Before the Independent Hearing Panel

In the Matter	of the Resource Management Act 1991 (**RMA**)
And	
In the Matter	of an application to the Central Otago District Council and Otago Regional Council for resource consent to establish and operate a gold mining activity at 1346 – 1536 Teviot Road, Millers Flat
Reference	RC230325 (Central Otago District Council) RM23.819 (Otago Regional Council)

Evidence of Nevil Ian Hegley on behalf Hawkeswood Mining Limited

(Noise)

Dated 29 April 2024

Jeremy Brabant

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Introduction

1. My full name is Nevil Ian Hegley.

2. I have the following relevant qualifications and experience:

   a. I have specialised in acoustics for over 40 years.

   b. I have an MSc from Southampton University (UK) where I undertook research in acoustics in 1975/76.

   c. I have been on the majority of the Standards sub-committees dealing with sound issues since 1977 and I was the Chairman of both of the sub-committees that approved the 1984 and 1999 versions of the Construction Noise Standard NZS6803.

3. I have been involved with more than 130 mines and quarries throughout the country ranging from small to very large, including projects of a similar size to the one proposed at the subject site. Three of the alluvial mining projects have been within 45km of the subject site and two of these are to the north on the Clutha River.

4. I was instructed by Hawkeswood Mining Limited in early 2022 to assess the noise from the proposal and recommend any acoustic treatment that would be appropriate to ensure noise to the neighbours would be within a reasonable level at all times. I am familiar with the area to which the application for resource consent relates and to the levels of noise along the Clutha River in general.

5. Although this is not a hearing before the Environment Court, I record that I have read and agree to abide by the Environment Court's Code of Conduct for Expert Witnesses as specified in the Environment Court's Practice Note 2023. This evidence is within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses as presented to this hearing. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

Scope of Evidence

6. My evidence will address the following:
    a. District Plan requirements;
    b. The proposal;
    c. Predicted noise levels;
    d. Existing noise environment;
    e. Submissions;
    f. Section 42A Report
    g. Proposed conditions; and
    h. Recommendations.

7. Rather than repeat all of the details of the original noise assessment undertaken, this evidence assumes the Commissioners are familiar with that information. This evidence has been restricted to a summary of that work plus a response to submitters' concerns and the section 42A report.

District Plan Requirements

8. The proposed mining area and all the closer neighbours are located in a Rural Resource Area in the Central Otago District Plan. The main references to noise in the District Plan are set out in a general noise rule, the Objectives, Policies, and General responsibilities.

9. Rule 4.7.6 E. Noise of the District Plan requires:

    (a) All activities shall be conducted so as to ensure the following noise limits are not exceeded at any point within the notional boundary of any dwelling, rest home or hospital, or at any point within any Residential Resource Area or any Rural Settlements Resource Area:

On any day 7:00am to 10:00pm	*55dBA L_{10}*
10:00pm to 7:00am the following day	*40dBA L_{10}*
	70dBA L_{max}

10. Rule 12.3.2 Objective - Protection from Noise the objective is:

To avoid, remedy or mitigate the adverse effects of noise on the District's amenity values and the health and wellbeing of the District's people.

11. Rule 12.4.2 Policy – Noise states:

To determine the suitability of noise generating activities in any given locality by having regard to:

(a) The specific characteristics and amenity values of the locality from which the noise originates, and

(b) The sound pressure level of the proposed activity, and

(c) The frequency that the noisy activity takes place, and

(d) The length of time that the noise continues, and

(e) Any special characteristics of the noise,

to ensure that the adverse effects of noise on other activities and the natural and physical resources of the locality (including cumulative effects) reflect standards acceptable to the community.

Explanation

All activities generate some degree of noise. High levels of noise can be detrimental to the health and wellbeing of the community and can adversely affect quality of life. The standards set throughout the District recognise this by ensuring relatively quiet areas are protected and that activities that generate high levels of noise locate away from noise sensitive areas and activities.

12. Rule 12.5.2 12.5.3 12.5.4 Noise – General Responsibilities states:

Every occupier of land and every person carrying out an activity on land or water, is required by the Act to adopt the best practicable option to ensure emission of noise from that activity does not exceed a reasonable level.

