# APPENDIX G

Acoustic Assessment Report

Report Ref Tomago Ashphalt Acoustic Assessment
Report Rev 1c

# Acoustic Assessment
# For
# Proposed Asphalt Batching Plant
# Lot 14 and 15 Kennington Drive
# Tomago

.

## Prepared For:

## Tropic Asphalt

by

HUNTER ACOUSTICS

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## 1. INTRODUCTION

Hunter Acoustics has been engaged to conduct an acoustic assessment of a proposal to establish an asphalt batching plant at Lot 14 and 15 Kennington Drive Tomago. The location of the site is shown in Figure 1 below. The site planning constraints are described in the Development Application prepared by Lindsay and Dynan Pty Ltd that this study supports. This report describes the methodology, results, and findings of the study and makes recommendations for noise control measures to ensure that the operation of the facility does not become a source of offensive or intrusive noise.

## 2. TERMS AND DEFINITIONS

dB(A) ..... Unit of sound pressure level, modified by the A-weighting network to represent the sensitivity of the human ear.

SPL..... The incremental variation of sound pressure from the reference pressure level expressed in decibels.

SWL ($L_W$)..... Sound Power Level of a noise sources per unit time expressed in decibels from reference level $W_{O.}$

$L_X$ ..... Statistical noise descriptor. Where (x) represents the percentage of the time for which the specified noise level is exceeded.

$L_{eq}$..... Equivalent continuous noise level averaged over time on an equivalent energy basis.

$L_1$..... Average Peak Noise Level in a measurement period.

$L_{10}$..... Average Maximum Noise Level in a measurement period.

$L_{90}$..... Average Minimum Noise Level in a measurement period.

$L_{max}$..... Maximum Noise Level in a measurement period.

Background Noise Level..... Noise level determined for planning purposes as the one tenth percentile of the ambient $L_{A90}$ noise levels.

$P_O$ ..... Reference Sound Pressure for the calculation of SPL in decibels.

$W_O$..... Reference Sound Power for the calculation of SWL in decibels.



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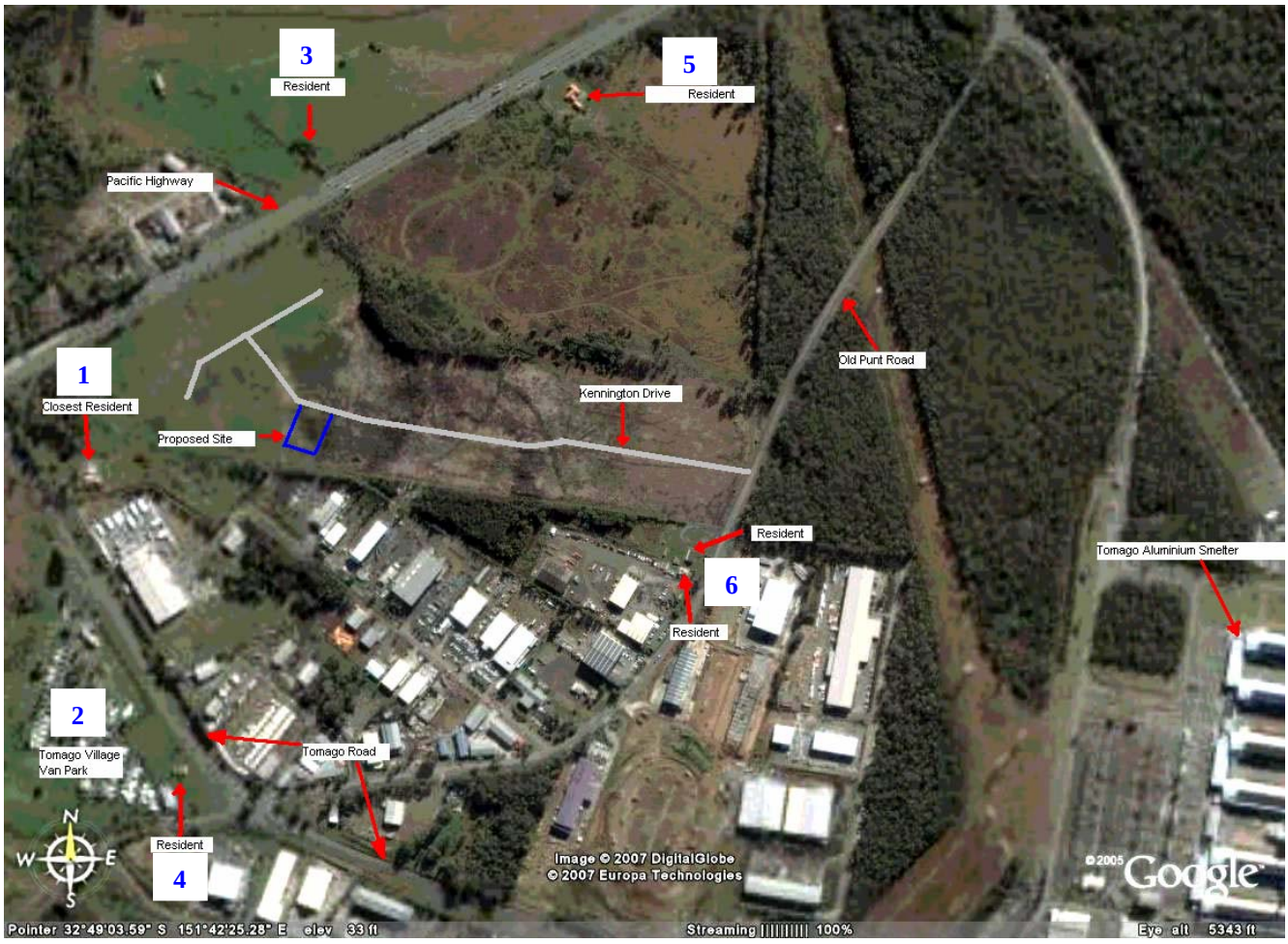
## 3. ACOUSTIC ISSUES

The site proposed for the development is located on Kennington Drive immediately adjacent to the existing Tomago Industrial estate located in the buffer zone for the Tomago Aluminium smelter. The Potentially affected residences are shown below in Figure 1 and each is variously affected by direct traffic noise from the Pacify Highway and Tomago Road.

The primary noise source for this type of facility is the operation of the burner / blower and its associated fan system, which heats the aggregate in the dryer prior to mixing. The proposal seeks to obtain approval for 24 hour operation and as such it is important for noise emissions from the plant to be controlled to a satisfactory level.

**Figure 1 Location of the Site, Surrounding Industries and Receptors**




### 3.1 ACOUSTIC ENVIRONMENT

The area is generally regarded as sub urban, however, the acoustic environment of the location and the associated receptors are dominated by large traffic volumes on the Pacific Highway and also by industrial noise from the existing industrial development and the aluminium smelter. The classification is considered to be existing Urban- Industrial interface for the receiver locations. The proposed asphalt plant will generate both vehicle and industrial noise from plant operations. Traffic noise on the Pacific Highway is unusually significant at night in this area and this is attributed to the large volume of heavy vehicles that use the Highway for interstate and long distance haulage at this



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point. Attended surveys were taken at selected locations and the only discernable industrial noise was that from immediately local sources. The overall noise climate is dominated by traffic noise on Tomago Road and the Pacific Highway for all identified receptors.

## 3.2 SITE OPERATIONS

The proposed location of the asphalt plant is lots 14 and 15 Kennington Drive and the site is shown in Figure 1 along with the location of the existing industries and the potentially affected receptors.

The proposed asphalt plant consists of material handling plant consisting of an aggregate unload hopper and conveyor systems, aggregate storage bins, aggregate feeders and conveyors and a recycled asphalt hopper and conveyor fed by a front end loader. The layout of the equipment is shown on the site plan in Appendix 1.

The aggregates are fed into a dryer in the batch plant which consists of a burner unit, and blower fan to heat the aggregates and the associated bag house exhaust fan and stack. The batching plant consists of bitumen storage bins and pumping equipment, a screen deck, hot aggregate storage bins, weigh hoppers, and a mixer. Recycled Asphalt Product (RAP) is also added to the aggregates in the batch plant along with other additives such as lime filler and recycled dust from the bag house. Asphalt from the batch process is either loaded directly into truck or may be placed in the storage bin for a period before loading the trucks from the storage bin.

The asphalt plant will operate on a batch basis to service the needs of construction projects as required. This means that on any given day there will be variations in the amount of time the plant operates and the number of trucks that it services to meet production requirements.

Batching plants such as this operate intermittently throughout the day with typically less than a 50 % duty cycle to meet delivery demands and truck availability. The proponents advise that that an expected average typical daily output is between 200 and 500 tonnes with a peak 8 hour output of 1000 tonnes, a peak 24 hour output of 1500 tonnes and an annual average of 75,000 tonnes per annum with a peak of 150,000 tonnes per annum.

The plant rated capacity is 150 tonne per hour, however, the proponents advise that the plant would normally operate at an average of 100 tonnes per hour on typical days and 150 tonnes pre hour on peak days. Normal daily usage would mean that the plant would run for between 2 and 5 hours per day with a peak of 10 hours per day.

The proposed asphalt plant seeks permission to operate 24 hours per day with two 12 hour shifts.

## 3.3 TRAFFIC NOISE FROM THE PROPOSED DEVELOPMENT

Truck traffic will pass down Kennington Road to Old Punt Road and then either

- exist directly to the Pacific Highway from Old Punt Road; or
- exit via Tomago Road to the Pacific Highway.
- or travel east along Tomago Road to local destinations.

Old Punt Road joins the Pacific Highway to the north of the site a distance of some 600 meters from the nearest residence and does not approach closer than 500 meters any existing residence in that direction. Tomago Road joins the Pacific Highway approximately 500 meters to the south west of the site and 200 metres from the existing Residence (Receptor 1) which is set back approximately 70 metres from Tomago Road. Traffic along Tomago Road will also travel past the Tomago Van Park with an approach distance of approximately 70 meters from the nearest dwelling within the park. The traffic volumes from this development are low and are generally not considered significant within the existing traffic context.



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# 4. ASSESSMENT CRITERIA

## 4.1 PLANNING LEVELS

This assessment is conducted in accordance with the Industrial Noise Policy released by the EPA in December 1999.

Ambient and background noise levels for the area were established by acoustic data logging at a near by representative site over the period 23 to 31 January 2006. The location for the data logger was chosen so as to have minimum direct exposure to traffic noise from the Pacific Highway, thereby, giving a conservative background noise level. An additional logger was placed outside residence No 1 to quantify the impact of the traffic noise and an attended survey was conducted at the location marked on Figure 2 to quantify existing industrial noise from the adjacent industrial site and traffic noise. The industrial noise exposure at the caravan park and other residences is less than that at residence 1 as they are further from the direct impact of adjacent industries.

The Rating Background Level was determined in accordance with Section 3 and Appendix B of the Industrial Noise Policy and the appropriate intrusiveness and sleep disturbance criteria determined. Rating Background levels and the associated Intrusiveness Criteria are set out in Table 1 below.

**Table 1 Intrusiveness Criteria**

| | Day Time<br>07:00-18:00 hrs Mon –Sat<br>08:00-18:00 hrs Sun & P/Hol | Evening<br>18:00-22:00 hrs<br>any day | Night time<br>All other times |
|---|---|---|---|
| Rating Background | 45.5 | 46.0 | 40.0 |
| Existing Amenity Level | 55 | 52 | 50 |
| Urban Amenity Criteria | 65 | 55 | 50 |
| ANL | 65 | 52 | 42.0 |
| Intrusiveness Criteria | 50.5 | 51.0 | 45.0 |
| Sleep Disturbance Criteria | N/A | N/A | 55.0 |

The limiting criteria, in accordance with the EPA Industrial Noise Source Policy 1999, are the night time amenity criteria, at 42.0 dB(A) $L_{eq15\ min}$, and sleep disturbance criteria, at 55.0 dB(A)$L_{01\ (1min)}$. Compliance with the intrusiveness criteria in this case will ensure compliance with the amenity criteria of the INP.

Additional data logging was conducted outside Residence 1 to determine the contribution of traffic noise for that location. The one tenth percentile $L_{A90\ 15\ minute}$ values for day, evening, and night at that location were 55dB(A), 53dB(A) and 49dB(A) respectively. The attended survey quantified direct impact industrial noise from the immediately adjacent site at Residence 1 as a contribution of 52 dB(A) $L_{eq\ 15min}$. during the day with additional contributions from traffic to 55 dB(A) $L_{eq\ 15min.}$

## 4.2 METEOROLOGY

The Hunter Region is potentially subject to significant noise enhancing wind and temperature inversion conditions that potentially may cause enhancement of noise at affected receptors.

Table F1 of the INP shows that the likelihood of F class temperature inversions for the area that is potentially affected by the proposed development is between 25% and 30% and, therefore, the occurrence of inversions is not considered significant and does not require assessment. Also in this case the area is not subject to drainage flows and distances between source and receivers are less that



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1000m. Table D1 of the INP shows that for these conditions the increase in noise level due to inversion conditions is between 1dB and 1.5 dB which is also not considered significant.

Wind roses for the Bureau of Meteorology's automatic weather station and Williamtown (Appendix 5) show that winds do not occur in any direction for more than 30 % of the time and, therefore, noise enhancing wind gradients do not need to be considered. Therefore, the noise level predictions were conducted only for neutral atmospheric conditions.

# 5. METHOD OF ASSESSMENT

## 5.1 SITE AND STATIONARY NOISE SOURCES

### 5.1.1 Plant and Equipment & General Site Activity

To establish the noise emission levels from a plant of this size, operational noise levels were measured at an existing Asphalt plant at Rutherford. Measurements were made in the near field during normal operations of the plant on the 6th February 06. Plant operations during the noise measurements included material receival and despatch, vehicle movements on site and the operation of the plant itself. The operation at Rutherford is a typical plant and is similar to the plant proposed for the Kennington Road location. Additional data was sourced from environmental surveys conducted by VIPAC Engineers and Scientists for a similar plant located in Mowbray in Tasmania. (Report No 42374-01 Vernachie Contracting Environmental Noise Survey, VIPAC Engineers and Scientists Dec 2005. Attached at Appendix 3)

There are noise sources within the proposed plant that have the potential to be tonal in nature, however, tonality was not identified at the Rutherford plant and the data from the Vipac survey (Figure 3) of the Vernachie Contracting plant in Mowbray Tasmania does not show tonality as defined in Table 4.1 of the INP. The proposed plant at Tomago has a vibrating screen deck and screen decks measured at similar plants give off broad band noise and do not show tonality. There is also the potential for the blower and fan at the proposed facility to exhibit tonal characteristics and the manufacturer has provided sound level information that does not contain spectral data. Typical fan sound power spectra have been used for similar size and type of fans as those proposed for the plant and those spectra do not contain tonal components. Therefore, no allowance for tonality has been made in this assessment and there is no significant excess of low frequency noise associated with the sources.

The proponents advise that the manufacturer of the proposed plant has made a significant effort to noise reduction and control. The major plant items are all resiliently mounted and the individual structural sections of the plant are also resiliently coupled to reduce the overall generation of structure born noise.

To determine the predicted received noise levels at affected receivers from the proposed asphalt plant, the measured noise source levels were propagated as octave band spectra using ENM software that includes allowance for distance attenuation, topographic and man made barriers, atmospheric absorption and ground absorption and reflection. With the exception of the burner the sound power levels used in the model are those supplied by the manufacturer of the plant and the spectral content of the sources was determined from measurements of existing plant at Rutherford. The sound power level of the burner was taken from the plant at Rutherford and the proponents advise that the burner proposed for use in this plant is of a different brand to that at the Rutherford plant and has a lower sound power level.

The noise model was developed based on drawings provided by the proponent that provided the locations of plant items on the site and the locations and heights of significant noise barriers associated



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with the site such as the tank bunds and other buildings.

