Graphinex – Esmeralda Graphite Project

Environmental Impact Statement

Appendix Y – Noise and Vibration Management Plan

GRAPHINEX



GRAPHINEX ESMERALDA PROJECT

Noise Management Plan

PREPARED FOR
QLD Aus Graphite Pty Ltd

September 2026

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1 Introduction

This Noise Management Plan (NMP) has been prepared for QLD Aus Graphite Pty Ltd (Graphinex), the proponent for the Esmeralda Project (the Project). The NMP forms part of the Environmental Management System (EMS) to ensure potential impacts from the Project on the existing noise values of the region are appropriately managed.

The proposed Project is a greenfield open-cut graphite mine and processing plant located approximately 70 km south of Croydon, and approximately 215 km south-east of the Gulf of Carpentaria, Queensland.

The NMP has been developed to meet the requirements and recommendations of the Noise and Vibration Impact Assessment report prepared for the project by AARC Environmental Solutions (AARC 2026). Following approval, the NMP should be updated to refer to the requirements of the Environmental Authority (EA) for the Project.

This NMP is to be implemented for all stages of the Project, including construction, operation and closure.

The NMP includes:

- description of the project;
- description of sensitive receptors, including coordinates;
- noise criteria;
- noise monitoring requirements;
- noise management and mitigation strategies to reduce noise levels at sensitive receptors;
- a description of the complaint management and investigation process;
- reporting requirements; and
- a two-yearly review of the suitability of the noise management plan.

Blasting is proposed for the Project, and is addressed in a separate environmental management plan, and therefore it is not addressed in this plan.

To aid in the understanding of the terms in this report a glossary is included in Appendix A.

2 Project background

The Project is a greenfield open cut graphite mine and processing plant located within Far North Queensland's Croydon Shire local government area, 70 km south of Croydon (Figure 1).

The Project proposes to mine up to 3.5 million tonnes per annum (Mtpa) of Run-of-Mine (ROM) ore over an operational phase of approximately 53 years, mining a total of approximately 170 Mt graphite ore. The proposed life-of-mine (LOM) is approximately 65 years, including overlapping periods of construction (2 years), operation (53 years), and final rehabilitation (10 years).

Ore will be mined to an approximate maximum depth of 250 m below ground level. Excavated overburden and non-ore-bearing material will be deposited to the south and east in out of pit dumps located adjacent to the mining void, and used to form the walls of the TSFs. The majority of waste movement will occur within the first 18 years of the mine life, with a total of 188.05 Mt estimated to be moved over the approximately 53-year production life of the Project. Extracted graphite ore will be trucked to the mineral processing plant (MPP) for stockpiling and concentration via conventional floatation methods.

The processing method includes an initial crushing and milling circuit that liberates the graphite in 106-micron product. Adequately sized ore will then be fed to a flotation circuit consisting of rougher, scavenger and cleaner flotation stages. A combination of standard flotation reagents will be used such as diesel and MIBC. Flotation tailings produced from the mineral processing circuit will be transferred to one of three purpose designed storage facilities, to be constructed in stages over the production life of the mine.

Process plan tailings will be pumped by the tailings thickener underflow pumps to the TSF. Floatation tailings discharge into the TSF via pumped discharge spigots around the perimeter of the TSF. Water produced from the tailings as it settles, along with rainfall, will be decanted in the TSF and pumped back for recycling in the MPP. The volume of tailings and decant water will be monitored throughout the process.

Graphite concentrate produced at the mine will be loaded into containers and transported by truck to Townsville to a separate facility for refinement and distribution. The site layout is shown in Figure 2 and Figure 3.

2.1 Project equipment

Haul truck numbers will vary over the life of the Project depending on the volume of material being moved. Higher haulage demand is expected from commencement to year 14 due to the removal of overburden during the establishment phase of the Project. Increased haulage is also forecast in years 37 and 38 associated with the transfer of tailings to in-pit backfill, and again from years 41 to 52 when both tailings are transferred to in-pit backfill and waste material from out-of-pit dumps is relocated to the pit.

A list of major mobile equipment quantities is included in Table 1. From this table it can be seen that Komatsu HD785 haul truck numbers vary significantly, but other equipment is more constant in quantity.

Table 1: Mining equipment quantities

Fleet	Equipment	Equipment quantity range across all years
Mobile	Excavator Komatsu PC2000	2 (years -1 to 14 & 37 to 52) and 1 (years 15 to 36 & 53)
Mobile	Truck Komatsu HD785	7 to 11 (years -1 to 14), 6 to 8 (years 15 to 36), 17 (years 37 to 41), 20 (years 42 to 48), 15 (years 49 to 52) and 4 (year 53)
Mobile	Wheel loader Komatsu WA480	1 (years -1 & 1) and 2 (years 2 to 48)
Mobile	Track dozer Komatsu 155	4 (years -1 to 14) and 3 (years 15 to 53)
Mobile	Water truck Komatsu HD785	2
Mobile	Grader Caterpillar 12	2
Mobile	Compactor SD200	1
Mobile	Road train	refer note 1
Mobile	Drill presplit 125mm	1 (years -1 to 42)
Mobile	Drill blasthole DTH 165mm	1 to 3 (years -1 to 42)
Auxiliary	Small excavator 40t	1
Auxiliary	Lighting Plant	4
Auxiliary	Small Construction Truck (20t)	2
Auxiliary	Tyre Handler/Forklift	1
Auxiliary	Mobile crane	1
Auxiliary	Fuel/Service Truck	1
Auxiliary	Dewatering Pump	3
Auxiliary	Light Vehicle (4 x 4)	7 to 10
Auxiliary	Crew transport van 4wd	2
Fixed	Processing plant, inc crusher & mill and diesel generators	refer note 2

Note: 1. An average 14 road trains per day are expected (based on 200 ktpa product loaded on trucks carrying 40 t). The model includes 2 road trains in the 15 minute period represented by the model as a conservative assumption.