Where Council is of the opinion that there is excessive noise in terms of sections 326 and 327 of the Act, Council may exercise the powers available under those sections.

Reason

Section 16 of the Act imposes a duty on people to avoid creating unreasonable noise. It is appropriate to note the provisions of sections 16, 326 and 327 of the Act in the plan to draw attention to all persons' responsibilities in terms of noise generation.

13. Rule 12.7.4(i) of the District Plan requires the noise to be measured in accordance with the provisions of NZS 6801:1991 Measurement of Sound and assessed in accordance with the provisions of NZS 6802:1991 Assessment of Environmental Sound.

14. Rule 12.7.4(ii) sets the limits for construction noise (which would apply to work such as the construction of bunds) as:

> *Construction noise within the district which is ancillary to the principal use of the site shall not exceed the recommended limits in and shall be measured and assessed in accordance with the provisions of NZS 6803P:1984 The Measurement and Assessment of Noise from Construction, Maintenance, and Demolition Work. Discretionary adjustments provided in Clause 6.1 shall be mandatory within the district.*

The Proposal

15. It is proposed to mine the alluvial material using conventional gold recovery plant located on a floating dredge with supporting mobile plant between 7:00am – 7:00pm Monday to Friday plus 7:00am – 1:00pm on Saturdays.

16. The first phase of the works will be to remove the topsoil and silt then excavate the gravel to form a pond area where a floating dredge will operate. The plant used to undertake this work is set out in the original noise assessment. Noise from the plant used has been based on field measurements of a similar activity to that proposed and although not normally the case, it has been assumed all plant will be operating at the same time so maximising the noise output.

17. As the mining progresses in any stage some of the plant will move from the surface into a cut so this will reduce the noise received. However, as all

stages of the activity must comply with the relevant noise limits the worst-case scenario has been adopted in all calculations.

Predicted Noise Levels

18. Figure 1 shows the locations adopted for the dredge at its maximum height that has been assessed. The additional plant, such as the dump trucks and dozers are located around the dredge on the ground surface.

