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Dear **Sarah Davidson**

Subject: Technical air quality review of the Cromwell Certified Concrete Quarry Section 92 response. RM20.360.03

Scope of Works

Otago Regional Council (**ORC**) issued a further information request¹ to Cromwell Certified Concrete Limited (**CCC**) in relation to its application to discharge contaminants to air from proposed quarry operations at its Amisfield Quarry. ORC has engaged NZ Air Limited (**NZ Air**) to undertake an independent air quality expert review of the response² (hereafter referred to as the s92 response) provided by the applicant's technical experts, Beca New Zealand Ltd (**Beca**).

Response to Question 1

Beca has supplied the air quality management plan (**AQMP**) as requested. The information and level of detail in the AQMP is consistent with that required in the relevant good practice guides. I am satisfied that the AQMP provides the information which was missing in the original application documents.

In particular, Section 6 details site mitigation measures for discharges of dust from the site and the monitoring program which is proposed. I note that the applicant is proposing to utilise Haul LocTM and Rubble LocTM to suppress dust from potential sources during regular operations and out of hours. This adds a level of protection above and beyond traditional water application methods.

The AQMP is structured such that it provides site operators with clear instructions and guidelines to operating the site within the bounds of that presented in the air quality assessment (**AQA**) and s92 response which support the application.

¹ ORC letter dated 21/1/2021 – reference A1434855

² Beca Letter titled: RM20.360.03 Amisfield Quarry Response to Request for Further Information. Dated 1/3/2021

Additionally, there are clear triggers which define conditions when site operations and dust discharges are to be reviewed and or restricted when operations are within 100 m of neighbouring sensitive receptors.

Response to Question 2

I agree with Beca that the dust emissions from the quarry will be inert and not result in significant chemical reactions with plant leaves/fruit which would result in direct plant tissue damage. I also agree that the highest potential for effect would be deposition of dust on the leaves and fruit which could result in reduced plant growth rates and potential degradation of fruit quality.

I consider that Beca's assessment of the potential for effects on the adjacent cropping correctly identifies that the existing environment has a high variability in background dust deposition rates. As such the existing crops will already be exposed to dust deposition from natural/existing sources. The question is whether or not the proposed future operation of the quarry will add to this existing dust loading and result in cumulative effects on the crops.

The proposed increase in product extraction rates (from 70,000 m³/annum to 200,000 m³/annum) and expanded quarry footprint (from 19 ha to 27 ha) is substantial. However, the current quarry has been operational for 25 years and ORC has not received any dust related complaints except for one which occurred after the application was lodged. Based on this lack of complaints it is reasonable for Beca to conclude that the existing operation is implementing dust mitigation measures which are effective and not resulting in adverse effects on neighbouring properties/crops.

Whilst there is an increased risk to adverse dust effects with increased material processing rates, based on discussions with Beca's air quality expert (Prue Harwood)³, the applicant is not seeking to add additional aggregate processing plant on-site, but rather just run the plant for longer durations. As such there is a reduced risk of 'cumulative' effects from this source as there will not be any 'new' sources. It is also noted from these discussions that the use of 'mobile processing plant' mentioned in the AQA refers only to the existing main processing plant (as part of it is in theory mobile) which is not proposed to move from its current location. The applicant is not proposing to utilise any additional mobile processing plants at other locations on the site.

With regards to the product extraction from the 8 ha expansion area, the methodology for this extraction and the associated mitigation measures which are currently being employed on-site are proposed to remain the same (and in some instances more stringent mitigation is proposed). There are areas of the existing quarry which have similar separation distances from existing cropping areas to that which are proposed in the expansion area. In the absence of complaints or confirmed off-site effects on these adjacent crops from the existing quarry's discharges to air it is reasonable to conclude that should the current mitigation be employed in the new extraction area that adverse effects will be avoided. Notwithstanding the above, the applicant is proposing additional industry standard mitigation measures on top of that currently employed (i.e. realtime wind and dust monitoring and associated restricted work conditions).

Beca has supplied an extensive analysis of wind conditions which could result in effects on any given off-site cropping receptor in Section 3 of the s92 response. I agree with the conclusions in this assessment that any one cropping receptor will have a low percentage of time that it is downwind from winds above 5 m/s. This reduces the potential for effect on any one given receptor. In addition,

³ Personal communications on 11/3/21 with Prue Harwood, the Beca air quality expert who has prepared the ADA and s92 response.

there are varying separation distances between the emission sources and each cropping operation. A number of these separation distances are well in excess of 250 m which would be the furthest extent at which an adverse dust effect could occur (however with industry best practice mitigation in place I consider that the potential for effects will be limited to within 100 m of the emission source).

The applicant has now proposed to extend the proposed realtime TSP monitoring and additional mitigation measures outlined in Section 7.3 of the ADA to occur whenever there are operations within 100 m of any off-site cropping operation. I consider that this is an appropriate mitigation measure and that by utilising real time dust and wind monitoring to restrict and ultimately cease discharges from within 100 m of these cropping operations that the residual risk of adverse effects on the crops will be low.

Also, based on my discussions with Ms Harwood, the applicant is proposing to undertake the additional monitoring and mitigation measures for any activity occurring within 100 m of a sensitive receptor from activities within the existing quarry. These monitoring requirements should be included in a Consent Condition should the Consent be granted.

