London Borough of Newham

Review of the Environmental Statement for London City Airport

Final Review Report

Final report
Prepared by LUC
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London Borough of Newham

Review of the Environmental Statement for London City Airport

Draft Review Report

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Chapter 1
Introduction

1.1 LUC, in association with Ardent Consulting and Yellow Sub Geo, has been commissioned by the London Borough of Newham (LBN) to provide a critical review of the Environmental Statement (ES) (dated December 2022) which accompanies an application by London City Airport to vary some of the conditions attached to the planning permission for the City Airport Development Programme (CADP1) (Ref: 13/01228/FUL). The application to vary conditions is hereafter referred to as the 'Proposed Development' or 'S73 Application' (Ref. 22/03045/VAR).

1.2 The ES has been prepared under the provisions of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations'). Under the EIA Regulations part 1, 4 (5) planning authorities are required to *"ensure that they have, or have access as necessary to, sufficient expertise to examine the environmental statement".* LUC is a Registrant of the Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark, and the LUC Project Director is individually accredited to the Institute. Details of the expertise of each of the team members involved in the review are set out in **Appendix A** to this review.

1.3 The purpose of this review is to determine whether the ES meets the statutory requirements of the EIA Regulations[1] and relevant guidance[2]. The assessments undertaken must be of a high enough quality to provide confidence in the reported impacts of the scheme.

1.4 If issues with the adequacy or robustness of the ES are identified, the review identifies what additional information is required to address concerns.

1.5 The review focusses on the EIA and does not provide comment on any additional planning judgements that need to be made by LBN. Where the securing of an environmental commitment or obligation is considered to warrant a planning condition, the proposed direction of such a condition will be provided (the proposed condition wording will be determined by LBN if required). The conclusions of the review report will be used by planning officers at LBN when determining the application.

[1] Town and Country Planning (Environmental Impact Assessment) Regulations 2017].

[2] Including the National Planning Guidance and the IEMA EIA Quality Review Criteria.

Planning History

1.6 A previous planning application – The City Airport Development Programme (CADP1) (Ref: 13/01228/FUL) was granted in July 2016 following an appeal and public inquiry which was held in March 2016. Planning permission was granted for the following:

- "Demolition of existing buildings and structures;
- Works to provide 4 no. upgraded aircraft stands and 7 new aircraft parking stands;
- The extension and modification of the existing airfield to include the creation of a taxi lane running parallel to the eastern part of the runway and connecting with the existing holding point;
- The creation of a vehicle access point over King George V dock for emergency vehicle access;
- Laying out of replacement landside Forecourt area to include vehicle circulation, pick up and drop off areas and hard and soft landscaping;
- The Eastern Extension to the existing Terminal building (including alteration works to the existing Terminal Building) to provide reconfigured and additional passenger facilities and circulation areas, landside and airside offices, immigration areas, security areas, landside and airside retail and catering areas, baggage handling facilities, storage and ancillary accommodation;
- The construction of a 3 storey Passenger Pier to the east of the existing Terminal building to serve the proposed passenger parking stands;
- Erection of a noise barrier at the eastern end of the proposed Pier;
- Erection of a temporary noise barrier along part the southern boundary of the Application Site to the north of Woodman Street;
- Western Extension and alterations to the existing Terminal to provide reconfigured additional passenger facilities and circulation areas, security areas, landside and airside offices, landside retail and catering areas and ancillary storage and accommodation;
- Western Energy Centre, storage, ancillary accommodation and landscaping to the west of the existing Terminal;
- Temporary Facilitation works including erection of a noise reduction wall to the south of 3 aircraft stand, a Coaching Facility and the extension to the outbound baggage area;
- Works to upgrade Hartmann Road;
- Landside passenger and staff parking, car hire parking and associated facilities, taxi feeder park and ancillary and related work;
- Eastern Energy Centre;
- Dock Source Heat Exchange System and Fish Refugia within King George V Dock; and
- Ancillary and related works."

1.7 The major civil engineering works associated with CADP1 including; the construction of the new taxi lane adjacent to the runway and the creation of a concrete deck over King George V (KGV) Dock to provide the 8 new aircraft stands, were completed in 2020. The parallel taxi lane and 4 of the new stands are now fully operational. However, the remaining construction works for CADP1 were temporarily suspended due to the Covid-19 pandemic. The Applicant is seeking approval to revise planning conditions attached to the CADP1 planning permission.

1.8 The description of the current application is as follows: *"Section 73 Application to vary conditions 2 (approved drawings and documents), 8 (aircraft maintenance), 10 (restrictions on development – Plan P4),12 (aircraft stand location – Plan P4), 17 (aircraft take-off and land times), 23, 25, 26 (daily limits), 35 (temporary facilities), 42 (terminal opening hours), 43 (passengers) and 50 (ground running) attached to planning permission 13/01228/FUL, dated 26 July 2016 (as varied) to allow up to 9 million passengers per annum (currently limited to 6.5 million), arrivals and departures on Saturdays until 18.30 with up to 12 arrivals for a further hour during British Summer Time (currently allowed until 12.30), modifications to daily, weekend and other limits on flights and minor design changes, including to the forecourt and airfield layout."*

1.9 Proposed amendments to the CADP1 planning permission in summary are:

- An increase in the number of passengers able to use the airport each year, from 6.5 million currently permitted to 9 million per year;
- An extension of operational hours on Saturday to allow flights and aircraft maintenance to take place through the afternoon up to 18.30 hours and a further one-hour extension (to 19.30) for up to 12 arrivals during British Summertime (BST);
- An increase in the number of flights permitted between 06:30 and 06:59 (from 6 to 9);
- Greater flexibility in the parking locations of the already permitted aircraft to allow for the wider wingspan of new generation aircraft; and

- Minor changes to the terminal forecourt to reflect changes to modal split assumptions since the plans were originally approved, and to the approved 'facilitating works' during the construction of the project.

Review Report

1.10 A criteria-based approach, developed by the Institute of Environmental Management and Assessment (IEMA) hereafter referred to as 'the IEMA criteria', has been used to inform this review[3]. The criteria cover:

- EIA regulatory compliance (COM3);
- EIA context and influence (the scope of the ES, coverage of alternatives and evolution of the scheme design, and consultation) (COM4);
- EIA content (the baseline conditions, assessment of impacts, and mitigation measures and management) (COM5); and
- EIA presentation (quality of the ES presentation and the Non-Technical Summary (NTS)) (COM6).

1.11 The review includes an assessment of the scope of the Environmental Impact Assessment (EIA) in relation to requirements set out in the LBN EIA Scoping Opinion issued on 24th November 2022, hereafter referred to as 'the EIA scoping opinion'. LUC also provided LBN with a Scoping Review Report dated 24th November 2022 which informed the LBN EIA Scoping Opinion.

1.12 It should be noted that at the request of LBN **Chapters 4 & 8** (Aviation Forecasts and Noise & Vibration respectively) of the ES have not been reviewed by LUC, Ardent or Yellow Sub Geo, as these will be reviewed by other specialists appointed separately by LBN.

1.13 The review identifies a list of clarifications required from the Applicant and a summary of any potential requests for further information under Regulation 25 of the EIA Regulations (referred to hereafter as potential Regulation 25 requests) to be made to the applicant, as appropriate. Potential Regulation 25 requests are identified in the first instance to enable the applicant to address the requests. Once the Applicant has received the clarifications and potential Regulation 25 requests from LBN they are invited to submit further information or clarifications addressing the points raised.

1.14 Any further information or clarifications received are reviewed and conclusions drawn as to whether the additional information is satisfactory and whether any Regulation 25 matters remain. These conclusions are then included in this report, and the document completed as the Final Review Report (FRR).

1.15 The structure of the report is as follows:

- Section 2 checks for Regulatory Compliance;
- Section 3 details review findings on the EIA Context and Influence (Project Description, Scoping, Alternatives and Consultation)[4];
- Section 4 provides commentary on the presentation of the ES and Non-Technical Summary[5];
- Section 5 provides commentary on the planning context;
- Section 6 reviews the construction programme;
- Sections 7 - 14 are topic specific reviews relating to each topic covered in the ES[6].

Applicant Response to Draft Review Report

1.16 The Draft Review Report (DRR) identified a list of the clarifications and potential Regulation 25 requests where further information was required from the Applicant.

1.17 Further clarification has been provided to LBN by the Applicant (May 2023) in response to the DRR, in the form of a draft report setting out the Applicant's responses to the clarifications and initial responses to the potential Regulation 25 requests identified within the DRR (see **Appendix B**). Further clarifications were provided in June 2023.

1.18 The Applicant's responses have been assessed and conclusions made as to whether the outstanding matters have been resolved and this is summarised in **Section 15** of this Final Review Report. Further detail in respect of Air Quality and Public Health is provided at **Appendix C**.

[3] Full details of the IEMA EIA review criteria are available at: https://www.iema.net/assets/newbuild/documents/EIA%20Quality%20Mark%20Applicant%20Guide%20February%202018%20V7.0.pdfhttps://www.iema.net/assets/newbuild/documents/EIA Quality Mark Applicant Guide June 2016 V6.pdf. It should be noted that the review criteria have not been updated to reflect the 2017 EIA Regulations and, as such, do not refer to the new topics of biodiversity, climate change, major accidents and disasters, or human health. The review of the ES has been undertaken in the context of the updated EIA Regulations and relevant guidance for the specialist topics assessed, in addition to the IEMA criteria.

[4] IEMA EIA Quality Mark – ES Review Criteria, COM4: Context and Influence

[5] IEMA EIA Quality Mark – ES Review Criteria, COM6: EIA Presentation

[6] IEMA EIA Quality Mark – ES Review Criteria, COM5: EIA Content

Chapter 2
Initial Regulatory Checklist

2.1 This section checks for the presence or absence of each item below, in accordance with COM3 'Regulatory Compliance' of the IEMA review criteria. Further detail is provided in the following sections in relation to the way each aspect of the EIA has been undertaken and is presented in the ES. Criteria A-I represent the minimum information which must be provided to constitute an ES.

2.2 It should be noted that the table below only confirms whether or not the information required has been provided in its most basic form, e.g., presence or absence of the of the topics in Criteria D and does not confirm regulatory compliance.

2.3 As noted in the IEMA EIA Quality Mark: Registrant Guide, a number of the criteria under COM3 cover similar subjects to criteria set out in COM4, COM5 and COM6 which are reviewed below, and as such, there is inevitably some overlap. The review undertaken in subsequent sections of this report provides further detail in relation to the way each aspect of the EIA has been undertaken and is presented in the ES, focussing on the quality of the information provided.

Table 2.1: Regulatory Checklist

Criteria		Yes/No
A	Does the ES contain a clear section, or sections, providing a description of the development comprising information on the site, design and size of the development during construction and operation?	Yes. Chapters 2 & 6.
B	Does the ES contain a section, or sections, that outline the main alternatives studied by the developer and an indication of the main reasons for this choice, taking into account the environmental effects?	Yes, Chapter 3,4,6 and technical chapters.
C	Does the ES contain a clear section, or sections, that provides the data required to identify and assess the main effects which the development is likely to have on the environment?	Yes, as set out within relevant technical chapters.
D	In the light of the development being assessed has the ES identified, described and assessed effects on: ■ Population ■ Human Health ■ Biodiversity (Fauna & Flora) ■ Land ■ Soil ■ Water ■ Air	Yes, as set out in Chapter 3 and within relevant technical chapters.

Criteria		Yes/No
	■ Climate ■ Material Assets ■ Cultural Heritage ■ Landscape ■ Risk of major accidents and disasters ■ Other	
E	Does the ES attempt to set out the interaction between the factors set out in COM3 D) above?	Yes, as set out in Chapter 14 and within relevant technical chapters.
F	Does the ES contain a section, or sections, that describe the likely significant effects of the proposed development on the environment, including as reasonably required: direct, indirect, secondary, cumulative, short, medium, long-term, permanent and temporary, positive and negative effects?	Yes, as set out within relevant technical chapters.
G	Does the ES contain a clear section, or sections, that provides a description of the measures envisaged to avoid, reduce and, if possible, remedy significant adverse effects?	Yes, as set out in Chapter 15 and within relevant technical chapters.
H	Has a Non-Technical Summary been produced containing an outline of the information mentioned in COM3 A) to G)?	Yes.
I	Does the ES contain a section, or sections, that outline any difficulties encountered by the developer in compiling the information presented in the ES?	Yes, as set out in Chapter 3 and within relevant technical chapters.

Chapter 3
EIA Context and Influence

Scoping and Assessment

3.1 Section 3.3 of the ES provides information on the scoping process carried out to inform the EIA. The EIA Scoping Report was submitted to LBN on 28th July 2022. The Applicant states that they received a formal Scoping Opinion from LBN on 24th November 2022, which has been relied upon in producing the ES.

3.2 This section also clearly outlies which topics have been scoped in and out of the EIA process, with justification being given for the decision.

3.3 Scoped in topics are detailed in individual technical chapters, while scoped out topics are summarised in Chapter 13 of the ES.

Identification of Sensitive Receptors

3.4 Section 3.4 of Chapter 3 describes how significance was determined generally for sensitive receptors. The topic chapters also identify potential environmental sensitivities/ sensitive receptors for each technical assessment.

Alternatives including Iterative Design

3.5 In accordance with Schedule 4 of the EIA regulations, the ES includes a consideration for alternatives in Section 2.4 of Chapter 2.

3.6 The ES assessed the difference between a 'Development Case' scenario (with the proposed amendments) and a 'Do Minimum' scenario (with the existing CADP1 conditions unchanged). This is discussed in detail in Chapters 3, 4 and 6 of the ES and these scenarios are used as part of the assessment methodology in all technical chapters.

3.7 The Applicant has stated that no plausible alternatives exist within the confines and specific characteristics of the CADP1 project and the existing planning permission.

3.8 The Applicant sets out the main reasons for not taking forward the Do Minimum Approach and provides justification as to why alternative sites have not been considered, stating: "*there are no proposed changes to the consented buildings or physical infrastructure at the airport as part of the S73 application. Therefore, it is not considered relevant to consider alternative sites, design or layouts of the proposed buildings and airfield, all of which were considered in detail in the 2015*

UES and fixed by virtue of the CADP1 planning permission." This is considered appropriate.

Description of Development

3.9 Chapter 1 of the ES provides a brief description on the site location. Figure 1.1 depicts the site location plan.

3.10 Chapter 2 of the ES provides a comprehensive description of the Proposed Development, providing details on aspects such as access and layout. The Proposed Development details are consistent with details within the Non-Technical Summary (NTS).

3.11 It is understood that the S73 application will facilitate more air traffic movements (ATMs), while remaining within the existing cap, and larger planes.

The Need Case

3.12 Volume 3 provides the needs case for the proposed development.

3.13 This document has been provided to support the planning application. It sets out the need for the proposed amendments to the existing condition and supports various aspects of the ES (e.g., Chapter 7: Socio-economics). This chapter was not a requirement of the Scoping Opinion in relation to the content of the ES.

3.14 The document addresses aviation forecasts stating, *'If the proposed amendments are approved, we have forecast that LCY would reach 9 mppa by 2031 in the Development Case'*.

3.15 Capacity requirements are also explored, and a strong argument is made that approval will enable compliance with current Government policy, making the best use of consented runway capacity. A refusal of the current proposals will result in current operational measures being retained over a longer period resulting in weaker finances, and in turn, delay of the current CADP1 works into the late 2030s.

Consultation

3.16 The consultation process is set out in Chapter 3. Section 3.3 covers the consultees contacted during and after the Scoping process.

3.17 Public consultation has taken place in varied forms including through a publicly accessible dedicated website, in – person events across several local London Boroughs and, Airport passengers and staff. Details are presented in a Statement of Community Involvement, which was submitted as a stand-alone document supporting the S73 application.

3.18 Statutory consultees and Local Authorities have also been involved and details of consultation are highlighted in Table 2.1 of the ES, and relevant technical chapters. This is considered appropriate.

Table 3.1: EIA Context and Influence Summary

Ref.	Summary of Clarifications Required from Applicant
N/A	None.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
N/A	None.

Chapter 4
EIA Presentation

Overall Presentation (ES Quality)

4.1 The ES is well presented, with appropriately labelled figures and tables. It also cross-references various parts of the ES and/or supporting application documents as required. Table 1.2 in Chapter 1 also signposts the location of all important information within the ES.

4.2 The length and main body of the ES, along with the technical appendices is considered to be acceptable for the type and scale of the Proposed Development. However, the report contains a significant amount of repetitive information across its chapters, making it longer than it needs to be.

4.3 Overall, the presentation of the ES is considered to be acceptable, subject to any other points noted in the reviews of the individual chapters below.

Non-Technical Summary

4.4 The NTS is provided as a standalone document, however it is wrongly labelled as a part of 'Volume 1 of the ES'. It also has no table of contents which would be useful to a reader for navigation to specific sections.

4.5 The presentation is otherwise clear and, in general, the language used is non-technical. It is of a reasonable length and provides an overview of the scope of the ES, describing the site, its surroundings and the Proposed Development.

4.6 Where relevant there is good use of tables, figures and plans showing the Proposed Development.

4.7 The NTS also provides a clear description of the significant effects of the Proposed Development on each topic area, including mitigation strategies and residual effects, which give the reader a good understanding of the findings and proposed mitigation.

4.8 Presentation of the NTS is acceptable, subject to any other points noted in the reviews of the individual chapters below. It should be updated where necessary to reflect any points noted in the review of the ES technical chapters.

Table 4.1: EIA Presentation Summary

Ref.	Summary of Clarifications Required from Applicant
N/A	None.

Ref.	Summary of Potential Regulation 25 Requests from Applicant
N/A	None.
Ref.	**Potential Planning Conditions**
N/A	None.

Chapter 5
Review of Chapter 5: Planning Context

5.1 This chapter provides an overview of planning policies relevant to the Proposed Development. It also provides information relating to the planning history of the airport and existing controls and planning conditions which continue to govern the operation of the airport.

5.2 LBN should satisfy itself that all policies listed in Chapter 5 are relevant and correct.

Chapter 6
Review of Chapter 6: Construction Programme

Scope of the EIA

6.1 The EIA SR is contained in Appendix 3.5 of the ES, within Volume 2 (Appendices).

6.2 Table 4.1 of the SR describes the construction information that will be made available in the ES, which includes the remaining build-out programme for CADP, based on a revised Construction Phasing Plan (CPP) and the proposed mitigation measures to be adopted through the approved Construction Environmental Management Plan (CEMP).

6.3 The construction methodology is not specifically mentioned further in the EIA SR, although it is stated that construction-phase impacts are described under other technical topics in the SR.

Assessment

6.4 Chapter 6 of Volume 1 of the ES contains information on the construction works of the CADP1. It outlines all the work completed to date under the CADP1 consent, work left to be completed, and how the construction programme has changed due to the nature of the development and the impact of the 2020 pandemic.

6.5 It highlights the implementation of the CEMP and other conditions of the planning permission which have been adhered to in the process of construction and states that this will be carried forward to the next phases of the construction.

6.6 It is stated in paragraph 6.2.5 that outline planning permission was also obtained for a 260 - room hotel on the southern dockside. This permission has not yet been implemented and remains uncertain if and when it will be built. It has been assumed, for the purpose of the EIA, that construction may commence around 2028 and so cumulative construction effects have been considered where necessary. This is considered appropriate.

6.7 Alternatives are also considered for the anticipated construction phasing programme based on the development case forecasts and the alternative scenario (Development Case and Do Minimum scenarios), which have been used as the basis for the technical assessments. It is noted that this indicative Construction Phasing Plan (CCP) is not being put forward for formal approval at this time, as this can only occur once the S73 amendments have been approved.

6.8 It is also highlighted that due to the nature of the development, construction of certain elements of CADP1 must be undertaken out of operational hours. An 'Out of Operational Hours programme' has been provided as Appendix 6.2, which outlines the construction methodology, phases, assumptions and limitations.

6.9 Paragraph 6.3.40 states "*most construction activities in the landside areas south of KGV Dock will take place during normal daytime hours (as set out in the approved CEMP), including the car park and forecourt works. This avoids potentially noisy construction activities having to take place during the night-time, especially in the areas closest to the residential communities to the south of the airport, including North Woolwich."*

6.10 Section 6.8 states that "*a CEMP was submitted to and approved by LBN in 2019 in accordance with Condition 88 of the CADP1 planning consent (planning ref: 19/02619/AOD)"* and that "*the approved CEMP will be carried forward to any new planning permission granted and will continue to apply to all future construction works"*. The references to the controls provided by the CEMP are brief, and the CEMP has not been provided as an Appendix to the ES. This would have been helpful to more fully understand the mitigation in place given it is relied on for the Development Case scenario. LBN should satisfy themselves that this condition is in place should permission be granted (**CP1**).

Non-Technical Summary

6.11 The NTS includes a summary of the alternative growth scenarios, and their implications for the construction programme in section 4, referring to the ES for more details. It would have been helpful to include a summary table of the indicative Construction Phasing Plan in the NTS to aid understanding.

Table 6.1: Construction Programme Summary

Ref.	Summary of Clarifications Required from Applicant
N/A	None.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
CP1	Planning condition required to ensure the continued application of the CEMP (approved under condition 88 of the CADP1 planning consent).

Chapter 7
Review of Chapter 7: Socio-Economics

Scope of EIA

7.1 Chapter 7 considers the socio-economic effects of the Proposed Development.

7.2 The assessment considers the effects during the construction and operational phases of the Proposed Development.

Baseline

7.3 The baseline presents data relevant to LBN and subsequently, the Proposed Development. This is also compared against data concerning the local area and London as a whole to provide wider context.

7.4 The baseline year used is 2019 (due to the impact of the Covid-19 pandemic on data in the following year). Sources used to inform the baseline are listed in paragraph 7.3.11.

7.5 Section 7.5 of the ES outlines the characteristics of the local community and economy providing a breakdown of the following information for LBN with comparison to the wider area for context:

- Demographics (Population);
- Labour market (Economic activity, qualifications and occupations);
- Deprivation;
- Employment;
- GVA; and
- The London Economy.

7.6 Details on the assumptions and limitations of the available data used to inform the baseline and scenarios used to carry out the assessment are also provided.

7.7 Overall, the approach to the baseline assessment is considered appropriate.

Assessment

7.8 Paragraphs 7.3.30 – 7.3.40 set out the effect significance criteria applied to the assessment of likely significant effects upon socio-economics as requested by the Scoping Opinion. The criteria consider the sensitivity of the receptor, the

magnitude, the duration, nature (adverse or beneficial) and scale.

7.9 Impacts have been assessed at both the construction and operational phase. This is considered appropriate.

7.10 The Socio-economics assessment has employed a range of methods to assess potential impacts. This includes the use of both qualitative and quantitative methods which are detailed in the chapter and Volume 3 of the ES: Need Case.

7.11 The economic impact is emphasised in the Need Case, particularly, the benefits in the context of the need for growth in East London (supporting initiatives in Newham and neighbouring boroughs), and the wider UK economy at large.

7.12 Table 7.27 presents a summary of residual effects identified throughout the socio-economic chapter. This table is clearly presented and reflects the findings of the assessment.

Secondary, Cumulative and Combined Impacts

7.13 The cumulative effects relating to socio-economics are summarised in section 7.10 of the ES chapter and further detailed in Chapter 14: Cumulative Effects.

7.14 It is stated that it is not expected that the cumulative schemes would generate any adverse effects with respect to socio-economics. All construction effects on employment are considered to be Negligible or Beneficial (Not Significant) as a result of the additional construction employment opportunities. Cumulative operational effects on employment are considered to be beneficial and Significant.

7.15 The impact on the local job market is considered to be long-term and beneficial, however given the range of initiatives across the schemes it is not possible to quantify overall. This is considered appropriate.

Mitigation and Management

7.16 Existing initiatives at the airport will continue to apply and carried forward to any future consent granted. Paragraph 7.4.1 also states that there is 'further embedded mitigation' set out in the 'future mitigation' section to be secured by an S106 agreement; however, it is unclear which of the initiatives listed is being referred to or if present at all. (**SE1**)

Non-Technical Summary

7.17 The NTS provides a summary which is consistent with the conclusions from the technical chapter. This is considered appropriate.

Table 7.1: Summary of Socio-Economics

Ref.	Summary of Clarifications Required from Applicant
SE1	The Applicant should clarify what additional mitigation has been proposed.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
N/A	None.

Chapter 8
Review of Chapter 9: Air Quality

Scope of EIA

8.1 Chapter 9 of the ES discusses the construction and operational impacts of the S73 application on air quality.

8.2 The application is for operational changes to the existing CADP1 consent, and it does not include any construction activity. Therefore, this chapter considers the impact on local air quality of construction traffic in combination with the operational traffic. This is an appropriate approach as construction impacts were considered in the 2015 Updated Environmental Statement (UES) for the CADP1 planning application and an Air Quality Construction Management and Monitoring Strategy has been approved by the London Borough of Newham (LBN).

8.3 The operational air quality assessment includes the impact of the emissions from the road traffic associated with the airport and the emissions from the airport, including from aircraft up to a height of ca 915m (3,000 ft) (i.e., over the landing take off (LTO) cycle).

8.4 The chapter considers the traditional road and air traffic related pollutants: nitrogen oxides (NOx), nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).

8.5 It focuses on the impact of air emissions on human health. Explanations are provided in Table 9.3 on why impacts on the closest ecological sites have been scoped out.

8.6 Table 9.3 quotes from paragraph 6 of Schedule 4 (Information for Inclusion in Environmental Statements) of the EIA Regulations. It states that an ES should provide *"A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved"*. It is unclear how ultrafine particles (UFP) "falls squarely into this definition", as the quote is a statement of information required to be included in Environmental Statements, not a definition. Clarification on this point is requested **(AQ1)**. The EIA Regulations do not preclude qualitative assessments where there is insufficient information available to quantify an impact, and therefore the EIA should include an assessment of UFP **(AQ2)**.

8.7 Table 9.3 states that UFPs have been assessed by "qualitative means" within the Public Health & Wellbeing

Chapter (Chapter 12). Yet the Public Health & Wellbeing Chapter states in several places that it draws on the assessment in Chapter 9 on Air Quality e.g., Paragraph 12.1.7. The need to include an assessment of UFPs in the Air Quality Chapter was requested by LBN during consultation with the Applicant and it remains a concern that this has not been undertaken.

8.8 Appendix 9.1 provides high level information on UFP and their emissions from aircraft. It does not provide an assessment of the impact of the proposals. It is known that both aircraft and road traffic are a source of UFP. The importance of the issue is reflected in the establishment by the International Civil Aviation Organisation (ICAO) of a mandatory method for reporting non-volatile UFPs for new commercial aircraft that recently came into effect. Whilst it is now accepted that there is insufficient information to quantify the impact of the S73 application on volatile UFP emissions a qualitative assessment in the air quality chapter is missing and needs to be provided. Our understanding is that the S73 application will result in more air traffic movements (ATMs) (within the existing cap) and larger planes. An analysis (quantitative for non-volatile and qualitive in total) of the likely impacts of the S73 proposals on UFP should be provided.

8.9 This is required to inform the Health & Wellbeing Chapter (Chapter 12) and to be consistent with the approach used for other issues (socio-economics, noise, traditional air pollutants, surface access and climate change). The technical limitations of the assessment should be set out **(AQ3)**.

8.10 Table 9.2 states, *"The principle underlying the guidance is to ensure that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on air quality. The extent of the study area has been based on this principle"*. No evidence has been provided as to why individual roads have been included or excluded on air quality grounds. Clarification should be provided on whether the transport assessment included all relevant roads, in particular where there are relevant receptors. The transport specialists have different foci for transport assessments than air quality practitioners. If the transport assessment criteria were used to select the study roads, important receptors with respect to air quality may have been missed (**AQ4**).

Baseline

8.11 The baseline draws on monitoring data for the traditional traffic related pollutants from LBN and London City Airport, supplemented by data from other sources. The NO_2 monitoring data shows a likely significant downward trend in concentrations for the eight monitoring sites over the period 2015 to 2019.

8.12 Figure 9.3 shows the location of the local authority automatic monitoring sites, however, there are a number of LBN and other data reported in the LBN Annual Status Report within the study area that should have informed the baseline. This data is not presented in the chapter. Clarification is required as to whether these have been considered in the assessment (**AQ5)**.

8.13 The baseline correctly excludes more recent data from 2020 and 2021 due to the effects of the pandemic on traffic levels. It would, however, have been useful to consider the available 2022 data, as the first year of 'near normal' traffic post the pandemic. This data should be compiled and submitted to LBN **(AQ6)**.

8.14 The dispersion modelling has estimated concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2019 (as well as four future years). According to Table 9.2 (Scoping clarification AQ13 refers), the model was verified according to the guidance and performance criteria in LAQM.TG22. This document clearly sets out the requirements. During the consultation with the Applicant LBN requested that the NO_x model output should all be within 10% of the measured road contributions to the concentrations (see Table 9.2 AQ13). The average of the total concentrations (i.e. model output + background) is reported to be within 10%, but no verification comparing the NO_x model outputs has been provided. It is clear from Figure 9.4 that the total concentration modelled deviates by more than 10% from the measured data at a number of locations. Although LAQM.TG22 states that the modelled data for each monitoring site is required to be within 25%, it also states that preferably it should be within 10%. No data is provided of the modelled NO_x. Without the NO_x verification there cannot be confidence in the model results. Further information on the verification of the modelled NO_x concentrations is required (**AQ7**).

8.15 Appendix 9.4 states that the NO_x concentrations were converted to NO_2 concentrations using Defra's NO_x to NO_2 calculator. This tool was designed for road traffic emission sources. Evidence of the appropriateness of using this tool near airports, as applied in this assessment, should be provided (**AQ8**).

8.16 A review of complaints from the local community has been provided as the baseline for odour. This is an acceptable approach.

8.17 No baseline data has been provided for UFPs as no monitoring has been undertaken around the airport.

8.18 Monitoring of UFP has been undertaken around Gatwick and Heathrow Airports, and possibly also around other UK airports. Although these two airports are busier than London City, the London City runway is closer to residential areas. The Gatwick monitoring shows that high levels of UFP (as defined by the 2021 WHO guidelines) occur frequently, around

50% of the days monitored, at a site outside but downwind of the airport. It is recommended in the Public Health and Wellbeing chapter that monitoring of UFP is undertaken at the airport, and a condition to this effect should be provided if LBN are minded to consent the Application (**AQ9**).

Assessment

8.19 Emissions and concentrations of the traditional pollutants were estimated for 2019 and four future years including the year with maximum construction traffic.

8.20 Tables 9.12 to 9.16 provide estimates of the emissions for the future baselines (DM scenarios) and development case (DC) scenarios for each assessment year. In the 2031 DC scenario 94% of the total estimated NO_x emissions come from the aircraft. It is noted that the assumed aircraft fleet composition is provided in Appendix 9.3, but insufficient information is provided to enable the breakdown in emissions to be calculated. The breakdown in aircraft emissions by aircraft type and size (i.e., passenger numbers), APU and engine testing should be provided for each scenario (**AQ10**).

8.21 Paragraph 9.3.6 provides proxy annual mean concentrations to enable the modelling to identify whether the short term NO_2 and PM_{10} objectives will be exceeded or not. These proxies are based on monitoring close to roads. Evidence is required that these proxies are appropriate for aircraft sources of emissions (**AQ11**).

8.22 Paragraph 9.1.36 of Appendix 9.3 states: *"Annual average daily traffic (AADT) flows, the proportions of Heavy Duty Vehicles (HDV) and average speeds for each road link were provided by Steer for the 2019 Baseline Year and all future year scenarios and are summarised in Table 9-8 to Table 9-9"*. The speeds and fleet composition data are not reported in these tables. This data should be provided (**AQ12)**.

8.23 Para 9.4.20 of the chapter states: *"A total of 71 receptors have been selected for the operational assessment to represent locations of relevant exposure for comparison against the objectives. These have been selected to include existing residential properties within approximately 1 km of the Airport, and along the road network potentially affected by the proposed development"*. It is unclear whether other highly sensitive exposure has been assessed such as schools, medical and care buildings. This information should be provided (**AQ13**).

8.24 It would be useful if all receptors included the property number/name to avoid confusion (**AQ14**).

8.25 LBN have requested the modelling files from the Applicant. The Applicant's consultants have declined to release them on grounds of intellectual property rights. As the assessment uses standard methodologies developed by ICOA, and widely used modelling software it is not immediately clear what the consultant is referring to. Regulators need to be able to check that the modelling is correct, and this is standard procedure for environmental permit applications (Table 9.2 states, "Model files that are not subject to Intellectual Property Rights (and specifically the airport emissions input files) can be provided on request." The applicant should provide the files (**AQ15**).

8.26 The modelling appendix (9.3) does not provide sufficient detailed information for the reviewer of the chapter to be confident in the modelling. Much of the detail necessary to make such a determination is omitted. In the absence of supplying any modelling files the modelling cannot be confirmed to be acceptable.

8.27 ADMS models require a series of user inputs which are tailored to a specific modelling study and such inputs can have a significant impact on the predicted concentrations.

8.28 In many places the methodology is described in general terms, but specific information is often missing and therefore it is not possible to critically review the modelling. As an example, in relation to stationary sources at the Airport, Paragraph 9.1.44 of Appendix 9.4 states: *"Emission rates for combustion of gaseous fuels have been obtained from the EMEP/EEA Emission Inventory Guidebook, which gives emission rates in grams of pollutant per gigajoule of energy (as fuel consumption). This has been used to calculate average annual emission rates based on the annual gas consumption, and assuming continuous operation throughout the year."* The utilised emission rate is unclear as no source category or code has been stated. Furthermore, in the case of stationary combustion sources it is clear that as the airport does not operate 24/7 emissions change over time. It is unclear if this has been considered.

8.29 While the focus of the assessment is on annual mean concentrations, clarification on the locations where there is short-term exposure is required. This includes, for example: locations within the dock (e.g. rowers on the water), seating areas on the northern side of the dock, restaurants and venues with outdoor space such as the Tereza Joanne venue to the east of the runway (**AQ16).**

8.30 Due to the lack of information provided it is unclear whether the need for larger aircraft to serve the increasing number of passengers whilst meeting the current cap of air traffic movements has been taken into account. Clarification is required (**AQ17**).

8.31 Paragraph 9.1.46 of Appendix 9.3 suggests that the emissions from the two 450kVA and one 66kVA backup generators have been estimated using the emission limits set by the Medium Combustion Plant Directive. These generators are exempt from meeting these emission limits under UK legislation. Therefore, unless the airport is committing to

achieve the limit values the emissions have been underestimated. Furthermore, it is not clear how these have been modelled. Further Information is required on appropriate emissions factors for these generators, how the short term and long term concentrations were estimated (given that they are not operational for most of the time) and the impact of more realistic emission factors (**AQ18).**

8.32 The predicted concentrations decline in future years at both background and roadside locations, such that even with the proposed development concentrations of the traditional pollutants are estimated to be lower than in the 2019 baseline scenario.

8.33 The impact, however, increases over time with the largest impact on annual mean NO_2 concentrations occurring in 2031 (1.4 µg/m^3). This impact is 3% of the objective (14% of the WHO guideline) but the total concentration is estimated to be well below the objective (26.8 µg/m^3). However, the S73 scheme alone also represents 6% of the total concentration in 2031, with the airport DM scenario expected to contribute to a large proportion of the total concentration (see paragraph 1.19). The conclusion for all scenarios and pollutants using the EPUK /IAQM descriptors based on the current objectives is that there will be a negligible impact. This is a reasonable conclusion based on the model results.

8.34 When compared to the GLA $PM_{2.5}$ target of 10 µg/m^3 to be achieved by 2030 the impact at two receptors in Camel Road, close to the airport in 2031 is moderate adverse.

8.35 In 2031 the S73 proposals increase the ATMs by 18%, with an associated increase in aircraft NOx emissions of 27%. The S73 application is therefore facilitating a significant increase in ATM and NO_x emissions which would not be realised without the S73 proposals. Paragraph 9.7.3 is misleading. This increase in NO_x emissions is not "*in broad proportion to the increasing numbers of passengers and scheduled aircraft movements"* but is increasing at a greater rate.

8.36 It is unclear if the increase in passenger number results in an increase in hire car usage, or staff access usage, deliveries etc. (Table 10.3 in Appendix 10.2 suggests hire cars are zero). A copy of the 'LCY Trip Generation spreadsheet (dated 10th August 2022)' referred to in Chapter 10 is requested. For transparency the Air Quality Chapter should have provided a discussion on the traffic data (**AQ19**).

8.37 Table 10.9 in Appendix 10.2 provides what is believed to be the traffic data used for the air quality modelling. This table provides the proportion of heavy goods vehicles (HGVs); however, the emissions modelling should be based on heavy duty vehicles (HDVs), i.e. buses and coaches as well as HGVs. Clarification is required as to whether HGVs or HDVs has been used (**AQ20)**.

8.38 Overall, the conclusion of the assessment is that the effect is not significant. The assessment also concludes that there is no material difference in the conclusion of this assessment and the 2015 UES provided for the CADP1 application.

8.39 The assessment acknowledges some of the uncertainties associated with forecasting future air quality, particularly from road transport. Evidence suggests that the EFT may be significantly under-estimating emissions[7]. This is due to an over optimistic fleet turnover and the use of average emission factors for Europe that do not take account of the manufacturer of vehicles on UK roads. The default fleet projections in the EFT version used (v11.0) are based on fleet growth assumptions from before the pandemic. Since 2020 there has been a dramatic reduction in new car sales (approximately 30% lower in 2020, 2021 and 2022 than in 2019) which will reduce the rate at which cleaner vehicles replace older ones in the vehicle fleet. This could have a significant impact on the emission forecasts, despite the growth in electric vehicle sales. This may be offset to some extent by the expansion of the Ultra-Low Emission Zone (ULEZ) to within the South and South Circular Roads which was not included in the modelling. Given the infrequent nature of journeys to the airport for many passengers, and the current uncertainties regarding the further expansion of the ULEZ, excluding the ULEZ from the modelling may make little difference as many infrequent passengers from outside the ULEZ are likely to be willing to pay to enter the ULEZ. It would be useful to undertake sensitivity tests to show the impact of higher emission factors and the older than anticipated vehicle fleet on the predicted emissions and concentrations (**AQ21**).

8.40 Two sensitivity tests have been undertaken assuming fast and slower growth than in the main assumptions. It would be useful if the airport emission data in Table 9-18 was broken into different types and size of aircraft, Auxiliary Power Units (APUs), engine testing, and the other main airport related sources set out in Appendix 9.3, (paragraph 9.1.3) (**AQ22**).

8.41 The reviewers of this chapter believe that there is sufficient information available to provide a qualitative assessment of the impact of the proposals on UFPs (**AQ2**).

8.42 The ICAO Airport Air Quality Manual has been used to calculate the emissions from the aircraft that currently, and in the future, are likely to use London City Airport (see Appendix

[7] Davidson J., Rose R.A., Naomi J., F., Wagner R.L., Murrells T.P., & Carslaw D. Verification of a National Emission Inventory and Influence of On-road Vehicle Manufacturer-Level Emissions, Environmental Science and Technology, 2021, 55, 4452-4461. https://pubs.acs.org/doi/10.1021/acs.est.0c08363

9.3). This Manual provides a database of non-volatile particle number emissions (i.e., UFPs) by aircraft type. Using this database would provide an indication of how these emissions will change as a consequence of the changing aircraft fleet using the airport as a result of the proposals.

8.43 It is unlikely that ICAO would have collected this data if it saw no benefit for airports to include non-volatile particles in their emission inventories and dispersion modelling. The Manual does not currently provide a method for estimating the volatile particle number, but does include a method for estimating the mass of volatile PM. It is clear from the Manual, however, that the emission of volatile particles is considered to be sulphur dependent. Whilst it is not currently possible to estimate the number of volatile UFPs emitted from engines and formed downwind, reducing the sulphur content of future fuels is considered likely to reduce the emissions of these particles. This has already been shown to be effective for reducing UFP emissions from road transport. There are many similarities in the combustion of automotive and jet fuels, and aircraft engines are adopting similar approaches to reducing emissions as used in the automotive industry.

8.44 There is already a move towards the use of Sustainable Aviation Fuels (SAFs) to meet net zero carbon emissions in the aviation industry. These low sulphur fuels are likely to also reduce the non-volatile UFP. It is understood that the airport is not in a position to commit to the use of these emerging fuels at the current time. However, to meet the airport's net zero commitments these and other ultra-low sulphur fuels including electricity and hydrogen will be used in the future.

8.45 It is not appropriate for LBN to tell the Applicant how to assess UFP. It is for the Applicant and its consultants to devise a suitable assessment method (which can be partly or even wholly qualitative).

8.46 It is not considered appropriate to consider UFP only in a Public Health and Wellbeing chapter. Every application should be considered on its own merits and the situation at Stansted and Bristol airports is very different to London City Airport.

8.47 The odour modelling suggests that in the future odour concentrations will decline, and they are lower in the DC scenarios than the DM scenarios. The estimated reductions are greater from 2027 onwards. Paragraph 9.7.44 states that *"These results may be attributed to the introduction of newer, cleaner aircraft in the DC scenario which outweighs the impact of greater aircraft activity"*. Clarification is needed as to what this greater aircraft activity refers (**AQ23**).

8.48 The assessment includes a discussion of the effects of climate change on air quality. It states (paragraph 9.10.1), *"Climate change is a long-term effect, and significant changes in climate are not expected by 2031"*. There is uncertainty around the rate of climate change and its significance for air quality assessments, which should be reflected in this statement. Some of the meteorological data used is for 16 years before the final assessment year (**AQ24**).

Secondary, Cumulative and Combined Impacts

8.49 The impact of other development on traffic in the local area has been taken into account by the transport assessment and is therefore included in the future DM and DC scenarios.

8.50 Air pollution from the energy systems of nearby major developments have been considered and scoped out as the impacts on the airport are considered not to be significant.

8.51 The emissions from the Tate and Lyle facility, located to the south of the airport, have been explicitly modelled for the assessment. All other sources of air pollution, not included in the air quality modelling, have been assumed to be included in Defra's background concentration maps. Sources which have been explicitly modelled have been removed from the background data to avoid 'double counting'.

Mitigation and Management

8.52 The embedded measures to reduce the operational emissions from the airport are set out in the Air Quality Management Strategy (2020-2023) approved by LBN. The Air Quality Positive Statement sets out the measures to reduce emissions agreed as part of the CADP1 consent. The applicant has not considered any further measures for reducing exposure on the grounds that the S73 application does not include any changes to design, infrastructure or layout of the airport. Clarification is required on whether operational changes have been considered (**AQ25**).

Non-Technical Summary

8.53 The Non-Technical Summary (NTS) generally provides an adequate description of the air quality assessment. Receptors R1 and R2 are described differently in the NTS to Appendix 9.2: Receptor Locations. Clarification is required. (**AQ26**).

8.54 Information on UFP should be provided in the NTS (**AQ27**).

Table 8.1: Summary of Air Quality

Ref.	Summary of Clarifications Required from Applicant
AQ1	Explanation why UFP 'squarely falls' into the description in Paragraph 6 of Schedule 4 of the EIA Regulations.
AQ4	Clarification is required on how the roads included in the air quality assessment have been selected.
AQ5	Clarification on whether all relevant monitoring data has been considered in defining the baseline conditions.
AQ6	2022 monitoring data should be compiled and submitted to LBN.
AQ7	Further information on the verification of the modelled NOx concentrations is required.
AQ8	Information on the appropriateness of using the NOx to NO_2 calculator and its application in this assessment.
AQ10	A breakdown of the aircraft emission sources in the relevant tables should be provided.
AQ11	Evidence should be provided of the appropriateness of the use of annual mean proxies for the short term objectives near airports.
AQ12	The speed and fleet composition data for road transport should be provided for all scenarios.
AQ13	Clarification is required on whether non-residential receptors such as schools, medical and care facilities have been included in the assessment.
AQ14	A list of receptors with the property number/name
AQ16	Clarification is required on whether the assessment has included locations where there is likely to be relevant short-term exposure.
AQ17	Clarification as to whether the need for larger aircraft has been taken into account in the assessments.
AQ18	Information on the generator emission factors, how the short-term and long-term impacts were considered, and what the impact of using more realistic emission factors would be.
AQ20	Clarification should be provided on whether HDV or HGV data has been used in the modelling.
AQ22	The airport emission data in Table 9-18 should be broken down into different types and size of aircraft, APUs, engine testing, and the other main airport related sources.
AQ23	Clarification is needed as to what the greater aircraft activity mentioned in 9.7.44 refers to.
AQ24	Clarification is required regarding the evidence for the comment that 'significant changes in climate are not expected by 2031' (in the context of the assessment).
AQ25	Clarification is required as to why no mitigation measures have been provided on operational changes to reduce emissions
AQ26	All residential receptors should include the property number/name to avoid confusion
AQ27	Information on UFP should be provided in the NTS
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
AQ2, AQ3	EIA should include an assessment of UFP. The technical limitations of the qualitative assessment should be clearly set out.
AQ15	The applicant should provide all the model files for review.

AQ19	The LCY Trip Generation Spreadsheet should be provided.
AQ21	Sensitivity tests of 1) the impact of recent road traffic emissions data (from DUKEMS) and 2) a slower vehicle fleet turnover as a result of the drop in new car sales in 2020, 2021 and 2022.
AQ25	Re AQ15 if the model files are not provided, all details of the modelling need to be provided so that the methodology can be fully reviewed.
Ref.	**Potential Planning Conditions**
AQ9	The Airport's Air Quality Management Strategy should be revised to include the monitoring of ultra-fine particles (particle number and size) and approved by LBN within 6 months of consent being granted.

Chapter 9
Review of Chapter 10: Surface Access

Scope of EIA

9.1 The Surface Access chapter of the Scoping Report was reviewed by Ardent Consulting Engineers and formed the scoping opinion prepared by Land Use Consultants.

9.2 Pre-application consultations have been held with officers at LBN, the Greater London Authority (GLA) and Transport for London (TfL) to agree the scope of the ES along with the Transport Assessment (TA) and associated reports which have been referenced in the ES, though not provided for review as part of the ES package.

9.3 The scope of the ES appears to address the details set out in the scoping report and addresses the majority of the comments made in the scoping opinion.

Baseline

9.4 The baseline situation is clearly set out in the ES. The ES Surface Access chapter clearly describes the existing situation for each mode of transport with details of network or service provision. An active travel zone (ATZ) assessment has been undertaken and is included within the TA which has been reviewed, along with the modelling report.

9.5 Baseline vehicular traffic data has been derived from DfT count data recorded prior to the COVID-19 pandemic as discussed and agreed with LBN and TfL. Vehicular flows were significantly reduced during the pandemic and therefore pre-pandemic data is considered more appropriate.

9.6 Baseline pedestrian and cycle data has been based on desktop studies and site surveys.

9.7 For travel by public transport modes, information on service capacities and frequencies has been derived from the LCY Airport Annual Performance Report 2019, LCY Airport Employee Survey 2019, Civil Aviation Authority (CAA) Annual passenger Survey 2019 – Detailed Data, DLR loadings from TfL Railplan modelling and TfL published bus services Assessment Methodology: highway impacts.

9.8 The baseline conditions set out in the ES chapter are considered reasonable.

Assessment

9.9 The ES clearly sets out the principles of the impact assessment methodology adopted and the IEMA guidelines the impact is assessed against.

9.10 The surface access chapter considers the following scenarios: 2019 Baseline year, 2025 transitional year do minimum (DM) and development case (DC) scenarios, 2027 DM and DC scenarios, 2029 transitional year DM and DC scenarios and 2031 principal year of assessment DM and DC scenarios. Given that the greatest impact will be when the airport reaches its operational limit, the surface access chapter only considers the impacts in 2031 as this is considered a worst case scenario in which the difference between the DM and DC scenarios would be at its greatest.

9.11 No discrete assessment of construction traffic has been undertaken in the ES due to the fact the physical structures permitted under the CADP1 consent have not materially changed with the proposed amendments and therefore predicted construction traffic flows remain the same. It should also be noted that the construction likely to attract the greatest number of vehicles has been completed. The volume of construction traffic will therefore be less than previously experienced for the remaining elements to be constructed under the CADP1 consent.

9.12 The methodology of calculating the quantum of passenger and airport employee trips is clearly set out.

9.13 The future year baseline traffic conditions under the DM scenario were derived from the TfL HAM model with airport-related vehicle trips adjusted to reflect anticipated future mode shares and the opening of the Silvertown Tunnel in 2025 which will have a significant impact on flows in the vicinity of the airport.

9.14 In order to be robust, links where AADT traffic has increased by 10% have been included in the assessment despite IEMA guidelines only requiring links with an increase of 30% to be included.

9.15 This resulted in 4 links being included with increases of 37% on Hartmann Road, East of Connaught Road – Western Airport Access and Hartmann Road, West of Albert Road – Committed Eastern Airport Access and 16% on Connaught Road, East of roundabout and Connaught Road, West of roundabout. The findings of minor negative to moderate negative on these links is considered reasonable.

9.16 The findings of slight to moderate negative significance of impact on severance is considered reasonable and it is noted that the absolute level of severance remains low.

9.17 The findings of negligible to minor magnitude of impact on driver delay is considered reasonable.

9.18 The findings of neutral to slight negative significance on pedestrian and cycle delay is considered reasonable.

9.19 The findings of neutral to slight negative significance on pedestrian amenity is considered reasonable.

9.20 The findings of neutral to slight negative significance of impact on Accidents and safety is considered reasonable.

9.21 The findings of neutral to slight negative significance of impact on pedestrian fear and intimidation is considered reasonable.

9.22 A detailed assessment of the impact on public transport is included in Chapter 8 of the TA.

9.23 TfL's Railplan model demonstrates ample spare capacity on the Docklands Light Railway network and therefore a finding of an overall level of significance of slight is considered reasonable.

9.24 A finding of negligible impact on bus services is considered reasonable given the expected passenger numbers and future provision.

9.25 A finding of negligible impact on the Elizabeth Line is considered reasonable.

9.26 Paragraph 10.1.2 states that "*a little more than half the additional travel demand would occur outside the weekday AM and PM peak periods"* which appears to contradict paragraph 10.6.54 which states that "*the net effect of the additional demand is minimal across the whole public transport network for the weekday AM and PM peak periods as the bulk of the assumed growth in passenger activity will occur during the weekday off-peak and Saturday periods".* Although the conclusions of the assessment are unchanged it would be worth clarifying this point. (**SA1**)

Secondary, Cumulative and Combined Impacts

9.27 Cumulative impacts have been considered through use of the TfL HAM and Railplan models which incorporate predicted future travel demand across London. These models consider a more comprehensive range of schemes than those identified within this ES ad therefore represent a robust means of assessing the cumulative impacts. This is agreed.

Mitigation and Management

9.28 No significant effects requiring mitigation have been identified that require specific mitigation.

9.29 Travel Plans for both staff and passengers are being implemented which include a range of measures to help achieve the predicted modal share targets.

9.30 Furthermore, a Sustainable Transport Fund (STF) is being implemented in order to fund surface access projects to help achieve the modal share targets.

9.31 The mitigation is considered appropriate.

Non-Technical Summary

9.32 The traffic and transport section effectively sets out the conclusions of the traffic and transport ES chapter and identifies that there will be no likely significant effects as a result of the Proposed Development.

Table 9.1: Summary of Surface Access

Ref.	Summary of Clarifications Required from Applicant
SA1	Clarify assumed contradiction in paragraphs 10.1.2 and 10.6.54
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
N/A	None.

Chapter 10
Review of Chapter 11: Climate Change

Scope of EIA

10.1 The scope of the EIA is deemed appropriate.

Baseline

10.2 The applicant is requested to provide more detail of the current climatic baseline. For example, data should be provided on the typical climatic conditions present at the nearest weather station to the proposed development. This should also include details of historic climate events and their impacts on baseline conditions. (**CC1**)

Assessment

Green House Gas (GHG) Assessment

10.3 In paragraph 11.4.14, it is stated that "*the 4th carbon budget totals exclude emissions in 2023 (as the modelling undertaken for this assessment is for the years 2024 onwards)*". If this is the approach that has been taken, please confirm that only three years' worth of the 4th Carbon Budget has been used to assess significance. For example, if emission from 2024 have been excluded, significance should be assessed against 1,462.5 MTCO2e. (**CC2**)

10.4 The applicant is requested to include an outline and description in the methodology of what is meant by the "planning assumption" used to assess significance in paragraph 11.6.22. It is currently not clear what underlying assumptions the "planning assumption" contains and the impact this has when assessing significance and establishing context and materiality. (**CC3**)

10.5 Confirmation should be provided regarding whether the Jet Zero "High ambition" scenario has been applied to both the DM and DC scenario. (**CC4**)

10.6 Whilst the use of the UK Government's "Jet Zero" strategy is justified in this context to underpin the GHG assessment (and therefore support the significance results), there are doubts as to the achievability of the assumptions that underpin the high ambition scenario. The mitigation measures outlined in the strategy, such as the proliferation of sustainable aviation fuel, are largely untested. Sustainable Aviation Fuels (SAFs) are currently too expensive and rely on technology that has not yet been proven at scale. There are also multiple issues surrounding land availability to grow the

energy crops necessary to meet the anticipated demand modelled in the strategy. The Climate Change Committee has stated that the technologies that underpin the modelling in this GHG assessment present "major risks" to the UK Government's emission reduction targets. The strategy also relies on the effective implementation of UK ETS and Corsia, however the UK Government has not yet set a credible policy in regard to these schemes.

10.7 IEMA guidance states that is down to practitioner judgement as to which carbon budget should be used to assess significance and contextualise the impacts of the proposed development. This can either be national, local or sector based. As London City Airport, as noted in paragraph 11.6.26, is a smaller airport and therefore not of national significance, it is our judgement that the GLA carbon budgets would be more appropriate in assessing significance. (**CC5**)

Climate Resilience Assessment

10.8 The climate resilience assessment is deemed sufficient.

Secondary, Cumulative and Combined Impacts

10.9 The assessment of secondary, cumulative and combined impacts is deemed sufficient.

Mitigation and Management

10.10 Scope three emissions make up the majority of GHG emissions in both development scenarios. Both DM and DC scenarios rely heavily on Government initiatives to reduce the GHG emissions associated with aviation. Please include details of how the Proposed Development itself intends to mitigate the GHG emissions of this activity, such as incentivising the uptake of newer generation aircraft as stated in paragraph 11.6.34 (**CC6**).

