

4 January 2022



Lot 2 DP1252505 - Putta Bucca

Acoustic Assessment for Zoning



Mid-Western Regional Council

Document Control

Acoustik 13 Orana Street, Orange NSW 2800		Report Ref:	2109.02.Report.1
		Date of Issue:	4/01/2022
		Engineer:	Tom Harper
Phone Contacts:	0431 914 038	02 6360 0423	www.acoustik.net.au
Email:	tom@acoustik.net.au	ABN:	27238273391

Title:	Lot 2 DP1252505 - Putta Bucca
Subject:	Acoustic Assessment for Zoning
Author:	Tom Harper
Client:	Mid-Western Regional Council
Client Contact:	Simon Jones

REVISION/VERIFICATION HISTORY

REVISION NUMBER	Comments - Date
0	Initial Report – 25 November 2021
1	Site layout and Car Parking Updated –4 January 2022
2	
3	
4	
5	

DISTRIBUTION

DESTINATION	NUMBER OF COPIES									
	0	1	2	3	4	5	6	7	8	9
Revision Number										
Mid-Western Regional Council	1	1								
File Copy	1	1								

X

Tom Harper
Acoustic Consultant - Acoustik

Table of Contents

1	Introduction	3
1.1	References	4
1.2	Glossary	4
2	Noise Measurements.....	6
2.1	Environmental Noise Levels	6
3	Project Noise Criteria	7
3.1	Environmental Noise Triggers.....	7
3.2	Maximum Noise Level Triggers – Sleep Disturbance	8
3.3	Noise Criteria – Construction	8
4	Noise Predictions.....	9
4.1	Putta Bucca House.....	9
4.2	Concrete Batching Plant – Boral Concrete.....	10
4.3	Sewerage Pumping Station.....	10
4.4	Glen Willow Sporting Complex	10
4.5	Noise Generation due to Women’s Sporting Centre	10
5	Recommendations	11
A.	Appendix A –Noise Logging Results.....	12
B.	Appendix B – Contour Noise Maps	16

1 Introduction

Acoustik was engaged by the Mid-Western Regional Council to provide a report on zoning changes for a parcel of land identified as Lot 2 DP1252505. The site is located on the eastern side of Putta Bucca Road, to the south and the east the site is bounded by the Cudgegong River and Lawsons Creek.

There is a concern that the change in zoning and the constructions on the site could impose a burden to control noise from the surrounding developments that does not currently exist.

Putta Bucca House hosts social events and weddings and is located at 74 Putta Bucca Road directly to the North of the site. The main building at Putta Bucca House is also used as a residential dwelling. A concrete batching plant is located on the North Western side of Putta Bucca Road from the site and a sewerage pumping station is on the western boundary of the site.

On the eastern side of the site is the Glen Willow Sporting complex. This area is currently undergoing development. The major facility is the Regional Sports Stadium that can host NRL level sporting events. An internal road is under construction that will connect the sporting complex to Putta Bucca Road via a bridge to be constructed over Lawsons Creek. A map of the development site and surrounding neighbouring properties is indicated in Figure 1 below.

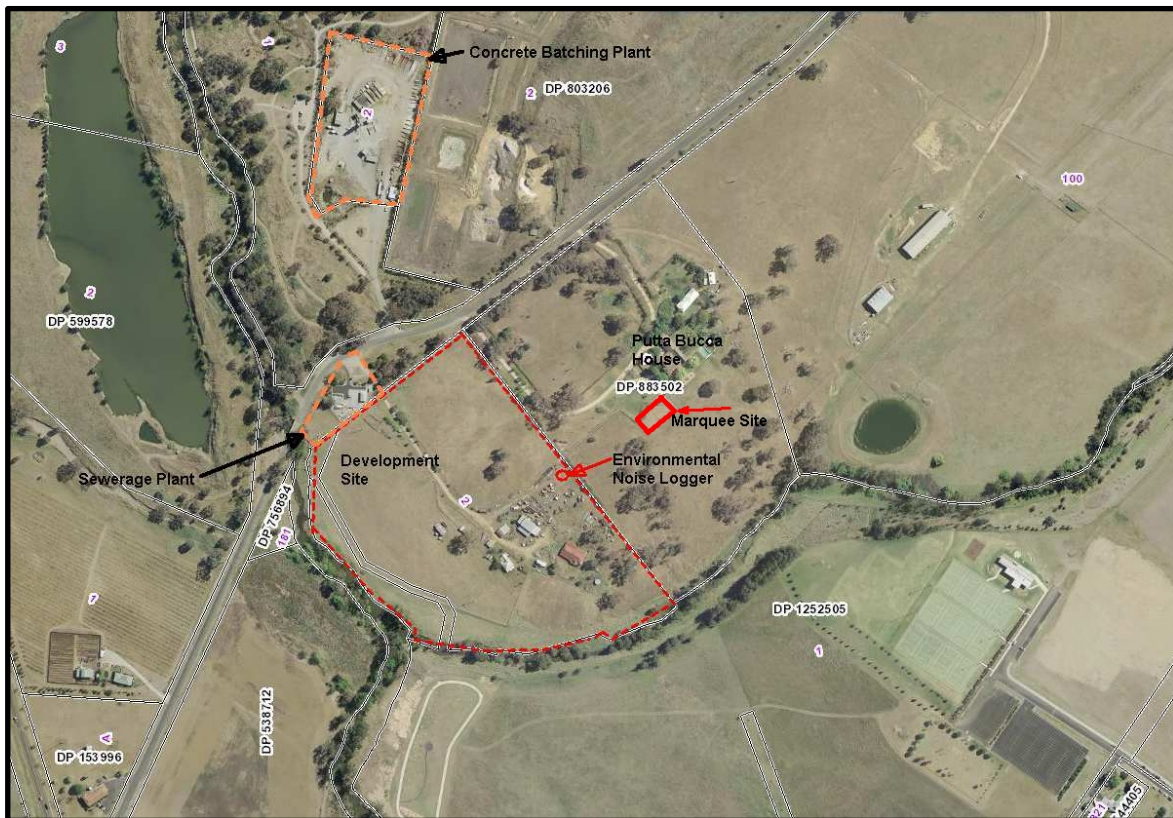


Figure 1: Proposed Site, New sporting Centre indicated in pink, Logger Location indicated with arrow

This study is to determine the acoustic impact of rezoning Lot 2 from RU4 - Primary Production Small Lots to RE1 – Public Recreation. The adjacent Glen Willow sport complex is zoned RE1, and the rezoning of Lot 2 will be extension of the existing sporting and recreation area. The rezoning of the Lot 2 opens the area for recreational use and the construction of a road through the property that will connect Putta Bucca Road directly to the Glen Willow Sporting complex.

There is a planning stage proposal to construct a Centre for women’s sport on the site. Preliminary plans indicate that the Centre will consist of three buildings, two being accommodation blocks (Buildings A and B) and the third a common building (building C) housing a dining/lounge, Lecture theatre and a gymnasium. A car parking area is located to the south of the proposed development. The layout of the development including the parking area and road is included in Figure 2 below.

Specifically, the study will address noise emissions from the surrounding developments that could affect the women’s sports centre. The activity within the sports centre and accommodation buildings is predominantly residential in nature and not likely to generate significant noise levels.

Car parking associated with the sports centre would be the main noise source that would affect the neighbouring Putta Bucca House.