2. Processing plant and diesel generators will vary in usage.

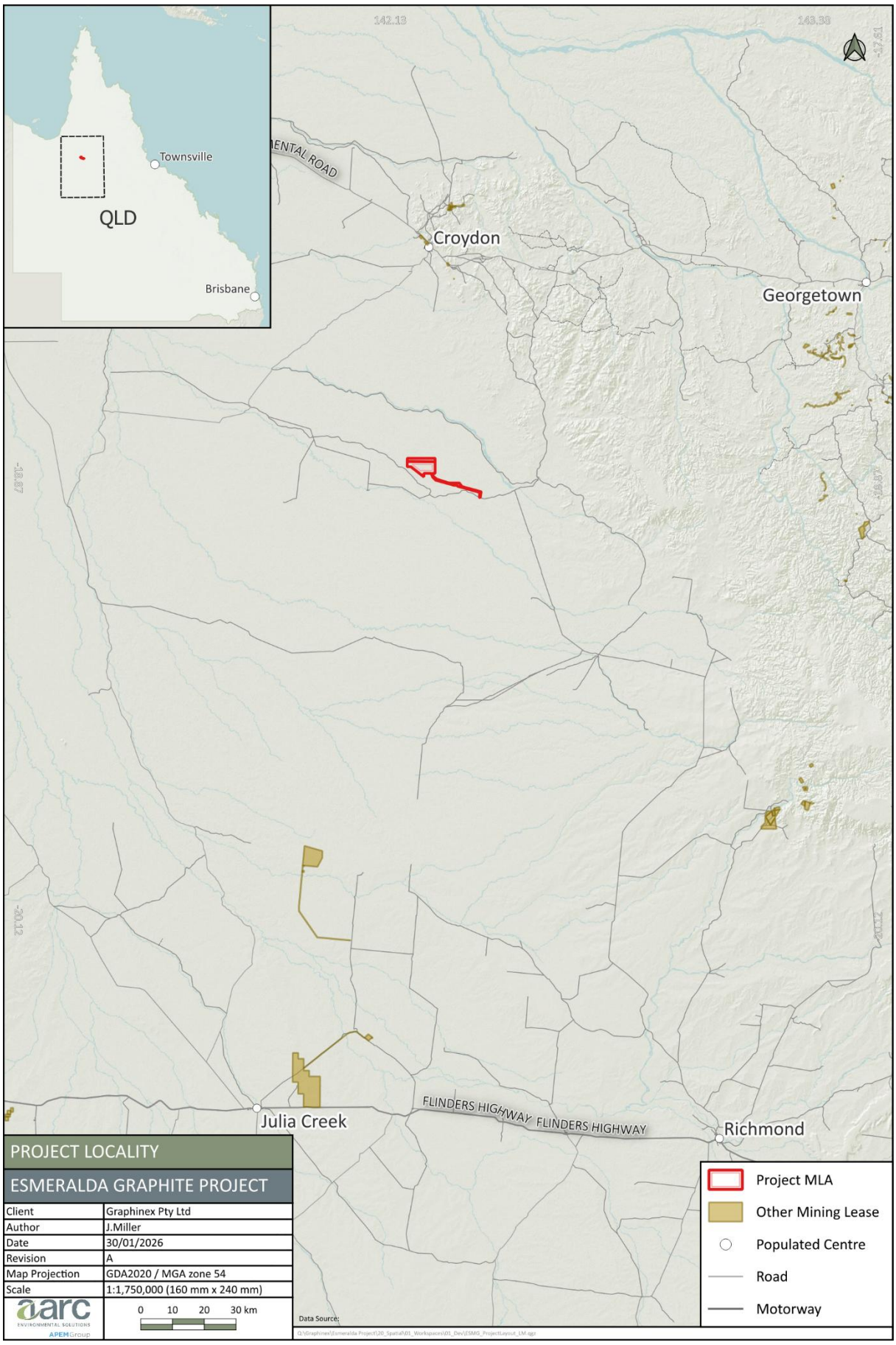


Figure 1: Project location

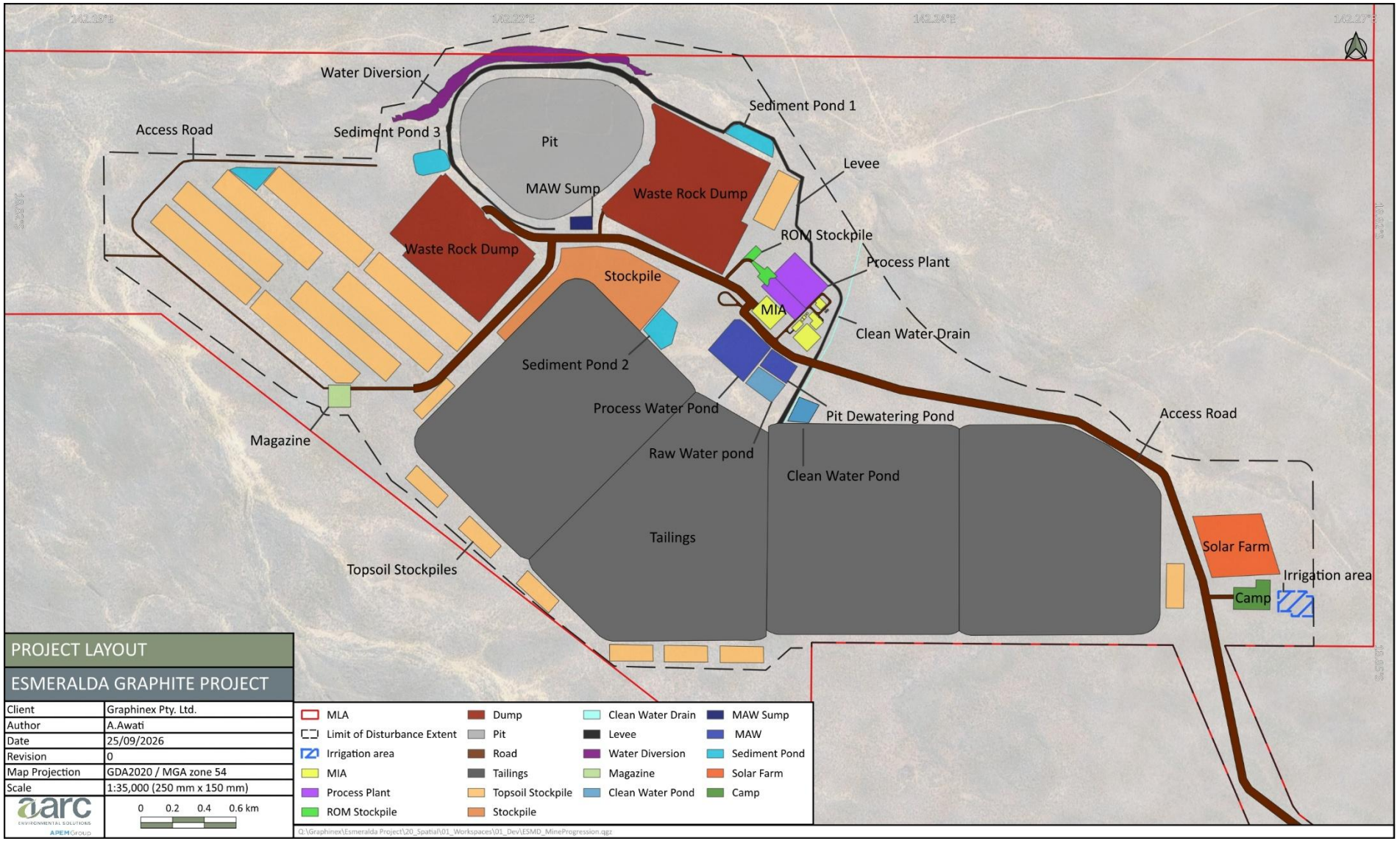


Figure 2: Project layout

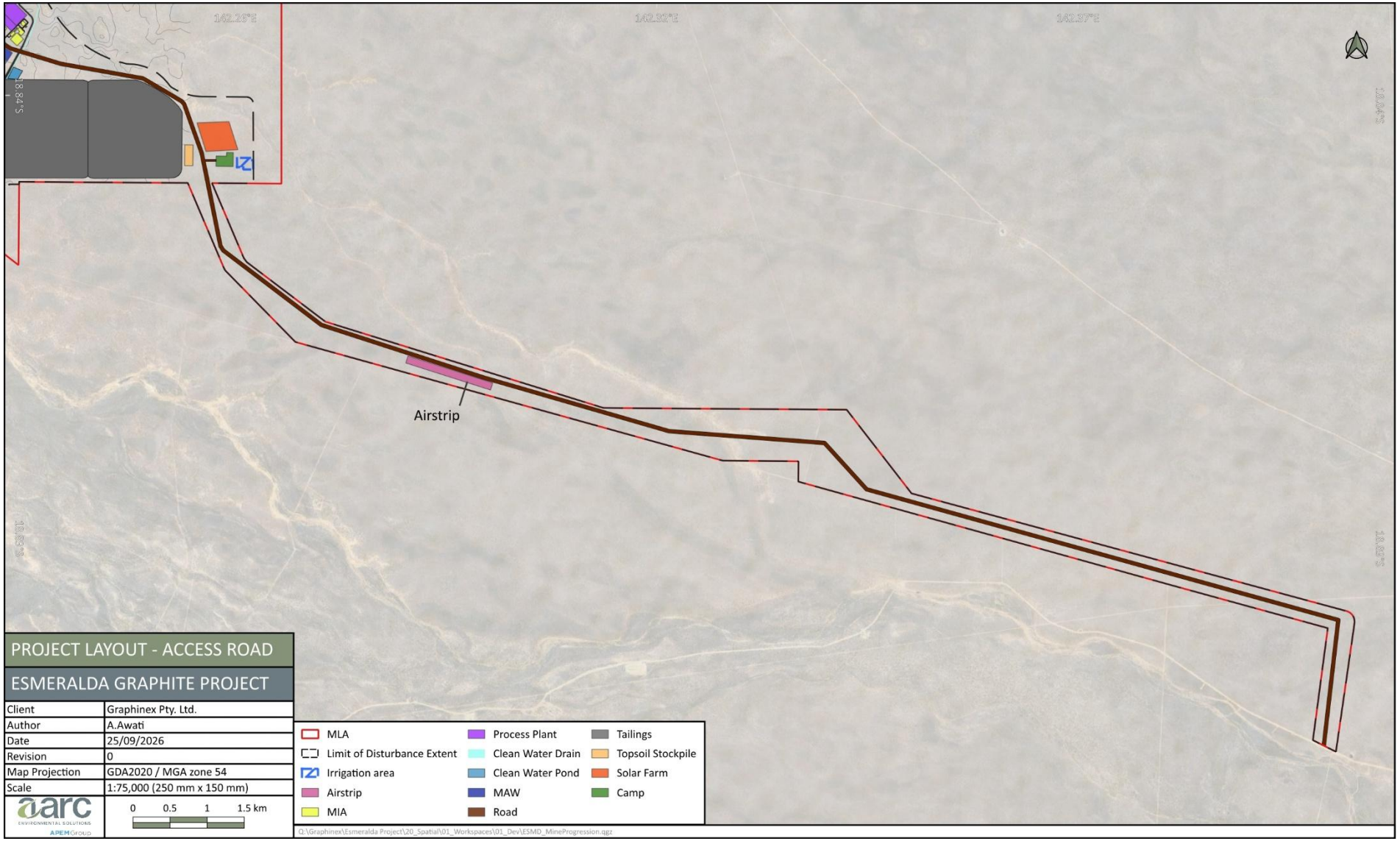


Figure 3: Project layout - access road

3 Sensitive receptors

The Project is located in a rural area surrounded by grazing land, with isolated residences in the vicinity. The closest town is Croydon, located approximately 70 km north of the Project (refer Figure 4).

A noise impact assessment (AARC 2026) must identify and address impacts onto any nearby sensitive places, where a sensitive place includes a sensitive receptor for the purpose of the EPP (Noise) 2019 (DESI 2024).

Sensitive receptors are listed in Schedule 1 of the EPP (Noise), and include residences, educational facilities, medical facilities, commercial facilities, protected area (see *Nature Conservation Act 