Air Quality Considerations

10.11 This commentary is provided by APS to support the overall climate change assessment.

10.12 Paragraph 11.1.2 states GHG footprint includes emissions from both the construction and operational phases of the proposed development. This is not the whole life cycle. The scope should include the decommissioning phase. Table 11-8 explains that GHG emissions from decommissioning are likely to be net zero, on the basis that the UK Government has committed to net zero by such a time that it may occur. The Government's net zero approach however allows for remaining headroom for international aviation and shipping. Scoping out decommissioning based on the Government's net zero plans is therefore not appropriate. Consideration should have been given here to the Government's Jet Zero approach. Nevertheless, net zero and jet zero do not mean zero emissions. Additionally, once built there would be little the Government could do to force the operator to use zero emission approaches, this would be the operator's choice. Given the likely timescale of the development, it is fair to reach the conclusion that emissions from decommissioning would be too uncertain to quantify currently. Instead, it is recommended that zero emission methods for decommissioning are set out in an operator management plan and secured via a planning condition. (**CC7**)

10.13 With regard to consumables. The ES Chapter assumes an average of 0.5 kg of food is consumed per person. Given that typical consumption per day, comprising typically three meals, is approximately 4.5 kg, the assumption appears rather low. It would be reasonable to assume passengers would consume one of their daily meals. The assumption is also only for food, if you take the consumption of drinks into account it would be higher. The daily intake of drinks per person is typically 1.6 – 2 kg, hence approximately 0.6 kg per meal. Thus, for food and drinks combined, the consumption would equate to approximately 2.1 kg, 4 times higher than assumed in the ES chapter. Following the approach set out in the ES, this would mean food and drink consumption would account for an additional 4% of total emissions. The argument that these emissions may otherwise be consumed elsewhere has been considered. For UK residents, this may well be the case, but for foreign residents it would not be, since their emissions would otherwise be in their country and not affect the UK carbon budgets, which the GHG emissions have been assessed against.

10.14 The response focuses on food consumption. The ES states little, if anything, regarding consumption of non-food products, such as material commodities from the retail shops. Many of the passengers will be tourists to London who would purchase products at the airport. It is not disputed that these products could be bought elsewhere. However, without the additional person capacity proposed, these additional people may not visit London and could buy products elsewhere. The proposed development does therefore introduce new consumption both in London (and further afield in the UK) as well as within the airport, and hence an increase in embodied emissions. Although there is uncertainty in the availability of emissions from the products, at the very least estimates should be produced. No evidence has been provided to demonstrate these would equate to less than 1% of total emissions.

10.15 Table 11-8 in the ES Chapter states that emissions from consumables would be less than 1% of total emissions and are thus scoped out. However, taking account of the above, consumables may equate to more than 5% of total emissions and likely should be scoped into the assessment. Sufficient evidence has therefore not been provided (**CC8**).

10.16 The assessment has not considered emissions associated with repair and maintenance during the operational phase. No evidence has been provided to scope out or assess this potential effect (**CC9**).

Air Quality Assessment

10.17 Significant concerns remain regarding significance. Comparing the emissions from a single development to the whole UK is useful but it is unlikely that any development would ever lead to more than 1% of the UK budget. This is not an appropriate test of significance. When considering whether the development would have a material impact on the ability of Government to meet its carbon reduction targets, the Government relies on local authorities to reduce emissions within their administrative areas, and for developments this is controlled via the planning regime. Consideration should therefore be given to the percentage contribution to the borough's budgets, which in turn represent a material contribution to the UK budgets. It is recommended that an appropriate test would be to determine whether the development's total emissions are less than 1% of the borough's equivalent 5-year budgets.

10.18 Regarding Indirect GHGs (referred to 'non-CO_2 emissions' in the ES), it is accepted that their impacts should not be compared to the UK's carbon budgets, since the budgets are based upon Direct GHGs. However, given that the ES has highlighted that they would likely cause the total CO2e emissions to be three times higher than presented, this should be taken into account when determining the overall significance of the development, focusing on taking a conservative determination.

10.19 The methodology used to calculate emissions from embodied carbon and site activities during the construction phase that is presented in the ES is considered quite basic and likely to misrepresent the actual emissions. Numerous more robust methodologies are readily available and should have been used for such a major development. Nevertheless, the level of emissions are considered unlikely to alter the conclusions.

Non-Technical Summary

10.20 The non-technical summary is deemed appropriate.

Table 10.1: Summary of Climate Change

Ref.	Summary of Clarifications Required from Applicant
CC1	Please provide more details on the current climatic baseline.
CC2	Please confirm that only three years of the 3rd carbon budget have been used to assess significance.
CC3	Provide a description and outline the assumptions that inform the "Planning assumption" that is used to assess significance within the body of text.
CC4	Confirm if the "Jet Zero" high ambition scenario has been applied to both DM and DC scenarios.
CC5	Please clarify why the more appropriate Local GLA carbon budgets have not been used to assess significance.
CC6	The Applicant should provide details of how the Proposed Development itself intends to mitigate the GHG emissions of the DM and DC scenarios.
CC8	Further clarification should be provided regarding the evidence to justify the 1% of total emissions being scoped out when compared to the expected 5% value as detailed.
CC9	Clarification should be provided to confirm the scoping out of emissions associated with repair and maintenance during the operational phase.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
CC7	Operator Management Plan for zero emission decommissioning methods. [This could be put into the Climate Change and Carbon Action Plan (CCCAP), provided the CCCAP is secured by planning condition]

Chapter 11
Review of Chapter 12: Public Health and Wellbeing

Scope of EIA

11.1 This section has been reviewed by LUC, with commentary from APS on 'Air Quality and UFPs' below.

11.2 The scope of the EIA considers the operational health impacts of the Proposed Development on the public. The ES states that construction effects are not considered as there are no proposed changes to the approved buildings or infrastructure, and so the effects remain as assessed in the 2015 ES.

11.3 This chapter builds on the 'residual effect' conclusions from other EIA chapters (including socio-economics, noise, air quality, surface access, climate change and cumulative effects), thus, ensuring that the assessment is not duplicated and is kept proportionate. This approach is considered appropriate.

Baseline

11.4 The baseline conditions are set out both in the chapter and supporting Appendix 12.3.

11.5 The approach to defining the existing baseline which includes details of published demographics, socio-economic and public health and healthcare capacity data is considered appropriate.

11.6 Paragraphs 12.3.31 – 12.3.34 set out the limitations and assumptions within the baseline data, with the data sources listed in paragraph 12.3.17.

11.7 Further information is provided in appendix 12.3 as stated above. This is considered appropriate.

Assessment

11.8 Paragraph 12.4.4 outlines sensitive receptors considered in the assessment making public health indicators in wards within close proximity. This is further broken down with sensitivity assigned by age group. This is considered appropriate.

11.9 Section 12.3 and Appendix 12.2 set out the methodology used to inform the health and wellbeing assessment. This includes the creation of a local health profile. Consultation with relevant consultees and subsequent appraisal of both positive and negative impacts on human health has been undertaken.

The significance criteria applied to potential likely effects are also clearly defined. This is considered appropriate.

11.10 As stated above, other technical chapters feed in to the health and wellbeing topic, including socio-economics, noise, air quality, surface access, climate change and cumulative effects. The Applicant should ensure to refer to any queries raised in relation to human health within relevant technical chapters.

11.11 The effects on healthcare provision mirror the assessment conclusions made in the socio-economics chapter. This is considered appropriate.

Secondary, Cumulative and Combined Impacts

11.12 The cumulative effects relating to health and wellbeing are set out in Chapter 14: Cumulative effects, although the Public Health and Wellbeing chapter incorrectly references this to be Chapter 18 in paragraph 12.23.1.

11.13 The approach to assessing cumulative effects is set out in Chapter 3. The Cumulative effects chapter also makes a distinction between intra and inter project effects associated with the Proposed Development.

11.14 Paragraphs 14.2.11-14.2.17 sets out the criteria used to determine developments included within the cumulative assessment. This included developments within 1 km of the development and other criteria listed in paragraph 14.2.14. The list of cumulative schemes has not been approved or objected to by LBN, however the criteria are considered appropriate.

11.15 The cumulative assessment concludes that there may be a minor adverse (not significant) cumulative effect in relation to health, due to expected increases in road traffic, including in relation to air quality and noise from cumulative schemes.

11.16 The intra-cumulative assessment concludes, rightly, that the health and wellbeing chapter inherently considers the combined impacts on human health receptors from all other technical disciplines in the ES and therefore further assessment would be disproportionate (see paragraph 14.3.8 of Chapter 14).

Mitigation and Management

11.17 This chapter inherently embeds mitigation already proposed in other technical chapters drawn on as identified above, the existing planning conditions attached to CADP1, alongside S106 agreements.

11.18 The overarching mitigation is the Health Action Plan included in the 2015 Heath Impact Assessment (HIA). Some of the key measures outlined in the plan include:

- The Construction Environmental Management Plan (CEMP) which will help inform, refine and enhance the construction process where relevant;
- LCY will continue to operate its existing UK airport air noise management programme and seek to improve the various noise mitigation in place at the airport;
- Continual operation of a comprehensive engagement programmed with local communities and stakeholders, etc.

Air Quality and UFP Considerations

11.19 This section includes commentary from APS.

Scope

11.20 The Public Health and Wellbeing chapter includes consideration of the traditional air pollutants and UFP. The approach adopted is generally reasonable. There are, however, contradictory statements regarding the use of regulatory standards and the World Health Organization (WHO) air quality guidelines, and confusion between air quality limit values and objectives throughout the chapter.

11.21 The context set out in Paragraph 12.1.3, states: *"Guidance explaining that this is the correct approach is set out in Section 12.1.6."*, however Paragraph 12.1.6 does not explain why the approach is suitable. Clarification is required (**PHW-AQ1**).

11.22 Paragraph 12.1.5 states that *'The health assessment considers the public health implications of the conclusions of the other technical assessments'*. This is good practice providing the limitations of the technical assessments are accounted for. With this in mind, should any further information be provided at LBN's request, the health assessment may need to be revisited, including any further limitations of the assessments identified.

11.23 Table 12.1 states, *"The health assessment includes a section on UFP. This provides a proportionate population health assessment based on the current state of scientific knowledge about the severity and causality of UFP health pathways. This is informed by discussion of UFP in the Chapter 9 air quality assessment and its appendices."* Table 9.3, however, scopes out the need for an assessment of UFP, and no assessment of the potential impacts of the proposals is provided in Appendix 9.1. The review of chapter 9 recommends LBN request an assessment of UFP. Clarification is requested (**PHW-AQ2**).

11.24 Table 12.1 also states that, *"The health assessment includes a comparison against the 2021 WHO Air Quality Guidelines, see Table 12.11. This is informed by quantitative analysis from the Chapter 9 air quality assessment."*. Table 12.11 provides a summary of the results of the air quality assessment. There are some differences between this table and the results of the air quality assessment presented in Appendix 9.4. For example, Table 12.11 suggests the highest predicted concentration of NO_2 in the 2027 DC scenario is 27.2 µg/m^3. Appendix 9.4 shows it to be 28.0 µg/m^3. Clarification on this is required (**PHW-AQ3**).

11.25 Table 12.1 states *"It is clear in guidance and national policy that weight should be given to regulatory standards as an appropriate health protection standard when determining population health significance."* This assumes that the regulatory standards provide adequate protection of public health; in respect to air quality this is clearly not the case. The limit values and objectives were mainly set over 25 years ago, since when there has been an increase in the literature on the health effects of exposure to air pollution, providing robust evidence of effects at much lower concentrations.

11.26 Chapter 9 should and does consider compliance with the limit values and national objectives.

11.27 The Public Health and Wellbeing chapter relies on the IEMA guidance and the NPPF to justify using the 'regulatory standards'. The IEMA guidance is a useful document filling the previous gap in guidance on HIA in EIA but following this approach risks underplaying the potential risk of the impacts to health due to exposure to air pollution. The guidance does not provide explicit advice on the use of regulatory standards for air quality but provides an example which suggests a more flexible approach.

11.28 The setting of the limit values and objectives includes consideration of a range of factors that are also considered in health assessments, such as socio-economic impacts. Therefore, not only are the limit values and objectives not sufficiently protective of human health, but their use would also result in a degree of double counting of the non-medical factors taken into account when they were adopted.

11.29 This chapter has included an assessment of the impact of the traditional air pollutants against the WHO 2021 and WHO 2005 air quality guidelines (which are significantly more stringent than the regulatory standards), which is appropriate. The chapter, however, argues that these guidelines are not relevant in the planning system. It should be noted that these guidelines are not mentioned in the NPPF but that does not mean that they are not relevant for considering the health impacts of a planning application.

11.30 It is not clear if the chapter considers the passenger population in the assessment. The proposal is explicitly for an increase in passenger numbers and thus there will be an increase in exposure of people to the environment at and on the way to the airport. This does not appear to be considered. Clarification on this is required (**PHW-AQ4**).

Assessment

Air Quality

11.31 In consideration of the S73 proposals, the health assessment undertaken is likely to have reached an appropriate determination of significance in regard to air quality (UFP are discussed later). However, there are elements of the approach that the reviewers of this section of the chapter do not agree with, and further evidence is required to confirm this determination.

11.32 The chapter (Paragraph 12.15.2) states that the role of NO_2 on health is independent to that of $PM_{2.5}$, citing a 2014 paper. This was not the conclusion of the UK Committee on the Medical Effects of Air Pollution (COMEAP) in a report published in 2018[8].

11.33 The Public Health and Wellbeing chapter places significant weight on evidence from the literature on health effects but ignores the WHO 2021 appraisal which is the latest robust synthesis of the evidence on health effects due to air pollution undertaken by a group of international experts. It is somewhat surprising that the assessment has not drawn on authoritative and systematic expert reviews of the evidence; instead, it often cites a small number of individual papers. Given the very large literature on this subject, citing a small number of individual papers can present a biased view.

11.34 Paragraphs 12.15.2 and 12.15.10 discuss the impact of air pollution on respiratory and cardiovascular diseases. It fails to recognise the wide range of other health effects due to exposure to air pollution such as low birth weight and dementia.

11.35 Paragraph 12.15.4 makes reference to "national standards' and that the changes in air quality *'would be well within the national standards set for health protection…'*. This terminology is confusing and is used in several different sections of the chapter (e.g. Footnote 4 on page 39: the distance of 4m relates to the limit values not the objectives; Paragraph 12.15.21). The only national standards are the limit

[8] Committee on the Medical Effects of Air Pollutants, 2018, Associations of Long-term Average Concentrations of Nitrogen Dioxide with Mortality, Crown Copyright. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf

values; the national objectives are not standards according to the latest statutory Air Quality Strategy, published under the 1995 Environment Act. Clarification is required as to whether the chapter is referring to the limit values or objectives, or both throughout the Chapter (**PHW-AQ5**). Limit values and objectives are set under different legislation, and compliance is assessed differently, at different locations, by different public bodies. The term regulatory thresholds is also used which also needs clarification regarding its meaning in this context (**PHW-AQ6**).

11.36 Paragraph 12.15.5 and Table 12.11 fail to include the future assessment year of 2029. The table should be corrected (**PHW-AQ7**).

11.37 Paragraph 12.15.6 suggests that aviation emissions are less than road traffic, when this is not the case (see Tables 9-12 to 9-16) (**PHW-AQ8**). In addition, clarification is required regarding what constitutes a community building (**PHW-AQ9**).

11.38 Paragraph 12.15.12 states *"Whilst the literature supports there being thresholds set for health protection purposes"* it would be useful to understand what is being referred to. The WHO document referenced was commissioned by the European Commission to review the health effects to inform future European air quality policy. A search of the document for 'thresholds' failed to find it. The COMEAP report referenced discusses the Government's air quality index not regulatory thresholds. Appropriate references to support this statement are required (**PHW-AQ10**).

11.39 Based on the IEMA guidance Paragraph 12.15.13 states that the EIA should include a discussion on 'what is acceptable for the jurisdiction' with respect to regulatory standards for non-threshold health effects.

11.40 Paragraph 12.15.14 quotes from the Defra website suggesting that the statutory air quality standards are 'acceptable' because *'air quality standards are based on what is known scientifically about the effects of each pollutant on health'*. This approach fails to acknowledge that the limit values and objectives are very out of date and are no longer considered sufficiently protective of human health. It has been widely accepted for many years by government (including the Chief Medical Officer in his recent report[9]) and others, that there are health effects below the regulatory thresholds, and reducing air pollution below these levels would improve public health.

11.41 It is accepted that the NPPF focuses on compliance with the relevant limit values and national objectives and the air quality chapter addresses this issue. The NPPF does not limit consideration of health in relation to air quality exclusively to limit values and national objectives.

11.42 Paragraph 12.15.15 states that the WHO 2021 guidelines *"…remain a relevant public health contextual consideration; however, the national statutory standards are the appropriate benchmark for an assessment of significance that informs a UK planning determination."* As noted in above, just because a particular document is not mentioned in the NPPF does not mean that it is not a material consideration in the planning system.

11.43 If the approach advocated by the Public Health and Wellbeing chapter was correct, the planning decision on an industrial process where there are no regulatory standards for the pollutants emitted, could not consider the health impacts despite the risk.

11.44 The chapter does provide some helpful information regarding the WHO guidelines (which are purely health based). The potential for non-threshold effects of NO_2 and $PM_{2.5}$ on population health were considered but the weight given, if any, to these impacts is not clear. This requires clarification (**PHW-AQ11**).

11.45 The reviewers of this chapter do not consider the use of the limit values and/or the national objectives to be acceptable for the jurisdiction to give members of the public confidence in the thresholds set for the purpose of health protection i.e. are not suitable for use in a health assessment. Clarification is required that the conclusions would have remained the same if the WHO guidelines had been used instead of the limit values and/or national objectives. (**PHW-AQ12**).

11.46 The overall conclusion of the health effects of exposure to air pollution is minor adverse (not significant) which seems reasonable. But further evidence is required to support this conclusion (**PHW-AQ13**).

11.47 It is unclear if effects on children at schools located near to the airport have been explicitly considered in relation to health effects rather than air quality compliance. Clarification on this is required (**PHW-AQ14**).

11.48 Paragraph 12.15.16 is misleading and contradictory in stating: *"In accordance with the aforementioned guidance for assessing health in EIA, the assessment of health significance gives weight to the statutory air quality standards set for the purpose of health protection by the Government. WHO air quality guideline values are referenced as an aspirational target…"* implying that only the statutory air quality standards (i.e. only the limit values) have been given weight when determining significance. Neither the objectives nor the WHO

[9] Department of Health and Social Care, (2022), Chief Medical Officer's Annual Report 2022: Air Pollution. https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2022-air-pollution

guidelines appear to have been given any given weight. Clarification is required on this point (**PHW-AQ15**).

11.49 Paragraph 12.15.25, however, states that non-threshold effects of NO_2 and $PM_{2.5}$ have been taken into account in determining the significance. Clarification is required as to how this was done (**PHW-AQ16**).

11.50 The change in concentrations set out in Table 12.11 are small for PM, even in relation to WHO guideline levels; but not at some locations for NO_2 (up to 14% of the guideline). However, this only affects a small number of people.

11.51 Paragraph 12.15.24, notes that air quality is unlikely to change inside the airport due to the proposal, although it could change outside due to the increased emissions from the aircraft as forecast in Chapter 9. It does not appear that the increase in passengers passing through the airport have been considered, which would impact on the overall public health due to the increased number of people exposed. Clarification on this point is required (**PHW-AQ17**). The passenger population is not limited to low risk groups and can often include vulnerable groups of the population. Therefore, the risk of a health effect due to the increased exposure should be considered and discussed.

11.52 The conclusions of Paragraph 12.21.8 are broadly reasonable, although it is considered remis to have excluded the passenger population from the health assessment and the requested evidence to support the conclusions need to be provided.

11.53 While the appropriateness of the statement that *"compliance with statutory standards demonstrates an acceptable level of health protection"* (Paragraph 12.15.24) is disputed, the conclusion of Paragraph appears reasonable, providing the further evidence requested is provided.

Ultra-Fine Particles (UFP)

11.54 The air quality chapter does not include an assessment of the impact of the proposals on UFP. Yet the Public Health and Wellbeing chapter assumes that there will be a small impact. Justification for this conclusion is required (**PHW-AQ18**).

11.55 If the Public Health and Wellbeing chapter can assess the impact of UFP qualitatively it is very unclear why the air quality chapter cannot do the same. As noted in the review of chapter 9 this should be provided.

11.56 Paragraph 12.16.6 states, *"The World Health Organisation (WHO) global air quality guidelines in 2021 (WHO, 2021) recognised that there is growing evidence from laboratory studies of toxicological effects of UFP, however concluded that the evidence from field research (i.e. real-world settings) is not sufficient to formulate air quality guideline levels for exposure."*

11.57 The 2021 WHO guidelines actually state that there was already considerable evidence of the toxicological impact of UFP in 2005. Since then the epidemiological (i.e. field research) evidence has grown and continues to grow. Based on two systematic reviews WHO state, *"short-term effects of exposure to UFP, including mortality, emergency department visit, hospital admissions, respiratory symptoms, and effects on pulmonary/systemic inflammation, heart rate variability and blood pressure; and long-term effects on mortality (all-cause, cardiovascular, IHD and pulmonary) and several types of morbidity."* The reason why WHO has not published guidelines is because the different size ranges and exposure metrics used in epidemiological studies prevent comparisons across studies.

11.58 Paragraph 12.16.10 states that *"UFP is elevated in and around airports"*. In Paragraph 12.16.7 it states, *"In this case, whilst there is a lack of full scientific certainty, the available epidemiological evidence suggests a small effect…"*. The health effect evidence presented in the ES does not quantify the magnitude of the effect, only the type of effect e.g. cardiovascular changes. The epidemiological evidence that there will be a small effect needs to be provided (**PHW-AQ19**).

11.59 Paragraph 12.16.27 states: *"It is concluded that the magnitude of the change due to the project, comparing the DC and DM scenarios in all assessment years, is low. The scale of change in UFPs due to the proposed development is considered to be small."* The chapter does not provide any robust evidence for this other than a statement that the change in $PM_{2.5}$ is small, but the chapter acknowledges that this is a crude indicator for UFP. Evidence is requested (**PHW-AQ20**).

11.60 It should be noted that there is no simple link between $PM_{2.5}$ mass and the number of UFP. UFP are extremely small and have little mass, but very numerous, and therefore this link should be treated with extreme caution.

11.61 No recognition is given to the need for larger aircraft to serve the increasing number of passengers whilst meeting the current cap of air traffic movements. Clarification on this is required (**PHW-AQ21**).

11.62 The section on UFPs comes to the same conclusion as for the traditional pollutants, i.e. the effect would be minor adverse (not significant). This conclusion is considered by the Applicant to be a conservative finding on the basis of the scientific uncertainty (and emerging evidence) about UFP. Given the nature of the S73 application the conclusion that there will be a minor adverse effect this does not seem unreasonable, however, whether or not this is conservative is

unclear and the further clarification is required to confirm this (**PHW-AQ22**).

Air Quality Mitigation and Management

11.63 Paragraph 12.20.9 states that *"The appropriate response is for public health to maintain a watching brief on UFP as a topic area. The monitoring of UFPs is therefore supported, including correlating results with use of sustainable aviation fuel".*

11.64 In pre-application discussions the Applicant was supportive of a planning condition requiring monitoring of UFP at or near the airport to improve knowledge of airport UFPs therefore such a condition is recommended (**PHW-AQ24**).

11.65 To review progress towards reducing UFP an annual review of the aviation emissions inventory, aviation fleet, SAF usage, fuel sulphur content, fuel consumption, hydrogen and electric update should be provided to LBN (**PHW-AQ25**).

Non-Technical Summary

11.66 The NTS provides a summary which is consistent with the conclusions from the technical chapter. This is considered appropriate.

11.67 The non-technical summary summarised the air quality impacts on public health in Table 6.6. Out of necessity it is a very short summary. It would be useful if it mentioned the specific pollutants considered including UFPs.

Table 11.1: Summary of Public Health and Wellbeing

Ref.	Summary of Clarifications Required from Applicant
PHW-AQ1	Clarification is required as to why using a population approach is the correct approach.
PHW-AQ2	Clarification is required on the source of the information used to assess the impact of the proposals on UFP.
PHW-AQ3	Confirmation that the data is Appendix (9.4) is correct and that in Table 12.11 is not correct.
PHW-AQ5	Clarification is required how the impact on the passenger population has been assessed.
PHW-AQ5	Clarification required as to whether the chapter is referring to the limit values or objectives, or both throughout the Chapter.
PHW-AQ6	Clarification required on what the term 'regulatory thresholds' is referring to.
PHW-AQ7	Clarification is required on why Paragraph 12.15.5 and Table 12.11 have ignored the 2029 assessment.
PHW-AQ8	Clarification is required regarding why aviation emissions are less important than road traffic emissions.
PHW-AQ9	Clarification is required on what constitutes a community building.
PHW-AQ10	Clarification is required on the literature that supports the statement regarding thresholds being set for health protection purposes.
PHW-AQ11	Clarification is required on the weight given to the non-threshold effects of NO_2 and $PM_{2.5}$ on population health in the assessment.
PHW-AQ12	Clarification is required that the conclusions would have remained the same of the WHO guidelines had been used instead of the limit values and/or national objectives. This is to give members of the public confidence that the thresholds used will protect human health.
PHW-AQ-13	Further evidence is required to support the conclusion that the health effects of exposure to air pollution from the proposals is minor adverse (not significant).
PHW-AQ14	Clarification is required on whether children at schools located near to the airport have been explicitly considered in relation to health effects rather than air quality compliance.
PHW-AQ15	Clarification is required regarding the weight, if any, given in the assessment to the limit values, national objective, WHO guidelines and non-threshold effects.
PHW-AQ16	Clarification required on how the non-threshold effects of NO_2 and $PM_{2.5}$ were taken into account in determining the significance.

PHW-AQ17	Clarification is required to be provided on how the health effects on passengers has been assessed, including the increased number of passengers.
PHW-AQ18	Clarification on how the health assessment of UFP was undertaken as it is not based on the results of a technical assessment.
PHW-AQ19 + PHW-AQ-20	Further information is required on how the UFP assessment reached the conclusion that there will be a small effect as the health effect evidence presented in the ES does not quantify the magnitude of the effect, only the type of effect.
PHW-AQ21	Clarification is required on whether the need for larger aircraft to serve the increasing number of passengers whilst meeting the current cap of air traffic movements has bene considered in the assessment.
PHW-AQ23	Clarification is required on why the impact on UFP/health is considered conservative.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
PHW-AQ24 & PHW-AQ25	The Airport's Air Quality Management Strategy should be revised to: ■ Include the monitoring of ultra-fine particles (particle number and size) and approved by LBN within 6 months of consent being granted. ■ To provide an annual review of the aviation fleet, fuel sulphur content, fuel consumption, and SAF, hydrogen and electric update. The first annual review should be for the year 2025 and submitted to LBN by April 2026, and subsequent review to be submitted to the council in the April of each year.

Chapter 12
Review of Chapter 13: Other Environmental Topics

Water Resources and Flood Risk

Scope of EIA

12.1 This review considers Chapter 13.3: Water Environment and associated appendices. The review also takes into account the requirements of the Scoping Report and Scoping Opinion.

12.2 The assessment has given due consideration to all sources of flooding to and from the development and has adequately identified factors that could impact the water environment.

Baseline

12.3 The baseline scenario has been well described and identified the key factors for consideration in the context of the proposals.

Assessment

12.4 The majority of the potential impacts have been adequately considered and assessed.

12.5 The Scoping Opinion noted that the applicant would consult with Thames Water regarding the increase in potable water demand and wastewater capacity. This has not been undertaken. The applicant should consult with Thames Water to confirm that sufficient capacity is available for the increased passenger traffic. (**WR1**)

Mitigation and Management

12.6 No specific mitigation measures are identified, and this is considered appropriate subject to confirmation from Thames Water regarding the potable water demand and wastewater capacity.

Non-Technical Summary

12.7 It is considered that the Water Resources and Flood Risk section of the NTS accurately reflects the conclusions of ES chapter.

Ecology and Biodiversity

Scope of EIA

12.8 Chapter 13 of the ES considers topics that at EIA scoping, were determined to be unlikely to be materially affected by the proposed amendments, of which Ecology and Biodiversity is included. This assessment has been undertaken in accordance with the guidance set out in the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines for Ecological Impact Assessments. The methodology and approach are considered to be appropriate and in line with current guidance.

Baseline

12.9 LUC is satisfied that the update Preliminary Ecological Appraisal (PEA) has been undertaken in accordance with the appropriate CIEEM guidelines and is within date as per the CIEEM Advice note on the Lifespan of Ecological Reports and Surveys.

12.10 LUC agrees that the airport is not located within or adjacent to any statutory designated sites for nature conservation.

12.11 Both the update PEA and the baseline summary acknowledge and confirm that the site is urbanised in nature and surrounded by residential, commercial and industrial land uses, thus due to limited habitat connectivity it is accepted that the ecological value of the site is low.

12.12 The PEA and the baseline summary confirm that tree and plant interest on site is limited in nature and grassland is frequently mown. Habitats present on site are generally common and widespread in nature.

Assessment

12.13 The update PEA assesses that habitats are common and widespread and generally found locally within the wider landscape. There is potential for disturbance of breeding birds in the adjacent SINC (non-statutory designated site), however due to current operations and bird deterrents it is agreed that it is unlikely that there will be a significant impact on bird species within the SINC.

12.14 It is agreed that buddleia should be controlled and replaced with native species that contribute positively to biodiversity value, to be delivered as part of the Landscape Strategy.

Secondary, Cumulative and Combined Impacts

12.15 It is agreed that the assessment appropriately follows the 2017 EIA Regulations in its assessment of cumulative effects.

Mitigation and Management

12.16 The applicant has committed to a biodiversity fund to support local projects and achieve biodiversity net gain off site; clarification would therefore be welcomed as to how biodiversity net gain will be assessed and achieved off site (**ECO1)**.

12.17 An eradication or management plan is recommended for the removal of buddleia. Clarification regarding details of this plan, controls and replacement habitat is therefore sought (**ECO2)**.

12.18 Chapter 13 confirms that additional biodiversity value will be added through the Landscape Strategy to reflect the PEA's conclusion that enhancements could include an increase of ornamental planting and tree planting in areas out of airport use. This is welcomed, with a preference for native flowering/fruiting species where appropriate.

Ground Conditions and Contamination

Scope of EIA

12.19 Ground conditions and contamination have been scoped out of the ES.

12.20 Planning Condition 39 pertaining to contamination, remediation and verification has been partially discharged with production of a Piling Risk Assessment. Other requirements of the conditions such as a site investigation are to be discharged when additional phases of the proposed development commence.

12.21 There is no discussion of updating the ES chapter to account for the latest works and findings on Site undertaken pursuant to the discharge of Condition 39. However, this is acceptable on the basis that the Condition remains in force until said works are completed to the acceptance of the LPA (**GC1**).

Baseline

12.22 A summary of the key findings and UES has been included with an assessment of potential impacts of the development on ground conditions.

12.23 Whilst the baseline is based on 2015 data and previous historic site investigations from other areas of the Site, the inclusion of a future site investigation and if necessary, subsequent remediation is welcomed.

Assessment

12.24 The assessment is based on the 2015 UES with risks considered to be low for all phases of the works which we agree with.

Secondary, Cumulative and Combined Impacts

12.25 Cumulative effects are discussed in Chapter 14 assessing neighbouring or nearby development schemes within 1 km of the Site. The conclusion drawn is that, provided these other sites have suitable environmental controls in place similar to those put forward for this proposed development, the cumulative effects will remain negligible.

Mitigation and Management

12.26 The inclusion of a Piling Risk Assessment which has been completed for Planning Condition 39 is welcomed. Contamination has previously been identified within made ground on site, albeit typically as localised pockets, therefore piling includes an inherent risk of creating potential pathways for contaminants (if present) to pass into other geological layers and/ or groundwater beneath the proposed development.

12.27 The chapter concludes that the proposed development is not anticipated to give rise to new or materially different significant effects on ground conditions. Whilst no significant effects will arise from the development, it could be argued that there would be a minor beneficial effect should contamination be encountered and remediated beneath the Site area.

Non-Technical Summary

12.28 The non-technical summary provides an acceptable summary of the programme and mitigation measures of the demolition and construction phase.

Cultural Heritage

Scope of EIA

12.29 This topic was scoped out of the ES. It was agreed at scoping that the alterations to the consented development which form the subject of the present application do not result in any sources of additional effects beyond those identified for the consented development (i.e. the current application has no novel ground impacts or changes in scale and massing of buildings). This was agreed at scoping.

Baseline

12.30 This section of Chapter 13 provides a summary of the baseline and findings of the 2015 Update ES to be read in the context of the current development. This largely represents a proportionate approach to conveying the baseline context for this topic. Paras. 13.5.1 - 4 give some detail on a series of designated and non-designated assets which constitute potential receptors. The ability of readers of the current application documents to cross-reference this back to information in the 2015 UES could be improved as no reference is made to any plans or maps or figures upon which these assets can be seen in relation to the proposed development. The Applicant is to clarify, e.g. with reference to relevant figure numbers, where in the 2015 UES such information can be found so readers of the ES can transparently interrogate this information (**CH1**). The Applicant is also to clarify the grade of the listed war memorial at the former St Mark's Church (last item in bullet list under para. 13.5.2) as grade information of this asset appears to be missing (**CH2**).

Assessment

12.31 Paras. 13.5.5 – 9 summarise the assessment of effects presented in the 2015 UES. As with the baseline summary, there is no reference back to the earlier documentation given to allow readers to interrogate the original conclusions. The Applicant is to clarify which sections of the 2015 UES present the full assessment of effects to receptors within this topic (**CH3**).

12.32 The finding that the alterations to the consented development which form the subject of the present application would give rise to no further effects than found in the 2015 UES is fair based upon the information presented.

Secondary, Cumulative and Combined Impacts

12.33 No reference is made to effects of this kind in the summary of effects identified by the 2015 UES so it is unclear whether the consented development gave rise to any such effects. The Applicant is to clarify which sections of the 2015 UES refer to cumulative effects (**CH4**).

Mitigation and Management

12.34 Paras.13.5.10 – 13 give details of conditions for mitigation related to this topic associated with the consented development. Some of the mitigation fieldwork referred to appears to have already been completed. The Applicant is to clarify where any reports arising from this process may be found (e.g. deposited with the Greater London Historic Environment Record and associated report references) so that readers of the ES can understand the mitigation carried out and its findings (**CH5**) and understand any implications on the Proposed Development.

Non-Technical Summary

12.35 The NTS content for this topic is an inadequate reflection of the more detailed content within Chapter 13.

Townscape and Visual Impact

Scope of EIA

12.36 Townscape and visual impacts of the proposed development were examined in the Scoping Report and determined as unlikely to give rise to any new or materially different significant townscape and visual effects from those identified in the 2015 UES. Review of the Scoping Report (November 2022) confirmed this and agreed that an updated standalone TVIA chapter was not needed as part of the new EIA. However, the review of the Scoping Report requested some more clarification which has been provided in the Townscape and Visual Impacts section of the ES. This includes:

- Provision of a brief summary of the townscape and visual effects previously identified in the 2015 UES and acknowledging the receptors affected.
- Provision of detail on the visual screening and townscape context of the west of the airfield (accompanied by photographs to illustrate this) and confirming that this area is not visible in any of the viewpoints identified by the TVIA contained in the 2015 UES or the subsequent 2016 assessment undertaken to assess the visual impacts of the Digital Air Traffic Control Tower (DATCT).
- Acknowledgement that there are no planning conditions attached to the CADP1 planning permission that specifically relate to townscape and visual impacts [relating to mitigation].
- Provision of further information on larger aircraft and explaining the existing context of the airfield to justify that neither the works, nor the larger aircraft that would use this part of the airfield in the future, are considered likely to cause any significant visual effects to visual receptors outside of the airport boundary.

12.37 The provision of the above information and justification is considered satisfactory in supporting the conclusion that the proposed development is not anticipated to give rise to any new or materially different significant townscape and visual effects from those previously reported in the 2015 UES.

Waste

Scope of EIA

12.38 Waste has been scoped out of the ES chapter as it is considered that the proposed development will not give rise to potentially significant effects in regard to waste management.

12.39 Section 13.6 provides reasonable assumptions regarding ongoing waste generation from proposed extensions and resultant passenger number increases and is considered to be sufficient.

Baseline

12.40 The baseline considers current waste production at the airport along with notable successes of waste management summarised. Percentage of materials recycled was highest in 2018, dipping during the pandemic with the percentage rising back up to just below 2018 rates in 2022. Table 13.6 discusses that waste volumes presented would likely increase in line with expanded passenger numbers relating to the proposed development however waste production per passenger may fall following initiatives implemented at the airport.

Assessment

12.41 The assessment focusses on findings from the 2015 UES which identified a negligible to minor adverse effect from waste produced during the demolition, earthworks, piling and operational phases of CADP1.

Secondary, Cumulative and Combined Impacts

12.42 Cumulative effects are discussed in Chapter 14 assessing neighbouring or nearby development schemes within 1 km of the Site. The conclusion drawn is that, provided these other sites have suitable environmental controls in place similar to those put forward for this proposed development, the cumulative effects will remain negligible.

Mitigation and Management

12.43 Mitigation is based on existing controls already in place at the airport. Construction waste is managed in accordance with a waste management strategy submitted to LBN under Planning Condition 70.

12.44 Initiatives and workshops to increase the volume of recycled material rates are outlined in paragraph 13.6.4. These initiatives align with the waste hierarchy to help create a reduction in overall waste production and are welcomed.

Non-Technical Summary

12.45 The non-technical summary provides an acceptable summary of the programme and mitigation measures of the demolition and construction phase.

Major Accidents and/or Disasters

Scope of EIA

12.46 The review of the Scoping Report for the Proposed Development concluded that the scoping out of this topic is considered to be appropriate.

12.47 All construction works will be managed in accordance with the CEMP. There are also existing measures in place to prevent/manage major accidents/disasters which will be maintained throughout the operational phase of the Proposed Development.

Table 12.1: Summary of Scoped Out Topics

Ref.	Summary of Clarifications Required from Applicant
ECO1	LCY has committed to a biodiversity fund to support local projects and achieve biodiversity net gain off site, clarification would therefore be welcomed as to how biodiversity net gain will be assessed and achieved off site.
ECO2	An eradication or management plan is recommended for the removal of buddleia. Clarification regarding details of this plan, controls and replacement habitat is therefore sought.
CH1	The Applicant is to clarify, e.g. with reference to relevant figure numbers, where in the 2015 UES more detailed information on receptors can be found so readers of the ES can transparently interrogate the summary presented in the present application.
CH2	The Applicant is also to clarify the grade of the listed war memorial at the former St Mark's Church as grade information of this asset appears to be missing.
CH3	The Applicant is to clarify which sections of the 2015 UES present the full assessment of effects to receptors within this topic.
CH4	The Applicant is to clarify which sections of the 2015 UES refer to cumulative effects.
CH5	The Applicant is to clarify where any reports arising from this process may be found (e.g. deposited with the Greater London Historic Environment Record and associated report references) so that readers of the ES can understand the mitigation carried out and its findings.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None
Ref.	**Potential Planning Conditions**
GC1	Ensure that Condition 39 either remains in force or is updated for the current proposed works.

Chapter 13
Review of Chapter 14: Cumulative Effects

Scope of EIA

13.1 The cumulative effects chapter provides an assessment for the potential of cumulative effects arising from the Proposed Development. It considers two types of cumulative effects:

- Intra- project cumulative effects: the combined or synergistic effects caused by the combination of a number of effects on a particular receptor, which may collectively cause a more significant effect than individually.
- Inter-project cumulative effects: the combined effect of the Proposed Development together with other existing and/or approved schemes.

13.2 A list of the cumulative schemes is set out in the Chapter. Further details, including the list of 180 schemes initially considered are detailed in Appendix 14.1. Justification is also provided for excluding schemes that were eventually not assessed. LBN should satisfy themselves that the schemes considered are appropriate and proportionate.

Non-Technical Summary

13.3 The NTS presents a summary of the cumulative effects which reflects the detailed findings in the main ES document.

13.4 The summary includes some information on the projected duration and likely significance of effects. However, the list of cumulative schemes assessed is not included. It would be helpful to include a summary of this information so that the reader does not have to access the more technical main report to understand the details of the likely cumulative effects of the Proposed Development.

Table 13.1: Summary of Cumulative Effects

Ref.	Summary of Clarifications Required from Applicant
N/A	None.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
N/A	None.

Chapter 14
Review of Chapter 15: Mitigation and Residual Effects

Scope of EIA

14.1 Chapter 15 and Table 15.1 provide a summary of the likely significant effects that have been identified within the ES, the mitigation required and residual effects. However contrary to the ES findings it identifies impacts on surface access (daily vehicle flows) as 'Not Significant'. Clarification (and potentially correction) is needed in this respect (**MRE1**).

14.2 The chapter should be updated if any of the assessment findings change as a result of comments made in this review report. The content of Chapter 15 is otherwise considered to be acceptable.

Non-Technical Summary

14.3 The NTS provides sufficient information in a non-technical language regarding residual effects and conclusions. However, as above, it does not identify impacts on Hartmann Road as 'Significant' in paragraph 6.4.9.

Table 14.1: Summary of Mitigation and residual Effects

Ref.	Summary of Clarifications Required from Applicant
MRE1	Clarity should be provided regarding the significance of impacts on Hartmann Road.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
N/A	None.

Chapter 15
Assessment of Submitted Regulation 25/ Clarification Information

15.1 Table 15.1 below summarises all clarifications, potential regulation 25 requests and potential planning conditions raised through the review of the ES, the Applicant's response and any additional / outstanding requests.

Table 15.1: Summary of the ES potential regulation 25 requests, clarifications and potential planning conditions

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
Construction Programme				
CP1	Planning Condition	Planning condition required to ensure the continued application of the CEMP (approved under Condition 88 of the CADP1).	An updated version of the CEMP will be prepared and submitted to LBN in due course in accordance with Condition 88, to ensure the continuation of previously agreed environmental controls during the remaining construction works	**Resolved subject to condition.** Submission of the updated CEMP noted. Detailed CEMP should be secured by a suitably worded planning condition
Socio-Economics				
SE1	Clarification	The Applicant should clarify what additional mitigation has been proposed. This is to differentiate between existing mitigation measures and 'further embedded mitigation' referred to at paragraph 7.4.1 of the ES chapter	The additional mitigation is set out at paragraphs 7.4.10 to 7.4.12 of the ES. This includes: ■ A significant enhancement to the airport's Community Fund that will see a total fund of £3.85 million administered over 10 years; ■ An Employment and Education contribution of up to £1.9m to LBN; ■ Continue and expand on existing employment and training initiatives.	**Resolved - No further clarification required.**
Air Quality				
AQ1	Clarification	Explanation why UFP 'squarely falls' into the description in Paragraph 6 of Schedule 4 of the EIA Regulations.	An ES Clarification Note, which addressed this point amongst others, was provided on 15 August 2022. In response to issue AQ4, first raised by LUC in that note, it is stated that it is not possible to construct a full emissions inventory for UFPs, it is not possible to predict UFP concentrations, and there are no policies, regulations, guidelines or standards relating to UFPs. As such, it is not possible to quantify the likely significant effects as defined in paragraph 6 of Schedule 4 of the EIA Regulations. A more detailed response is provided in response to Issue AQ2 and AQ3 (below).	**Not resolved.** Paragraph 6 of Schedule 4 of the EIA Regulations was used to justify not undertaking an assessment of the impact on ultra fine particles (UFP) due to the increase in ATM and the use of larger aircraft as a result of the proposals. The EIA Regulations do not preclude qualitative assessments where there is insufficient information available to quantify an impact. The

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
				air quality chapter should include an assessment of the impact of the application on UFP using a combination of qualitative and quantitative information together with professional judgement See Appendix C.
AQ2 & AQ3	Potential Regulation 25 Request	EIA should include an assessment of UFP. The technical limitations of the qualitative assessment should be clearly set out.	The CAEP/11 emissions standards now include both nvPM mass and number (nvPM#) regulatory limits for in-production and new engine types of rated thrust greater than 26.7kN. It is important to note that the fundamental purpose of emissions certification for nvPM is to compare engine technologies and to ensure that the engines produced comply with the prescribed regulatory limits. So far, aircraft engine designs have not been designed for low nvPM emissions. With the implementation of the CAEP/11 LTO nvPM mass and number standards, future engine designs will need to consider the full interdependencies between all pollutant emissions and fuel burn. "The new nvPM SARPs [Standards and Recommended Practices] will result in the implementation of [technologies such as lean-burn staged and advanced rich-burn combustors] across the industry and this will lead to significant reductions in emissions from aircraft engines."[10] This is evident even from in-production engines where nvPM# emissions from older technologies (e.g. Rich burn, Quick quench, Lean burn or RQL) are approximately 100 times higher than from newer Lean burn technologies[11]. Chapter 9 of the ES addresses the issues related to UFP and provides justification as to why quantification cannot be carried out; this logic does not appear to be questioned by LUC. Chapter 9 also makes reference to Chapter 12: Public Health and Wellbeing, where the health impacts related to the S73 application are considered. There are no impacts other than human health associated with UFPs,	**Not resolved – Further clarification required.** The applicant's response does not constitute further information under the EIA Regulations. However, no assessment has been provided in the air quality chapter as requested. Ideally an assessment would be provided to give assurance that there will be no more than a small change in UFP emissions and concentrations and the resulting impact would therefore be expected to be not significant. Given the nature of the s73 application, the level of change is unlikely to have a significant effect, but the applicant has not provided the evidence to demonstrate this. Presentation of at least the following two indicators along with commentary should be provided:

[10] https://www.icao.int/environmental-protection/Documents/EnvironmentalReports/2019/ENVReport2019_pg100-105.pdf
[11] European Aviation Environmental Report 2022.

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			and consideration within Chapter 12 is therefore appropriate. Paragraph 11.62 of the LUC Review notes that "the section on UFPs comes to the same conclusion as for the traditional pollutants i.e. the effect would be minor adverse (and not significant). This conclusion is considered by the Applicant to be a conservative finding on the basis of the scientific uncertainty (and emerging evidence) about UFP. Given the nature of the S73 application the conclusion that there will be a minor adverse effect does not seem unreasonable, however, whether or not this is conservative is unclear and further clarification is required (PHW-AQ22)". A response to PHW-AQ22 in respect of the conservative nature of the assessment has been provided. Given the LUC Review concurs with the conclusions of Chapter 12 with regard to UFPs and public health, replication in Chapter 9 would provide no additional information to assist the decision-making process and would only add unnecessary text to the ES (already considered by LUC to be too repetitive).	1) PM concentrations indicator – this is used in the Public Health and Wellbeing chapter. 2) The changes in UFP emissions based on the available information. See Appendix C.
AQ4	Clarification	Clarification is required on how the roads included in the air quality assessment have been selected.	The IEMA Guidelines recommend two rules to be considered when assessing the impact of development traffic on a highway link: Rule 1: Include highway links where the AADT traffic flows will increase by more than 30%; and Rule 2: Include any other specifically sensitive areas where AADT traffic flows have increased by 10% or more. The guidance suggests traffic volume changes of less than 30% on all local and strategic roads, that are deemed non-sensitive, could be reasonably considered as not significant (referred to as the 'Rule 1' threshold). However, in this instance, a more conservative approach has been adopted in this assessment whereby consideration has been given to the potential environmental impact on all roads that experience a 10% or greater rise in traffic flows when comparing the DM Scenario with the DC Scenario in the Principal Assessment Year (2031). The predicted traffic generation from the proposed development has been assigned to the local highway network based on an understanding of trip origins and destinations for passengers and staff. Then, in the first instance, where the predicted change in	**Resolved** - **No further clarification required**. It should be noted that there is no reference to the more stringent criteria recommend by the IAQM/EPUK guidance.

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			traffic volume is less than 10% between the DM Scenario and DC Scenario, this is considered not to be significant and therefore those highway links screened out of any further analysis in the EIA. The ES explains (Appendix 9.3, paragraph 9.1.37) that: *"Road links for assessment against the air quality objectives are the same as those used in the CADP1 assessment for consistency. These were chosen to cover the road links with the greatest airport-related traffic increases, and therefore the greatest air quality impacts. In addition, a number of road links were modelled for assessment against the Limit Values. These were chosen to be representative of links which had exceedances of the Limit Value in 2019 (there are no forecast exceedances in 2030) according to Defra's modelling; these are not intended to form a full road network but to assess impacts at representative receptors 4 m from the road, for consistency with Defra's Limit Value assessment process*." This therefore goes beyond what was modelled and considered acceptable for the CADP1 assessment and covers all roads which are likely to have either a high amount of airport-related traffic or a high level of existing traffic which may be increased by the proposed development.	
AQ5	Clarification	Clarification on whether all relevant monitoring data has been considered in defining the baseline conditions	All relevant monitoring data has been considered in defining the baseline conditions. Some monitoring carried out by LB Newham was omitted from the ES for brevity, as it is consistent with other monitoring data and does not change the overall picture (especially as most of the monitoring locations close to LCY were only commissioned in 2019 and are therefore unable to inform the analysis of trends).	**Resolved – No further clarification required**
AQ6	Clarification	2022 monitoring data should be compiled and submitted to LBN.	Monitoring in the vicinity of the airport is undertaken as part of the approved Air Quality Monitoring Strategy. This includes both automatic and non-automatic data. At the time the ES was submitted, the data were not available for the 2022 calendar year, and the final audit and data ratification had not been completed. In accordance with the established timescale in previous years, the 2022 Annual Performance Report was submitted to LBN in April 2023.	**Resolved – No further clarification required**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
AQ7	Clarification	Further information on the verification of the modelled NOx concentrations is required.	A model evaluation has been carried out in terms of nitrogen dioxide concentrations. Since this is the endpoint of interest, not Nox, it is incorrect to claim that without Nox verification there cannot be confidence in the model results. The model evaluation shows that the model provides good agreement with monitoring data, with a tendency to overpredict nitrogen dioxide concentrations.	**Not resolved.** A full model evaluation should be performed. As the applicant has referred to the approach in LAQM.TG22, this should be in accordance with the methodology in LAQM.TG22. See Appendix C.
AQ8	Clarification	Information on the appropriateness of using the NOx to NO_2 calculator and its application in this assessment.	This has not been previously raised by LUC or Newham in the Scoping Opinion. There are several approaches to calculating NO2 concentrations from NOx concentrations at airports and which have been previously investigated; all of which have advantages and disadvantages. The chemistry module incorporated into ADMS could potentially be used, but it is not a generally accepted approach and does not easily fit to a "kernel" modelling approach where a large number of sources are included and is impractical. The Jenkin approach has been applied to several airport studies (including the recent Stansted ES), but it now superseded. The Abbott approach (used in the S73 application) has also been applied at many airport studies (e.g., Bristol, Manston, Heathrow 3R PEIR, and Gatwick) which were undertaken by a number of practitioners including Ricardo, Wood and Arup. Most importantly, it was the approach used in the Airports Commission study caried out by AQC under commission from Jacobs. The Airports Commission appointed Prof. Helen ApSimon (Imperial College) to lead an audit team (including David Carruthers at CERC) to scrutinise the airport assessment methodology. The Abbott approach was considered, among other options, and was approved for use by the audit team. Given that the model has been verified (including both roadside and airport monitoring sites), the appropriateness to this S73 assessment has been demonstrated.	**Not resolved.** No evidence has been provided. See Appendix C.
AQ9	Planning Condition	The airport's Air Quality Management Strategy should be revised to include	Para 8.18 of the LUC Review makes reference to UFP monitoring at both Heathrow and Gatwick Airports but provides only a limited	**Planning condition.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
		the monitoring of ultra-fine particles (particle number and size) and approved by LBN within 6 months of consent being granted.	summary. It is important to note that monitoring at both airports was carried out on a "campaign" basis for short periods of time, and it is understood that there are no permanent UFP monitoring sites at any UK airport. The monitoring at Heathrow Airport (at the LHR2 site) was undertaken in support of PhD research by Brian Stacey (Ricardo) and concluded that "*total UFP concentrations in the vicinity of the airport are within the range of those measured at traffic and urban background sites".* The monitoring at Gatwick Airport (at two sites) concluded that *"the airport sources contributed 17% to the PNC [particle number concentration] at both sites and the concentrations were greatest when the respective sites were downwind of the runway; however, the main source of PNC was associated with traffic emissions".* However, to reassure that UFPs will be monitored, it is proposed to amend CADP1 Condition 57 to include the following text: *Within 6 months of approval of the S73 application, a scheme to undertake monitoring of Ultra Fine Particles for a period of two months in the vicinity of London City Airport shall be submitted to and approved by the local planning authority. The agreed scheme of monitoring shall be completed on a two-yearly basis and reported thereafter to the local planning authority in the Air Quality Monitoring Strategy Annual Report*.	Following receipt of the written draft response form the applicant, this was discussed at the meeting on 19 May 2023. It was agreed the monitoring requirement should be more flexible. Based on this the matter is resolved.
AQ10	Clarification	A breakdown of the aircraft emission sources in the relevant tables should be provided.	It is not usual to provide the breakdown of emissions requested, for reasons explained in the ES (paragraph 9.7.8), namely that emissions are not the endpoint of interest, and a simple reading of emissions is potentially misleading. However, a breakdown of emissions is given in the Appendix (Table AQ10-1 to AQ10-3) for information. The engine testing emissions were erroneously omitted from Tables 9-12 to 9-16 of the ES; correcting these increases modelled aircraft emissions by less than 0.4%. The engine testing emissions were included correctly in the dispersion modelling and their contribution is included in the concentration results. Note that some aircraft types are in the 2019 fleet but not in some of the future forecast fleets, and vice versa, and therefore may have zero emissions in some cases.	**Resolved – No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
AQ11	Clarification	Evidence should be provided of the appropriateness of the use of annual mean proxies for the short-term objectives near airports.	This matter was not previously raised by LUC or Newham in the Scoping Opinion. The approach used in the ES is focused on predicting annual mean concentrations. It is recognised that "dispersion models cannot predict short-term concentrations as reliably as annual mean concentrations", and "moreover, model verification is likely to be challenging" (TG22, para 7.96). It is, thus, common practice for airport assessments to assess the potential exceedances of the short-term objectives using empirical relationships published by Defra, but it is acknowledged that these relationships are founded on roadside monitoring sites. Information on the hour-by-hour aircraft movements on a busy day have been provided by York Aviation for 2031, for both the DM and DC cases, and are summarised in the Appendix Table AQ11 (appended to this document). For each scenario, the peak hours are 0800-0900 and 1800-1900. Peak hour movements are forecast to increase from 34 (DM) to 41 (DC). It should be borne in mind that these movements represent both arrivals and departures, and that NOx emissions are substantially higher on departure (due to take-off) than arrivals. The incremental change to the number of peak-hour departures between the 2031 DM and DC scenarios is about 4 movements. There have been no recorded exceedances of the 1-hour mean objective for nitrogen dioxide at either of the automatic sites since monitoring commenced in 2006, and in the majority of the years the maximum recorded level has been below 200 µg/m3 (see Table 9-4 of the ES). A comparison can also be drawn with Heathrow Airport which in 2019 operated at 80.9 mppa with 475,000 movements (using much bigger aircraft than at LCY). This compares with the 9.0 mppa and 111,000 movements in 2031 for the DC scenario at LCY. At Heathrow Airport, a monitoring site (LHR2) is located 180 metres to the north of the northern main runway (in the prevailing downwind direction) and 18 metres from the Northern Perimeter Road. There have been no recorded exceedances of the 1-hour mean objective at this site since 1997, and in the majority of years the maximum recorded hourly concentration has been below 200 µg/m3. Based on empirical evidence it is	**Resolved – No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			extremely unlikely that the small increase in peak-hour movements associated with the proposed development would cause any exceedances of the 1-hour mean objective for nitrogen dioxide. A similar logic can be applied to the daily mean objective for PM10, where the airport contribution to local concentrations is much smaller.	
AQ12	Clarification	The speed and fleet composition data for road transport should be provided for all scenarios.	This is provided in Appendix A, Table AQ-12.	**Resolved – No further clarification required.**
AQ13	Clarification	Clarification is required on whether non-residential receptors such as schools, medical and care facilities have been included in the assessment.	Specific receptors were chosen to be representative of worst-case locations; that is, those likely to experience the highest concentrations or greatest increase in concentrations, where there is relevant exposure (including schools, hospitals and residential institutions). Not every location of relevant exposure was assigned a specific receptor, but all were covered by the grid of receptors and concentrations at any particular location can therefore be inferred from the contour plots.	**Resolved – No further clarification required.**
AQ14	Clarification	A list of receptors with the property number/name.	It is not clear why this level of detail is requested because this would be an onerous exercise which would have no bearing on the impact assessment conclusions; all receptors have been assigned a six-figure grid reference and the locations are unambiguous. There is no potential for confusion.	**Resolved – No further clarification required.**
AQ15	Potential Regulation 25 Request	The applicant should provide all the model files for review	See response to AQ25. We note that the Environment Agency is a regulatory body which keeps model files provided to it internal and confidential and does not share them with commercial competitors to the owners of the model files. We would consider providing model files to the London Borough of Newham under the same conditions (enforced by an NDA).	**Not resolved – Further clarification required.** No files provided as Applicant's consultants would not sign a NDA directly with LBN's consultants. Discussions between applicant and LBN's consultants identified a missing road link. Further errors may have been identified if a review of the model files has been undertaken,

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
				which would have provided greater confidence in the model results. The applicant makes reference in response to the Environment Agency (EA) as justification for not providing the modelling files, however, the EA do not keep files confidential and files are available to download and review from the EA's consultation website, unless specifically requested, example due to application being confidential i.e. due to National Security and Safety implications. There is not considered to be any commercially sensitive contents of the modelling files because all inputs to the files should be reported. See Appendix C. Further clarification is required.
AQ16	Clarification	Clarification is required on whether the assessment has included locations where there is likely to be relevant short-term exposure.	Specific receptors were chosen to be representative of worst-case locations, that is those likely to experience the highest concentrations or greatest increase in concentrations, where there is relevant exposure. Not every location of relevant exposure was assigned a specific receptor, but all were covered by the grid of receptors and concentrations at any particular location can therefore be inferred from the contour plots.	**Resolved – No further clarification required.**
AQ17	Clarification	Clarification as to whether the need for larger aircraft has been taken into account in the assessments.	In the DC scenario, the average passengers per movement increases from 67 to 81 (about 20%). This is reflected in the increasing numbers of the largest aircraft, namely the A220 (100–130 seats) and E195-E2 (120–132 seats). Details of the fleet assumptions used are given in Section 5 of the Need Case.	**Resolved – No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
AQ18	Clarification	Information on the generator emission factors, how the short-term and long-term impacts were considered, and what the impact of using more realistic emission factors would be.	The generator emissions were included for completeness, but they are an extremely small source. They will be tested for 30 minutes each month off-load, and annually under full load for one hour. The assessment assumes that all tests are at full load for conservatism. The total annual mean NOx emission rate from the three engines is modelled to be 0.2 mg/s, assuming an emission factor of 180 mg/Nm3 at 15% O2. Assuming an emission factor of 1,800 mg/Nm3, which is typical of unabated small generators, the emission rate is still only 2 mg/s. This is below the screening criterion of 5 mg/s suggested by IAQM/EPUK guidance as "unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion." Since the generators' vents are a good distance from any relevant exposure, this criterion applies. Regarding short-term impacts, assuming that the generators operate continuously every hour of the year (which is an extreme worst case), the maximum one-hour NOx concentration at any of the specific receptors in any of the five meteorological years is 0.12 µg/m3, and the maximum anywhere on the grid is 0.16 µg/m3. With the higher emission rate, these would be 1.2 µg/m3 and 1.6 µg/m3 respectively as Nox. Concentrations of nitrogen dioxide will be lower than this (maximum of 0.6 µg/m3 anywhere on the grid using the Environment Agency's recommended factor of 0.35). This is under 0.3% of the objective of 200 µg/m3 and will not affect the conclusions of the air quality assessment.	**Resolved – No further clarification required.**
AQ19	Potential Regulation 25 Request	The LCY Trip Generation Spreadsheet should be provided.	Please see the attached. Particular comments are as follows: ■ Hire cars are not specifically split out in the summary 2019 CAA passenger data ■ We have assumed that staff travel will increase in line with the increase in staff numbers ■ We have assumed that servicing activity will increase at 50% the rate of passenger growth. This is considered robust in view of the potential for further consolidation of deliveries.	**Resolved – No further clarification required.** However, we note the spreadsheet was not provided. Spreadsheet output only provided in the appendix to the Applicant's responses.

