

Santos

Wilga Park Power Station Compliance noise monitoring (September 2020)

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1. Introduction

1.1 Purpose of report

Santos NSW (Eastern) Limited (Santos) is the operator of the Wilga Park Power Station (WPPS) which was approved in 2008.

The Department of Planning, Industry and Environment (the Department) Minister's condition of approval (Project Approval) places standards on the proponent with regards to noise monitoring once the WPPS is operating above 12 MW capacity. Santos also agreed to subsequent monitoring during the following winter period. On 22 December 2018, the WPPS operated above 12 MW with a subsequent monitoring program was undertaken in January 2019. Following this, the power station operated above 16 MW on 13 July 2020 and monitoring was undertaken on 15 to 17 September 2020 to satisfy the Project Approval Condition 3.5.

GHD Pty Ltd (GHD) was commissioned by Santos to undertake this noise monitoring program and this report provides details and results. The GHD assessment of the monitoring results concluded on 16 October 2020. On this basis, the due date for this report's submission is 13 November 2020 as per Condition 3.5.

2. Requirements

The Planning Approval requirements are provided in the following sections.

2.1 Condition 3.5

Condition 3.5: Within 90 days of the commencement of operation of the power station at a capacity of more than 12 megawatts and at every stage that new generation capacity is added to the power station or as otherwise agreed by the Secretary, and during a period in which the power station is operating under normal operating conditions (considering all operational generators at the time), the Proponent shall undertake a program to confirm the noise emission performance of the project. The program shall include, but not necessarily be limited to:

- a) noise monitoring, consistent with the guidelines provided in the New South Wales Industrial Noise Policy (EPA, 2000), to assess compliance with the maximum allowable noise contributions specified in Table 2 of condition 2.8 of this approval in relation to the locations specified in condition 2.8; and
- b) details of any entries in the Complaints Register (condition 5.3 of this approval) relating to noise impacts.

A report providing the results of the program shall be submitted to the Secretary and the EPA within 28 days of completion of the assessment required under condition 3.5.

2.2 Condition 2.8 and 2.9

Condition 2.8: The Proponent shall implement all reasonable and feasible at-source noise control measures at the Wilga Park power station to ensure that the noise contributions from the operation of the power station does not exceed the maximum allowable noise contributions specified in Table 2, at the following locations:

- a) all existing sensitive receivers identified in Attachment A;
- b) any residential dwelling within the land area shown in Attachment A for which an approval has been obtained under the Environmental Planning and Assessment Act 1979 at the date of this project approval; and
- c) over 25% or more of a vacant allotment within the land area shown in Attachment A in existence at the date of this project approval and for which a dwelling is permissible under the Environmental Planning and Assessment Act 1979 at the date of this project approval.

The maximum allowable noise contributions apply under wind speeds up to 3 ms-1 (measured at 10 metres above ground level), or under temperature inversion conditions of up to 3 °C/ 100 metres and wind speeds of up to 2m/s at 10 metres above the ground.

Table 2 - Maximum Allowable Noise Contribution

7:00am to 6:00pm Mondays to Saturdays 8:00am to 6:00pm Sundays and public holidays	Evening 6:00pm to 10:00pm on any day	Night 10:00pm to 7:00am N Saturdays 10:00pm to 8:00am S holidays	
35 LAeq(15 minute)	35 LAeq(15 minute)	35 LAeq(15 minute)	45 LA1 (1 minute)

Condition 2.9: For the purpose of assessment of noise contributions specified under condition 2.8 of this approval, noise from the project shall be:

- a) measured at the most affected point within the residential boundary or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary to determine compliance with the LAeq(15 minute) noise limits;
- b) measured at 1 metre from the dwelling façade to determine compliance with the LA1 (1 minute) noise limits; and
- c) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

Notwithstanding the above, should direct measurement of noise from the project be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the EPA (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA, 2000)). Details of such an alternative noise assessment method accepted by the EPA shall be submitted to the Secretary prior to the implementation of the assessment method.

Condition 2.16: Should the monitoring required under condition 3.5 indicate that the operational noise contributions of the Wilga Park Power Station, following the implementation of all reasonable and feasible at-source mitigation measures in accordance with condition 2.8, exceed the maximum allowable noise contributions specified in Table 2 at the location identified in condition 2.8c) by more than 5 dB(A), then the Proponent shall, upon receiving a written request for acquisition from the landowner within two years of the date of that landowner being notified of his/her acquisition rights, acquire the land in accordance with the procedures in conditions 2.17 to 2.21 of this approval.