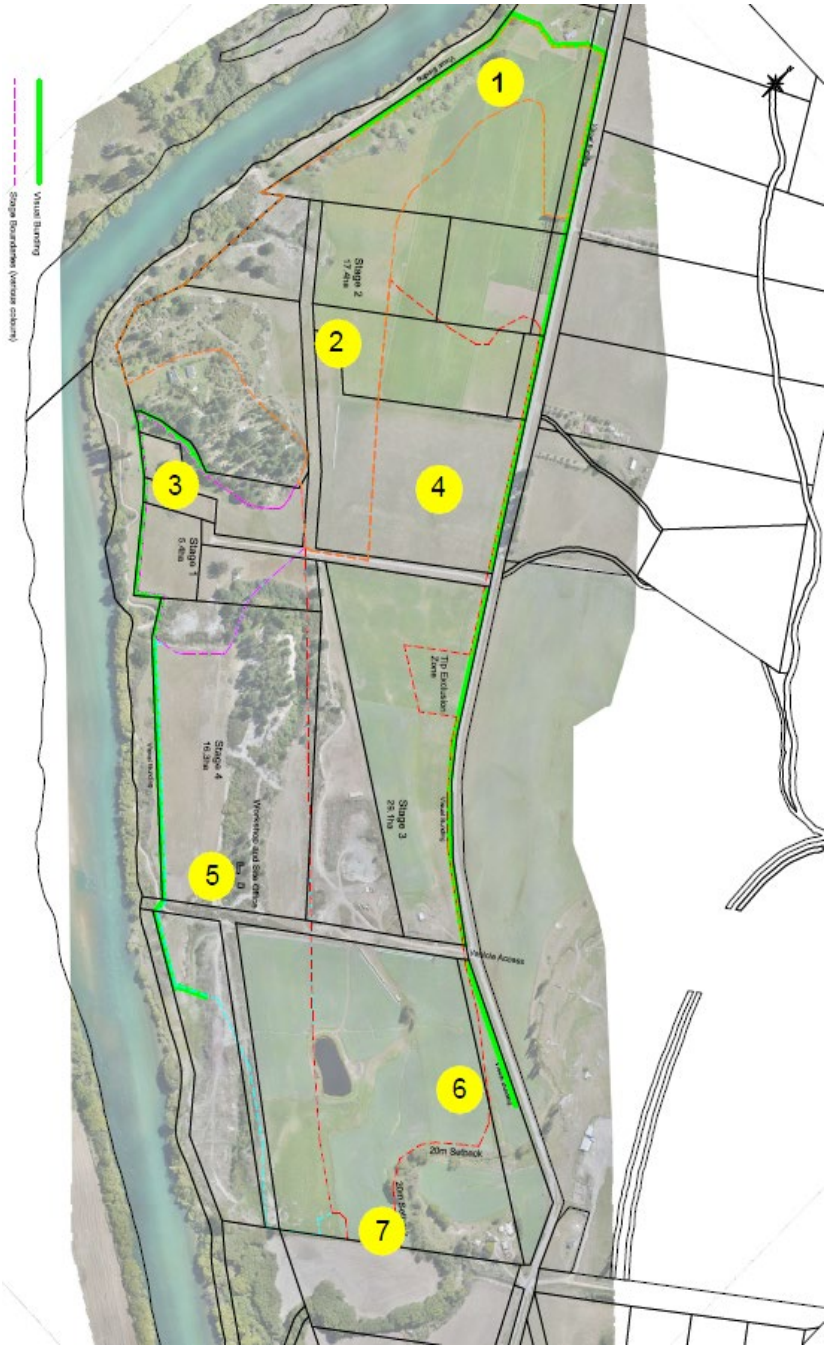

Figure 1. Positions of dredging stages evaluated.

19. Each location of the dredge positions was selected to reflect the mining position at the closest dwellings along the route and hence represent the highest noise level received at each dwelling.

20. The assessment assumes that a minimum of a 4m high bund will be constructed across the northern side of the mining area and nominally 300m down the western side of the site and 700m down the eastern side of the site. It has also been assumed a 3m high bund nominally 300m long will be constructed to screen the dwelling at 5386 Ettrick-Raes Junction Road.

21. The resulting noise contours are shown on Figures 15 – 21 in the original noise assessment report.

22. In addition to the noise contouring, the noise has been predicted at the most exposed notional boundary of all closer dwellings. The results are shown in Table 1. The highest predicted noise level when mining each site has been given. Where written consent has been given these sites are shaded in Table 1.

Table 1. Highest Predicted Noise Levels (dBA L_{10})

Dwelling	Site 1*	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
67 Clutha Road	47	47	43	42	35	33	30
68 Clutha Road	45	47	43	43	35	33	31
69 Clutha Road	47	49	45	44	36	34	31
5280 Ettrick-Raes Junct	40	48	48	44	38	34	32
5330 Ettrick-Raes Junct	40	49	50	45	40	35	33
5386 Ettrick-Raes Junct	35	42	47	42	50	44	43
5434 Ettrick-Raes Junct	31	37	40	37	43	46	47
5474 Ettrick-Raes Junct	30	35	37	35	39	44	45
1313 Teviot Road	42	38	34	36	29	32	29
1333 Teviot Road	46	41	37	39	31	34	31
1334 Teviot Road	50	43	38	40	32	31	28
1353 Teviot Road	47	42	38	41	33	35	32
1377 Teviot Road	45	43	38	42	36	36	33
1403 Teviot Road	44	48	43	50	41	40	37

1535 Teviot Road	29	36	36	37	40	47	48
1537 Teviot Road	28	34	35	35	39	49	49
1580 Teviot Road	28	33	34	33	38	47	49
1581 Teviot Road	28	33	34	33	38	47	49
1594 Teviot Road	28	32	33	32	37	44	46
1595 Teviot Road	28	32	33	32	36	44	46
1599 Teviot Road	27	31	32	31	36	43	45
18 Oven Hill Road	26	31	32	31	35	42	43
23 Oven Hill Road	26	33	34	33	37	46	47
23 Oven Hill Road	27	33	34	33	37	47	48
25 Oven Hill Road	26	32	33	33	36	44	44

* Site locations are shown on Figure 1

23. Consented accommodation units at 1535A Teviot Road may be developed at some point in the future and have not been included in the above calculations. With the maximum plant operating at ground surface and at the closest point and no specific noise control bunds included in the calculations, the noise level at the closest site boundary of 1535A Teviot Road would be up to 55dBA L_{10}. Written consent has been given for the proposed mining, so the effects have not been considered further.

