

**BEFORE A COMMISSIONER APPOINTED BY THE OTAGO REGIONAL  
COUNCIL AND THE CENTRAL OTAGO DISTRICT COUNCIL**

**IN THE MATTER OF**

the Resource Management Act 1991

**AND**

**IN THE MATTER OF**

applications by Cromwell Certified  
Concrete Limited for resource  
consents to expand Amisfield Quarry

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**STATEMENT OF EVIDENCE OF JAMIE EXETER  
ON BEHALF OF CROMWELL CERTIFIED CONCRETE LIMITED**

**(NOISE)**

Dated: 30 November 2021

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**GREENWOOD ROCHE**  
LAWYERS  
CHRISTCHURCH  
Solicitor: Monique Thomas  
(Monique@greenwoodroche.com)

Applicant's Solicitor  
Level 3  
680 Colombo Street  
P O Box 139  
Christchurch  
Phone: 03 353 0572

## 1 INTRODUCTION

- 1.1 My name is Jamie Leif Exeter. I am a Senior Consultant at Styles Group Acoustics & Vibration Consultants. Styles Group is an acoustics consultancy specialising in the measurement, prediction, and assessment of environmental and underwater noise, building acoustics, and vibration.
- 1.2 I hold a Diploma of Audio Engineering from the School of Audio Engineering in Auckland. I am a professional Member of the Acoustical Society of New Zealand and served as an elected Council Member from 2012 to 2018. I am also an Associate Member of the New Zealand Planning Institute.
- 1.3 I have 16 years' experience in the field of acoustics, including 13 years' experience as an environmental acoustics consultant. I regularly prepare assessments of environmental noise effects and provide peer reviews for Councils throughout New Zealand. My experience relevant to this project includes:
- (a) Preparing and reviewing a significant number of acoustic assessments for resource consent applications nationwide against District Plan requirements and in accordance with New Zealand environmental noise standards;
  - (b) Undertaking acoustic measurements, assessments and reviews for quarries at locations across New Zealand, including Auckland, Whangarei, Hawkes Bay and Manawatu. This work has included noise measurements, building 3D computer noise models, and assessing the potential noise and vibration effects from operational activities on quarry sites;
  - (c) Working on a significant number of construction noise and vibration projects including many major infrastructure projects, landfills, managed fills, transfer stations, truck depots, and large scale commercial and industrial operations throughout New Zealand.
- 1.4 Styles Group was engaged by Cromwell Certified Concrete Limited (**CCCL**) in September 2019 to assess the potential noise

effects of the proposed deepening and expansion of the existing Amisfield Quarry. I was responsible for preparing the *Assessment of Noise Effects* (dated 19 October 2020) and an updated version of that assessment (which was expanded to address operational vibration and potential effects on recently consented building platforms at 1286 Luggate-Cromwell Road) dated 12 February 2021, which formed part of the Section 92 response to Central Otago District Council.

- 1.5 I visited the site on 20 September 2019 to undertake site and plant specific noise measurements of the existing operations, and to observe the existing layout and surrounding environment.
- 1.6 My previous assessments were prepared based on the existing resource consent conditions, which appear to enable hours of operation from 6 am to 8 pm, Monday to Saturday. I understand however that the consented operating hours are in fact 7 am to 7 pm, Monday to Saturday. My assessment has been revised and my evidence has been prepared on this basis.
- 1.7 In preparing this evidence, I have reviewed the following:
  - (a) The AEE;
  - (b) The draft conditions provided to council on 10 November 2021;
  - (c) The site plans, the extraction plan, and the draft quarry rehabilitation plan;
  - (d) The acoustic review of my Assessment of Noise Effects by Mr Reeve of Acoustic Engineering Services (**AES**) dated 8 April 2021;
  - (e) The submissions on the application related to noise and vibration;
  - (f) The evidence of Mr Allison (the quarry manager) in relation to operational matters; and
  - (g) The section 42A report prepared by Mr Whyte.

1.8 Whilst this is a Council hearing, I acknowledge that I have read and agree to comply with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2014. My qualifications as an expert are set out above. Other than where I state that I am relying on the advice of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## 2 **SCOPE OF EVIDENCE**

2.1 My evidence addresses:

- (a) The existing quarry;
- (b) The proposed expansion;
- (c) Relevant standards applying to the proposal (in relation to construction noise, and operational noise and vibration);
- (d) Construction noise and potential effects;
- (e) Operational noise and vibration and potential effects;
- (f) Proposed mitigation measures;
- (g) Noise and vibration related matters raised in the s42A Report;
- (h) Submissions on the proposal in relation to noise and vibration effects; and
- (i) Consent conditions.