Response to Question 3

Beca has provided a photo of the weather station located on the Fulton Hogan quarry, the data from which has formed the basis for the wind direction and speed assessments for the Amisfield Quarry expansion. Beca has calculated the increase in wind speed which would occur between 7.5 m above ground level as compared with 10 m above ground level. I agree with Beca that the adjustment factor of 1.04 will result in a negligible change in the calculated effects.

Additionally, I note from the photo that the weather station appears to be well situated in an open, unobstructed area where the wind flows are unlikely to be impeded by vegetation, topography or structures.

Therefore, I am happy that the wind data used in the assessment is representative of conditions at the Amisfield Quarry.

Response to Question 4

Whilst Beca has not addressed the likely/actual differences in the quartz content of the material which is processed at the Amisfield quarry as compared with that in the Yaldhurst monitoring program which was used to support the conclusions in the ADA, Beca is correct that the potential for RCS health effects is more dependent on the point source mitigation used and separation distances between the emission source and neighbouring receptors.

I accept Beca's assertions that the separation distance between the current product processing plant and the nearest dwelling are beyond that which current research would indicate that there is a potential for adverse health effects. As stated above, I have been informed that the product processing plant will not move from its existing location and there will not be any mobile plant operating at locations closer to off-site receptors, therefore I agree with Beca that the potential for adverse health effects from the discharge of RCS are low to negligible.

Response to Question 5

I have discussed the subject of progressive rehabilitation/stabilisation of exposed areas with Ms Harwood. I expressed my concerns that should the applicant end up having large areas of exposed unconsolidated surfaces and as such the risk for dust emissions from the site will increase. Ms

Harwood stated that the current plan is to rehabilitate quarried areas 'as needed'. I suggested that the applicant could consider including contingency mitigation measures in it's AQMP should the unconsolidated surfaces from previous extraction stages result in off-site effects/excessive dust discharges. Examples of contingency mitigation measures include, stabilisation of the surface with chemical surfactants, covering the surface with a layer of washed product such that the amount of surface fines is reduced, temporary rehabilitation, etc. Ms Harwood agreed that this would be appropriate.

Response to Question 6

From the response to this question I note that the processing plant produces products which have a higher potential for dust discharges (due to the higher proportion of fines). However, Beca has confirmed that the current plant will not move, will not increase in size and that the current mitigation measures (which have been successful to date) will be maintained. In addition, Beca has provided an analysis of the separation distances between the plant and the nearest boundaries/off-site receptors. In most instances the separation distances between sensitive receptors and the processing plant are relatively large. Additionally, I note that the applicant is proposing good practice dust mitigation measures (the use of water on the processing plant at all times)

In the s92 response Beca has provided the maximum processing rates for the existing processing plant (250 t/hr). I recommend that this is included in a Consent Condition such that the scale of the processing plant is maintained within that assessed in the AQA. If the applicant is agreeable, I recommend that the location of the processing plant also be fixed to that which has been assessed in the ADA and the s92 response.

Response to Question 7

Beca has undertaken an assessment of potential effects on the vineyard to the southwest of the Quarry throughout the s92 response and in Section 8 of the s92 response. This magnitude of dust effect on this receptor has been assessed as 'slight adverse effect' utilising the IAQM method adopted by Beca.

Summary and Conclusions

In my opinion, CCC need to undertake a high level of dust mitigation to ensure that nuisance, ecological, or health based air quality effects do not occur off-site. This is a function of the size and scale of the proposed quarry in conjunction with the small separation distances between some air discharging activities and the nearest off-site sensitive receptors.

I have undertaken a technical review of the air quality assessment of effects and subsequent s92 response provided by Beca on behalf of CCC. In my professional opinion the applicant is proposing to use dust mitigation measures which are consistent with industry good practice for a quarry operation such as that proposed.

The site is unique in the fact that it is almost entirely surrounded by cropping activities (cherry orchards and vineyards). Whilst the deposition of dust can result in adverse effects to plant health and degrade crops, this effect is dose dependant. The existing environment can have high natural dust deposition levels due to weather conditions and existing sources of dust in the environment. Based on the information I have reviewed the current operation of the quarry (which has operated for 25 years) is not resulting in adverse effects on these cropping operations. Whilst the applicant is proposing to increase both the quarry extraction rates and the area for extraction, the applicant is

also proposing to increase the level of dust mitigation on-site, particularly within 100 m of off-site sensitive receptors (including cropping operations).

In my opinion the greatest risk for adverse off-site effects is from dust emitting activities which are proposed to occur within 100 m of off-site sensitive receptors, as intensities of dust deposition will be greatest within close proximity to the sensitive receptors (due to reduced dispersion and progressive deposition of heavier particulates). The applicant has identified this as a risk and is proposing a high level of mitigation and monitoring when any activities are occurring within these critical separation distances (as outlined in Section 7.3 of the ADA). This additional mitigation includes alarm trigger points which require contributing dust sources within 200 m of sensitive receptors to cease. Neighbouring cropping activities have also been included in the definition of 'sensitive receptors' for the purposes of the requirements for this additional mitigation. I consider that this level of mitigation is appropriate and that the residual risk of adverse dust effects at both residential and cropping receptors will be low post mitigation.

I provided a list of additional mitigation measures in my initial review (NZ Air review letter dated 12/1/21), a number of these are still valid. They are not mandatory but should be considered by the applicant and added into the proposed AQMP where appropriate.

I have also recommended aspects of the application and proposed operation which could be included in Consent Conditions should ORC be of the mind to grant the consent.

Closure

If you have any questions about this review, please contact Donovan Van Kekem on 021 329 970.

Yours Sincerely,

Donovan Van Kekem

Managing Director

