing of local residents in the Grass Valley area".

The Environmental Protection Authority Guideline – Human Health, also need to be addressed. The latest (Dec 2016) guideline considers that the Environmental Impact Assessment Process considers possibly impacts on human health associated with harmful emissions to air and harmful discharges to soil, inland waters and marine waters. It acknowledges that noise can pose health problems, as can radiation.

The Project:
Resource Group WA propose to convert 4 existing hard rock quartzite outcrops into concrete aggregate and road gravel by the processes of, a) blasting to fragment the rock, b) loading trucks using a front end loader for transport to a hardstand crushing and screening plant, c) removal from the crushing/screening plant using trucks to a product stockpile area for subsequent sales and distribution. Mining operations will be for three to four months per year primarily during wetter months from April to November.

Previous Studies:
Resource Group WA have commissioned a number of studies to assess potential environmental impacts. Of relevance to potential human health impacts are:

- "Air Quality Impact Assessment" by SLR Consulting Australia Pty Ltd (30 September 2019
- "Crushing Plant Acoustic Assessment" by SLR Consulting Australia Pty Ltd (21 May 2018)
- "Pit 2 Acoustic Assessment" by SLR Consulting Australia Pty Ltd (2 October 2019)
- "Pit 2 Blasting Assessment" by SLR Consulting Australia Pty Ltd (21 September 2019)
- "Landform Description Report" by G. Lee and Associates Pty Ltd (27 August 2019)
- "Hydrology Report" by Water Technology – 20 December 2019

The reports cover all of the areas which might impact on health and wellbeing of local residents, and on human health according to EPA guidelines.

The **Air Quality Impact Assessment** considers the proposed operation in the context of the immediate receiving environment including sensitive receptors, the local climate and meteorology data, the site operations and the state and federal legislative framework for air quality management. This work concludes with setting appropriate air quality assessment criteria dust (Particulate Matter or PM_{10} and $PM_{2.5}$) and for silica (Respirable Crystalline Silica or RCM) in dust.

The report then models the impact on two worst case operational scenarios, being the operation of the quarry at maximum weekly throughput with proposed dust mitigation measures (watering haul roads and exposed areas) and the same maximum activity without any dust mitigation measures. The model considers industry accepted data of emissions for each of the 15 discrete mining activities, and the impact of wind erosion across the site. Due to the nature of the operations, SLR concluded there would be no exceedances of cumulative 24 hour or annual averages for the three criteria at the nearest sensitive receptors (being a residential property 864 m away). As such, no instrument-based air quality monitoring programs are recommended.

The Acoustic Assessment considered the 10 separate operational activities believed to be source noise. This included an original crushing plant acoustic assessment (21st May-18).
An acoustic model was developed to predict the impact of the worst case scenario on the nearest sensitive receiver, with and without mitigation. Without mitigation the worst-case scenario (i.e. operating all plant simultaneously) produced and exceedance of 2 dB for daytime criteria according to the *Environmental Protection (Noise) Regulation 1997.* Mitigation measures proposed by SLR included the use of localized bunding and/or selection of quieter plant showed the quarry activity noise levels achieve full compliance.

The Blasting Assessment considered the amount of explosive used the break up rock, and thereby predicted likely ground vibration and airblast pressure as a function of distance from the explosion. The thresholds determined were from Australian Standards for the storage and use of explosives, and taking into account human comfort and potential for building damage. The study concluded that blasting would comply with human conformance criteria at the nearest residences and would not cause structural damage.

The Hydrology Report considered results of a drilling program of over 12 bores to a depth of 60 m. No groundwater was encountered to this depth below the site. Further, there was no evidence of possible connectivity between surface water and groundwater.

The report considered rainfall catchment details of the site, and used standard hydrological modelling to estimate peak flows possible in major rainfall events. It developed a surface water management plan wherein infrastructure is protected from

surface runoff by bunding to create modified flow paths toward sediment capture ponds.

The Landform Report considered the soil to this, skeletal and sandy over the bulk of the proposed project apart from the actual extraction site. The landform is robust, not sensitive to damage and there should be no impact on surrounding soils.

Radioactivity. There are no sources of radioactivity proposed for use during either the construction or operating phase. As such it was deemed unnecessary to compile a report on this subject.

Conclusion

The studies already undertaken indicate that the risks of air pollution by dust in respirable silica is within acceptable human health limits. The noise generated from full scale operation may just exceed the acceptable limits however through simple mitigation steps being taken conformity with standards are easily achieved. Likewise, the impacts of using explosives to enable quarrying will cause minimal harm.

The hydrological report outlines management strategies to manage and retain stormwater runoff to capture sediment. This will prevent any foreseeable impact on groundwater and inland waterways, thence any discharge towards marine waters.

However, fear and anxiety are deleterious to human health, so there are societal as well as environmental factors which are associated with human well-being. It is thus recommended that neighbour's are kept informed of proposed operations, of the findings of the studies undertaken, and reassured that they are safe. It would also be prudent to maintain open channels for neighbour's to express concerns, and to keep them informed of the proposed schedule of activities.

Dr Peter Keating
Senior Consultant
22 January 2020