The noise predictions were made for the proposed operations under both neutral conditions and a set of noise contours were produced for the noise emissions from the site to the surrounding area. Point to point calculations were also conducted to sensitive receivers to more accurately quantify the received noise levels. The calculated point to point received noise levels are shown in Table 3 and assessed against the relevant criteria in Table 1, to determine the acceptability of the received noise levels.

**Figure 2 Location of Attended Survey**




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**Figure 3 Location of Data Logger**


## 5.2 TRAFFIC NOISE

Traffic generation data is taken from the traffic report prepared by BJ Bradley and Associates dated 13 June 07. The report indicates that the maximum daily trucking movements are expected to be 83 trucks per day with a peak volume of 31 truck movements per hour. On a base traffic flow on Tomago Road of approximately 9000 vehicles AADT, or approximately 500 vehicles per hour, the additional 83 trucks pre day and total of 38 vehicles per hour are inconsequential in terms of traffic noise. The impact on potentially affected residential receptors on Punt Road will be minimal and the additional traffic flows on the Pacific Highway are even less significant than the effect on Tomago Road.

The proponent has advised that night time trucking movements will not depart via Tomago Road but will depart north along old Punt Road, thereby, avoiding night time traffic noise exposure to the residents in Old Punt Road.

In all there will be no significant acoustic impact from the additional traffic volumes generated by the proposed batch plant. No further traffic noise assessment is considered necessary for this project.

## 5.3 CONSTRUCTION NOISE

I have reviewed the proposed construction methods with the proponent and they advise that there will be approximately two days of piling with an Hydraulic hammer that has the potential to be audible but not disruptive at nearby residences. Other than that the construction techniques are non noise generating being lifting and placing of prefabricated plant items and securing them with screw or bolted fixings. There is no significant noise impact risk associated with this construction, therefore, it is my view that further construction noise impact assessment is not warranted.



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# 6. RESULTS

## 6.1 SITE NOISE LEVELS

### 6.1.1 Modelling Assumptions

The plant and the installation details of the noisier plant items for the proposed asphalt plant have been determined from drawings provided by the proponent and these have been included as elements in the noise model. In order to provide a meaningful assessment the following assumptions have been made in respect of the plant configuration. In the unlikely event that excessively noisy plant is identified during the design process specific noise treatments may be implemented during the design process to ensure that the target noise levels are met and that the noise from the plant does not become offensive or intrusive. The following assumptions form an integral part of the noise model:-

1. The manufacturer has advise that a plenum silencer is fitted to the fan outlet prior to discharge up the stack, and this reduces fan noise levels at the top of the stack by 5 dB (A). A 90 degree directivity characteristic is assumed for sound radiation from the top of the stack.
2. The fan is assumed to run at full load and full rated speed, however, the unit is fitted with a variable speed drive which means that for most of the time it will be running between 50% and 80% speed a sound level reduction of between 6 and 8dB(A) is anticipated during normal operation but not included in the model.
3. It is assumed that the main burner is installed with the centre line at 1.2 meters above the ground. Residences are shielded from noise exposure from the burner by a 4 metre high bunded tank farm other site buildings which are included in the plant noise model.
4. It is assumed that the fan is installed with a centre line height of 1.5 meters above the ground. The sound pressure level from the fan as supplied by the manufacturer is assumed to be case breakout. That is to say that the case radiated noise is assumed to be the same as the in duct fan noise level which is highly conservative. The fan case is then treated as a point source and is in addition to the noise from the fan exhaust at the top of the stack.
5. The fan housing and associated radiating ductwork are enclosed within an acoustic building to reduce sound levels for the treated condition. No directivity is allowed for the fan.
6. Noise levels from the feed hoppers and truck loading hoppers were measured during the attended survey at Rutherford and are combined to give a total powered level at the top of the hoppers.
7. The sound power level of the screen is taken from other plant measured by Hunter Acoustics and confirmed by the manufacturer of the plant. It is assumed the screen is at highest position shown on the drawings and that it is untreated.

It is assumed in this assessment that all other plant is located externally and is untreated. None of the sound sources measured showed adverse characteristics such as tonality impulsiveness, or excessive low frequency noise components.



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**Table 2 Site Noise Sources Used for Predictive Modelling.**

| | Sound Power Level | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site Sources** | $L_{Aeq\ 15min}$ | | | | | | | | | | $L_{A01\ 1min}$ |
| **Proposed Asphalt Plant** | **32** | **64** | **125** | **250** | **500** | **1** | **2** | **4** | **8** | Total | |
| Main Burner RL 1.5 | 105 | 104 | 107 | 104 | 103 | 106 | 98 | 99 | 99 | 113 dB(L) 109 dB(A) | N/A |
| Fan Case SWL RL 1.5 | 112 | 113 | 114 | 111 | 112 | 108 | 106 | 102 | 96 | 120 dB(L) 114 dB(A) | N/A |
| Fan Case enclosed in Building | 103 | 99 | 96 | 89 | 87 | 85 | 80 | 73 | 76 | 105 dB(L) 90 dB(A) | |
| Stack Unsilenced RL 19 | 112 | 113 | 114 | 111 | 112 | 108 | 106 | 102 | 96 | 120 dB(L) 114 dB(A) | N/A |
| Stack with silencer and directivity allowance | 108 | 107 | 107 | 102 | 101 | 96 | 93 | 92 | 84 | 113 dB(L) 103dB(A) | N/A |
| Screen RL 19 | 96 | 95 | 98 | 95 | 94 | 93 | 92 | 88 | 83 | 103 dB(L) 98 dB(A) | N/A |
| Ancillary equipment conveyors motors etc | 81 | 83 | 83 | 84 | 89 | 92 | 89 | 82 | 75 | 96 dB(L) 95 dB(A) | N/A |
| On site trucking 2 vehicles | 98 | 106 | 102 | 97 | 93 | 91 | 96 | 96 | 89 | 108 dB(L) 102 dB(A) | 110 dB(A) |
| Asphalt Plant Loader Cat 316 (Assumed)** | 97 | 105 | 101 | 99 | 93 | 91 | 96 | 96 | 89 | 108 dB(L) 101 dB(A) | 112 dB(A) |

** Maximum SWL is set for reversing Alarms for this equipment.

Truck tail gates and truck and trailer body and suspension noise are often the source of potentially sleep disturbing noise. For the proposed plant the SWL for Truck and trailer body noise is approximately the same as that for the fan, therefore, they do not produce the typical noise spikes as one might expect to observe in a lower ambient sound environment. In this case the proponents advise that the roadway areas will be paved, thereby, reducing the presence of truck body and suspension noise. Also the proposed operation does not have tipping activities, where tail gates slam shut, occurring at night and those that do occur during the day are shielded from the nearby neighbour by a site building. Measurements at the Rutherford plant have shown that there is not as much difference between the $L_{01}$ and $L_{eq}$ values for this type of plant as might be expected for a normal trucking operation. This is primarily due to the fact that trucks are loaded from overhead hoppers with a material that is heavily sound damped. Therefore, the usual sources of high intermittent noise are not present in typical asphalt plant operations. It can be seen from Table 3 that the $L_{A01}$ levels of typical



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trailer and body noise do not exceed the intrusiveness criteria, much less the sleep disturbance criteria at the worst affected residents and are, therefore, not likely to be of concern and given the existing night time traffic noise levels of 49 dB(A) $L_{90}$ it is highly unlikely that any sound from the plant will be audible at all.

**Table 3 Point to Point Calculations**

| **Item ID** | **Name** | **Location** | **Total Received Noise level dB(A) $L_{eq15min}$** | | | |
|---|---|---|---|---|---|---|
| | | | **Asphalt Plant** | | | |
| | | | **Untreated stack and fan** | | **Treated** | |
| | | | $L_{Aeq15\ min}$ | $L_{A01\ 1\ min}$ | $L_{Aeq15\ min}$ | |
| 1 | Tomago Road A | Tomago Road near Pacific Highway | 44.1 | 44 | 37.8 | |
| 2 | Tomago Van Park | Tomago Road | 42.5 | 43 | 38.0 | |
| 3 | Pacific Hwy South | Pacific Highway | 42.7 | 43 | 39.7 | |
| 4 | Tomago Road B | Tomago Road Near Van Park | 41.0 | 41 | 36.5 | |
| 5 | Pacific Highway North | Pacific Highway | 46.4 | 46 | 37.5 | |
| 6 | Old Punt Road | Old Punt Road | 39.7 | 40 | 36.3 | |
| | **Daytime Criteria** | | **50** | | **50** | |
| | **Evening** | | **51** | | **51** | |
| | **Night time Criteria** | | **42** | | **42** | |
| | **Sleep Disturbance $L_{A01\ 1\ min}$** | | | **60** | | |

Table 3 Shows that the treated received noise levels are within the night time criteria for all receptors and it is unlikely that any noise will be audible at receptors. The untreated fan noise levels are also below the night time ambient noise levels generated by traffic at 49dB(A). The $L_{A01}$ levels which tend to occur from intermittent sound such as tail gates and vehicle doors closing will be around 8-10 dB(A) higher than the SWL $L_{Aeq}$ for the equipment to which the tailgates and doors belong but they are not as high as the SWL's allowed for other plant on the site and they are well below the sleep disturbance level. It is my view that the proposed operation will have no discernible effect on the receptor residences either during the day or at night nor is there a potential for sleep disturbance.



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## 7. DISCUSSION

The assessment has shown that the proposed plant can comply with the requirements of the NSW Industrial Noise Policy. The only noise source that becomes significant at the nearby residences is the exhaust fan. The manufacturers data for this fan indicates an SWL of 114 dB(A) and this is assumed to be an in duct SWL. There is some evidence that this particular fan also has significant case breakout levels but the manufacturer was not able to provide that data. Under normal circumstances the case breakout SWL would be substantially (at least 20 dB(A) ) lower than the in duct levels. The modelling assumes that the case breakout SWL is the same as the induct levels and this is highly conservative.

The manufacture has advised that a plenum silencer is fitted to the fan outlet and this reduces the in duct levels up the stack by 5 dB(A).

In the absence of detailed information from the supplier of the equipment a number of modelling assumptions are made in respect of the likely SWL of the sources. In this case the untreated and excessive SWL assigned to the exhaust fan case marginally exceeds the night time intrusiveness criteria and it is unlikely that the fan sound levels will be as allowed for in the model due to the presence of the variable speed drives that automatically reduce operating speed and, thereby, noise levels. The fan case break out levels allowed for in the modelling are abnormally high for this type of application. Should the case break out level be as high as is used in the model the fan case is readily able to be treated by the construction of a noise enclosure or the application of surface damping treatments to the fan case which substantially reduce sound radiating from the case. Subject to certain design aspects, there is some potential for the fan to exhibit low frequency noise characteristics and this character will only occur if certain standard design parameters are not adequately addressed. Should adverse low frequency levels be identified during the design phase then appropriate action can be taken to remove the excessive low frequency components by applying external treatments to the fan housing and changing the silencer provided in the duct work.

In the event that noise immissions at neighbouring residences become a source of concern or fail to comply with the noise criteria target levels then treatments are available for the plant to reduce noise levels by providing additional noise barriers or engineering noise controls to the equipment.

It is, therefore, my view that appropriate noise assessment of plant items should be incorporated as part of the development of this plant to ensure that the specific plant items that have the potential to create excessive noise do not cause offensive or intrusive noise at nearby sensitive receivers.

High noise generating activities during construction have been identified as short term ( 2 to 3 days ) of piling with standard hydraulic piling hammers. Generally noise from this type of piling activity can only be managed by limiting time of exposure or by changing to a drop hammer type piling system which slightly reduces noise exposure. The best management method for control of construction noise for this project is to conduct attended monitoring during the identified noisy activities.



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## 8. RECOMMENDATIONS

The following recommendations are made to ensure that noise emissions from the proposed plant are adequately controlled and do not become a source of offensive noise:-

1. Sound power levels of the proposed plant to be verified by an appropriately qualified acoustic consultant during the design phase and at commissioning.
2. In the event that the sound power levels are higher than expected then provide appropriately designed acoustic treatments at the site to control noise levels, as set out in section 6.1 and section 7 of this report.
3. Reversing alarms or audible warning devices on loaders and other equipment are not to exceed 75 dB(A) when measured at a distance of 7 meters directly behind the rear of the equipment.
4. Conduct attended noise monitoring of construction noise impacts during identified noisy operations such as piling and heavy steel assembly where air impact tools may be used.

## 9. CONCLUSION

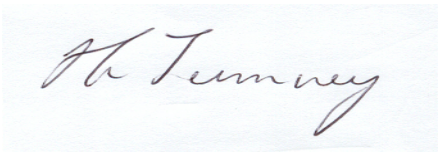
The assessment has shown that the operation of a proposed asphalt plant at this particular location will be able to meet the noise criteria for daytime, evening and night time operations and will be unlikely to become a source of offensive or intrusive noise. In the event that noise treatments are required treatments are readily available and can be implemented without significant loss of production and without compromising the plant.

Based on the outcomes of this assessment, I see no acoustic reason to withhold permission for the proposed development.

If you have any questions regarding this report please do not hesitate to contact me on 02 49208999.

Thank you for the opportunity to provide this assessment, please do not hesitate to contact the undersigned if you have any questions regarding this or any other acoustic or environmental matter

Yours Sincerely
Hunter Acoustics



Ray Tumney BEng(Mech), MEnv Stud, MAAS, MIEAust, MSEE,
Principle Consultant



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## Appendix 1 Site Plan



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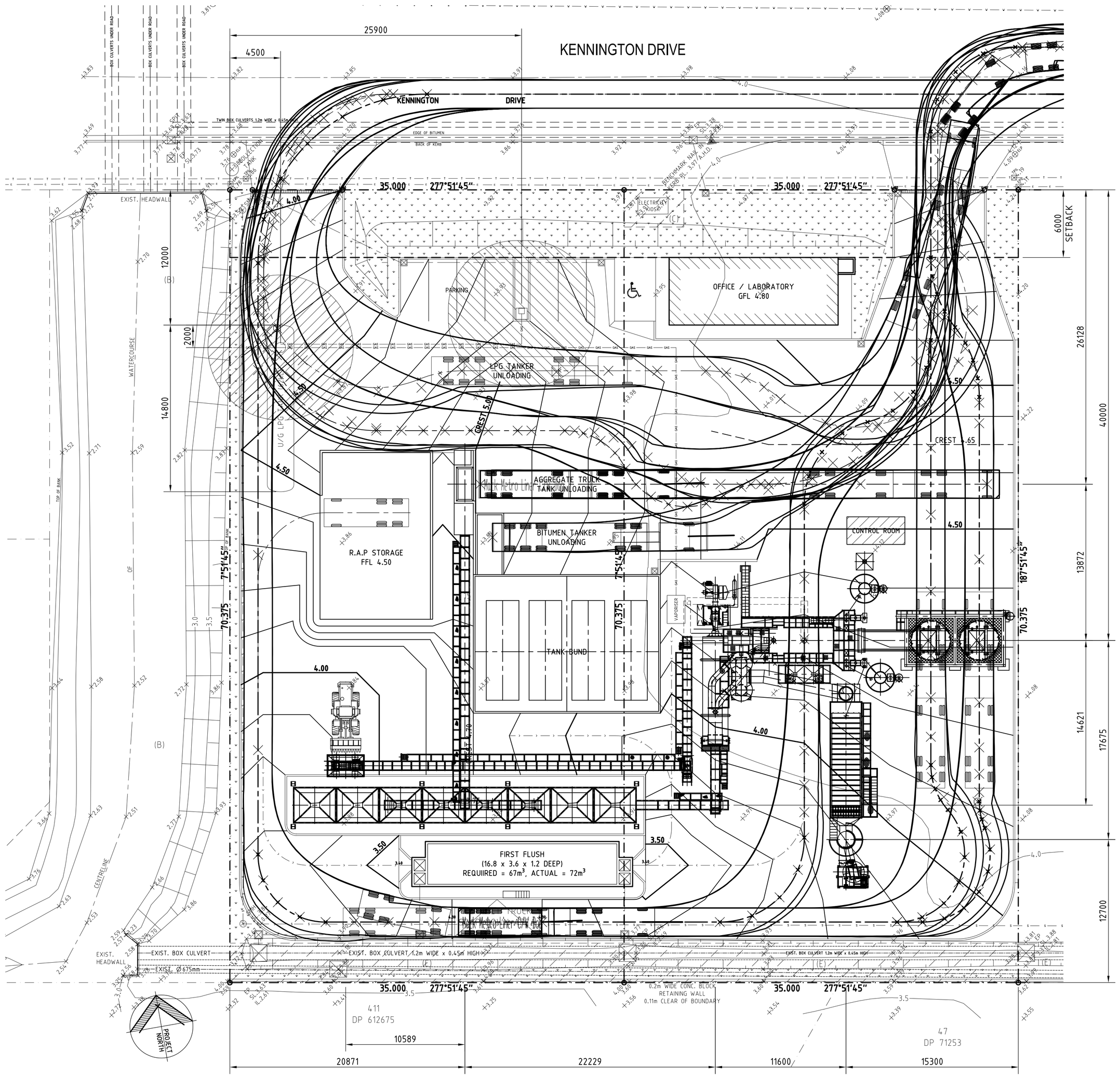


