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October 2023

London Luton Airport Expansion

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Volume 8 Additional Submissions (Examination)

8.41 Surface Access Noise Modelling Additional Information

Infrastructure Planning (Examination Procedure) Rules 2010

Application Document Ref: TR020001/APP/8.41

The Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

London Luton Airport Expansion Development Consent Order 202x

8.41 SURFACE ACCESS NOISE MODELLING ADDITIONAL INFORMATION

Deadline:	Deadline 3
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Author:	Luton Rising

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Issue 1	September 2023	Additional Submission - Deadline 2
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Contents

1 PURPOSE OF THIS PAPER

1.1.1 The Host Authorities (HA) have raised comments in their relevant representations and in technical meetings on the surface access noise modelling. Further information and clarification has been provided to the HAs and their noise consultant in technical meetings, and it was agreed in these meetings to provide the information and clarification in writing.

1.1.2 Section 2 of this paper provides an overview of the surface access noise modelling methodology, Section 3 reports on the queries raised by the HAs and Section 4 sets out a response to the comments.

1.1.3 This paper has been updated at Deadline 3 following further discussion and a collaborative exercise with the HAs and their noise consultant. A new Section 5 has been added to summarise the outcomes of this exercise.

2 SURFACE ACCESS NOISE METHODOLOGY

2.1.1 The methodology employed for the surface access noise assessment is described in Section 16.5 of **Chapter 16 Noise and Vibration of the Environmental Statement (ES) [REP1-003]** with further details provided in Section 9 of **Appendix 16.1 Noise and vibration information of the ES [AS-096]**.

2.1.2 The methodology follows best practice guidance for the assessment of road traffic noise as provided in National Highways' Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration Rev 2 (Ref 1).

2.1.3 In summary, the steps described in **Appendix 16.1 of the ES [AS-096]** for the surface access noise assessment are as follows:

a. Define a study area for the assessment, giving due consideration to the roads included in the traffic model and their distance from the Proposed Development.

b. Calculate road traffic noise levels at noise sensitive receptors for the opening year of assessment Phase 1, Phase 2a and Phase 2b both with and without the Proposed Development using the Calculation of Road Traffic Noise (CRTN) methodology (Ref 2).

c. Consider the likelihood of significant effects on all noise sensitive receptors in the study area given the calculated daytime and night-time road traffic noise levels, the expected short-term and long-term change with the Proposed Development in place and any associated contextual change to the local environment.

2.1.4 This approach, including the setting of Lower Observed Adverse Effect Levels (LOAELs) and Significant Observed Adverse Effect Levels (SOAELs) as defined in Table 16.16 and the noise change criteria given in Table 16.17 of **Chapter 16 of the ES [REP1-003]**, has been agreed as appropriate by the HAs and this is confirmed in the **draft Statements of Common Ground (SoCGs) [REP2-020** to **REP2-024].**

2.1.5 The SoCGs also note that there is agreement from the HAs in terms of the roads used in the surface access noise assessment and the assumption that there will be no reduction in noise from electric vehicles.

3 HOST AUTHORITY QUERIES RAISED IN RELEVANT REPRESENTATIONS

3.1.1 Alongside the broad level of agreement on the approach to the surface access assessment, as summarised in Section 2, some queries have been raised with respect to parts of the modelling methodology. These queries are highlighted in this section and a response is provided in Section 4.

3.1.2 The HAs have sought further justification for the setting of the surface access noise Unacceptable Adverse Effect Level (UAEL) of 74dB$L_{Aeq,16h}$ and have queried whether a daytime UAEL value of 71dB$L_{Aeq,16h}$ should instead be used to match the UAEL used in the Heathrow Preliminary Environmental Information Report (PEIR).

3.1.3 The HAs have also queried the validation of the surface access noise model, with references to instances where the measured and predicted values, with respect to the modelled baseline, differ by more than 3 dB. They recommend a clear explanation of these differences, and further justification for why the model can be relied upon.