## 3 **THE EXISTING QUARRY**

3.1 The existing quarry and all surrounding sites are located within the Rural Zone of the Central Otago District Plan. To the east and north of the existing quarry are dwellings at 1286 and 1308 Luggate-Cromwell Road, respectively. The property at 1286 Luggate-Cromwell Road also has land use consent for two building platforms (granted on 21 September 2020) and a land

use consent for a dwelling on one of those platforms (granted on 14 October 2021).

- 3.2 Operations on the existing site include the use of fixed processing plant (washing and screening), two mobile crushers (one permanent, the second brought to site only when required), front end loaders, an excavator, and trucks. The hours of operation are 7 am to 7 pm Monday to Saturday, excluding public holidays.
- 3.3 I have quantified the noise emissions from the existing plant and activities on site with attended noise measurements during my site visit. The noise emissions from the plant and activities are typical for a quarry of this size. The highest noise levels are generated by the loading and operation of the fixed screening plant and mobile crushers.
- 3.4 Except for the vehicle access from State Highway 6, the existing site is surrounded by earth bunds, for noise mitigation. The bunds are of various heights and some have been constructed or lengthened since my previous noise modelling was undertaken. A plan showing the locations and heights of the bunds around the existing site is attached to my evidence as **Appendix 1**.

#### 4 **THE PROPOSED EXPANSION**

- 4.1 The hours for excavating and processing (7 am to 7 pm) will not change. Additional hours of operation are sought to enable the loading of customer's trucks (purchasing trucks) on Monday to Friday between 6 am and 7 am, and between 7 pm and 8 pm. A watercart will be operated on site for dust control, generally between 7 am and 8 pm, Monday to Saturday.
- 4.2 Loading trucks between 6 am and 7 am will not take place more than twice per week. I understand that early morning loading would predominantly be to provide concrete plants with aggregate for early morning concrete pours during the busier summer months.
- 4.3 The product loaded between 6 am and 7 am will be limited to no larger than 22 mm concrete aggregate. This activity will

generate lower noise levels than loading trucks with the larger product assumed in my previous assessments.

- 4.4 The areas in which the crushers operate will not change. The mobile crusher will only be operated in the western area of the existing extraction pit, below the fixed screening plant. When a second mobile crusher is required on site, it will be operated in the same area. I have modelled the use of two mobile crushers in my noise assessment.
- 4.5 Activities in the expansion area will only involve the movement and operation of an excavator and dump trucks. There will be no processing and no loading of purchasing trucks in the proposed expansion area at any time.
- 4.6 A watercart is owned and operated by the quarry for dust control. Dust control will generally take place between 7 am and 8 pm Monday to Saturday, but may sometimes be required outside of these hours. I understand that it is unlikely that the watercart would need to be used between 10 pm and 7 am on any day.
- 4.7 The proposed operational activities on site can be summarised as:
- (a) Loading purchasing trucks from stockpiles on the existing site from 6 am to 7 am (concrete aggregate only), and 7 pm and 8 pm (any product), Monday to Friday;
  - (b) Site excavation, processing, loading purchasing trucks, truck movements, and loaders manoeuvring on the existing site from 7 am to 7 pm, Monday to Saturday (authorised by the existing consent);
  - (c) Site excavation and loading dump trucks in the expansion area from 7 am to 7 pm Monday to Saturday; and
  - (d) Use of a watercart around the stockyard and the active excavation face as required, generally between the hours of 7 am and 8 pm, Monday to Saturday.

- 4.8 Earth bunds no less than 3 m high will be constructed to surround the proposed extraction area before extraction begins. The earth bunds will reduce noise emissions from this area to all surrounding notional boundaries, and to the Department of Conservation Reserve to the north. A plan showing the locations and heights of the proposed bunds around the expansion area is attached to my evidence as **Appendix 2**.

