6. Noise and Vibration

Bickerdike Allen Partners
Architecture
Acoustics
Technology

Project: **BRISTOL AIRPORT – POST APPLICATION**

File Ref: A11260_01_MO004_3.0

Date: 13 May 2019

Subject: **Second Response to NSC and Jacobs Comments**

From: N Williams/P Henson

To:

Name	Role	Company	Initials
R Allard		North Somerset Council	RA
A Melling		Wood PLC	AM
J Shearman		Bristol Airport	JS

1.0 INTRODUCTION

In December 2018, Bristol Airport Ltd (BAL) submitted a planning application to North Somerset Council (NSC) for the development of Bristol Airport to accommodate 12 million passengers per annum (mppa) (Application No. 18/P/5118/OUT).

NSC provided comments, including those by their consultants (Jacobs), on the noise and vibration chapter (Chapter 7) of the Environmental Statement (ES) accompanying the planning application. The comments were received on 7th February 2019 and discussed at a meeting held on 11th February 2019, which was also attended by Bickerdike Allen Partners LLP (BAP). As BAL's noise consultants and the authors of Chapter 7 of the ES, BAP then prepared responses to the comments.

NSC and Jacobs have reviewed BAP's responses and on 11th April 2019 provided BAL with further comments requesting some further clarifications on particular items. This memo sets out this information as requested.

2.0 NORTH SOMERSET COUNCIL COMMENTS

The following points were raised by NSC as not being resolved. They also requested that the points raised by Jacobs be addressed.

2.1 Future Fleet Mix

NSC are still not satisfied with the evidence of future fleet mix forecasts. This is a matter which will be addressed separately by BAL.

2.2 Noise Insulation Scheme Eligibility

NSC have requested that the number of properties that were eligible for the scheme be provided in order to determine its effectiveness.

The ES assessment found that around 450 dwellings lie within the 57 dB $L_{Aeq,16h}$ contour in 2017 and therefore would be eligible for treatment under the current noise insulation scheme.

Around 335 properties have been treated to date which therefore would represent approximately 75% of those eligible.

3.0 JACOBS COMMENTS

The following points were raised by Jacobs:

3.1 Methodology – guidance documents

3.1.1 2015 Institute of Acoustics document *Acoustics of Schools: A Design Guide*

Jacobs have stated that they are of the opinion that this document is relevant to the ES. They consider that *"the guidelines provide a context for the consideration by the ES of the predicted change in noise levels"* and note that design guidelines from BS8233 have been used for other receptors.

Acoustic criteria for schools are set out in Building Bulletin 93 (BB93), as referenced in the ES and acknowledged by Jacobs. These have been used as the basis of the assessment of schools in the ES, in the same way that design guidelines from BS8233 have been used for other receptors. The design guide document mentioned by Jacobs provides supporting guidance and recommendations on the acoustic design of schools to meet the criteria set out in BB93. The two documents therefore support what BAP have adopted as design criteria within the ES. It has been agreed with Jacobs that it is simply a difference in professional judgement as to whether this document should also be listed in the ES but that it does not change the criteria adopted to rate noise effects on schools nor the outcome of the assessment.

3.1.2 BS4142

Jacobs have accepted that the use of BS4142 to assess airport ground noise would identify that complaints are likely in almost all situations, but have requested that some method of accounting for the local noise climate is used when assessing ground noise.

This has been covered in Section 3.14 of this memo.

3.2 Methodology – potential receptors

Jacobs highlight that there may be some sensitive receptors exposed to significant noise effects that are not accounted for by the receptor types assessed, such as hotels, guesthouses and campsites where the owners/staff live at these locations.

For air noise, ground noise, and road noise effects, BAP are of the opinion that while this could potentially lead to a small under-estimation of the number of people exposed to significant levels of noise, as the assessment finding was that none of the assessed receptors were exposed to significant effects due to the small changes in noise level, this would also be true for other receptors.

For construction noise, please refer to Section 3.15 of this memo.

Jacobs have highlighted that one nursing home/hospice and one hospital were identified in the 2009 ES as within the 54 dB $L_{Aeq,16h}$ contour for the 10mppa scenario of the 2009 ES and requested confirmation of the effects at these receptors under the 2018 ES.

The 12mppa scenario of the 2018 ES shows smaller noise contours than the 10mppa scenario of the 2009 ES, but not by as much as 3 dB. Therefore BAP would expect the two receptors mentioned to be within the 51 or 54 dB $L_{Aeq,16h}$ contour of the 12mppa scenario of the 2018 ES.

BAP have not been able to identify these specific receptors as they are not described in detail in the 2009 ES. BAP note that the AddressBase dataset used for identification of non-residential receptors includes Weston Hospicecare in Congresbury and St. Peter's Hospice in Yatton. Neither have been included in the 2018 ES as the buildings are charity shops rather than actual hospices. It is unclear whether these are the receptors referred to by the 2009 ES.

3.3 Methodology – places of worship

BAP accept Jacobs statement that places of worship may be more sensitive than residential receptors in some circumstances, although we would still regard the use of residential criteria as appropriate for this case.

If, for example, the adopted SOAEL were to be lowered by 5 dB to 58 dB $L_{Aeq,16h}$, this would not materially change the assessment. The small changes in noise level at all of the assessed places of worship would still lead to a conclusion of no significant effect. There is one church (St. Katherine's in Felton) which is exposed to a noise level of 58 dB $L_{Aeq,16h}$ or above. This is also the

case in 2017 (it actually decreases slightly from the baseline scenario to the 12mppa scenario). Therefore BAP consider that the choice of SOAEL for places of worship does not materially affect the assessment in this case.

3.4 Methodology – cumulative effects

Jacobs have requested that the presented cumulative noise levels include those for 2017 and for night time road traffic noise. BAP had omitted these initially as night-time road traffic noise was not assessed as part of the ES. These have been converted from the $L_{A10,18h}$ levels following the formula given in the TRL report *"Converting the UK traffic noise index LA10,18h to EU noise indices for noise mapping"*. Specifically method 3 for non-motorway roads has been used.

BAP have expanded the data provided previously at the four locations shown in Figure 1 to include all four scenarios assessed as part of the ES. This is given in Table 1.

