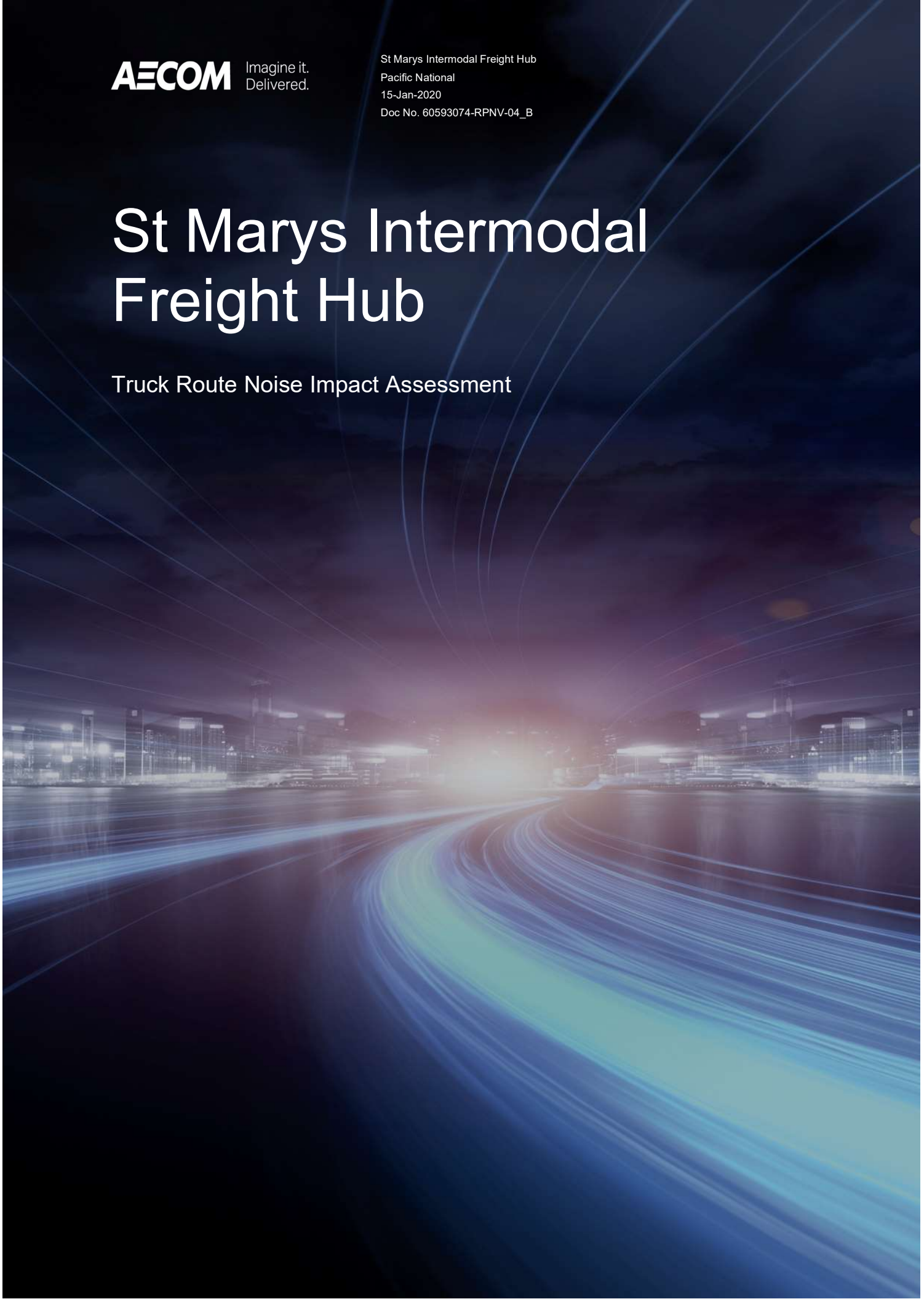
AECOM Imagine it. Delivered.

St Marys Intermodal Freight Hub
Pacific National
15-Jan-2020
Doc No. 60593074-RPNV-04_B

St Marys Intermodal Freight Hub

Truck Route Noise Impact Assessment



St Marys Intermodal Freight Hub

St Marys Intermodal Freight Hub

Truck Route Noise Impact Assessment

Client: Pacific National

ABN: 39 098 060 550

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

15-Jan-2020

Job No.: 60593074

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

St Marys Intermodal Freight Hub

Quality Information

Document	St Marys Intermodal Freight Hub
Ref	60593074
Date	15-Jan-2020
Prepared by	Geoff Lucas
Reviewed by	Gayle Greer

Revision History

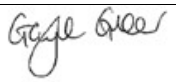
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	18-Dec-2019	Draft for review	Gayle Greer Acoustics Team Leader – NSW	GG
B	15-Jan-2020	Final	Gayle Greer Acoustics Team Leader – NSW	

Table of Contents

1.0 Introduction

1.1 Background information

AECOM Australia Pty Ltd (AECOM) has been commissioned by Urbanco and SITE Planning+Design on behalf of Pacific National to undertake a Noise and Vibration Impact Assessment of the construction and operation of the proposed St Marys Intermodal Freight Hub (the Proposal).

The Proposal site has a total area of 9.6 ha and forms part of a broader 43 ha site. The site comprises predominantly flat cleared land and an existing rail siding and is zoned IN1 General Industrial. The broader site is surrounded by industrial properties to the north and east, parkland to the west and the main western railway line to the south. The closest noise sensitive receivers are located 200 m to the south.

The Proposal site will facilitate the introduction of a new container rail shuttle between Port Botany and Greater Western Sydney. It will allow an increase of the volume of import and export freight moved via rail and relieve the regional and state road network of heavy vehicle and container traffic, including primary freight roads servicing Port Botany.

Containers will be loaded onto/unloaded from trains and heavy vehicles; and transferred to designated container storage areas by mobile container handling equipment (reach stackers and forklifts).

The development would comprise the following:

- Construction of hardstand areas for container storage and laydown and loading/unloading areas
- Construction of new internal roads for light and heavy vehicles
- Construction of buildings such as offices, wash bays and parking areas
- Installation of services and ancillary works.

It is proposed for the site to operate 24 hours per day, 7 days per week with 80% of heavy vehicle movements expected to occur between 6 am and 6 pm. The site has three road frontages, Forrester Road, Lee Holm Road and Christie Street. Light vehicle access is proposed to be via Lee Holm Road. Four heavy vehicles access routes were considered. The proposed heavy vehicle access is proposed to be via Forrester Road.

1.2 Scope

The objective of this noise impact assessment is to provide additional information regarding the impact of each proposed heavy vehicle access route. The scope is presented below:

- Consider each road affected by each of the four proposed heavy vehicle access routes.
- Measure current $L_{Aeq,15hr}$ and $L_{Aeq,9hr}$ noise levels along each road. Measurements would be completed concurrently with traffic counts. The locations are as follows:
  - 151 Forrester Road, St Marys
  - 150 Glossop Street, St Marys
  - 304 Great Western Highway, St Marys
  - 62 Mamre Road, St Marys
  - 1 Werrington Road, Werrington
  - Christie Street, St Marys
- Based on the existing traffic counts and predicted future traffic counts calculate the likely increase in road traffic noise levels along each road.
- Determine the number of noise sensitive receivers along each road where noise levels exceed the *Road Noise Policy* criteria of $L_{Aeq,15hr}$ 60 dB(A) and $L_{Aeq,9hr}$ 55 dB(A) using the methodology of the *Calculation of Road Traffic Noise* guideline.

- Rank the access routes in terms of their noise impact on noise sensitive receivers.
- If increases in road traffic noise are greater than 2 dB(A) propose suitable noise mitigation measures in accordance with the *Road Noise Policy* and *Noise Mitigation Guideline*.

1.3 Policies and guidelines

The following policies and guidelines are relevant for this assessment:

- *NSW Road Noise Policy* (RNP), Department of Environment, Climate Change and Water, 2011
- *Noise Policy for Industry* (NPfI), Environment Protection Authority, 2017
- *Calculation of Road Traffic Noise (CoRTN),* UK Department of Transport,1988.

Definitions for acoustic terminology used within this report can be found in Appendix A.

2.0 Existing Acoustic Environment

2.1 Unattended noise measurement methodology

Long term unattended noise monitoring was conducted at six locations between 19 and 28 December 2019, at the properties indicated in Table 1. The noise loggers were calibrated prior to and after the monitoring period with a drift in calibration not exceeding ± 0.5 dB.

All the acoustic instrumentation employed during the noise measurements comply with the requirements of "*AS IEC 61672.1-2004 Electroacoustics - Sound level meters - Specifications*" and were within their current National Association of Testing Authorities, Australia (NATA) certified in-calibration period (i.e. calibration in the last two years).

Table 1 Noise monitoring details

Logger	Location	Model	Serial number
1	151 Forrester Road, North St Marys	ARL316	16-707-037
2	150 Glossop Street, St Marys	Rion NL-42	221356
3	304 Great Western Highway, St Marys	Rion NL-42	521657
4	62 Mamre Road, St Marys	Rion NL-42	410151
5	1 Werrington Road, Werrington	ARL316	16-707-006
6	Christie Street, St Marys	Rion NL-42	810712

In accordance with the EPA's NSW *Noise Policy for Industry* (NPfI), noise monitoring affected by adverse weather conditions or extraneous noise events was excluded from the monitoring data. The *Noise Policy for Industry* advises that data may be affected where adverse weather, such as wind speeds higher than 5 m/s or rain, occurs. Weather data was acquired from the Bureau of Meteorology's Penrith Lakes AWS weather station (station number 067113) located around nine kilometres northwest of the Proposal.

The loggers measured the noise levels over the sample period and then determined L_{A1}, L_{A10}, L_{A90}, and L_{Aeq} levels of the noise environment. The L_{A1}, L_{A10} and L_{A90} noise levels are the levels exceeded for 1%, 10% and 90% of the measurement period respectively. The L_{A90} is taken as the background level. The L_{A1} is indicative of the maximum noise levels due to individual noise events such as the pass-by of a heavy vehicle. The L_{Aeq} level is the equivalent continuous sound level and has the same sound energy over the sample period as the actual noise environment with fluctuating sound levels.

2.2 Unattended noise measurement results

Provided in Table 2 are the $L_{Aeq(15hr)}$ and $L_{Aeq(9hr)}$ noise levels measured at each monitoring location for the period 19 to 28 November 2019.

The results for each day and the graphical noise logging results are presented in Appendix B.

Table 2 Existing traffic noise levels

Logger	L_{Aeq} noise levels, dB(A)	
	Day, $L_{Aeq\ 15hr}$ dB(A)	Night, $L_{Aeq\ 9hr}$ dB(A)
1	66	63
2	65	62
3	74	70
4	69	66
5	71	67
6	65	61

2.3 Traffic counts

The current traffic volumes and speeds for roads surrounding the Proposal were measured by Bitzios Consulting from 3 December to 9 December 2019. This data is presented below in Table 3.

Table 3 Measured traffic volumes and speeds

Road	Daytime (7am – 10pm)			Night-time (10pm – 7am)		
	Speed (km/h)	Light (volume)	Heavy (volume)	Speed (km/h)	Light (volume)	Heavy (volume)
Forrester Road (north of Glossop Street)	60	17,154	2,611	62	3,523	518
Forrester Road (south of Glossop Street)	49	3,178	373	51	713	82
Glossop Street	57	16,077	3,070	58	3,130	598
Harris Street	50[1]	1,661	307	50[1]	506	36
Great Western Highway (east of Mamre Road)	60[1]	28,175	3,066	60[1]	5,694	672
Great Western Highway (west of Mamre Road)	60[1]	22,541	1,591	60[1]	4,020	312
Mamre Road	58	18,733	2,952	60	3,992	646
Werrington Road	38	13,323	1,670	46	3,107	391
Christie Street	57	17,625	2,061	61	3,114	445
Lee Holm Road	60[1]	1,521	641	60[1]	361	92

Notes:

1. *Posted speed limit*

3.0 Operational Road Noise Criteria

The *Road Noise Policy* presents noise criteria for developments with the potential to generate additional traffic on arteria or sub-arterial roads. These criteria are:

- $L_{Aeq,15hr}$ 60 dB(A) during the daytime; and
- $L_{Aeq,9hr}$ 55 dB(A) during the night-time.

Where the criteria above are already currently exceeded the development should not increase traffic noise levels by more than 2 dB(A). When the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion then noise mitigation should be considered for those receivers affected.

The *Road Noise Policy* does not require assessment of noise impact to commercial or industrial receivers.

4.0 Operational Traffic Noise

Once operational the Proposal would generate additional truck movements on nearby roads. The four heavy vehicle access routes considered are:

- Route 1 – Mamre Road, Great Western Highway, Glossop Street, Forrester Road, Christie Street and Lee Holm Road;
- Route 2 – Mamre Road, Great Western Highway, Werrington Road, Christie Street and Lee Holm Road;
- Route 3 – Mamre Road, Great Western Highway, Glossop Street, Forrester Road, Harris St; and
- Route 4 – Mamre Road, Great Western Highway, Glossop Street, Forrester Road.

The truck routes are shown in Appendix C.

The predicted additional heavy vehicle volumes are shown below in Table 4. Based upon the measured traffic volumes presented in section 2.3 the predicted traffic noise increases are also presented in Table 4. The predicted road traffic noise levels have been calculated using the Calculation of Road Traffic Noise (CoRTN) algorithm.

Table 4 shows that predicted noise level increases on roads with residential receivers are 0.1 dB or less. Generally an increase of 50-60% in traffic volumes is required to increase traffic noise levels by 2 dB(A). The traffic generated by the Proposal is therefore considered to comply with the *Road Noise Policy* criteria.

It is noted that the proposed additional heavy vehicle volumes could increase by more than tenfold on the roads with residential receivers and the increase in road traffic noise levels would remain below 2 dB and therefore comply with the *Road Noise Policy* criteria.

Table 4 Predicted increase in traffic noise levels

Road	Type	Residential receivers	Heavy vehicles generated by the proposal		RNP criteria exceeded currently	Predicted road traffic noise increase	
			Day	Night		Day, $L_{Aeq\ 15hr}$, dB(A)	Night, $L_{Aeq\ 9hr}$, dB(A)
Forrester Road (north of Glossop Street)	Sub-arterial Road	Yes	376	60	Yes	0.1	0.1
Forrester Road (south of Glossop Street)	Sub-arterial Road	No	376	60	-	0.4	0.3
Glossop Street	Sub-arterial Road	Yes	376	60	Yes	0.1	0.1
Harris Street	Sub-arterial Road	No	188	30	-	0.4	0.2
Great Western Highway (east of Mamre Road)	Arterial Road	Yes	316	50	Yes	< 0.1	< 0.1
Great Western Highway (west of Mamre Road)	Arterial Road	Yes	376	60	Yes	0.1	0.1
Mamre Road	Arterial Road	Yes	316	50	Yes	0.1	< 0.1
Werrington Road	Sub-arterial Road	Yes	376	60	Yes	0.1	0.1
Christie Street	Sub-arterial Road	No	376	60	-	0.1	0.1
Lee Holm Road	Sub-arterial Road	No	376	60	-	0.7	0.5

Table 5 below shows the estimated number of residential receivers along each truck route where the RNP criteria are currently exceeded. The smallest number of receivers are located on Route 2 and the largest number are located on Route 1. Routes 3 and 4 have equal numbers of receivers.

Whilst the predicted traffic noise level increases are negligible (0.1 dB or less) on all truck routes with residential receivers it can be seen from Table 5 that the route with the smallest total number of receivers impacted by additional truck noise is Route 2 and the route with the largest total number of receivers impacted by additional truck noise is Route 1. Routes 3 and 4 have slightly fewer receivers impacted than Route 1.

Table 5 Estimated number of residential receivers where the RNP criteria is currently exceeded.

Route	Number of properties where the RNP criteria is currently exceeded
1	423
2	133
3	371
4	371

It is noted that regardless of the number of receivers along each route with residential receivers, the predicted maximum increase of 0.1 dB is a negligible increase which would not be discernible.

5.0 Conclusions

The proposed St Marys Intermodal Freight Hub would generate additional truck movements on nearby roads. Four heavy vehicle access routes were considered:

- Route 1 - Mamre Road, Great Western Highway, Glossop Street, Forrester Road, Christie Street and Lee Holm Road;
- Route 2 Mamre Road, Great Western Highway, Werrington Road, Christie Street and Lee Holm Road;
- Route 3 Mamre Road, Great Western Highway, Glossop Street, Forrester Road, Harris St; and
- Route 4 Mamre Road, Great Western Highway, Glossop Street, Forrester Road.

The assessment has shown that the existing traffic volumes are substantially greater than the proposed operational traffic numbers on all roads. Therefore predicted noise level increases on roads with residential receivers are negligible (0.1 dB or less). As all increases are less than 2dB the traffic generated by the operation of the site complies with the *Road Noise Policy* criteria.

Whilst the predicted traffic noise level increases are negligible (0.1 dB or less) on all truck routes the route with the smallest total number of receivers impacted by additional truck noise is Route 2 whilst the route with the largest total number of receivers impacted by additional truck noise is Route 1. Routes 3 and 4 have slightly fewer receivers impacted than Route 1.

Appendix A

Acoustic Terminology

Appendix A Acoustic Terminology

The following is a brief description of acoustic terminology used in this report.

Sound power level	The total sound emitted by a source.
Sound pressure level	The amount of sound at a specified point.
Decibel [dB]	The measurement unit of sound.
A Weighted decibels [dB(A)]	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:

0dB(A)	Threshold of human hearing
30dB(A)	A quiet country park
40dB(A)	Whisper in a library
50dB(A)	Open office space
70dB(A)	Inside a car on a freeway
80dB(A)	Outboard motor
90dB(A)	Heavy truck pass-by
100dB(A)	Jackhammer/Subway train
110 dB(A)	Rock Concert
115dB(A)	Limit of sound permitted in industry
120dB(A)	747 take off at 250 metres

Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
L_{max}	The maximum sound pressure level measured over the measurement period.
L_{min}	The minimum sound pressure level measured over the measurement period.
L_{10}	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the L_{10}.

L_{90}	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the L_{90}.
Ambient noise	The all-encompassing noise at a point composed of sound from all sources near and far.
Background noise	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The L_{90} sound pressure level is used to quantify background noise.
Traffic noise	The total noise resulting from road traffic. The L_{eq} sound pressure level is used to quantify traffic noise.
Day	The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.
Evening	The period from 1800 to 2200 h Monday to Sunday and Public Holidays.
Night	The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.
Noise catchment area [NCA]	The noise environment at each of the sensitive receivers within a noise catchment area is considered to be similar to the unattended monitoring location within that NCA.
Assessment background level [ABL]	The overall background level for each day, evening and night period for **each day** of the noise monitoring.
Rating background level [RBL]	The overall background level for each day, evening and night period for the **entire length** of noise monitoring.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 *"Acoustics – Glossary of terms and related symbols"*, the EPA's *Noise Policy for Industry* and the EPA's *Road Noise Policy*.

Appendix B

Noise Logging

Noise Logger Report

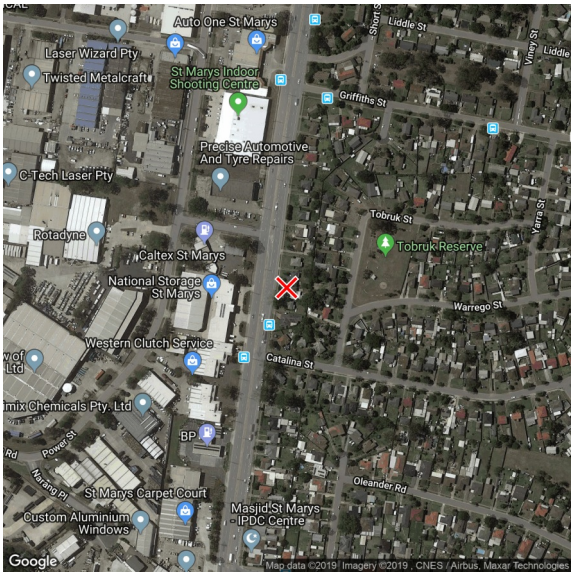
151 Forrester Road, North St Marys

Item	Information
Logger Type	ARL316
Serial number	16-707-037
Address	151 Forrester Road, North St Marys
Location	151 Forrester Road, North St Marys
Facade / Free Field	Facade
Environment	Noise environment dominated by constant road traffic noise from Forrester Road.