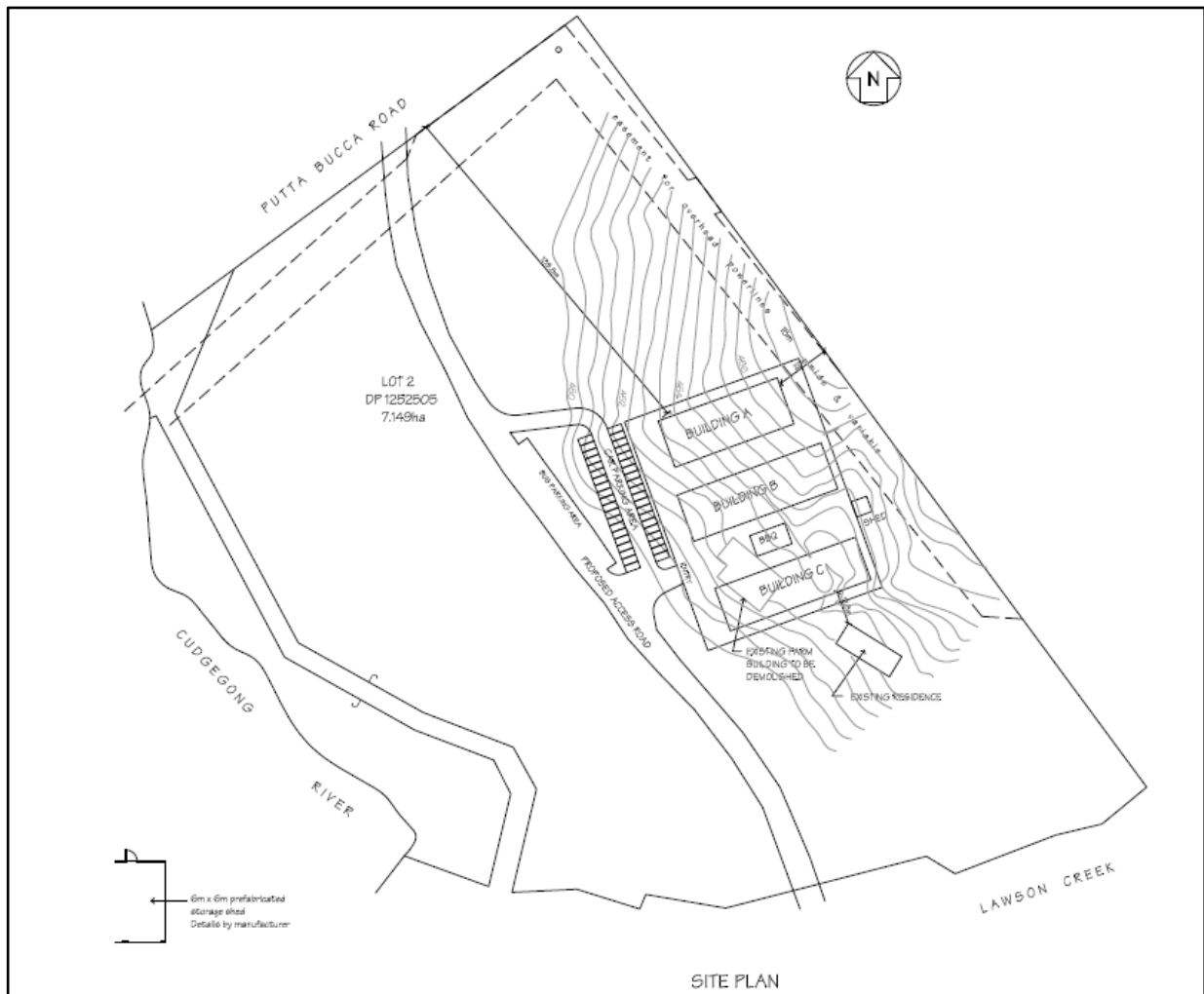


Figure 2: Development layout on Lot 2 DP1252505

1.1 References

The following reference material was consulted while preparing this report:

- NSW EPA Noise Guide for Local Government 2013
- NSW Environmental Protection Authority (EPA) Noise Policy for Industry (NPI)
- NSW RTA – Guide to Traffic Generating Developments Version 2.2, October 2002

1.2 Glossary

A short list of acoustic terms is included below:

$L_{Aeq, X \text{ min}(s)}$: is the Sound Pressure Level (SPL) in decibels (dB), equivalent to the total sound energy over the measurement period of X minutes (or the energy average). The A signifies that an A-Weighting applied to the spectrum to simulate human hearing response

L_{Amax} : is the maximum Sound Pressure Level (SPL) in decibels (dB) that occurs during a measurement

L_{A90} : is the noise level exceeded for 90% of the measurement period, calculated by Statistical Analysis, it is considered to represent the background noise level or the noise that is present for most of the time

L_{Ceq} , dBC or C-weighting: C-weighting is an adjustment made to sound-level measurements which takes account of low-frequency components of noise within the audibility range

Intrusive noise: is noticeably louder than the background noise and considered likely to disturb or interfere with those who can hear it. Depending on the nature of the noise source it is defined as:

- a) $L_{A90} + 5$ dB for noise sources that are continuous in nature for extended periods or all day and night typical of industrial or residential sources that are a permanent fixture.
- b) $L_{A90} + 10$ dB for noise sources that are temporary in nature like construction where the activity is limited to day time operation some elements of the noise may be continuous.

2 Noise Measurements

Environmental measurements were made at the Northern Edge of Lot 2 as indicated in Figure 1.

The noise logger was placed close to the boundary with Putta Bucca House (74 Putta Bucca Road) as Putta Bucca House and its operations as an entertainment venue are the affected residential noise receivers. The microphone was in an open field environment.

2.1 Environmental Noise Levels

Environmental noise logging was conducted at both locations from Wednesday 27 October to Saturday 6 November 2021. Ten (10) days of continuous noise logging. During the logging period there was periods of wind and rain that have been accounted for in the results below.

Noise Logging Results have been analysed to exclude periods where wind or rain has adversely affected results. Where wind speeds continually exceeded 5 m/s or rain is detected the acoustic data is analysed to determine if results are affected, affected results are marked “invalid”.

For the 10 days of logging 6 full days of valid noise logging was obtained for most day/evening/night periods. All night periods of logging are valid.

Summaries of the logging results are presented in Table 1 below.

Table 1: SVAN 958A Noise Logger Sn:59161 – Lot 2 DP1252505 Mudgee NSW

	Day 7am – 6pm		Evening 6pm – 10pm		Night 10pm – 7am	
	L _{A90}	L _{Aeq}	L _{A90}	L _{Aeq}	L _{A90}	L _{Aeq}
Wednesday, 27 October 2021	Blanks	0.0	32.3	51.0	27.2	42.0
Thursday, 28 October 2021	36.4	49.6	32.6	39.7	26.6	41.9
Friday, 29 October 2021	Invalid	Invalid	Invalid	Invalid	26.0	44.2
Saturday, 30 October 2021	33.2	46.6	31.1	43.5	26.0	39.0
Sunday, 31 October 2021	31.5	44.9	28.1	38.9	24.7	43.1
Monday, 1 November 2021	32.5	46.8	31.4	43.6	26.3	51.4
Tuesday, 2 November 2021	34.7	46.3	33.7	43.8	28.0	48.0
Wednesday, 3 November 2021	34.0	46.5	32.0	39.7	26.6	38.3
Thursday, 4 November 2021	Invalid	Invalid	Invalid	Invalid	25.3	38.2
Friday, 5 November 2021	Invalid	Invalid	Invalid	Invalid	26.8	39.6
RBL/Ambient	34 (35[*])	47	32	42	26 (30[#])	45

Note^{*}: The day RBL will be set at 35 dBA the default minimum value for day

Note[#]: The night RBL will be set at 30 dBA the default minimum value for night

Note: Morning shoulder period (5 am to 7 am) ambient noise levels increase along with the increases in early morning traffic. An analysis of the morning shoulder period indicates an RBL of 35 dBA.

3 Project Noise Criteria

The NSW EPA released the Noise Policy for Industry (NPI) in late 2017 will be used to guide the acoustic assessment. Noise levels generated on the site due to operations of a sports training centre with accommodation facilities will be assessed against the NPI requirements. The same assessment will be conducted for noise from the existing Putta Bucca House operations.

There is no current information of traffic flows on Putta Bucca Road. Traffic on both sites will generate noise on the internal roads within the boundaries of the properties.

As the traffic noise is generated on site it will be assessed against the NPI. Traffic generated on public roads is assessed against the NSW Road Noise Policy (RNP).

Construction on the site would generate noise levels that could affect residential and business operations. The NSW DECC 2009 Interim Construction Noise Guideline (ICNG) will be outlined regarding permissible noise levels during construction works.

3.1 Environmental Noise Triggers

The NPI assessment is based on the establishment of trigger levels; if noise levels exceed the trigger a noise management response is required that includes all reasonable and feasible mitigation measures and an assessment of the impact of any residual noise that continue to exceed trigger levels. The final level of acceptable noise is determined by the regulatory authority balancing the noise impact against other social and economic benefits.

The NPI employs two measures to control noise so that residential acoustic amenity is protected. The first is the intrusive noise trigger (L_{A90} background (RBL) + 5dB) and the second is the amenity level based on the type of area.

Acoustik consider that the residential noise receivers near Lot 2 are in a Rural residential area as defined in the NPI, the existing zoning of the area is (RU1-Primary Production or RU4 -Primary Production Small Lots). Land to the south and east of the Lot 2 is not residential and is zoned E3 – Environmental management and RE1 – Public Recreation respectively.

The amenity level is designed to halt the increase of background levels due to continuing development and to control noise emissions affecting a community from the total industrial noise. The Project Amenity noise level limits the noise emissions from any one site and is equal to the Recommended Amenity Noise Level (re Table 2.2 of NPfI) minus 5 dB plus 3 dB to convert the amenity limits to 15 minute assessment periods.