## 5 RELEVANT NOISE AND VIBRATION STANDARDS

### ***Construction Noise***

- 5.1 The District Plan permitted construction noise limits<sup>1</sup> are the recommended limits set out in the New Zealand construction noise standard NZS 6803P:1984 *The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*. These will apply to the construction of the earth bunds on site and to the backfill and rehabilitation works at the end of the life of the quarry.
- 5.2 The relevant NZS 6803P:1984 noise limits are 75 dB  $L_{A10}$  and 90 dB  $L_{Amax}$  for the construction of the earth bunds, and 70 dB  $L_{A10}$  and 85 dB  $L_{Amax}$  for the backfill and rehabilitation works (based on the expected durations of the works, and on all construction works occurring between 7.30 am and 6 pm, Monday to Saturday). These limits apply at 1 m from the most exposed façade of any dwelling.
- 5.3 Adopting the current New Zealand construction noise standard NZS 6803:1999 *Acoustics – Construction noise* for any construction noise conditions for the quarry would be in accordance with best practice. This may enable noise levels that are numerically 1-3 dB higher than the District Plan permitted construction noise limits, but it is unlikely to give rise to additional noise effects (for the same reasons discussed at paragraphs 5.9 and 5.10 of this evidence).

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<sup>1</sup> Section 12.7.4.ii

### **Operational Noise**

- 5.4 The District Plan permitted noise limits<sup>2</sup> between sites in the Rural Zone are:
- 55 dB  $L_{A10}$  on any day between 7 am and 10 pm; and
  - 40 dB  $L_{A10}$  and 70 dB  $L_{Amax}$  at all other times.
- 5.5 The noise limits specified in the land use consent for the existing quarry are:
- 55 dB  $L_{A10}$  on any day between 7 am and 7 pm; and
  - 45 dB  $L_{A10}$  and 75 dB  $L_{Amax}$  at all other times.
- 5.6 The District Plan permitted noise limits and the consented noise limits apply at the notional boundary of any dwelling when measured and assessed in accordance with NZS 6801:1991 *Measurement of sound* and NZS 6802:1991 *Assessment of environmental sound*.
- 5.7 I have assessed the noise in terms of the  $L_{A10}$  metric and the noise standards referenced by both the District Plan and the existing land use consent, but I have recommended conditions and noise limits in terms of  $L_{Aeq}$  and the current New Zealand environmental noise standards (NZS 6801:2008 *Acoustics – Measurement of environmental sound* and NZS 6802:2008 *Acoustics – Environmental noise*), in accordance with current best practice.
- 5.8 By adopting the current versions of the environmental noise standards, the change in descriptor (from  $L_{A10}$  to  $L_{Aeq}$ ) could mean that approximately 1-3 dB more noise (numerically) is enabled within a measured sample between 6 am and 7 am.
- 5.9 I do not consider adopting the 2008 standards would give rise to additional noise effects at the nearest notional boundaries because:

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<sup>2</sup> Section 4.7.6(E)



- An increase of 1-2 dB would be indiscernible, and 3 dB only just perceptible; and
- The  $L_{Aeq}$  descriptor will capture and represent transient noise from impacts and other short-term events, whereas the  $L_{A10}$  can miss such events because it does not take into account the loudest 10% of the noise in a measured sample.

- 5.10 The  $L_{Aeq}$  descriptor is widely accepted as a better descriptor than  $L_{A10}$  for environmental noise because it represents all sounds in the measurement period.
- 5.11 During the daytime period, there would be no difference numerically between using either standard because averaging of the noise levels would be permitted under NZS 6802:1991<sup>3</sup>.

### **Vibration**

- 5.12 The permitted vibration limits in the District Plan are for blasting vibration. These limits do not apply to vibration generated by heavy plant and trucks, and they would not be appropriate for managing any vibration effects of this proposal.
- 5.13 The guideline vibration values of the German Vibration Standard DIN 4150-3:2016 *Vibrations in buildings – Part 3: Effects on structures* (**DIN 4150-3:2016**) is commonly adopted in New Zealand for the assessment of potential effects of construction and operational vibration on buildings. I have assessed the potential vibration emissions from the site against this standard.

## **6 CONSTRUCTION NOISE AND POTENTIAL EFFECTS**

- 6.1 During the construction of new earth bunds in the expansion area, noise will arise from the operation of an excavator, and truck and loader movements. The noise from these activities will readily comply with the District Plan permitted construction noise

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<sup>3</sup> Averaging of  $L_{A10}$  levels would be permitted between 7 am and 10 pm under NZS 6802:1991 but no similar adjustment would be applied over the prescribed timeframe of 7 am to 8 pm under NZS 6802:2008 if processing plant is operated all day and trucks are loaded between 7 pm and 8 pm.

limits due to the distance between the machinery and any dwelling that may be occupied during the works.

