Matrix Acoustic Design Consultan

AeroSuperBatics
Rendcomb Airfield
White Way
Cirencester
Gloucesterhire
GL7 7DF

NOISE IMPACT ASSESSMENT

Acoustics Report 2122/R04
2nd October 2023

To: LPC (Trull) Ltd
Trull
Tetbury
Gloucestershire
GL8 8SQ

By: Paul Smith BSc MIOA

1. Introduction

This acoustic report reviews a noise impact assessment with regard to the commercial wingwalking events operated by AeroSuperBatics at Rendcomb airfield; Figure 1.

The report is divided into the following sections:

Section 2: Overview of Rendcomb Airfield

Section 2: Noise Criteria

Section 3: Noise Survey

Section 4: Findings

Section 5: Conclusion

Appendix A: Survey Data

Appendix B: Calibration Certificates

2. Overview of Rendcomb Airfield

2.1 Rendcomb Airfield

RFC Rendcomb was built in 1914 as a training ground for WW1 pilots. After the war it was returned to agricultural use until 1990, when land was granted planning permission for a return to a grassed airfield.

The planning permission was subject to minimal conditions as a legal agreement was entered into under Section 106 of the Town and Country Planning Act, which restricted the timing and types of aircraft that could be flown from the land; not to allow or permit the general public to have access onto the land except on ‘open days’, which required the previous written consent of the Council; not to use the land for training flights; limiting the number of aircraft to be kept at Rendcomb Airfield to 25; 35 take-offs per day over a maximum of 180 days in any calendar year between sunrise and sunset with a restriction that not more than 2 aircraft shall take off before 08.00 on any day; preventing the installation of landing lights; and not to use the land for commercial purposes with the exception that aircraft used elsewhere for commercial purposes may be kept or stationed upon the land.

2.2 Wingwalking

AeroSuperBatics (ASB) have operated from Rancomb Airfield since 1993, using Boeing Stearman Aircraft to provide display flights throughout the UK and the world and a wingwalking experience.

The wingwalking experience, which has been operating at Rendcomb Airfield for the last 28 years, provides customers an 8-minute flight whilst attached to a harness on top of the biplane.

We have been informed that typically the flights are used by the customers to raise funds for charities; as an example, £100k was raised in 2020 despite the business being curtailed by Covid-19 lockdown periods.

Currently, ASB operate the commercial wingwalking flights from April until October, generally between 09:00 – 18:00hrs.

Table 1 provides an example of the existing number of scheduled flights; note that not all of these flights occurred due to adverse weather (the conditions need to be dry with low wind speeds). As can be seen the number of scheduled flights for June 2021 ranged from 2 per day up to the maximum of 21 per day.

The Civil Aviation Authorities ”Aviation law for low flying aircraft” states that aircraft must not fly <500ft from people, vehicles, vessels and structures with the except of take-off and landing. There is however an exemption for low level flights over the airfield if the pilots meet the necessary criteria, which we understand is the case for the wingwalking pilots.

Due to ASB's wingwalking experience falling into 'commercial use' it is in conflict with the Section 106 Agreement for the airfield. An application has therefore been submitted to vary the Section 106 Agreement in order to provide an exception for the commercial wingwalking activities.

For the application ASB are proposing a maximum of:

20 flights per day

100 flight days per year

5 days of flights between Monday – Saturday (no flights on a Sunday)

Table 1. Scheduled commercial wingwalking flights for June 2021 (subject to weather)

Day	Proposed no. of flights	Day	Proposed no. of flights	Day	Proposed no. of flights
Tuesday 1st		Friday 11th	15	Monday 21st	21
Wednesday 2nd	8	Saturday 12th	12	Tuesday 22nd	6
Thursday 3rd	14	Sunday 13th		Wednesday 23rd	5
Friday 4th	15	Monday 14th		Thursday 24th	
Saturday 5th	9	Tuesday 15th	14	Friday 25th	
Sunday 6th		Wednesday 16th	3	Saturday 26th	
Monday 7th		Thursday 17th	20	Sunday 27th	
Tuesday 8th	4	Friday 18th	15	Monday 28th	6
Wednesday 9th	2	Saturday 19th	10	Tuesday 29th	
Thursday 10th	12	Sunday 20th		Wednesday 30th	11

2.3 Noise Complaints

Some local residents have objected to the planning application, with one of the reasons being an adverse noise impact generated by the wingwalking experience.

Due to the concerns raised by the objectors, Neil Shellard, Environmental & Regulator Services Officer, has attended a wingwalking experience event (12th May 2021) in order to both observe and undertake noise measurements of the flights.

His observations concluded that the commercial wingwalking flights were clearly audible off-site, with the airplane noise changing in both loudness and pitch depending on flight path relative to the receiver.

Mr Shellard measured maximum noise levels (with the meter on the 'fast' setting) of between $L_{Amax,F}$ 55 – 70dB depending on receiver location, which he compared with residual background noise levels; see Table 2. The highest maximum noise level recorded adjacent to a dwelling was $L_{Amax,F}$ 64dB.

No rational for comparing the maximum noise levels against the background noise levels was given. We assume it was a nod toward a BS4142 assessment, which determines the noise impact of industrial/commercial plant/activities by the difference between the background noise level and the Rating Level (ambient noise level with corrections applied to take into account operating period and noise characteristics).

It should be highlighted that plane noise is outside the scope of BS4142 and the assessment methodology does not include the review of maximum noise levels.

Comment or analysis of the noise impact of the commercial wingwalking flights was not provided by Mr Shellard. However, he has advised that an agreed locally specific noise standard for the airfield may be necessary, to allow for the commercialisation as proposed. Additionally, he considers that there needs to be concessions from the applicant on the proposed number of flying days if a sensible balance is to be struck between allowing the wingwalking business to continue without detriment to the quality of life for local residents and visitors to the AONB landscape.

Table 2: Neil Shellard's Noise Measurements and Comments

Measurement Location	Highest Plane/flight noise $L_{Amax,F}$ dB	L_{A90} dB	Indicative excess over L_{A90}	Manoeuvre	Comments on audibility
Rendcomb Airfield	n/a	n/a	n/a	take off	No measurements taken. Visual obsvs only
North Cerney SW Airfield	56	36	20	plane circling	audible approx. 1min
Bagendon	59	39-40	20	plane circling	flight audible 4min 8sec
Rendcomb Playing Fields	61	not measured	n/a	"	flight audible 5 mins
Chedworth laines	55	34	21	plane circling	audible 5mins 12 secs
The Smithy, Calmsden	64	not measured	n/a	plane circling	take -off
North Cerney SE Airfield	70	37	33	take off	Clearly audible over background and ambient

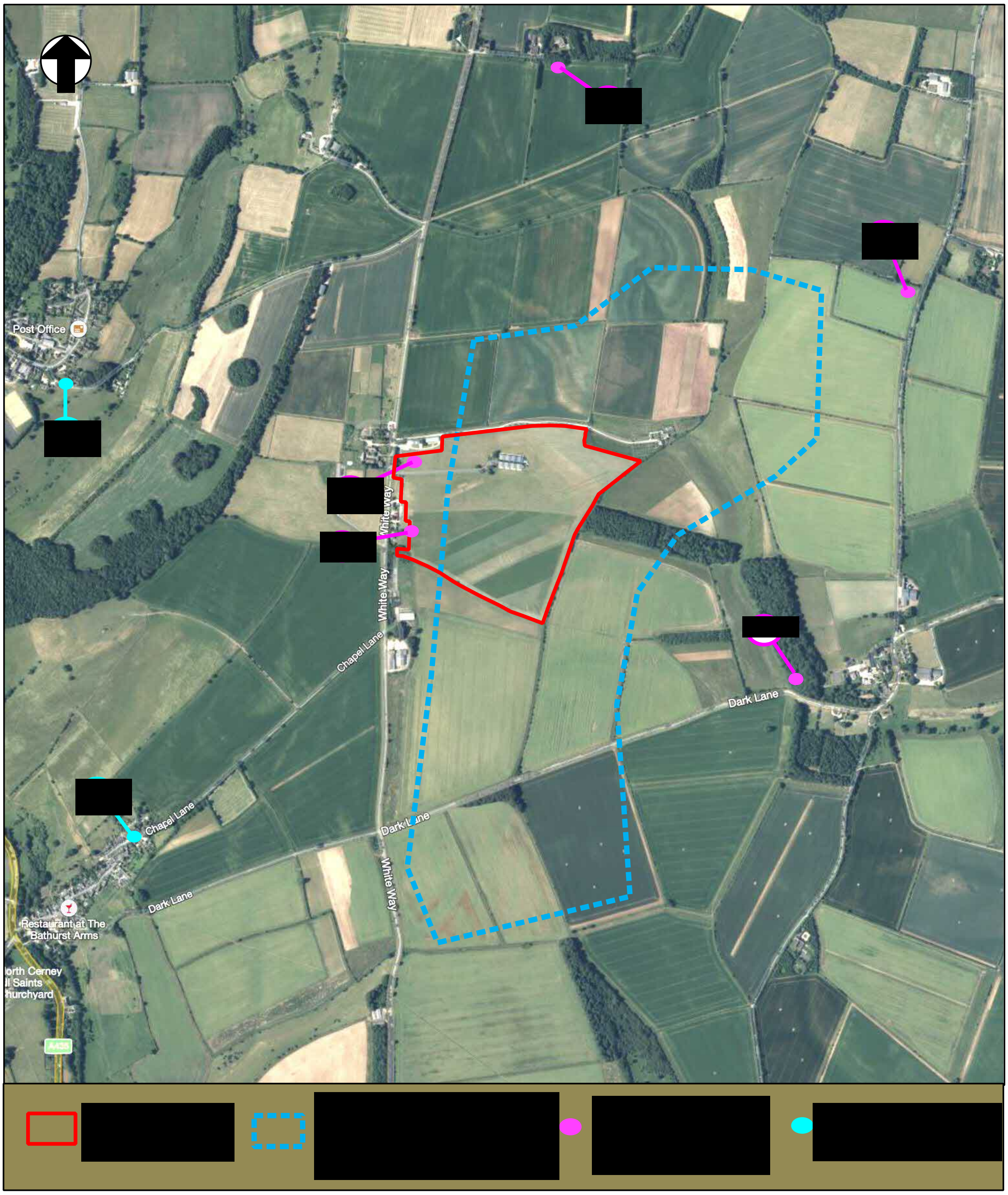


Figure 1. Aerial view (source: ww.google.com) showing Rencombe Airfield, survey measurement and observation locations and observed approximate extent of wingwalking flights

3. Noise Criteria

This assessment of the noise impact generated by the wingwalking flights has considered the following published guidance.

3.1 Noise Nuisance

Section 79(6) of the Environmental Protection Act 1990, as amended, specifically exempts aircraft noise from the general noise nuisance controls which exist under that legislation. This is the case, irrespective of whether an airfield in question is small and unlicensed or a major UK airport.

3.2 National Planning Policy Framework (NPPF)

NPPF (2019) sets out the Government's planning policies for England and how these are expected to be applied.

The framework states (among other commitments) that the planning system should contribute to and enhance the natural and local environment by *"Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability".*

The express inclusion of noise in the NPPF means that it is a material planning consideration for local planning decisions.

With regard to noise paragraph 180 of the NPPF document states that planning policies and decisions should aim to:

> mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life
>
> identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

3.3 Noise Policy Statement for England (NPSE)

The Noise Policy Statement for England (NPSE) launched in March 2010 states the long-term vision of Government noise policy is to *"promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".*

The aims of NPSE, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development are to:

> Avoid significant adverse impacts on health and quality of life;
>
> Mitigate and minimise adverse impacts on health and quality of life;
>
> Where possible, contribute to the improvement of health and quality of life.

NPSE provides the following categories to aid the identification of potential impact of noise:

> NOEL (No Observed Effect Level): This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
>
> LOAEL (Lowest Observed Adverse Effect Level): This is the level above which adverse effects on health and quality of life can be detected.
>
> SOAEL (Significant Observed Adverse Effect Level): This is the level above which significant adverse effects on health and quality of life occur.

It should be highlighted that NPSE does not provide noise limits or threshold associated with the above effect level categories.

3.4 Civil Aviation Authority (CAA)

The CAA provides a number of studies and documents covering the assessment and impact of aircraft noise.

For the assessment of aircraft noise CAA provides the following measurement parameters:

Maximum sound level ($L_{Amax,S}$): The simplest measure of a noise event such as the over-flight of an aircraft is the maximum sound level recorded. The measurements of L_{Amax} should be undertaken with the meter set to the 'slow' response. L_{Amax} measurements do not take into account the duration of the noise event and therefore cannot be taken to be representative of the disturbance due to the entire noise event. However, they are useful in reviewing potential sleep disturbance during the night (WHO advises that regular maximum noise levels above L_{Amax} 42dB can lead to sleep disturbance). They are also often reported as they are easier to measure and are considered simpler for the lay person to understand.

Sound Exposure Level (SEL): The SEL of an aircraft noise event is the sound level of a one second burst of steady noise that contains the same total A-weighted sound energy as the whole event. In other words, it is the dBA value that would be measured if the entire event energy were uniformly compressed into a reference time of one second.

Most of the sound energy recorded from an aircraft is concentrated in the highest sound levels. For a constant level sound event, the SEL increases by 3 dB if the duration is doubled, because the energy is doubled. As most aircraft noise events have durations significantly greater than the reference time of one second, their SEL values are invariably numerically greater than L_{Amax} values, typically by around 10 dB.

L_{Aeq}: L_{Aeq} can be defined as the hypothetical steady sound, which contains the same sound energy as the actual variable sound, over a defined measurement period, T. As aircraft noise is composed of individual noise events, L_{eq} can be expressed in terms of the number of events N that occur during the measurement period T, and their logarithmic average Sound Exposure Level (SEL): L_{eq} = Average SEL + 10 x log (N) – 10 x log10 (T)

Perceived Noise Level (PNL): The PNL is used to capture the complex signature of aircraft noise and enable a review of potential for 'annoying' characteristics. It's use is typically limited to the review of jet and propeller driven heavy aircraft and heavy helicopters.

3.5 Department for Transport

The Department of Transport's 'Air Navigation Guidance (2017)' document advises that for the purposes of assessing noise impacts of airspace changes, the government has set threshold for LOAEL of $L_{Aeq,16hr}$ 51dB for daytime noise and $L_{Aeq,8hr}$ 45dB for night time noise. Note that we have been informed that these threshold levels are for the aircraft generated noise alone i.e., they do not include the contribution of environmental noise.

The document also advises that for communities with aircraft noise below the LOAEL threshold, the number of overflights that exceed 65dB (N65) during the day may also be worthy of consideration. Note that it is not defined if the 65dB is a $L_{Amax,S}$ or L_{Aeq} value (for the assessment we have reviewed the $L_{Amax,S}$ values) and no guidance is provided on suitable measurement durations (informs on the frequency of events) or acceptable range of N65.

With regard to AONB the 'Air Navigation Guidance' document advises that:

> Where practical it is desirable that airspace routes below 7,000 feet should seek to avoid flying over AONB
>
> Given the finite amount of airspace available, it will not always be possible to avoid overflying AONB, and there are no legislative requirements to do so as this would be impractical.

We also consider that context with regard to the Rendcomb Airfield's setting in an AONB should be taken into account; the airfield is an existing operation (i.e., aircraft noise, including take-off and landing, is to be expected) and that there are frequent other airplane/helicopter overflights in the local area, many of which are also tonal. The use of a lower assessment threshold than the $L_{Aeq,16hr}$ 51dB on the basis that the airfield is within an AONB is therefore considered to be over onerous in this case.

3.6 IEMA Guidelines for Environmental Noise Impact Assessments

The Institute of Environmental Management & Assessment (IEMA) document Guidelines for Environmental Noise Impact Assessment (2014) provides descriptors for noise effects based on the change in sound level and sensitivity of the receptor; Table 3

Table 3. IEMA guideline effect descriptors

Effect Descriptor	Change in sound level
Very substantial	Greater than 10dB L_{Aeq} change in sound level perceived at receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise sensitive receptor, or a 5 to 9.9dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Non/Not significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the some of influence of the proposals

In addition to the guideline effect descriptors given in Table 3, IEMA advises that even a relatively small impact could have a potentially substantive effect on tranquil areas. IEMA defines areas of tranquillity as those that have *'.. remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'.*

Aircraft noise, be it from the permitted unregulated non-commercial flights from Rendcomb Airfield or other frequent aircraft over-flights, affects the local area. We therefore do not consider that the local area can be described as 'undisturbed by noise', and consequently does not fall within IEMA's definition of tranquil.

4. Noise Survey

Table 4. Survey details					
Date	Day	Weather	Wind speed, m/s; Table 3		Wind direction
		Precipitation	Highest	Median	
30/06/2021	Wednesday	Dry	1.3	0.7	N
23/09/2022	Friday	Dry	2.5	0.5	N
23/10/2022	Saturday	Dry	5.0	2.3	N
13/10/2022	Thursday	Dry	0.9	0.0	N
14/10/2022	Friday	Dry	1.8	0.0	SW
18/10/2022	Tuesday	Dry	4.4	3.0	E
22/10/2022	Saturday	Dry	1.7	0.9	SW

Noise monitors:

Position 1: Brüel & Kjær Type 2260

Positions 2 - 5: Brüel & Kjær Type 2238

Spot measurements (Positions 1 - 5): Brüel & Kjær Type 2260

Noise monitor calibrated before and after the survey using a Brüel & Kjær Type 4230 calibrator with no deviations found

Unmanned monitors configured to measure consecutive samples of noise (2.5minute durations on 30/6/21 and 1minute durations for the remaining survey dates)

All noise measurements are free-field.

Weather station:

Weather station: Kestrel type 4500

Configuration: Configured to measure the average wind speed and temperature over consecutive 10-minute periods

Figure 1 provides an aerial view with the measurement locations identified, whilst Figure 2 shows the setting of the monitors.

The survey results are provided in:

Table A1, Appendix A: Weather station data

Tables A2 – A8, Appendix A: the consecutive measurements obtained at Positions 1 - 5. Note that the periods of identified wingwalking flights (either from observation of analysis of the noise data) are presented in red. Note that AeroSuperBatics are not required to keep flight logs; the wingwalker flights were identified by analysis of data and observation.

Table 5: The measured $L_{Amax,S}$ and SEL of example wingwalking and other aircraft

Figures 3 – 8: plots of the unmanned measurements made at Positions 1 - 5, with the periods of wingwalking flights highlighted.

Figure 9: provides the 1/3 octave band measurements of example wingwalking and other aircraft flights.

AeroSuperBatics provided the number of flights on each surveyed day, and additionally the approximate flight times on the 23 & 24/9/22.

During periods that the surveys were attended, the start and end times of the flights were recorded, which included taxiing and engine on times. For periods that the monitors were unattended, the survey data was analysed to identify sections of corresponding elevated noise levels at Positions 1 - 5; the elevated values recorded at Positions 1 and 5 informed on the total duration of the flight.

The number of identified flights (observed and determined from analysis of the noise data) matched the number of flights provided by AeroSuperBatics.

The noise levels recorded during the wingwalking flights will have also included the contribution of non-wingwalking noise sources; due to the irregular occurrence of these noise events it is not possible to remove the contribution of these other noise events from the survey data.

The elevated noise levels recorded outside of the flight periods will have been due to various other noise sources such as passing vehicles or non-wingwalking over-flights.

During the survey periods there were no non-wingwalking flights from the airfield; it is therefore not possible to review noise emissions generated by non-wingwalking aircraft using the airfield.