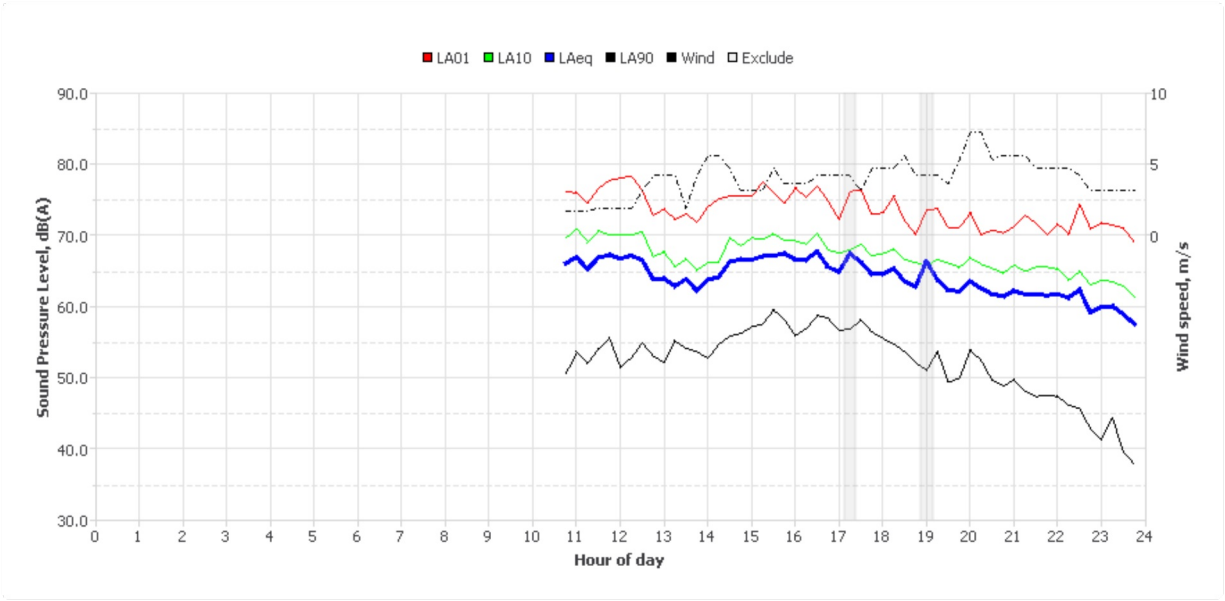
Measured noise levels

Logging Date	L_{Aeq} Day	Eve	Night	ABL Day	Eve	Night	$L_{Aeq,15hr}$	$L_{Aeq,9hr}$
Tue Nov 19 2019	66	63	60	-	-	-	65	60
Wed Nov 20 2019	67	64	63	54	47	32	66	63
Thu Nov 21 2019	67	64	63	55	46	33	66	63
Fri Nov 22 2019	68	65	63	55	48	34	67	63
Sat Nov 23 2019	65	62	60	49	46	32	64	60
Sun Nov 24 2019	63	62	58	43	42	32	63	58
Mon Nov 25 2019	68	63	64	54	45	-	67	64
Tue Nov 26 2019	68	63	63	-	-	38	67	63
Wed Nov 27 2019	66	63	63	52	47	35	65	63
Thu Nov 28 2019	68	-	64	-	-	-	68	64
Summary	**67**	**63**	**63**	**54**	**46**	**33**	**66**	**63**

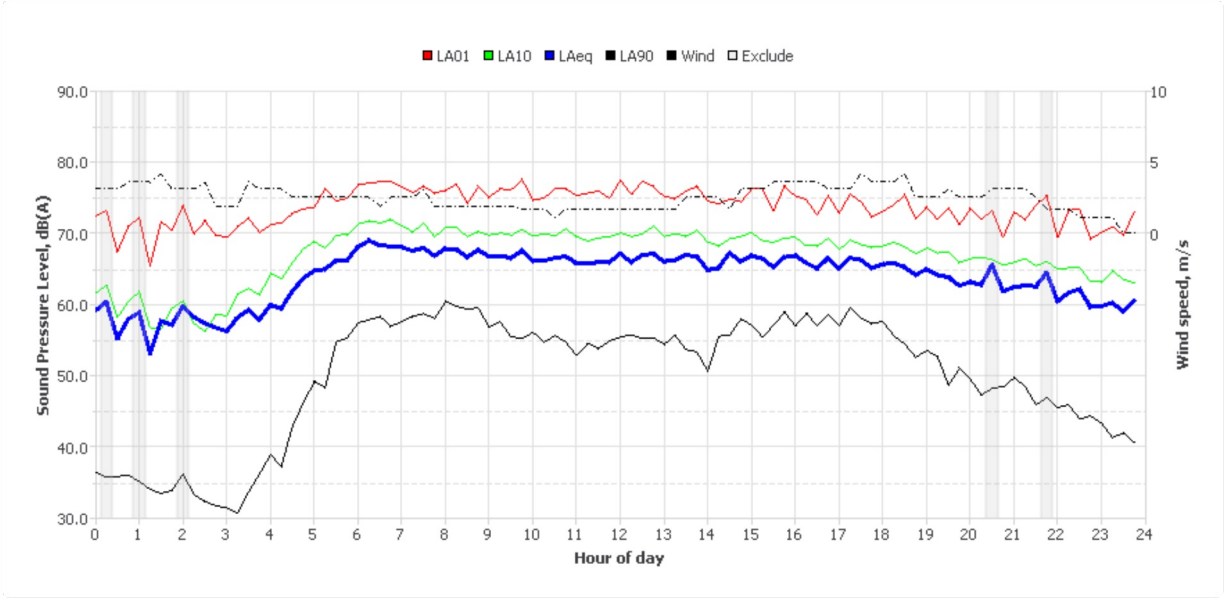
Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

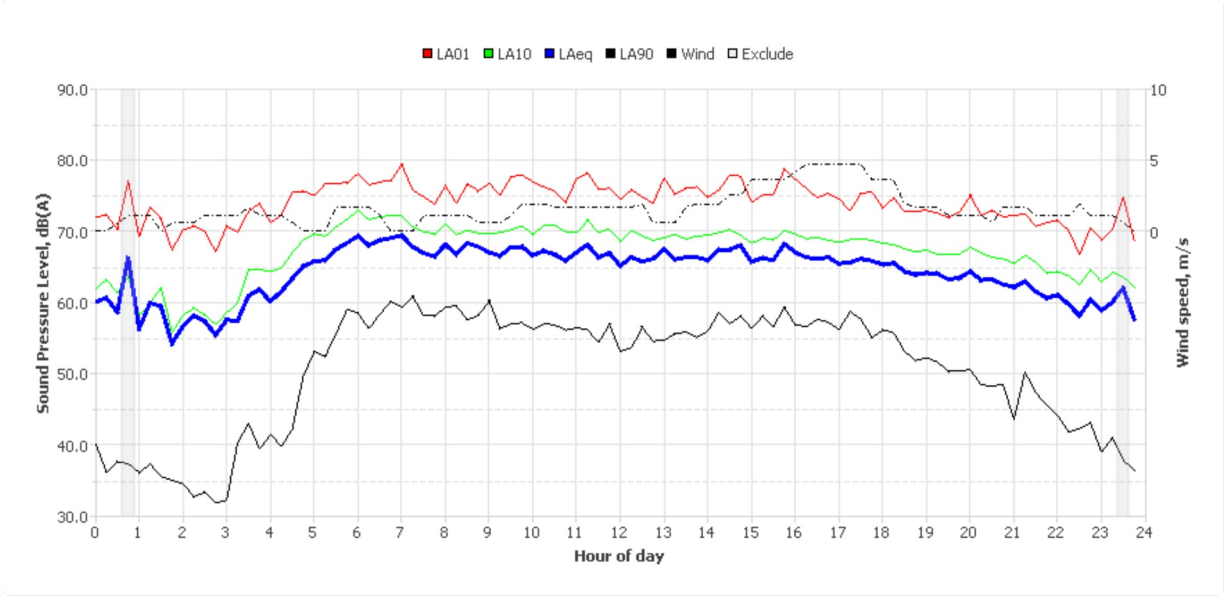
Tuesday, 19 Nov 2019



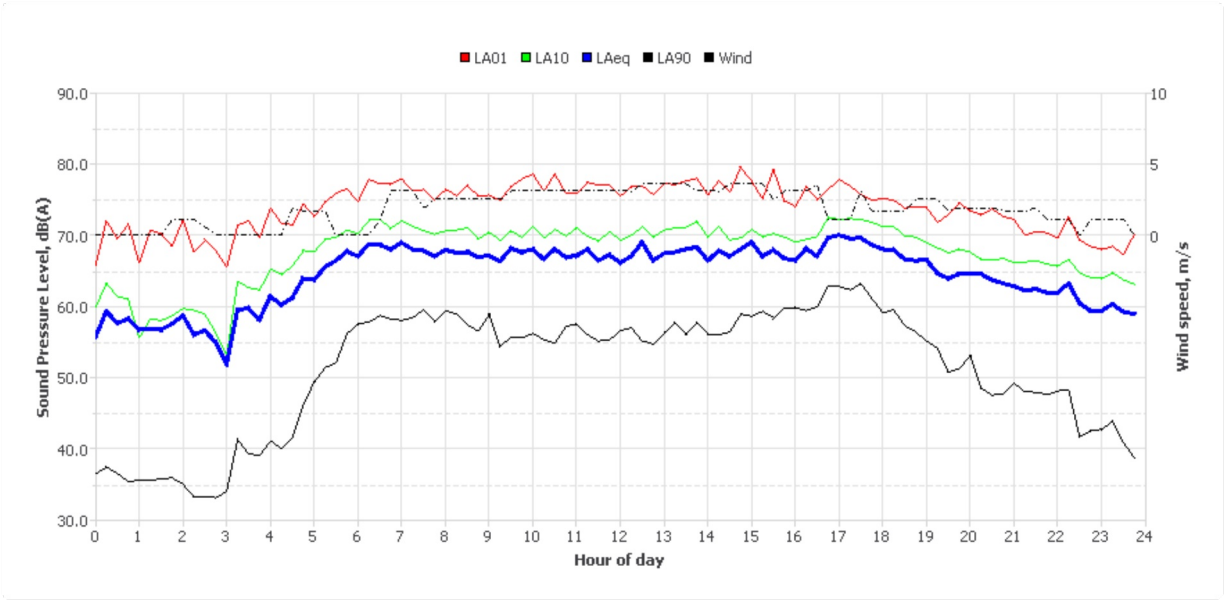
Wednesday, 20 Nov 2019



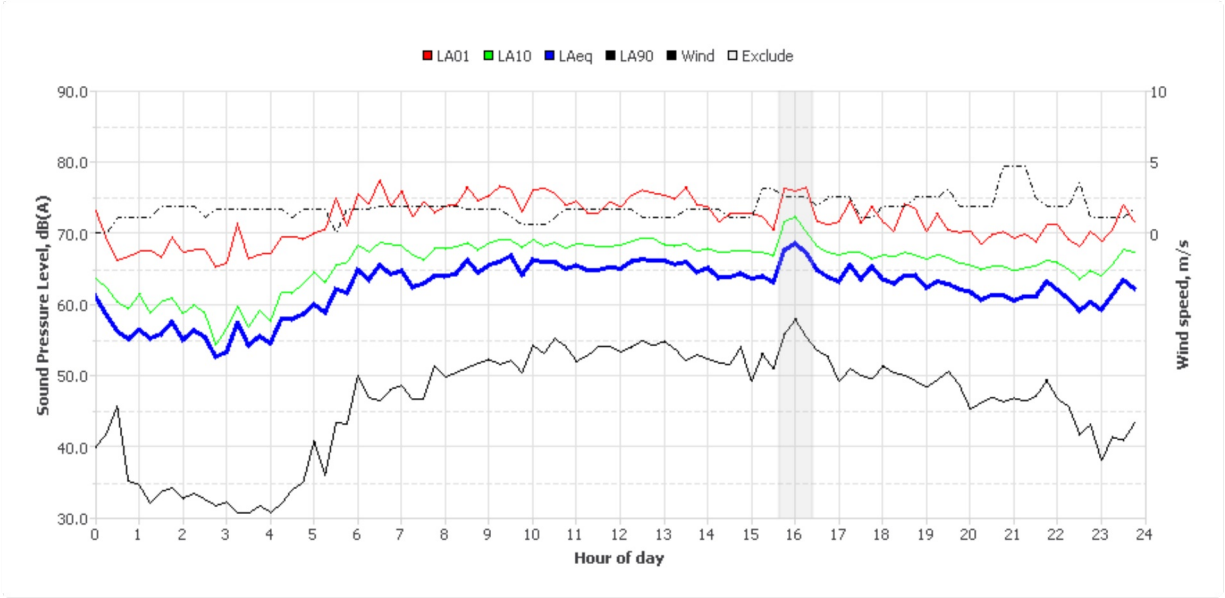
Thursday, 21 Nov 2019



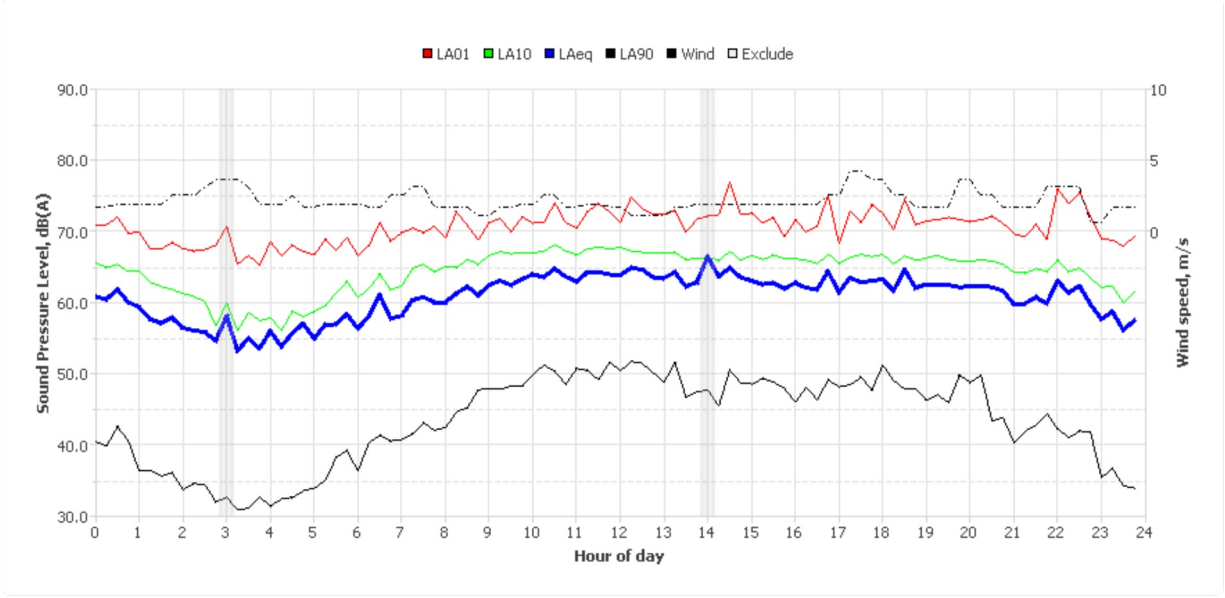
Friday, 22 Nov 2019



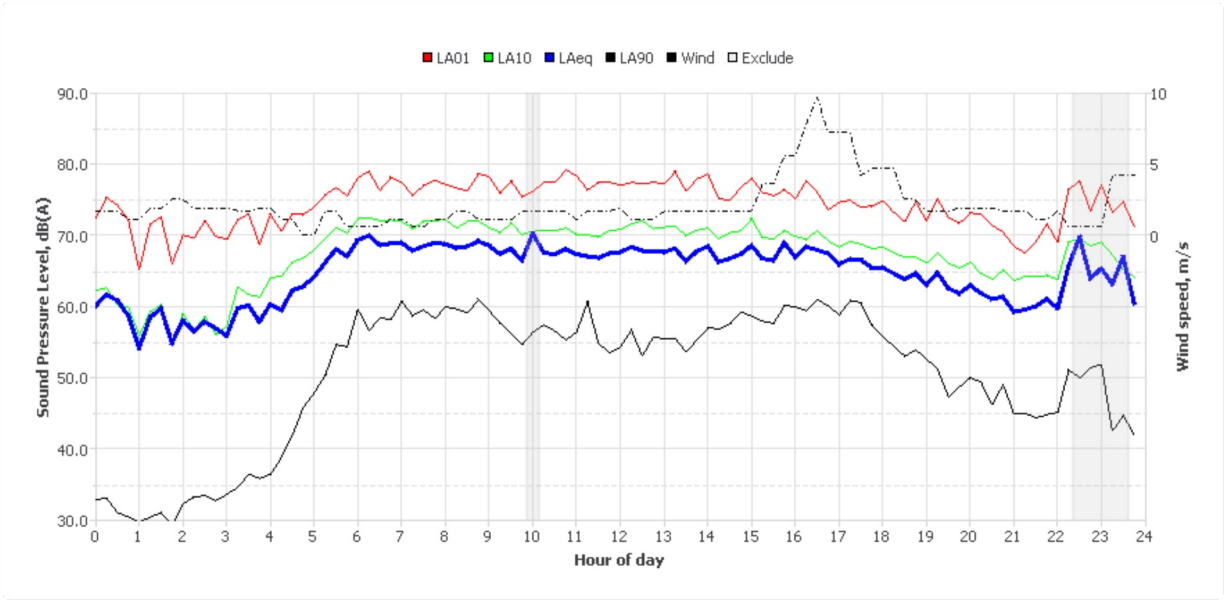
Saturday, 23 Nov 2019



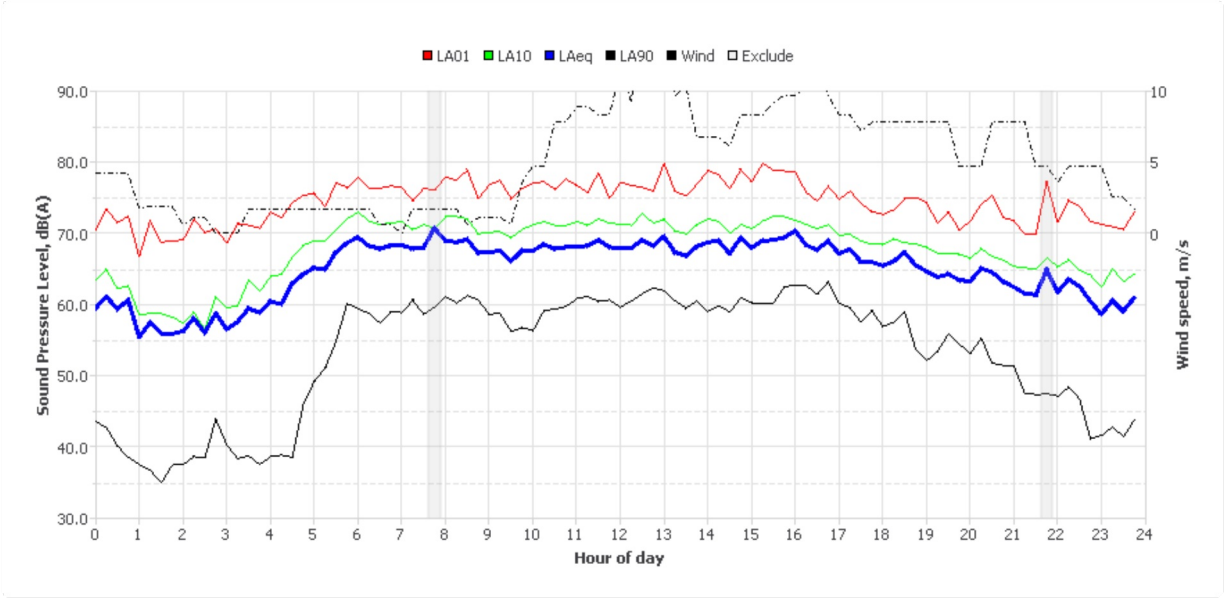
Sunday, 24 Nov 2019



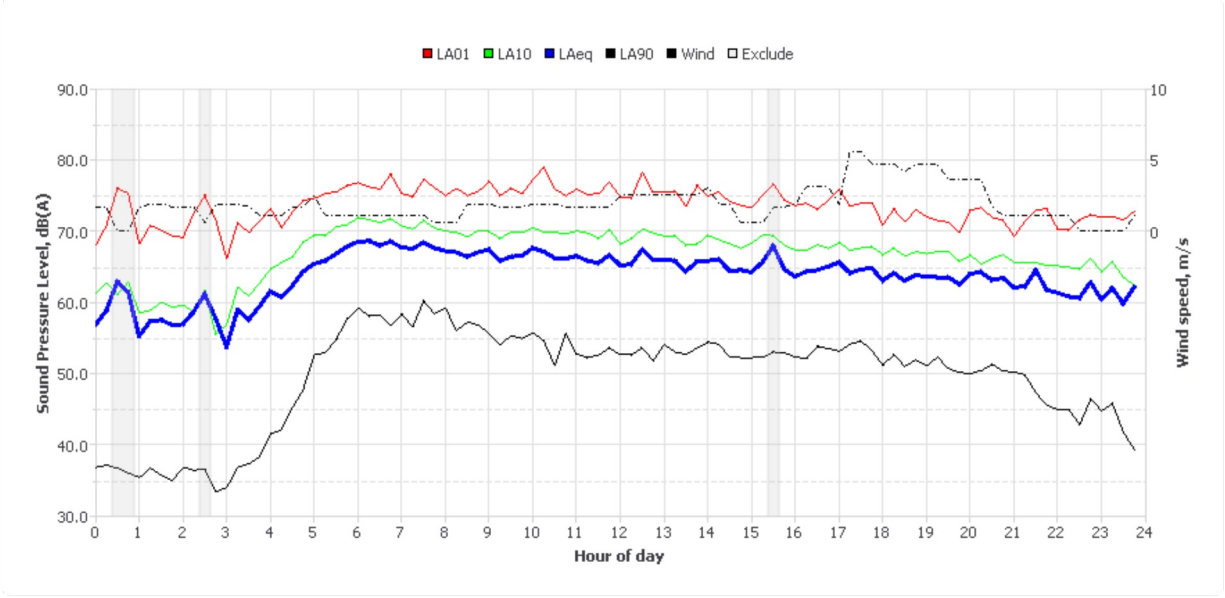
Monday, 25 Nov 2019



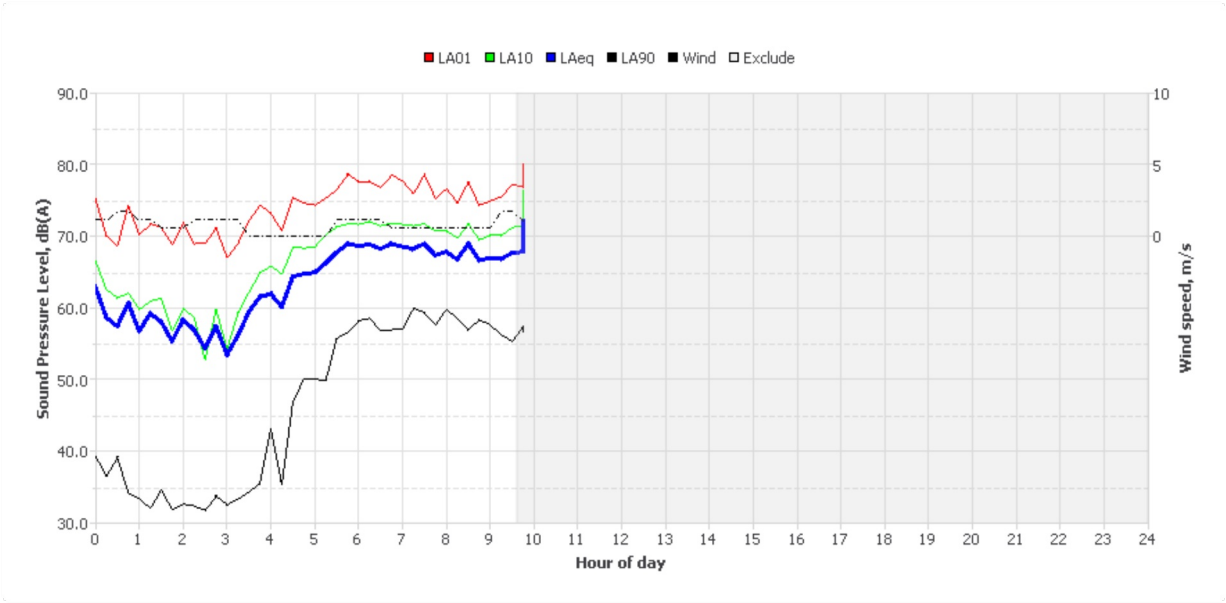
Tuesday, 26 Nov 2019



Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Noise Logger Report

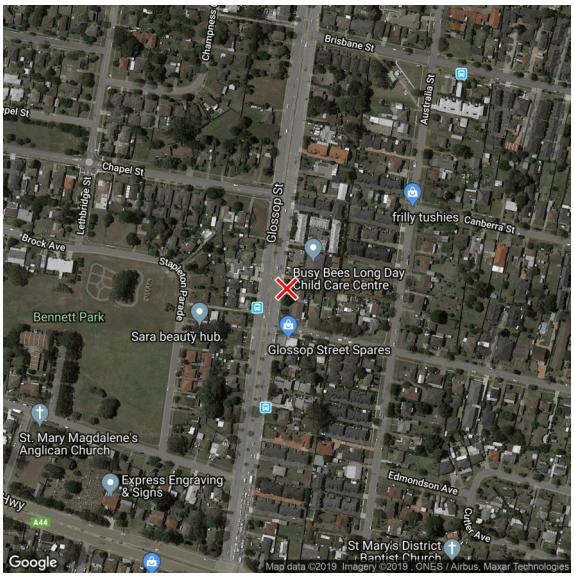
150 Glossop Street, St Marys

Item	Information
Logger Type	NL-42
Serial number	221356
Address	150 Glossop Street, St Marys
Location	150 Glossop Street, St Marys
Facade / Free Field	Free field
Environment	Noise environment dominated by road traffic noise.

