

ACOUSTIC ASSESSMENT

LOT 1002 PRESTON BEACH ROAD - LIMESTONE QUARRY

FOR

EMISSION ASSESSMENTS PTY LTD

AUGUST 2020

REFERENCE: 26252-1-20174

DOCUMENT CONTROL PAGE

ACOUSTIC ASSESSMENT

LOT 1002 PRESTON BEACH ROAD - LIMESTONE QUARRY

Job No: 20174

Document Reference: 26252-1-20174

FOR

EMISSION ASSESSMENTS PTY LTD

DOCUMENT INFORMATION				
Author:	Paul Drew	Checked By:	Paul Daly	
Date of Issue :	1 September 2020			
REVISION HISTORY				
Revision	Description	Date	Author	Checked
DOCUMENT DISTRIBUTION				
Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Emission Assessments Pty Ltd Attn: Daniel Jackson Email: daniel@eapl.net.au		✓

CONTENTS

1.0	INTRODUCTION	1
2.0	BASELINE NOISE MONITORING	2
3.0	ACOUSTIC CRITERIA	3
4.0	METHODOLOGY	5
5.0	PREDICTED NOISE LEVELS	6
6.0	CONCLUSION	7

APPENDIX

A	Noise Contour Plots
---	---------------------

1.0 INTRODUCTION

Emission Assessments Pty Ltd commissioned Herring Storer Acoustics to carry out an acoustic assessment of noise emissions for a proposed limestone extraction operation at Lot 1002 Preston Beach Road. The proponent is Doyle's Lime Services.

The surrounding area contains a number of rural properties, some with dwellings, and there are a number of rural and public purposes premises nearby, including the Martins Tank campground and recreational walk trails within bushland. The neighbouring noise sensitive premises and extraction pit location are shown on Figure 1.