1992*, schedule) or critical area (means an area identified in a conservation plan under the *Nature Conservation Act 1992*, section 120H as, or as including, a critical habitat or an area of major interest), marine park (see *Marine Parks Act 2004*, schedule); and a park or garden that is open to the public (whether or not on payment of an amount) for use other than for sport or organised entertainment.

The nearest receptors which may be influenced by potential noise emissions from the Project are listed in Table 2 and shown in Figure 4. The tabled receptors are the nearest to the Project in their respective directions and have the potential to be impacted by the Project.

It is noted that the proposed on-site mine camp is subject to special conditions which limit its applicability for consideration as a sensitive receptor. As such, this is not considered as a sensitive receptor. Notwithstanding this, it is acknowledged that human health related considerations will be monitored by Graphinex to ensure protection of the health and safety of resident contractors and employees.

Based on the above considerations, the sensitive receptors for the project are R1, R2 and R3.

Table 2: List of nearest receptors and distance from activities

Receptor ID[1]	**Receptor description**	**Easting (GDA2020, Zone 54)**	**Northing (GDA2020, Zone 54)**	**Approximate distance (km) from the Project footprint and direction**	**Approximate distance (km) from the Project access road and direction**
R1 – Esmeralda Homestead	Residential	665762	7914629	33 km east	18 km east
R2 – Prospect Homestead	Residential	631806	7908655	7 km south	5 km south-west
R3 – Homestead	Residential	612870	7910311	16 km south-west	20 km west
R4 - Camp	Mining lease residential	632773	7915899	0.5 km east	0.2 km east

Note: Receptor R4 is located within the MLA and is not considered a sensitive receptor.