- 6.2 The construction noise limits only apply at buildings that are occupied while the works are underway. If there are houses constructed at the building platforms at 1286 Luggate-Cromwell Road before the earth bunds are formed, the construction noise will comply with the permitted standards at 1 m from the nearest façades due to the separation distance.
- 6.3 The backfilling and rehabilitation works at the end of the life of the quarry will involve dismantling and removing the fixed plant and workshops, stabilisation, earthworks, and landscaping. These works will be limited in duration and will not be part of an ongoing land use activity. They are within the scope and definition of construction work in accordance with NZS 6803P:1984 (and NZS 6803:1999) and are therefore covered by the District Plan permitted construction noise limits.
- 6.4 The backfilling and rehabilitation works will not involve any high-noise activities. These works will be able to comply with the permitted standards if they are only undertaken between the hours of 7.30 am and 6 pm, Monday to Saturday. This is due to the separation distance between the plant and any dwelling that may be occupied during the works, including any new dwellings on the building platforms at 1286 Luggate-Cromwell Road.
- 6.5 Noise from the construction works required for earth bund formation and rehabilitation works will be noticeable at the nearest dwellings at times, but it is unlikely to interfere with daily residential activities. The construction noise will comply with the District Plan permitted construction noise limits and the guideline limits of the New Zealand construction noise standard NZS 6803:1999. In my opinion the construction noise will not exceed a reasonable level.

## 7 **OPERATIONAL NOISE AND POTENTIAL EFFECTS**

- 7.1 In my previous assessment I prepared computer noise models to represent the activities that will be undertaken during the

early morning from 6 am to 7 am, during the day from 7 am to 7 pm, and in the evening from 7 pm to 8 pm. The noise models were calibrated using octave-band data obtained from my site and plant specific measurements<sup>4</sup>.

- 7.2 I have updated these noise models based on the final earth bund design and to include the proposed restrictions on the number of trucks and the type of product loaded between 6 am and 7 am.
- 7.3 The noise model for 6 am to 7 am includes 5 purchasing trucks accessing the site and being loaded with 22 mm concrete aggregate in the north-west area of the site, near to the fixed processing plant. The sound power level used for loading during this period is 108 dB L<sub>WA</sub><sup>5</sup>.
- 7.4 The noise model for 7 am to 7 pm includes the two mobile crushers and the fixed processing plant operating simultaneously all day, purchasing truck and loader movements in the existing quarry, and excavation and truck movements in the expansion area.
- 7.5 The noise model for 7 pm to 8 pm includes 5 purchasing trucks accessing the site and being loaded with larger product (e.g., 150 mm rock) in the north-west area of the site, near to the fixed processing plant. Loading of trucks at this time will only take place Monday to Friday.
- 7.6 If use of the watercart is required for dust control after 8 pm on Monday to Saturday, or at any time on Sunday, it will be the only activity on site at these times. The noise will readily comply with the District Plan permitted night-time noise limit of 40 dB L<sub>A10</sub> at any notional boundary, due to the screening provided by the earth bunds.
- 7.7 Excavation in the expansion area will begin with a 7 m cut at the south-west corner, then continue east towards 1286 Luggate-

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<sup>4</sup> Except for the loaders. This data came from measurements undertaken at another quarry site.

<sup>5</sup> This is based on attended noise measurements (L<sub>A10</sub>) undertaken by Styles Group of a 24 t loader filling an empty truck with concrete aggregate at a quarry in Hastings.

Cromwell Road. It will then progress north towards 1308 Luggate-Cromwell Road. The excavation from south to north will be undertaken in stages, with sections being cut to 7 m, then down to 16 m. Once the expansion area has been cut to 16 m, the below groundwater excavation will begin, excavating from north to south. At this point, the height between the bottom of the pit and the top of the earth bunds will be approximately 19 m, which will mitigate the noise emissions from the expansion area significantly.

- 7.8 The predicted noise levels do not include the additional screening provided by the cut, only by the earth bunds. The noise was modelled this way to represent the worst case for noise levels when the first cuts are being made near to each receiver.
- 7.9 The updated noise level predictions, including the final earth bund design and the restrictions on the number of trucks and type of product between 6 am and 7 am, are displayed in Table 1 below. These worst-case noise level predictions demonstrate that the cumulative noise from the existing and proposed activities will comply with the District Plan permitted noise limits.