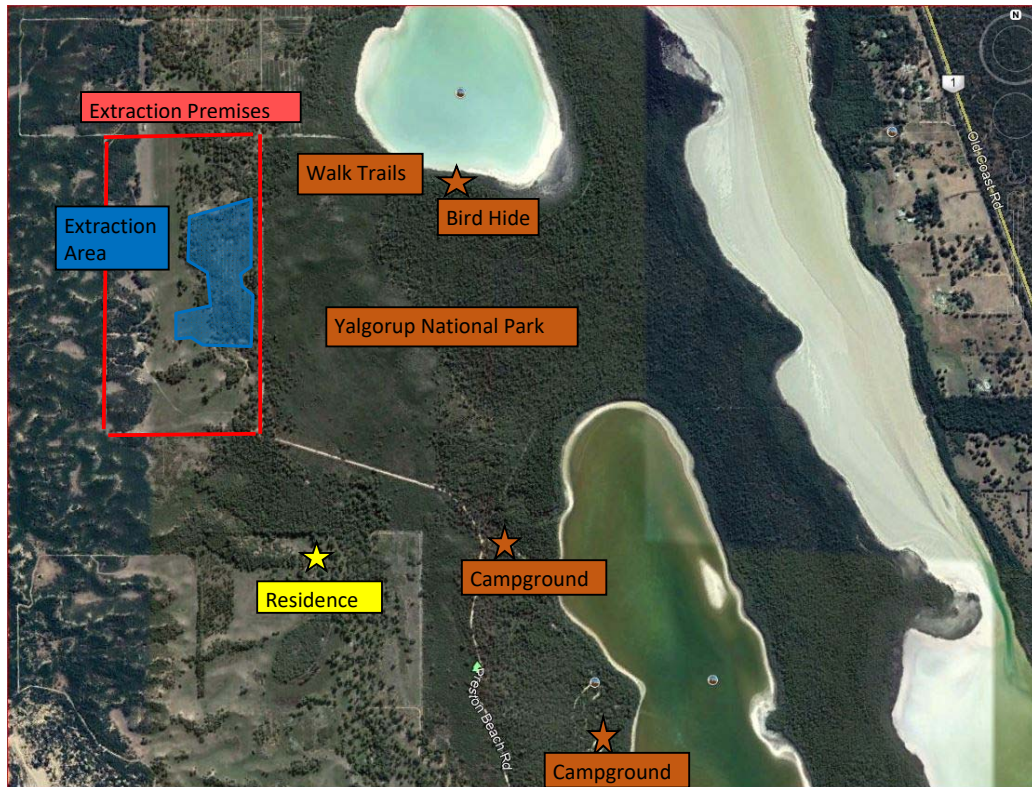


FIGURE 1 – AERIAL VIEW OF SITE AND NOISE SENSITIVE RECEPTORS

The operations are intended to operate between December to April each year, during the weekday period as defined under the *Environmental Protection (Noise) Regulations 1997*. The limited period of operation is because lime products are only required in late summer and autumn for agricultural purposes.

Proposed operations include the relocation of topsoil, and in some areas overburden, with extraction of sand and limestone from 15m AHD to 5-6m AHD. This operation is anticipated to be carried out using a loader, excavator, mobile crusher and screen and 10,000 litre water truck. A maximum of ten trucks per day will enter site to transport extracted product.

The purpose of this assessment is to determine whether the project will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

2.0 BASELINE NOISE MONITORING

The baseline existing noise environment has been characterised through noise monitoring. The baseline noise monitoring was carried out over the period 4th to 11th June 2020.

Monitoring was carried out in bushland on the western side of the Martins Tank access road, opposite the main Martins Tank access road (northern entry), near the hiking trail parking area. This is considered representative of the area general background noise environment, as many of the camping areas are also close to trees / bushland, and a similar distance from Forrest Highway and the coast (wave generated noise). The monitoring location was also chosen as it was not likely to be disturbed by users within the local area.

Weather conditions were obtained from the Bunbury Bureau of Meteorology (BOM) web site, this being the nearest available weather monitoring site. Wind speed and direction are plotted on the statistical noise measurement graphs, Figures 1 & 2.

The monitoring period covered a range of wind conditions, including low windspeed conditions, which typically are the wind conditions where greatest sound propagation occurs and also the condition when background noise is lowest. The lower background noise levels associated with low wind speeds are because wind induced noise generated by the tree canopy are minimized.

The acoustic parameters of interest include the statistical L_{A90} and L_{A10} levels. The subscript 90 refers to the 90th percentile for the 15 minute measurement period, essentially the noise level in dB(A) which is not exceeded for 90 seconds within that 15 minute measurement period (nearly the lowest noise level). The L_{A90} noise levels are of interest in baseline noise monitoring because this represents the period where plant noise levels could be most audible at residential receptor locations.

A graph of 7 days of measured noise levels shows the variation in noise level over time is shown below as Figure 2. The noise monitoring for the period 7th - 10th of June has been shown, allowing the variation in sound level to be more clearly seen.

