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SOL Group

Simon Hedley

Via email: simon@landsandsurvey.co.nz

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Dear Simon,

NOISE ASSESSMENT FOR THE EXPANSION OF THE SOL QUARRY 81-83 CONSERVATORS ROAD CHRISTCHURCH

Introduction

1. SOL Quarries Ltd holds a suite of resource consents granted by Environment Canterbury Regional Council (ECan) and Christchurch City Council (CCC), authorising the operation of a Quarry at 81-83 Conservators Road, Yaldhurst.
2. SOL Quarries currently operates a quarry at 81 Conservators Road. The Site is approximately 25 hectares and is located roughly 3 km to the north west of Christchurch International Airport. It is irregular in shape and bound by Canterbury Regional Council properties to the south and west and Christchurch City Council property to the north utilised for grazing. Further characteristics of the site include:
 - The Site is zoned Rural 5 (Airport Influences) and the surrounding area is predominantly zoned Rural Waimakariri in the Christchurch District Plan.
 - The property has previously been used for stock grazing. There is a dwelling and several out sheds present on the eastern portion of the property.
 - The Site does not have any known outstanding or significant landscape values. Soil across the property is mapped as Selwyn stony sand and shallow sand. These soils are highly permeable.
 - An access road of approximately 745 metres joins the Site to Conservators Road in the north-east (Light Vehicle Access Road).
 - A Heavy Vehicle Access Road connects the Quarry to Guys Road.
 - The wider area includes rural residential properties along Conservators Road and Savills Road.
 - Rural residential roading continues with Guys Road extending in a south westerly direction towards Yaldhurst.
 - A SDC Stockwater Race enters the property on the west and exits on the east. This race was realigned as part of the pre-establishment works.



- The western section of the property is traversed by the Transpower NZ ISL-KIK B transmission line.
3. The extraction of aggregate occurs in stages progressing from west of the property to the east. A maximum of 9 Ha (excluding the Heavy Vehicle Access and Light Vehicle Access Roads) is exposed and actively quarried at any one time. The following associated activities also occur:
- Processing of aggregate on-Site;
 - Water take for dust suppression;
 - Diesel storage;
 - Removal of contaminated material was undertaken during the 'enabling works' in early 2016 (managed in accordance with the Remedial Action Plan & a Site Validation Report, confirming that the site was not contaminated, has been submitted and accepted by ECan);
 - Heavy vehicle movements from an access at Guys Road;
 - Light vehicle movements from Conservators Road;
 - Cleanfilling (managed in accordance with the Cleanfill Management Plan); and
 - Site rehabilitation (managed in accordance with the Quarry Rehabilitation Plan).
4. We understand that SOL Quarries Ltd has entered an unconditional Agreement for Sale and Purchase, relating to an adjoining property on Conservators Road, Yaldhurst (89 Conservators Road). We also understand that SOL Quarries Ltd has entered a conditional Agreement for Sale and Purchase on a property at 133 Conservatoes Road. The Agreement is conditional upon a boundary adjustment subdivision and securing the appropriate consents authorising quarrying of the adjoining property, enabling the incorporation of a portion of the adjoining property with the current SOL Quarries Ltd property at 81-83 Conservators Road, Yaldhurst and the quarrying of that property.
5. This letter relates to the assessment of the noise impact of the expansion of the quarry and whether it will comply with the Christchurch District Council's rural zone noise limits (Rule 6.1.5.2.1).

Terms of Reference

6. Rule 6.1.5.2.1 applies to this assessment due to the surrounding receptors located within the Rural Waimakariri Zone (Planning Map 22 in the Christchurch District Plan). The rule relates to the zone noise limits outside the central city, with Table 1 presenting the relevant limits for the purpose of this assessment. The quarry activities will only take place during daytime hours and therefore the night time limits will not apply.



Table 1: Rural Zone Noise Limit

Zone of site receiving noise from the activity	Time (hrs)	Noise Limit (dB)	
		LAEq	LAmx
All rural zones, except Rural Quarry Zone, assessed at any point within a notional boundary	07:00-22:00	50	n/a
All rural zones, except Rural Quarry Zone, assessed at the site boundary	07:00-22:00	55	n/a

7. However, the construction activities (enabling works) during the construction phase would according to the Christchurch District Plan need to comply with NZS 6803:1999 – Construction Noise. The construction activities include site clearing, construction of three-metre high earth bund along the north-eastern boundary, as well as realignment of the stockwater race on the northern boundary and part of the north-eastern boundary. The indicative construction period of three weeks relates to a “typical duration” period in terms of the Standard, which subsequently relates to the following upper limits:

Table 2: Recommended upper limits for construction noise

Time of week	Time period	Duration of work	
		Typical duration (dBA)	
		Leq	Lmax
Weekdays	06:30 – 07:30	60	75
	07:30 – 18:00	75	90
	18:00 – 20:00	70	85
Saturdays	07:30 – 18:00	75	90

Methodology

8. A site visit was conducted on the 2nd of November 2018 during which an ambient noise measurement was taken from 10:42 to 11:11 (refer to Figure 1 below for location). The sound level meter was set up at a height of between 1.2 and 1.5 meters above ground level and 3.5 meters away from reflecting surfaces (refer to Figure 2 below). The weather conditions during the measurements were fair with clear skies, gentle breeze and temperature at 12°C.
9. A Brüel & Kjær 2238 Mediator Sound Level Meter (Type 1) was used for the measurement in accordance with NZS 6801:2008 “Acoustics – Measurement of environmental sound” and NZS 6802:2008 “Acoustics - Environmental noise”. The sound level meter was calibrated in situ before and after the measurement within the required tolerances. The sound level meter and calibrator are within current Laboratory Calibration periods (calibration certificates available upon request).