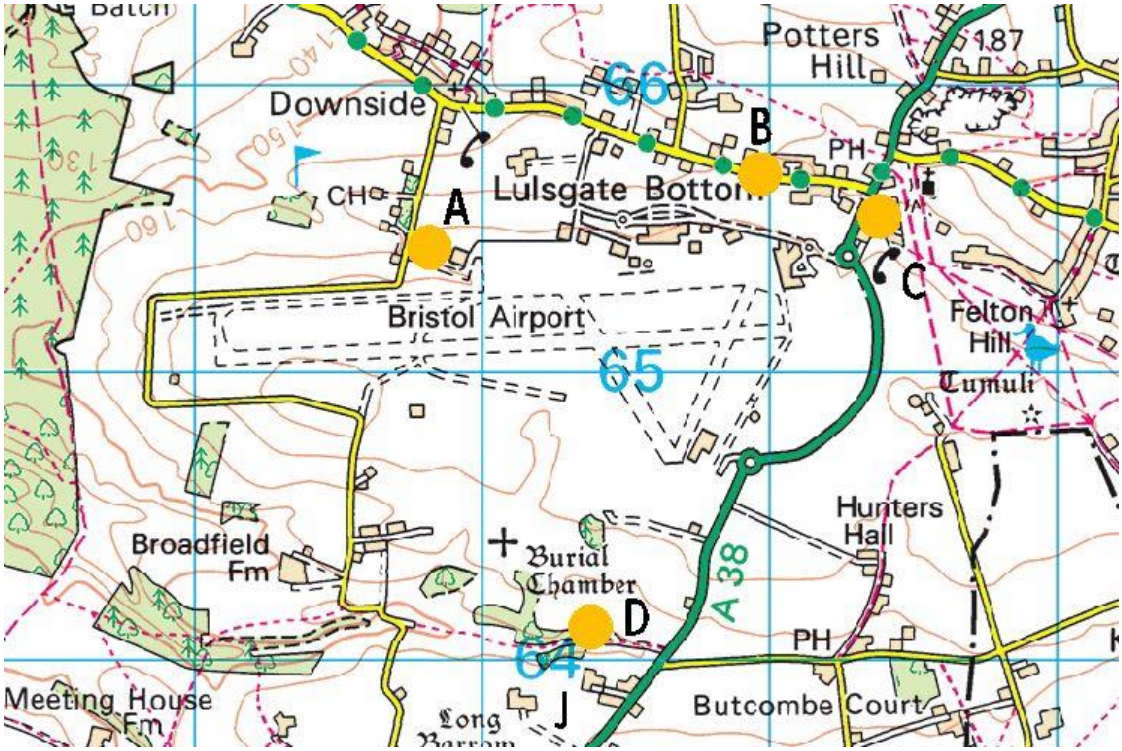

Figure 1: Cumulative Receptor Locations

Scenario	Noise Source	Noise Level at Location							
		Day Noise Level, dB $L_{Aeq,16h}$				Night Noise Level, dB $L_{Aeq,8h}$			
		A	B	C	D	A	B	C	D
2017	Air	61	60	62	51	56	54	57	46
	Ground	61	58	52	45	56	52	46	39
	Road	39	62	55	44	33	54	47	38
	Total	**64**	**65**	**63**	**53**	**59**	**58**	**57**	**48**
10 mppa (2021)	Air	60	60	62	51	57	56	58	48
	Ground	61	58	52	45	59	54	50	41
	Road	40	63	57	45	34	54	49	39
	Total	**64**	**65**	**63**	**53**	**61**	**60**	**59**	**49**
10 mppa (2026)	Air	59	58	60	49	56	55	57	46
	Ground	61	58	52	45	59	54	50	41
	Road	40	63	57	45	34	54	49	39
	Total	**63**	**65**	**62**	**52**	**61**	**59**	**58**	**48**
12 mppa (2026)	Air	60	59	61	51	57	56	58	48
	Ground	63	52	52	46	61	47	49	41
	Road	40	63	57	46	34	55	49	39
	Total	**65**	**65**	**63**	**53**	**62**	**59**	**59**	**49**

Table 1: Cumulative Noise Levels

BAP agree with Jacobs that at higher absolute noise levels, it may be that a smaller change in noise level is required to be of significance. For this reason, the ES assessment of air noise and ground noise considered an increase of more than 2 dB(A) to be significant for absolute noise levels above the SOAEL, compared to 3 dB(A) below the SOAEL (but above the LOAEL).

As discussed previously, the change in noise level for a cumulative level cannot be greater than the change in level for individual sources. For each individual source, the change in noise level at all assessed receptors was less than 2 dB(A). Therefore BAP consider that these would not be considered significant in the context of the ES if cumulative noise levels were considered.

BAP remain of the opinion that it is not appropriate to assess the cumulative noise from different sources in the context of a LOAEL and SOAEL. For example, with an adopted SOAEL of 63 dB $L_{Aeq,16h}$ for air noise and 60 dB $L_{Aeq,16h}$ for ground noise, it is not clear how one could set a SOAEL for a cumulative level considering the two sources. If it were set at 60 dB $L_{Aeq,16h}$, then a

hypothetical receptor which had an air noise level of 61 dB $L_{Aeq,16h}$ and a ground noise level of 50 dB $L_{Aeq,16h}$ would be considered to be above the SOAEL based on a cumulative level, even though the contribution was entirely from the air noise source and it was not considered above the SOAEL for air noise alone. Alternatively if a SOAEL for cumulative noise were set at 63 dB $L_{Aeq,16h}$, the opposite could be true in that a receptor above the SOAEL for ground noise but with a low air noise level might not be considered above the cumulative SOAEL.

The calculation of noise levels for individual sources of noise generally errs on the conservative side. As a result, the cumulative addition of sources as shown above will tend to magnify the conservative nature of a noise assessment. This is evident when comparing the predicted cumulative total noise levels for 2017 from Table 1 above with those measured during BAP's long-term noise survey that were presented in the ES. This comparison is provided in Table 2 below.

Location	16-hour day (07:00 to 23:00)		8-hour night (23:00 to 07:00)		Dominant daytime noise source
	Measured L_{Aeq}, dB(A)	Predicted L_{Aeq}, dB(A)	Measured L_{Aeq}, dB(A)	Predicted L_{Aeq}, dB(A)	
A Cooks Bridle Path, Downside	53	64	49	59	Aircraft
B Downside Road, Lulsgate Bottom	58	65	54	58	Aircraft
C School Lane, Lulsgate Bottom	59	63	54	57	Aircraft
D Red Hill (A38), Redhill	50	53	47	48	Road traffic

Table 2: Comparison of Measured Baseline and Predicted Cumulative Noise Levels

This shows that for all positions, the cumulative noise levels are greater than those measured and, for some receptors, such as A and B, large differences arise. This will be in part due to the local circumstances of a given receptor where the measurement point is better screened than allowed for in the prediction. It does however support the point that cumulative levels given in Table 1 over-estimate the actual total noise levels at these receptors.

To put the above noise levels into context, the most recent National Noise Incidence Survey found that over 54% of the UK population is exposed to over 55 dB L_{Aeq} over the day. For cumulative levels of 63 to 65 dB(A), were they to occur, some form of noise protection would be desirable. For Bristol Airport, while measured noise levels at receptors A, B and C lie well below these predicted values, they do lie within the airport's sound insulation scheme zone and therefore qualify for noise protection.

3.5 Baseline monitoring – data presentation

Jacobs have requested that histograms be provided. BAP have included a frequency chart for each monitoring location, separately for daytime and night-time, at the end of this memo.

3.6 Baseline monitoring – complaint statistics

Jacobs have requested 2018 complaint statistics to establish if the increase in complainants (but not complaints) in 2017 has continued. This information was not available at the time of the first response but has since been compiled and provided by BAL. Table 3 presents this information alongside the 2015-2017 data which was previously presented.

Year	2018	2017	2016	2015
Total number of complaints	379	172	167	173
Number of individual complainants	176	100	71	77
Average number of complaints per complainant	2.2	1.7	2.4	2.1
Number of aircraft movements per complaint	203	443	442	393

Table 3: Summary of Complaints 2015-2018

3.7 Air noise – examples of prior use of Significant Observed Adverse Effect Level (SOAEL)

Jacobs have requested further examples of the use of 63 dB $L_{Aeq,16h}$ as a SOAEL, ideally in an ES for a rural or semi-rural airport that is not a noise-designated airport since the publication of the SoNA study in February 2017. The only major airport ES BAP are aware of in this timeframe is Stansted, which is a noise-designated airport but is in a relatively rural location. The Stansted ES also referred to 63 dB $L_{Aeq,16h}$, making the point that the SoNA study should not change this as the percentage of people highly annoyed at the value of 63 dB $L_{Aeq,16h}$ was identical to the previously used ANIS study (i.e. 23%).

BAP are not aware of any similar recent airport Environmental Statements where a SOAEL of lower than 63 dB $L_{Aeq,16h}$ has been adopted.