24. The use of dewatering pumps at night time is not included in the above. During stage 1 the dewatering pumps will powered with a small diesel generator located within the pond area. This will provide good screening of the generator plus it will be minimum of 600m from the closest notional boundary where no written consent has been given. Thus, noise from the dewatering for stage 1 has been predicted at 29dBA L_{10}, below the existing night time noise environment

25. For all other mining stages the pumps will be electric powered so there will be minimal noise to the neighbours. The level will vary depending on the location of the dredge but will not exceed 21dBA L_{10}.

Existing Noise Environment

26. I measured the existing noise environment between 24 August to 31 August 2023 at two locations. The first measurement (Figure 2) was on the road boundary opposite 1313 Teviot Road. This site was selected, as it was a good location to reflect the typical existing noise environment at the northern end of the proposed mining site.

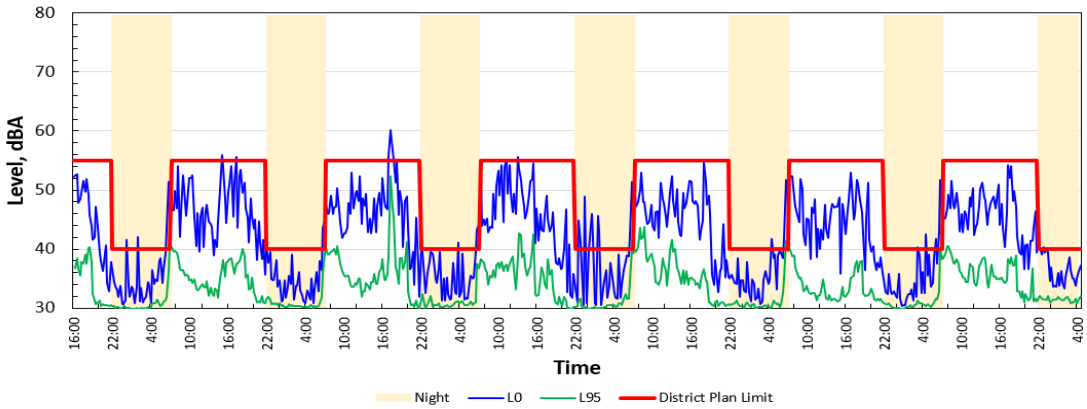

Figure 2. Noise measurement at northern end of the site

27. The second noise measurement (Figure 3) was on the road boundary opposite 1535A Teviot Road. This location reflects the typical existing noise environment at the southern end of the proposed mining site.