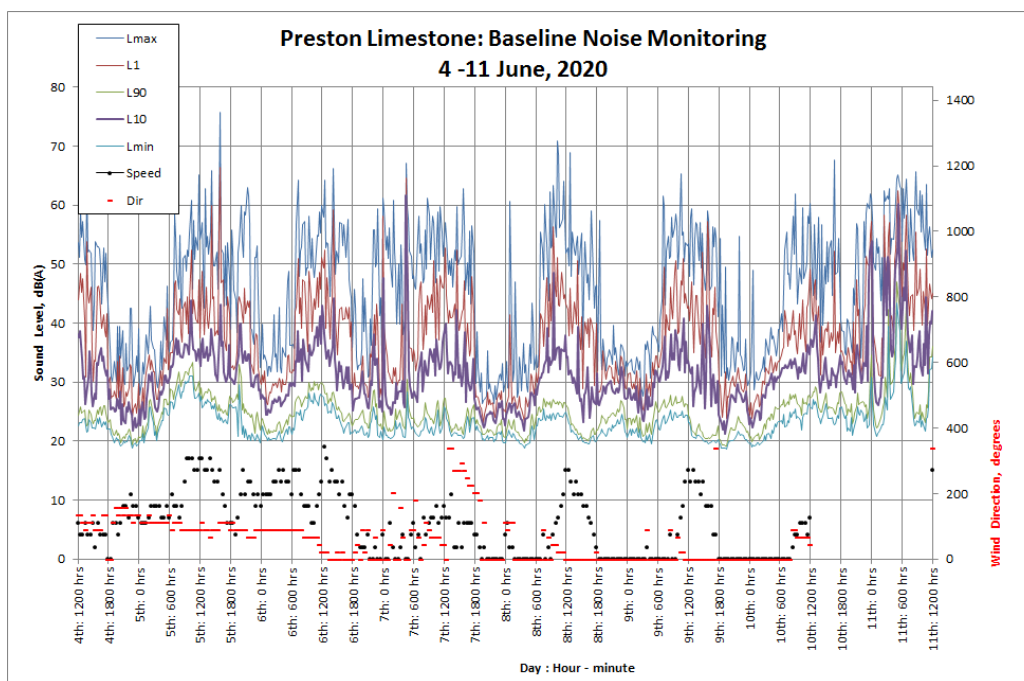


FIGURE 2 – BACKGROUND NOISE MONITORING

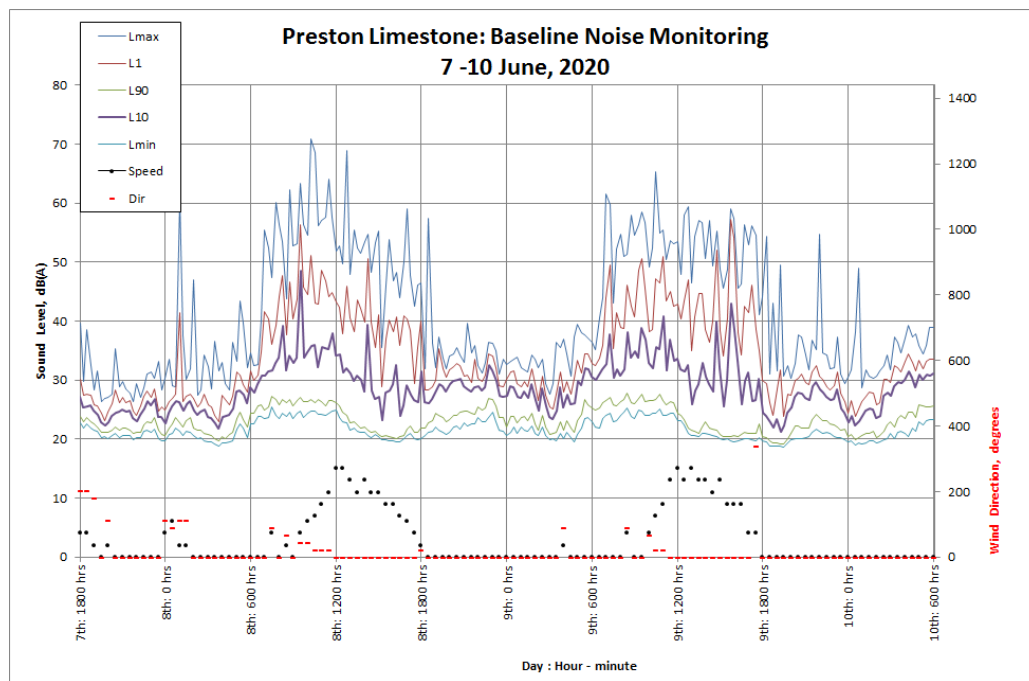


FIGURE 3 – BACKGROUND NOISE MONITORING – 3 DAY ZOOM

From the statistical monitoring it is evident that this is a relatively quiet location, with the typical range of noise levels during the lower wind-speed conditions being.

L _{A90}	20 – 25 dB(A)
L _{A10}	30 – 35 dB(A)

The main sources of background noise are wind induced tree noise, fauna and insects, coastal wave noise and traffic noise from Forrest Highway.

There are no other extractive industries or other premises that generate significant noise at the nearby receptors.

3.0 ACOUSTIC CRITERIA

The criteria used is in accordance with the *Environmental Protection (Noise) Regulations 1997 (as amended)*. These regulations stipulate maximum allowable external noise levels determined by the calculation of an influencing factor. The influencing factor is calculated for the usage of land within the two circles, having radii of 100m and 450m from the premises of concern.