Acoustik have noted that the environmental noise logging indicates that the ambient noise levels in the early morning from 5 am to 7 am increase significantly due to local traffic and early morning activity in the area. Therefore, a morning shoulder period RBL will be calculated to reflect the increased ambient noise levels during the early hours of the day before the normal day period from 7 am (8am on Sundays and Public Holidays). The RBL for these periods are calculated based $L_{A90, \text{morning shoulder}}$ and using an average of the night and day amenity noise criteria. Graphical plots of the morning shoulder periods are included in Appendix A.

The project noise trigger levels are detailed in Table 2 below.

Table 2: Proposed Noise Trigger Levels – Residential and other noise receivers – Rural Residential

Area	Intrusive Level $L_{A90} + 5$ dB	Project Amenity Noise Urban Residential	Noise Trigger dBA
Day 0700 – 1800	40	48	40
Evening 1800 – 2200	37	43	37
Night 2200 – 0700	35	38	35
Morning Shoulder 0500 – 0700	40	43	40
Commercial Premises	During Use - Not dependant on Intrusive Level		65
Active Recreation – Parks	During Use - Not dependant on Intrusive Level		55
Passive Recreation – Parks	During Use - Not dependant on Intrusive Level		50

3.2 Maximum Noise Level Triggers - Sleep Disturbance

Sudden loud noise events can interrupt sleep by awakenings and disturbance to sleep stages. The following trigger levels to address sleep disturbance are set in section 2.5 of the NPI.

The site sports facility is unlikely to conduct any activity during the early morning but if any did occur an assessment of sleep disturbance would be required.

“Where the subject development/premises night-time noise levels at a residential location exceed:

- *L_{Aeq,15min} 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*

A detailed maximum noise level event assessment should be undertaken.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.”

The assessment should address frequency of occurrence, and the distribution of events over the night time and any change in environmental noise levels over the night (10 pm to 7 am)

The primary noise level parameter is L_{AFmax} and the assessment should consider all feasible and reasonable noise mitigation measures to achieve the maximum noise triggers.

3.3 Noise Criteria - Construction

The NSW DECC 2009 Interim Construction Noise Guideline (ICNG) will be used to guide the construction noise assessment.

Within standard construction hours the Noise Affected Level control is RBL background + 10 dB and then a Highly Noise Affected Level of 75 dBA. Outside of standard hours the Noise Affected Level is RBL background + 5 dB. Non-residential land users are protected with set noise limits. The ICNG construction management noise levels are summarised in Table 3 below.

Table 3: Summary of ICNG Construction Noise Management Levels

Time	Management Level (L_{Aeq, 15 min})	Application (refer Appendix B for full application details)
Residences North of site Putta Bucca House	Noise Affected 45 dBA	This level represents the point above which there may be some community reaction to noise.
Standard hours Monday to Friday 7 am to 6 pm Saturday 8am to 1 pm No work on Sundays or public holidays	Highly Affected 75 dBA	This level represents the point above which there may be strong community reaction to noise
Outside standard hours	Noise Affected Evening 40 dBA Night 35 dBA	A strong justification would typically be required for works outside the recommended standard hours
Industrial Premises	External 75 dBA	During occupation
Commercial Premises	External 70 dBA	During occupation
Active Recreation Areas	External 65 dBA	During use
Passive Recreation Areas	External 60 dBA	During use

4 Noise Predictions

Noise generated by the existing developments is predicted using an iNoise model

The following sites are possible sources of noise that could impact the acoustic amenity of guests staying at the women's sports centre:

1. Wedding and other social events held at Putta Bucca house – 74 Putta Bucca Road
2. Vehicles exiting the Putta Bucca House grounds
3. The concrete batching plant located at 69 Putta Bucca Road
4. Sewerage pumping plant on the western boundary of lot 2 adjacent to Putta Bucca Road
5. Sporting events at the Glen Willow Sporting Complex
6. Vehicles exiting or arriving at the proposed women's sports centre

Weather Induced Noise-Enhancement

The NPI generally requires that Noise-enhancing meteorological conditions are considered for noise modelling predictions. In this case all the predicted noise levels made with the iNoise program are within distances of less than 150 m. At these distances, there is insignificant enhancement due to weather effects, so it was not included in the modelling results.

4.1 Putta Bucca House

Putta Bucca House is an historical dwelling that hosts weddings and social events. The significant noise generation on the site will be from events that are held in a building that has a solid masonry wall on the Southern end of the marquee. A stage is located at the southern end of the marquee and faces Northeast, away from the women's sports centre. The roof and all other walls of the semi-permanent marquee are canvas.

Based on similar outdoor events, Acoustik have calculated noise emissions from the canvas roof and side walls of the marquee for general crowd noise including two applause events and speeches by a single person using a speech reinforcement system or general noise from a crowd of up to 100 people. The prediction is based on a 15 minute average L_{Aeq} as is normally applied for INP assessments.

The predicted noise levels at the façade of the accommodation blocks of the sporting centre indicate noise levels of up to 51 dBA which exceeds the trigger levels for day and evening periods by 11 dB and 14 dB respectively. We note that these levels will only be exceeded when events are held and the predicted noise levels represent the loudest periods of a typical social event when speeches are being made and applause occurs at other times like during the dinner noise emissions will be at least 10 dB less. **Noise barrier fencing 2 m high located on the property boundary to the North of the Women's Sports centre would reduce noise levels from Putta Bucca House events by up to 11 dB.**

Amplified music noise emissions from live performance vary depending on the number of performers and the type of music. Live performers would be located on the stage at the Southern end of the marquee with loudspeakers facing North. The solid wall at the southern end of the marquee will act as a sound barrier. Good quality sound reinforcement loudspeakers can direct sound into the marquee audience and minimise the spill over of the music to residential areas. The operator of Putta Bucca House should choose equipment that reduces the impact of events on neighbouring properties. In general, assuming that the loudspeakers are positioned as noted above noise from live entertainment should not exceed the general crowd noise levels.

At the end of an event at Putta Bucca house, vehicles would leave the site driving slowly on the site. Assuming an event size of 100 guests with on average 2 guests per vehicle and 80% of the guest leave in the last hour of the evening up to 10 pm. Predicted noise levels due to the vehicles leaving the site are 35 dBA at the Women's Sports Centre. Noise from vehicles leaving the site does not exceed the noise trigger limits.

The noise contour maps for the above predictions are presented in Appendix B.

4.2 Concrete Batching Plant - Boral Concrete

Noise predictions from the batching plant are based on generic data included with the iNoise modelling program. The plant operates from 6:30 am to 5:30 pm and on Saturdays from 6:30 am to 12:30 pm.

Noise contour plots of the noise emissions from the batching plant are included in Appendix B.

The predicted noise levels close to the proposed women's sporting centre do not exceed the day and morning shoulder trigger levels. Acoustik note that the predicted noise levels are only applicable when the plant is batching at other times noise levels would be considerably less.

4.3 Sewerage Pumping Station

The sewerage pumping plant is located near to the Putta Bucca Road entrance of Lot 2. The pumps and other noise generating equipment is located inside a building. Noise from the pumping station is not expected to disturb any guests at the proposed women's sporting centre.

4.4 Glen Willow Sporting Complex

The Glen Willow Sporting Complex is a large area of sporting fields, including netball courts and the Regional Sports Stadium these facilities are 430 m and 800 m from the women's sporting complex respectively.

Netball operates during the day and noise generated by the games varies widely depending on the number of participants. Considering the connection that guests at the sports centre would have with community sport it is unlikely that noise generated by netball would be annoying and due to the distance from the netball courts noise levels could be audible but not likely to be intrusive nor would the source of the netball noise levels be a persistent annoyance.

Larger events held at the Regional Sports Stadium would be planned and managed by organisers that are required to submit a management plan to includes control of noise emissions.

4.5 Noise Generation due to Women's Sporting Centre

The general operation of the sporting centre will be predominately residential, it is essentially a hotel with facilities in a common building.

The sports facilities have limited outdoor areas for sports activity, and it is not likely that significant noise would be generated. Patron noise outside the accommodation buildings and the common building C can be controlled by staff at the centre.

Mechanical services noise servicing the air-conditioning accommodation and facilities and kitchen exhaust from block C can be controlled using normal acoustic treatments to meet the boundary noise limits by the sports centre developer/builder.

The primary source of uncontrollable noise associated with the sports centre is car parking and traffic noise generation associated with the sports centre operation. Based on the Roads and Traffic Authority – "Guide to Traffic Generating Developments" version 2.2. The proposed sports centre has 28 units and the evening peak hour trips for a hotel are estimated at 0.4 trips per unit leading to 11 trips in the busiest hour in the evening. Predicted noise levels at Putta Bucca house boundary from traffic generation by the sports centre would not exceed 30 dBA.