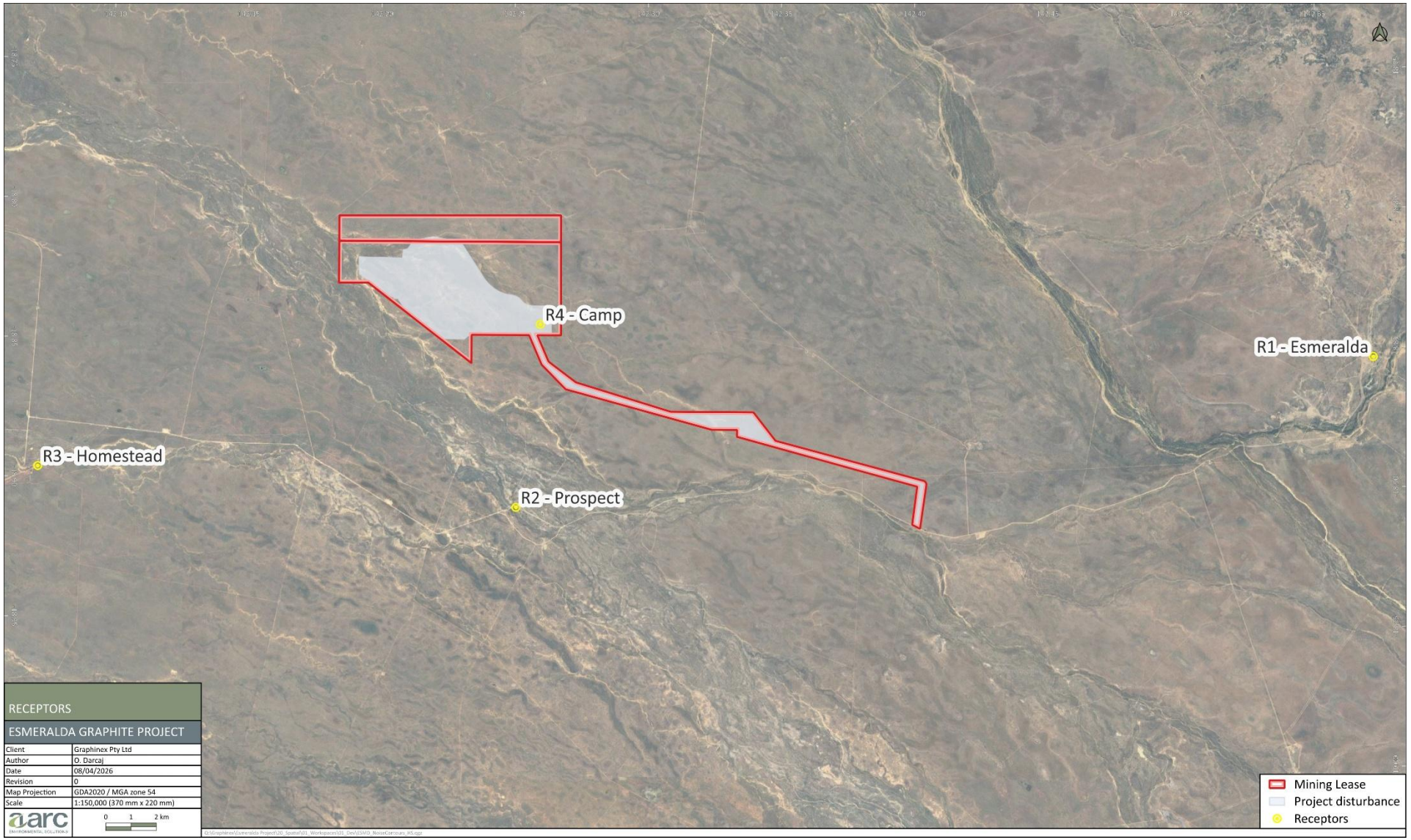


Figure 4: Receptors R1 to R4 near Project

4 Noise Criteria

As noted previously, the Project has not received approval and therefore there is no approved EA, and no corresponding legal obligations. Therefore, this NMP has been developed to meet the requirements and recommendations of the Noise and Vibration Impact Assessment report prepared for the project by AARC Environmental Solutions (AARC 2026).

The proposed noise criteria are shown below in Table 3.

Further to Table 3, it is noted that the noise limits relate to noise generated by Graphinex mining activities, and exclude noise from extraneous noise sources such as road traffic (off the MLA), wind, insects, birds, residential activities and other mines. Additionally, for any assessment of noise, the noise limits are to be adjusted ('adj') for tonality and impulsiveness.

Table 3: Proposed Project noise criteria

Noise level dBA measured as:	**All days**		
	Day (7am to 6pm)	**Evening (6pm to 10pm)**	**Night (10pm to 7am)**
Sensitive Place – Residences			
$L_{Aeq,adj,15min}$	40	40	35

5 Noise Monitoring

The EIS noise assessment (AARC 2026) determined that under all meteorological conditions, noise levels at sensitive receptors listed in Table 2 are compliant, by a notable margin of 14 dBA below the proposed daytime noise limit of 40 dBA, and minimum 5 dB below the proposed night-time noise limit of 35 dBA. Given the models predict relative ease of compliance under various adverse meteorological conditions, regular or continuous noise monitoring is not considered necessary for the mine.

Noise monitoring at the Project is only proposed in the event of receipt of a non-vexatious noise complaint and is addressed in Section 7.

Where noise monitoring is to be conducted, it will be undertaken in accordance with the latest version of the Noise Measurement Manual (DES 2020), relevant Australian Standards and EA conditions.

Mining noise levels at receptors will generally be loudest at night-time, and therefore noise monitoring should consider this night-time period, and the time of complaint.

Noise monitoring should be conducted at or proximal to receptors, as listed in Table 2. The noise monitoring location should measure noise levels that are representative of the noise levels experienced at the residence.

It is generally preferred to undertake noise monitoring a little distance from a residence (e.g. 20 to 200 metres) for multiple reasons:

- to avoid noise levels from the house (e.g. television, talking, music, air-conditioning equipment) and nearby noise sources (e.g. pump, dog kennels);
- to avoid privacy concerns, as the noise logger may record audio in addition to numerical levels; and
- to minimise impacts to residents when setting up, retrieving or otherwise accessing the equipment.

Noise monitoring should include the following:

- location, date and time of monitoring;
- one-third octave band noise levels measured in 15-minute periods, including the L_{Aeq}, L_{A1}, L_{A10} and L_{90} parameters;
- continuous audio recording or regular audio samples;
- field notes describing the audible noise sources and their noise levels;
- the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels;
- weather data (i.e. wind direction and speed, rainfall, temperature and humidity); and
- any other specific requirements included in the EA.

6 Noise Management and Mitigation Strategies

The EIS noise report (AARC 2026) indicates that noise exceedance is very unlikely, and that noise mitigation measures are not required. However, this NMP includes potential noise management and mitigation strategies.

Should noise monitoring indicate that noise level exceedances occur at sensitive receptors, then further noise management may be required by way of:

- Regular or continuous noise monitoring;
- Development and implementation of a Trigger Action Response Plan (TARP);
- Management controls, including:
    - Awareness and training: site induction provides details on the compliance requirements regarding noise management on site; and
    - Reviewed noise complaints management system.
- Operational controls, including:
    - Controls that can be implemented quickly, for example:
        - Reducing the numbers of equipment in operation;
        - Management of mining equipment locations, such as operating at lower elevation or shielded areas.
    - Controls that require further investigation, for example:
        - Attenuation of equipment (e.g. improved mufflers, noise attenuation packages);
        - Use of broadband reverse beepers;
        - Use of silent horns; and
        - Construction of bund walls.