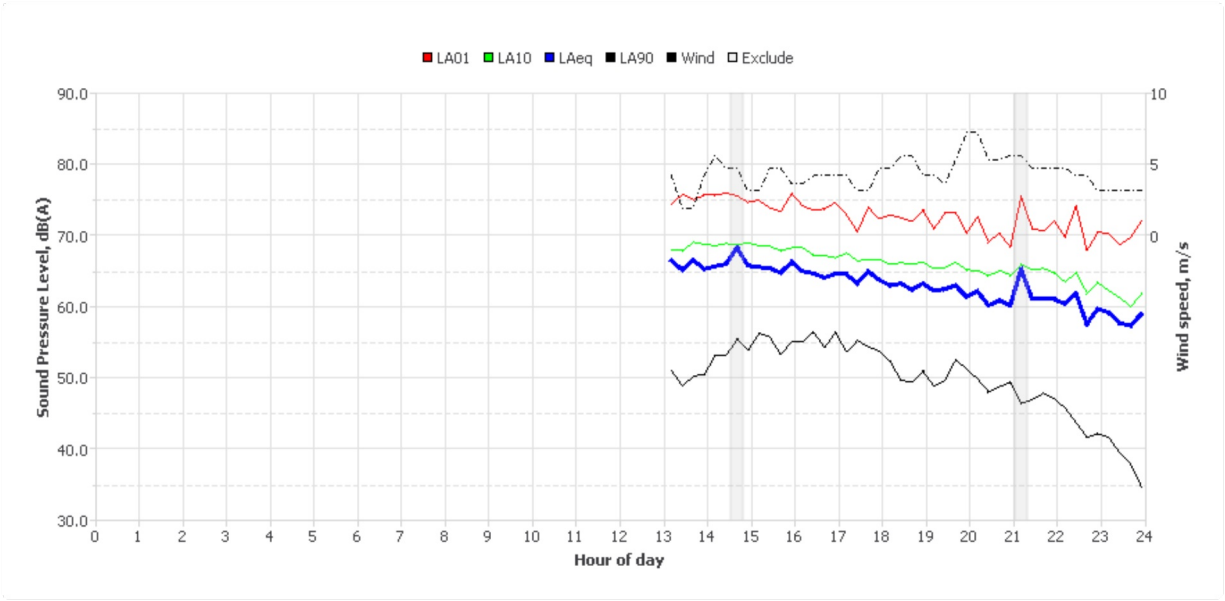
Measured noise levels

Logging Date	L_{Aeq} Day	Eve	Night	ABL Day	Eve	Night	$L_{Aeq,15hr}$	$L_{Aeq,9hr}$
Tue Nov 19 2019	65	62	59	-	-	-	64	59
Wed Nov 20 2019	66	62	62	51	44	34	65	62
Thu Nov 21 2019	65	62	63	51	43	35	65	63
Fri Nov 22 2019	66	62	62	52	45	34	65	62
Sat Nov 23 2019	63	61	59	48	45	32	63	59
Sun Nov 24 2019	62	61	57	46	42	34	62	57
Mon Nov 25 2019	66	62	62	52	45	-	66	62
Tue Nov 26 2019	66	62	62	-	-	36	65	62
Wed Nov 27 2019	65	62	62	52	44	37	64	62
Thu Nov 28 2019	65	-	63	-	-	-	65	63
Summary	**65**	**62**	**62**	**51**	**44**	**34**	**65**	**62**

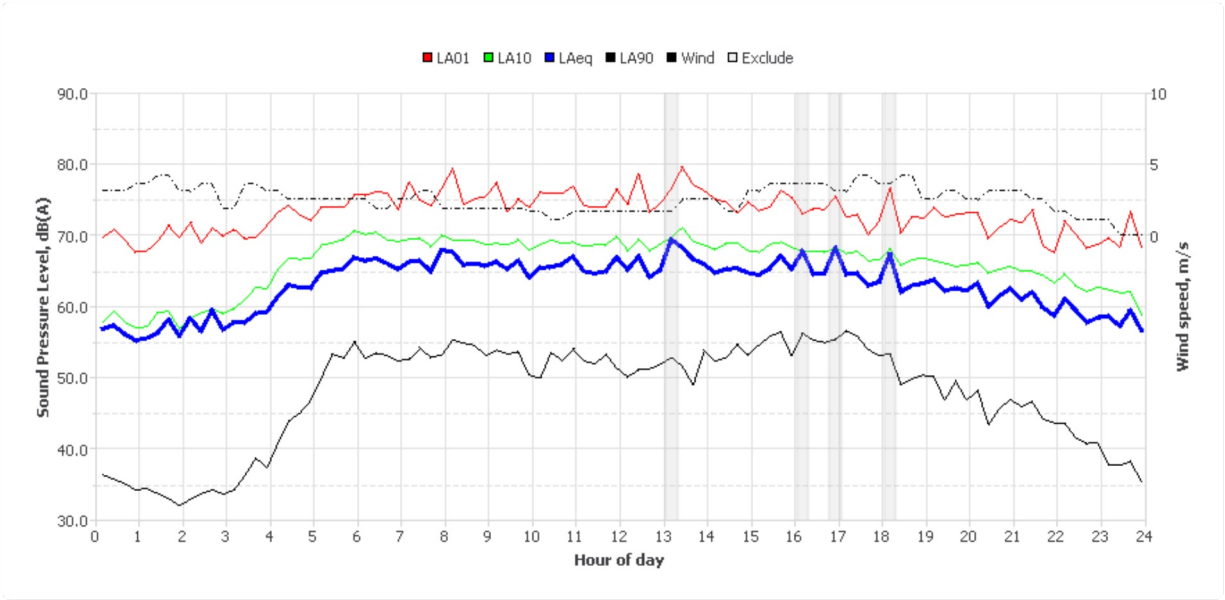
Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