## LEGEND

- DENOTES DRAINAGE EXISTING PIT
- EXIST. Ø675mm — DENOTES EXISTING DRAINAGE PIPE
- 4.0 — DENOTES EXISTING CONTOUR
- +3.82 — DENOTES EXISTING SPOTLEVEL
- DENOTES EXISTING BENCH MARK
- DENOTES EXISTING TELSTRA LINE
- DENOTES EXISTING TELSTRA PILLAR
- DENOTES EXISTING U/G ELECTRICITY LINE
- DENOTES EXISTING ELECTRICITY PILLAR
- DENOTES EXISTING LIGHT POST
- DENOTES EXISTING SEWER LINE
- DENOTES EXISTING SEWER MANHOLE

## CONTRACTOR NOTE

1. THE POSITION OF ALL SERVICES SHOWN SHOULD BE REGARDED AS APPROXIMATE ONLY.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE EXACT LOCATIONS AND INFORM ALL RELEVANT AUTHORITIES PRIOR TO ANY EXCAVATION.
3. IT IS THE CONTRACTOR'S RESPONSIBILTY TO ENSURE EXISTING FOOTINGS ARE NOT UNDERMINED.
4. DESIGN & INSTALLATION OF ANY TEMPORARY SHORING THAT MAY BE REQUIRED IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. DRAWINGS SHOULD BE READ IN CONJUNCTION WITH ALL OTHER SERVICE ENGINEERS DRAWINGS

SITE PLAN
(SCALE 1:200)

NOT FOR CONSTRUCTION

| REVISIONS | No. | DATE | APP. | AMENDMENTS |
|---|---|---|---|---|
| | H | 17.05.07 | N.I. | VAPORISER ADDED |
| | G | 16.05.07 | N.I. | DESIGN CONTOURS ADDED, SITE LAYOUT REVISED |
| | F | 10.05.07 | N.I. | LPG TANK REVISED TO UNDERGROUND / MOUNDED |
| | E | 02.05.07 | N.I. | LPG TANK & FILL POINT ADDED TO SITE |
| | D | 01.05.07 | N.I. | RAP SYSTEM & BITUMEN TANKS REVISED |
| | C | 30.04.007 | N.I. | SURVEY INFORMATION ADDED TO DRAWING |
| | B | 17.04.07 | N.I. | SECOND HOT STORAGE BIN ADDED |
| | A | 28.03.07 | N.I. | ISSUED FOR INFORMATION |

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CONSULTING ENGINEERS

| | |
|---|---|
| CLIENT | TROPIC ASPHALT |
| TITLE | PLANT LAYOUT |
| PROJECT | PROPOSED ASPHALT PLANT<br>LOTS 14 & 15 KENNINGTON DRIVE<br>TOMAGO N.S.W. |

| | | | |
|---|---|---|---|
| DRAWN: N.I. | DESIGNED: M.L. | CHECKED: | SHEET SIZE: A1 |
| SCALE: A1 - 1:200 | DATE: MARCH 2007 | APPROVED: | |
| PROJECT No.: 6511 | DRAWING No.: SK320 | | REVISION: H |

## Appendix 2 Noise Impact Contours



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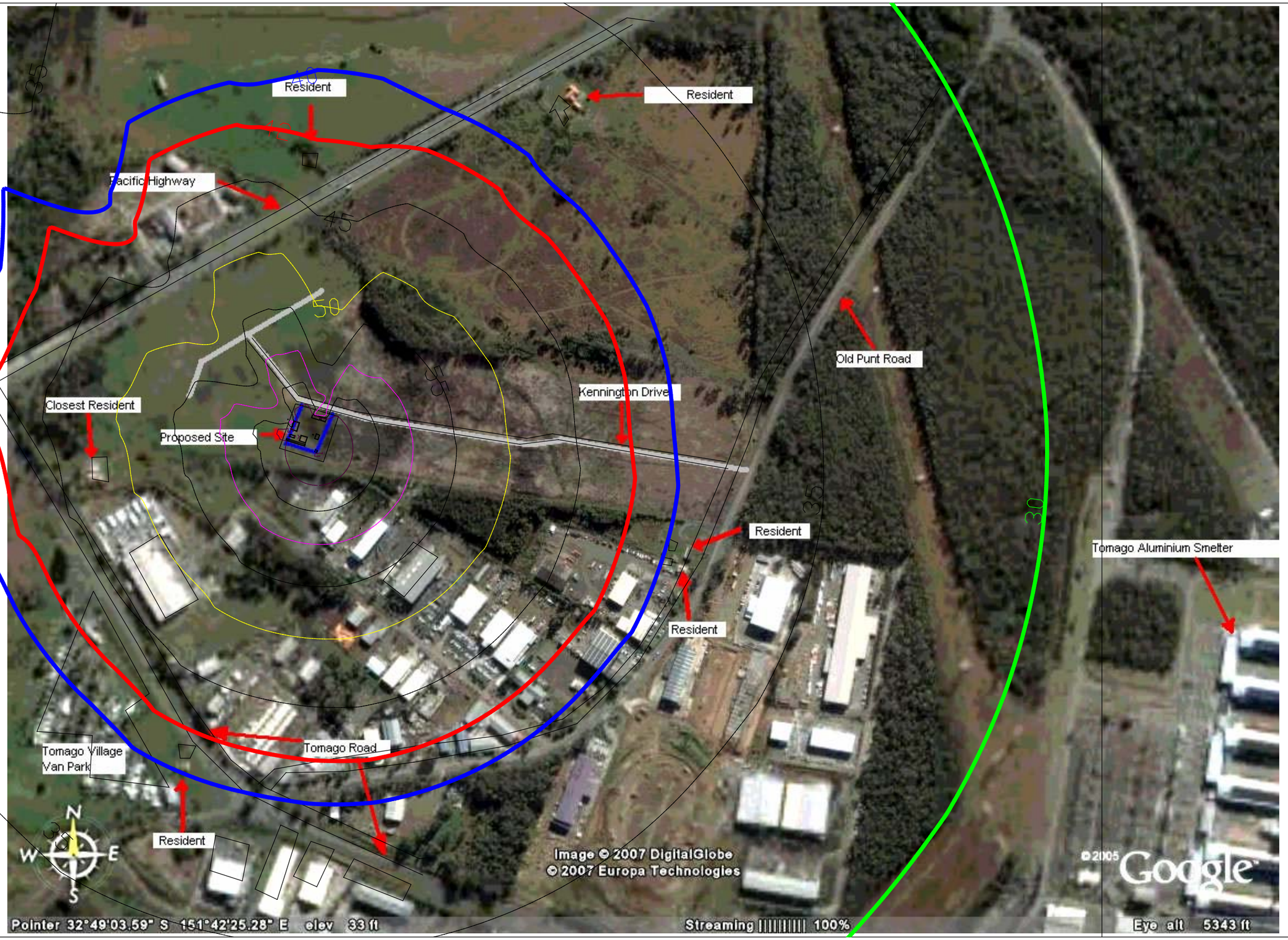
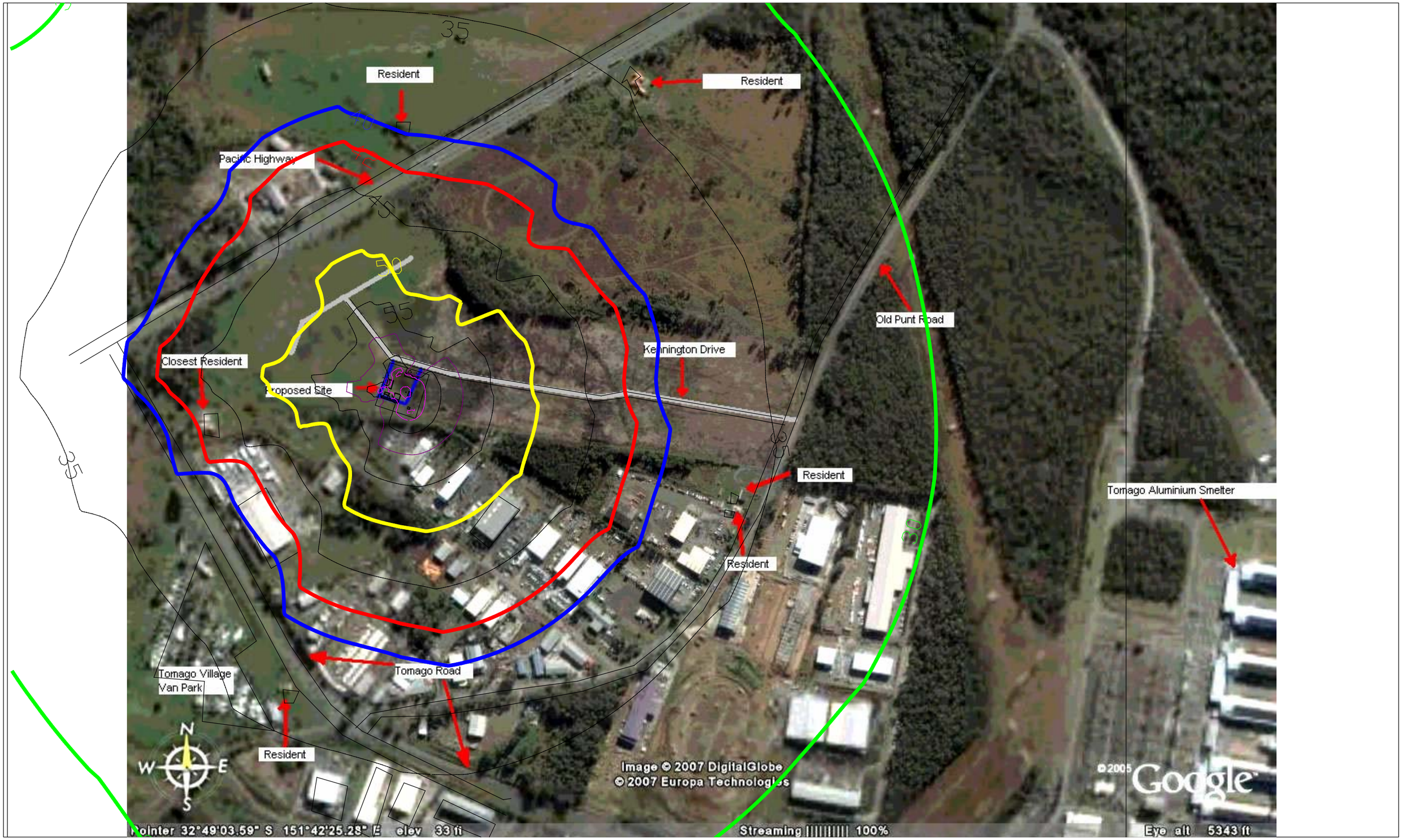



HUNTER ACOUSTICS

| Date | Project |
|---|---|
| 3 August 07 | Tropic Ashphalt Noise Contours Untreated Plant |

P.O. Box 565 KOTARA, 2289. Tel 02 49208999, Fax 02 49424452




HUNTER ACOUSTICS

| Date | Project |
|---|---|
| 7 August 07 | Tropic Ashphalt Noise Contours Treated Plant |

P.O. Box 565 KOTARA, 2289. Tel 02 49208999, Fax 02 49424452

**Appendix 3**
**Report No 42374-01 Vernachie Contracting Environmental Noise Survey, VIPAC Engineers and Scientists Dec 2005**

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# VIPAC ENGINEERS & SCIENTISTS

Vipac Engineers & Scientists Limited A.C.N. 005 453 627 ABN 33 005 453 627

PO Box 506, Kings Meadows, Tasmania 7249 AUSTRALIA
Telephone (+61 3) 6343 2077, Facsimile (+61 3) 6343 4849, www.vipac.com.au


21 December 2005

Venarchie Contracting Pty. Ltd.
P.O, Box 395
(Tip access road)
Mowbray Heights
Tas. 7248

**Attention: Mr N. Bedford**

Ref: 42734-01
PAH

Dear Sir,

**RE: Environmental Noise Survey – Venarchie Contracting Pty. Ltd.**

Please find below our report on the environmental noise survey carried out for Venarchie Contracting Pty. Ltd. at Mowbray Heights Tasmania during December 2005.

## 1.0 Background

Venarchie contracting Pty. Ltd. is an asphalt batching plant located on the tip access road in Mowbray Heights. The asphalt batching plant is located at the north end of the site with a workshop and administration building located at the southern end.

To the north of Venarchie contracting is a Collex depot, a quarry is located to the east, Toll transport container yard is located to the south and Mowbray race course is located to the west. There are two noise sensitive locations in this area; a house at the automotive wrecker located at 19 Remount Road and the other is a house in the automotive wreckers at the end of Brussels St.

Three measurement locations have been chosen to characterise noise emissions from the Venarchie Contracting asphalt plant. These locations are shown in figure 1.

Measurement locations were chosen as follows.

1. Southeast site boundary.
2. Southwest boundary corner.
3. Adjacent to house at the end of Brussels St.

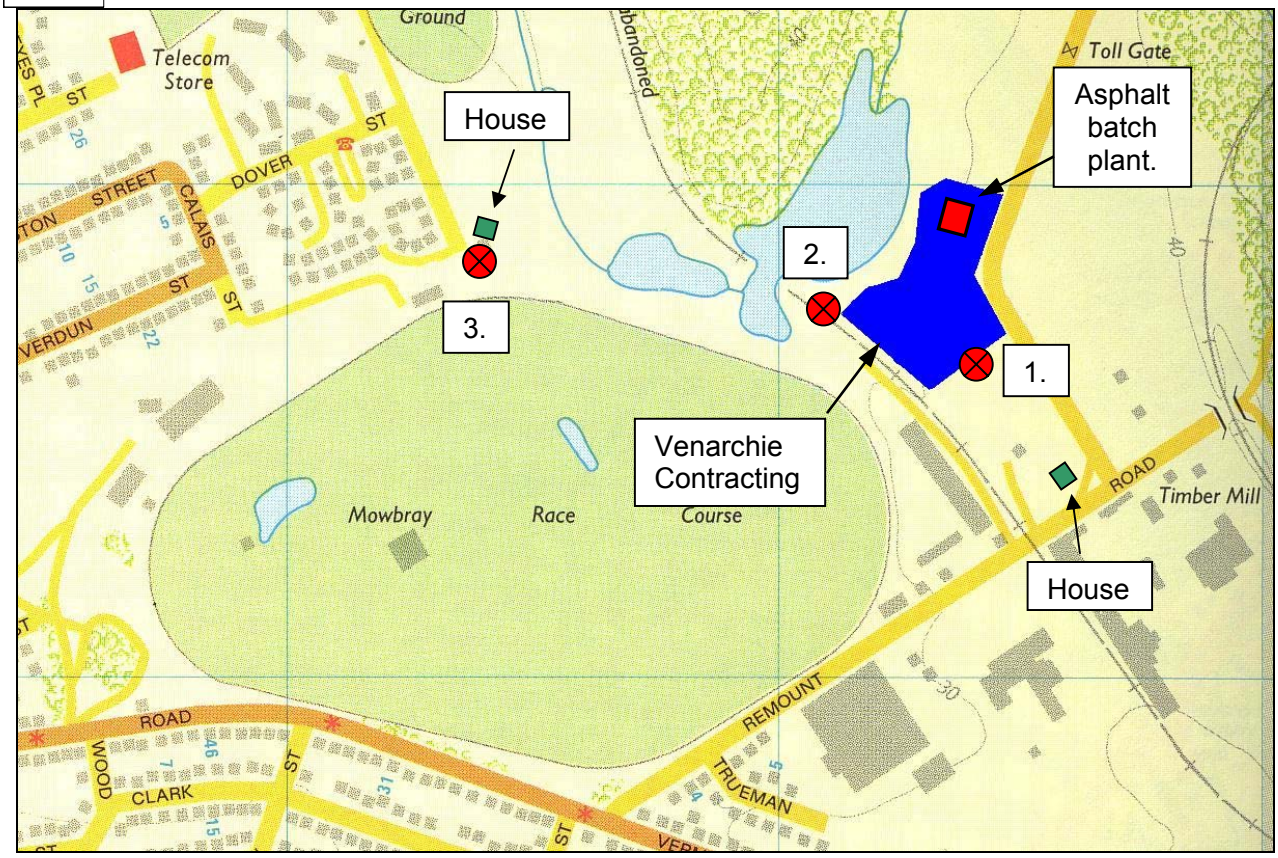


Figure 1 – Locality map for Venarchie Contracting Pty. Ltd.