4 RESPONSE TO HOST AUTHORITY COMMENTS

4.1 Setting of the UAEL

4.1.1 The UAEL of 74dB$L_{Aeq,16h}$ is considered to be appropriate and has been set with reference to British Standard 8233 (BS8233, Ref 3) and the Association of Noise Consultant's and Institute of Acoustics' Professional Practice Guidance on Planning and Noise (ProPG, Ref 4), and was accepted as appropriate in the DCO decision for the A14 Cambridge to Huntingdon Improvement Scheme (Ref 5).

4.1.2 ProPG incorporates guidance from BS8233 to set indoor 'target levels' and sets target level of 35 dB $L_{Aeq,16h}$ for living rooms and 40dB$L_{Aeq,16h}$ for dining rooms and notes that *"Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally."* Therefore, it is considered internal noise levels greater than 45-50dB$L_{Aeq,16h}$ would mark the onset of unacceptable levels in the daytime. Assuming a precautionary outdoor to indoor level difference of 26dB[1] this leads to a daytime external UAEL value of 71-76 dB$L_{Aeq,16h}$. The UAEL value of 74dB$L_{Aeq,16h}$ has therefore been set to be within this range and to be consistent with the accepted UAEL for the A14 Cambridge to Huntingdon Improvement Scheme DCO.

[1] A 26 dB level difference represents a property with a masonry construction and either single glazed windows (closed) or thermal double-glazed windows (closed) with and open trickle vent. This represents a precautionary approach to identifying an external exposure above which, without mitigation, people will have exhausted their ability to protect themselves from unacceptable levels indoors (i.e. by closing their existing windows).

4.1.3 It is acknowledged that, in the absence of any specific guidance on the setting of a UAEL for road traffic noise, different values have been adopted for different developments, including Heathrow which set a different UAEL of 71dB$L_{Aeq,16h}$ in its Preliminary Environmental Information Report.

4.1.4 However, whilst it is considered that the UAEL set for the Proposed Development is appropriate, it is contended that the setting of the UAEL is immaterial to the conclusions of the surface access noise assessment. DMRB LA111 does not specify a UAEL and as such the agreed methodology, summarised in Section 2, does not specify additional assessment criteria above and beyond those considered for receptors above the SOAEL. At these exposure levels even minor increases in road traffic noise (greater than or equal to 1dB), not considered to be noticeable, are considered significant whether above the SOAEL or UAEL.

4.1.5 Receptors in the surface access study area subject to noise levels close to or above the UAEL, even if it were set to 71dB$L_{Aeq,16h}$, are predicted to experience negligible changes in road traffic noise (less than 1dB) as a result of the Proposed Development. This may be noted by comparing **Figure 16.83 of the ES [AS-116]**, showing absolute road traffic noise levels in 2043, with **Figure 16.85 of the ES [AS-116]**, showing changes in road traffic noise levels in 2043. Therefore, the conclusions of the surface access noise assessment are unchanged regardless of the setting of the UAEL at 71 or 74dB$L_{Aeq,16h}$.

4.2 Surface access noise modelling approach

4.2.1 As explained in Section 9 of **Appendix 16.1 of the ES [AS-096]**, predicted daytime and night-time traffic noise levels at noise sensitive receptors within the surface access study area have been generated using SoundPlan v8.2 noise modelling software which implements the CRTN methodology for calculating road traffic noise.

4.2.2 The noise model is based on traffic data generated by the traffic model of the surrounding area, factored to 18-hour Annual Average Weekday Traffic (AAWT) as required by CRTN. The noise model includes the ground topography, ground type and buildings to form a 3D representation of the study area. The model also incorporates road network changes illustrated in the surface access drawing package as appropriate for the year and scenario under consideration.