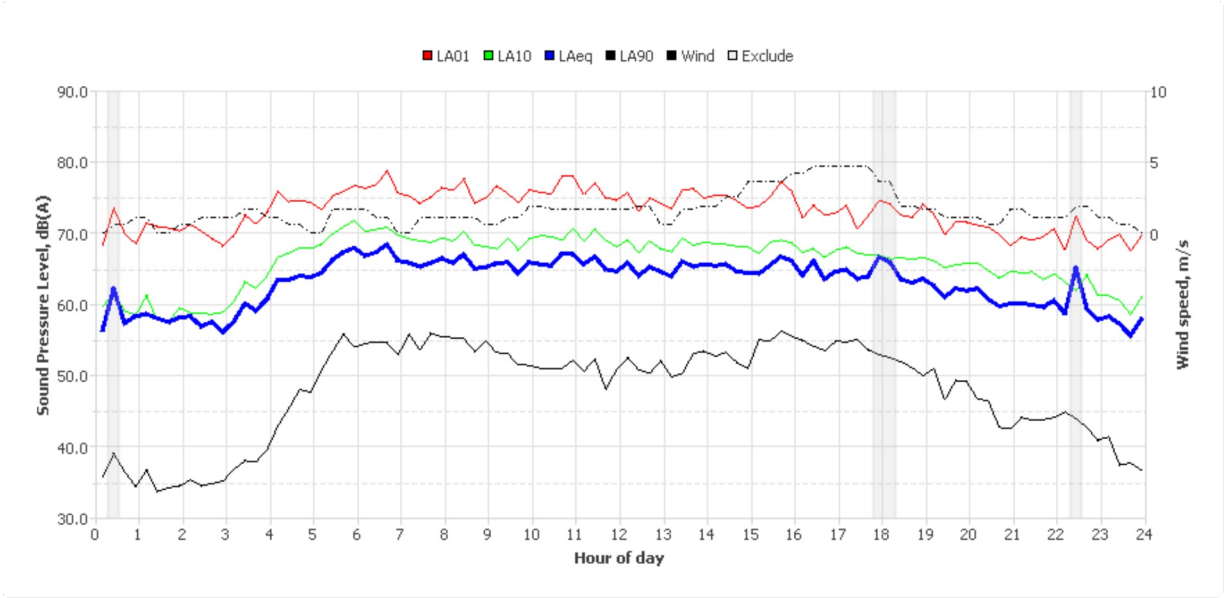
Tuesday, 19 Nov 2019



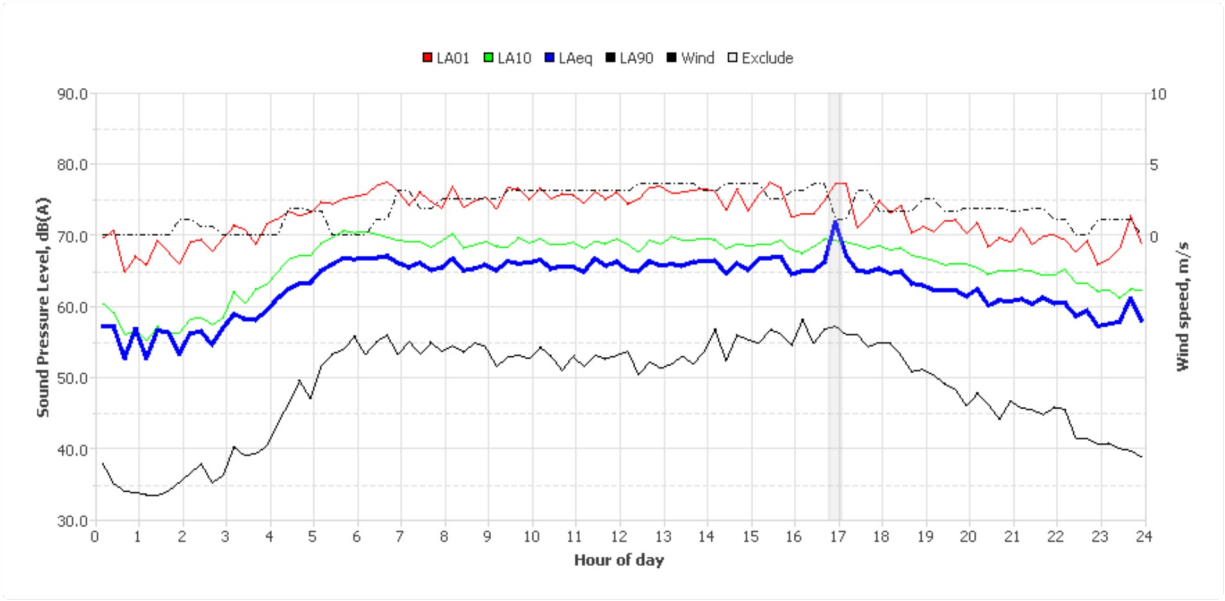
Wednesday, 20 Nov 2019



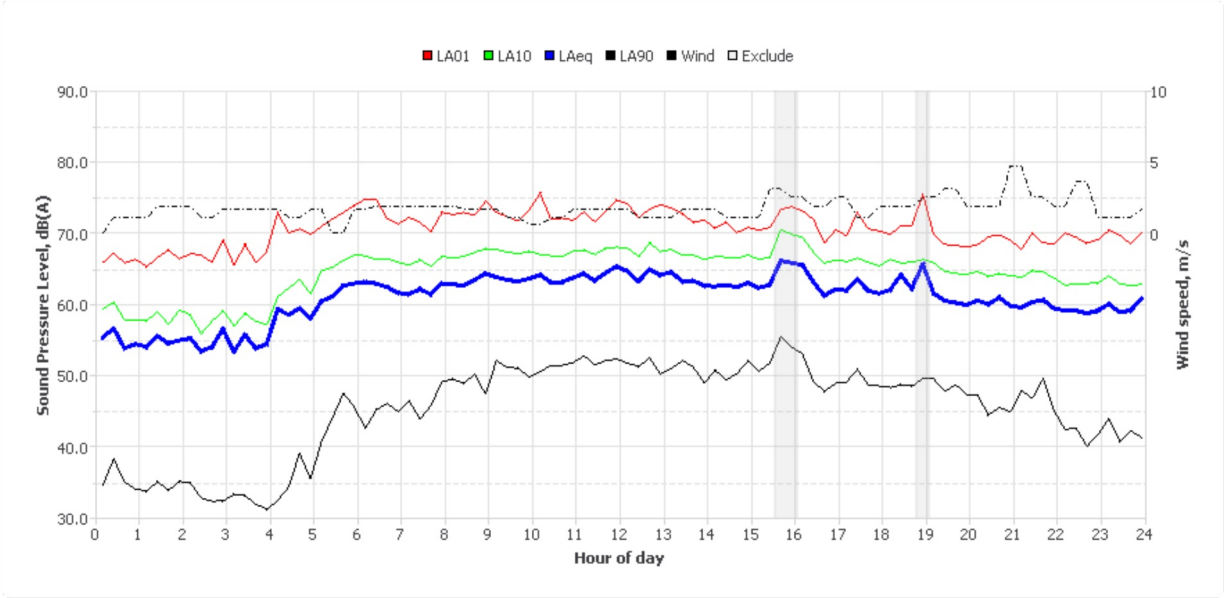
Thursday, 21 Nov 2019



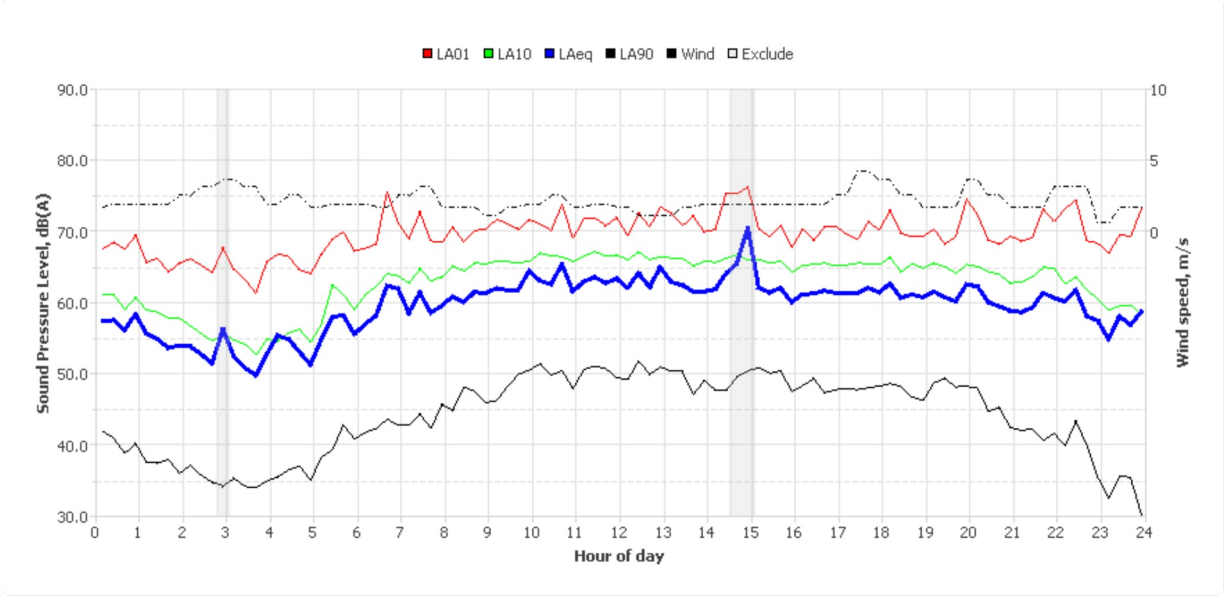
Friday, 22 Nov 2019



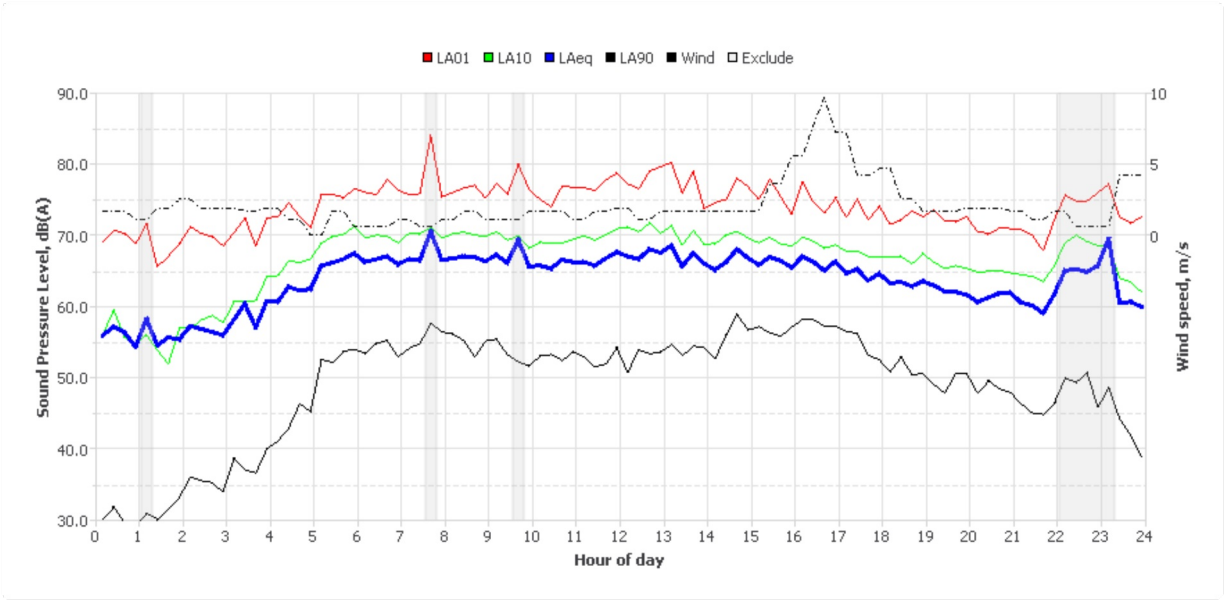
Saturday, 23 Nov 2019



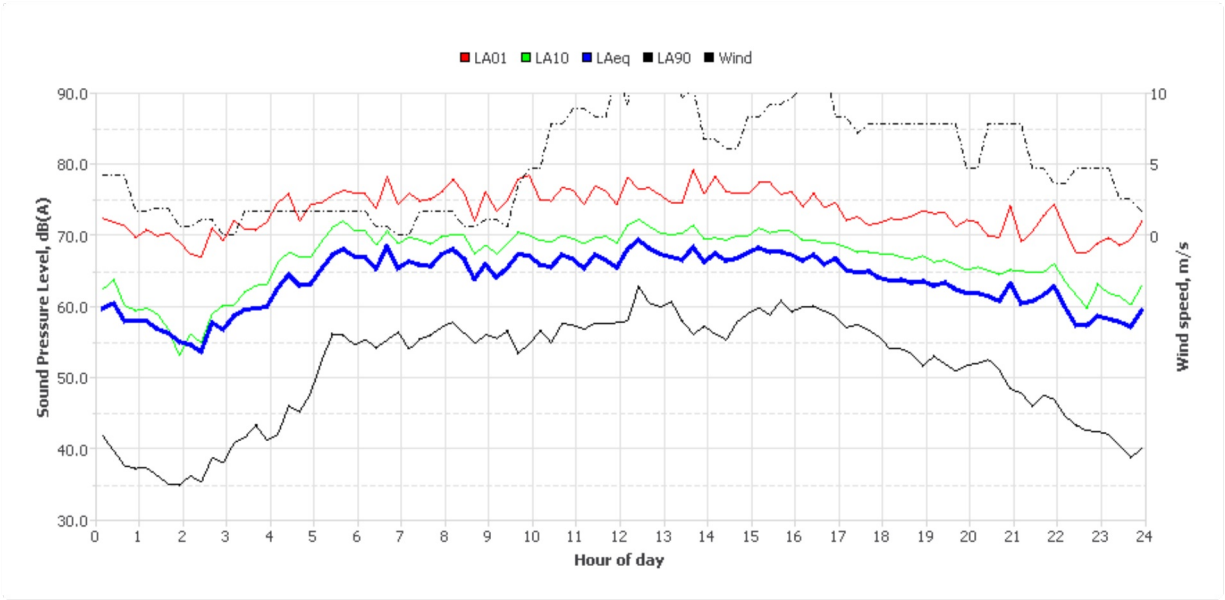
Sunday, 24 Nov 2019



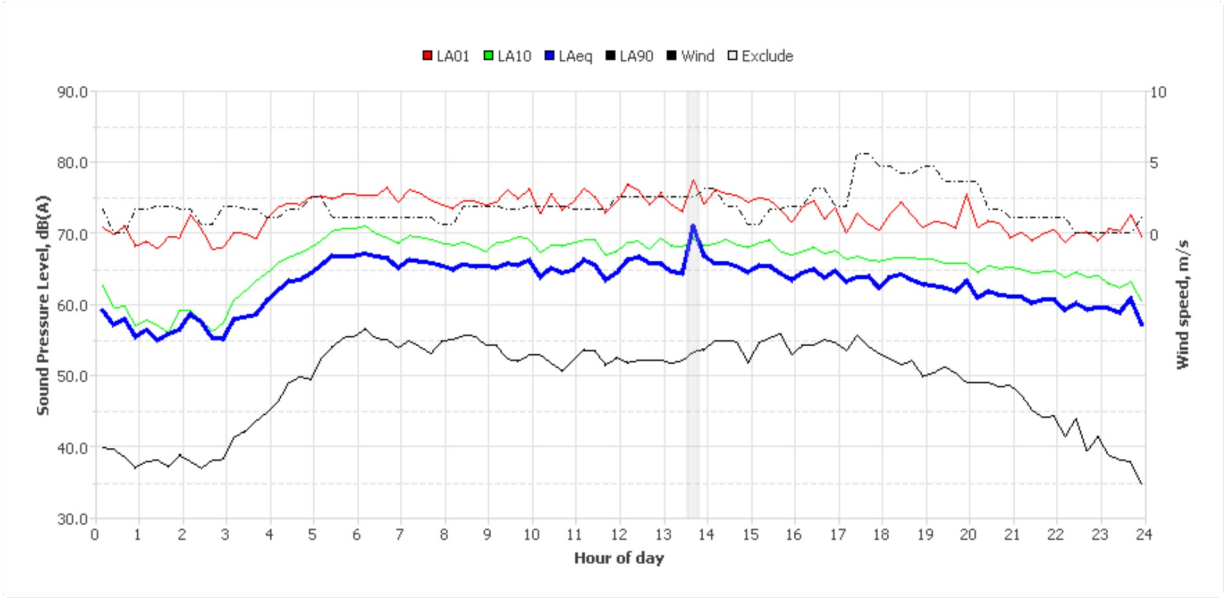
Monday, 25 Nov 2019



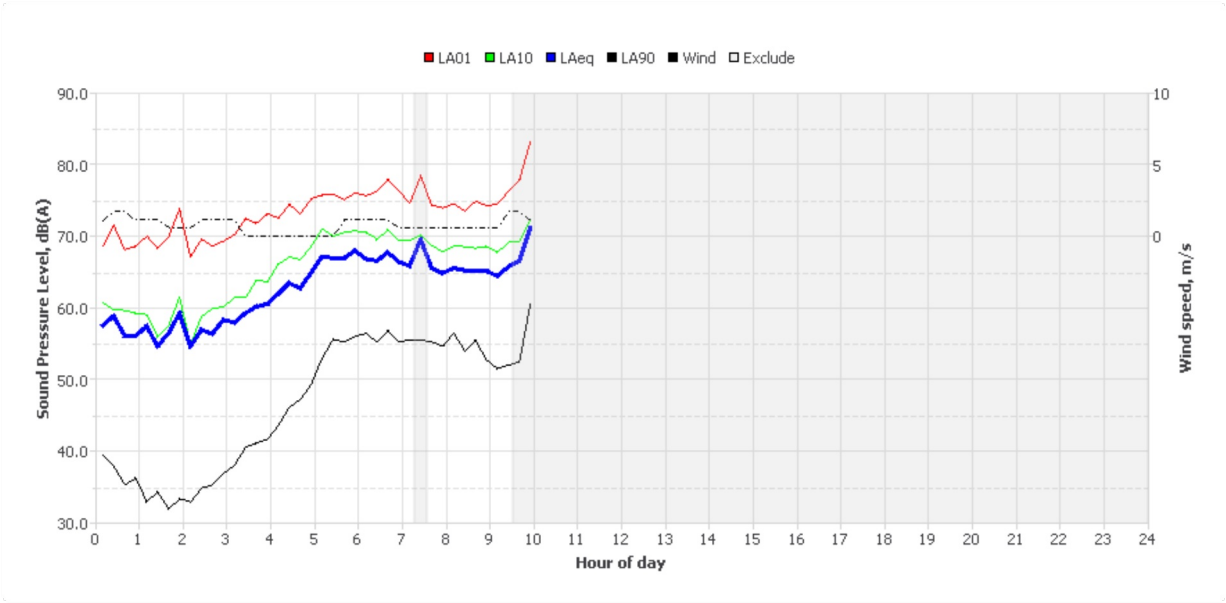
Tuesday, 26 Nov 2019



Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Noise Logger Report

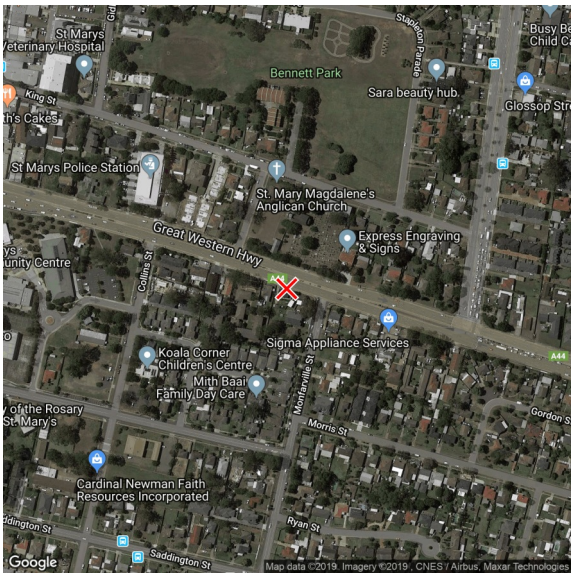
304 Great Western Highway, St Marys

Item	Information
Logger Type	NL-42
Serial number	521657
Address	304 Great Western Highway, St Marys
Location	304 Great Western Highway, St Marys
Facade / Free Field	Facade
Environment	Noise environment dominated by constant road traffic noise.

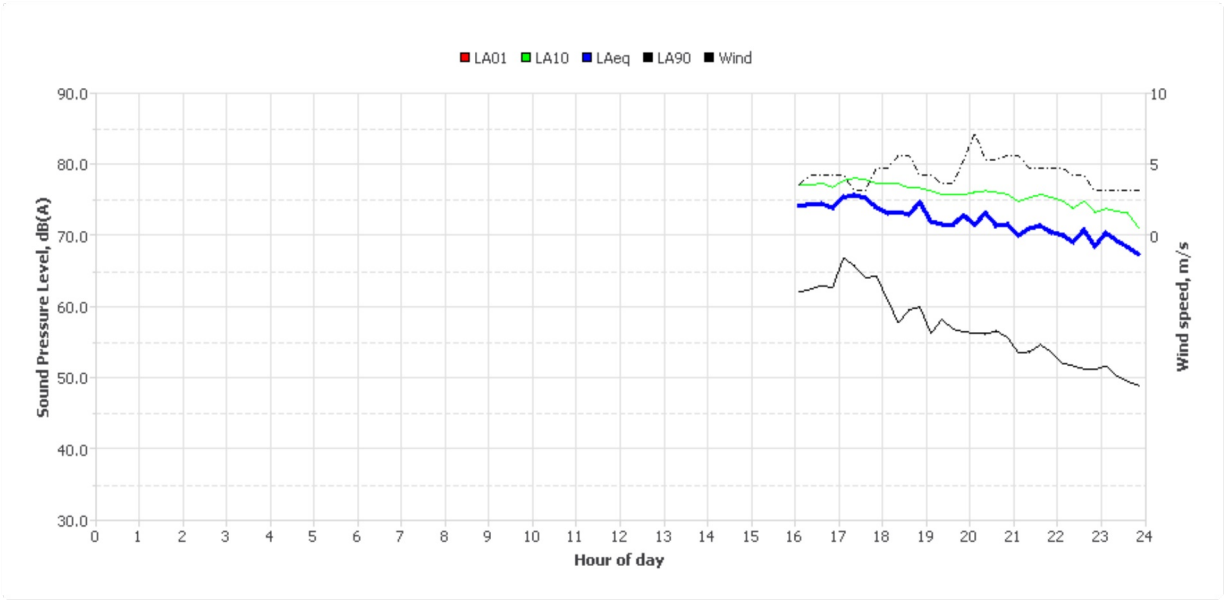
Measured noise levels

Logging Date	L_{Aeq} Day	Eve	Night	ABL Day	Eve	Night	$L_{Aeq,15hr}$	$L_{Aeq,9hr}$
Tue Nov 19 2019	75	72	69	-	54	-	73	69
Wed Nov 20 2019	75	73	70	58	53	46	74	70
Thu Nov 21 2019	74	73	71	59	55	38	74	71
Fri Nov 22 2019	75	73	71	59	53	42	75	71
Sat Nov 23 2019	75	72	69	57	52	38	74	69
Sun Nov 24 2019	73	72	68	54	51	37	73	68
Mon Nov 25 2019	75	72	72	58	53	35	74	72
Tue Nov 26 2019	75	71	71	-	-	44	74	71
Wed Nov 27 2019	74	73	70	57	52	37	74	70
Thu Nov 28 2019	75	-	71	-	-	-	75	71
Summary	**75**	**72**	**70**	**58**	**53**	**38**	**74**	**70**

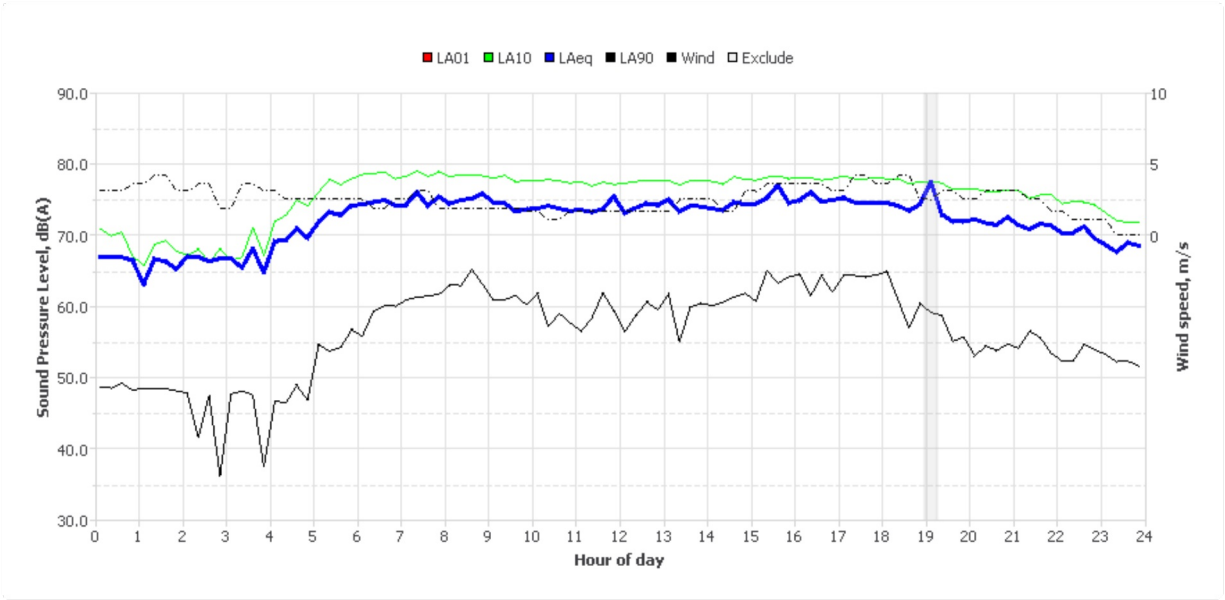
Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