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			It should be noted that we have redistributed the 1.4% of passengers arriving by "other mode" to the main modes recorded in the CAA survey. The redistribution of an average of 200 passenger movements per day arriving by "other mode" each day is insignificant and has no material impact on the assessment of transport impacts and hence upon our conclusions.	
AQ20	Clarification	Clarification should be provided on whether HDV or HGV data has been used in the modelling.	The definition of Heavy Goods Vehicle used in the traffic modelling includes all vehicles heavier than cars, light vehicles or taxis. This definition is therefore equivalent to that of Heavy Duty Vehicle (HDV).	**Resolved – No further clarification required.**
AQ21	Potential Regulation 25 Request	Sensitivity tests of 1) the impact of recent road traffic emissions data (from DUKEMS) and 2) a slower vehicle fleet turnover as a result of the drop in new car sales in 2020, 2021 and 2022.	LUC correctly note that new car registrations in 2020, 2021 and 2022 were approximately 30% lower than in 2019. Assuming that sales return to pre-pandemic levels from 2023, this would result in the car fleet being on average one year older in 2031 than if there had been no dip in sales. The model has used 2030 emission factors to model 2031, so it has, in effect, modelled this scenario already. A further sensitivity test is, therefore, unnecessary. Clearly, it is impossible to say yet whether car sales will return to pre-pandemic levels from 2023, but long-term sales data (Figure AQ21-1 in Appendix) show that periods of low sales (e.g. 2008–2012, after the financial crisis) tend to be followed by periods of very high sales (2014–2017). LUC refer to a recent paper by Davidson et al (2021), which suggests that emissions of NOx from road vehicles in the UK are systematically underestimated in emission inventories, due to the UK mix of car manufacturers being different from that of the European average. While interesting, a single paper seems a weak basis for requiring an assessment that goes against widely-accepted guidance and usage. Davidson et al do not make any such recommendation. It should also be noted that it is increasingly clear that the Emission factors Toolkit (EFT) version 11 substantially underestimates the uptake of electric vehicles, assuming they make up just a few percent of the vehicle-kilometres in 2030. In fact. battery electric cars (BEV) made up 17% of new car registrations in 2022, and that figure is	**Resolved – No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			rapidly increasing (see Figure AQ21-2 in Appendix). The Department for Transport's Transport Analysis Guidebook (TAG) databook was last updated in January 2023, and thus contains more recent projections for BEV uptake. A comparison of the assumptions for vehicle-kilometres by BEV cars used in the EFT with those recently published by DfT is given in Figure AQ21-3 in the Appendix. From 2017 onwards, the trajectory of BEV uptake in the TAG dataset is considerably higher than the projections used within the EFT, with BEVs accounting for 36% of car vehicle-kilometres in 2030, compared with 7.5% for England Outside London in the EFT.	
AQ (Paragraph 8.35)	Clarification	In 2031 the S73 proposals increase the ATMs by 18%, with an associated increase in aircraft NOx emissions of 27%. The S73 application is therefore facilitating a significant increase in ATM and NOx emissions which would not be realised without the S73 proposals. Paragraph 9.7.3 is misleading.	Airport source NOx emissions in 2031 are 27% higher in the DC scenario than in the corresponding DM scenario. The corresponding changes in total movements are 18%, in passenger movements (i.e. scheduled aircraft movements) 31% and passengers 39%. LUC are incorrect in stating that ATMs increase by 18%, since Jet Centre movements are not categorised as ATMs. The statement that the increase in airport source NOx emissions "is in broad proportion to the increasing numbers of passengers and scheduled aircraft movements" is an accurate summary and not misleading.	**Resolved – No further clarification required.**
AQ22	Clarification	The airport emission data in Table 9-18 should be broken down into different types and size of aircraft, APUs, engine testing, and the other main airport related sources.	This is provided in the Appendix (Tables AQ22-1 to AQ22-3). Note that some aircraft types are in the 2019 fleet but not in some of the future forecast fleets, and vice versa, and therefore may have zero emissions in some cases.	**Resolved – No further clarification required.**
AQ23	Clarification	Clarification is needed as to what the greater aircraft activity mentioned in 9.7.44 refers to.	This sentence simply refers to the increase in aircraft movements, passenger numbers and overall aircraft sizes.	**Resolved – No further clarification required.**
AQ24	Clarification	Clarification is required regarding the evidence for the comment that 'significant changes in climate are not expected by 2031' (in the context of the assessment).	There is uncertainty about the significance of climate change for air quality assessments. The expectation is that climate change will results in more extreme weather in the UK, with stormier winters and hotter summers. Whether the net effect will be a tendency to increase or decrease concentrations of air pollutants, all other things being equal, cannot be forecast with any confidence. However, all other	**Resolved – No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			things are not equal: any climate-related changes over the next decade or so are likely to be small compared to the rapid improvements in general air quality over the same time period.	
AQ25	Clarification	Clarification is required as to why no mitigation measures have been provided on operational changes to reduce emissions.	As the Air Quality Assessment concludes that there are no likely significant effects, mitigation is not required. As acknowledged in Para 8.52 of the LUC Review, there are measures within the Air Quality Management Strategy (AQMS), that have been agreed with LBN, and additional measures are set out in the Air Quality Positive Statement. Appendix 2 of the AQMS includes a benchmarking study of measures in place at other UK airports (Gatwick, Manchester, Birmingham and Heathrow). From this benchmarking study, the only measure not included at LCY is the use of Preconditioned Air (PCA) systems; this is not feasible to introduce as passenger airbridges are not utilised at LCY. Whilst "NOx charging schemes" have been introduced at other airports, the whole rationale for the CADP scheme is to introduce "new generation aircraft", which, by definition, will conform to stricter CAEP emissions standards, and a charging scheme would serve no purpose. In addition, an evaluation of a charging scheme has previously been carried out at the request of LBN; this concluded that due to the limited aircraft that can operate from LCY (due to the steep approach angle and short runway) it would not be feasible to introduce such a scheme. Some of the measures that have been, or are being progressed within the AQMS are summarised below: **Fixed Electrical Ground Power (FEGP)** - FEGP has been installed on all refurbished and new standards. **Mobile Ground Power Units (MGPUs)** - All diesel MGPUs were phased out in 2021 and have been replaced with battery-MGPUs. **Engine Out Taxiing (EOT)** - Airlines are encouraged to switch off one engine during taxiing subject to safety considerations. It is used for approximately 20% of the time pending safety and operational requirements.	**Resolved – No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			Electric taxiing systems - Electric pushback tugs will be required as and when new CADP stands become operational. A feasibility study was issued to LBN on 20/12/2021. **ULEZ compliance for airside vehicles** - All airport-owned vehicles are ULEZ compliant. 84% of third-party vehicles are complaint. A feasibility study to achieve 100% compliance was submitted to LBN on 21/12/2021. **Hybrid and electric airside vehicles** - LCY is reviewing the fleet with the aim to introduce hybrid and electric vehicles in line with net zero ambitions. There are no other operational measures that can be introduced that are not already in place, or which have not been previously considered.	
AQ25 (duplicate number but separate point)	Potential Regulation 25 Request	If the model files are not provided, all details of the modelling need to be provided so that the methodology can be fully reviewed.	Further information provided, see Appendix B.	**See Appendix C for current situation.**
AQ26	Clarification	All residential receptors should include the property number/name to avoid confusion.	Para 8.53 of the LUC Review notes that Receptors R1 and R2 are described differently in the NTS to Appendix 9.2: Receptor Locations. All receptor locations have been assigned six-figure grid references are unambiguous. R1 is at the junction of Camel Road / Hartmann Rad (but is referred to as Hartmann Road in the NTS), while R2 is at the junction of Camel Road / Parker Street (but is referred to as Parker Street in the NTS). This does not introduce any confusion and it is not necessary to include property names or numbers. It is confirmed that all grid references are correct.	**Resolved – No further clarification required.**
AQ27	Clarification	Information on UFP should be provided in the NTS.	See response to AQ2 and AQ3. The NTS includes a summary of the impacts related to UFP as set out in Chapter 12: Public Health and Wellbeing, and duplication is not required.	**Not Resolved.** This should be in the air quality section of the NTS, as an air pollutant

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
				this is where readers of the ES would expect to find it. See Appendix C.
-	**Following discussion a series of additional clarifications where sought.** **The applicant provided additional information, and numbered information requests from AQ28 to AQ47. Much of these information requests related to the modelling files and arose due to the applicant refusing access to the model files. The information provided by the applicant is set out in Appendix B.** **A review of the information provided verbally and in writing, including via email has been carried out. The remaining issues have been summarised (including the outstanding issues from AQ1 to AQ27 above) in a revised version of the draft *Chapter 8 Review of Chapter 9: Air Quality* review commentary (set out earlier in this document). This revised review commentary is presented in Appendix C and sets out the current position, this includes an additional planning condition. Additional requests (starting from AQ48) have been added as necessary.**			
Surface Access				
SA1	Clarification	Clarify assumed contradiction in paragraphs 10.1.2 and 10.6.54.	Both statements are correct. Paragraph 10.1.2 deals with the relative increase in passenger numbers and relates to the predicted change of use of the airport such that in the future there will be greater growth of passengers outside of weekday AM and PM transport network peak periods, which provides opportunity to make use of spare capacity in the surrounding transport networks. Paragraph 10.6.54 relates to the detailed modelling of the network peak periods that remain the busiest in terms of total demand on surface access transport infrastructure and is that considered for the purposes of the environmental assessment of impact on sustainable transport modes	**Resolved - No further clarification required.**
Climate Change				
CC1	Clarification	Please provide more details on the current climatic baseline.	Table 11-32 of the ES chapter provides details on the baseline climate at the airport. As requested, weather data for the period of 2018 to 2022 from the weather station located at London City Airport is summarised below: ■ Average annual temperature: 12.7 ºC	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			■ Average summer temperature: 16.2 ºC ■ Average winter temperature: 9.15 ºC ■ Max summer temperature: 39 ºC ■ Min winter temperature: -5 ºC ■ Total annual rainfall: 661.4 mm ■ Average monthly rainfall: 55.12 mm ■ Max average monthly rainfall: 102.2 mm (October) ■ Min average monthly rainfall: 25.3 mm (April).	
CC2	Clarification	Please confirm that only three years of the 3rd carbon budget have been used to assess significance.	By way of clarification, the assessment of significance is based on the methodology set out in paragraphs 11.3.43 to 11.3.58 of the ES. The methodology does not prescribe a threshold of emissions to establish significance; instead, the contribution of emissions to budgets and sectoral totals is calculated to provide context. Comparisons are made to the 4th, 5th and 6th carbon budgets since these coincide with the assessment years for the development - 2024 to 2050 (which have been adopted for this particular assessment, rather than the EIA as a whole). The 4th carbon budget starts in 2023, a year prior to the assessment period. The 4th carbon budget has therefore been reduced from 1,950 MT CO2e to 1,560MT CO2e (see ES Table 11-27, and footnote 65) to reflect the 4-year period of the assessment (I.e., 2024 to 2027) that it coincides with.	**Resolved - No further clarification required.**
CC3	Clarification	Provide a description and outline the assumptions that inform the "Planning assumption" that is used to assess significance within the body of text.	The "planning assumption" represents the maximum emissions from UK aviation (37.5MT CO2 by 2050) that were considered by the Committee on Climate Change (CCC) to be consistent with the UK's climate change targets and was initially proposed in the CCC's report to government in 2009 (see https://www.theccc.org.uk/publication/meeting-the-uk-aviation-target-options-for-reducing-emissions-to-2050/). The CCC also advised that international aviation emissions should be included in carbon budgets starting with the 4th carbon budget based	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			on the planning assumption. As described in ES Table 11.1, the UK Government did not explicitly include international aviation into the 4th and 5th carbon budget. However, emissions from international aviation were taken into account through reference to the CCC's Planning Assumption. In providing context, the assessment of significance of aircraft emissions compared emissions from aircraft over the 4th and 5th carbon budgets to the Planning Assumption (see ES Table 11-23 and footnote 64.).	
CC4	Clarification	Confirm if the "Jet Zero" high ambition scenario has been applied to both DM and DC scenarios.	The Jet Zero High Ambition scenario assumptions have been applied equally to the DM and DC scenario.	**Resolved - No further clarification required.**
CC5	Clarification	Please clarify why the more appropriate Local GLA carbon budgets have not been used to assess significance.	In terms of aircraft emissions, comparison to the GLA carbon budgets was not made since, as explained in the ES chapter, it is government policy that aircraft emissions are to be managed at a national level. The size of the airport is not relevant.	**Resolved - No further clarification required.**
CC6	Clarification	The Applicant should provide details of how the Proposed Development itself intends to mitigate the GHG emissions of the DM and DC scenarios.	Section 11.5 of the ES details embedded mitigation measures to reduce GHG emissions from the proposed development (DC scenario) and correspond with measures identified in the Transport Assessment (ES Volume 4), together with the Energy Strategy, Sustainability Roadmap and the Outline Carbon and Climate Change Action Plan (CCCAP). The measures and targets detailed in the Sustainability Roadmap would apply equally to DM and DC scenarios. This means that the assessment assumes that Scope 1 and 2 emissions in 2030 are 'Net Zero' (in line with the existing Sustainability Roadmap) for both the DM and DS scenario. As detailed in LCY's Sustainability Roadmap and CCCAP appended to the Climate Change chapter of the ES, LCY is also committed to influencing Scope 3 emissions. Specific measures identified in the CCCAP on influencing aircraft emissions include:	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			■ Work with airlines to facilitate the first zero emissions flight from the airport within the next decade; ■ Apply restrictions that permit only cleaner, quieter, new generation aircraft to fly in newly extended operating periods, thereby accelerating the take-up of newer more fuel-efficient aircraft; ■ Alongside airlines, aircraft manufacturers and fuel suppliers review opportunities for providing the necessary storage and refuelling facilities needed to increase the usage of Sustainable Aviation Fuels (SAFs) by airlines, with an ambition to exceed the Government policy of 10% SAF use by 2030; ■ Work with partners to adapt the airport's infrastructure and operating environment to facilitate the development and roll-out of new generation aircraft, the use of SAF, and emerging technologies for Zero Emission Aircraft (ZEA); ■ Continue to examine any near- and longer-term requirements resulting from increased use of ZEA aircraft at the airport to ensure ZEA can be accommodated in the wider airport masterplan. ■ Continue to support key electric flight initiatives across the aviation sector; ■ Implement operational procedures to encourage single engine taxing and reduced use of auxiliary power units (APUs); ■ Examine and implement policies to reduce taxing times and delays to aircraft on the ground; ■ Continue to engage with Sustainable Aviation to drive long term policy for the sustainable growth of UK aviation; and ■ Continue to track and monitor non-CO2 effects.	
CC7	Planning Condition	Operator Management Plan for zero emission decommissioning methods. [This could be put into the Climate	LCY are happy to include an Operator Management Plan for zero emission decommissioning methods as part of the Climate Change	**Planning condition.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
		Change and Carbon Action Plan (CCCAP), provided the CCCAP is secured by planning condition	and Carbon Action Plan (CCCAP), to be secured by planning condition.	
CC8	Clarification	Further clarification should be provided regarding the evidence to justify the 1% of total emissions being scoped out when compared to the expected 5% value as detailed.	The assessment has excluded emissions embedded in food, beverage and consumables from the assessment, as: ■ Any consumption of food and beverage whilst at the airport is unlikely to be additional to consumption that would occur if passengers did not fly. Whilst there might be marginal differences in patterns and types of consumption this is unlikely to be material. ■ The consumption of food and beverages is not in the control of LCY and the need to influence dietary choices is not one specific to travelling through an airport but a national policy issue. ■ There is significant uncertainty on the level of consumption as well as emissions factors for products consumed and bought at the airport. For the reasons provided above, the inclusion of embodied carbon of items bought and consumed at the airport (or indeed any airport) is not considered to be an emissions source that is worthy of detailed analysis. Notably, such emissions sources have not been considered in any recent airport expansion projects (for example Bristol, Stansted, Luton and Southampton). These applications have all been rigorously reviewed at both a local planning authority level, and during planning inquiries in front of the SoS. However, the airport has a limited role to play in influencing retailers and concessionaires and this is reflected in the proposed CCCAP	**Not Resolved - Potential Planning condition.** The Applicant has since provided further information and states "The consumption of food and beverages is not in the control of LCY and the need to influence dietary choices is not one specific to travelling through an airport but a national policy issue". However, the provision of food and beverages is at the control of LCY and thus LCY can influence the dietary choices made by consumers. Nevertheless, this does not take away from the fact that there will be an increase in consumption at LCY due to increased international passenger numbers and the associated increase in GHG emission. The Applicant refers to the role they can play in accounting for consumable emissions within the CCCAP, which includes a single statement to work with airport concessionaires to promote lower carbon alternative food and beverage options to passengers. This statement gives no firm commitments to achieve emission reductions. Given the stated uncertainty in calculating emissions, it is recommended that accountable emission

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
				reduction methods for consumables are set out in an airport concessionaires GHG management plan and secured via a planning condition. This should include a range of measures to enable LCY to demonstrate quantifiable emission reductions to offset 5% of total emissions.
CC9	Clarification	Clarification should be provided to confirm the scoping out of emissions associated with repair and maintenance during the operational phase.	The Scoping Opinion did not request inclusion of such emission sources and they were not proposed in LCY's own Scoping Report. Moreover, the calculation of emissions from aircraft repair and maintenance is challenging due to lack of data and the fact that such activities are relatively infrequent at LCY. As such, it is not considered necessary, reasonable or proportionate to include such an assessment. Over the lifetime of a development, maintenance emissions are typically a smaller portion than the product stage (embodied carbon of materials e.g., stage A1 to A3 of WLCA) of a development. Embodied carbon from construction has been calculated in the assessment and represents 2.7% of total airport emissions between 2023 to 2032, and <1% of whole life emissions out to 2050. It therefore follows that emissions from repair and maintenance will be less than1% of the whole life footprint and not material.	**Resolved - No further clarification required.**
Public Health and Wellbeing				
PHW-AQ1	Clarification	Clarification is required as to why using a population approach is the correct approach.	The relevant practitioner guidance for an assessment of human health as part of an environmental impact assessment (EIA) is that published by the Institute of Environmental Management & Assessment (IEMA). Pyper, R., et al. (2022) IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment. The guidance states: *"The guidance confirms that a population health approach should be taken when determining significance."* Further detail on the	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			reason for a population health approach is set out in section 5 of the IEMA guidance.	
PHW-AQ2	Clarification	Clarification is required on the source of the information used to assess the impact of the proposals on UFP.	The ES Chapter 12 qualitative assessment of UFP is based on the scientific literature and professional judgement. Published international field-research to date neither shows evidence of UFPs having a large effect size on population health outcomes nor has a clear causal relationship been established for correlated outcomes. As noted in the Chapter 12 discussion of UFP magnitude, the relative change in other air pollutant types due to the project (as previously explained in Chapter 9) is informative to the professional judgement of the relative scale of changes in UFP. Chapter 12 is pragmatic and proportionate whilst acknowledging uncertainties and limitations. This is considered a reasonable approach for EIA purposes, aligning with the EIA Regulations 18(4)(b) requirement for the assessment to account of current knowledge and methods and the Schedule 4 paragraph 6 requirement to acknowledge uncertainties.	**Resolved - No further clarification required.**
PHW-AQ3	Clarification	Confirmation that the data is Appendix (9.4) is correct and that in Table 12.11 is not correct.	Appendix 9.4 is correct. The differences are very small. This 'errata' is not material and does not affect the conclusions of the ES health assessment. A revised table 12.11 is located in Appendix PHW-AQ3.	**Resolved - No further clarification required.**
PHW-AQ5	Clarification	Clarification is required how the impact on the passenger population has been assessed. [NB: the numbering has been replicated from the report for consistency]	The health assessment states, at paragraph 12.15.8: "The population groups relevant to this [air quality] assessment are… communities in the Chapter 9 zone of influence (1 km radius around the runway and the Transport Assessment road transport network extent) … In addition to residents near the Airport, this assessment qualitatively takes into account passengers, visitors and workers at the Airport in terms of any effect of short-term exposure to air pollutants indoors or outdoors." Paragraph 12.15.24 continues "…the health assessment considers the potential for exposures at all locations where people may be exposed. This consideration includes at the airport, where short-term exposures may arise due to the transitory presence of passengers and visitors. Exposures are likely to be greatest closest to sources, i.e. plant, road traffic and aircraft. Such effects include exposures	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			outside as people arrive and depart, e.g. carparks and drop-off/pick-up points. They also include airside locations not generally accessible to the public, e.g. where staff are temporarily working on the aprons. …". The assessment is qualitative and follows the same methodology as for other aspects of the health assessment, i.e. Pyper, R., et al. (2022) IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment.	
PHW-AQ5	Clarification	Clarification required as to whether the chapter is referring to the limit values or objectives, or both throughout the Chapter.	The NPPF (para 186) states "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants..." The Objectives and Limit Values are numerically the same, but they apply at different places. For the health assessment the focus is on Objectives as they more accurately reflect public exposure. The reference to such statutory standards by the health assessment is as a relevant benchmark of concentration levels that are considered acceptable for the jurisdiction (see PHW – AQ6 clarification). It is not a technical analysis of whether statutory compliance has been achieved (e.g., as Limit Value compliance is judged by Defra). If there are minor inaccuracies in technical terminology usage of the terms 'limit value' or 'objective', which describe an equivalent benchmarking scale, such errata do not affect the health assessment conclusions.	**Resolved - No further clarification required.**
PHW-AQ6	Clarification	Clarification required on what the term 'regulatory thresholds' is referring to.	IEMA EIA health guidance (Pyper, R., et al. 2022) refers to 'regulatory thresholds or statutory standards' as an evidence source. The guidance states (para 8.19) "*The phrasing is intended to cover the formal standards adopted by national jurisdictions. This may include statutory air quality standards."* The methodology for determining health significance (IEMA Guidance Table 7.4 and Chapter 12 Table 12.5) references 'regulatory thresholds'. The tables distinguish between the potential crossing or approaching of regulatory thresholds due to the project as being a factor indicating a significant effect. By contrast, where the change is well within the regulatory threshold, or where a 'guideline' is crossed	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			(such as the WHO guidelines) this is indicative of a minor adverse (not significant effect).	
PHW-AQ7	Clarification	Clarification is required on why Paragraph 12.15.5 and Table 12.11 have ignored the 2029 assessment.	2029 was included in the ES air quality chapter as a sensitivity test for the worst-case construction year. The results are very similar to in data for 2027 presented in Table 12.11 and do not affect the health assessment conclusions. For completeness, though not required by the health assessment, the summary data for 2029 is appended to this report.	**Resolved - No further clarification required.**
PHW-AQ8	Clarification	Clarification is required regarding why aviation emissions are less important than road traffic emissions.	The health assessment is simply indicating that the dominant source of air pollution exposure to the population in proximity to airports is related to surface access (i.e. road transport) not due to aviation emissions. There is no inference that aviation emissions are less important.	**Resolved - No further clarification required.**
PHW-AQ9	Clarification	Clarification is required on what constitutes a community building.	The health assessment use of the term 'community buildings' is not a technical term, but covers non-residential receptors identified in the air quality assessment model. In the ES air quality assessment, specific receptors were chosen to be representative of worst-case locations. I.e. those likely to experience the highest concentrations or greatest increase in concentrations where there is relevant exposure (including schools, hospitals and residential institutions). Not every location of relevant exposure was assigned a specific receptor, but all were covered by the grid of receptors. Concentrations at any particular location can therefore be inferred from the contour plots.	**Resolved - No further clarification required.**
PHW-AQ10	Clarification	Clarification is required on the literature that supports the statement regarding thresholds being set for health protection purposes.	The text of health assessment in question is making a general point about the importance of considering non-threshold air quality effects below the thresholds set in regulatory thresholds. The cited references relate to non-threshold effects of PM2.5 and NO2. It is not considered necessary to provide references to substantiate that statutory air quality standards in the UK are informed by evidence from the scientific literature and have a health protection purpose.	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
PHW-AQ11	Clarification	Clarification is required on the weight given to the non-threshold effects of NO2 and PM2.5 on population health in the assessment.	Being a qualitative assessment in line with IEMA guidance methodology, there are not quantitative weightings applied to each criterion or evidence source informing the professional judgments. In relation to the non-threshold effects of PM2.5 and NO2 the 'weight' given to this is the difference between a finding of an effect of negligible significance and a finding of a minor adverse effect. On the four-score category scale of the IEMA health in EIA significance methodology, this is an influential weighting for the issue. As stated in Chapter 12 paragraph 12.15.26 "*The minor adverse (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO2, and PM2.5*."	**Resolved - No further clarification required.**
PHW-AQ12	Clarification	Clarification is required that the conclusions would have remained the same of the WHO guidelines had been used instead of the limit values and/or national objectives. This is to give members of the public confidence that the thresholds used will protect human health.	The health assessment is in line with EIA practitioner guidance (Pyper, R., et al. 2022) and a planning policy (NPPF) approach of having regard to compliance with national statutory standards. The health assessment conclusion also reflects there is a very small scale of change in air pollutants due to the project. Regard has also been given to the baseline context, the WHO guidelines and to non-threshold effects. Non-threshold effects, by definition, operate down to zero, much lower than even the WHO guideline levels. Neither the UK statutory standards nor the WHO guidelines have been used as a single definitive basis for determining if the effect is significant or not for public health. As advocated by the IEMA guidance, an evidence-based professional judgement is reached that is informed by a range of evidence sources. This includes scientific literature, regulatory standards, baseline conditions and policy context. Had the changes been in the context of future baseline concentrations that exceeded relevant statutory thresholds, it would remain relevant to consider if the project was causing widespread exceedances or whether the exceedances were driven by background levels. This is clearly stated in the health significance methodology (IEMA Guidance Table 7.4 and Chapter 12 Table 12.5) e.g. "*Change, due to the project, could result in a regulatory threshold or statutory standard being crossed*". For these reasons the same conclusion on EIA significance would likely be reached even if the WHO guidelines were elevated in status above the national statutory standards (which is not considered correct in	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
			planning terms). As explained in the response to PHW – AQ11, the assessment clearly states at paragraph 12.15.26 "*The minor adverse (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO2, and PM2.5*." The assessment is therefore already going beyond the WHO guidelines.	
PHW-AQ13	Clarification	Further evidence is required to support the conclusion that the health effects of exposure to air pollution from the proposals is minor adverse (not significant).	A proportionate level of information has been provided, cross-referenced or referenced in ES Chapter 12. Given agreement on the conclusions, it is unclear from the clarification request what further evidence is sought. Ultimately, the determination of EIA significance is a professional judgment. The scientific literature referenced within Chapter 12 is illustrative of the most relevant health outcomes; it is not intended to be exhaustive of all sources or of all health outcomes. It is agreed that there are other systematic reviews that make similar points. Whilst these could be referenced, they would not change the conclusions reached. IEMA guidance (para 6.11) directs that "*Ensure conclusions provide a suitable concise narrative to evidence a reasoned conclusion of the public health implications for the relevant context…. Reporting should summarise key considerations and supporting evidence." Paragraph 6/17 continues* "*… take a proportional approach to the depth of evidence gathering, analysis and reporting in the EIA health chapter*".	**Resolved - No further clarification required.**
PHW-AQ14	Clarification	Clarification is required on whether children at schools located near to the airport have been explicitly considered in relation to health effects rather than air quality compliance.	ES paragraph 12.15.8 confirms that the study area includes a 1 km radius around the runway and the Transport Assessment road transport network extent. Furthermore, the paragraph confirms that consideration has been given to young age vulnerability (children, young people and pregnant women). Children, whether at school, at home, or in other contexts, have been considered. Paragraph 12.15.9 notes their particular susceptibility to air pollution and paragraph 12.15.11 notes that the baseline indicates higher than average numbers of young people in the 12 wards around the airport compared to national averages.	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
PHW-AQ15	Clarification	Clarification is required regarding the weight, if any, given in the assessment to the limit values, national objective, WHO guidelines and non-threshold effects.	See responses to PHW – AQ11 and PHW – AQ12. Both national air quality standards and WHO guidelines have been given weight. In line with national planning policy (NPPF) and IEMA Guidance, more weight is given to the national standards as a benchmark for determining what is considered acceptable for the particular jurisdiction, i.e. England context. The point is somewhat moot as the level of change due to the project is very small, so the project is not driving an exceedance of either national or WHO thresholds.	**Resolved - No further clarification required.**
PHW-AQ16	Clarification	Clarification required on how the non-threshold effects of NO2 and PM2.5 were taken into account in determining the significance.	See response to PHW – AQ11.	**Resolved - No further clarification required.**
PHW-AQ17	Clarification	Clarification is required to be provided on how the health effects on passengers has been assessed, including the increased number of passengers.	See response to PHW – AQ5.	**Resolved - No further clarification required.**
PHW-AQ18	Clarification	Clarification on how the health assessment of UFP was undertaken as it is not based on the results of a technical assessment.	See response to PHW – AQ2.	**Resolved - No further clarification required.**
PHW-AQ19 and PHW-AQ20	Clarification	Further information is required on how the UFP assessment reached the conclusion that there will be a small effect as the health effect evidence presented in the ES does not quantify the magnitude of the effect, only the type of effect.	See response to PHW – AQ2. ES paragraph 12.16.17 states the magnitude of change due to the project and provides a proportionate evidence-based narrative explaining the professional judgement for this conclusion.	**Not resolved.** No evidence has been provided that the impact on UFP is the same or similar as the impact on $PM_{2.5}$. See Reassessment Conclusion for AQ2 and AQ3 and Appendix C.
PHW-AQ21	Clarification	Clarification is required on whether the need for larger aircraft to serve the increasing number of passengers	The aircraft fleet mix in each future DM and DC scenario has been explicitly defined in the ES air quality chapter, which has been used in	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
		whilst meeting the current cap of air traffic movements has bene considered in the assessment.	the modelling assessment, and which has informed the ES health chapter assessment.	
PHW-AQ23	Clarification	Clarification is required on why the impact on UFP/health is considered conservative.	A conservative assessment approach is where the professional judgment gives the benefit-of-the-doubt, where elements of the evidence informing the assessment has uncertainty. In this case, as there is considerable uncertainty surrounding UFPs (see response to PHW – AQ2). It may be that the effect of the project's change in UFPs to public health is in fact negligible, and such a conclusion might reasonably be reached based on the available evidence. In this case, erring on the side of potentially overstating rather than understating the risks, the professional judgment conservatively concludes that the effect is minor adverse. Whether it is agreed or not that the assessment is 'conservative' there is agreement that the minor adverse score is reasonable. The point is therefore not material.	**Resolved - No further clarification required.**
PHW-AQ24 & PHW-AQ 25	Planning Condition	The Airport's Air Quality Management Strategy should be revised to: ■ Include the monitoring of ultra-fine particles (particle number and size) and approved by LBN within 6 months of consent being granted. ■ To provide an annual review of the aviation fleet, fuel sulphur content, fuel consumption, and SAF, hydrogen and electric update. The first annual review should be for the year 2025 and submitted to LBN by April 2026, and subsequent review to be submitted to the council in the April of each year.	PHW-AQ24: See response to AQ9. PHW-AQ25: See response to the potential planning condition in the AQ chapter commentary.	**Planning Condition** Subject to agreement on planning conditions. See Reassessment Conclusion response to AQ9. Applicant has not provided a response to the second bullet point. See Appendix C.

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
Other Issues				
WR1		(referred to at para 12.5) - The applicant should consult with Thames Water to confirm that sufficient capacity is available (for both potable water supply and wastewater) for the increased passenger traffic.	The airport is in regular contact with Thames Water regarding its water supply and drainage requirements. They have not expressed any concerns regarding the capacity of their utilities to provide for the future growth of the airport. Thames Water have been consulted by LBN on the application, but we are not aware of any response.	**Further clarification required.** If Thames Water have provided a positive response to the application then this is accepted. Otherwise the applicant should consult Thames Water to confirm that there is sufficient capacity available to serve the increased passenger traffic.
ECO1	Clarification	LCY has committed to a biodiversity fund to support local projects and achieve biodiversity net gain off site, clarification would therefore be welcomed as to how biodiversity net gain will be assessed and achieved off site.	In our opinion there is no statutory or policy basis for undertaking a biodiversity net gain (BNG) calculation, on or off-site, given that the S73 application does not seek to vary the original CADP1 planning permission with respect to the form and spatial extent of the approved buildings and infrastructure. Moreover, the statutory provision of 10% BNG in accordance with the Environment Act, does not come into effect until November 2023. In essence, there will be no associated loss of habitats or related impacts to ecology which would necessitate any on- or off-site replacement or other compensation. However, as set out in Chapter 13 of the ES (Para 13.4.16 to para 13.4.17) Condition 56 of the CADP1 planning permission requires LCY to develop and implement a Sustainability and Biodiversity Strategy. This Strategy is reviewed every 3 years, with the latest iteration produced in 2021 setting out new targets, actions and initiatives to enhance biodiversity off-site and to promoting access to, and the appreciation of, biodiversity in the wider community. Targets set out in the Strategy include providing £10,000 a year to LBN for educational biodiversity and environmental programmes for the local community from 2023 onwards. In addition, as part of LCY's Sustainability Roadmap which was published in 2022, a new biodiversity fund of £25,000 has also been committed to which will further support local projects to enhance nature and achieve biodiversity net gain off site. It is for the recipients of these funds to determine and, where appropriate, measure how they achieve biodiversity net gain.	**Resolved - No further clarification required.**

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
ECO2	Clarification	An eradication or management plan is recommended for the removal of buddleia. Clarification regarding details of this plan, controls and replacement habitat is therefore sought.	Agreed. LCY's maintenance team will develop a buddleia eradication plan in accordance with Natural England, Defra and Environment Agency Guidance – 'How to stop the spread and dispose of invasive non-native plants that can be harmful to the environment in England' (February 2022). This will likely entail cutting the plants down to ground level and inserting slow-release herbicide plugs to kill off the root system. This eradication programme will commence in summer 2023.	**Resolved - No further clarification required.** This approach is appropriate and acceptable.
CH1	Clarification	The Applicant is to clarify, e.g. with reference to relevant figure numbers, where in the UES more detailed information on receptors can be found so readers of the ES can transparently interrogate the summary presented in the present application.	Heritage receptors are described in the Heritage Asset Baseline Summary of Chapter 14: Cultural Heritage of the UES (paragraphs 14.90 to 14.97) and in the accompanying Desk Based Assessment (Appendix 14.1).	**Acceptable subject to minor further clarification** The UES was resupplied by LBN to LUC for review on the 31st May 2023. In this document (dated November 2014 in the footer), information on cultural heritage receptors appears to be set out in paras. 14.85 to 14.92 of Chapter 14, rather than the paragraphs directed to by the Applicant's response. The Applicant is to confirm which is the correct reference. Figure 7 of Appendix 14.1 illustrates the designated heritage assets recorded on the GLHER. The numbers annotated on the figure relate to the GLHER Gazetteer in Annex Five at the end of the document. Reference should made to this alongside Figure 7 to enable the reader to easily identify the receptors discussed. In all other respects the detailed information on receptors provided in Chapter 14 and Appendix 14.1 of the

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
				2015 UES are suitable to inform a planning decision on the current application.
CH2	Clarification	The Applicant is also to clarify the grade of the listed war memorial at the former St Mark's Church as grade information of this asset appears to be missing.	The Newham War Memorial in the grounds of St Mark's Church is Grade II listed (list entry number 1430662).	**Resolved - No further clarification required.** This approach is appropriate and acceptable.
CH3	Clarification	The Applicant is to clarify which sections of the 2015 UES present the full assessment of effects to receptors within this topic.	Given that the s73 application does not include any new physical infrastructure which might impact upon archaeology or built heritage assets and that LBN agreed that this topic could be scoped out, there is no need for readers to "interrogate the original conclusions" of the 2015 UES. Instead, it is considered that the summary provided in section 13.5 of the 2022 ES, is more than sufficient to provide context to this scoped-out topic. However, should the reader wish to review the previous assessment, this can be found in Chapter 14 of the 2015 UES.	**Resolved - No further clarification required.** Table 14.5 of Chapter 14 of the 2015 UES appropriately assesses effects to cultural heritage receptors at a level suitable to inform a planning decision.
CH4	Clarification	The Applicant is to clarify which sections of the 2015 UES refer to cumulative effects.	Chapter 17 of the 2015 UES describes the sites that are considered as possibly creating significant cumulative ('in combination') effects with the CADP1. This assessment was completed following a review of other developments and planning applications in proximity to the airport and, where available, environmental and heritage statements submitted with such applications. Other schemes considered included Royal Albert Basin / IVAX Quays / Great Eastern Quays masterplan, together with the ABP Royal Albert Docks, Silvertown Quays and Gallions Quarter schemes. No significant adverse cumulative effects with CADP1 were identified.	**Acceptable subject to minor further clarification.** Chapter 17 of the 2015 UES relates to climate change. The discussion on cumulative impact in para 17.107 of this chapter relates only to emissions and does not discuss any other topics. The Applicant is to clarify that this was an error and that they intended to refer back to UES Chapter 14. The discussion of cumulative effects in Chapter 14 of the UES (paras. 14.191-193) references cumulative/combined effects from the Royal Albert Basin,/IVAX

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
				Quays/Great Eastern Quays development at the eastern end of the Royal Albert Dock. Presuming there have been no other major development schemes in the area since 2015 the information provided is proportionate and adequate to inform a planning decision on the current application
CH5	Clarification	The Applicant is to clarify where any reports arising from this process may be found (e.g. deposited with the Greater London Historic Environment Record and associated report references) so that readers of the ES can understand the mitigation carried out and its findings.	This comment refers to Condition 62: Archaeology attached to the CADP1 planning permission which requires the implementation of a programme of archaeological evaluation in accordance with a Written Scheme of Investigation (WSI). A WSI was agreed with the LPA's Archaeological Adviser (GLAAS) and submitted to and approved by LBN (ref: 17/00508/AOD). This report can be readily located by searching on LBN's planning portal using this application reference number. The reports of the archaeological investigation works undertaken to-date, namely (a) Geo-archaeological boreholes with sub-surface topographic modelling and (b) 'Level 2' photographic record of KGV Dock, have been deposited with London Archaeological Archive and Research Centre (LAARC) according to current guidance http://www.museumoflondon.org.uk/collections-research/laarc/standards-deposition	**Resolved - No further clarification required.**
GC1	Planning Condition	Ensure that Condition 39 either remains in force or is updated for the current proposed works.	This is agreed. The previous 2019 report and accompanying Piling Risk Assessment (PRA) submitted in accordance with Condition 39 (Contamination) had a specific focus on preventing pollution during the piling & deck works in KGV Dock. Therefore, this document will need to be amended in due course to deal solely with the remaining landside construction works.	**Resolved - subject to condition.**
Mitigation and Residual Effects				

Code	Request Type	Clarification/Request	Applicant's Response	Reassessment Conclusion
MRE1	Clarification	Clarity should be provided regarding the significance of impacts on Hartmann Road	This is a slightly nuance point, but we would happily accept that the predicted "minor to moderate" impacts on Hartmann Road should have been stated in Table 15.1 rather than the use of the term "slight". However, this has no material implications on the conclusions of the ES.	**Resolved - No further clarification required.**

Appendix A

Evidence of Reviewer Competency

A.1 Details of the expertise of each of the team members involved in the review are set out in the table below.

Table A.1: Reviewer Competency

Reviewer	Topic/Responsibility	Professional Qualifications	Years of Experience
Helen Kent, Associate Director, LUC	Project Director	BA(Hons) Geography MSc Land Resource Management PGDip Town & Regional Planning MRTPI, MIEMA, Chartered Environmentalist	20+
Laura McGowan, Associate Planner, LUC	Project Manager	BA (Hons) Environmental Planning MRTPI	15+
Ife Asiyanbi, Consultant Environmental Planner, LUC	General ES review, Major Accidents & Disasters, Socio-economics, and Public Health and Wellbeing	B.Sc. (Hons) Geology and Mineral Sciences M.Sc. Environmental Assessment and Management GradIEMA	1 year
Ella Moseley, Associate Director, LUC	Ecology and Biodiversity	BSc (Hons) Physical Geography FCWIEM, C.WEM, CEnv FRGS, CGEOG FLS	10+
Gareth Owen (Yellow Sub Geo)	Ground Conditions and Contamination Waste	BSc. Applied Environmental Geology MSc. Applied Environmental Geology Chartered Geologist (CGeol.) Fellow of the Geological Society (FGS)	22+
James Mortimer (Yellow Sub Geo)	Ground Conditions Waste	B.Eng. (hons) Engineering Geology and Geotechnics Fellow of the Geological Society (FGS)	20+

Reviewer	Topic/Responsibility	Professional Qualifications	Years of Experience
Peter Baker, Senior Consultant, LUC	Climate Change	BA (Hons) MSc AIEMA	3+
Charlie Cooper	Water Resources and Flood Risk	BEng Civil Engineering MSc Water and Environmental Engineering	12
Bill Springett	Surface Access	MPlan (Transport)	8
Dr Claire Holman	Air Quality (including Climate Change and Public Health and Wellbeing)	FIAQM FIEnvSc CSci CEnv BSc	40+
Kieran Laxen	Air Quality (including Public Health and Wellbeing)	MIAQM MIEnvSc MEng	15+
Dr Austin Cogan	Climate Change	MIAQM MIEnvSc CEnv MPhys	15+

Appendix B

Applicant's Response to Air Quality/Public Health and Wellbeing Draft Review

B.1 The applicant's written responses are appended.

London City Airport: Response to questions about air quality assessment

June 2023

Experts in air quality management & assessment

Document Control

Client	London City Airport	**Principal Contact**	Stephen Allen

Job Number	J10/12793H/10

Report Prepared By:	Martin Peirce

Document Status and Review Schedule

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1 Introduction

1.1 LUC (acting on behalf of the London Borough of Newham) submitted a Review of the Environmental Statement for London City Airport (Draft Review Report) on 04/04/2023. In terms of clarifications required from the Applicant, these included AQ15 (the applicant should provide all the model files for review) and AQ25 (re AQ15 if the model files are not provided all details of the modelling need to be provided so that the methodology can be fully reviewed).

1.2 This note presents responses to the request for further information by Air Pollution Services, acting on behalf of the London Borough of Newham (LBN), in the email from Kieran Laxen on 30 May 2023. The questions are reproduced verbatim here, but the email notes that "*these are brief statements (potentially with typos due to the urgency as which I have tried to get this to you) which should make sense following our call rather than detailed questions without the context of the call today*."

1.3 This note is intended to discharge the request for detailed modelling methodology in relation to AQ25. It also addresses a number of other issues identified by APS subsequent to the LUC Draft Review Report (unrelated to modelling methodology) that were not previously identified. For ease of future reference, the further requests have been assigned numbers following on from the LUC Draft Review Report (i.e. starting at AQ28).

2 Further Responses

2.1 In general, the approach to the modelling for the Section 73 assessment has been that assumptions should remain consistent with the CADP1 modelling, unless there are specific and justifiable reasons to change them. The CADP1 application was initially approved by LBN and subsequently granted planning permission by the Secretaries of State for Communities and Local Government and Transport in July 2016 following an appeal and public inquiry which was held in March / April 2016; during this process, the modelling approach was scrutinised by a number of third parties acting on behalf of LBN and GLA. The present modelling is in support of a Section 73 application to the CADP1 permission, rather than a full, new model.

2.2 Moreover, assumptions are chosen so that the assessment is proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), in accordance with the Government's Planning Practice Guidance for air quality[1].

[1] https://www.gov.uk/government/collections/planning-practice-guidance

1) You stated that ADMS airports and road were both run as they were intended and not used to generate dispersion kernels. Please confirm that is the case. [AQ28]

2.3 The ADMS models were run “straight” and no dispersion kernel techniques were used.

2) You have stated on a number of occasions you are unwilling to share modelling setup files, although following our call I believe you may be able to share just the ADMS-roads files and not ADMS-Airports? Is that correct? [AQ29]

2.4 We have reviewed the request and believe we have provided all of the information required under AQ25. It is not a validation requirement of LBN to provide model files, and we believe this is also the case for all other local planning authorities in the UK. LBN approves a number of planning applications each year, and we are not aware that they have previously requested that model files be provided (even when LBN has appointed third parties to carry out the review on their behalf) and it is not standard practice across the UK for such third parties to request such files.

3) Please can you confirm the approaches based on ICAO Doc 9889 – AQ Manual for Table 3-1. Ideally the table with confirmation which approach was adopted for each line. [AQ30]

2.5 Table 3-1 is a summary so it is not always clear what is expected in each category, and categories do not always align exactly with what has been done to support the S73 application. However, we have provided the best matches in Table 1.

Table 1: Emissions inventory conducted at three levels of complexity

Characteristics	Approach	Description from ICAO Manual
Complexity	Advanced/ Sophisticated	Advanced knowledge, airport-specific and/or access to additional data sources are required. In-depth knowledge, cooperation amongst various entities and/or access to proprietary data.
Accuracy	Advanced	Good
Confidence	Advanced	Medium

4) Please can you confirm the approaches based on ICAO Doc 9889 – AQ Manual for Table 5-2. Ideally the table with confirmation which approach was adopted for each line. [AQ31]

2.6 Table 5-2 is a summary so it is not always clear what is expected in each category, and categories do not always align exactly with what has been done to support the S73 application. However, we have provided the best matches in Table 2.

Table 2: Input data needed depending upon the approach taken

Key parameters	Approach	Description from ICAO Manual	Comments
Spatial resolution	Sophisticated	Defined receptor positions with fine grid on a 10 x 10 m mesh size, but not more than 500 x 500 m mesh size.	
Temporal resolution	Sophisticated	Hourly or smaller resolution.	
Meteorological	Advanced/ Sophisticated	(Too long to reproduce here)	Standard ADMS met data approach, as CADP1
Surface roughness	Sophisticated	Consideration of topographical features, ground cover and local buildings.	As CADP1
Receptor information	Sophisticated	Specific locations with varying horizontal and vertical locations.	
Background concentration	Advanced/ Sophisticated	Single value for airport area / Temporal and spatial considerations included.	Spatial but not temporal considerations included.
Atmospheric chemistry	Advanced	Typical (analytical) transformation ratios from established studies.	

5) Please can you confirm the approaches based on ICAO Doc 9889 – AQ Manual for Table 3-A1-2. Ideally the table with confirmation which approach was adopted for each line. [AQ32]

2.7 Table 3-A1-2 is a summary so it is not always clear what is expected in each category, and categories do not always align exactly with what has been done to support the S73 application. However, we have provided the best matches in Table 3.

Table 3: Overview of the calculation approaches

Key parameters	Approach	Description from ICAO Manual	Comments
Fleet (aircraft/engine combinations)	Advanced	Identification of aircraft and representative engine types (e.g. all A320 with 50% V52527 and 50% CFM56-5B4/3)	More detailed information not available for future years
Movements	Advanced	Number of aircraft movements by aircraft-engine combinations as defined in "Fleet"	More detailed information not available for future years
Emissions calculation	Simple B	Option B Spreadsheet calculation	
Thrust levels	Advanced A	Average airport and/or aircraft-group-specific reduced thrust rate	As CADP1
TIM	Advanced A	Modified times in mode (airport-specific average or actual for one or several modes)	As CADP1
Fuel Flow	Simple B	ICAO certification data bank values	As CADP1
EI	Simple B	ICAO certification data bank values	As CADP1
Start-up emissions	Simple	Not considered	Not considered to be significant source of NOx or PM
Engine deterioration	All	Not considered	Not considered, as per ICAO Manual

6) What is the grid resolution you have used? Any special treatment to this such as the source orientated transects combined with a regular coarse grid? [AQ33]

2.8 50 m regular grid. No source-orientated receptors. Specific receptors as identified in ES.

7) What are the receptor heights for the grid (and discrete receptors if not provided)? [AQ34]

2.9 Grid: ground-level. Receptors: various heights, as documented in ES.

8) Roads modelling, please provide sufficient information for me and my team to review the road parameters: [AQ35]

a. please confirm road widths modelled.