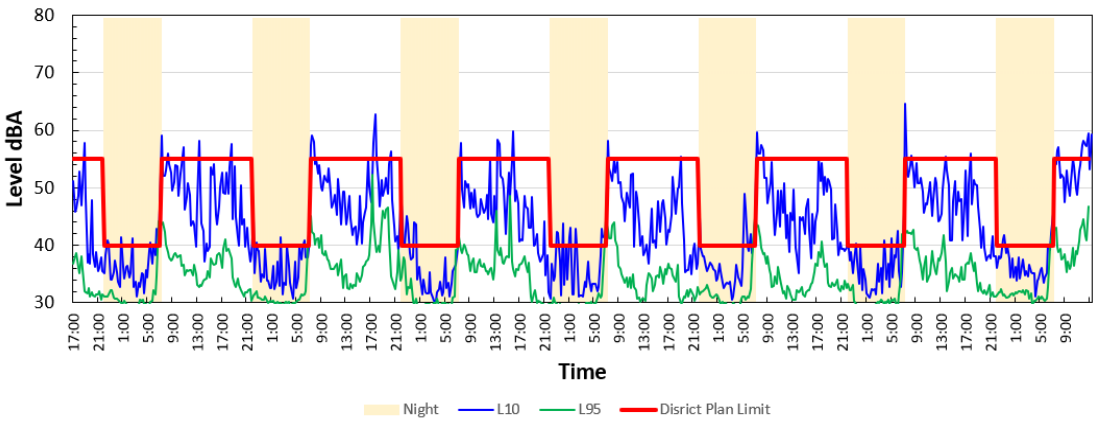

Figure 3. Noise measurement at southern end of the site

28. At the time of year when the monitoring was undertaken there was minimal insect and bird noise. The best description of the noise is that it was general environmental noise. The weather throughout the monitoring period was fine with calm to light winds. Water flow in the Clutha River was typical for the time of year and during the calmer periods the river flow influenced the background sound (L_{95}). These levels are considered representative of a calm period in the area and based on noise measurements undertaken at similar sites in Central Otago the levels fairly represent the noise that can be expected in the rural areas clear of busy roads.

29. As monitoring was not attended the results should be taken as representing the general noise environment for calm to light wind conditions. With higher wind speeds (>3-4m/s) the noise environment would quickly increase by 5 – 10dBA over the measured level, the exact level being dependent on the wind speed.

30. Based on the measured ambient sound and the maximum noise predicted from the proposed mining (Table 1 above) it becomes apparent the noise effects from the mining will be at or below the existing ambient sound for all neighbours for the majority of the time. Based on this, and considering the noise from mining will be a minimum of 5dB L_{10} below the District Plan limits for a permitted activity, the noise effects from the mining are considered to be less than minor

Submissions

31. I have reviewed the submissions to this application and respond to the points raised by the submitters with respect to noise.

32. The Culling Trust owns a house at 1594 Teviot Road. Continuous noise has been raised as a concern. From Table 1 it can be seen the highest noise level that will be heard at the most exposed notional boundary of 1594 Teviot Road will be 46dBA L_{10} when mining is closest to this site (dropping to 28dBA L_{10} when mining is at the opposite end of the site). As a guide, a level of

45dBA L_{10} is considered a level that will allow undisturbed sleep at night time when assuming the windows are open for ventilation. An increase of 1dBA from 45dBA to 46dBA would not be perceptible, as it takes an increase of 3dBA to be just noticeable. The upper level received at this site of 46dBA L_{10} during the daytime is below the existing environmental L_{10} level so noise is not expected to be intrusive at this site.

33. Graeme Young at 1266 Teviot Road has asked how can 4m high bunds stop noise from a 7m high stockpile. The stockpiling referred to is only undertaken for the initial mining and undertaken in conjunction with the development of the noise bunds. It is part of the initial construction work and will be completed within approximately eight weeks. The resulting noise received at Mr Young's notional boundary will be 38dBA L_{10}, well within a reasonable level and similar to the existing noise environment in this area.

34. The submission from JP Clarke, KL Franklin and FG Works Limited suggests the effects of special audible characteristics (SAC) from the proposed mining have not been included in the assessment. As set out in the noise assessment report the District Plan requires the SAC to be considered and this has been included in the assessment. Further, it is anticipated that any approval of this application would include a condition to adopt the requirements of NZS6802:2008 Acoustics – Environmental Noise and hence take any special audible characteristics into account. In the recommended conditions, Council has also included a condition stating quarry-based trucks, plant and machinery must not be fitted with tonal reversing alarms. Therefore, there is a doubling up of conditions to satisfy this submission.

35. In paragraph 8.3.2 of this submission, it is suggested the District Plan noise limits may actually be exceeded. This is incorrect. The noise level at the notional boundary of 1334 Teviot Road is a predicted level of up to 50dBA L_{10} when mining is at the most exposed location to the notional boundary. This is 5dBA L_{10} within the noise expectations for the area.

36. It may assist if the effects of the proposed bunding are clarified. The maximum reduction from a bund is achieved when standing very close to

the bund. As the distance from the bund is increased the reduction effects of the bund will reduce, that is, the received noise will increase. However, as the distance of the plant from the bund increases so the noise will reduce. Therefore, the effect of the bunds and the effect of increasing the distance from the bund cancel each other out for the initial 200m – 300m in this case. This is why site 1 is not located closer to 1334 Teviot Road.