**Table 1: Updated predicted noise levels**

<b>Notional boundary</b>	<b>Time period</b>	<b>Updated <math>L_{A10}</math> noise levels</b>	<b>District Plan Permitted <math>L_{A10}</math> noise limit</b>
1308 Luggate-Cromwell Rd	6 am to 7 am	38 dB $L_{A10}$	40 dB $L_{A10}$
	7 am to 7 pm	53 dB $L_{A10}$	55 dB $L_{A10}$
	7 pm to 8 pm	43 dB $L_{A10}$	55 dB $L_{A10}$
1286 Luggate-Cromwell Rd existing notional boundary	6 am to 7 am	31 dB $L_{A10}$	40 dB $L_{A10}$
	7 am to 7 pm	46 dB $L_{A10}$	55 dB $L_{A10}$
	7 pm to 8 pm	37 dB $L_{A10}$	55 dB $L_{A10}$
1286 Luggate-Cromwell Rd at hypothetical notional boundary of northernmost building platform	6 am to 7 am	26 dB $L_{A10}$	40 dB $L_{A10}$
	7 am to 7 pm	50 dB $L_{A10}$	55 dB $L_{A10}$
	7 pm to 8 pm	31 dB $L_{A10}$	55 dB $L_{A10}$
	6 am to 7 am	29 dB $L_{A10}$	40 dB $L_{A10}$

<b>Notional boundary</b>	<b>Time period</b>	<b>Updated <math>L_{A10}</math> noise levels</b>	<b>District Plan Permitted <math>L_{A10}</math> noise limit</b>
1286 Luggate-Cromwell Rd at hypothetical notional boundary of southernmost building platform	7 am to 7 pm	48 dB $L_{A10}$	55 dB $L_{A10}$
	7 pm to 8 pm	34 dB $L_{A10}$	55 dB $L_{A10}$

- 7.10 The  $L_{Amax}$  values between 6 am and 7 am will be approximately 10-15 dB higher than the  $L_{A10}$  values and will comply with the District Plan permitted  $L_{Amax}$  noise limit of 70 dB between 10 pm and 7 am.
- 7.11 The level and character of the noise at the notional boundaries of 1286 and 1308 Luggate-Cromwell Road is unlikely to be discernibly different from the existing noise emissions from the quarry, because the processing plant will still be the controlling noise source.
- 7.12 Based on the updated noise levels in Table 1, the proposed operational noise limits for the quarry are:
- Monday to Saturday 7 am to 8 pm: 55 dB  $L_{Aeq}$ ; and
  - At all other times: 40 dB  $L_{Aeq}$  and 70 dB  $L_{Amax}$ .

These noise limits would apply at the notional boundary of any dwelling when measured and assessed in accordance with NZS 6801:2008 *Acoustics – Measurement of environmental sound* and NZS 6802:2008 *Acoustics – Environmental noise*.

- 7.13 The New Zealand environmental noise standard NZS 6802:2008 *Acoustics – Environmental noise* provides guideline residential upper noise limits for the reasonable protection of health and amenity associated with the use of land for residential purposes<sup>6</sup>. During the night-time (typically 10 pm to 7 am), the recommended guideline limit to prevent against sleep disturbance is 45 dB  $L_{Aeq}$ . The proposed noise limit of 40 dB  $L_{Aeq}$

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<sup>6</sup> This includes rural dwellings.

between 6 am and 7 am Monday to Friday is 5 dB lower than this guideline limit.

- 7.14 I consider that the cumulative noise emissions from the expanded quarry will be reasonable. The proposed noise limits are in accordance with current best practice and they will not enable noise effects that are discernibly any greater than the District Plan permitted noise standards. The cumulative noise emissions from the site will comply with the guidance of NZS 6802:2008 for avoiding annoyance and sleep disturbance at residential sites. The exposure and frequency of noise during the night-time period will be limited to between 6 am and 7 am on Monday to Friday only, and no more than twice per week.

## **8 OPERATIONAL VIBRATION AND POTENTIAL EFFECTS**

- 8.1 The proposed operational activities within the expansion area are excavation and truck movements. These are not high-vibration generating activities. The shortest distance between these activities in the expansion area and the nearest dwellings or building platforms will be approximately 50 m.
- 8.2 Intermittent and low levels of vibration may be just perceptible within the neighbouring dwellings during excavation in the nearest parts of the site. This would be generated by the bucket of an excavator being impacted on the ground. Experienced operators do not generally operate plant in this way so this would be unlikely to occur. Low levels of perceptible vibration could also be generated if the excavator or trucks were to move quickly over uneven ground in the nearest parts of the site.
- 8.3 When the excavation works are in the nearest part of the site to a dwelling, the vibration felt indoors could potentially reach a peak particle velocity of approximately 0.5 mm/s with a dominant frequency of up to approximately 40 Hz. This will depend on the ground type and the response of the receiving structure.
- 8.4 Vibration within dwellings is potentially perceptible at levels above 0.3 mm/s during the day when the occupants are active.