4.2.3 To provide spot-check data for the baseline road traffic model, one long-term (one-week) and several short-term (3-hour) measurements were undertaken at key locations where road traffic noise was considered to be the dominant noise source. The results of these measurement surveys, together with road traffic noise levels at these locations, calculated from the modelling software and 2016 traffic data, are provided in Section 16.7 of **Chapter 16 of the ES [REP1-003]**. Further information on the measurements themselves is provided in **Ambient noise monitoring data and survey sheets [AS-120]**.

4.2.4 It is noted by the HAs that at four of these 11 locations (ML25-28) the $L_{Aeq,16h}$ derived from the measured sound levels differs by more than 3 dB from the $L_{Aeq,16h}$ derived from the road traffic noise model.

4.2.5 However, it should be noted that it is not standard practice to calibrate or adjust a road traffic noise model, representing annual average conditions, using data from short term three-hour measurements which are subject to particular traffic conditions on the day of measurement which may be atypical as well as requiring conversion to 16-hour levels based on assumed diurnal traffic patterns. Measured sound data will also record all sound sources at each location whereas the road traffic noise model only calculates the contribution from motorised vehicles. This uncertainty in one three-hour measurement is illustrated by the variability in sound levels at the long-term monitoring location. As can be seen from the measured levels reported in Table 16.25 of **Chapter 16 of the ES [REP1-003]**, there is a seven-decibel range in levels at the long-term position across one week. Given this range it is possible that modelled levels at all locations would be within 3 dB of the range of levels measured over the long-term.

4.2.6 Paragraph 16.7.14 of **Chapter 16 of the ES [REP1-003]** explains that traffic counts taken during the measurements indicated higher levels of traffic at some of these locations during the three-hour measurement period, than would be expected from an annual average. In addition, it is likely that other localised factors such as the condition of the road surface and the speed of the traffic at the time of the survey led to the reported difference in levels. For example, the road surfaces at these monitoring locations are quite worn, leading to higher road traffic noise levels than expected from the model where a correction applicable to a new Hot Rolled Asphalt surface has been assumed (Ref 6), as reported in Section 9.3 of **Appendix 16.1 of the ES [AS-096]**. This assumption is standard practice for local authority roads, and it is not proportionate, or even feasible in some cases, to measure the precise acoustic performance of every road surface in the study area.

4.2.7 For these reasons, it is not best practice to make a universal adjustment to the CRTN model to match spot measurements. Confidence in the road traffic noise model comes from the long-term validation of the core calculation methodology from thousands of measurements at the time of creation (Ref 7), decades of road traffic scheme assessments for which CRTN has been considered fit for purpose and a robust quality assurance procedure for checking the model input data. In particular, the monitoring locations in question represent locations close to busy yet free-flowing roads and it is precisely this situation for which CRTN was specifically designed to be most accurate.

4.2.8 The key input data to the road traffic noise model consists of the AAWT data derived from the traffic model. Details of the development and calibration/validation of the traffic model are documented in Appendix E1 of **Transport Assessment Appendices - Part 1 of 3 (Appendices A-E) [APP-200]**. This appendix provides a copy of the Strategic Modelling: Highway Local Model Validation Report which concludes in paragraph 12.1.1:

4.2.9 *“The preceding sections of this report detail the development of the CBLTM-LTN highway model, the definition and derivation of the observed data used to assess the model, the calibration process adopted, and the results of this calibration process assessed against standards defined in WebTAG’ and in Para. 12.4.1 ‘Based on the results detailed above [in Table 12.1], the CBLTM-*

LTN highway model meets and generally exceeds WebTAG acceptability guidelines for all measures."

4.2.10 Figure 1 and Figure 2 of this document show the monitoring locations overlayed on the surface access noise change contours for 2043. These figures show that the monitoring locations in question are either in areas expected to experience a negligible change in road traffic noise or outside of the surface access study area entirely[2]. Given that localised corrections to the model would be applicable to both the Do-Minimum and Do-Something scenarios, the only change would be to absolute levels reported in the vicinity of these locations. And as explained in Section 4.1 this would not alter the conclusions of the assessment.