2.10 See following table.

Table 4: Modelled road widths

Link ID	Road	Width (m)
1	Connaught Road (east of Hartmann Road) Two-way	7.8
2	Connaught Road (east of Hartmann Road) Two-way	7

Link ID	Road	Width (m)
3	Connaught Road (east of Hartmann Road) Two-way	7.5
4	Connaught Road (east of Hartmann Road) Two-way	7.2
5	Pier Road Two-way	10
6	Woolwich Manor Way (north of rdbt) Two-way	9.8
7	Woolwich Manor Way (north of rdbt) Two-way	7.6
8	Woolwich Manor Way (north of rdbt) Two-way	9
9	Woolwich Manor Way (north of rdbt) Two-way	16
10	Woolwich Manor Way (north of rdbt) Two-way	7.4
11	Woolwich Manor Way (north of rdbt) Northbound	6.6
12	Woolwich Manor Way (north of rdbt) Southbound	8.3
13	Gallions Roundabout	10
14	Gallions Roundabout	10.9
15	Royal Albert Way (east of Cyprus DLR) Westbound	7
16	Royal Albert Way (east of Cyprus DLR) Eastbound	7.3
17	Gallions Roundabout	11
18	Gallions Roundabout	11
19	Woolwich Manor Way (south of rdbt) Northbound	8.6
20	Woolwich Manor Way (south of rdbt) Southbound	9.6
21	Gallions Roundabout	10.7
22	Gallions Roundabout	11
23	Royal Docks Road Northbound	12
24	Royal Docks Road Southbound	7.8
25	Gallions Roundabout	11
26	Gallions Roundabout	11
27	Royal Docks Road Northbound	7.3
28	Royal Docks Road Southbound	7.5
29	Woolwich Manior Way (south of rdbt) Two-way	9
30	Royal Albert Way (east of Cyprus DLR) Westbound	7.3
31	Royal Albert Way (east of Cyprus DLR) Eastbound	7.4
32	Royal Albert Way (west of Stanfield Road) Westbound	7.3

Link ID	Road	Width (m)
33	Royal Albert Way (west of Stanfield Road) Eastbound	7.4
34	Royal Albert Way (west of Stanfield Road) Westbound	7.4
35	Royal Albert Way (west of Stanfield Road) Eastbound	7.4
36	Connaught Roundabout	8.8
37	Connaught Roundabout	9.2
38	Connaught Bridge (north) Southbound	10
39	Connaught Bridge (north) Northbound	7.4
40	Connaught Roundabout	9
41	Connaught Roundabout	8.9
42	Victoria Dock Road Eastbound	7.2
43	Victoria Dock Road Westbound	7.2
44	Connaught Roundabout	8.9
45	Connaught Roundabout	8.9
46	Victoria Dock Road Two-way	10.3
47	Connaught Bridge (north) Southbound	7.3
48	Connaught Bridge (north) Northbound	7.4
49	Connaught Bridge (north) Southbound	8
50	Connaught Bridge (north) Northbound	8
51	Connaught Road (west of rdbt) Eastbound	7.5
52	Connaught Road (west of rdbt) Westbound	7.5
53	Connaught Bridge (south) Southbound	8
54	Connaught Bridge (south) Northbound	8
55	Connaught Bridge (south) Southbound	7.5
56	Connaught Bridge (south) Northbound	7.3
57	Connaught Bridge (south) Southbound	7.4
58	Connaught Bridge (south) Northbound	10
59	North Woolwich Roundabout	8.2
60	North Woolwich Roundabout	8.2
61	North Woolwich Road (east of rbdt) Eastbound	8
62	North Woolwich Road (east of rbdt) Westbound	7.5

Link ID	Road	Width (m)
63	North Woolwich Roundabout	8.2
64	North Woolwich Roundabout	8.2
65	North Woolwich Road (west of rbdt) Westbound	7
66	North Woolwich Road (west of rbdt) Eastbound	7.2
67	North Woolwich Roundabout	8.2
68	North Woolwich Roundabout	8.2
69	North Woolwich Road (east of rbdt) Two-way	8.1
70	North Woolwich Road (west of rbdt) Westbound	6.5
71	North Woolwich Road (west of rbdt) Eastbound	6
72	North Woolwich Road (west of rbdt) Westbound	6.5
73	North Woolwich Road (west of rbdt) Eastbound	7.6
74	Connaught Road (west of rdbt) Two-way	10
75	Connaught Road (east of rdbt) Two-way	8.4
76	Hartmann Road West Two-way	9.3
77	Hartmann Road West Two-way	7.5
78	Hartmann Road East Two-way	6.6
79	Silvertown Way (Between Caxton Street and Hallsville Road) 23TW	16.8
80	Silvertown Way (Between Caxton Street and Hallsville Road) 23TW	17
81	Silvertown Way (Between Caxton Street and Hallsville Road) 23TW	12.6
82	Lower Lea Crossing (East of East India Dock Road) 17EB	7.3
83	Lower Lea Crossing (East of East India Dock Road) 17WB	7.4
84	Lower Lea Crossing (East of East India Dock Road) 17WB	7.5
85	Lower Lea Crossing (East of East India Dock Road) 17EB	7.4
86	Lower Lea Crossing (East of East India Dock Road) 17WB	12
87	Lower Lea Crossing (East of East India Dock Road) 17EB	7.6
88	Lower Lea Crossing (East of East India Dock Road) 17WB	11.2
89	Lower Lea Crossing (East of East India Dock Road) 17EB	8.3
90	Leamouth Road Roundabout	14.2
91	Leamouth Road Roundabout	14.3
92	Aspen Way (West of Slip to Lower Lee Crossing) 18WB	9

Link ID	Road	Width (m)
93	Leamouth Road Roundabout	14
94	Aspen Way (West of Slip to Lower Lee Crossing) 18EB	11
95	Leamouth Road Roundabout	14
96	Leamouth Road 20NB	9
97	Leamouth Road Roundabout	12.1
98	Leamouth Road 20SB	10.1
99	Leamouth Road Roundabout	14
100	Aspen Way (West of Slip to Lower Lee Crossing) 18WB	7.6
101	Aspen Way (West of Slip to Lower Lee Crossing) 18EB	10.2
102	Aspen Way (West of Slip to Lower Lee Crossing) 18WB	14.8
103	Aspen Way (West of Slip to Lower Lee Crossing) 18EB	14.8
104	Leamouth Road 20NB	8.2
105	Leamouth Road 20SB	9.9
106	Leamouth Road 20NB	14.6
107	Leamouth Road 20SB	12
108	A13 East of A102 19TW	20
109	Aspen Way (East of Upper Bank Street) 27WB	11
110	Aspen Way (East of Upper Bank Street) 27EB	11.1
111	Blackwall Tunnel Southern Approach A12 (South of Boord Street) 28NB	9.8
112	Blackwall Tunnel Southern Approach A12 (South of Boord Street) 28SB	9.9
113	Blackwall Tunnel Southern Approach A12 (North of Peartree Way) 29NB	17.3
114	Blackwall Tunnel Southern Approach A12 (North of Peartree Way) 29SB	16.5

b. can you confirm that you regard speed limits to be representative of annual average daily speeds along links which are away from junctions (I note junction speeds have been reduced).

2.11 Speeds have been based on speed limits, and reduced near junctions using professional judgement. They are considered to be representative in the absence of measured speeds.

c. street canyon parameters – I assume asymmetric advance street canyons were used. In the absence of the model files, please confirm the approach and the parameters for these (canyon widths, heights, porosities etc.) and provide figures which show the links with canyons.

2.12 Street canyons were considered as part of setting up the model. The majority of the study area is open, and it is not considered necessary to model canyons. There is one small part of the study area (Albert Road) where there are terraced houses for a small section of road, but the road is wide and clear on the opposite side. There are two receptors in this area. Receptor R69 is located on a 6 m high building, which is 5.5 m from the road centre; this is not considered to be a street canyon as the building height is less than double the road width. Receptor C5 represents a cumulative scheme which will only be relevant in future year scenarios; concentrations at this receptor are well below the objective in the future year scenarios and inclusion of street canyons will not affect this conclusion.

2.13 The model is consistent with the previous CADP1 modelling which also did not utilise street canyons.

d. In the absence of the model files, please confirm the distances between the kerb and the discrete receptors and provide figures which show the alignment of roads at a local scale.

2.14 Distances from each receptor to the nearest road centreline (not kerb) are given in the following table. We have not provided figures showing the alignment of roads at a local scale as this would entail an extremely large number of figures for the 100-plus receptors modelled, and which is unnecessary for the review.

Table 5: Distance from receptor to nearest road centreline

Receptor ID	Distance (m)
R1	16.45
R2	20.18
R3	75.67
R4	30.57
R5	28.47
R6	191.94
R7	63.43
R8	6.79
R9	13.31
R10	17.03
R11	33.29
R12	39.91

Receptor ID	Distance (m)
R13	13.30
R14	9.63
R15	49.37
R16	24.75
R17	23.06
R18	143.81
R19	342.40
R20	330.22
R21	63.90
R22	118.91
R23	23.90
R24	84.05
R25	148.99
R26	14.52
R27	40.26
R28	194.37
R29	48.98
R30	213.88
R31	254.43
R32	163.80
R33	163.60
R34	13.66
R35	162.47
R36	15.08
R37	15.34
R38	17.75
R39	16.66
R40	19.05
R41	34.68
R42	18.89

Receptor ID	Distance (m)
R43	53.92
R44	155.62
R45	140.53
R46	196.57
R47	190.80
R48	17.17
R49	38.17
R50	14.55
R51	6.00
R52	25.14
R53	21.57
R54	17.03
R55	16.16
R56	21.50
R57	28.43
R58	44.07
R59	25.95
R60	16.87
R61	7.87
R62	7.36
R63	19.66
R64	33.29
R65	7.78
R66	6.30
R67	9.82
R68	17.31
R69	5.16
R70	7.73
R71	6.35
C1	15.93

Receptor ID	Distance (m)
C2	53.53
C3	36.59
C4	5.73
C5	6.82
C6	7.63
LV1	11.56
LV2	11.49
LV3	9.73
LV4	8.13
LV5	8.60
LV6	8.67
LV7	7.72
LV8	9.76
LV9	12.57
LV10	11.98
LV11	9.63
LV12	9.90
LV13	9.60
LV14	10.12
LV15	12.19
LV16	12.58
LCA-CAH	12.00
LCA-ND	162.45
LCA 01	31.37
LCA 02	18.63
LCA 03	45.94
LCA 04	162.19
LCA 05	34.40
LCA 06	7.37
LCA 07	180.46

Receptor ID	Distance (m)
LCA 08	202.62
LCA 09	12.00
LCA 10	50.49
LCA 11	145.52
LCA 12	243.08
LCA 13	101.00
LCA 14	161.63
LCA 15	7.17
LCA 16	154.02
LCA 18	162.45
LCA 19	137.55
NHM-S 91	6.51
KGV	67.31

e. Were any links modelled as elevated sources or tunnels e.g. the one going over the docks?

2.15 All roads were modelled at ground level. There are no relevant receptors adjacent to the elevated section of the Sir Steve Redgrave Bridge and the closest receptors are set well back from the road. The tunnels are located over 200 m from modelled receptors and have, therefore, not been considered.

f. Figure 9.1: Modelled Road Network – I believe you modelled a new access road (committed). Can this be highlighted on the figure as I'm not sure which it is.

2.16 The eastern access link is shown highlighted in Figure 1. The eastern access to Hartmann Road (from Albert Road) is not scheduled to be opened to operational traffic until post-2030, for both the DM and DC scenarios. In the earlier years (2025, 2027 and 2029) the eastern access will be open to construction traffic only. Whilst the road link falls with the whole-borough AQMA, as previously explained it is not within or adjacent to an area where the air quality objectives are exceeded, and the construction traffic flows in the earlier years are below the EPUK/IAQM screening thresholds. As such, only the 2031 DM and DC scenarios need be considered in any detail.

2.17 The 2031 DM and DC models erroneously omitted the eastern part of Hartmann Road. Remodelling to include the extra road section increases the modelled annual mean NO_2 concentration by at most 0.1 µg/m^3 at the six receptors closest to this road. All impacts remain negligible, and the conclusions of the ES are unchanged and remain robust.

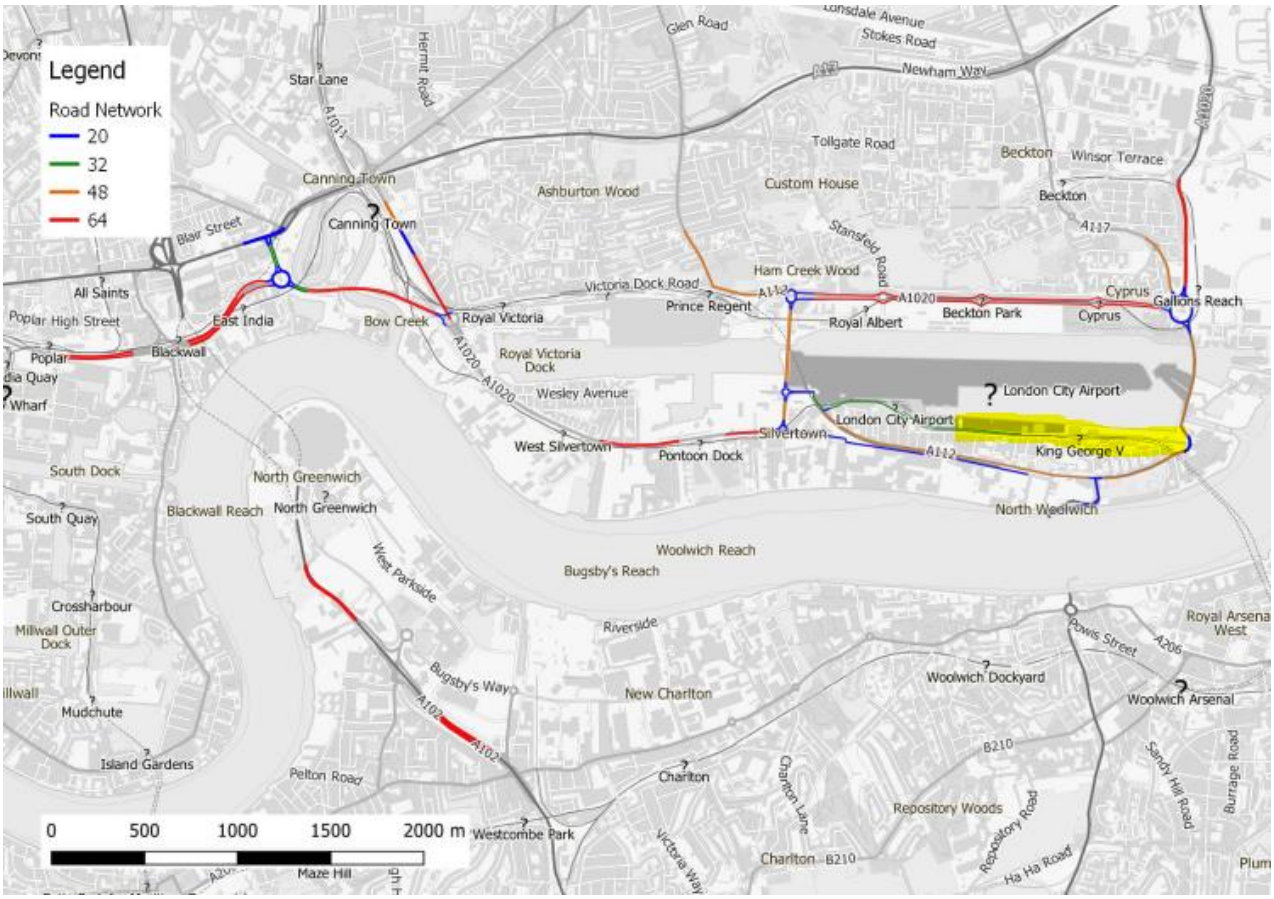

Figure 1: Hartmann Road

9) Did you model any shipping/waterways activity? Can you provide details if you have. [AQ36]

2.18 Not as explicit sources, but they are included in the Defra background maps. It is also noted that in LCY's response to the LUC note on 'London City Airport Scoping Review – Initial Informal Feedback: Air Quality and Transport' dated 12th July 2022, it was stated (in response to AQ5) that "*the contribution of non-airport related sources of air pollution (e.g. shipping) is already captured by the baseline monitoring undertaken by both LCY and LBN. In addition, emissions from shipping are recorded in the Defra background maps. As such, these non-airport sources will not be explicitly included as separate sources in the model*". It is understood that LUC agreed with this statement as it was not raised again.

10) Model performance based on comparison between modelled outputs and measurements. This is the process of considering and investigating uncertainties in a range of modelled elements (e.g. met data, source activity and emissions, source terms i.e. how models represent sources) and

minimising the uncertainty. Are you able to share some additional information on the following: [AQ37]

a. Please note, Steve M (SM) referenced the text in old LAQM.TG, the latest is TG22. In particular SM referenced the initial comparison should be for total NO2 and that's all that is needed (now Box 7-17). From my understanding the principle in the TG is first to minimise uncertainty before then considering if a final adjustment is needed. Was the model setup adjusted to improve the model before being finalised? If so can you confirm which adjustments were required and were the adjustments made follow a wholistic approach?

2.19 The model was set up to provide a realistic worst case as far as possible, with conservative assumptions being made where there is uncertainty due to a lack of data. As such, managing uncertainty is integral to the development of the model. No model adjustments were made to improve the fit before the model evaluation described in the ES was undertaken.

b. TG22 Box 7-17 states "These comparisons may be performed when using NO2 concentrations predicted by dispersion models directly (including background assumptions and chemical conversions). If a model is used to predict the road contribution of NOx only or the comparison of modelled and monitored NO2 indicates that model adjustment is required, then Box 7-18 should be used to verify and adjust". As you have not predicted NO2 directly, box 7.18 is the relevant one which states the "modelled NOx must be verified (which may include adjustment)". As you have not provided information in relation to modelled NOx please can you provide it? Including at the NOx auto sites. Please provide the info set out in Box 7-18. I do note that this has been set out for road sources so it might be necessary to include the non-road sources as the 'background NOx' as you have done for the NOX to NO2 calculator when reporting the info in Box 7-18.

2.20 Box 7.18 is focused on road verification and would need adapting to the case where there are other significant sources to be evaluated. Considering that there is a contribution from airport and miscellaneous sources, it was considered that the most appropriate approach was to verify the total NO_2 concentration. Since evaluating the total NO_2 concentrations produced a good model performance (Root Mean Square Error less than 10% of the Air Quality Objective) with a modest tendency to over-predict (Fractional Bias -0.04; average overprediction of NO_2 concentrations around 9%), further model evaluation and model adjustment was not considered necessary.

2.21 The following table gives the various NOx contributions at the verification sites.

Table 6: NOx contributions (µg/m³)

Receptor	Background NOx (µg/m³)	Modelled road NOx (µg/m³)	Modelled airport and misc sources NOx (µg/m³)
LCA-CAH	50.3	0.6	2.1
LCA-ND	37.3	0.8	2.7

Receptor	Background NOx (µg/m^3)	Modelled road NOx (µg/m^3)	Modelled airport and misc sources NOx (µg/m^3)
LCA 01	41.5	2.2	7.2
LCA 02	41.5	3.7	5.7
LCA 04	37.4	0.8	2.7
LCA 05	39.4	2.0	1.5
LCA-06	36.1	8.0	2.6
LCA 07	35.9	0.5	6.3
LCA 08	44.0	0.5	1.4
LCA 09	50.3	0.6	2.1
LCA 10	42.2	3.4	11.5
LCA 11	37.6	0.8	4.3
LCA 12	37.3	0.8	8.0
LCA 13	37.4	1.0	2.0
LCA 14	37.7	1.0	2.2
LCA 15	37.5	5.0	1.4
LCA 18	37.3	0.8	2.7
NHM-S 91	38.6	4.5	0.4

c. was analysis carried out to determine systematic vs random error? When modelling different source types it is useful to undertake a full model review. I.e. is any error applicable to all locations consistently or is it different. Uncertainty in modelling of different source types can vary. Does comparison with monitoring near to road sources and away from road sources behave in the same way?

2.22 Figure 2 shows a comparison of modelled versus monitored annual mean NO_2 concentrations, as per the ES. Monitoring locations are colour-coded according to whether they are near-road (modelled road NOx contribution > 1 µg/m^3), near-airport (modelled airport and miscellaneous sources contribution > 2 µg/m^3; a larger value is used here since most monitors have a contribution greater than 1 µg/m^3), both or neither. It can be seen that there is no apparent difference between the four groups in terms of consistent over- or under-prediction, with a slight tendency to over-predict in each case.

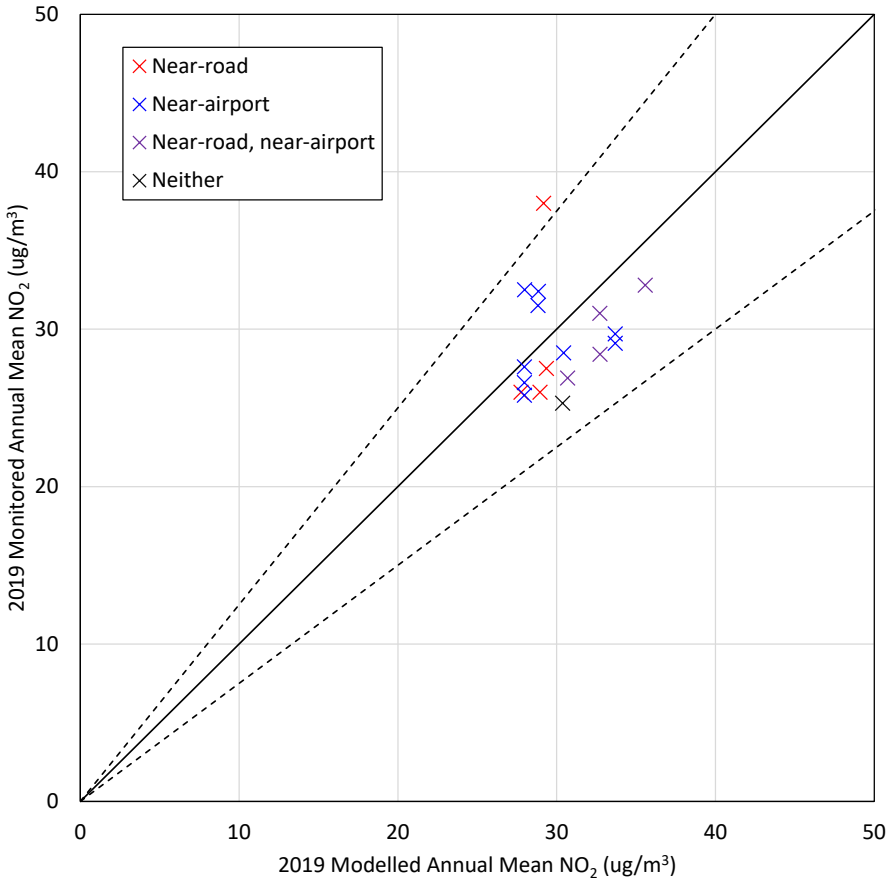

Figure 2: Monitored versus modelled annual mean nitrogen dioxide concentrations

11) Building downwash for point source modelling. Please confirm. [AQ38]

2.23 The only sources modelled as points were the Tate and Lyle stacks, which are 93.5 m high. Building downwash was not modelled, as per CADP1.

12) Met data: [AQ39]

a. Please provide data capture of each variable

2.24 See table below.

Table 7: Met data capture

Parameter	2017	2018	2019	2020	2021
U	99.7%	99.5%	99.6%	99.6%	99.7%
PHI	99.7%	99.3%	99.4%	99.5%	99.4%
T0C	99.8%	99.8%	100.0%	100.0%	100.0%
RHUM	99.8%	99.8%	100.0%	100.0%	100.0%
CL	99.8%	99.8%	100.0%	100.0%	100.0%
Calms (hours)	26	52	62	78	79
Calms (%)	0.30%	0.59%	0.71%	0.89%	0.90%

b. What is the source of the data? I don't believe there is a met office synoptic station at the airport so I assume it is operated as part of the METAR requirements and therefore is associated with the uncertainties linked to METAR datasets. Please confirm where you believe the data represents and if, to the best of your knowledge, any adjustments were made to the met data prior to reporting as part of the METAR following the requirements of CAA.

2.25 Meteorological data from the London City Airport METAR site were obtained from the UK Meteorological Office ('Met Office'). The data were prepared by the Met Office in accordance with their own procedures, and sold to AQC specifically for use in air quality dispersion modelling. The data also went through AQC's own validation and processing procedures, which include interpolating to fill short gaps in the data. For the present datasets, it was not necessary to obtain any data from other stations. The data are assumed to represent London City Airport and its vicinity which is the model domain for this assessment.

c. Any QA process on the data done by you or that you are aware of along with any data filling information.

2.26 See above.

d. How many calms were there (and how were these considered).

2.27 Number of calms are given in the table above. They are treated using ADMS default behaviour.

e. I understand no specific vertical profiles were used and the ADMS default was.

2.28 Correct.

13) The approach and justification for defining surface characteristics which influence dispersion (e.g. surface roughness, the min LM-O) and any sensitivity testing carried out. [AQ40]

2.29 Unchanged from CADP1.

14) Has the urban canopy option been used? [AQ41]

2.30 No. ADMS-Airport ignores the effect of urban canopy flow for air file sources.

15) Backgrounds – in-square components removed but were all sources modelled for each square? Not clear. I understand interpolation was used to get location specific 'backgrounds' after sector removal. Please confirm. Was a local calibration carried out for the Defra mapped data using local background sites. [AQ42]

2.31 In-square and out-square airport components and in-square primary A-road components were removed for grid squares covered by the explicitly modelled roads. Out-square primary A-road components were not removed, meaning there is a small amount of double-counting.

2.32 Backgrounds at specific receptors and on the contour grid points were obtained by bilinear interpolation.

2.33 No local calibration was carried out.

16) NOx chemistry – Defra NOx to NO2 calc used. Please confirm if 'background' NO2 was entered or if the only inputs were 'modelled road NOx', 'background Nox which includes the non-road traffic emissions' and defaults for the other settings. Was a primary NO2 entered? Which spreadsheet version did you use or did you utilise an automated script to calculate it? [AQ43]

2.34 Inputs to the NOx to NO2 spreadsheet were "Road increment NOx" (explicitly modelled roads only) and "background NOx" (explicitly modelled aircraft, miscellaneous sources and Defra background NOx).

17) Odours -percentiles or annual mean? I believe you modelled the 98th percentile, please confirm. [AQ43]

2.35 As stated in the ES (e.g. para 9.7.43), where quantified odour concentrations have been presented, these are 98th percentile hourly mean concentrations (as OU_E/m^3).

18) What are the emissions associated with 1% of ATM APUs having to run during -5degC or +20degC? It's not clear it is appropriate to screen out based on the frequency of occurrence (ATMs) rather than the potential emissions. [AQ44]

2.36 We have assumed an average APU running time of 13 minutes per LTO cycle, consistent with CADP1. London City Airport's Aircraft Noise and Maintenance Procedure (which now incorporates AOI 07) states that:

"4.2.2 APUs should be shut down as soon as practicable following the arrival of an aircraft and must not be restarted until 10 minutes prior to Estimated Off Blocks Time (EOBT) except when the outside air temperature (as promulgated via Air Traffic Control (ATC)) is below +5ºc or above +20ºc."

2.37 The 2019 Annual Performance Report records 1,031 requests to ATC for use of APU, and only 10 breaches of the above instruction, out of about 83,000 movements. An analysis of APU requests due to low (below +5º C) or high (above +20º C) temperatures has been carried out for the last 12 months (01/06-2022 to 31/05/2023) which identifies 12 requests with a total APU run time of 302 minutes (an average of 25 minutes, or 12 minutes above that assumed). It is therefore considered that assuming an average of 13 minutes per LTO cycle is likely to be highly conservative.

19) Were the buoyancy and engine characteristics defined for each of the aircraft or where they general for fleet categories? Please set out the MCATs used, the associated parameters (no of engines, geometry etc) and which aircraft are in which category. [AQ45]

2.38 For take-off, climb and approach, three MCats were defined, as detailed in Table 8. Aircraft were assigned to each MCat based on their buoyancy at take-off thrust. For low-thrust settings, a single MCat (MCat 12) was defined and applied to all aircraft types.

Table 8: MCats

	MCat 1	MCat 2	MCat 3	MCat 12
Aircraft types	Others	BCS1, E170, E290, E295, GLEX	A318, E190	All
Take-off thrust buoyancy range (m^4/s^3)	<100	100–150	>150	All
Representative aircraft	C680 Cessna Citation Sovereign	E290 Embraer E190-E2	E190 Embraer E190	E190 Embraer E190
Representative engine	7PW078	01P20PW188	8GE119	8GE119
Buoyancy of representative engine at take-off/initial-climb thrust (m^4/s^3)	55	114	168	N/A
Buoyancy of representative engine at climb-out thrust (m^4/s^3)	47	101	145	N/A
Buoyancy of representative engine at approach thrust (m^4/s^3)	20	53	62	N/A
Buoyancy of representative engine at idle thrust (m^4/s^3)	N/A	N/A	N/A	24
Number of engines	2	2	2	2
XE (m)	-14.9	-14.7	-16.5	-16.5
YE (m)	+/-2.1	+/-4.8	+/-4.5	+/-4.5
ZE (m)	2.6	1.8	1.4	1.4

20) Figure 9.2 and 9.3. Modelled Stand Groups and Taxi Routes. It's hard to see all lines, can you confirm if there are overlapping lines? Can you provide a figure showing the take-off/climbs/approach sources. [AQ46]

2.39 See figures below.

Figure 3: Taxi-in, 09, 2019

Figure 4: Taxi-in, 09, future scenarios

Figure 5: Taxi-in, 27

Figure 6: Taxi-out, 09

Figure 7: Taxi-out, 27, 2019

Figure 8: Taxi-out, 27, future scenarios

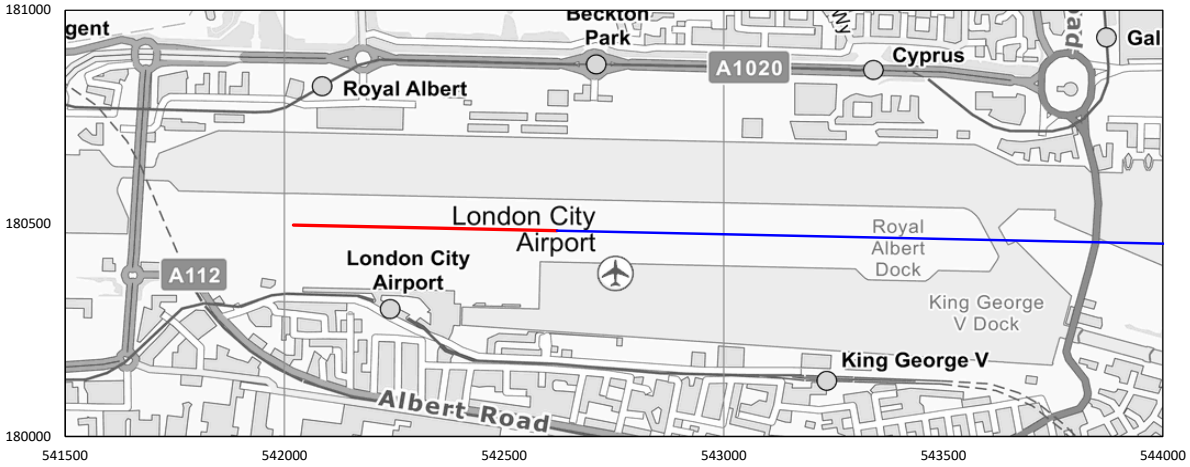

Figure 9: Take-off roll and climb, 09

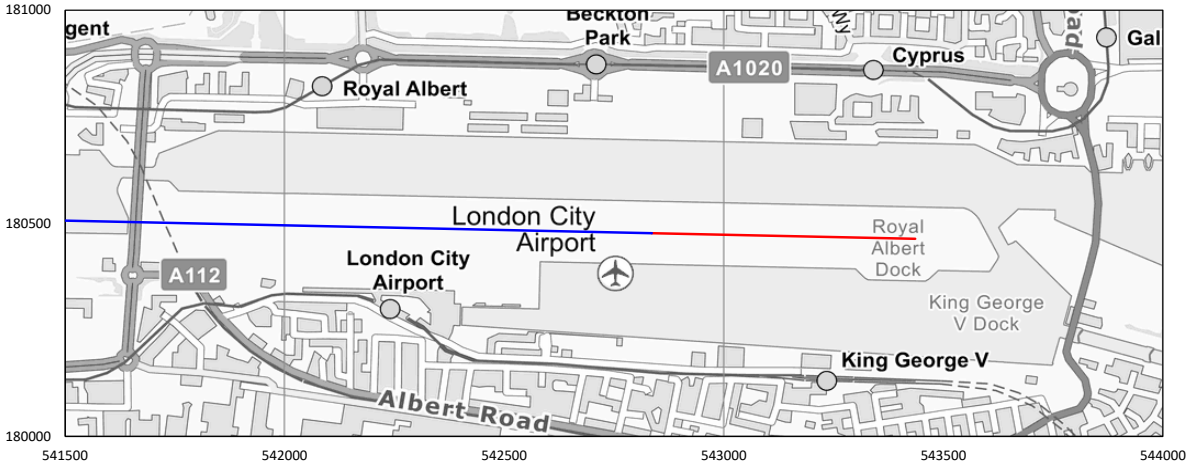

Figure 10: Take-off roll and climb, 27

Figure 11: Approach, 09

Figure 12: Approach, 27

The wind roses for each year: pre-processed (input into model) and post-processed (after ADMS has run it's algorithms). [AQ47]

2.40 See figures below.

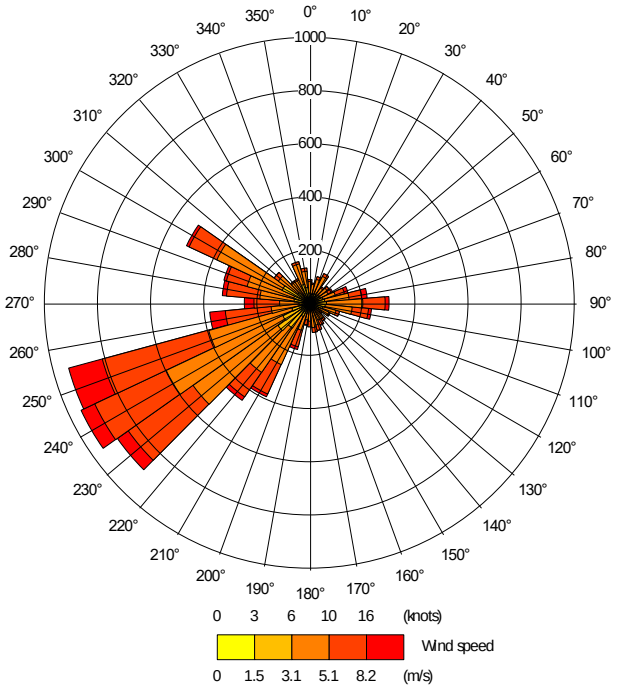

Figure 13: Windrose, 2017, input to model

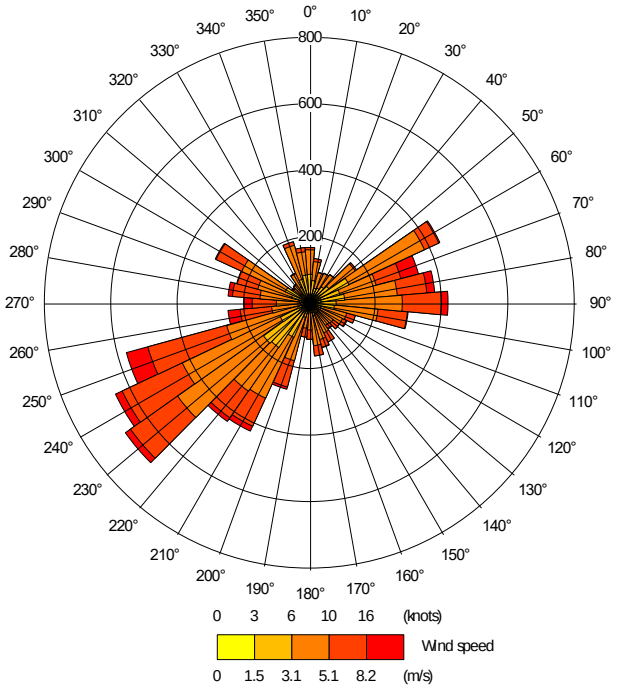

Figure 14: Windrose, 2018, input to model

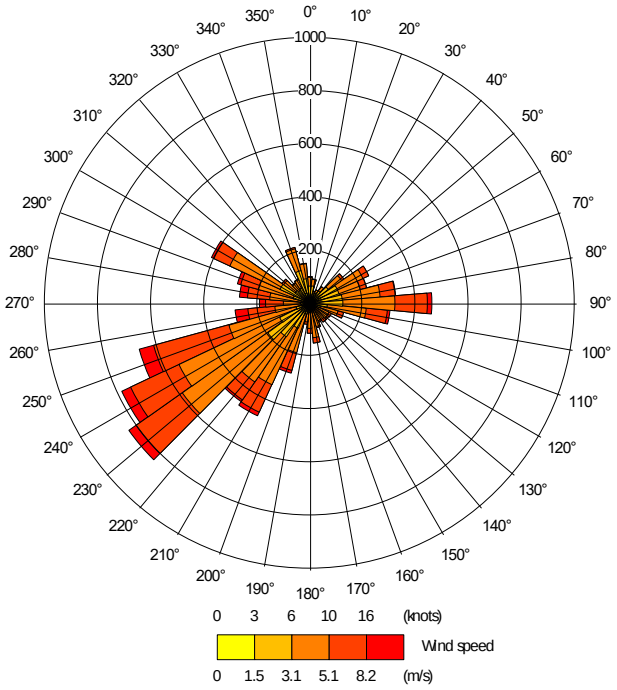

Figure 15: Windrose, 2019, input to model

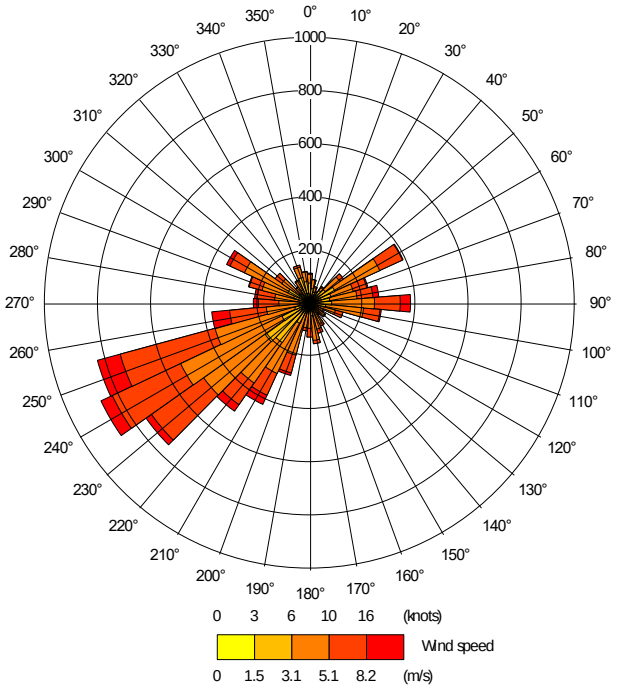

Figure 16: Windrose, 2020, input to model

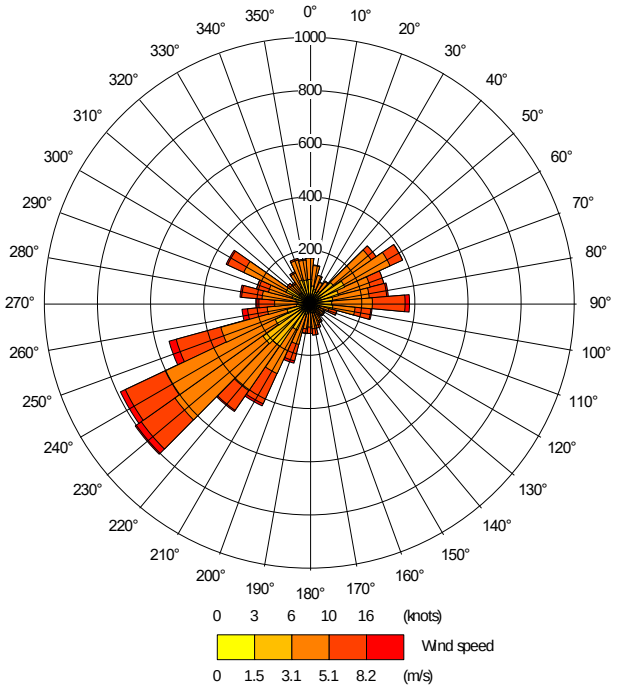

Figure 17: Windrose, 2021, input to model

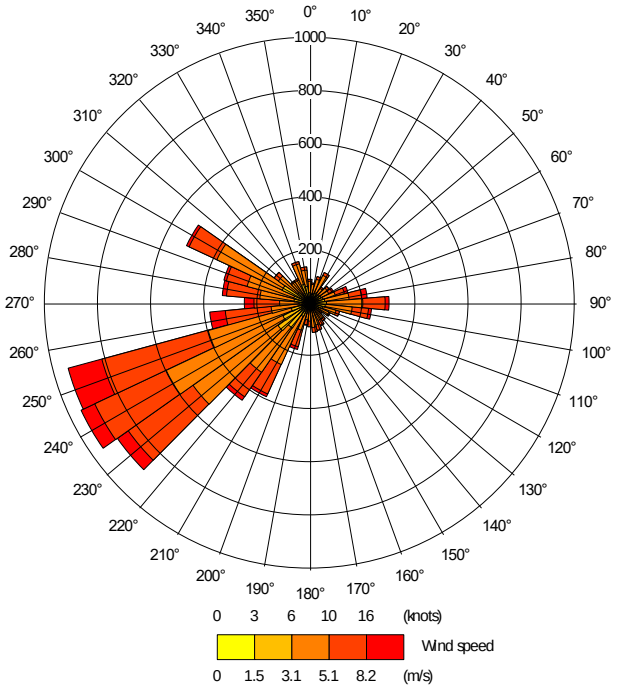

Figure 18: Windrose, 2017, output from model

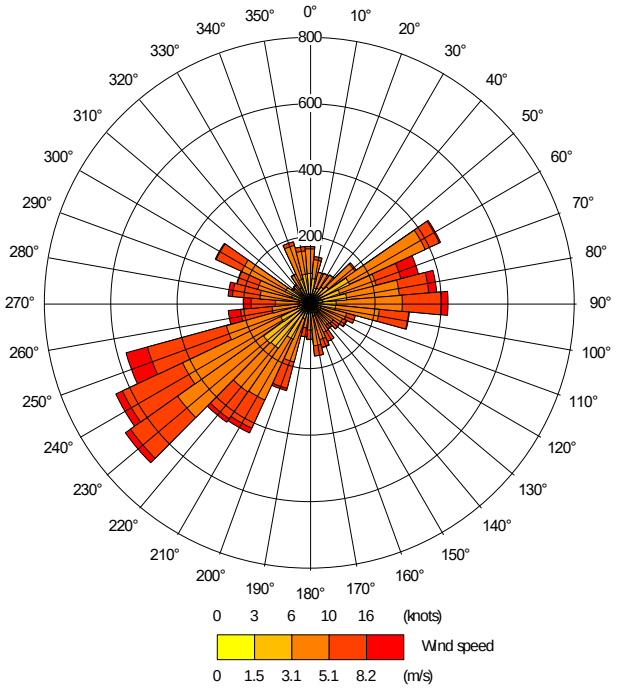

Figure 19: Windrose, 2018, output from model

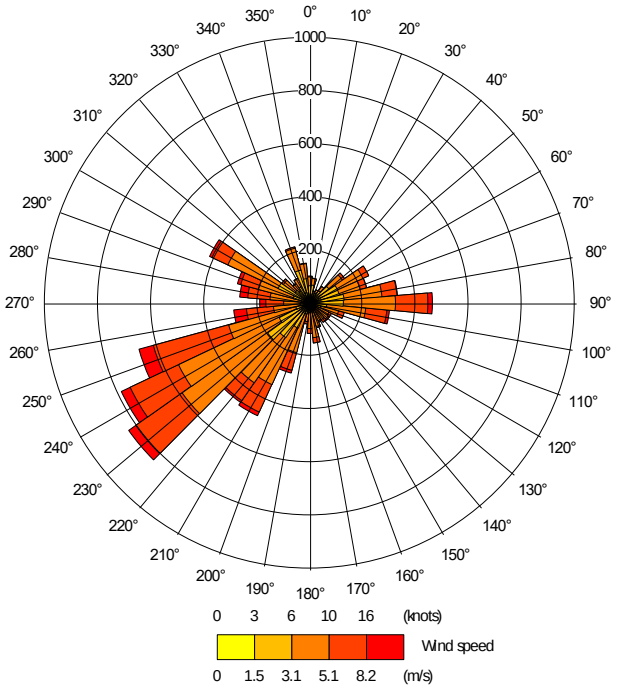

Figure 20: Windrose, 2019, output from model

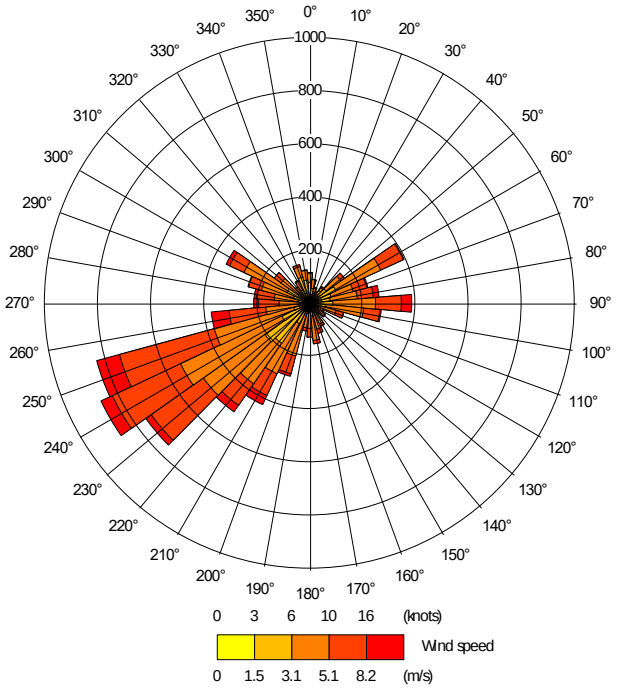

Figure 21: Windrose, 2020, output from model

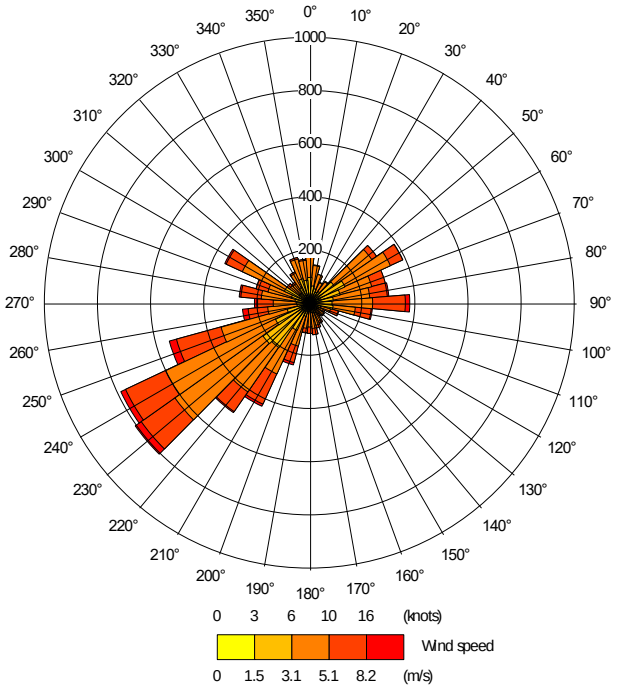

Figure 22: Windrose, 2021, output from model

Email chain

From: XXXXXX

Sent: Thursday, June 15, 2023 12:05

To: XXXXXX

Cc: XXXXXX

Subject: RE: LCY S73 modelling information

Hi XXXXXX,

Answers are:

1) The grid is at 0 m height. Note the grid is only used for drawing contour plots.
2) See attached figures. There are a couple of links missing labels, which are: Fig 1, green link on Gallions roundabout is Link 17; Fig 3, links immediately south of Link 108 are Link 106 (magenta) and Link 107 (indigo).
3) It does not state that. During model setup we considered the restriction of dispersion and recirculation due to massing adjacent to roads and concluded that it was not appropriate to model them as canyons, for reasons given in our previous response.
4) NHM-S 91 (541234, 181038) Royal Docks Academy kerbside.

Regards,

XXXXXX

Associate Director

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Description automatically generated with low confidence

Air Quality Consultants Ltd

23 Coldharbour Road, Bristol. BS6 7JT

T 0117 974 1086

From: XXXXXX

Sent: Tuesday, June 13, 2023 4:53 PM

To: XXXXXX

Cc: XXXXXX

Subject: RE: LCY S73 modelling information

Email chain

Afternoon XXXXXX (as you authored to note I've assumed you're best placed to help but sorry if not),

Sorry to ask but a few quick clarifications:

"2.9 Grid: ground-level." Is ground level 0 m or 1.5 m or something else?

"2.10 See following table" Can you provide a figure (I imagine a series of figures) which show(s) the Link IDs to accompany Table 4.

"2.12 Street canyons were considered as part of setting up the model…." Can you confirm that this paragraph states that no consideration of the restriction of dispersion and recirculation due to massing adjacent to roads was considered in the modelling.

"Figure 2: Monitored versus modelled annual mean nitrogen dioxide concentrations" Can you confirm the monitoring site ID/name for the X which is located highest visually (on the figure) which is classified as "Near-road" with values of approx. Modelled 29 and measured 38.

If you are able to provide these items that would help a lot. Provision via email and as separate responses so the quickest can be provided is fine for me.

Thank you

XXXXXX

Logo

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Response to LUC Review of the Environmental Statement – Draft Review Report (April 2023)

Introduction

This note forms the basis of LCY's response to the 'Draft Review Report' prepared by Land Use Consultants (LUC), with contributions from Ardent, Yellow Sub Geo and Air Pollution Solutions (collectively referred to as LUC) which was issued to the airport via email on 5th April 2023. In paragraph 1.13 of the introduction to the report, LUC explain that:

"The review identifies a list of clarifications required from the Applicant and a summary of any potential requests for further information under Regulation 25 of the EIA Regulations…to be made to the applicant, as appropriate" [our emphasis].

This note therefore provides the requested information and clarifications on the ES, at a level of detail which we fully expect will satisfy LUC's remaining queries. However, this note and the accompanying tables and appendices should also be treated as 'draft', so as to permit further dialogue to take place between LUC, LBN and the Airport's EIA Team on any remaining areas of misunderstanding and/or disagreement, should this be necessary This approach should ensure that LUC's Final Review Report (FRR) contains accurate and robust conclusions. Prior to the issue of FRR, it is understood that LBN will not be in a position to decide whether or not a formal Regulation 25 is necessary.

It is noted that, apart from six specific matters under the heading of Air Quality (which are disputed), none of the LUC comments are provisionally considered to be Regulation 25 issues which might otherwise necessitate a revision of the ES (i.e., providing further information in order to satisfy the requirements of Regulation 18(2) and *"which is directly relevant to reaching a reasoned conclusion on the likely significant effects of the development described in the application in order to be an environmental statement etc...."*). Instead, most of LUC comments are posed as "clarifications" which can be interpreted to mean the requirement to submit "other information", as referred to in Regulation 25(2). Overall, this approach is welcomed as it aligns with the Government's stated intention that EIA should be proportionate and focused on the "main" and "likely significant effects" of any development.

LUC has not commented on the noise chapter/ assessment, which has instead been reviewed by Mr Rupert Thornley-Taylor on behalf of LBN. His separate (undated) note was issued to LCY 3rd April 2023. This independent review raises a range of issues on the noise assessment contained in Chapter 8 of the ES and provides some related commentary on Chapter 12: Public Health and Wellbeing. For the sake of completeness, we have summarised the main issues referred to in this separate note and provided an appropriate response to each matter at the end of this document, noting that Mr Thornley-Taylor has not specifically identified any potential Regulation 25 matters.

The separate comments of Chris Smith Aviation Consultancy Limited (CSACL) on the forecasts and Need Case (issued on 13th April 2023) are not strictly EIA matters, so LCY/ York Aviation will provide a response to this under separate cover.

It is noted that LUC report contains various comments on the ES, particularly in respect to air quality, which had already been raised at the scoping stage and which LCY and its consultant team had either clarified or refuted at that time. There are also a few matters in LUC's current report which are entirely new and which we consider to be unwarranted and/or to have a minor and non-material purpose. Therefore, for the sake of offering up a transparent 'audit trail', this report cross-refers

back to these earlier comments and, where appropriate, highlights those matters which were omitted from the earlier scoping review and LBN's formal Scoping Opinion issued on 24th November 2022 (included as Appendix 3.10 of the ES). In our opinion, such additional assessments should have properly been requested at that juncture, were they considered by LBN/ LUC to be essential matters to be address in the EIA/ ES. As a reminder, LUC issued a range of queries and comments on the Draft Scoping Report on 21st July 2022, which were included as Appendix 3.3 of the ES. LCY's point-by-point response was issued in an ES Clarification Note on 15th August 2022 – this was provided in Appendix 3.4 of the ES. Thereafter, LBN's Scoping Opinion attached LUC's 'Final Report' which formed the basis of the Opinion – this is included at Appendix 3.10 of the ES.

The table below sets out our response to the specific clarifications and the limited "potential"' Regulation 25 matters raised by LUC.

Where a response to the clarifications raised by LUC requires more detailed text than would fit into this table and/or where additional documents (e.g., the 2022 Annual Performance Report) have been requested, these are appended to this document or are provided separately.

Table 1 Response to specific clarifications and the 'potential' Regulation 25 matters raised by LUC

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
Chapter 1: Introduction		
Introduces structure of review report and sets out review criteria including IEMA EIA Quality Mark.	None	No relevant comments to address
Chapter 2: Initial Regulatory Checklist		
Provides a table to record the 'Regulatory Compliance' of the ES based on the IEMA review criteria.	No Reg 25 matters or clarifications identified. Table confirms all criteria have been met.	No relevant comments to address
Chapter 3: EIA Context and Influence		
Provides a summary of the EIA scoping and assessment; identification of sensitive receptors; alternatives including iterative design; description of development; the Need Case; and consultation.	No Reg 25 matters or clarifications identified. It is noted that the authors concur with the approach taken to the consideration of alternatives and conclude "This is considered appropriate". In respect of the Need Case, they also observe that "...a strong argument is made that approval will enable compliance with current Government policy, making best use of consented development".	No relevant comments to address
Chapter 4: EIA Presentation		
Comments on the overall ES presentation/ quality and the NTS	No Reg 25 matters or clarifications identified.	No relevant comments to address. Updates to NTS, if any, to be considered in responses to technical chapters.

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	Generally, the authors agree that the ES and NTS are well presented, clear and proportionate to the type and scale of the development (albeit they consider there is some repetitive information across chapters). They note that the NTS "should be updated where necessary to reflect any points noted in the review of the ES technical chapters".	
Chapter 5: Review of ES Chapter 5: Planning Context		
Briefly summarises ES chapter but makes no comment beyond "LBN should satisfy itself that all policies listed in Chapter 5 are relevant and correct".	No Reg 25 matters or clarifications identified.	No relevant comments to address.
Chapter 6: Review of ES Chapter 6: Construction Programme Summary of Comments/ Scope of Review		
This section largely summarises the information provided in Chapter 6 of the ES: Construction Programme & Environmental Management, including the revised Construction Phasing Plan (CPP) for the remaining build-out programme for CADP, as well as alternative construction scenarios in the DC and DM cases. The authors say that it would have been "helpful" to have append the approved CEMP to the ES, and for the NTS to have included a summary table of the "indicative CPP".	No Reg 25 matters or clarifications identified. CP1: Planning condition required to ensure the continued application of the CEMP (approved under Condition 88 of the CADP1).	No relevant comments to address. An updated version of the CEMP will be prepared and submitted to LBN in due course in accordance with Condition 88, to ensure the continuation of previously agreed environmental controls during the remaining construction works.
Chapter 7: Review of ES Chapter 7: Socio-Economics Summary of Comments/ Scope of Review		
This section summarises the information provided in the chapter including the approach to the baseline, the main assessment, and secondary, cumulative and combined effects – all "considered appropriate".	No Reg 25 matters but one point of clarification: identified: SE1 - The Applicant should clarify what additional mitigation has been proposed. This is to differentiate between existing mitigation measures and 'further embedded mitigation' referred to at paragraph 7.4.1 of the ES chapter.	The additional mitigation is set out at paragraphs 7.4.10 to 7.4.12 of the ES. This includes: ➢ A significant enhancement to the airport's Community Fund that will see a total fund of £3.85 million administered over 10 years; ➢ An Employment and Education contribution of up to £1.9m to LBN; and ➢ Continue and expand on existing employment and training initiatives.