TABLE 3.1 –ASSIGNED OUTDOOR NOISE LEVELS

Type of premises receiving noise	Time of day	Assigned level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area (i.e within 15m of a dwelling)	0700 to 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial premises	All hours	60	75	80

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
 The L_{A1} noise level is the noise that is exceeded for 1% of the time.
 The L_{Amax} noise level is the maximum noise level recorded.
 IF = Influencing Factor

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined below as per Regulation 9.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

TABLE 3.2 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS WHEN MUSIC IS NOT PRESENT

Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

Residential receptors in the vicinity have background noise levels typical of a rural setting. These receptors may, if the equipment has strong characteristics such as tonality, be exposed to noise characteristic from limestone extraction operations. Where noise emissions are dominant, loader crusher and screen noise emissions can exhibit tonal characteristic. At distance loader noise emissions are generally not tonal. The operation of an excavator and trucks are unlikely to exhibit noise characteristic at receptors.

Key receptors and influencing factors have been determined based on rural land use zoning near the receptors. The identified receptors and calculated influencing factors / assigned levels are listed in Table 3.3. Note that only residential receptors have assigned levels determined by the influencing factor. All other receptor types have fixed assigned levels.

TABLE 3.3 –RECEIVER INFLUENCING FACTORS

Receptor	Industrial% Inner	Industrial% Outer	Commercial% Inner	Commercial% Outer	TF (1)	IF (2)	Weekday 'assigned level', L _{A10} dB(A)
R1 – Rural residence to the south	0	0	0	0	0	0	45
R2 - > 15m from R1 dwelling at property boundary.							60
R3– Martins Tank campground							60
R4 – Bird hide (lakes edge)							60
R5 – hike trail / park boundary							60

Notes:

1. Traffic Factor.
2. Influencing Factor.
3. For these premises, the high influencing factor is overridden by the fixed level criteria for 'Noise sensitive premises: any area other than highly sensitive area', which is an L_{A10} of 60 dB(A). If this does not strictly apply within 15m of the dwelling, it does apply further than 15m and these premises are larger lots and both categories apply.

The most critical assessment parameter is the L_{A10} noise level 'assigned level' at the respective receptor locations.

R1 residence is a "Noise sensitive premises: highly sensitive area". The rural properties at distances greater than 15m from the dwellings are "Noise sensitive premises: any area other than highly sensitive area". The Martins Tank campground is an official signed campground, however there are no accommodation buildings so it is a "Noise sensitive premises: any area other than highly sensitive area". Similarly, the park area used for hiking and the bird hide is also classified as "Noise sensitive premises: any area other than highly sensitive area".

4.0 METHODOLOGY

Noise levels were predicted using the acoustic software "SoundPlan" for worst case wind conditions as per the DER 'Draft Guideline on Environmental Noise for Prescribed Premises (May 2016)' for day operation.

It is noted that 'worst case' wind conditions refer to conditions where there is a temperature inversion in conjunction with light winds in the direction from noise source to receiver, resulting in effective sound propagation to receiver locations.

The sound power levels used in the acoustic modelling are shown in Table 4.

TABLE 4.1 – EQUIPMENT SOUND POWER LEVELS

Where tonality is present	Sound Power Level, dB(A)
Impact Crusher (Terex Finlay I-130)	112
Supertrak (Terex Finlay 693+)	107
CAT 972 Front End Loader	105
CAT 330F Excavator	105
Sand Truck B-double (25 ton)	101
Water Truck	101

Various operating scenarios were modelled. These were:

- Initial Extraction at ground surface
- Extraction at northern end of site
- Extraction near eastern boundary

Acoustic modelling for the crusher and screen within 100m of the eastern boundary incorporates a 6m high stockpile on the eastern side of the crusher and screen.

It is noted that the site will only be operated during the period December to April, as limestone is extracted and trucked directly for use. Agricultural limestone is usually applied once crops have been harvested. The prevailing wind conditions for summer are predominantly easterly winds throughout the morning and mid-day period, with south-westerly winds in the afternoon.