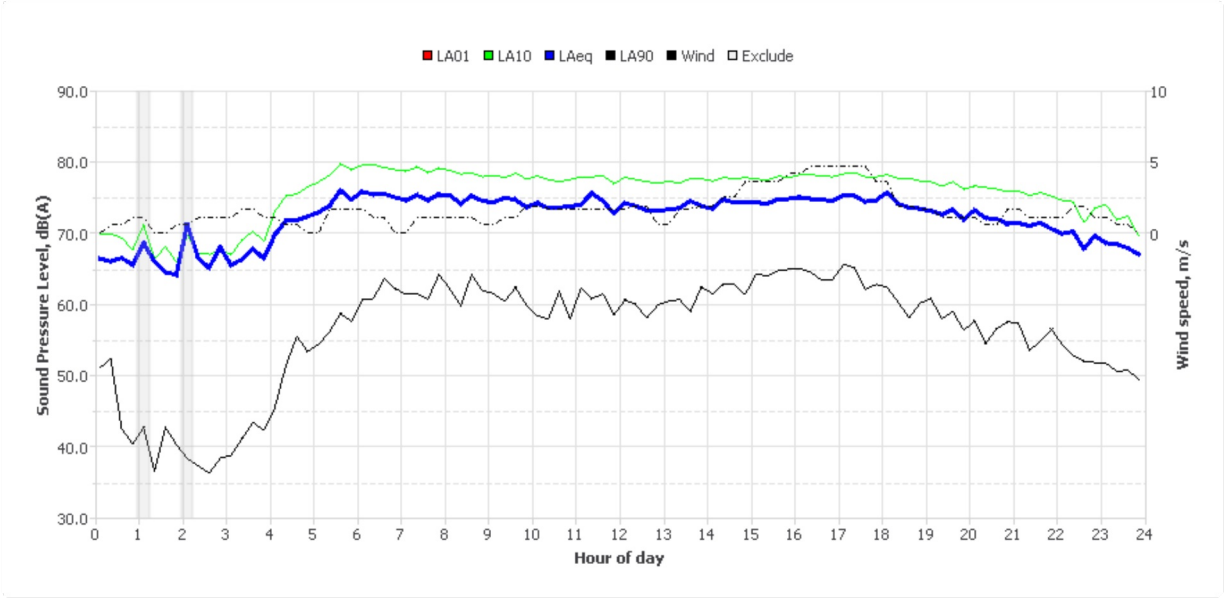
Tuesday, 19 Nov 2019



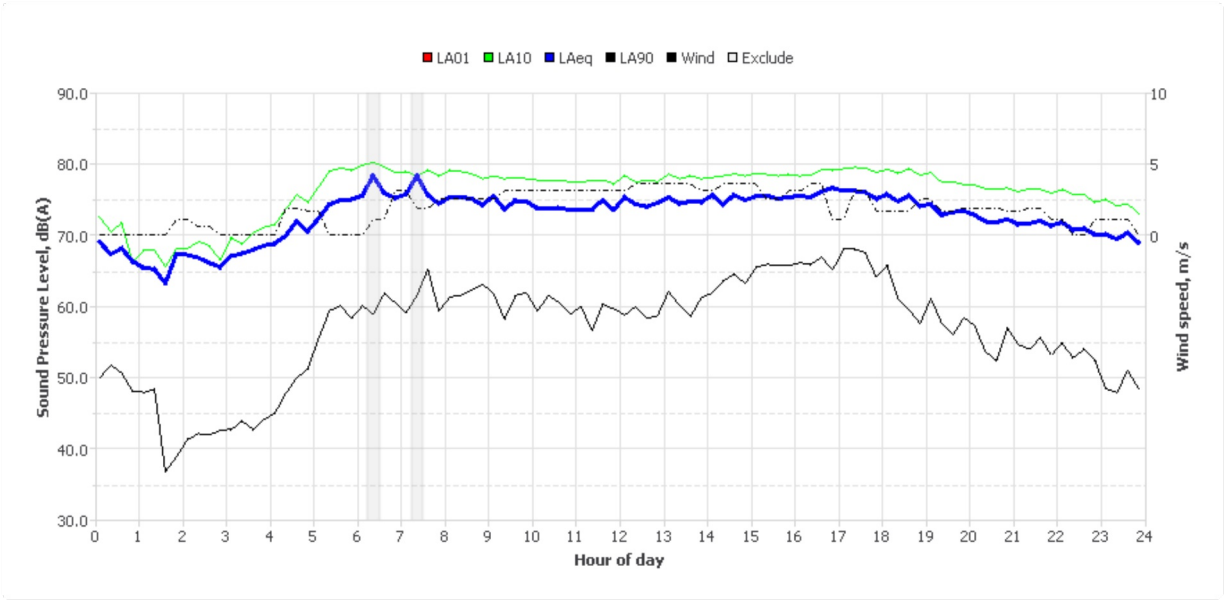
Wednesday, 20 Nov 2019



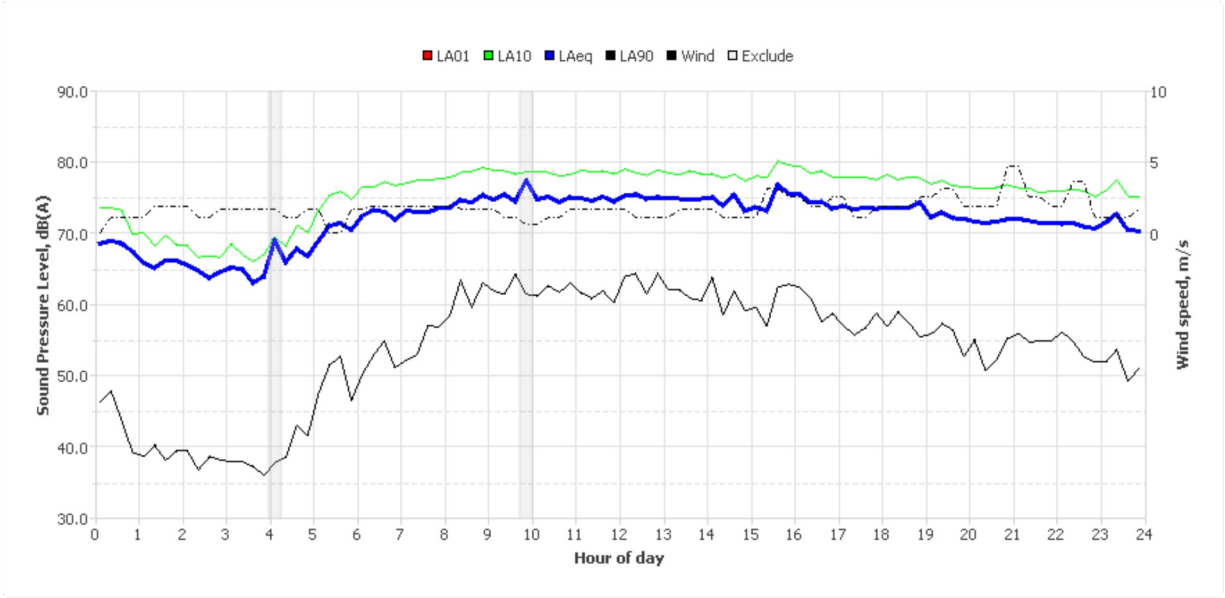
Thursday, 21 Nov 2019



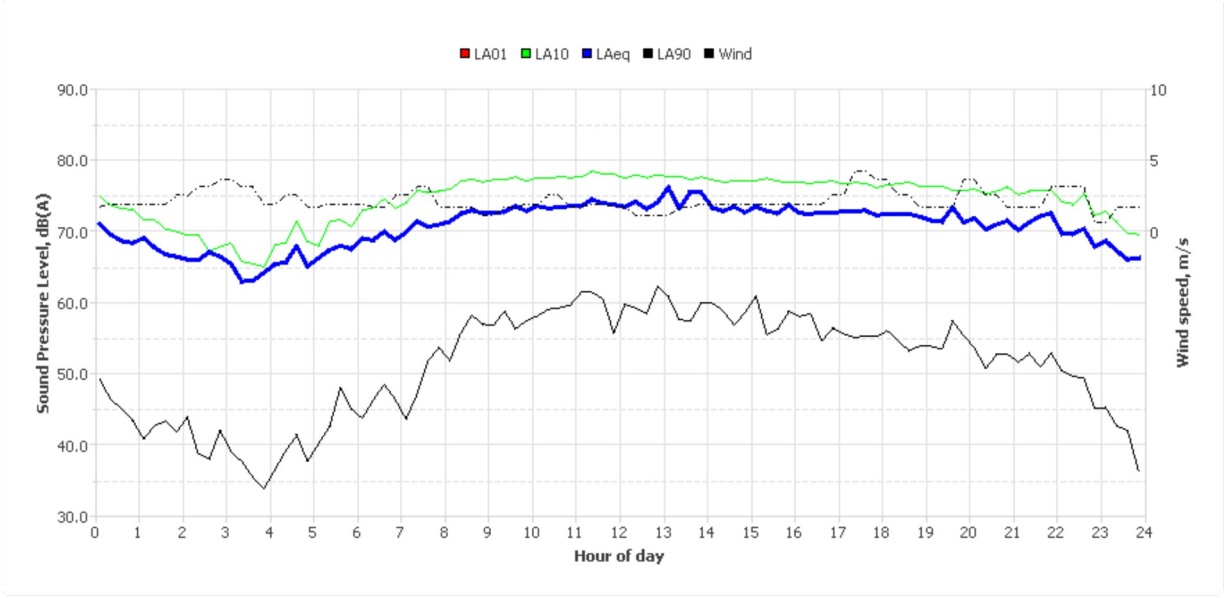
Friday, 22 Nov 2019



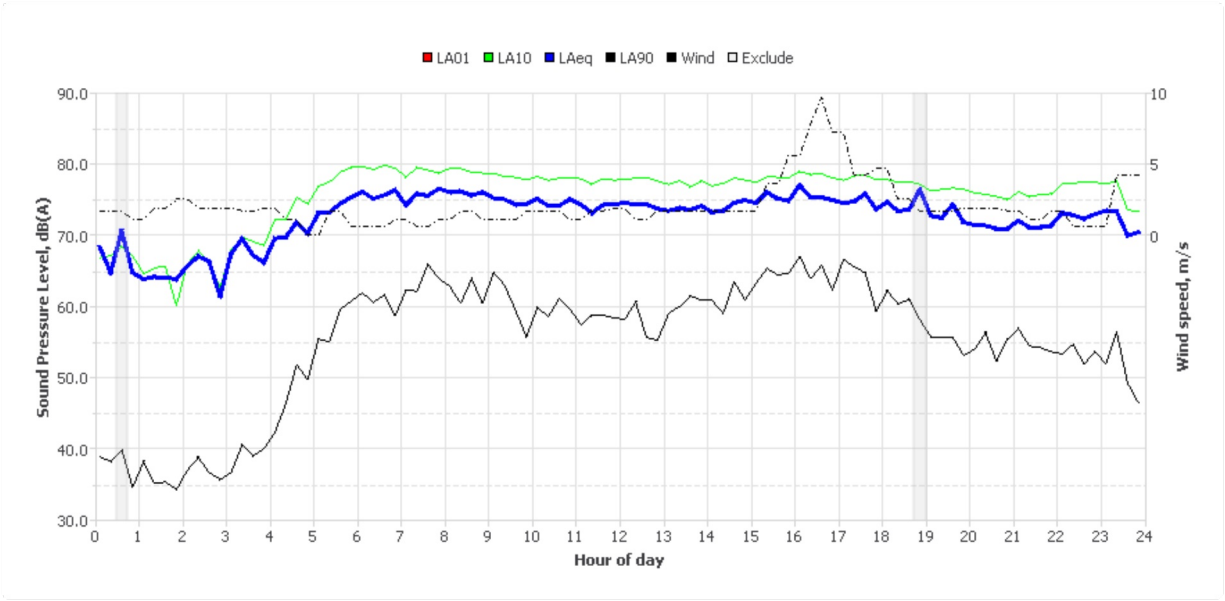
Saturday, 23 Nov 2019



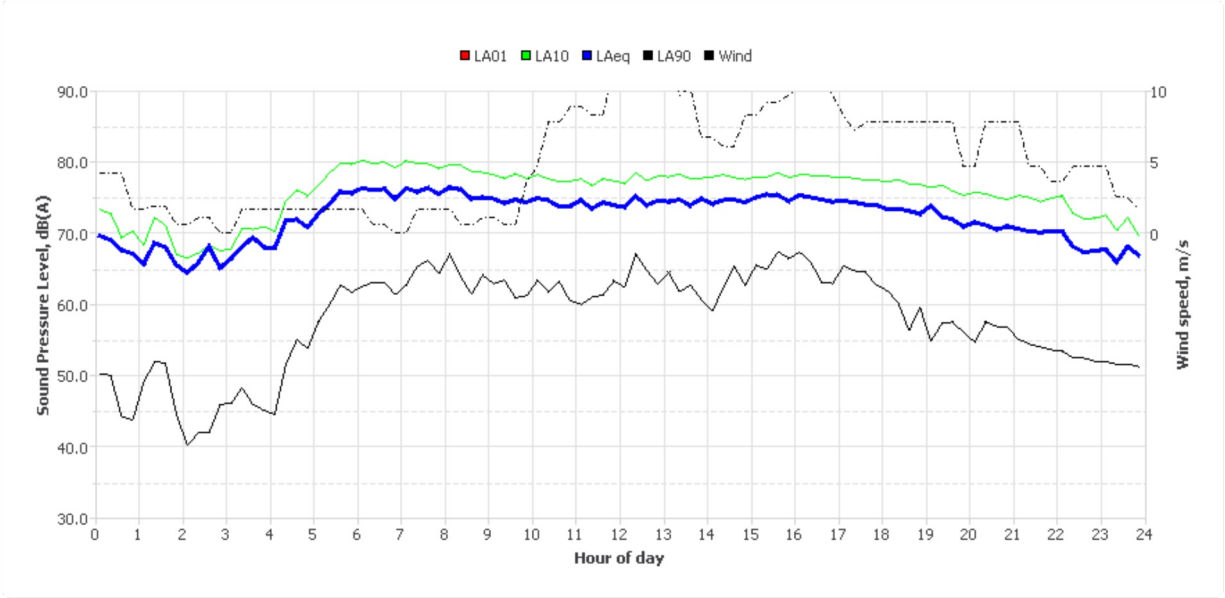
Sunday, 24 Nov 2019



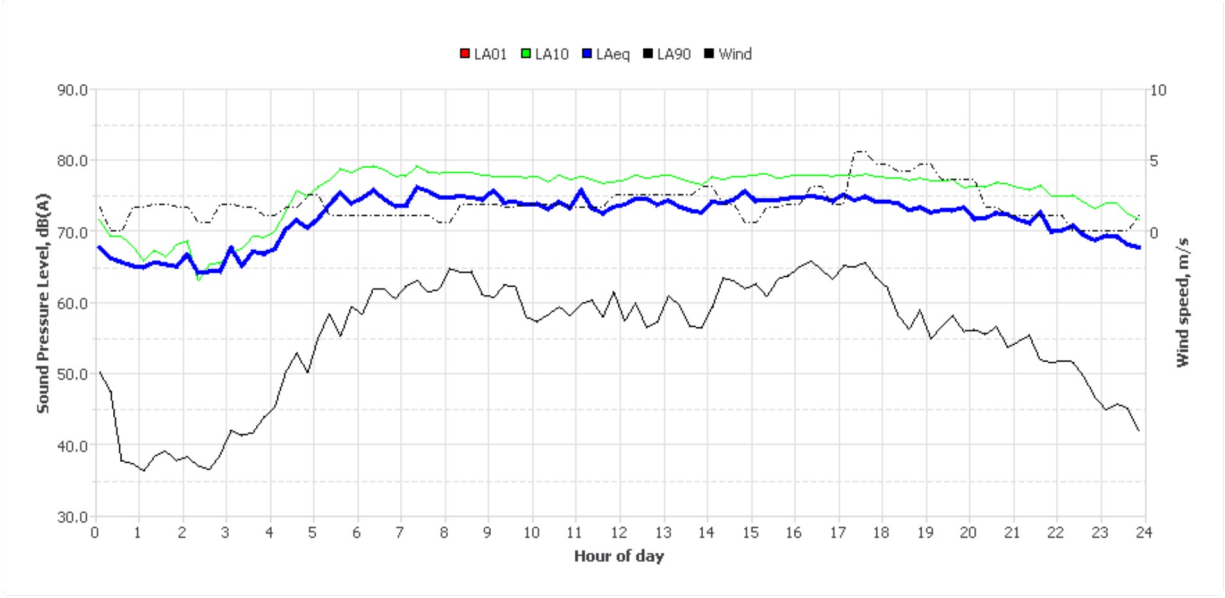
Monday, 25 Nov 2019



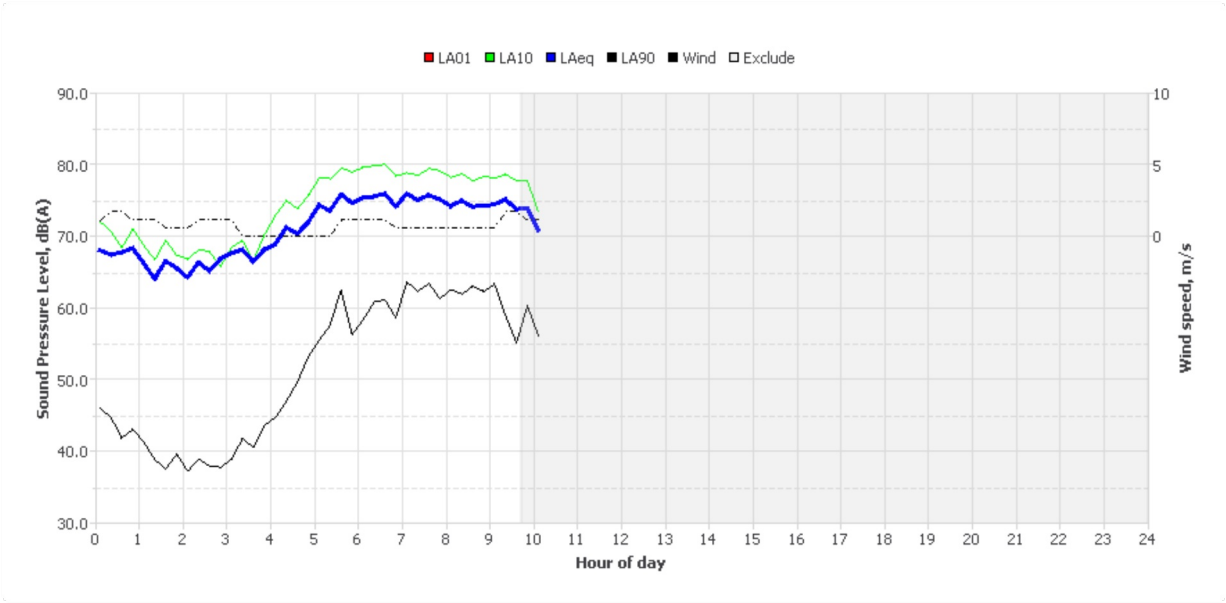
Tuesday, 26 Nov 2019



Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Noise Logger Report

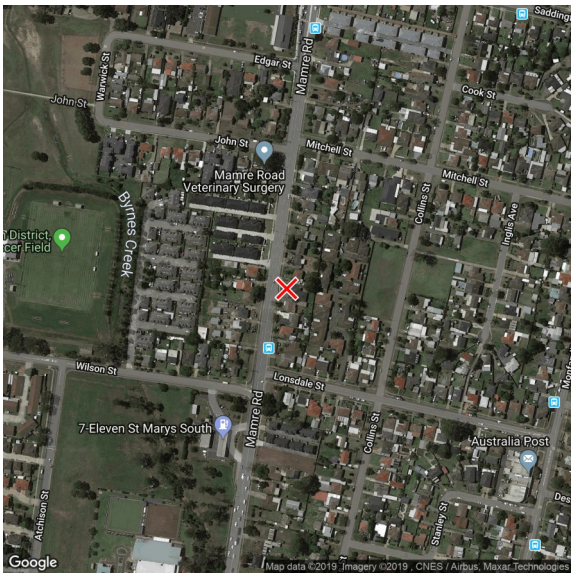
62 Mamre Road, St Marys

Item	Information
Logger Type	NL-42
Serial number	410151
Address	62 Mamre Road, St Marys
Location	62 Mamre Road, St Marys
Facade / Free Field	Facade
Environment	Noise environment dominated by road traffic noise along Mamre Road.

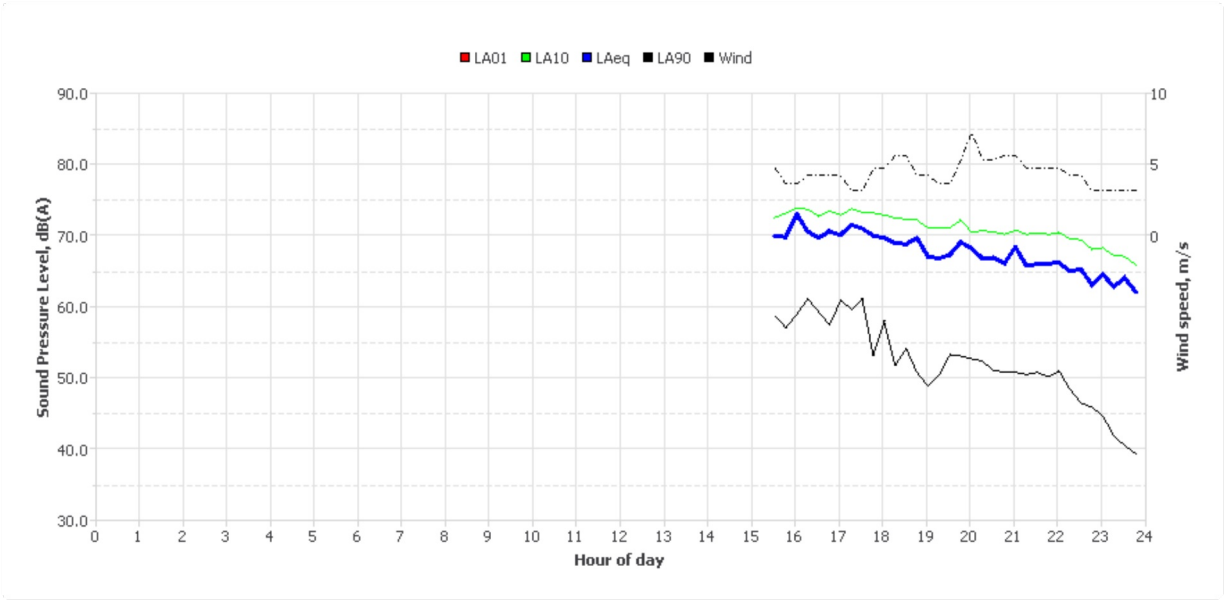
Measured noise levels

Logging Date	L_{Aeq} Day	Eve	Night	ABL Day	Eve	Night	$L_{Aeq,15hr}$	$L_{Aeq,9hr}$
Tue Nov 19 2019	71	68	64	-	50	-	69	64
Wed Nov 20 2019	70	68	67	50	45	38	70	67
Thu Nov 21 2019	70	68	67	51	49	39	70	67
Fri Nov 22 2019	70	67	67	50	48	41	69	67
Sat Nov 23 2019	67	65	62	49	47	37	67	62
Sun Nov 24 2019	66	64	60	47	43	38	65	60
Mon Nov 25 2019	69	66	65	50	46	31	68	65
Tue Nov 26 2019	71	67	67	-	-	40	70	67
Wed Nov 27 2019	70	67	67	49	46	41	69	67
Thu Nov 28 2019	70	-	68	-	-	-	70	68
Summary	**70**	**67**	**66**	**50**	**46**	**39**	**69**	**66**

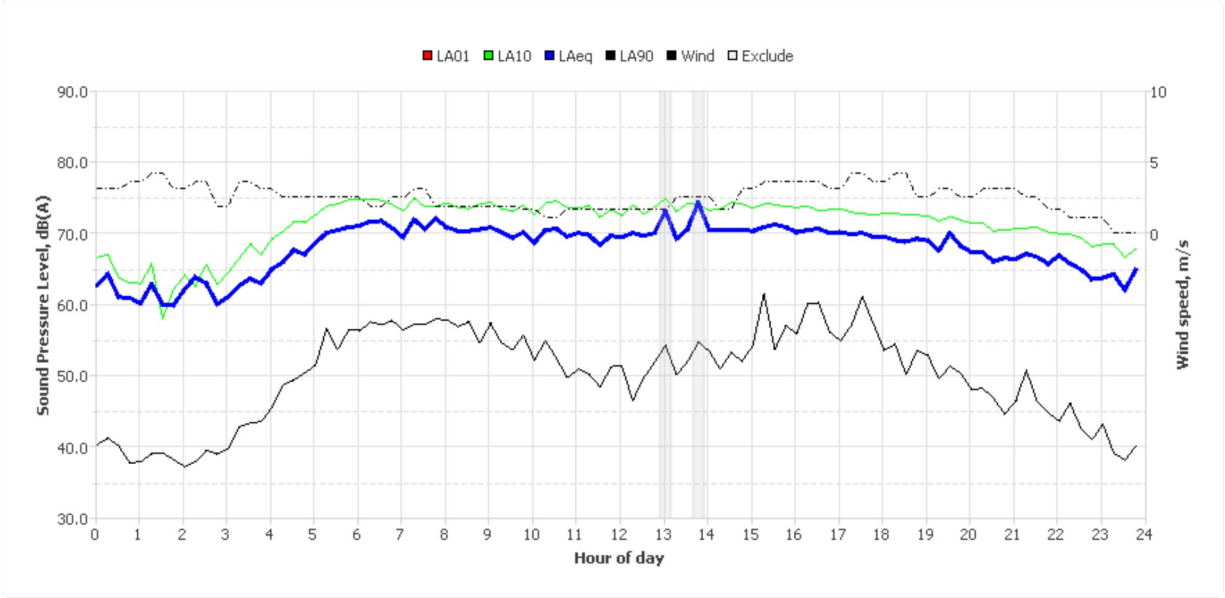
Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