Vibration generated by activities in the expansion area will generally be imperceptible within the closest neighbouring dwellings. If the vibration is just-noticeable, it would be intermittent, limited to when excavation is taking place in the nearest part of the site, and during the daytime only. This would be very unlikely to interfere with daily residential activities.

- 8.5 The German vibration standard DIN 4150-3:2016 provides guideline values for vibration in dwellings and states that cosmetic building damage will not occur where these values are complied with. This includes any cracks forming in plastered surfaces and any existing cracks in a structure being enlarged.
- 8.6 Any potential vibration from the proposed activity in the expansion area will be significantly lower than the DIN 4150-3:1999 guideline values, by at least an order of magnitude.
- 8.7 In my opinion any vibration generated by activities in the expansion area will generally be imperceptible to any residents within the nearest dwellings and will not exceed a reasonable level.

## 9 **SECTION 42A REPORT**

- 9.1 Paragraph 12.9.5 of the s42A report includes the comment that Styles Group has "*modelled noise levels rather than undertaking monitoring of existing activities on the site*". Paragraph 12.9.14 states that the compliance monitoring condition recommended by AES is based on my noise assessment using predicted levels and not actual noise levels.
- 9.2 However, my noise modelling and assessment are based on noise monitoring of the existing plant and activities on the site. Section 5.1 of my Assessment of Effects (February 2021) sets out the methodology and results of my attended noise monitoring. I used the results of my site and plant specific measurements to calibrate my noise model.
- 9.3 The s42A Report notes the condition recommended by AES requiring the use of broadband reversing alarms on all plant and

vehicles that are owned and operated by the quarry (in place of tonal alarms). I support the recommended condition.

## 10 SUBMISSIONS

### ***Nicola and Bryson Clark – 1308 Luggate-Cromwell Road***

- 10.1 The submitters raise concerns about adverse noise effects from increased traffic and worker activity, the proximity of works in the expansion area, tonal reversing alarms, and infringements of the District Plan permitted noise limits between 6 am and 7 am.
- 10.2 The proposal has been amended to comply with a proposed noise limit of 40 dB  $L_{Aeq}$  between 6 am and 7 am, Monday to Friday. This will not enable greater noise effects than the District Plan permitted standard.
- 10.3 The proposed operation of the expanded quarry involves additional hours of noise from 6 am to 7 am, and from 7 pm to 8 pm, Monday to Friday. The reasons for these hours being necessary are addressed in Mr Allison's evidence.
- 10.4 The following restrictions are proposed during the additional hours to mitigate the noise effects and enable compliance with the proposed limits:
- Between 6 am and 7 am: Monday to Friday only, no more than 5 trucks, no trucks or loading on more than two days per week, no product larger than 22 mm concrete aggregate to be loaded; and
  - Between 7 pm and 8 pm: Monday to Friday only, no more than 5 trucks.
- 10.5 The noise levels between 7 am and 7 pm at the notional boundary of 1308 Luggate-Cromwell Road will continue to be controlled by noise from processing plant and I do not expect them to increase by more than 2 dB, which is not a noticeable change. The excavator and trucks that will be used in the expansion area are quieter than the crushing plant, and their noise emissions will be mitigated considerably by the cut and earth bund configuration.



- 10.6 Tonal reversing alarms will no longer be used on quarry plant. These will be replaced by broadband reversing alarms, which sound like short bursts of white noise.
- 10.7 In their submission, Mr and Mrs Clark seek the following conditions with respect to noise effects:
- (a) *"All activity, including loading of trucks and staff leaving, be limited to current operating hours";* and
  - (b) *"A consent condition be adopted preventing quarry activities being moved from present locations within the site (including rock crushing facilities)".*
- 10.8 The proposal does involve additional operating hours but with the mitigation described above at paragraph 10.4. The locations of the fixed processing plant and mobile crushers on site will not change. There will be no processing, crushing, or loading of purchasing trucks in the expansion area.

