



December 2016

**APPENDIX 15. REVISED NOISE
ASSESSMENT**

**RESPONSE TO SUBMISSIONS
CABBAGE TREE ROAD SAND QUARRY (SSD 13_6125)**



Project No: 161267

Noise Impact Assessment Proposed Sand Quarry Cabbage Tree Road, Williamtown, NSW

Prepared for:

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December 2016

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1.0 INTRODUCTION

1.1 Background

An Environmental Impact Statement (EIS) for the proposed Cabbage Tree Road Sand Quarry at Williamtown was publicly exhibited from 4 December 2015 to 15 February 2016. The proposed sand quarry is located on the northern side of Cabbage Tree Road approximately 3.5 km southwest of Newcastle Airport, NSW.

Government authority, special interest groups and the public made submissions on the exhibited EIS. The New South Wales Department of Planning and Environment then requested the proponent, Williamtown Sand Syndicate Pty Limited (WSS), provide a response to the issues raised.

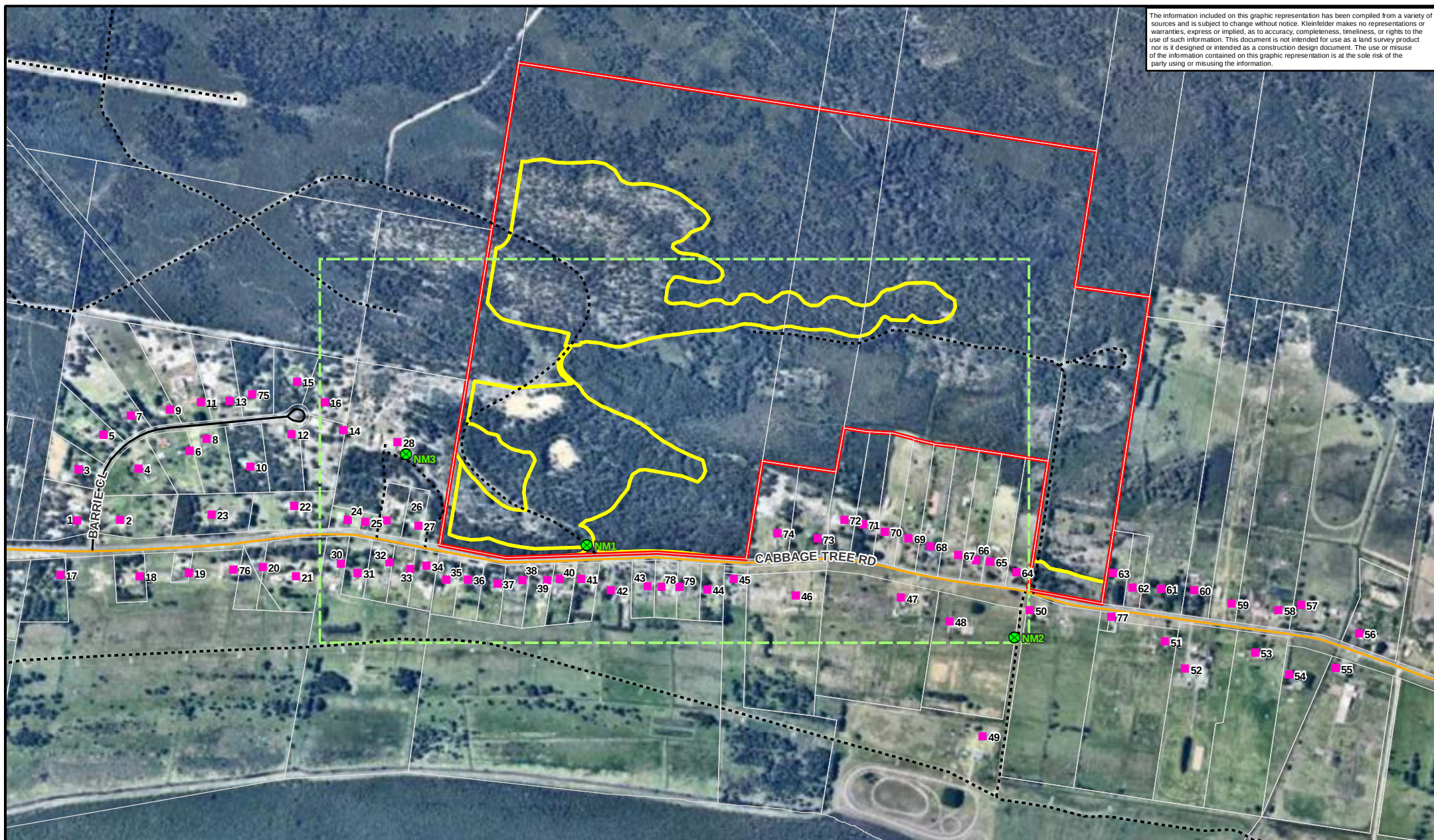
Feedback from the agencies and public submissions has resulted in substantial amendments to the proposal and this noise assessment has been commissioned to determine potential noise impacts from the redesigned project and provide responses to commonly raised noise concerns in the submissions.

This noise impact assessment has been carried out in accordance with the *NSW Industrial Noise Policy* (INP, 2000).

1.2 Receiver Locations

There are 38 residential receivers around the Project Site who would potentially be impacted by noise from the proposal as identified in **Figure 1**. Also shown are noise monitoring locations which will be discussed in Section 4.2.

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Legend

- Subject Land Boundary
- Project Area Boundary
- Noise Modelling Area
(Receptors outside of this area not expected to be affected by noise)

- X Noise Monitoring Point
- Receptor
- Lot Boundary
- Arterial Road
- Local Road
- Track

Metres
0 50 100 200 300 400 500



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PROJECT REFERENCE: 20170448

DATE DRAWN: 9/12/2016 10:16 Version 2

DRAWN BY: gjoyce

DATA SOURCE:
LPI - 2016
Nearmap - 2016

Subject Land and Receptors

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

1

2.0 THE PROPOSAL

2.1 Staged Mining

The proposed quarry would be staged over a period of approximately 8-15 years depending on market demand, from commencement to the final landform. The processing plant moves through ten sites (1- 10) through the life of the quarry (site 1 and 10 are common, as is 8 and 9), with extraction occurring within 27 different areas (the subsets of each, e.g. 10A, 10B, 10 C). **Figure 2** shows the ten sequential processing sites, and associated extraction areas.

2.2 Haul route

The haul route to and from the Project site would be via Cabbage Tree Road. The acoustic assessment of the project by Global Acoustics (GA2015) found insignificant impacts (a 0.1 dB increase) from project-generated traffic for average haulage rates during years at maximum annual extraction levels (i.e. 600,000t).

In order to provide a worst case traffic noise assessment, the peak traffic generation rate has been calculated (this would equate to an annual theoretical extraction rate of 1.16Mt). At peak haulage rates, the project would generate 12 heavy vehicle movements (i.e. both empty and laden trucks) per hour from 5am – 7am and 20 heavy vehicle movements per hour from 7am – 6pm, for a total of 244 heavy vehicle movements per day. Allowing for 12 vehicles movements over each day for the six staff and an arbitrary additional 10 movements for ancillary vehicles (deliveries, visitors etc) gives a worst case traffic generation of 266 movements per day.

Traffic data (AADT) were provided in Section 5 of GA2015, showing 8908 vehicles per day on Cabbage Tree Road. Adding the worst case traffic generation of 266 movements from the proposal gives a total traffic volume of 9174 vehicles per day, of which 2.9% would be project related.

The corresponding noise increase is approximated by $10 \cdot \log(1.029) = 0.12$ dB. This is an imperceptible and practically unmeasurable noise increase and is considered negligible.

2.3 Operational Times and Employment

The Project will employ up to six staff for the duration of the construction activities and quarry operations.

Construction activities are expected to be 12 weeks in duration and will be undertaken during the standard construction hours of:

- 7 am to 6 pm Monday to Friday.
- 8 am to 1 pm Saturdays.
- No work on Sundays or public holidays.