[redacted]

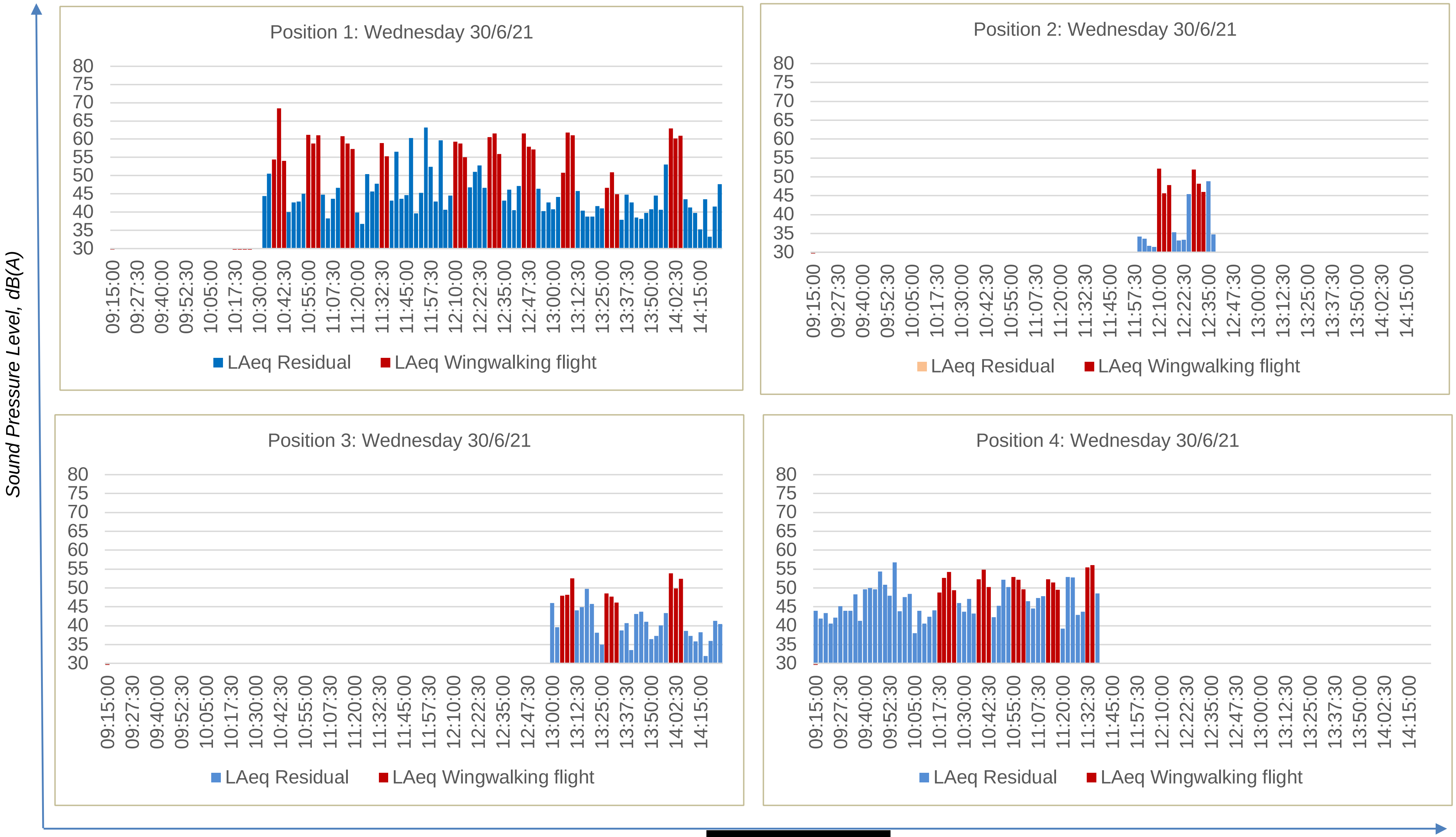
[redacted]

[redacted]

Figure 2. Photos of the settings of noise monitor Positions 3, 4 and 5

Table 5. Spot measurement data (free-field)

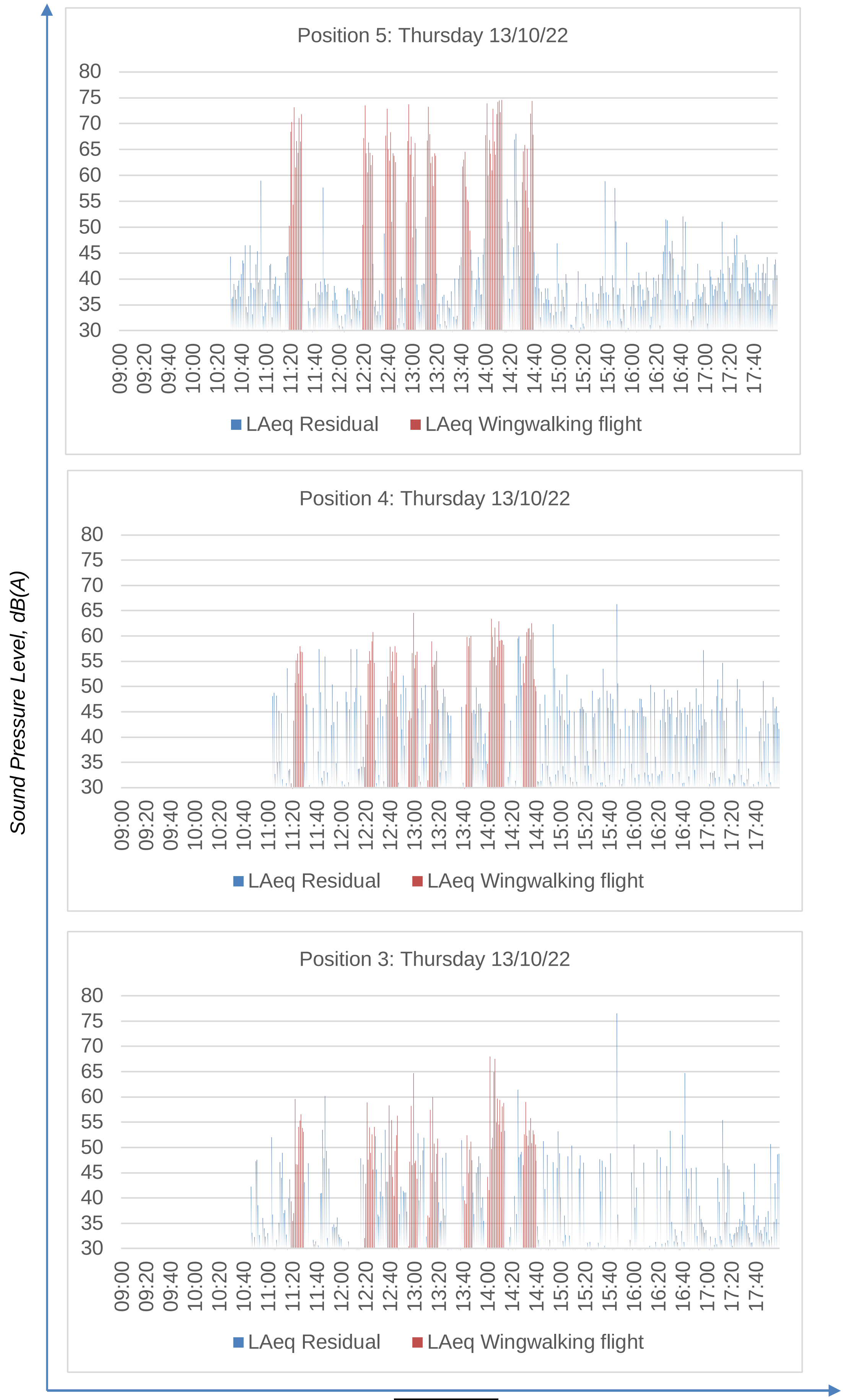
Position	Duration	$L_{Amax,S}$ dB	SEL dB	Aircraft	Notes
Wingwalking Flights					
1	01:14	51.1	62.3	Boeing Stearman	Engine start up & taxi
1	00:35	54.6	65.2	Boeing Stearman	Take off
1	00:23	50.4	60.0	Boeing Stearman	Taxing
1	01:20	64.6	74.5	Boeing Stearman	Fly pass + circling over airfield
1	00:41	65.5	74.4	Boeing Stearman	Fly pass + circling over airfield
1	01:26	61.5	74.9	Boeing Stearman	Fly pass + circling over airfield
2	01:07	60.2	70.3	Boeing Stearman	Banking at northern extent of the flight area
2	00:26	42.0	51.3	Boeing Stearman	Banking at northern extent of the flight area
2	00:36	58.0	65.7	Boeing Stearman	Banking at northern extent of the flight area
2	00:46	65.0	74.9	Boeing Stearman	Banking at northern extent of the flight area
2	01:10	66.7	76.4	Boeing Stearman	Banking at northern extent of the flight area
2	00:51	61.6	68.9	Boeing Stearman	Banking at northern extent of the flight area
3	00:43	68.2	75.4	Boeing Stearman	Fly pass/circling
3	01:42	64.2	73.6	Boeing Stearman	Fly pass/circling
3	01:28	61.9	68.2	Boeing Stearman	Fly pass/circling
3	00:22	61.1	69.0	Boeing Stearman	Fly pass/circling
3	01:19	66.6	76.5	Boeing Stearman	Fly pass at western edge of flight area
3	00:41	64.4	72.1	Boeing Stearman	Fly pass at western edge of flight area
3	00:34	66.8	76.7	Boeing Stearman	Fly pass at western edge of flight area
3	00:43	60.1	69.4	Boeing Stearman	Fly pass at western edge of flight area + stunts (sharp up/down)
3	00:39	61.0	70.9	Boeing Stearman	Fly pass at western edge of flight area + stunts (sharp up/down)
3	00:45	60.0	68.1	Boeing Stearman	Fly pass at western edge of flight area + stunts (sharp up/down)
3	00:46	56.5	66.3	Boeing Stearman	Banking at western edge of flight area to turn toward airfield
3	00:36	62.6	70.3	Boeing Stearman	Banking at western edge of flight area to turn toward airfield
3	00:41	54.9	60.9	Boeing Stearman	Banking at western edge of flight area to turn toward airfield
3	00:31	64.7	72.4	Boeing Stearman	Banking at western edge of flight area to turn toward airfield
3	00:36	51.7	61.2	Boeing Stearman	Banking at western edge of flight area to turn toward airfield
3	00:47	54.6	63.7	Boeing Stearman	Banking at western edge of flight area to turn toward airfield
4	01:31	61.0	73.0	Boeing Stearman	Fly pass/circling
4	01:15	59.5	73.2	Boeing Stearman	Fly pass/circling
4	01:44	58.6	72.2	Boeing Stearman	Fly pass/circling
4	01:39	65.3	76.3	Boeing Stearman	Fly pass/circling
4	01:19	61.9	74.3	Boeing Stearman	Fly pass/circling
4	01:17	62.6	74.7	Boeing Stearman	Fly pass/circling
4	00:41	65.9	71.5	Boeing Stearman	Banking to turn toward airfield
4	00:49	62.8	67.3	Boeing Stearman	Fly pass at western flight area
4	00:42	62.3	68.5	Boeing Stearman	Fly pass at western flight area
4	00:46	63.5	66.6	Boeing Stearman	Banking to turn toward airfield
4	00:47	66.2	74.7	Boeing Stearman	2 planes: fly pass at western flight area
4	00:44	62.2	70.4	Boeing Stearman	Fly pass at western flight area
4	00:43	63.7	70.3	Boeing Stearman	Fly pass at western flight area
4	00:40	60.0	66.8	Boeing Stearman	Fly pass at western flight area
4	00:51	68.6	76.7	Boeing Stearman	Fly pass at western flight area
5	03:26	77.9	89.3	Boeing Stearman	Taxing + take off
5	01:34	79.9	88.9	Boeing Stearman	Taxing + take off
5	02:45	77.8	88.9	Boeing Stearman	Taxing + take off + circling over airfield
5	00:28	70.4	78.9	Boeing Stearman	Fly pass mid airfield
5	00:35	70.0	77.3	Boeing Stearman	Fly pass mid airfield
5	02:05	76.5	87.3	Boeing Stearman	2 plane: fly passes + circling over airfield + stunts (sharp up and down)
5	02:14	71.0	81.3	Boeing Stearman	Fly pass near Position 1
5	00:46	74.9	81.9	Boeing Stearman	Fly pass near Position 1
5	00:36	71.5	79.0	Boeing Stearman	Fly pass mid airfield
5	00:45	66.9	76.7	Boeing Stearman	Fly pass mid airfield
5	00:35	71.2	78.3	Boeing Stearman	Fly pass mid airfield
5	00:37	71.8	79.2	Boeing Stearman	Fly pass mid airfield
5	00:43	70.0	78.3	Boeing Stearman	Fly pass mid airfield
Non-wingwalking aircraft					
3	00:46	49.6	60.3	Light single propeller plane	High level fly pass
3	00:52	66.9	76.6	Light single propeller plane	Low level fly pass
3	00:48	58.1	65.7	Light single propeller plane	Low level fly pass + circling
3	01:13	59.4	70.0	Light single propeller plane	High level fly pass
3	01:07	57.8	71.2	Light single propeller plane	Low level fly pass + stunts (loop the loop over airfield)
3	00:49	49.4	58.6	Light single propeller plane	High level fly pass
3	00:55	54.0	64.9	Light single propeller plane	High level fly pass
3	00:48	58.9	69.5	Light single propeller plane	High level fly pass
3	00:54	48.2	59.6	Light single propeller plane	High level fly pass
3	00:57	74.0	83.8	Helicopter	Mid level fly pass
3	01:01	62.9	76.3	Helicopter	Mid level fly pass
3	00:59	55.0	66.8	Military plane (4 propeller)	High level fly pass
3	00:51	72.1	82.2	Military plane (4 propeller)	High level fly pass
4	00:54	59.7	70.5	Light single propeller plane	Mid level fly pass
4	00:49	60.2	65.6	Light single propeller plane	Mid level fly pass
4	00:43	59.9	67.3	Light single propeller plane	Mid level fly pass


Sound Pressure Level, dB(A)
Position 1: Wednesday 30/6/21
LAeq Residual
LAeq Wingwalking flight
Position 2: Wednesday 30/6/21
LAeq Residual
LAeq Wingwalking flight
Position 3: Wednesday 30/6/21
LAeq Residual
LAeq Wingwalking flight
Position 4: Wednesday 30/6/21
LAeq Residual
LAeq Wingwalking flight

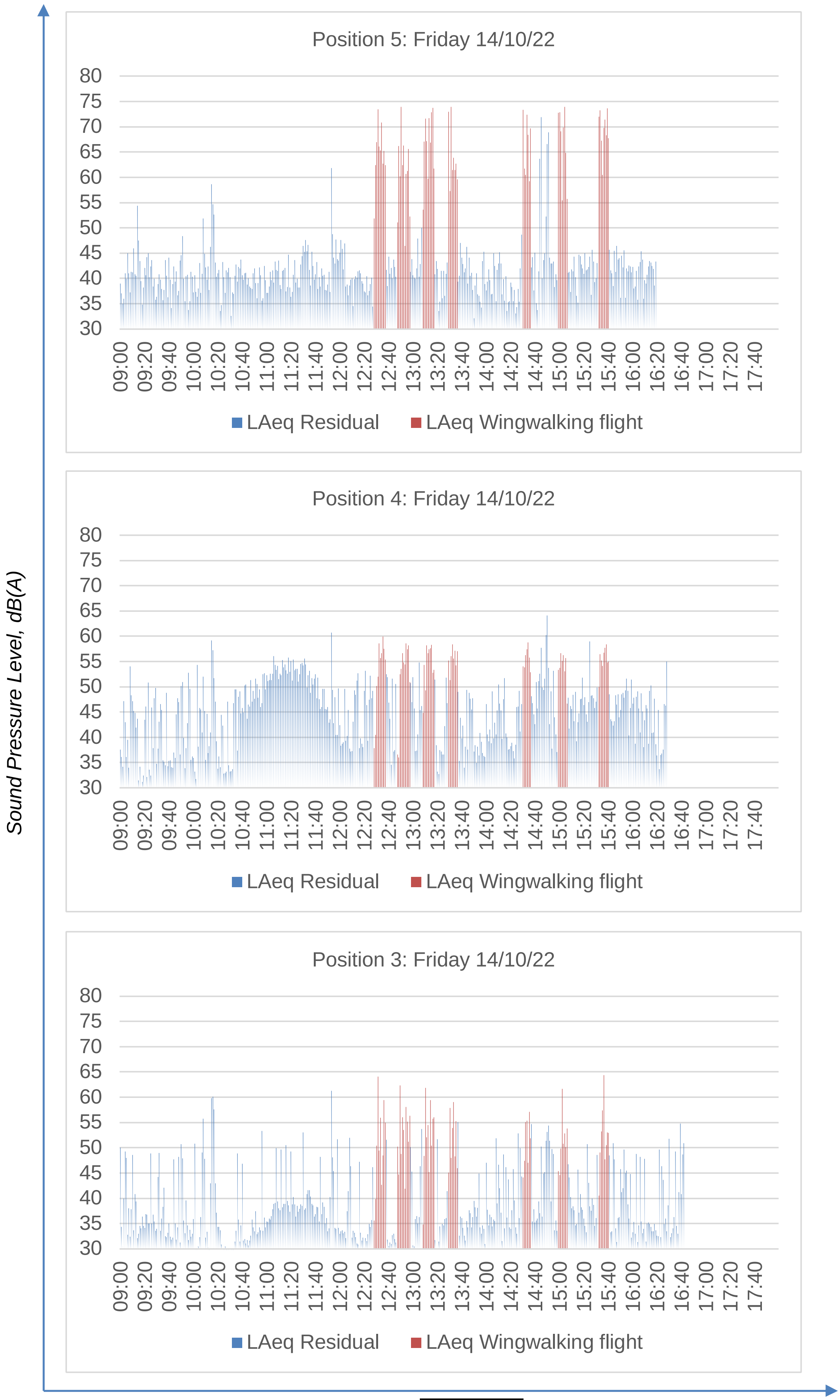
[redacted]


Sound Pressure Level, dB(A)
Position 4: Friday 23/9/22
Position 3: Saturday 24/9/22
Position 3: Friday 23/9/22
Position 4: Saturday 24/9/22
LAeq Residual
LAeq Wingwalking flight

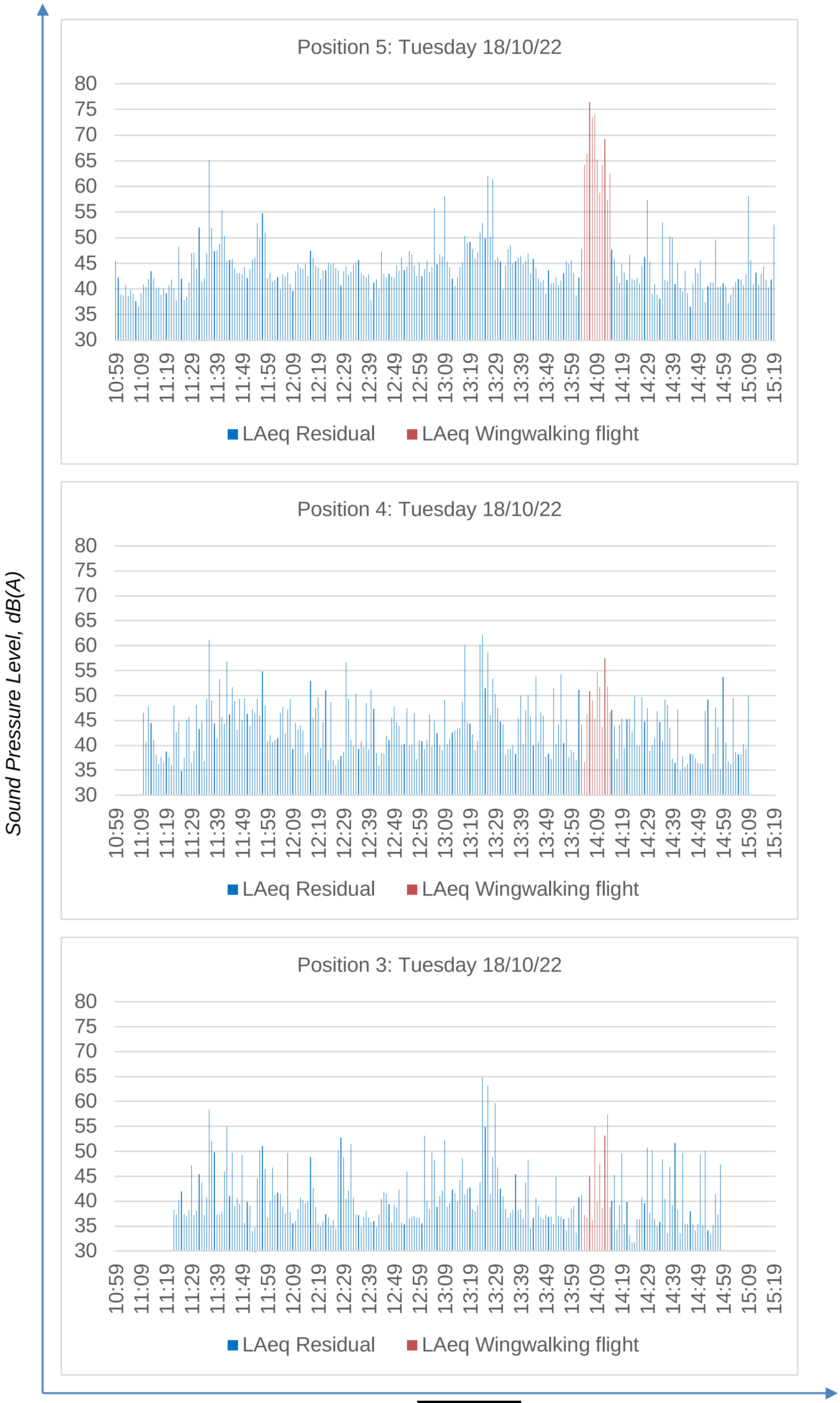
[redacted]