***Amisfield Orchard Ltd and Hayden Little Family Trust – 1286 Luggate-Cromwell Road***

- 10.9 The submitters raise concerns about noise with respect to working hours, activities on site, and there being no setback between the noise generating activities and their boundary.
- 10.10 The proposal does involve additional operating hours, but with the mitigation described above at paragraph 10.4.
- 10.11 The noise levels between 7 am and 7 pm at the notional boundary of 1286 Luggate-Cromwell Road will continue to be controlled by noise from processing plant and I do not expect them to increase by more than 2 dB, which is not a noticeable change.
- 10.12 The nearest noise generating activities to 1286 Luggate-Cromwell Road will be excavation and loading dump trucks. These activities will be separated from the site boundary by 25 m and a 3 m high earth bund when excavation is in the nearest part of the site.

***Justine and Philip Davis – 1310 Luggate-Cromwell Road***

- 10.13 The submitters raise concerns about noise from increased hours of operation and additional noise from increased truck movements.
- 10.14 The proposal does involve additional operating hours, but with the mitigation described above at paragraph 10.4.
- 10.15 The expected change in the overall noise levels during the day at the notional boundary of 1310 Luggate-Cromwell Road from activities on the site, including additional truck movements, is approximately 1 dB. This would not be a noticeable change.

***Department of Conservation – Mahaka Katia Scientific Reserve***

- 10.16 The submission by the Department of Conservation seeks that no quarrying or bund construction or removal be undertaken (or heavy machinery be used) within 50 metres of the Mahaka Katia Scientific Reserve between September and January in any year (bird nesting season). This has been accepted by the applicant and is reflected in the proposed draft consent conditions.

**11 CONSENT CONDITIONS**

- 11.1 The draft conditions provided to council on 10 November 2021 will require updating to reflect the revised noise limits and mitigation measures proposed for activities on site between 6 am and 7 am Monday to Friday.
- 11.2 AES has recommended conditions of consent regarding operational noise monitoring, non-tonal reversing alarms, and construction noise. I generally support these, but the requirements of the operational noise monitoring condition could be reduced to one set of measurements and reporting, because my noise modelling was based on measurements of the actual plant and activities on site.

**12 CONCLUSION**

- 12.1 I have assessed the potential noise and vibration effects from the proposed quarry expansion. My operational noise

assessment used site and plant specific noise measurements to calibrate a computer noise model. This was based on peak production, with all processing plant operating constantly between 7 am and 7 pm.

- 12.2 Construction noise will comply with the District Plan permitted construction noise limits. I recommend that any construction noise condition is in terms of the current New Zealand construction noise standard, NZS 6803:1999. Adoption of this standard is unlikely to give rise to any additional construction noise effects.
- 12.3 Operational noise will comply with the District Plan permitted noise limits for the rural zone. I have recommended proposed noise limits in terms of the current New Zealand environmental noise standards, NZS 6801:2008 and NZS 6802:2008. Adoption of these standards will not result in any increase in noise effects.
- 12.4 The proposed operation of the expanded quarry involves additional hours of noise from 6 am to 7 am, and from 7 pm to 8 pm, Monday to Friday.
- 12.5 I have recommended restrictions during the additional hours to mitigate the noise effects and enable compliance with the proposed limits. Earth bunds have been constructed around the existing site, and will be constructed around the expansion area before excavation begins, to mitigate noise emissions.
- 12.6 Operational vibration generated by activities in the expansion area will generally be imperceptible within the nearest dwellings. Vibration will not exceed standards for avoiding cosmetic building damage, or a reasonable level.
- 12.7 The proposed noise limits are in accordance with current best practice. They will not enable noise effects that are discernibly any greater than the District Plan permitted noise standards. I consider that the cumulative noise emissions from the expanded quarry will be reasonable. The cumulative noise emissions from the site will comply with the guidance of NZS 6802:2008 for avoiding annoyance and sleep disturbance at residential sites.

The exposure and frequency of noise during the night-time period will be limited to between 6 am and 7 am on Monday to Friday only, and no more than twice per week.