At each location a recording type 1 sound level meter was used to obtain the following statistical parameters over 15 minute intervals for a minimum of 1-hour during the day with the plant operating.

- $L_{A10,10min}$
- $L_{A50,10min}$
- $L_{A90,10min}$
- $L_{Aeq,10min}$
- $L_{Amax,10min}$
- $L_{Amin,10min}$

During the measurement periods weather conditions at Mowbray on 1 December 2005 were hot, sunny 2/8 cloud cover and a light easterly wind. Weather conditions for the 16 December 2005 were warm, sunny 0/8 cloud cover and a light north-westerly wind.

All measurements were carried out in general accordance with Australian Standard AS1055.1-1997 'Acoustics – Description and measurement of environmental noise – General procedures'

The following instrumentation was used: -

- Sound level meter - Larson Davis LD700-20 S/N 4086B1116
- Spectrum analyser - Larson Davis LD2900 S/N 2099A0343
- Acoustic calibrator – Larson Davis CA250 S/N 2706

All equipment was field calibrated prior to use.

At present the plant typically operates between 0700 and 1700 hours Monday to Friday with additional hours on weekends to finish projects.

# 2.0 Noise Measurements

Daytime 15-minute interval measurements have been obtained at the southeast side and southwest corner of the Venarchie contracting boundary. Measurements were also obtained adjacent to the house located at the end of Brussels St. as this is deemed the most noise sensitive location. Noise emissions from Venarchie Contracting to the resident at 19 Remount Road were not possible to measure as other industry and local traffic controlled the ambient noise levels. A reasonable prediction can be made from the southeast boundary measurements.

1/3 octave band spectra have been recorded at each measurement location.

## 2.1 Position 1 – Southeast boundary.

Asphalt plant noise emissions control the $L_{90,15min}$ noise level at 49 to 50 dBA. The $L_{eq,15min}$ noise level was controlled by the large forklift at Toll transport moving containers, traffic along the tip access road and large haul trucks at the quarry to the east.

Audible noise sources from the asphalt plant to this location were the vibrating screen located at the top of the asphalt plant and bag house compressed air discharges.

This measurement location is half way between Venarchie contracting and 19 remount Road and so a 5 to 6 dBA attenuating due to distance applies. The predicted noise level to 19 Remount Road is between 43 and 45 dBA neglecting local shielding.

Figure 2 shows the ambient noise levels with and without the asphalt plant operating at the southeast boundary. Figure 3 shows the 1/3 octave band spectrum at the southeast boundary with and without the asphalt plant operating.

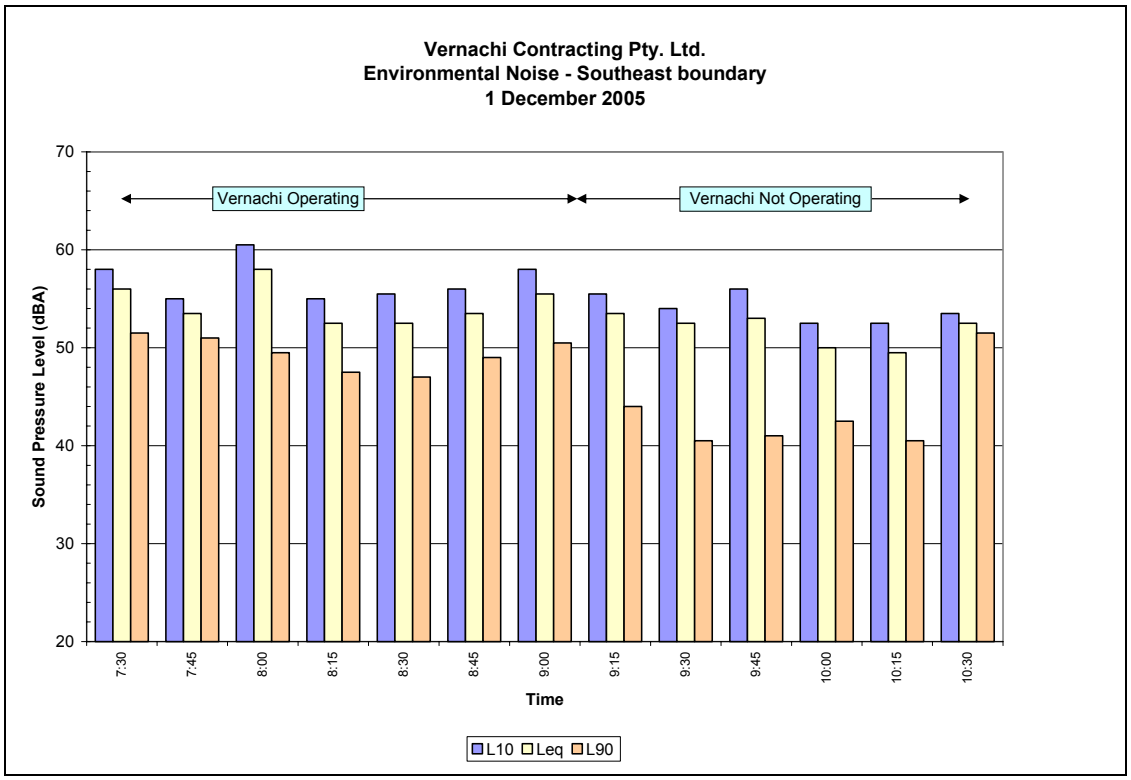


Figure 3 – Southeast boundary.

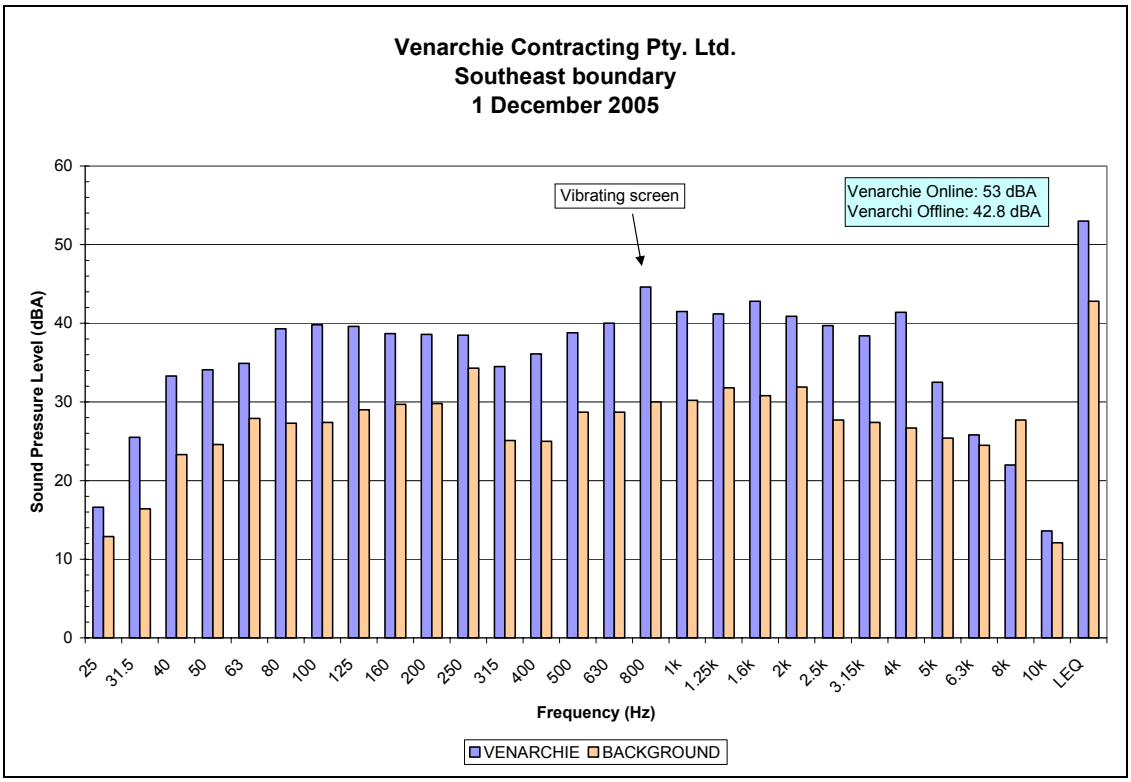


Figure 3 – Southeast boundary (1/3 octave band spectra).

## 2.2 Position 2 – Southwest boundary corner.

Venarchie contracting controls the ambient noise levels at this location. Audible sources of noise were the vibrating screen, bag house compressed air discharges and a low frequency tone from the turbo blower fan duct.

Large diesel haul trucks at the quarry, large forklift at Toll transport and birds were other sources of noise to this location.

Table 1 lists the ambient noise levels for this location while figure 4 shows the 1/3 octave band spectra for the asphalt plant at this location.

| Position 2 – Southwest boundary corner (16 December 2005) | | | | |
|---|---|---|---|---|
| **Time** | **$L_{Aeq,15min}$** | **$L_{A10,15min}$** | **$L_{A90,15min}$** | **Comments** |
| 12:45 | 52 | 54 | 49 | Vibrating screen, low frequency tone from turbo blower fan duct and bag house compressed air discharges. |
| 13:00 | 52 | 54 | 48.5 | |
| 13:15 | 51 | 53.5 | 46.5 | Asphalt plant only operated for part of the interval. |
| 13:30 | 48.5 | 49.5 | 45.5 | Asphalt plant not operating. Bird noise controlled the $L_{eq}$ and $L_{10}$ noise levels. |
| 13:45 | 51 | 53.5 | 47 | Asphalt plant only operated for part of the interval. |
| 14:00 | 52.5 | 54 | 51 | Asphalt plant operated for whole interval. |

Table 1 – Position 2

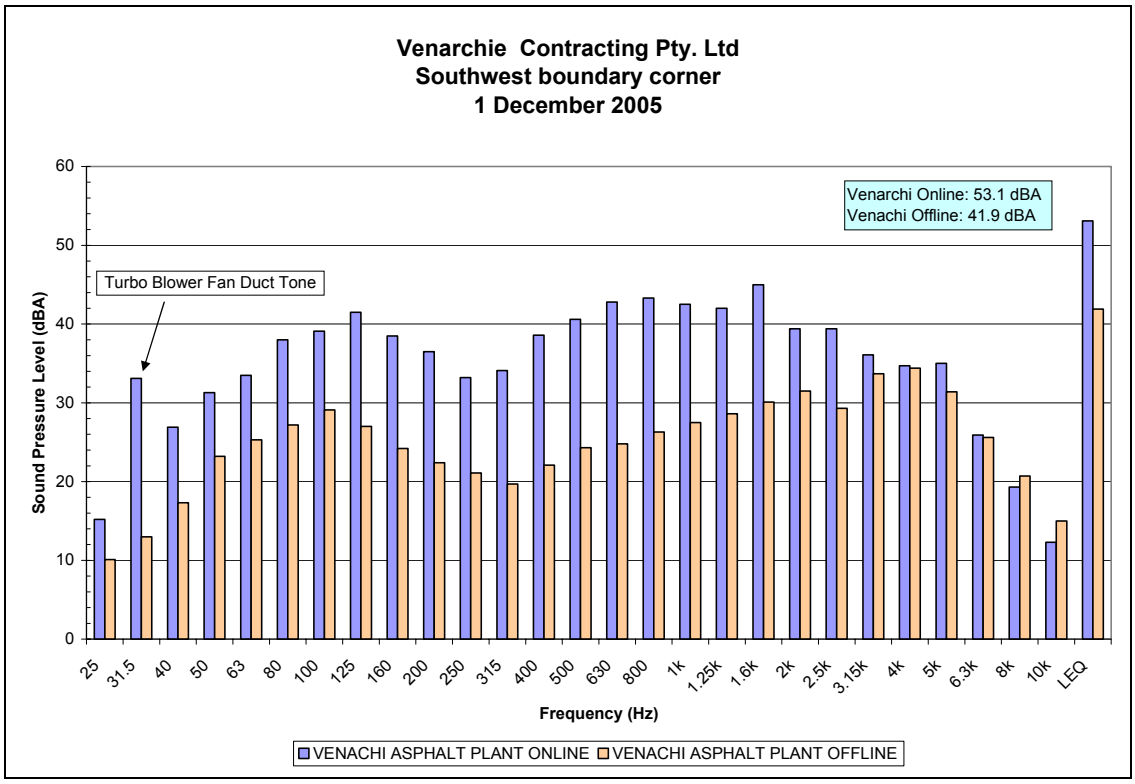


Figure 4 – Southwest boundary corner (1/3 octave band spectra).

## 2.3 Position 3 – House at southern end of Brussels St.

At this location Venarchie contracting was not audible. Ambient noise at this location was a light wind in the trees, birds, haul truck engine noise and reverse alarms from the quarry, distant lawn mowers, metal on metal impacts from the automotive wrecking yard and a two stroke motorbike.

| Position 3 – house at southern end of Brussels St. (16 December 2005) | | | | |
|---|---|---|---|---|
| **Time** | **$L_{Aeq,15min}$** | **$L_{A10,15min}$** | **$L_{A90,15min}$** | **Comments** |
| 14:15 | 44.5 | 48 | 36.5 | Ride on lawn mower 200m west by Mowbray race course stands. |
| 14:30 | 39 | 41 | 34.5 | Wind in trees, large haul truck engine noise and reverse alarms from quarry, birds and metal on metal impacts from automotive wreckers. |
| 14:45 | 36.5 | 38.5 | 33.5 | |
| 15:00 | 43.5 | 46.5 | 35 | |
| 15:15 | 44.5 | 48 | 38.5 | Two stroke motorbike being ridden in paddock 200m away intermittently. |
| 15:30 | 46 | 50.5 | 39 | |

Table 2 – House at southern end of Brussels St.

# 3.0 Conclusions

1. Environmental noise emissions from Venarchie Contracting Pty. Ltd. in Mowbray Heights have been measured at the two boundaries closest to noise sensitive locations and at the closest noise sensitive location.

2. At measurement position 1 Venarchie Contracting asphalt plant controlled the $L_{90,15min}$ noise level. Traffic along the tip access road, Toll transport and Venarchie Contracting all contribute to the $L_{10,15min}$ and $L_{eq,15min}$ noise levels at this location.

3. Predicted noise level to 19 Remount Road is 43 to 45 dBA (neglecting local shielding) for Venarchie Contracting noise emissions.

4. Venarchie Contracting Pty. Ltd. controlled the $L_{10,15min}$, $L_{eq,15min}$ and the $L_{90,15min}$ noise levels at position 2.