3.8 Air noise – noise insulation scheme

Jacobs had similar comments to NSC regarding the insulation scheme take-up which are discussed in Section 2.2 of this memo.

Jacobs also recommend that any new night scheme should extend to lower noise levels than the SOAEL, as the daytime scheme does.

Government guidance is for airports to offer (as a minimum) sound insulation to those exposed to a level of 63 dB $L_{Aeq,16h}$ or greater. No requirements are given by the Government relating to night noise. The assessment finds that there is no significant impact due to the proposed development. Even so, the airport have chosen to upgrade their sound insulation scheme which commences at a threshold (57 dB $L_{Aeq,16h}$).

BAP are not aware of any major UK airport offering sound insulation with regard to night noise levels lower than 55 dB $L_{Aeq,8h}$, indeed many have a scheme based only on the daytime noise level (as Bristol do currently).

3.9 Air noise – selection of scenario

Jacobs repeat their disappointment that the 'sensitivity test' of the 10mppa 2026 scenario has not been assessed for all indicators. BAP feel this is being exaggerated since for almost every indicator, and all primary indicators, the 10mppa 2026 scenario was assessed to the same level of detail and given the same weight in determining the significance of effect.

3.10 Air noise – annoyance

Jacobs make the point that more people are assessed as being highly annoyed than in the previous application, and that this should be considered when assessing the application, while accepting that this is due to differences in the assessment methodology.

It is acknowledged and accepted that, particularly at lower levels of aircraft noise exposure, people appear to be more annoyed by aircraft noise than in the past. This is something we identified in the noise chapter of the ES in paragraphs 7.9.17 to 7.9.20 and this has been taken into account in the setting of our LOAEL and SOAEL values to rate the acceptability of air noise from the airport and its future development. In this manner, the latest research findings concerning community response to air noise have already been accounted for the in the ES.

Regarding this application and specifically annoyance, in our view, it is not appropriate to conflate the two different assessment methods, as we demonstrate below.

The finding of the ES is that the number of people highly annoyed will be the same under the 12mppa scenario as in 2017 (when rounded to the nearest 50, if unrounded the 2017 number is slightly higher). This demonstrates that this application would not result in more people becoming highly annoyed compared to the current situation.

As a further example, a hypothetical application to reduce the current operations at Bristol Airport by 20%, which would result in a 1 dB decrease in noise level at all locations, would still result in an assessment of 600 people being highly annoyed. This is nearly double that assessed under the 2009 application. We presume it is not being suggested that such an application should be refused on noise grounds.

3.11 Air noise – 'salami slicing'

BAP agree with the underlying point made by Jacobs that if a number of sequential applications are made to increase noise by a small amount, the net effect could be a larger impact.

However, as stated previously, this point does not apply to this case since the 2018 application (12mppa scenario) gives rise to lower noise levels than those assessed as part of the 2009 application (10mppa scenario).

Jacobs refer to the increase in the number of people assessed as being highly annoyed as justification for the air noise effects being greater. BAP are of the opinion that if the noise level is lower, it should not be regarded as a worsening of effects purely because of a different assessment method.

3.12 Air noise – Winford Primary School

BAP welcome that Jacobs accept the change in noise level at Winford Primary School will be small (the change from 2017 to 12mppa is only 0.5 dB).

BAP agree with Jacobs conclusion that there is likely to be a current noise effect at the school.

Jacobs have recommended that specific funding should be made available to the school to mitigate the air noise effects. BAP remain of the opinion that as the current Government guidance is that it expects insulation to be provided to schools at a level of 63 dB $L_{Aeq,16h}$, it is not reasonable to compel Bristol Airport to insulate this school due to the proposed development, which results in an increase of only 0.5 dB compared to current noise levels and does not exceed 63 dB $L_{Aeq,16h}$. However, BAP support the school being given assistance by BAL where possible.

3.13 Ground noise – SOAEL selection

Jacobs have put forward that the SOAEL should be set at the level where people are not disturbed, even with their windows open. BAP remain of the opinion that this level would relate to the LOAEL. This is supported by government guidance in Planning Practice Guidance Noise[1], which includes a table with examples of outcomes of the various effect levels. The relevant text is reproduced in Table 4.

[1] https://www.gov.uk/guidance/noise--2

Perception	Examples of outcomes	Increasing effect level	Action
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		LOAEL	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, eg turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
		SOAEL	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, eg avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Table 4: Extract from Planning Practice Guidance Noise

3.14 Ground noise – local context

Jacobs accept that the use of BS4142 may not be appropriate for airport ground noise, but have requested that the ground noise be put into the context of the local external noise environment.

BAP have used an approach which considers the measured L_{A90} as well as the absolute level of noise and change in noise level. The following approach has been taken to determine a significant ground noise effect due to the proposed development:

- For dwellings below the LOAEL, no significant impact

- For dwellings above the LOAEL but below the SOAEL, a significant effect occurs if:
    - Change in noise level (due to the development) of greater than 3 dB $L_{Aeq,T}$
    - Change in noise level of greater than 2 dB $L_{Aeq,T}$ and ground noise level of greater than 10 dB above the existing average L_{A90}
- For dwellings above the SOAEL, a significant effect occurs if:
    - Change in noise level (due to the development) of greater than 2 dB $L_{Aeq,T}$

BAP have, for each receptor above the LOAEL, assigned an existing L_{A90} level based on which of the four long term locations were the most representative. This approach would reach the same conclusion as for that in the ES; i.e. that there are a small number of receptors (1 in the day period and 3 in the night period) exposed to a significant noise level, but the change due to the proposed development is not considered significant.

3.15 Construction noise

BAP agree with Jacobs that the main source of uncertainty is the detailed plant and programme, which is not currently available. BAP recommend that BAL consider committing to a Section 61 process for the sites where a potential significant impact (in the absence of mitigation) was identified.