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Attachment A: Noise Receivers

3. Assessment

3.1 Assessment methodology

A noise monitoring program was undertaken between 15 and 17 September 2020 at the WPPS to confirm compliance with Condition 2.8 and 2.9 of the Planning Approval. The WPPS was operating at its full available output.

The following Type 1 Sound Level Meter's (SLMs) were used for the monitoring program:

Svantek SV977 serial number 36873 within NATA calibration.

The $L_{Aeq(15min)}$ measurements were set to linear averaging and the L_{Amax} and $L_{A90(15min)}$ measurements were set to Fast time-response. Field calibration checks were performed at the start and end of the measurement sessions.

Temperatures at 10 m and 60 m elevation and wind speeds at 10 m were obtained from Whitehaven Coal's weather station which is located 27 km to the south east of the WPPS. This data was used to determine the presence of noise enhancing meteorological conditions including the temperature lapse rate and wind speed at 10 m. Wind speed measurements were also undertaken simultaneously with the noise measurements at the WPPS site at ground level (1.5 m) using a Kestral 5500 Anemometer, to confirm the influence of wind over the microphone did not affect the noise measurements. At ground level, during all measurements, the wind speed was less than 3 m/s.

Direct noise measurements were undertaken at all of the locations identified in Condition 2.8 of the Planning Approval where practical, or conservatively on the intervening site boundary. Access was not available at location H, I, J and R and the nearest location to the WPPS has been reported. Location G was used to represent locations H, I, J, which is closer to the WPPS. Location P was used to represent location R which is closer to the WPPS. Where the receiver was a vacant allotment the measurement was either taken on the lot boundary nearest the WPPS or at a location within the allotment set back so that it is representative of 25% of the vacant land area (estimated based on spherical spreading).

The ambient noise environment has an influence on the measured WPPS noise levels. The WPPS was observed to be a steady state noise source, whereas attended observations noted that the ambient environment contained contributions from dogs, insects, distant vehicles and other wildlife. The total measured noise level (L_{Aeq}) in Table 1 includes all extraneous contribution and would be a conservative estimate of noise levels from the WPPS. The L_{A90} noise level provides a better representation of a steady-state noise source where there are contributions from extraneous noise. Using the L_{A90} noise level to estimate noise levels from the WPPS is consistent with EPA guidance (Noise Policy for Industry (EPA, 2017) Section 7.1.1 and Industrial Noise Policy (EPA, 2000) Section 2.3) for steady state noise sources.

A review of the 1/3 octave band data at the nearest receiver locations (Receiver E, N and O) as shown in Appendix A) indicates that WPPS contribution is between 40 Hz and 160 Hz and 400 Hz to 630 frequency bands. The L_{Aeq} summation of these bands was reviewed as an alternative estimate to determine the contribution from the WPPS. However for location C, dogs were significantly dominant and also in the 400 Hz to 630 Hz frequency bands, so these third-octave bands were excluded from this location. The frequency analysis method provides a reasonable correlation with the L_{A90} method. The L_{A90} method provides a more reliable estimate for all modelling locations as it excludes extraneous noise and was used to determine the contribution from the WPPS for assessment of compliance in accordance with the Noise Policy for Industry (EPA, 2017) Section 7.1.1.

The SLM was paused during some extraneous events where possible. Note it was not possible to pause the SLM for the majority of extraneous events.

It is understood that these methods are considered acceptable from the EPA as they are based on latest EPA guidance and were provided to EPA for comment (GHD Letter to EPA dated 11 May 2018).

3.2 Noise level contribution from WPPS

The total measured ambient noise level and the noise level contribution from the WPPS is provided in Table 2. The WPPS noise level contribution has been determined based on the direct operator attended measurements and the L_{A90} assessment methodology and the frequency analysis assessment method described in Section 3.1. It is noted that the noise level contribution may still contain influence from ambient noise, particularly for receivers where the WPPS was only just audible.