5. Venarchie Contracting Pty. Ltd. was not audible at the house located at the southern end of Brussels Street. This was the most noise sensitive location identified.

I hope this information meets your immediate requirements. Please call me directly if you have any questions concerning this work.

Yours faithfully,

Vipac Engineers & Scientists
Peter Hargreaves
Project Engineer
6343 2077
Email: peterh@vipac.com.au

## Appendix 4 Sound Level Logging Data



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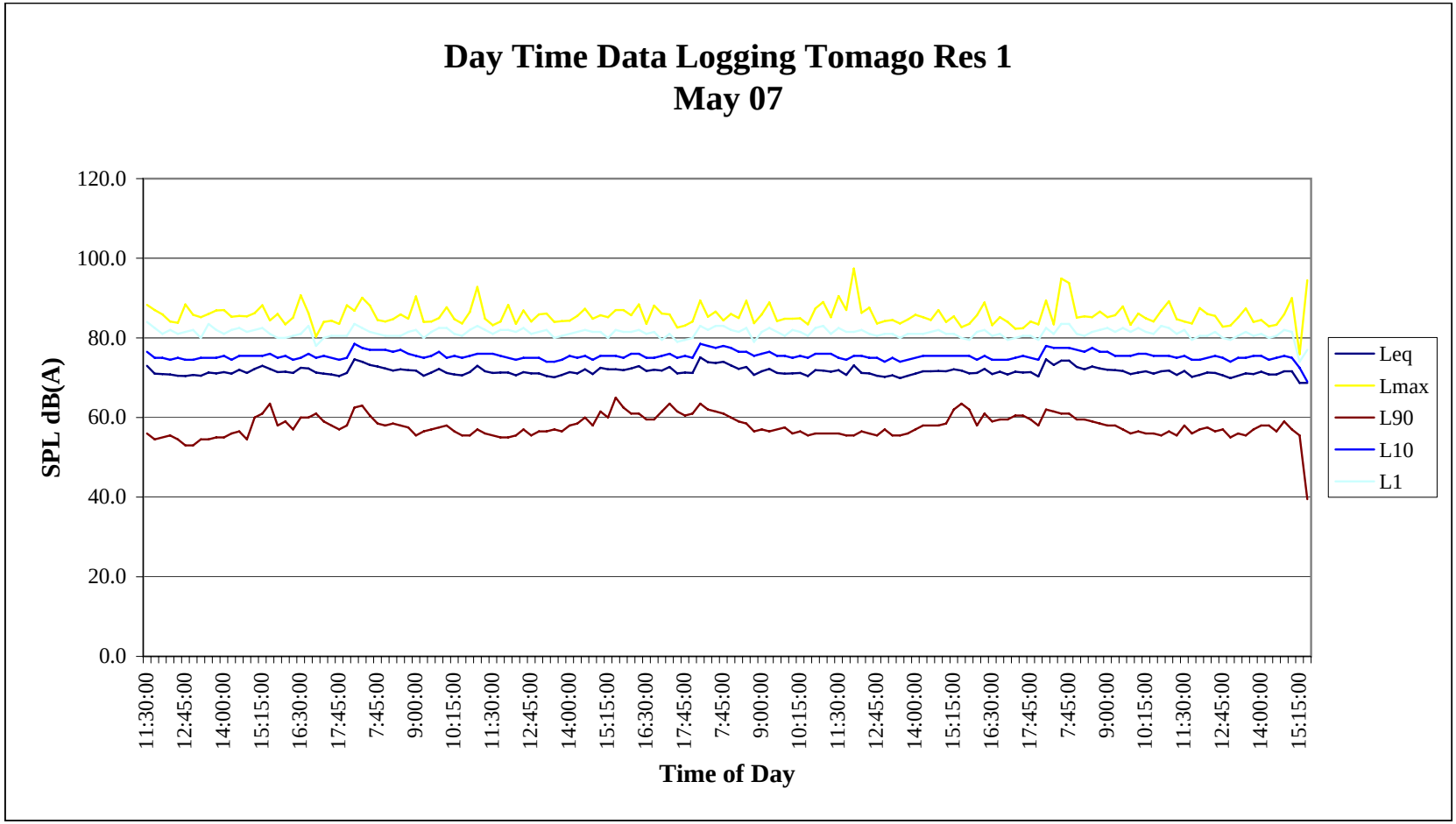
Day Time Data Logging Tomago Res 1
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SPL dB(A)
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100.0
80.0
60.0
40.0
20.0
0.0
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12:45:00
14:00:00
15:15:00
16:30:00
17:45:00
7:45:00
9:00:00
10:15:00
11:30:00
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16:30:00
17:45:00
7:45:00
9:00:00
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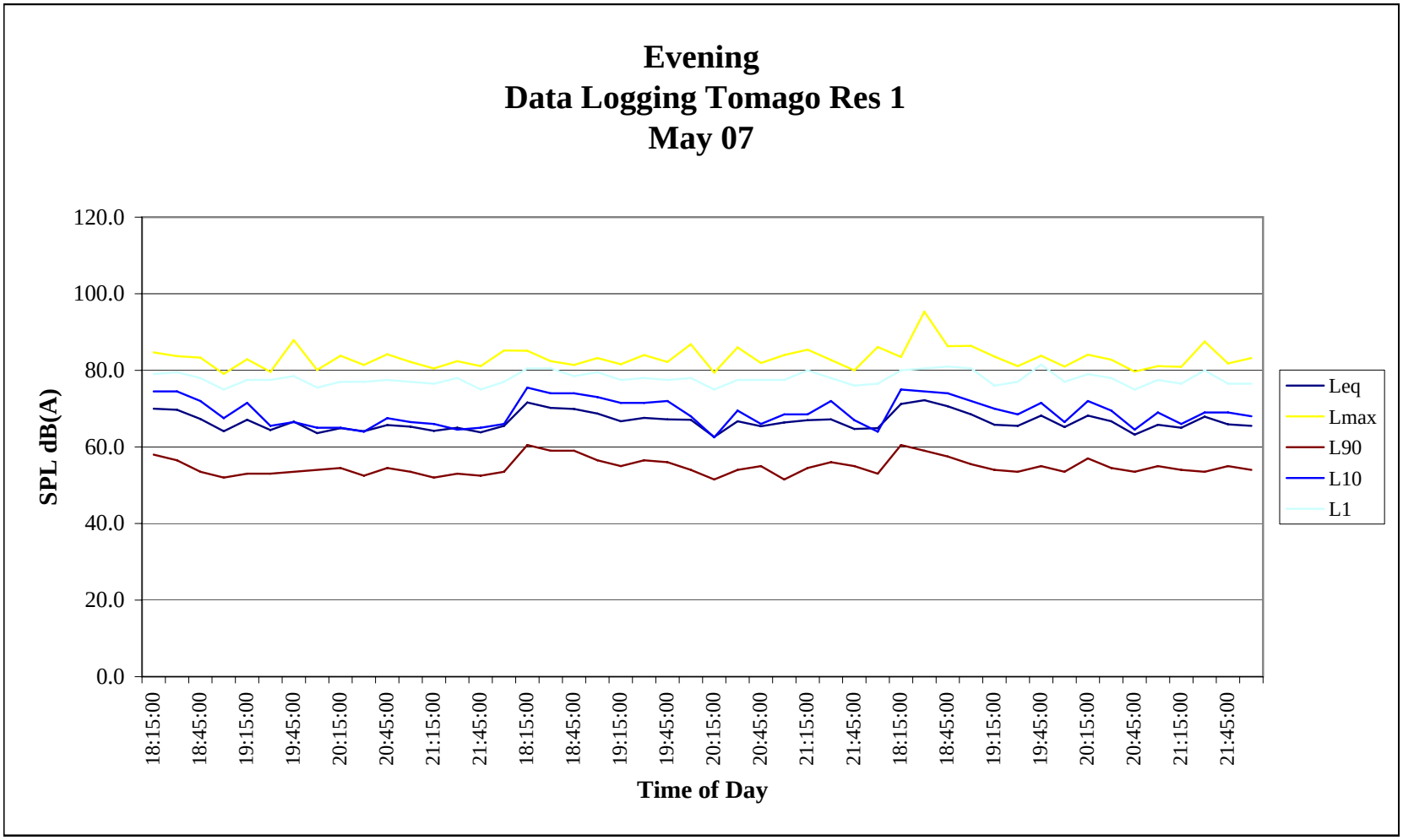
Time of Day
Leq
Lmax
L90
L10
L1


Evening
Data Logging Tomago Res 1
May 07
SPL dB(A)
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100.0
80.0
60.0
40.0
20.0
0.0
18:15:00
18:45:00
19:15:00
19:45:00
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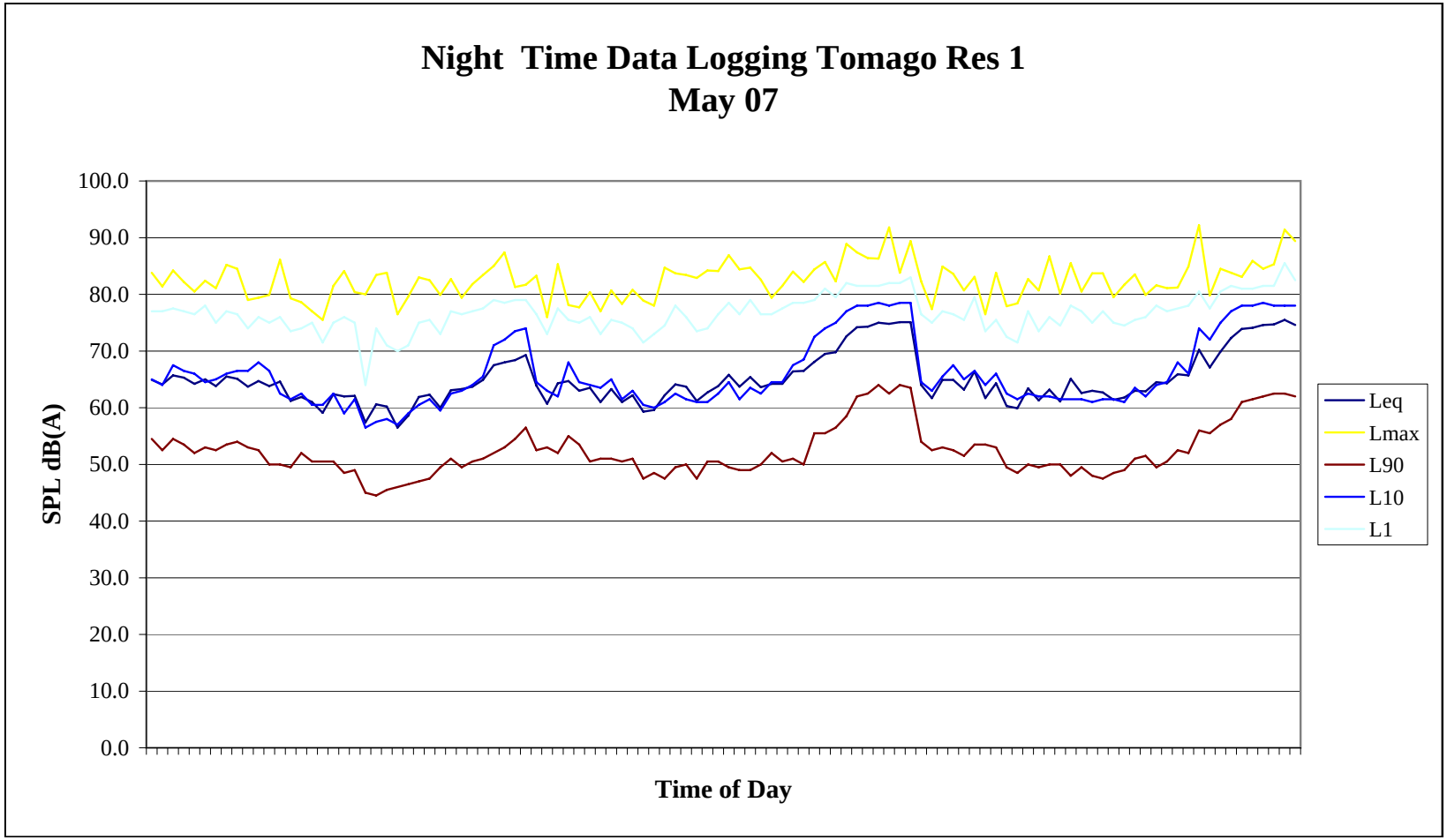
21:15:00
21:45:00
Time of Day
Leq
Lmax
L90
L10
L1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May 07
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70.0
60.0
50.0
40.0
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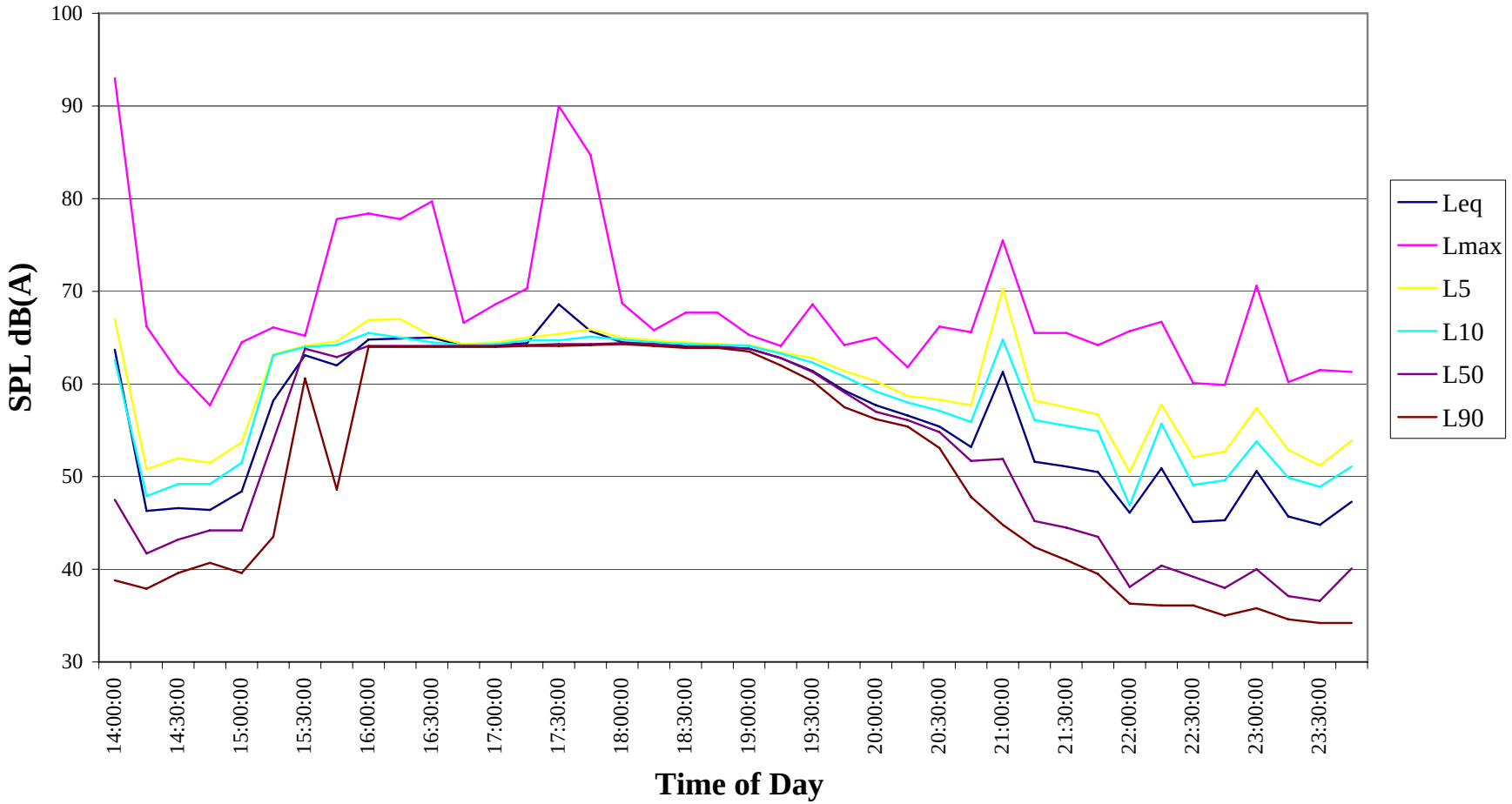
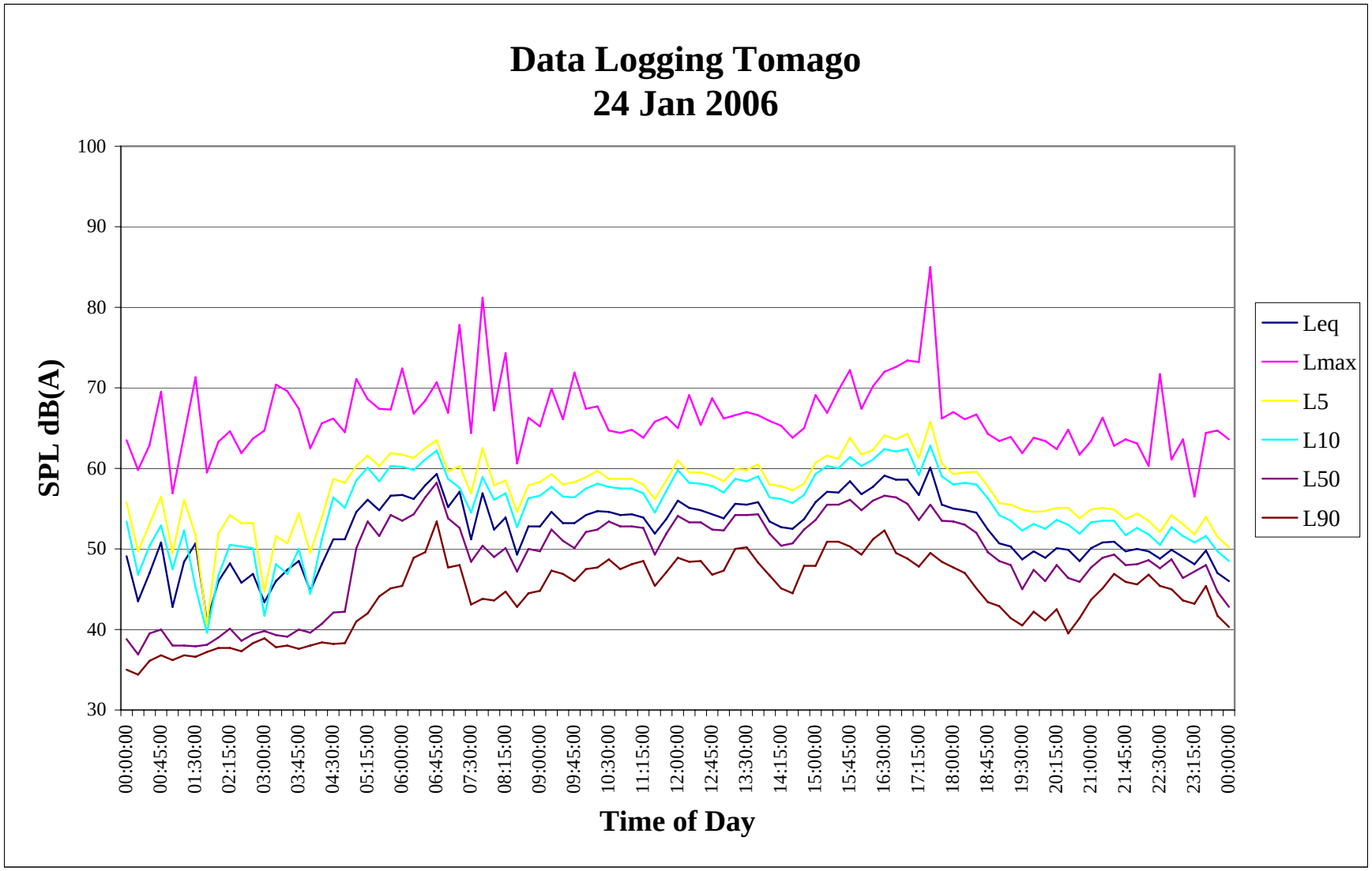
10.0
0.0
SPL dB(A)
Time of Day
Leq
Lmax
L90
L10
L1