5 FURTHER ANALYSIS OF SPECIFIC MONITORING LOCATIONS

5.1.1 Following submission of this paper at Deadline 2, further technical discussions were held between the Applicant and the HAs and their noise consultant. In these sessions, the four monitoring locations that had previously been queried due to discrepancies of greater than 3 dB (ML25-28) were discussed in detail, including a review of the locations using Google Streetview.

5.1.2 This exercise identified justifiable reasons for the discrepancies that are specific to the measurement locations and spot check exercise, including:

a. planned survey locations were used in the spot-check exercise, however for these four locations the actual survey location was slightly updated on the day to due to survey practicalities;

b. each of the four locations were 3-hour short term measurements which cannot be directly compared to long term annual average weekday model outputs (DMRB itself cautions the comparison of short-term measurements to long-term predictions at paragraph 4.2); and

c. there were localised road surfacing conditions for each of the four locations that would influence the noise levels.

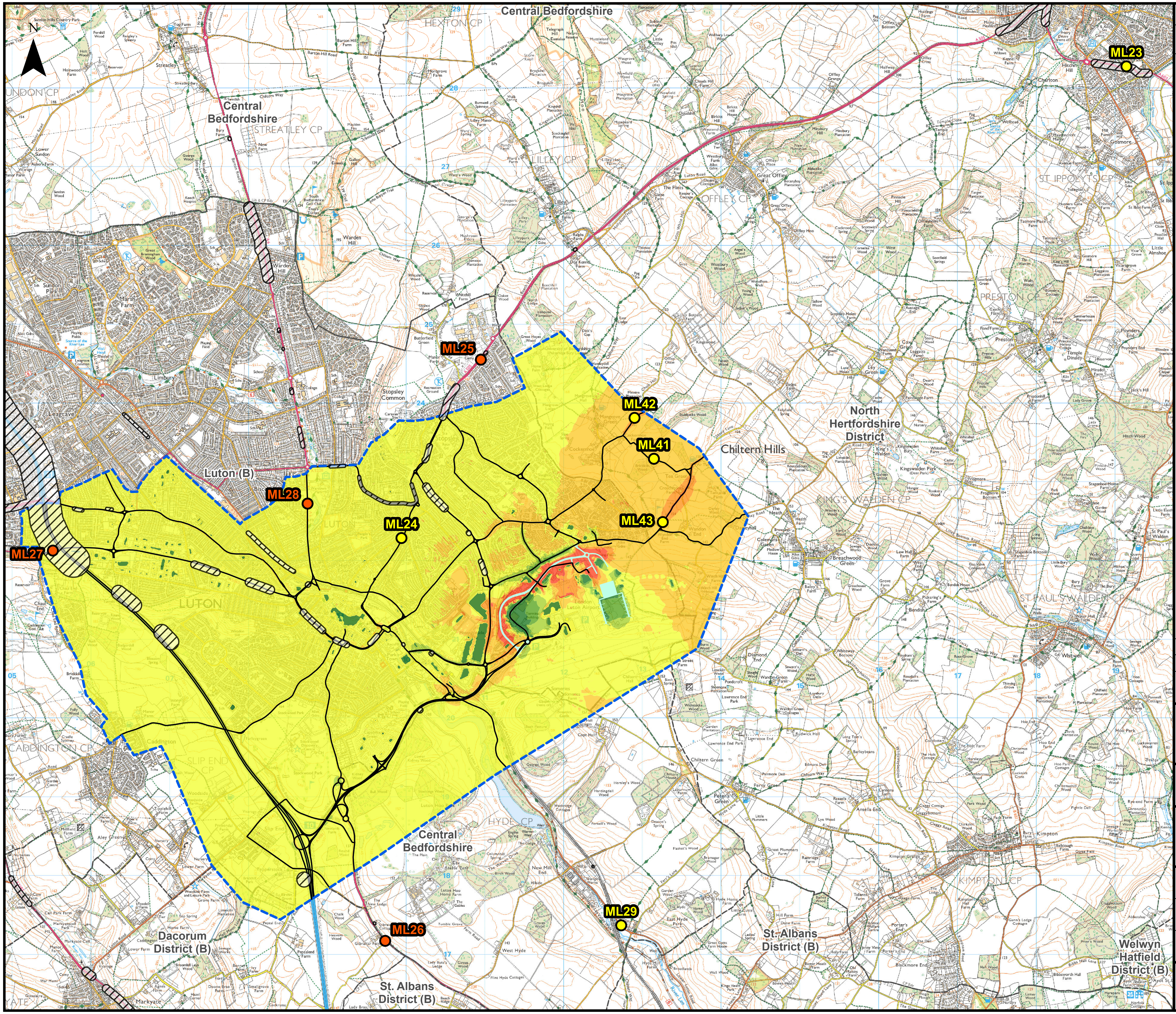
5.1.3 Following this exercise, the spot check exercise was repeated with the corrected actual survey locations, and details of the road surfacing conditions were provided to the HAs in writing, as per **Table 5.1**. As a result, it was agreed between the Applicant and the HA's noise consultant that the discrepancies are due to locations specific factors, and it was agreed that the surface access noise model is appropriate. This will be recorded in the next update of the Statements of Common Ground.