During all operator attended measurements, when the WPPS was audible, no impulsive noise characteristics or maximum noise events were attributed to the WPPS. In addition to this a review of source measurements on site at the WPPS shows that the difference between the L_{Aeq} noise level and the L_{A1} noise level was less than 1 dBA. As such the received $L_{A1(1minute)}$ noise level should not exceed the WPPS contribution shown in Table 1 by more than 1 dBA. As such the WPPS is assessed to be compliant with the 45 dBA L_{A1} (1 minute) maximum allowable noise contribution.

Condition 2.9 requires the adoption of the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000). Note that under the Implementation and transitional arrangements for the Noise Policy for Industry (2017) (EPA 2017P0293; October 2017), where conditions reference the New South Wales Industrial Noise Policy (EPA, 2000) the modification factors these are to be transitioned to the Noise Policy for Industry (2017) Fact Sheet C through the practice notes issued on the EPA website. The potential for low frequency noise impacts were assessed using the difference between the modelled C- and A-weighted noise levels. At most locations a difference of 15 dB was measured. Therefore, there is the potential for low frequency noise if the threshold levels are exceeded. The measured one-third octave noise levels were reviewed and assessed against the Noise Policy for Industry (2017) one-third octave noise threshold levels provided in Table 1. The measured noise levels are below the noise threshold levels in all one-third octave bands at all locations with the exception of Receivers E, N and O. In accordance with the Noise Policy for Industry (2017) Fact Sheet C, a low frequency noise modification factor is applied to the measured noise levels at these locations prior to assessment against the maximum allowable noise contribution in Condition 2.8. Receiver N exceeds the noise threshold levels by 4 dB in the 40 Hz band and a 2 dB correction is applied. Receiver E exceeds the noise threshold levels by 2 dB in the 63 Hz band and a 2 dB correction is applied. Receiver O exceeds the noise threshold levels by 3 dB in the 40 Hz band and a 2 dB correction is applied.

 Table 1
 One-third octave low-frequency noise threshold level

Frequency	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dBZ criteria	92	89	86	77	69	61	54	50	50	48	48	46	44

Based on the direct attended noise measurements and the assessment methodology in Section 3.1, all receivers comply with the criteria (with the inclusion of the low frequency noise modification factor) when considering negotiated agreements. It is also noted that the meteorological conditions at the time of these measurements were measured to be 'very noise enhancing' in accordance with the Noise Policy for Industry (EPA, 2017) definition and the maximum allowable noise contributions do not apply under these conditions as per Condition 2.8.

3.3 Complaints register

Santos has advised that no complaints have been received since the power station began generating above 12MW and subsequently 16 MW. Note for future noise assessment reports for each stage of increase in power generation, this will be the point of reference for complaints.

Table 2 WPPS noise contribution, L_{Aeq(15minute)}

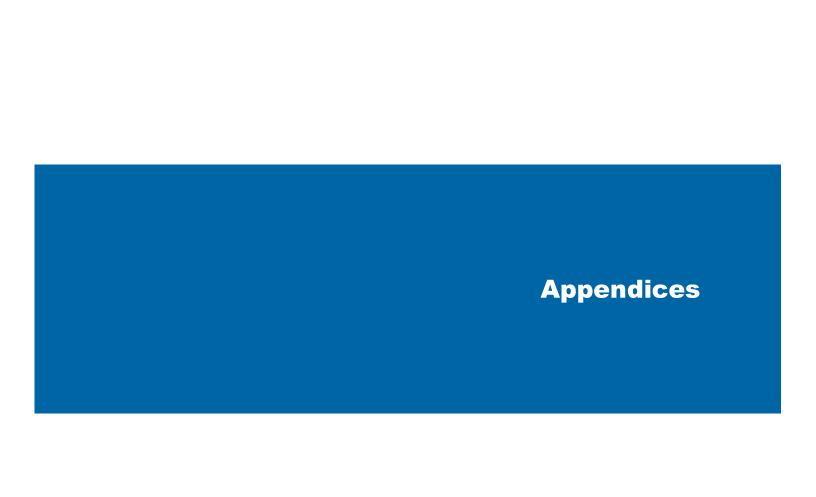
Receiver	Criteria	Total noise level	WPPS Contribution (dBA) L _{A90 Method}	LAeq(40Hz to 160 Hz, 400 Hz to 630 Hz)	Date (Start time)	Wind speed at 10 m (Direction)	Temperature Lapse rate	Observations
В	40 (vacant lot)	32	30	29	16/09/20 (23:16)	0 m/s (-)	4.6 °C/100m	WPPS audible Distant dogs barking Insects and frogs
С	35	42	20	19	17/09/20 (01:37)	0.8 m/s (28°)	5.6 °C/100m	Dogs barking and dominating the LAeq overall measurements with spikes from dogs barking clearly identifiable in the time trace plot WPPS audible
D (Boundary)	35	24	18	19	17/09/2020 (02:01)	0.8 m/s (25°)	6.2 °C/100m	Distant dogs barking WPPS just audible
E	40 (vacant lot)	33	32 (34)	33 (35)	16/09/2020 (22:30)	0.2 m/s (49°)	3.2 °C/100m	WPPS audible Insects and frogs
F	35	28	25	22	17/09/2020 (02:30)	0 m/s (-)	6.4 °C/100m	Insects WPPS just audible

