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☐ Urgent ☐ Please Reply ■ For your files ☐ No action required

Subject: Response to RFI – Deep Creek Quarry (SSD-11591659), Limeburners Creek NSW

This letter report provides responses to issues raised in a Request for Further Information (RFI) from the Department of Planning and Environment (DPE) dated 21 March 2023 following their review of our noise and vibration assessment for the proposal. The additional information request is reproduced below.

- Further evidence to demonstrate that a reasonable worst case scenario has been included in the noise modelling predictions. The department notes that the modelling scenarios described in the NIA do not include equipment operating at elevations above the pit floor (excepting the drill rig), or at locations in the south-western side of the extraction area. The department is also unable to confirm if the dozer (listed in Table 7 of the NIA) has been used in the noise model. The department also notes that only three of the four operational project stages have been included in noise model predictions. If necessary, revised noise model predictions should be provided to account for a reasonable worst case scenario, with consideration of these comments.
- A description of the 'noise shield' shown on Figure 6 of the NIA and an explanation as to how this has been considered in the noise model predictions.
- Further descriptions of the proposed noise mitigation measures, including a description of 'relevant best practice noise management practices' mentioned in Section 6 of the NIA and any noise bunding/noise shields used to inform the noise modelling predictions.

Point 1

DPE has correctly noted that operational scenarios provided for noise modelling within the EIS only included drills operating at natural ground level above the advancing quarry face, these typically represent the likely worst case noise levels given the high sound power level (SPL). A review of the modelled noise sources, equipment and scenarios were undertaken. There are intermediate stages in the quarry progression but the modelled scenarios were selected worst case with regards to operations at the western and southern extents of the extraction footprint. West of the quarry the natural ridge line rises a further 20-40m in elevation, providing effective noise attenuation for dwellings west of the quarry (such as R23 and R24).

The following scenario is considered a worst case example, as practically it would be unlikely all equipment would be operating simultaneously and at the SPL, this scenario is consistent through each of the different stages of the quarry. It includes:

- Excavator and dumper are completing preparations for drill rig.
- Drill rig has started blast holes.

- Excavator and dumper are working on extraction face (8-10m below surface).
- Loader is working on processing plant at floor level.
- Processing plant is operating.
- Dumper is moving product to stockpile area.
- Loader is loading road trucks at stockpile area.
- Up to 6 trucks are onsite at any one time, including:
    - 1 being loaded,
    - 1 on weighbridge,
    - 1 at intersection,
    - 2 on quarry access road,
    - 1 between weighbridge and stockpile area

The primary equipment proposed to be used onsite is shown by **Table 1**. These show the sound power levels of equipment used in the noise modelling, these should not be used to in isolation to assess individual plant sound power levels as the effect on receivers is relative to the location of the plant (e.g. a more attenuated drill rig will have a greater effect on receiver noise than small increases in processing plant located in a screened position on the floor). A recommendation has been included to ensure Plant and Equipment specifications are reviewed by a suitably qualified noise consultant prior to use onsite (excluding plant onsite for short term irregular use).

Table 1
Indicative equipment used onsite and indicative sound power levels

Equipment	Number 500 ktpa	Use/Activity	Lw, dB(A)	
			Leq	Lmax
Drill Rig	1	Drilling blast holes (typically used 2-3 days every month)	113	121
Hydraulic Excavator 33t	2	Resource extraction and haul truck loading.	108	113
Articulated 40t Haul Truck (Caterpillar 730C or similar)	3	Raw material haulage to processing area.	98	102
Front-end Loader (Caterpillar 972 or similar)	2	Haul truck and product truck loading, blending road pavement materials.	110	112
Processing equipment including: • Mobile Jaw Crusher • Mobile Cone Crusher • Mobile VSI Crusher • Mobile Screen • Mobile Screen	1	Processing of material, located on the quarry floor.	116	122
Product truck	6*	Transport of product materials	91	115#
Water Cart	1	Used periodically for dust suppression, unlikely to be used concurrently with all other haulage trucks.	91	115
Tracked bulldozer (CAT D9 or similar)	1	Used on campaign basis, unlikely to be operating concurrently with above plant.	108	113

* Typical number on-site at any given time.
# Impact from truck being loaded.

However, to clarify, three revised worst case scenarios for noise modelling have been identified and are shown in the figures below, with an excavator, drill and truck on the top bench. These figures are updates of Figures 3-6 in our original acoustic report with the relocated excavator and dumper added for revised noise modelling only increasing the combined surface level sound power level by 1-3 dB.