Figure 1: Measurement location



Figure 2: Noise measurement

10. The expected noise levels from the quarry expansion were calculated using modelling software SoundPLAN®. SoundPLAN® is an internationally recognised noise modelling software package, which uses the internationally accepted ISO 9613-2 method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The Table below presents the noise sources and related sound power levels used in the dispersion



model. Noise sources were mainly taken from the SoundPLAN® database, with data from the crusher taken from an on-site measurement taken at 5m from the crusher.

Table 3: Input Sources

Noise source	Sound power levels dB						
Octave band frequencies, Hz	63	125	250	500	1000	2000	4000
Construction Phase							
Excavator	113	117	107	108	106	101	95
Dozer	110	112	104	103	106	104	98
Scraper	110	77	91	95	98	102	108
Operational Phase							
Haul trucks	117	113	105	107	103	101	95
Front end Loader	108	116	107	108	105	99	95
Crusher	117	114	107	109	103	99	94

Assumptions

11. The dispersion models¹ represent a worst-case scenario with down wind conditions for all receptors. It is assumed that all relevant processes, machinery and vehicles are running simultaneously and at full capacity. Due to the quarry activities following a staged approach and the extent of each stage not being clear, the dispersion models also represent what the noise levels will likely be during the final extent of phase 2.
12. The heavy vehicle activity on the haul road which is included in the operational scenario further assumes a maximum trip amount of 300 vehicles per day, loaded and unloaded at a speed of 15km/h (150 movements into the Quarry and 150 movements out of the Quarry).

¹The operational phase prediction model has since been updated to present the proposed set back buffer area of the crushing, screening, stockpiling and loading activities. The model also includes a berm along the north eastern boundary only.



Assessment Results

13. An ambient noise level of 52dBA L_{Aeq} was measured which is typically expected within a rural residential environment with low traffic frequency. The existing in pit quarry activities were inaudible at the measurement location during the measurement and also no aircraft were observed passing overhead during the measurement and therefore not impacting on the measurement.
14. The construction model (refer to Attachment 1) indicates that the construction noise levels will range between 39dBA and 52dBA L_{Aeq} at the indicated receptors, which are rural dwellings.
15. The operational model (refer to Attachment 1) indicates that the in pit noise levels will comply at the notional boundary of 133 Conservators Road as well as 119 Conservators Road, which are the nearest dwellings to the quarrying activities.
16. The operational model indicates that the in pit noise levels will exceed the open space zone limit at Mcleans Grassland Park to the north-west by up to 10dB across the boundary with no dwellings within a reasonable proximity. The size of the area that constitutes the area of influence where the increase will be noticeable to significantly noticeable (5dB A-10dBA) is 1.2Ha and stretches into the Mcleans Grassland Park property by maximum of 65m directly across the quarry pit footprint.
17. The noise from the heavy vehicle activity on the haul road which runs through property owned by Environment Canterbury, is however likely to exceed the 55dBA limit across the site boundary but only extending as far as roughly 12-metres into the property on either side of the road.

Conclusion

18. It is evident from the noise dispersion models that the proposed phase 2 expansion project will comply with limits that are recommended in the construction noise standards as well as with the rural zone noise limits in the Christchurch District Plan. With the construction activities complying with the L_{Aeq} limits it is highly likely that it would comply with the L_{Max} limits as well.
19. It should be noted that noise levels are for the final stages of the quarry at its closest distance from indicated receptors. Bearing in mind that the quarrying progresses from west to east, lower noise levels will be received during the earlier stages which are further away from the receptors. The predicted operational noise levels at the final stages are significantly lower than the measured ambient noise level and are compatible with the existing noise environment at the surrounding dwellings.
20. With the haul road noise exceeding the 55dBA limit across the boundary into ECan's property, by 10dBA or less, it technically designates the hauling activities as 'restricted discretionary' (Rule 6.1.5.1.1 P1 or P3). However, due to the noise only exceeding the limit at roughly 12-metres into the property from the edge of the haul road (on either side) and with no nearby sensitive activities and receptors (the property being vacant) it is concluded that the effect is less than minor. The same is said for the exceedance towards the north-west across the boundary of Mcleans Grassland Park, with only a



small area of influence and no sensitive activities and receptors it is also concluded that the effect on this property is less than minor.

21. It should also be noted that this haul road has existing consent approval under resource consent application RMA/2018/505 and there is no proposed change to traffic volumes (a level which has been consented) rather just a change in duration (extending the Quarry operations by a maximum of 8-years).

Yours sincerely,

Novo Group Limited

Luke Sadler

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Attachment 1: Construction and Operational Noise Models