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
Chapter 8: Review of ES Chapter 9: Air Quality Summary of Comments/ Scope of Review. There are twenty Clarifications and six Regulation 25 matters under this chapter heading. The Clarification points are first discussed followed by the potential Regulation 25 matters.		
Summary of clarification points and LCY response.		
	AQ1 - Explanation why UFP 'squarely falls' into the description in Paragraph 6 of Schedule 4 of the EIA Regulations.	An ES Clarification Note, which addressed this point amongst others, was provided on 15 August 2022. In response to issue AQ4, first raised by LUC in that note, it is stated that it is not possible to construct a full emissions inventory for UFPs, it is not possible to predict UFP concentrations, and there are no policies, regulations, guidelines or standards relating to UFPs. As such, it is not possible to quantify the likely significant effects as defined in paragraph 6 of Schedule 4 of the EIA Regulations. A more detailed response is provided in response to Issue AQ2 and AQ3 (below)
	AQ4 - Clarification is required on how the roads included in the air quality assessment have been selected.	The IEMA Guidelines recommend two rules to be considered when assessing the impact of development traffic on a highway link: ➢ Rule 1: Include highway links where the AADT traffic flows will increase by more than 30%; and ➢ Rule 2: Include any other specifically sensitive areas where AADT traffic flows have increased by 10% or more. The guidance suggests traffic volume changes of less than 30% on all local and strategic roads, that are deemed non-sensitive, could be reasonably considered as not significant (referred to as the 'Rule 1' threshold). However, in this instance, a more conservative approach has been adopted in this assessment whereby consideration has been given to the potential environmental impact on all roads that experience a 10% or greater rise in traffic flows when comparing the DM Scenario with the DC Scenario in the Principal Assessment Year (2031). The predicted traffic generation from the proposed development has been assigned to the local highway network based on an understanding of trip origins and destinations for passengers and staff. Then, in the first instance, where the predicted change in traffic volume is less than 10% between the DM Scenario and DC Scenario, this is considered not to be significant and therefore those highway links screened out of any further analysis in the EIA. The ES explains (Appendix 9.3, paragraph 9.1.37) that: *"Road links for assessment against the air quality objectives are the same as those used in the CADP1 assessment for consistency. These were chosen to cover the*

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		road links with the greatest airport-related traffic increases, and therefore the greatest air quality impacts. In addition, a number of road links were modelled for assessment against the Limit Values. These were chosen to be representative of links which had exceedances of the Limit Value in 2019 (there are no forecast exceedances in 2030) according to Defra's modelling; these are not intended to form a full road network but to assess impacts at representative receptors 4 m from the road, for consistency with Defra's Limit Value assessment process." This therefore goes beyond what was modelled and considered acceptable for the CADP1 assessment and covers all roads which are likely to have either a high amount of airport-related traffic or a high level of existing traffic which may be increased by the proposed development.
	AQ5 - Clarification on whether all relevant monitoring data has been considered in defining the baseline conditions.	All relevant monitoring data has been considered in defining the baseline conditions. Some monitoring carried out by LB Newham was omitted from the ES for brevity, as it is consistent with other monitoring data and does not change the overall picture (especially as most of the monitoring locations close to LCY were only commissioned in 2019 and are therefore unable to inform the analysis of trends).
	AQ6 - 2022 monitoring data should be compiled and submitted to LBN.	Monitoring in the vicinity of the airport is undertaken as part of the approved Air Quality Monitoring Strategy. This includes both automatic and non-automatic data. At the time the ES was submitted, the data were not available for the 2022 calendar year, and the final audit and data ratification had not been completed. In accordance with the established timescale in previous years, the 2022 Annual Performance Report was submitted to LBN in April 2023.
.	AQ7 - Further information on the verification of the modelled NOx concentrations is required	A model evaluation has been carried out in terms of nitrogen dioxide concentrations. Since this is the endpoint of interest, not NOx, it is incorrect to claim that without NOx verification there cannot be confidence in the model results. The model evaluation shows that the model provides good agreement with monitoring data, with a tendency to overpredict nitrogen dioxide concentrations.
	AQ8 - Information on the appropriateness of using the NOx to NO2 calculator and its application in this assessment.	This has not been previously raised by LUC or Newham in the Scoping Opinion. There are several approaches to calculating NO2 concentrations from NOx concentrations at airports and which have been previously investigated; all of which have advantages and disadvantages. The chemistry module incorporated into ADMS could potentially be used, but it is not a generally accepted approach and does not easily fit to a "kernel" modelling approach where a large number of sources are included and is impractical.

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		The Jenkin approach has been applied to several airport studies (including the recent Stansted ES), but it now superseded. The Abbott approach (used in the S73 application) has also been applied at many airport studies (e.g., Bristol, Manston, Heathrow 3R PEIR, and Gatwick) which were undertaken by a number of practitioners including Ricardo, Wood and Arup. Most importantly, it was the approach used in the Airports Commission study caried out by AQC under commission from Jacobs. The Airports Commission appointed Prof. Helen ApSimon (Imperial College) to lead an audit team (including David Carruthers at CERC) to scrutinise the airport assessment methodology. The Abbott approach was considered, among other options, and was approved for use by the audit team. Given that the model has been verified (including both roadside and airport monitoring sites), the appropriateness to this S73 assessment has been demonstrated.
	AQ10 – A breakdown of the aircraft emission sources in the relevant tables should be provided.	It is not usual to provide the breakdown of emissions requested, for reasons explained in the ES (paragraph 9.7.8), namely that emissions are not the endpoint of interest, and a simple reading of emissions is potentially misleading. However, a breakdown of emissions is given in the Appendix (Table AQ10-1 to AQ10-3) for information. The engine testing emissions were erroneously omitted from Tables 9-12 to 9-16 of the ES; correcting these increases modelled aircraft emissions by less than 0.4%. The engine testing emissions **were included correctly** in the dispersion modelling and their contribution is included in the concentration results. Note that some aircraft types are in the 2019 fleet but not in some of the future forecast fleets, and vice versa, and therefore may have zero emissions in some cases.
	AQ11 - Evidence should be provided of the appropriateness of the use of annual mean proxies for the short-term objectives near airports.	This matter was not previously raised by LUC or Newham in the Scoping Opinion. The approach used in the ES is focused on predicting annual mean concentrations. It is recognised that "*dispersion models cannot predict short-term concentrations as reliably as annual mean concentrations", and "moreover, model verification is likely to be challenging*" (TG22, para 7.96). It is, thus, common practice for airport assessments to assess the potential exceedances of the short-term objectives using empirical relationships published by Defra, but it is acknowledged that these relationships are founded on roadside monitoring sites. Information on the hour-by-hour aircraft movements on a **busy day** have been provided by York Aviation for 2031, for both the DM and DC cases, and are summarised in the Appendix Table AQ11 (appended to this document).

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		For each scenario, the peak hours are 0800-0900 and 1800-1900. Peak hour movements are forecast to increase from 34 (DM) to 41 (DC). It should be borne in mind that these movements represent both arrivals and departures, and that NOx emissions are substantially higher on departure (due to take-off) than arrivals. The incremental change to the number of peak-hour departures between the 2031 DM and DC scenarios is about 4 movements. There have been no recorded exceedances of the 1-hour mean objective for nitrogen dioxide at either of the automatic sites since monitoring commenced in 2006, and in the majority of the years the maximum recorded level has been below 200 µg/m^3 (see Table 9-4 of the ES). A comparison can also be drawn with Heathrow Airport which in 2019 operated at 80.9 mppa with 475,000 movements (using much bigger aircraft than at LCY). This compares with the 9.0 mppa and 111,000 movements in 2031 for the DC scenario at LCY. At Heathrow Airport, a monitoring site (LHR2) is located 180 metres to the north of the northern main runway (in the prevailing downwind direction) and 18 metres from the Northern Perimeter Road. There have been no recorded exceedances of the 1-hour mean objective at this site since 1997, and in the majority of years the maximum recorded hourly concentration has been below 200 µg/m3. Based on empirical evidence it is extremely unlikely that the small increase in peak-hour movements associated with the proposed development would cause any exceedances of the 1-hour mean objective for nitrogen dioxide. A similar logic can be applied to the daily mean objective for PM10, where the airport contribution to local concentrations is much smaller.
	AQ12 - The speed and fleet composition data for road transport should be provided for all scenarios.	This is provided in Appendix A, Table AQ-12.
	AQ13 - Clarification is required on whether non-residential receptors such as schools, medical and care facilities have been included in the assessment.	Specific receptors were chosen to be representative of worst-case locations; that is, those likely to experience the highest concentrations or greatest increase in concentrations, where there is relevant exposure (including schools, hospitals and residential institutions). Not every location of relevant exposure was assigned a specific receptor, but all were covered by the grid of receptors and concentrations at any particular location can therefore be inferred from the contour plots.
	AQ14 - A list of receptors with the property number/name	It is not clear why this level of detail is requested because this would be an onerous exercise which would have no bearing on the impact assessment conclusions; all receptors have been assigned a six-figure grid reference and the locations are unambiguous. There is no potential for confusion

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	AQ16 - Clarification is required on whether the assessment has included locations where there is likely to be relevant short-term exposure.	Specific receptors were chosen to be representative of worst-case locations, that is those likely to experience the highest concentrations or greatest increase in concentrations, where there is relevant exposure. Not every location of relevant exposure was assigned a specific receptor, but all were covered by the grid of receptors and concentrations at any particular location can therefore be inferred from the contour plots.
	AQ17 - Clarification as to whether the need for larger aircraft has been taken into account in the assessments.	In the DC scenario, the average passengers per movement increases from 67 to 81 (about 20%). This is reflected in the increasing numbers of the largest aircraft, namely the A220 (100–130 seats) and E195-E2 (120–132 seats). Details of the fleet assumptions used are given in Section 5 of the Need Case.
	AQ18 - Information on the generator emission factors, how the short-term and long-term impacts were considered, and what the impact of using more realistic emission factors would be.	The generator emissions were included for completeness, but they are an extremely small source. They will be tested for 30 minutes each month off-load, and annually under full load for one hour. The assessment assumes that all tests are at full load for conservatism. The total annual mean NOx emission rate from the three engines is modelled to be 0.2 mg/s, assuming an emission factor of 180 mg/Nm^3 at 15% O_2. Assuming an emission factor of 1,800 mg/Nm^3, which is typical of unabated small generators, the emission rate is still only 2 mg/s. This is below the screening criterion of 5 mg/s suggested by IAQM/EPUK guidance as *"unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion."* Since the generators' vents are a good distance from any relevant exposure, this criterion applies. Regarding short-term impacts, assuming that the generators operate continuously every hour of the year (which is an extreme worst case), the maximum one-hour NOx concentration at any of the specific receptors in any of the five meteorological years is 0.12 µg/m^3, and the maximum anywhere on the grid is 0.16 µg/m^3. With the higher emission rate, these would be 1.2 µg/m^3 and 1.6 µg/m^3 respectively as NOx. Concentrations of nitrogen dioxide will be lower than this (maximum of 0.6 µg/m^3 anywhere on the grid using the Environment Agency's recommended factor of 0.35). This is under 0.3% of the objective of 200 µg/m^3 and will not affect the conclusions of the air quality assessment.
	AQ20 - Clarification should be provided on whether HDV or HGV data has been used in the modelling.	The definition of Heavy Goods Vehicle used in the traffic modelling includes all vehicles heavier than cars, light vehicles or taxis. This definition is therefore equivalent to that of Heavy Duty Vehicle (HDV).
	Paragraph 8.35 - In 2031 the S73 proposals increase the ATMs by 18%, with an associated	Airport source NOx emissions in 2031 are 27% higher in the DC scenario than in the corresponding DM scenario. The corresponding changes in total

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	increase in aircraft NOx emissions of 27%. The S73 application is therefore facilitating a significant increase in ATM and NOx emissions which would not be realised without the S73 proposals. Paragraph 9.7.3 is misleading.	movements are 18%, in passenger movements (i.e. scheduled aircraft movements) 31% and passengers 39%. LUC are incorrect in stating that ATMs increase by 18%, since Jet Centre movements are not categorised as ATMs. The statement that the increase in airport source NOx emissions *"is in broad proportion to the increasing numbers of passengers and scheduled aircraft movements"* is an accurate summary and not misleading.
	AQ22 - The airport emission data in Table 9-18 should be broken down into different types and size of aircraft, APUs, engine testing, and the other main airport related sources.	This is provided in the Appendix (Tables AQ22-1 to AQ22-3). Note that some aircraft types are in the 2019 fleet but not in some of the future forecast fleets, and vice versa, and therefore may have zero emissions in some cases.
	AQ23 - Clarification is needed as to what the greater aircraft activity mentioned in 9.7.44 refers to.	This sentence simply refers to the increase in aircraft movements, passenger numbers and overall aircraft sizes.
	AQ24 - Clarification is required regarding the evidence for the comment that 'significant changes in climate are not expected by 2031' (in the context of the assessment).	There is uncertainty about the significance of climate change for air quality assessments. The expectation is that climate change will results in more extreme weather in the UK, with stormier winters and hotter summers. Whether the net effect will be a tendency to increase or decrease concentrations of air pollutants, all other things being equal, cannot be forecast with any confidence. However, all other things are not equal: any climate-related changes over the next decade or so are likely to be small compared to the rapid improvements in general air quality over the same time period.
	AQ25- Clarification is required as to why no mitigation measures have been provided on operational changes to reduce emissions	As the Air Quality Assessment concludes that there are no likely significant effects, ***mitigation*** is not required. As acknowledged in Para 8.52 of the LUC Review, there are measures within the Air Quality Management Strategy (AQMS), that have been agreed with LBN, and additional measures are set out in the Air Quality Positive Statement. Appendix 2 of the AQMS includes a benchmarking study of measures in place at other UK airports (Gatwick, Manchester, Birmingham and Heathrow). From this benchmarking study, the only measure not included at LCY is the use of Preconditioned Air (PCA) systems; this is not feasible to introduce as passenger airbridges are not utilised at LCY. Whilst "NOx charging schemes" have been introduced at other airports, the whole rationale for the CADP scheme is to introduce "new generation aircraft", which, by definition, will conform to stricter CAEP emissions standards, and a charging scheme would serve no purpose. In addition, an evaluation of a charging scheme has previously been carried out at the request of LBN; this concluded that

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		due to the limited aircraft that can operate from LCY (due to the steep approach angle and short runway) it would not be feasible to introduce such a scheme. Some of the measures that have been, or are being progressed within the AQMS are summarised below: **Fixed Electrical Ground Power (FEGP) -** FEGP has been installed on all refurbished and new standards. **Mobile Ground Power Units (MGPUs) -** All diesel MGPUs were phased out in 2021 and have been replaced with battery-MGPUs **Engine Out Taxiing (EOT) -** Airlines are encouraged to switch off one engine during taxiing subject to safety considerations. It is used for approximately 20% of the time pending safety and operational requirements **Electric taxiing systems -** Electric pushback tugs will be required as and when new CADP stands become operational. A feasibility study was issued to LBN on 20/12/2021 **ULEZ compliance for airside vehicles -** All airport-owned vehicles are ULEZ compliant. 84% of third-party vehicles are complaint. A feasibility study to achieve 100% compliance was submitted to LBN on 21/12/2021. **Hybrid and electric airside vehicles -** LCY is reviewing the fleet with the aim to introduce hybrid and electric vehicles in line with net zero ambitions There are no other operational measures that can be introduced that are not already in place, or which have not been previously considered.
	AQ26 - All residential receptors should include the property number/name to avoid confusion	Para 8.53 of the LUC Review notes that Receptors R1 and R2 are described differently in the NTS to Appendix 9.2: Receptor Locations. All receptor locations have been assigned six-figure grid references are unambiguous. R1 is at the junction of Camel Road / Hartmann Rad (but is referred to as Hartmann Road in the NTS), while R2 is at the junction of Camel Road / Parker Street (but is referred to as Parker Street in the NTS). This does not introduce any confusion and it is not necessary to include property names or numbers. It is confirmed that all grid references are correct.
	AQ27 - Information on UFP should be provided in the NTS	See response to AQ2 and AQ3. The NTS includes a summary of the impacts related to UFP as set out in Chapter 12: Public Health and Wellbeing, and duplication is not required.
Summary of Potential Regulation 25 Requests and LCY response.		
	AQ2, AQ3 – EIA should include an assessment of UFP. The technical limitations of the	The CAEP/11 emissions standards now include both nvPM mass and number (nvPM#) regulatory limits for in-production and new engine types of rated thrust greater than 26.7kN. It is important to note that the fundamental

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	qualitative assessment should be clearly set out.	purpose of emissions certification for nvPM is to compare engine technologies and to ensure that the engines produced comply with the prescribed regulatory limits. So far, aircraft engine designs have not been designed for low nvPM emissions. With the implementation of the CAEP/11 LTO nvPM mass and number standards, future engine designs will need to consider the full interdependencies between all pollutant emissions and fuel burn. "*The new nvPM SARPs [Standards and Recommended Practices] will result in the implementation of [technologies such as lean-burn staged and advanced rich-burn combustors] across the industry and this will lead to significant reductions in emissions from aircraft engines.*" [1] This is evident even from in-production engines where nvPM# emissions from older technologies (e.g. Rich burn, Quick quench, Lean burn or RQL) are approximately 100 times higher than from newer Lean burn technologies[2]. Chapter 9 of the ES addresses the issues related to UFP and provides justification as to why quantification cannot be carried out; this logic does not appear to be questioned by LUC. Chapter 9 also makes reference to Chapter 12: Public Health and Wellbeing, where the health impacts related to the S73 application are considered. There are no impacts other than human health associated with UFPs, and consideration within Chapter 12 is therefore appropriate. Paragraph 11.62 of the LUC Review notes that "*the section on UFPs comes to the same conclusion as for the traditional pollutants i.e. the effect would be minor adverse (and not significant). This conclusion is considered by the Applicant to be a conservative finding on the basis of the scientific uncertainty (and emerging evidence) about UFP. Given the nature of the S73 application the conclusion that there will be a minor adverse effect does not seem unreasonable, however, whether or not this is conservative is unclear and further clarification is required (PHW-AQ22)*". A response to PHW-AQ22 in respect of the conservative nature of the assessment has been provided. Given the LUC Review concurs with the conclusions of Chapter 12 with regard to UFPs and public health, replication in Chapter 9 would provide no additional information to assist the decision-making process and would only add unnecessary text to the ES (already considered by LUC to be too repetitive).
	AQ15 - The applicant should provide all the model files for review.	See response to AQ25. We note that the Environment Agency is a regulatory body which keeps model files provided to it internal and

[1] https://www.icao.int/environmental-protection/Documents/EnvironmentalReports/2019/ENVReport2019_pg100-105.pdf
[2] European Aviation Environmental Report 2022.

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		confidential and does not share them with commercial competitors to the owners of the model files. We would consider providing model files to the London Borough of Newham under the same conditions (enforced by an NDA).
.	AQ19 - The LCY Trip Generation Spreadsheet should be provided	Please see the attached. Particular comments are as follows: ➢ Hire cars are not specifically split out in the summary 2019 CAA passenger data ➢ We have assumed that staff travel will increase in line with the increase in staff numbers ➢ We have assumed that servicing activity will increase at 50% the rate of passenger growth. This is considered robust in view of the potential for further consolidation of deliveries. It should be noted that we have redistributed the 1.4% of passengers arriving by "other mode" to the main modes recorded in the CAA survey. The redistribution of an average of 200 passenger movements per day arriving by "other mode" each day is insignificant and has no material impact on the assessment of transport impacts and hence upon our conclusions.
	AQ21 - Sensitivity tests of 1) the impact of recent road traffic emissions data (from DUKEMS) and 2) a slower vehicle fleet turnover as a result of the drop in new car sales in 2020, 2021 and 2022.	LUC correctly note that new car registrations in 2020, 2021 and 2022 were approximately 30% lower than in 2019. Assuming that sales return to pre-pandemic levels from 2023, this would result in the car fleet being on average one year older in 2031 than if there had been no dip in sales. The model has used 2030 emission factors to model 2031, so it has, in effect, modelled this scenario already. A further sensitivity test is, therefore, unnecessary. Clearly, it is impossible to say yet whether car sales will return to pre-pandemic levels from 2023, but long-term sales data (Figure AQ21-1 in Appendix) show that periods of low sales (e.g. 2008–2012, after the financial crisis) tend to be followed by periods of very high sales (2014–2017). LUC refer to a recent paper by Davidson et al (2021), which suggests that emissions of NOx from road vehicles in the UK are systematically underestimated in emission inventories, due to the UK mix of car manufacturers being different from that of the European average. While interesting, a single paper seems a weak basis for requiring an assessment that goes against widely-accepted guidance and usage. Davidson et al do not make any such recommendation. It should also be noted that it is increasingly clear that the Emission factors Toolkit (EFT) version 11 substantially underestimates the uptake of electric

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		vehicles, assuming they make up just a few percent of the vehicle-kilometres in 2030. In fact. battery electric cars (BEV) made up 17% of new car registrations in 2022, and that figure is rapidly increasing (see Figure AQ21-2 in Appendix). The Department for Transport's Transport Analysis Guidebook (TAG) databook was last updated in January 2023, and thus contains more recent projections for BEV uptake. A comparison of the assumptions for vehicle-kilometres by BEV cars used in the EFT with those recently published by DfT is given in Figure AQ21-3 in the Appendix. From 2017 onwards, the trajectory of BEV uptake in the TAG dataset is considerably higher than the projections used within the EFT, with BEVs accounting for 36% of car vehicle-kilometres in 2030, compared with 7.5% for England Outside London in the EFT.
	AQ25 - Re AQ15 if the model files are not provided, all details of the modelling need to be provided so that the methodology can be fully reviewed.	Further details of the modelling methodology are given in the Appendix AQ25.
Potential Planning Conditions		
	The airport's Air Quality Management Strategy should be revised to include the monitoring of ultra-fine particles (particle number and size) and approved by LBN within 6 months of consent being granted.	Para 8.18 of the LUC Review makes reference to UFP monitoring at both Heathrow and Gatwick Airports but provides only a limited summary. It is important to note that monitoring at both airports was carried out on a "campaign" basis for short periods of time, and it is understood that there are no permanent UFP monitoring sites at any UK airport. The monitoring at Heathrow Airport (at the LHR2 site) was undertaken in support of PhD research by Brian Stacey (Ricardo) and concluded that "*total UFP concentrations in the vicinity of the airport are within the range of those measured at traffic and urban background sites*". The monitoring at Gatwick Airport (at two sites) concluded that "*the airport sources contributed 17% to the PNC [particle number concentration] at both sites and the concentrations were greatest when the respective sites were downwind of the runway; however, the main source of PNC was associated with traffic emissions"*. However, to reassure that UFPs will be monitored, it is proposed to amend CADP1 Condition 57 to include the following text: *Within 6 months of approval of the S73 application, a scheme to undertake monitoring of Ultra Fine Particles for a period of two months in the vicinity of London City Airport shall be submitted to and approved by the local planning authority. The agreed scheme of monitoring shall be completed on a two-yearly basis and reported thereafter to the local planning authority in the Air Quality Monitoring Strategy Annual Report.*

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
Chapter 9 Review of ES Chapter 10: Surface Access Summary of Comments/ Scope of Review		
This chapter comments on the methodology and findings of the Surface Access chapter of the ES. The review finds that the baseline assessment and methodology are "clearly set out" and that all impact assessment conclusions and proposed mitigation measures are "considered reasonable".	No Reg 25 matters but one point of clarification: identified: SA1 - Clarify assumed contradiction in paragraphs 10.1.2 and 10.6.54	Both statements are correct. Paragraph 10.1.2 deals with the relative increase in passenger numbers and relates to the predicted change of use of the airport such that in the future there will be greater growth of passengers outside of weekday AM and PM transport network peak periods, which provides opportunity to make use of spare capacity in the surrounding transport networks. Paragraph 10.6.54 relates to the detailed modelling of the network peak periods that remain the busiest in terms of total demand on surface access transport infrastructure and is that considered for the purposes of the environmental assessment of impact on sustainable transport modes.
Chapter 10 Review of ES Chapter 11: Climate Change Summary of Comments/ Scope of Review		
This chapter comments on the methodology and findings of the Climate Change chapter of the ES. Whilst the scope of this assessment is "deemed appropriate", LUC raise eight detailed points of clarification (CC1 to CC8).	CC1 - Please provide more details on the current climatic baseline.	Table 11-32 of the ES chapter provides details on the baseline climate at the airport. As requested, weather data for the period of 2018 to 2022 from the weather station located at London City Airport is summarised below: ➢ Average annual temperature: 12.7 ºC ➢ Average summer temperature: 16.2 ºC ➢ Average winter temperature: 9.15 ºC ➢ Max summer temperature: 39 ºC ➢ Min winter temperature: -5 ºC ➢ Total annual rainfall: 661.4 mm ➢ Average monthly rainfall: 55.12 mm ➢ Max average monthly rainfall: 102.2 mm (October) ➢ Min average monthly rainfall: 25.3 mm (April)

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	CC2 - Please confirm that only three years of the 3rd carbon budget have been used to assess significance.	By way of clarification, the assessment of significance is based on the methodology set out in paragraphs 11.3.43 to 11.3.58 of the ES. The methodology does not prescribe a threshold of emissions to establish significance; instead, the contribution of emissions to budgets and sectoral totals is calculated to provide context. Comparisons are made to the 4th, 5th and 6th carbon budgets since these coincide with the assessment years for the development - 2024 to 2050 (which have been adopted for this particular assessment, rather than the EIA as a whole). The 4th carbon budget starts in 2023, a year prior to the assessment period. The 4th carbon budget has therefore been reduced from 1,950 MT CO_2e to 1,560MT CO_2e (see ES Table 11-27, and footnote 65) to reflect the 4-year period of the assessment (I.e., 2024 to 2027) that it coincides with.
	CC3 - Provide a description and outline the assumptions that inform the "Planning assumption" that is used to assess significance within the body of text.	The "planning assumption" represents the maximum emissions from UK aviation (37.5MT CO_2 by 2050) that were considered by the Committee on Climate Change (CCC) to be consistent with the UK's climate change targets and was initially proposed in the CCC's report to government in 2009 (see https://www.theccc.org.uk/publication/meeting-the-uk-aviation-target-options-for-reducing-emissions-to-2050/) The CCC also advised that international aviation emissions should be included in carbon budgets starting with the 4th carbon budget based on the planning assumption. As described in ES Table 11.1, the UK Government did not explicitly include international aviation into the 4th and 5th carbon budget. However, emissions from international aviation were taken into account through reference to the CCC's Planning Assumption. In providing context, the assessment of significance of aircraft emissions compared emissions from aircraft over the 4th and 5th carbon budgets to the Planning Assumption (see ES Table 11-23 and footnote 64.)
	CC4 - Confirm if the "Jet Zero" high ambition scenario has been applied to both DM and DC scenarios.	The Jet Zero High Ambition scenario assumptions have been applied equally to the DM and DC scenario.

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	CC5 - Please clarify why the more appropriate Local GLA carbon budgets have not been used to assess significance.	In terms of aircraft emissions, comparison to the GLA carbon budgets was not made since, as explained in the ES chapter, it is government policy that aircraft emissions are to be managed at a national level. The size of the airport is not relevant.
	CC6 - The Applicant should provide details of how the Proposed Development itself intends to mitigate the GHG emissions of the DM and DC scenarios.	Section 11.5 of the ES details embedded mitigation measures to reduce GHG emissions from the proposed development (DC scenario) and correspond with measures identified in the Transport Assessment (ES Volume 4), together with the Energy Strategy, Sustainability Roadmap and the Outline Carbon and Climate Change Action Plan (CCCAP). The measures and targets detailed in the Sustainability Roadmap would apply equally to DM and DC scenarios. This means that the assessment assumes that Scope 1 and 2 emissions in 2030 are 'Net Zero' (in line with the existing Sustainability Roadmap) for both the DM and DS scenario. As detailed in LCY's Sustainability Roadmap and CCCAP appended to the Climate Change chapter of the ES, LCY is also committed to influencing Scope 3 emissions. Specific measures identified in the CCCAP on influencing aircraft emissions include: ➢ Work with airlines to facilitate the first zero emissions flight from the airport within the next decade; ➢ Apply restrictions that permit only cleaner, quieter, new generation aircraft to fly in newly extended operating periods, thereby accelerating the take-up of newer more fuel-efficient aircraft; ➢ Alongside airlines, aircraft manufacturers and fuel suppliers review opportunities for providing the necessary storage and refuelling facilities needed to increase the usage of Sustainable Aviation Fuels (SAFs) by airlines, with an ambition to exceed the Government policy of 10% SAF use by 2030; ➢ Work with partners to adapt the airport's infrastructure and operating environment to facilitate the development and roll-out of new generation aircraft, the use of SAF, and emerging technologies for Zero Emission Aircraft (ZEA); ➢ Continue to examine any near- and longer-term requirements resulting from increased use of ZEA aircraft at the airport to ensure ZEA can be accommodated in the wider airport masterplan. ➢ Continue to support key electric flight initiatives across the aviation sector; ➢ Implement operational procedures to encourage single engine taxing and reduced use of auxiliary power units (APUs);

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		➢ Examine and implement policies to reduce taxing times and delays to aircraft on the ground; ➢ Continue to engage with Sustainable Aviation to drive long term policy for the sustainable growth of UK aviation; and ➢ Continue to track and monitor non-CO2 effects.
	CC8 - Further clarification should be provided regarding the evidence to justify the 1% of total emissions being scoped out when compared to the expected 5% value as detailed.	The assessment has excluded emissions embedded in food, beverage and consumables from the assessment, as: ➢ Any consumption of food and beverage whilst at the airport is unlikely to be additional to consumption that would occur if passengers did not fly. Whilst there might be marginal differences in patterns and types of consumption this is unlikely to be material. ➢ The consumption of food and beverages is not in the control of LCY and the need to influence dietary choices is not one specific to travelling through an airport but a national policy issue. ➢ There is significant uncertainty on the level of consumption as well as emissions factors for products consumed and bought at the airport. For the reasons provided above, the inclusion of embodied carbon of items bought and consumed at the airport (or indeed any airport) is not considered to be an emissions source that is worthy of detailed analysis. Notably, such emissions sources have not been considered in any recent airport expansion projects (for example Bristol, Stansted, Luton and Southampton). These applications have all been rigorously reviewed at both a local planning authority level, and during planning inquiries in front of the SoS. However, the airport has a limited role to play in influencing retailers and concessionaires and this is reflected in the proposed CCCAP.
	CC9 - Clarification should be provided to confirm the scoping out of emissions associated with repair and maintenance during the operational phase.	The Scoping Opinion did not request inclusion of such emission sources and they were not proposed in LCY's own Scoping Report. Moreover, the calculation of emissions from aircraft repair and maintenance is challenging due to lack of data and the fact that such activities are relatively infrequent at LCY. As such, it is not considered necessary, reasonable or proportionate to include such an assessment. Over the lifetime of a development, maintenance emissions are typically a smaller portion than the product stage (embodied carbon of materials e.g., stage A1 to A3 of WLCA) of a development. Embodied carbon from construction has been calculated in the assessment and represents 2.7% of total airport emissions between 2023 to 2032, and <1% of whole life emissions out to 2050. It therefore follows that emissions

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		from repair and maintenance will be less than1% of the whole life footprint and not material.
Potential Planning Conditions		
	CC7 - Operator Management Plan for zero emission decommissioning methods. [This could be put into the Climate Change and Carbon Action Plan (CCCAP), provided the CCCAP is secured by planning condition]	LCY are happy to include an Operator Management Plan for zero emission decommissioning methods as part of the Climate Change and Carbon Action Plan (CCCAP), to be secured by planning condition.
Chapter 11: Review of ES Chapter 12: Public Health and Wellbeing Summary of Comments/ Scope of Review		
This section summarises the information provided in the chapter including the approach to the baseline, the main assessment, and secondary, cumulative and combined effects – all "considered appropriate". The only matters queried with respect to the public health and wellbeing assessment are those raised by Air Pollution Solutions (APS), which again focus on air quality and UFP considerations. In total, twenty-three points of clarification are raised on this matter (PHW-AQ1 to PHW-AQ23)	PHW – AQ1- Clarification is required as to why using a population approach is the correct approach.	The relevant practitioner guidance for an assessment of human health as part of an environmental impact assessment (EIA) is that published by the Institute of Environmental Management & Assessment (IEMA). Pyper, R., *et al.* (2022) IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment. The guidance states: "*The guidance confirms that a population health approach should be taken when determining significance*." Further detail on the reason for a population health approach is set out in section 5 of the IEMA guidance.
	PHW – AQ2 - Clarification is required on the source of the information used to assess the impact of the proposals on UFP.	The ES Chapter 12 qualitative assessment of UFP is based on the scientific literature and professional judgement. Published international field-research to date neither shows evidence of UFPs having a large effect size on population health outcomes nor has a clear causal relationship been established for correlated outcomes. As noted in the Chapter 12 discussion of UFP magnitude, the relative change in other air pollutant types due to the project (as previously explained in Chapter 9) is informative to the professional judgement of the relative scale of changes in UFP. Chapter 12 is pragmatic and proportionate whilst acknowledging uncertainties and limitations. This is considered a reasonable approach for EIA purposes, aligning with the EIA Regulations 18(4)(b) requirement for the assessment to account of current knowledge and methods and the Schedule 4 paragraph 6 requirement to acknowledge uncertainties.
	PHW – AQ3 - Confirmation that the data is Appendix (9.4) is correct and that in Table 12.11 is not correct.	Appendix 9.4 is correct. The differences are very small. This 'errata' is not material and does not affect the conclusions of the ES health assessment. A revised table 12.11 is located in Appendix PHW-AQ3

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	PHW – AQ5 - Clarification is required how the impact on the passenger population has been assessed. [NB: the numbering has been replicated from the report for consistency]	The health assessment states, at paragraph 12.15.8: "The population groups relevant to this [air quality] assessment are… communities in the Chapter 9 zone of influence (1 km radius around the runway and the Transport Assessment road transport network extent) … In addition to residents near the Airport, this assessment qualitatively takes into account passengers, visitors and workers at the Airport in terms of any effect of short-term exposure to air pollutants indoors or outdoors." Paragraph 12.15.24 continues "…the health assessment considers the potential for exposures at all locations where people may be exposed. This consideration includes at the airport, where short-term exposures may arise due to the transitory presence of passengers and visitors. Exposures are likely to be greatest closest to sources, i.e. plant, road traffic and aircraft. Such effects include exposures outside as people arrive and depart, e.g. carparks and drop-off/pick-up points. They also include airside locations not generally accessible to the public, e.g. where staff are temporarily working on the aprons. …". The assessment is qualitative and follows the same methodology as for other aspects of the health assessment, i.e. Pyper, R., et al. (2022) IEMA Guide: Determining Significance for Human Health in Environmental Impact Assessment.
	PHW – AQ5 - Clarification required as to whether the chapter is referring to the limit values or objectives, or both throughout the Chapter.	The NPPF (para 186) states "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants..." The Objectives and Limit Values are numerically the same, but they apply at different places. For the health assessment the focus is on Objectives as they more accurately reflect public exposure. The reference to such statutory standards by the health assessment is as a relevant benchmark of concentration levels that are considered acceptable for the jurisdiction (see PHW – AQ6 clarification). It is not a technical analysis of whether statutory compliance has been achieved (e.g., as Limit Value compliance is judged by Defra). If there are minor inaccuracies in technical terminology usage of the terms 'limit value' or 'objective', which describe an equivalent benchmarking scale, such errata do not affect the health assessment conclusions.
	PHW – AQ6 - Clarification required on what the term 'regulatory thresholds' is referring to.	IEMA EIA health guidance (Pyper, R., *et al.* 2022) refers to 'regulatory thresholds or statutory standards' as an evidence source. The guidance states (para 8.19) "*The phrasing is intended to cover the formal standards adopted by national jurisdictions. This may include statutory air quality standards*."

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		The methodology for determining health significance (IEMA Guidance Table 7.4 and Chapter 12 Table 12.5) references 'regulatory thresholds'. The tables distinguish between the potential crossing or approaching of regulatory thresholds due to the project as being a factor indicating a significant effect. By contrast, where the change is well within the regulatory threshold, or where a 'guideline' is crossed (such as the WHO guidelines) this is indicative of a minor adverse (not significant effect).
	PHW – AQ7 - Clarification is required on why Paragraph 12.15.5 and Table 12.11 have ignored the 2029 assessment.	2029 was included in the ES air quality chapter as a sensitivity test for the worst-case construction year. The results are very similar to in data for 2027 presented in Table 12.11 and do not affect the health assessment conclusions. For completeness, though not required by the health assessment, the summary data for 2029 is appended to this report.
	PHW – AQ8 - Clarification is required regarding why aviation emissions are less important than road traffic emissions.	The health assessment is simply indicating that the dominant source of air pollution exposure to the population in proximity to airports is related to surface access (i.e. road transport) not due to aviation emissions. There is no inference that aviation emissions are less important.
	PHW – AQ9 - Clarification is required on what constitutes a community building.	The health assessment use of the term 'community buildings' is not a technical term, but covers non-residential receptors identified in the air quality assessment model. In the ES air quality assessment, specific receptors were chosen to be representative of worst-case locations. I.e. those likely to experience the highest concentrations or greatest increase in concentrations where there is relevant exposure (including schools, hospitals and residential institutions). Not every location of relevant exposure was assigned a specific receptor, but all were covered by the grid of receptors. Concentrations at any particular location can therefore be inferred from the contour plots.
	PHW – AQ10 - Clarification is required on the literature that supports the statement regarding thresholds being set for health protection purposes.	The text of health assessment in question is making a general point about the importance of considering non-threshold air quality effects below the thresholds set in regulatory thresholds. The cited references relate to non-threshold effects of $PM_{2.5}$ and NO_2. It is not considered necessary to provide references to substantiate that statutory air quality standards in the UK are informed by evidence from the scientific literature and have a health protection purpose.
	PHW – AQ11 - Clarification is required on the weight given to the non-threshold effects of NO2 and PM2.5 on population health in the assessment.	Being a qualitative assessment in line with IEMA guidance methodology, there are not quantitative weightings applied to each criterion or evidence source informing the professional judgments. In relation to the non-threshold effects of $PM_{2.5}$ and NO_2 the 'weight' given to this is the difference between a finding of an effect of negligible significance and a finding of a minor adverse effect. On the four-score category scale of the IEMA health

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
		in EIA significance methodology, this is an influential weighting for the issue. As stated in Chapter 12 paragraph 12.15.26 "*The minor adverse (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO_2, and $PM_{2.5}$.*"
	PHW – AQ12 - Clarification is required that the conclusions would have remained the same of the WHO guidelines had been used instead of the limit values and/or national objectives. This is to give members of the public confidence that the thresholds used will protect human health.	The health assessment is in line with EIA practitioner guidance (Pyper, R., *et al.* 2022) and a planning policy (NPPF) approach of having regard to compliance with national statutory standards. The health assessment conclusion also reflects there is a very small scale of change in air pollutants due to the project. Regard has also been given to the baseline context, the WHO guidelines and to non-threshold effects. Non-threshold effects, by definition, operate down to zero, much lower than even the WHO guideline levels. Neither the UK statutory standards nor the WHO guidelines have been used as a single definitive basis for determining if the effect is significant or not for public health. As advocated by the IEMA guidance, an evidence-based professional judgement is reached that is informed by a range of evidence sources. This includes scientific literature, regulatory standards, baseline conditions and policy context. Had the changes been in the context of future baseline concentrations that exceeded relevant statutory thresholds, it would remain relevant to consider if the project was causing widespread exceedances or whether the exceedances were driven by background levels. This is clearly stated in the health significance methodology (IEMA Guidance Table 7.4 and Chapter 12 Table 12.5) e.g. "*Change, due to the project, could result in a regulatory threshold or statutory standard being crossed*". For these reasons the same conclusion on EIA significance would likely be reached even if the WHO guidelines were elevated in status above the national statutory standards (which is not considered correct in planning terms). As explained in the response to PHW – AQ11, the assessment clearly states at paragraph 12.15.26 "*The minor adverse (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO_2, and $PM_{2.5}$.*" The assessment is therefore already going beyond the WHO guidelines.
	PHW – AQ13 - Further evidence is required to support the conclusion that the health effects of exposure to air pollution from the proposals is minor adverse (not significant).	A proportionate level of information has been provided, cross-referenced or referenced in ES Chapter 12. Given agreement on the conclusions, it is unclear from the clarification request what further evidence is sought. Ultimately, the determination of EIA significance is a professional judgment. The scientific literature referenced within Chapter 12 is illustrative of the most relevant health outcomes; it is not intended to be exhaustive of all sources or of all health outcomes. It is agreed that there are other systematic reviews that make similar points. Whilst these could be referenced, they would not change the conclusions reached. IEMA

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		guidance (para 6.11) directs that "*Ensure conclusions provide a suitable concise narrative to evidence a reasoned conclusion of the public health implications for the relevant context…. Reporting should summarise key considerations and supporting evidence*." Paragraph 6/17 continues "… *take a proportional approach to the depth of evidence gathering, analysis and reporting in the EIA health chapter*".
	PHW – AQ14 - Clarification is required on whether children at schools located near to the airport have been explicitly considered in relation to health effects rather than air quality compliance.	ES paragraph 12.15.8 confirms that the study area includes a 1 km radius around the runway and the Transport Assessment road transport network extent. Furthermore, the paragraph confirms that consideration has been given to young age vulnerability (children, young people and pregnant women). Children, whether at school, at home, or in other contexts, have been considered. Paragraph 12.15.9 notes their particular susceptibility to air pollution and paragraph 12.15.11 notes that the baseline indicates higher than average numbers of young people in the 12 wards around the airport compared to national averages.
	PHW – AQ15 - Clarification is required regarding the weight, if any, given in the assessment to the limit values, national objective, WHO guidelines and non-threshold effects.	See responses to PHW – AQ11 and PHW – AQ12. Both national air quality standards and WHO guidelines have been given weight. In line with national planning policy (NPPF) and IEMA Guidance, more weight is given to the national standards as a benchmark for determining what is considered acceptable for the particular jurisdiction, i.e. England context. The point is somewhat moot as the level of change due to the project is very small, so the project is not driving an exceedance of either national or WHO thresholds.
	PHW – AQ16 - Clarification required on how the non-threshold effects of NO2 and PM2.5 were taken into account in determining the significance.	See response to PHW – AQ11.
	PHW – AQ17 - Clarification is required to be provided on how the health effects on passengers has been assessed, including the increased number of passengers.	See response to PHW – AQ5.
	PHW – AQ18 - Clarification on how the health assessment of UFP was undertaken as it is not based on the results of a technical assessment.	See response to PHW – AQ2.
	PHW – AQ19 + PHW-AQ20 - Further information is required on how the UFP assessment reached the conclusion that there will be a small effect as the health effect	See response to PHW – AQ2. ES paragraph 12.16.17 states the magnitude of change due to the project and provides a proportionate evidence-based narrative explaining the professional judgement for this conclusion.

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	evidence presented in the ES does not quantify the magnitude of the effect, only the type of effect.	
	PHW – AQ21 - Clarification is required on whether the need for larger aircraft to serve the increasing number of passengers whilst meeting the current cap of air traffic movements has bene considered in the assessment.	The aircraft fleet mix in each future DM and DC scenario has been explicitly defined in the ES air quality chapter, which has been used in the modelling assessment, and which has informed the ES health chapter assessment.
	PHW – AQ23 - Clarification is required on why the impact on UFP/health is considered conservative	A conservative assessment approach is where the professional judgment gives the benefit-of-the-doubt, where elements of the evidence informing the assessment has uncertainty. In this case, as there is considerable uncertainty surrounding UFPs (see response to PHW – AQ2). It may be that the effect of the project's change in UFPs to public health is in fact negligible, and such a conclusion might reasonably be reached based on the available evidence. In this case, erring on the side of potentially overstating rather than understating the risks, the professional judgment conservatively concludes that the effect is minor adverse. Whether it is agreed or not that the assessment is 'conservative' there is agreement that the minor adverse score is reasonable. The point is therefore not material.
Potential Planning Conditions		
	PHW-AQ24 & PHW-AQ25 - The Airport's Air Quality Management Strategy should be revised to: ➢ Include the monitoring of ultra-fine particles (particle number and size) and approved by LBN within 6 months of consent being granted. ➢ To provide an annual review of the aviation fleet, fuel sulphur content, fuel consumption, and SAF, hydrogen and electric update. The first annual review should be for the year 2025 and submitted to LBN by April 2026, and subsequent review to be submitted to the council in the April of each year.	PHW-AQ24: See response to AQ9. PHW-AQ25: See response to the potential planning condition in the AQ chapter commentary.
Review of ES Chapter 13: Other Environment Topics Summary of Comments/ Scope of Review		

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
This section of LUC report covers the following sub-section of Chapter 13: • Water Resources and Flood Risk – one clarification **(WR1)** in text which is not repeated in the summary table at the end of the section. • Ecology and Biodiversity – two points of clarification (**ECO1** and **ECO2**). • Ground Conditions and Contamination – no clarifications but one comment on planning condition 39. • Cultural Heritage – five points of clarification **(CH1, CH2, CH3, CH4 and CH5)** • Townscape & Visual Impact – no points of clarification • Major Accidents and/or Disasters – no points of clarification.	WR1 (referred to at para 12.5) - The applicant should consult with Thames Water to confirm that sufficient capacity is available (for both potable water supply and wastewater) for the increased passenger traffic.	The airport is in regular contact with Thames Water regarding its water supply and drainage requirements. They have not expressed any concerns regarding the capacity of their utilities to provide for the future growth of the airport. Thames Water have been consulted by LBN on the application, but we are not aware of any response.
	ECO1 - LCY has committed to a biodiversity fund to support local projects and achieve biodiversity net gain off site, clarification would therefore be welcomed as to how biodiversity net gain will be assessed and achieved off site.	In our opinion there is no statutory or policy basis for undertaking a biodiversity net gain (BNG) calculation, on or off-site, given that the S73 application does not seek to vary the original CADP1 planning permission with respect to the form and spatial extent of the approved buildings and infrastructure. Moreover, the statutory provision of 10% BNG in accordance with the Environment Act, does not come into effect until November 2023. In essence, there will be no associated loss of habitats or related impacts to ecology which would necessitate any on- or off-site replacement or other compensation. However, as set out in Chapter 13 of the ES (Para 13.4.16 to para 13.4.17) Condition 56 of the CADP1 planning permission requires LCY to develop and implement a Sustainability and Biodiversity Strategy. This Strategy is reviewed every 3 years, with the latest iteration produced in 2021 setting out new targets, actions and initiatives to enhance biodiversity off-site and to promoting access to, and the appreciation of, biodiversity in the wider community. Targets set out in the Strategy include providing £10,000 a year to LBN for educational biodiversity and environmental programmes for the local community from 2023 onwards. In addition, as part of LCY's Sustainability Roadmap which was published in 2022, a new biodiversity fund of £25,000 has also been committed to which will further support local projects to enhance nature and achieve biodiversity net gain

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		off site. It is for the recipients of these funds to determine and, where appropriate, measure how they achieve biodiversity net gain.
	ECO2 - An eradication or management plan is recommended for the removal of buddleia. Clarification regarding details of this plan, controls and replacement habitat is therefore sought.	Agreed. LCY's maintenance team will develop a buddleia eradication plan in accordance with Natural England, Defra and Environment Agency Guidance – 'How to stop the spread and dispose of invasive non-native plants that can be harmful to the environment in England' (February 2022). This will likely entail cutting the plants down to ground level and inserting slow-release herbicide plugs to kill off the root system. This eradication programme will commence in summer 2023.
	CH1 - The Applicant is to clarify, e.g. with reference to relevant figure numbers, where in the UES more detailed information on receptors can be found so readers of the ES can transparently interrogate the summary presented in the present application.	Heritage receptors are described in the Heritage Asset Baseline Summary of Chapter 14: Cultural Heritage of the UES (paragraphs 14.90 to 14.97) and in the accompanying Desk Based Assessment (Appendix 14.1).
	CH2 - The Applicant is also to clarify the grade of the listed war memorial at the former St Mark's Church as grade information of this asset appears to be missing.	The Newham War Memorial in the grounds of St Mark's Church is Grade II listed (list entry number 1430662)
	CH3 - The Applicant is to clarify which sections of the 2015 UES present the full assessment of effects to receptors within this topic.	Given that the s73 application does not include any new physical infrastructure which might impact upon archaeology or built heritage assets and that LBN agreed that this topic could be scoped out, there is no need for readers to "interrogate the original conclusions" of the 2015 UES. Instead, it is considered that the summary provided in section 13.5 of the 2022 ES, is more than sufficient to provide context to this scoped-out topic. However, should the reader wish to review the previous assessment, this can be found in Chapter 14 of the 2015 UES.
	CH4 - The Applicant is to clarify which sections of the 2015 UES refer to cumulative effects.	Chapter 17 of the 2015 UES describes the sites that are considered as possibly creating significant cumulative ('in combination') effects with the CADP1. This assessment was completed following a review of other developments and planning applications in proximity to the airport and, where available, environmental and heritage statements submitted with such applications. Other schemes considered included Royal Albert Basin / IVAX Quays / Great Eastern Quays masterplan, together with the ABP Royal Albert Docks, Silvertown Quays and Gallions Quarter schemes. No significant adverse cumulative effects with CADP1 were identified.
	CH5 - The Applicant is to clarify where any reports arising from this process may be found (e.g. deposited with the Greater London	This comment refers to Condition 62: Archaeology attached to the CADP1 planning permission which requires the implementation of a programme of archaeological evaluation in accordance with a Written Scheme of

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
	Historic Environment Record and associated report references) so that readers of the ES can understand the mitigation carried out and its findings.	Investigation (WSI). A WSI was agreed with the LPA's Archaeological Adviser (GLAAS) and submitted to and approved by LBN (ref: 17/00508/AOD). This report can be readily located by searching on LBN's planning portal using this application reference number. The reports of the archaeological investigation works undertaken to-date, namely (a) Geo-archaeological boreholes with sub-surface topographic modelling and (b) 'Level 2' photographic record of KGV Dock, have been deposited with London Archaeological Archive and Research Centre (LAARC) according to current guidance http://www.museumoflondon.org.uk/collections-research/laarc/standards-deposition
Potential Planning Conditions		
	GC1 - Ensure that Condition 39 either remains in force or is updated for the current proposed works.	This is agreed. The previous 2019 report and accompanying Piling Risk Assessment (PRA) submitted in accordance with Condition 39 (Contamination) had a specific focus on preventing pollution during the piling & deck works in KGV Dock. Therefore, this document will need to be amended in due course to deal solely with the remaining landside construction works.
Chapter 13: Review of Chapter 14: Cumulative Effects		
Summary of Comments/ Scope of Review		
LUC make two comments in the text: Para 13.2 - "LBN should satisfy themselves that the [cumulative] schemes considered are appropriate and proportionate." and Para 13.4 (in respect of the NTS) - "it would be helpful to include a summary of this information so that the reader does not have to access the more technical main report to understand the details of the likely cumulative effects of the Proposed Development." However, neither of these comments results in an itemised request for clarification.	No Reg 25 matters or clarifications identified.	The two observations are noted. However, there are no stated 'clarifications' to address currently.
Chapter 14: Review of Chapter 15: Mitigation and Residual Effects		
Summary of Comments/ Scope of Review		
There is one point of clarification raised by LUC **(MRE1)**. This relates to the fact that the Surface Access chapter of the ES concludes that the impacts	MRE1 - Clarity should be provided regarding the significance of impacts on Hartmann Road.	This is a slightly nuance point, but we would happily accept that the predicted "minor to moderate" impacts on Hartmann Road should have

LUC Report Chapter	Clarification/ Issue Raised (inc. Ref)	Response from Specialist (including whether the issue was raised at scoping stage)
of changes to daily traffic flows on Hartmann Road are “minor to moderate” which are then classified as “not significant”, and this chapter (Table 15.1) describes these impacts as “slight adverse to moderate negative (not significant) in 2031”.		been stated in Table 15.1 rather than the use of the term “slight”. However, this has no material implications on the conclusions of the ES.

Table 2 Summary of Comments Raised by Rupert Thornley-Taylor on Noise Assessment

Summary of Comments Raised by Rupert Thornley-Taylor on Noise Assessment		
Issue	**Specific Comment**	**Initial Response from BAP**
Scoping out of Vibration from Construction	Some of the construction activity includes the use of a ‘vibratory roller’. It would be desirable to present the results of a check that vibration effects from it at sensitive receptors would not be significant.	Vibration from construction activity was scoped out, as set out in the scoping report, on the basis that the piling works for the apron extension had been completed without issue. The level of vibration produced by the ‘vibratory roller’ is lower than from piling, and the areas where it is to be used are 90 – 100 m distant from the nearest sensitive receptors.
Noise Indices	The ES departs from established convention by including some night movements in the daytime noise contours.	As acknowledged in the ES, the contours produced for the daytime period are based on the period 06:30 – 22:30 rather than the conventional period 07:00 – 23:00. This is done because 06:30 – 22:30 are the operational hours at LCY, i.e. there are no flights after 22:30. This has been the standard approach at LCY for many years, was undertaken for the CADP application and is also used when checking compliance with the noise contour limit. The effect, compared to following the conventional approach, is that the daytime noise contours will be slightly larger, due to the relatively small number of movements before 07:00 being added to the much larger number of movements in the 07:00 to 22:30 period.
Noise Indices	The ES also departs from convention by including a specific assessment for the weekend period.	A feature of the application is the change to the operating hours on a Saturday and the consequential change to activity at the weekend. This was acknowledged by the applicant during scoping where a specific assessment was included. The LBN scoping response concluded that a separate consideration of weekend daytime noise seemed appropriate. A similar approach of a weekend assessment has been used before when Farnborough Airport applied to increase

		the permitted number of weekend movements at that airport.
Noise Indices	Significance of change above the SOAEL.	For the CADP application, in order to be considered potentially significant a change of at least 3 dB was required when above the SOAEL. As set out in the scoping report this was revised to at least 2 dB for this assessment, in part following recent applications. No reference was made to the Luton inquiry as it had not reported at the time. We are not aware of this lower threshold being used in any recent applications at other airports.
Accuracy of Assumptions	Performance of new generation types.	At the Luton inquiry the issue of concern was the performance of the Airbus A321neo, which showed a smaller improvement than expected, and that achieved by other re-engined types. This was based on measurements at the airport monitors, rather than more distant locations. The Airbus A321neo is not a type that will operate at LCY. Regarding the Airbus A220-100 and Embraer E190-E2 these aircraft are already in service at LCY. Therefore, the modelled performance is based on measured results from the noise monitoring system around LCY and so is representative of the area where significant effects in the context of formal environmental assessment could arise. It should be noted that the airborne aircraft noise has been computed using the methodology set out in the Air Noise Contour Validation 2022 Assessment which was approved by LBN.
Overall Outcome	Avoidance of noise exposure above the SOAEL is achieved by the provision of sound insulation. The take up and effectiveness of the sound insulation offered should therefore be explored.	For noise exposure above the SOAEL the current scheme has two tiers. The first applies to those exposed to the highest noise levels, at least 66 dB $L_{Aeq,16h}$, and has a very high take up rate for the acoustic glazing and ventilation arrangements that it includes. The current tier for those exposed to just above the SOAEL has a significantly lower take up and consequently as part of the application it is proposed to enhance this tier of the scheme. The value of the grant available for works will increase. There will also be changes to the management of the scheme, so the airport deals with the contractor. This replaces the current process whereby the resident pays for the works initially, and then makes a claim under the scheme. These changes are expected to greatly improve the take up.