Quarry operations will occur during the following hours:

- All quarry activities:
 - ☐ 7 am to 6 pm Monday to Friday.
 - ☐ 7 am to 4 pm on Saturdays.
- Transportation and loading of sand only:
 - ☐ 5 am to 6 pm Monday to Friday.
 - ☐ 7 am to 4 pm on Saturdays.
- No work on Sundays or public holidays with an exception for repair and maintenance of plant and equipment that may occur during these times.

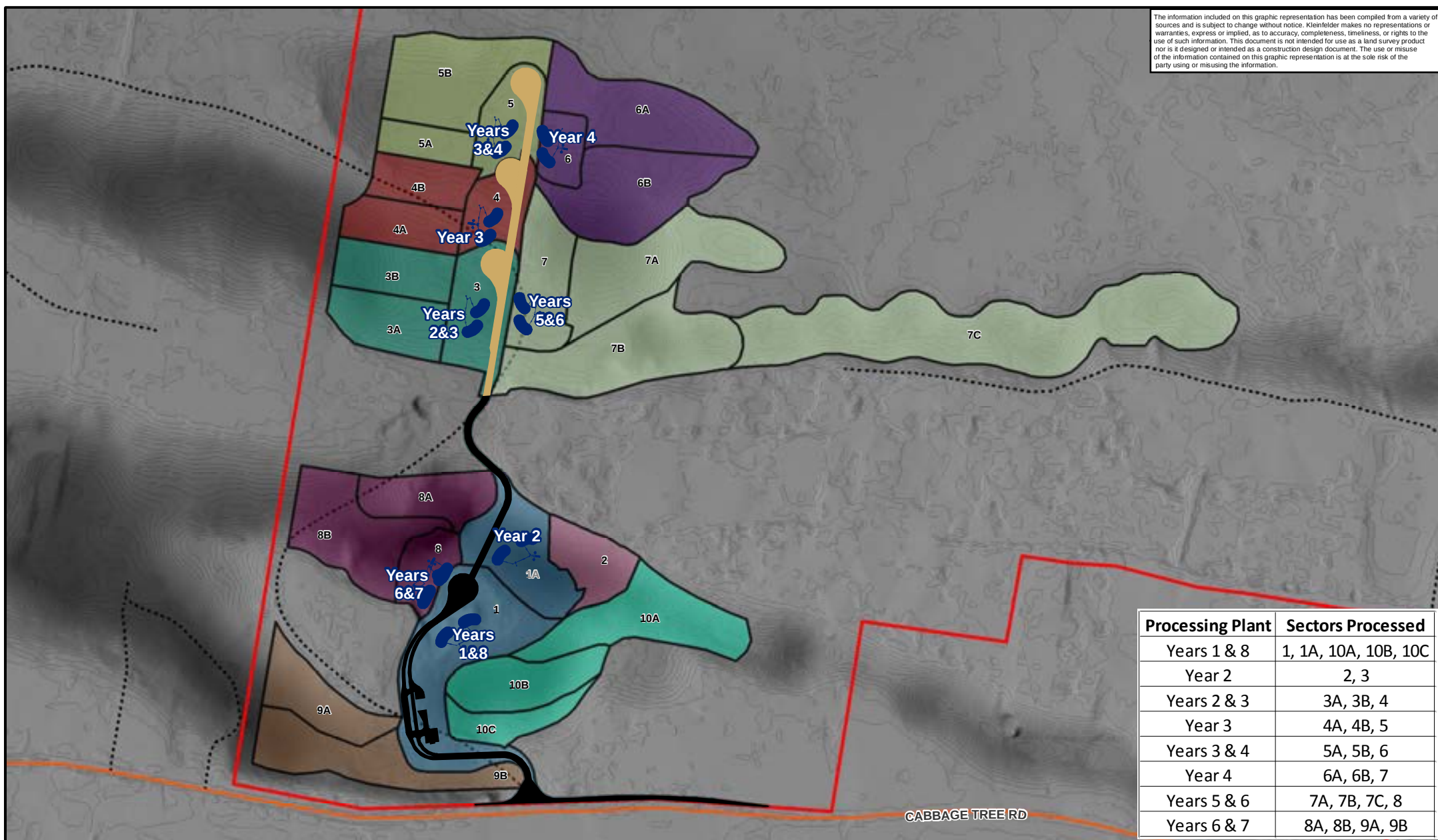
Employees (in light vehicles) will arrive at the quarry approximately 15 minutes before opening (i.e. 4:45 am) to open quarry gates, by 5 am, and will leave approximately 30 minutes after quarry close (i.e. to 6:30 pm).

3.0 DESCRIPTION OF TERMS

Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

TABLE 1 DEFINITION OF ACOUSTICAL TERMS	
Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.

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Processing Plant	Sectors Processed
Years 1 & 8	1, 1A, 10A, 10B, 10C
Year 2	2, 3
Years 2 & 3	3A, 3B, 4
Year 3	4A, 4B, 5
Years 3 & 4	5A, 5B, 6
Year 4	6A, 6B, 7
Years 5 & 6	7A, 7B, 7C, 8
Years 6 & 7	8A, 8B, 9A, 9B

Legend

- Subject Land
- Road - gravel
- Road - sealed
- Arterial Road
- Track

Sector

- 1
- 2
- 3
- 4
- 5

- 6
- 7
- 8
- 9
- 10

Processing Plant Locations

Metres
0 25 50 100 150 200 250



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PROJECT REFERENCE: 20170448

DATE DRAWN: 5/09/2016 15:24 Version 1

DRAWN BY: gjoyce

DATA SOURCE:
LPI - 2016
Nearmap - 2016

Quarry Operations Plan

Williamtown Sand Syndicate
Noise Monitoring Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

2

4.0 EXISTING ENVIRONMENT AND CRITERIA

The existing meteorological and acoustical environments of the site have been studied to determine prevailing conditions and to allow noise goals to be set.

4.1 Meteorology

An assessment of meteorological conditions in the project area was conducted in GA2015. That analysis has been reviewed and its finding that winds and temperature inversions do not require inclusion in an acoustic assessment will be carried over to this reassessment.

4.2 Existing Acoustic Environment

The area around the Project Site is rural in nature with a reasonably busy road, Cabbage Tree Road which becomes Tomago Road to the west, impacting all assessed receivers to some degree. The runway at Newcastle Airport carries both commercial and Air Force aircraft and is a significant noise source in the area.

The original acoustic assessment for the proposal by Global Acoustics, November 2015, referenced herein as GA15, stated that data from two background noise monitoring surveys was corrupted and data from only four days was used to determine project noise criteria. One of these days was a Sunday and since the proposal would not operate on a Sunday, GA15 only has three days of data available for assessment of noise criteria. Section 3.5 of the *NSW Industrial Noise Policy* (INP) allows for three days of monitoring if traffic is the dominant noise source at the logger location.

The noise logger location NM1 in GA15 was close to the northern side of Cabbage Tree Road (see Figure 1). The rating background level derived from this monitoring event was 38 dB(A),L90 (day).

Based on this RBL a daytime noise criterion of 43 dB(A), $L_{eq}(15\text{minute})$ was determined from the INP. This criterion will be retained in this assessment for receivers immediately adjacent to Cabbage Tree Road on similar topographic levels (i.e. generally below 4m AHD).

Several receivers north of Cabbage Tree Road are elevated (5 to 16 m AHD) with respect to the road and have a greater field of view of the area, implying a greater noise catchment area. Additional noise monitoring was conducted to determine the existing acoustic environment at these elevated locations. Ambient noise levels were measured near the Receptor 28 residence at 442 Cabbage Tree Road, location NM3 in Figure 1, from 17 June to 3 July, 2016.

Noise levels were measured at 15 minute statistical intervals using a Rion NL-42 environmental noise logger. The measurements were conducted in accordance with relevant EPA guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise logger complies with the

requirements of AS 1259.2-1990 “Acoustics – Sound Level Meters”, and has current NATA calibration certification.

The logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed during the instrument’s initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range.

Ambient L_{Aeq} and background (L_{A90}) noise levels, obtained from the logger, are summarised below in **Table 2** which includes the background (L_{90}) levels, and the Leq over the full day (11 hour, 7am-6pm), evening (4 hour, 6pm-10pm) and night (9 hour, 10pm-7am) periods. There were several windy and or rainy days during the monitoring period and these were omitted from the analysis. As a conservative measure, any daytime period with an L_{90} level exceeding 45 dB(A), night time L_{90} exceeding 40 dB(A), daytime L_{Aeq} exceeding 55 dB(A) or evening L_{Aeq} exceeding 50 dB(A) were also omitted from the analysis. Omitted data is shaded grey in Table 2. The data set is shown graphically in Appendix A.

TABLE 2						
MEASURED AMBIENT NOISE LEVELS AT NM3 17/6/16 to 3/7/16						
Date	$Leq(day)$	$Leq(eve)$	$Leq(night)$	$L_{90}(day)$	$L_{90}(eve)$	$L_{90}(night)$
17 Jun 16	55.6	48.3	45.7	41.4	37.8	27.8
18 Jun 16	48.9	46.9	45.5	38.3	34.7	35.7
19 Jun 16*	50.6	44.3	47.5	40.2	35.2	30.7
20 Jun 16	65.4	65.1	61.9	46.4	56.7	52.8
21 Jun 16	62.7	54.5	53.7	50.2	46.0	41.9
22 Jun 16	56.0	50.3	48.0	48.0	41.7	30.8
23 Jun 16	55.2	50.4	47.0	43.3	33.6	32.3
24 Jun 16	60.5	50.0	47.2	47.4	38.5	38.2
25 Jun 16	51.1	47.4	45.2	41.6	35.3	36.0
26 Jun 16*	59.3	47.1	44.2	39.8	31.8	28.2
27 Jun 16	53.4	54.3	48.6	45.3	41.0	41.1
28 Jun 16	54.9	51.0	45.7	44.0	36.7	35.9
29 Jun 16	51.0	50.3	45.8	40.4	35.1	32.5
30 Jun 16	51.7	46.6	45.5	41.1	33.8	29.2
1 Jul 16	54.8	48.1	47.3	46.3	41.2	39.1
2 Jul 16	60.4	48.2	43.2	42.3	31.1	34.9
3 Jul 16*	49.3	46.9	46.0	38.9	31.4	29.2
L_{Aeq}	53	48	46	--	--	--
L_{90} (RBL)	--	--	--	42	35	32

* Sundays removed from the assessment of RBL as the quarry would not operate on Sundays.

Noise monitoring for another, since approved, project was conducted at the location indicated as NM2 in Figure 1 by Spectrum Acoustics during June-July 2011. The results are summarised in **Table 3** and data charts are included in Appendix A.

TABLE 3 MEASURED AMBIENT NOISE LEVELS (2011) dB(A)		
Period	Cabbage Tree Road (NM2)	
	L90	Leq (period)
Day	42	60
Evening	40	53
Night	36	51

The monitoring surveys summarised in Table 2 and 3 were conducted during winter, thereby avoiding the insects during the warmer months which elevated background noise levels in the GA15 assessment, and are in exact agreement regarding daytime background noise level. Background noise levels for all elevated receivers north of Cabbage Tree Road will be adopted from the values in Table 2, as these were measured directly at one of the elevated receivers, R28

4.3 Noise criteria

In setting noise goals for a particular project the INP considers both Amenity and Intrusiveness criteria. The former is set to limit continuing increase in noise from industry, whilst the latter is set to minimise the intrusive impact of a particular noise source. Amenity criteria are dependent upon the nature of the receiver area and the existing level of industrial noise. The residential areas near the site are best described acoustically as suburban as per definitions in the INP but are not subjected to existing industrial noise sufficient to warrant adoption of amenity criteria.

The intrusive criteria for receivers at the same elevation as, and adjacent to, Cabbage Tree Road are those established in GA15 as follows:

Day (7am* – 6pm)	43 dB(A),_{Leq(15minute)}
Evening (6pm – 10pm)	38 dB(A),_{Leq(15minute)}
Night (10pm – 7am*)	35 dB(A),_{Leq(15minute)}
Morning shoulder[#] (5am – 7am)	45 dB(A),_{Leq(15minute)}

* 8am on Sundays and public holidays.

[#] Recalculated from GA15 data. See Section 7 (5).

The intrusiveness criteria for elevated receivers north of Cabbage Tree Road are based on the Rating Background Level (RBL) for the time period, plus 5 dB(A) shown in Table 2:

Day (7am* – 6pm)	47 dB(A),_{Leq(15minute)}
Evening (6pm – 10pm)	40 dB(A),_{Leq(15minute)}
Night (10pm – 7am*)	37 dB(A),_{Leq(15minute)}
Morning shoulder[#] (5am – 7am)	47 dB(A),_{Leq(15minute)}

* 8am on Sundays and public holidays.

Daytime operational noise criteria for the assessed receivers shown in Figure 1 are summarised in **Table 4**. These receptors and the relevant daytime operational noise criteria are shown spatially with model results in Figures 3 to 8.

TABLE 4
DAYTIME OPERATIONAL NOISE CRITERIA

Receiver ID	Address	Criterion dB(A), _{Leq(15min)}
14	24 Barrie Close	47
16	39 Barrie Close	47
24	464 Cabbage Tree Road	43
25	458 Cabbage Tree Road	43
26	452 Cabbage Tree Road	43
27	444 Cabbage Tree Road	43
28	442 Cabbage Tree Road	47
30	465 Cabbage Tree Road	43
31	457 Cabbage Tree Road	43
32	451 Cabbage Tree Road	43
33	447 Cabbage Tree Road	43
34	441 Cabbage Tree Road	43
35	435 Cabbage Tree Road	43
36	431 Cabbage Tree Road	43
37	425 Cabbage Tree Road	43
38	415 Cabbage Tree Road	43
39	409 Cabbage Tree Road	43
40	407 Cabbage Tree Road	43
41	397 Cabbage Tree Road	43
42	393 Cabbage Tree Road	43
43	373 Cabbage Tree Road	43
44	365 Cabbage Tree Road	43
45	363 Cabbage Tree Road	43
46	343 Cabbage Tree Road	43
47	313 Cabbage Tree Road	43
48	303 Cabbage Tree Road	43
64	290 Cabbage Tree Road	43
65	296 Cabbage Tree Road	47
66	298 Cabbage Tree Road	47
67	306 Cabbage Tree Road	47
68	312 Cabbage Tree Road	47
69	318 Cabbage Tree Road	47
70	322 Cabbage Tree Road	47
71	328 Cabbage Tree Road	47
72	336 Cabbage Tree Road	47
73	340 Cabbage Tree Road	43
74	350 Cabbage Tree Road	43
78	383 Cabbage Tree Road	43
79	379 Cabbage Tree Road	43

5.0 ASSESSMENT METHODOLOGY

5.1 Modelled Scenarios

The Environmental Noise Model (ENM) software produced by Renzo Tonin Associates (RTA) Technologies was used to generate noise contours for six operational areas of the proposed quarry.

Scenario 1:

Operation of air dryer and McCloskey screen in Area 1. Truck loading and transport to site boundary on Cabbage Tree Road.

Scenario 2:

Extraction of sand near eastern end of Area 7c using D8 dozer at RL 4. Cat 980 loader loading sand into feed bin. Electric conveyor transferring material back to processing area in Area 3. Truck loading and transport to southern site boundary.

Scenario 3:

Extraction of sand near western end of Area 8b using D8 dozer at RL 4. Cat 980 loader loading sand into feed bin. Electric conveyor transferring material back to processing area in Area 8. Truck loading and transport to southern site boundary.

Scenario 4:

Extraction of sand at southern extent of Area 9b using D8 dozer at RL 4. Cat 980 loader loading sand into feed bin. Southern extraction face at its proposed lower limit of RL 9. Electric conveyor transferring material back to processing in Area 1. Truck loading and transport to southern site boundary.