Sound Pressure Level, dB(A)
Position 5: Thursday 13/10/22
80
75
70
65
60
55
50
45
40
35
30
09:00 09:20 09:40 10:00 10:20 10:40 11:00 11:20 11:40 12:00 12:20 12:40 13:00 13:20 13:40 14:00 14:20 14:40 15:00 15:20 15:40 16:00 16:20 16:40 17:00 17:20 17:40
LAeq Residual
LAeq Wingwalking flight
Position 4: Thursday 13/10/22
80
75
70
65
60
55
50
45
40
35
30
09:00 09:20 09:40 10:00 10:20 10:40 11:00 11:20 11:40 12:00 12:20 12:40 13:00 13:20 13:40 14:00 14:20 14:40 15:00 15:20 15:40 16:00 16:20 16:40 17:00 17:20 17:40
LAeq Residual
LAeq Wingwalking flight
Position 3: Thursday 13/10/22
80
75
70
65
60
55
50
45
40
35
30
09:00 09:20 09:40 10:00 10:20 10:40 11:00 11:20 11:40 12:00 12:20 12:40 13:00 13:20 13:40 14:00 14:20 14:40 15:00 15:20 15:40 16:00 16:20 16:40 17:00 17:20 17:40
LAeq Residual
LAeq Wingwalking flight

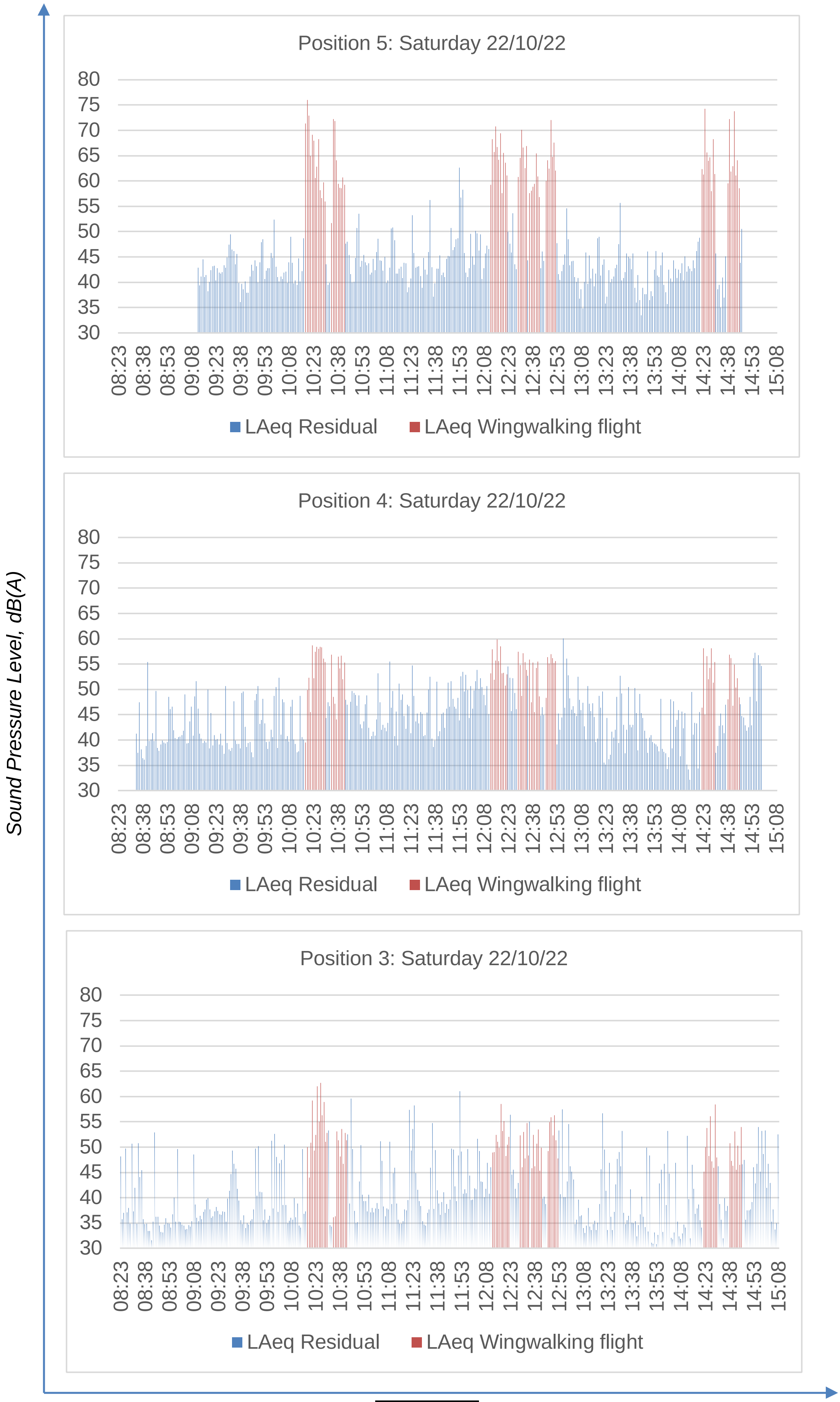
[redacted]


Sound Pressure Level, dB(A)
Position 5: Friday 14/10/22
80
75
70
65
60
55
50
45
40
35
30
09:00
09:20
09:40
10:00
10:20
10:40
11:00
11:20
11:40
12:00
12:20
12:40
13:00
13:20
13:40
14:00
14:20
14:40
15:00
15:20
15:40
16:00
16:20
16:40
17:00
17:20
17:40
LAeq Residual
LAeq Wingwalking flight
Position 4: Friday 14/10/22
Position 3: Friday 14/10/22

[redacted]


Sound Pressure Level, dB(A)
Position 5: Tuesday 18/10/22
80
75
70
65
60
55
50
45
40
35
30
10:59 11:09 11:19 11:29 11:39 11:49 11:59 12:09 12:19 12:29 12:39 12:49 12:59 13:09 13:19 13:29 13:39 13:49 13:59 14:09 14:19 14:29 14:39 14:49 14:59 15:09 15:19
LAeq Residual
LAeq Wingwalking flight
Position 4: Tuesday 18/10/22
80
75
70
65
60
55
50
45
40
35
30
10:59 11:09 11:19 11:29 11:39 11:49 11:59 12:09 12:19 12:29 12:39 12:49 12:59 13:09 13:19 13:29 13:39 13:49 13:59 14:09 14:19 14:29 14:39 14:49 14:59 15:09 15:19
LAeq Residual
LAeq Wingwalking flight
Position 3: Tuesday 18/10/22
80
75
70
65
60
55
50
45
40
35
30
10:59 11:09 11:19 11:29 11:39 11:49 11:59 12:09 12:19 12:29 12:39 12:49 12:59 13:09 13:19 13:29 13:39 13:49 13:59 14:09 14:19 14:29 14:39 14:49 14:59 15:09 15:19
LAeq Residual
LAeq Wingwalking flight

[redacted]


Sound Pressure Level, dB(A)
Position 5: Saturday 22/10/22
Position 4: Saturday 22/10/22
Position 3: Saturday 22/10/22
30 35 40 45 50 55 60 65 70 75 80
08:23 08:38 08:53 09:08 09:23 09:38 09:53 10:08 10:23 10:38 10:53 11:08 11:23 11:38 11:53 12:08 12:23 12:38 12:53 13:08 13:23 13:38 13:53 14:08 14:23 14:38 14:53 15:08
LAeq Residual
LAeq Wingwalking flight

[redacted]

Figure 9. 1/3 octave band measurements of example wingwalker/other aircraft flights

5. Findings

4.1 Survey Observations

During the survey it was observed that:

General noise environment:

- The general environmental noise levels are low, consisting of birdsong, road traffic and non-wingwalking aircraft passes
- The non wingwalking aircraft passes, of which there were approximately 10 per hour, consisted of helicopters, light single propellor planes and large 4 propellor military planes. These were all clearly audible for up to 5-minute durations, in particular the helicopters and low-level light aircraft. A single propellor plane was also observed performing stunts (loop the loop) to the north of the airfield.
- During the survey on the 30/623 a tractor was mowing the airfield; this will have influenced some of the measurements made at Position 1.

Wingwalking flights

- North-easterly take-off from Rendcomb airfield, with the take-off starting adjacent to Position 5 (we understand that the take-off direction varies depending on the wind direction/speed)
- The noise emissions of the Boeing Stearman taxiing/taking-off were at a low level, i.e., just audible, at Positions 2 – 4; at Position 5, which was adjacent to where the wingwalkers started the take-off, the plane was the dominant noise source.
- The noise emissions of landings, which were of short duration, were inaudible at Positions 2 - 4 and had lower noise emissions than fly passes
- The airtime of the wingwalker flights lasted approximately 8minutes
- Noise emissions from the Boeing Stearman engine were characterised by a lower frequency rumble
- The commercial wingwalker flights were conducted within the approximate area identified in Figure 1; there were no instances of a residential over-flight
- At each measurement position the commercial wingwalker flights were only clearly audible for parts of the flight circuit; typically, this resulted in 4 instances up to 1-minute periods of clearly audible plane noise at Positions 2 – 4 and 8 instances at Position 5.
- At observation locations 6 and 7 commercial wingwalker flights were audible on occasion at a low level; meaningful measurements could not be made as the plane noise was too low relative to the environmental noise.

4.2 Aircraft noise characteristics

The spot measurements of the Boeing Stearman's flights confirm that they produce characteristic tonal peaks at the 50Hz and 63Hz frequency bands, which are >10dB above the adjacent frequency bands; see Figure 8. This finding is consistent with the survey observations. It should be highlighted that below 50Hz the noise emissions significantly drop.

The Boeing Stearman did not contain any other identifiable noise characteristics.

The spot measurement of light propeller planes and helicopters identified that:

The light propeller planes have a tonal peak at around 125Hz

Helicopters have tonal peaks at 20Hz, 40Hz, 50Hz and 160Hz

The 1/3 octave band measurements identified that all aircraft included tonality, with the helicopters having the lowest frequency peaks.

4.3 Flight durations

Table 6 provides the total duration of each wingwalking flight, which includes taxing/take-off, air time and landing, during the 7 surveys. The overall average of the 58 flights is 10-minutes, which equates to approximately 8-minutes air time (taxiing/take-off and landing take around 2 minutes).

Table 6. Wingwalker total flight durations

Flight	30/6/21	23/9/22	24/9/22	13/10/22	14/10/22	18/10/22	22/10/22
1	11	10	9	11	10	11	13
2	8	15	10	9	11		9
3	9	12	11	9	10		11
4	9	10	12	8	8		6
5	7	11	13	9	7		7
6	9	8	9	7	8		7
7	7	11	11	14	9		9
8	8	8	12	11			8
9	7	8	9				
10	9		8				
11	8		11				
12			10				
13			10				
14			9				
Total Average	10						

4.4 Measured ambient noise levels with and without wingwalker flights

Table 7 provides the measured ambient noise levels with and without the contribution of the wingwalker flights at Positions 3, 4 and 5 over the duration of the surveys conducted in 2022 (the 2021 data has not been included due to the reduced duration of the survey).

Table 7. Measured L_{Aeq} values at Positions 1, 3 and 4

No. of Flights	Day	Date	Position 3				Position 4				Position 5			
			$L_{Aeq,T}$ dB				$L_{Aeq,T}$ dB				$L_{Aeq,T}$ dB			
			A	B	C	D	A	B	C	D	A	B	C	D
9	Fri	23/9/22	47.4	34.1	47.6	0.2	48.1	42.7	49.2	1.1				
14	Sat	24/9/22	46.4	38.1	47.0	0.6	45.1	45.7	48.4	3.3				
8	Thurs	13/10/22	52.6	47.2	53.7	1.1	46.4	49.3	51.1	4.7	47.1	60.4	60.6	13.5
7	Fri	14/10/22	45.2	46.5	48.9	3.7	49.2	46.0	50.9	1.7	50.1	60.4	60.8	10.7
1	Tues	18/10/22	47.7	34.4	47.9	0.2	48.2	34.9	48.4	0.2	48.2	56.5	57.1	8.9
8	Sat	22/10/22	46.5	45.2	48.9	2.4	47.6	47.0	50.3	2.7	46.4	60.1	60.3	13.9

A = Residual; decibel average of all the measurements obtained during periods without wingwalking flights

B = Noise levels during wingwalking flights; decibel average of all the measurements made during the identified wingwalking flights

C = Residual + wingwalking flights

D = Change in the ambient noise level due to the contribution of the wingwalking flights

As can be seen in Table 7, the identified change in the ambient noise levels and corresponding IEMA effect descriptor ranges between:

Position 3: 0.2 – 3.7dB; ‘Not significant’ to ‘slight’

Position 5: 8.9 – 13.9dB; ‘Substantial’ to ‘Very substantial’

Position 4: 0.2 – 4.7dB; ‘Not significant’ to ‘slight’

It should be noted that a direct correlation between the number of wingwalking flights and increase in ambient noise levels was not identified. This finding highlights that there is a degree of variation in the plane noise emissions on a flight-to-flight basis, which will be due to the maneuvers being undertaken and exact flight path.

At Positions 3 and 4 the ambient noise levels during the wingwalking flights do not exceed the LOAEL $L_{Aeq,9hr}$ 51 dB threshold. At Position 5 however the LOAEL $L_{Aeq,9hr}$ 51 dB threshold was consistently exceeded; this is expected as Position 1 was adjacent to the start of the take-off location of the planes, which had a significant impact on the noise emissions.

We consider that context must be taken into consideration when viewing the higher noise emissions at Position 5. The dwellings that this location represents are directly on the western boundary of the airfield, and consequently high plane noise emissions, in particular for take-offs, are inevitable and expected (that be for wingwalking or other aircraft). The occupiers of these dwellings will be fully aware of their proximity to the airfield and therefore the noise implementations (AeroSuperBatics have been operating wingwalking flights from Rencomb Airfield for the last 28 years).

We therefore consider the exceedance of the LOAEL threshold is acceptable at Position 1, as it is within context for dwellings bounding a small airfield.

It should also be highlighted that at Position 1 recorded lower wingwalking noise emissions; this will be due to a combination of the monitor being located further to the north and the mid-airfield take-off location used by the planes on the 30/6/21. The noise emissions at the dwellings along the western boundary will therefore vary, with the 2022 surveys identify the highest expected noise emissions due to the south-west corner take-off location used.

4.5 Calculated wingwalking flight noise emissions

The maximum number of flights proposed for the commercial wingwalking flights is 20 per day.

To establish the aggregate wingwalking noise emissions at Positions 2 - 5 for this worst-case scenario, the noise levels have been calculated using the average measured SEL levels of the clearly audible sections of the commercial wingwalking flights.

For the calculation four periods of clearly audible wingwalking flight noise at Positions 2 – 4 have been assumed between 10:00 – 16:00hrs; at Position 5 eight periods have been used together with a take-off per flight. The calculation is provided in Table 8, which includes the aggregate of the wingwalking noise emissions and environmental noise (logarithmic average of the 7 survey days) and corresponding change in noise level.

As can be seen in Table 8, the resultant wingwalking noise emissions do not exceed the LOAEL L_{Aeq} 51dB threshold at Positions 2 – 4. Note that this finding holds true even if the highest measured SEL’s are used.

At Position 5 the LOAEL L_{Aeq} 51dB threshold is exceeded by around 9dB.

The change in noise levels is <5dB at Positions 2 – 4 (IEMA ‘slight’ change in noise level) and >10dB at Position 1 (IEMA ‘very substantial’ change in noise level)

These findings are consistent with the measured noise emissions presented in Table 7.

Table 8. Calculation of Wingwalking Flight and Aggregate L_{Aeq}					
	Pos 2	Pos 3	Pos 4	Pos 5	
	Flight	Flight	Flight	Take-off	Flight
SEL average, dB	73	72	72	89	79
Highest SEL , dB	76	77	77	89	87
No. of audible events	80	80	80	20	160
No. events correction, dB	19	19	19	13	22
Time correction, dB	45.1	45.1	45.1	45.1	45.1
Average $L_{Aeq,9hr}$ dB	47	46	46	57	56
Highest $L_{Aeq,9hr}$ dB	50	51	51	57	64
General environmental noise, $L_{Aeq,9hr}$ dB	46	47	49	48	
Aggregate (flight + environmental), $L_{Aeq,9hr}$ dB	53	53	54	60	
Change	7	6	5	12	

4.6 N65

Table 9 provides the N65 at Positions 3, 4 and 5 during the wingwalking flights for each survey together with the average N65 per flight. Note that the N65 has been determined using the consecutive 1-minute measurements.

Using the established overall average N65 per flight, the total N65 over the 9-hr day period that the wingwalking operates for the proposed maximum of 20 wingwalking flights would be:

Position 3: 28

Position 4: 10

Position 5: 101

Note that a N65 for Position 2 has not been established as long term measurements were not possible due to there being no suitable secure location for a noise monitor. It is expected however that the N65 will be similar to those established at Position 3.

The N65 at Positions 3 and 4 at are not high, being at highest <30 individual events over a 9hr period (based on the maximum of 20 wingwalker flights); to put this into perspective that is less than 30 instances of an individual maximum event that exceeds 65dB over 540 minutes. It should also be highlighted that other aircraft fly passes also resulted in exceedance of $L_{Amax,S}$ 65dB

We therefore consider the relatively low N65 at Positions 3 and 4 (and expected at position 2) to be acceptable.

The significantly higher N65 at Position 5 is predominately due to the take-offs. As already discussed, we consider that this is acceptable when context is taken into account.

Table 9. N65 ($L_{Amax,S}$)								
No. of Flights	Day	Date	Position 1		Position 3		Position 4	
			N65		N65		N65	
			Total	Average per flight	Total	Average per flight	Total	Average per flight
9	Fri	23/9/22			5	0.6	2	0.2
14	Sat	24/9/22			7	0.5	21	1.5
8	Thurs	13/10/22	47	5.9	18	2.3	0	0
7	Fri	14/10/22	26	3.7	13	1.9	0	0
1	Tues	18/10/22	7	7	2	2	1	1
8	Sat	22/10/22	28	3.5	9	1.1	3	0.4
Overall average N65 per flight				5.0		1.4		0.5

6. Conclusion

Surveys over 7 days of wingwalking flights has been conducted to review the noise emissions of the commercial wingwalking flights at Rendcomb Airfield.

The survey established that the Boeing Stearman, as used for the wingwalking, contained tonal peaks at 50H and 63Hz; this was perceived as a distinctive low frequency rumble. Other aircraft using the air space locally were also identified to have a tonal signature, with Helicopters having a tonal peak as low as 20Hz.

Analysis of the survey data, which had up to 14 flights within a single day, established that at the dwellings to the north, north-east, east and south-east of the airfield the wingwalker noise emissions resulted in:

- Compliance with the LOAEL threshold with regard to plane noise
- Low N65 values
- ‘Slight’ change in noise according to IEMA guidance

These findings hold true for the calculated noise emissions for the proposed maximum of 20 wingwalker flights in any one day (each flight is on average 8-minutes airtime).

For the dwellings along the western boundary of the airfield the wingwalker noise emissions were significantly higher. These higher noise emissions however are considered to be acceptable when taking into consideration context; dwellings directly bounding the airfield will inevitable be exposed to higher plane noise, be that from wingwalker events or other aircraft. The occupiers of these dwellings will be fully aware of their proximity to the airfield and therefore the noise implementations (AeroSuperBatics have been operating wingwalking flights from Rencomb Airfield for the last 28 years).

The survey established that that there is a degree of variation in the wingwalker noise emissions on a flight-to-flight basis, which will be due to the maneuvers being undertaken and exact flight path. This does not alter the overall survey findings; there is however potential for a significant reduction in noise emissions for the western dwellings for alternative take-off locations (these are dictated by the weather) than occurred for the majority of the surveyed days.