Receiver	Criteria	Total noise level	WPPS Contribution (dBA) LA90 Method	LAeq(40Hz to 160 Hz, 400 Hz to 630 Hz)	Date (Start time)	Wind speed at 10 m (Direction)	Temperature Lapse rate	Observations
G (H, I, J) ¹	35	24	21	20	16/09/2020 (02:35)	0.7 m/s (169°)	5.4 °C/100m	Insects and birds Distant traffic Distant dogs barking WPPS just audible
L	40 (vacant lot)	30	24	29	15/09/2020 10:42:53 PM	1.2 m/s (129°)	1.6 °C/100m	Distant highway traffic noise Insects WPPS just audible
К	35	31	24	30	15/09/2020 11:29:59 PM	0.6 m/s (147°)	2.6 °C/100m	Distant highway traffic noise WPPS just audible Short beep every 30 seconds
М	Negotiated agreement in place	33	30	31	16/09/2020 1:58:32 AM	0.8 m/s (199°)	6.2 °C/100m	Insects and frogs Distant highway traffic noise WPPS audible
N	Negotiated agreement in place (vacant lot)	38	36 (38)	38 (40)	16/09/2020 1:31:34 AM	1.3 m/s (198°)	5.2 °C/100m	Insects and frogs Distant highway traffic noise WPPS audible

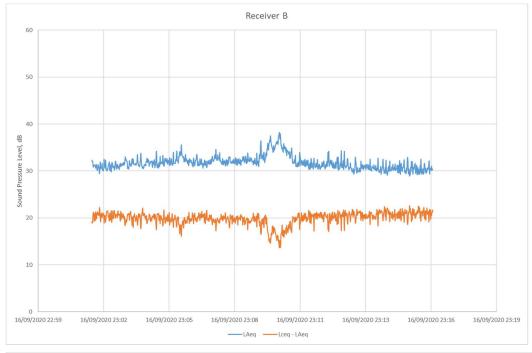
Receiver	Criteria	Total noise level	WPPS Contribution (dBA) LA90 Method	LAeq(40Hz to 160 Hz, 400 Hz to 630 Hz)	Date (Start time)	Wind speed at 10 m (Direction)	Temperature Lapse rate	Observations
0	40 (vacant lot)	38	37 (39)	37 (39)	16/09/2020 11:48:45 PM	1.1 m/s (254°)	5.2 °C/100m	Insects WPPS audible
P, R (Boundary)	40 (vacant lot)	25	22	22	17/09/2020 12:35:27 AM	0 m/s (-)	5.4 °C/100m	Insects dominant WPPS audible
Q	40 (vacant lot)	28	24	27	16/09/2020 12:50:30 AM	1.4 m/s (207°)	3 °C/100m	Insects and frogs Distant highway traffic noise WPPS audible
S, T, U (Boundary)	35	19	22	19	17/09/2020 1:08:47 AM	0.6 m/s (270°)	5.4 °C/100m	Insects WPPS just audible

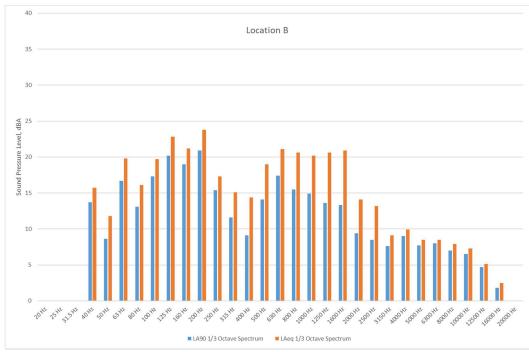
Note 1: Access to H, I and J was not available. Site G was considered representative of these locations and is significantly closer to the WPPS.

