

City Airport Development Programme (CADP1)

Condition 58: Air Quality Management Strategy



June 2023

**LONDON CITY AIRPORT
AIR QUALITY MANAGEMENT STRATEGY
2023-2026**

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1 INTRODUCTION

1.1. The City Airport Development Programme (CADP1) application (13/01228/FUL) 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.

1.2. Condition 58 of the CADP1 Permission states:

The development shall not commence until an Air Quality Management Strategy has been submitted to and approved in writing by the Local Planning Authority. The Air Quality Management Strategy shall be implemented on the commencement of the development. The Strategy shall include but not be limited to the following details:

- *Measures to manage and mitigate adverse air quality impacts (including black smut and oily deposits) due to the operation of the Airport;*
- *Measures to minimise idle and taxi times for aircraft prior to take off;*
- *Measures introducing and enforcing regulations to prevent airside vehicles being left unattended with engines running;*
- *Periodic emissions-checking of airside vehicles;*
- *A system to ensure that regular maintenance of airside vehicles is being undertaken;*
- *Measures to encourage the use by staff of the most sustainable options for travel to and from the Airport; and*
- *A linkage between air quality and the Staff Travel Plan and the Passenger Travel Plan.*

Every three years from approval of the first Air Quality Management Strategy the Strategy shall be reviewed and the reviews shall be submitted to the Local Planning Authority for approval on 1 June (or the first working day thereafter) and implemented as approved

Reason: In the interests of reducing air quality impacts in accordance with the UES.

1.3. An Air Quality Management Strategy was prepared to discharge Condition 58 of the CADP1 Permission; this covered the period 2020 – 2023 and was approved by the London Borough of Newham (LBN) in November 2020. In accordance with Condition 58, a revised Air Quality Management Plan is to be submitted to LBN before 1 June 2023 which covers the period 2023 to 2036.

1.4. A number of other CADP1 conditions relate to aspects of this strategy. Where appropriate, key elements of these Plans and Strategies, insofar as they support or are directly related to this Air Quality Management Strategy, are summarised in this document.

1.5. Progress on each measure/target will be set out in the Annual Progress Report each year, and any breaches of the targets will be clearly identified together with the remedial actions that were taken, or are proposed.

BOX 1: AIR QUALITY MANAGEMENT STRATEGY (2023 – 2026)

Measure	Expected emissions / air quality benefit	Outputs / targets / KPIs	Completed by
Ground Power			
Measure 1: Maximising availability of Fixed Electrical Ground Power (FEGP).	Measures to minimise APU run times (and emissions) include the provision of FEGP and actions taken to ensure its availability.	London City Airport will continue to routinely record the availability of FEGP on all stands where it has been installed. It will also continue to record the use of FEGP within the online portal and document any contraventions of Airfield Operating Instruction AOI 07.	June in each year
Measure 2: Minimising APU Use.	NOx and PM ₁₀ emissions from APU use were 5.2 and 0.32 tonnes respectively, in 2019. 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 "Quickview" online reporting tool. Any contraventions of the Airfield Operating Instructions, updated as necessary to comply with any requirements within the APU Strategy.	June in each year
Emissions from Aircraft Taxiing Operations			
Measure 3: Ground Engine Running Strategy – air quality implications	Ground running relates to the use of aircraft engines on stand, during taxiing, and on-hold, and accounted for 15.6 tonnes NOx and 0.35 tonnes PM ₁₀ in 2019. 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
Measure 4: Reduced thrust during taxiing.	Taxiing accounted for 18.8 tonnes NOx and 0.47 tonnes PM ₁₀ in 2019. Emissions can be reduced by "Engine-Out Taxiing" in which one or more engines is switched off. However, there are both safety and operational concerns with the use of this measure.	London City Airport will continue to work with the major airlines to explore the potential to introduce reduced thrust during taxiing. Direct engagement with the airlines will be made at forthcoming bi-annual pilot forums	June in each year
Measure 5: Electric Taxiing Systems	Emissions from taxiing could be reduced by the use of electric pushback from stand	London City Airport will review the requirements for electric pushback systems as the new CADP stands become available.	June in each year
Airside Vehicles and Plant			
Measure 6: ULEZ Compliance – Third Party Operators	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 continue to engage with third-party operators of airside vehicles to monitor progress and update records on ULEZ compliance on an annual basis going forwards.	June in each year
Measure 7: Airside Vehicle Permits (AVP) – Promote Earlier Introduction of Cleaner Vehicles	Emissions from Ground Support Equipment (principally airside vehicles) accounted for 2.6 tonnes NOx in 2019. The	London City Airport will continue to enforce a requirement in AOI 12 that all new vehicles issued with a Airside Vehicle Permit	June in each year