Table A1. Weather station data							
Time	Wed	Fri	Sat	Thurs	Fri	Tues	Sat
	30/06/2021	23/09/2022	23/10/2022	13/10/2022	14/10/2022	18/10/2022	22/10/2022
	Wind Speed, m/s						
09:00		0.0	0.0		0.0		
09:10	0.7	0.0	0.0		0.0		
09:20	1.3	0.0	0.0	0.0	0.0		1.3
09:30	0.0	0.0	1.1	0.0	0.0		0.0
09:40	0.0	0.0	1.1	0.0	0.0		0.0
09:50	0.0	0.8	1.2	0.0	0.0		0.9
10:00	0.0	2.5	0.0	0.0	0.6		0.6
10:10	0.0	0.0	1.6	0.0	0.7		0.7
10:20	0.0	0.9	2.5	0.0	0.5		1.0
10:30	0.0	0.0	1.5	0.0	0.0		1.3
10:40	0.0	0.5	1.3	0.0	0.0		0.6
10:50	0.0	0.5	1.2	0.0	0.6		0.5
11:00	0.0	0.0	2.5	0.0	0.0		0.0
11:10	0.3	0.7	1.2	0.8	0.0	3.0	0.9
11:20	0.8	1.5	2.8	0.0	0.0	2.9	0.6
11:30	0.0	0.0	2.1	0.0	0.0	3.3	1.7
11:40	0.0	0.8	0.4	0.0	0.5	3.0	1.4
11:50	0.5	0.0	1.9	0.0	0.0	2.3	0.4
12:00	0.0	0.0	0.8	0.0	0.4	3.6	1.1
12:10	0.0	0.6	2.6	0.0	1.0	1.9	1.3
12:20	0.5	1.5	1.8	0.0	0.4	2.7	1.7
12:30	1.0	0.0	1.5	0.9	0.0	3.0	1.4
12:40	0.0	0.9	3.0	0.0	1.0	3.3	1.4
12:50	0.0	0.4	2.2	0.0	0.0	2.4	1.4
13:00	0.0	0.6	1.9	0.0	0.8	3.9	0.7
13:10	0.0	0.7	1.7	0.8	0.6	1.7	1.0
13:20	0.0	1.5	2.5	0.0	0.0	3.5	0.7
13:30	0.0	1.2	2.1	0.0	0.0	4.4	0.5
13:40	0.0	0.7	2.6	0.0	1.1	4.1	1.1
13:50	0.0	0.0	1.6	0.0	0.3	2.6	1.0
14:00	0.0	0.4	3.8	0.0	0.4	4.0	0.9
14:10	0.0	0.4	2.6	0.0	0.0	2.3	0.9
14:20	0.0	2.1	2.2	0.7	0.0	3.3	1.3
14:30		0.0	3.8	0.0	1.8	2.5	0.8
14:40		1.0	2.8	0.0	1.4	1.3	0.9
14:50		0.4	1.6	0.0	0.0	2.6	1.4
15:00		0.0	3.0	0.0	0.4	1.2	0.0
15:10		1.1	3.1	0.0	0.0	3.1	
15:20		0.3	3.2	0.0	1.3	1.8	
15:30		0.4	3.0	0.0	1.1		
15:40		0.0	2.5	0.6	0.6		
15:50		0.8	4.2	0.0	0.0		
16:00		0.9	3.7	0.0	0.5		
16:10		0.9	2.9	0.0	0.0		
16:20		0.0	5.0	0.0	0.9		
16:30		2.0	2.2	0.0	0.0		
16:40		1.7	2.8	0.0	1.0		
16:50		1.9	2.4	0.0	0.0		
17:00		1.9	2.3	0.0	0.5		
17:10		0.5	2.3	0.0	0.7		
17:20		0.0	2.7	0.0	0.0		
17:30		0.8	2.4	0.0	0.0		
17:40		0.0	2.7	0.0	0.0		
17:50		1.1	2.5	0.0	0.0		
Max	*1.3*	*2.5*	*5.0*	*0.9*	*1.8*	*4.4*	*1.7*
Median	*0.0*	*0.5*	*2.3*	*0.0*	*0.0*	*3.0*	*0.9*

Table A2. Wednesday 30/6/23 - Positions 1 - 4 L_{Aeq} measurements (free-field)

Start Time	Position				Start Time	Position				Start Time	Position			
	1	2	3	4		1	2	3	4		1	2	3	4
09:15:00				43.9	11:00:00	61.0			49.6	12:45:00	61.5			
09:17:30				41.9	11:02:30	44.8			46.5	12:47:30	57.9			
09:20:00				43.4	11:05:00	38.2			44.5	12:50:00	57.2			
09:22:30				40.6	11:07:30	43.6			47.3	12:52:30	46.4			
09:25:00				42.1	11:10:00	46.7			47.8	12:55:00	40.3			
09:27:30				45.2	11:12:30	60.8			52.3	12:57:30	42.6			
09:30:00				44.0	11:15:00	58.8			51.4	13:00:00	40.8		46.0	
09:32:30				44.0	11:17:30	57.3			49.5	13:02:30	44.1		39.6	
09:35:00				48.3	11:20:00	39.9			39.2	13:05:00	50.8		48.0	
09:37:30				41.3	11:22:30	36.8			52.9	13:07:30	61.8		48.2	
09:40:00				49.6	11:25:00	50.4			52.8	13:10:00	61.0		52.5	
09:42:30				50.0	11:27:30	45.6			42.9	13:12:30	45.8		44.1	
09:45:00				49.7	11:30:00	47.8			43.7	13:15:00	40.4		44.9	
09:47:30				54.4	11:32:30	58.9			55.4	13:17:30	38.8		49.8	
09:50:00				50.9	11:35:00	55.3			56.0	13:20:00	38.8		45.8	
09:52:30				48.0	11:37:30	43.1			48.6	13:22:30	41.6		38.1	
09:55:00				56.8	11:40:00	56.6				13:25:00	41.0		35.0	
09:57:30				43.8	11:42:30	43.7				13:27:30	46.7		46.5	
10:00:00				47.6	11:45:00	44.7				13:30:00	50.9		47.7	
10:02:30				48.4	11:47:30	60.3				13:32:30	44.9		46.1	
10:05:00				38.0	11:50:00	39.6				13:35:00	37.9		38.7	
10:07:30				44.0	11:52:30	45.3				13:37:30	44.8		40.7	
10:10:00				40.6	11:55:00	63.2				13:40:00	42.7		33.5	
10:12:30				42.4	11:57:30	52.4				13:42:30	38.5		43.1	
10:15:00				44.1	12:00:00	42.9	34.2			13:45:00	38.1		43.7	
10:17:30				48.8	12:02:30	59.7	33.6			13:47:30	39.7		41.1	
10:20:00				52.7	12:05:00	40.6	31.7			13:50:00	40.8		36.4	
10:22:30				54.2	12:07:30	44.5	31.4			13:52:30	44.5		37.3	
10:25:00				49.4	12:10:00	59.3	52.2			13:55:00	40.6		40.1	
10:27:30				46.0	12:12:30	58.8	45.6			13:57:30	53.0		43.4	
10:30:00				43.7	12:15:00	55.0	47.8			14:00:00	62.9		53.9	
10:32:30	44.4			47.1	12:17:30	46.8	35.3			14:02:30	60.2		49.9	
10:35:00	50.5			43.2	12:20:00	51.0	33.1			14:05:00	60.9		52.4	
10:37:30	54.4			52.3	12:22:30	52.8	33.3			14:07:30	43.5		38.6	
10:40:00	68.4			54.9	12:25:00	46.6	45.4			14:10:00	41.3		37.3	
10:42:30	54.1			50.2	12:27:30	60.6	52.0			14:12:30	39.8		35.8	
10:45:00	40.0			42.2	12:30:00	61.5	48.2			14:15:00	35.2		38.3	
10:47:30	42.7			45.3	12:32:30	55.9	46.0			14:17:30	43.5		32.0	
10:50:00	42.9			52.2	12:35:00	43.1	48.8			14:20:00	33.2		36.0	
10:52:30	45.0			50.3	12:37:30	46.1	34.8			14:22:30	41.5		41.3	
10:55:00	61.2			52.9	12:40:00	40.5				14:25:00	47.6		40.4	
10:57:30	58.8			52.2	12:42:30	47.1								

Table A3. Friday 23/9/22 - Positions 3 and 4 L_{Aeq} measurements (free-field)

Start	Position		Start	Position		Start	Position		Start	Position		Start	Position		Start	Position		Start	Position		Start	Position		Start	Position		Start	Position	
Time	3	4	Time	3	4	Time	3	4	Time	3	4	Time	3	4	Time	3	4	Time	3	4	Time	3	4	Time	3	4	Time	3	4
09:00			09:54			10:48			11:42			12:36	36.6	45.0	13:30	31.6	31.0	14:24	46.5	49.7	15:18	30.5	35.8	16:12	47.6	46.4	17:06	29.1	37.7
09:01			09:55			10:49			11:43			12:37	36.3	47.2	13:31	32.0	37.1	14:25	34.3	52.8	15:19	27.9	41.4	16:13	58.7	61.1	17:07	32.7	41.4
09:02			09:56			10:50			11:44			12:38	47.4	48.7	13:32	36.2	47.7	14:26	34.0	48.9	15:20	58.3	48.8	16:14	50.0	51.1	17:08	30.3	40.7
09:03			09:57			10:51			11:45		42.2	12:39	58.8	51.0	13:33	33.9	55.2	14:27	29.9	46.3	15:21	64.8	46.0	16:15	38.6	43.8	17:09	31.7	36.3
09:04			09:58			10:52			11:46		47.1	12:40	41.9	55.3	13:34	35.4	42.1	14:28	31.4	42.9	15:22	38.7	36.4	16:16	48.5	45.5	17:10	48.5	34.3
09:05			09:59			10:53			11:47		44.9	12:41	38.8	43.5	13:35	33.7	42.7	14:29	34.5	46.3	15:23	46.9	45.9	16:17	33.2	51.4	17:11	58.4	55.4
09:06			10:00			10:54			11:48		45.6	12:42	34.8	45.6	13:36	55.3	46.4	14:30	35.0	45.2	15:24	41.4	51.2	16:18	33.7	39.1	17:12	48.8	48.2
09:07			10:01			10:55			11:49		37.2	12:43	32.3	43.8	13:37	41.1	46.1	14:31	34.2	47.2	15:25	34.9	41.9	16:19	34.1	38.2	17:13	30.3	41.5
09:08			10:02			10:56			11:50		41.8	12:44	48.1	53.8	13:38	36.1	51.5	14:32	34.6	52.1	15:26	37.1	42.3	16:20	32.4	38.4	17:14	29.9	36.2
09:09			10:03			10:57			11:51		31.7	12:45	37.7	57.0	13:39	33.7	43.6	14:33	32.4	50.2	15:27	34.7	44.4	16:21	32.1	42.8	17:15	47.2	35.7
09:10			10:04			10:58			11:52		41.0	12:46	33.6	41.9	13:40	30.7	47.6	14:34	30.5	46.4	15:28	43.5	50.6	16:22	32.8	46.3	17:16	34.2	47.6
09:11			10:05			10:59			11:53		38.6	12:47	48.1	37.5	13:41	32.1	48.2	14:35	34.2	44.3	15:29	46.7	55.9	16:23	34.7	35.4	17:17	35.3	38.3
09:12			10:06			11:00			11:54		39.0	12:48	39.9	44.1	13:42	44.5	48.4	14:36	41.5	48.1	15:30	33.9	42.0	16:24	39.0	34.4	17:18	57.2	55.2
09:13			10:07			11:01			11:55		46.6	12:49	46.2	41.0	13:43	31.9	56.3	14:37	37.9	50.9	15:31	35.1	34.5	16:25	33.2	34.3	17:19	39.4	59.8
09:14			10:08			11:02			11:56		43.8	12:50	44.1	47.0	13:44	47.5	48.9	14:38	47.6	47.6	15:32	36.9	38.7	16:26	33.3	48.5	17:20	32.8	30.6
09:15			10:09			11:03			11:57		37.8	12:51	34.6	45.3	13:45	52.6	49.4	14:39	31.7	49.2	15:33	37.7	34.9	16:27	32.1	46.5	17:21	47.7	35.5
09:16			10:10			11:04			11:58		48.3	12:52	44.8	44.1	13:46	34.5	49.9	14:40	48.4	43.9	15:34	34.8	34.8	16:28	32.0	31.3	17:22	46.5	42.8
09:17			10:11			11:05			11:59		45.3	12:53	36.3	44.6	13:47	32.0	51.3	14:41	48.7	48.5	15:35	46.7	41.1	16:29	30.6	31.4	17:23	50.5	41.8
09:18			10:12			11:06			12:00		48.4	12:54	37.3	41.8	13:48	49.7	50.3	14:42	35.5	48.1	15:36	32.4	43.2	16:30	30.5	32.1	17:24	54.5	57.6
09:19			10:13			11:07			12:01		42.4	12:55	35.9	46.8	13:49	29.2	43.2	14:43	44.6	45.2	15:37	30.9	37.5	16:31	44.3	31.8	17:25	37.0	42.8
09:20			10:14			11:08			12:02		47.0	12:56	47.6	45.6	13:50	48.7	50.0	14:44	40.4	52.3	15:38	36.5	48.8	16:32	30.4	40.9	17:26	47.7	33.8
09:21			10:15			11:09			12:03		45.3	12:57	38.4	35.8	13:51	31.3	50.7	14:45	38.2	62.7	15:39	50.7	53.3	16:33	29.7	39.3	17:27	35.0	34.2
09:22			10:16			11:10			12:04		51.7	12:58	38.4	51.7	13:52	45.1	51.0	14:46	61.4	53.9	15:40	37.1	48.8	16:34	47.4	40.6	17:28	36.8	33.2
09:23			10:17			11:11			12:05		53.1	12:59	37.7	45.0	13:53	31.2	52.0	14:47	47.3	55.9	15:41	35.9	37.5	16:35	38.4	39.1	17:29	41.0	31.4
09:24			10:18			11:12			12:06		54.0	13:00	36.3	40.3	13:54	33.6	49.8	14:48	36.6	40.5	15:42	35.6	45.8	16:36	38.5	36.5	17:30	34.7	41.7
09:25			10:19			11:13			12:07		55.0	13:01	44.5	46.8	13:55	46.9	53.1	14:49	34.5	42.0	15:43	33.7	45.2	16:37	38.2	36.2	17:31	35.9	43.5
09:26			10:20			11:14			12:08		56.1	13:02	35.8	42.4	13:56	32.6	54.2	14:50	48.4	44.3	15:44	33.9	45.9	16:38	36.6	42.2	17:32	35.1	33.4
09:27			10:21			11:15			12:09		54.9	13:03	44.4	43.3	13:57	32.8	51.3	14:51	45.3	47.2	15:45	35.1	35.1	16:39	35.9	42.5	17:33	38.3	36.6
09:28			10:22			11:16			12:10		52.0	13:04	46.7	44.9	13:58	35.7	54.0	14:52	37.5	48.6	15:46	35.0	35.7	16:40	47.3	39.0	17:34	34.7	39.0
09:29			10:23			11:17			12:11	50.1	51.4	13:05	34.7	44.5	13:59	33.5	51.2	14:53	44.4	46.0	15:47	36.9	37.8	16:41	43.6	43.0	17:35	35.7	42.2
09:30			10:24			11:18			12:12	47.6	54.0	13:06	35.1	45.9	14:00	31.3	47.8	14:54	50.1	46.7	15:48	35.6	38.1	16:42	34.3	45.6	17:36	36.8	32.8
09:31			10:25			11:19			12:13	45.8	51.6	13:07	36.5	47.7	14:01	40.8	55.5	14:55	49.9	43.7	15:49	30.8	47.0	16:43	35.5	41.8	17:37	36.2	33.7
09:32			10:26			11:20			12:14	34.0	45.6	13:08	35.3	33.8	14:02	57.6	50.0	14:56	32.8	50.1	15:50	31.7	45.2	16:44	36.1	43.6	17:38	42.5	32.8
09:33			10:27			11:21			12:15	30.6	46.2	13:09	33.2	42.8	14:03	47.0	57.1	14:57	45.8	38.5	15:51	33.5	42.2	16:45	34.7	38.3	17:39	44.4	35.0
09:34			10:28			11:22			12:16	44.7	50.9	13:10	38.1	44.0	14:04	33.7	54.4	14:58	41.0	42.0	15:52	33.8	46.4	16:46	32.3	42.4	17:40	52.1	44.8
09:35			10:29			11:23			12:17	31.2	50.1	13:11	36.7	45.0	14:05	32.2	54.3	14:59	51.4	49.3	15:53	35.8	45.9	16:47	31.4	40.1	17:41	34.9	34.5
09:36			10:30			11:24			12:18	43.0	50.4	13:12	34.8	43.2	14:06	31.3	57.3	15:00	42.2	48.7	15:54	47.4	37.9	16:48	49.7	42.9	17:42	36.5	42.8
09:37			10:31			11:25			12:19	45.3	50.8	13:13	48.5	43.3	14:07	46.7	59.6	15:01	38.0	44.8	15:55	34.3	42.3	16:49	44.5	33.3	17:43	48.0	42.9
09:38			10:32			11:26			12:20	45.4	49.6	13:14	39.4	48.9	14:08	44.6	56.5	15:02	38.0	41.9	15:56	43.6	40.7	16:50	48.4	32.5	17:44	48.4	34.5
09:39			10:33			11:27			12:21	37.1	51.9	13:15	36.5	44.3	14:09	30.3	49.7	15:03	31.0	45.4	15:57	35.4	38.2	16:51	34.7	41.3	17:45	41.6	42.7
09:40			10:34			11:28			12:22	44.0	51.1	13:16	57.1	54.8	14:10	31.4	43.6	15:04	32.7	51.7	15:58	35.1	48.0	16:52	33.3	42.7	17:46	34.3	34.7
09:41			10:35			11:29			12:23	55.8	54.0	13:17	60.1	60.8	14:11	32.2	47.9	15:05	58.8	49.1	15:59	36.3	42.4	16:53	48.2	42.3	17:47	31.4	31.0
09:42			10:36			11:30			12:24	41.5	52.6	13:18	47.4	42.2	14:12	34.6	42.6	15:06	44.0	53.3	16:00	48.3	38.5	16:54	48.3	34.1	17:48	31.9	36.3
09:43			10:37			11:31			12:25	38.6	55.2	13:19	41.5	44.7	14:13	32.6	44.7	15:07	39.4	47.8	16:01	45.5	44.7	16:55	46.8	41.7	17:49	31.1	43.8
09:44			10:38			11:32			12:26	37.2	51.5	13:20	53.2	33.9	14:14	50.8	46.9	15:08	37.1	37.7	16:02	32.5	44.6	16:56	33.2	40.9	17:50	52.8	50.6
09:45			10:39			11:33			12:27	38.1	48.2	13:21	48.5	41.3	14:15	36.1	42.2	15:09	33.6	44.6	16:03	31.3	40.0	16:57	48.5	43.1	17:51	41.2	47.0
09:46			10:40			11:34			12:28	40.3	55.1	13:22	34.3	47.2	14:16	36.4	41.2	15:10	50.4	53.3	16:04	32.2	41.1	16:58	45.3	34.6	17:52	45.2	36.1
09:47			10:41			11:35			12:29	42.2	51.0	13:23	35.1	35.5	14:17	36.8	47.2	15:11	46.1	49.9	16:05	31.9	41.4	16:59	33.9	33.5	17:53	48.6	45.0
09:48			10:42			11:36			12:30	52.5	41.8	13:24	34.6	36.1	14:18	57.6	53.4	15:12	34.8	48.0	16:06	33.7	35.2	17:00	33.2	36.2	17:54	32.3	35.2
09:49			10:43			11:37			12:31	47.7	38.0	13:25	57.9	46.1	14:19	45.8	56.9	15:13	46.5	42.2	16:07	48.6	37.6	17:01	35.7	46.4	17:55	47.3	36.9
09:50			10:44			11:38			12:32	35.0	47.6	13:26	40.2	45.3	14:20	38.5	54.5	15:14	31.4	39.2	16:08	38.2	40.6	17:02	33.4	36.8	17:56	28.8	39.8
09:51			10:45			11:39			12:33	38.8	44.7	13:27	47.5	44.2	14:21	34.5	44.0	15:15	33.1	47.5	16:09	47.2	45.2	17:03	30.1	33.1	17:57	29.0	44.4
09:52			10:46			11:40			12:34	44.7	47.7	13:28	30.0	52.0	14:22	33.9	43.2	15:16	32.8	49.1	16:10	46.9	50.8	17:04	31.9	32.9	17:58	29.1	36.0
09:53			10:47			11:41			12:35	47.8	45.2	13:29	32.2	42.8	14:23	32.4	44.8	15:17	44.6	40.0	16:11	33.9	42.2	17:05	30.8	36.0	17:59	29.7	36.6

Table A4: Saturday 24/9/22 - Positions 3 and 4 L_{Aeq} measurements (free-field)

Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4	Start Time	Position 3	Position 4
09:00	40.4	44.0	09:54	48.0	52.5	10:48	43.3	39.7	11:42	40.9	39.1	12:36	37.1	37.0	13:30	40.1	40.7	14:24	35.3	40.6	15:18	38.0	41.3	16:12	39.5	39.8	17:06	41.5	29.2
09:01	39.5	37.0	09:55	59.2	45.1	10:49	43.2	49.1	11:43	40.5	37.0	12:37	37.9	35.7	13:31	40.7	40.0	14:25	35.5	44.2	15:19	45.6	39.9	16:13	40.2	43.2	17:07	34.9	49.5
09:02	38.3	39.3	09:56	40.2	41.5	10:50	51.0	50.4	11:44	39.7	45.6	12:38	40.2	60.3	13:32	36.9	40.4	14:26	33.9	35.5	15:20	32.9	38.1	16:14	40.2	44.0	17:08	40.0	38.9
09:03	39.7	45.9	09:57	35.8	46.1	10:51	45.4	51.2	11:45	39.9	39.2	12:39	52.2	51.9	13:33	48.8	40.9	14:27	33.3	35.8	15:21	30.6	36.8	16:15	43.5	41.2	17:09	41.3	33.3
09:04	41.3	35.5	09:58	38.0	43.3	10:52	45.3	41.1	11:46	39.8	47.3	12:40	47.3	54.9	13:34	41.9	40.5	14:28	34.9	40.2	15:22	38.9	58.7	16:16	38.3	41.9	17:10	41.1	46.8
09:05	40.4	37.2	09:59	39.3	45.5	10:53	46.1	42.8	11:47	42.7	45.3	12:41	46.4	41.5	13:35	38.5	42.3	14:29	46.5	37.5	15:23	55.7	47.0	16:17	38.6	46.2	17:11	44.1	42.5
09:06	48.9	44.5	10:00	40.0	41.2	10:54	44.8	45.9	11:48	39.8	40.2	12:42	37.6	44.2	13:36	52.4	52.0	14:30	44.6	35.5	15:24	45.5	54.6	16:18	37.6	42.6	17:12	36.7	36.3
09:07	44.4	40.4	10:01	39.7	39.4	10:55	47.4	47.5	11:49	37.5	37.0	12:43	47.1	39.8	13:37	33.9	37.4	14:31	37.8	42.7	15:25	63.7	47.7	16:19	49.5	43.2	17:13	52.7	34.7
09:08	38.5	39.5	10:02	38.9	41.2	10:56	44.5	45.5	11:50	41.2	44.1	12:44	55.2	53.9	13:38	32.3	40.0	14:32	41.2	40.8	15:26	41.4	43.8	16:20	35.7	45.0	17:14	50.2	35.7
09:09	41.3	46.1	10:03	44.3	40.5	10:57	43.9	39.3	11:51	60.4	60.3	12:45	54.6	56.8	13:39	30.3	41.1	14:33	46.7	60.5	15:27	39.1	46.1	16:21	36.1	44.1	17:15	53.1	33.4
09:10	45.8	47.7	10:04	49.6	43.5	10:58	44.3	56.0	11:52	47.6	48.6	12:46	33.2	36.7	13:40	36.0	58.2	14:34	56.9	53.0	15:28	57.5	48.1	16:22	39.0	39.4	17:16	37.9	34.6
09:11	44.6	41.7	10:05	49.7	39.6	10:59	54.0	49.2	11:53	45.1	37.7	12:47	43.3	35.8	13:41	53.2	50.0	14:35	44.8	56.1	15:29	54.0	54.0	16:23	39.7	39.3	17:17	31.9	42.7
09:12	39.3	43.9	10:06	40.7	42.9	11:00	44.0	53.5	11:54	43.9	43.9	12:48	38.4	43.4	13:42	43.8	54.4	14:36	33.0	44.6	15:30	36.6	48.1	16:24	38.9	37.7	17:18	30.7	30.5
09:13	40.8	44.9	10:07	41.8	41.3	11:01	44.4	46.9	11:55	39.7	44.8	12:49	36.9	39.7	13:43	39.1	54.4	14:37	33.4	37.2	15:31	35.7	45.7	16:25	40.0	36.7	17:19	32.9	29.9
09:14	41.1	38.9	10:08	43.1	41.4	11:02	46.8	45.8	11:56	38.1	39.8	12:50	36.1	37.3	13:44	36.9	37.8	14:38	35.5	45.3	15:32	38.8	42.8	16:26	35.0	36.9	17:20	34.3	28.3
09:15	43.1	41.7	10:09	38.0	53.2	11:03	49.8	42.7	11:57	34.6	38.1	12:51	47.8	37.8	13:45	39.9	41.9	14:39	57.8	55.5	15:33	36.7	40.8	16:27	35.5	39.1	17:21	41.7	29.1
09:16	40.3	45.7	10:10	40.6	44.2	11:04	43.4	51.2	11:58	37.3	42.6	12:52	50.1	53.2	13:46	43.1	46.7	14:40	45.3	51.6	15:34	35.5	43.5	16:28	37.2	36.9	17:22	36.8	41.2
09:17	41.7	40.5	10:11	42.3	43.7	11:05	49.9	48.0	11:59	39.8	39.8	12:53	54.1	58.2	13:47	46.6	53.4	14:41	36.9	53.7	15:35	39.6	45.4	16:29	40.2	38.3	17:23	34.4	31.4
09:18	42.1	38.4	10:12	49.3	46.3	11:06	42.5	47.3	12:00	41.9	37.5	12:54	49.7	51.1	13:48	43.6	54.0	14:42	45.5	42.9	15:36	49.4	44.1	16:30	38.3	42.6	17:24	50.8	40.1
09:19	40.6	43.0	10:13	44.6	61.0	11:07	41.8	39.5	12:01	42.2	46.1	12:55	37.6	51.7	13:49	43.8	41.2	14:43	41.2	43.2	15:37	40.6	54.8	16:31	41.9	39.2	17:25	31.2	37.0
09:20	43.2	41.5	10:14	53.5	47.8	11:08	44.5	43.1	12:02	40.8	40.6	12:56	41.1	39.8	13:50	46.5	42.2	14:44	42.5	40.4	15:38	50.6	47.1	16:32	42.5	37.1	17:26	31.9	52.6
09:21	40.5	42.2	10:15	48.7	53.7	11:09	50.2	43.1	12:03	46.2	41.9	12:57	45.2	37.8	13:51	37.3	38.2	14:45	35.1	43.2	15:39	39.2	53.7	16:33	53.1	35.5	17:27	38.3	51.2
09:22	42.8	43.8	10:16	40.4	55.7	11:10	46.9	42.3	12:04	44.3	44.1	12:58	33.1	38.0	13:52	63.8	62.8	14:46	37.3	45.6	15:40	37.3	48.8	16:34	45.8	37.1	17:28	50.7	34.5
09:23	46.9	46.4	10:17	48.4	39.6	11:11	39.3	46.3	12:05	49.0	52.8	12:59	37.7	52.0	13:53	46.7	51.1	14:47	32.6	43.5	15:41	35.8	39.2	16:35	56.1	45.5	17:29	40.4	40.1
09:24	41.7	40.9	10:18	44.9	47.0	11:12	41.8	45.8	12:06	45.6	42.9	13:00	50.4	49.5	13:54	34.5	42.5	14:48	34.0	36.3	15:42	37.9	39.3	16:36	37.7	36.6	17:30	37.1	34.9
09:25	42.9	45.1	10:19	41.1	55.1	11:13	38.6	42.8	12:07	43.4	38.7	13:01	47.9	50.1	13:55	35.5	38.8	14:49	37.7	35.0	15:43	48.0	44.2	16:37	37.7	36.1	17:31	37.0	34.3
09:26	43.4	42.8	10:20	43.3	55.3	11:14	43.4	44.8	12:08	40.7	37.8	13:02	46.5	40.7	13:56	36.7	46.1	14:50	36.6	37.3	15:44	43.9	52.4	16:38	35.7	34.7	17:32	34.7	33.8
09:27	53.4	40.8	10:21	41.6	38.9	11:15	49.5	51.5	12:09	40.2	38.6	13:03	34.3	37.7	13:57	37.8	41.1	14:51	40.7	38.0	15:45	40.1	54.4	16:39	37.6	50.5	17:33	36.1	33.2
09:28	47.9	45.6	10:22	47.2	45.5	11:16	53.3	56.3	12:10	43.3	37.4	13:04	35.7	42.8	13:58	32.2	41.1	14:52	41.8	58.6	15:46	38.9	39.9	16:40	40.7	38.0	17:34	40.6	34.1
09:29	44.0	41.5	10:23	48.7	43.5	11:17	44.9	51.8	12:11	44.5	42.9	13:05	36.4	38.2	13:59	31.3	41.7	14:53	58.1	50.8	15:47	51.3	43.4	16:41	35.5	41.0	17:35	39.2	33.8
09:30	44.0	40.0	10:24	41.6	38.2	11:18	46.3	53.6	12:12	38.8	38.0	13:06	39.3	36.8	14:00	31.0	34.9	14:54	42.5	56.0	15:48	38.2	43.9	16:42	32.5	38.4	17:36	40.0	34.3
09:31	43.1	44.0	10:25	44.0	38.2	11:19	47.5	41.2	12:13	39.5	36.7	13:07	37.8	36.8	14:01	33.1	33.5	14:55	35.1	49.9	15:49	37.4	53.9	16:43	46.5	35.1	17:37	40.3	33.9
09:32	43.6	43.6	10:26	40.2	43.9	11:20	43.2	43.1	12:14	37.7	37.5	13:08	49.7	53.6	14:02	36.0	37.7	14:56	34.3	35.1	15:50	38.3	43.9	16:44	33.6	34.0	17:38	34.9	42.6
09:33	42.1	39.6	10:27	41.0	48.2	11:21	41.6	46.7	12:15	37.0	37.8	13:09	41.0	52.5	14:03	36.4	36.0	14:57	47.3	35.0	15:51	38.8	39.9	16:45	46.4	36.6	17:39	37.0	35.5
09:34	45.7	43.4	10:28	51.4	61.9	11:22	48.5	53.3	12:16	34.9	38.8	13:10	37.6	52.1	14:04	35.9	41.6	14:58	37.7	49.1	15:52	46.3	40.1	16:46	41.0	34.4	17:40	33.9	33.8
09:35	43.5	38.1	10:29	55.2	53.4	11:23	40.8	49.4	12:17	34.9	42.7	13:11	45.7	35.7	14:05	34.7	37.3	14:59	33.2	45.9	15:53	35.4	37.1	16:47	34.1	44.9	17:41	32.8	40.1
09:36	42.6	38.3	10:30	49.0	52.7	11:24	50.1	38.9	12:18	37.7	38.7	13:12	47.6	45.1	14:06	32.3	39.0	15:00	33.9	34.6	15:54	53.7	48.2	16:48	32.5	32.7	17:42	36.7	36.0
09:37	40.2	41.7	10:31	41.9	42.0	11:25	39.0	37.9	12:19	48.4	36.5	13:13	44.1	39.7	14:07	35.2	42.7	15:01	51.7	37.3	15:55	37.3	51.6	16:49	35.2	41.2	17:43	35.5	40.8
09:38	56.3	48.3	10:32	45.1	43.1	11:26	44.1	38.0	12:20	35.2	39.5	13:14	40.1	55.8	14:08	30.6	43.5	15:02	35.6	37.0	15:56	36.2	39.7	16:50	39.8	32.4	17:44	44.9	39.0
09:39	47.2	49.2	10:33	44.9	54.1	11:27	43.0	37.3	12:21	39.0	43.3	13:15	45.5	51.4	14:09	32.0	35.0	15:03	32.5	39.9	15:57	44.2	45.3	16:51	49.9	29.5	17:45	38.9	44.2
09:40	44.0	44.3	10:34	51.0	50.7	11:28	45.2	38.2	12:22	47.5	39.2	13:16	54.7	52.4	14:10	30.9	38.1	15:04	32.8	37.7	15:58	58.3	38.6	16:52	51.1	31.2	17:46	34.0	42.8
09:41	44.2	37.0	10:35	42.9	51.4	11:29	42.6	43.2	12:23	37.3	41.8	13:17	39.6	40.5	14:11	34.1	41.6	15:05	31.0	46.0	15:59	35.5	38.1	16:53	34.6	32.4	17:47	34.0	44.2
09:42	49.5	42.8	10:36	41.7	48.5	11:30	45.5	46.2	12:24	45.5	57.2	13:18	47.3	43.8	14:12	36.9	41.8	15:06	38.1	40.7	16:00	33.1	38.3	16:54	35.4	28.8	17:48	34.4	44.6
09:43	43.8	37.9	10:37	42.7	40.3	11:31	43.0	42.7	12:25	56.3	48.3	13:19	41.3	45.0	14:13	43.1	42.8	15:07	40.4	60.3	16:01	36.9	43.1	16:55	35.8	28.5	17:49	34.8	42.2
09:44	43.2	37.7	10:38	46.5	42.3	11:32	41.7	41.6	12:26	42.1	55.0	13:20	40.1	41.3	14:14	36.1	40.6	15:08	54.4	45.4	16:02	34.6	31.8	16:56	47.3	37.5	17:50	37.5	42.6
09:45	40.6	39.8	10:39	44.7	41.6	11:33	44.7	41.2	12:27	41.6	46.5	13:21	36.7	38.9	14:15	40.0	42.5	15:09	47.8	53.2	16:03	31.5	39.0	16:57	39.0	38.6	17:51	37.5	41.3
09:46	41.6	43.6	10:40	42.1	42.7	11:34	45.2	42.9	12:28	40.1	40.3	13:22	34.8	40.5	14:16	38.8	41.9	15:10	44.6	52.1	16:04	31.9	30.2	16:58	45.1	41.4	17:52	37.1	38.7
09:47	41.8	38.8	10:41	44.1	45.9	11:35	41.7	45.7	12:29	39.6	44.4	13:23	35.4	44.2	14:17	36.7	39.7	15:11	33.5	39.6	16:05	34.0	43.0	16:59	34.3	42.2	17:53	48.4	39.5
09:48	42.0	43.9	10:42	45.9	46.9	11:36	41.3	40.6	12:30	47.3	52.1	13:24	45.4	50.1	14:18	47.3	38.5	15:12	32.2	41.7	16:06	37.8	37.4	17:00	30.2	36.1	17:54	31.3	38.2
09:49	48.8	40.7	10:43	48.7	60.5	11:37	39.1	42.0	12:31	48.1	50.0	13:25	56.5	50.0	14:19	35.0	43.8	15:13	32.2	36.9	16:07	35.7	38.4	17:01	28.1	43.6	17:55	32.6	39.2
09:50	39.3	36.9	10:44	53.8	50.3	11:38	36.8	42.3	12:32	49.5	49.3	13:26	47.5	43.8	14:20	46.9	41.7	15:14	50.2	53.4	16:08	37.5	38.6	17:02	29.5	43.0	17:56	31.7	35.5
09:51	40.3	43.7	10:45	45.5	54.5	11:39	49.1	37.8	12:33	36.0	42.6	13:27	39.1	40.0	14:21	36.3	44.0	15:15	37.3	49.4	16:09	36.4	38.9	17:03	28.8	41.5	17:57	30.4	38.6
09:52	40.5	40.2	10:46	43.9	53.2	11:40	40.7	37.4	12:34	38.0	42.8	13:28	37.5	35.9	14:22	37.1	45.1	15:16	32.1	44.7	16:10	36.0	39.0	17:04	28.6	38.2	17:58	31.7	37.2
09:53	44.7	40.6	10:47	41.5	39.0	11:41	39.1	38.1	12:35	40.5	45.6	13:29	37.9	41.2	14:23	38.5	39.8	15:17	36.5	44.0	16:11	35.8	43.9	17:05	43.8	30.0	17:59	29.2	38.0

Table A5. Thursday 13/10/22 - Positions 1, 3 and 4 L_{Aeq} measurements (free-field)

Start	Position			Start	Position			Start	Position			Start	Position			Start	Position		
Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4
09:00				09:54				10:48	39.2	26.3		11:42	26.9	30.4	57.4	12:36	37.0	53.5	26.6
09:01				09:55				10:49	33.2	32.3		11:43	37.4	40.9	48.9	12:37	48.8	43.2	46.4
09:02				09:56				10:50	38.3	47.3		11:44	36.9	41.0	31.9	12:38	67.7	43.2	52.0
09:03				09:57				10:51	38.0	47.6		11:45	39.5	53.5	31.3	12:39	72.9	58.3	49.2
09:04				09:58				10:52	42.8	38.6		11:46	37.4	47.9	33.3	12:40	65.0	46.5	57.9
09:05				09:59				10:53	45.4	32.7		11:47	57.7	60.2	55.9	12:41	62.9	55.4	53.0
09:06				10:00				10:54	39.3	28.0		11:48	40.1	49.3	45.6	12:42	68.3	44.2	56.9
09:07				10:01				10:55	39.8	30.0		11:49	38.8	32.1	33.0	12:43	51.0	40.4	50.7
09:08				10:02				10:56	59.0	36.0		11:50	37.5	45.8	29.9	12:44	64.3	49.3	58.0
09:09				10:03				10:57	38.0	34.0		11:51	39.0	28.5	30.3	12:45	63.8	52.4	56.7
09:10				10:04				10:58	32.8	32.4		11:52	30.1	26.2	42.4	12:46	62.6	56.3	44.0
09:11				10:05				10:59	34.8	25.7		11:53	29.8	34.3	50.4	12:47	36.4	28.9	30.9
09:12				10:06				11:00	35.4	33.0		11:54	30.4	34.8	43.0	12:48	31.1	36.8	26.6
09:13				10:07				11:01	29.1	29.9		11:55	35.8	34.1	28.8	12:49	32.4	42.2	48.5
09:14				10:08				11:02	38.0	30.0		11:56	38.6	34.3	34.8	12:50	38.0	26.2	41.5
09:15				10:09				11:03	42.6	52.0		11:57	37.3	36.1	47.0	12:51	40.4	41.4	52.2
09:16				10:10				11:04	42.9	36.7	48.1	11:58	36.0	32.8	27.2	12:52	38.3	41.1	38.3
09:17				10:11				11:05	32.6	29.0	48.8	11:59	33.3	32.3	27.4	12:53	31.5	41.1	49.7
09:18				10:12				11:06	38.0	29.1	32.7	12:00	31.0	31.9	28.6	12:54	36.3	37.3	29.2
09:19				10:13				11:07	39.0	31.7	48.2	12:01	26.8	28.4	31.2	12:55	54.8	30.4	43.3
09:20				10:14				11:08	40.4	25.5	35.0	12:02	32.9	28.3	27.9	12:56	66.6	47.2	45.1
09:21				10:15				11:09	35.6	35.1	45.2	12:03	30.8	29.2	30.6	12:57	73.7	58.2	43.7
09:22				10:16				11:10	36.8	47.1	35.2	12:04	29.5	25.8	49.0	12:58	64.0	46.5	56.6
09:23				10:17				11:11	38.6	44.0	44.7	12:05	33.2	25.9	46.9	12:59	67.5	64.7	64.6
09:24				10:18				11:12	35.1	48.9	31.6	12:06	38.1	31.4	31.0	13:00	48.0	46.9	53.6
09:25				10:19				11:13	29.2	37.0	30.3	12:07	38.3	24.7	45.5	13:01	59.7	47.4	56.2
09:26				10:20				11:14	24.6	37.6	28.9	12:08	37.8	22.7	57.4	13:02	66.3	43.8	56.9
09:27				10:21				11:15	28.1	32.8	30.8	12:09	35.0	22.6	27.9	13:03	49.7	52.8	45.7
09:28				10:22				11:16	41.2	29.3	53.6	12:10	32.2	23.6	29.7	13:04	38.9	39.5	32.3
09:29				10:23				11:17	44.2	39.9	33.4	12:11	37.7	25.9	46.9	13:05	35.9	46.5	31.1
09:30				10:24				11:18	44.4	43.7	33.7	12:12	37.0	23.3	49.7	13:06	33.6	27.4	49.7
09:31				10:25				11:19	50.3	39.3	30.8	12:13	36.4	29.4	57.4	13:07	35.0	49.4	47.3
09:32				10:26				11:20	68.4	35.5	29.2	12:14	34.3	29.2	33.7	13:08	38.8	51.9	35.9
09:33				10:27				11:21	70.3	37.0	43.2	12:15	35.9	28.1	33.8	13:09	39.1	27.9	50.3
09:34				10:28				11:22	54.3	59.6	50.7	12:16	37.6	47.9	48.2	13:10	39.0	32.4	38.5
09:35				10:29				11:23	73.2	46.7	55.2	12:17	33.8	25.4	34.1	13:11	52.0	36.5	31.4
09:36				10:30				11:24	61.5	46.6	56.5	12:18	40.0	46.6	36.1	13:12	66.7	36.1	38.7
09:37				10:31	44.3			11:25	66.6	54.1	52.5	12:19	50.5	32.1	34.0	13:13	73.3	57.5	42.6
09:38				10:32	36.2			11:26	64.4	55.3	58.0	12:20	67.2	42.8	45.2	13:14	68.0	45.0	58.9
09:39				10:33	36.6			11:27	71.1	56.6	56.9	12:21	73.5	58.9	42.5	13:15	62.4	60.0	53.9
09:40				10:34	39.0			11:28	66.5	53.9	56.8	12:22	64.3	47.6	54.5	13:16	63.6	50.8	54.3
09:41				10:35	37.9			11:29	71.8	53.1	48.1	12:23	60.6	54.0	57.0	13:17	57.9	43.2	55.1
09:42				10:36	36.1			11:30	40.0	43.1	34.9	12:24	66.4	48.9	55.2	13:18	64.3	48.7	57.0
09:43				10:37	38.6			11:31	28.6	24.5	48.7	12:25	64.4	52.6	58.9	13:19	63.8	51.7	49.3
09:44				10:38	39.7			11:32	27.8	27.1	46.4	12:26	62.0	45.6	60.8	13:20	41.0	39.1	45.5
09:45				10:39	36.6			11:33	28.0	46.9	29.9	12:27	63.9	54.1	54.7	13:21	33.2	35.1	33.0
09:46				10:40	40.9			11:34	26.2	24.7	30.5	12:28	42.9	52.2	35.4	13:22	35.2	35.5	35.4
09:47				10:41	43.6			11:35	35.7	25.8	29.7	12:29	34.7	45.6	30.8	13:23	31.3	48.0	46.7
09:48				10:42	43.0			11:36	34.4	25.9	30.0	12:30	35.8	36.7	43.8	13:24	30.2	37.9	49.5
09:49				10:43	46.5			11:37	29.9	31.7	45.8	12:31	33.0	36.3	32.5	13:25	36.6	36.5	48.0
09:50				10:44	34.6			11:38	29.3	30.8	27.3	12:32	33.7	41.3	47.5	13:26	36.9	48.9	33.3
09:51				10:45	33.5			11:39	34.3	31.4	27.6	12:33	37.8	48.9	29.4	13:27	31.8	29.4	44.9
09:52				10:46	36.7	42.2		11:40	34.5	30.1	29.2	12:34	33.0	40.3	44.1	13:28	31.0	28.5	44.3
09:53				10:47	46.5	33.1		11:41	39.1	30.6	37.1	12:35	37.2	25.6	31.2	13:29	35.8	24.8	40.7