Gap in assessment – respite	Reference has not been made to work which has been carried out at other airports, including Heathrow, into the value of periods of respite.	Although work has been undertaken looking into respite, as noted it has not been in relation to the change sought at the weekend. That work has also highlighted the importance of non-acoustic factors which means that its findings are of limited relevance to this application. The research also does not lead to a method of determining the significance of any changes in respite in an ES context.
Gap in assessment – sleep disturbance	The additional population likely to be highly sleep disturbed is not reported.	Table 8-34 of Chapter 8 of the ES contains the calculated number of people highly sleep disturbed both with and without the proposed application. The finding is the number of people highly sleep disturbed will initially increase in 2025 with the application. However, by 2031 the number of people highly sleep disturbed with the application is expected to decrease so that is it only slightly higher than in 2019 and slightly lower than is predicted for 2031 without the application. As noted, this is without allowing for the properties currently treated under the noise insulation scheme or those that are expected to be treated under the proposed enhanced scheme, which would be expected to further reduce sleep disturbance.
Issues raised in consultation – airspace changes	It is questioned whether airspace changes would be required due to the application.	The S73 application does not seek any increase to the permitted number of annual movements, or to departure or arrival routes. Therefore, the current airspace around the airport is sufficient to accommodate the application. Should any airspace change be sought, unrelated to the this S73 application, it would need to be fully assessed and the regulator would be looking for environmental improvements before giving permission.
Issues raised in consultation – impact of the transport network	The ES does not address possible changes in the frequency or timing of train services on the Docklands Light Railway.	No changes to the frequency or timing of the DLR are proposed as part of the S73 application.
Issues raised in consultation – delayed departures and arrivals	The London Borough of Lewisham has commented “It remains unclear why additional flexibility is sought for delayed departures and arrivals…’	Although seeking greater flexibility for delayed flights was considered during the pre-application consultation over the summer of 2022, following feedback, it was decided not to pursue any changes to the current limits on delayed departures and arrivals in the S73 application.
Matters to be taken into account – Social survey	A local social survey is put forward as an option to find out the significance of the proposed change in respite.	We are not aware of any requirement or previous approaches whereby a social survey is carried out as part of an ES. Prior to submitting the S73, the airport undertook a comprehensive pre-application consultation exercise over a

		period of twelve weeks in summer 2022. The feedback was taken into account and informed the eventual S73 application. A Statement of Community Involvement has been submitted with the application. Therefore, a social survey is neither appropriate or necessary at this juncture, given the extent of pre-application public consultation undertaken by the airport and the fact that local residents and other interested parties have had ample opportunity (over four months) to submit comments to the Council in response to its own consultation on the application.
Matters to be taken into account – Quota Count system	It would be possible to look forward to the forecasts in future years given in the ES and to set out accompanying provisional future limits for the ANCS system.	The ANCS is regularly reviewed as required by a CADP planning condition. The last review was in March 2022 and has been approved by LBN.
Matters to be taken into account – Noise Contour Limit	The current noise contour limit, a CADP planning condition, could be revised to reflect the areas now forecast.	In addition to setting a contour area limit, the planning condition requires a Noise Contour strategy be submitted to the local authority for approval. This was submitted in October 2022 and subsequently approved by LBN. The airport is required to operate this strategy which aims to reduce the area of the contour by 2030 and beyond.

Appendix A

Table AQ10-1: Breakdown of the aircraft LTO emissions: NOx emissions (kg)

	2019	2025DM	2027DM	2029DM	2031DM	2025DC	2027DC	2029DC	2031DC
A318	2,318	0	0	0	0	0	0	0	0
AT45	0	2,396	2,396	2,396	2,396	2,396	2,396	2,396	2,396
AT75	874	2,189	2,189	2,189	2,189	2,189	2,189	2,189	2,189
B462	1,055	0	0	0	0	0	0	0	0
BCS1	14,018	14,864	14,864	22,285	22,285	15,315	15,789	28,623	31,578
C680	655	2,082	2,915	3,747	3,747	2,082	2,082	2,082	0
C68A	609	0	0	0	0	0	0	0	0
CL35	10	2,122	2,971	3,820	3,820	2,122	2,122	2,122	0
DH8D	19,852	6,397	6,397	6,397	6,397	6,564	6,739	6,739	6,739
E170	27,934	0	0	0	0	0	0	0	0
E190	175,795	218,628	214,421	159,640	93,138	202,452	72,181	55,412	65,910
E290	0	11,893	21,783	72,675	130,082	42,609	163,324	184,421	189,203
E295	0	0	7,923	29,940	35,300	0	52,534	62,298	87,599
E35L	0	321	449	578	578	321	321	321	0
FA7X	845	1,450	2,030	2,610	2,610	1,450	1,450	1,450	0
GLEX	433	768	1,075	1,382	1,382	768	768	768	0
J328	1,576	1,806	1,806	1,806	1,806	1,806	1,806	1,806	1,806
RJ85	9,273	0	0	0	0	0	0	0	0
Other	1,561	0	0	0	0	0	0	0	0
APU	5,728	5,444	5,844	6,502	6,502	5,758	6,750	7,242	7,739
Engine Testing	1,032	1,062	1,128	1,242	1,227	1,123	1,299	1,406	1,553
Total	**263,568**	**271,423**	**288,191**	**317,208**	**313,458**	**286,955**	**331,750**	**359,275**	**396,713**

Table AQ10-2: Breakdown of the aircraft LTO emissions: PM10 emissions (kg)

	2019	2025DM	2027DM	2029DM	2031DM	2025DC	2027DC	2029DC	2031DC
A318	24	0	0	0	0	0	0	0	0
AT45	0	8	8	8	8	8	8	8	8
AT75	3	8	8	8	8	8	8	8	8
B462	19	0	0	0	0	0	0	0	0
BCS1	91	96	96	143	143	99	102	184	203
C680	6	18	25	33	33	18	18	18	0
C68A	5	0	0	0	0	0	0	0	0
CL35	0	42	59	75	75	42	42	42	0
DH8D	55	18	18	18	18	18	19	19	19
E170	237	0	0	0	0	0	0	0	0
E190	1,535	1,900	1,864	1,388	810	1,760	627	482	573
E290	0	83	153	509	912	299	1,145	1,292	1,326
E295	0	0	58	220	259	0	386	458	643
E35L	0	3	5	6	6	3	3	3	0
FA7X	19	30	43	55	55	30	30	30	0
GLEX	14	25	35	45	45	25	25	25	0
J328	14	16	16	16	16	16	16	16	16
RJ85	186	0	0	0	0	0	0	0	0
Other	23	2	2	3	3	2	2	2	0
APU	316	274	296	329	329	289	335	358	374
Engine Testing	6	5	6	6	6	6	6	6	7
Total	**2,552**	**2,529**	**2,689**	**2,861**	**2,725**	**2,621**	**2,771**	**2,950**	**3,176**

Table AQ10-3: Breakdown of the aircraft LTO emissions: $PM_{2.5}$ emissions (kg)

	2019	2025DM	2027DM	2029DM	2031DM	2025DC	2027DC	2029DC	2031DC
A318	21	0	0	0	0	0	0	0	0
AT45	0	3	3	3	3	3	3	3	3
AT75	1	3	3	3	3	3	3	3	3
B462	18	0	0	0	0	0	0	0	0
BCS1	73	77	77	116	116	80	82	149	164
C680	5	17	23	30	30	17	17	17	0
C68A	5	0	0	0	0	0	0	0	0
CL35	0	40	56	72	72	40	40	40	0
DH8D	25	8	8	8	8	8	8	8	8
E170	207	0	0	0	0	0	0	0	0
E190	1,335	1,652	1,620	1,206	704	1,529	545	419	498
E290	0	67	123	412	737	241	925	1,044	1,071
E295	0	0	46	175	206	0	307	364	512
E35L	0	3	4	5	5	3	3	3	0
FA7X	18	29	40	51	51	29	29	29	0
GLEX	13	24	34	43	43	24	24	24	0
J328	13	15	15	15	15	15	15	15	15
RJ85	172	0	0	0	0	0	0	0	0
Other	19	1	1	1	1	1	1	1	0
APU	316	274	296	329	329	289	335	358	374
Engine Testing	6	5	6	6	6	6	6	6	7
Total	**2,246**	**2,218**	**2,356**	**2,476**	**2,330**	**2,287**	**2,343**	**2,483**	**2,656**

Table AQ11: Summary of Hourly Movements (2031) For A Busy Day

	Do Minimum case				Development Case		
Hour	Arrivals	Departures	Total		Arrivals	Departures	Total
06	1	4	5		1	8	9
07	14	15	29		18	16	34
08	18	16	34		21	20	41
09	11	13	24		13	17	30
10	9	10	19		10	10	20
11	7	8	15		9	10	19
12	9	2	11		11	3	14
13	3	7	10		4	8	12
14	6	9	15		9	10	19
15	7	7	14		9	12	21
16	9	6	15		10	6	16
17	13	12	25		16	16	32
18	18	16	34		22	19	41
19	13	17	30		15	21	36
20	7	8	15		9	9	18
21	6	0	6		9	0	9

Table AQ12: Road traffic speeds and fleet composition

		Percent HDVs								
Link name	Speed (km/h)	2019	2025DM	2027DM	2029DM	2031DM	2025DC	2027DC	2029DC	2031DC
Royal Docks Road	48	7%	5%	5%	5%	5%	5%	5%	5%	5%
Woolwich Manor Way (north of rdbt)	36	9%	13%	13%	13%	13%	13%	13%	13%	12%
Royal Albert Way (east of Cyprus DLR)	49	5%	6%	5%	5%	4%	6%	5%	5%	4%
Woolwich Manor Way (south of rdbt)	41	2%	6%	7%	7%	7%	6%	7%	7%	7%
Pier Road	37	8%	8%	9%	10%	10%	8%	9%	10%	10%
Connaught Road (east of Hartmann Road)	33	12%	11%	11%	11%	14%	11%	11%	11%	14%
Hartmann Road (east of Connaught Road) - Western Airport Access	30	6%	10%	11%	10%	11%	10%	9%	9%	8%
Hartmann Road (West of Albert Road) - Committed Eastern Airport Access	30	0%	0%	0%	0%	11%	29%	35%	21%	8%
Connaught Road (east of rdbt)	33	8%	9%	9%	8%	9%	9%	8%	8%	8%
Connaught Road (west of rdbt)	36	8%	9%	9%	8%	9%	9%	8%	8%	8%
Connaught Bridge (south)	40	6%	8%	7%	7%	7%	8%	7%	7%	7%
North Woolwich Road (east of rbdt)	26	5%	7%	8%	8%	8%	7%	8%	8%	8%
North Woolwich Road (west of rbdt)	32	8%	9%	8%	8%	8%	9%	8%	8%	8%
Connaught Bridge (north)	44	6%	7%	7%	6%	6%	7%	7%	6%	6%
Royal Albert Way (west of Stanfield Road)	46	6%	7%	7%	6%	6%	7%	7%	6%	6%
Victoria Dock Road	44	3%	7%	6%	6%	6%	7%	6%	6%	6%
Lower Lea Crossing (East of East India Dock Road)	55	7%	6%	5%	5%	5%	6%	5%	5%	5%

		Percent HDVs								
Link name	**Speed (km/h)**	**2019**	**2025DM**	**2027DM**	**2029DM**	**2031DM**	**2025DC**	**2027DC**	**2029DC**	**2031DC**
Aspen Way (West of Slip to Lower Lee Crossing)	64	7%	7%	6%	6%	6%	7%	6%	6%	6%
A13 East of A102	43	8%	7%	7%	7%	7%	7%	7%	7%	7%
Leamouth Road	38	6%	4%	4%	4%	4%	4%	4%	4%	4%
Silvertown Way (Slip to Lower Lea Crossing)	41	8%	7%	7%	7%	6%	7%	7%	7%	6%
Silvertown Way (Overpass)	31	7%	9%	9%	8%	8%	9%	9%	8%	8%
Silvertown Way (Between Caxton Street and Hallsville Road)	35	8%	6%	6%	6%	5%	6%	6%	6%	5%
Blackwall Tunnel Northern Approach A12 (South of Abbott Road)	70	5%	4%	4%	4%	4%	4%	4%	4%	4%
Limehouse Tunnel	48	8%	7%	7%	7%	7%	7%	7%	7%	7%
West India Dock Road (West of Caster Lane)	42	5%	5%	5%	5%	5%	5%	5%	5%	5%
Aspen Way (East of Upper Bank Street)	52	7%	6%	6%	6%	6%	6%	6%	6%	6%
Blackwall Tunnel Southern Approach A12 (South of Boord Street)	67	6%	5%	5%	5%	5%	5%	5%	5%	5%
Blackwall Tunnel Southern Approach A12 (North of Peartree Way)	**72**	**6%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**

AQ22-1: Breakdown of emissions: NOx emissions (kg), sensitivity scenarios

Table AQ22-1: Breakdown of emissions: NOx emissions (kg), sensitivity scenarios

	2029 Faster Growth	2033 Slower Growth
A318	0	0
AT45	2,396	2,396
AT75	2,189	2,189
B462	0	0
BCS1	24,157	31,578
C680	0	0
C68A	0	0
CL35	0	0
DH8D	6,739	6,739
E170	0	0
E190	65,910	59,600
E290	193,155	195,501
E295	89,566	87,220
E35L	0	0
FA7X	0	0
GLEX	0	0
J328	1,806	1,806
RJ85	0	0
Other	0	0
APU	7,739	7,739
Engine Testing	1,547	1,551
GSE	1,614	1,614
Stationary sources	506	506
Car Parks	209	155

	2029 Faster Growth	2033 Slower Growth
Total Airport Related	**397,534**	**398,594**

Table AQ22-2: Breakdown of emissions: PM_{10} emissions (kg), sensitivity scenarios

	2029 Faster Growth	2033 Slower Growth
A318	0	0
AT45	8	8
AT75	8	8
B462	0	0
BCS1	155	203
C680	0	0
C68A	0	0
CL35	0	0
DH8D	19	19
E170	0	0
E190	573	518
E290	1,354	1,370
E295	658	641
E35L	0	0
FA7X	0	0
GLEX	0	0
J328	16	16
RJ85	0	0
Other	0	0
APU	374	374

	2029 Faster Growth	2033 Slower Growth
Engine Testing	7	7
GSE	123	123
Stationary sources	20	20
Car Parks	20	15
Total Airport Related	**3,333**	**3,321**

Table AQ22-3: Breakdown of emissions: $PM_{2.5}$ emissions (kg), sensitivity scenarios

	2029 Faster Growth	2033 Slower Growth
A318	0	0
AT45	3	3
AT75	3	3
B462	0	0
BCS1	126	164
C680	0	0
C68A	0	0
CL35	0	0
DH8D	8	8
E170	0	0
E190	498	450
E290	1,094	1,107
E295	523	510
E35L	0	0
FA7X	0	0
GLEX	0	0

	2029 Faster Growth	2033 Slower Growth
J328	15	15
RJ85	0	0
Other	0	0
APU	374	374
Engine Testing	7	7
GSE	123	123
Stationary sources	20	20
Car Parks	20	15
Total Airport Related	**2,814**	**2,800**

AQ21: Sensitivity of road vehicle emission factors

Supporting figures.

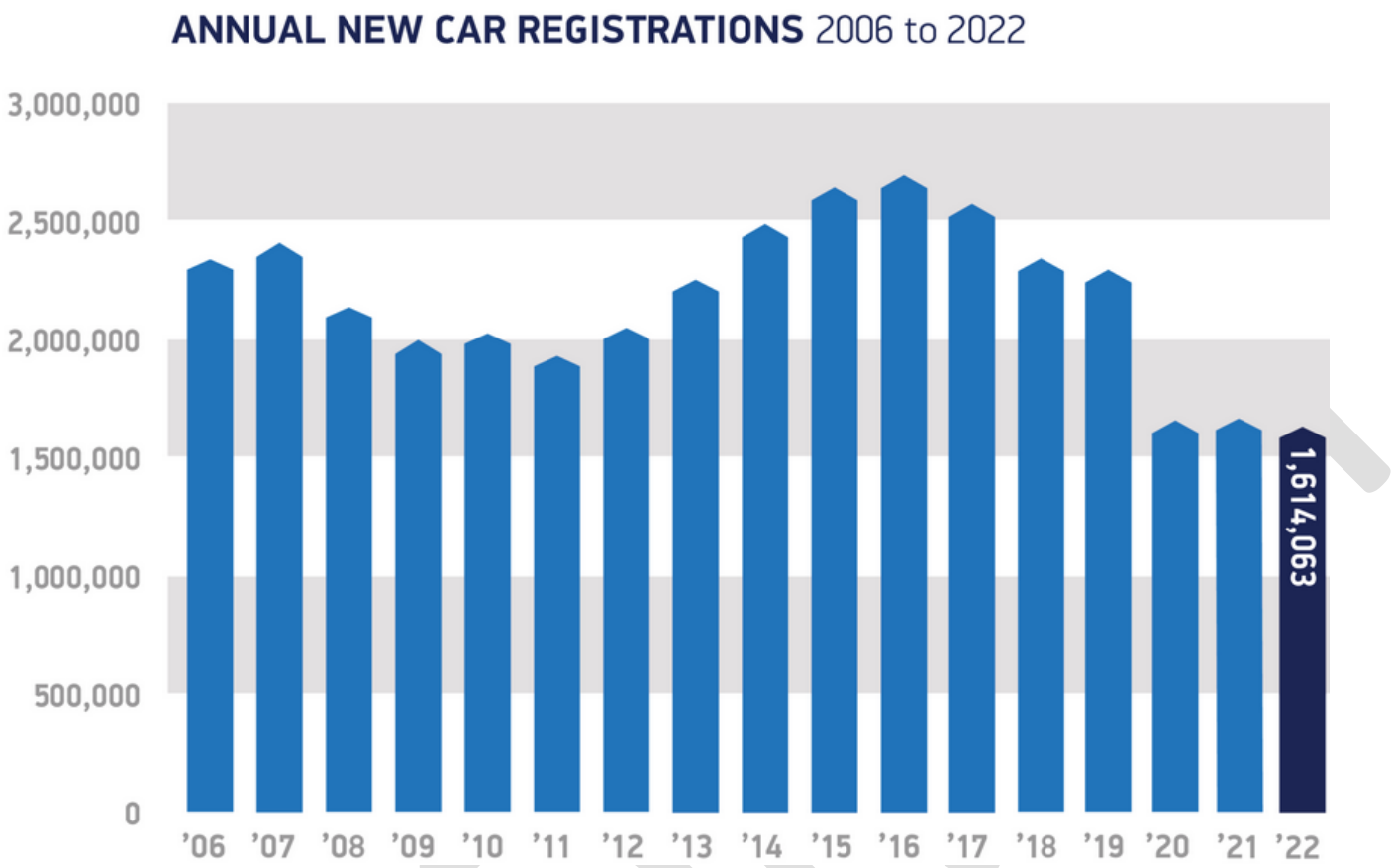


Figure AQ22-1: Long-term car registrations (source: Society for Motor Manufacturers and Traders)

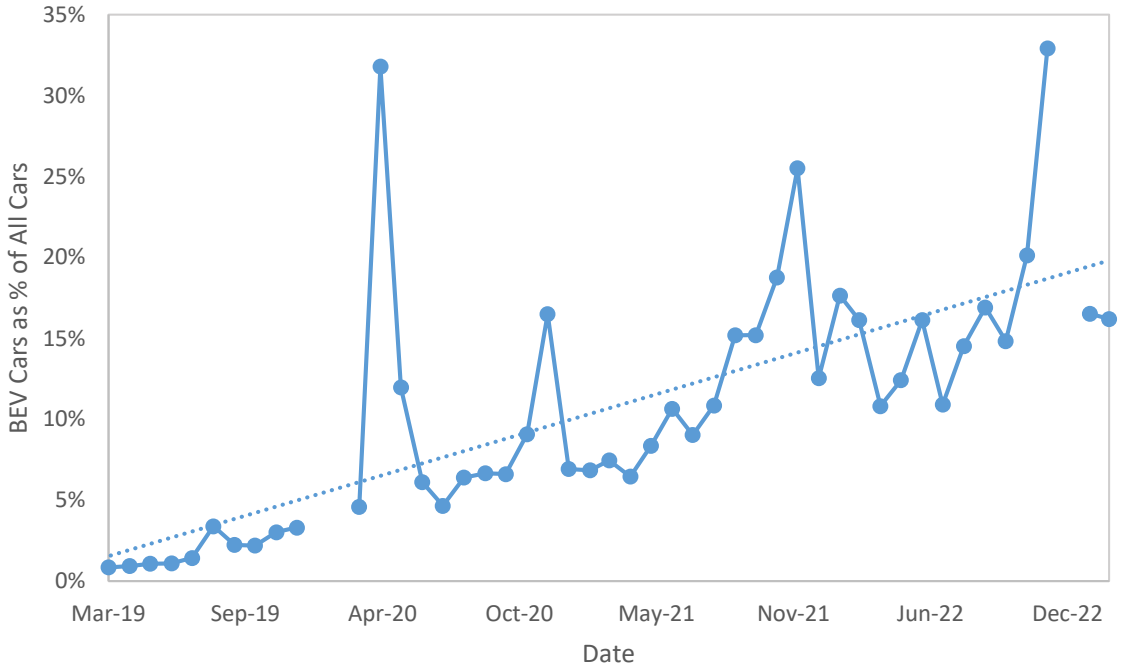


Figure AQ22-2: BEV car registrations as percentage of all car registrations (source: Society for Motor Manufacturers and Traders)

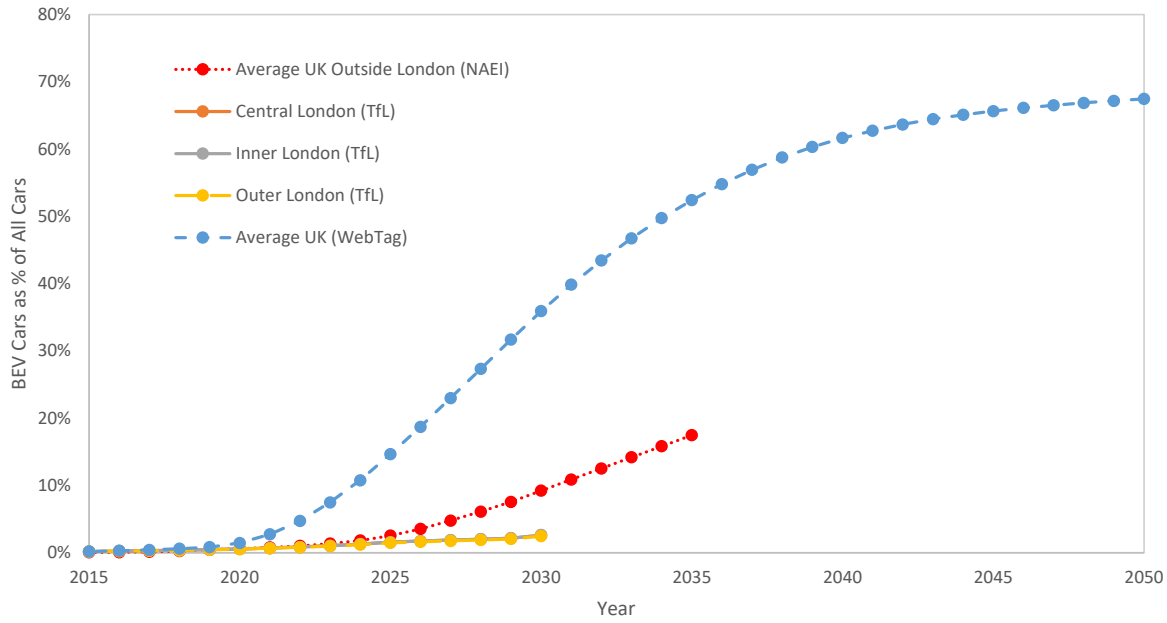


Figure AQ22-3: Projected Proportions of Vehicle-Kilometres Driven by EV Cars in the Fleet

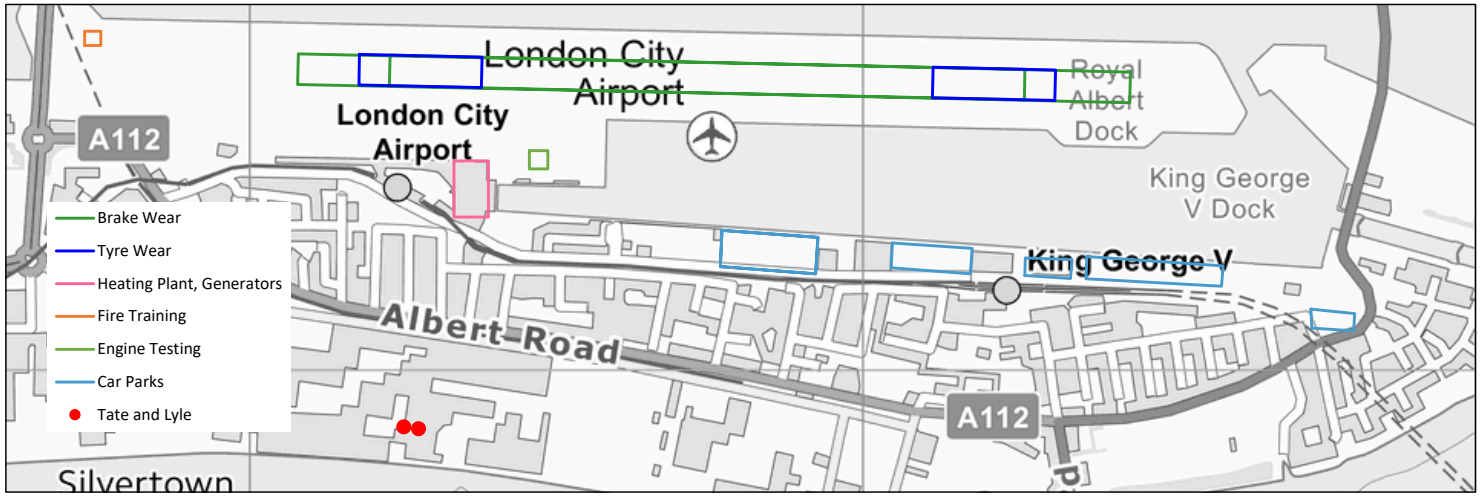
AQ25: Details of modelling methodology

Chapter 9 of the Environmental Statement (ES) gave a brief overview of the methodology used for modelling air quality impacts. More detail was given in Appendix 9.3 of the ES. Further details are given below.

Aircraft engine and APU assignments for the principal aircraft types are given in the following table. In this table, the Aircraft Groups for APU Assignment refer to Table 9-6 in ES Appendix 9.3.

Aircraft Type	Description	Engine Model	Engine UID	Aircraft Group for APU Assignment
A318	Airbus A318	CFM56-5B, PW6000A	7CM049	Smaller (100 ≤ seats < 200), newer types
AT45	ATR-45-600	PW127E	PW127E	Business jets/regional jets (seats < 100)
AT75	ATR 72-212A	PW127F	PW127F	Business jets/regional jets (seats < 100)
B462	BAe 146-200	Lycoming ALF 502R-5	1TL003	Business jets/regional jets (seats < 100)
BCS1	Airbus A220-100 (formerly Bombardier CS100)	PW1500G	01P20PW182	Smaller (100 ≤ seats < 200), newer types
C680	Cessna Citation Sovereign	PW306C	7PW078	Business jets/regional jets (seats < 100)
C68A	Cessna Citation Latitude	PW306D	7PW078	Business jets/regional jets (seats < 100)
CL35	Bombardier BD-100 Challenger 350	AS907-2-1A (HTF7350)	01P14HN011	Business jets/regional jets (seats < 100)
DH8D	Dash 8-400	PW150	PW150A on Dash8-Q400	Business jets/regional jets (seats < 100)
E170	Embraer E170	CF34-8E	01P08GE199	Business jets/regional jets (seats < 100)
E190	Embraer E190	CF34-10E	8GE119	Smaller (100 ≤ seats < 200), newer types
E290	Embraer E190-E2	PW1921G	01P20PW188	Smaller (100 ≤ seats < 200), newer types
E295	Embraer E195-E2	PW1921G	01P20PW188	Smaller (100 ≤ seats < 200), newer types
E35L	Embraer Legacy 600	Rolls-Royce AE 3007A1E	01P06AL032	Business jets/regional jets (seats < 100)
FA7X	Dassault Falcon 7X	PW307A	03P16PW192	Business jets/regional jets (seats < 100)
GLEX	Bombardier BD-700 Global Express	BR710A2-20, R-R Pearl	01P04BR013	Business jets/regional jets (seats < 100)
J328	Dornier 328JET	PW306B	7PW078	Business jets/regional jets (seats < 100)
RJ85	RJ-85 Avroliner, BAe RJ-85	Honeywell LF 507-1F	1TL004	Business jets/regional jets (seats < 100)

Locations of the road network and most modelled aircraft sources are given in the ES, Appendix 9.3. Aircraft brake wear emissions are distributed across the length of the landing roll from the touchdown point to the runway exit, and aircraft tyre wear emissions are distributed across a 200 m length of runway around the touchdown point; in each case they are modelled as volume sources, 50 m wide and 15 m vertical extent. Locations of other sources are shown in the following figure.



Emission factors for heating plant were taken from the EMEP/EEA guidebook, Chapter 1.A.4 Small Combustion, Table 3.8 Tier 1 emission factors for NFR source category 1.A.4.a/c, 1.A.5.a, using gaseous fuels. The factors used were 74 g/GJ for NOx and 0.78 g/GJ for PM.

Aircraft emissions were given a diurnal profile, reflecting the fact that there are strong morning and afternoon peaks of activity. Road vehicles were given a diurnal profile derived from the national profiles published by DfT (DfT Road traffic statistics (TRA03), 2020). All other sources were assumed to operate at a uniform rate for each hour of the year.

Other key input parameters for the dispersion model are given in the following table.

Parameter	Value
Latitude	51.5°
Surface roughness length*	0.5 m
Surface albedo*	0.23
Minimum Monin-Obukhov length*	100 m
Priestley-Taylor parameter*	1

* The same parameters are used for the dispersion site and for the meteorological station site.

Table PHW-AQ3 – Revised Table 12.11 Air quality national limit values, advisory WHO guidelines and changes in the DM and DC Scenarios, Annual Means

Pollutant (µg/m3)	National Limit Value	WHO 2005	WHO 2021[3]	2019 Base-line	2025			2027			2029			2031			Type of change[4]
					DM	DC	Change	DM	DC	Change	DM	DC	Change	DM	DC	Change	
NO_2	40	40	10	33.8	28.4	28.5	0.1	27.7	28.0	0.3	27.1	27.4	0.3	26.7	27.2	0.5	Highest
					27.1	27.4	0.3	26.5	27.5	1	26.1	27	0.9	25.4	26.8	1.4	Greatest
PM_{10}	40	20	15	19.9	18.7	18.7	<0.1	18.7	18.7	<0.1	18.7	18.7	<0.1	17.6	17.6	<0.1	Highest
					16.9	16.9	<0.1	16.9	17	0.1	16.9	17	0.1	16.9	17	0.1	Greatest
$PM_{2.5}$	20	10	5	13.1	12.2	12.2	<0.1	12.2	12.2	<0.1	12.2	12.2	<0.1	12.2	12.2	<0.1	Highest
					11.3	11.3	<0.1	11.3	11.3	<0.1	11.2	11.3	0.1	11.2	11.3	0.1	Greatest

[3] With Annual Mean interim targets to guide reduction efforts as follows (µg/m³):
- NO_2: 40, 30 and 20
- PM_{10}: 70, 50, 30 and 20
- $PM_{2.5}$: 35, 25, 15 and 10

[4] Based on ambident exposure relevant to UK Objectives (4m distant from kerbside). Further information is provided in Chapter 9.

London City Airport Air Quality Monitoring Strategy:

Annual Report 2022

April 2023

Experts in air quality management & assessment

Document Control

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Executive Summary

This document represents the 2022 Annual Report for the Air Quality Monitoring Strategy (AQMS) that is operated by Air Quality Consultants Ltd. on behalf of London City Airport (LCA). This programme measures concentrations of nitrogen dioxide (NO_2) and fine particles (the so called PM_{10} and $PM_{2.5}$ fractions, i.e., particles that are less than 10 and 2.5 micrometres in diameter, respectively).

Monitoring is currently carried out at two automatic monitoring stations. One is to the north of Royal Albert Dock adjacent to the Newham Dockside building (LCA-ND), and one is adjacent to King George V House (LCA-KGV). These automatic sites are supplemented by a network of passive monitoring devices (nitrogen dioxide diffusion tubes) located at a further 15 sites in and around the Airport boundary.

The decommissioned monitoring station previously sited on the rooftop of City Aviation House (LCA-CAH) has been replaced by a new automatic nitrogen dioxide analyser located at King George V House, adjacent to the existing FIDAS PM_{10} analyser; this re-siting of the NOx analyser was agreed and approved by the London Borough of Newham. This new analyser was installed on the 1st of June 2022, and underwent a period of testing, configuration and integration for approximately one month. Measured concentrations of nitrogen dioxide from LCA-CAH for 1st January 2022 – 31st May 2022 (inclusive) are reported, and measured concentrations at LCA-KGV from 1st July 2022 to 31st December 2022 are reported.

The Government has set a number of air quality objectives to protect human health. These are based on monitoring carried out over the period of a calendar year. In some cases, these objectives refer to average concentrations of pollutants measured over the calendar year (the “annual mean”); in other cases, they refer to the number of hours or days on which a specified pollutant concentration should not be exceeded (for example, no more than 35 days in each calendar year on which PM_{10} concentrations exceed 50 µg/m^3, and no more than 18 hours in each calendar year on which nitrogen dioxide concentrations exceed 200 µg/m^3). The GLA has also set an aspirational target to achieve the WHO Guideline for $PM_{2.5}$ (10 µg/m^3) by 2030.

In addition to the objectives, the Government has established a set of descriptors for the 1-hour mean concentrations of nitrogen dioxide and 24-hour mean concentrations of PM_{10} and $PM_{2.5}$. Air quality is defined by these descriptors as being ‘Low’, ‘Moderate’, ‘High’ or ‘Very High’.

Pollution concentrations measured in and around the Airport are associated with a wide range of sources at the local, regional, national and international scales. On occasions when pollution levels rise, these higher levels are often observed across the whole of London as a “regional pollution episode”. To assist with the interpretation of the results, pollution levels measured at other London monitoring sites are included in this report.

Nitrogen Dioxide

The 2022 annual mean nitrogen dioxide concentration measured at the automatic station at the Newham Dockside (LCA-ND) site was 22.1 µg/m^3 (micrograms per cubic metre). An estimated annual mean concentration of 18.8 µg/m^3 was measured at the King George V House site, and an estimated annual mean concentration of 20.3 µg/m^3 was measured at City Aviation House; the estimates were derived using "annualisation" approaches published by Defra. The annual mean objective (40 µg/m^3) was not exceeded at any of the automatic sites in 2022.

There were 11 exceedances of the 1-hour mean objective value (200 µg/m^3) at the Newham Dockside site (believed to be associated with a localised, non-airport source), but no exceedances of the 1-hour mean objective at either the King George V House or City Aviation House sites. The vast majority (> 99%) of the 1-hour mean concentrations across all three sites fell into the "Low" pollution band.

Annual mean concentrations of nitrogen dioxide at other background and roadside sites elsewhere in London over this period ranged from 16.0 to 23.8 µg/m^3. The 1-hour mean concentrations over the year show similar patterns at all Airport monitoring sites. There was a good correlation between observed peaks at the Airport sites and other London sites, suggesting that these occurrences were principally due to regional sources and changing weather conditions that affect the dispersion and dilution of pollutant emissions.

The annual mean nitrogen dioxide concentrations measured at the diffusion tube sites ranged from 18.7 to 26.7 µg/m^3 compared with the objective value of 40 µg/m^3. There were no measured exceedances of the air quality objective. As measured concentrations are well below 60 µg/m^3, it is highly unlikely that the 1-hour mean objective was exceeded (based on empirical relationships published by Defra).

Fine Particles (PM_{10})

The annual mean PM_{10} concentration measured at the automatic station situated at King George V House was 14.6 µg/m^3. This is well below the objective value of 40 µg/m^3. There were five recorded exceedances of the 24-hour mean objective (compared with the 35 exceedances allowed in a calendar year). The majority (98.6%) of the running 24-hour mean concentrations were classified as 'Low', 1.1% were 'Moderate', and the remaining 0.3% were 'High'. There were no running 24-hour mean concentrations within the 'Very High' pollution band.

24-hour mean concentrations of PM_{10} at other background sites in London over this period showed a similar pattern to those seen at the Airport site. There was a good correlation between observed peaks at the Airport site and other London sites, suggesting that these occurrences were principally due to regional sources and changing weather conditions that affect the dispersion and dilution of pollutant emissions.

Fine Particles ($PM_{2.5}$)

The annual mean $PM_{2.5}$ concentration measured at the automatic station at King George V House was 9.2 µg/m^3, well below the objective value of 25 µg/m^3, and below the GLA target of 10 µg/m^3. The majority (98.6%) of the running 24-hour mean concentrations were classified as 'Low', 1.1% were 'Moderate', and the remaining 0.3% were 'High'. There were no running 24-hour mean concentrations within the 'Very High' pollution band.

Concentrations of $PM_{2.5}$ at other background and roadside sites in London over this period showed similar patterns and correlation in observed peaks as that at the Airport site. As for PM_{10}, this suggests that these occurrences were principally attributable to regional sources.

1 Introduction

1.1 This document represents the 2022 Annual Report for the Air Quality Monitoring Strategy (AQMS), operated on behalf of London City Airport (LCA).

1.2 The City Airport Development Programme (CADP) 1 planning application was granted planning permission by the Secretaries of State for Communities and Local Government and Transport in July 2016 following an appeal and public inquiry which was held in March / April 2016. Condition 57 of the CADP 1 planning permission requires that an Air Quality Monitoring Strategy be implemented on commencement of the development.

1.3 The AQMS, as defined within Condition 57, requires the operation of two automatic air quality monitoring stations and a network of nitrogen dioxide diffusion tubes situated in and around the Airport site.

1.4 The AQMS also included a commitment to commission a new site measuring $PM_{2.5}$ concentrations before 31 December 2018 at King George V House. This new site was fully operational on 1st January 2019, and records concentrations of both PM_{10} and $PM_{2.5}$; both metrics have been included within this report.

1.5 The PM_{10} and nitrogen dioxide automatic analysers, previously situated on the rooftop of City Aviation House, were decommissioned at the end of September 2020 and May 2022, respectively, in agreement with the London Borough of Newham. They have been replaced with a combined PM10/PM2.5 analyser and a new NOx analyser at KGV House

1.6 The AQMS is managed by Air Quality Consultants Ltd. (AQC) on behalf of London City Airport. Service support for the automatic monitoring stations is provided by Enviro Technology Services plc and Aecom Ltd, with Ricardo Energy & Environment providing independent audit checks.

1.7 Chapter 2 of this Report sets out the various standards and guidelines against which air pollution concentrations should be compared. Chapter 3 describes the monitoring methodology and provides a summary of the measured concentrations in 2022 with respect to these criteria, and compares the measured concentrations with other local monitoring sites. Chapter 4 then provides an analysis of the monitoring data with respect to trends and source contributions.

2 Assessment Criteria

2.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

2.2 For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value (see Paragraph 2.5), originally set at 25 $\mu g/m^3$ and currently set at 20 $\mu g/m^3$.

2.3 The WHO has set a guideline for annual mean $PM_{2.5}$ concentrations of 10 $\mu g/m^3$. The guideline is not currently in UK regulations and there is no requirement to assess against it at this time. However, achievement of the guideline is a long-term aspiration of the UK Government and the GLA has set out an intent in the London Environment Strategy to achieve it by 2030[1]. As such, consideration to this guideline has been included within this report.

2.4 Defra has also recently set two new targets, and two new interim targets, for $PM_{2.5}$ concentrations in England. It is not clear at this stage as to what obligations will be placed on local authorities with regard to these targets, and at this stage the Department for Levelling Up, Housing and Communities (DLUCH) has advised that no changes should be implemented. These targets are not considered further in this report.

2.5 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

[1] The WHO Guideline of 10 $\mu g/m^3$ was set in 2005. In 2021, WHO revised this guideline down to 5 $\mu g/m^3$. The Mayor has made it clear that the aspiration in London is to achieve the 2005 Guideline by 2030.

2.6 The relevant air quality criteria for this report are provided in Table 1.

Table 1: Relevant Air Quality Criteria

Pollutant	Time Period	Objective / Value
Nitrogen Dioxide	1-hour mean	200 μg/m^3 not to be exceeded more than 18 times a year
	Annual mean	40 μg/m^3
Fine Particles (PM_{10})[a]	24-hour mean	50 μg/m^3 not to be exceeded more than 35 times a year [b]
	Annual mean	40 μg/m^3
Fine Particles ($PM_{2.5}$)[c]	Annual mean	20 μg/m^3

[a] Measured by the gravimetric method.

[b] Equivalent to a 90th percentile of 24-hour mean concentrations of 50 μg/m^3.

[c] There is no numerical $PM_{2.5}$ objective for local authorities. Convention is to assess against the UK limit value which is currently 20 μg/m^3.

2.7 In addition to the objectives, Defra has established a set of descriptors for the 1-hour mean values for nitrogen dioxide and for the 24-hour mean values for PM_{10} and $PM_{2.5}$, classifying the concentrations in an index from 1 to 10 and thus labelling the levels as 'Low', 'Moderate', 'High' or 'Very High' (Defra, 2022c). The banding is referred to as the Daily Air Quality Index (DAQI). The DAQI criteria are set out in Table 2.

Table 2: Daily Air Quality Index Bandings (μg/m^3)

Band	Index	Nitrogen Dioxide 1-hour Mean (μg/m^3)	PM_{10} 24-hour mean (μg/m^3) [a]	$PM_{2.5}$ 24-hour mean (μg/m^3) [a]
Very High	**10**	601 or more	101 or more	71 or more
High	**9**	535 – 600	92 – 100	65 – 70
	8	468 – 534	84 – 91	59 – 64
	7	401 – 467	76 – 83	54 – 58
Moderate	**6**	335 – 400	67 – 75	48 – 53
	5	268 – 334	59 – 66	42 – 47
	4	201– 267	51 – 58	36 – 41
Low	**3**	135 – 200	34 – 50	24 – 35
	2	68 – 134	17 – 33	12 – 23
	1	0 – 67	0 – 16	0 – 11

[a] Reference equivalent. 24-hour values are for the period 00:00 to 23:59.

3 Monitoring Methodology and Results

Automatic Monitoring Stations

3.1 Monitoring was carried out at three automatic stations throughout 2022 as follows:

- City Aviation House (LCA-CAH): Nitrogen dioxide (decommissioned 1st June 2022).
- Newham Dockside (LCA-ND): Nitrogen dioxide.
- King George V House (LCA-KGV): Nitrogen dioxide (commissioned 1 July 2022), PM_{10} and $PM_{2.5}$.

The locations of the three automatic sites are shown in Figure 1.

3.2 The LCA-ND and LCA-CAH automatic stations measure nitrogen dioxide using a M200E TAPI chemiluminescence analyser, while the LCA-KGV site measure nitrogen dioxide using a T200 chemiluminescence analyser. The LCA-KGV site also measures PM_{10} and $PM_{2.5}$ using a Palas FIDAS 200 Particulate Monitor. The data are stored as 15-minute mean concentrations, with further processing and ratification of the nitrogen dioxide concentrations to adjust to "reference-equivalent" as recommended by Defra (2022a). The PM_{10} and $PM_{2.5}$ concentrations measured at LCA-KGV are "reference equivalent" and are unadjusted.

3.3 Independent site audits, conducted by Ricardo-E&E were carried out on 15th March 2022, 15th September 2022, and 30th March 2023. The audits in 2022 confirmed that all automatic monitoring stations were operating above the minimum standards set for the national networks operated by Government. The final audit undertaken in 2023 identified that the LCA-ND site was operating below standard (with regard to the calibration cylinder gas), which has been taken account of in the data ratification process.

3.4 Ratification of the data has been based on calibration factors determined from the calibration reports, along with visual examination of the data and comparison with monitoring data from nearby national network sites (Defra, 2022a). Any erroneous data have been flagged and removed from subsequent analysis. 1-hour, 24-hour, and annual mean concentrations have then been calculated.

3.5 As the LCA-CAH and LCA-KGV sites both had less than 75% data capture for nitrogen dioxide in 2022 (due to the approved decommissioning and recommissioning of the analyser), their respective period means have been 'annualised' by deriving an adjustment factor from nearby background monitoring sites in accordance with technical guidance (Defra, 2022a). The annualisation process is detailed further in Appendix A5.

3.6 Pollution concentrations measured at all three automatic Airport monitoring stations are associated with a wide range of sources at the local, regional, national and international scales. On occasions when pollution levels rise, these higher levels are often observed across the whole of London as a "regional pollution episode". To assist with the interpretation of the results, comparable data have been obtained via the London Air Application Programming Interface (API), which stores data from the UK Automatic Urban and Rural Network (AURN) (Defra, 2022b), London Air Quality Network (LAQM) (Imperial College London, 2023), and monitoring undertaken by local authorities. Data were obtained for the following five sites:

- Bexley – Belvedere (suburban);
- Bexley – Slade Green (suburban);
- Camden – Bloomsbury (background);
- Newham - Wren Close (background); and
- Newham - Cam Road (roadside).

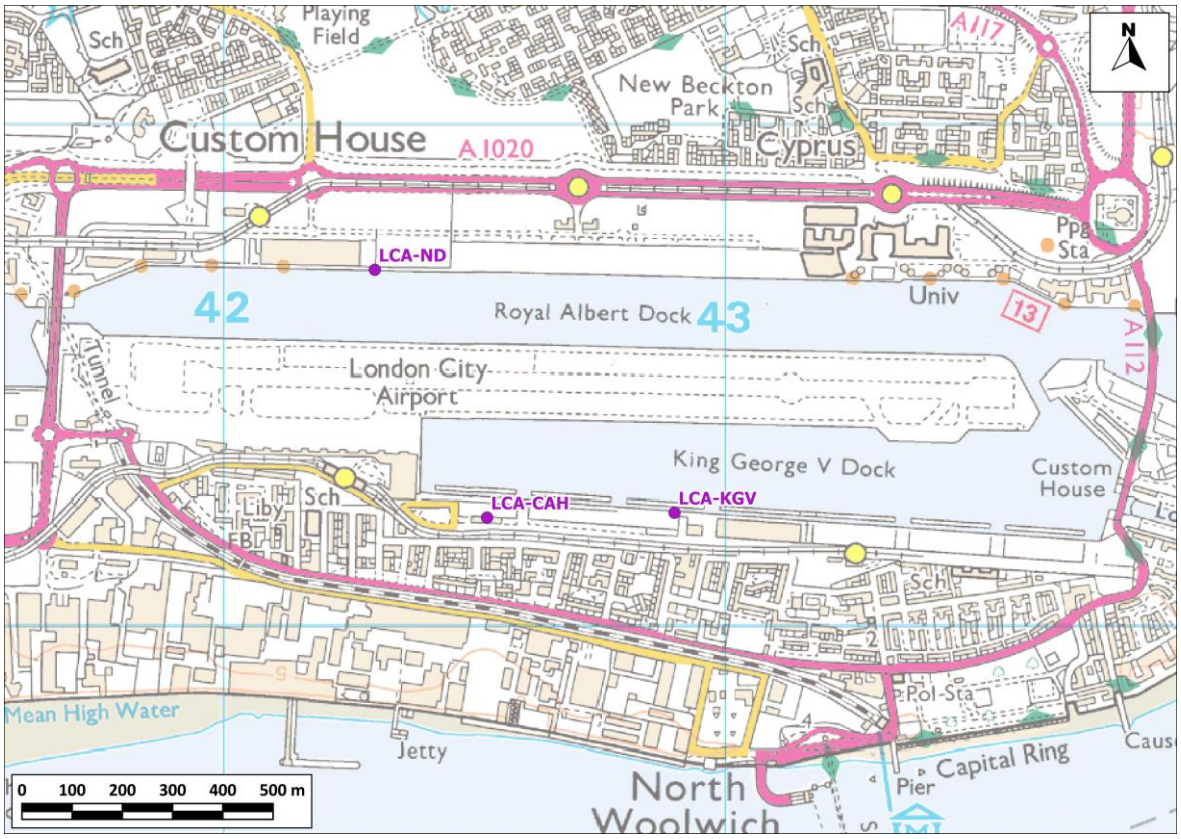


Figure 1: Automatic Monitoring Locations

Nitrogen Dioxide

3.7 The 2022 nitrogen dioxide results for the LCA-CAH, LCA-ND and LCA-KGV automatic monitoring stations are summarised in Table 3. Data capture[2] for LCA-CAH, LCA-ND and LCA-KGV was 41.0%, 85.5% and 47.5%, respectively. The annual mean concentration did not exceed the objective of 40 µg/m^3 at any site. The 1-hour mean objective was also not exceeded at LCA-CAH and LCA-KGV; there were no 1-hour mean concentrations above the objective value (200 µg/m^3). However, there were 11 recorded concentrations above the objective value at LCA-ND, compared with the 18 exceedances allowed in a calendar year.

Table 3: Nitrogen Dioxide (NO_2) Data Summary for LCA-CAH, LCA-ND and LCA-KGV, 2022[a]

Metric	LCA-CAH[b]	LCA-ND	LCA-KGV[b]	Objectives
	NO_2	NO_2	NO_2	
Maximum 1- Hour Mean	108.8 µg/m^3	1,091.3 µg/m^3	100.6 µg/m^3	-
No. 1-Hour Mean > 200 µg/m^3	0	11	0	200 µg/m^3; no more than 18 exceedances
Annual Mean	22.7 µg/m^3	22.1 µg/m^3	18.1 µg/m^3	40 µg/m^3
Data Capture	41.0%	85.5%	47.5%	-
Annualisation Factor	0.89	-	1.04	-
Adjusted Annual Mean	20.3 µg/m^3	-	18.8 µg/m^3	40 µg/m^3

[a] Nitrogen oxides concentrations are provided in Appendix 1.

[b] Concentrations annualised due to less than 75% annual data capture.

3.8 Table 4 shows the distribution of the 1-hour mean values into the different pollution bands (DAQI). At LCA-CAH and LCA-KGV, all measured 1-hour mean nitrogen dioxide concentrations fell into the 'Low' pollution band during 2022. However, due to a single pollution event[3] on the 23rd June (when only the LCA-ND site was recording concentrations) there were three moderately hourly concentrations, three high hourly concentrations, and five very high hourly concentrations at LCA-ND.

[2] It is inevitable that a small amount of data will be "lost" in each year due to routine downtime for calibrations and site servicing. Data capture at CAH and KGV was low due to decommissioning and recommissioning of the analyser.

[3] As detailed in the Q2 2022 report.

Table 4: DAQI Bandings for Nitrogen Dioxide, 2022

Band	Index	LCA-CAH	LCA-ND	LCA-KGV
Very High [a]	10		5	
High [a]	9			
	8		1	
	7		2	
Moderate [a]	6			
	5		1	
	4		2	
Low [a]	3		3	
	2	125	225	66
	1	3,466	7,253	4,091

[a] Number of 1-hour values

3.9 Nitrogen dioxide concentrations for five monitoring sites across London in 2022 are summarised in Table 5. These sites range from central London (Camden) to outer London (Bexley), with two in east London (Newham). The measured annual mean concentrations at London City Airport (20.3 µg/m^3 at LCA-CAH, 22.1 µg/m^3 LCA-ND, and 18.1 µg/m^3 at LCA-KGV) were higher than those measured at both Bexley sites, similar to those measured at Camden – Bloomsbury and Newham – Wren Close, and lower than those measured at Newham – Cam Road. This is broadly consistent with the location of London City Airport between the areas of high concentrations in central London and lower concentrations towards the outskirts. The maximum 1-hour mean concentrations recorded at LCA-CAH and LCA-KGV are very similar to those measured at other London sites, while the maximum 1-hour mean concentration at LCA-ND is likely to be due to a localised (non-airport) source, as previously concluded in the 2022 Q2 report.

Table 5: Nitrogen Dioxide (NO_2) Data Summary for London Monitoring Sites, 2022[a]

	Background				Roadside
	Bexley *Belvedere*	Bexley *Slade Green*	Camden *Bloomsbury*	Newham *Wren Close*	Newham *Cam Road*
Max. 1-hr Mean (µg/m^3)	112.1	111.5	99.5	113.2	111.7
Period Mean (µg/m^3)	16.0	17.7	20.7	21.9	23.8
No. 1-hr >200 µg/m^3	0	0	0	0	0
Data Capture (%)	99.7	96.2	95.9	98.5	97.9

[a] Includes provisional data. Nitrogen oxides concentrations are provided in Appendix 1.

Particulate Matter PM_{10}

3.10 The PM_{10} results for the LCA-KGV automatic monitoring station are summarised in Table 6. Data capture was good (99.9%) at LCA-KGV during the period. The recorded annual mean concentration at LCA-KGV (14.6 µg/m^3) was well below the objective value of 40 µg/m^3. There were five measured exceedances of the 24-hour mean objective level of 50 µg/m^3, compared with the 35 exceedances allowed in a year. The 90th percentile of daily mean concentrations at LCA-KGV (24.1 µg/m^3) was below 50 µg/m^3.

Table 6: PM_{10} Data Summary for LCA-KGV, 2022

Metric	LCA-KGV	PM_{10} Objectives
	FIDAS	
Maximum 24-hour Mean	76.3 µg/m^3	-
No. 24-Hour Means >50 µg/m^3	5	50 µg/m^3; no more than 35 exceedances
90th Percentile	24.1 µg/m^3	50 µg/m^3
Annual Mean	14.6 µg/m^3	40 µg/m^3
Data Capture	99.9%	-

3.11 Table 7 includes the distribution of the 24-hour mean values into the different pollution bands (DAQI). Most of the 24-hour mean measured PM_{10} concentrations during 2022 fell into the 'Low' pollution band (98.6%), with four occasions falling into the 'Moderate' band, and one occasion falling into the 'High' band. There were no 'Very High' pollution events.

Table 7: DAQI Bandings for PM_{10}, 2022

Band	Index	LCA-KGV
Very High [a]	**10**	
High [a]	**9**	
	8	
	7	1
Moderate [a]	**6**	2
	5	
	4	2
Low [a]	**3**	5
	2	89
	1	266

[a] Number of 24-hour mean values falling within band.