Scenario 5:

Extraction of sand near eastern limit of Area 10a using D8 dozer at RL 4. Cat 980 loader loading sand into feed bin. Electric conveyor transferring material back to processing in Area 1. Truck loading and transport to southern site boundary.

Scenario 6:

Extraction of sand near southeastern limit of Area 10c using D8 dozer at RL 4. Cat 980 loader loading sand into feed bin. Electric conveyor transferring material back to processing in Area 1. Truck loading and transport to southern site boundary.

5.2 Short term activities

It should be noted that some activities on site are likely to occur over a very short duration. **Table 5** shows the estimated duration of extraction and associated clearing at planned extraction rates. As the clearing activities are not shielded from the topography as occurs during normal extraction, the potential noise propagation is typically higher. However, as shown by Table 5, the periods of higher noise levels are limited to periods of 5 days or less, and occur over a frequency of 2 to 6 months.

For example from the start of Area 8B, surface clearing activities are expected to occur over a period of less than 25 days over a period of approximately 23 months.

TABLE 5 Duration of extraction within key areas		
Sector	Months of Supply	Estimated Surface Clearing Duration
1	3	Up to 5 days
7C	4	Up to 5 days
8B	4	Up to 5 days
9B	2	Up to 5 days
10A	6	Up to 5 days
10B	7	Up to 5 days
10C	4	Up to 5 days

For each of Scenarios 2-6, a model was generated in which tree stripping using a D8 dozer restricted to first gear in reverse was modelled at the highest point of the natural ground surface in combination with the extraction scenario. A final model for each of Scenarios 2-6 considered the use of an excavator instead of the dozer for tree clearing, as the excavator is quieter than the dozer.

5.3 Noise Sources

Quarrying equipment for use for extraction and processing is listed in **Table 6**.

TABLE 6 NOISE SOURCES AND SOUND POWER LEVELS, Lw dB(A)			
Equipment	Indicative Number	Use	Lw dB(A)
D8 Bulldozer (1st gear)	1	Tree clearing/material push-up	109
CAT 980 Loader	1	Loading conveyors and trucks	104
Excavator (30T)	1	Tree clearing/material push-up	104
Jump conveyor (30m)	1 per 30m	Material transfer	76
Zip line conveyor (150m)	1 per 150m	Material transfer	83
Radial stacker	1	Stacking product	93
Fisher air separator	1	Processing sand	98
McCloskey S190 screen	1	Screening sand	103

6.0 RESULTS AND DISCUSSION

Predicted noise levels for each modelled operational scenario are discussed below with noise contours presented in **Figures 3-8**.

6.1 Predicted Noise Levels Scenario 1

Noise contours for Scenario 1 (Area 1) are shown in Figure 3. There are no exceedances of the 43 dB(A) and 47 dB(A) operational noise criteria at any receiver, with levels less than or equal to 35 dB(A) predicted at all receivers except R28 where 45 dB(A) is predicted.

6.2 Predicted Noise Levels Scenario 2

Noise contours for Scenario 2 (Area 7c) are shown in Figure 4. There are no exceedances of the 43 dB(A) and 47 dB(A) operational noise criteria at any receiver, with levels less than or equal to 35 dB(A) predicted at all receivers except R28 where 42 dB(A) is predicted.

6.3 Predicted Noise Levels Scenario 3

Noise contours for Scenario 3 (Area 8b) are shown in Figure 5. There are no exceedances of the 43 dB(A) and 47 dB(A) operational noise criteria at any receiver, with 46 dB(A) predicted at the worst impacted receiver R28.

6.4 Predicted Noise Levels Scenario 4

Noise contours for Scenario 4 (Area 9b) are shown in Figure 6. There are no exceedances of the 43 dB(A) and 47 dB(A) operational noise criteria at any receiver, with levels of 38 dB(A) predicted at the worst impacted receivers south of Cabbage Tree Road and 44 dB(A) predicted at R28.

6.5 Predicted Noise Levels Scenario 5

Noise contours for Scenario 5 (Area 10a) are shown in Figure 7. There are no exceedances of the 43 dB(A) and 47 dB(A) operational noise criteria at any receiver, with levels of 36 dB(A) predicted at the worst impacted receivers south of Cabbage Tree Road and 44 dB(A) predicted at R28.

6.6 Predicted Noise Levels Scenario 6

Noise contours for Scenario 6 (Area 10c) are shown in Figure 8. There are no exceedances of the 43 dB(A) and 47 dB(A) operational noise criteria at any receiver, with levels of 42 dB(A) predicted at the worst impacted receivers south of Cabbage Tree Road and 44 dB(A) predicted at R28.

6.7 Short term impacts

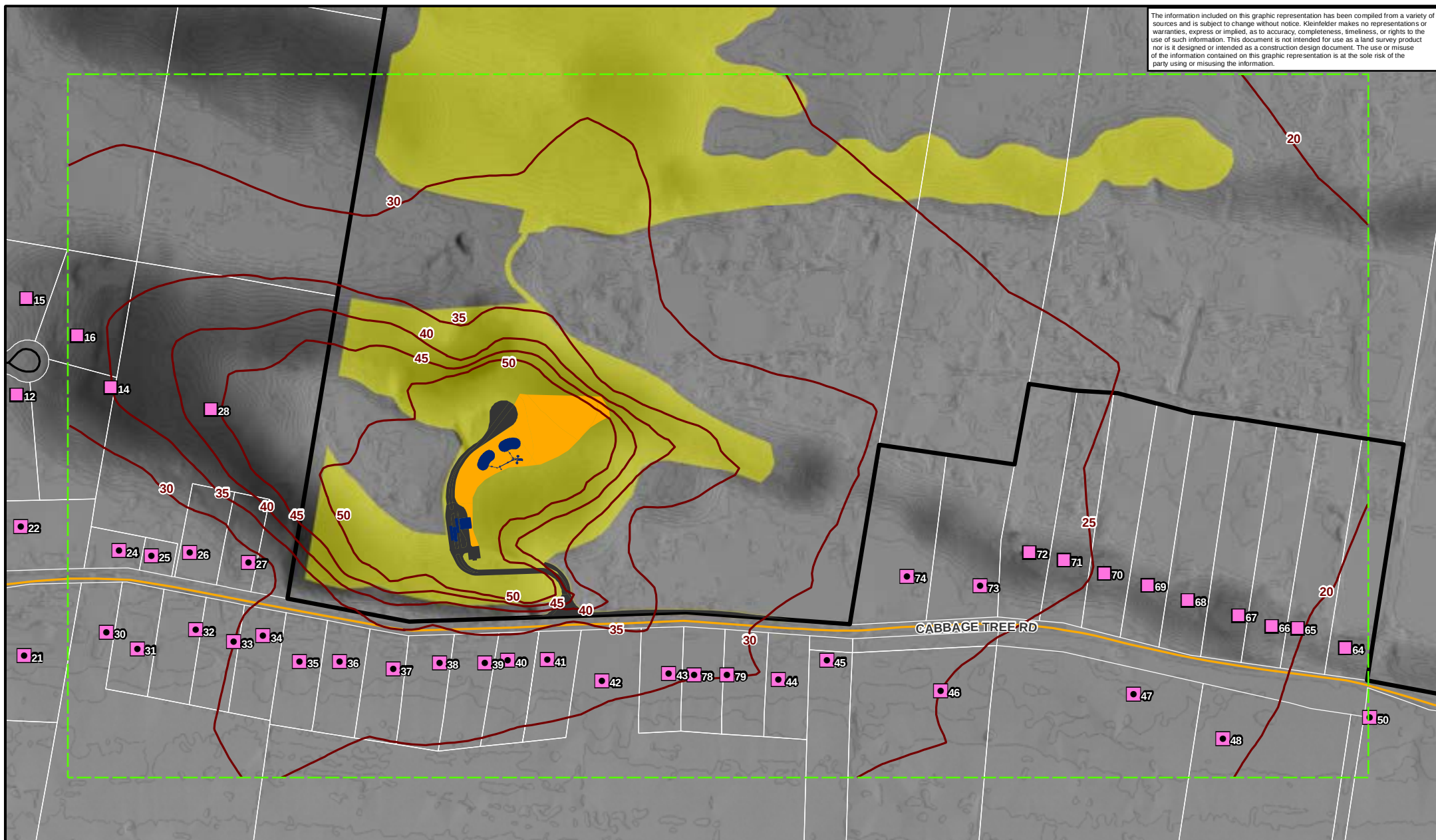
Each extraction area will require the vegetation to be cleared prior to recovering the sand. This will require the use of a bulldozer or excavator and will occur for periods in the order of five days as indicated in Table 5. Noise modelling results

for clearing activities in each modelled stage using a bulldozer or excavator are summarised in **Table 7**.