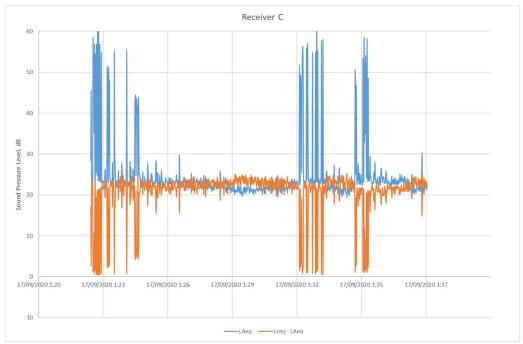
Note 2: Results in brackets indicate the noise levels contribution from the WPPS with the inclusion of the low frequency modification factor

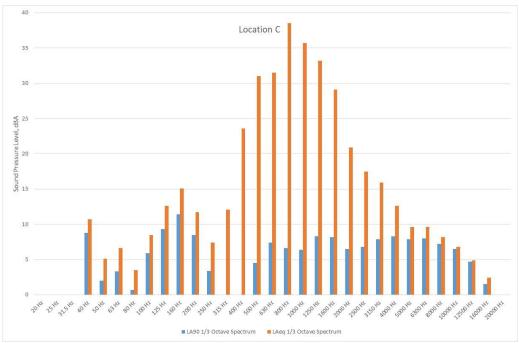


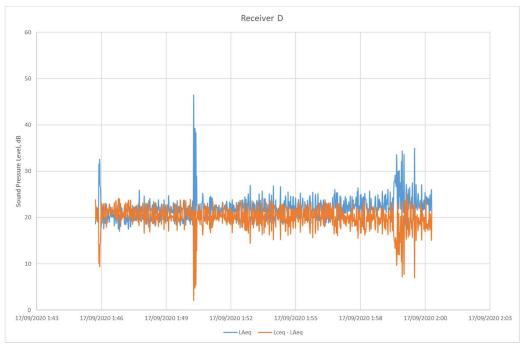
Appendix A – Measured noise level charts and frequency spectrums