This NMP should be updated accordingly, should the above management and mitigation measures need to be implemented.

7 Complaints Management

A Complaints Management System is to be developed for the Project, and this will include management of noise complaints. This system will be used to record all feedback received from the community and respond appropriately to ensure community satisfaction and relationships are upheld.

Any noise complaints are to be directed to the Graphinex management team and the Graphinex Environmental Specialist.

Records of noise complaints are to include time, date, complainant location and description of noise causing the complaint.

Complaints are to be acknowledged within 2 business days of receiving the complaint, and investigated within 10 business days of receiving the complaint; or as directed by the administrating authority in accordance with the EA.

The noise investigation may include:

- Reviewing the complainant's location with respect to mine activities;
- Reviewing the complainant's location with respect to non-mine activities, e.g. nearby roads or other activities;
- Reviewing predicted noise levels at the complainant's location based on modelling in the EIS noise report (AARC 2026) – tabulated noise results and noise contours are included in Appendix B;
- Visiting the complainant and discussing the noise concern;
- Listening to mining noise at the complainant's location, noting the time of the complaint and the meteorological conditions experienced at that time; and/or
- Noise measurements at the complainants for an appropriate period (e.g. short-term attended measurements, longer term unattended monitoring) – refer to Section 5 for monitoring requirements.

All investigations are to be recorded in the complaints register, and if applicable, feedback is given to the complainant within 10 business days; or as directed by the administrating authority in accordance with the EA.

Complaints are to be reviewed two-yearly as per reporting requirements in Section 8.

8 Reporting and Review

The following are considered minimum requirements in relation to the recording of noise data and related reporting requirements:

- All monitoring results and complaint investigation records will be kept for a minimum of five years.
- The Environment Specialist will keep records of all audits.
- All complaints will be documented in the relevant register and reported to management and the administering authority where applicable as per the EA.
- Any noise criterion exceedance is to be reported to the administering authority as per the EA.

Graphinex will review and evaluate the suitability of this NMP on a two-yearly basis (or as otherwise required by the EA), and update it if required to address any administering authority comments. The review is to consider:

- Noise related complaints and management/mitigation actions made in response, if any;
- Noise monitoring results and comparison to performance criteria, if any;
- Ongoing noise management/mitigation measures, if any, and the NMP performance.

If the two-yearly review includes any non-vexatious noise complaints, and these noise complaints have not been previously reviewed or assessed by an independent appropriately qualified person (AQP), Graphinex may elect to have the two-yearly review of the NMP undertaken or audited by an AQP.

9 Roles and Responsibilities

Compliance with this NMP is the responsibility of Graphinex employees and contractors. The key roles and responsibilities for noise management at the Project are outlined in Table 4.

Table 4: Roles and Responsibilities for Noise Management

Role	Responsibility
General Manager	• Providing sufficient resources for effective implementation of this NMP. • If required negotiate with affected parties to resolve ongoing complaints.
Mining/Operations Manager	• Ensuring mining and noise mitigation measures are in accordance with this NMP. • Providing sufficient resources for effective implementation of this NMP.
Environmental Specialist	• Ensure noise monitoring is undertaken according to the requirements of this NMP, if required. • Responding to community complaints. • Liaising with regulatory authorities regarding noise management. • Schedule noise monitoring at the site of a sensitive receptor, if required. • Notifying the administering authority of exceedances in accordance with this NMP. • Maintaining the site's noise equipment, if any. • Coordinate any required noise mitigation measures outlined in this NMP. • Review and revise this management plan where required. • Make employees and contractors aware of their obligations under this NMP.
Mine SSE / OCE	• Implementing noise management measures in accordance with this NMP. • Developing and implementing specific procedures for employees and subcontractors under their responsibility to facilitate compliance with this NMP. • Ensuring employees and subcontractors under their control are aware of their obligations under this NMP. • Providing relevant environmental data to assist site with investigation and reporting requirements in accordance with this NMP.
All site employees and contractors	• Conducting activities, as required, in accordance with this NMP under instruction from their supervisor. • Informing either their supervisor or site environment and community specialist of any noise related issues as they arise.

References

AARC 2026, Graphinex Project Noise and Vibration Impact Assessment Report, dated 22 September 2026, AARC Environmental Solutions.

Department of Environment and Science (DES) 2020, Noise Measurement Manual, [ESR/2016/2195], version 4.01, Queensland Government, Brisbane.

Department of Environment, Science and Innovation (DESI) 2024, Noise and vibration – EIS information guideline, [ESR/2020/5305], Version 1.03, Queensland Government, Brisbane.

Standard Australia 2018, *Acoustics – Description and measurement of environmental noise (AS1055:2018)*, Standards Australia (Standards Association of Australia).