3.12 PM_{10} concentrations for four sites across London in 2022 are summarised in Table 8. These sites range from central London (Camden) to outer London (Bexley), with two in east London

(Newham). The measured period mean concentration at LCA-KGV (14.6 µg/m^3) was lower than all these sites. The number of 24-hour mean exceedances of 50 µg/m^3 was similar to those of all the other London sites. The 90th percentile of 24-hour means at LCA-KGV was lower than those recorded at all of the other sites.

Table 8: PM_{10} Data Summary of Background London Monitoring Sites, 2022[a]

	Background			Roadside
	Bexley ***Slade Green FIDAS***	**Camden** ***Bloomsbury***	**Newham** ***Wren Close***	**Newham** ***Cam Road***
Maximum 24-hr mean (µg/m^3)	73.3	80.6	70.8	67.2
Period Mean (µg/m^3)	15.2	17.6	17.8	16.5
No. 24-hr mean >50 µg/m^3	5	5	4	4
90th Percentile	25.7	29.0	25.8	25.9
Data Capture (%)	99.7	95.6	97.2	94.3

Particulate Matter $PM_{2.5}$

3.13 The 2022 $PM_{2.5}$ results for the LCA-KGV automatic monitoring station are summarised in Table 9. Data capture was 99.9% during the period. The recorded annual mean concentration was 9.2 µg/m^3, and below both the objective and the GLA target.

Table 9: $PM_{2.5}$ Data Summary for LCA-KGV, 2022

Pollutant	**FIDAS**
	$PM_{2.5}$
Period Mean	9.2 µg/m^3
Data Capture	99.9%

3.14 Table 10 includes the distribution of the 24-hour mean values into the different pollution bands (DAQI). The majority of 24-hour mean measured $PM_{2.5}$ concentrations fell into the 'Low' pollution band (98.6%) during 2022; there were also four 24-hour mean values within the 'Moderate' pollution band (1.1%), and one 24-hour mean value within the 'High' band. There were no 'Very High' pollution events.

Table 10: DAQI Bandings for $PM_{2.5}$, 2022

Band	Index	LCA-KGV
Very High [a]	**10**	
High [a]	**9**	
	8	
	7	1
Moderate [a]	**6**	2
	5	
	4	2
Low [a]	**3**	15
	2	65
	1	280

[a] Number of 24-hour mean values falling within band.

3.15 $PM_{2.5}$ concentrations for four sites in London in 2022 are summarised in Table 11. The sites are the same as those presented for PM_{10} concentrations. The measured period mean concentration at London City Airport (9.2 µg/m^3) was lower than all the other London sites presented.

Table 11: $PM_{2.5}$ Data Summary of London Monitoring Sites, 2022

	Background			Roadside
	Bexley *Slade Green FIDAS*	**Camden *Bloomsbury***	**Newham *Wren Close***	**Newham *Cam Road***
Period Mean (µg/m^3)	9.4	10.3	11.4	10.3
Data Capture (%)	99.7	97.5	97.0	99.2

Nitrogen Dioxide Diffusion Tube Network

3.16 London City Airport also operates a network of passive diffusion tube samplers for nitrogen dioxide. The intent of this network is to establish the wider spatial pattern of nitrogen dioxide concentrations in the area surrounding the Airport. The locations of the monitoring sites are shown in Figure 2, and are described in Table 9; grid references and the monthly mean data are provided in Appendix A2. The diffusion tubes are exposed for approximately 4-week intervals. They are supplied and analysed by Gradko International Ltd. and are prepared using the 20% TEA in water method.

3.17 The diffusion tubes record monthly mean concentrations, which have been averaged to give the annual mean. The results cannot, therefore, be directly compared with the 1-hour mean objective.

However, measurements across the UK have shown that the 1-hour mean nitrogen dioxide objective is unlikely to be exceeded where the annual mean concentration is below 60 μg/m^3 (Defra, 2022a).

Table 9: Description of Diffusion Tube Monitoring Sites [a]

Location	Site ID
Lamp post at top of Parker Street, adjacent to housing	LCA-01
Lamp post on Camel Road, adjacent to nearest property on Hartmann Street	LCA-02
Lamp post at waterfront to east end of Newham Dockside	LCA-04
Lamp post on Straight Road, at kerbside	LCA-05
Lamp post on pedestrian walkway adjacent to nearest housing at Gallions Way	LCA-06
Landing Lights	LCA-07
Jet Centre – airside	LCA-10
Lamp post at waterfront, eastern end of the University of East London	LCA-11
ILS, to north of runway and south of Royal Albert Dock	LCA-12
Lamp post at north west corner of Newham Dockside	LCA-13
Lamp post on waterfront at western end of Newham Dockside	LCA-14
Lamp post at kerbside (approx 1 m) of Royal Albert Way	LCA-15
Newham Dockside analyser (duplicate tubes)	LCA-18
Lamp post adjacent to roundabout, near to access road in Silvertown Quay. Approx. 1 metre from kerbside of main road.	LCA-20
Lamp post on Brixham Street	LCA-21

[a] LCA-17 was discontinued from January 2012, as the lamppost on which diffusion tubes were deployed had been removed. LCA-16 and LCA-19 were discontinued from January 2017, as the land on which the sites were located had been vacated for construction works. LCA-03 has been discontinued from April 2018 due to ongoing issues with access. LCA-20 was initiated at the start of April 2018. LCA-08 was discontinued in February 2021 as the lamppost on which diffusion tube was deployed had been removed. The site has been relocated to a nearby lamppost and will become operational (LCA-21) in April 2021.

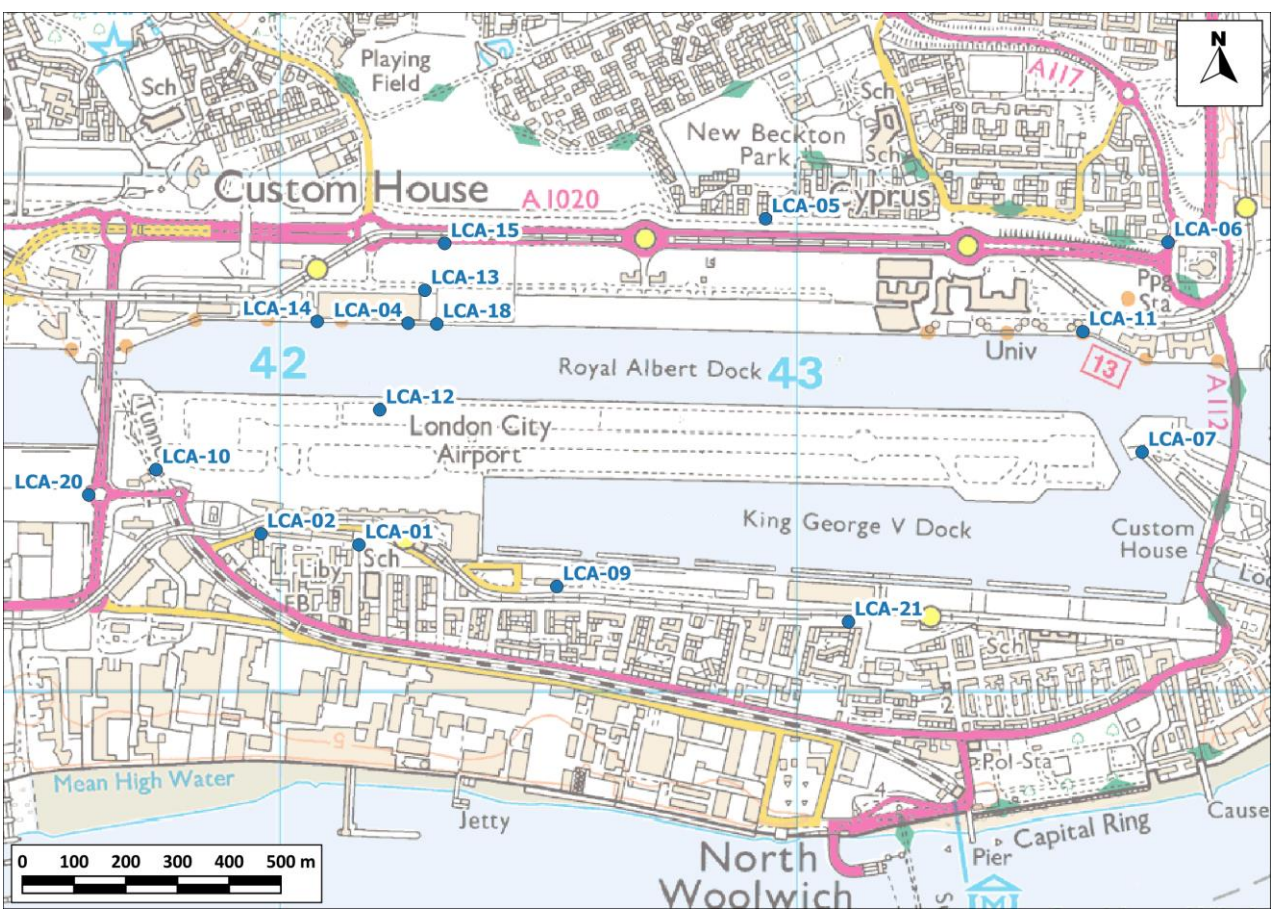
3.18 It is important to note that not all of these monitoring sites represent relevant public exposure for annual mean concentrations of nitrogen dioxide; thus, the objectives are not strictly applicable at all of these sites. For instance, the sites at Landing Lights (LCA 07), the Jet Centre (LCA 10) and the ILS (LCA 12) are located on land that is not generally accessible by the public, or is owned by the Airport. The sites at LCA 04 (at the waterfront of Newham Dockside), LCA 11 (at the waterfront of the University of East London) and LCA 13, 14 and 15 (in the vicinity of Newham Dockside and Royal Albert Way) and LCA 20 would also not represent relevant exposure for annual mean concentrations according to the criteria defined in LLAQM.TG(22)[4], but are relevant for the 1-hour

[4] Defra Technical Guidance Note LLAQM.TG(22) suggests that in the case of the annual mean objective, relevant locations should not include kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.

mean objective. These sites have been included in the study to better understand the spatial pattern of nitrogen dioxide concentrations around the Airport.

3.19 Diffusion tubes are known to show systematic bias in relation to automatic (reference) monitors. For this reason, a co-location study has been carried out with duplicate tubes exposed near the inlet of the LCA-ND automatic monitor[5]. Comparison of the matched period results shows that the diffusion tubes were over-reading by an average of 14.5%. An adjustment factor of 0.873 has therefore been applied to all diffusion tube results to ensure that they give the best representation of true concentrations (see Appendix 3). The results from the duplicate tubes at LCA-ND indicate overall "good" precision (±10.0% at both sites) in 2022 (Defra, 2022a).

3.20 The bias-adjusted results are summarised in Table 10, and are also shown in Figure 3. The annual mean objective of 40 µg/m^3 was achieved at all monitoring locations during 2022. All measured annual mean nitrogen dioxide concentrations were well below 60 µg/m^3, and it is thus unlikely that the 1-hour mean objective was exceeded at any location.



[5] Due to the relocation of the automatic analyser from LCA-CAH to LCA-KGV, the collocation of the diffusions tubes was interrupted. A new collocation of triplicate tubes has been established at LCA-KGV and will be reported in 2023.

Figure 2: Diffusion Tube Monitoring Locations © Crown copyright and database right 2023. Ordnance Survey licence number 100046099.

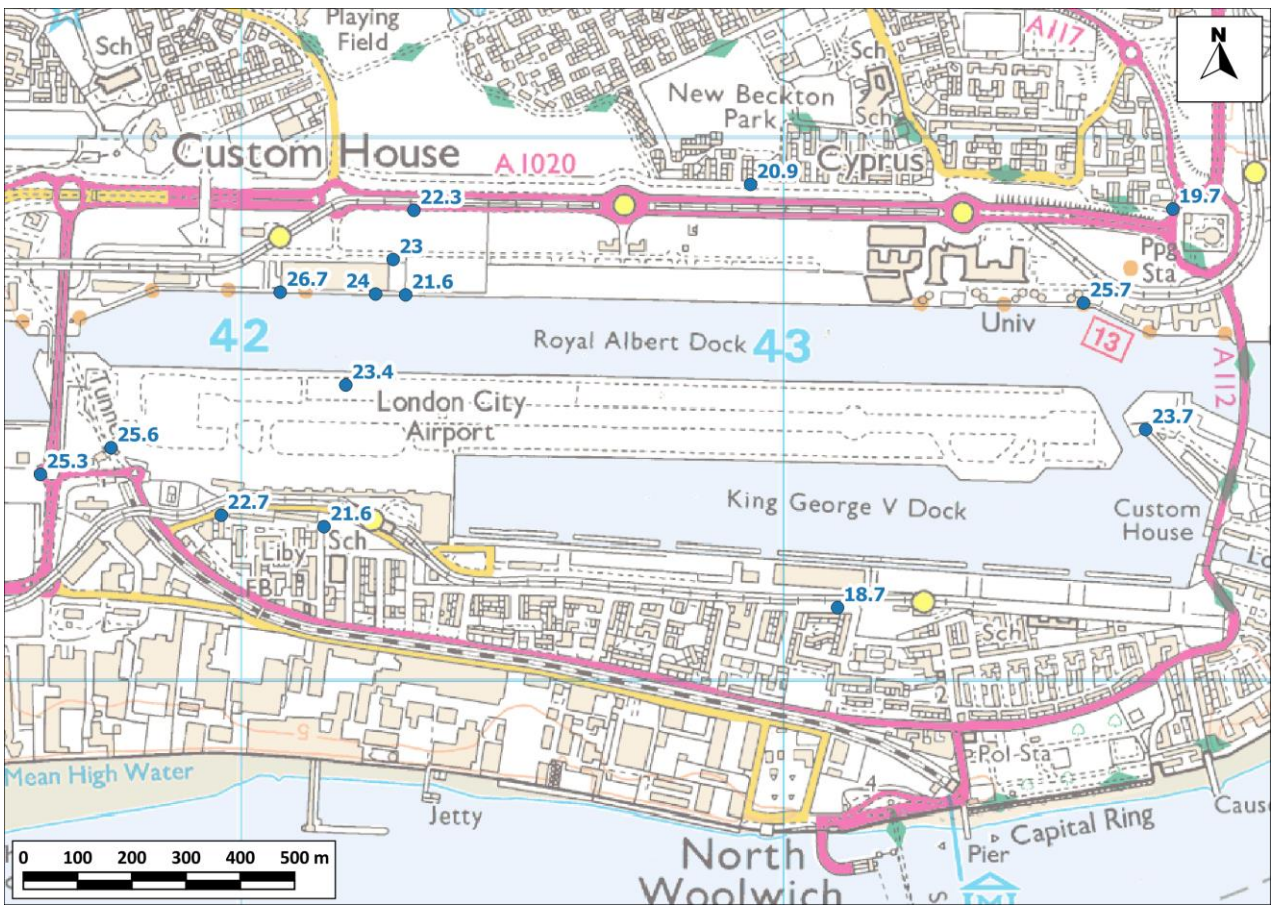


Figure 3: Nitrogen Dioxide Diffusion Tube Results 2022 (µg/m^3) © Crown copyright and database right 2023. Ordnance Survey licence number 100046099.

Table 10: Diffusion Tube Data Summary for London City Airport, 2022 (Adjusted for Bias)

Site ID	Adjusted Value (µg/m^3) [a]
LCA 01	21.6
LCA 02	22.7
LCA 04	24.0
LCA 05	20.9
LCA 06	19.7
LCA 07	23.7
LCA 10	25.6
LCA 11	25.7

LCA 12	23.4
LCA 13	23.0
LCA 14	26.7
LCA 15	22.3
LCA 18	21.6
LCA 20	25.3
LCA 21	18.7

[a] Data have been adjusted using a local bias adjustment factor for 2022 of 0.873.

4 Data Analyses

4.1 This chapter provides analyses of the data, including time series, trends and source contributions.

Time Series

4.2 The measured 1-hour mean nitrogen dioxide concentrations at LCA-CAH, LCA-KGV, LCA-ND, Bexley (Belvedere and Slade Green), Camden (Bloomsbury), and Newham (Wren Close and Cam Road), are shown as a time series in Figures 4 and 5 respectively. The concentrations over the year generally show similar patterns at all monitoring sites. The concurrence of periods with elevated concentrations at all sites suggests that these episodes were due to regional changes in concentrations. The only exception to this is the period of high concentrations measured at LCA-ND on the 23rd of June which was not recorded at other London monitoring sites, and is thus likely to be due to a localised (and non-airport) source.

4.3 The measured daily mean PM_{10} concentrations at LCA-KGV, and at Bexley (Slade Green), Camden (Bloomsbury), and Newham (Wren Close and Cam Road), are shown in Figures 6 and 7 respectively. Once again, the analysis suggests that periods of high pollution were principally due to regional changes in concentrations.

4.4 As with PM_{10}, the concurrence of many periods of elevated $PM_{2.5}$ concentrations at all sites (see Figures 8 and 9) suggests that these episodes were due to regional rather than local sources and that changing weather conditions across the region affected the dispersion and dilution of pollutants.

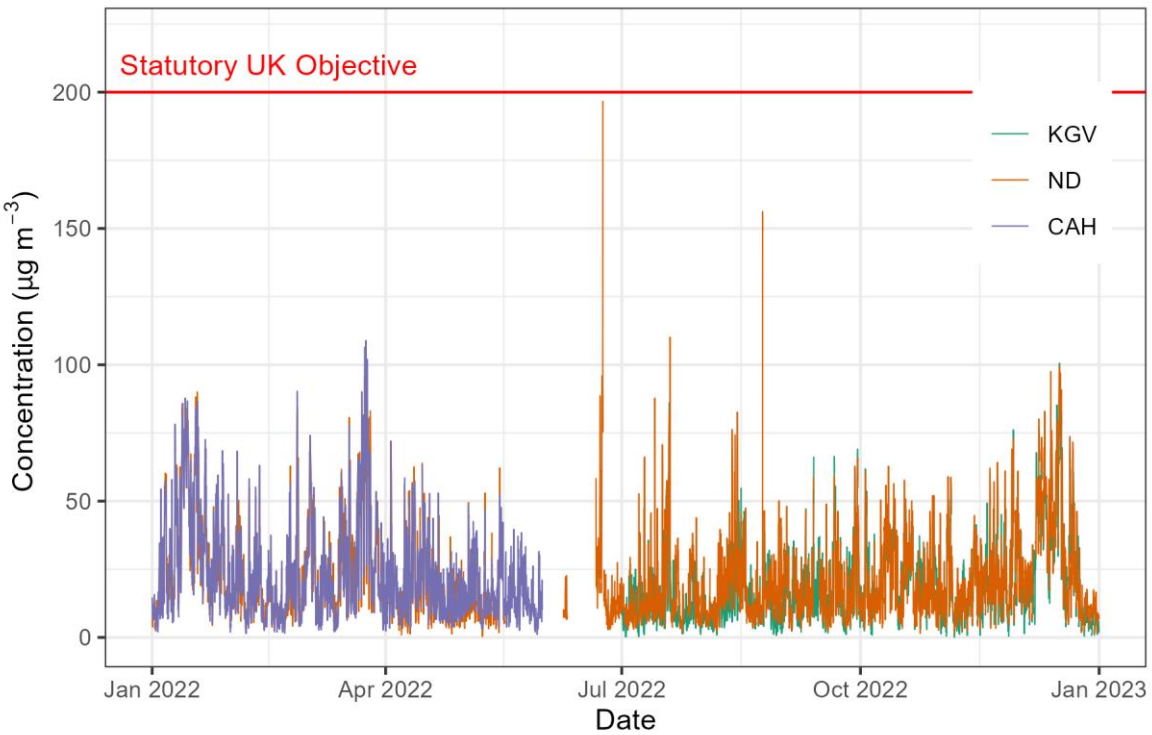


Figure 4: 1-Hour Mean Nitrogen Dioxide Concentrations at London City Airport, 2022

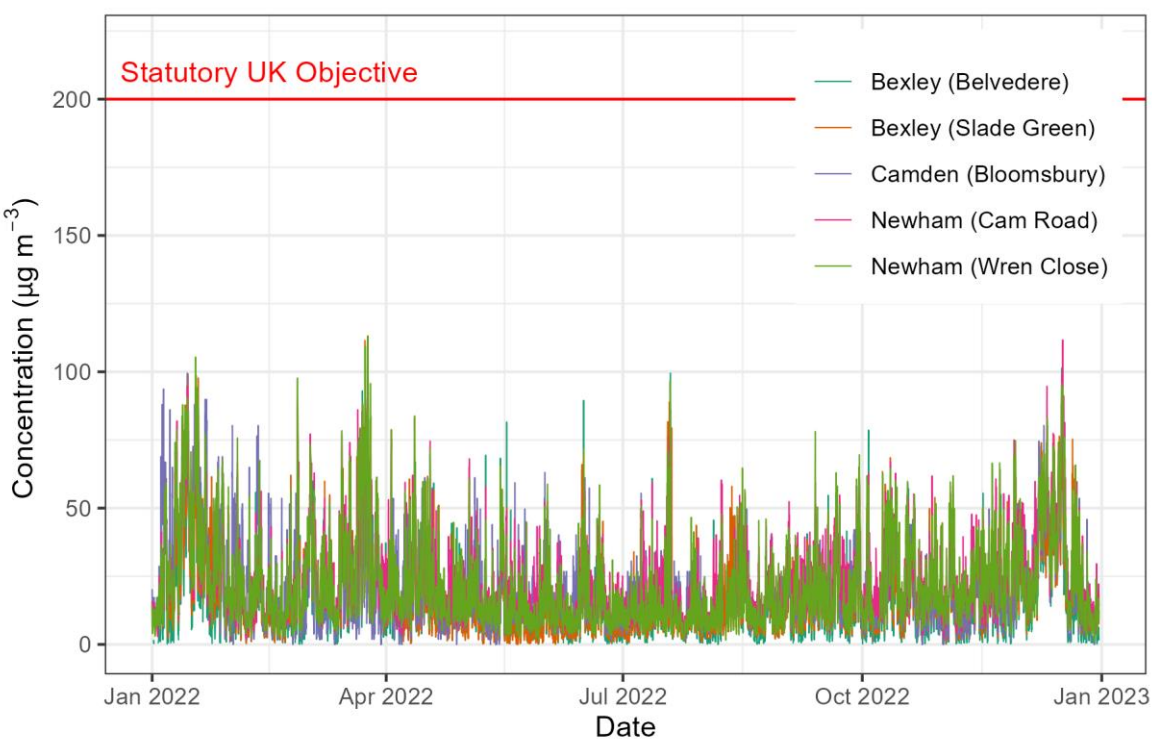


Figure 5: 1-Hour Mean Nitrogen Dioxide Concentrations at London Monitoring Sites, 2022

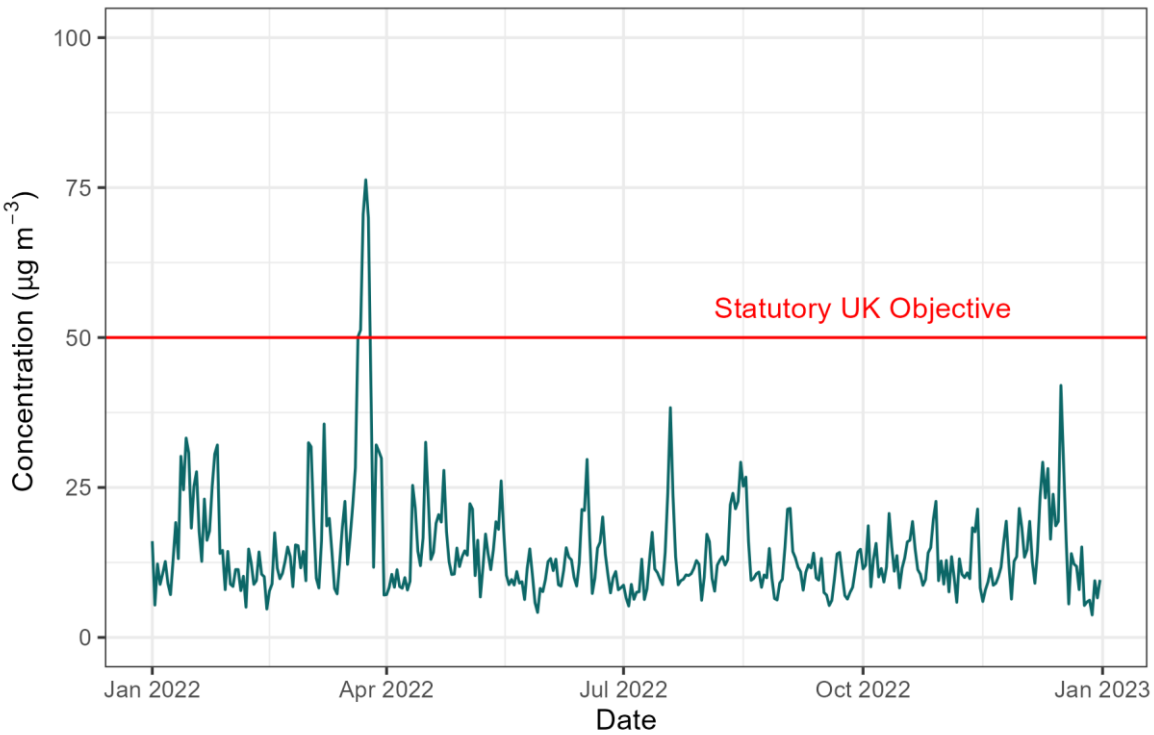


Figure 6: Daily Mean PM_{10} Concentrations at London City Airport (LCA-KGV), 2022

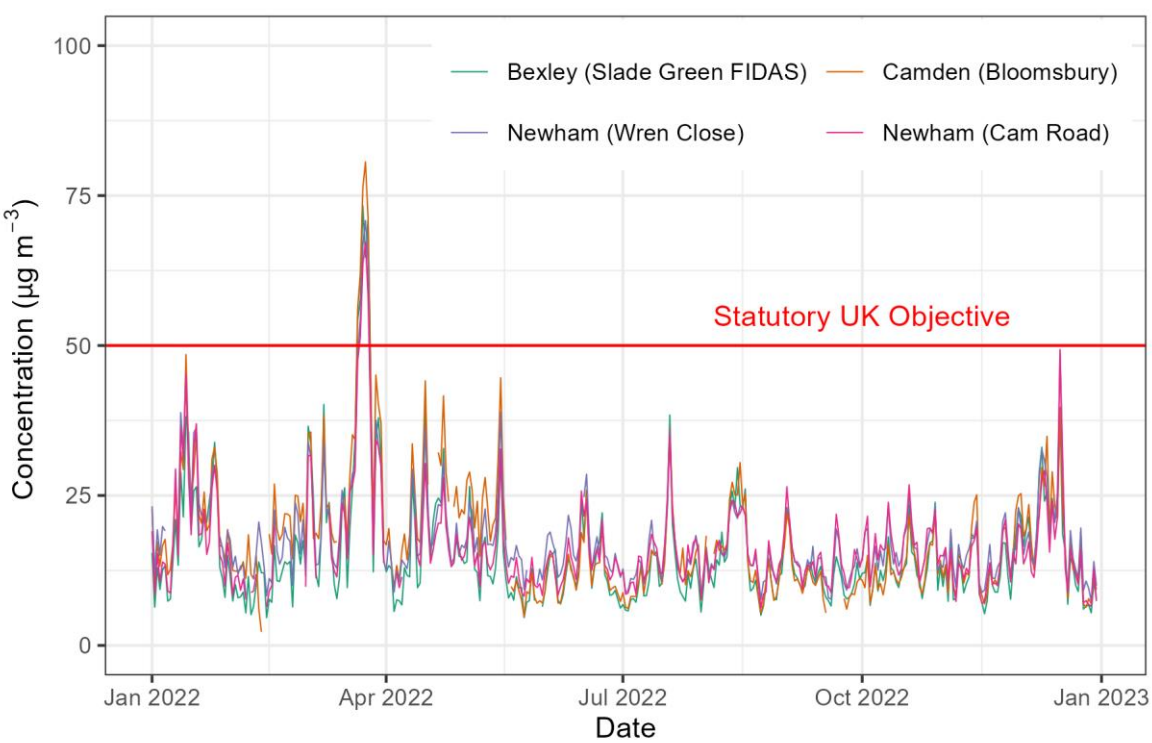


Figure 7: Daily Mean PM_{10} Concentrations at London Monitoring Sites, 2022

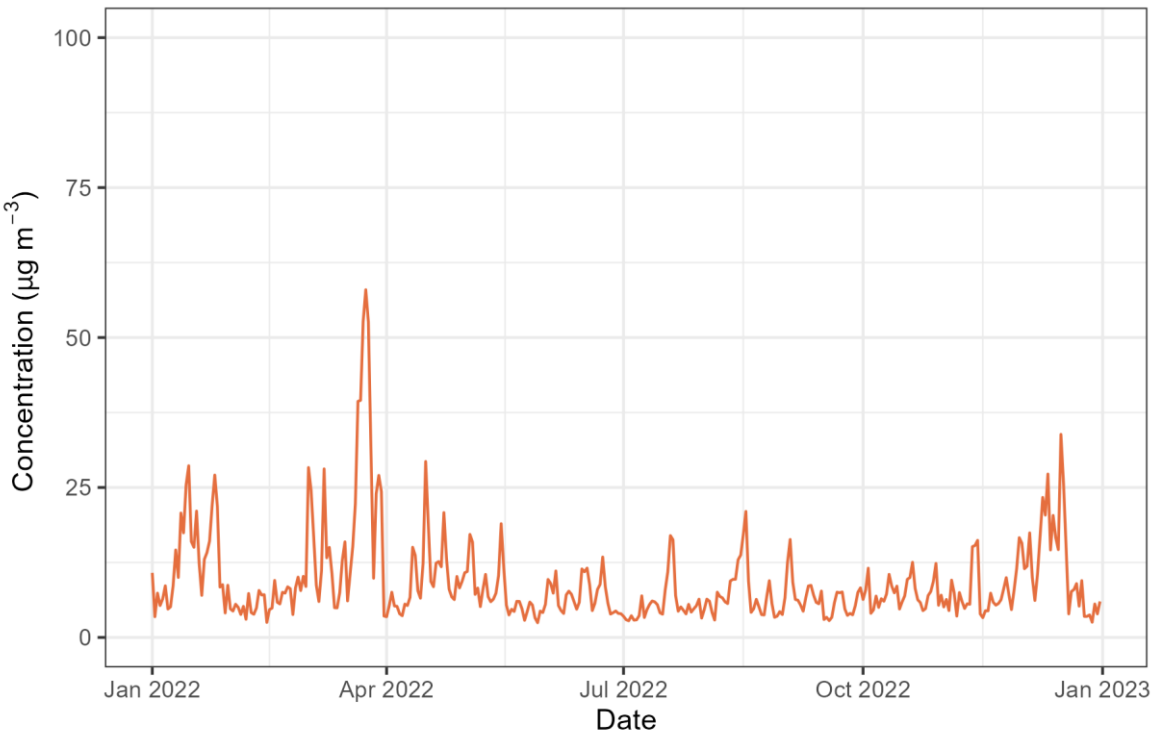


Figure 8: Daily Mean $PM_{2.5}$ Concentrations at London City Airport (LCA-KGV), 2022

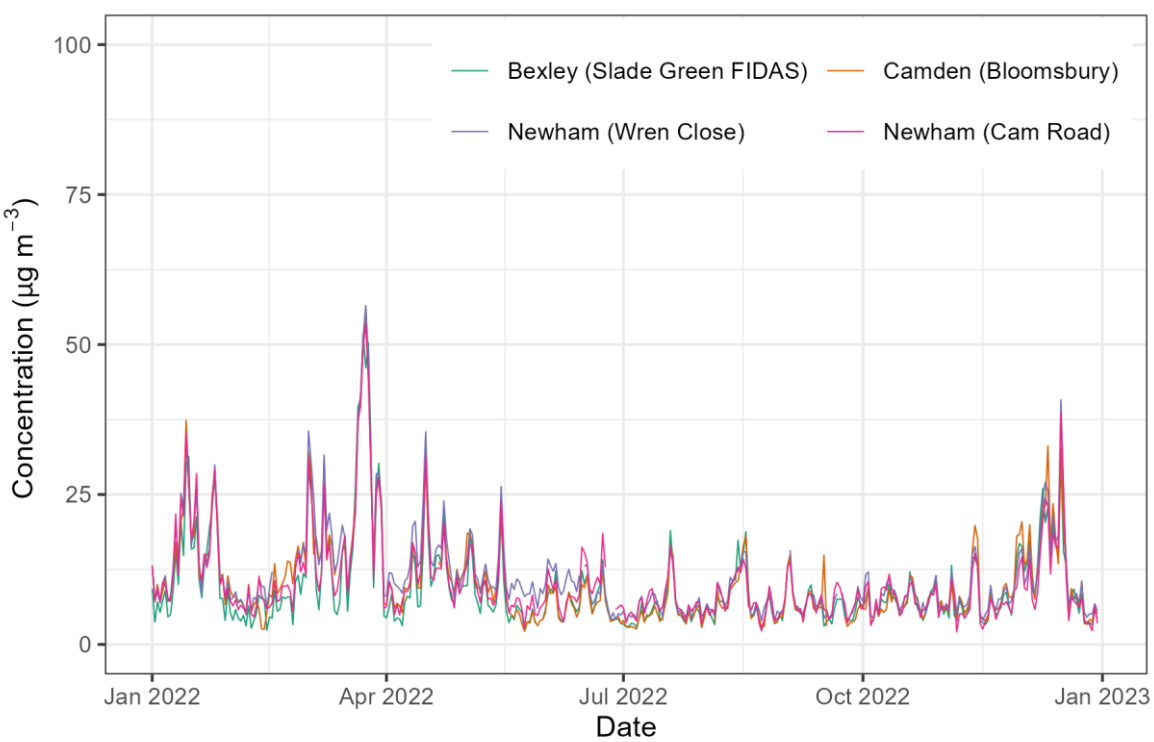


Figure 9: Daily Mean $PM_{2.5}$ Concentrations at London Monitoring Sites, 2022

Trends in Pollutant Concentrations

4.5 The automatic station at the LCA-CAH site has been in operation since 2006, the LCA-ND site since 2011, and the LCA-KGV site since 2019 ($PM_{2.5}/PM_{10}$) and July 2022 (NOx/NO_2). It is therefore appropriate to examine whether there are any trends in the measured pollutant concentrations over time.

4.6 Figure 10 shows the trends in measured annual mean nitrogen dioxide concentrations at LCA-CAH, LCA-ND, and at the five other monitoring locations identified for the regional evaluation of pollution episodes (Bexley – Belvedere, Bexley – Slade Green, Camden - Bloomsbury, Newham - Wren Close, and Newham - Cam Road). From a visual examination of Figure 10, there appears to be a general downward trend at all sites from 2007 to 2019, followed by an acceleration of the downward trend in 2020, likely due to Covid-19 lockdown restrictions.

4.7 Because of the interest in trends, a more detailed analysis has been carried out, focusing on monitoring sites in the east London area. The results of the detailed analysis are provided in Appendix 6. In summary, there is a statistically significant downward trend at all the east-London monitoring sites for both nitrogen dioxide and nitrogen oxides (NOx), including at LCA-CAH and LCA-ND (approximately 0.9 µg/m^3 per annum at both LCA sites over 2007-2022).

4.8 The trends in annual mean PM_{10} concentrations are shown in Figure 11, for the LCA-KGV site (2019 onwards), LCA-CAH site (2007-2022) and three other monitoring locations, for which sixteen years of data are available. There is generally a downward trend between 2007 and 2022; concentrations in 2007 were all above 20 µg/m^3, whereas concentrations in 2022 were all lower than 20 µg/m^3.

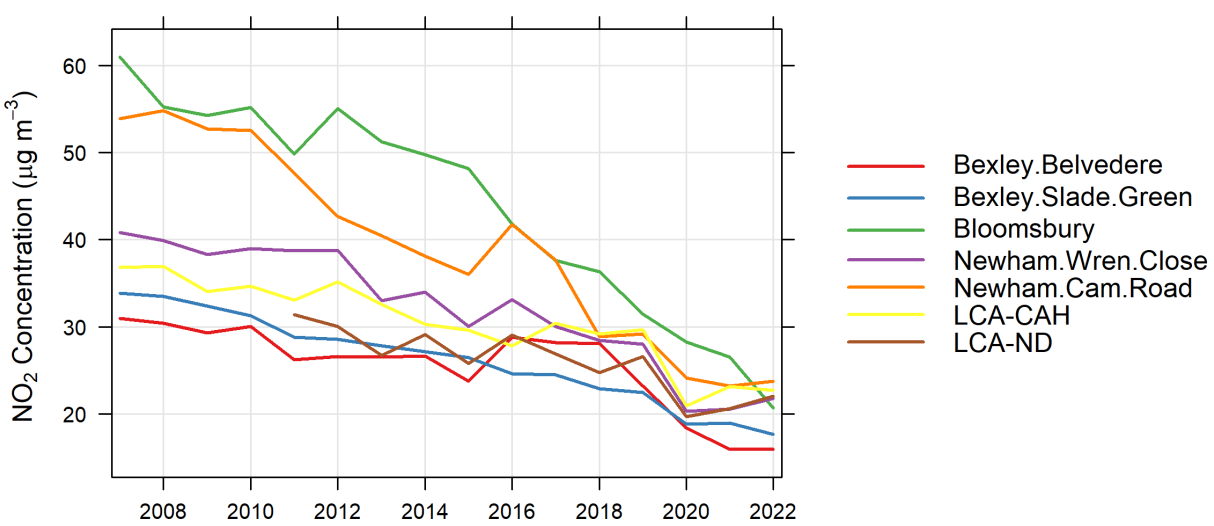


Figure 10: Annual Mean Nitrogen Dioxide Concentrations, 2007 – 2022 (µg/m^3)

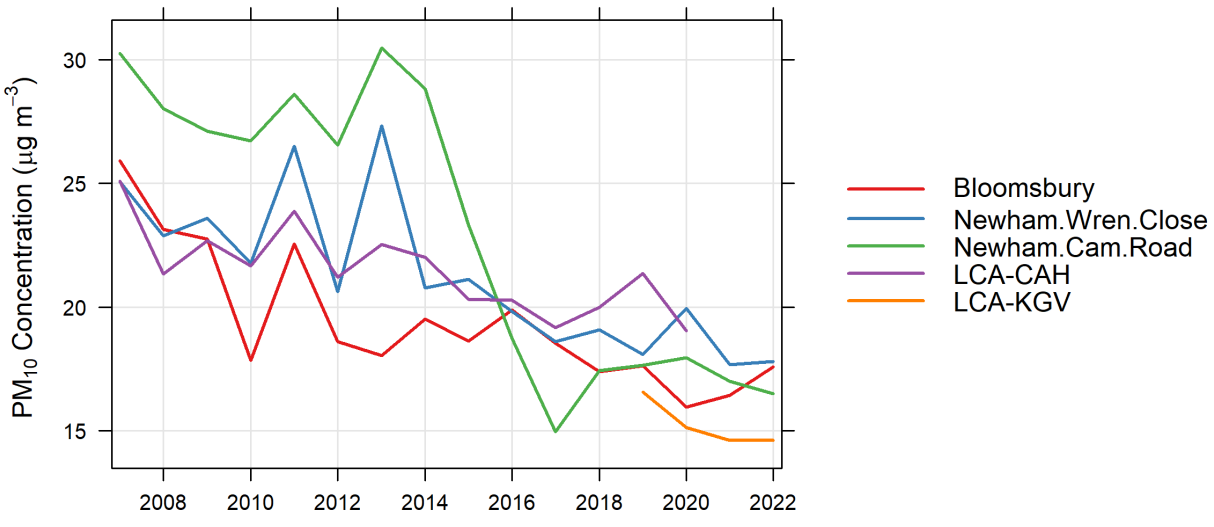


Figure 11: Annual Mean PM_{10} Concentrations, 2007 – 2022 (µg/m^3)

Bivariate Pollution Roses

4.9 Pollution roses are a useful technique for exploring the influence of different sources of air pollution at a monitoring site. Bivariate pollution roses have been prepared using the "Openair" software[6]. These bivariate roses process average pollution concentration data by both wind direction and wind speed. They provide a powerful tool in identifying source contributions to measured concentrations at monitoring sites. The concentrations are shown by colour shading, with the distance from the centre point representing increasing wind speed.

4.10 It is known from both modelling studies and the analysis of empirical data that emissions from different source types behave differently in low and high wind speed conditions. For emissions from ground-level sources (such as road traffic), concentrations are highest during low wind speeds, and decrease rapidly with increasing wind speed (due to greater dilution and dispersion). In contrast, emissions released from elevated (e.g. chimney) sources, give rise to higher concentrations at higher wind speeds, as the plume is more likely to come down to ground close to the source. Emissions from the buoyant plumes of jet aircraft engines tend to behave in a similar manner to elevated sources. Carslaw *et al* (2006) showed how these bivariate plots could be used to identify the contribution of aircraft emissions to measured concentrations at Heathrow Airport.

[6] Carslaw, D. C., and K. Ropkins. 2012. "openair — An R package for air quality data analysis." Environmental Modelling & Software 27–28 (0): 52–61. https://doi.org/10.1016/j.envsoft.2011.09.008.

4.11 Figure 12 shows bivariate pollution roses for NOx concentrations in 2022 at the LCA-CAH, LCA-ND and LCA-KGV sites, using wind data from the meteorological station at London City Airport. During low wind speeds, dispersion is reduced and concentrations from ground-level sources are higher.

4.12 The pattern at all monitoring sites is that the highest NOx concentrations occur during low wind speeds (i.e. towards the centre of the rose), indicating that the highest concentrations are associated with ground-level source releases. These higher concentrations are not associated with any particular wind direction. There is also some indication that emissions from the apron area are making a small contribution at all sites, with these contributions being associated with moderate wind speeds. The association with higher wind speeds is suggestive of emissions from an elevated, buoyant source reflecting emissions from aircraft engines.

4.13 It is concluded that airport sources do not make a significant contribution to local NOx concentrations

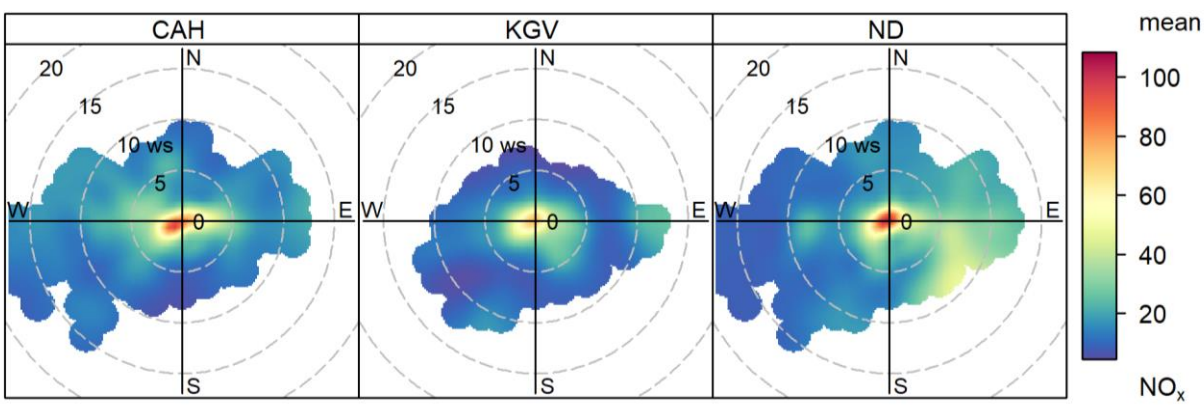


Figure 12: Bivariate Pollution Roses at LCA-CAH, LCA-KGV and LCA-ND Sites, 2022 (NO_x, µg/m^3)

5 References

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6 Glossary

Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.
FDMS	Filter Dynamics Monitoring System.
LAQN	London Air Quality Network.
LCA	London City Airport
LCA-CAH	London City Airport – City Aviation House monitoring site
LCA-KGV	London City Airport – King George V House monitoring site
LCA-ND	London City Airport – Newham Dockside monitoring site
$\mu g/m^3$	Microgrammes per cubic metre.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides (taken to be NO_2 + NO).
NO	Nitric oxide.
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometers in aerodynamic diameter.
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.
TEA	Triethanolamine – absorbent for nitrogen dioxide used in diffusion tubes.
TEOM	Tapered Element Oscillating Microbalance.
VCM	Volatile Correction Model.

A1 Nitrogen Oxides Results

A1.1 Nitrogen oxides (NO_x) concentrations, which are essentially the sum of nitrogen dioxide and nitric oxide, are presented in Table A1.1 for the automatic monitoring stations at London City Airport and for five sites across London in Table A1.2. There are no relevant air quality criteria for nitrogen oxides in an urban area. Nitrogen oxides concentrations are included here for completeness, and because they are relevant for air quality modelling.

Table A1.1: Nitrogen Oxides (NO_x) Data Summary for LCA-CAH, LCA-KGV and LCA-ND, 2022

Site	LCA-CAH	LCA-ND	LCA-KGV
Maximum 1-Hour Mean	486.7 µg/m^3	1,686.9 µg/m^3	508.3 µg/m^3
Annual Mean	34.8 µg/m^3	32.7 µg/m^3	27.4 µg/m^3
Data Capture	50.0%	85.5 %	47.5%

Table A1.2: Nitrogen Oxides (NO_x) Data Summary for London Monitoring Sites, 2022

	Bexley *Belvedere*	Bexley *Slade Green*	Camden *Bloomsbury*	Newham *Wren Close*	Newham *Cam Road*
Maximum 1-Hour Mean (µg/m^3)	414.2	478.8	540.7	599.1	624.1
Period Mean (µg/m^3)	23.4	26.1	35.1	29.7	36.1
Data Capture %	99.7	96.2	86.8	98.5	97.9

A2 Diffusion Tube Data

A2.1 Raw monthly average diffusion tube data, along with the location details and monitoring periods, are presented in Table A2.1.

Table A2.1: Raw Monthly Diffusion Tube Data for 2022, Not Bias Adjusted (µg/m^3)

Site ID	Grid ref	14/01/22 to 01/02/22	01/02/22 to 04/03/22	04/03/22 to 30/03/22	30/03/22 to 05/05/22	05/05/22 to 10/06/22	10/06/22 to 08/07/22	08/07/22 to 04/08/22	04/08/22 to 02/09/22	02/09/22 to 03/10/22	03/10/22 to 31/10/22	31/10/22 to 29/11/22	29/11/22 to 09/01/23	Unadjusted Annual Mean	Data Capture (%)
LCA 01	542154, 180288	40.3	27.3	34.9	-	18.6	16.9	19.9	22.9	24.0	25.5	-	-	24.7	75.0
LCA 02	541965, 180299	38.8	25.2	35.1	-	18.1	21.2	18.2	23.9	26.1	27.0	27.4	30.6	26.0	91.7
LCA 04	542271, 180708	38.6	-	31.7	22.8	22.1	20.0	20.0	22.1	25.5	34.1	34.3	34.6	27.4	91.7
LCA 05	542847, 180914	37.0	24.2	32.5	22.8	18.2	18.5	17.7	20.3	23.3	29.2	26.8	-	24.0	91.7
LCA 06	543712, 180868	36.9	16.4	30.4	22.2	18.3	18.0	16.6	19.9	25.6	25.7	20.9	25.8	22.6	100.0
LCA 07	543662, 180460	38.3	-	31.9	23.3	21.2	21.1	22.5	22.9	29.1	-	33.1	31.9	27.1	83.3
LCA 10	541758, 180428	42.4	29.8	38.7	27.9	22.0	18.6	24.4	27.1	23.0	31.9	35.9	35.9	29.4	100.0
LCA 11	543549, 180693	43.5	34.9	35.6	24.9	21.3	21.6	20.9	19.7	27.2	32.6	38.0	37.5	29.4	100.0
LCA 12	542192, 180561	37.0	28.7	34.9	20.0	-	23.6	19.8	11.3	28.8	29.3	33.5	31.8	26.9	91.7
LCA 13	542280, 180769	41.5	26.3	33.4	-	16.8	18.7	19.9	20.6	-	-	30.8	34.0	26.3	75.0
LCA 14	542070, 180712	44.5	35.6	39.2	25.2	20.4	22.4	21.9	23.4	28.5	36.1	36.7	38.8	30.6	100.0
LCA 15	542316, 180862	42.2	25.6	35.2	24.2	17.7	19.2	18.8	19.0	22.0	29.3	27.6	32.3	25.6	100.0
LCA 18	542303, 180707	38.8	24.6	31.1	21.9	17.8	17.9	18.9	19.4	24.7	30.3	28.9	30.6	24.9	100.0
		38.1	23.9	34.7	21.9	18.1	17.8	19.2	18.7	23.9	27.2	30.1	26.9	24.5	100.0
LCA 20	541632, 180378	39.4	-	45.0	-	20.9	26.3	29.4	11.7	27.8	36.4	31.8	-	29.0	75.0
LCA 21	543100, 180132	33.9	23.3	27.0	19.6	14.9	15.1	16.2	17.0	20.2	23.3	22.8	28.1	21.4	100.0

– not available

A3 Bias Adjustment Factor for Diffusion Tubes

A3.1 Diffusion tubes are known to exhibit bias when compared to results from automatic analysers. Therefore, diffusion tube results need to be adjusted to account for this bias. One of the main factors influencing diffusion tube performance is thought to be the laboratory that supplies and analyses the tubes. The diffusion tubes exposed at London City Airport are supplied and analysed by Gradko International Ltd. (20% TEA in water).

A3.2 In order to determine the bias exhibited by these tubes, a study was carried out using duplicate tubes at LCA-ND. All diffusion tube data presented in this report have been adjusted using the overall factor calculated from the data presented in Table A3.1.

A3.3 The accuracy of the bias adjustment factor is limited by the exposure periods of the co-located diffusion tubes and time the corresponding automatic monitors were operating for. At LCA-ND there were no missing diffusion tube data and the automatic monitor had a good level of data capture for 2022 (85.5%). A comparison between the 2022 bias adjustment factor calculated at those from previous years (see Table A3.2) shows a close comparison, and as such the factor has been considered appropriate to use.

Table A3.1: Results of Diffusion Tube and Continuous Monitor Co-location Study in 2022

	Diffusion Tube [a]	Automatic [b]	Adjustment Factor
LCA-ND	24.71	21.57	0.873

[a] Diffusion tubes were exposed for the period between 14th January 2022 to 9th January 2023.

[b] The automatic period corresponds with the diffusion tube period.

A3.4 Table A3.2 presents the bias adjustment factors applied to the data for the last fifteen years.

Table A3.2: Previous Bias Adjustment Factors

Year	Factor
2008	0.786
2009	0.717
2010	0.801
2011	0.738
2012	0.744
2013	0.771
2014	0.832
2015	0.858
2016	0.762
2017	0.724
2018	0.784
2019	0.796
2020	0.783
2021	0.846
2022	0.873

A4 Diffusion Tube Precision

A4.1 Diffusion tube precision describes the ability of a measurement to be consistently reproduced, i.e., how similar the results of duplicate or triplicate tubes are to each other. It is an indication of how carefully the tubes have been handled in either the laboratory and/or the field. Tube precision is separated into two categories 'Good' or 'Poor' as follows: tubes are considered to have **'Good'** precision where the coefficient of variation (CV) of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have **'Poor'** precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

A4.2 Table A4.2 shows that monitoring at LCA-ND there was 'Good' precision at every month of the year (Defra, 2011). The precision is consistent with the performance of 20% TEA in water tubes supplied by Gradko International in other co-location studies (Defra, 2022b).

Table A4.2: Precision of Duplicate Diffusion Tubes, LCA-ND

Period	Start Date	End Date	Tube 1	Tube 2	Mean	Standard Deviation	CV	Tube Precision
1	14/01/2022	01/02/2022	38.8	38.1	38	0.5	1	4.4
2	01/02/2022	04/03/2022	24.6	23.9	24	0.5	2	4.4
3	04/03/2022	30/03/2022	31.1	34.7	33	2.5	8	22.9
4	30/03/2022	05/05/2022	21.9	21.9	22	0.0	0	0.0
5	05/05/2022	10/06/2022	17.8	18.1	18	0.2	1	1.9
6	10/06/2022	08/07/2022	17.9	17.8	18	0.1	0	0.6
7	08/07/2022	04/08/2022	18.9	19.2	19	0.2	1	1.9
8	04/08/2022	02/09/2022	19.4	18.7	19	0.5	3	4.4
9	02/09/2022	03/10/2022	24.7	23.9	24	0.6	2	5.1
10	03/10/2022	31/10/2022	30.3	27.2	29	2.2	8	19.7
11	31/10/2022	29/11/2022	28.9	30.1	30	0.8	3	7.6
12	29/11/2022	09/01/2023	30.6	26.9	29	2.6	9	23.5
Average CV							**3**	**-**

A5 Adjustment of Short-Term Data to Annual Means

A5.1 The monitoring sites have been annualised as per Technical Guidance LAQM.TG22 (Defra, 2022a) in instances where valid data capture was less than 75% (and at least 25%). Annualisation was required for both LCA-CAH and LCA-KGV nitrogen dioxide concentrations.

A5.2 This sites have been annualised against automatic background monitoring sites used throughout this report (Bexley – Belvedere, Bexley – Slade Green, Camden – Bloomsbury, and Newham – Wren Close), which fulfil the criteria specified by LAQM.TG22 guidance of being long-term continuous monitoring sites with data capture over 85% for 2022, and for both respective periods of data capture at LCA-CAH and LCA-KGV.

A5.3 The annual mean nitrogen dioxide concentrations and the period means for each of the monitoring sites from which adjustment factors have been calculated are presented in Table A5.1, along with the overall Annualisation Factor.

Table A5.1: Data used to Adjust Short-term Monitoring Data

[a]

	Nearby Background Monitoring Sites			
	Bexley - Belvedere	**Bexley – Slade Green[b]**	**Camden - Bloomsbury[b]**	**Newham – Wren Close**
CAH Period Mean (Pm)	18.0	19.7	23.0	24.3
KGV Period Mean (Pm)	15.2	17.3	19.6	21.0
Annual Mean (Am)	15.9	17.6	20.7	21.8
CAH Ratio (Am/Pm)	0.89	0.90	0.90	0.90
KGV Ratio (Am/Pm)	1.05	1.02	1.05	1.04
CAH Average (Ra) [a]	0.89			
KGV Average (Ra) [a]	1.04			

[a] Averages calculated on un-rounded ratios.

[b] Includes some provisional data

A6 Detailed Trend Analysis

Nitrogen Dioxide

A6.1 Figure A6.1 shows the smooth-trend analyses of monthly mean nitrogen dioxide concentrations for LCA-CAH, LCA-ND and seven other, nearby monitoring sites (Greenwich Eltham, Camden Bloomsbury, Newham Wren Close, Newham Cam Road, Greenwich Burrage Grove, Greenwich Woolwich Flyover, Tower Hamlets Blackwall), over the period 2007 to 2022.