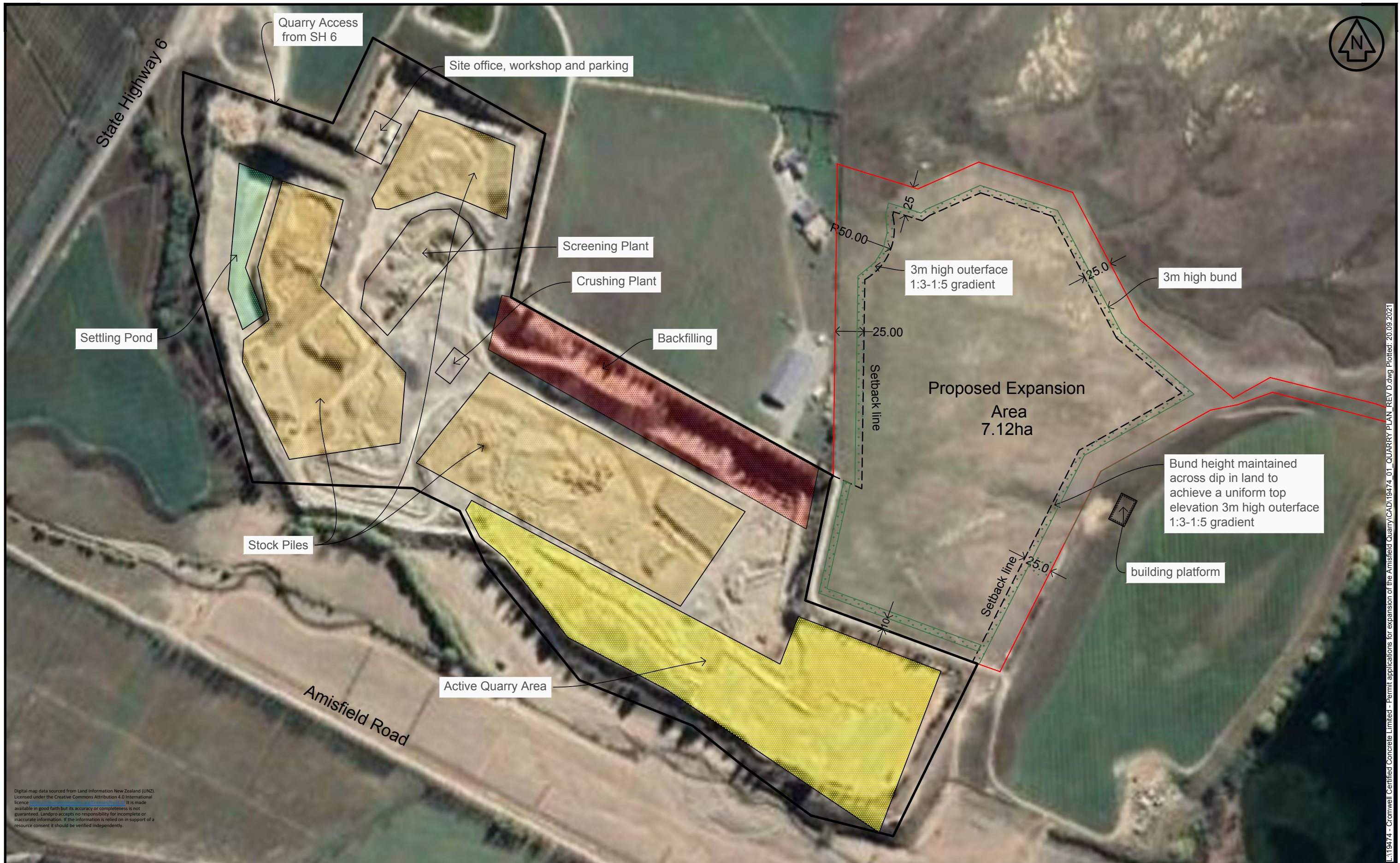
**Jamie Exeter**

**30 November 2021**

**APPENDIX 1: Earth bunds around the existing site**



**APPENDIX 2: Proposed new earth bunds and setbacks (expansion land)**



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Client  
**CROMWELL CERTIFIED CONCRETE LTD**

NOTES  
 - All dimensions shown are in metres unless otherwise shown  
 - Copyright on this drawing is reserved  
 - Check any electronic data against the hardcopy plan to ensure it is the latest version  
 - If this plan is being used as part of sale and purchase agreement then it is done so on the basis that it is preliminary only, final dimensions and areas may vary on final survey

**SITE PLAN**

Rev.	Date	Revision Details	By	Surveyed	Signed	Date	Job No.	Drawing No.
A	21.7.20	50m setback around neighbouring dwelling	slb				19474	01
B	22.7.20	setback area expanded	slb	Drawn	Signed	Date	Scale	1:1500 @ A1
C	9.9.21	Bunding added, active area reduced	slb				1:3000 @ A3	
D	20.9.21	Bunding changed, wording added	slb			4.6.20	Datum & Level	Rev.
				Designed	Signed	Date	NZTM 2000 & MSL	D



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