	AVP system can be used to drive the introduction of cleaner vehicles at an earlier stage, in advance of full ULEZ compliance.	(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.	
Measure 8: 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
Measure 9: 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	Both hybrid and electric vehicles would reduce emissions (above and beyond ULEZ standards) but is dependent on availability. London City Airport will continue to review the Airport-owned fleet with the aim of maximising the use of hybrid and electric vehicles in line with its net zero ambitions.	June in each year
Emissions from Black Cabs			
Measure 10: Anti-Idling: Black cabs	Idling engines when stationary causes unnecessary pollution emissions. Vehicle Idling Action is a behaviour change campaign supported by LBN.	London City Airport will continue to monitor idling by black cabs and will report any issues or complaints to the Airport Transport Forum	Twice a year
Publicity and Promotion			
Measure 11: 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
Measure 12: 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 2025
Measure 13: 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 eBulletin	June in each year
Ultra Fine Particles			
Measure 14: 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	London City Airport will continue to review the emerging evidence on UFPs related to aircraft emission inventories and will	June in each year

	which a complete emissions inventory can be compiled.	provide an update on an annual basis.	
Measure 15: UFP Emissions and Sulphur Content of Aviation Fuel	Evidence has identified a unique size distribution of UFPs related to aviation emissions, which is thought to be linked to the high S content of aviation fuel.	London City Airport will continue 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 introducing SAFs	June in each year

2. BACKGROUND

- 2.1 This Air Quality Management Strategy describes:
1. Why local air quality is of relevance to London City Airport;
 2. What contribution the Airport makes to local air quality conditions; and
 3. What measures the Airport intends to implement, with the objective of minimising the impact of its operations on local air quality.
- 2.2 London City Airport (LCA) comprises a single runway, a main terminal area, and a corporate aviation facility (the “Jet Centre”), together with supporting infrastructure, including a fuel farm, fire testing facilities and car parking. It has excellent public transport links, with 73% of passengers travelling by public transport in 2019¹, the highest use of public transport by any airport in the UK.
- 2.3 The pollutants of principal concern in the London Borough of Newham (LBN) are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}). A summary of the sources of these pollutants and the principal environmental effects are described in Box 2.

Box 2: Pollutants of Concern in London Borough of Newham

Nitrogen dioxide: All combustion processes give rise to emissions of nitrogen oxides (NO_x). Nitrogen dioxide (NO₂) and nitric oxide (NO) are collectively referred to as NO_x.

The most important source of NO_x is road transport, but emissions also arise from aircraft operations and other combustion sources such as boiler plant.

Particulate Matter: Particulate Matter (PM) is generally categorised according to the particle size; thus PM₁₀ refers to particles with a diameter of less than 10 micrometres (µm), and PM_{2.5} to particles with a diameter of less than 2.5 micrometres (µm).

Particulate Matter arises from a wide variety of sources, including both primary particles (which are directly emitted into the atmosphere) and secondary particles (which are formed in the atmosphere via chemical reactions). Road transport and aircraft operations generate emissions of primary PM through fuel combustion and non-exhaust emissions such as brake and tyre wear. There are many other sources of primary PM, including power generation, construction and quarrying; natural sources such as sea salt and Saharan dust also make a contribution.

- 2.4 London City Airport is committed to reducing air quality impacts on local air quality in accordance with the UES, reducing both concentrations and public exposure. Airport operations, including aircraft movements and airside operations, contribute to local air quality conditions to a relatively small degree, with other sources at both the local (e.g. road transport on the wider road network, industry etc.) and regional (e.g. transboundary) scales playing a major role.
- 2.5 London City Airport will continue to manage its operations over the three-year period between 2023 and 2026, so as to minimise its air quality impacts. An annual statement on progress and performance, will be included within the Annual Performance Report (APR).
- 2.6 Whilst producing this document, consideration has also been given to the Air Quality Action Plan that was published by LBN in November 2019, and the Climate Emergency Action Plan

¹ London City Airport 2018 Annual Performance Report. Data for 2020 and 2021 are not reported due to the influence of the Covid-19 pandemic restrictions.

published by LBN in July 2020. The measures and findings of that assessment have been considered to ensure that the proposed measures in this Strategy both enhance and complement the actions of LBN within the wider borough boundary.

- 2.7 The Air Quality Management Area (AQMA), which has been designated by LBN for exceedances of the annual mean objective for nitrogen dioxide and the daily mean objective for PM₁₀, was amended in 2019 to encompass the whole borough, and by definition, London City Airport lies within this AQMA. GLA has also identified a number of Air Quality Focus Areas in London, defined as areas that have both high levels of nitrogen dioxide and significant human exposure. The Airport does not lie within any of these Focus Areas.
- 2.8 The LBN Air Quality Action Plan presents modelled pollutant concentrations from the London Atmospheric Emissions Inventory 2016 and notes that:
- Nitrogen dioxide concentrations exceed the air quality objective in the locality of all major roads in the borough;
 - PM₁₀ concentrations exceed the objective around some major roads, with the most significant source of PM₁₀ being road transport and other sources associated with central London; and
 - Concentrations of PM_{2.5} exceed the WHO guideline of 10 µg/m³ across the borough. Levels in the vicinity of major roads are higher, particularly in Stratford, Canning Town and at Prince Regent Lane.
- 2.9 The key 10 priorities identified in the Action Plan are:
- Enforcing the Non-Road Mobile Machinery (NRMM) Low Emission Zone;
 - Promoting and enforcing smoke control zones;
 - Promoting and delivering energy efficiency retrofitting projects in workplaces and homes;
 - Supporting alert services such as airTEXT and promoting the Mayor's air pollution forecasts;
 - Reducing pollution in and around schools, and extending school audits;
 - Installing Ultra Low Emission Vehicle infrastructure;
 - Improving walking and cycling infrastructure;
 - Regular car free days/temporary road closures in high footfall areas;
 - Reducing emissions from Council fleets; and
 - Ensuring Master planning and development areas are aligned with *Air Quality Positive* and *Healthy Streets* approaches.
- 2.10 Insofar as Airport operations are related to these key priorities, London City Airport has:

- Committed as part of the CADP infrastructure to safeguard for 50 fast electrical charging points and 9 rapid charge points. These will be shared between cars and taxis (during daytime peak hours) and airport vehicles (in evening off-peak hours);
- Doubled the provision of staff cycling to 48 across two key staff locations and provided additional stands take public cycle provision to 22. This provides a total of 70 cycle spaces across the airport.
- Provided funding through the CADP1 Section 106 for improvements to cyclist and pedestrians routes, which could be used to create a connection between Hartmann Road and Connaught Road to connect the Airport to the local cycle network;
- Provided funding through the CADP1 Section 106 for additional DLR station staff to ensure DLR remains the best choice for getting to and from the airport.
- The Airport Surface Access Strategy has identified facilitating the Healthy Streets approach as a key priority; and
- Any future planning application will conform with the Air Quality Positive approach, taking account of any future guidance issued by the GLA.

2.11 The LBN Climate Emergency Action Plan (Section 10 – Transport) commits to continuing to review compliance with all planning conditions and obligations for operation and construction works at London City Airport.

2.12 Wider policy and legislative context considered when creating this Air Quality Management Strategy is in Appendix 1.

3 AIR QUALITY MANAGEMENT STRATEGY 2023 - 2026

Contribution of Airport Operations to Local Pollution Levels

- 4.1. The Airport operates an Air Quality Monitoring Strategy, which currently comprises two automatic stations² and a network of 16 nitrogen dioxide diffusion tubes. The locations of these sites are shown in Figure 1. There have been no recorded exceedances of the nitrogen dioxide or PM₁₀ objectives at the automatic sites since monitoring commenced at the Airport in September 2006. There were a number of recorded exceedances of the annual mean nitrogen dioxide objective at some of the diffusion tubes sites in 2011 and 2012; however none of these were at locations relevant to public exposure.
- 4.2. A site measuring PM_{2.5} was installed at KGV House at the beginning of 2019. The annual mean concentration recorded in 2022 was 9.2 µg/m³, and well below the Air Quality Limit Value (20 µg/m³), and also below the GLA target³ of 10 µg/m³.