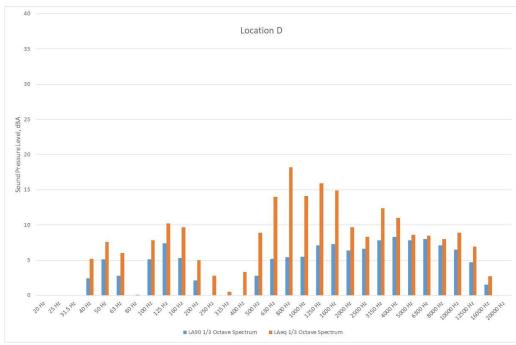


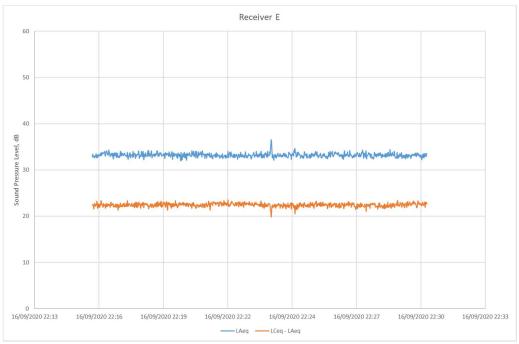


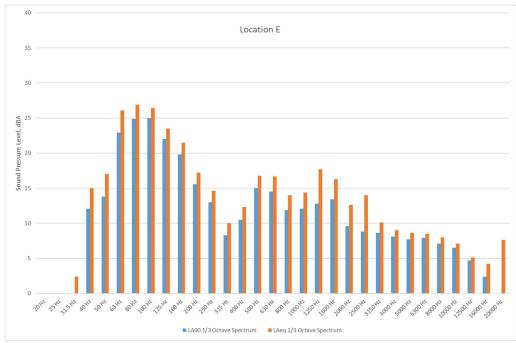


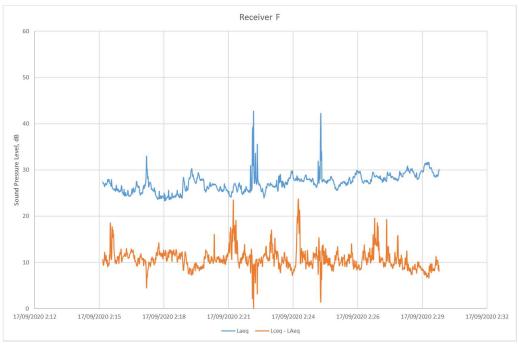


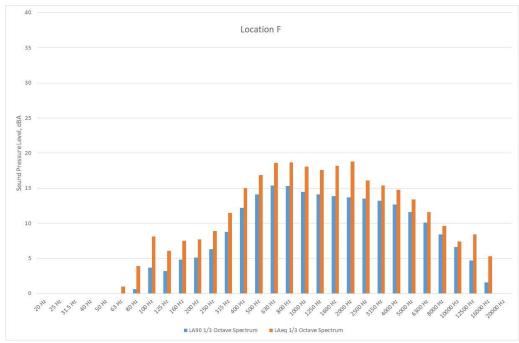


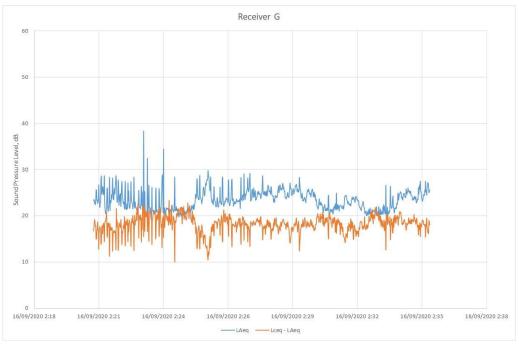


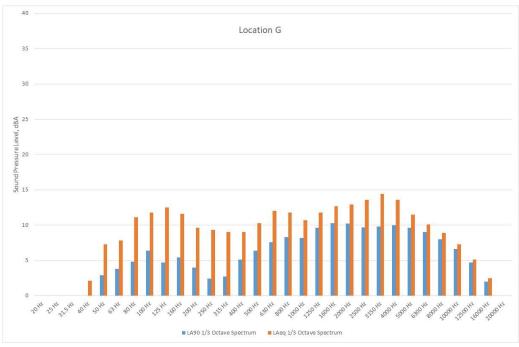


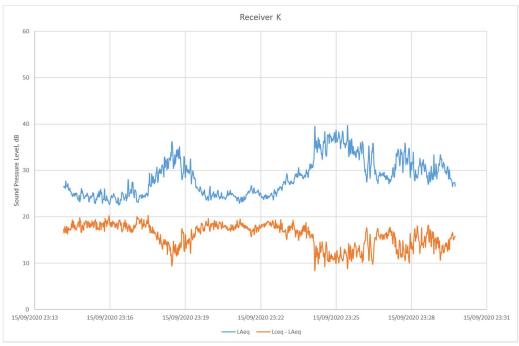


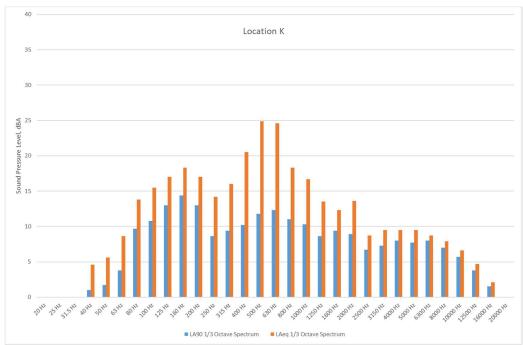


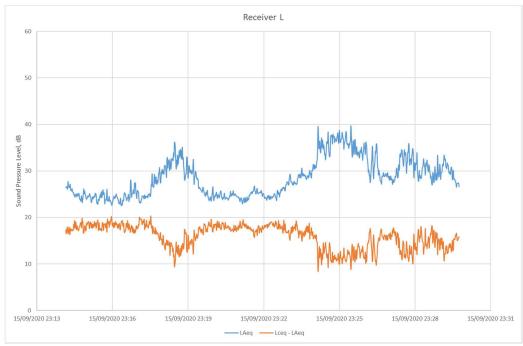