5.0 PREDICTED NOISE LEVELS

Predicted noise emissions are shown on contour plots in Appendix A. Under ‘worst case’ day time wind conditions.

The noise contour plots within Appendix A are:

- 102 Initial Extraction at ground surface;
- 103 Extraction at northern end of site;
- 105 Extraction near eastern boundary;

Noise levels were predicted to identified receptor locations. These are shown in Table 5.1.

TABLE 5.1 – PREDICTED SOUND LEVELS DURING MAXIMUM DAYTIME PROPAGATION CONDITIONS

Receptor	Daytime Assigned Level, L _{A10} dB(A)	Initial Extraction Sound Level, dB(A)	North Extraction Sound Level, dB(A)	West Boundary Extraction Sound Level, dB(A)	Comment
R1 – Rural residence to the south	45	20	35	18	Complies
R2 - > 15m from R1 dwelling at property boundary.	60	39	37	41	Complies
R3– Martins Tank campground	60	35	33	31	Complies
R4– Martins Tank campground	60	27	25	23	Complies
R5 – Bird hide (lakes edge)	60	36	31	31	Complies
R6 – Hike trail / park boundary	60	59	49	58	Complies

Acoustic modelling for the crusher and screen within 100m of the eastern boundary incorporates a 6m high stockpile on the eastern side of the crusher and screen.

The maximum predicted noise emission at the bird hide and Martins Tank campgrounds under conditions of maximum sound propagation is 36 dB(A). It is noted however, that during the extraction months December – April, prevailing winds are easterly or south westerly, therefore much of the extraction period noise emissions at these locations will be reduced.

The acoustic modelling shows that the proposed sand and limestone extraction will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

6.0 CONCLUSION

Emission Assessments Pty Ltd commissioned Herring Storer Acoustics to carry out an acoustic assessment of noise emissions for a proposed limestone extraction operation at Lot 1002 Preston Beach Road. The proponent is Doyle's Lime Services.

The surrounding area contains a number of rural properties, some with dwellings, and there are a number of rural and public purposes premises nearby, including the Martins Tank campground and recreational walk trails within bushland.

The operations are intended to operate between December to April each year, during the weekday period as defined under the *Environmental Protection (Noise) Regulations 1997*. The limited period of operation is because lime products are only required in late summer and autumn for agricultural purposes.

The baseline existing noise environment has been characterised through noise monitoring. The baseline noise monitoring was carried out over the period 4th to 11th June 2020.

Noise levels were predicted using the acoustic software "SoundPlan" for worst case wind conditions as per the DER 'Draft Guideline on Environmental Noise for Prescribed Premises (May 2016)' for day operation.

Various operating scenarios were modelled. These were:

- Initial Extraction at ground surface;
- Extraction at northern end of site; and
- Extraction near eastern boundary.