Putta Bucca would not be adversely affected by noise from the operation of the Sports Centre assuming that reasonable steps are taken to control noise emissions from mechanical plant servicing the Sports Centre. The noise contour maps for the above predictions are presented in Appendix B.

5 Recommendations

Acoustik's study reveals that noise levels generated by social events at the existing Putta Bucca House venue site would exceed trigger levels during the loudest activity of a typical social event (typically during speeches and applause). Construction of a 2 metre high noise barrier to the north of the proposed sports centre will ameliorate crowd noise levels within 3 dB of the trigger levels for the residential noise receivers staying at the sports centre.

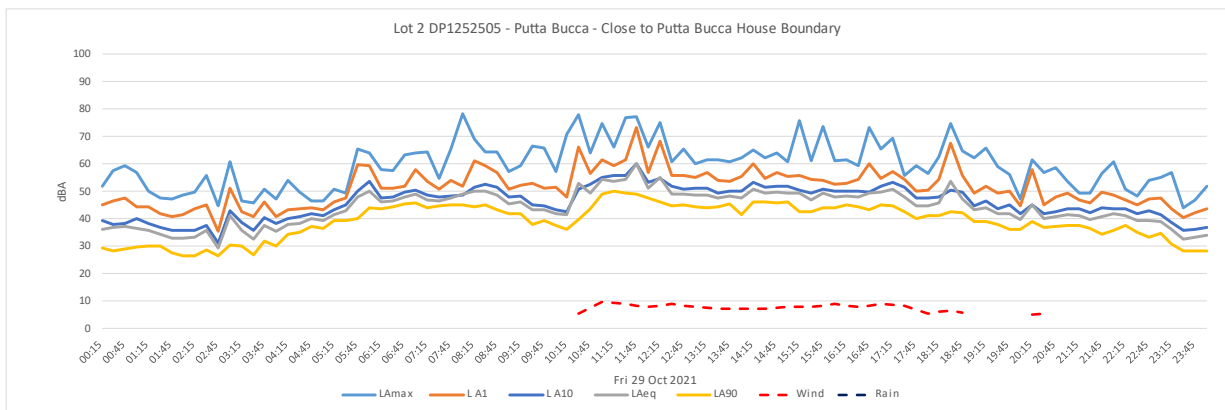
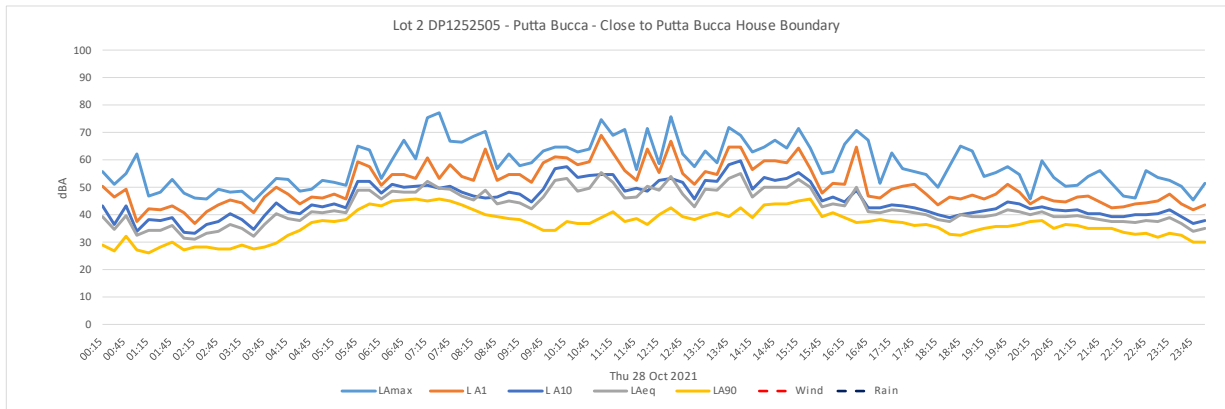
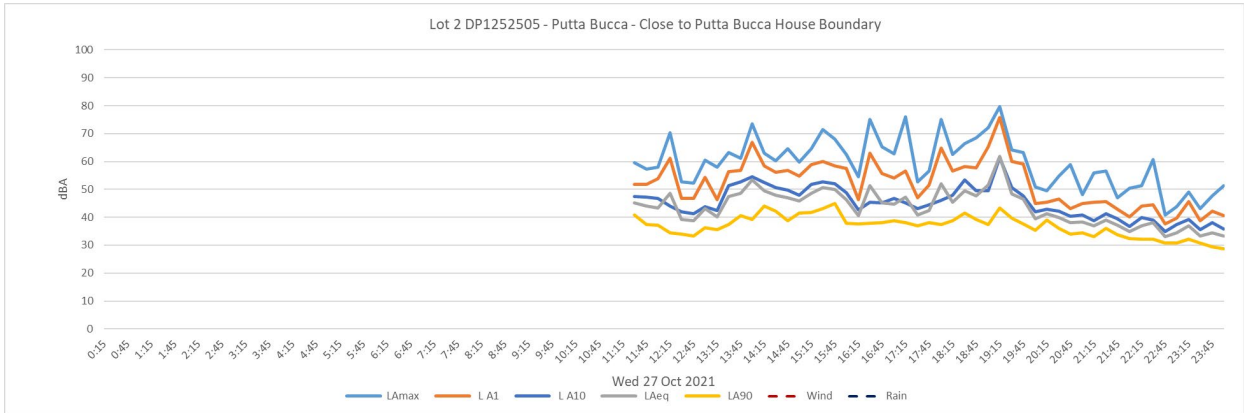
Other event activity can be controlled so that the acoustic amenity of the sports centre is not adversely impacted.

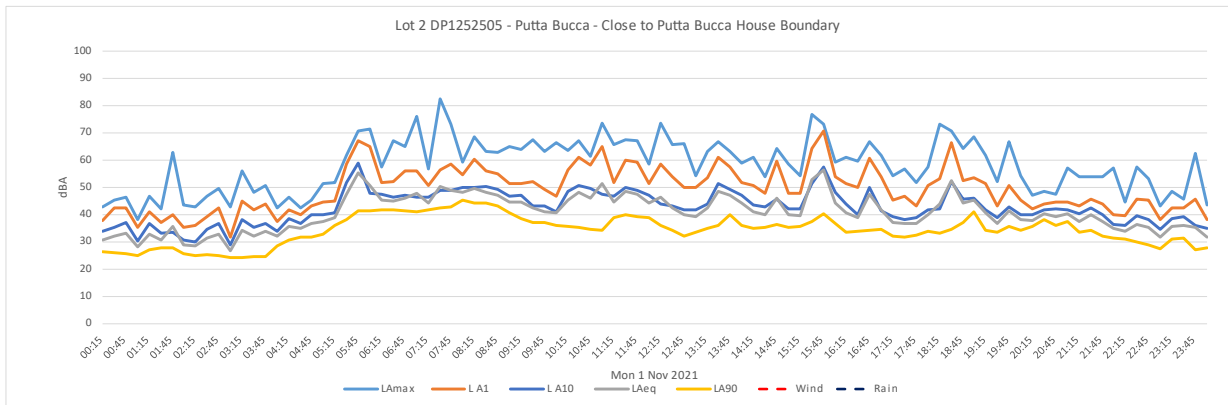
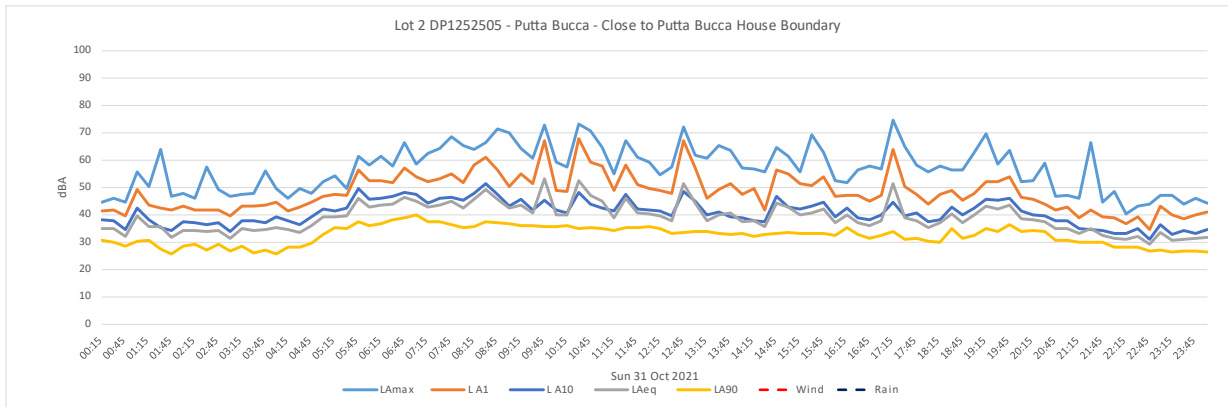
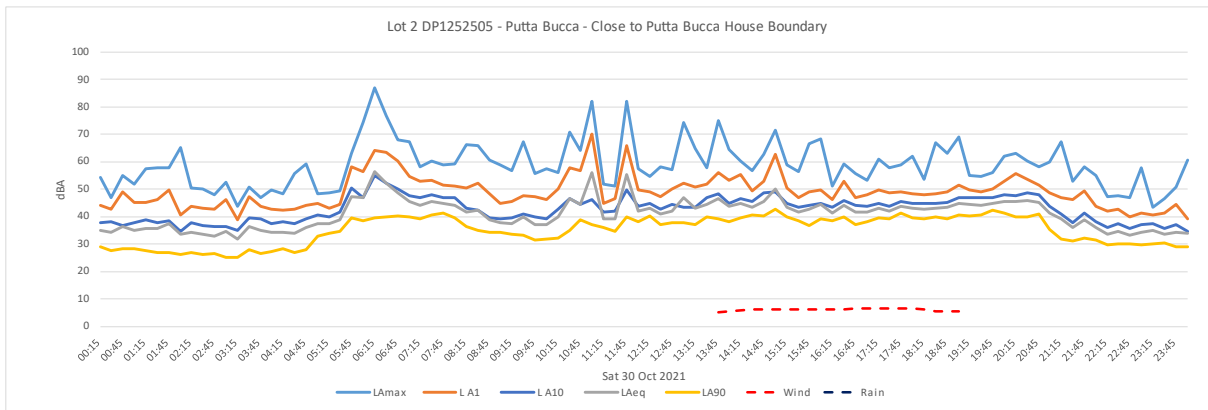
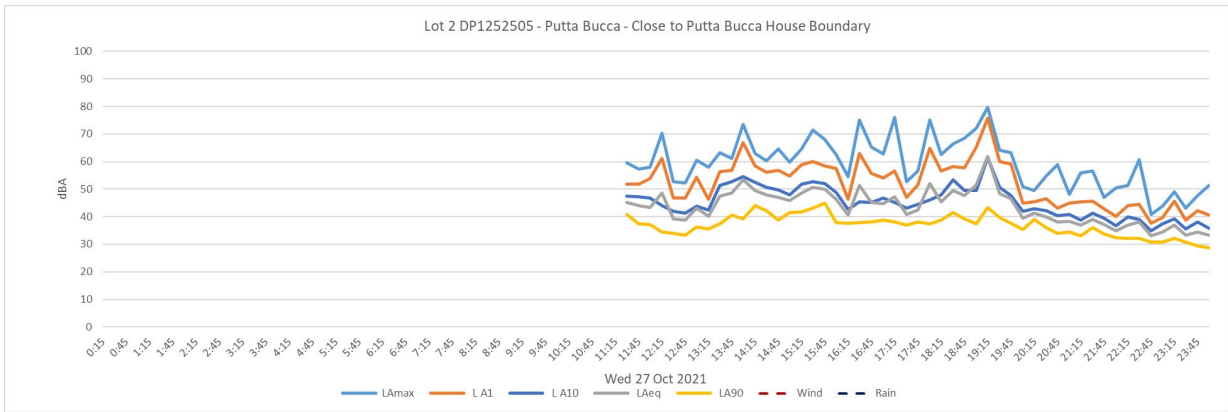
Noise generated due to the operation of the women's sporting centre is not expected to adversely impact the venue hosting operations of Putta Bucca House nor the residential areas on the same site.

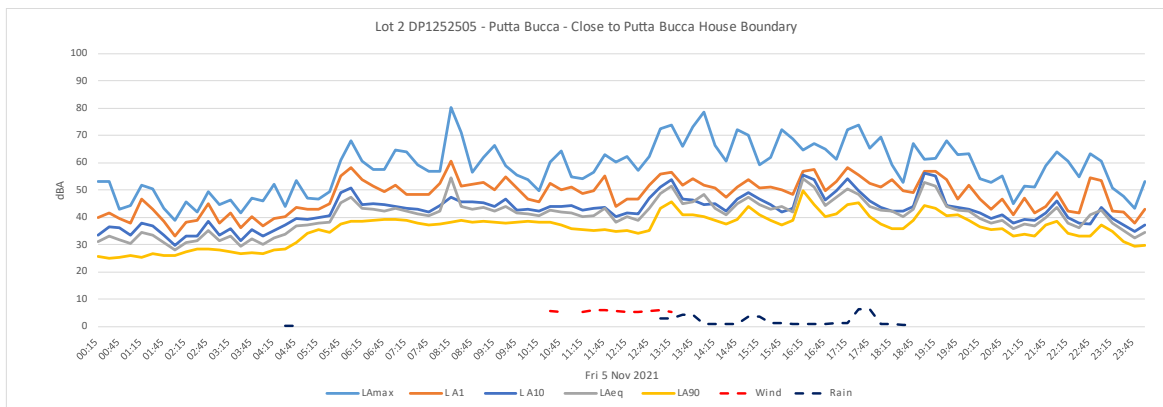
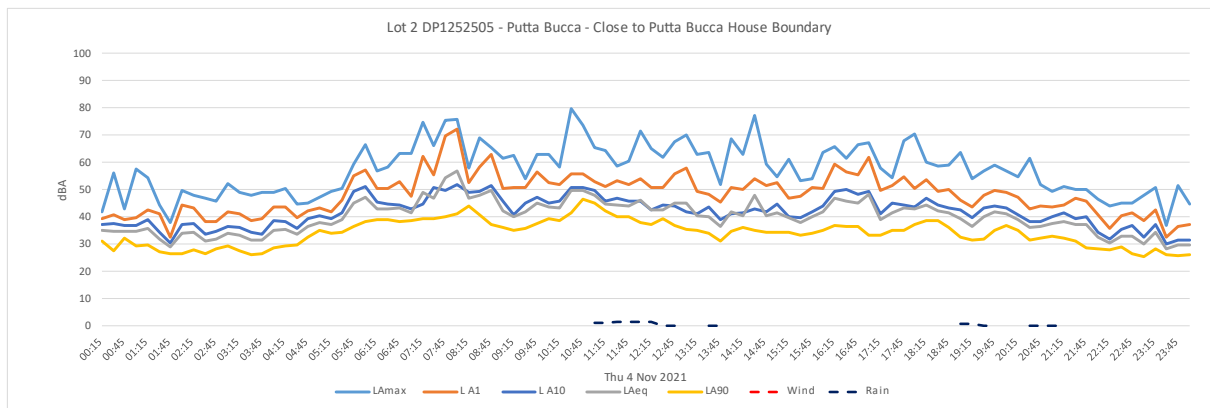
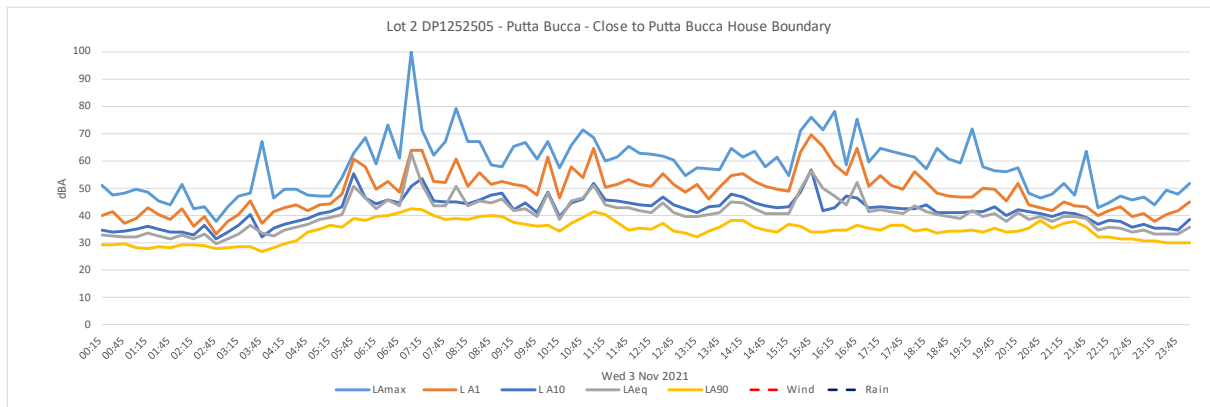
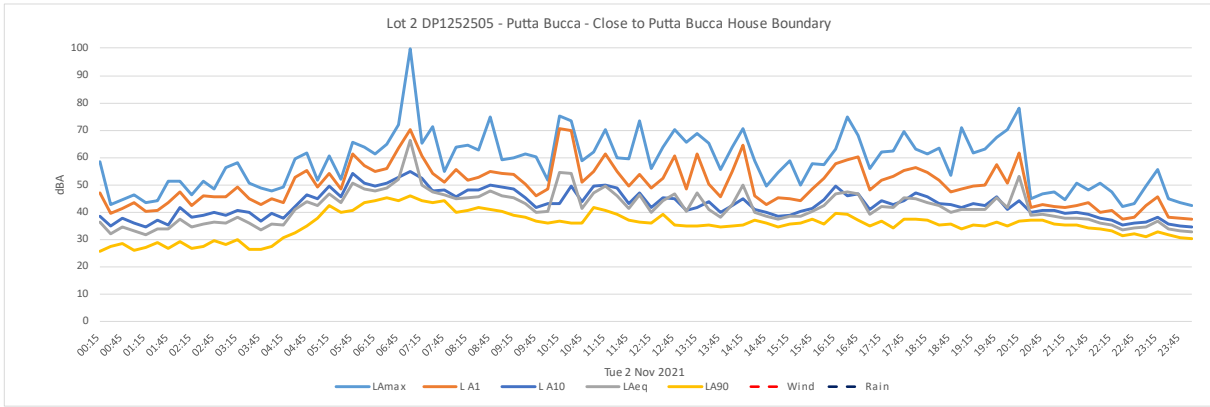
Appropriate acoustic treatments would need to be applied to mechanical plant servicing the Women's Sporting Centre.

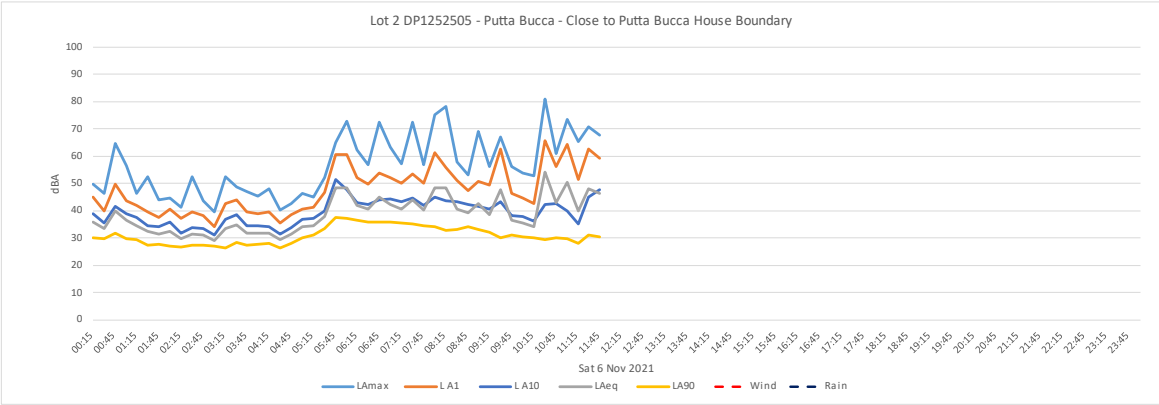
A. Appendix A - Noise Logging Results

Environmental Noise logging levels

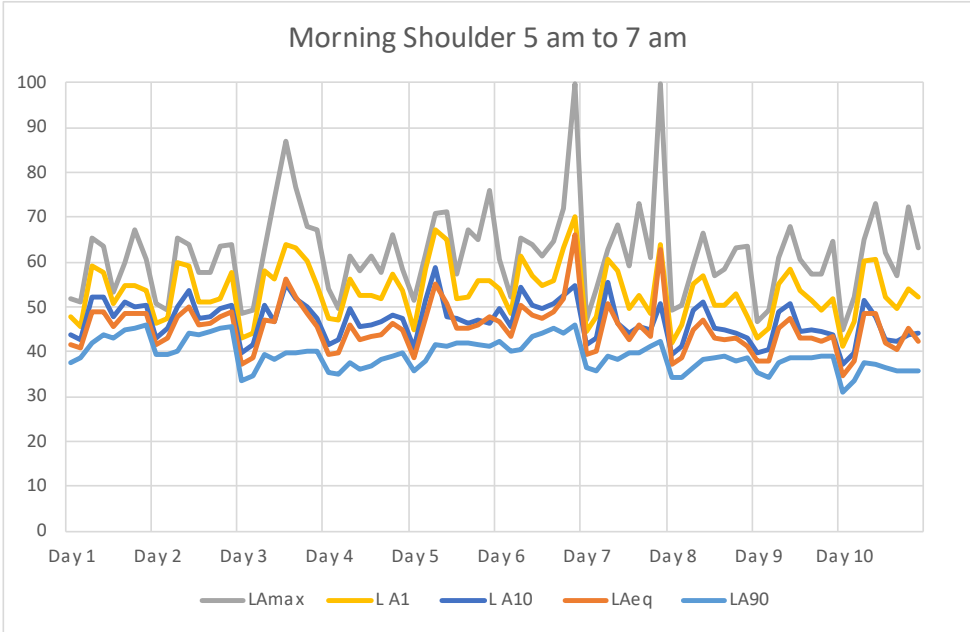






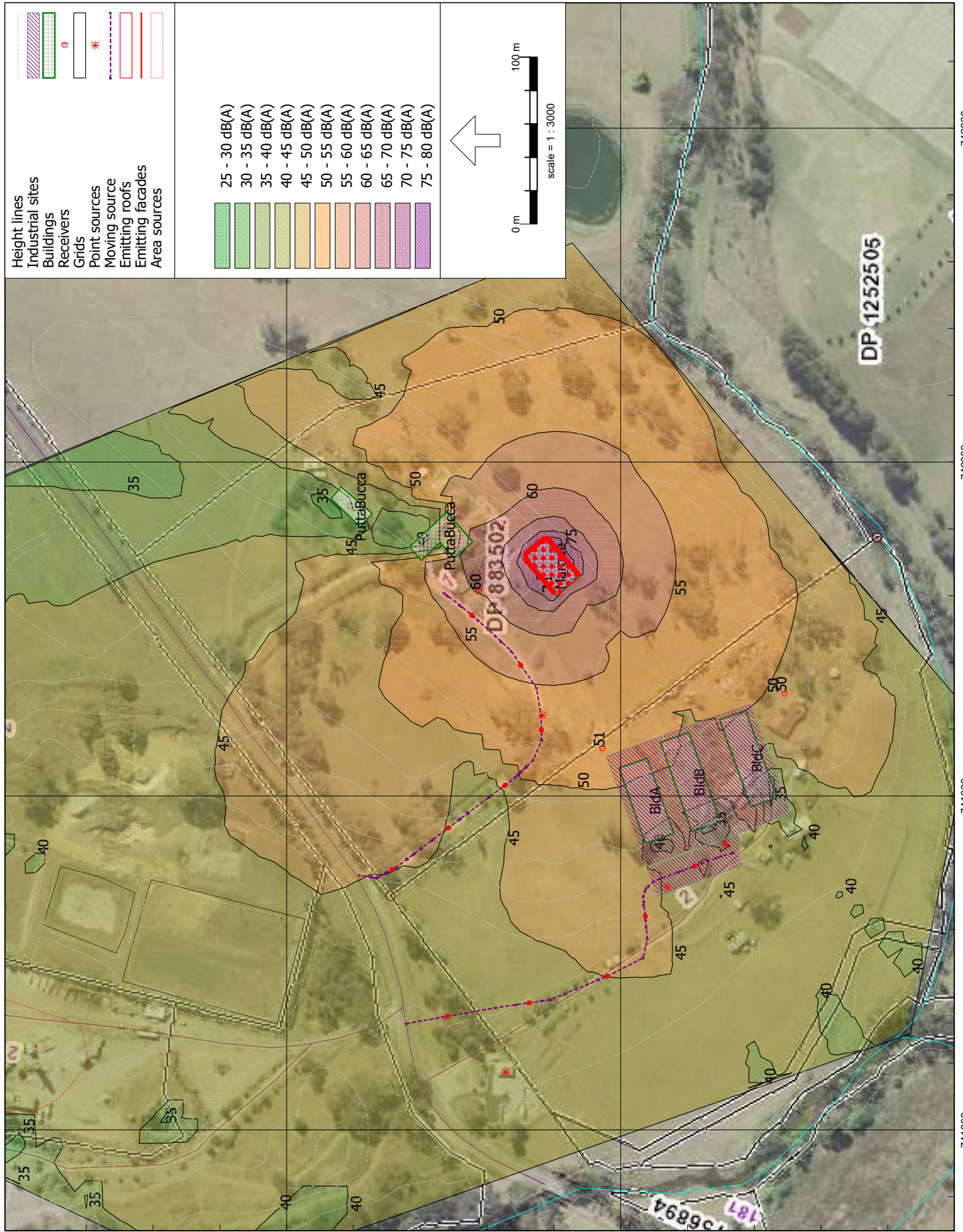


Morning Shoulder Plot



B. Appendix B - Contour Noise Maps

Noise Contour Maps from iNoise



6392600

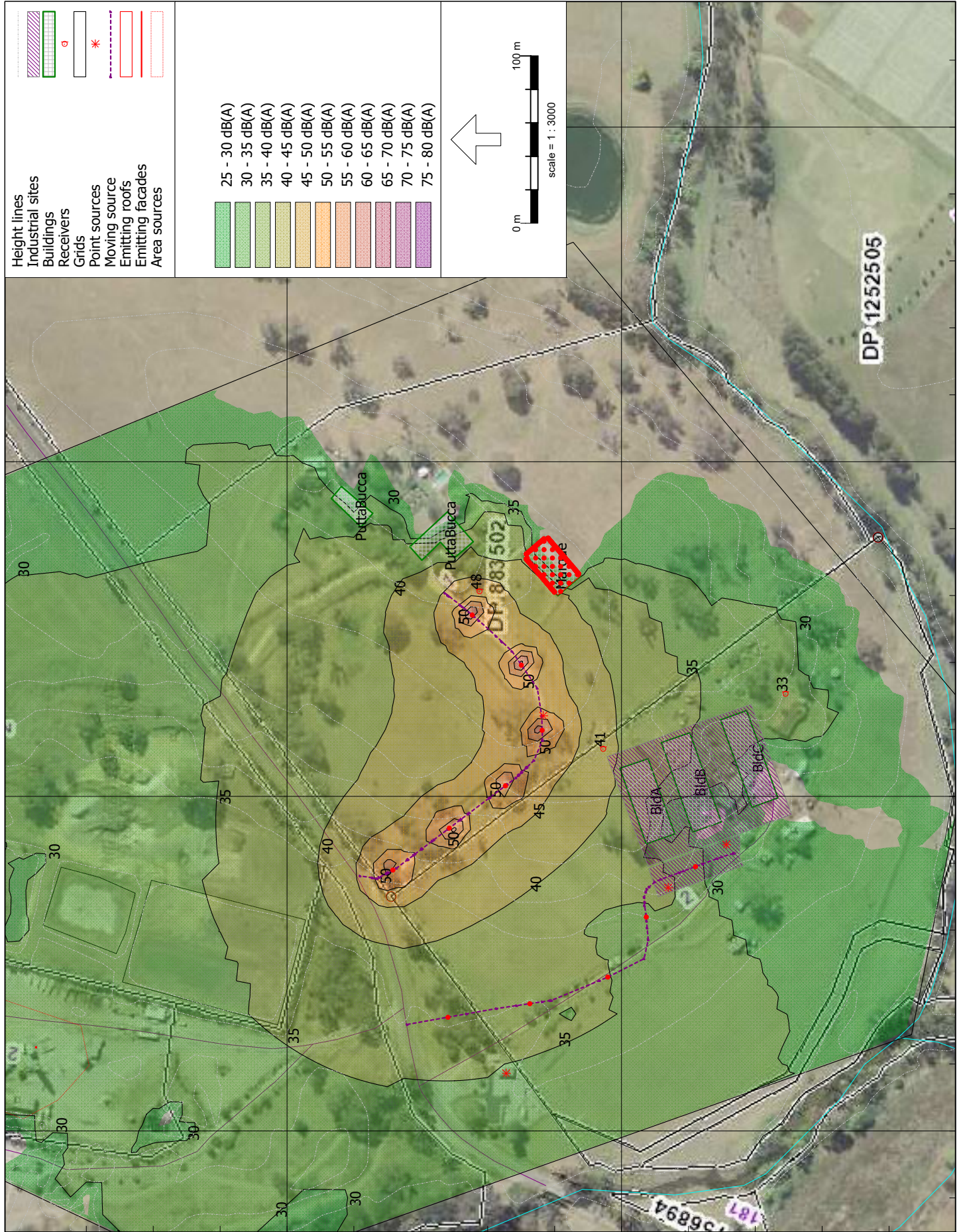
6392400

741800

ISO 9613, [version of Area 1 - Model with Carpark Layout], [Noise V2022 rev 1 Free Licensed to Tom Harper - Acoustik

742000

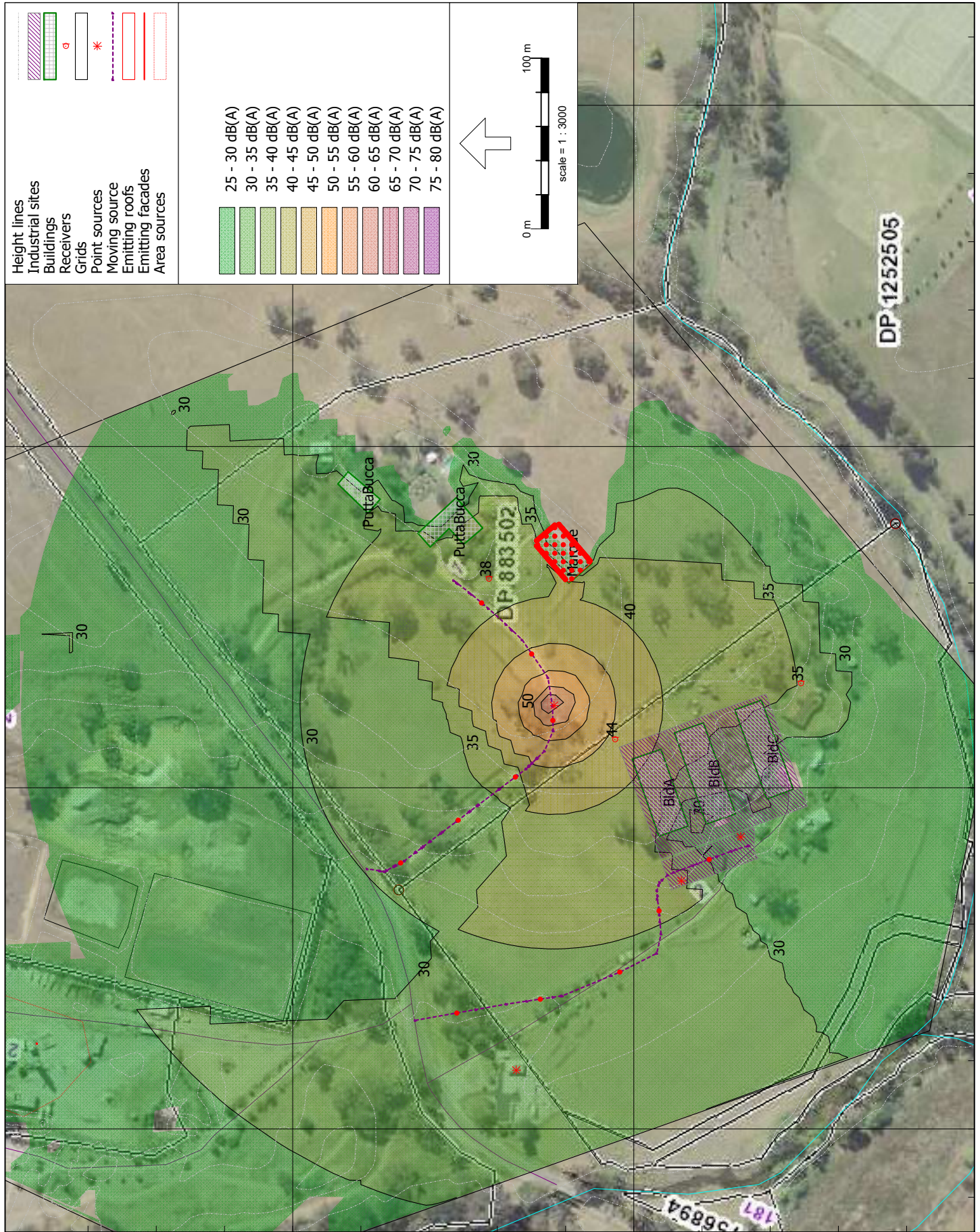
742200



6392600

6392400

Example of engine start close to Sports Centre



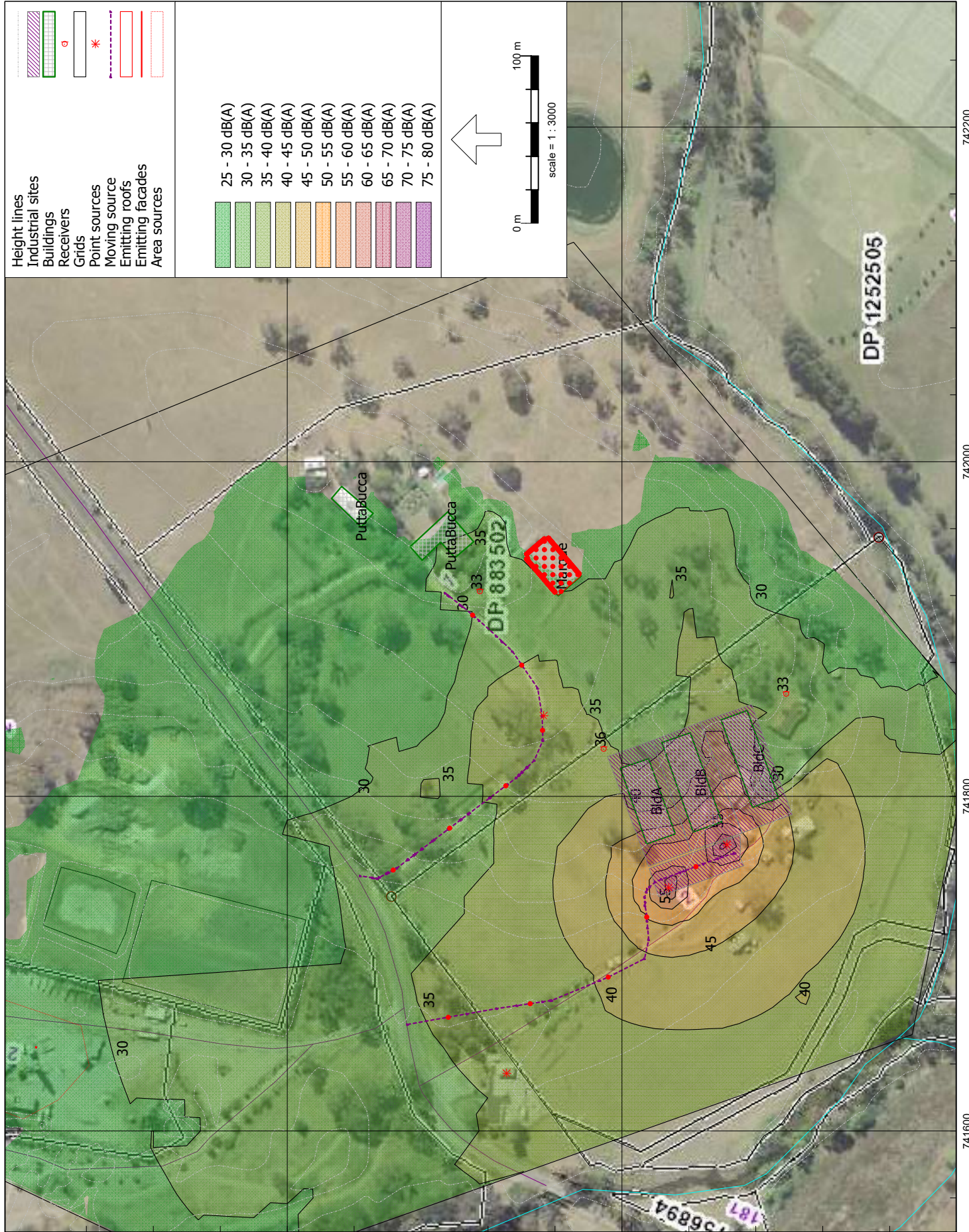
Height lines
 Industrial sites
 Buildings
 Receivers
 Grids
 Point sources
 Moving source
 Emitting roofs
 Emitting facades
 Area sources

25 - 30 dB(A)
 30 - 35 dB(A)
 35 - 40 dB(A)
 40 - 45 dB(A)
 45 - 50 dB(A)
 50 - 55 dB(A)
 55 - 60 dB(A)
 60 - 65 dB(A)
 65 - 70 dB(A)
 70 - 75 dB(A)
 75 - 80 dB(A)

0 m
 100 m
 scale = 1 : 3000
 ↑

6392600

6392400



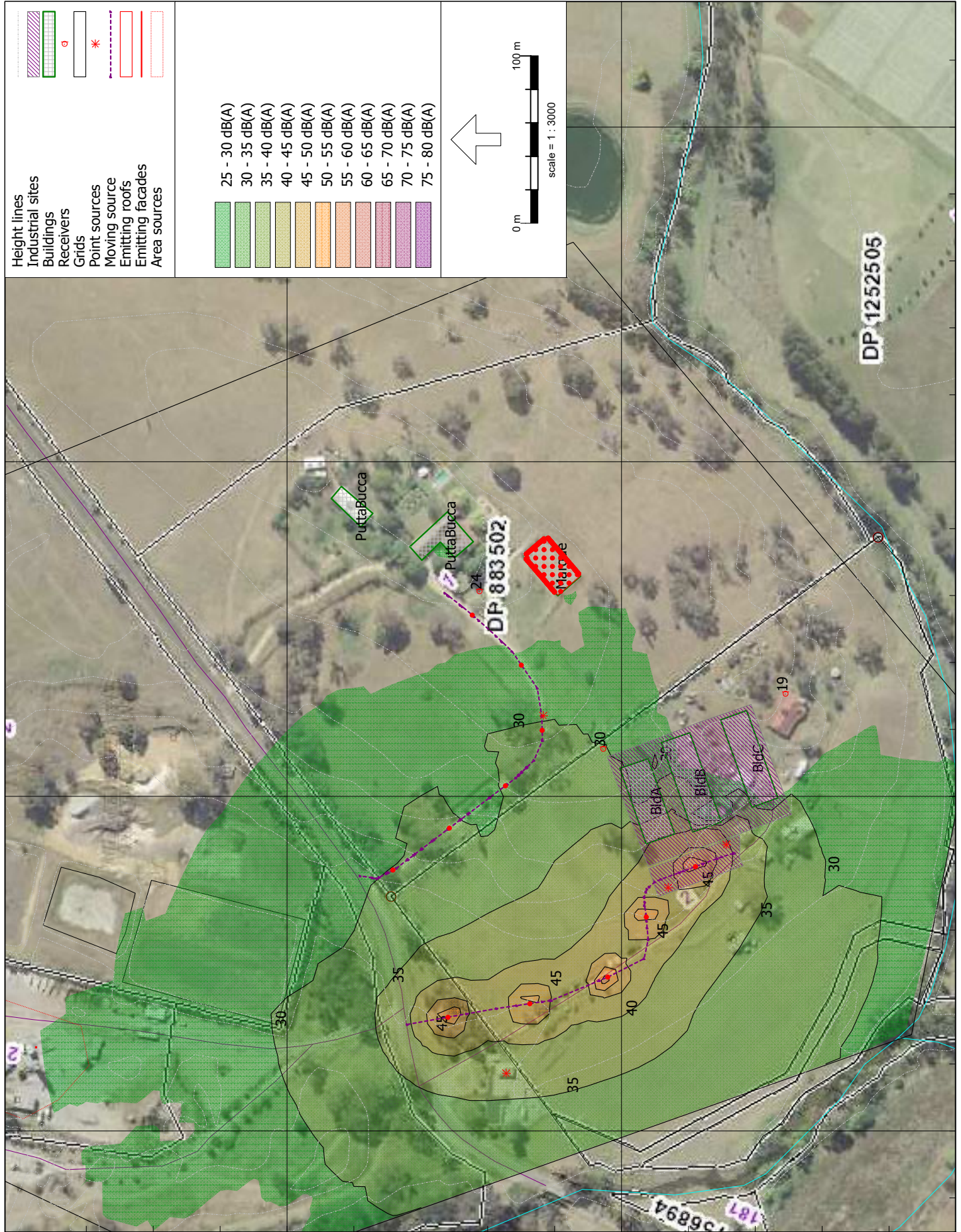
6392600

6392400

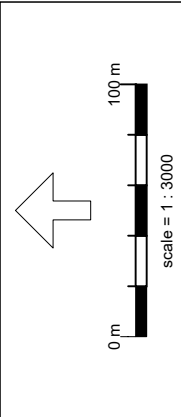
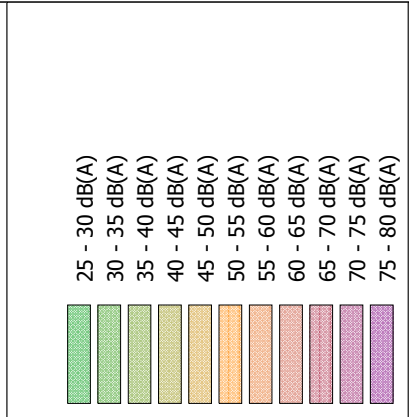
741800

742000

742200



Height lines
 Industrial sites
 Buildings
 Receivers
 Grids
 Point sources
 Moving source
 Emitting roofs
 Area sources



6392600

6392400

742000

742000

741800

741600