Nick Williams/Peter Henson
for Bickerdike Allen Partners LLP

David Charles
Partner

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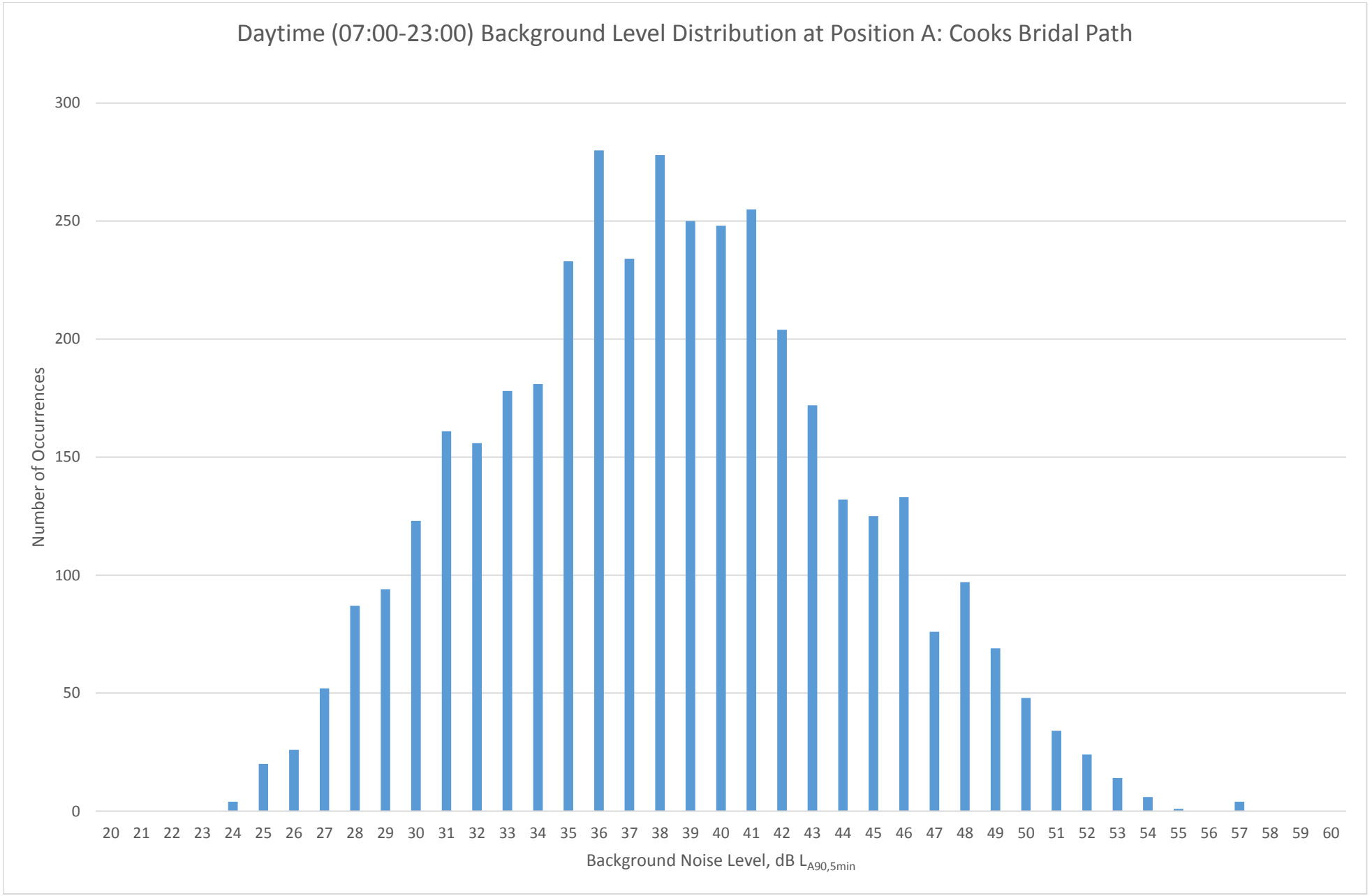
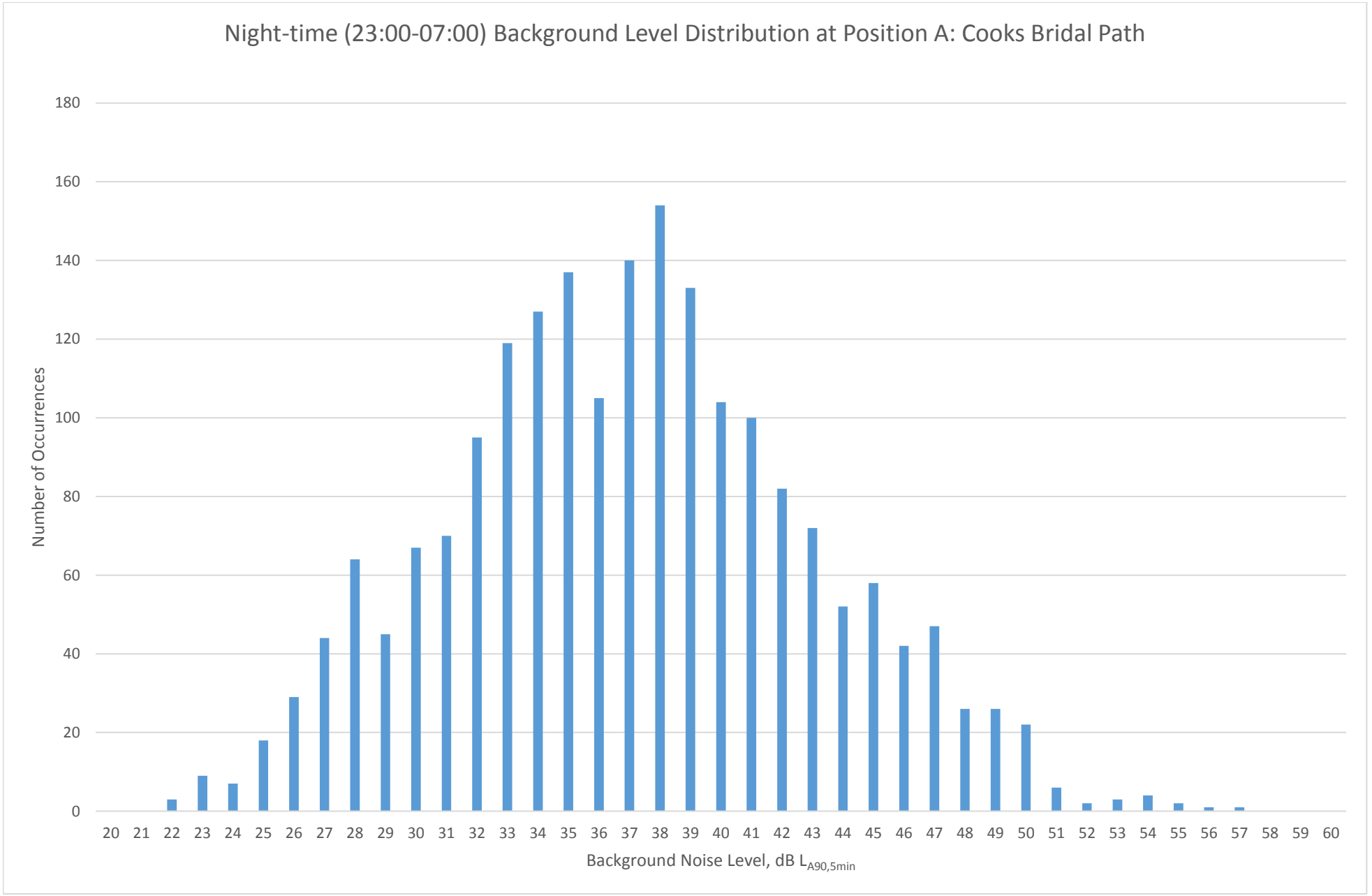
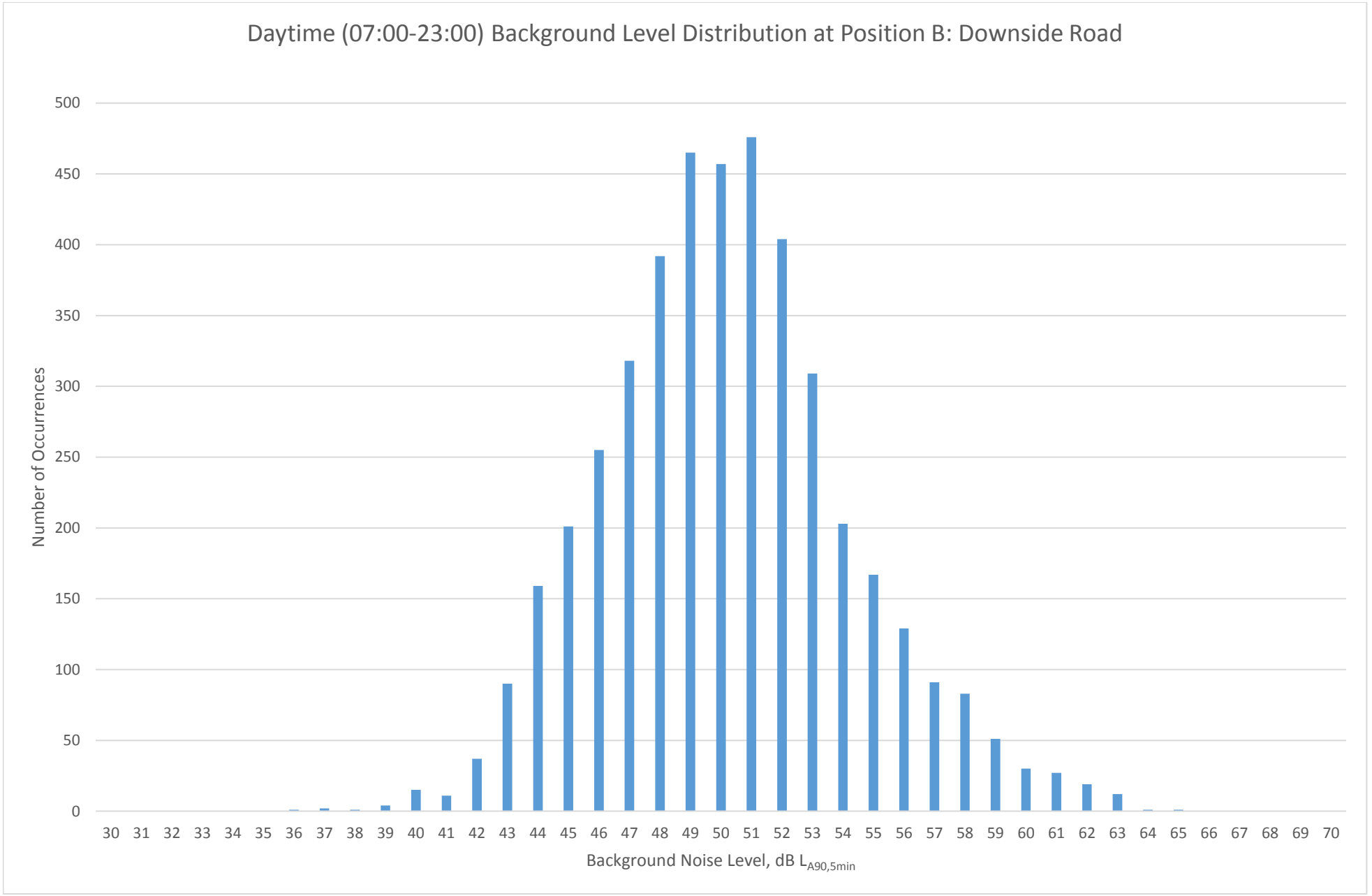