Start	Position			Start	Position			Start	Position			Start	Position			Start	Position		
Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4
13:30	34.5	27.6	44.2	14:24	66.9	36.8	48.2	15:18	30.6	27.2	46.0	16:12	41.4	26.9	32.5	17:06	38.9	30.7	33.3
13:31	34.3	26.1	28.2	14:25	68.1	61.4	59.5	15:19	35.6	47.0	45.5	16:13	38.4	30.5	31.1	17:07	36.8	32.1	31.9
13:32	37.6	26.7	28.3	14:26	55.1	48.1	59.9	15:20	31.4	29.3	34.3	16:14	37.7	28.3	50.3	17:08	38.0	30.8	48.1
13:33	29.1	26.8	28.4	14:27	46.5	48.6	55.9	15:21	30.8	28.1	44.8	16:15	31.1	28.3	32.8	17:09	38.6	44.0	51.4
13:34	32.7	27.5	27.7	14:28	40.5	49.1	50.2	15:22	39.0	31.1	37.2	16:16	32.7	26.0	29.4	17:10	37.7	39.2	32.1
13:35	40.1	29.7	29.9	14:29	50.0	46.5	54.6	15:23	36.4	29.7	34.3	16:17	36.4	27.0	48.9	17:11	40.3	32.5	45.2
13:36	32.2	28.2	29.0	14:30	58.7	52.6	50.7	15:24	34.8	31.3	30.2	16:18	40.3	31.3	36.1	17:12	39.2	31.7	47.6
13:37	32.9	27.4	28.4	14:31	64.7	59.0	56.0	15:25	29.9	29.6	32.7	16:19	36.6	49.6	29.3	17:13	41.8	55.4	54.7
13:38	40.0	29.5	29.2	14:32	65.9	52.3	60.8	15:26	33.3	27.9	49.2	16:20	39.6	28.8	32.3	17:14	51.0	46.9	43.2
13:39	42.6	51.4	46.0	14:33	57.1	50.4	61.5	15:27	27.4	28.0	43.9	16:21	37.1	29.1	32.6	17:15	41.0	35.3	37.7
13:40	44.2	42.3	30.9	14:34	65.1	53.4	61.6	15:28	37.4	28.6	44.7	16:22	40.8	48.1	43.3	17:16	37.5	37.1	45.8
13:41	61.7	39.5	28.7	14:35	53.8	55.8	59.3	15:29	27.8	28.9	37.5	16:23	31.0	30.9	33.3	17:17	35.5	46.4	29.8
13:42	63.0	38.9	46.4	14:36	49.1	50.9	62.5	15:30	27.6	28.0	30.9	16:24	36.0	29.8	45.6	17:18	36.0	45.6	31.8
13:43	64.6	52.4	59.8	14:37	71.9	53.4	60.7	15:31	35.3	31.1	47.5	16:25	40.9	29.2	49.4	17:19	44.4	32.9	31.5
13:44	57.8	44.9	58.0	14:38	74.4	52.6	51.5	15:32	34.1	47.7	47.8	16:26	45.3	31.1	43.0	17:20	42.1	31.8	29.9
13:45	55.3	49.6	59.6	14:39	67.9	50.6	50.0	15:33	37.1	41.3	30.9	16:27	46.5	46.3	29.9	17:21	39.2	30.5	30.9
13:46	54.9	51.2	60.0	14:40	45.2	47.4	49.1	15:34	40.2	47.4	31.0	16:28	51.5	31.6	47.4	17:22	40.8	32.8	32.7
13:47	49.3	47.5	44.8	14:41	38.5	34.4	31.2	15:35	38.6	28.1	53.5	16:29	51.3	41.5	46.0	17:23	43.1	33.0	32.4
13:48	45.6	41.1	35.8	14:42	40.6	31.7	31.1	15:36	40.5	30.5	35.0	16:30	40.0	53.3	44.6	17:24	47.8	34.2	47.1
13:49	41.6	36.8	45.4	14:43	41.0	29.9	46.5	15:37	37.2	46.1	30.5	16:31	45.4	35.3	47.8	17:25	44.6	33.2	51.5
13:50	31.7	27.1	44.6	14:44	38.2	29.1	31.3	15:38	58.9	27.1	49.2	16:32	44.9	30.2	32.7	17:26	48.5	34.3	35.6
13:51	34.6	45.0	49.8	14:45	32.6	29.7	34.7	15:39	37.4	27.4	45.8	16:33	47.3	31.4	27.9	17:27	37.6	35.9	49.4
13:52	37.9	46.1	38.9	14:46	37.5	51.3	30.0	15:40	31.9	28.6	32.5	16:34	43.9	33.8	40.4	17:28	36.1	34.4	32.5
13:53	39.9	48.3	46.5	14:47	28.2	41.8	48.4	15:41	36.9	48.8	48.6	16:35	36.9	32.6	43.9	17:29	36.3	35.5	45.7
13:54	44.2	46.9	46.6	14:48	35.3	29.1	42.4	15:42	31.9	29.0	45.2	16:36	37.7	31.2	49.3	17:30	39.0	41.2	31.0
13:55	40.3	38.1	45.7	14:49	38.2	48.5	34.3	15:43	30.2	27.8	47.5	16:37	34.1	29.6	33.1	17:31	43.2	38.7	30.8
13:56	36.9	40.1	33.5	14:50	36.1	29.6	43.7	15:44	40.7	27.2	42.7	16:38	40.8	29.6	45.4	17:32	38.5	34.7	42.0
13:57	37.0	35.5	38.6	14:51	38.2	31.7	32.1	15:45	38.4	26.8	30.2	16:39	37.7	33.4	44.8	17:33	44.7	34.4	31.6
13:58	44.7	26.5	40.7	14:52	35.9	28.5	31.1	15:46	57.6	76.5	66.3	16:40	37.3	52.5	30.8	17:34	43.7	33.0	33.8
13:59	47.8	29.3	35.2	14:53	33.4	28.2	28.9	15:47	51.1	36.7	50.6	16:41	42.4	31.3	30.9	17:35	42.2	32.2	30.3
14:00	67.8	44.2	34.7	14:54	35.1	47.1	62.3	15:48	36.9	29.7	31.5	16:42	52.1	64.7	45.9	17:36	39.1	31.1	30.2
14:01	73.9	41.6	45.0	14:55	30.3	28.7	53.6	15:49	36.9	28.0	41.6	16:43	41.8	45.8	40.2	17:37	39.1	31.2	30.1
14:02	59.9	68.0	55.2	14:56	33.0	29.3	32.6	15:50	38.2	25.8	30.7	16:44	51.0	40.3	44.4	17:38	38.5	38.6	30.7
14:03	66.8	49.7	63.4	14:57	36.6	45.9	46.1	15:51	32.3	26.6	31.7	16:45	34.9	41.9	32.2	17:39	38.0	46.8	29.1
14:04	64.2	51.9	59.8	14:58	33.6	53.2	33.4	15:52	31.8	27.7	33.8	16:46	36.0	29.2	46.9	17:40	39.3	34.6	28.6
14:05	61.0	64.9	55.8	14:59	46.9	48.8	49.3	15:53	35.1	27.9	45.6	16:47	29.8	45.9	27.9	17:41	37.4	35.8	29.8
14:06	72.9	67.5	61.7	15:00	39.1	40.1	44.2	15:54	34.1	29.0	28.6	16:48	30.0	28.8	45.6	17:42	41.2	36.5	31.1
14:07	66.5	54.9	54.2	15:01	27.5	27.5	48.5	15:55	29.4	27.3	30.4	16:49	32.0	27.3	38.6	17:43	35.9	33.1	41.1
14:08	64.0	59.7	57.9	15:02	33.7	31.5	34.2	15:56	47.1	28.3	42.2	16:50	35.5	34.9	33.5	17:44	42.8	33.6	43.7
14:09	71.8	54.5	62.9	15:03	37.9	36.5	43.3	15:57	30.5	31.7	29.6	16:51	32.8	46.0	49.6	17:45	37.8	32.9	35.1
14:10	74.2	59.4	59.0	15:04	36.6	32.7	32.6	15:58	27.4	45.1	34.7	16:52	36.1	32.5	39.8	17:46	37.6	31.4	51.1
14:11	74.5	53.1	59.2	15:05	34.6	30.0	52.4	15:59	34.7	29.6	45.4	16:53	39.3	29.6	46.3	17:47	41.2	34.3	39.2
14:12	72.2	58.1	59.1	15:06	40.9	48.3	42.5	16:00	38.5	50.6	45.3	16:54	42.9	38.5	41.4	17:48	42.9	36.2	45.3
14:13	74.6	58.8	58.3	15:07	39.2	32.6	45.3	16:01	39.7	38.1	31.9	16:55	36.9	35.9	46.5	17:49	39.2	33.2	30.6
14:14	47.8	53.3	46.6	15:08	29.2	28.2	32.0	16:02	38.8	42.1	29.2	16:56	36.2	35.2	42.3	17:50	41.1	37.4	42.7
14:15	40.6	27.4	30.3	15:09	28.3	50.4	29.1	16:03	34.4	28.5	44.8	16:57	36.6	34.3	57.2	17:51	44.2	31.7	32.9
14:16	29.0	26.0	30.1	15:10	31.2	28.5	31.1	16:04	29.1	28.8	32.6	16:58	37.4	33.1	43.5	17:52	36.7	50.7	31.0
14:17	29.0	29.6	32.1	15:11	31.1	27.4	45.0	16:05	38.6	29.2	47.6	16:59	39.0	33.6	43.0	17:53	37.0	32.4	30.0
14:18	55.5	32.3	35.1	15:12	30.5	28.5	36.3	16:06	41.2	27.0	47.5	17:00	38.5	30.4	30.2	17:54	34.1	30.3	47.9
14:19	51.0	34.2	43.2	15:13	27.7	26.2	31.1	16:07	38.9	27.7	45.9	17:01	35.3	27.7	29.4	17:55	34.9	35.3	42.5
14:20	36.2	29.0	30.4	15:14	32.7	26.3	29.6	16:08	34.7	47.0	44.1	17:02	31.4	29.6	30.7	17:56	39.8	42.9	45.7
14:21	27.9	27.4	30.3	15:15	35.3	45.8	29.9	16:09	38.0	29.5	33.0	17:03	35.0	32.4	33.0	17:57	42.8	35.9	46.1
14:22	38.0	40.4	29.2	15:16	41.5	48.4	45.6	16:10	35.8	28.2	44.0	17:04	41.7	29.4	45.5	17:58	43.8	48.6	42.8
14:23	46.1	28.7	31.3	15:17	29.6	27.1	47.6	16:11	35.9	26.8	36.9	17:05	40.4	28.6	32.9	17:59	40.7	48.7	41.6

Table A6. Friday 14/10/22 - Positions 1, 3 and 4 L_{Aeq} measurements (free-field)

Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4	Start Time	Position 1	Position 3	Position 4
09:00	39.0	50.0	37.6	09:54	40.4	39.6	37.9	10:48	37.9	35.8	47.1	11:42	37.9	38.2	51.8	12:36	65.2	59.4	57.5	13:30	57.3	57.9	51.3	14:24	33.1	34.2	38.5	15:18	42.7	38.2	47.6	16:12	40.7	35.0	45.7	17:06			
09:01	37.0	34.3	36.1	09:55	40.7	34.6	42.8	10:49	41.0	34.2	49.2	11:43	40.2	35.4	47.5	12:37	62.4	55.0	55.4	13:31	73.9	48.0	56.1	14:25	34.3	33.0	46.0	15:19	42.0	37.7	51.8	16:13	42.4	35.2	38.7	17:07			
09:02	35.0	30.4	34.2	09:56	33.7	31.7	52.8	10:50	42.0	33.5	47.6	11:44	38.4	48.2	45.6	12:38	41.7	51.6	52.5	13:32	61.4	53.9	58.4	14:26	37.9	52.8	46.1	15:20	40.9	36.0	46.4	16:14	43.4	34.9	49.2	17:08			
09:03	36.0	40.0	47.2	09:57	35.5	33.8	49.6	10:51	39.1	37.4	51.6	11:45	42.0	36.9	46.0	12:39	38.5	31.8	51.9	13:33	63.9	59.0	55.6	14:27	35.4	36.1	49.2	15:21	45.0	34.5	47.9	16:15	43.1	34.3	50.3	17:09			
09:04	41.0	49.3	43.0	09:58	41.3	32.4	35.5	10:52	36.1	32.9	50.5	11:46	40.5	39.2	49.6	12:40	44.3	30.6	46.9	13:34	61.4	48.3	57.1	14:28	42.0	49.9	41.1	15:22	41.6	33.3	44.5	16:16	42.5	33.5	40.9	17:10			
09:05	39.9	48.0	36.1	09:59	40.3	33.0	36.2	10:53	39.1	33.3	47.8	11:47	40.7	38.3	49.6	12:41	40.9	31.2	43.7	13:35	62.7	55.3	54.2	14:29	48.7	44.3	46.6	15:23	41.8	50.7	43.1	16:17	41.9	33.5	41.0	17:11			
09:06	45.0	32.8	39.5	10:00	37.2	35.9	35.9	10:54	42.2	34.2	49.5	11:48	37.7	35.0	45.6	12:42	42.1	30.9	34.6	13:36	59.6	46.0	57.0	14:30	73.4	44.1	54.0	15:24	42.3	43.1	47.0	16:18	38.6	34.9	47.6	17:12			
09:07	41.0	38.0	34.0	10:01	40.6	50.8	33.2	10:55	40.6	33.7	46.0	11:49	37.6	36.1	45.5	12:43	40.0	32.7	51.6	13:37	39.4	55.1	49.0	14:31	61.7	47.4	53.8	15:25	44.3	38.4	59.0	16:19	43.3	33.7	38.6	17:13			
09:08	37.2	32.4	54.0	10:02	37.3	28.7	31.8	10:56	35.6	53.3	46.8	11:50	38.8	33.5	46.0	12:44	43.7	33.0	37.2	13:38	40.5	32.6	35.3	14:32	60.5	55.1	56.3	15:26	36.7	37.5	48.2	16:20		32.6	36.4	17:14			
09:09	41.3	37.8	48.3	10:03	36.4	28.3	54.3	10:57	36.1	33.6	52.5	11:51	41.3	34.0	42.9	12:45	42.3	31.9	37.5	13:39	47.0	36.4	43.9	14:33	72.4	55.4	57.4	15:27	45.7	40.0	48.3	16:21		32.5	45.4	17:15			
09:10	41.2	48.6	47.2	10:04	38.0	30.5	38.1	10:58	42.5	36.2	52.7	11:52	37.3	40.2	43.6	12:46	40.3	31.2	50.5	13:40	44.1	36.1	39.8	14:34	68.4	47.0	58.8	15:28	43.3	38.7	47.7	16:22		49.6	33.7	17:16			
09:11	45.9	33.7	45.2	10:05	43.0	32.3	45.8	10:59	39.6	34.2	49.5	11:53	61.8	61.3	60.7	12:47	51.1	50.2	36.6	13:41	42.8	34.1	42.3	14:35	59.2	57.1	55.8	15:29	39.3	34.5	45.8	16:23		32.3	36.5	17:17			
09:12	40.8	40.8	44.8	10:06	37.1	36.3	45.5	11:00	37.1	35.4	52.3	11:54	48.8	48.1	49.4	12:48	66.2	44.7	36.0	13:42	41.2	32.6	34.0	14:36	69.7	51.9	52.9	15:30	40.0	36.1	47.1	16:24		46.3	36.8	17:18			
09:13	40.5	39.4	41.9	10:07	40.9	49.1	41.0	11:01	37.1	35.3	51.1	11:55	44.1	45.4	42.8	12:49	60.2	62.3	52.5	13:43	42.0	31.6	38.1	14:37	42.2	54.7	48.1	15:31	43.0	48.6	49.9	16:25		43.6	37.6	17:19			
09:14	54.4	32.1	43.7	10:08	51.9	55.7	52.0	11:02	38.4	36.0	51.3	11:56	42.9	34.1	47.9	12:50	73.9	48.8	53.5	13:44	46.2	35.5	49.4	14:38	44.2	35.4	46.8	15:32	72.0	40.5	50.0	16:26		34.9	46.6	17:20			
09:15	47.5	33.0	31.5	10:09	44.9	47.8	45.2	11:03	41.3	35.8	52.6	11:57	47.7	33.9	40.5	12:51	62.4	56.0	56.6	13:45	39.0	34.2	37.6	14:39	37.6	37.8	44.5	15:33	73.3	49.1	56.5	16:27		36.0	46.3	17:21			
09:16	43.4	34.5	34.2	10:10	42.2	32.2	35.5	11:04	39.6	36.5	51.3	11:58	43.8	51.7	40.5	12:52	66.3	53.5	54.8	13:46	44.1	37.6	48.8	14:40	45.1	35.2	42.6	15:34	67.3	53.2	55.2	16:28		33.5	55.0	17:22			
09:17	39.5	34.0	30.1	10:11	39.7	33.4	44.6	11:05	41.6	37.8	52.6	11:59	43.5	34.1	49.7	12:53	46.4	41.9	54.4	13:47	40.5	37.0	47.6	14:41	35.1	35.6	50.9	15:35	60.5	57.4	54.1	16:29		38.6		17:23			
09:18	34.8	36.4	31.2	10:12	42.4	30.3	36.9	11:06	39.2	38.9	56.1	12:00	45.1	33.0	42.4	12:54	60.7	58.1	58.6	13:48	41.1	34.2	45.5	14:42	33.7	36.0	45.7	15:36	69.8	64.4	56.7	16:30		51.8		17:24			
09:19	38.2	34.5	32.4	10:13	37.7	29.2	38.2	11:07	43.3	39.1	54.3	12:01	47.6	33.5	38.3	12:55	61.2	55.2	57.4	13:49	37.7	36.3	47.7	14:43	41.4	39.4	51.1	15:37	71.4	47.7	57.7	16:31		32.3		17:25			
09:20	42.1	34.1	43.5	10:14	46.2	43.0	41.0	11:08	41.7	49.9	53.4	12:02	45.8	33.7	38.7	12:56	65.6	51.2	58.2	13:50	32.1	39.5	37.2	14:44	63.7	37.0	52.6	15:38	68.3	50.5	58.4	16:32		33.1		17:26			
09:21	40.6	36.9	46.1	10:15	58.6	59.8	59.2	11:09	41.5	39.4	54.1	12:03	41.8	33.1	39.0	12:57	52.2	56.3	50.9	13:51	38.6	38.2	38.4	14:45	71.9	50.2	57.7	15:39	73.6	53.0	54.8	16:33		34.0		17:27			
09:22	44.2	36.8	32.1	10:16	54.7	60.1	57.2	11:10	43.5	38.0	51.5	12:04	46.9	33.4	49.6	12:58	41.3	50.1	50.7	13:52	41.0	36.4	34.9	14:46	40.0	36.4	49.9	15:40	67.7	52.9	55.0	16:34		36.3		17:28			
09:23	45.0	35.0	50.8	10:17	52.6	57.6	51.7	11:11	38.7	37.6	52.6	12:05	38.4	32.1	39.3	12:59	43.8	45.3	47.0	13:53	36.8	38.1	38.1	14:47	43.6	44.9	49.4	15:41	45.7	48.5	48.5	16:35		49.3		17:29			
09:24	40.2	35.0	33.6	10:18	43.1	43.0	47.1	11:12	37.9	49.6	52.3	12:06	38.8	37.4	40.3	13:00	40.6	30.7	51.9	13:54	36.5	44.9	36.4	14:48	45.0	45.2	51.6	15:42	41.6	33.3	43.6	16:36		34.5		17:30			
09:25	42.4	48.9	32.4	10:19	40.3	37.1	39.2	11:13	41.5	38.2	55.3	12:07	36.6	41.4	45.4	13:01	40.1	30.5	45.7	13:55	35.4	34.2	40.9	14:49	52.2	51.4	60.2	15:43	41.0	33.5	43.2	16:37		33.0		17:31			
09:26	43.6	35.0	45.9	10:20	41.0	34.3	33.8	11:14	41.7	38.9	53.8	12:08	38.6	52.0	37.8	13:02	39.9	35.9	37.3	13:56	34.2	33.0	39.1	14:50	66.6	53.1	64.1	15:44	38.5	50.9	42.3	16:38		41.2		17:32			
09:27	38.4	36.8	37.9	10:21	41.7	34.3	36.2	11:15	42.1	38.9	54.4	12:09	39.7	46.3	37.2	13:03	42.0	36.5	37.4	13:57	43.4	34.6	36.9	14:51	68.9	54.4	53.7	15:45	45.5	47.7	43.2	16:39		54.8		17:33			
09:28	39.9	35.4	47.7	10:22	33.5	33.7	34.1	11:16	37.4	50.5	53.3	12:10	40.0	32.2	37.3	13:04	47.9	35.0	40.6	13:58	45.3	33.9	36.3	14:52	44.1	51.4	42.6	15:46	41.3	34.0	48.3	16:40		40.8		17:34			
09:29	35.8	33.6	49.8	10:23	34.7	30.8	44.4	11:17	38.3	39.5	52.6	12:11	34.5	33.6	43.1	13:05	40.3	36.3	54.8	13:59	38.9	30.9	36.1	14:53	42.9	39.4	49.1	15:47	46.4	31.3	46.5	16:41		48.7		17:35			
09:30	36.4	33.9	34.8	10:24	43.2	29.9	42.3	11:18	44.7	38.6	55.8	12:12	39.8	33.2	49.3	13:06	42.8	46.3	45.4	14:00	37.6	47.0	46.6	14:54	42.9	49.7	37.8	15:48	43.7	36.1	48.5	16:42		50.9		17:36			
09:31	38.9	44.2	37.8	10:25	40.2	29.1	32.8	11:19	38.2	37.3	53.0	12:13	40.4	32.3	48.4	13:07	50.0	53.7	46.2	14:01	39.4	37.7	40.6	14:55	43.3	48.8	53.2	15:49	44.0	36.3	44.0	16:43				17:37			
09:32	40.8	49.0	43.1	10:26	37.1	30.5	32.9	11:20	36.4	49.3	55.1	12:14	40.1	31.0	51.2	13:08	53.6	34.8	44.8	14:02	41.8	34.6	39.2	14:56	38.3	33.7	44.0	15:50	36.2	45.8	45.4	16:44				17:38			
09:33	39.7	33.6	46.6	10:27	41.6	29.3	33.2	11:21	37.3	38.8	51.2	12:15	41.4	30.8	52.7	13:09	67.1	48.4	54.3	14:03	39.6	36.8	41.5	14:57	40.8	35.6	40.6	15:51	44.5	41.2	48.5	16:45				17:39			
09:34	37.9	36.0	45.4	10:28	41.2	28.2	47.1	11:22	40.7	40.2	55.4	12:16	41.6	47.2	37.9	13:10	71.6	61.8	49.3	14:04	36.8	36.3	38.8	14:58	39.6	33.6	37.1	15:52	42.2	42.0	48.8	16:46				17:40			
09:35	35.7	38.3	35.4	10:29	42.1	28.5	34.5	11:23	43.6	38.8	53.3	12:17	41.0	33.2	39.8	13:11	67.2	52.1	58.2	14:05	36.9	34.4	49.1	14:59	72.8	45.4	53.4	15:53	45.6	49.6	47.8	16:47				17:41			
09:36	37.7	42.1	35.1	10:30	40.2	29.7	33.2	11:24	39.2	36.4	53.5	12:18	39.5	31.6	38.7	13:12	59.7	54.5	56.6	14:06	45.0	35.8	39.8	15:00	72.9	44.6	53.7	15:54	36.2	45.0	49.3	16:48				17:42			
09:37	43.6	32.5	34.5	10:31	32.6	28.9	33.3	11:25	39.9	38.5	53.5	12:19	39.0	32.2	38.0	13:13	71.7	45.2	57.4	14:07	42.5	35.5	42.9	15:01	69.1	49.8	56.6	15:55	42.0	45.5	51.6	16:49				17:43			
09:38	40.5	32.3	48.8	10:32	37.2	28.8	33.7	11:26	38.2	37.3	51.0	12:20	37.4	30.3	49.2	13:14	66.9	59.4	57.6	14:08	35.5	51.9	40.6	15:02	55.4	61.7	55.1	15:56	41.4	38.8	49.2	16:50				17:44			
09:39	36.3	33.2	34.3	10:33	36.9	28.8	46.8	11:27	38.2	37.9	52.5	12:21	37.2	32.1	53.2	13:15	72.9	50.4	58.3	14:09	41.7	39.0	45.3	15:03	69.9	50.8	56.3	15:57	42.6	36.0	40.4	16:51				17:45			
09:40	44.1	35.0	35.3	10:34	40.5	31.4	49.5	11:28	42.7	38.8	54.5	12:22	40.4	31.5	46.4	13:16	73.7	55.7	52.8	14:10	42.9	46.6	50.4	15:04	73.9	52.8	53.1	15:58	42.4	44.8	45.8	16:52				17:46			
09:41	39.7	32.4	35.4	10:35	42.7	33.6	49.5	11:29	44.4	38.5	54.7	12:23	36.6	32.9	39.3	13:17	61.7	56.0	53.4	14:11	45.2	42.0	46.7	15:05	64.8	50.1	55.7	15:59	41.2	32.2	51.4	16:53				17:47			
09:42	34.1	31.8	34.1	10:36	39.4	48.9	37.4	11:30	46.4	53.0	54.2	12:24	37.5	34.9	47.4	13:18	40.8	31.7	51.4	14:12	42.9	37.1	45.3	15:06	55.7	53.8	46.7	16:00	42.3	33.3	46.7	16:54				17:48			
09:43	38.9	32.2	34.0	10:37	42.3	35.8	48.0	11:31	45.3	37.7	55.6	12:25	38.9	34.3	52.2	13:19	43.4	30.0	38.4	14:13	36.8	31.5	39.7	15:07	41.1	46.7	47.8	16:01	38.0	35.3	47.8	16:55				17:49			
09:44	42.4	47.7	37.0	10:38	42.0	31.4	49.1	11:32	47.6	38.0	54.4	12:26	40.1	35.7	47.7	13:20	41.9	51.7	33.2	14:14	39.8	48.7	47.5	15:08	41.3	44.1	41.7	16:02	38.4	33.0	38.7	16:56				17:50			
09:45	39.4	35.0	35.9	10:39	43.7	34.6	44.7	11:33	45.4	40.8	49.9	12:27	34.4	46.2	49.2	13:21	33.5	31.4	32.7	14:15	35.6	34.0	51.7	15:09	37.3	40.2	46.2	16:03	41.5	48.8	48.0	16:57				17:51			
09:46	41.4	31.8	44.5	10:40	40.6	46.8	45.8	11:34	46.6	41.6	52.3	12:28	51.9	35.6	37.9	13:22	35.4	34.4	37.5	14:16	40.4	46.2	40.8	15:10	41.8	38.0	45.6	16:04	35.8	31.3	49.1	16:58				17:52			
09:47	36.6	34.2	47.7	10:41	39.7	31.6	44.9	11:35	41.7	41.6	53.2	12:29	62.4	39.9	40.5	13:23	41.5	30.0	37.2	14:17	33.5	36.2	40.0	15:11	41.4	38.4	48.4	16:05	42.4	34.6	45.7	16:59				17:53			
09:48	37.5	48.2	47.0	10:42	41.0	31.9	50.3	11:36	38.6	40.3	48.8	12:30	67.0	50.4	50.2	13:24	36.1	34.9	36.6	14:18	35.3	43.7	37.6	15:12	44.3	37.6	43.2	16:06	43.2	48.2	41.0	17:00				17:54			
09:49	43.5	31.2	36.6	10:43	41.1	31.0	50.4	11:37	45.3	38.9	51.7	12:31	73.5	64.1	52.0	13:25	41.5	34.6	36.6	14:19	35.5	34.2	37.7	15:13	40.2	34.6	49.0	16:07	45.4	35.4	48.7	17:01				17:55			
09:50	44.6	50.7	50.2	10:44	38.8	31.7	43.7	11:38	42.5	38.6	50.4	12:32	66.1	49.4	58.6	13:26	36.5	35.9	42.2	14:20	39.2	33.9	38.2	15:14	36.5	34.9	39.2	16:08	43.7	33.1	45.1	17:02				17:56			
09:51	48.4	47.9	50.9	10:45	40.0	30.7	46.5	11:39	39.7	36.4	51.6	12:33	65.3	55.9	55.7	13:27	40.9	36.1	51.8	14:21	38.3	37.6	38.9	15:15	35.2	45.7	43.0	16:09	36.0	33.9	38.0	17:03				17:57			
09:52	39.9	35.6	39.9	10:46	38.4	31.6	46.1	11:40	40.8	36.9	52.5	12:34	70.8	42.7	56.6	13:28	43.1	41.4	46.8	14:22	35.5	45.8	37.3	15:16	44.7	37.1	44.7	16:10	39.6	47.8	43.4	17:04				17:58			
09:53	35.5	33.1	33.9	10:47	38.1	32.6	51.3	11:41	43.2	38.3	47.7	12:35	62.7	48.5	59.9	13:29	73.0	45.1	55.2	14:23	37.7	39.6	35.8	15:17	44.4	40.8	47.5	16:11	39.0	31.4	46.4	17:05				17:59			