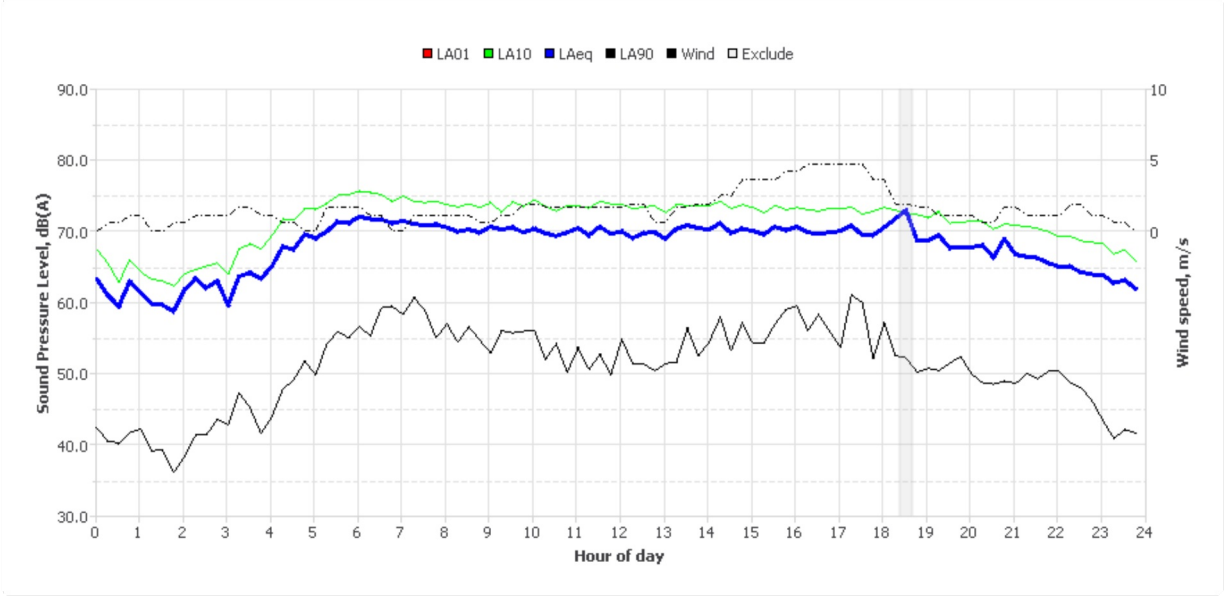
Tuesday, 19 Nov 2019



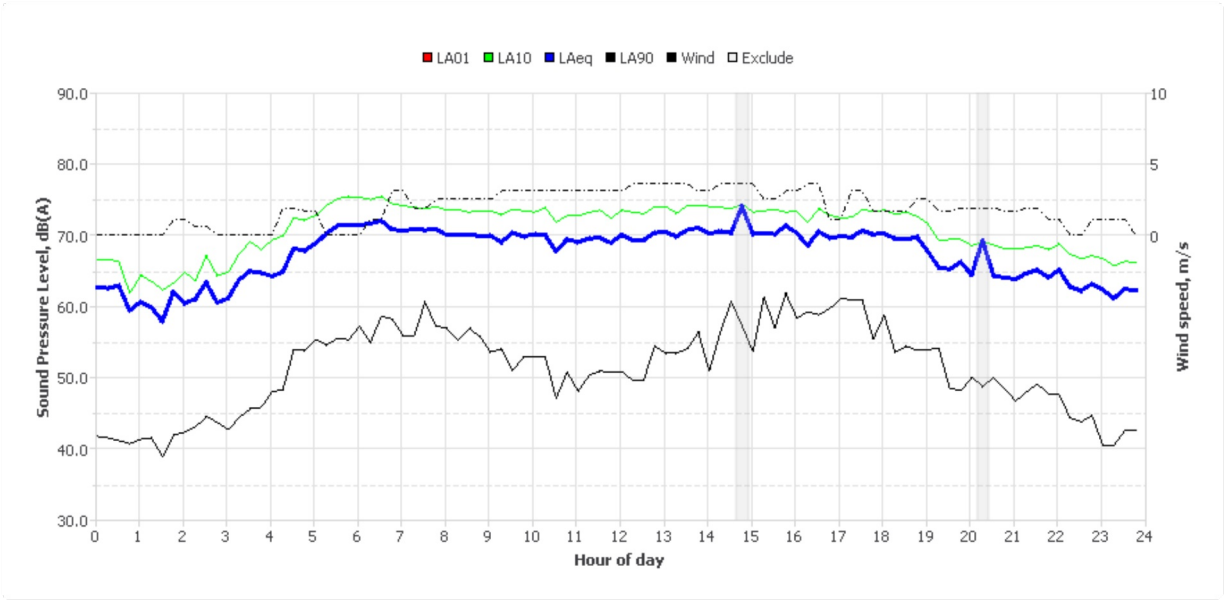
Wednesday, 20 Nov 2019



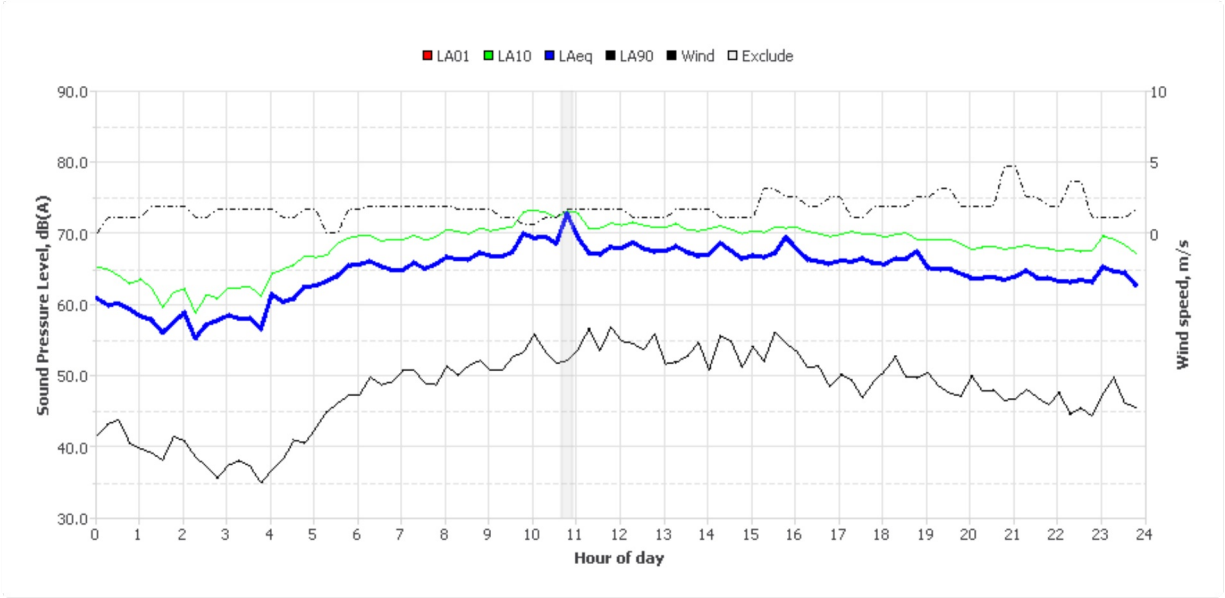
Thursday, 21 Nov 2019



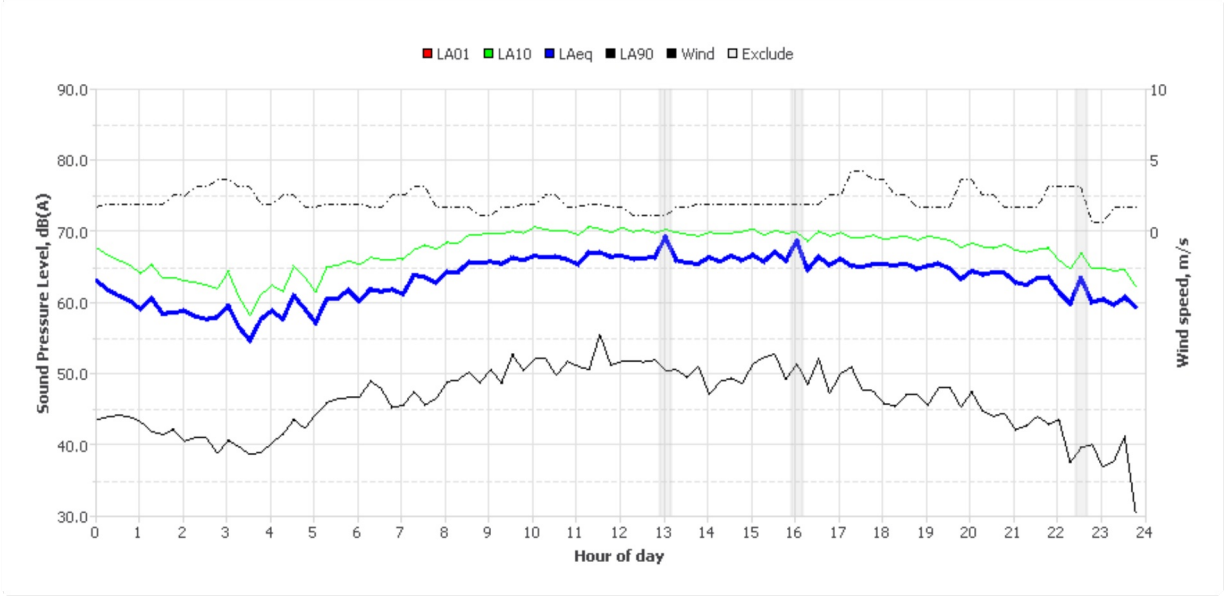
Friday, 22 Nov 2019



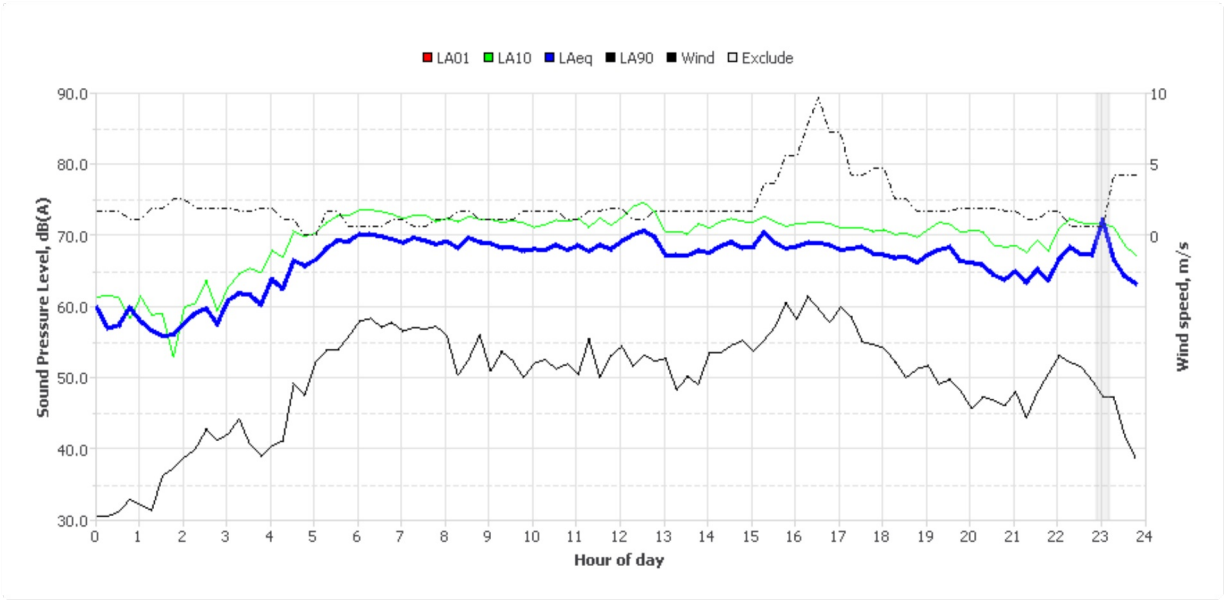
Saturday, 23 Nov 2019



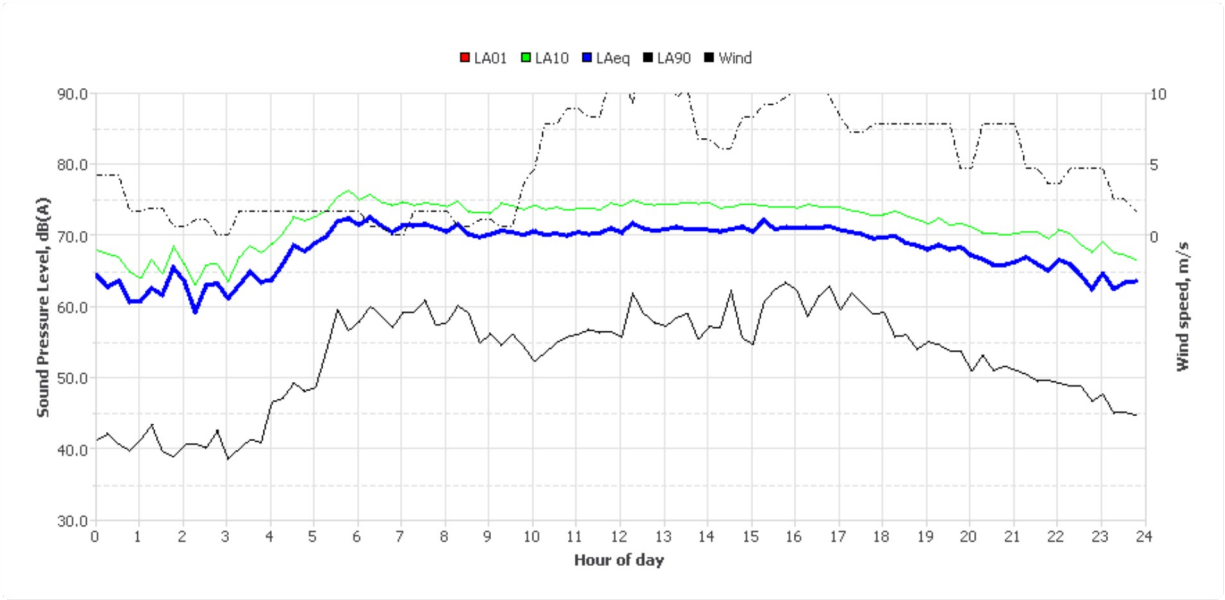
Sunday, 24 Nov 2019



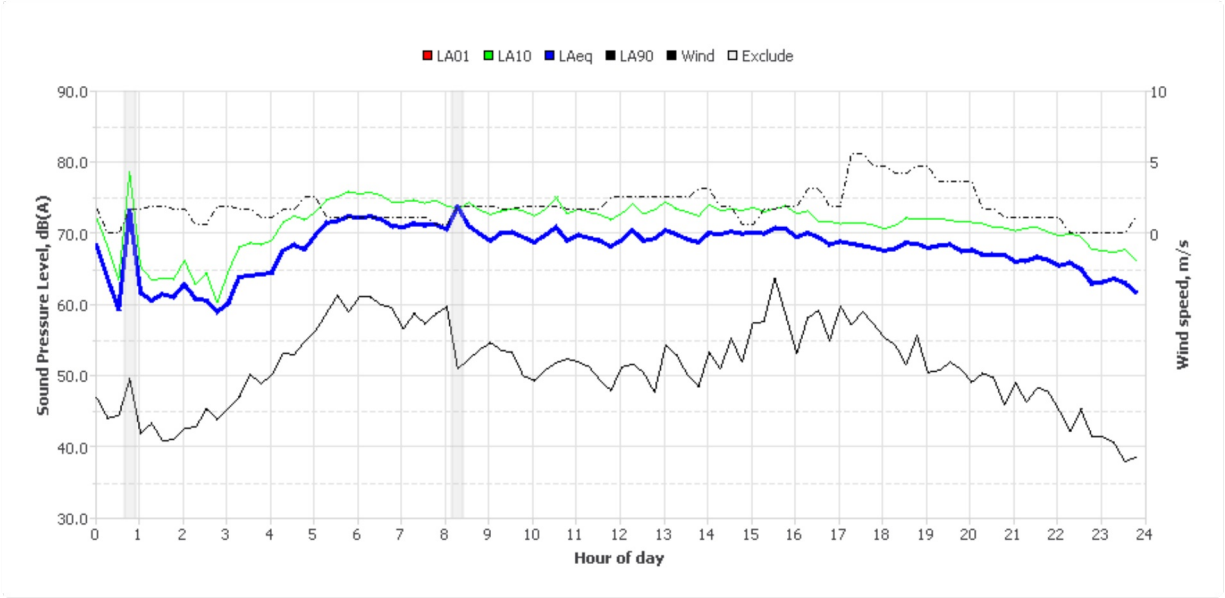
Monday, 25 Nov 2019



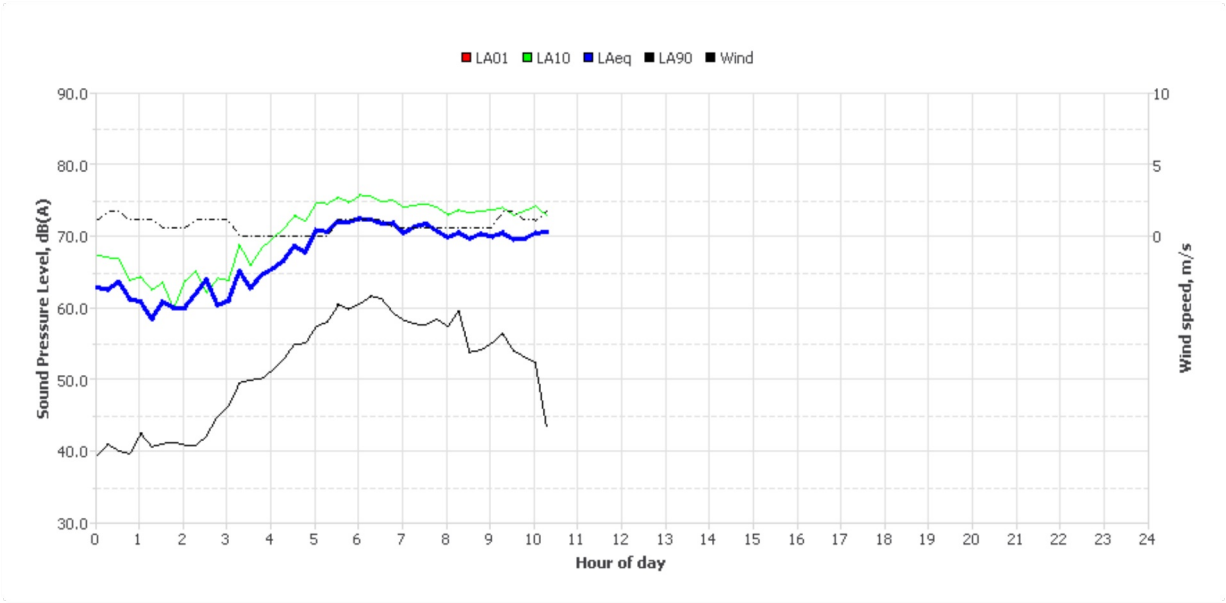
Tuesday, 26 Nov 2019



Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Noise Logger Report

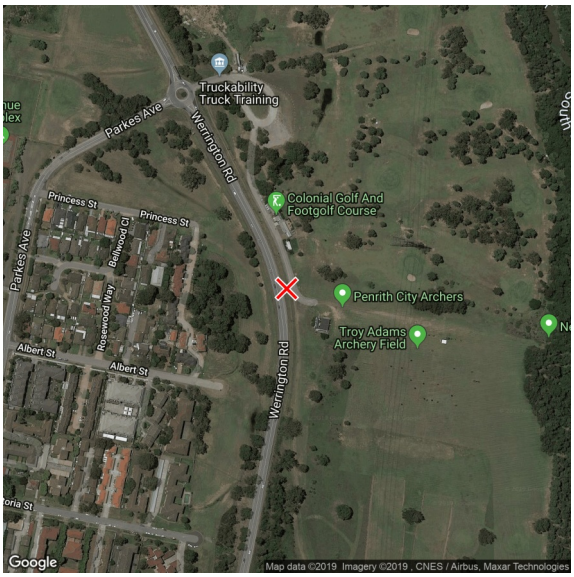
1 Werrington Road, Werrington

Item	Information
Logger Type	ARL316
Serial number	16-707-006
Address	1 Werrington Road, Werrington
Location	1 Werrington Road, Werrington
Facade / Free Field	Free field
Environment	noise environment dominated by constant road traffic noise from Werrington Road.

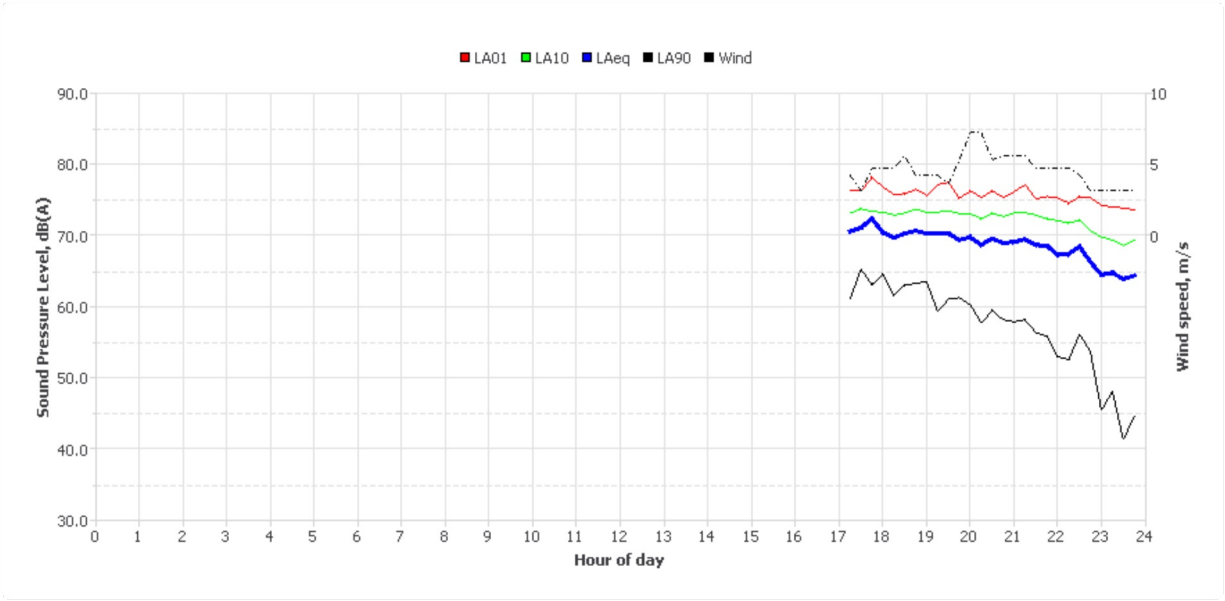
Measured noise levels

Logging Date	L_{Aeq} Day	Eve	Night	ABL Day	Eve	Night	$L_{Aeq,15hr}$	$L_{Aeq,9hr}$
Tue Nov 19 2019	71	70	66	-	56	-	70	66
Wed Nov 20 2019	71	70	68	-	58	37	71	68
Thu Nov 21 2019	71	70	68	57	57	39	70	68
Fri Nov 22 2019	71	70	68	58	58	41	71	68
Sat Nov 23 2019	71	69	66	60	55	37	70	66
Sun Nov 24 2019	70	69	64	55	54	38	69	64
Mon Nov 25 2019	71	69	68	55	55	37	70	68
Tue Nov 26 2019	71	70	68	-	-	42	71	68
Wed Nov 27 2019	70	70	68	54	58	36	70	68
Thu Nov 28 2019	72	-	68	-	-	-	72	68
Summary	**71**	**70**	**67**	**56**	**57**	**38**	**71**	**67**

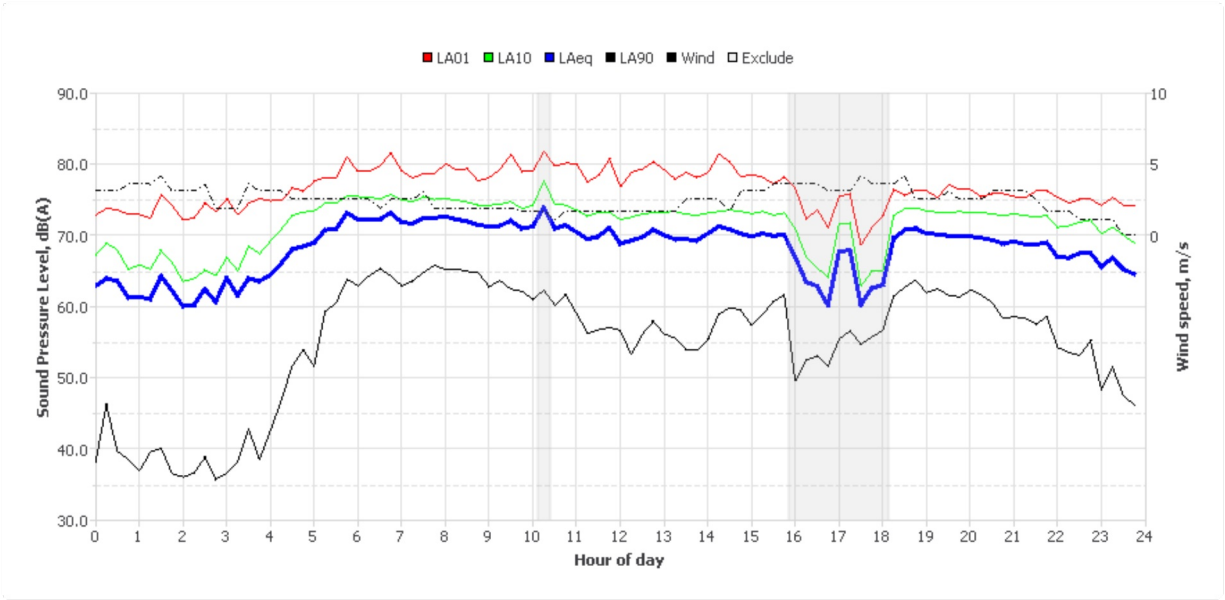
Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