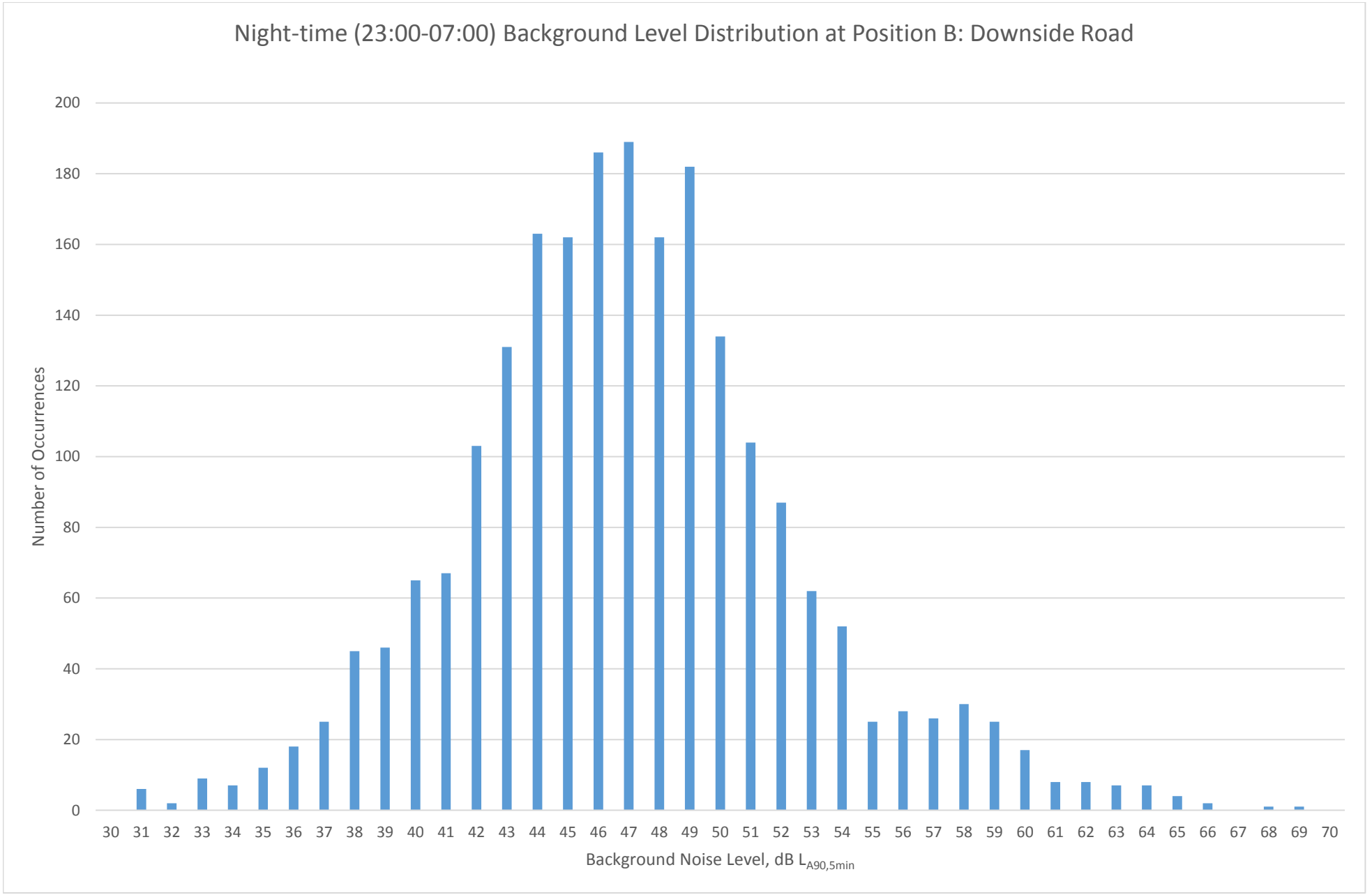
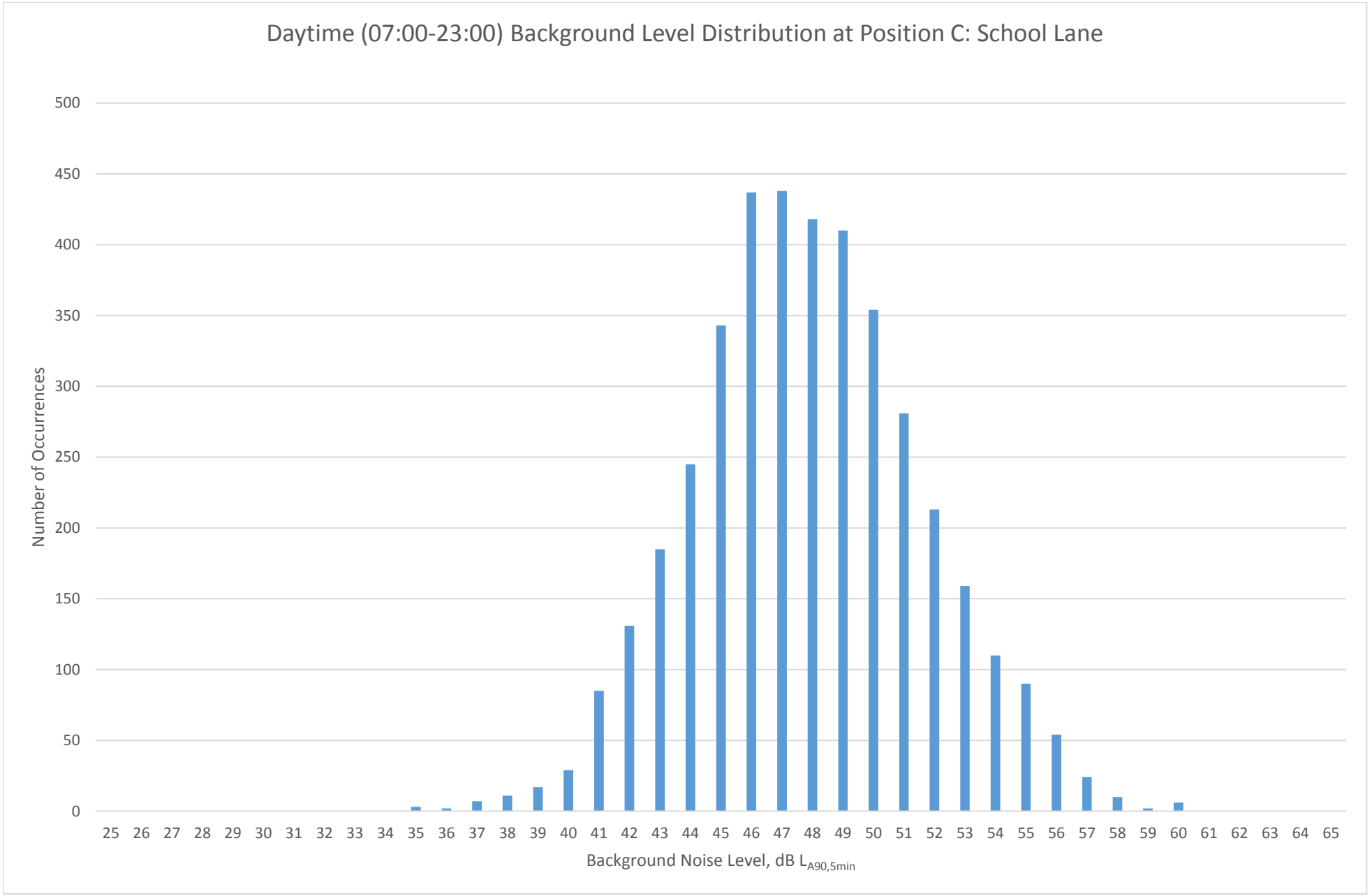
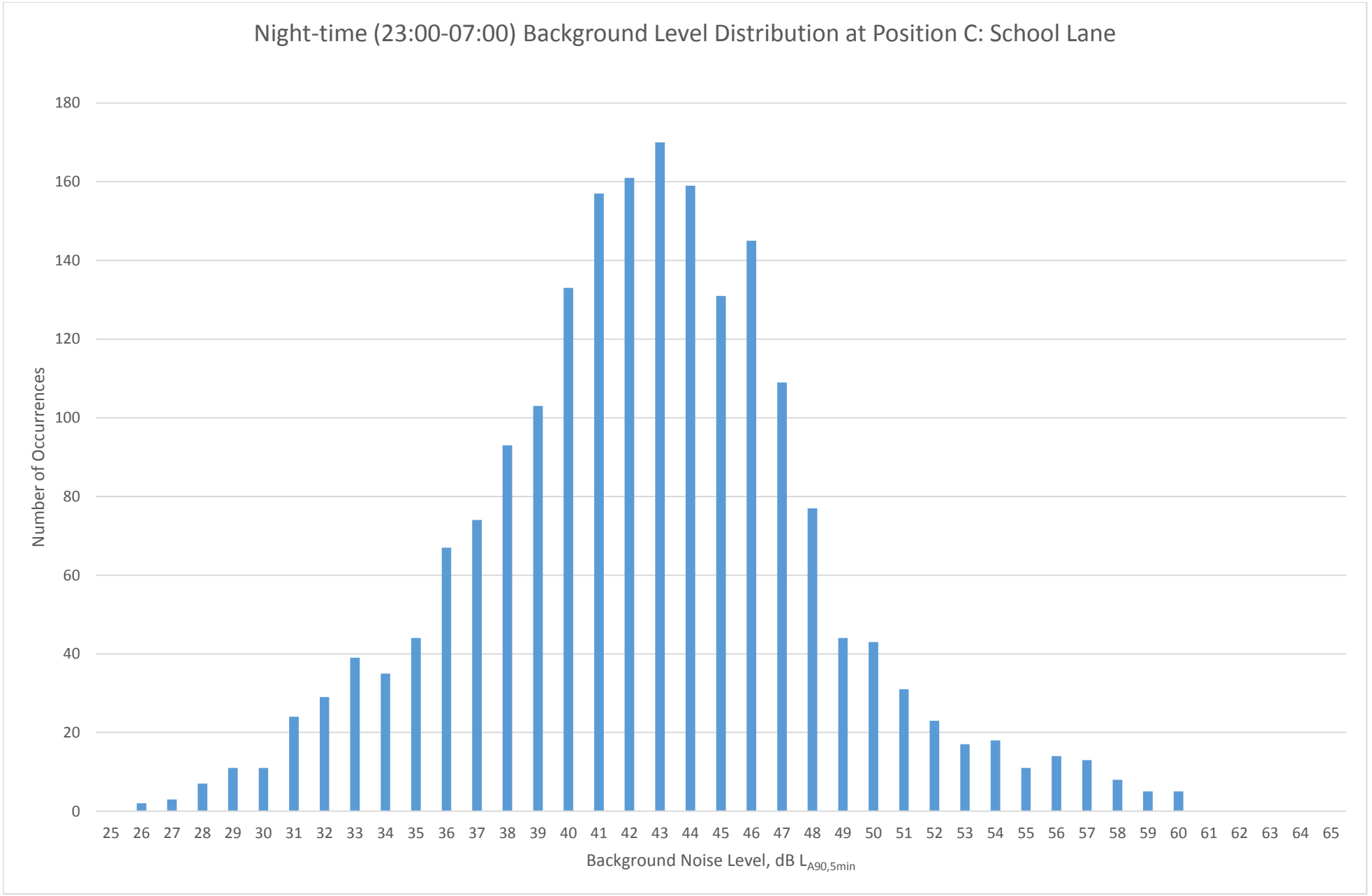