Table A7. Tuesday 18/10/22 - Positions 1, 3 and 4 L_{Aeq} measurements (free-field)

Start	Position			Start	Position			Start	Position			Start	Position			Start	Position		
Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4
09:00				09:54				10:48				11:42	50.4	46.0	44.4	12:36	43.2	34.9	40.8
09:01				09:55				10:49				11:43	45.5	55.0	56.9	12:37	42.7	36.8	39.7
09:02				09:56				10:50				11:44	45.7	41.1	46.2	12:38	42.2	38.0	48.5
09:03				09:57				10:51				11:45	45.9	49.7	51.7	12:39	42.9	36.7	39.2
09:04				09:58				10:52				11:46	44.0	39.0	48.9	12:40	37.8	35.7	51.2
09:05				09:59				10:53				11:47	43.1	40.7	43.1	12:41	41.3	36.0	47.3
09:06				10:00				10:54				11:48	43.1	39.5	49.4	12:42	41.8	34.8	38.5
09:07				10:01				10:55				11:49	42.8	49.3	45.1	12:43	40.0	37.3	36.0
09:08				10:02				10:56				11:50	44.3	35.6	49.5	12:44	47.3	40.5	38.5
09:09				10:03				10:57				11:51	42.1	39.9	46.3	12:45	43.0	41.9	38.3
09:10				10:04				10:58				11:52	43.8	39.1	43.9	12:46	42.2	41.5	41.9
09:11				10:05				10:59	45.5			11:53	45.8	34.0	47.2	12:47	43.0	39.4	41.0
09:12				10:06				11:00	42.2			11:54	46.2	34.8	46.5	12:48	42.4	35.7	45.6
09:13				10:07				11:01	39.0			11:55	52.8	44.6	49.3	12:49	42.2	39.3	47.8
09:14				10:08				11:02	38.8			11:56	49.9	50.2	46.0	12:50	44.6	38.8	44.7
09:15				10:09				11:03	40.9			11:57	54.8	51.1	54.8	12:51	43.6	42.3	43.9
09:16				10:10				11:04	38.7			11:58	51.0	46.5	48.0	12:52	46.1	35.7	40.1
09:17				10:11				11:05	39.8			11:59	42.1	36.7	40.8	12:53	43.7	35.3	40.2
09:18				10:12				11:06	39.1			12:00	43.2	40.1	42.0	12:54	44.3	46.0	47.4
09:19				10:13				11:07	37.6			12:01	41.5	46.8	40.6	12:55	47.4	36.5	40.0
09:20				10:14				11:08	36.6			12:02	41.7	41.2	41.0	12:56	46.7	36.9	40.2
09:21				10:15				11:09	39.2			12:03	42.3	41.7	41.4	12:57	44.5	37.1	46.4
09:22				10:16				11:10	40.9		46.5	12:04	39.9	41.4	46.5	12:58	42.5	36.6	37.2
09:23				10:17				11:11	40.4		40.7	12:05	42.9	39.0	47.7	12:59	45.2	36.7	41.0
09:24				10:18				11:12	41.9		47.8	12:06	42.4	37.6	42.5	13:00	42.5	35.5	40.8
09:25				10:19				11:13	43.5		44.5	12:07	43.3	49.7	47.1	13:01	43.8	53.2	39.3
09:26				10:20				11:14	42.1		41.1	12:08	41.0	37.9	49.3	13:02	45.6	40.1	41.1
09:27				10:21				11:15	40.0		38.1	12:09	39.6	35.5	39.3	13:03	43.4	38.5	46.2
09:28				10:22				11:16	40.3		36.2	12:10	43.5	36.0	44.5	13:04	44.2	49.8	39.8
09:29				10:23				11:17	38.9		37.7	12:11	44.9	38.4	43.2	13:05	55.7	48.2	45.0
09:30				10:24				11:18	40.1		36.6	12:12	44.2	40.8	44.0	13:06	44.8	38.9	42.4
09:31				10:25				11:19	39.2		38.8	12:13	43.9	40.3	43.0	13:07	46.7	41.1	40.0
09:32				10:26				11:20	40.7		37.7	12:14	44.9	39.6	38.1	13:08	46.2	42.1	39.1
09:33				10:27				11:21	41.8		36.1	12:15	42.6	40.0	38.6	13:09	58.1	52.4	49.1
09:34				10:28				11:22	40.1	38.3	48.0	12:16	47.5	48.8	52.9	13:10	45.3	38.9	40.2
09:35				10:29				11:23	37.7	37.4	42.6	12:17	46.0	42.7	45.6	13:11	44.2	39.6	41.2
09:36				10:30				11:24	48.2	40.2	44.9	12:18	44.5	38.9	47.5	13:12	42.0	42.3	42.6
09:37				10:31				11:25	42.0	41.9	34.8	12:19	44.1	35.5	49.6	13:13	40.6	41.6	43.1
09:38				10:32				11:26	37.8	37.4	37.5	12:20	41.9	35.0	39.5	13:14	42.3	40.0	43.4
09:39				10:33				11:27	38.5	36.9	45.2	12:21	43.7	36.0	44.7	13:15	44.2	44.2	43.5
09:40				10:34				11:28	41.2	38.2	45.8	12:22	43.7	37.4	51.1	13:16	45.2	48.6	48.7
09:41				10:35				11:29	47.0	47.2	36.5	12:23	45.2	36.8	37.0	13:17	50.4	41.3	60.1
09:42				10:36				11:30	47.1	37.2	39.0	12:24	44.8	35.1	48.7	13:18	49.0	42.5	44.8
09:43				10:37				11:31	43.9	38.1	48.1	12:25	45.0	36.2	37.1	13:19	49.2	42.7	44.4
09:44				10:38				11:32	52.0	45.4	43.3	12:26	44.0	34.5	36.0	13:20	47.9	38.4	42.2
09:45				10:39				11:33	41.4	43.7	44.9	12:27	43.7	50.2	37.1	13:21	46.0	38.0	39.1
09:46				10:40				11:34	42.1	37.2	36.9	12:28	40.7	52.8	37.9	13:22	47.2	39.2	40.9
09:47				10:41				11:35	46.9	40.8	49.3	12:29	43.5	48.8	38.7	13:23	51.0	43.8	60.1
09:48				10:42				11:36	65.1	58.4	61.2	12:30	44.5	40.5	56.7	13:24	52.8	64.8	62.1
09:49				10:43				11:37	51.9	52.1	49.0	12:31	42.8	42.1	49.4	13:25	49.9	54.9	51.5
09:50				10:44				11:38	47.4	49.8	44.4	12:32	43.4	51.5	41.0	13:26	62.1	63.2	58.6
09:51				10:45				11:39	47.6	37.3	41.4	12:33	44.7	40.7	39.9	13:27	50.2	41.4	46.1
09:52				10:46				11:40	48.8	37.3	53.3	12:34	45.2	37.3	50.4	13:28	61.5	48.8	53.3
09:53				10:47				11:41	55.3	37.8	45.7	12:35	45.7	37.2	39.3	13:29	45.7	59.6	50.3

Start	Position			Start	Position			Start	Position			Start	Position			Start	Position		
Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4
13:30	46.2	46.8	47.5	14:24	41.7	31.7	49.8	15:18	41.8			16:12				17:06			
13:31	45.4	42.5	44.8	14:25	42.1	36.3	40.1	15:19	52.6			16:13				17:07			
13:32	39.9	41.0	44.2	14:26	41.1	36.4	39.9	15:20				16:14				17:08			
13:33	44.5	38.5	38.2	14:27	44.5	40.9	49.7	15:21				16:15				17:09			
13:34	47.8	36.7	39.2	14:28	46.2	39.6	44.8	15:22				16:16				17:10			
13:35	48.5	37.6	39.3	14:29	57.3	50.8	47.4	15:23				16:17				17:11			
13:36	45.0	38.3	40.1	14:30	45.3	37.7	38.9	15:24				16:18				17:12			
13:37	45.4	45.4	38.3	14:31	39.1	50.2	40.1	15:25				16:19				17:13			
13:38	46.1	38.3	45.5	14:32	41.0	36.4	41.4	15:26				16:20				17:14			
13:39	46.4	38.4	50.0	14:33	38.9	35.0	46.8	15:27				16:21				17:15			
13:40	44.8	36.5	40.3	14:34	38.1	35.8	44.7	15:28				16:22				17:16			
13:41	45.5	43.7	47.0	14:35	53.0	48.4	40.8	15:29				16:23				17:17			
13:42	47.0	48.3	50.0	14:36	41.7	40.5	49.2	15:30				16:24				17:18			
13:43	43.0	34.6	45.8	14:37	41.5	33.6	48.1	15:31				16:25				17:19			
13:44	45.9	36.6	40.0	14:38	50.3	46.9	43.5	15:32				16:26				17:20			
13:45	44.1	40.7	53.8	14:39	50.0	39.3	37.3	15:33				16:27				17:21			
13:46	42.0	39.1	40.7	14:40	41.0	51.7	36.5	15:34				16:28				17:22			
13:47	41.4	36.7	46.6	14:41	45.1	38.3	47.1	15:35				16:29				17:23			
13:48	41.7	36.4	46.0	14:42	40.2	33.6	34.9	15:36				16:30				17:24			
13:49	39.1	37.3	37.8	14:43	39.5	49.7	37.8	15:37				16:31				17:25			
13:50	43.7	36.8	38.3	14:44	43.6	35.5	35.7	15:38				16:32				17:26			
13:51	41.1	36.9	37.3	14:45	39.2	35.3	36.3	15:39				16:33				17:27			
13:52	41.2	35.4	51.6	14:46	36.6	38.0	38.3	15:40				16:34				17:28			
13:53	42.3	44.9	40.2	14:47	41.1	35.3	38.3	15:41				16:35				17:29			
13:54	40.7	37.0	44.2	14:48	44.0	34.1	37.3	15:42				16:36				17:30			
13:55	41.6	36.9	54.2	14:49	43.1	35.4	36.5	15:43				16:37				17:31			
13:56	43.1	36.4	40.4	14:50	45.6	49.4	36.3	15:44				16:38				17:32			
13:57	45.4	34.2	45.3	14:51	39.8	35.1	36.3	15:45				16:39				17:33			
13:58	44.9	36.6	37.7	14:52	37.4	50.1	46.9	15:46				16:40				17:34			
13:59	45.7	38.5	39.1	14:53	40.5	34.2	49.2	15:47				16:41				17:35			
14:00	43.2	39.0	38.7	14:54	41.3	33.4	35.1	15:48				16:42				17:36			
14:01	38.8	33.7	37.0	14:55	41.3	35.2	38.3	15:49				16:43				17:37			
14:02	42.2	40.8	51.2	14:56	49.6	41.4	47.6	15:50				16:44				17:38			
14:03	47.9	41.2	44.2	14:57	40.4	37.3	43.7	15:51				16:45				17:39			
14:04	64.2	37.2	36.7	14:58	40.5	47.3	35.2	15:52				16:46				17:40			
14:05	66.4	36.7	46.2	14:59	41.2		53.7	15:53				16:47				17:41			
14:06	76.5	45.0	50.9	15:00	40.5		40.5	15:54				16:48				17:42			
14:07	73.5	36.2	49.0	15:01	37.2		36.8	15:55				16:49				17:43			
14:08	74.1	55.0	45.4	15:02	38.9		36.2	15:56				16:50				17:44			
14:09	65.3	40.0	54.7	15:03	40.5		49.5	15:57				16:51				17:45			
14:10	58.8	47.5	51.8	15:04	41.4		38.7	15:58				16:52				17:46			
14:11	64.2	38.6	43.7	15:05	41.9		38.2	15:59				16:53				17:47			
14:12	69.2	53.2	57.5	15:06	41.8		38.2	16:00				16:54				17:48			
14:13	57.3	57.4	51.8	15:07	40.8		40.2	16:01				16:55				17:49			
14:14	62.6	38.8	46.6	15:08	42.9		39.4	16:02				16:56				17:50			
14:15	47.7	40.1	47.1	15:09	58.1		49.9	16:03				16:57				17:51			
14:16	45.9	45.3	43.9	15:10	45.6			16:04				16:58				17:52			
14:17	42.5	34.4	37.3	15:11	41.0			16:05				16:59				17:53			
14:18	41.2	39.3	44.1	15:12	43.2			16:06				17:00				17:54			
14:19	44.9	49.6	45.4	15:13	40.8			16:07				17:01				17:55			
14:20	43.2	35.3	39.6	15:14	43.0			16:08				17:02				17:56			
14:21	41.7	39.9	45.3	15:15	44.4			16:09				17:03				17:57			
14:22	46.6	33.2	45.4	15:16	41.8			16:10				17:04				17:58			
14:23	41.9	31.7	42.8	15:17	40.3			16:11				17:05				17:59			