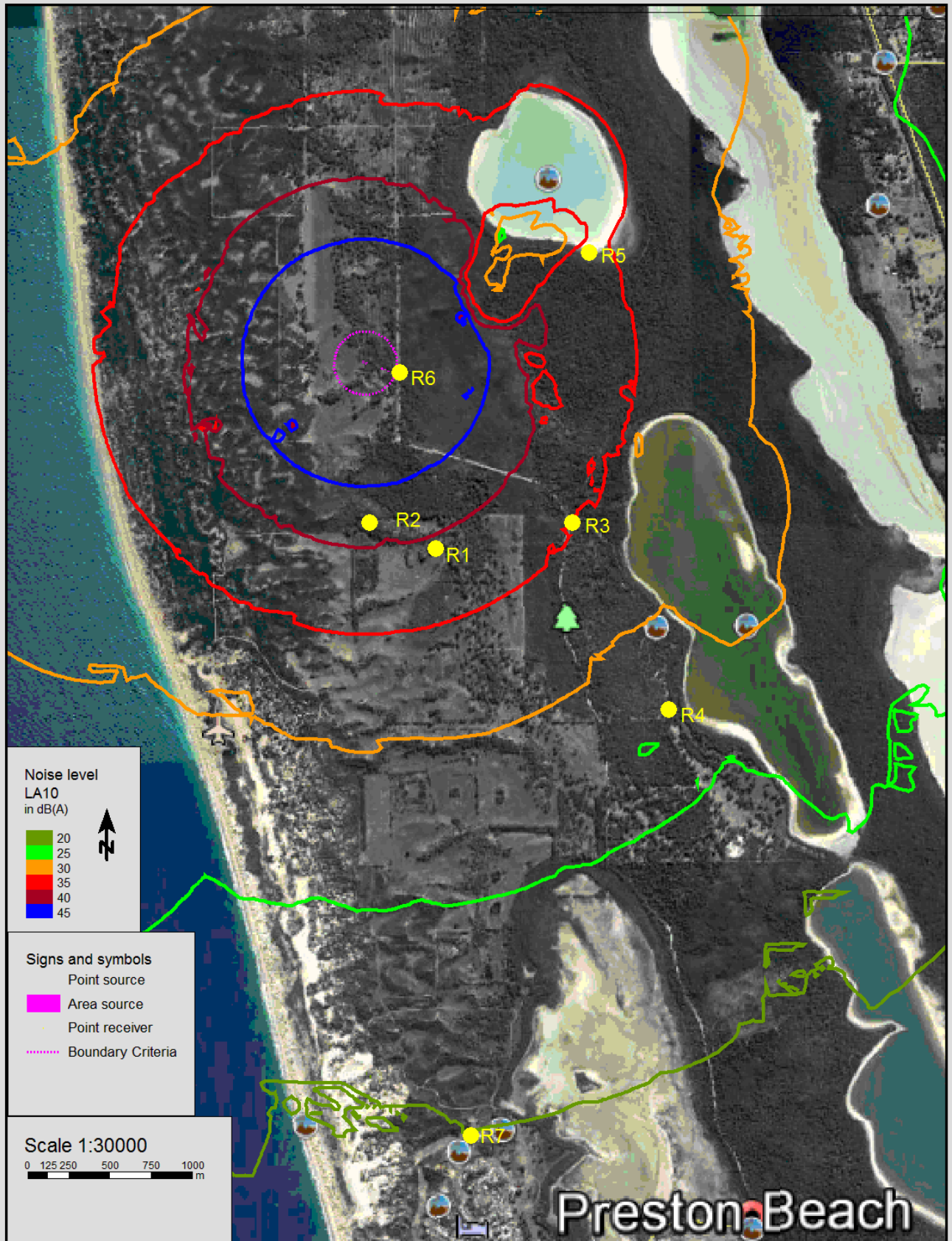
Acoustic modelling for the crusher and screen within 100m of the eastern boundary incorporates a 6m high stockpile on the eastern side of the crusher and screen.

The maximum predicted noise emission at the bird hide and Martins Tank campgrounds under conditions of maximum sound propagation is 36 dB(A). It is noted however, that during the extraction months December – April, prevailing winds are easterly or south westerly, therefore much of the extraction period noise emissions at these locations will be reduced.