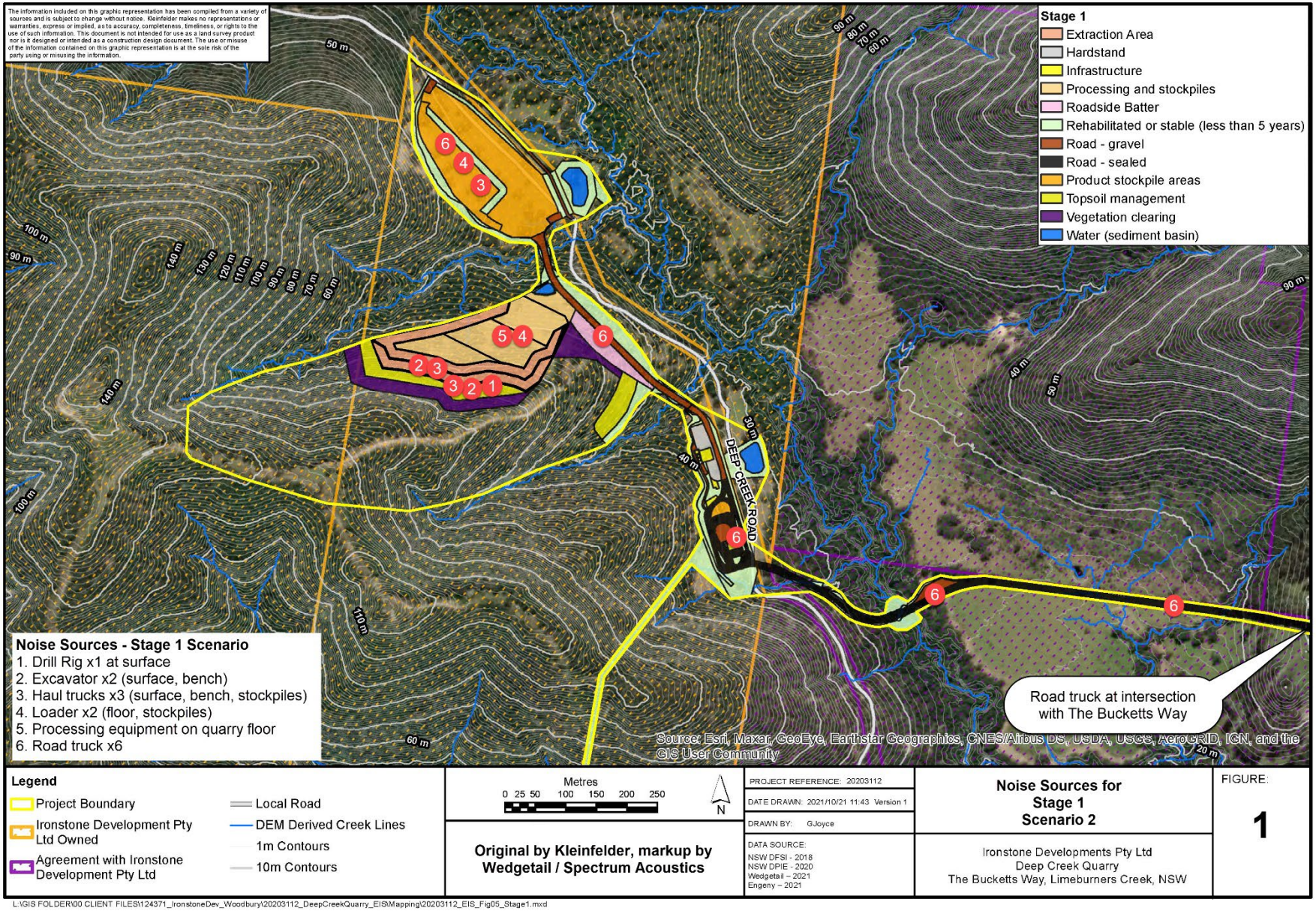

Fig 1. Noise Sources for Stage 1, Scenario 2.