37. At this location, noise from mining has been undertaken with all mining plant operating between the toe of the bund and 230m from the notional boundary. It is unlikely all plant would operate this close to the notional boundary at the same time so there is a factor of safety with the predictions. A real-world assessment reflecting more realistic mining plant operations would result in a lower noise level.

38. It is stated in paragraph 8.3.3 of the submission that the noise contours are inconsistent with the source data provided. I have used field measurements of the proposed plant that will operate on site and adopted these levels using an internationally recognised prediction model, so I believe the predictions are valid. This is exactly the same technique adopted for other sites that in hindsight have shown to achieve reliable results.

39. In paragraph 8.3.4 it is stated terrain data should have been used in the noise model. As set out in the noise assessment report "*As the ground contours are not available for the area it has been assumed the ground is flat. This will result in higher noise levels being predicted. Any screening effects of the ground contour will provide a factor of safety with the assessment. However, for the majority of the area the ground is relatively flat, so the results will be representative for the site.*"

40. This assumption means there will be line of sight between the noise source and receiver position at all times where there is no specific bunding. Even if the noise source or receiver is elevated the only change to the received noise level would be due to ground effects and in the extreme, this would be fractions of a decibel. Where bunding is relied upon there is insignificant variation in the ground level to change the received noise.

41. In paragraph 8.3.5 it has been suggested it is inappropriate to assume a soft ground (0.7 ground absorption) as the Clutha River will not provide this level of absorption.

42. The computer model allows for a number of variables. The ground effects reflect the absorption of the surface that the noise travels over and I have adopted 0.7 as a conservative (low) level; 0.8 is often used. The model allows for additional global variables, such as temperature, humidity, and meteorological effects. There is also a separate section of the model that allows localised variables such as barriers, buildings, foliage regions and ground regions. Although there are areas of foliage in the area, I have not included this effect in the modelling, which will be small and may be considered a minor factor of safety with the assessment.

43. The Clutha River clearly does not provide the ground absorption that is achieved by farmland. However, I have included the Clutha River in a separate section of the model as a ground region category having a "very hard and dense surface" to reflect the effects of a water surface. What I have not done is to put the Clutha River at a lower ground level than the surrounding farmland. The overall effect of the Clutha River modelling is very small in terms of the total noise path so has an insignificant effect (≈0.1dBA) on the noise received. Similarly, the fact the river is below the surrounding ground surface will provide an insignificant noise reduction to the sound path. None of these finer modelling variables that do not noticeably influence the results are normally reported (and have not been reported in any previous reports) but are included in the assessment. These variables are acknowledged in ISO 9613-1/2 Acoustics – Attenuation of Sound during Propagation Outdoors which has been adopted as set out in the original noise assessment.

44. In paragraph 8.3.6 the submission is critical of adopting 7 items of machinery plus trucks for the assessment which suggests there will be up to 15 full time operators.

45. The seven items of machinery plus trucks reflect the noisier plant on site. There will be some light vehicles arriving and departing but the noise from

this type of plant is insignificant compared to the mining plant so does not have any cumulative noise effects for the neighbours.

46. In paragraph 8.3.7 of the submission, it is stated "*the Noise Assessment does not assess all potential noise effects (ie. noise generated from the land-based GRP or cumulative noise from supporting plant when this will be operating in the north of the site, the plant that has been identified as likely to operate on the site, and site management and mitigation activities outside of "operational hours*").

47. There is no proposal to operate the gold recovery plant (GRP) on land. It is not clear what is meant by supporting plant to the GRP, as it is a complete unit on its own, albeit comprising of a number of mining components. As set out in paragraph 34 all mining plant has been included in the assessment.

48. In paragraph 9.1 the submission states "*the proposal will result in an unacceptable level of adverse effects arising from vibration. We have concerns with the level of vibration associated during both bund construction and then subsequently the closest land-based mining and mining-related activities, particularly since our dwelling is also our place of business for FG Works Ltd*".

49. The effects of vibration from the proposed mining were addressed in a response dated 11 November 2022 to a request from Council for further information. In the acoustic review dated 26 May 2023 for Council by Mr Exeter of Styles Group it was stated the vibration assessment was representative and he supported my conclusions. The report went on to say he did not expect vibration generated on the site to interfere with residential activities or cause unreasonable disruption or annoyance. I agree with his findings.