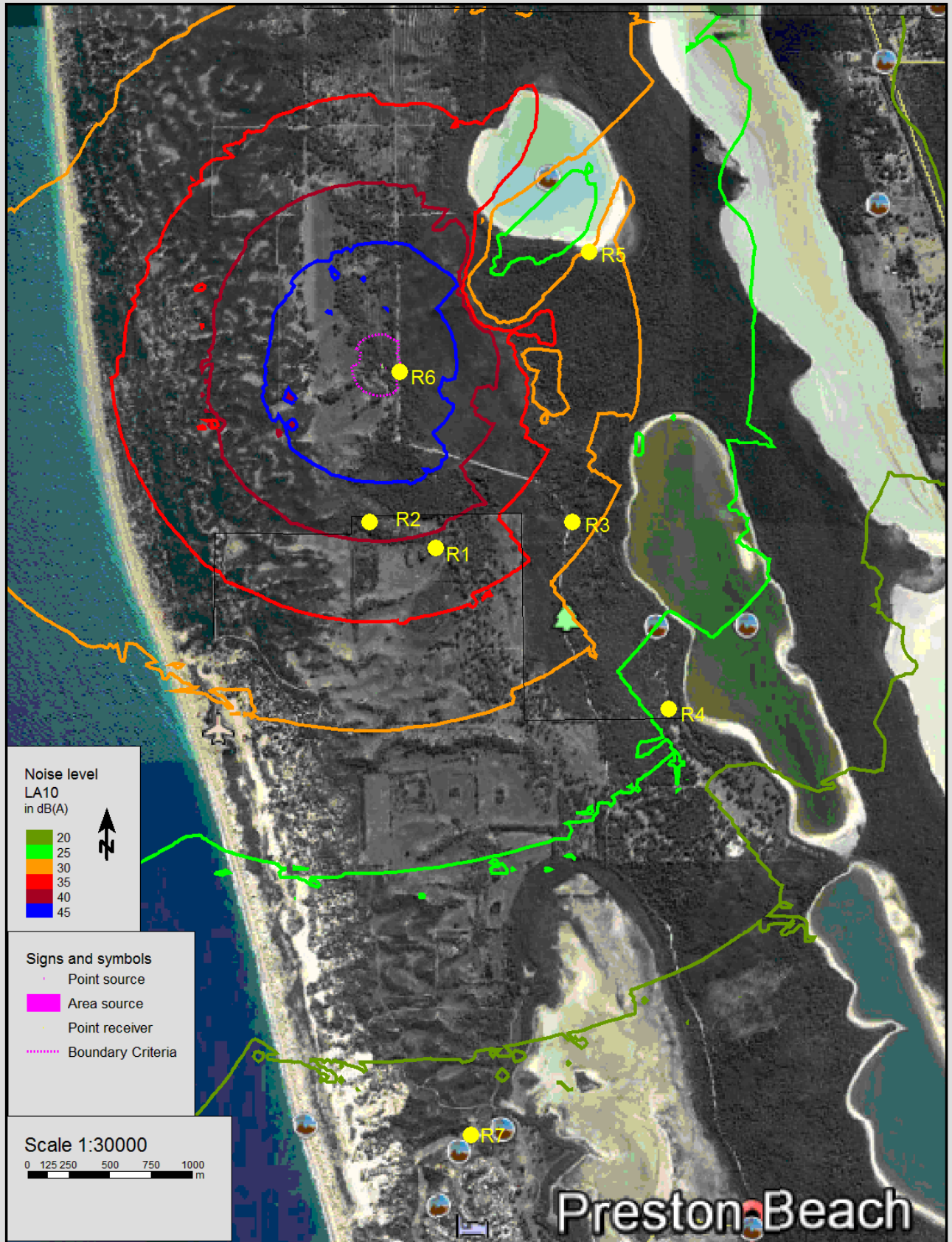
The acoustic modelling shows that the proposed sand and limestone extraction will comply with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