TABLE 7 PREDICTED VEGETATION CLEARING NOISE LEVELS, dB(A), L_{eq}(15minute)			
Scenario / Area	Equipment	Worst case predicted (receptor)	Criterion
Scenario 2 / Area 7c	D8 Bulldozer (1 st gear)	40 (R30, R31)	43
	Excavator (30T)	37 (R30, R31)	43
Scenario 3 / Area 8b	D8 Bulldozer (1 st gear)	46 (R28)	47
	Excavator (30T)	44 (R28)	47
Scenario 4 / Area 9b	D8 Bulldozer (1 st gear)	51 (R35 – R38)	43
	Excavator (30T)	47 (R35 – R38)	43
Scenario 5 / Area 10a	D8 Bulldozer (1 st gear)	46 (R41 – R43)	43
	Excavator (30T)	42 (R41 – R43)	43
Scenario 6 / Area 10c	D8 Bulldozer (1 st gear)	50 (R41 – R43)	43
	Excavator (30T)	46 (R41 – R43)	43

The results in Table 7 show that short term criterion exceedances up to 8 dB are predicted to occur when the dozer is used to clear the most exposed areas of the extraction area, being Areas 9b and 10c. The exceedances decrease to 4 dB for receivers R35 – R38 if the excavator is used for vegetation clearing in Area 9b, and 3 dB for receivers R41 – R43 for Area 10c. Given the small number of affected receivers, the very short duration of the activity and the unfeasibility of alternate noise control options, it is recommended that the predicted noise levels be adopted as the noise criteria for this short term activity and a condition be imposed that the dozer must not be used to clear vegetation in the most exposed areas of Areas 9b, 10a and 10c.

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Legend

- Subject Land Boundary
- Project Area Boundary
- Site Office and Processing Areas
- Total Disturbance Area
- Road - Sealed
- Arterial Road
- Local Road

Noise Impact Assessment

- Noise Modelling Area
- Noise Contours (5db Increments)
- Noise Criterion**
- 43 dB(A), $L_{eq}(15min)$
- 47 dB(A), $L_{eq}(15min)$

Metres
0 25 50 100 150 200 250



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PROJECT REFERENCE: 20170448

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DRAWN BY: BDeane

DATA SOURCE:
LPI - 2016
Nearmap - 2016

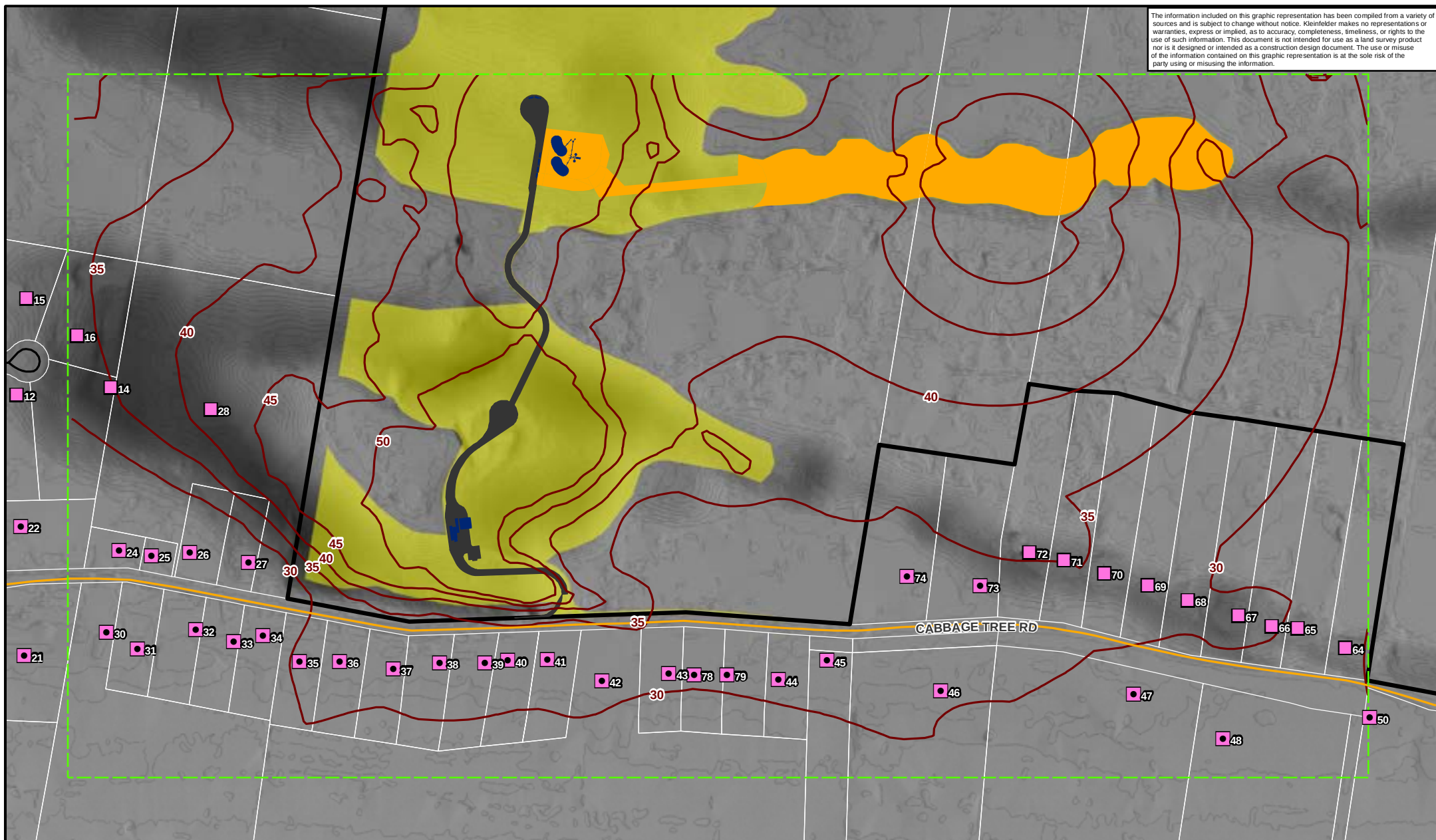
Noise Impact Assessment Scenario 1 Area 1 - Extraction

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

3

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Legend

- Subject Land Boundary
- Project Area Boundary
- Site Office and Processing Areas
- Total Disturbance Area
- Road - Sealed
- Arterial Road
- Local Road

Noise Impact Assessment

- Noise Modelling Area
- Noise Contours (5db Increments)
- Noise Criterion**
 - 43 dB(A), $L_{eq}(15min)$
 - 47 dB(A), $L_{eq}(15min)$