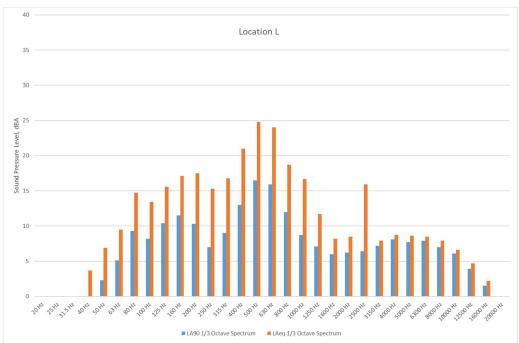


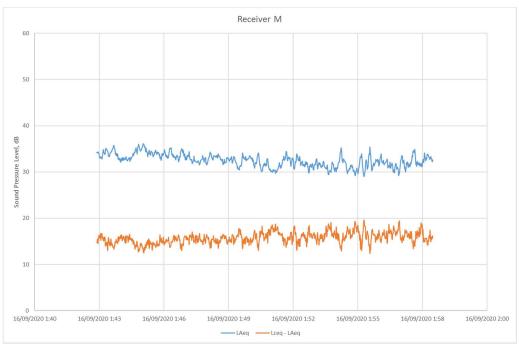


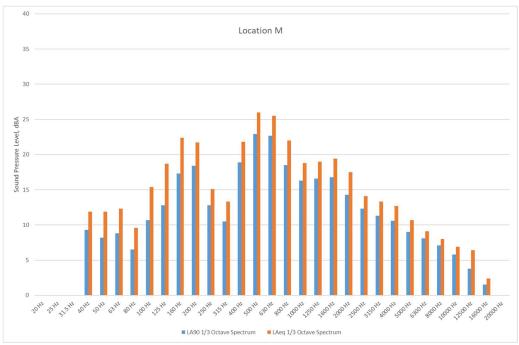


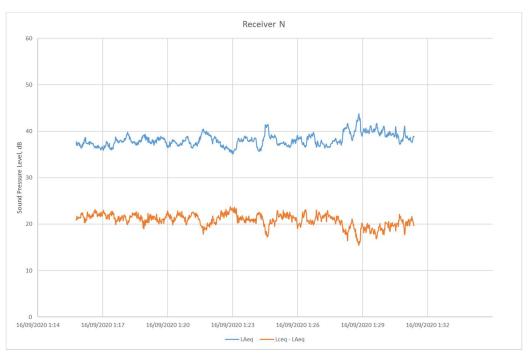


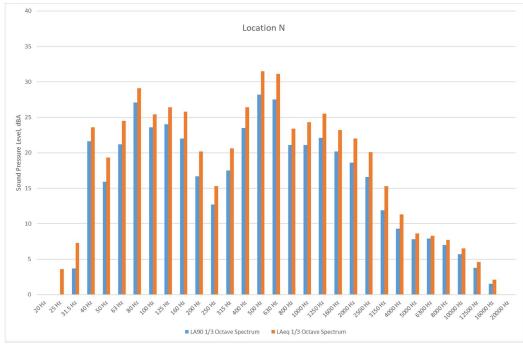


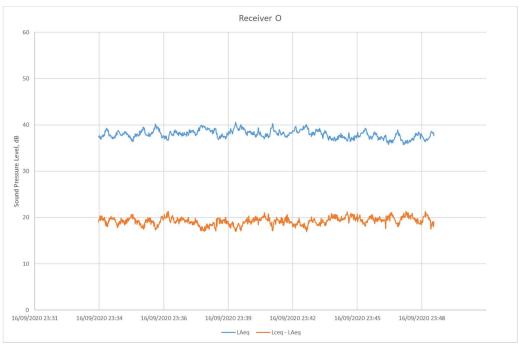


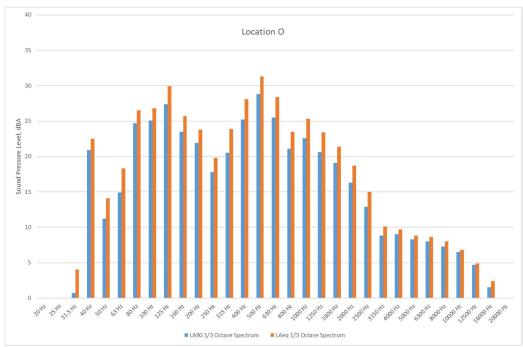


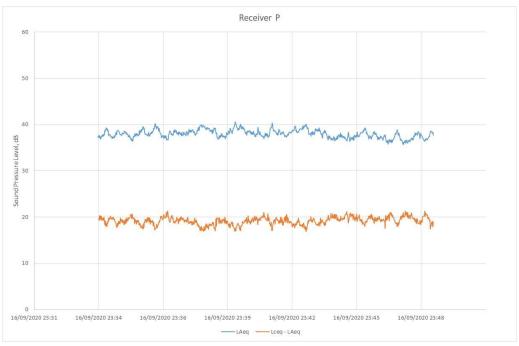


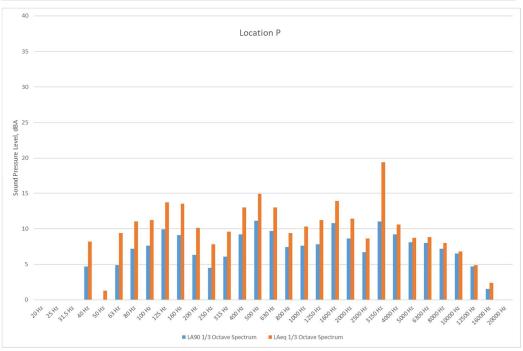