50. Jane and Noel Barrett at 67 Clutha Road have submitted that the noise is not less than minor, particularly during working hours and if there will there be noise monitoring.

51. As shown in Table 1 above, the upper level of noise that will be experienced at their notional boundary is 47dBA L_{10} and for the majority of the mining period less than 45dBA L_{10}. At these levels the noise will be around the existing background sound and below the typical existing L_{10} level. As set out above, a level of 45dBA L_{10} is often adopted to allow undisturbed sleep at night time. At these levels during the daytime and when considering the District Plan allows 55dBA L_{10} during the daytime, it is reasonable to conclude the noise effects from mining will be less than minor.

52. It is recommended that with any consent granted an Operational Noise Management Plan (ONMP) should be prepared (as set out in the recommended conditions in the s42A report). The ONMP shall include the requirements and procedures for noise monitoring to ensure consistent compliance with the noise limits in the consent. This is proposed in the Council conditions.

53. Wendy Gunn at 1581 Teviot Road has stated the existing environment is quiet and tranquil so she was opposed to any actions that would alter this. She stated that if the application was approved continuous noise monitoring should be undertaken and the residents should be provided with a monitoring device.

54. The existing noise environment at this site will be similar to the existing noise environment as shown on Figure 3.

55. Permanent noise monitoring for a noise source that is both similar to the existing noise environment and travels as the mining progresses is unlikely to provide meaningful results. However, as set out above, it is proposed to prepare an OMNP to ensure consistent compliance with the noise limits in the consent so this should satisfy this submission.

Section 42A Report

56. The Section 42A report relies on a noise and vibration report undertaken by Mr Exeter. This report raises various aspects of the project that I will respond to.

57. This report recommends quarry-based trucks, plant and machinery should be fitted with broadband reversing alarms and that tonal alarms are prohibited. This is proposed and is accepted.

58. The report further recommends the use of water carts for dust management should be restricted to daytime hours only and if this is not practical the noise from any night time activity should be assessed.

59. The water cart will only be used at night time where required for dust control. The water cart to be used is a Moxy truck with an upgraded muffler system added with a sound power of 97dB L_{WA}. The noise from this water cart operating will be up to 34dBA L_{10} at the most exposed dwelling, well within the 40dBA L_{10} night time requirement of the District Plan. It is not expected the water cart would be required for more than 10% of the time at night.

60. Noise at 1535A Teviot Road has been commented on. As set out above, written consent for the proposed mining has been provided so the effects at this site cannot be considered. Regardless, the noise will be within a reasonable level from anyone on this site.

61. In his report dated 26 May 2023 Mr Exeter has discussed the use of dewatering pumps at night time. He stated "*We recommend that pump noise is mitigated to be generally inaudible or at a very low level outside the neighbouring dwellings at night to avoid causing annoyance. This can be achieved by imposing a design noise limit of 25dBA L_{10} at any notional boundary for pump noise to avoid it being considerably higher than other sound in the area at night*." This gives an internal noise level of 10dBA L_{10} when assuming open windows for ventilation. I cannot support such a proposal. Any level below the 40dBA L_{10} is difficult to support when taking into account the existing noise environment, objectives, policies and night time noise limit of the District Plan.

62. There is no information in the District Plan that suggests a level of below 40dBA L_{10} at night time is envisaged for any situation or any zone. The objective of Rule 12.3.2 is "*To avoid, remedy or mitigate the adverse effects*

of noise on the District's amenity values and the health and wellbeing of the District's people".

63. The explanation of Rule 12.4.2 policy states "*All activities generate some degree of noise. High levels of noise can be detrimental to the health and wellbeing of the community and can adversely affect quality of life. The standards set throughout the District recognise this by ensuring relatively quiet areas are protected and that activities that generate high levels of noise locate away from noise sensitive areas and activities*".

64. The District Plan sets a level of 40dBA L_{10} at night time to satisfy the above.

65. The night time noise control is to allow undisturbed sleep. The World Health Organization adopts a level of 30dBA inside to satisfy this requirement and that level is generally accepted as appropriate in New Zealand and by the Environment Court.