Daytime (07:00-23:00) Background Level Distribution at Position A: Cooks Bridal Path
Number of Occurrences
300
250
200
150
100
50
0
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Background Noise Level, dB $L_{A90,5min}$


Night-time (23:00-07:00) Background Level Distribution at Position A: Cooks Bridal Path
Number of Occurrences
0
20
40
60
80
100
120
140
160
180
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Background Noise Level, dB $L_{A90,5min}$


Daytime (07:00-23:00) Background Level Distribution at Position B: Downside Road
Number of Occurrences
0
50
100
150
200
250
300
350
400
450
500
30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Background Noise Level, dB $L_{A90,5min}$


Night-time (23:00-07:00) Background Level Distribution at Position B: Downside Road
Number of Occurrences
0
20
40
60
80
100
120
140
160
180
200
30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70
Background Noise Level, dB $L_{A90,5min}$


Daytime (07:00-23:00) Background Level Distribution at Position C: School Lane
Number of Occurrences
0
50
100
150
200
250
300
350
400
450
500
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
Background Noise Level, dB $L_{A90,5min}$


Night-time (23:00-07:00) Background Level Distribution at Position C: School Lane
Number of Occurrences
0
20
40
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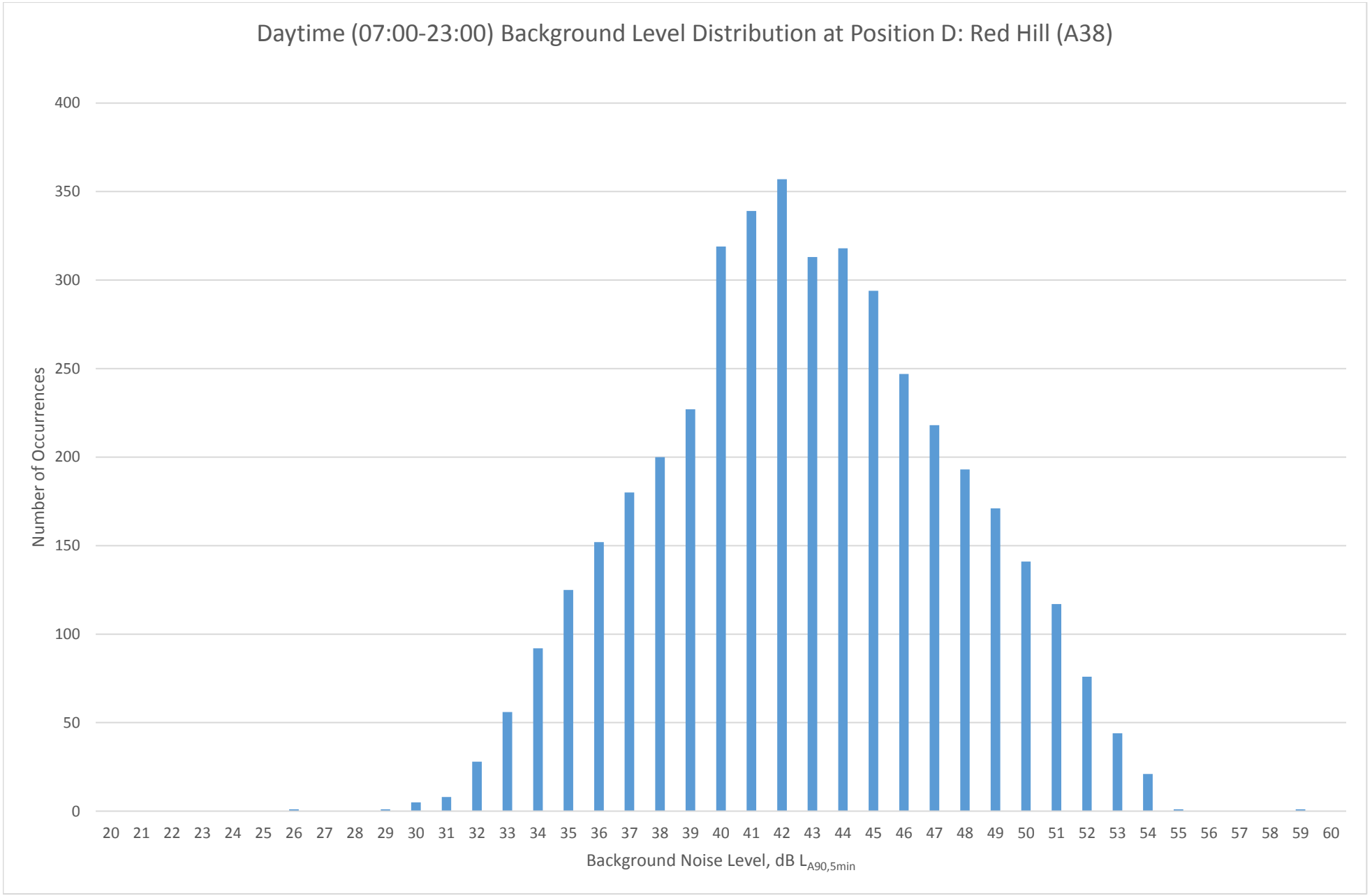
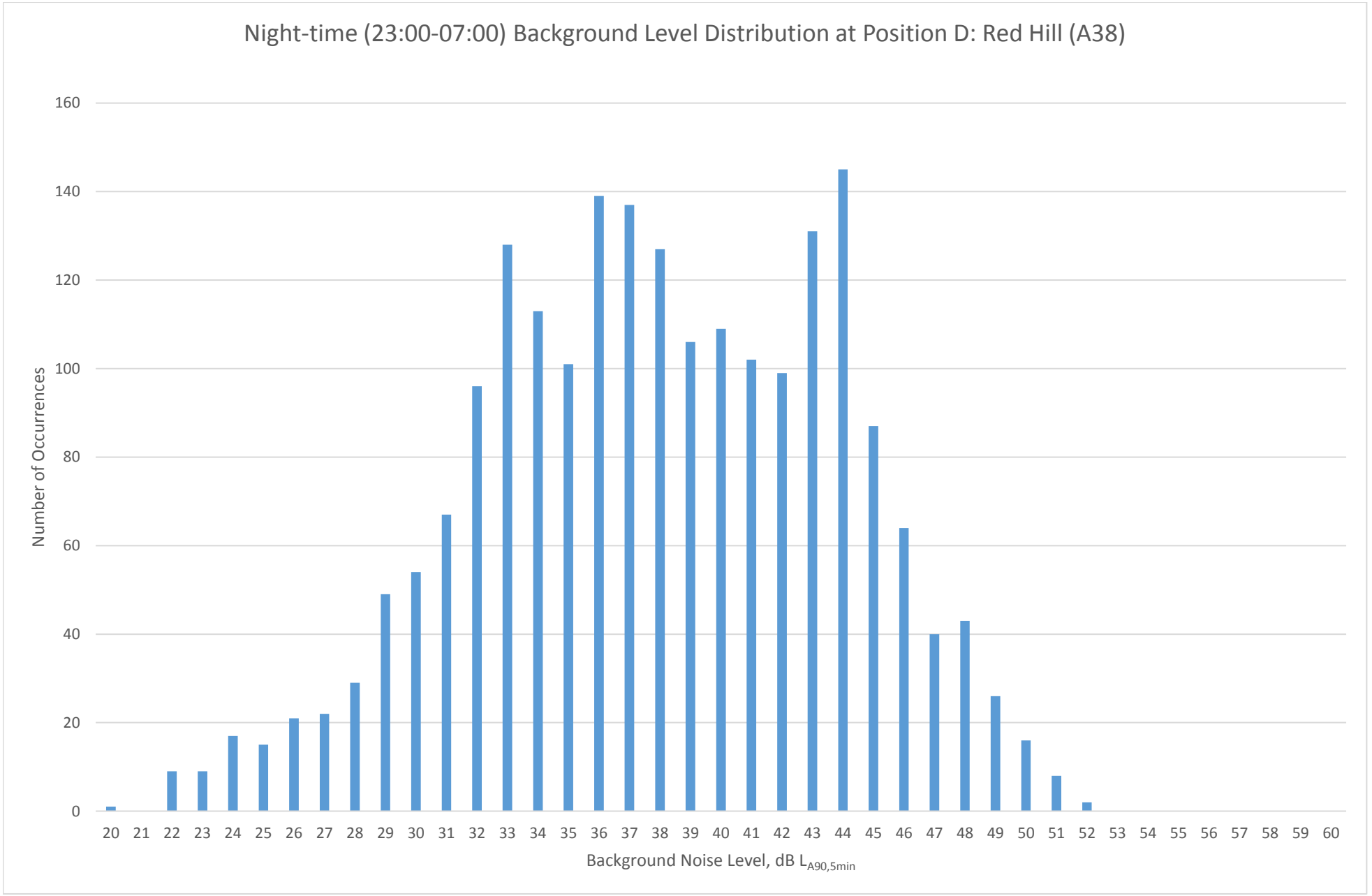
180
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
Background Noise Level, dB $L_{A90,5min}$