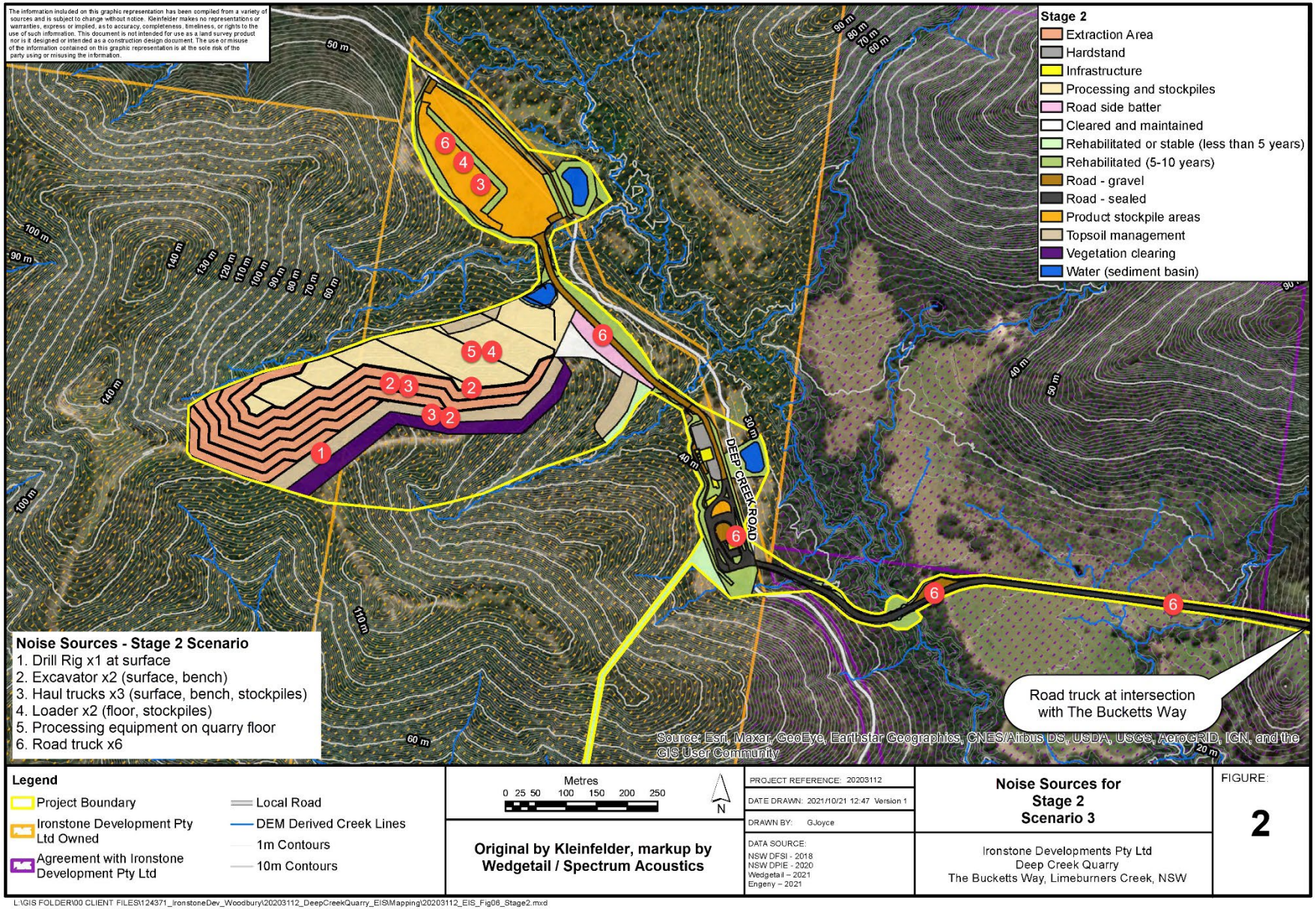

Fig 2. Noise Sources for Stage 2, Scenario 3.