# Data Logging Tomago
# 23 Jan 2006

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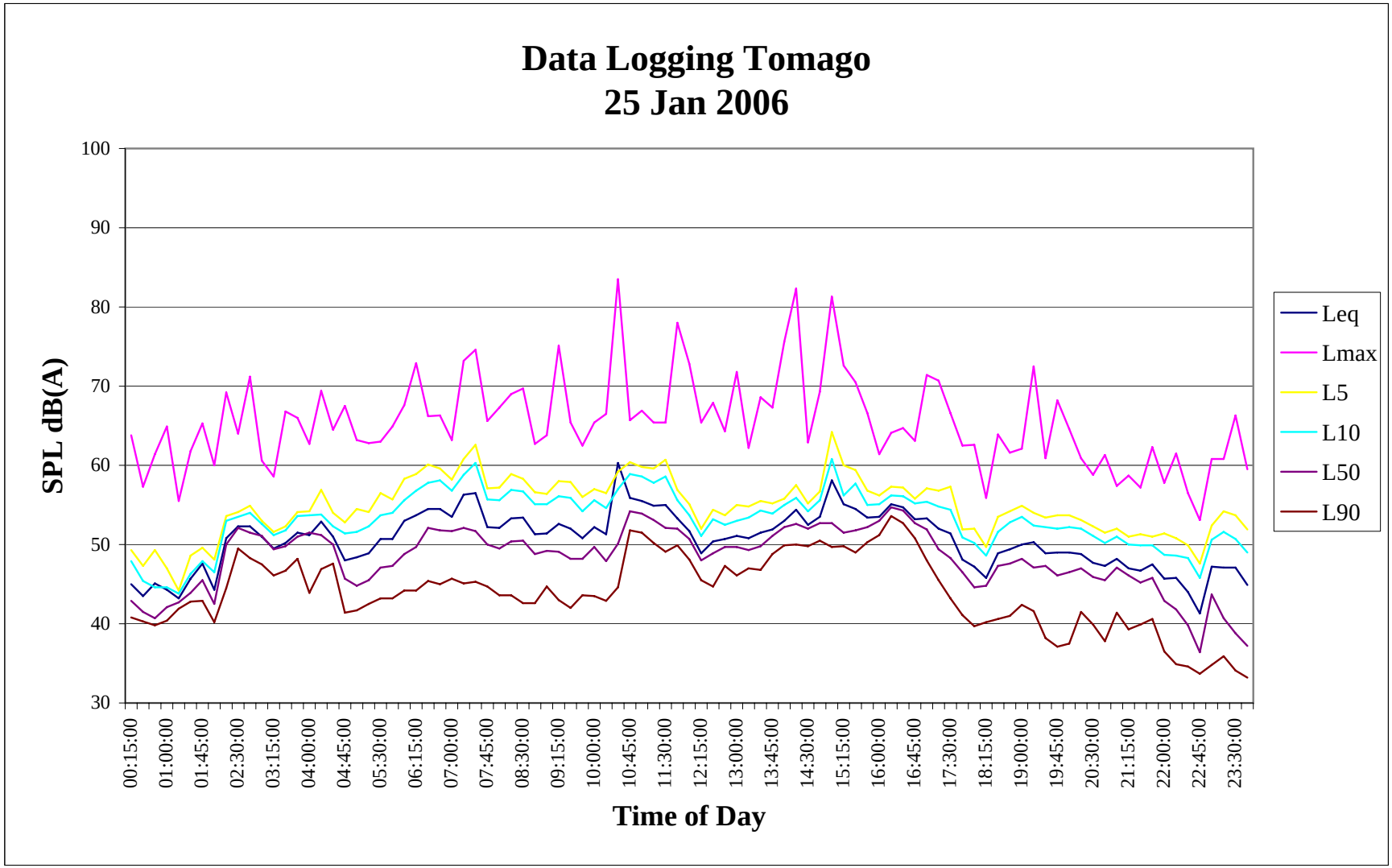
Time of Day
Leq
Lmax
L5
L10
L50
L90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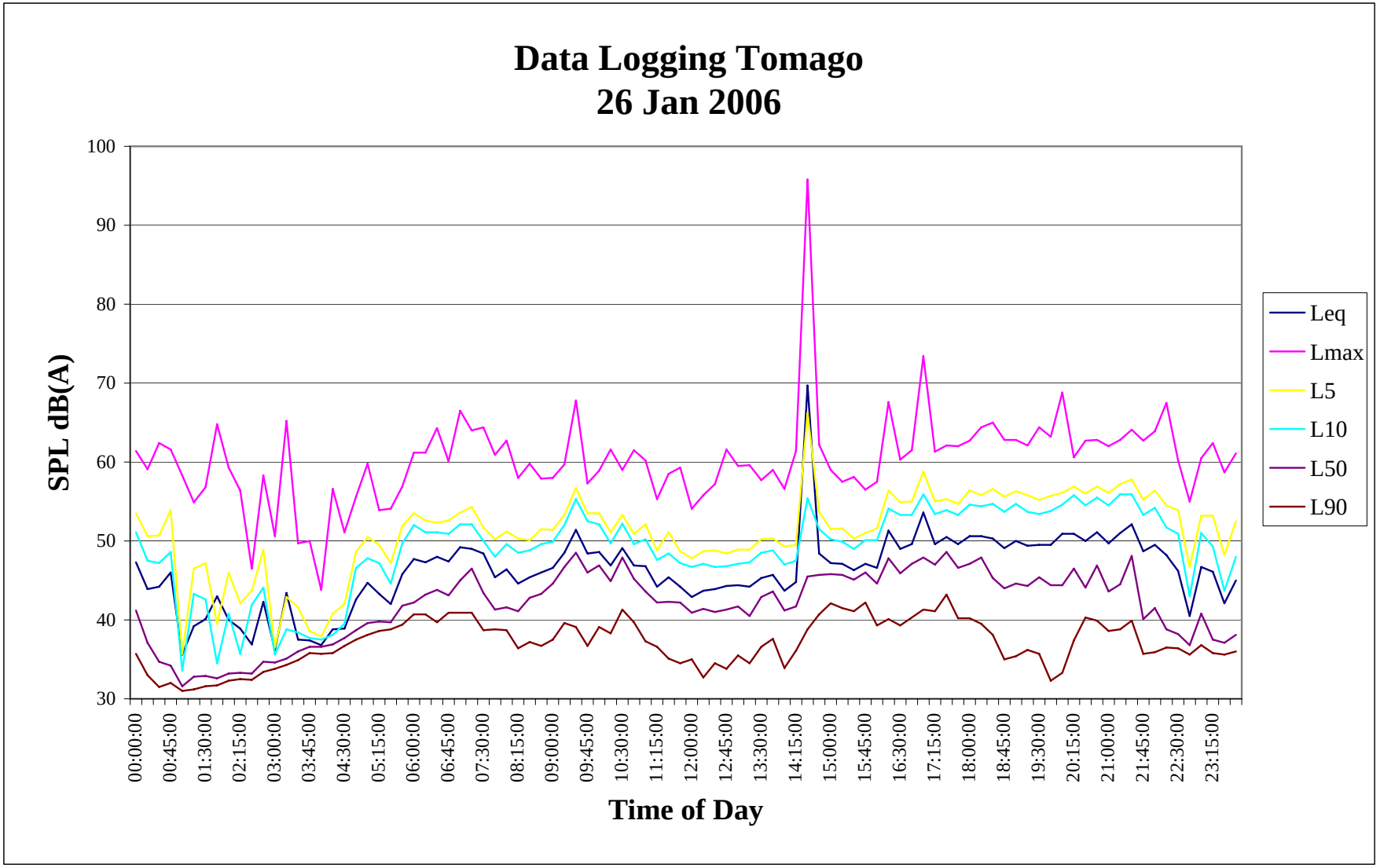
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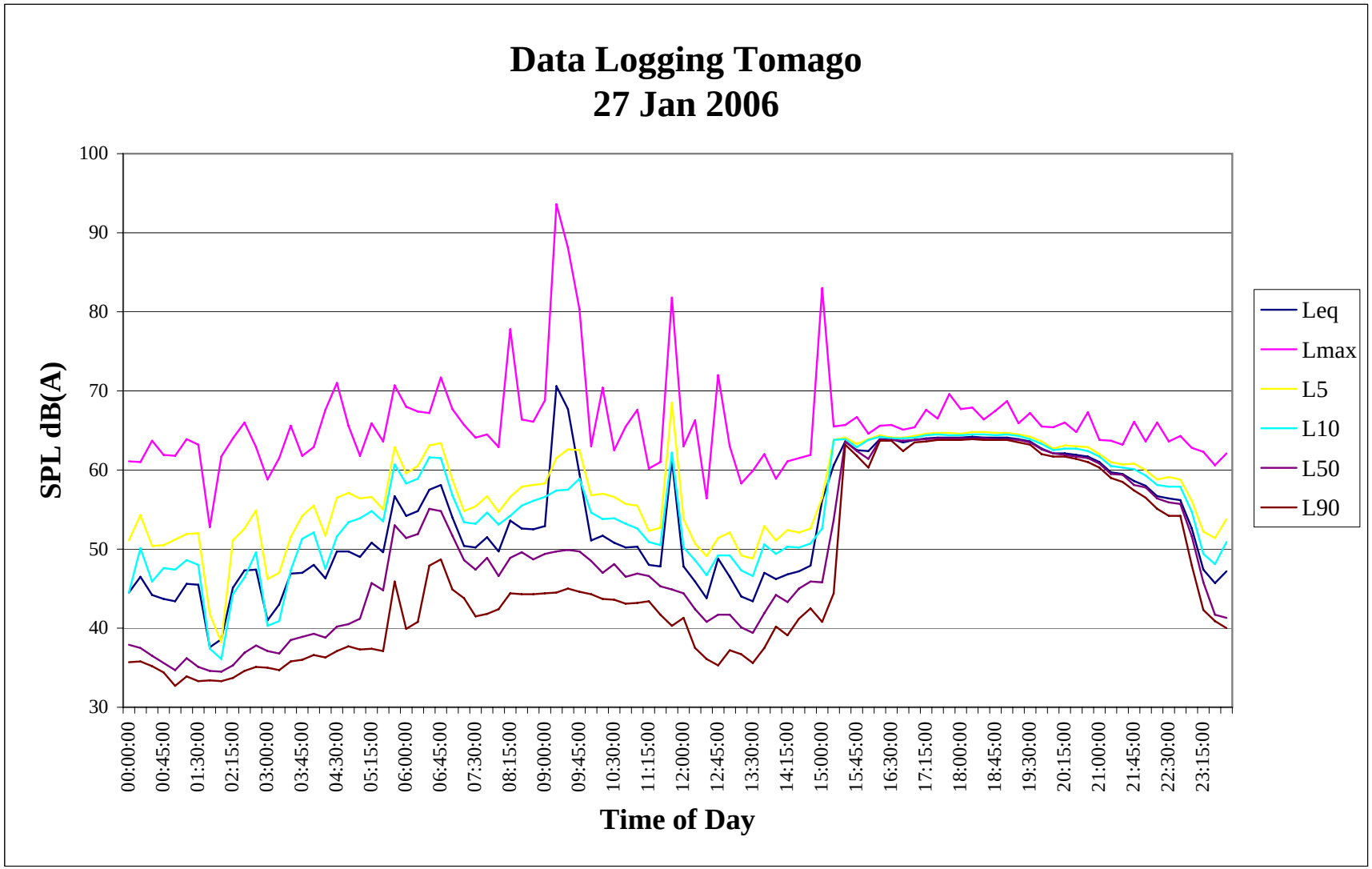
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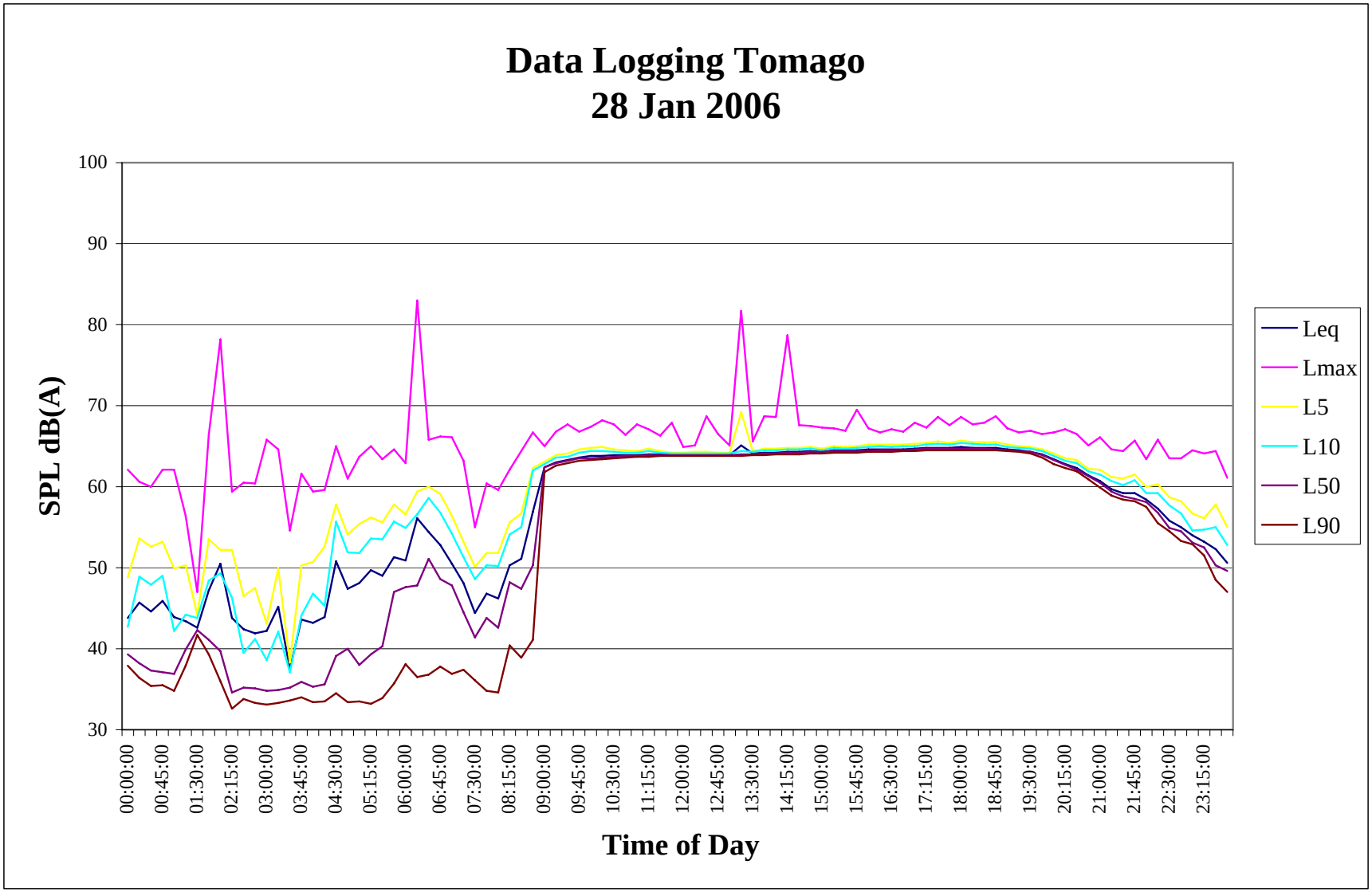