Logger Location	Logger Deployment Photo
	

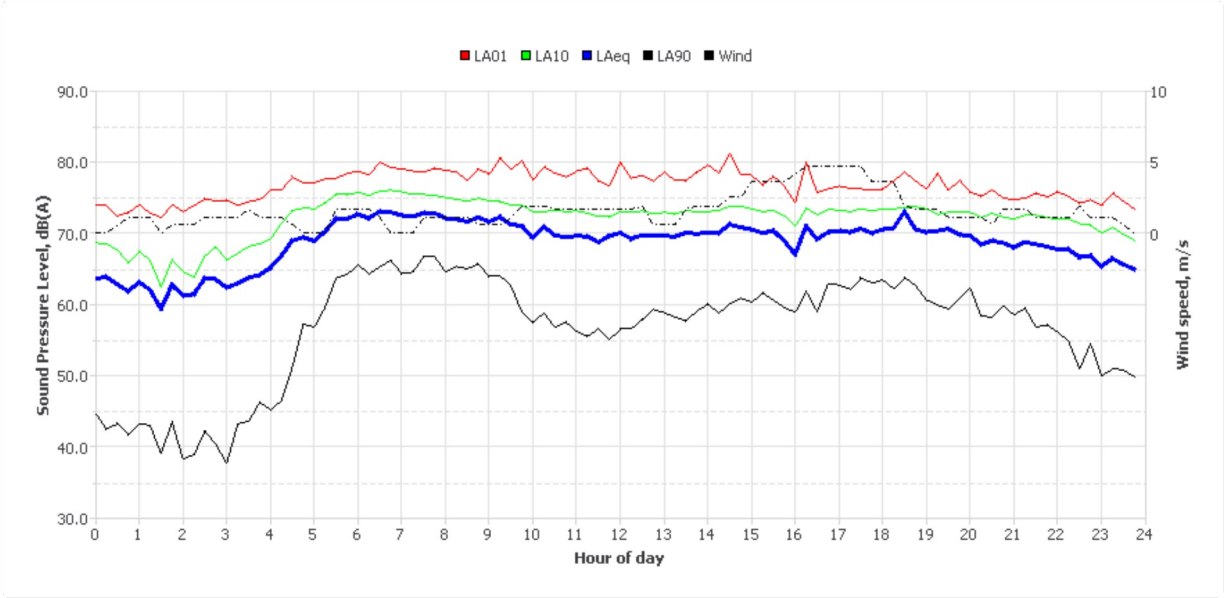
Tuesday, 19 Nov 2019



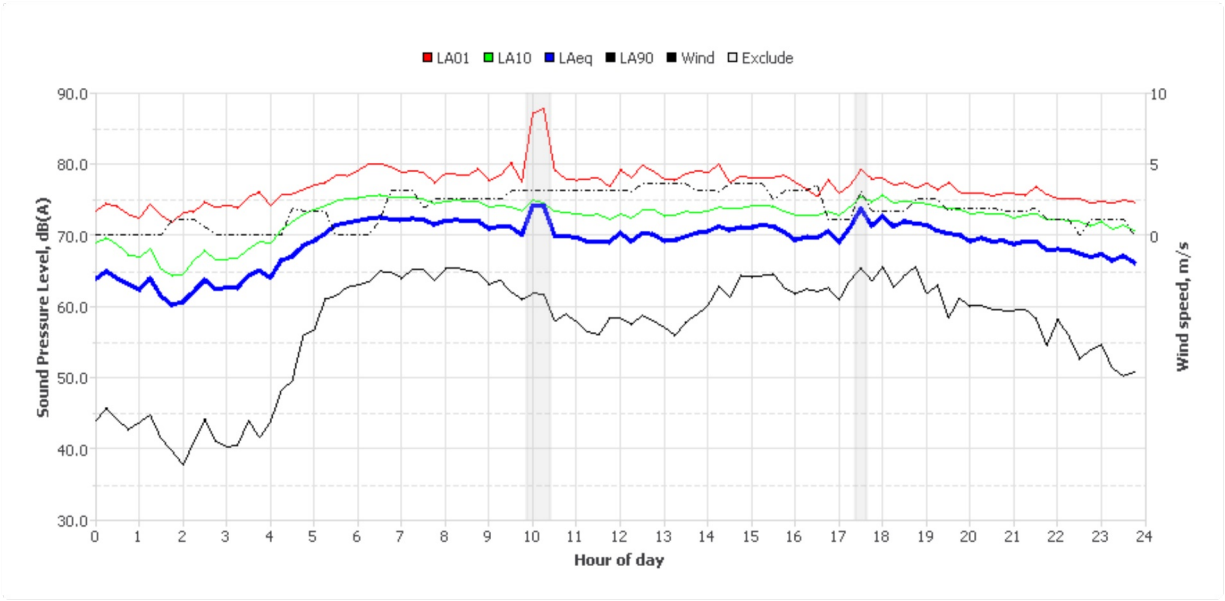
Wednesday, 20 Nov 2019



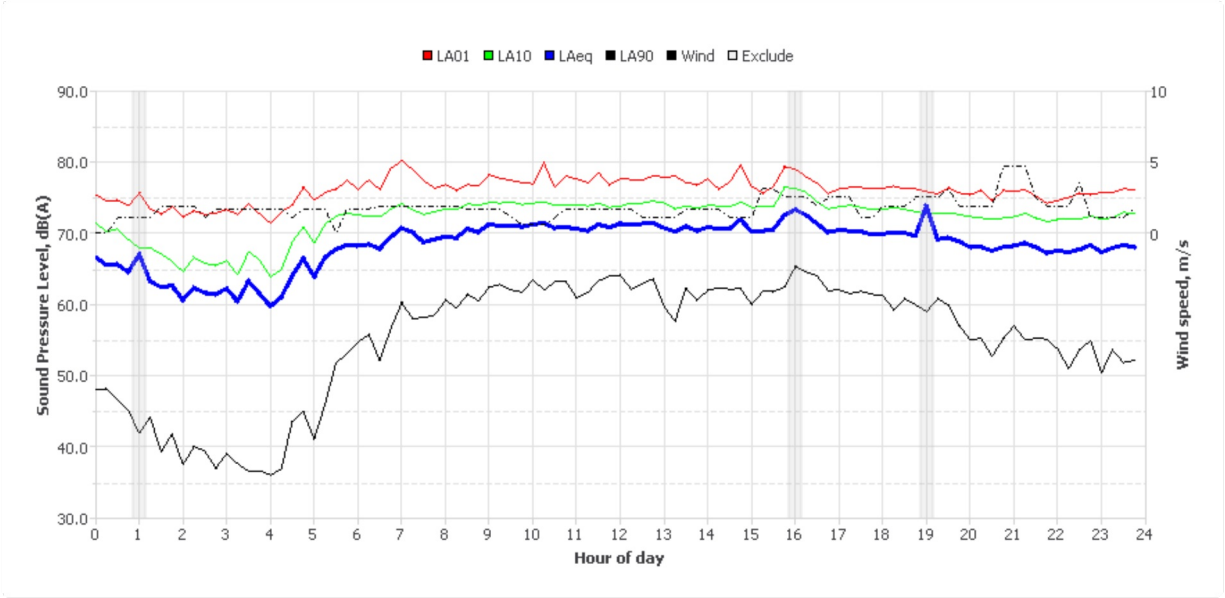
Thursday, 21 Nov 2019



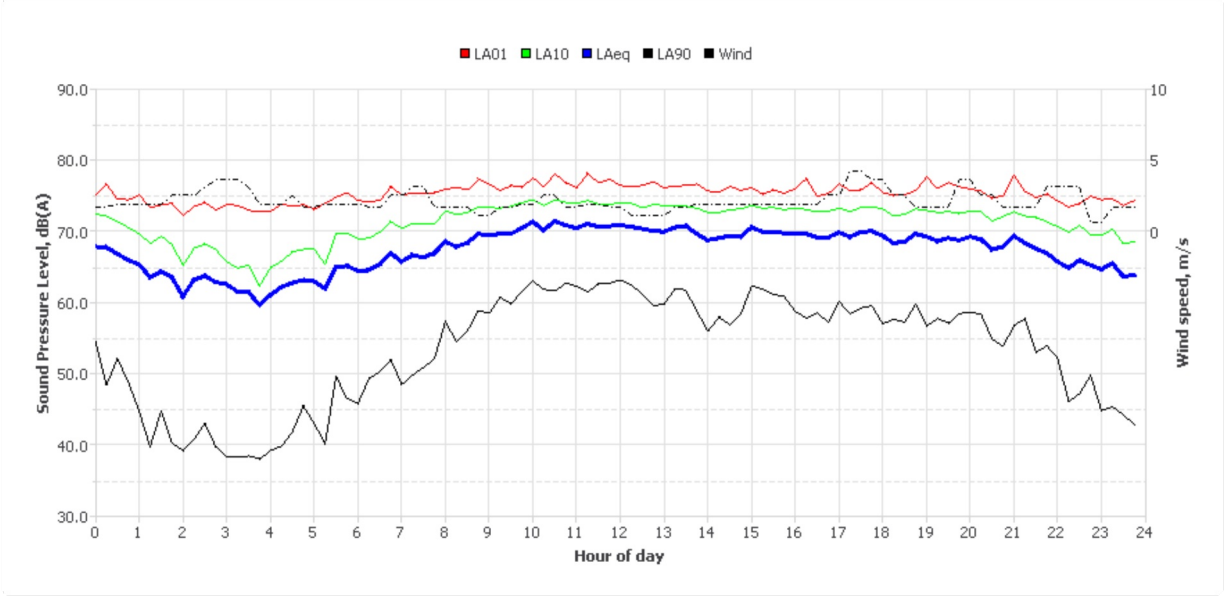
Friday, 22 Nov 2019



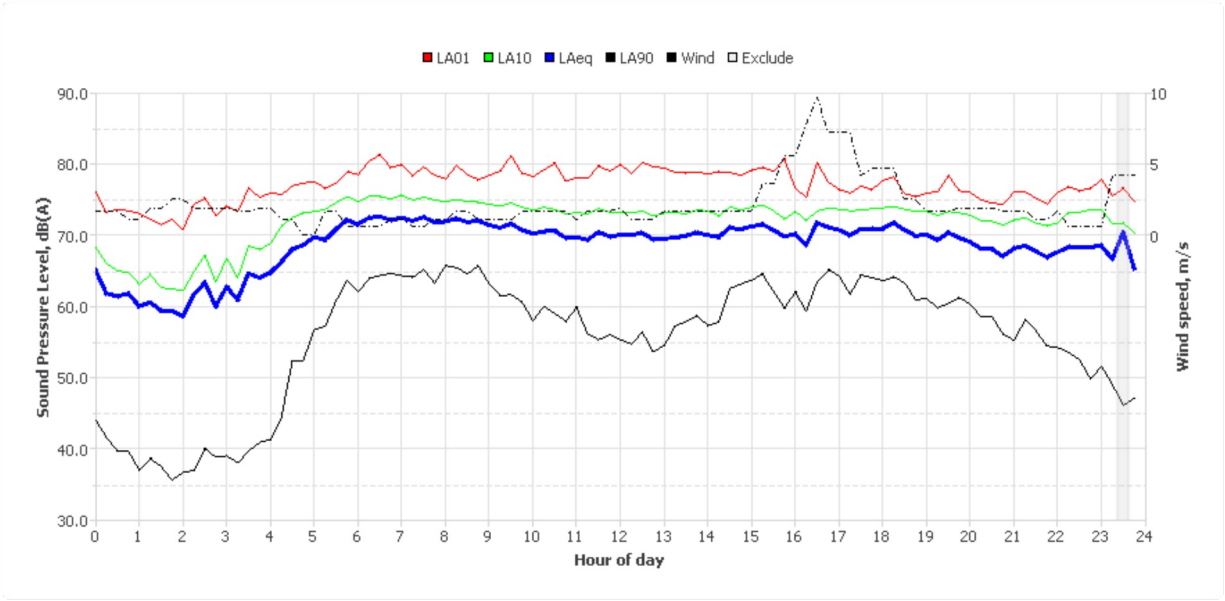
Saturday, 23 Nov 2019



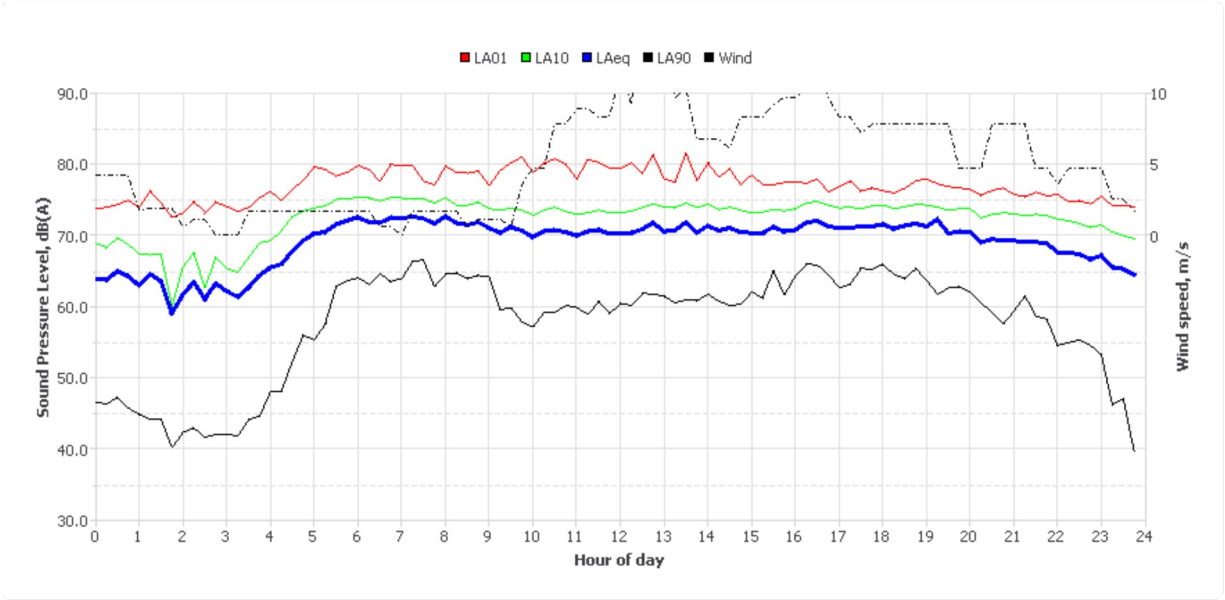
Sunday, 24 Nov 2019



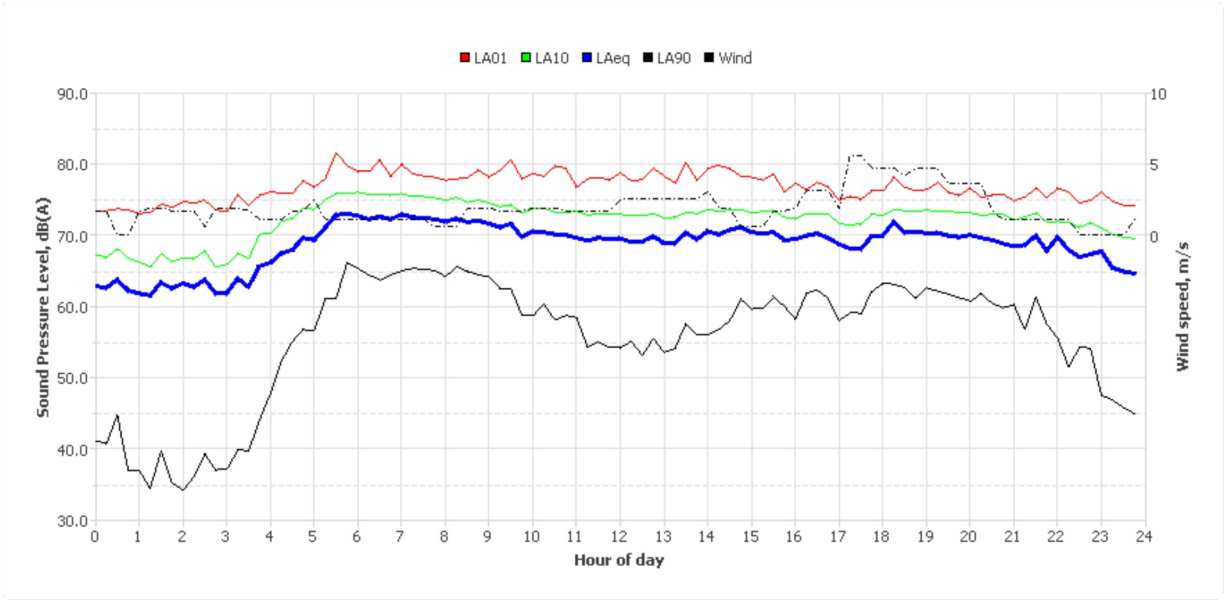
Monday, 25 Nov 2019



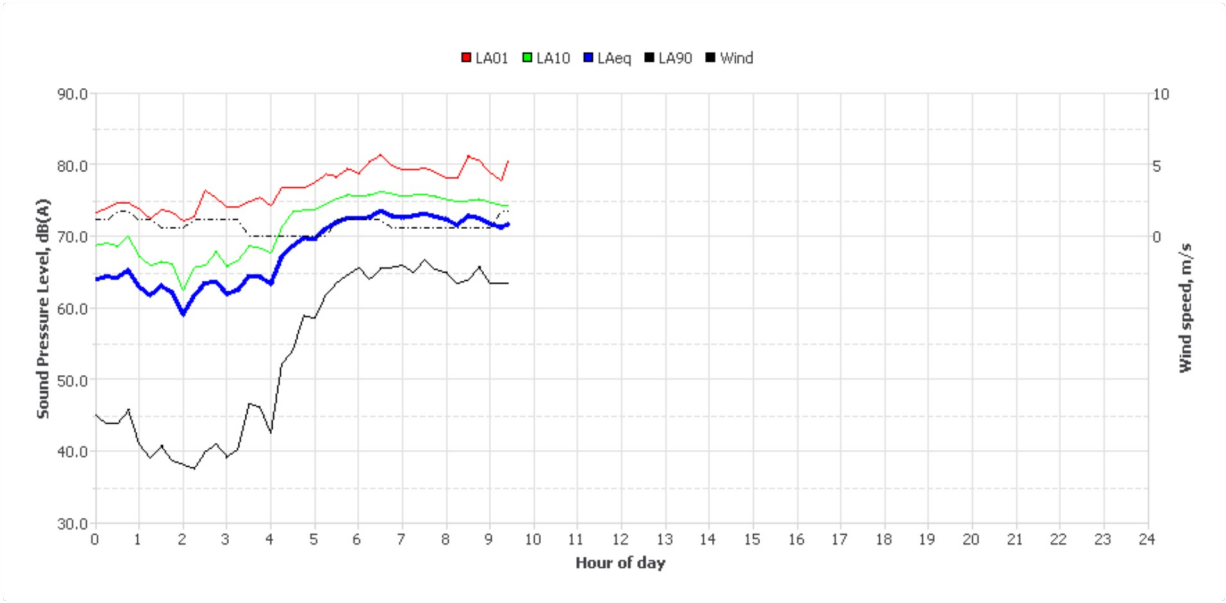
Tuesday, 26 Nov 2019



Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Noise Logger Report

Christie Street, St Marys

Item	Information
Logger Type	NL-42
Serial number	810712
Address	Christie Street, St Marys
Location	Christie Street, St Marys
Facade / Free Field	Free field
Environment	Noise environment dominated by constant road traffic noise from Christie street

Measured noise levels

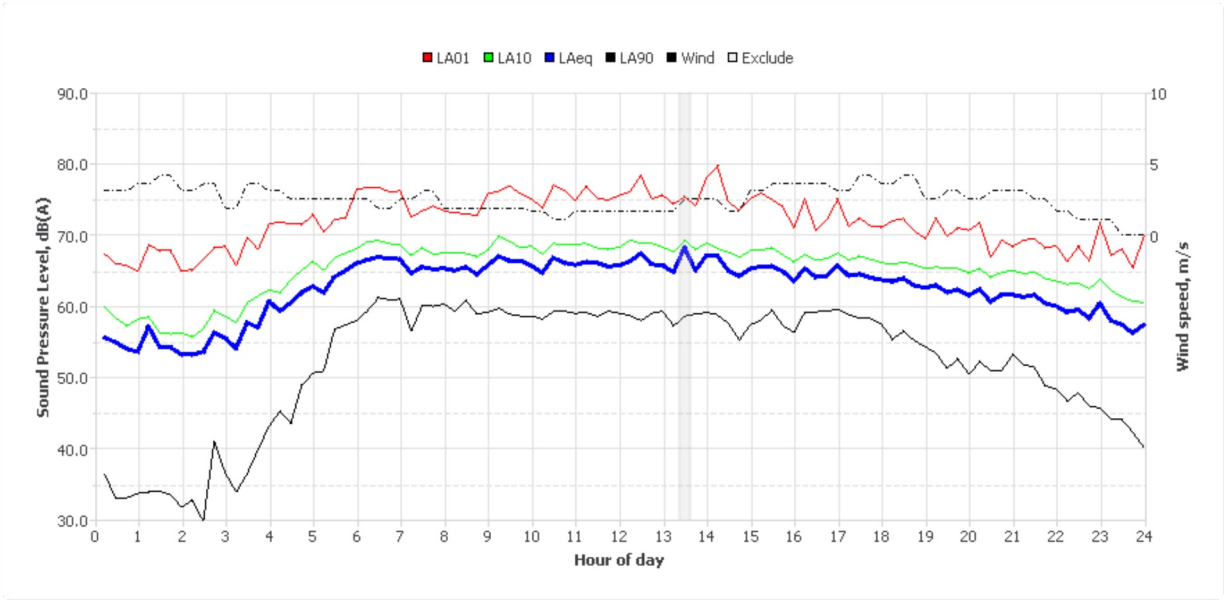
Logging Date	L_{Aeq} Day	Eve	Night	ABL Day	Eve	Night	$L_{Aeq,15hr}$	$L_{Aeq,9hr}$
Tue Nov 19 2019	65	62	57	-	48	-	64	57
Wed Nov 20 2019	66	62	61	57	49	33	65	61
Thu Nov 21 2019	65	62	61	57	50	35	65	61
Fri Nov 22 2019	66	63	61	54	49	39	65	61
Sat Nov 23 2019	64	62	59	51	47	34	64	59
Sun Nov 24 2019	62	61	57	45	44	35	62	57
Mon Nov 25 2019	66	61	62	55	42	-	65	62
Tue Nov 26 2019	67	61	62	-	-	39	66	62
Wed Nov 27 2019	65	62	62	55	47	34	65	62
Thu Nov 28 2019	66	-	63	-	-	-	66	63
Summary	**65**	**62**	**61**	**55**	**48**	**35**	**65**	**61**

Note: Results denoted with '-' do not contain enough valid data for a value to be calculated. The data has been excluded either manually or automatically as a result of adverse weather conditions.

