

## **STRATEGEN JBS&G**

**SAND EXTRACTION  
LOT 2 ROWLEY ROAD, MANDOGALUP**

## **ACOUSTIC ASSESSMENT**

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MANDOGALUP**

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**STRATEGEN JBS&G**

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## 1. INTRODUCTION

Herring Storer Acoustics have been commissioned by Strategen JBS&G to undertake an acoustic assessment of noise emissions from the proposed sand extraction operations located at Lot 2 Rowley Road, Mandogalup.

The operators of the proposed extraction on Lot 2 are currently extracting sand from the neighbouring premise to the west (Lot 10). Noise measurement of the existing operations has been undertaken with these noise levels being used to relate sand extraction to the proposed premise.

The proposed extraction operations will operate from 0700 – 1900 Monday to Friday and 0700 – 16:00 on Saturdays. No operations would occur on Sundays or Public Holidays.

The operations will contain a central area for the stockpiling of materials. Sand extraction will occur in various areas around the stockpiling area. This will be extracted using a front-end loader and screen within the sand pit. Semi-trailers will attend site and be loaded via the front-end loader for transport of sand offsite.

The main access road to Rowley Road is shown in Figure 1, along with the existing and proposed operations.



**FIGURE 1 – SAND EXTRACTION OPERATIONS**

This assessment is provided to support the regulatory approvals processes and show that compliance with the requirements of the Environmental Protection (Noise) Regulations 1997 can be achieved. Future residential development, as referenced in Figure 1 has been considered in this assessment.

As part of the study, the following was carried out:

- Identification of individual operations and the associated noise levels.
- Monitoring of existing ambient and sand extraction noise levels.
- Assess the predicted noise levels at the nearest surrounding noise sensitive premises for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

For information, a locality plan is shown in Appendix A.

## 2. SUMMARY

Assessment has been conducted on the proposed sand extraction operations for Lot 2 Rowley Road, Mandogalup.

The facility would only operate during the day period (i.e. within Monday to Saturday 0700 to 1900 hours). Therefore, at the neighbouring residences, the applicable acoustic criteria for this assessment are the assigned  $L_{A10}$  day period noise level of 50 dB(A).

Noise received at the nearest residential premises has been determined, to be 50 dB(A) for the sand operations. This can be compared to the applicable assigned noise level criteria of 50 dB(A).

Although unlikely (based on background noise measurement) the above assessable noise levels have been considered to contain tonal characteristics and therefore, contains a +5 dB(A) penalty.

It is noted that the above noise level allows for the start of operations at natural ground level, however, if this occurs, then a 3m bund would be required until the pit is developed to greater than 3m below ground level. Operations for the future sand pit has been based at the eastern boundary of the premise. It is also noted that this would be considered a worst-case scenario as there it likely to be a buffer / setback from the boundary. Additionally, upon review of the future residence to the east, the estate is located in a considerable cutting. The receiver (future slab heights of the housing) a likely to be 5 to 6m below those assumed in this assessment. Although the assessable noise level is 50 dB(A) for this scenario, expectations are that it would be less given the additional cutting in the neighbouring development.

Given these operating parameters, noise levels received at the nearest premises has been determined to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment, even with the inclusion of a +5 dB(A) penalty for tonality.

## 3. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

**TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL**

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L <sub>A 10</sub>	L <sub>A 1</sub>	L <sub>A max</sub>
Noise sensitive premises	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF

Note: L<sub>A10</sub> is the noise level exceeded for 10% of the time.  
L<sub>A1</sub> is the noise level exceeded for 1% of the time.  
L<sub>Amax</sub> is the maximum noise level.  
IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

**“impulsiveness”** means a variation in the emission of a noise where the difference between L<sub>Apeak</sub> and L<sub>Amax Slow</sub> is more than 15 dB when determined for a single representative event;

**“modulation”** means a variation in the emission of noise that –

- (a) is more than 3dB L<sub>A Fast</sub> or is more than 3 dB L<sub>A Fast</sub> in any one-third octave band;
- (b) is present for more at least 10% of the representative assessment period; and
- (c) is regular, cyclic and audible;

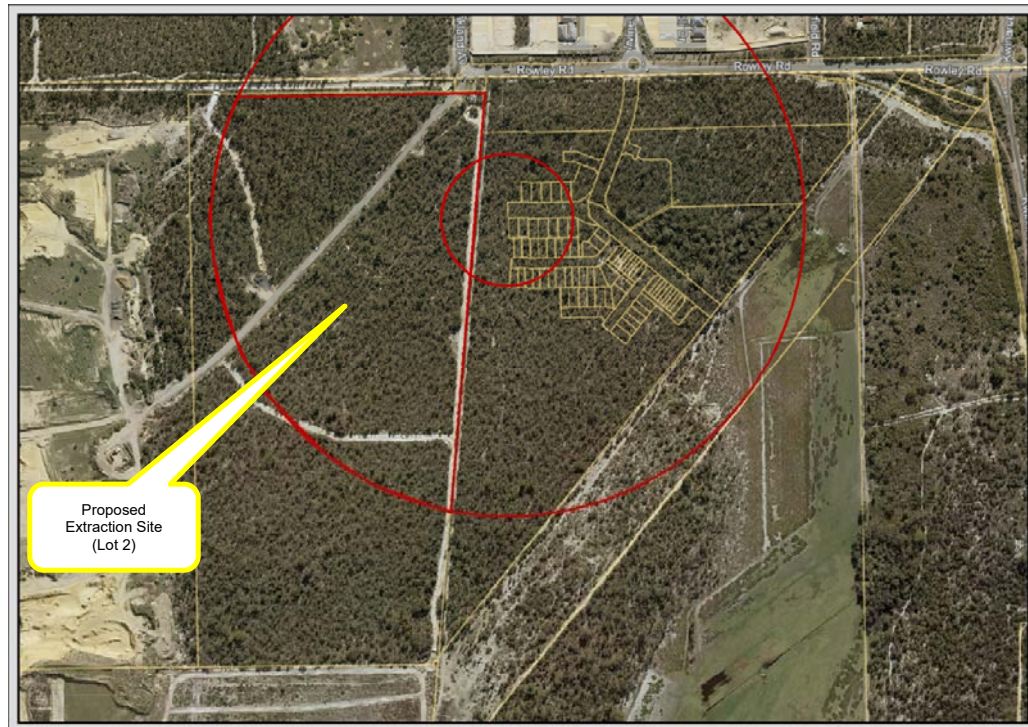
**“tonality”** means the presence in the noise emission of tonal characteristics where the difference between –

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as L<sub>Aeq,T</sub> levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L<sub>A Slow</sub> levels.

The nearest potential noise sensitive premises to the proposed development have been identified using the area map in Figure 2.

Due to the distance from the prescribed premise (Lot 2) the influencing factor is 5 dB. Therefore, the assigned noise levels for operational times are as noted in Table 3.



**FIGURE 2 – RECEIVER LOCATION MAP**

**TABLE 3 – ASSIGNED NOISE LEVELS**

Premises Receiving Noise	IF dB	Time of Day	Assigned Level (dB)		
			L <sub>A</sub> 10	L <sub>A</sub> 1	L <sub>A</sub> max
Receiver	5	0700 - 1900 hours Monday to Saturday (Day)	50	60	70

#### 4. MONITORED NOISE LEVELS

As per the “Draft Guidelines on Environmental Noise for Prescribed Premises” (released in May 2016), continuous noise monitoring has been conducted to establish the ambient noise levels.

The monitoring locations were chosen to represent the various activities occurring in the area. Figure 3 contains a map of the monitoring location.





FIGURE 3 – MONITORING LOCATION MAP

Noise monitoring results are contained in Appendix C.

## 5. CALCULATED NOISE LEVELS

Noise immissions<sup>1</sup> at the nearest neighbouring residential premises, due to noise associated with the proposed operations, were modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of equipment proposed for use on site (based on current usage).

The modelling of noise levels has been based on noise sources and sound power levels shown in Table 5.

TABLE 5 – SOUND POWER LEVEL - NOISE SOURCES dB(A)

Source Name	Quantity	SWL dB(A)
Front End Loader (Komatsu WA430)	1	105
Screening Plant	1	101
Truck (Semi Trailer)	3	98

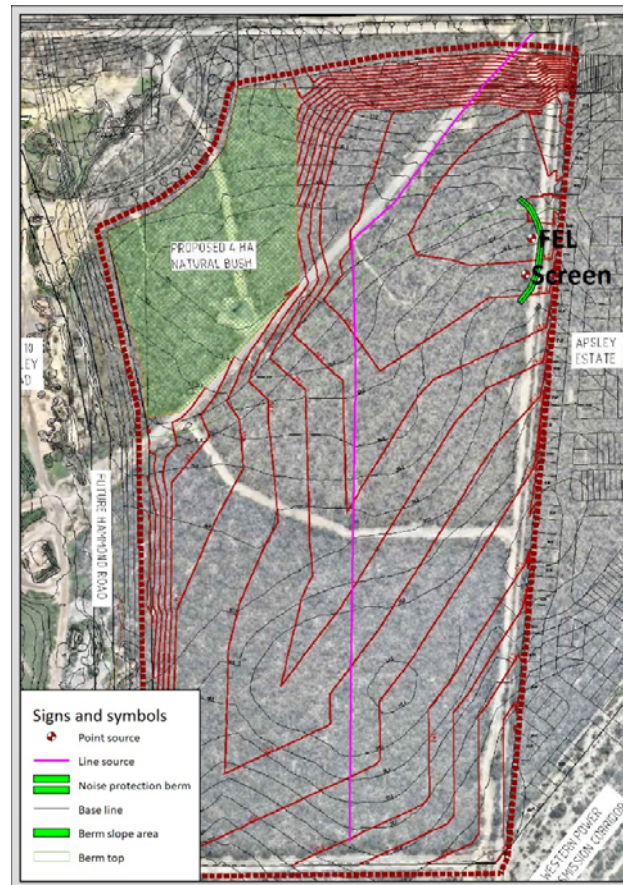
Note: The above equipment models have been used to provide an indication of the size. Other models may be used although these have been assumed to have a similar sound power level.

Based on noise emissions from the above equipment, a preferred operating scenario has been developed. Figure 5 details the source locations assumed in the predictive modelling.

<sup>1</sup> Immissions – noise received at a source

<sup>2</sup> Emissions – noise emanating from a source and / or location





**FIGURE 5 – SOURCE LOCATION**

Based on the initial modelling scenario, the noise sources have been placed at natural surface level. This allows for a worst-case operating scenario, however, as it is more likely the sources will be below this ground level once the pit progresses. To allow for this, additional bunding around the loader and screen have been included in the modelling. The height of the bund has been set at 3 metres and has been located 15 metres from the screen and 40 metres from the loader (in the direction of the noise sensitive receivers).

Operations for the future sand pit has been based at the eastern boundary of the premise. It is noted that this would be considered a worst-case scenario as there is likely to be a buffer / setback from the boundary. Additionally, upon review of the future residence to the east, the estate is located in a considerable cutting. The receiver (future slab heights of the housing) are likely to be 5 to 6m below those assumed in this assessment (natural ground level) hence the expected noise level would be less than those assumed in the modelling. This provides an additional component to the “worst case” scenario considered.

The following input data was used in the calculations:

- Provided area plots.
- Sound Power Levels listed in Table 5.
- Ground contours and receiver point provided by client.

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "Draft Guidelines on Environmental Noise for Prescribed Premises" and for the day period are as listed in Table 6.

**TABLE 6 – WEATHER CONDITIONS**

Condition	Day
Temperature	20°C
Relative humidity	50%
Pasquill Stability Class	E
Wind speed	4 m/s*

\* From sources, towards receivers.

## 6. RESULTS

Calculated noise levels associated with the noise emissions from the proposed operations for the assumed scenario, are summarised below in Table 7. Appendix B contains the overall noise contour plot.

**TABLE 7 – CALCULATED NOISE LEVEL**

Location	Calculated Noise Level (dB(A))
	L <sub>A10</sub>
Future Closest Residence	45

## 7. ASSESSMENT

For the day time operations, based on calculated noise levels at the nearest premises and the monitored ambient noise levels, noise levels are unlikely to be considered as being tonal in characteristics due to the background noise level being between 50 and 60 dB(A), as referenced by Logger B in Appendix C. However, to provide a conservative assessment, a +5 dB(A) penalty has been included to allow for a tonal component for the future residence.

Hence, Table 8 summarises the applicable Assigned Noise Levels, and assessable noise level emissions, for the cumulative (all industry) scenario considered.

**TABLE 8 – APPLICABLE ADJUSTMENTS AND ASSESSABLE LEVEL OF NOISE EMISSIONS, dB(A)**

Receiver	Calculated Noise Level, dB(A)	Applicable Adjustments to Measured Noise Levels, dB(A)			Assessable Noise Level, dB(A)
		Where Noise Emission Is Not Music			
		Tonality	Modulation	Impulsiveness	
Future Closest Residence	45	+5	-	-	50

Based on the assessable noise levels above, comparison against the relevant assigned noise level is contained in Table 9.

**TABLE 9 – ASSESSMENT OF NOISE LEVELS**

Premises Receiving Noise	Assessable Noise Level dB(A)	Time of Day	Assigned Level (dB)	Compliance
Res A	50	0700 - 1900 hours Monday to Saturday (Day)	50	Complies

## 8. CONCLUSION

Assessment has been conducted on the proposed sand extraction operations for Lot 2 Rowley Road, Mandogalup.

The facility would only operate during the day period (being Monday to Friday 0700 to 1900 hours and 0700 to 1600 on Saturdays). Therefore, at the neighbouring residences, the applicable acoustic criteria for this assessment are the assigned  $L_{A10}$  day period noise level of 50 dB(A).

Noise received at the nearest residential premises has been determined, to be 50 dB(A) for the sand operations. This can be compared to the applicable assigned noise level criteria of 50 dB(A).

Although unlikely (based on background noise measurement) the above assessable noise levels have been considered to contain tonal characteristics and therefore, contains a +5 dB(A) penalty.

Given these operating parameters, noise levels received at the nearest premises has been calculated to comply with the *Environmental Protection (Noise) Regulations 1997* for the operating times as outlined in this assessment, even with the inclusion of a +5 dB(A) penalty for tonality.

## **APPENDIX A**

FIGURE A1 – LOCATION MAP

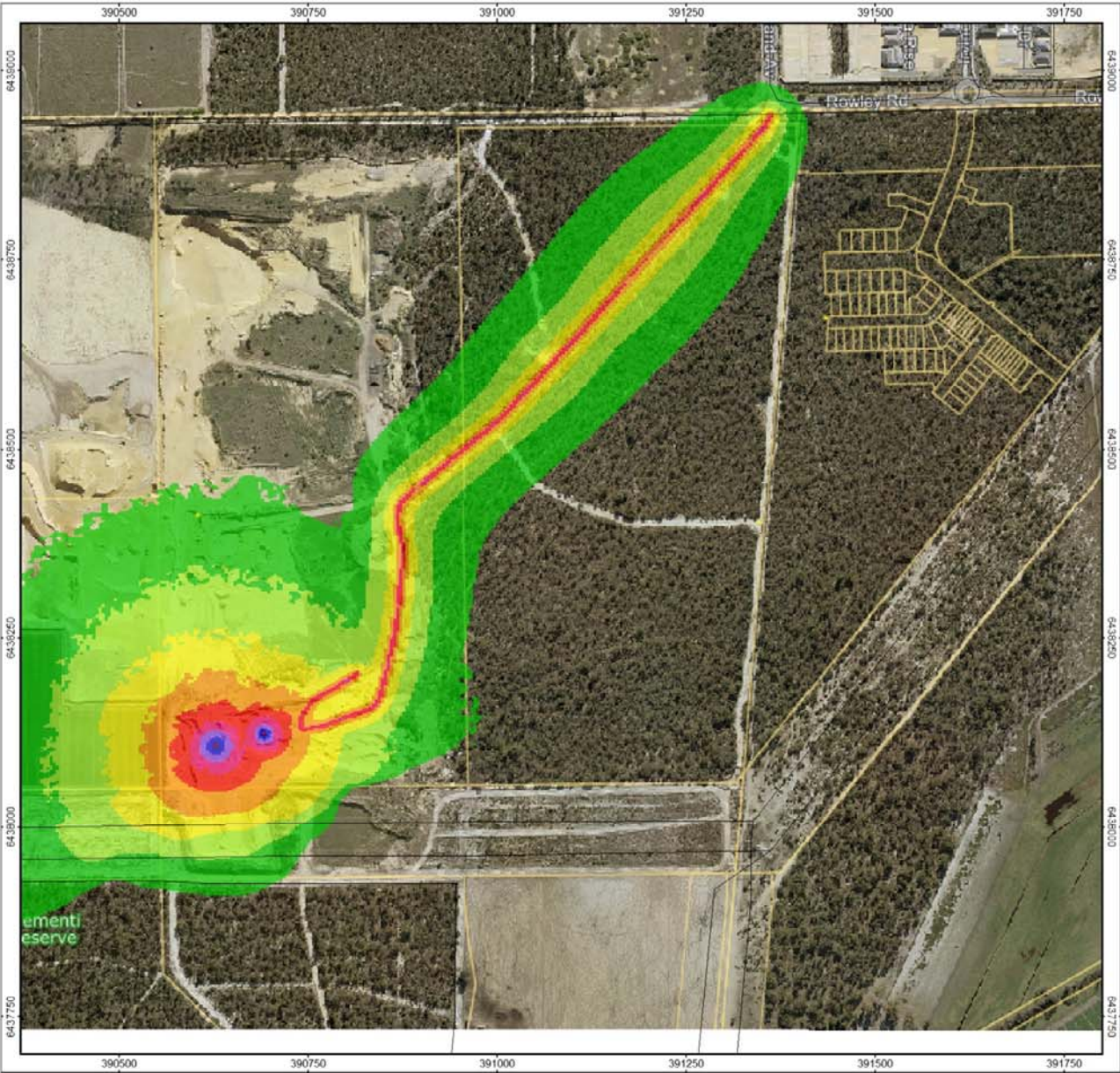
FIGURE A1 – SITE LAYOUT



## **APPENDIX B**

### Noise Contours





Customer:  
Stratgen  
Project: Rowley Road Sand Pit  
Project-No. 19305

Map  
1

Current Operations GNM  
Result number 3  
Calculation in 1.5 m above ground

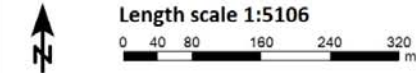
Project engineer: PLD  
Created: 15/06/2020  
Processed with SoundPLAN 8.2, Update 8/06/2020

Levels LA10  
in dB(A)