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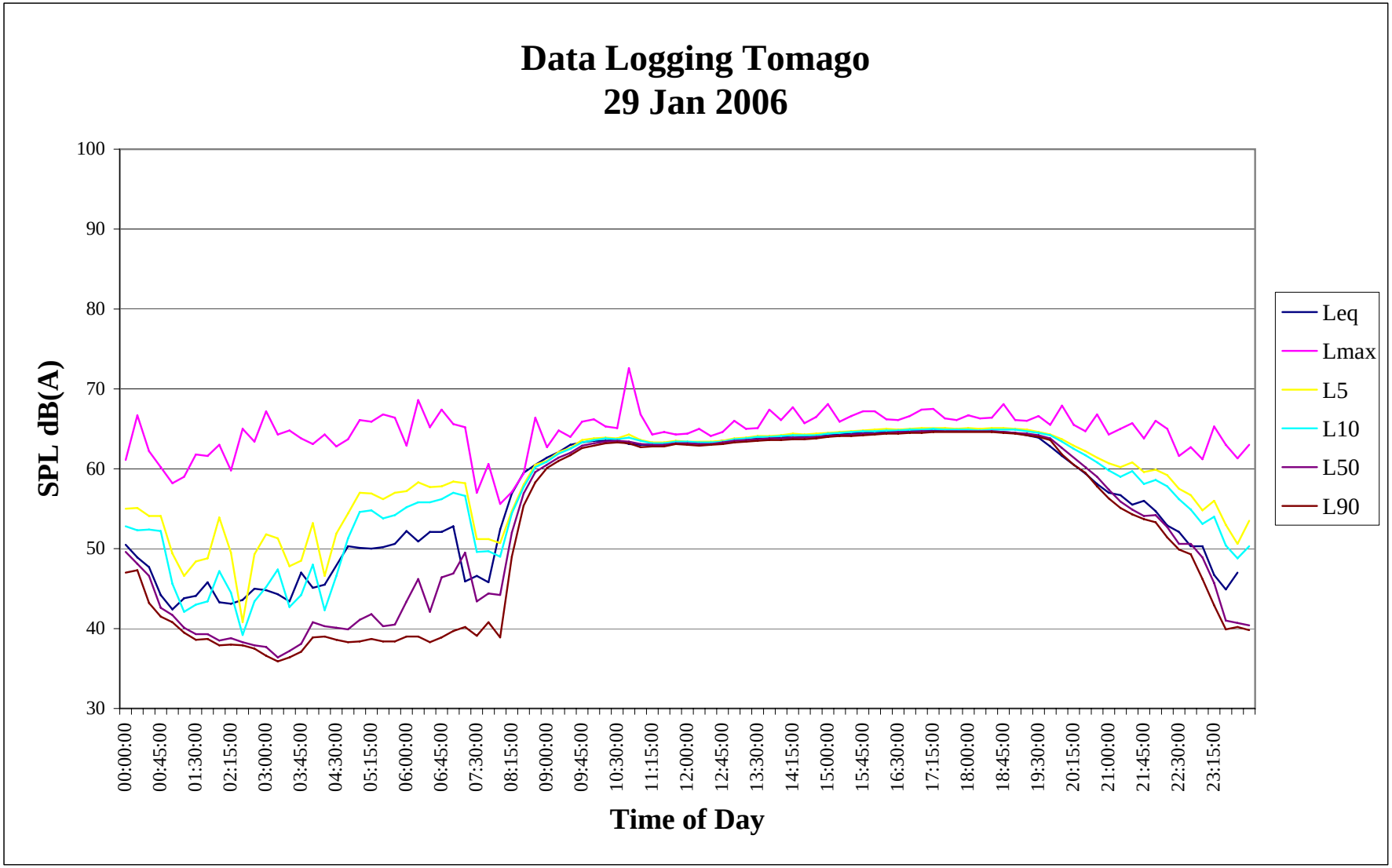
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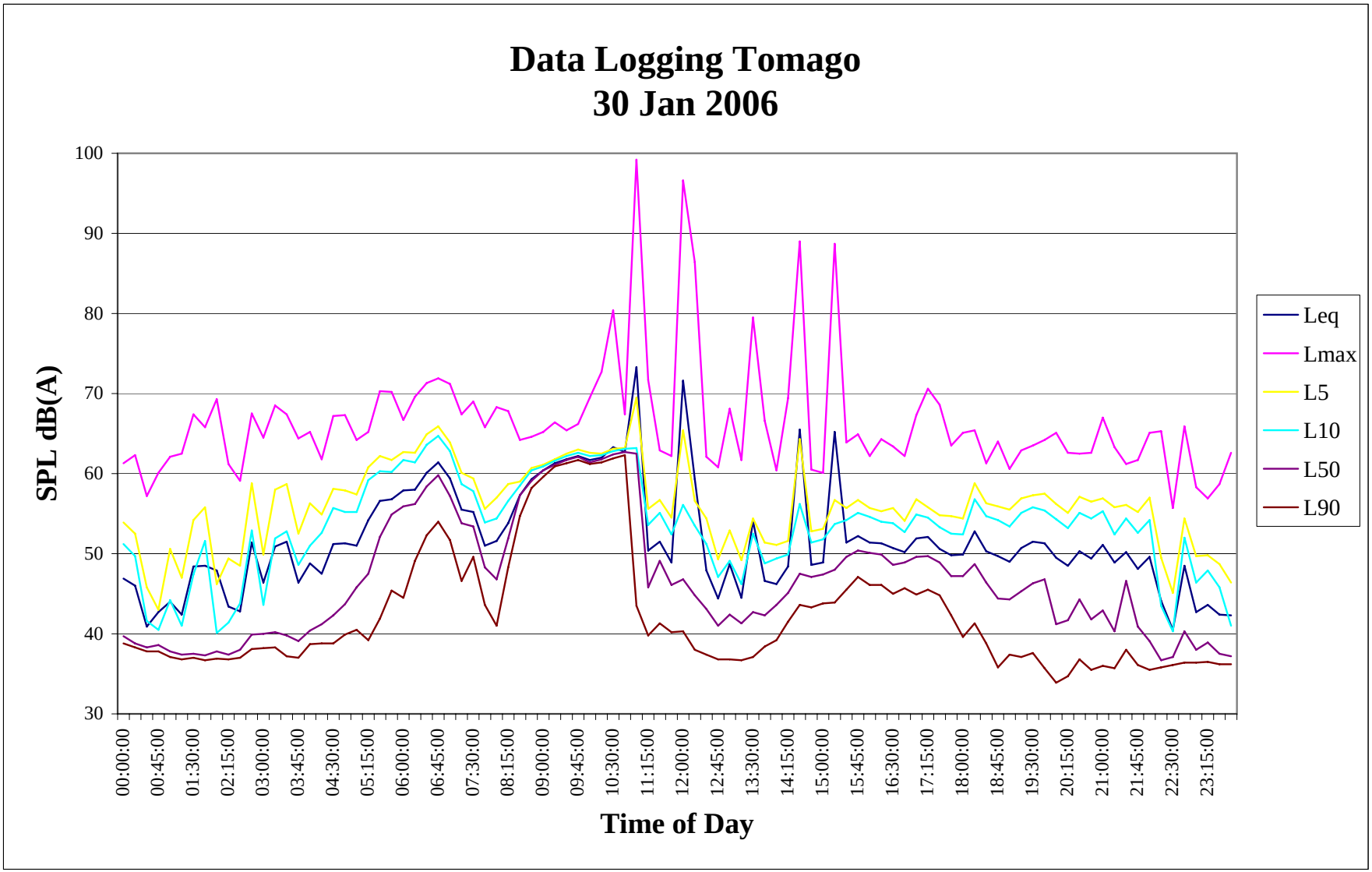
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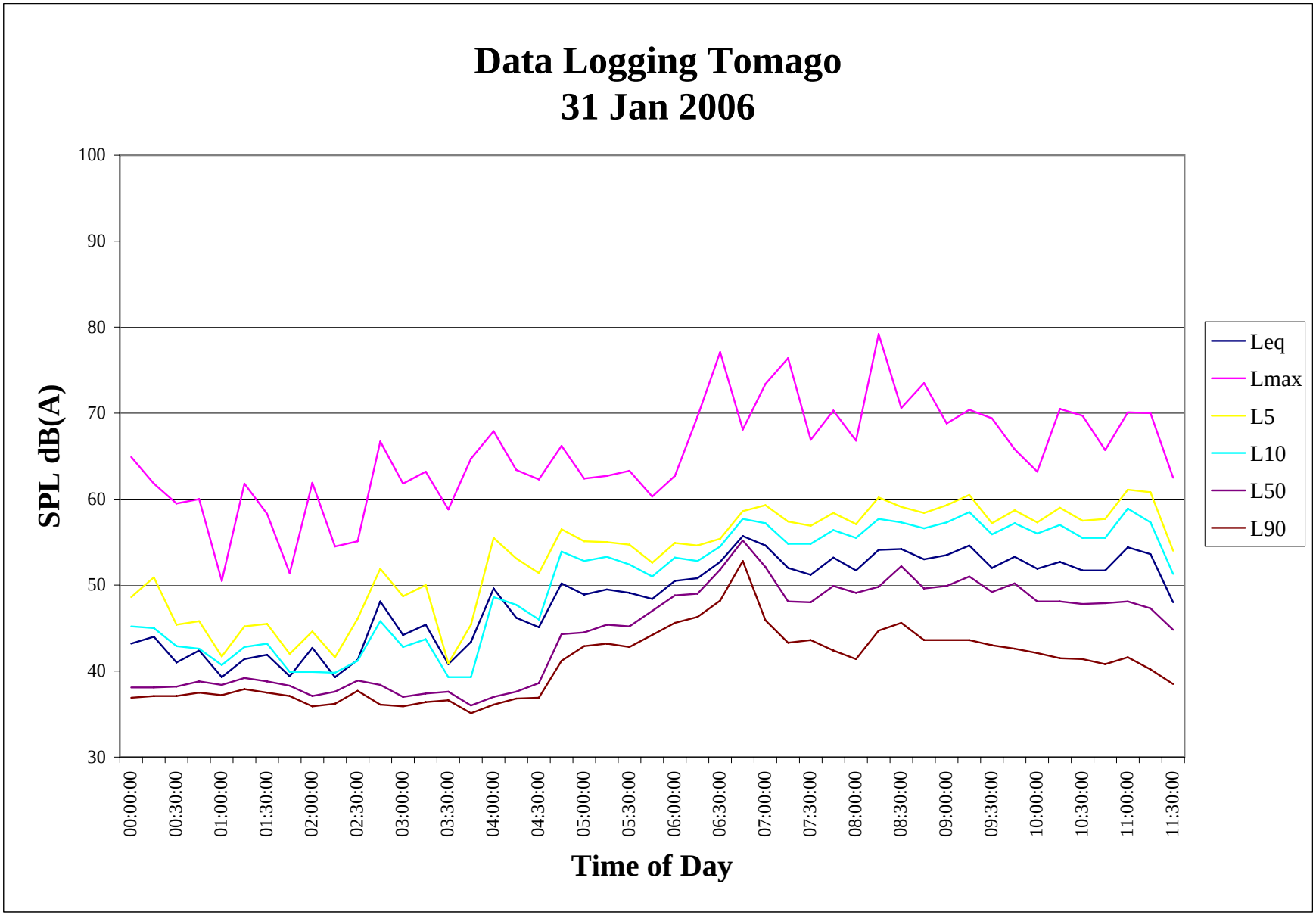
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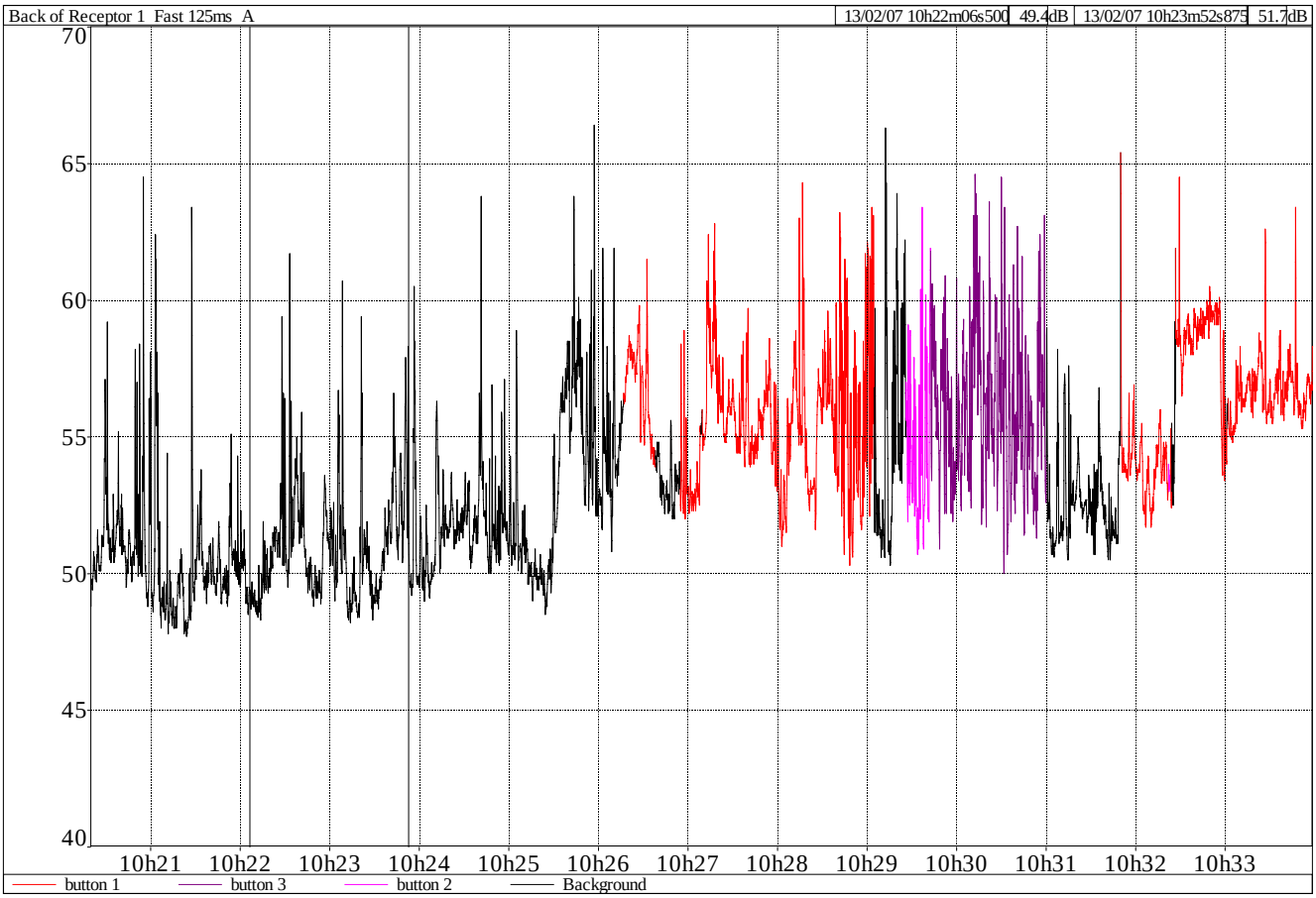
Time of Day
Leq
Lmax
L5
L10
L50
L90