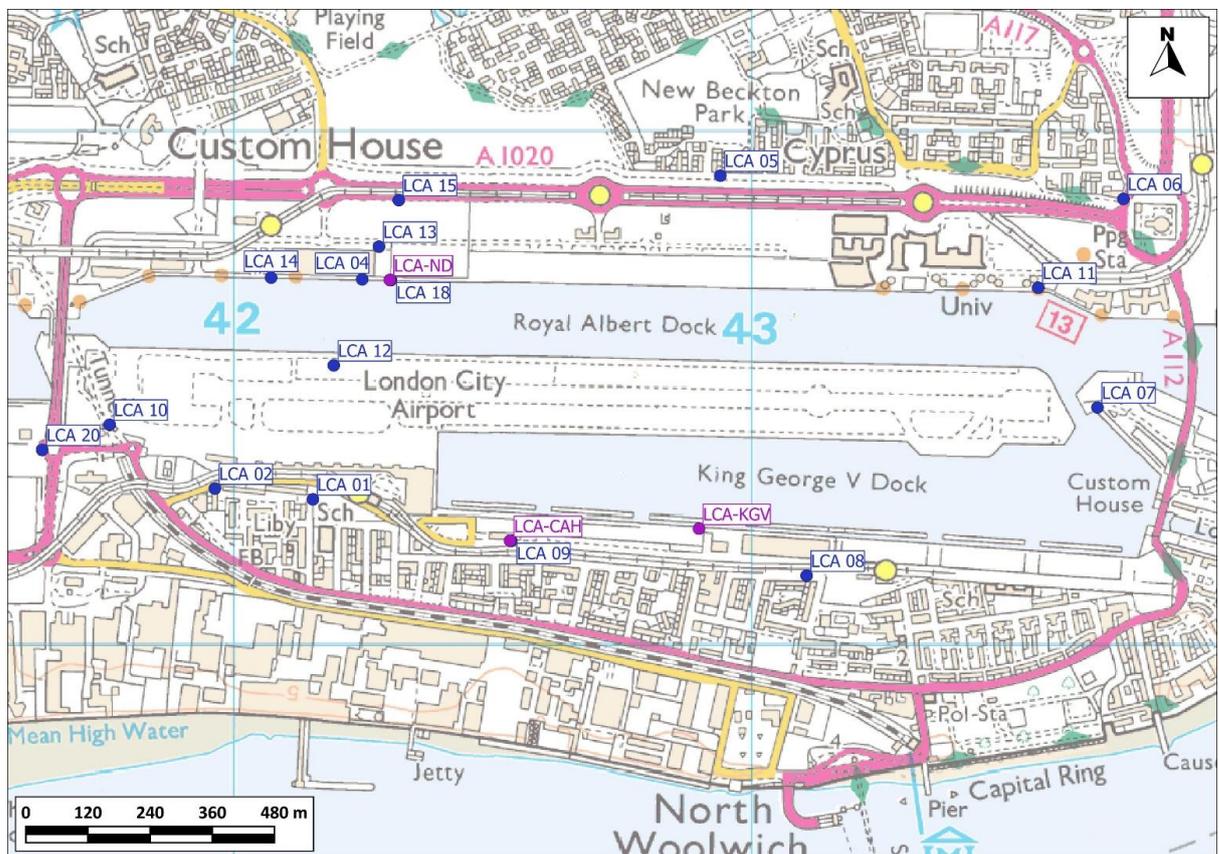


Figure 1: Monitoring site locations. LCA-CAH (NO_x and PM₁₀); LCA-ND (NO_x); LCA-KGV (PM₁₀ and PM_{2.5}). Sites LCA01 - LCA20 are nitrogen dioxide diffusion tube locations

- 4.3. A detailed analysis of trends (2007 to 2022) in measured annual mean nitrogen dioxide concentrations has been carried out for monitoring sites in east London and this was

² The LCA-CAH was fully decommissioned in June 2022, and the NO_x analyser was relocated to LCA-KGV. This is described in detail in the Air Quality Monitoring Strategy.

³ The GLA target as defined in the London Environment Strategy is set at the 2005 WHO guideline value.

published as part of the Airport's 2022 APR⁴. This has shown a statistically significant downward trend at both the LCA-CAH (-0.92 µg/m³ per annum) and LCA-ND (-0.88 µg/m³ per annum) sites, and at other sites in east London (including Newham Cam Road, Newham Wren Close, Tower Hamlets Blackwall, and all three sites in Greenwich).

- 4.4. The Environmental Statement (ES), which was published in December 2022 to accompany the S73 Application proposal, includes a detailed emissions inventory and dispersion modelling study. The results of this study provide useful information regarding the contribution that Airport operations make to local air pollution levels. In terms of pollutant concentrations, the modelling study completed for the ES showed that Airport sources in 2019 (the baseline year for the ES) contributed a maximum of about 15% to nitrogen oxides concentrations at locations immediately to the south of the Airport, and less than about 5% at most other locations. The contribution to PM₁₀ and PM_{2.5} concentrations is extremely small and generally less than 1%.
- 4.5. While concentrations of pollutants at relevant receptors (i.e. the levels at which pollution is present in the air) are the best measure of air quality impacts, since they are closely related to the health effects experienced, it is often simpler to refer to emissions (i.e. how much pollution is released into the air). Emissions from a source can be presented as a single number, rather than a table or contour plot of concentrations. However, it should be borne in mind that emissions are an imperfect measure of impacts. Also, road emissions depend on the extent of the network modelled, and so may not be comparable from one study to another.
- 4.6. Emissions from aircraft above about 100 metres altitude make very little contribution to ground-level pollutant concentrations in the vicinity of the Airport (AQEG, 2004); in addition, the CAP1616 Airspace Management guidance published by the Civil Aviation Authority (CAA, 2018) notes that "*due to the effects of mixing and dispersion, emissions from aircraft above 1,000 feet (~300m) are unlikely to have a significant impact on local air quality*", and it is therefore appropriate to focus on emissions from sources at ground level. An estimate of the contributing factors to NO_x, PM₁₀ and PM_{2.5} emissions arising from various Airport sources at London City Airport in 2019 is shown in Figures 2, 3 and 4.

⁴ Air Quality Consultants (2023) London City Airport Air Quality Measurement Programme: 2022 Annual Report

Figure 2: Estimated Source Contributions to NO_x emissions at London City Airport in 2019.

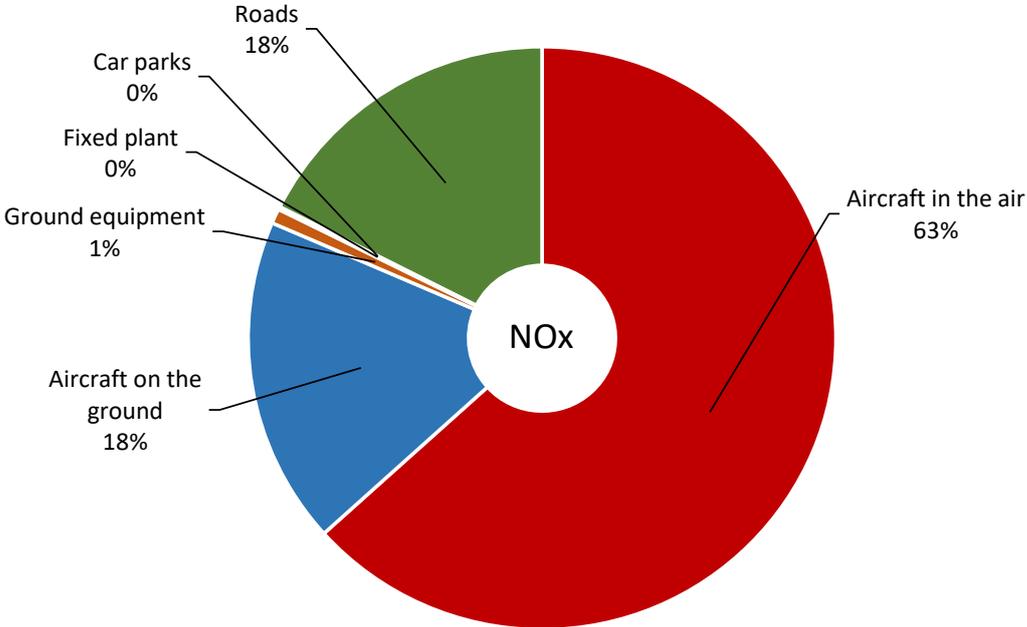


Figure 3: Estimated Source Contributions to PM₁₀ emissions at London City Airport in 2019:

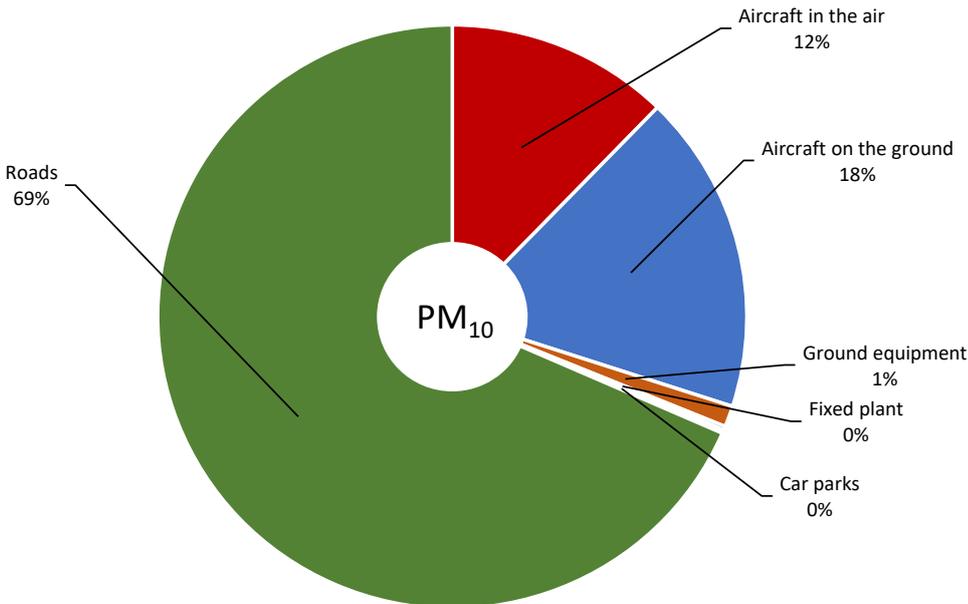
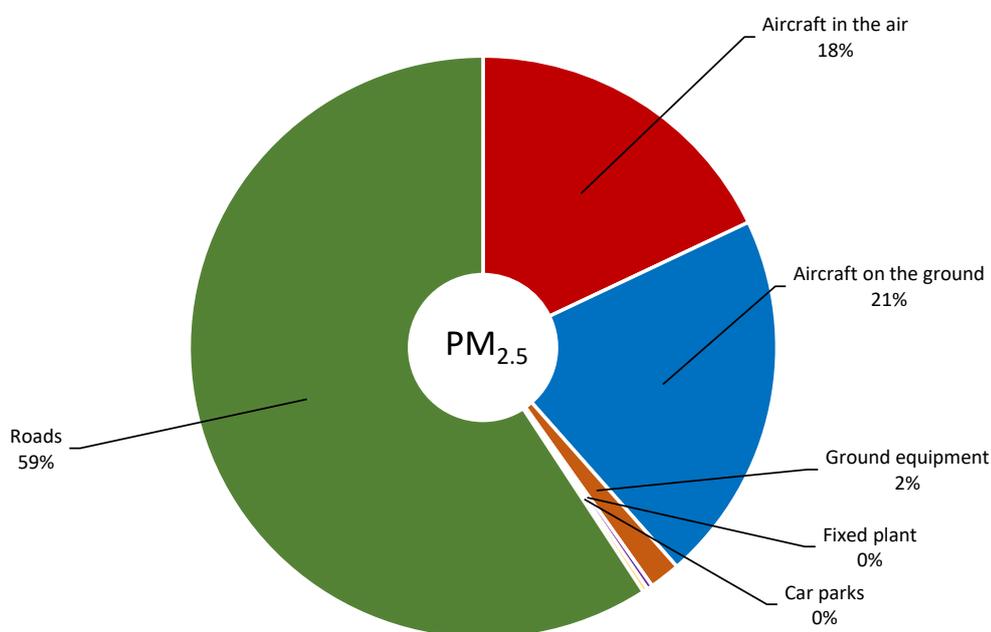


Figure 4: Estimated Source Contributions to PM_{2.5} emissions at London City Airport in 2019:



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4.7. These source contributions are further broken down and expressed as emissions (tonnes/annum) and as a percentage of the total ground-based emissions (for the reasons stated in paragraph 3.5) and are shown in Table 1.

4.8.

Table 1: Summary of Annual Emissions (Ground-Based Sources) – 2019

Source	NOx emissions te/yr (% of total)	PM ₁₀ emissions te/yr (% of total)	PM _{2.5} emissions te/yr (% of total)
Aircraft on Ground			
Landing	0.9 (0.8%)	0.02 (0.3%)	0.02 (0.4%)
Taxi in	4.5 (3.8%)	0.09 (1.2%)	0.09 (1.9%)
Hold	3.2 (2.7%)	0.06 (0.9%)	0.06 (1.4%)
Taxi out	15.6 (13.1%)	0.32 (4.2%)	0.32 (6.6%)
Take-off	28.5 (23.9%)	0.14 (1.8%)	0.14 (2.9%)
Brake wear	0 (0%)	0.46 (6.2%)	0.18 (3.8%)
Tyre wear	0 (0%)	0.10 (1.3%)	0.07 (1.5%)
APUs	5.7 (4.8%)	0.32 (4.2%)	0.32 (6.6%)
Engine testing	1.0 (0.9%)	0.01 (0.1%)	0.01 (0.1%)
Ground Support Equipment	2.6 (2.2%)	0.10 (1.3%)	0.10 (2.1%)
Fixed Plant			
Fire Training Ground	<0.1 (0.0%)	0.01 (0.2%)	0.01 (0.3%)
Energy Centre	0.3 (0.2%)	<0.01 (0.0%)	<0.01 (0.0%)
Generators	<0.1 (0.0%)	<0.01 (0.0%)	<0.01 (0.0%)
Car Parks	0.2 (0.2%)	0.02 (0.2%)	0.02 (0.3%)

Source	NOx emissions te/yr (% of total)	PM ₁₀ emissions te/yr (% of total)	PM _{2.5} emissions te/yr (% of total)
Roads*	56.5 (47.4%)	5.82 (78.0%)	3.44 (72.0%)
TOTAL	119.3 (100.0%)	7.46 (100.0%)	4.78 (100.0%)

*Includes non-airport traffic on modelled road links

- 4.9. In relation to airport sources, for NO_x, emissions from taxiing (24%), take-off (19%) and Auxiliary Power Units (APUs) (7%) use dominate. For both PM₁₀ and PM_{2.5}, emissions from APUs (>24%), taxiing (8%) and brake wear (9%) dominate. Emissions related to surface access dominate overall, contributing >42% of emissions for all pollutants.

Focus of the Air Quality Management Strategy

- 4.10. The focus of this Air Quality Management Strategy (AQMS) is on minimising emissions of nitrogen oxides (NO_x)⁵ from Airport operations, as this is the pollutant of greatest concern in the local area. Consideration is also given to the benefits of reducing exposure to particulate matter (especially PM_{2.5}). LBN has also raised concerns regarding emissions of Ultra-Fine Particles (UFPs) and this issue has been given additional consideration in this Strategy.
- 4.11. Measures to reduce emissions from fuel combustion sources (e.g. aircraft engines and road vehicles) will generally reduce emissions of both NO_x and PM₁₀/PM_{2.5}, but in drawing together this Strategy, careful consideration has been given to ensure that this is the case for all measures considered.
- 4.12. London City Airport has established a protocol relating to the commissioning of Deposits Studies in the event that any complaints are received in relation to black smuts or oily deposits. As of 2016, complaints associated with these issues suggests that they are not a major problem but if the studies or the pattern of future complaints indicate otherwise, the Air Quality Management Strategy will be revised as appropriate.
- 4.13. This AQMS identifies measures that will be put into place to minimise both NO_x and Particulate Matter (PM) emissions from Airport-related sources including:
- i. Aircraft operations;
 - ii. Ground Support Equipment (including airside vehicles);
 - iii. Staff and passenger travel
- 4.14. The AQMS also identifies measures that will be used to inform and promote practices to improve air quality.
- 4.15. Where appropriate, this AQMS makes reference to other plans and strategies that are in place at London City Airport. In addition, previous progress has been considered when determining the measures within this latest AQMS.
- 4.16. To support the identified measures a review of air quality plans at a number of other airports have been reviewed, to ensure that all potential options are considered. A summary of this review is set out in Appendix 2.

⁵ Emissions from combustion processes are primarily in the form of nitrogen oxides (NO_x). Nitrogen oxides are transformed to nitrogen dioxide via chemical processes in the atmosphere.

Air Quality Management Strategy - Measures

Continuity of Previous Measures

- 4.17. To ensure continuity between the 2020-2019 Air Quality Management Strategy and this updated Strategy, it is important to ensure that any outstanding or ongoing measures are completed and progressed. Appendix 3 provides a list of Measures in the 2020-2023 Strategy, progress to date, and the status of each Measure. Where a Measure has been fully closed out, it has been removed from this revised Strategy. The Measures which have been fully closed out are:

Measure 3 – Phasing out of diesel MGPUs. All diesel MGPUs were decommissioned in August 2021

Measure 8 – ULEZ compliance of Airport-owned vehicles. All Airport-owned vehicles were ULEZ compliant as of 31/10/2021.

- 4.18. It is important to note that progress has been, and will continue to be determined with regard to the success with which the measure has been implemented, and it is not possible to determine the impact of individual measures, or a package of measures, with respect to changes in pollutant concentrations. This has been recognised in a report by the Air Quality Expert Group (AQEG)⁶ which notes that *“The assessment of interventions can be challenging for several reasons. These challenges include the common situation where interventions rarely occur in isolation from other changes that affect air quality, and the difficulty in detecting and quantifying changes if the interventions are small. Indeed, not every intervention is detectable in terms of quantifying changes in pollutant concentrations or health outcomes, even using sophisticated analysis techniques”*.

Ground Power

- 4.19. APUs⁷ are used to provide power to the aircraft at times when the main engines are not running. This is necessary to provide power to the aircraft control systems, to provide conditioned air within the cabin for passenger comfort, and to enable start-up for some of the newer aircraft on scheduled routes. Potential measures to control APU use include using Fixed Electrical Ground Power (FEGP), limiting the use and/or running times of APUs, and using battery-powered ground power units (Mobile Electrical Ground Power Units – B-MGPUs).

MEASURE 1: Maximising availability of FEGP. London City Airport will continue to routinely record the availability of FEGP on all stands where it has been installed, and the time taken to effect repairs. It will also continue to record the use of FEGP within the online portal and document any contraventions of Airfield Operating Instruction AOI 07.

- 4.20. Emissions from APUs represented 5% of NO_x, 4% of PM₁₀ and 7% of PM_{2.5} ground-based emissions in 2019. London City Airport has Airfield Operating Instructions (AOI's) which restricts the running of APUs except when there is a problem with the FEGP, or if required for cabin comfort during extreme temperatures. London City Airport will continue to operate and enforce these instructions. The AOI which contain directions on APU use is AOI 07

⁶ AQEG (2020) Assessing the Effectiveness of Interventions on Air Quality

⁷ Auxiliary Power Units are devices located on the aircraft to provide power to start the main engines, and to run the heating, cooling and ventilation systems prior to engine start-up.

Aircraft Noise & Maintenance⁸. In order to discharge Condition 47 of the CADP 1 Conditions, an APU Strategy has been prepared.

MEASURE 2: Minimising APU Use. London City Airport will continue to monitor the use of APUs in accordance with AOI 07, and will continue to record APU use via the Airport's "Quickview" online reporting tool, and document any contraventions of the Airfield Operating Instructions, updated as necessary to comply with any requirements within the APU Strategy.

Minimising Emissions From Aircraft Taxiing Operations

- 4.21. Emissions from aircraft taxiing to and from stand, and when aircraft are held on the taxiway, represent a significant proportion of the ground-level NO_x and PM₁₀ emissions from aircraft. In 2019, these activities accounted for 23.3 tonnes (19.6%) NO_x and 0.47 tonnes (6.3 – 9.9%) PM₁₀ and PM_{2.5} respectively.
- 4.22. Due to the size and layout of the Airport, the distance aircraft have to taxi between the runway and the parking area is less than most UK international airports and therefore the extent of these emissions is relatively low due to the Airport's restricted physical footprint.
- 4.23. The Standard Terms and Conditions of Use of London City Airport require that Operators should:
1. Not seek approval from Air Traffic Control for aircraft engine start-up until strictly necessary;
 2. Shut down all engines as soon as possible following arrival; and
 3. Where a delay occurs subsequent to engine start-up to shut down engines whenever possible.
- 4.24. London City Airport will continue to operate and enforce these instructions. London City Airport operates an Electronic Flight Progress System (EFPS) as part of the Air Traffic Control System. The EFPS monitors the progress of each aircraft from engine start-up, to start-of-roll, and then from touch down to engine shut-down on stand. This system allows precise details of ground aircraft movements to be analysed.
- 4.25. A Ground Engine Running Strategy has been prepared to discharge Condition 48 of the CADP1 Conditions. This sets out measures to reduce engine running on stand, and to minimise engine usage whilst taxiing, and commits to quarterly reporting to LBN.

Box 3: Ground Engine Running Strategy

Ground Engine Running relates to the use of aircraft engines from the time of engine start-up prior to departure, during taxiing and during holding, to the time of departure. Similarly, it relates to the time following an aircraft arrival from the time when it has reduced to taxiing speed on the runway, or when the aircraft turns off the runway, whichever occurs first, to the time when an aircraft switches off its engines on a stand. This Strategy is aimed at ensuring aircraft engines are operated with the minimum power necessary and for as short a time as possible to

⁸ AOI 07 requires that 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 where the outside air temperature (as promulgated by Air Traffic Control) is below +5°C or above 20°C. It also requires that FEGP should be used wherever possible. APU running times are recorded electronically by the Airfield Operations & Safety Unit (AOSU) and will be provided to the local authority on a quarterly basis..

minimise noise, but will have benefits in reducing pollutant emissions, especially nitrogen oxides (NOx).

Management procedures for aircraft while on, approaching, or leaving a stand are set out in Airside Operating Instruction AOI 06 Apron management and will be retained for the new stands. In addition, the potential use of nose-in parking for all stands is currently under consideration, and which would provide scope to reduce engine running time. The Airport also operates an Electronic Flight Progress System (EPFS) that records times of aircraft ground operations; this system will be retained for the reconfigured and new stands.

Information from these systems will be interrogated on a quarterly basis and a report issued to LBN. Where engine run times on stand exceed agreed targets, the relevant airline will be contacted to explore ways of reducing engine running in future.