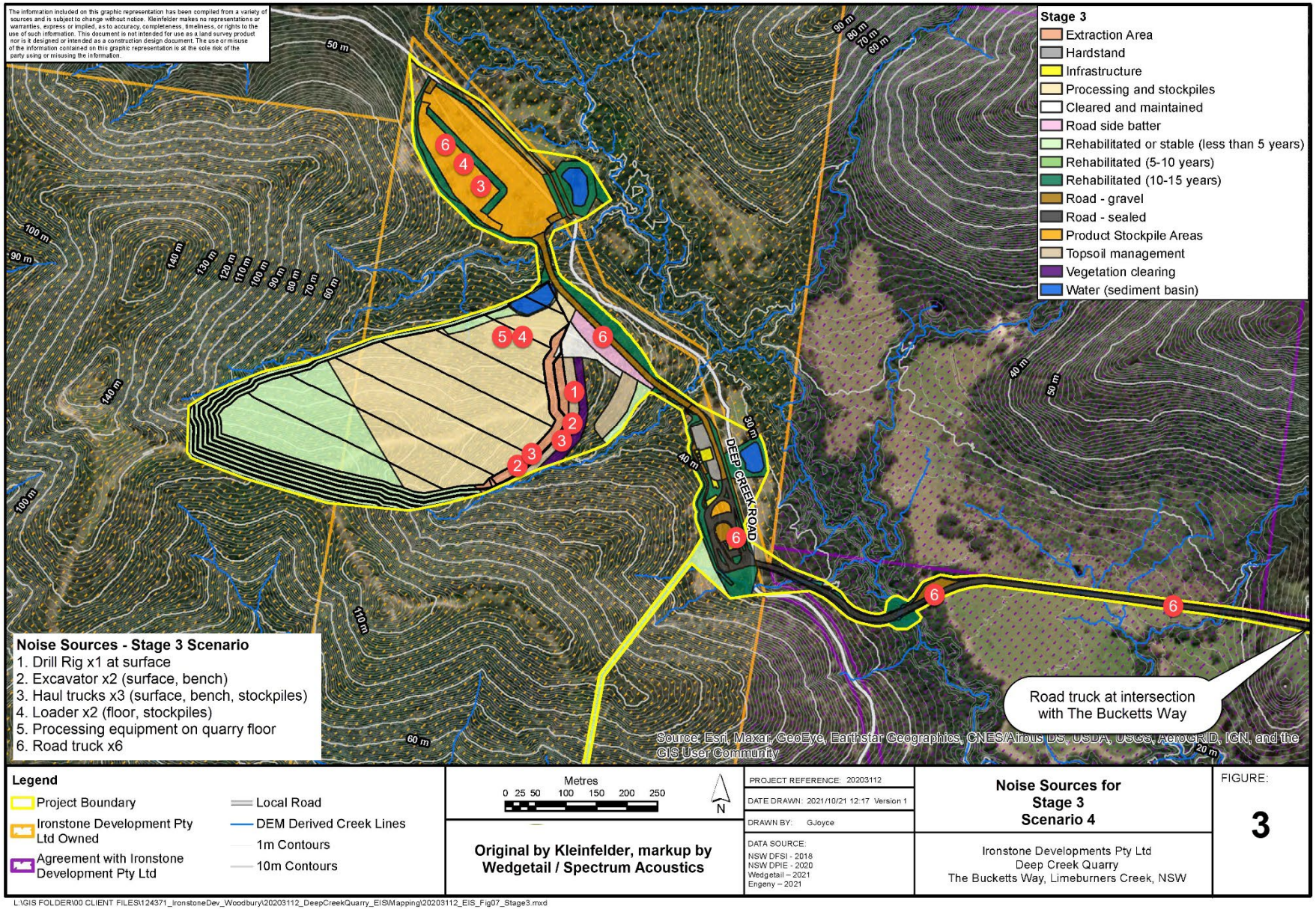

Fig 3. Noise Sources for Stage 3, Scenario 4.

Noise emissions from the revised scenarios were modelled using the Environmental Noise Model (ENM, v3.06) algorithms in point-calculation mode. This does not produce noise contours but does calculate levels at the specific receiver points. Noise contours are generally inaccurate by 2 dB or more and are often included as a visual aid, but tabulated results from the point calculation mode are used for comparison with project noise criteria.

Figure 5 shows the assessed receivers with original numbering and an outline of the noise model domain. Calculated noise levels for the three remodelled scenarios are shown in **Tables 2-4**.