## Appendix 5 Attended Survey Data

### Figure A5.1 Industrial and Traffic noise at Residence 1




Red coding is noise from adjacent industrial site at a distance of approximately 40 meters other coding is traffic noise



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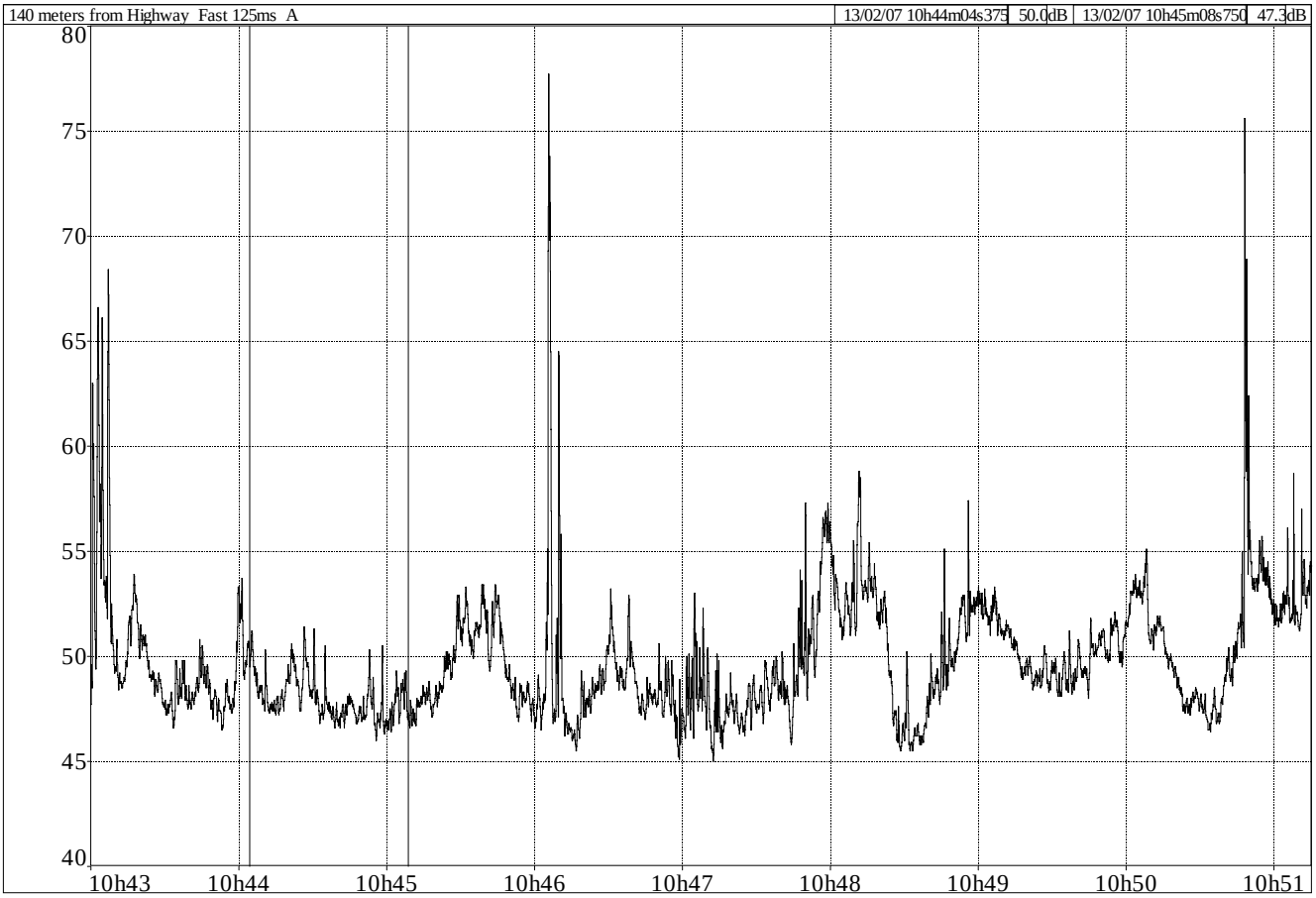
**Figure A5.2 Traffic noise at 140 meters from the highway on vacant land adjacent to Residence 1**



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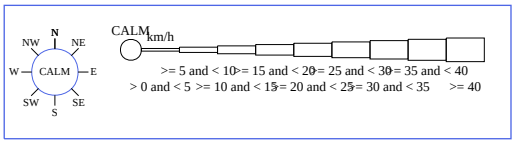
# Roses of Wind direction versus Wind speed in km/h (10 Sep 1942 to 31 May 2007)

Custom times selected, refer to attached note for details

## WILLIAMTOWN RAAF

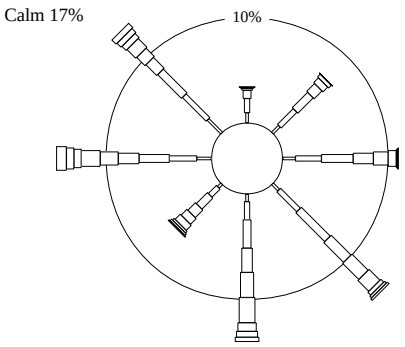
Site No: 061078 • Opened Jan 1942 • Still Open • Latitude: -32.7932° • Longitude: 151.8359° • Elevation 9m



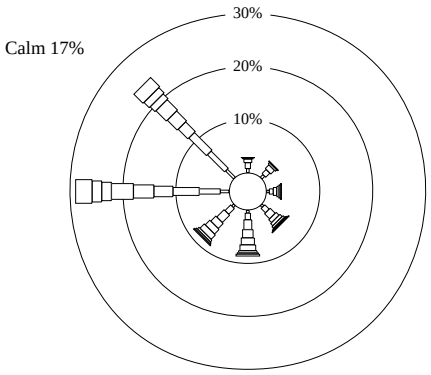

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

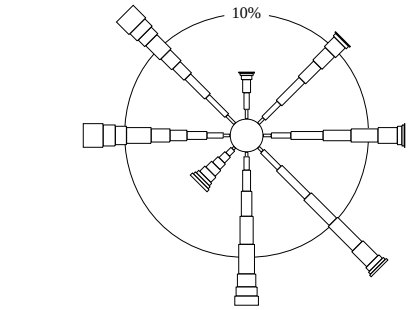
Autumn 22003 Total Observations



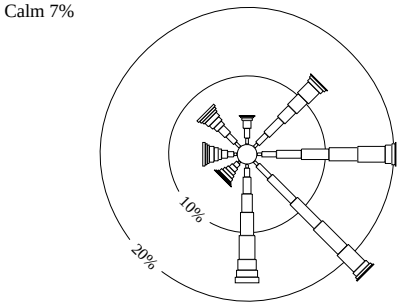

Winter 21784 Total Observations




Spring 21836 Total Observations




Summer 20936 Total Observations

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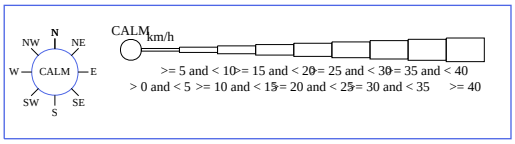
# Roses of Wind direction versus Wind speed in km/h (10 Sep 1942 to 31 May 2007)

Custom times selected, refer to attached note for details

## WILLIAMTOWN RAAF

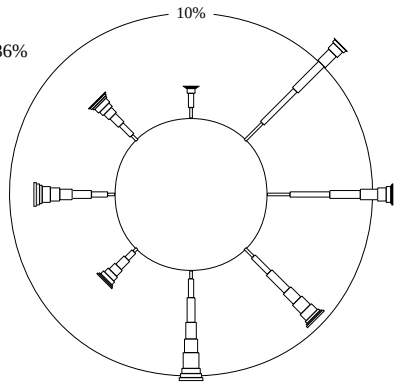
Site No: 061078 • Opened Jan 1942 • Still Open • Latitude: -32.7932° • Longitude: 151.8359° • Elevation 9m



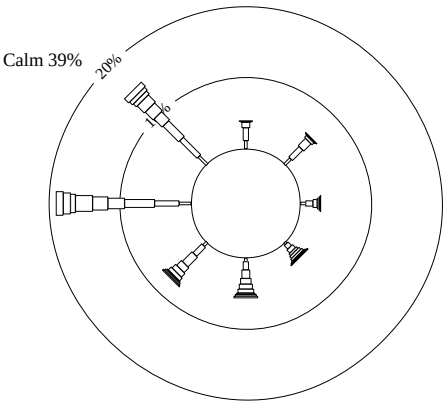

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

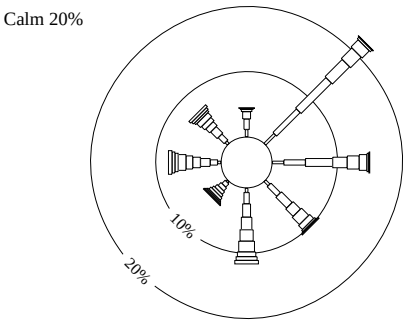
Autumn 10856 Total Observations



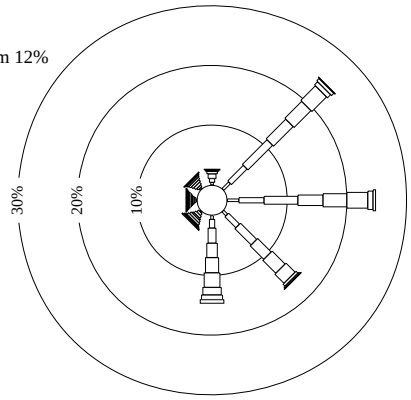

Winter 10819 Total Observations




Spring 10859 Total Observations




Summer 10338 Total Observations

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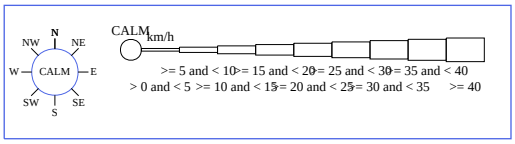
# Roses of Wind direction versus Wind speed in km/h (11 Sep 1942 to 31 May 2007)

Custom times selected, refer to attached note for details

## WILLIAMTOWN RAAF

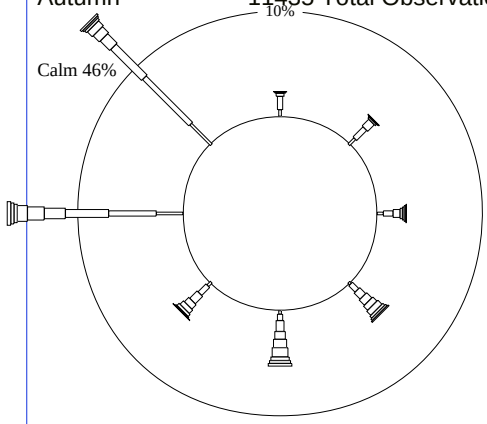
Site No: 061078 • Opened Jan 1942 • Still Open • Latitude: -32.7932° • Longitude: 151.8359° • Elevation 9m



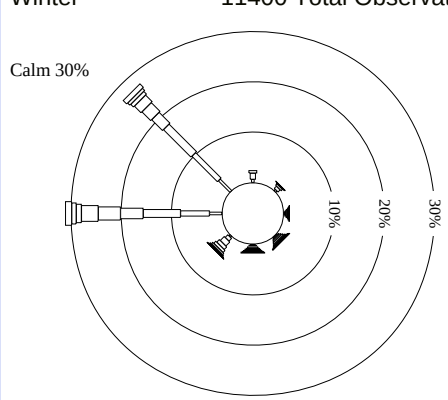

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

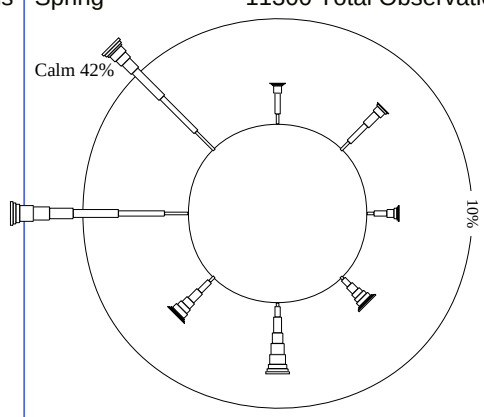
Autumn 11435 Total Observations



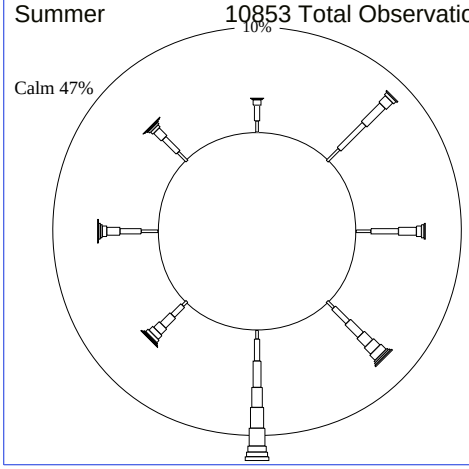

Winter 11400 Total Observations




Spring 11300 Total Observations




Summer 10853 Total Observations

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