5.1.4 Figure 1 and Figure 2 within this document have been updated with the corrected survey locations (this has only affected ML25-28).

[2] These conclusions also apply to surface access noise in assessment Phase 1 and assessment Phase 2a.

Table 5.1: Further information on spot check exercise

Ref.	Description	Measured dB$L_{Aeq,16h}$	Predicted using planned survey location dB$L_{Aeq,16h}$	Updated using actual survey location dB$L_{Aeq,16h}$	Comments on discrepancies
ML25	A505 Beech Hill	78	70	73	Speeds below 75 km/h: a -1 dB correction applied as per CRTN but the impact of the slightly worn surface likely to be closer to +1 dB. Correcting for the above localised conditions would result in the predicted levels being within 3 dB of the measured levels.
ML26	A1081 London Road	78	74	75	The road surface is slightly aged and could likely account for a 1-2 dB in measured data. Correcting for the above localised conditions would result in the predicted levels being within 1-2 dB of the measured levels.
ML27	A505 Hatters Way	79	75	75	There looks to be a transverse ridge in the road surface at the measurement locations which, based on prior experience and professional judgement, could lead to increased noise levels of approximately 2-5 dB. Correcting for the above localised conditions would result in the predicted levels being within 1-2 dB of the measured levels.
ML28	A6 New Bedford Road	75	70	71	A worn road surface here means that the assumed correction of -0.5 dB would likely be around +1 dB in practice. Correcting for the above localised conditions would result in the predicted levels being within 2-3 dB of the measured levels.



All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Legend

- Local Authority Boundaries
- Ambient Noise Monitoring Location
- Ambient Noise Monitoring Location (3+ dB difference between modelled baseline and shortened CRTN measurement)
- Surface access noise study area
- Road Traffic Noise Important Area
- Proposed Terminal - Assessment Phase 2b
- Road
- Airport Access Road

Change in 2043 Do-Something and Do-Minimum Daytime LAeq,16h Surface Access Noise Contours in Decibels (dB)

Noise Decrease

- 5.0 dB or more
- 3.0 - 4.9 dB
- 1.0 - 2.9 dB
- 0.1 - 0.9 dB

Noise Increase

- 0.1 - 0.9 dB
- 1.0 - 2.9 dB
- 3.0 - 4.9 dB
- 5.0 dB or more

Revision History	Drawn	Checked	Approved	Date	Rev.
Additional submissions (updated in response to Rule 9 letter)	LP	CSh	CS	02/10/23	P02
First Issue	LP	CSh	CS	31/01/23	P01