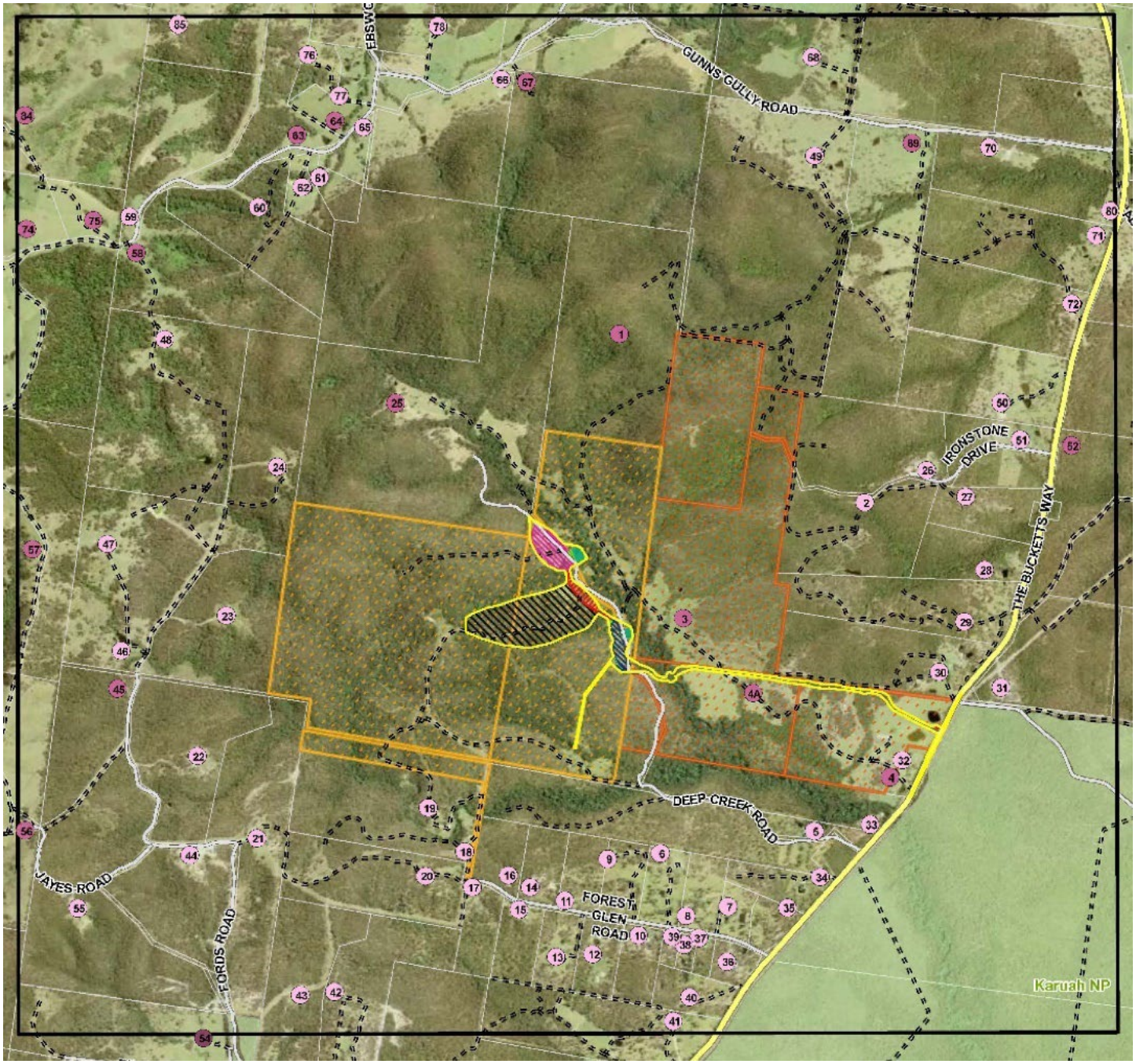

Fig 4. Assessed receptors and the noise domain.

