

Report

Maes y Droell Quarry

Noise & Vibration Report

For Stephenson Halliday

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Prepared By:	Tom Everson (Principal Consultant)
Reviewed By:	Jon Sims (Technical Director)

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3rd Floor St Augustine's Court, 1 St. Augustine's Place, Bristol, BS1 4UD Tel: +44(0)117 974 1086

First Floor, 3 – 7 Herbal Hill, London, EC1R 5EJ Tel: +44(0)20 3873 4780

First Floor, Patten House, Moulders Lane, Warrington, WA1 2BA Tel: +44(0)1925 937 195

Nile House, Nile St, Brighton and Hove, Brighton, BN1 1HW Tel: +44(0)20 3873 4780

1 Aire St, Leeds, LS1 4PR Tel: +44(0)20 3873 4780

Avenue du Port, 86c Box 204, 1000 Bruxelles Tel: +44(0)20 3873 4780

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1 Noise and Vibration

1.1 Introduction

- 1.1.1 This chapter presents an assessment of the likely noise effects of the Proposed Development, as described in **Chapter 4: Description of the Proposed Development**.
- 1.1.2 Noise and vibration can have an effect on the environment and the quality of life enjoyed by individuals and communities. Noise and vibration are often therefore important considerations in the determination of planning applications. This chapter therefore considers the effects of noise during the construction and operation the Proposed Development.

1.2 Legislation, Planning Policy and Guidance

- 1.2.1 The assessment of noise and vibration effects of the Proposed Development has been carried out with reference to relevant national, regional and local planning policy, and guidance, as detailed in **Appendix 6.2**.

1.3 Approach and Methodology

Consultation

- 1.3.1 The Proposed Development is located within the administrative area of Denbighshire County Council (DCC).
- 1.3.2 **Table 1-1** summarises key comments and assessment responses to EIA Scoping consultees and Local Authority engagements, respectively.

Table 1-1: Consultation Response Summary

Consultation	Comment Summary	Response
Maes-Y-Droell Quarry: Noise and Vibration Scoping Input (February 2025)	Effects scoped in: - noise associated with the construction of the Proposed Development; - noise associated with the operation of on-site plant and equipment used for the key extraction phases; - noise associated with operational road traffic on the local road network; and - noise associated with any on-site plant and equipment used during the restoration phase.	Scoping response received from DCC dated 27/05/2025 agreeing with all aspects scoped in/out the noise assessment.
Email to DCC regarding the proposed noise survey and assessment methodology. Subject: Maes-y-Droell Quarry - Noise Assessment Methodology. (31 st January 2025)	Consultation with DCC to seek agreement on the proposed noise survey and assessment methodology.	Response received 17 th February 2025 asking that a monitoring location was added on the western site boundary. This was included in the final noise survey locations.

Scoping

Matters Scoped In

1.3.3 With regard to operational noise, potential effects assessed include:

- Noise associated with the on-site construction of the Proposed Development;
- Noise associated with on-site plant and equipment during the operation of the Proposed Development
- Noise associated with on-site plant and equipment during the restoration of the Proposed Development; and
- Noise associated with operational road traffic from the Proposed Development.

Matters Scoped Out

1.3.4 Matters Scoped Out:

- Vibration associated with the operation of the Proposed Development;
- Vibration associated with operational traffic;
- Vibration associated with the restoration of the Proposed Development; and
- Noise and vibration associated with construction traffic.

Study Area

Operational Noise

1.3.5 To assess the effects of noise associated with the operation of the Proposed Development, the spatial extents of the study area are defined by a 300 m buffer from the site boundary. The operational phase will involve mineral extraction on an open site using plant and equipment of a similar nature to construction equipment. Therefore, the 300 m buffer has been determined based guidance in BS5228-1 and the operational noise assessment study area is presented in **Figure 1-1**.

Construction Noise

1.3.6 To assess the effects of noise associated with the construction of the Proposed Development, the spatial extents of the study area are defined by a 300 m buffer from the construction site boundary, as advocated in BS5228-1. The construction noise assessment study area is presented in **Figure 1-1**.

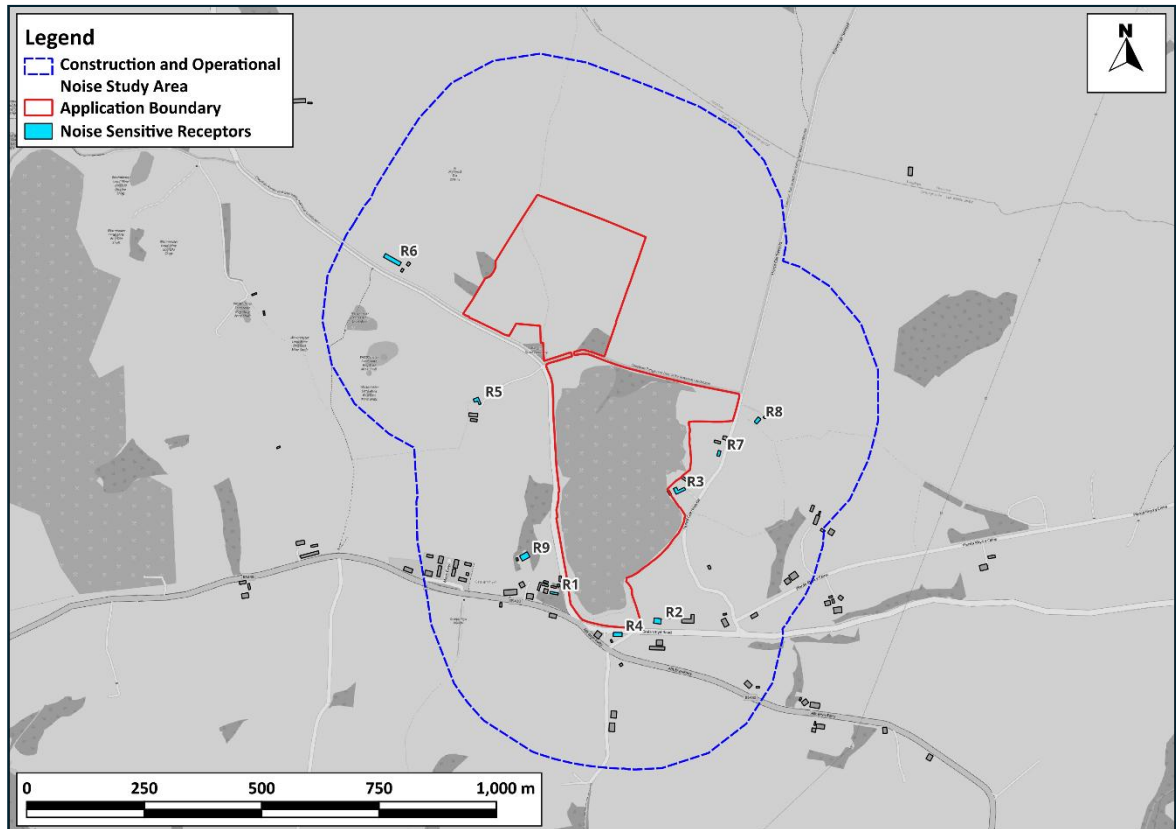


Figure 1-1: Construction and Operational Noise Study Area

Operational Traffic Noise

- 1.3.7 To assess the effects of off-site construction traffic, the spatial extents of the study area are defined by a 50 m width from the kerb line of public roads with the potential for an increase in basic noise level (BNL) of 1 dB or more as a result of the addition of construction traffic to existing traffic levels, as advocated in LA111. The road links considered in the assessment are summarised in **Table 1-2** and the operational road traffic noise study area is presented in **Figure 1-2**.