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Drawing Title

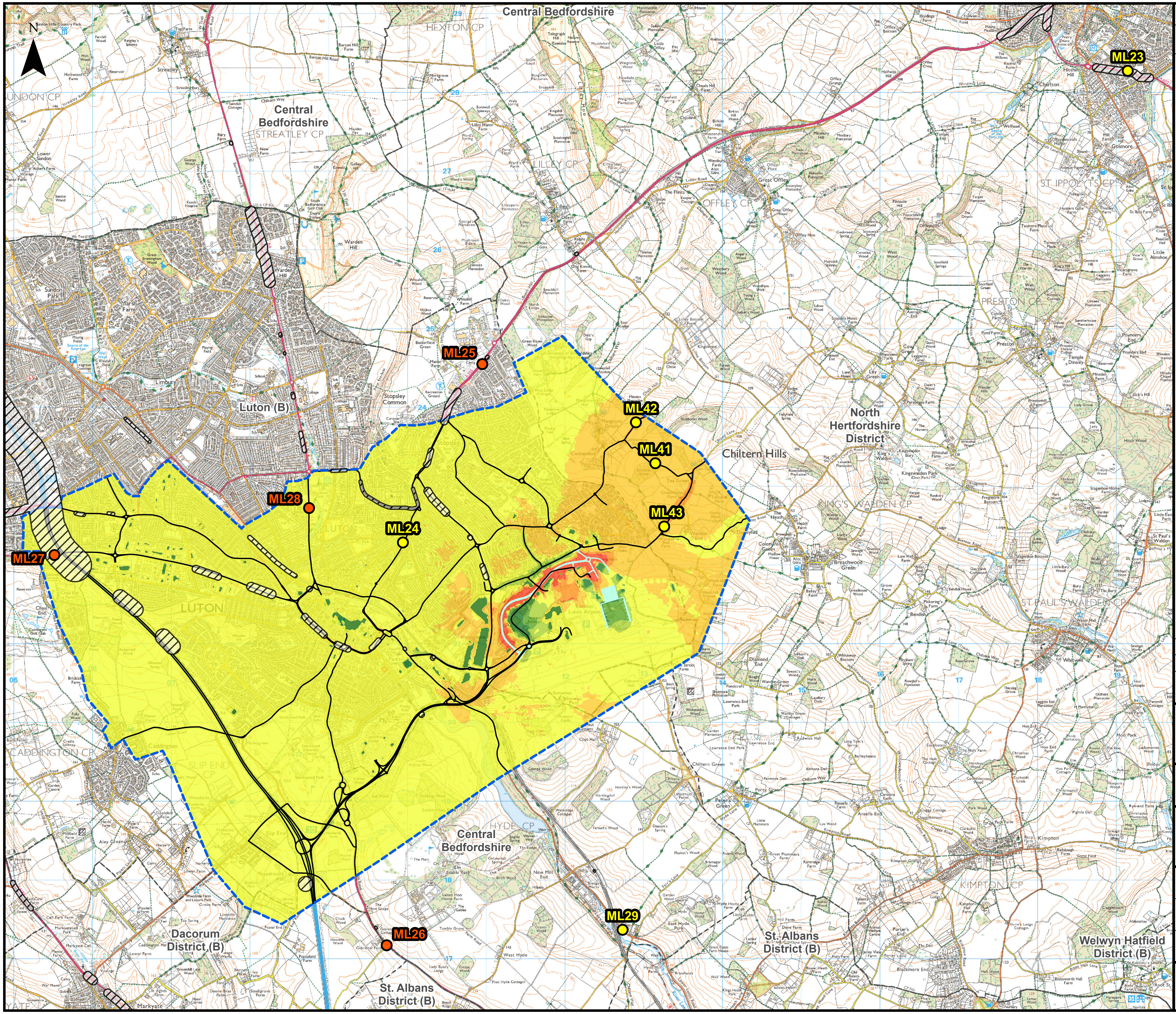
Figure 1
Change in 2043 Do-Something - Do-Minimum Daytime LAeq,16h Surface Access Noise Contours