Metres
0 25 50 100 150 200 250



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PROJECT REFERENCE: 20170448

DATE DRAWN: 12/13/2016 15:16 Version 2

DRAWN BY: BDeane

DATA SOURCE:
LPI - 2016
Nearmap - 2016

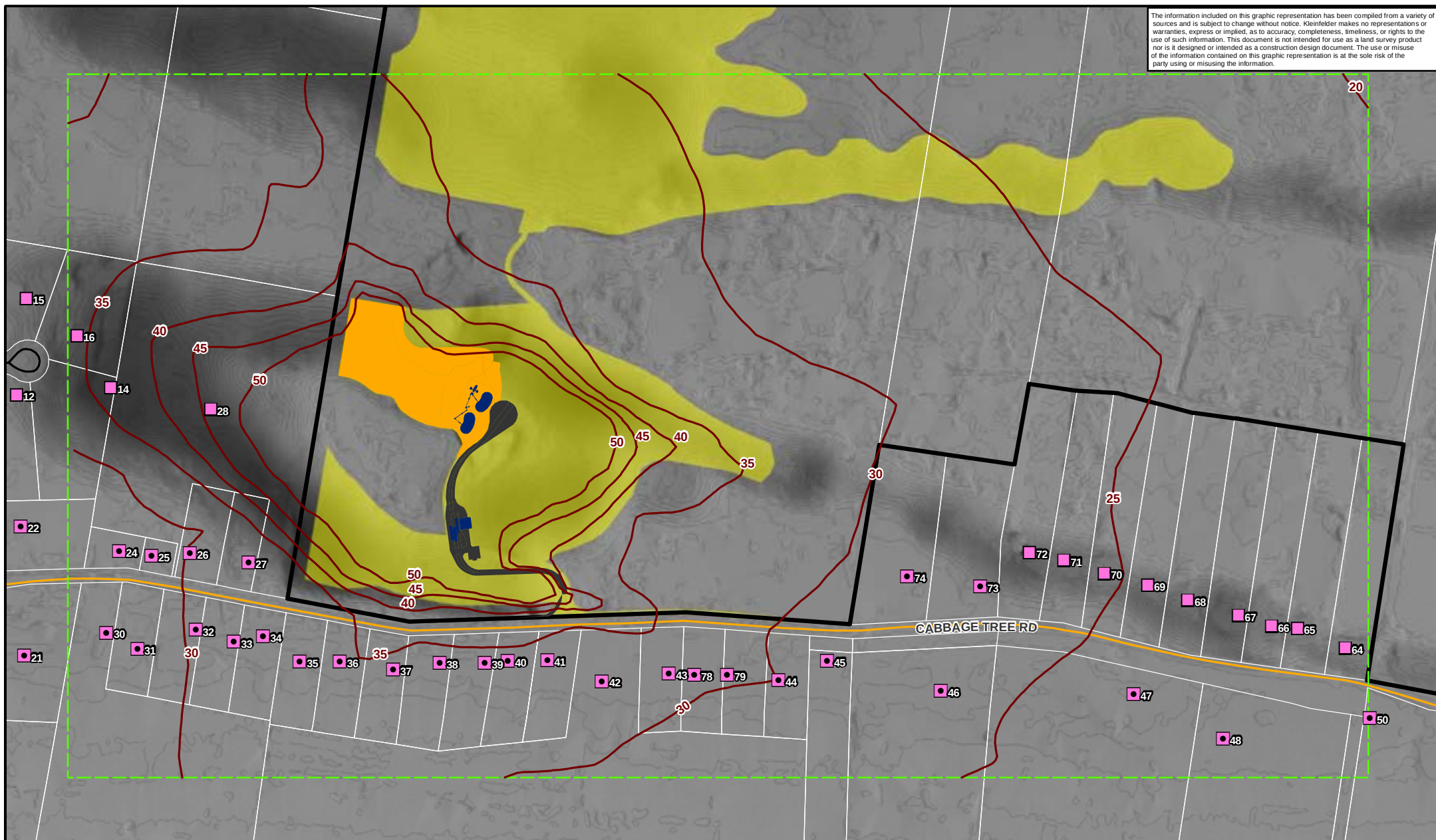
Noise Impact Assessment Scenario 2 Area 7C - Extraction

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

4

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Legend

- Subject Land Boundary
- Project Area Boundary
- Site Office and Processing Areas
- Total Disturbance Area
- Road - Sealed
- Arterial Road
- Local Road

Noise Impact Assessment

- Noise Modelling Area
- Noise Contours (5db Increments)
- Noise Criterion
 - 43 dB(A), L_{eq}(15min)
 - 47 dB(A), L_{eq}(15min)

Metres
0 25 50 100 150 200 250



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PROJECT REFERENCE: 20170448

DATE DRAWN: 12/13/2016 15:17 Version 2

DRAWN BY: BDeane

DATA SOURCE:
LPI - 2016
Nearmap - 2016

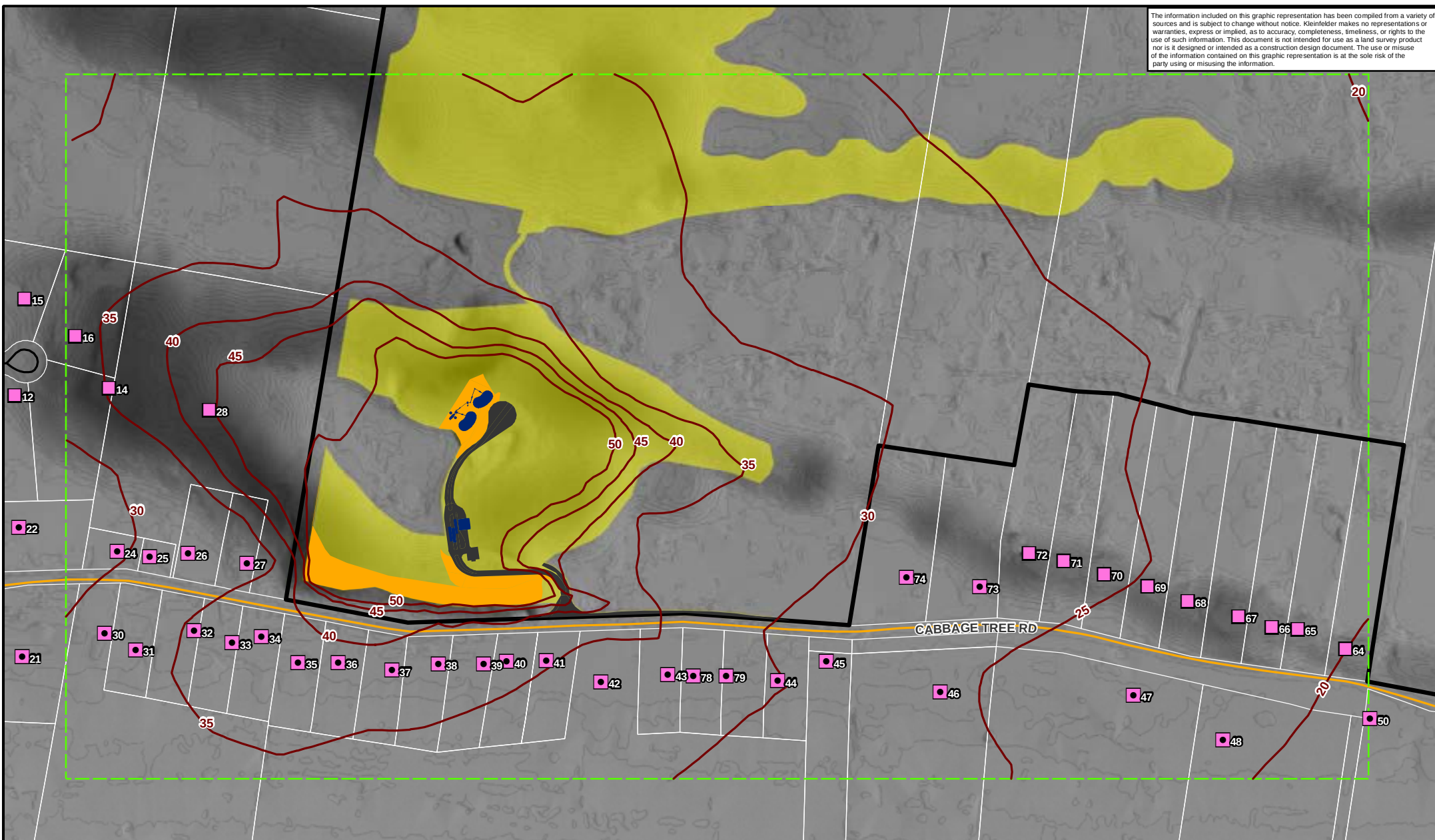
Noise Impact Assessment Scenario 3 Area 8B - Extraction