Table 1-2: Road Traffic Links

Link ID	Road
1	Unnamed Road (Northern Site)
2	Unnamed Road (Southern Site)
3	Graianrhyd Road (Western Site)
4	Graianrhyd Road (Eastern Site)

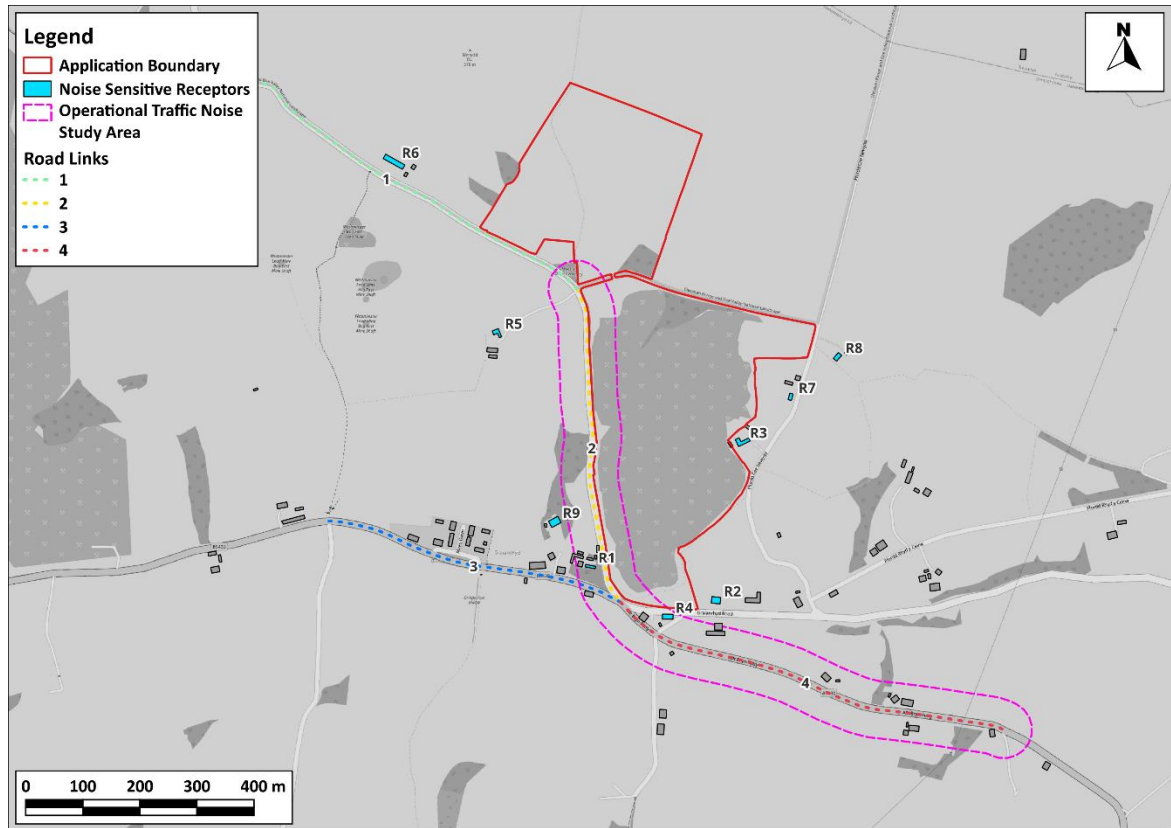


Figure 1-2: Operational Road Traffic Noise Study Area

Receptor Groups

1.3.8 As can be seen in **Figure 1-1**, there are a number of noise-sensitive receptors (NSRs) identified with the construction and operational noise assessment study areas. NSRs closest to the Proposed Development have been identified using aerial photography, GIS datasets and site visits, as summarised in **Table 1-3**.

Table 1-3: Receptors

Receptor ID	Receptor	Study Area
R1	Ty Isa	Construction & Operational Noise
R2	Y Fron	Construction & Operational Noise
R3	Property 3 – Ffordd Cae Newydd	Construction & Operational Noise
R4	Property 4 – Graianrhyd Road	Construction & Operational Noise
R5	Maes Y Droell Farm	Construction & Operational Noise
R6	Castell	Construction & Operational Noise
R7	Property 7 – Ffordd Cae Newydd	Construction & Operational Noise
R8	Property 8 – Ffordd Cae Newydd	Construction & Operational Noise
R9	Property 9 – B5430	Construction & Operational Noise

Assessment Methodology

Construction Noise

- 1.3.9 Construction noise has been assessed for the proposed removal of existing building on the Site. The assessment of noise from on-site construction activities has been carried out with reference to the criteria set out in BS 5228-1:2009+A1:2014. Construction activities that are likely to be needed for the construction of the Proposed Development have been considered, along with noise levels for typical items of construction plant and equipment that may be required. A more detailed assessment of construction noise impacts is proposed to be considered as part of the CEMP, at which time further details of construction plant and equipment that are likely to be required will be available.
- 1.3.10 The criteria adopted for the assessment is set out in **Table 1-4** below.

Table 1-4: Magnitude of Impact Categories – On-Site Construction Activities

Magnitude of Impact	Construction Noise
Negligible	< 65 dBA
Minor	65 – 70 dBA
Moderate	70 – 75 dBA
Major	≥ 75 dBA

- 1.3.11 Where a magnitude of impact is found to be Negligible or Minor due to construction noise, the effects are considered to be 'not significant' in the context of the EIA Regulations.
- 1.3.12 Where a magnitude of impact of Moderate or Major are shown to occur, the effects are considered to be 'significant adverse' in the context of the EIA Regulations.
- 1.3.13 The above magnitudes are considered to apply where the levels of construction noise quoted would be expected to be experienced for 10 days in any consecutive 15-day period, or more than 40 days in a consecutive six-month period. Where the duration of exposure is shorter than these periods, construction noise impacts are considered to be Minor, and therefore 'not significant' in the context of EIA Regulations.