APPENDIX A

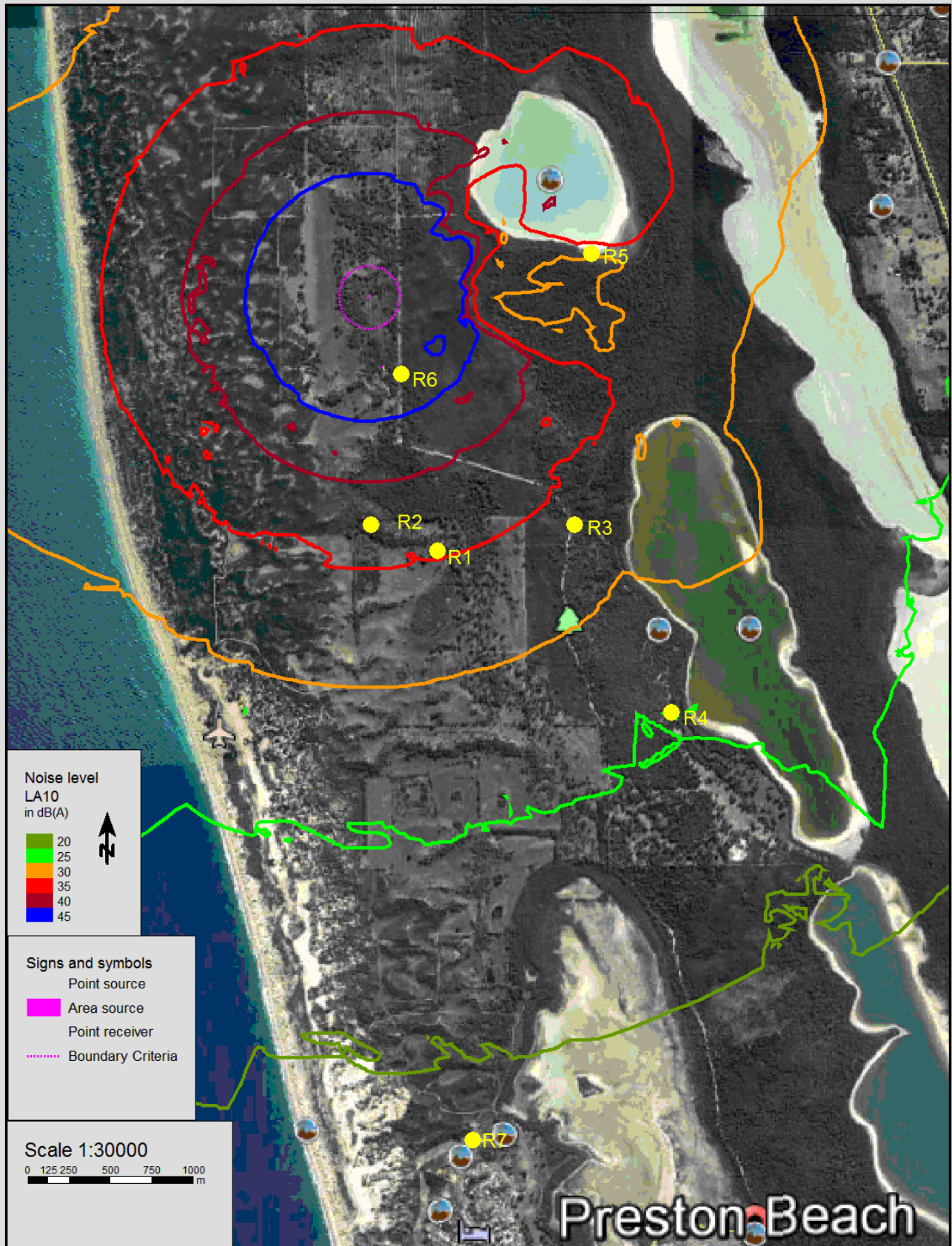
NOISE CONTOUR PLOTS



PRESTON LIMESTONE - INITIAL EXTRACTION
 LOADER, EXCAVATOR, CRUSHER, SCREEN, TRUCK
 Predictions: EPA 'worst case' propagation 4 m/s Pasquill Class E, 20 deg (INVERSION)
 Residential Receptor R1 Compliance 'blue' 45 dB(A) contour
 Run: 101 Ref: 20174 Date: 1/9/2020
 Herring Storer Acoustics



PRESTON LIMESTONE - EXTRACTION NEAR EASTERN BOUNDARY
 LOADER, EXCAVATOR, CRUSHER, SCREEN, TRUCK
 Predictions: EPA 'worst case' propagation 4 m/s Pasquill Class E, 20 deg (INVERSION)
 Residential Receptor R1 Compliance 'blue' 45 dB(A) contour
 Run: 102 Ref: 20174 Date: 1/9/2020
 Herring Storer Acoustics



PRESTON LIMESTONE - EXTRACTION AT NORTHERN END OF EXTRACTION AREA
 LOADER, EXCAVATOR, CRUSHER, SCREEN, TRUCK
 Predictions: EPA 'worst case' propagation 4 m/s Pasquill Class E, 20 deg (INVERSION)
 Residential Receptor R1 Compliance 'blue' 45 dB(A) contour
 Run: 105 Ref: 20174 Date: 1/9/2020
 Herring Storer Acoustics