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

5

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Legend

- Subject Land Boundary
- Project Area Boundary
- Site Office and Processing Areas
- Total Disturbance Area
- Road - Sealed
- Arterial Road
- Local Road
- Noise Modelling Area
- Noise Contours (5db Increments)
- Noise Criterion**
 - 43 dB(A), $L_{eq}(15min)$
 - 47 dB(A), $L_{eq}(15min)$

Metres
0 25 50 100 150 200 250



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PROJECT REFERENCE: 20170448

DATE DRAWN: 12/13/2016 15:18 Version 2

DRAWN BY: BDeane

DATA SOURCE:
LPI - 2016
Nearmap - 2016

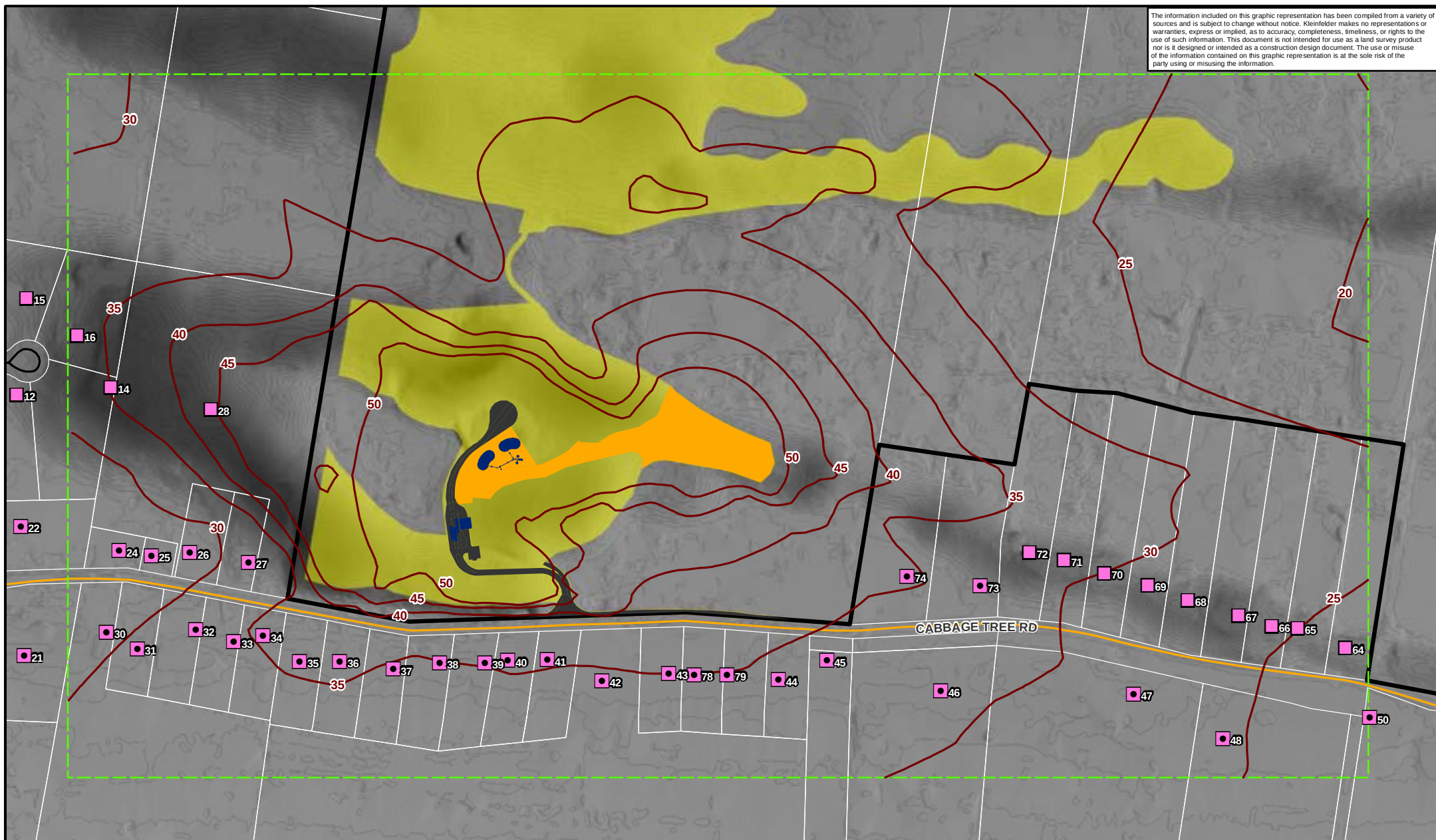
Noise Impact Assessment Scenario 4 Area 9B - Extraction

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

6

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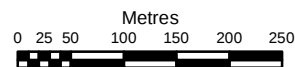


Legend

- Subject Land Boundary
- Project Area Boundary
- Site Office and Processing Areas
- Total Disturbance Area
- Road - Sealed
- Arterial Road
- Local Road

Noise Impact Assessment

- Noise Modelling Area
- Noise Contours (5db Increments)
- Noise Criterion
 - 43 dB(A), $L_{eq}(15min)$
 - 47 dB(A), $L_{eq}(15min)$



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PROJECT REFERENCE: 20170448

DATE DRAWN: 12/13/2016 15:19 Version 2

DRAWN BY: BDeane

DATA SOURCE:
LPI - 2016
Nearmap - 2016

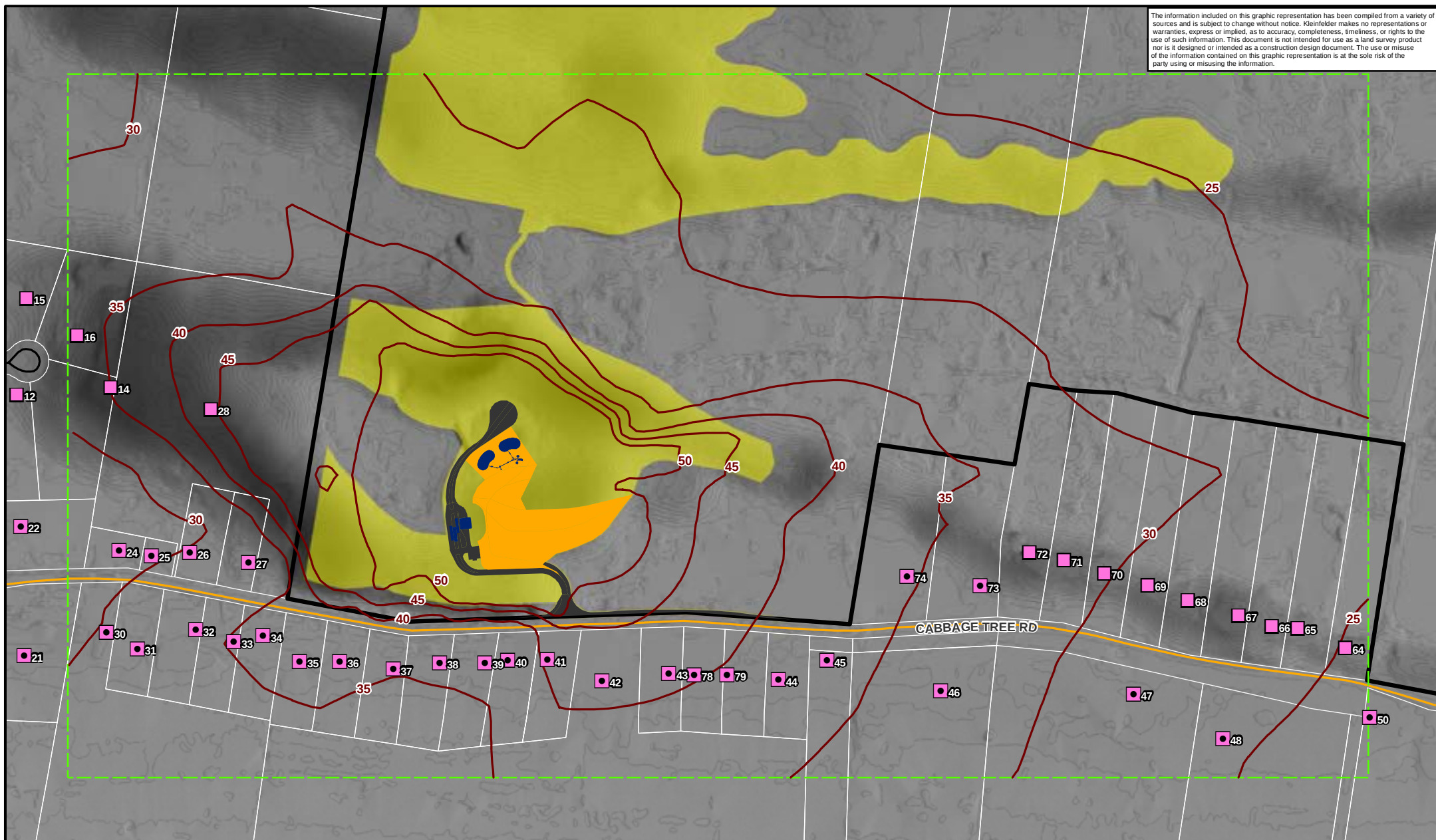
Noise Impact Assessment Scenario 5 Area 10A - Extraction

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

7

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Legend

- Subject Land Boundary
- Project Area Boundary
- Site Office and Processing Areas
- Total Disturbance Area
- Road - Sealed
- Arterial Road
- Local Road

Noise Impact Assessment

- Noise Modelling Area
- Noise Contours (5db Increments)
- Noise Criterion**
- 43 dB(A), $L_{eq}(15min)$
- 47 dB(A), $L_{eq}(15min)$

Metres
0 25 50 100 150 200 250



PROJECT REFERENCE: 20170448

DATE DRAWN: 12/13/2016 15:22 Version 2

DRAWN BY: BDeane

DATA SOURCE:
LPI - 2016
Nearmap - 2016

Noise Impact Assessment Scenario 6 Area 10C - Extraction

Williamtown Sand Syndicate
Noise Impact Assessment
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:

8

7.0 RESPONSE TO SUBMISSION ISSUES

The following issues were raised in the submissions in relation to noise, a response is provided in relation to each matter raised.

- 1. Increase in noise levels from the Williamtown Airport experienced by receptors as a result of the removal of sand dunes associated with the quarry operations, and the need for the RAAF to re-evaluate noise mapping.**

Aircraft take-offs and landings are the only activities that may receive noise screening from the very low sand dunes on the subject site, with no theoretical screening once the aircraft are approximately 10m off the ground. Two military jets were observed taking off to the west during installation of the noise logger at R28. Noise from the take-off was immediately apparent, but was at its loudest when the jets circled to the south after take-off and continued to turn until it heading southeast almost over the top of cabbage Tree road residences near the site.

The loss of barrier screening due to dune removal would not significantly change the aircraft noise environment at the receivers near the proposal as the proportion of time each aircraft is above the ground is much greater than the time they are making noise on the runway.

- 2. Clearing of vegetation will result in increased noise levels from the Williamtown airport, anecdotal comments regarding observed increased noise after the 2013 bushfires.**

Quantifying the effect of this perceived noise level change is not possible, although it would have been a valuable study to conduct following the fires. As with the perceived barrier effects, ground effects may only influence noise propagating across the ground surface from aircraft on the runway. Ground effects are strongly dependent on the ground surface itself and less so on the vegetative cover. It is again noted that in-flight noise emissions, in terms of proximity to residences and duration of exposure, exceed those of on-ground emissions and vegetative changes between the runway and residences are unlikely to lead to significant changes in total aircraft noise exposure.

- 3. Accelerating, decelerating trucks (especially air braking) and the trucks returning along Cabbage Tree Road will have a cumulative noise impact.**

Drivers should be instructed to avoid the use of air-braking when entering the quarry. As determined within the EIS Noise Impact Assessment the potential noise from the accelerating and decelerating vehicles and the addition of a vehicle returning on the road is unlikely to result in any appreciable noise increase above existing levels or the appropriate noise criteria.

It should be noted that a substantial portion of the noise generated by passing trucks is from tyre noise, where vehicles are travelling slower (i.e. when accelerating or decelerating) the portion of wheel generated noise is likely to decrease the overall noise from the trucks accessing the quarry.

4. No consideration of truck movements onsite, only at exit.

The revised extraction plan has substantially removed onsite truck movements (other than sales trucks) and has replaced these with an electric conveyor system. Truck movements between the site entrance and loading points have been included in all modelled scenarios.

5. Noise levels during the early morning period from 5am to 7am.

Analysis of the noise logger data at NM3 for this “morning shoulder” period reveals a background noise level of 42 dB(A) which equals the full daytime background noise level of 42 dB(A). All of the results and findings of this report therefore apply equally to this time period, for elevated receivers north of Cabbage Tree Road.

Noise logger data included in Appendix C of GA15 was reviewed to estimate background noise levels during this shoulder period, by conservatively taking the minimum 15-minute L_{A90} level between 5am and 7am, for each day when the data was valid, as the background noise level. This analysis is summarised below.

Day/Date	Min L_{90} (5-7am)
Tues 17/3/2015	37
Wed 18/3/2015	40
Thurs 19/3/2015	40
Median (RBL)	40

The RBL of 40 dB(A), L_{90} during the morning shoulder period 5am – 7am is greater than the daytime background noise level of 38 dB(A), L_{90} established in GA16 for receivers adjacent to Cabbage Tree Road. For predicted noise impacts, the difference between predicted levels and the noise criterion, for these receivers will therefore be 2 dB less during this period due to a 2 dB higher criterion.

6. Effective noise monitoring and management of the project is important.

Noise compliance monitoring should be conducted, as a minimum:

- At project commencement:
- At commencement of each vegetation clearing campaign; and
- At commencement of extraction in each area.

The DP&E and/or EPA are likely to nominate noise monitoring frequency as a consent condition should the proposal be approved.

7. Noise mitigation for the operation should include:

- a. Noise barriers (up to 5m high) should be erected around the site perimeter or on neighbouring properties to reduce noise levels from the project.**
- b. Double glazing of house windows nearby.**

Where noise measured from the operation exceeds the adopted noise criteria for the project, the Proponent will be required to undertake the following process:

Review cause of excess noise.

- Implement control to minimise noise from identified cause or remove noise source from operation.
- Where the above controls are not feasible, liaise with the affected party and determine alternative control to minimise noise affectation, such controls could include:
 - o Double glazing.
 - o Noise barriers around site activity or on the property.
 - o Compensation for the affected party such that they can find alternative relief from the project.

8.0 SUMMARY

A reassessment of noise impacts from proposed sand mine at Cabbage Tree Road Williamtown has been conducted. The study has found the following:

- Noise monitoring has established a daytime background noise level of 42 dB(A), L90 at R28;
- No exceedances of noise criterion during extraction, processing and transportation activities;
- Exceedance of noise criterion for a brief period at some receivers if dozer used to clear trees in some areas;
- Above exceedances mitigated by the use of the excavator instead of the dozer for tree clearing in these critical areas;
- Noise monitoring should be conducted during critical periods where tree clearing is occurring in Areas 8b, 9b and 10c which are closest to residences.

The original acoustic assessment (Global Acoustics, November 2015) found no exceedances of vibration or traffic noise criteria.

On the basis of the results of this assessment, we advise that the project could operate within any reasonable noise and vibration criteria as may be included in a project approval.

APPENDIX A

NOISE LOGGER DATA CHARTS