Operational Road Traffic

- 1.3.14 Operational road traffic noise has been assessed by comparing the baseline traffic along the local road network to the increase as a result of additional traffic generated by the Proposed Development, predicted using Calculation of Road Traffic Noise (CRTN, 1988) methodology. The calculations provide a basic noise level (BNL) from road traffic 10 m from the roadside.
- 1.3.15 The CRTN calculation methodology has limitations when considering low traffic flows and states the following:
- "Calculations of noise level for traffic flows below 50 veh/h or 1000 veh/18-hour day are unreliable and measurements should be taken when evaluating such cases."*
- 1.3.16 Therefore, noise levels for road links which are shown to experience a traffic flow of less than 1000 movements over an 18-hour day (06:00-24:00) have been calculated in accordance with the Haul Roads method in BS5228-1:2009+A1:2014.
- 1.3.17 The BS5228 calculation method calculates an $L_{Aeq,12h}$ noise level across a typical construction period (07:00-19:00), which in this case, aligns with the operational hours of the Proposed Development. The

$L_{Aeq,12h}$ noise level is then time corrected to an equivalent $L_{Aeq,16h}$ by applying a 75% on time correction. The $L_{Aeq,16h}$ noise level is then converted to an equivalent $L_{A10,18h}$ using the methods advocated in TRL "Converting the UK Traffic Noise Index $L_{A10,18h}$ to EU Noise Indices for Noise Mapping" to derive a BNL for comparison against the criteria presented in LA111.

- 1.3.18 As the definition of impact relates to an increase in noise, the position suitably represents any receptor (i.e. the absolute noise, which would change with distance from the road and differing between receptors, is not relevant).
- 1.3.19 An adverse change is deemed to occur where operational road traffic gives rise to an increase in noise exposure. The significance of the increase in noise exposure is dependent on the magnitude of the change as advocated in LA111.
- 1.3.20 The short-term magnitude of impact criteria presented in LA111 was used to determine the Negligible, Minor, Moderate and Major categories, as summarised in **Table 1-5**.

Table 1-5: Magnitude of Impact Categories – Operational Road Traffic

Magnitude of Impact	Operational Traffic Noise
Negligible	< 1 dB
Minor	1 – 2.9 dB
Moderate	3 – 4.9 dB
Major	≥ 5 dB

- 1.3.21 Where a magnitude of impact is found to be Negligible or Minor due to operational road traffic, the effects are considered to be 'not significant' in the context of the EIA Regulations.
- 1.3.22 Where a magnitude of impact of Moderate or Major are shown to occur, the effects are considered to be 'significant adverse' in the context of the EIA Regulations.

Operational Noise

- 1.3.23 The assessment of noise from the operation of the Proposed Development will be carried out with reference to the criteria set out in Minerals Technical Advice Note (Wales) 1: Aggregates (MTAN1, 2024) and Minerals Planning Guidance: The Control of Noise at Surface Mineral Workings (MGP11, 1993). The criteria that will be adopted for the assessment is set out in **Table 1-6** below.

Table 1-6: Magnitude of Impact Categories – Operational Noise

Magnitude of Impact	Operational Noise Level ($L_{Aeq,1h}$)
Negligible	< Background Noise Level, $L_{A90,T}$ and < 55 dBA
Minor	0 – 10 dB Above Background Noise Level, $L_{A90,T}$ and < 55 dBA
Moderate	> 10 dB Above Background Noise Level, $L_{A90,T}$ and < 55 dBA
Major	> 10 dB Above Background Noise Level, $L_{A90,T}$ and > 55 dBA

- 1.3.24 Where a magnitude of impact is found to be Negligible or Minor due to operational noise, the effects are considered to be 'not significant' in the context of the EIA Regulations.
- 1.3.25 Where the magnitude of impact is found to be Moderate, the significance of effect can require some additional quantitative and qualitative considerations. Consideration must be given to the context within which the effect occurs in addition to employing professional judgement. These considerations can include:
- The magnitude of the effect;
 - The change in magnitude of the effect;
 - The type of effect, including intermittency;
 - The existing ambient environment;
 - How effective the measures employed to mitigate the effect are, including best practicable means (BPM); and
 - The duration of the effect.
- 1.3.26 Where a magnitude of impact of Major is shown to occur, the effects are considered to be 'significant adverse' in the context of the EIA Regulations.

1.4 Baseline Conditions

Current Baseline

- 1.4.1 A baseline noise survey has been carried out to quantify current levels of ambient noise across the Site and at the closest NSRs. The survey has captured noise levels during the daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods on a part-attended basis. The noise survey was conducted over an 8-day period, including a weekend, between Wednesday 21st May and Wednesday 28th May 2025.
- 1.4.2 Unattended noise monitoring was carried out at four locations across the Site, which were chosen to be representative of the closest NSRs. **Figure 1-3** presents the noise monitoring locations and the identified NSRs. A summary of the baseline noise monitoring results is presented in **Table 1-7**.
- 1.4.3 Full details of the baseline noise survey are presented in **Appendix 6.3**.

Table 1-7: Long Term Noise Measurement Results Summary

Measurement Location	Date and Time	Period	L _{Aeq,T} (dB)	Mean L _{A90,15mins} (dB)	Mode L _{A90,15mins} (dB)
LT1	21/05/2025 13:00 – 28/05/2025 13:00	Daytime (07:00-19:00)	44	34	31
		Evening (19:00 – 23:00)	42	29	29
		Night-time (23:00-07:00)	45	30	18*
LT2	21/05/2025 13:00 – 28/05/2025 13:00	Daytime (07:00-19:00)	46	34	26

Measurement Location	Date and Time	Period	L _{Aeq,T} (dB)	Mean L _{A90,15mins} (dB)	Mode L _{A90,15mins} (dB)
		Evening (19:00 – 23:00)	43	29	23
		Night-time (23:00-07:00)	45	30	16*
LT3	21/05/2025 13:00 – 28/05/2025 13:00	Daytime (07:00-19:00)	52	39	34
		Evening (19:00 – 23:00)	51	34	33
		Night-time (23:00-07:00)	48	33	17*
LT4	21/05/2025 13:00 – 28/05/2025 13:00	Daytime (07:00-19:00)	46	35	29
		Evening (19:00 – 23:00)	45	30	30
		Night-time (23:00-07:00)	43	31	16*
Note * Modal noise level at the noise floor of the monitoring equipment and is therefore unreliable.					

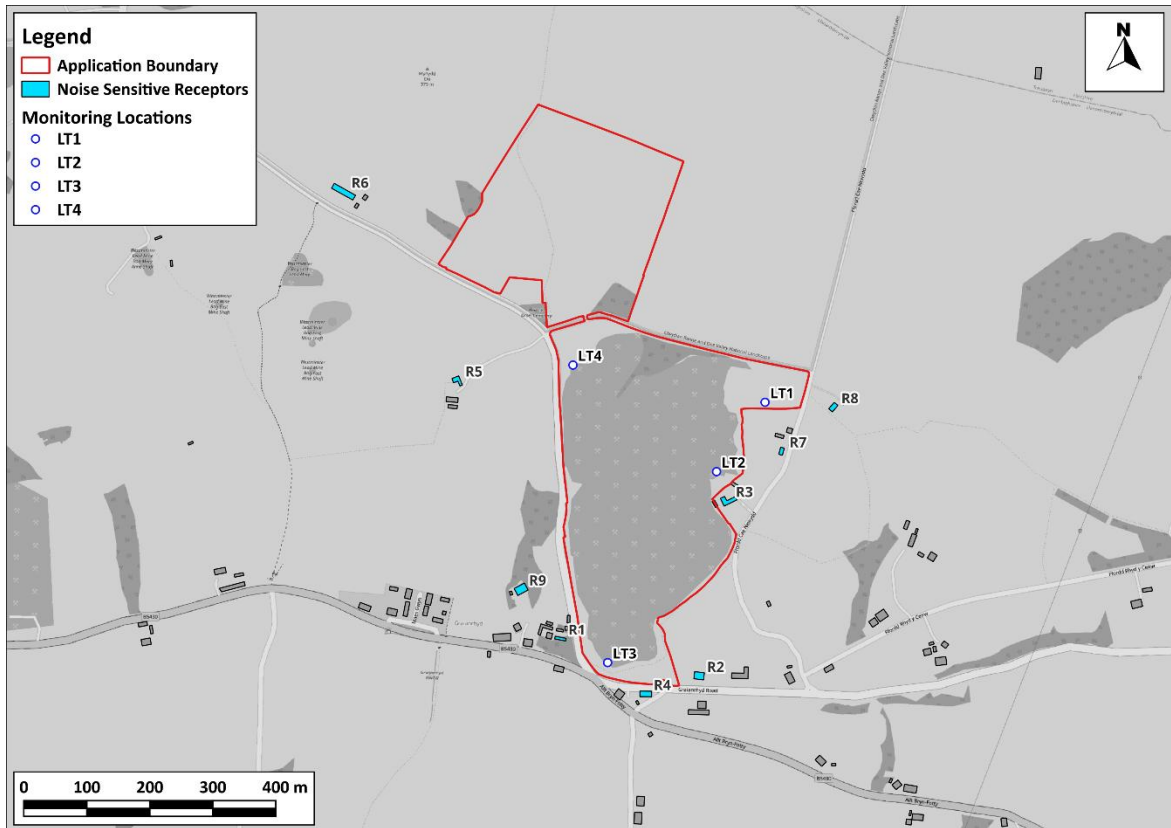


Figure 1-3: Noise Monitoring Locations and Noise Sensitive Receptors

1.4.4 A summary of the residential receptors within the study area of the Proposed Development, and the noise monitoring locations considered to be representative of each location, is presented in **Table 1-8**.

Table 1-8: Receptors and Representative Baseline Noise Monitoring Locations

Receptor ID	Receptor	Representative Monitoring Locations	Justification of Representative Monitoring Location
R1	Ty Isa	LT3	LT3 was the closest monitoring location and deemed to have a similar noise climate.
R2	Y Fron	LT3	LT3 was the closest monitoring location and deemed to have a similar noise climate.
R3	Property 3 – Ffordd Cae Newydd	LT2	LT2 was the closest monitoring location and deemed to have a similar noise climate.
R4	Property 4 – Graianrhyd Road	LT3	LT3 was the closest monitoring location and deemed to have a similar noise climate.
R5	Maes Y Droell Farm	LT4	LT4 was the closest monitoring location and deemed to have a similar noise climate.

Receptor ID	Receptor	Representative Monitoring Locations	Justification of Representative Monitoring Location
R6	Castell	LT4	LT4 was the closest monitoring location and deemed to have a similar noise climate.
R7	Property 7 – Ffordd Cae Newydd	LT1	LT1 was the closest monitoring location and deemed to have a similar noise climate.
R8	Property 8 – Ffordd Cae Newydd	LT1	LT1 was the closest monitoring location and deemed to have a similar noise climate.
R9	Property 9 – B5430	LT3	LT3 was the closest monitoring location and deemed to have a similar noise climate.

Future Baseline

- 1.4.5 The proposed development is located in a rural area, with no major noise sources identified within close proximity of the identified noise-sensitive receptors. Therefore, the future baseline is not expected to change significantly than that was captured during the baseline noise monitoring.

1.5 Assessment of Effects

Construction Noise

- 1.5.1 Predictions of noise impacts due to the construction works identified in **Table 1-9** have been carried out with reference to the methodology set out in BS 5228-1. Whilst the precise extents of the construction works have not yet been established, based on the current information, construction works will be located in the area of the existing buildings on the Site, along the western Site boundary during the construction of the haul road and to the north of the southern land parcel during the excavation of the processing area. Construction noise predictions have been undertaken using DGMR's Predictor-LimA noise modelling software, configured to calculate in accordance with the BS 5228 methodology.
- 1.5.2 The precise details of the plant and equipment that would be required during each construction activity are not known at this stage. However, the following plant and equipment have been assumed based on the noise source information provided in BS 5228-1.

Table 1-9: Assumed Construction Plant and Equipment

Construction Activity	Plant and Equipment	Total Sound Power Level (dBA)
Demolition of Existing Buildings	Tracked Excavator, Wheeled Loader	110
Haul Road Excavation	Tracked Excavator, Articulated Dump Truck	111
Processing Area Excavation	Tracked Excavator, Articulated Dump Truck	111

1.5.3 **Table 1-10, Table 1-11 and Table 1-12** present the predicted worst-case noise levels during each construction activity at the noise sensitive receptors.

Table 1-10: Construction Noise Assessment – Demolition of Existing Buildings

Receptor ID	Receptor	Predicted Noise Level (L _{Aeq,12h})	Magnitude of Impact
R1	Ty Isa	29	Negligible
R2	Y Fron	23	Negligible
R3	Property 3 – Ffordd Cae Newydd	29	Negligible
R4	Property 4 – Graianrhyd Road	29	Negligible
R5	Maes Y Droell Farm	54	Negligible
R6	Castell	45	Negligible
R7	Property 7 – Ffordd Cae Newydd	24	Negligible
R8	Property 8 – Ffordd Cae Newydd	22	Negligible
R9	Property 9 – B5430	36	Negligible

Table 1-11: Construction Noise Assessment – Haul Road Excavation

Receptor ID	Receptor	Predicted Noise Level (L _{Aeq,12h})	Magnitude of Impact
R1	Ty Isa	19	Negligible
R2	Y Fron	13	Negligible
R3	Property 3 – Ffordd Cae Newydd	21	Negligible
R4	Property 4 – Graianrhyd Road	18	Negligible
R5	Maes Y Droell Farm	48	Negligible
R6	Castell	36	Negligible
R7	Property 7 – Ffordd Cae Newydd	18	Negligible
R8	Property 8 – Ffordd Cae Newydd	17	Negligible
R9	Property 9 – B5430	26	Negligible

Table 1-12: Construction Noise Assessment – Processing Area Excavation

Receptor ID	Receptor	Predicted Noise Level (L _{Aeq,12h})	Magnitude of Impact
R1	Ty Isa	19	Negligible
R2	Y Fron	14	Negligible
R3	Property 3 – Ffordd Cae Newydd	34	Negligible
R4	Property 4 – Graianrhyd Road	16	Negligible
R5	Maes Y Droell Farm	38	Negligible
R6	Castell	35	Negligible
R7	Property 7 – Ffordd Cae Newydd	35	Negligible
R8	Property 8 – Ffordd Cae Newydd	42	Negligible
R9	Property 9 – B5430	20	Negligible

- 1.5.4 **Table 1-10, Table 1-11 and Table 1-12** show that the predicted noise levels at all receptors during each construction activity are expected to result in magnitude of impacts of 'Negligible'. Therefore, noise effects as a result of noise during the construction phase are considered 'not significant' in the context of the EIA regulations.

Operational Road Traffic

- 1.5.5 **Table 1-13** presents the traffic data for the 'Baseline' scenario and the 'Proposed Development' and the associated change in basic noise level (BNL).

Table 1-13: Operational Traffic Noise Assessment

Road Link	Baseline (AAWT 18h)		Proposed Development (Daily)		Basic Noise Level (BNL) L _{A10,18h} (dB)		Change (dB)	Magnitude of Impact
	Total	% HGV	Total	% HGV	Baseline	Baseline + Proposed Development		
1	244	30	0	0	58.6	58.6	0.0	Negligible
2	241	30	120	100	58.9	62.9	4.0	Moderate
3	948	22	0	0	64.3	64.3	0.0	Negligible
4	491	24	120	100	61.7	64.2	2.5	Minor

- 1.5.6 **Table 1-13** shows that road link 4 is expected to experience a magnitude of change of 'Minor' and road link 2 is expected to experience a magnitude of change of 'Moderate'. Therefore, the effects of operational traffic noise at receptors within 50 m of road links 1, 3 and 4 are deemed 'not significant' in the context of the EIA regulations. The effects of operational traffic noise at receptors

within 50m of road link 2 (Unnamed Road - Southern Site) are deemed 'significant adverse' in the context of the EIA regulations.

- 1.5.7 The 50m operational traffic noise study area is shown in **Figure 1-2**. A total of 2 receptors are located within 50m of road link 2 and are therefore expected to experience a 'Moderate' impact, and the effects is deemed 'significant adverse' in the context of the EIA regulations at these receptors.
- 1.5.8 It should however be noted that although the assessment has indicated that a 4 dB change is expected along road link 2 due to operational road traffic, which indicates a 'Moderate' impact, the assessment is based on peak operational traffic flows and typical operational traffic flows are expected to be lower than those presented in the assessment. Typical operational traffic flows are likely to result in 'Minor' impacts which would be deemed 'not significant' in the context of the EIA regulations, however, the assessment is based on peak traffic flows as a worst-case.
- 1.5.9 Operational road traffic will be managed via a HGV Traffic Management Plan, which will be secured by planning condition.

Operational Noise

- 1.5.10 Predictions of noise impacts during the operational phases identified in **Table 1-14** have been carried out with reference to the methodology set out in MGP11 and MTAN1, which advocate noise predictions are carried out in accordance with the BS 5228-1 calculation method. Operational noise predictions for each operational phase have been undertaken using DGMR's Predictor-LimA noise modelling software, configured to calculate in accordance with the BS 5228 methodology.
- 1.5.11 The precise details of the plant and equipment that would be required during each operational phase have been provided by the client and noise emission data for the Mineral Processing plant has been provided. For the Excavation, Backfilling and HGV Movement activities, noise emission data has been selected based on noise source information provided in BS 5228-1. A summary of the noise emission data used in the assessment is provided in **Table 1-14**.

Table 1-14: Assumed Operational Plant and Equipment

Phase	Operational Phase	Plant	BS5228 Ref	Quantity	% On Time	L _w dB(A)
Phase 1	Mineral Processing	Loading Shovel	Client Provided	2	4%	93
		R Series / AGGMAX / HYDROGRADE	Client Provided	1	50%	110
		EVOWASH / GMAX	Client Provided	1	100%	103
		Sand Stockpile Conveyors	Client Provided	3	100%	73 ¹
		Feed Conveyor	Client Provided	3	100%	76 ¹
		AQUACYCLE	Client Provided	1	100%	94
		Static Screen	Client Provided	1	100%	80
		Chemical Dosing Plant	Client Provided	1	100%	87
		Overband Magnet	Client Provided	1	100%	85
		Control Cabin	Client Provided	1	100%	73
		Agitators	Client Provided	1	100%	73
		Filter Press	Client Provided	1	100%	61 ²
		Sludge Pump	Client Provided	1	100%	82
		Cloth Wash Pump	Client Provided	1	100%	76
		Carbon Filters	Client Provided	1	100%	75
	HGV Movements	Lorry	C11.10	120/day		105
	Phase 1 Excavation	Tracked Excavator	C2.7	1	75%	98
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102

Phase	Operational Phase	Plant	BS5228 Ref	Quantity	% On Time	L _w dB(A)
Phase 2	Mineral Processing	Loading Shovel	Client Provided	2	4%	93
		R Series / AGGMAX / HYDROGRADE	Client Provided	1	50%	110
		EVOWASH / GMAX	Client Provided	1	100%	103
		Sand Stockpile Conveyors	Client Provided	3	100%	73 ¹
		Feed Conveyor	Client Provided	3	100%	76 ¹
		AQUACYCLE	Client Provided	1	100%	94
		Static Screen	Client Provided	1	100%	80
		Chemical Dosing Plant	Client Provided	1	100%	87
		Overband Magnet	Client Provided	1	100%	85
		Control Cabin	Client Provided	1	100%	73
		Agitators	Client Provided	1	100%	73
		Filter Press	Client Provided	1	100%	61 ²
		Sludge Pump	Client Provided	1	100%	82
		Cloth Wash Pump	Client Provided	1	100%	76
		Carbon Filters	Client Provided	1	100%	75
	HGV Movements	Lorry	C11.10	120/day		105
	Phase 2 Excavation	Tracked Excavator	C2.7	1	75%	98
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
	Phase 1 Backfilling	Tracked Excavator	C2.7	1	75%	98

Phase	Operational Phase	Plant	BS5228 Ref	Quantity	% On Time	L _w dB(A)
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
		Dozer	C8.7	1	75%	103
Phase 3	Mineral Processing	Loading Shovel	Client Provided	2	4%	93
		R Series / AGGMAX / HYDROGRADE	Client Provided	1	50%	110
		EVOWASH / GMAX	Client Provided	1	100%	103
		Sand Stockpile Conveyors	Client Provided	3	100%	73 ¹
		Feed Conveyor	Client Provided	3	100%	76 ¹
		AQUACYCLE	Client Provided	1	100%	94
		Static Screen	Client Provided	1	100%	80
		Chemical Dosing Plant	Client Provided	1	100%	87
		Overband Magnet	Client Provided	1	100%	85
		Control Cabin	Client Provided	1	100%	73
		Agitators	Client Provided	1	100%	73
		Filter Press	Client Provided	1	100%	61 ²
		Sludge Pump	Client Provided	1	100%	82
		Cloth Wash Pump	Client Provided	1	100%	76
		Carbon Filters	Client Provided	1	100%	75
	HGV Movements	Lorry	C11.10	120/day		105
	Phase 3 Excavation	Tracked Excavator	C2.7	1	75%	98

Phase	Operational Phase	Plant	BS5228 Ref	Quantity	% On Time	L _w dB(A)
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
	Phase 2 Backfilling	Tracked Excavator	C2.7	1	75%	98
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
		Dozer	C8.7	1	75%	103
Phase 4	Mineral Processing	Loading Shovel	Client Provided	2	4%	93
		R Series / AGGMAX / HYDROGRADE	Client Provided	1	50%	110
		EVOWASH / GMAX	Client Provided	1	100%	103
		Sand Stockpile Conveyors	Client Provided	3	100%	73 ¹
		Feed Conveyor	Client Provided	3	100%	76 ¹
		AQUACYCLE	Client Provided	1	100%	94
		Static Screen	Client Provided	1	100%	80
		Chemical Dosing Plant	Client Provided	1	100%	87
		Overband Magnet	Client Provided	1	100%	85
		Control Cabin	Client Provided	1	100%	73
		Agitators	Client Provided	1	100%	73
		Filter Press	Client Provided	1	100%	61 ²
		Sludge Pump	Client Provided	1	100%	82
		Cloth Wash Pump	Client Provided	1	100%	76

Phase	Operational Phase	Plant	BS5228 Ref	Quantity	% On Time	L _w dB(A)
		Carbon Filters	Client Provided	1	100%	75
	HGV Movements	Lorry	C11.10	120/day		105
	Phase 4 Excavation	Tracked Excavator	C2.7	1	75%	98
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
Restoration	Phase 2 Backfilling	Tracked Excavator	C2.7	1	75%	98
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
		Dozer	C8.7	1	75%	103
	Phase 1 Backfilling	Tracked Excavator	C2.7	1	75%	98
		Dump truck	C4.4	1	5 trips per hour	104
		Dump truck (tipping fill)	C2.32	1	4%	102
		Dozer	C8.7	1	75%	103
Note ¹ L _w per m ² Internal sound pressure level						

1.5.12 Table 1-15 - Table 1-19 present the assessment of operational noise from each operational phase at the NSRs.

Table 1-15: Operational Noise Assessment – Phase 1

ID	Background Sound Level L _{A90,T}	Operational Noise Level L _{Aeq,1h} dB				Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 1 Excavation	Total	
R1	39	21	22	24	27	Negligible
R2	39	15	19	16	22	Negligible
R3	34	35	38	34	41	Minor
R4	39	20	20	23	26	Negligible
R5	35	44	31	40	46	Moderate
R6	35	35	30	31	37	Minor
R7	34	28	37	23	37	Minor
R8	34	32	41	28	41	Minor
R9	39	27	23	24	29	Negligible

Table 1-16: Operational Noise Assessment – Phase 2

ID	Background Sound Level L _{A90,T}	Operational Noise Level L _{Aeq,1h} dB				Total	Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 1 Backfilling	Phase 2 Excavation		
R1	39	21	22	29	23	30	Negligible
R2	39	15	19	20	15	24	Negligible
R3	34	35	38	39	43	46	Moderate

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB					Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 1 Backfilling	Phase 2 Excavation	Total	
R4	39	20	20	27	21	29	Negligible
R5	35	44	31	35	42	47	Moderate
R6	35	35	30	28	34	38	Minor
R7	34	28	37	28	37	40	Minor
R8	34	32	41	21	32	42	Minor
R9	39	27	23	26	23	31	Negligible

Table 1-17: Operational Noise Assessment – Phase 3

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB					Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 2 Backfilling	Phase 3 Excavation	Total	
R1	39	22	25	24	16	29	Negligible
R2	39	15	20	16	10	23	Negligible
R3	34	38	45	40	34	47	Moderate
R4	39	21	23	16	15	26	Negligible
R5	35	42	31	33	40	45	Minor
R6	35	33	30	29	32	37	Minor
R7	34	30	39	35	27	41	Minor
R8	34	30	40	30	28	41	Minor

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB					Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 2 Backfilling	Phase 3 Excavation	Total	
R9	39	26	28	25	20	31	Negligible

Table 1-18: Operational Noise Assessment – Phase 4

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB				Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 4 Excavation	Total	
R1	39	22	26	18	27	Negligible
R2	39	15	20	10	22	Negligible
R3	34	40	45	37	47	Moderate
R4	39	22	23	18	26	Negligible
R5	35	45	47	39	50	Moderate
R6	35	35	34	23	37	Minor
R7	34	31	39	34	41	Minor
R8	34	30	40	29	41	Minor
R9	39	27	28	28	32	Negligible

Table 1-19: Operational Noise Assessment – Restoration

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB			Magnitude of Impact
		Phase 1 Backfilling	Phase 2 Backfilling	Total	
R1	39	28	22	29	Negligible

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB			Magnitude of Impact
		Phase 1 Backfilling	Phase 2 Backfilling	Total	
R2	39	21	16	22	Negligible
R3	34	39	39	41	Minor
R4	39	25	19	26	Negligible
R5	35	42	43	45	Minor
R6	35	36	34	38	Minor
R7	34	27	33	34	Minor
R8	34	26	31	32	Negligible
R9	39	33	23	33	Negligible

- 1.5.13 **Table 1-15 - Table 1-19** shows that the predicted noise levels at R3 (Property 3 – Ffordd Cae Newydd) during Phase 2, Phase 3 and Phase 4 operations are expected to result in a magnitude of impact of 'Moderate'. It is also shown that the predicted noise level at R5 (Maes-Y-Droell Farm) during Phase 1, Phase 2 and Phase 4 are expected to result in a magnitude of impact of 'Moderate'. Therefore, in the absence of specific noise mitigation measures, noise effects during the operational phase are deemed 'significant adverse' in the context of the EIA regulations and specific noise mitigation measures have been considered in the following section.