Daytime (07:00-23:00) Background Level Distribution at Position D: Red Hill (A38)
Number of Occurrences
0
50
100
150
200
250
300
350
400
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Background Noise Level, dB $L_{A90,5min}$


Night-time (23:00-07:00) Background Level Distribution at Position D: Red Hill (A38)
Number of Occurrences
0
20
40
60
80
100
120
140
160
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
Background Noise Level, dB $L_{A90,5min}$

MOTT MACDONALD

23 May 2019

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Bristol Airport Forecast Validation

Dear Mr Allard

I have been asked to write to you by Bristol Airport Limited (BAL) to provide additional information regarding Mott MacDonald's review and validation of BAL's traffic forecasts for Bristol Airport (BRS). Our validation was submitted in support of BAL's planning application for the development of Bristol Airport to accommodate 12 million passengers per annum (mppa) (application reference 18/P/5118/OUT).

Mott MacDonald was appointed to undertake an independent review and validation of traffic forecasts prepared by BAL in support of its emerging Master Plan and 12 mppa planning application. The final report, *Bristol Airport – Forecast Validation*, was completed in December 2018 and is contained at Appendix F to the Planning Statement submitted as part of the 12mppa planning application. I understand that you have received a copy of this report.

In addition, your email to James Shearman of 9 May 2019 included questions regarding the projected increase in newer, quieter aircraft types in operation at BRS by 2026. I will address this question also in this letter.

Scope of the Forecast Validation

The scope of the forecast validation included:

- Benchmarking and validating the BAL forecasts against Mott MacDonald developed econometric demand forecasts
- Benchmarking BAL forecasts against the latest Department of Transport (2017) forecasts
- Review and comment upon the detailed BAL air traffic forecast assumptions
- Review of future fleet assumptions and consultation with key BRS-based airlines
- Validation and calculation of future night movement and QC point requirements consistent with the forecasts.

Results and Conclusions

The full methodology of our forecast validation is set out in the Mott MacDonald report.

To validate the overall forecast level of demand, Mott MacDonald developed its own econometric forecast model considering forecast economic growth for the UK and BRS's main destination markets, the BRS catchment area population, and traffic spill from the South West region to other UK airports (primarily London airports). The impact of opening a new runway at Heathrow from 2027 is also considered, only affecting post 2026 forecasts, and therefore

is not applicable to the planning application for growth to 12 mppa.

The Mott MacDonald forecast's Base Case produced very similar forecasts to BAL management forecasts, validating the expectation of 12 million passengers by 2026, with growth up to 19.8 million by 2045 (compared with 19.5 million forecast by BAL in 2045, a variance of only 1.5%).

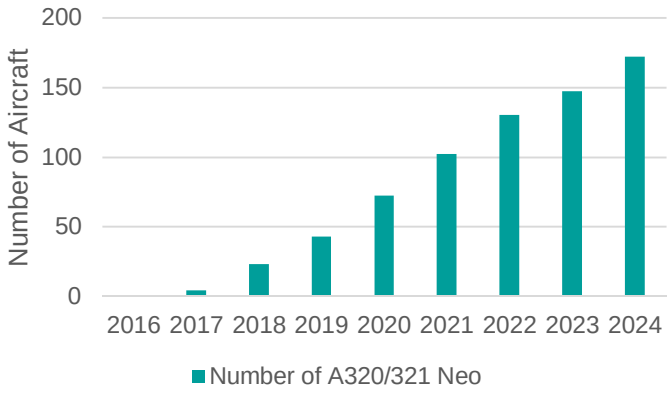
Fleet Renewal Forecasts

easyJet

The largest airline at BRS is easyJet, with around 45% share of movements currently. It currently operates 15 based aircraft at BRS, and this is expected to grow to 18 by 2026. easyJet operate a mix of Airbus A319/A320ceo[1] aircraft at BRS and the airline is in the process of renewing its fleet with A320/A321neo[2] types.

The A320neo entered service with easyJet in 2017, and by the end of 2019 easyJet will have taken delivery of over 40 Neo types. Based on current orders, easyJet's overall fleet of Neo's is expected to grow to over 170 aircraft by 2024, as per the chart below. By 2026, the easyJet Neo fleet is expected to be around 240 aircraft.

easyJet A320/321neo Network-wide Fleet Deployment



Source: MM analysis of CAPA fleet data

As part of our forecast validation, Mott MacDonald consulted with easyJet regarding their future fleet plans for BRS within the 2026 time horizon relevant to BAL's current planning application. easyJet have not yet made decisions regarding the airport-by-airport deployment of Neo's so far in the future, but indicated that their BRS operation in 2026 is likely to be either 100% Neo types or a mix of Ceo and Neo types.

The BAL management forecasts assume easyJet operations at BRS will consist of a mix of A320series Ceo/Neo types. The Neo share is assumed to be around 67% of operations in 2021, rising to 80% by 2026[3]. Given the size of the overall easyJet Neo fleet and growth over this timeframe, Mott MacDonald believes that the BAL management forecasts

[1] CEO – Current Engine Option
[2] NEO – New Engine Option
[3] As reflected in Tables 7D.9 to 7D.12 of Appendix 7D of the BAL submission Noise Chapter.

represent reasonable and conservative projections of the likely mix of current/new generation A320 series fleet types in service by 2026.

Other Airlines

The second most common type of aircraft in operation at BRS is the Boeing 737 family of aircraft, used by BRS's second and third largest carriers, Ryanair and TUI respectively.

Ryanair operate a fleet of B737-800 aircraft, and have ordered 210 of the newer B737-8 Max aircraft types for delivery by 2024. The B737Max has new-generation engines similar to the A320neo series.

TUI are also in the process of replacing their fleet of B737-800s and B757s operated at BRS with B737Max types.

Although the B737Max is currently grounded following the recent Lion Air and Ethiopian Airlines crashes, industry expectations are that the issues with the B737Max will be resolved during 2019 and that the grounding will not affect longer-term deployment of the aircraft.

The BAL management projections are that B737Max's will represent around 14% of the B737 variants in service by 2021, rising to 61% by 2026[4]. This level of B737 fleet renewal is in line with airline expectations: by 2026 Ryanair will have 210 B737Max aircraft in service, equivalent to around half of its overall fleet; TUI expect to have replaced all of its B737-800 and B757s in operation at BRS with B737Max types by 2026.

The BAL management forecasts also make modest assumptions about fleet renewal by other airlines currently or forecast to operate at BRS by 2026. Mott MacDonald's review of these future fleet assumptions concluded that the assumptions are reasonable and in line with airline fleet orders and the retirement profiles of aircraft types already in service.

Mott MacDonald also notes that BRS is subject to night flying restrictions, including noise point (QC) limits, which will act to incentivise easyJet and other airlines to deploy their newest, quietest aircraft types at BRS in order to make efficient use of available quota.

I trust that the above additional information answers the questions raised.

Yours sincerely

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[4] As reflected in Tables 7D.9 to 7D.12 of Appendix 7D of the BAL submission Noise Chapter.