Purpose of issue				Suitability	
Additional submissions (updated in response to Rule 9 letter)				S2	
Drawn	Checked	Approved	Date	Scale	Size
LP	CSh	CS	02/10/23	1:45,000	A3

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	APFP 5(2)(a)	TR020001/APP/8.32

Drawing Number	Revision
LLADCO-3C-AEC-00-00-DR-YE-0001	P02

Project - Phase - Originator - Asset/Zone - Sub Asset - Type- Discp. - Number



All structure positions are indicative. The proposed works will be subject to detailed design development. The changes will be within limits of deviation specified in the Development Consent Order.

Legend

- Local Authority Boundaries
- Ambient Noise Monitoring Location
- Ambient Noise Monitoring Location (3+ dB difference between modelled baseline and shortened CRTN measurement)
- Surface access noise study area
- Road Traffic Noise Important Area
- Proposed Terminal - Assessment Phase 2b
- Road
- Airport Access Road

Change in 2043 Do-Something and Do-Minimum Night-time LAeq,8h Surface Access Noise Contours in Decibels (dB)

Noise Decrease

- 5.0 dB or more
- 3.0 - 4.9 dB
- 1.0 - 2.9 dB
- 0.1 - 0.9 dB

Noise Increase

- 0.1 - 0.9 dB
- 1.0 - 2.9 dB
- 3.0 - 4.9 dB
- 5.0 dB or more

Revision History	Drawn	Checked / Approved	Date	Rev.
Additional submissions (updated in response to Rule 9 letter)	LP	CSh / CS	02/10/23	P02
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Drawing Title

Figure 2
Change in 2043 Do-Something - Do-Minimum Night-time LAeq,8h Surface Access Noise Contours

Purpose of issue				Suitability	
Additional submissions (updated in response to Rule 9 letter)				S2	
Drawn	Checked	Approved	Date	Scale	Size
LP	CSh	CS	02/10/23	1:45,000	A3

DCO Application Ref.	APFP Regulation	DCO Document Ref.
TR020001	APFP 5(2)(a)	TR020001/APP/8.32

Drawing Number	Revision
LLADCO-3C-AEC-00-00-DR-YE-0002	P02

Project - Phase - Originator - Asset/Zone - Sub Asset - Type- Discp. - Number

GLOSSARY AND ABBREVIATIONS

Term	Definition
AAWT	Annual Average Weekday Traffic
CRTN	Calculation of Road Traffic Noise
DMRB	Design Manual for Roads and Bridges
HA	Host Authorities
LOAEL	Lowest Observable Adverse Effect Level
ProPG	Professional Practice Guidance on Planning and Noise
SOAEL	Significant Observed Adverse Effect Level
UAEL	Unacceptable Observed Adverse Effect Level

REFERENCES

Ref 1 Highways England (2020), *Design Manual for Roads and Bridges, LA111 Noise and Vibration Revision 2*
Ref 2 Department of Transport/Welsh Office (1988), *Calculation of Road Traffic Noise*. Her Majesty's Stationery Office, London
Ref 3 British Standard Institute (2014), BS 8233:2014, *Guidance on sound insulation and noise reduction for buildings*
Ref 4 ProPG: Planning and Noise (2017), *Professional Practice Guidance on Planning and Noise*
Ref 5 A14 Cambridge to Huntingdon improvement scheme (2014), TR010018, Environmental Statement Appendix 14.3: Noise and vibration significance criteria
ES Appendix 14.3: Noise and vibration significance criteria.
Ref 6 Muirhead M, Morris L and Stait RE (2010), *The performance of quieter surfaces over time*, PPR485 TRL Limited
Ref 7 Delany ME, Harland DG, Hood RA and Scholes WE (1976), *The prediction of noise levels L_{10} due to road traffic*, Journal of Sound and Vibration 48(3), 305-325