Appendix A. Terminology and descriptors

Table 5: Terminology and descriptors

Term or Descriptor	Definition
Noise	Noise is unwanted, harmful or inharmonious (discordant) sound. Noise usually includes vibration as well as sound.
Audible	Audible refers to a sound that can be heard. There are a range of audibility grades, varying from "barely audible", "just audible" to "clearly audible" and "prominent".
Ambient noise	The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including all forms of traffic, industry, lawnmowers, wind in foliage, insects, animals, etc. Usually assessed as an energy average over a set time period 'T' ($L_{Aeq,T}$).
Decibel or dB	The decibel (dB) is a logarithmic scale that allows a wide range of values to be compressed into a more comprehensible range, typically 0 dB to 120 dB. Noise levels in decibels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dB, and another similar machine is placed beside it, the level will increase to 53 dB (from 10 $\log_{10}(10^{(50/10)} + 10^{(50/10)})$ and not 100 dB. In theory, ten similar machines placed side by side will increase the sound level by 10 dB, and one hundred machines increase the sound level by 20 dB.
'A' frequency weighting	The 'A' frequency weighting roughly approximates to an equal loudness contour. The human loudness perception at various frequencies and sound pressure levels is equated to the level of 40 dB at 1 kHz. The human ear is less sensitive to low frequency sound and very high frequency sound than midrange frequency sound (i.e. 500 Hz to 6 kHz). Humans are most sensitive to midrange frequency sounds, such as a child's scream. Sound level meters have inbuilt frequency weighting networks that very roughly approximates the human loudness response at low sound levels. It should be noted that the human loudness response is not the same as the human annoyance response to sound. Here low frequency sounds can be more annoying than midrange frequency sounds even at very low loudness levels. The 'A' weighting is the most commonly used frequency weighting for occupational and environmental noise assessments. However, for environmental noise assessments, adjustments for the character of the sound will often be required.
'Z' frequency weighting	The 'Z' (Zero) frequency weighting is 0 dB within the nominal 1/3 octave band frequency range centred on 10 Hz to 20 kHz. A Z-weighted noise level will be higher than the A-weighted noise level for the same noise source due to the different weightings.
Sound pressure level, L_p	The level of sound measured on a sound level meter and expressed in decibels (dB). Where $L_P = 10 \log_{10}(Pa/Po)^2$ dB (or 20 $\log_{10}$(Pa/ Po) dB) where Pa is the rms sound pressure in Pascal and Po is a reference sound pressure conventionally chosen is 20 µPa (20 x 10^{-6} Pa) for airborne sound. L_p varies with distance from a noise source.
Sound power level, L_w	The sound power level of a noise source is the inherent noise of the device. Therefore sound power level does not vary with distance from the noise source or with a different acoustic environment. $L_w = L_p + 10$ log10 'a' dB, re: 1pW, (10-12 watts) where 'a' is the measurement noise-emission area (m^2) in a free field.
Free-field	In acoustics a free field is a measurement area not subject to significant reflection of acoustical energy. A free field measurement is typically not closer than 3.5 metres to any large flat object (other than the ground) such as a fence or wall or inside an anechoic chamber.
Frequency	The number of oscillations or cycles of a wave motion per unit time, the SI unit is the hertz (Hz). 1 Hz is equivalent to one cycle per second. 1000 Hz is 1 kHz.

Term or Descriptor	Definition
Loudness	The volume to which a sound is audible to a listener is a subjective term referred to as loudness. Humans generally perceive an approximate doubling of loudness when the sound level increases by about 10 dB and an approximate halving of loudness when the sound level decreases by about 10 dB.
Equivalent continuous sound level, L_{Aeq}	Many sounds, such as road traffic noise or construction noise, vary repeatedly in level over a period of time. Most modern sound level meters have an integrating/averaging electronic device inbuilt, which will display the energy time-average (equivalent continuous sound level - L_{Aeq}) of the 'A' frequency weighted sound pressure level. Because the decibel scale is a logarithmic ratio, the higher noise levels have far more sound energy, and therefore the L_{Aeq} level tends to indicate an average which is strongly influenced by short-term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closer to the L_{Aeq} noise level than any other descriptor.
LP L_{Aeq} (also LP L_{eq})	The low pass (LP) L_{Aeq} (see definition above) is summed over the lower frequency range of 20 to 630 Hz.
Statistical noise levels, L_n (e.g. L_1, L_{10}, L_{90})	Noise which varies in level over a specific period of time 'T' (standard measurement times are often 15-minute periods) may be quantified in terms of various statistical descriptors with some common examples: • The noise level, in decibels, exceeded for 1 % of the measurement time period, is reference to as L_1. This may be used for describing short-term noise levels such as could cause sleep arousal during the night. • The noise level, in decibels, exceeded for 10 % of the measurement time period, is reference to as L_{10}. In most countries the L_{10} is measured over periods of 15 minutes and is used to describe the average maximum noise level. The noise level, in decibels, exceeded for 90 % of the measurement time period, is reference to as L_{90}. In most countries the L_{90} is measured over periods of 15 minutes and is used to describe the average minimum or background noise level.
Background noise level, L_{90}	Total silence does not exist in the natural or built-environments, only varying degrees of noise. The Background Noise Level is the minimum repeatable level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by all forms of traffic, industry, lawnmowers, wind in foliage, insects, animals, etc. It is quantified by the noise level that is exceeded for 90 % of the measurement period 'T' ($L_{A90,T}$). Background Noise Levels are often determined for the day, evening and night time periods where relevant. This is done by statistically analysing the range of time period (typically 15 minute) measurements over multiple days (often 7 days). For a 15-minute measurement period the Background Noise Level is set at the quietest level that occurs at 1.5 minutes.
LP L_{A90} (also L_{90LF}, L_{A90LF}, LP L_{90}, or $L_{A90(20\text{-}630Hz)}$)	The low pass (LP) L_{A90} (see definition above) is summed over the lower frequency range of 20 to 630 Hz.
Maximum noise level, L_{max}	The maximum sound pressure level measured with sound level meter over a time period. If referring to a calculated noise level it may be referring to an average maximum noise level, though this should be clear in the report text.
Minimum noise level, L_{min}	The minimum sound pressure level measured with sound level meter over a time period.