Table 2
Predicted noise levels, dB(A),Leq(15min) – Operations Stage 1

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R1*	40	34	30	32	32
R2	40	<20	26	<20	<20
R3*#	40	40	42	41	40
R4a*#	40	39	42	40	39
R4	40	33	36	38	32
R5	40	27	35	33	30
R6	40	25	27	31	27
R7	40	<20	30	30	<20
R8	40	<20	24	27	<20
R9	40	23	27	29	24
R10	40	<20	<20	28	<20
R11	40	<20	<20	28	<20
R12	40	<20	<20	26	<20
R13	40	<20	<20	24	<20
R14	40	<20	<20	28	<20
R15	40	<20	<20	26	<20
R16	40	<20	<20	28	<20
R17	40	<20	<20	26	<20
R18	40	<20	<20	26	<20
R19	40	<20	<20	25	<20
R20	40	<20	<20	26	<20
R21	40	<20	<20	<20	<20
R22	40	<20	<20	<20	<20
R23	40	<20	<20	<20	21
R24	40	<20	<20	<20	23
R25*	40	32	28	31	42
R26	40	<20	<20	<20	<20
R27	40	<20	<20	<20	<20
R28	40	<20	24	23	<20
R29	40	26	28	23	24
R30	40	34	34	31	34
R31	40	27	32	22	22
R32	40	36	38	38	35
R33	40	28	35	34	25
R34	40	24	32	31	<20
R35	40	23	31	31	<20
R36	40	<20	27	29	<20
R37	40	<20	26	29	<20
R38	40	<20	25	28	<20
R39	40	<20	23	29	<20
R40	40	<20	23	27	<20
R41	40	<20	<20	24	<20
R42	40	<20	<20	24	<20
R43	40	<20	<20	<20	<20
R44	40	<20	<20	<20	<20
R45	40	<20	<20	<20	<20
R46	40	<20	<20	<20	20
R47	40	<20	<20	<20	25

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R48	40	<20	<20	<20	26
R49	40	<20	<20	<20	<20
R50	40	<20	<20	<20	<20
R51	40	<20	25	<20	<20
R52	40	<20	28	<20	<20
R56	40	<20	<20	<20	<20
R57	40	<20	<20	<20	<20
R58	40	<20	<20	<20	25
R60	40	<20	<20	<20	30
R61	40	<20	<20	<20	<20
R62	40	<20	<20	<20	<20
R63	40	<20	<20	<20	<20
R64	40	<20	<20	<20	<20
R65	40	<20	<20	<20	<20
R66	40	<20	<20	<20	<20
R67	40	<20	<20	<20	<20
R68	40	<20	<20	<20	<20
R69	40	<20	<20	<20	<20
R70	40	<20	<20	<20	<20
R71	40	<20	<20	<20	<20
R72	40	<20	<20	<20	<20
R74	40	<20	<20	<20	<20
R75	40	<20	<20	<20	<20
R76	40	<20	<20	<20	<20
R77	40	<20	<20	<20	<20
R78	40	<20	<20	<20	<20
R80	40	<20	<20	<20	<20
R84	40	<20	<20	<20	<20
R85	40	<20	<20	<20	<20
* No approved dwelling, nominal location selected based on structures present. # Associated property, proponent has a negotiated agreement with this receptor.					

Table 3
Predicted noise levels, dB(A),Leq(15min) – Operations Stage 2

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R1*	40	33	32	33	35
R2	40	23	33	<20	<20
R3*#	40	**44**	**49**	43	**42**
R4a*#	40	**41**	**46**	42	40
R4	40	35	40	39	34
R5	40	29	36	33	25
R6	40	25	31	30	25
R7	40	23	32	30	20
R8	40	22	29	29	21
R9	40	25	28	31	24
R10	40	22	26	27	<20
R11	40	22	27	30	21
R12	40	20	24	26	<20
R13	40	<20	21	25	<20
R14	40	30	30	31	22

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R15	40	21	23	27	20
R16	40	30	27	32	22
R17	40	30	25	26	21
R18	40	22	26	35	22
R19	40	25	25	30	25
R20	40	21	24	30	21
R21	40	22	21	31	26
R22	40	22	<20	30	33
R23	40	20	<20	24	30
R24	40	20	<20	<20	30
R25*	40	31	29	30	**42**
R26	40	<20	23	<20	<20
R27	40	<20	27	<20	<20
R28	40	<20	31	<20	<20
R29	40	28	33	20	23
R30	40	32	36	28	32
R31	40	24	35	22	20
R32	40	34	39	38	33
R33	40	27	37	32	25
R34	40	23	33	30	21
R35	40	22	32	30	<20
R36	40	<20	31	27	<20
R37	40	21	30	28	<20
R38	40	20	29	27	<20
R39	40	21	28	28	<20
R40	40	<20	27	26	<20
R41	40	<20	25	25	<20
R42	40	25	20	23	21
R43	40	<20	<20	20	<20
R44	40	21	<20	28	25
R45	40	<20	<20	<20	28
R46	40	<20	<20	<20	28
R47	40	<20	<20	<20	29
R48	40	<20	<20	<20	29
R49	40	<20	<20	<20	<20
R50	40	<20	27	<20	<20
R51	40	<20	32	<20	<20
R52	40	<20	31	<20	<20
R56	40	<20	<20	<20	<20
R57	40	<20	<20	<20	<20
R58	40	<20	<20	<20	26
R60	40	<20	<20	<20	31
R61	40	<20	<20	<20	<20
R62	40	<20	<20	<20	<20
R63	40	<20	<20	<20	<20
R64	40	<20	<20	<20	<20
R65	40	<20	<20	<20	<20
R66	40	<20	<20	<20	<20
R67	40	<20	<20	<20	<20
R68	40	<20	<20	<20	<20
R69	40	<20	<20	<20	<20