66. Based on field tests there is a minimum of 15dB reduction (NZTA adopts 17dBA) between the outside level and inside level when assuming the windows are open to allow for adequate ventilation. That is, to achieve a level of 30dBA inside the bedroom the outside level should not exceed 45dBA; the District Plan adopts 40dBA (25dBA inside the bedroom) so providing a good factor of safety for the resident. As a guide, a reduction of 5dBA is a clearly noticeable reduction.

67. One of the perceived concerns with this project is that there will be 10 years of noise exposure. This is a transient activity with the mine travelling at typically 140m per month based on a 100m wide working face. The rate of noise reduction as the mine passes a given notional boundary will vary depending on how close the mining comes to any specific site.

68. Based on the above, the maximum period when the noise levels are likely to be above the existing L_{10} level at any given point as the mining passes is 2 – 3 months. Within 4 – 6 months the noise level will be below 45dBA L_{10} during the daytime. As set out above, this is a level that will allow undisturbed sleep at night time, it is below the existing ambient sound level

and 10dBA below the expectations of the District Plan for a permitted activity.

69. From the above, any potential noise effects from this project will be of limited duration and certainly not long term exposure. In addition, when considering the District Plan adopts a daytime level of 55dBA L_{10} for a permitted activity that may continue long term to satisfy their objectives and policies, the effect of any mining noise is considered less than minor in terms of the requirements of the Resource Management Act.

Proposed Conditions

70. Proposed conditions 24 and 25 are accepted. However, for certainty, it should be acknowledged dewatering pump will also be operating Sundays and Public holidays. As set out above, the pump will be below the night time limit of 40dBA L_{10} so unlikely to be heard during the daytime.

71. Condition 26 requiring earth bunds (presumably bunds for noise control) to be constructed before mining takes place. This means the construction of bunds that will not be required until mining reaches the area, which for some areas will be 7 – 8 years after mining commences. To construct the bunds will require stripping of adjacent areas for the material which would then be left stripped until the mining reaches that location.

72. To avoid the problem of extending the mining period and still satisfy the noise conditions it is recommended this condition should be modified as set out in Ms Collie's planning evidence.

73. Condition 27 is accepted with the exception of the note which should be reviewed. To provide for an activity that is not permitted appears flawed in terms of basic planning principles and providing certainty for a condition. This will be addressed in more detail in the planner's evidence. Further, the report prepared by Mr Exeter states that establishing a residential dwelling on a rural site is a restricted discretionary activity and cannot be undertaken as of right. Any review of the conditions should be made in conjunction with any application and not pre-empted. This note should be deleted.

74. Condition 28 is considered inappropriate and should be deleted. As set out above, a level of 25dBA L_{10} at the notional boundary cannot be supported on any grounds. The requirement of proposed condition 27 will provide a good level of noise protection for residents and should be adopted.

75. Conditions 29, 30 and 31 are accepted.

Conclusions

76. Based on field measurements of the type of plant that will be used on site the noise from the various mining activities has been predicted for the dredge operating at the closer points to existing dwellings to reflect the upper level of noise likely to be experienced by the neighbours. For the majority of the proposed mining period the equipment will be further from the individual dwelling and hence there will be less noise at the receiver positions. However, to ensure there will be compliance with the predicted noise levels the noisiest scenarios have been modelled.

77. When mining near the closer houses it will be necessary to include a minimum of a 4m high bund at the northern end of the site and a 3m bund opposite 5386 Ettrick-Raes Junction Road to provide screening of the closer houses. This will enable the daytime limit of 55dBA L_{10} to be achieved with a good factor of safety.

78. The only night time noise will be from the dewatering and water cart operating when required will be well within the 40dBA L_{10} night time limit at all times.

79. With the noise control proposed plus achieving the noise limits with a good factor of safety, this will satisfy section 16 of the RMA to adopt the best practicable option to minimise noise.

80. Considering the above and the requirements of the RMA, the proposed mining can be managed so the noise effects will be less than minor.

Nevil Hegley

Dated 29 April 2024