Note: References include (1): https://aaac.org.au/Terminology

Appendix B. Predicted Noise Levels (AARC 2026)

The predicted noise levels presented in the EIS noise report (AARC 2026) are listed in Table 6.

The highest noise levels are calculated for Scenario 2 (Year 47) with CONCAWE night calm meteorological conditions. The noise contours associated with these calculations are shown graphically in Figure 5.

Table 6: Predicted A-weighted noise levels at sensitive receptors

Receptor	**Predicted A-weighted noise levels, $L_{Aeq,adj,15min}$ dBA**				
Met' condition:	**CONCAWE Day-calm**	**CONCAWE Day-downwind**	**CONCAWE Night-Calm**	**CONCAWE Night-Downwind**	**ISO 9613-2:2024**
Scenario 1					
R1 – Esmeralda	0	0	8	2	9
R2 – Prospect	19	25	29	26	28
R3 – Homestead	7	13	18	13	19
Scenario 2					
R1 – Esmeralda	0	2	10	5	9
R2 – Prospect	20	26	31	27	29
R3 – Homestead	9	15	20	16	20
Scenario 3					
R1 – Esmeralda	0	1	9	4	9
R2 – Prospect	18	24	28	25	28
R3 – Homestead	6	12	17	12	19
Scenario 4					
R1 – Esmeralda	0	1	9	4	8
R2 – Prospect	14	20	24	21	27
R3 – Homestead	3	8	13	9	19

Note: Predicted noise levels at residential sensitive receptors R1, R2 and R3 comply with 40 dBA daytime and 35 dBA night-time noise criteria.

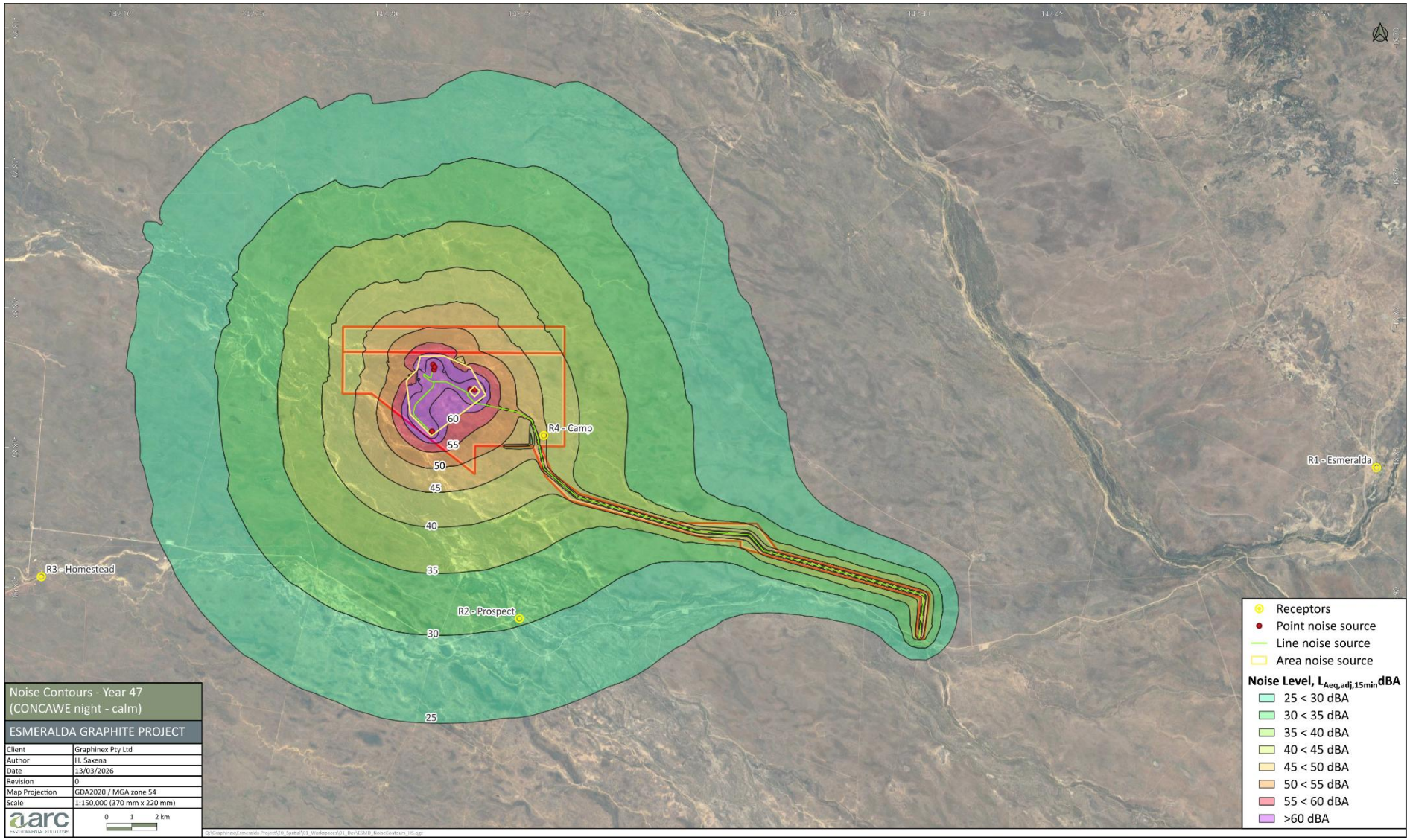


Figure 5: Noise contours (worst case - Scenario 2, Year 47 (CONCAWE Night-Calm conditions)