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R70	40	<20	<20	<20	<20
R71	40	<20	24	<20	<20
R72	40	<20	28	<20	<20
R74	40	<20	<20	<20	<20
R75	40	<20	<20	<20	<20
R76	40	<20	<20	<20	<20
R77	40	<20	<20	<20	<20
R78	40	<20	<20	<20	<20
R80	40	<20	20	<20	<20
R84	40	<20	<20	<20	<20
R85	40	<20	<20	<20	<20
* No approved dwelling, nominal location selected based on structures present. # Associated property, proponent has a negotiated agreement with this receptor.					

Table 4
Predicted noise levels, dB(A),Leq(15min) – Operations Stage 3

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R1*	40	30	32	29	31
R2	40	22	29	<20	<20
R3*#	40	40	**49**	35	35
R4a*#	40	40	**46**	**41**	39
R4	40	35	40	37	32
R5	40	30	39	34	27
R6	40	27	32	32	26
R7	40	26	32	32	23
R8	40	23	27	29	24
R9	40	27	27	32	26
R10	40	<20	25	29	<20
R11	40	<20	24	29	<20
R12	40	<20	23	27	<20
R13	40	<20	<20	26	<20
R14	40	<20	23	28	20
R15	40	<20	<20	27	<20
R16	40	<20	20	28	22
R17	40	<20	<20	28	<20
R18	40	<20	<20	29	20
R19	40	<20	<20	26	25
R20	40	<20	<20	27	<20
R21	40	<20	<20	25	<20
R22	40	<20	<20	<20	<20
R23	40	<20	<20	23	27
R24	40	<20	<20	<20	28
R25*	40	33	31	32	**42**
R26	40	<20	23	<20	<20
R27	40	<20	24	<20	<20
R28	40	<20	26	<20	<20
R29	40	27	32	23	25
R30	40	35	36	31	34
R31	40	27	33	25	22

Receiver	Noise Trigger level	Meteorological conditions			
		Neutral	WNW	NNE	ESE
R32	40	35	40	37	34
R33	40	29	39	35	27
R34	40	26	37	33	23
R35	40	25	35	34	23
R36	40	20	31	31	<20
R37	40	20	27	29	<20
R38	40	<20	27	29	<20
R39	40	20	26	29	<20
R40	40	<20	28	30	<20
R41	40	<20	26	28	<20
R42	40	<20	<20	27	<20
R43	40	<20	<20	25	<20
R44	40	<20	<20	23	23
R45	40	<20	<20	<20	<20
R46	40	<20	<20	<20	<20
R47	40	<20	<20	<20	26
R48	40	<20	<20	<20	25
R49	40	<20	<20	<20	<20
R50	40	<20	25	<20	<20
R51	40	<20	27	<20	<20
R52	40	<20	29	<20	<20
R56	40	<20	<20	<20	<20
R57	40	<20	<20	<20	<20
R58	40	<20	<20	<20	27
R60	40	<20	<20	<20	30
R61	40	<20	<20	<20	<20
R62	40	<20	<20	<20	<20
R63	40	<20	<20	<20	<20
R64	40	<20	<20	<20	<20
R65	40	<20	<20	<20	<20
R66	40	<20	<20	<20	<20
R67	40	<20	<20	<20	<20
R68	40	<20	<20	<20	<20
R69	40	<20	<20	<20	<20
R70	40	<20	<20	<20	<20
R71	40	<20	23	<20	<20
R72	40	<20	24	<20	<20
R74	40	<20	<20	<20	<20
R75	40	<20	<20	<20	<20
R76	40	<20	<20	<20	<20
R77	40	<20	<20	<20	<20
R78	40	<20	<20	<20	<20
R80	40	<20	23	<20	<20
R84	40	<20	<20	<20	<20
R85	40	<20	<20	<20	<20

* No approved dwelling, nominal location selected based on structures present.
# Associated property, proponent has a negotiated agreement with this receptor.