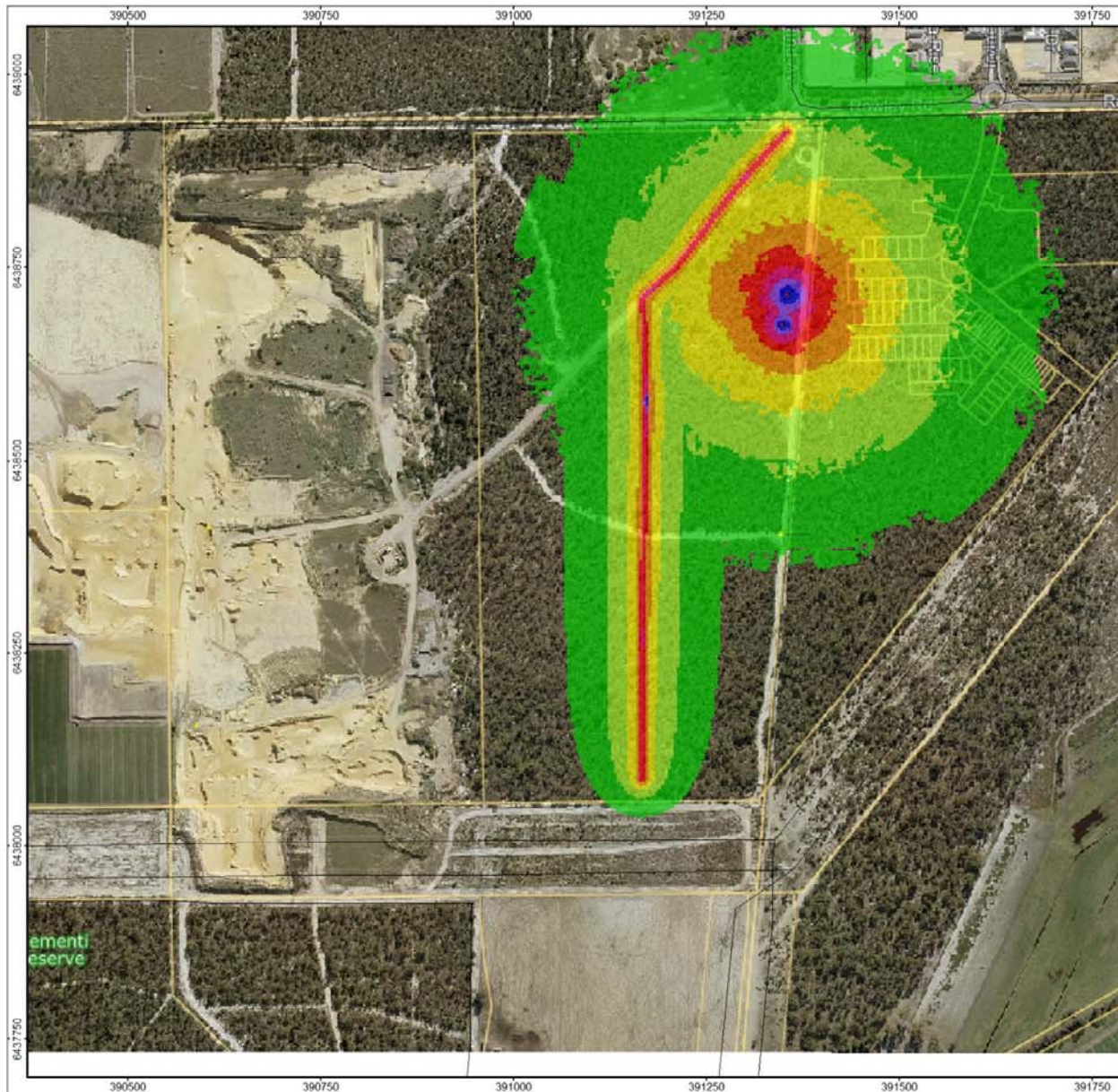


Signs and symbols

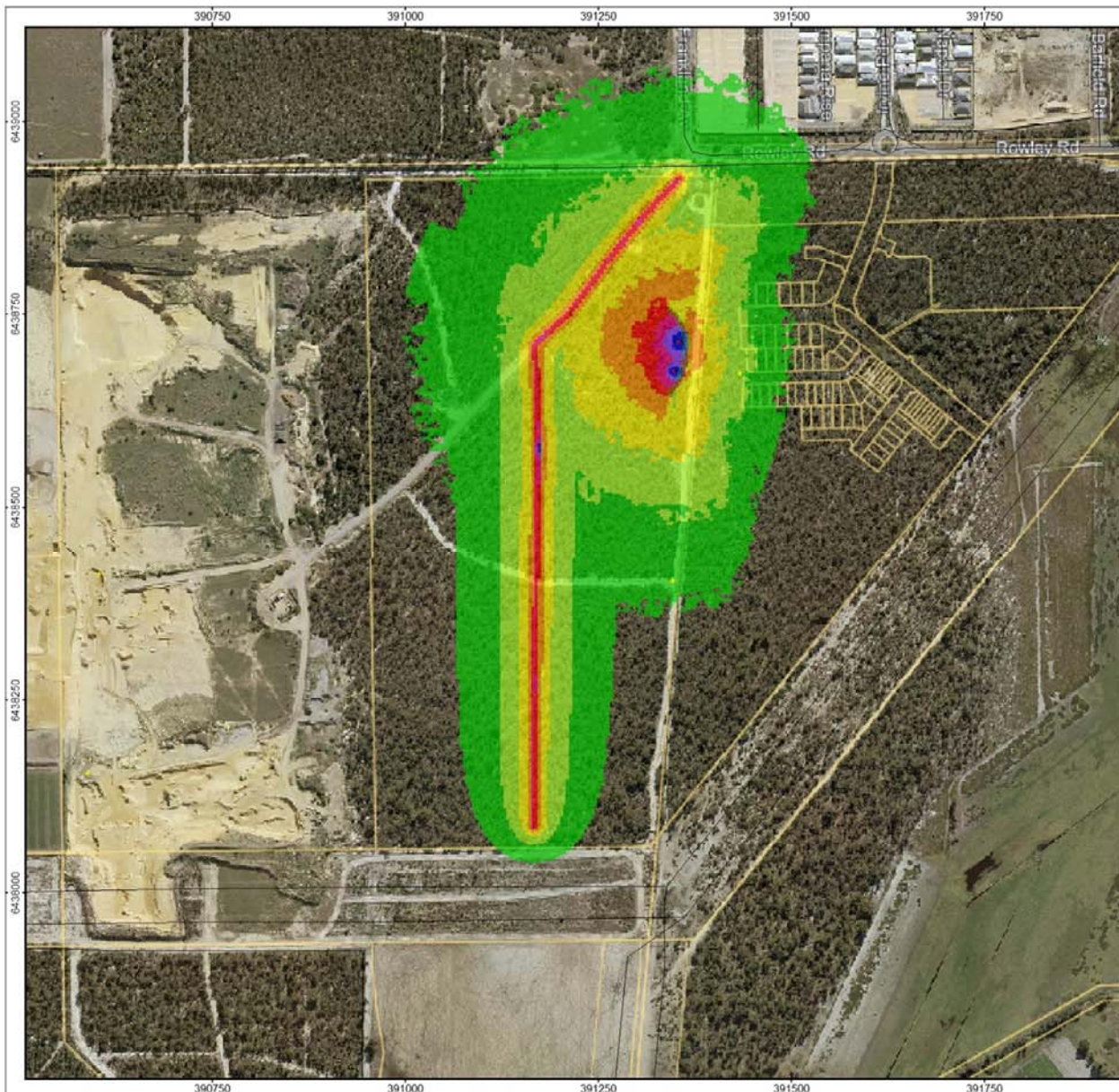
- Road axis
- Emission line
- Surface
- Central reservation
- Wall
- Inside tunnels
- Signal
- Railway axis
- Emission line
- Surface
- Wall
- Inside tunnels











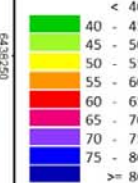
**Customer:**  
**Strategen**  
**Project: Rowley Road Sand Pit**  
**Project-No. 19305**

**Map**  
**3**

**Future Operations With Bunds Rev 15062020 GNM**  
**Result number 7**  
Calculation in 1.5 m above ground

Project engineer: PLD  
Created: 15/06/2020  
Processed with SoundPLAN 8.2, Update 8/06/2020

**Levels LA10**  
in dB(A)



**Signs and symbols**

- Road axis
- Emission line
- Surface
- Central reservation
- Wall
- ... Inside tunnels
- Signal
- Railway axis
- Emission line
- Surface
- Wall
- ... Inside tunnels



**Length scale 1:5106**



## **APPENDIX C**

### Monitored Noise Levels Chart