A6.2 A Theil-Sen analysis has been applied to the data to identify statistically significant trends and slopes, and the results are described in Table A6.1. There is a statistically significant downward trend in nitrogen dioxide concentrations at LCA-CAH, LCA-ND and all of the seven monitoring sites.

Table A6.1: Theil-Sen Analysis, NO_2 Concentrations at LCA-CAH, LCA-ND, and Other London Monitoring Sites, 2007 to 2022

Monitoring Site	Theil-Sen Analysis [a]	Statistically Significant Trend?
Greenwich Eltham	-0.92 [-1.13, -0.70]	**Yes**
Camden Bloomsbury	-2.57 [-2.88, -2.27]	**Yes**
Newham Wren Close	-1.46 [-1.77, -1.18]	**Yes**
Newham Cam Road	-2.24 [-2.53, -1.94]	**Yes**
Greenwich Burrage Grove	-2.00 [-2.25, -1.74]	**Yes**
Greenwich Woolwich Flyover	-2.49 [-2.81, -2.14]	**Yes**
Tower Hamlets Blackwall	-2.21 [-2.48, -1.92]	**Yes**
LCA-CAH	-0.92 [-1.24, -0.59]	**Yes**
LCA-ND [b]	-0.88 [-1.30, -0.45]	**Yes**

[a] The first value is the slope. The number in brackets is the upper and lower 95th percentile confidence interval.

[b] Analysis carried out for 2011 to 2022.

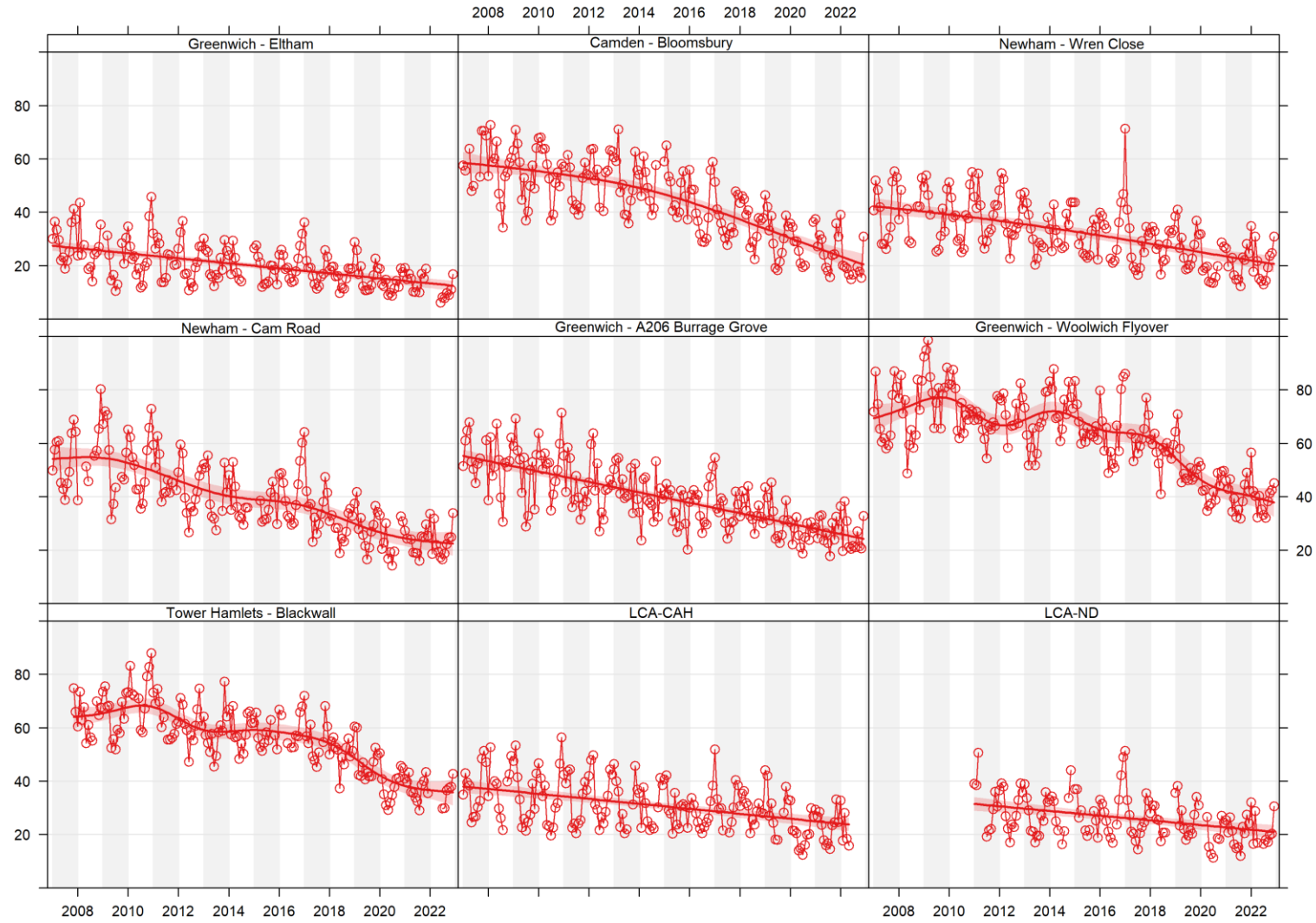

Figure A6.1: Smooth Trend Analysis, Monthly NO_2 Concentrations at LCA-CAH, LCA-ND, and Other Monitoring Sites, 2007 – 2022

Nitrogen Oxides (NO_x)

A6.3 Figure A6.2 shows the smooth trend analysis of monthly mean NO_x concentrations for LCA-CAH, LCA-ND and other monitoring sites (Greenwich Eltham, Camden Bloomsbury, Newham Wren Close, Newham Cam Road, Greenwich Burrage Grove, Greenwich Woolwich Flyover, Tower Hamlets Blackwall) for the period 2007 to 2022.

A6.4 The Theil-Sen analysis, shown in Table A6.2, indicates a statistically significant downward trend in NOx concentrations at LCA-CAH, LCA-ND and all seven of the other London monitoring sites.

Table A6.2: Theil-Sen Analysis, NO_x Concentrations at LCA-CAH, LCA-ND, and Other London Monitoring Sites, 2007 to 2022

Monitoring Site	Theil-Sen Analysis [a]	Statistically Significant Trend?
Greenwich Eltham	-1.28 [-1.77, -0.91]	**Yes**
Camden Bloomsbury [b]	-4.97 [-5.87, -4.06]	**Yes**
Newham Wren Close	-2.43 [-3.10, -1.80]	**Yes**
Newham Cam Road	-4.81 [-5.56, -4.05]	**Yes**
Greenwich Burrage Grove	-4.67 [-5.36, -3.93]	**Yes**
Greenwich Woolwich Flyover	-9.19 [-10.71, -7.74]	**Yes**
Tower Hamlets Blackwall	-6.92 [-8.07, -5.88]	**Yes**
LCA-CAH	-1.81 [-2.50, -1.11]	**Yes**
LCA-ND [c]	-1.90 [-2.96, -1.01]	**Yes**

[a] The first value is the slope. The value in brackets is the upper and lower 95th percentile confidence interval.

[b] Analysis carried out for 2007 to 2021.

[c] Analysis carried out for 2011 to 2022.

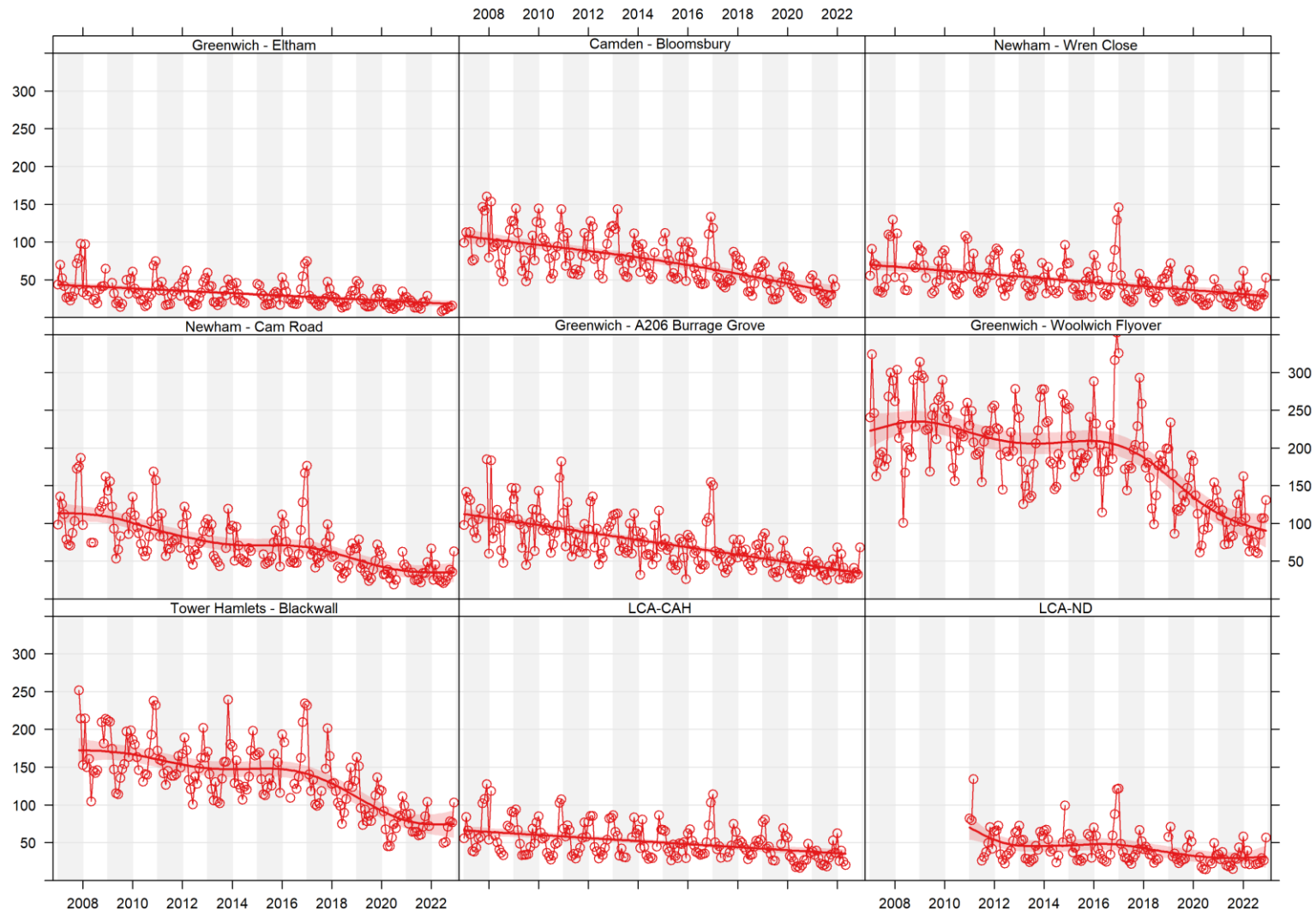

Figure A6.2: Smooth Trend Analysis, Monthly NO_x Concentrations at LCA-CAH, LCA-ND, and Other London Monitoring Sites, 2007 – 2022

Appendix 6
Air Quality Action Plan Progress Summary

Measure	Expected emissions / air quality benefit	Outputs / targets / KPIs	Completed by	Status Update 2022
Ground Power				
Measure 1: Maximising availability of Fixed Electrical Ground Power (FEGP).	NOx and PM_{10} emissions from Auxiliary Power Units (APUs) and Mobile Ground Power Units (MGPUs) were 4.7 and	London City Airport will continue to routinely record the availability of FEGP on all stands where it is has been installed, and the time taken to effect repairs until June 2021 when all diesel MGPUs will be replaced with battery MGPUs. It will also continue to record the use of FEGP within the online portal and document any contraventions of Airfield Operating Instruction AOI 07 until June 2021.	Jun-21	Completed. Diesel MGPU no longer in use. This condition has been superseded by measure 3 below.
Measure 2: Minimising APU Use.	NOx and PM_{10} emissions from APU use were 4.5 and 1.05 tonnes respectively, in 2017. Airfield Operating Instruction AOI 07 restricts the running of APUs.	London City Airport will continue to monitor the use of APU in accordance with AOI 07, and will continue to record APU use via the Airport's "Qlickview" online reporting tool. Any contraventions of the Airfield Operating Instructions, and any future requirements within the forthcoming APU Strategy, will be documented.	June in each year	Ongoing. This continues to the be recorded on Qlik. 223 instances of extended APU usage were recorded in 2022.
Measure 3: Phasing Out Diesel MGPUs.	NOx and PM_{10} emissions from diesel powered Mobile Ground Power Units (MGPUs) were 0.2 and).1 tonnes respectively, in 2017. Completely restricting their use will eliminate these emissions.	Reliance on diesel MGPUs will be phased out completely by 30 June 2021 in accordance with the requirements of Condition 46 of the CADP1 Conditions. Battery-powered units (B- MGPUs) and FEGP will remain in use	Jun-21	Completed. All diesel units no longer in use as of end Aug 2021. Electric MGPU being operating after delivery delays and adjustment with self-manoeuvring.
Emissions from Aircraft Taxiing Operations				
Measure 4: Ground Engine Running Strategy – air quality implications	Ground running relates to the use if aircraft engines on stand, during taxiing, and on-hold, and accounted for 15.6 tonnes NOx and 0.35 tonnes PM10 in 2017. The Ground Engine Running Strategy is aimed at ensuring aircraft engines are operated at minimum power necessary and for as short a time as possible.	London City Airport will continue to review the outcomes of the Ground Engine Running Strategy within the quarterly reports and will prepare a report for submission to LBN on the air quality implications where ground running times exceed agreed targets.	Within 2 months of GERS quarterly reports	Ongoing. No exceedances reported.

Measure	Expected emissions / air quality benefit	Outputs / targets / KPIs	Completed by	Status Update 2022
Measure 5: Reduced thrust during taxiing.	Taxiing accounted for 14.2 tonnes NOx and 0.3 tonnes PM_{10} in 2017. Emissions can be reduced by "Engine-Out Taxiing" in which one or more engines is switched off. However, while EOT is used, there are current safety concerns. Reduced thrust on taxiing may also be used, but is limited due to the current taxiway infrastructure.	London City Airport will work with the major airlines to explore the potential to introduce reduced thrust during taxiing. A feasibility study will be completed within six months of the new CADP taxiways becoming operational	End of 2021	Engagement with airlines highlighted operational and safety constraints for the use of reduced thrust during taxiing but for some main airlines, including BACF. Report provided to LBN on 21/12/2021.
Measure 6: Electric Taxiing Systems	Emissions from taxiing could be reduced or potentially eliminated by the use of electric tugs or on-board electric systems	London City Airport will review emerging technologies related to Electric Taxiing Systems and will provide an updated report on feasibility**.**	Dec-21	Electric pushback tugs required as and when new CADP stands become operational. Report provided to LBN on 20/12/2021.
Ground Running, Testing and Maintenance				
Measure 7: Ground Engine Running, Testing and Maintenance	Emissions from engine testing accounted for 0.8 tonnes NOx in 2017.	London City Airport will continue to review the outcomes of the Ground Engine Running, Testing and Maintenance (GERT&M) Strategy and will advise on the air quality implications, specifically with regard to proposals for relocation of the engine ground run positions.	Within 2 months of the revised GERT&M Strategy	Review has concluded that distance from engine testing location to closest receptor remains the same, so there will be no air quality impacts implications.
Airside Vehicles and Plant				
Measure 8: ULEZ Compliance – Airport owned vehicles	The ULEZ will require diesel cars and vans to comply with the Euro 6 emission standard which will, on average, reduce NOX emissions by 65% compared to Euro 5.	A strategy to upgrade the LCY- owned fleet to ULEZ requirements has been developed and shared with LBN. Once the ULEZ is extended London City Airport will carry out a feasibility study as to whether LCA-owned airside vehicles can be made ULEZ compliant. If this is feasible, a programme for vehicle upgrades and/or replacement will be submitted to LBN. London City Airport will also review AOI 12 to reflect the expansion of the ULEZ.	October 2021 or on extension of ULEZ	Closed. All airport owned vehicles on the airfield are compliant with the ULEZ requirements as of 31st October 2021.

Measure	Expected emissions / air quality benefit	Outputs / targets / KPIs	Completed by	Status Update 2022
Measure 9: ULEZ Compliance	The ULEZ will require diesel cars and vans to comply with the Euro 6 emission standard which will, on average, reduce NOX emissions by 65% compared to Euro 5.	London City Airport will work with third-party operators of airside vehicles and undertake a feasibility study for achievement of full ULEZ compliance.	October 2021 or on extension of ULEZ	All supplier with non-compliant vehicles (16%) were contacted for their plans to upgrade their fleet which will be monitored on an annual basis. Updated report provided to LBN on 21/12/2021.
Measure 10: Airside Vehicle Permits (AVP) – Promote Earlier Introduction of Cleaner Vehicles	Emissions from Ground Support Equipment (principally airside vehicles) accounted for 2.7 tonnes NOx in 2017. The AVP system can be used to drive the introduction of cleaner vehicles at an earlier stage, in advance of full ULEZ compliance.	London City Airport will continue to enforce a requirement in AOI 12 that all new vehicles issued with an Airside Vehicle Permit (i.e. not renewal applications for existing AVPs, comply with the latest vehicle emissions standards for road vehicles (Euro Standards) defined as the date by which the Euro Standard comes into force for registration and the sale of new vehicles.	June in each year	Ongoing. As agreed on 21/12/2021, some dispensations may be granted if ULEZ compliant vehicles cannot be deployed on the basis of documented technical, safety, operational and financial constraints. Justification provided will be reviewed by LCY, records retained and updates required annually.
Measure 11: Vehicle Emissions Testing	Failed abatement systems can lead to substantially high emissions on individual vehicles	London City Airport will continue to undertake routine annual, and periodic, random emissions testing for Airport owned and third-party airside vehicles. Where a vehicle fails, a Vehicle Defect Notice will be used; the operator will have 14 days to rectify the fault or the AVP will be withdrawn. The results of the testing will be reported to LBN on an annual basis.	June in each year	Ongoing. No LCY vehicles failed the testing required.
Measure 12: Introduction of Hybrid and Electric Vehicles	Both hybrid and electric airside vehicles would reduce emissions (above and beyond ULEZ standards), but is dependent on the availability of suitable vehicles	London City Airport will revise the procurement process for the purchase of new vehicles owned by the Airport, with a focus on hybrid or electric alternatives. The outcome of this process will be reported on an annual basis.	June in each year	Ongoing. LCY has been reviewing its vehicle fleet with the aim of maximising the number of hybrid and especially electric vehicles to reach its net zero aspirations.
Emissions from Black Cabs				
Measure 13:.Anti-Idling: Black cabs	Idling engines when stationary causes unnecessary pollution emissions. Vehicle Idling Action is a behaviour change	London City Airport will continue to monitor idling by black cabs and will report any issues to the Airport Transport Forum	Twice a year	Signs are in place to advise drivers to turn off engines and drivers were compliant with this. No related issues or complaints were

Measure	Expected emissions / air quality benefit	Outputs / targets / KPIs	Completed by	Status Update 2022
	campaign supported by LBN.			raised in the last year.
Publicity and Promotion				
Measure 14: Review and Update Website	No direct emissions benefits, but critical in communicating with staff, passengers and members of the public, and disseminating information of air quality	London City Airport will continue to review and update the website to provide clear, concise information to the local and wider community on the performance of the Air Quality Management Strategy.	June in each year	Ongoing. The AQMS continues to be available on the website as well as air quality monitoring data. Progress on Air Quality Action Plan continues to be updated annually and made available on the website as part of the APR. LCY's Sustainability Roadmap publicised and promoted the need to reduce carbon emissions and is available on the website.
Measure 15: RAMP Sampling.	Although subject to workplace air quality standards, staff on the RAMP are likely to be exposed to higher levels of pollution	London City Airport will continue to undertake, on a two-year basis, a RAMP employee air quality monitoring assessment with direct, individual recording apparatus	April 2021 and April 2023	RAMP sampling completed in Q1 2022 following agreement with LBN to delay until aircraft numbers increased following the pandemic. Following RAMP sampling currently scheduled for 2nd May 2023 due to availability of the machinery required.
Measure 16: Staff Communications.	No direct emissions benefits, but critical in communicating with staff, and in gaining support to this Strategy	London City Airport will publish an article relating to air quality and airport operations at least once per year in the airport newsletter "Inside E16" or in the staff E-Bulletin	June in each year	News about the installation and use of the electric charging points was promoted through the E-Bulletin in June 2022. Also promoted through the E-Bulletin the Employee Travel Survey in May and June 2022. The Sustainability Roadmap, and Airport Carbon Accreditation level 4+ transition, the Governments Aviation Strategy - Flight Path to the Future were also

Measure	Expected emissions / air quality benefit	Outputs / targets / KPIs	Completed by	Status Update 2022
				promoted through it.
Ultra Fine Particles				
Measure 17: Emission Inventories for Ultra Fine Particles (UFPs)	There is increasing evidence related to aircraft operations and UFPs, but there is currently no robust manner in which an emissions inventory can be compiled.	London City Airport will review the emerging evidence on UFPs related to aircraft emission inventories and will provide an update on an annual basis.	June in each year	Ongoing. No change in status in 2022. Note on updated review sent to LBN on 27/04/2023
Measure 18: UFP Emissions and Sulphur Content of Aviation Fuel	Recent evidence has identified a unique size distribution of UFPs related to aviation emissions, which may potentially be linked to the high S content of aviation fuel.	London City Airport will review the emerging evidence on the link between the sulphur content of aviation fuel and UFP emissions and will work with industry partners to assess the benefits and feasibility of reducing the sulphur content of the fuel.	Dec-21	Note on updated review sent to LBN on 27/04/2023.

CADP Condition 58 Air Quality Management Strategy

Ultra Fine Particles

London City Airport

27 March 2023

Document Control

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1 Introduction

1.1 The City Airport Development Programme (CADP) application (13/01228/FUL) was granted planning permission by the Secretaries for State for Communities and Local Government and Transport in July 2016 following an appeal and public inquiry which was held in March / April 2016. Condition 58 of the CADP1 Permission requires an Air Quality Management Strategy (AQMS) to be submitted to, and approved by, the London Borough of Newham (LBN).

1.2 The AQMS (2020-2023), hereafter referred to as the "2020 AQMS", was approved in November 2020. There are two measures related to Ultra Fine Particles (UFPs):

Measure 17: UFP Emissions Inventory. London City Airport will review the emerging evidence on UFPs related to aircraft emissions inventories and will provide an update on an annual basis.

Measure 18: UFP Emissions and Sulphur Content of Aviation Fuel. London City Airport will review the emerging evidence on the link between the sulphur content of aviation fuel and UFP emissions, and will work with industry partners to assess the benefits and feasibility of reducing the sulphur content of the fuel.

1.3 It is confirmed that there have been no changes to policies or regulations since the 2020 AQMS was submitted, and there are no standards, objectives, guidelines or targets with respect to UFP concentrations.

2 Update on Measures 17 and 18

2.1 Following the development of the CAEP/10 nvPM[1] mass concentration standard (as reported in the 2020 AQMS, ICAO continued the development of the nvPM mass and number standards. About 25 engines that represented the range of in-production technologies and sizes were tested to characterise both nvMP mass and number emissions. The CAEP/11 nvPM mass and number standards have now been formally adopted, and are incorporated into the ICAO Aircraft Emissions Databank[2].

2.2 Whilst it is possible to construct an aircraft emissions inventory for nvPM mass and numbers, this only represents a proportion of the total UFP emissions associated with aircraft operations. In addition, there is no robust manner in which to quantify UFP emissions from other sectors such as road transport.

2.3 There are currently no CAEP standards to represent the volatile PM emissions (vPM), although previous studies have suggested that aircraft exhaust nanoparticles mainly comprise volatile

[1] non-volatile Particulate Matter
[2] ICAO (2021) Aircraft Emissions Databank, version 28c. Available at https://www.easa.europe.eu/domains/environment/icao-aircraft-emissions-databank

particles[3]. Volatile UPFs are formed from the gaseous exhaust emissions condensing in the atmosphere to form new particles. Formation of vPM is driven by both the gaseous precursor emissions in the engine exhaust, as well as the ambient air quality conditions. There is currently no methodology to estimate vPM emissions associated with aircraft engines.

2.4 There is also increasing evidence of the importance of non-combustion emissions from aircraft engines in the formation of UFPs. A study[4] conducted at Narita International Airport (Japan) collected UFPs using Nano-Moudi samplers, with subsequent analysis of mass, EC/OC, elements and organic composition. It was concluded that approximately 50% of the organic compounds in the <30nm particles could be attributed to nearly-intact forms of jet lubrication oil.

2.5 A further study[5] conducted at Frankfurt Airport (Germany) also collected particles onto Nano-Moudi samplers. The subsequent analysis identified homologous series of pentaerythritol esters (PEE) and trimethylplpropane (TMPE) esters which are unique base stocks of aircraft lubrication oil. The authors conclude that jet oil nucleation is an important mechanism which explains the observations of high number concentrations of non-refractory ultrafine particles close to airports.

2.6 Several studies have investigated the improvements to local air quality associated with the introduction of Sustainable Aviation Fuel (SAF) blends. SAFs high cetane number, lack of aromatic hydrocarbons and near-zero sulphur content generally helps to reduce aviation emissions of key pollutants, including UFPs. A key Airport Cooperative Research Programme (ACRP) study[6] was conducted in 2018-2019 to assess the benefits of introducing SAF blends to commercial aircraft. Known as ACRP 02-80, the study was sponsored by the National Academy of Science, and was completed in two stages. The study investigated varying SAF blends (5%, 25% and 50%) and reported benefits related to UFPs in terms of both particle mass [nvPM mass] and particle number [nvPM #]. In a Fact Sheet that summarises the ACRP 02-80 study[7], the authors conclude that SAFs significantly reduce emissions of Particulate Matter, and reduce the emissions of UFPs. For a SAF 50% blend, [nvPM mass] was reduced by 65% and [nvPM #] reduced by 43%.

2.7 A more recent study[8] investigated the effects of a 32% SAF blend on a widely-used turbofan engine (CFM56-7B26 engine, Boeing 737NG series aircraft) at Zurich Airport. The study investigated the effects at different engine thrust settings, and across the whole LTO cycle. The nvPM emission indices were reduced most markedly at idle (7% thrust) by 70% in terms of [nvPM mass] and by 60%

[3] Wey et al (2016). Over of the Aircraft Particles Emissions Experiment. Available at: https://scholarsmine.mst.edu/chem_facwork/161/
[4] Fushimi et al (2019). Identification of jet lubrication oil as a major component of aircraft exhaust nanoparticles. *Atmos. Chem. Phys* (19), 6389-6399.
[5] Ungeheuer et al (2022) Nucleation of jet engine oil vapours is a large source of aviation-related ultrafine particles. Communications Earth & Environment. Available at: https??doi.org/10.1038/s43247-022-00653
[6] Gladstone et al (2020). Sustainable Aviation Fuel : Greenhouse Gas Reductions from Bay Area Commercial Aircraft.
[7] Emissions Quantification Methodology Report. ACRP 02-80 Qualifying Emissions Reductions at Airports from the Use of Alternative Fuels.
[8] Durdina et al (2021). Reduction of nonvolatile particulate matter emissions of a commercial turbofan engine at the ground level from the use of a Sustainable Aviation Fuel blend. *Environ. Sci. Technol*, 55, 14576-14585

in terms of [nvPM #]. The relative reduction of nvPM emissions decreased with increasing thrust. In terms of the entire LTO cycle, the SAF blend reduced [nvPM mass] by 20% and [nvPM #] by 25%.

3 Other Issues

3.1 During the course of preparing the 2020 AQMS, LBN queried the outcome of studies deigned to investigate the combined health impacts of noise and UFP emissions from airports. The study[9] was carried out at Gatwick Airport by the MRC Centre for Health at Imperial College. It demonstrated that mean Particle Number Concentrations (PNC) near to Gatwick Airport (7,500-12,000 particles/cm^3) were similar to those close to a heavily-trafficked road in central London. The airport source factor contributed 17% to the PNC at both airport sites, and the concentrations were greatest when the respective sites were downwind of the runway. However, the main source of PNC was associated with road traffic emissions. Noise and UFP correlations were moderate to low, suggesting that UFPs are unlikely to be an important cofounder in epidemiological studies of aircraft noise and health.

[9] Tremper et al (2022). Sources of particle number concentrations and noise near London Gatwick Airport. Environment International, 161.

Appendix C

Updated topic reviews: Air Quality & Public Health

Review of Chapter 9: Air Quality

Scope of EIA

C.1 Chapter 9 of the ES discusses the construction and operational impacts of the S73 application on air quality. Since the ES was produced further information has been provided by the Applicant in response to requests from LBN's consultants (APS), in writing and during two on-line meetings.

C.2 The application, if consented, will facilitate an increase in air traffic movements (ATMs) through an increase in passenger throughput.

C.3 The application is for operational changes to the existing CADP1 consent, and it does not include any construction activity. Therefore, this chapter only considers the impact on local air quality of construction traffic in combination with the operational traffic. This is an appropriate approach as construction impacts were considered in the 2015 Updated Environmental Statement (UES) for the CADP1 planning application and an Air Quality Construction Management and Monitoring Strategy has been approved by the London Borough of Newham (LBN).

C.4 The operational air quality assessment includes the impact of the emissions from the road traffic associated with the airport and the emissions from the airport, including from aircraft up to a height of ca 915m (3,000 ft) (i.e., over the landing take off (LTO) cycle).

C.5 The chapter considers the traditional road and air traffic related pollutants: nitrogen oxides (NOx), nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).

C.6 It focuses on the impact of air emissions on human health. Explanations are provided in Table 9.3 on why impacts on the closest ecological sites have been scoped out.

C.7 Table 9.3 quotes from paragraph 6 of Schedule 4 (Information for Inclusion in Environmental Statements) of the EIA Regulations. This paragraph states that an ES should provide *"A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved".* This paragraph has been used to justify not

undertaking an assessment of the impact on ultra fine particles (UFP) due to the increase in ATM and the use of larger aircraft as a result of the proposals. The EIA Regulations do not preclude qualitative assessments where there is insufficient information available to quantify an impact. The air quality chapter should include an assessment of the impact of the application on UFP using a combination of qualitative and quantitative information together with professional judgement **(AQ1)**.

C.8 Table 9.3 states that UFPs have been assessed by "qualitative means" within the Public Health & Wellbeing Chapter (Chapter 12). Yet the Public Health & Wellbeing Chapter states in several places that it draws on the assessment in Chapter 9 on Air Quality e.g., Paragraph 12.1.7. The inclusion of an assessment of UFPs in the Air Quality Chapter was requested by LBN during consultation with the Applicant and it remains a concern that this has not been undertaken.

C.9 Appendix 9.1 provides high level information on UFP and their emissions from aircraft. It does not provide an assessment of the impact of the proposals. It is known that both aircraft and road traffic are a source of UFP.

C.10 The importance of the issue is reflected in the establishment by the International Civil Aviation Organisation (ICAO) of a mandatory method for reporting non-volatile UFP for new commercial aircraft that recently came into effect. Whilst it is accepted that there is insufficient information to quantify the impact of the S73 application on volatile UFP emissions, a qualitative assessment in the air quality chapter is missing on the non-volatile UFP. An analysis (quantitative for non-volatile and qualitive for volatile UFP) of the likely impacts of the S73 proposals on UFP should be provided.

C.11 This is required to inform the Health & Wellbeing Chapter (Chapter 12) and to be consistent with the approach used for other issues (socio-economics, noise, traditional air pollutants, surface access and climate change). The technical limitations of the assessment should be set out **(AQ1, AQ2 and AQ3)**.

Baseline

C.12 The baseline draws on monitoring data for the traditional traffic related pollutants from LBN and London City Airport, supplemented by data from other sources. The NO_2 monitoring data shows a likely significant downward trend in concentrations for the eight monitoring sites over the period 2015 to 2019.

C.13 The dispersion modelling has estimated the baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2019.

C.14 Appendix 9.4 states that the NO_x concentrations were converted to NO_2 concentrations using Defra's NO_x to NO_2 calculator. This tool was designed for road traffic emission sources. No evidence of the appropriateness of using this tool near airports, has been provided. The further information provided justifies its use on the basis that it has been used in previous airport assessments including the modelling for the Airport's Commission undertaken nearly a decade ago. Evidence could be derived from monitoring near to airports and roads of the ratio of NO_2 to NOx to determine whether the Defra tool is fit for purpose in this situation (**AQ8**).

C.15 Table 9.2 states the model was verified in accordance with the guidance and performance criteria in Defra's LAQM.TG22. This document clearly sets out the requirements. LAQM.TG22 states that the modelled data for each monitoring site is required to be within 25%, but preferably it should be within 10%. During the consultation with the Applicant, LBN requested that the NO_x model output should all be within 10% of the measured road contributions (see Table 9.2 AQ13).

C.16 No data is provided on the performance of the model in estimating NO_x. Without the NO_x verification there cannot be confidence in the model results from two separate models. Clarification on the model performance in terms of NO_x concentrations is required (**AQ7**).

C.17 The applicant compared the NO_2 concentrations to the measured data. The average total NO_2 concentrations are reported to be within 10% of the measured concentrations. It is clear from Figure 9.4 of Appendix 9.3 that the total NO_2 concentrations estimated deviates by more than 10% from the measured data at a number of locations. One underestimates the concentration by 30% in a location where the measured concentration is within 95% of the objective. At 42% of the measured locations the model deviated by more than 10%. Given that the model deviated from the measured concentrations at close to half the locations it would be useful for the Applicant to provide a discussion on the implications of this for the results. This should include the implications of a 30% under-estimate at all receptors, unless there is a valid reason why the model did not perform well at this location (new **AQ48**).

C.18 A review of complaints from the local community has been provided as the baseline for odour. This is an acceptable approach.

C.19 No baseline data has been provided for UFPs as no monitoring has been undertaken around the airport.

C.20 Monitoring of UFP has been undertaken around Gatwick and Heathrow Airports, and possibly also around other UK airports. Although these two airports are busier than London City, the London City runway is closer to residential areas. The Gatwick monitoring shows that high levels of UFP (as defined by the 2021 WHO guidelines) occur frequently, around

50% of the days monitored, at a site outside but downwind of the airport.

C.21 If LBN are minded to consent the application, the Applicant has agreed to a condition requiring UFP monitoring to be undertaken at the airport (**AQ9**).

Assessment

C.22 Emissions and concentrations of the traditional pollutants were estimated for four future years including the year with maximum construction traffic.

C.23 LBN requested the modelling files from the Applicant. The Applicant's consultants have declined to release them on grounds of intellectual property rights. As the assessment uses standard methodologies developed by ICOA, and widely used modelling software it is not immediately clear what the consultant is referring to. Regulators need to be able to check that the modelling is correct, and this is standard procedure for environmental permit applications.

C.24 The modelling appendix (9.3) does not provide sufficient detailed information for the reviewer of the chapter to be confident in the modelling. Further information has been provided following an on-line meeting between the Applicant's consultants and APS on 19th May 2023, and although helpful, this is no substitute for reviewing the model files (**AQ15**).

C.25 Some errors have been identified through this process, including a missing road link, thus illustrating the importance of reviewing the model files.

C.26 In many places the Applicant has adopted the same modelling approach used in the CADP1 application. This was completed almost a decade ago and over that time models have improved. The modelling would benefit from using the latest model features. As an example, massing (i.e. physical obstructions) adjacent to roads lead to both a restriction in dispersion of pollutants from the road traffic and the potential for recirculation of pollutants in the street zone. This interference of objects such as buildings and, barriers on air flow is commonly referred to as the 'street canyon effect'. Historically, 'street canyons' were considered to be where there were uniform buildings on both sides of roads where the height of the buildings are greater than the width between the building. However, current modelling approaches are able to consider the interference of massing on air flow which do not meet this criteria (i.e. using the phrase 'street canyon' is misleading in current modelling practices). Inclusion of low height buildings, asymmetric massing (where the mass is a different distance from the road centreline on either side and different heights or no buildings on one side etc.), porous barriers, overhanging obstructions etc. can now all be included. Many studies have shown the importance of including this influence on the concentrations produced by the models, including studies by the Applicant's consultants. Following requests for information, the Applicant's consultants have confirmed that, while inclusion of street canyons were considered, no account of this interference has been included in the modelling on the basis that much of the area is 'open' and the one area considered to be a potential canyon did not meet their criteria of the building height being more than twice the road width. This omission (and others) is not considered to be current good practice modelling and risks underpredicting concentrations at locations near to roads.

C.27 The assessed impact increases over time with the largest impact on annual mean NO_2 concentrations occurring in 2031 (1.4 µg/m^3). This impact is 3% of the objective (14% of the WHO guideline) but the total concentration is estimated to be well below the objective (26.8 µg/m^3). However, the S73 scheme alone also represents 6% of the total concentration in 2031, with the airport DM scenario expected to contribute to a large proportion of the total concentration (see paragraph 1.19). The conclusion for all scenarios and pollutants using the EPUK /IAQM descriptors based on the current objectives is that there will be a negligible impact. This is a reasonable conclusion based on the model results.

C.28 When compared to the GLA $PM_{2.5}$ target of 10 µg/m^3 to be achieved by 2030 the impact at two receptors in Camel Road, close to the airport, in 2031 is moderate adverse.

C.29 Overall, the conclusion of the assessment is that the effect is not significant. The assessment also concludes that there is no material difference in the conclusion of this assessment and the 2015 UES provided for the CADP1 application.

C.30 The assessment acknowledges some, but not all of the known limitations and assumptions associated with forecasting future air quality. There is little discussion of the uncertainties related to the modelling of the airport operations.

C.31 The verification of the baseline model outputs (i.e. using the predicted NOx concentrations from the modelled sources), as described in Defra's guidance, should be provided to give confidence in the assessment results (**AQ7** and new **AQ48**).

C.32 The reviewers of this chapter believe that there is sufficient information available to provide a qualitative assessment of the impact of the proposals on UFPs (**AQ1**).

C.33 The ICAO Airport Air Quality Manual has been used to calculate the emissions from the aircraft that currently, and in the future, are likely to use London City Airport (see Appendix 9.3). ICAO provides a database of non-volatile particle mass and number emissions (i.e., UFPs) by aircraft type. Using this database would provide an indication of how these emissions will change as a consequence of the changing aircraft fleet using the airport as a result of the proposals.

C.34 It is unlikely that ICAO would have collected this data if it saw no benefit for airports to include non-volatile particles in their emission inventories and dispersion modelling. The Manual does not currently provide a method for estimating the volatile particle number, but does include a method for estimating the mass of volatile PM. It is clear from the Manual, however, that the emission of volatile particles is considered to be sulphur dependent. Whilst it is not currently possible to estimate the number of volatile UFPs emitted from engines and formed downwind, reducing the sulphur content of future fuels is considered likely to reduce the emissions of these particles. This has already been shown to be effective for reducing UFP emissions from road transport. There are many similarities in the combustion of automotive and jet fuels, and aircraft engines are adopting similar approaches to reducing emissions as used in the automotive industry.

C.35 There is already a move towards the use of Sustainable Aviation Fuels (SAFs) to meet net zero carbon emissions in the aviation industry. The UK Government confirmed in July 2022 that it would introduce a SAF mandate in 2025 requiring at least 10% of jet fuel to be made from sustainable feedstocks by 2030. SAF are currently the subject on a second consultation by Government. SAFs are low sulphur fuels that are likely to reduce the volatile UFP. It is understood that the airport is not in a position to commit to the use of these emerging fuels at the current time. However, to meet the airport's net zero commitments these and other ultra-low sulphur fuels including electricity and hydrogen will be used in the future.

C.36 It is not appropriate for LBN to tell the Applicant how to assess UFP. It is for the Applicant and its consultants to devise a suitable assessment method (which can be partly or even wholly qualitative).

C.37 In addition, it would be useful to review progress towards reducing UFP through an annual review of relevant information such as the aviation fleet, SAF usage, fuel sulphur content, fuel consumption, hydrogen and electric update. An amendment to the CADI 1 planning condition 57 may be an appropriate mechanism (new **AQ49**).

C.38 It is not considered appropriate to consider UFP only in a Public Health and Wellbeing chapter. The Public Health and Wellbeing chapter relies, in part, on $PM_{2.5}$ as an indicator of changes in UFP. In the absence of an assessment of UFP (which should be provided in the AQ chapter), a potentially more useful indicator could be the non-volatile UFP number and mass emissions for different aircraft engines from the ICAO database. Evidence that the change in UFP will be 'small', a judgement stated in the Public Health and Wellbeing chapter, should be provided (new **AQ50**). As a minimum this should include a UFP emission based comparison to be used as an indicator of the level of change of emissions along with the PM concentration indicator and associated commentary on both indictors.

C.39 Every application should be considered on its own merits. Relying on the situations at Stansted and Bristol airports, which are very different to London City Airport, is not appropriate.

C.40 The odour modelling suggests that in the future odour concentrations will decline, and they are lower in the DC scenarios than the DM scenarios.

Secondary, Cumulative and Combined Impacts

C.41 The impact of other development on traffic in the local area has been taken into account by the transport assessment and is therefore included in the future DM and DC scenarios.

C.42 Air pollution from the energy systems of nearby major developments have been considered and scoped out as the impacts on the airport are considered not to be significant.

C.43 The emissions from the Tate and Lyle facility, located to the south of the airport, have been explicitly modelled for the assessment. All other sources of air pollution, not included in the air quality modelling, have been assumed to be included in Defra's background concentration maps. Sources which have been explicitly modelled have been removed from the background data to avoid 'double counting'.

Mitigation and Management

C.44 The embedded measures to reduce the operational emissions from the airport are set out in the Air Quality Management Strategy (2020-2023) approved by LBN. The Air Quality Positive Statement sets out the measures to reduce emissions agreed as part of the CADP1 consent. The applicant has not considered any further measures for reducing exposure on the grounds that the S73 application does not include any changes to design, infrastructure or layout of the airport.

Non-Technical Summary

C.45 The Non-Technical Summary (NTS) generally provides an adequate description of the air quality assessment. The Applicant has provided clarification that Receptors R1 and R2, which are described differently in the NTS and Appendix 9.2, are in fact the same receptors.

C.46 Information on UFP should be provided in the NTS (**AQ7**).

Review of Chapter 12: Public Health and Wellbeing

Air Quality and UFP Considerations

C.47 This section includes commentary from APS.

Scope

C.48 The Public Health and Wellbeing chapter includes consideration of the traditional air pollutants and UFP. The approach adopted is generally reasonable. There are, however, contradictory statements regarding the use of regulatory standards and the World Health Organization (WHO) air quality guidelines, and confusion between air quality limit values and objectives throughout the chapter.

C.49 Paragraph 12.1.5 states that *'The health assessment considers the public health implications of the conclusions of the other technical assessments'*. This is good practice providing the limitations of the technical assessments are accounted for.

C.50 Table 12.1 states, *"The health assessment includes a section on UFP. This provides a proportionate population health assessment based on the current state of scientific knowledge about the severity and causality of UFP health pathways. This is informed by discussion of UFP in the Chapter 9 air quality assessment and its appendices."* Table 9.3, however, scopes out the need for an assessment of UFP, and no assessment of the potential impacts of the proposals is provided in Chapter 9 or its appendices. The review of chapter 9 recommends LBN request an assessment of UFP (**AQ1, AQ2 and AQ3**).

C.51 Table 12.1 states *"It is clear in guidance and national policy that weight should be given to regulatory standards as an appropriate health protection standard when determining population health significance."* This assumes that the regulatory standards provide adequate protection of public health; in respect to air quality this is clearly not the case. The limit values and objectives were mainly set over 25 years ago, since when there has been an increase in the literature on the health effects of exposure to air pollution, providing robust evidence of effects at much lower concentrations.

C.52 Chapter 9 should and does consider compliance with the limit values and national objectives.

C.53 The Public Health and Wellbeing chapter relies on the IEMA guidance and the NPPF to justify using the 'regulatory standards'. The IEMA guidance is a useful document filling the previous gap in guidance on HIA in EIA but following this approach risks underplaying the potential risk of the impacts to health due to exposure to air pollution. The guidance does not provide explicit advice on the use of regulatory standards for air quality but provides an example which suggests a more flexible approach.

C.54 The setting of the limit values and objectives includes consideration of a range of factors that are also considered in health assessments, such as socio-economic impacts. Therefore, not only are the limit values and objectives not sufficiently protective of human health, but their use would also result in a degree of double counting of the non-medical factors taken into account when they were adopted.

C.55 This chapter has included an assessment of the impact of the traditional air pollutants against the WHO 2021 and WHO 2005 air quality guidelines (which are significantly more stringent than the regulatory standards), which is appropriate. The chapter, however, argues that these guidelines are not relevant in the planning system. It should be noted that these guidelines are not mentioned in the NPPF but that does not mean that they are not relevant for considering the health impacts of a planning application.

Assessment

Air Quality

C.56 In consideration of the S73 proposals, the health assessment undertaken is likely to have reached an appropriate determination of significance in regard to air quality (UFP are discussed later). However, there are elements of the approach that the reviewers of this section of the chapter are not in full agreement with.

C.57 The chapter (Paragraph 12.15.2) states that the role of NO_2 on health is independent to that of $PM_{2.5}$, citing a 2014 paper. This was not the conclusion of the UK Committee on the Medical Effects of Air Pollution (COMEAP) in a report published in 2018[12].

C.58 The Public Health and Wellbeing chapter places significant weight on evidence from the literature on health effects but ignores the WHO 2021 appraisal which is the latest robust synthesis of the evidence on health effects due to air pollution undertaken by a group of international experts. It is somewhat surprising that the assessment has not drawn on authoritative and systematic expert reviews of the evidence; instead, it often cites a small number of individual papers. Given the very large literature on this subject, citing a small number of individual papers can present a biased view.

C.59 Paragraphs 12.15.2 and 12.15.10 discuss the impact of air pollution on respiratory and cardiovascular diseases. It fails to recognise the wide range of other health effects due to

[12] Committee on the Medical Effects of Air Pollutants, 2018, Associations of Long-term Average Concentrations of Nitrogen Dioxide with Mortality, Crown Copyright. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf

exposure to air pollution such as low birth weight and dementia.

C.60 Paragraph 12.15.4 makes reference to "national standards' and that the changes in air quality *'would be well within the national standards set for health protection…'*. This terminology is confusing and is used in several different sections of the chapter (e.g. Footnote 4 on page 39: the distance of 4m relates to the limit values not the objectives; Paragraph 12.15.21). The only national standards are the limit values; the national objectives are not standards according to the statutory Air Quality Strategy current at the time of the assessment, published under the 1995 Environment Act.

C.61 Limit values and objectives are set under different legislation, and compliance is assessed differently, at different locations, by different public bodies.

C.62 Paragraph 12.15.6 suggests that aviation emissions are less than road traffic, when this is not the case (see Tables 9-12 to 9-16). Following a request for further information for the air quality chapter, it has become clear that the modelled contribution to NO_2 concentrations are, at a number of monitoring sites, much greater from the airport than local roads.

C.63 Based on the IEMA guidance Paragraph 12.15.13 states that the EIA should include a discussion on 'what is acceptable for the jurisdiction' with respect to regulatory standards for non-threshold health effects.

C.64 Paragraph 12.15.14 quotes from the Defra website suggesting that the statutory air quality standards are 'acceptable' because *'air quality standards are based on what is known scientifically about the effects of each pollutant on health'*. This approach fails to acknowledge that the limit values and objectives are very out of date and are no longer considered sufficiently protective of human health. It has been widely accepted for many years by government (including the Chief Medical Officer in his recent report[13]) and others, that there are health effects below the regulatory thresholds, and reducing air pollution below these levels would improve public health.

C.65 It is accepted that the NPPF focuses on compliance with the relevant limit values and national objectives and the air quality chapter addresses this issue. The NPPF does not limit consideration of health in relation to air quality exclusively to limit values and national objectives.

C.66 Paragraph 12.15.15 states that the WHO 2021 guidelines *"…remain a relevant public health contextual consideration; however, the national statutory standards are the appropriate benchmark for an assessment of significance that informs a UK planning determination."* As noted above, just because a particular document is not mentioned in the NPPF does not mean that it is not a material consideration in the planning system.

C.67 If the approach advocated by the Public Health and Wellbeing chapter was correct, the planning decision on an industrial process where there are no regulatory standards for the pollutants emitted, could not consider the health impacts despite the risk.

C.68 The chapter does provide some helpful information regarding the WHO guidelines (which are purely health based). The potential for non-threshold effects of NO_2 and $PM_{2.5}$ on population health were considered.

C.69 The overall conclusion of the health effects of exposure to air pollution is minor adverse (not significant) which seems reasonable.

C.70 The change in concentrations set out in Table 12.11 are small for PM, even in relation to WHO guideline levels; but not at some locations for NO_2 (up to 14% of the guideline). However, this only affects a small number of people.

C.71 Paragraph 12.15.24, notes that air quality is unlikely to change inside the airport due to the proposal, although it could change outside due to the increased emissions from the aircraft as forecast in Chapter 9. It does not appear that the increase in passengers passing through the airport have been considered, which would impact on the overall public health due to the increased number of people exposed. The passenger population is not limited to low risk groups and can often include vulnerable groups of the population. Therefore, the risk of a health effect due to the increased exposure has not been considered and discussed.

C.72 The conclusions of Paragraph 12.21.8 are broadly reasonable, although it is considered remis to have excluded the passenger population from the health assessment and the requested evidence to support the conclusions need to be provided.

C.73 While the appropriateness of the statement that *"compliance with statutory standards demonstrates an acceptable level of health protection"* (Paragraph 12.15.24) is disputed, the conclusion of Paragraph appears reasonable.

Ultra-Fine Particles (UFP)

C.74 The air quality chapter does not include an assessment of the impact of the proposals on UFP. Yet the Public Health and Wellbeing chapter assumes that there will be a small impact..

[13] Department of Health and Social Care, (2022), Chief Medical Officer's Annual Report 2022: Air Pollution. https://www.gov.uk/government/publications/chief-medical-officers-annual-report-2022-air-pollution

C.75 If the Public Health and Wellbeing chapter can assess the impact of UFP qualitatively it is very unclear why the air quality chapter cannot do the same. As noted in the review of chapter 9 this should be provided.

C.76 Paragraph 12.16.6 states, *"The World Health Organisation (WHO) global air quality guidelines in 2021 (WHO, 2021) recognised that there is growing evidence from laboratory studies of toxicological effects of UFP, however concluded that the evidence from field research (i.e. real-world settings) is not sufficient to formulate air quality guideline levels for exposure."*

C.77 The 2021 WHO guidelines actually state that there was already considerable evidence of the toxicological impact of UFP in 2005. Since then the epidemiological (i.e. field research) evidence has grown and continues to grow. Based on two systematic reviews WHO state, *"short-term effects of exposure to UFP, including mortality, emergency department visit, hospital admissions, respiratory symptoms, and effects on pulmonary/systemic inflammation, heart rate variability and blood pressure; and long-term effects on mortality (all-cause, cardiovascular, IHD and pulmonary) and several types of morbidity."* The reason why WHO has not published guidelines is because the different size ranges and exposure metrics used in epidemiological studies prevent comparisons across studies.

C.78 Paragraph 12.16.10 states that *"UFP is elevated in and around airports"*. In Paragraph 12.16.7 it states, *"In this case, whilst there is a lack of full scientific certainty, the available epidemiological evidence suggests a small effect…"*. The health effect evidence presented in the ES does not quantify the magnitude of the effect, only the type of effect e.g. cardiovascular changes.

C.79 Paragraph 12.16.27 states: *"It is concluded that the magnitude of the change due to the project, comparing the DC and DM scenarios in all assessment years, is low. The scale of change in UFPs due to the proposed development is considered to be small."* The chapter suggests that because the change in $PM_{2.5}$ is small the UFP impact will also be small, but acknowledges that this is a crude indicator for UFP. Another potentially more useful indicator could be the non-volatile UFP number and mass emissions for different aircraft engines from the ICAO database.

C.80 It should be noted that there is no simple link between $PM_{2.5}$ mass and the number of UFP. UFP are extremely small and have little mass, but very numerous, and therefore this link should be treated with extreme caution.

C.81 The section on UFPs comes to the same conclusion as for the traditional pollutants, i.e. the effect would be minor adverse (not significant). This conclusion is considered by the Applicant to be a conservative finding on the basis of the scientific uncertainty (and emerging evidence) about UFP. Given the nature of the S73 application the conclusion that there will be a minor adverse effect this does not seem unreasonable.

Air Quality Mitigation and Management

C.82 Paragraph 12.20.9 states that *"The appropriate response is for public health to maintain a watching brief on UFP as a topic area. The monitoring of UFPs is therefore supported, including correlating results with use of sustainable aviation fuel".*

C.83 In pre-application discussions the Applicant was supportive of a planning condition requiring monitoring of UFP at or near the airport to improve knowledge of airport UFPs therefore such a condition is recommended (**AQ9**).

C.84 To review progress towards reducing UFP an annual review of the aviation emissions inventory, aviation fleet, SAF usage, fuel sulphur content, fuel consumption, hydrogen and electric update should be provided to LBN (new **AQ49**).

Non-Technical Summary

C.85 The NTS provides a summary which is consistent with the conclusions from the technical chapter. This is considered appropriate.

C.86 The non-technical summary summarised the air quality impacts on public health in Table 6.6. Out of necessity it is a very short summary. It would be useful if it mentioned the specific pollutants considered including UFPs.

Ref.	Summary of Clarifications Required from Applicant
AQ1, AQ2 and AQ3	EIA should include an assessment of the impact of the s73 application on UFP. The technical limitations of the qualitative assessment should be clearly set out.
AQ7	A full model evaluation should be performed. As the applicant has referred to the approach in LAQM.TG22, this should be in accordance with the methodology in LAQM.TG22, see new AQ48.

AQ8	Evidence to be provided that Defra's NOx to NO_2 converter is appropriate for the area around London City Airport.
AQ15	Given at least one error in the modelling was identified through discussion, the model files should be provided.
AQ48	Information on the model performance, including verification, using NOx and an assessment of the implication of a 30% under-estimation on NO_2 concentrations should be provided.
AQ50	Information on the evidence that the change in UFP will be small due to the s73 proposal including details of the non-volatile UFP number and mass emissions for the fleet in each assessment scenario, with reference to the two indicators (PM concentrations and UFP emissions).
AQ27	Information on UFP should be provided in the NTS.
Ref.	**Summary of Potential Regulation 25 Requests from Applicant**
N/A	None.
Ref.	**Potential Planning Conditions**
AQ9	It has been agreed with the Airport that CADP1 Condition 57 be amended to include the monitoring of ultra-fine particles (particle number and size).It is recommended that this monitoring scheme is approved by LBN within 6 months of consent being granted (assuming it is).
AQ49	To provide an annual review of the aviation fleet, fuel sulphur content, fuel consumption, and SAF, hydrogen and electric update. The first annual review should be for the year 2025 and submitted to LBN by April 2026, and subsequent review to be submitted to the council in the April of each year.