Mitigation

- 1.5.14 In order to mitigate noise levels at NSRs, an assessment has been undertaken with the inclusion of 4 m earth bunds along the western and eastern site boundaries as presented in **Figure 1-4**. The earth bunds are proposed to be constructed using material excavated during the Haul Road Excavation and Processing Area Excavation works and remain in place for all operational phases and will be secured by planning condition.

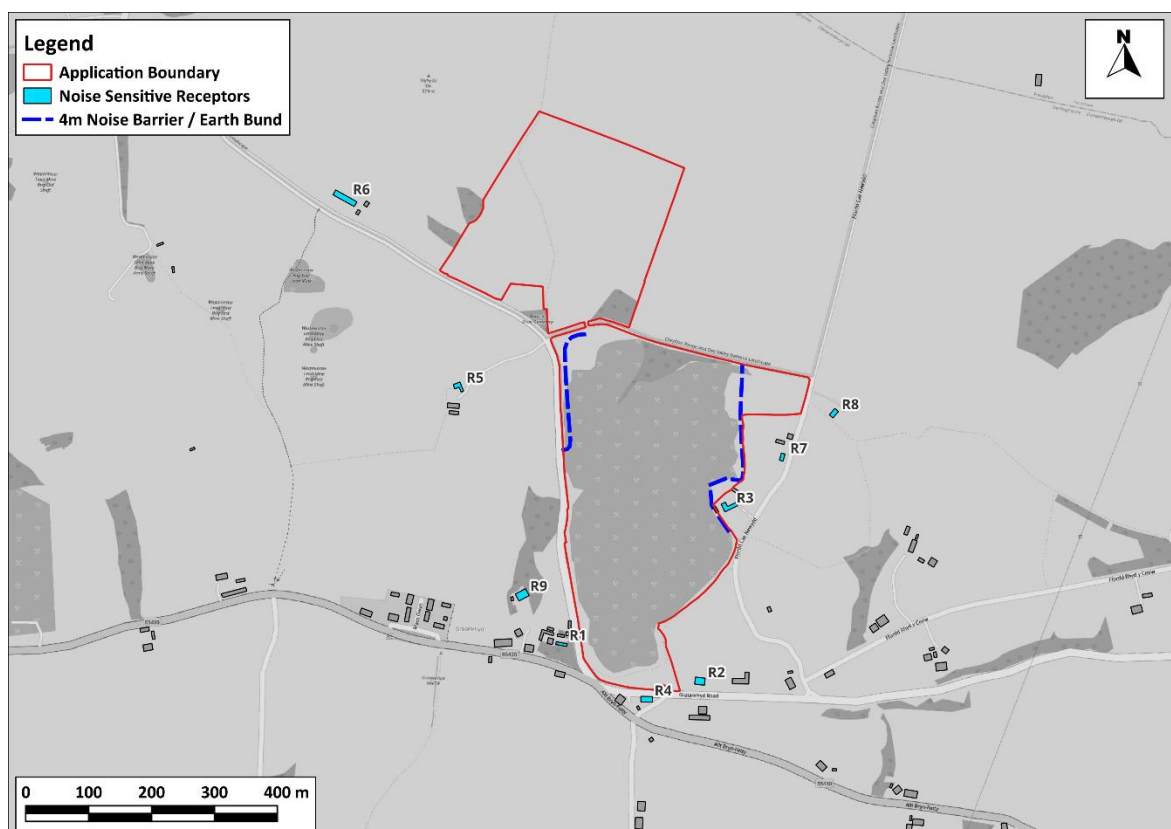


Figure 1-4: 4m Noise Barrier / Earth Bunds – All Operational Phases

- 1.5.15 In order to mitigate noise levels further at NSRs during Phase 4 Operations, an assessment has been undertaken with the inclusion of an additional 4 m earth bund or fencing along the western boundary of the processing area as presented in **Figure 1-5**. The earth bund or barrier is proposed to be constructed using material excavated on site and remain in place throughout Phase 4 operations and is proposed to be secured by planning condition.

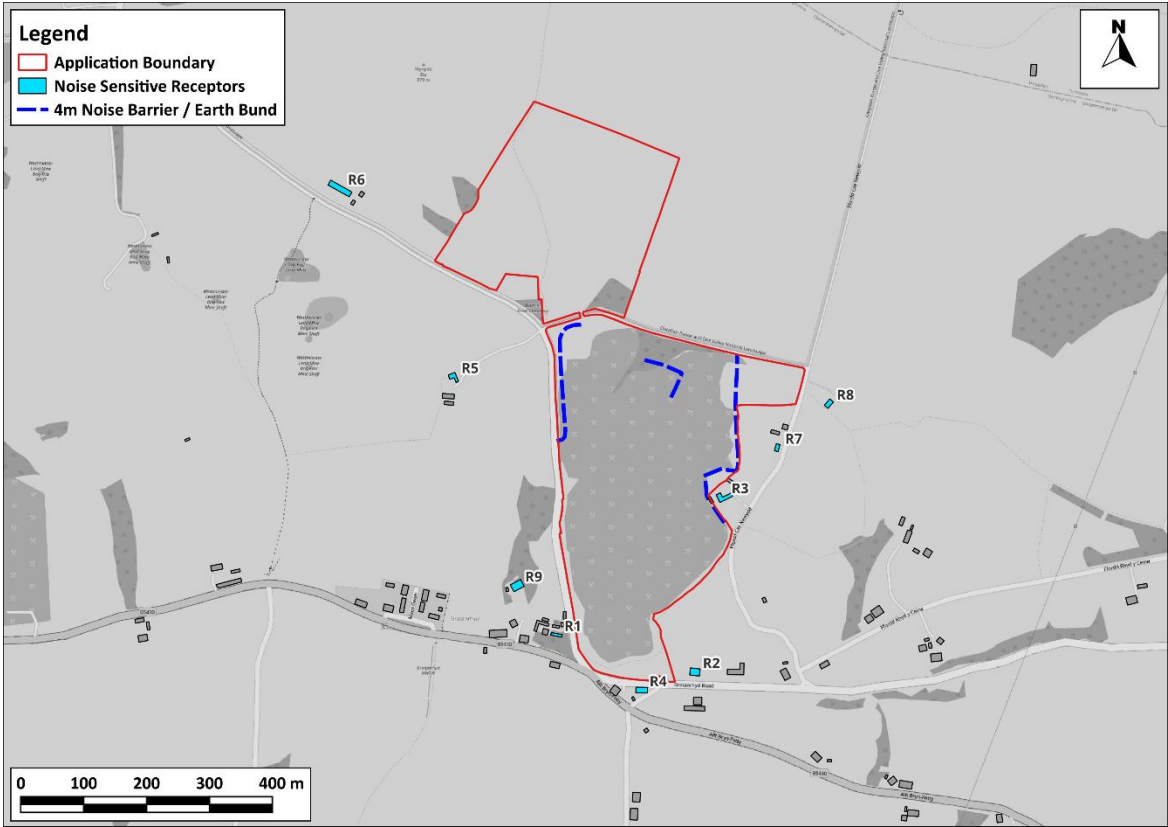


Figure 1-5: 4m Noise Barrier / Earth Bunds – Phase 4

1.5.16 **Table 1-20 - Table 1-24** present the assessment of operational noise from each operational phase at the NSRs for the mitigated scenario.

Table 1-20: Mitigated Operational Noise Assessment – Phase 1

ID	Background Sound Level L _{A90,T}	Operational Noise Level L _{Aeq,1h} dB				Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 1 Excavation	Total	
R1	39	21	22	24	27	Negligible
R2	39	15	19	16	22	Negligible
R3	34	28	32	28	34	Minor
R4	39	20	20	23	26	Negligible
R5	35	39	31	35	41	Minor
R6	35	28	30	25	33	Negligible
R7	34	26	34	22	35	Minor
R8	34	28	37	23	38	Minor
R9	39	25	23	24	29	Negligible

Table 1-21: Mitigated Operational Noise Assessment – Phase 2

ID	Background Sound Level L _{A90,T}	Operational Noise Level L _{Aeq,1h} dB				Total	Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 1 Backfilling	Phase 2 Excavation		
R1	39	21	22	29	23	30	Negligible
R2	39	15	19	20	15	24	Negligible
R3	34	28	32	32	33	38	Minor
R4	39	20	20	27	21	29	Negligible

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB					Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 1 Backfilling	Phase 2 Excavation	Total	
R5	35	39	31	33	38	43	Minor
R6	35	28	30	27	32	36	Minor
R7	34	26	34	25	32	37	Minor
R8	34	28	37	20	28	38	Minor
R9	39	25	23	26	22	30	Negligible

Table 1-22: Mitigated Operational Noise Assessment – Phase 3

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB				Total	Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 2 Backfilling	Phase 3 Excavation		
R1	39	22	25	24	16	29	Negligible
R2	39	15	20	16	10	23	Negligible
R3	34	30	38	33	26	40	Minor
R4	39	21	23	16	15	26	Negligible
R5	35	38	31	33	40	43	Minor
R6	35	28	30	29	32	36	Minor
R7	34	28	38	35	24	40	Minor
R8	34	26	37	29	23	38	Minor
R9	39	25	28	25	20	31	Negligible

Table 1-23: Mitigated Operational Noise Assessment – Phase 4

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB				Magnitude of Impact
		HGV Movements	Mineral Processing	Phase 4 Excavation	Total	
R1	39	21	25	18	27	Negligible
R2	39	15	20	10	21	Negligible
R3	34	31	38	27	39	Minor
R4	39	22	23	18	26	Negligible
R5	35	38	42	38	44	Minor
R6	35	28	33	21	34	Negligible
R7	34	29	38	29	39	Minor
R8	34	28	37	28	38	Minor
R9	39	25	27	28	31	Negligible

Table 1-24: Mitigated Operational Noise Assessment – Restoration

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB			Magnitude of Impact
		Phase 1 Backfilling	Phase 2 Backfilling	Total	
R1	39	28	22	29	Negligible
R2	39	21	16	22	Negligible
R3	34	35	35	38	Minor
R4	39	25	19	26	Negligible
R5	35	41	40	44	Minor

ID	Background Sound Level $L_{A90,T}$	Operational Noise Level $L_{Aeq,1h}$ dB			Magnitude of Impact
		Phase 1 Backfilling	Phase 2 Backfilling	Total	
R6	35	31	34	36	Minor
R7	34	27	33	34	Minor
R8	34	24	30	31	Negligible
R9	39	33	23	33	Negligible

- 1.5.17 **Table 1-20 - Table 1-24** show that the predicted noise levels at all receptors during all operational phases are expected to result in a magnitude of impact of either 'Negligible' or 'Minor' following the implementation of noise mitigation in the form of 4 m earth bunds or barriers. Therefore, noise effects during the operational phase are deemed 'not significant' in the context of the EIA regulations.
- 1.5.18 For context, it is worth noting that the absolute noise levels at the NSRs during all operational phases are expected to be lower than the 55 dB(A) maximum daytime noise limit as advocated within MTAN1 and are also expected to be below the 50 dB(A) daytime lower guideline for external amenity noise as advocated in the World Health Organization (WHO) Guidelines for Community Noise (WHO, 1999).
- 1.5.19 It is also worth noting that a large portion of the Site has been used as a quarry until quite recently. Therefore, whilst the noise levels measured during the baseline noise survey don't reflect this, receptors in the area, would have experienced noise from quarrying activities at the Site until operations were completed.
- 1.5.20 In addition to the mitigation measures outlined above, best practicable means (BPM) will be employed to control noise where practicable. These can include but are not limited to:
- Avoid unnecessary revving of engines and switch off equipment when not required;
 - Keep internal haul routes well maintained and avoid steep gradients;
 - Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
 - Minimise drop height of materials;
 - Start up plant and vehicles sequentially rather than all together; and
 - Maintain good communication with residents to advice of any planned noisy works and inform of likely duration.

Soundscape

- 1.5.21 Like any development, the Proposed Development will have an effect on the soundscape. During construction, noise is likely to be audible in the local area, but any effect on the soundscape will be temporary and short term. During operation, noise from the Proposed Development is again likely to be audible in the local vicinity of the Site, and is therefore likely to change the soundscape from that currently experienced. However, since the site is an existing quarry that is proposed to be brought back into use, the soundscape will be similar to that which existed at that time. Once all of the material has been extracted, the Site will be restored and the soundscape will return back to a similar soundscape as currently.

1.6 Summary of Effects

1.6.1 **Table 1-25** sets out a summary of the likely significant environmental effects considered.

Table 1-25: Summary of Likely Significant Effects

Receptor	Embedded Measures	Description of the Effect	Direct/ Indirect	Duration	Geographic Scale	Nature of Effect	Significant/ Not Significant	Next Steps
Construction								
Residential Receptors	CEMP	On-site Construction Activities	Direct	Short Term	Local	Negligible - Minor	Not Significant	Contractor to agree CEMP
Operation								
Residential Receptors	HGV Traffic Management Plan	Operational Road Traffic Noise	Direct	Long Term	Local	Negligible - Moderate	Significant effect at two receptors, not significant elsewhere.	Operator to agree HGV Traffic Management Plan
Residential Receptors	4 m high noise barriers / bunding along the western and eastern site boundary during all operational phases, as presented in Figure 1-4. 4 m high noise barrier / bunding along western boundary of processing area during Phase 4, as presented in Figure 1-5.	Operational Noise	Direct	Long Term	Local	Negligible – Minor	Not Significant	N/A



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