The results in Tables 1 to 3 predict noise levels unchanged or within 3 dB of the originally predicted levels, with the greatest increases at project-related receivers close to the site, and remaining at or below the project noise trigger level at all assessed receivers with the following exceptions:

- Receiver R25: 2dB exceedance under ESE winds during Stages 1 and 2, and at, but not exceeding noise criteria during ESE winds in Stage 3.
- Receiver R3 (associated property): 5-10 dB exceedance under WNW winds from Stage 2 onwards.
- Receiver R4a (associated property): 6 dB exceedance under WNW winds from Stage 3 onwards.
- Receiver 3, 4, and 4a have agreements in place with Ironstone Developments Pty Ltd accounting for potential noise impacts due to quarrying activity.

Point 2

The second point of the RFI has queried the "noise shield" indicated in Figure 6 of our original report. The Proponent has advised that this is not a constructed barrier or bund. Rather, it is ground left undisturbed to act as a natural noise barrier to emissions from latter stages of extraction. Noise source figures have since been updated (as included in this letter) and show no "noise shield".

Point 3

The operating plan involves no constructed noise mitigation structures. Best management practices are built into the quarry design, which went through several iterations to arrive at the submitted layout, as follows:

- Quarry progression has been planned to provide a natural noise screen at the advancing quarry face for the life of the project;
- Processing plant has been positioned to maximise noise screening;
- Quarry access road has been relocated from its originally proposed location to maximise its distance from residences.
- The eastern extent of the quarry has been retained to maintain a nominal 4-5m high barrier above the quarry floor.

Best practice noise mitigation measures relevant to the quarry that will be integrated with the Noise Management Plan and should be followed in the construction and operation of the quarry include:

- Noise monitoring on commencement of construction and on a quarterly basis for at least the first year of operation to determine compliance with the noise criteria and to inform any further noise mitigation works, should the need arise. Potential monitoring locations would include R6 and/or R19 and R25.
- Operation noise and blast monitoring informed from noise monitoring conducted during construction.
- Plant and equipment specifications (relating to noise levels) should be reviewed and authorised by a suitably qualified noise consultant prior to use onsite (excluding plant onsite for short term irregular use).
- The location of plant and equipment relative to bunding is generally consistent with this noise modelling assessment, with the key parameter being the crusher must be located on the quarry floor as shown in the model scenarios.
- Ensure plant is regularly maintained, and repair or replace equipment that becomes noisy.
- Haulage and access roads are kept in good condition to minimise associated noise from pot holes or corrugations.
- Plant and equipment is switched off when not in use.
- Where possible avoid dropping material from height, and metal on metal contact.
- Arrange the work site to minimise the use of movement alarms on vehicles and mobile plant.

- Ensure plant is installed with broadband reverse alarms.
- Response protocols in the event of a monitored exceedance or noise complaint and implementation of reasonable feasible mitigation measures where criteria is exceeded.

In the event higher than expected noise emissions are identified through the noise monitoring program or complaints, there measures that the quarry can take to reduce noise in these situations, including:

- Change or suspension of certain activities during some weather conditions.
- Constructing additional noise attenuation, bunding or noise barriers for some plant.

Where these measures are not sufficient Ironstone Developments would be subject to the requirements of the Voluntary Land Acquisition and Mitigation Policy, that includes:

- Negotiated agreements with the affected resident.
- Voluntary mitigation, including installation and maintenance of mitigation measures at the affected property; or
- Voluntary acquisition options for the affected property owner.

Conclusion

The revised modelling of the amended scenarios found noise levels increased marginally at nearby receptors but were generally consistent with the original modelling, the impacts include:

- For R25, a 2dB exceedance of the criteria was found under ESE weather conditions (that is when wind is blowing from the source to receiver). There is no approved dwelling or permanent residence at R25.
- R3 and R4a have modelled exceedances of more than 5dB under WNW conditions (that is when wind is blowing from the source to receiver). Both R3 and R4a are have an agreement with Ironstone Developments and do not contain any approved dwellings or permanent residents.

Best practice noise mitigation measures relevant to this quarry have been identified and demonstrate that the quarry as proposed can proceed without significant noise impacts providing these measures are implemented and measures exist to enable the appropriate management of noise impacts should they occur.

Regards,

Neil Pennington
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Principal/Director