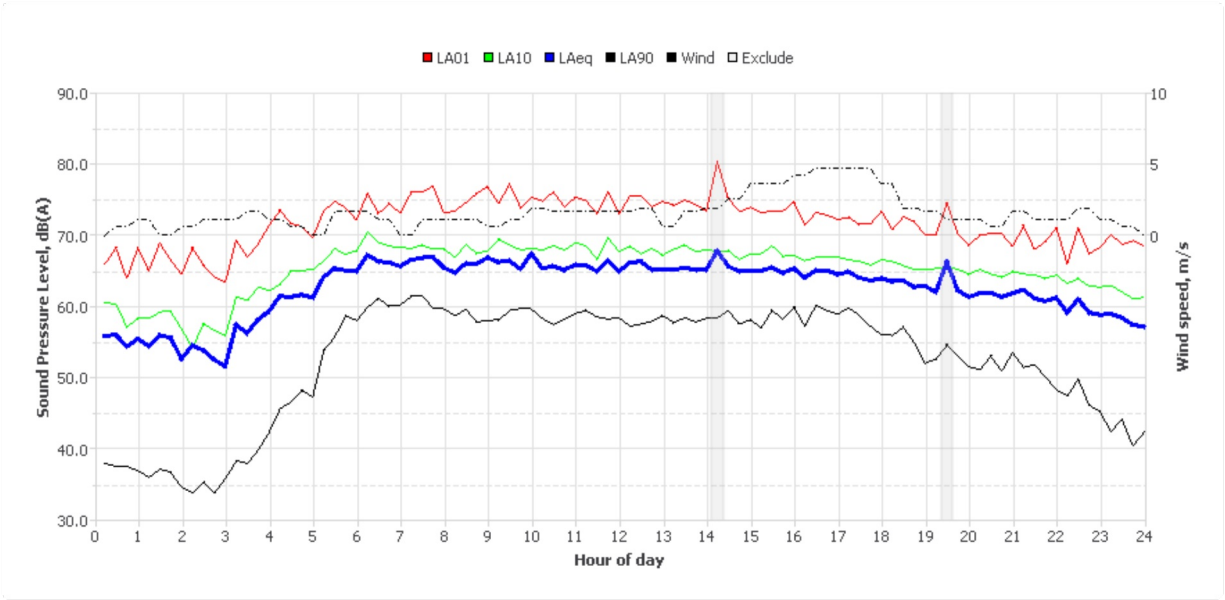
Logger Location	Logger Deployment Photo
	

Tuesday, 19 Nov 2019

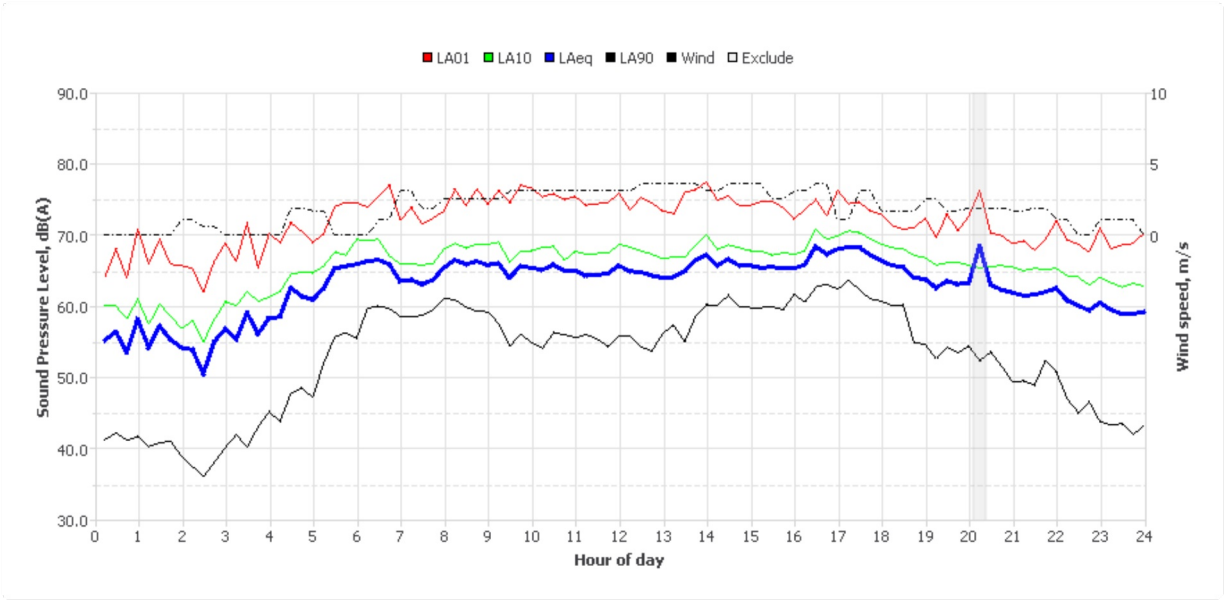
Wednesday, 20 Nov 2019



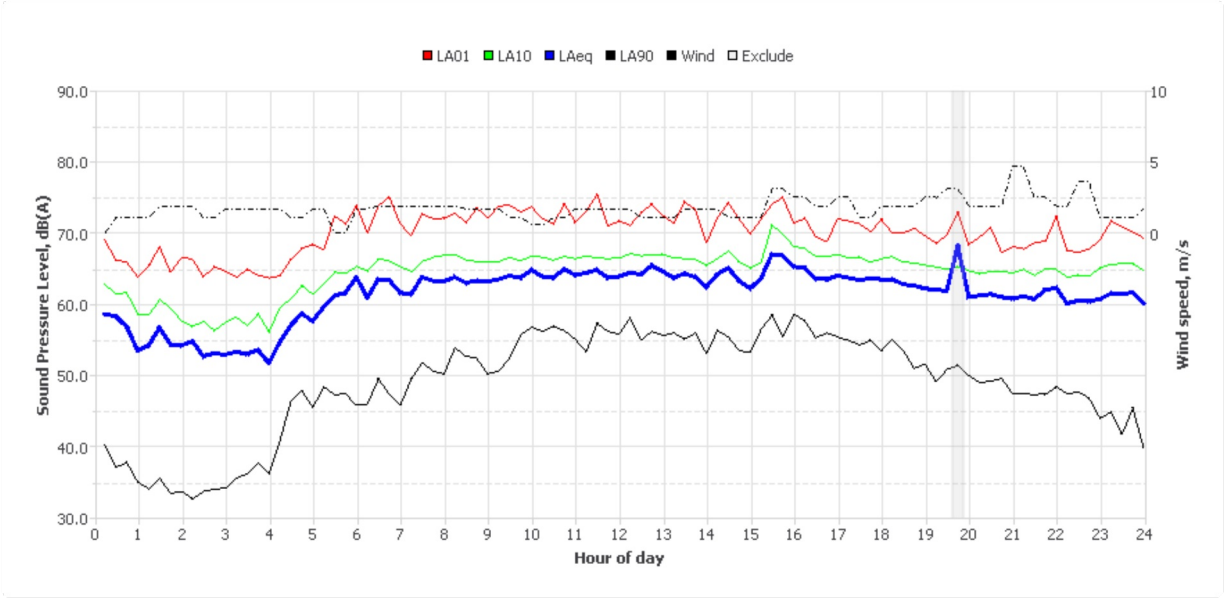
Thursday, 21 Nov 2019



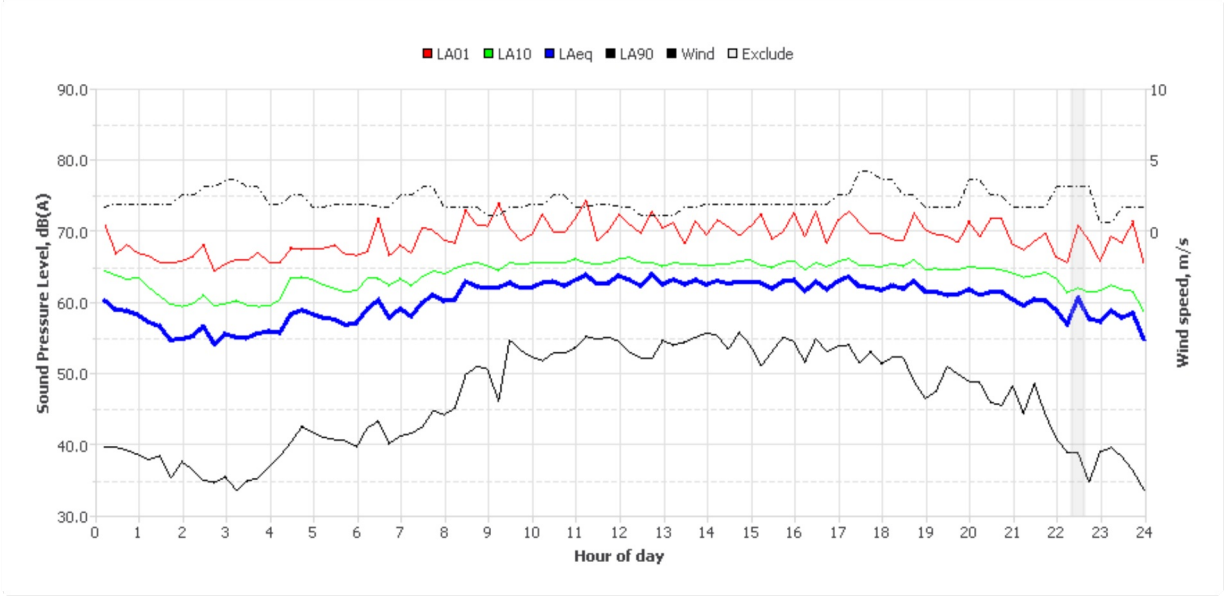
Friday, 22 Nov 2019



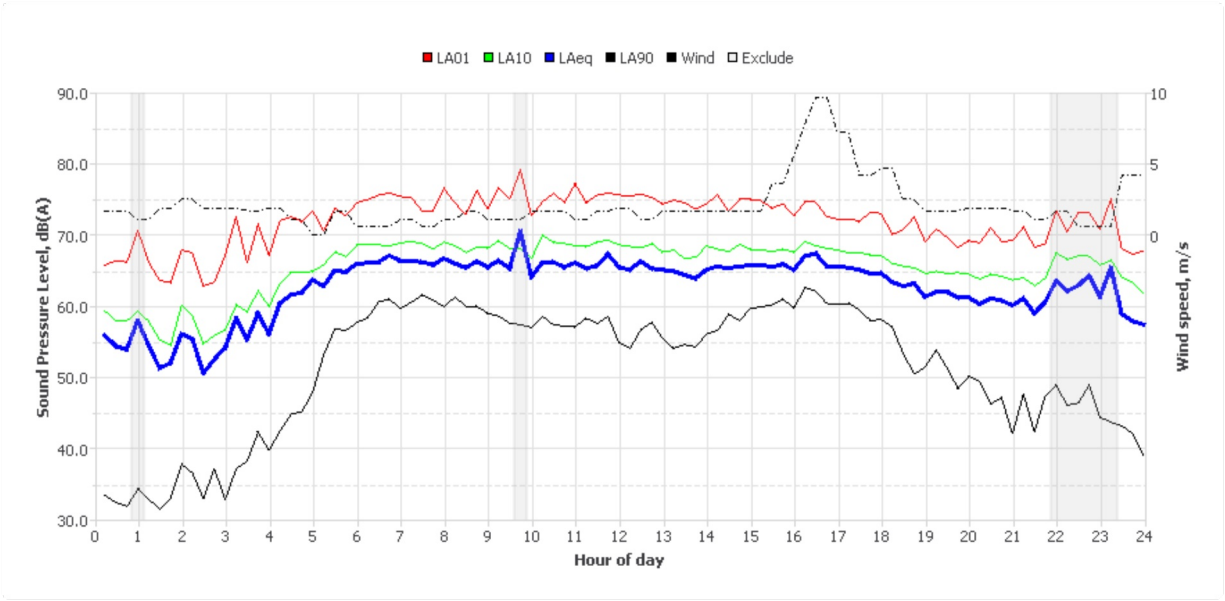
Saturday, 23 Nov 2019



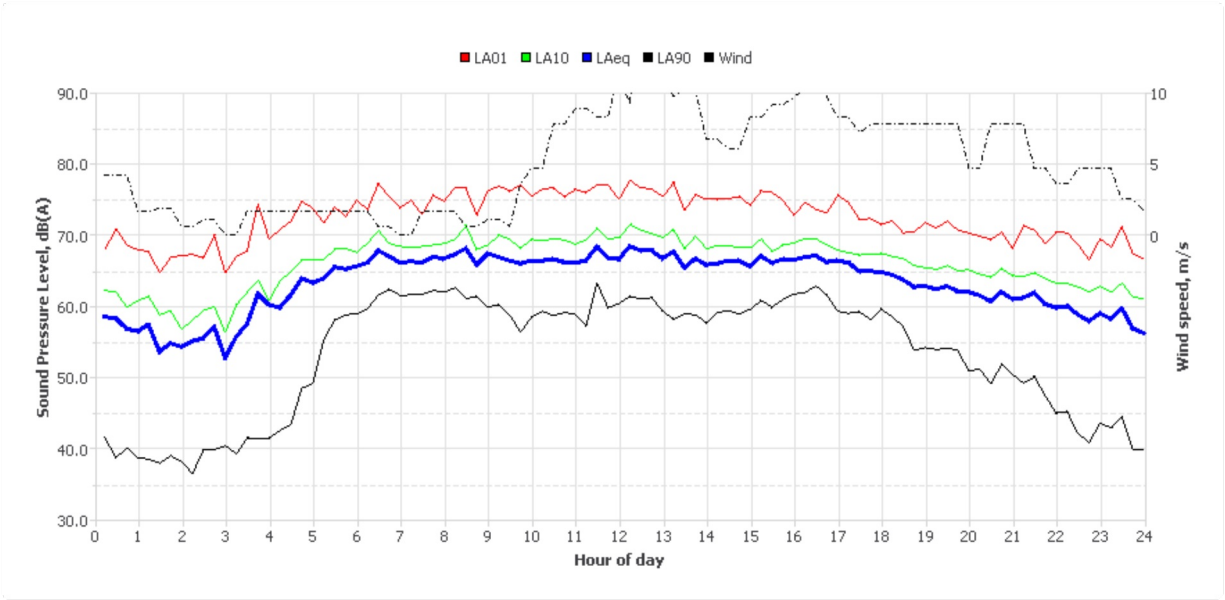
Sunday, 24 Nov 2019



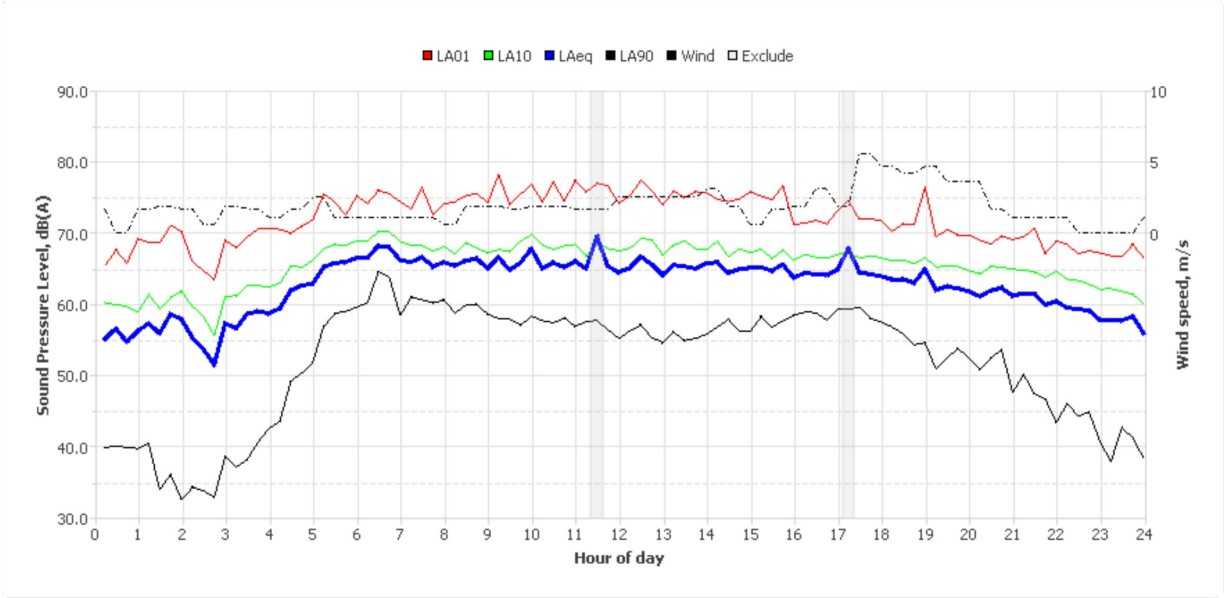
Monday, 25 Nov 2019



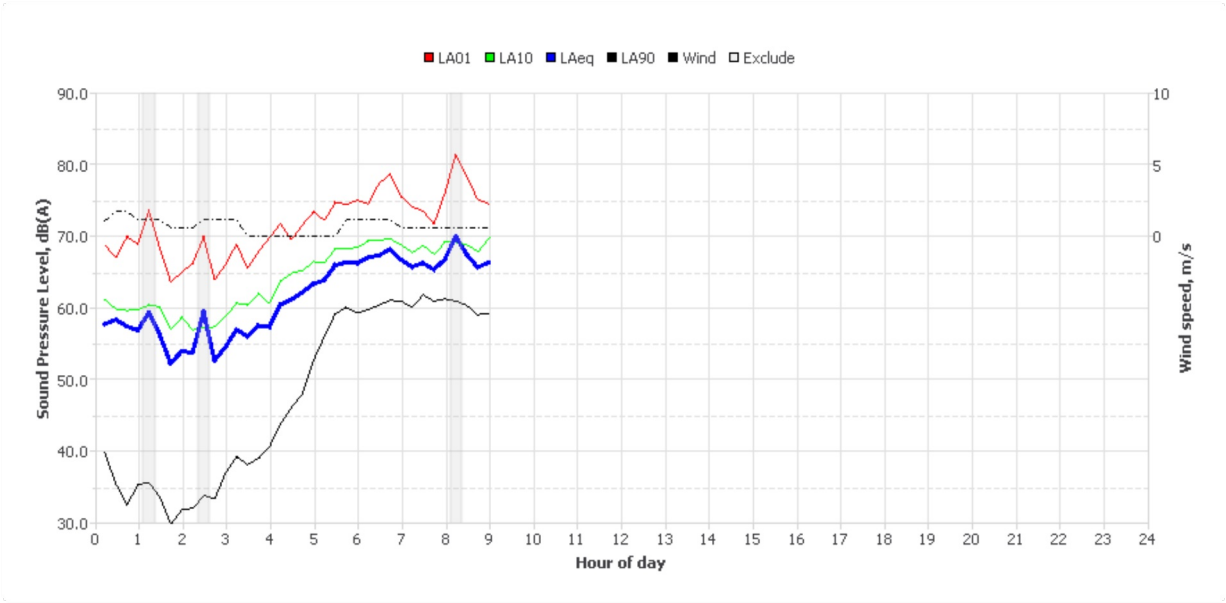
Tuesday, 26 Nov 2019



Wednesday, 27 Nov 2019



Thursday, 28 Nov 2019



Appendix C

Truck Routes

Noise logging locations and Truck Routes

pacificnational AECOM

N

0 290 580 Meters

- Noise Loggers
- Route 1

Source:

Noise logging locations and Truck Routes

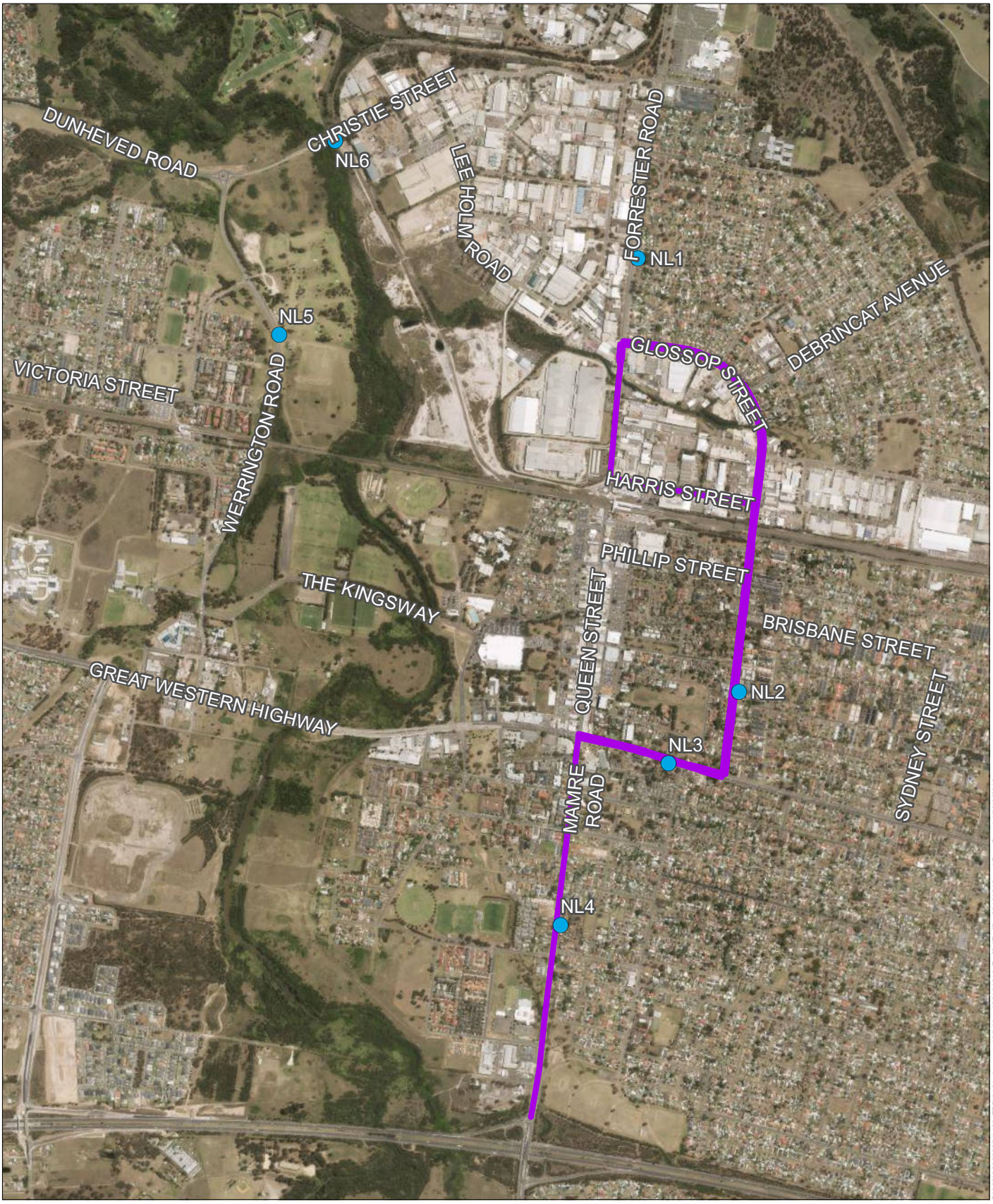
pacificnational AECOM

N

0 290 580 Meters

- Noise Loggers
- Route 2

Source:



Noise logging locations and Truck Routes

pacificnational AECOM

N

0 290 580 Meters

- Noise Loggers
- Route 3

Source:

Noise logging locations and Truck Routes

pacificnational AECOM

N

0 290 580 Meters

- Noise Loggers
- Route 4

Source: