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7.08 Green Controlled Growth Framework
Appendix D - Air Quality Monitoring Plan

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**London Luton Airport Expansion Development Consent
Order 202x**

**7.08 GREEN CONTROLLED GROWTH FRAMEWORK APPENDIX D -
AIR QUALITY MONITORING PLAN**

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Appendix D

D1 Introduction

D1.1 Overview of document

- D1.1.1 This Monitoring Plan for air quality has been submitted as part of the proposed **Green Controlled Growth (GCG) Framework [TR020001/APP/7.08]**.
- D1.1.2 It is intended that this Monitoring Plan will be approved as part of the application for development consent, and paragraph 21 of Schedule 2 to the **Draft Development Consent Order (DCO) [TR020001/APP/2.01]** will require the airport operator to undertake monitoring and reporting in accordance with this Monitoring Plan as part of their GCG responsibilities.
- D1.1.3 As such, this document will establish monitoring and reporting requirements for air quality within the GCG Framework. Failure to carry out monitoring and reporting in line with this document will constitute a breach of the DCO and may result in enforcement action as detailed in Section 2.7 of the **GCG Framework Explanatory Note [TR020001/APP/7.07]**.
- D1.1.4 It is intended that this Monitoring Plan can be revised in future, for example in response to new monitoring technology or guidance. Any revisions would need to be agreed by both the airport operator and the Environmental Scrutiny Group (ESG), a new body established through the DCO to provide independent scrutiny of airport impacts. Paragraph 21 of Schedule 2 to the **Draft DCO [TR020001/APP/2.01]** sets out the mechanism for this.

D2 Monitoring Air Quality

D2.1 Monitoring approach

- D2.1.1 The monitoring equipment proposed for each location will consist of two NO₂ diffusion tubes and one continuous sensor monitoring system (AQMesh or equivalent) measuring NO₂, PM₁₀ and PM_{2.5}, mounted on appropriate street furniture as close as possible to the eastings and northings for each location given in **Table 2.1**.
- D2.1.2 The airport operator will be responsible for installation, maintenance and data collection (although may use a sub-contractor for this purpose).
- D2.1.3 NO₂ diffusion tubes will be included at each location and changed monthly. Diffusion tubes will be co-located with MCERT monitoring stations (e.g. Wigmore Park) to allow for local bias adjustment. These will be used for data resilience (e.g. if sensors go offline or need maintenance) but due to nature of data collection will be retrospective not real time.
- D2.1.4 The assessment of compliance with the NO₂ annual mean air quality objective will be assessed based on the annual results from these diffusion tubes. This has been agreed with the local authority to match the approach taken across Luton and allow for directly comparable bias adjustment and results.
- D2.1.5 The AQMesh or equivalent monitoring system will be used to provide ongoing real-time data (or as close as possible) via an online portal, although it should be noted that this will be unvalidated data so subject to ratification and validation. The live results will provide a useful indication of particular source effects or regional pollution events. This will allow for rapid assessment of changes, local validation of impacts and comparison to national level monitoring. AQMesh data will also be used for reporting PM concentrations.

D2.2 Monitoring location selection

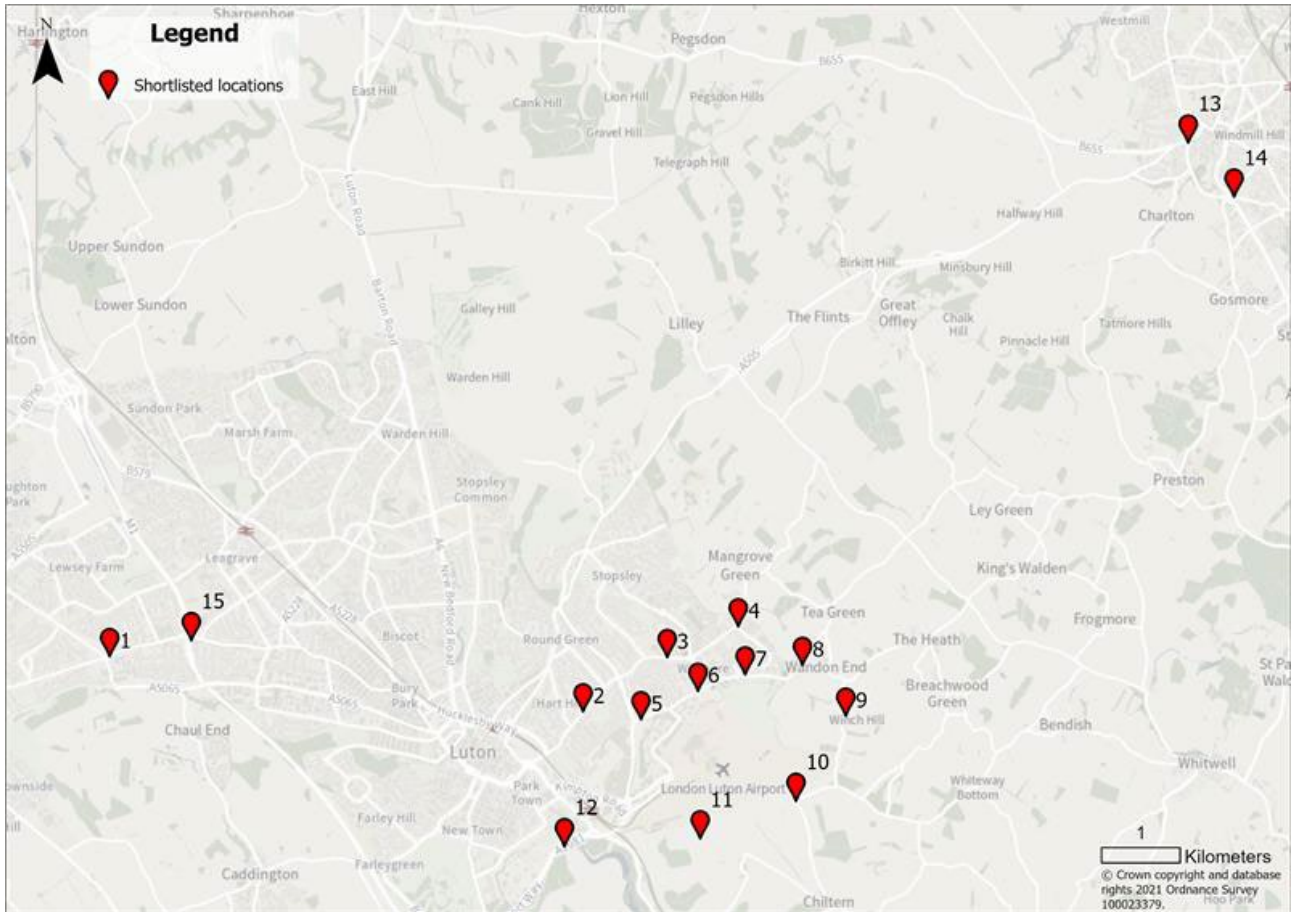
- D2.2.1 As explained in Section 3.3 of the **GCG Explanatory Note [TR020001/APP/7.07]**, a set of sifting criteria has been applied to the environmental receptors considered in **Chapter 7** of the **Environmental Statement (ES) [TR020001/APP/5.01]** to arrive at a shortlist of monitoring locations within scope for GCG.
- D2.2.2 The shortlist of sensitive locations has been derived on the following basis:
- Locations with greatest adverse impacts in NO₂, PM₁₀ or PM_{2.5} as a result of the scheme (i.e. from the future baseline 'Do Minimum' scenario (without airport expansion) to the future 'Do Something' scenario with airport expansion in place in 2027, 2039 and 2043).
- D2.2.3 This is subject to receptors predicted to receive a slight, moderate or substantial adverse change (following EPUK/IAQM criteria) – i.e. not those with negligible change. The approach therefore considers both core and LTP traffic impacts and location of the greatest impacts from airport-related traffic, as reported in **Chapter 7** of the **ES [TR020001/APP/5.01]**.

D2.2.4 This results in the list of fifteen locations to be monitored for all three pollutants, shown in **Figure 2.1** and **Table 2.1**. Note however that as per Section 4.1 of the **GCG Framework [TR020001/APP/7.08]**, not all of these locations are in scope for GCG – e.g. there are only certain locations where the GCG Limits and Thresholds will apply. In future, it will be possible for this list to be updated through agreement between the airport operator and the Environmental Scrutiny Group (ESG).

Table 2.1: Air quality monitoring locations

ID	X	Y	Location type	Owner	Name
1	504408	222509	Additional	-	A505
2	510431	221806	Additional	-	Crawley Green Road 1
3	511502	222497	Additional	-	Crawley Green Road 2
4	512405	222887	Additional	-	Crawley Green Road 3
5	511168	221706	Existing: LLA 15	LLAOL	Eaton Green Road 1 (LLA15)
6	511893	222068	Existing: LN25	LBC	Eaton Green Road 2 (LN25)
7	512493	222276	Additional	-	Eaton Green Road 3
8	513223	222397	Existing: L4	LR	Darley Road (L4)
9	513773	221752	Existing: L6	LR	Winch Hill (L6)
10	513140	220669	Existing: LLA 11	LLAOL	Dane Street (LLA11)
11	511922	220193	Additional	-	Somerles Castle
12	510194	220093	Additional	-	New Airport Way
13	518130	229036	Existing: NH93	NHDC	Hitchin 1 (NH93)
14	518713	228349	Existing: NH2	NHDC	Hitchin 2 (NH2)
15	505447	222712	Additional	-	M1

Figure 2.1 – Air quality monitoring locations



D2.3 Assessment of results

Assessment against ES results

- D2.3.1 The air quality monitoring will include PM₁₀, PM_{2.5} and NO₂ concentrations at each of the fifteen locations continually throughout the year. This will be helpful for determining the total concentrations around the proposed development.
- D2.3.2 As air quality modelling results are based on road traffic modelling and future year predictions of emission factors there is an inherent level of uncertainty in the results. This uncertainty is managed, as detailed in the ES, through conservative use of background concentrations and model verification.
- D2.3.3 An initial review in 2027 is recommended to assess if the annual concentrations measured are 20% higher than the modelled concentration in that location. The value of 20% is selected to provide a reasonable estimate of risk from potential changes compared to the results in the ES which had already made conservative assumptions in the modelling. This review would subsequently be repeated every five years.
- D2.3.4 The process for undertaking this review is set out in the **GCG Framework** and secured by paragraph 25 of Schedule 2 to the **draft DCO [TR020001/APP/2.01]**.
- D2.3.5 The assessment in the ES is based on reasonable worst case assumptions and so its conclusions are considered conservative. It is therefore considered unlikely the future concentrations will be 20% higher than modelled (i.e. worse than the reasonable worst case assessed).
- D2.3.6 If a greater than 20% change is identified, it is recommended that a review of 2027 emission factors (actual emissions) compared with the 2027 modelled emissions is carried out, to determine if the increase is a result of higher than forecast airport-related effects, an increase in background pollutant concentrations, or a combination of the two.
- D2.3.7 Should it be identified that the increase is due to the airport, the location could come 'in scope' for GCG, if agreed between the airport operator and ESG. Where considered necessary, dependent on the magnitude of any increase, the Operational Air Quality Plan should be revisited and where reasonably practicable strengthened to help drive emission reductions.

Assessment against GCG thresholds

- D2.3.8 As determined through the modelling results the GCG review thresholds will only need to be applied for those pollutants at locations where a slight, moderate or substantial adverse change is forecast, based on guidance from the Institute of Air Quality Management (IAQM), reproduced at **Table 2.2**.

Table 2.2: IAQM guidance on significance of air quality impacts (Ref 2.1)

Annual Average Concentration at receptor	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	<1%	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

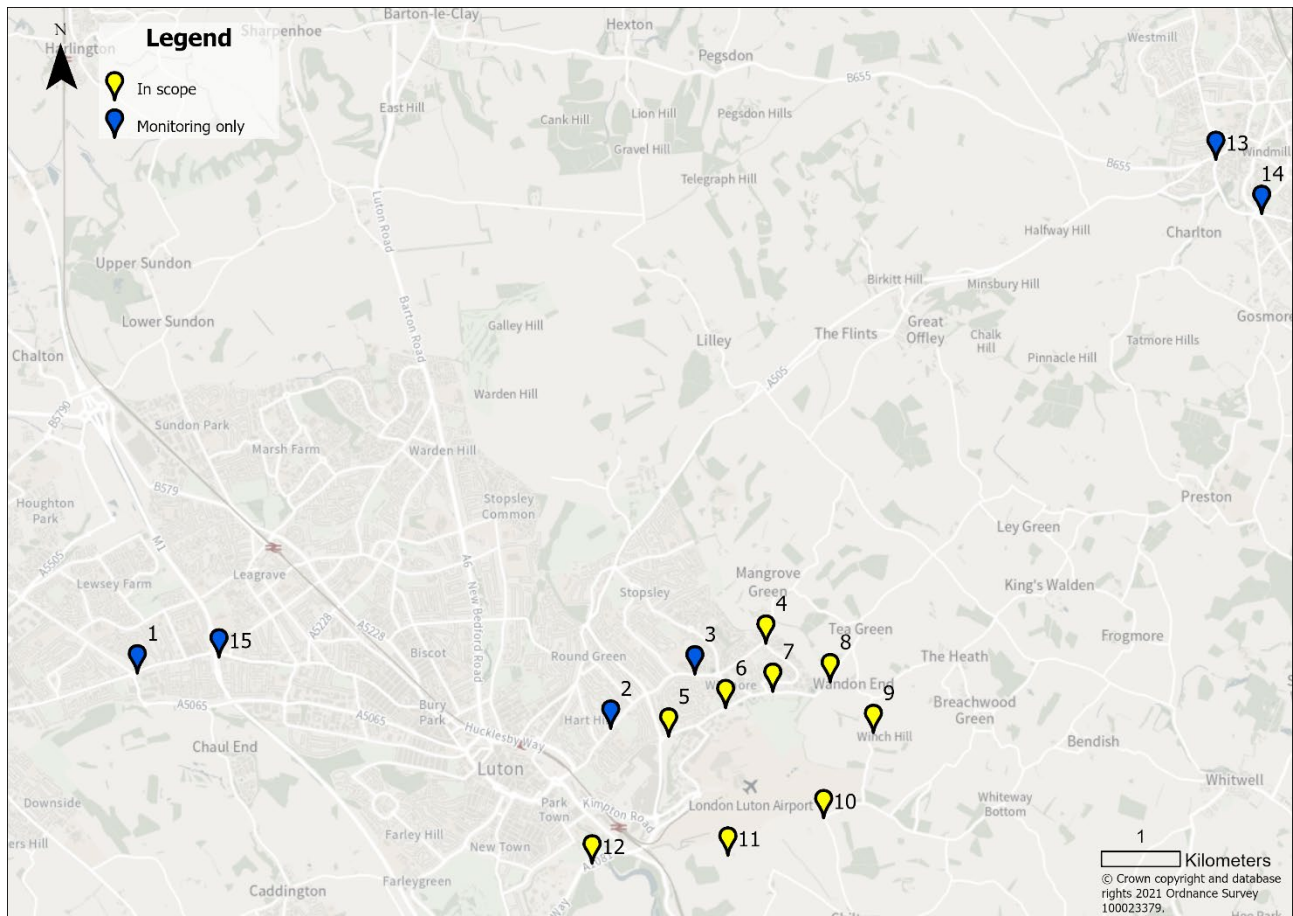
D2.3.9 Where the ES predicts negligible effects for a given pollutant at a given location, these pollutants will be monitored at these locations but there is no requirement to consider them against any change thresholds. A summary of which pollutant will be included in the GCG assessment by location is provided in **Table 2.3**, and shown in **Figure 2.2**.

Table 2.3: Air quality monitoring requirements by location

ID	Name	Pollutant	Assessment Phase 1	Assessment Phase 2a	Assessment Phase 2b
1	A505	NO ₂	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀			
		PM _{2.5}			
2	Crawley Green Road 1	NO ₂	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀			
		PM _{2.5}			
3	Crawley Green Road 2	NO ₂	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀			
		PM _{2.5}			
4	Crawley Green Road 3	NO ₂	In Scope (6% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}			
5	Eaton Green Road 1 (LLA15)	NO ₂	In Scope (12% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}			
6	Eaton Green Road 2 (LN25)	NO ₂	In Scope (14% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}			
7	Eaton Green Road 3	NO ₂	In Scope (12% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}			
8	Darley Road (L4)	NO ₂	In Scope (8% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}			

ID	Name	Pollutant	Assessment Phase 1	Assessment Phase 2a	Assessment Phase 2b
9	Winch Hill (L6)	NO ₂	In Scope (8% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}	Out of Scope – Monitoring Only		
10	Dane Street (LLA11)	NO ₂	In Scope (16% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}	Out of Scope – Monitoring Only		
11	Someries Castle	NO ₂	In Scope (10% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}	Out of Scope – Monitoring Only		
12	New Airport Way	NO ₂	In Scope (8% airport contribution)	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀	Out of Scope – Monitoring Only		
		PM _{2.5}	Out of Scope – Monitoring Only		
13	Hitchin 1 (NH93)	NO ₂	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀			
		PM _{2.5}			
14	Hitchin 2 (NH2)	NO ₂	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀			
		PM _{2.5}			
15	M1	NO ₂	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only	Out of Scope – Monitoring Only
		PM ₁₀			
		PM _{2.5}			

Figure 2.2 – Air quality in scope and monitoring only locations



- D2.3.10 For those locations and pollutants shown as being in scope for GCG in **Table 2.3**, if the annual average concentration of a pollutant exceeds the GCG Limit or Level 2 Threshold, this will trigger a further assessment. The purpose of this further assessment is to determine the cause of any exceedance of an objective, and the extent to which this is airport-related.
- D2.3.11 The Applicant does not consider it is appropriate for this Monitoring Plan to be overly prescriptive in respect of this further assessment given the potential range of causes for an air quality limit exceedance.
- D2.3.12 Where an exceedance of the air quality objectives is identified the use of automatic data will have allowed an early indication of the risk of a particular exceedance and hence work will have started to look into the cause as the exceedance happens. This may allow easier identification of factors such as roadworks or meteorological events at the time the exceedance is taking place.
- D2.3.13 Potential external factors which will be assessed would include, but are not limited to:
 - a. Meteorological factors.
 - a. National / Regional pollution events, such as dust storms.
 - b. National / Regional differences in the traffic fleet or changes to uptake rate of EVs.

- c. Local factors such as a new development or construction works.
- d. Temporary highway factors such as roadworks causing additional queuing.

- D2.3.14 The analysis of the impact of each of the above can be determined based on data which may include the results from the automatic monitor, meteorological data and the wider Defra Automatic Rural and Urban Network of monitoring sites.
- D2.3.15 Software such as OpenAir can be used to analyse and process the results to determine the source of emissions and where required determine the potential airport impacts supported by additional sources of data such as ANPR data or aircraft and on-site activity.
- D2.3.16 The consideration of need to carry out additional analysis or surveys to support air quality findings will be included in a Monitoring Report and agreed with the ESG as required.

D3 Reporting Air Quality

- D3.1.1 Monitoring data for each location and each pollutant will be provided along with details of the quality assurance process, any bias adjustment or annualisation (if required) in a Monitoring Report.
- D3.1.2 Where further detailed analysis of results is required (for example to determine the cause of an exceedance) this will be detailed in a technical report for review by the ESG, which will be included as an appendix to the Monitoring Report.
- D3.1.3 The airport operator will make underlying air quality data available on a confidential basis at the reasonable request of the ESG or Air Quality Technical Panel.

GLOSSARY AND ABBREVIATIONS

Term	Definition
DCO	Development Consent Order
ESG	Environmental Scrutiny Group. The ESG will be established through the DCO to independently oversee operation of the GCG framework. Its membership will include an independent chair, an independent aviation expert, representatives of local authorities and an airline industry body. The ESG will have a range of powers enshrined in its Terms of Reference, that can be utilised at its discretion.
GCG Framework	Green Controlled Growth Framework
Level 2 Threshold	A defined level of environmental effect, below the Limit level, which triggers additional requirements for the airport operator, to avoid a future exceedance of a Limit.
LLAOL	London Luton Airport Operations Limited
Monitoring Plan	Individual plans secured through the DCO for each of the four environmental topics of the GCG Framework, setting out the monitoring and reporting requirements associated with the relevant Limits of that topic.
Monitoring Report	A report (or reports) produced by the airport operator annually, to set out the monitoring results for each of the GCG Limits, with its content defined by the Monitoring Plans.

REFERENCES

Ref 2.1 Table 6.3, Land Use Planning & Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, January 2017