Table A8. Saturday 22/10/22 - Positions 1, 3 and 4 L_{Aeq} measurements (free-field)

Start	Position			Start	Position			Start	Position			Start	Position			Start	Position			Start	Position			Start	Position			Start	Position			Start	Position			Start	Position		
Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4	Time	1	3	4
09:00		35.2	40.6	09:54	42.3	35.7	39.6	10:48	40.1	35.0	49.3	11:42	41.4	41.1	45.1	12:36	57.6	45.8	55.9	13:30	43.5	49.0	48.5	14:24	74.3	53.8	45.0	15:18	41.8			16:12				17:06			
09:01		34.7	40.7	09:55	42.8	36.4	38.3	10:49	44.8	35.2	48.9	11:43	41.9	37.0	45.4	12:37	58.1	52.4	47.5	13:31	47.5	46.2	39.4	14:25	65.6	48.3	56.6	15:19	52.6			16:13				17:07			
09:02		34.5	41.0	09:56	42.8	51.3	39.7	10:50	50.7	43.2	46.8	11:44	41.0	38.8	42.4	12:38	58.9	46.2	55.3	13:32	55.7	53.2	52.7	14:26	64.0	56.1	52.0	15:20				16:14				17:08			
09:03		33.7	41.8	09:57	45.8	37.9	42.0	10:51	53.5	50.4	48.8	11:45	44.6	37.8	46.2	12:39	59.4	50.7	45.5	13:33	40.4	37.0	49.2	14:27	64.7	47.2	54.2	15:21				16:15				17:09			
09:04		33.8	49.0	09:58	44.8	52.6	40.6	10:52	43.1	40.6	43.1	11:46	45.2	39.6	51.3	12:40	65.4	53.5	54.2	13:34	40.8	34.8	43.0	14:28	58.0	45.9	58.1	15:22				16:16				17:10			
09:05		34.6	39.3	09:59	52.4	48.1	48.7	10:53	44.2	39.3	42.3	11:47	45.1	49.7	46.6	12:41	60.9	45.3	55.5	13:35	42.0	35.6	37.4	14:29	68.3	58.4	51.3	15:23				16:17				17:11			
09:06		34.3	39.4	10:00	43.1	37.2	50.5	10:54	45.4	39.3	43.7	11:48	50.7	49.5	51.6	12:42	56.8	49.9	48.6	13:36	45.7	36.4	42.0	14:30	61.4	48.0	55.4	15:24				16:18				17:12			
09:07		35.4	43.7	10:01	41.0	46.8	38.5	10:55	43.9	37.3	47.1	11:49	46.4	42.2	48.1	12:43	42.8	39.8	44.8	13:37	45.0	41.7	50.5	14:31	45.7	46.2	37.5	15:25				16:19				17:13			
09:08		48.5	46.6	10:02	40.2	47.5	52.3	10:56	43.4	40.6	48.8	11:50	46.9	39.3	46.6	12:44	46.1	40.2	46.5	13:38	44.7	35.1	43.0	14:32	38.6	38.8	38.8	15:26				16:20				17:14			
09:09		38.7	40.9	10:03	41.1	38.6	41.1	10:57	43.7	37.1	42.4	11:51	48.5	48.4	46.2	12:45	44.2	38.8	44.9	13:39	42.6	35.0	42.5	14:33	39.5	35.7	42.8	15:27				16:21				17:15			
09:10		36.0	48.6	10:04	40.6	50.5	48.0	10:58	41.5	38.0	40.2	11:52	48.7	61.0	48.3	12:46	60.0	49.2	48.3	13:40	45.7	35.4	43.0	14:34	35.0	32.0	45.2	15:28				16:22				17:16			
09:11		35.4	51.6	10:05	41.9	38.6	47.5	10:59	41.9	37.1	40.8	11:53	62.6	49.1	43.9	12:47	64.1	54.9	56.4	13:41	38.9	32.4	50.3	14:35	40.9	39.9	42.9	15:29				16:23				17:17			
09:12	42.9	36.4	46.2	10:06	42.1	35.0	40.2	11:00	44.6	37.9	41.6	11:54	56.7	40.8	52.6	12:48	62.4	55.9	55.1	13:42	36.0	34.6	45.3	14:36	37.0	37.4	41.4	15:30				16:24				17:18			
09:13	39.4	35.8	41.3	10:07	39.9	35.5	40.8	11:01	42.4	39.0	40.9	11:55	58.3	41.7	53.5	12:49	72.0	52.3	57.0	13:43	41.4	36.7	38.0	14:37	45.1	38.4	47.0	15:31				16:25				17:19			
09:14	41.1	37.2	40.3	10:08	43.9	36.0	39.7	11:02	46.0	37.8	44.1	11:56	45.8	40.9	49.6	12:50	64.8	56.3	56.2	13:44	36.5	40.2	49.1	14:38	59.5	50.8	48.0	15:32				16:26				17:20			
09:15	44.5	37.7	39.4	10:09	49.0	35.7	46.6	11:03	48.6	51.2	53.2	11:57	41.9	49.6	52.9	12:51	67.6	51.4	55.2	13:45	33.5	36.2	45.3	14:39	72.2	47.3	56.9	15:33				16:27				17:21			
09:16	41.0	39.6	39.8	10:10	43.8	39.9	47.9	11:04	44.3	47.3	47.5	11:58	41.0	44.4	49.9	12:52	62.1	47.8	55.6	13:46	38.9	34.2	44.4	14:40	61.9	46.3	56.2	15:34				16:28				17:22			
09:17	41.4	39.9	39.5	10:11	39.8	36.1	40.1	11:05	44.2	38.3	42.0	11:59	42.8	39.5	44.4	12:53	47.7	53.3	39.1	13:47	37.6	49.9	41.8	14:41	62.9	53.1	46.8	15:35				16:29				17:23			
09:18	38.2	37.7	50.0	10:12	40.4	38.9	39.2	11:06	42.3	36.3	43.0	12:00	49.6	39.6	50.7	12:54	41.6	40.7	45.2	13:48	37.6	33.3	40.3	14:42	73.8	45.5	54.9	15:36				16:30				17:24			
09:19	40.1	36.0	38.4	10:13	39.5	34.5	37.6	11:07	45.0	37.9	42.4	12:01	45.1	41.9	46.2	12:55	40.5	57.5	42.0	13:49	46.1	48.4	37.5	14:43	61.1	50.3	50.4	15:37				16:31				17:25			
09:20	42.4	36.3	45.3	10:14	44.7	34.1	37.8	11:08	39.9	37.7	41.7	12:02	43.5	41.7	49.8	12:56	42.2	40.1	44.5	13:50	36.5	31.1	40.5	14:44	64.1	46.5	52.2	15:38				16:32				17:26			
09:21	43.2	37.3	38.9	10:15	40.2	49.6	48.7	11:09	40.4	51.1	43.4	12:03	50.1	51.6	51.6	12:57	43.5	40.1	60.1	13:51	38.2	30.9	41.0	14:45	58.6	54.0	48.4	15:39				16:33				17:27			
09:22	43.3	38.2	41.0	10:16	42.2	36.8	40.6	11:10	42.9	38.8	55.5	12:04	49.7	49.2	53.9	12:58	45.5	43.2	46.4	13:52	37.3	33.1	39.6	14:46	43.8	46.6	47.1	15:40				16:34				17:28			
09:23	40.4	37.4	40.0	10:17	48.7	37.3	40.1	11:11	50.6	44.9	46.4	12:05	46.3	43.2	50.1	12:59	54.6	54.6	56.1	13:53	42.5	30.8	39.3	14:47	50.5	47.5	44.7	15:41				16:35				17:29			
09:24	42.8	36.7	40.2	10:18	71.4	50.0	39.5	11:12	50.8	45.9	49.7	12:06	49.5	43.1	52.2	13:00	48.5	46.2	52.8	13:54	46.2	32.7	39.1	14:48		35.7	44.5	15:42				16:36				17:30			
09:25	41.9	36.6	39.1	10:19	76.0	44.0	49.9	11:13	48.3	38.9	40.8	12:07	40.6	40.1	50.5	13:01	43.4	45.2	48.2	13:55	41.3	42.8	38.7	14:49		37.5	42.9	15:43				16:37				17:31			
09:26	41.7	37.3	41.3	10:20	72.9	50.9	52.3	11:14	41.7	35.7	45.6	12:08	42.8	41.8	48.9	13:02	44.1	43.6	46.0	13:56	41.0	45.5	37.8	14:50		37.5	41.8	15:44				16:38				17:32			
09:27	42.0	37.2	38.9	10:21	65.0	59.2	45.5	11:15	41.7	34.9	38.9	12:09	45.7	46.9	46.9	13:03	44.2	34.8	46.7	13:57	43.4	33.2	48.1	14:51		37.7	42.5	15:45				16:39				17:33			
09:28	43.4	35.3	37.3	10:22	69.1	49.3	58.7	11:16	42.7	34.9	51.1	12:10	47.2	40.8	50.7	13:04	41.0	35.7	45.3	13:58	45.9	46.7	38.3	14:52		39.1	48.5	15:46				16:40				17:34			
09:29	42.9	39.8	50.7	10:23	68.0	52.4	52.2	11:17	43.1	35.4	47.9	12:11	46.6	46.0	45.1	13:05	40.1	39.6	44.7	13:59	39.5	38.6	37.7	14:53		46.0	42.9	15:47				16:41				17:35			
09:30	44.9	41.4	39.4	10:24	60.6	62.0	57.4	11:18	40.8	37.7	49.0	12:12	59.2	48.9	53.2	13:06	40.8	36.3	52.5	14:00	38.0	53.2	37.4	14:54		42.8	56.2	15:48				16:42				17:36			
09:31	47.4	44.7	38.2	10:25	62.8	55.0	58.4	11:19	43.8	37.5	44.7	12:13	68.3	49.0	57.9	13:07	36.8	36.5	47.9	14:01	35.7	44.8	34.3	14:55		46.7	57.2	15:49				16:43				17:37			
09:32	49.5	49.3	37.9	10:26	68.3	62.7	58.0	11:20	43.7	39.5	42.2	12:14	65.7	52.4	51.9	13:08	38.6	34.0	45.9	14:02	42.5	32.1	36.6	14:56		54.0	47.7	15:50				16:44				17:38			
09:33	46.5	46.7	38.5	10:27	58.2	56.3	58.4	11:21	38.0	57.4	47.0	12:15	70.8	51.1	55.7	13:09	34.8	33.0	47.4	14:03	40.7	31.8	48.0	14:57		45.2	56.8	15:51				16:45				17:39			
09:34	46.2	45.7	47.7	10:28	56.6	58.9	58.3	11:22	39.0	49.3	46.7	12:16	66.7	49.9	59.9	13:10	40.1	34.5	42.7	14:04	40.1	33.1	38.4	14:58		53.2	55.1	15:52				16:46				17:40			
09:35	43.6	41.8	39.9	10:29	59.7	51.1	56.1	11:23	40.7	53.6	41.4	12:17	64.2	58.5	55.6	13:11	45.9	38.0	40.1	14:05	44.3	46.9	47.7	14:59		48.6	54.6	15:53				16:47				17:41			
09:36	45.6	39.4	39.2	10:30	56.0	52.8	55.4	11:24	53.2	58.2	54.7	12:18	69.4	53.2	58.5	13:12	39.7	34.3	50.7	14:06	42.7	35.3	42.6	15:00		53.3		15:54				16:48				17:42			
09:37	39.9	35.6	39.2	10:31	43.6	53.3	44.4	11:25	45.8	44.9	48.7	12:19	57.6	55.1	53.2	13:13	45.3	33.6	47.2	14:07	40.8	32.4	44.0	15:01		42.0		15:55				16:49				17:43			
09:38	36.1	34.8	38.4	10:32	39.5	34.6	47.5	11:26	42.9	41.6	43.7	12:20	65.5	48.3	53.3	13:14	40.7	34.8	45.7	14:08	42.5	31.9	45.9	15:02		46.7		15:56				16:50				17:44			
09:39	39.7	36.5	49.3	10:33	39.9	34.3	46.7	11:27	43.1	39.3	45.2	12:21	63.6	50.5	50.8	13:15	42.7	35.5	47.3	14:09	41.8	32.9	36.8	15:03		42.9		15:57				16:51				17:45			
09:40	38.6	34.0	49.6	10:34	51.7	36.1	56.9	11:28	43.2	38.4	43.3	12:22	61.1	52.0	53.0	13:16	39.2	33.6	44.6	14:10	43.7	34.7	45.6	15:04		35.3		15:58				16:52				17:46			
09:41	40.2	35.0	42.6	10:35	72.2	36.3	48.5	11:29	41.2	35.4	45.5	12:23	49.9	56.4	54.5	13:17	41.7	35.1	39.6	14:11	40.4	34.1	42.3	15:05		37.7		15:59				16:53				17:47			
09:42	37.9	34.7	38.6	10:36	71.8	53.1	47.2	11:30	38.9	34.7	45.1	12:24	47.6	44.6	52.3	13:18	48.7	38.8	40.3	14:12	45.1	52.2	45.3	15:06		33.7		16:00				16:54				17:48			
09:43	37.9	35.5	39.4	10:37	64.1	51.4	44.1	11:31	44.8	34.5	40.8	12:25	45.9	45.5	45.7	13:19	49.0	45.6	48.7	14:13	42.1	39.7	35.2	15:07		35.0		16:01				16:55				17:49			
09:44	41.1	35.8	39.6	10:38	59.4	48.2	56.5	11:32	42.5	37.0	41.0	12:26	53.6	41.8	52.2	13:20	41.3	56.7	46.4	14:14	43.2	32.0	34.2	15:08		52.5		16:02				16:56				17:50			
09:45	43.5	37.7	37.6	10:39	58.7	53.6	54.1	11:33	41.5	37.7	45.4	12:27	43.6	39.9	49.3	13:21	43.5	49.5	49.6	14:15	42.7	46.5	32.2	15:09				16:03				16:57				17:51			
09:46	42.3	49.7	36.6	10:40	58.6	46.7	56.7	11:34	46.0	45.9	50.0	12:28	42.6	42.9	46.1	13:22	44.5	41.4	35.5	14:16	42.2	41.8	49.5	15:10				16:04				16:58				17:52			
09:47	44.3	40.4	47.8	10:41	60.7	52.8	52.0	11:35	56.2	54.7	52.5	12:29	60.8	52.3	57.4	13:23	35.8	33.6	35.2	14:17	44.3	36.8	41.1	15:11				16:05				16:59				17:53			
09:48	43.2	50.2	49.1	10:42	59.2	51.4	55.3	11:36	43.0	37.8	40.3	12:30	64.6	46.0	54.8	13:24	37.2	46.9	44.4	14:18	42.8	37.9	43.4	15:12				16:06				17:00				17:54			
09:49	40.0	41.2	50.7	10:43	47.6	52.5	47.9	11:37	37.2	49.4	38.6	12:31	70.1	53.0	48.7	13:25	42.4	36.2	36.2	14:19	46.2	38.7	43.3	15:13				16:07				17:01				17:55			
09:50	43.9	41.1	43.2	10:44	48.0	38.9	47.0	11:38	39.8	41.5	39.9	12:32	66.6	47.8	57.1	13:26	40.0	33.6	37.1	14:20	48.0	35.6	34.4	15:14				16:08				17:02				17:56			
09:51	47.9	35.6	44.0	10:45	45.4	59.6	40.0	11:39	42.7	38.9	51.5	12:33	62.5	54.7	55.4	13:27	40.6	37.2	41.6	14:21	48.8	34.1	45.5	15:15				16:09				17:03				17:57			
09:52	48.5	37.7	48.1	10:46	41.6	49.6	47.6	11:40	42.7	36.6	40.8	12:34	66.9	48.4	53.9	13:28	41.1	42.6	40.5	14:22	62.3	45.2	46.4	15:16				16:10				17:04				17:58			
09:53	40.6	35.0	43.3	10:47	40.0	37.4	49.7	11:41	45.3	39.1	41.7	12:35	44.3	55.0	52.7	13:29	42.8	47.7	42.0	14:23	61.3	50.0	58.1	15:17				16:11				17:05				17:59			

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0702
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER	APPROVING SIGNATORY
Jamie Bishop	Greg Rice

[redacted]

Equipment	**B&K 2238, s/n: 2428864**
Description	Mediator - Type 1, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards

BS EN 60651 / BS EN 60804

Conditions

Atmospheric Pressure	102.1 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0705
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER APPROVING SIGNATORY

[redacted]

Equipment	**B&K 2238, s/n: 2540985**
Description	Mediator - Type 1, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards

BS EN 60651 / BS EN 60804

Conditions

Atmospheric Pressure	102.1 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0706
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 2

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER APPROVING SIGNATORY

[redacted]

Equipment	**B&K 4188, s/n: 2408019**
Description	Microphone - 1/2" FF 0V, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards

BS EN 61094

Conditions

Atmospheric Pressure	102.0 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Data

Sensitivity -29.2 dB

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
B&K 4134 L	1675305	14-Jul-20	Druck DPI 141	479	06-Aug-20
HP 34401	3146A16728	30-Mar-21	Nor 1253	20848	14-Jul-20
Stanford DS36	33213	17-Aug-20	Vaisala HMP23	S2430007	03-Aug-20

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0703
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 2

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER   APPROVING SIGNATORY

[redacted]

Equipment	**B&K 4188, s/n: 2426929**
Description	Microphone - 1/2" FF 0V, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards

BS EN 61094

Conditions

Atmospheric Pressure	102.0 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Data

Sensitivity -29.7 dB

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
B&K 4134 L	1675305	14-Jul-20	Druck DPI 141	479	06-Aug-20
HP 34401	3146A16728	30-Mar-21	Nor 1253	20848	14-Jul-20
Stanford DS36	33213	17-Aug-20	Vaisala HMP23	S2430007	03-Aug-20

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0707
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER	APPROVING SIGNATORY
Jamie Bishop	Greg Rice

[redacted]

Equipment	**B&K ZC 0030, s/n: 2478**
Description	Preamplifier - 1/2" - B&K 2238, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards
Manufacturer Specifications

Conditions

Atmospheric Pressure	102.8 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes
We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0704
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER	APPROVING SIGNATORY
Jamie Bishop	Greg Rice

[redacted]

Equipment **B&K ZC 0030, s/n: 4949**
Description Preamplifier - 1/2" - B&K 2238, Hottinger Bruel & Kjaer UK Ltd

Customer Matrix Acoustic Design Consultants
Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards
Manufacturer Specifications

Conditions
Atmospheric Pressure 102.8 kPa
Temperature 22.4 °C
Relative Humidity 49.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes
We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0710
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER	APPROVING SIGNATORY
Jamie Bishop	Greg Rice

[redacted]

Equipment **B&K 2260 B, s/n: 2305168**
Description Investigator, Hottinger Bruel & Kjaer UK Ltd

Customer Matrix Acoustic Design Consultants
Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards
BS EN 60651 / BS EN 60804

Conditions
Atmospheric Pressure 102.1 kPa
Temperature 22.4 °C
Relative Humidity 49.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes
We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0711
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 2

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER APPROVING SIGNATORY

[redacted]

Equipment	**B&K 4189, s/n: 2294181**
Description	Microphone - 1/2" FF 0V, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards

BS EN 61094

Conditions

Atmospheric Pressure	102.0 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Data

Sensitivity -26.3 dB

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
B&K 4134 L	1675305	14-Jul-20	Druck DPI 141	479	06-Aug-20
HP 34401	3146A16728	30-Mar-21	Nor 1253	20848	14-Jul-20
Stanford DS36	33213	17-Aug-20	Vaisala HMP23	S2430007	03-Aug-20

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	16 July 2021	CERTIFICATE NUMBER	2021-0712
DATE OF CALIBRATION	16 July 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER APPROVING SIGNATORY

[redacted]

Equipment	**B&K ZC 0026, s/n: 2305168**
Description	Preamplifier - 1/2" - B&K 2260, Hottinger Bruel & Kjaer UK Ltd
Customer	Matrix Acoustic Design Consultants Brookfield Coach House, Weston Lane, Bath, BA1 4AG

Standards

Manufacturer Specifications

Conditions

Atmospheric Pressure	102.8 kPa
Temperature	22.4 °C
Relative Humidity	49.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.