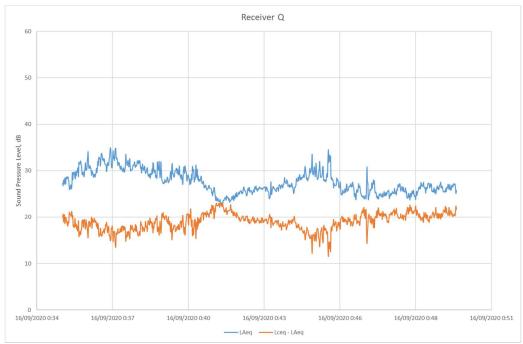


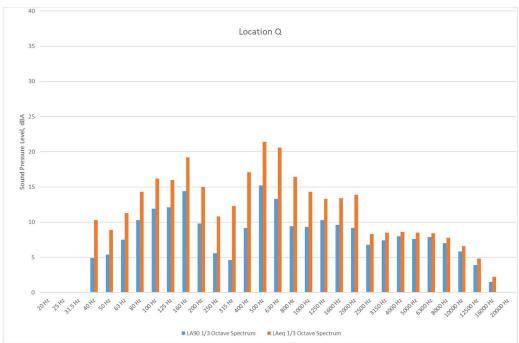


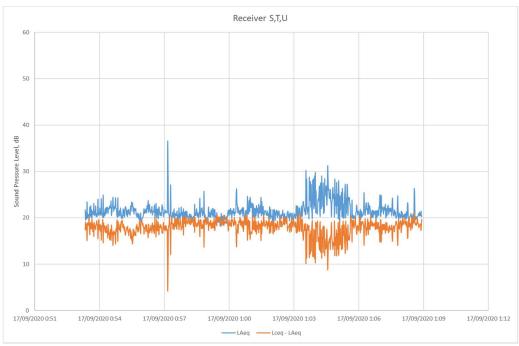


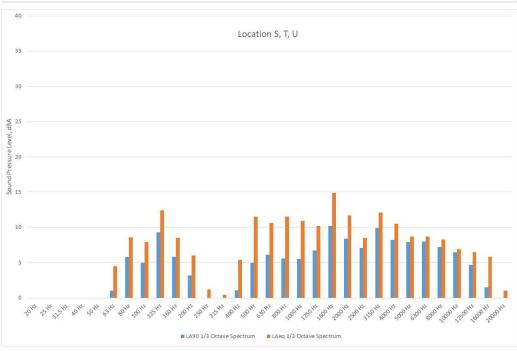












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Document Status

Revision	Author	Reviewer		Approved for Issue Under delegation from David Chubb				
		Name Signature		Name	Signature	Date		
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