The system will also be used to interrogate hold times, and taxi times after departure and on arrival. This information will be collated and reported on a quarterly basis to LBN. The Strategy will include a review of these data, in order to establish targets to improve/minimise overall ground running times.

MEASURE 3: Ground Engine Running Strategy. London City Airport will continue to review the outcomes of the Ground Engine Running Strategy (GERS) within the quarterly reports and will prepare a report for submission to LBN on the air quality implications where ground running exceeds agreed targets.

- 4.26. Emissions can potentially be reduced from taxiing by a practice known as “Engine-out Taxi (EOT)” in which one or more of the aircraft engines are switched off. London City Airport has engaged with the airlines to discuss the use of EOT, and a report was provided to LBN in December 2021. This concluded that there are a series of safety and operational constraints to the current deployment of reduced thrust during taxi-out but also opportunities to explore this further with the collaboration of the aircraft crew who are ultimately responsible for any implementation and use of this measure.

MEASURE 4 Reduced Thrust During Taxiing. London City Airport will continue to work with the major airlines to explore the potential to introduce reduced thrust during taxiing. Direct engagement with the airlines will be made at forthcoming bi-annual pilot forums.

- 4.27. London Airport has engaged with suppliers for procuring electric taxiing systems since 2019, and suitable technologies to support pushback from stand have been identified. These will be required as and when the new 8 CADP stands become operational.

MEASURE 5: Electric Taxiing Systems London City Airport will review the requirements for electric pushback systems as the new CADP stands become available.

Airside Vehicles and Plant

- 4.28. Airside vehicles are used to provide a range of routine services, including baggage handling, aircraft refueling, catering, cleaning and engineering support. There are also other vehicles and plant used on an occasional basis, such as fire tenders, snow ploughs, de-icing equipment and rescue boats.
- 4.29. All baggage tugs and belt loaders are electric. Measures to reduce NOx and PM emissions from airside vehicles and plant include the introduction of newer, low-emission or zero-

emission units, ensuring that all vehicles and plant are correctly maintained and operated, and preventing unnecessary running of engines. The Ultra-Low Emissions Zone (ULEZ) introduced by the Mayor of London requires the use of Euro 6 diesel cars and vans which have, on average, 65% lower NOx emissions than Euro 5.

Introduction of cleaner vehicles and plant

- 4.30. London City Airport directly owns a small fleet of vehicles. Of these, some are specialist vehicles such as fire tenders and vehicles reserved for winter use (e.g. tractors, snow ploughs and de-icing equipment). There are also airside vehicles owned by a number of third-party operators.
- 4.31. From 25 October 2021, the Ultra-Low Emission Zone was extended to the North and South Circular Roads and encompasses London City Airport. All Airport-owned vehicles on the airfield were compliant with the ULEZ with effect of 31/10/2021. In October 2021, there were 152 airside vehicle permits registered to third-party operators⁹; of these, 104 vehicles (85%) were ULEZ-compliant (an increase from 68% compliance in April 2020).
- 4.32. Airport Operating Instruction AOI 12 controls the operation of airside vehicles and includes measures which aim to reduce the environmental impacts of airside vehicle operations. The key principles in AOI 12 ensure:
- Compliance with the requirements of the London Low Emissions Zone for all vehicles which use the public highway;
 - Compliance with the latest emissions standards for all new Airside Vehicle Permits;
 - Prevention of unnecessary engine idling of vehicles;
 - Provision of driver employee awareness to reduce vehicle emissions; and
 - Maintenance of vehicles in a road legal standard.
- 4.33. With specific regard to vehicle emissions, AOI 12 notes that

“London City Airport falls with Transport for London’s (TfL) London Low Emission Zone (LLEZ), and all vehicles which are operating airside and which enter a public highway must comply with the low emissions standards. In addition, all new vehicles issued with an Airside Vehicle Permit must comply with the latest EU emissions standards for road vehicles, defined as the date by which the Euro Standard comes into force for the registration and sale of new vehicles” (Para 3.8.1); and

“Control of vehicles to ensure they meet these requirements is primarily achieved through the AVP application process where vehicles are required to provide approved certificates of inspection which cover emissions standards. This is supported by random vehicle emissions testing airside” (Para 3.8.2).

MEASURE 6: ULEZ Compliance – Third Party Operators. London City Airport will continue to engage with third-party operators of airside vehicles to monitor progress and update records on compliance on an annual basis going forwards.

MEASURE 7: Airside Vehicle Permits – Promote Earlier Introduction of Cleaner Vehicles. The vehicle permit system can be used to promote the earlier introduction of Euro

⁹ This excludes the Cobus buses (which do not have UK licence plates) and certain types of specialist equipment such as cherry pickers.

6 (or hybrid/electric) vehicles. London City Airport will continue to enforce a requirement in AOI 12 that all new vehicles issued with a 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.

MEASURE 8: Vehicle Emissions Testing. Failed abatement systems can lead to substantially higher emissions from individual vehicles. London City Airport will continue to undertake routine annual, and periodic, random emissions testing for Airport owned and third-party airside vehicles¹⁰. The results of the testing will be reported to LBN on an annual basis, by June of each year.

MEASURE 9: Introduction of Hybrid or Electric Vehicles. Both hybrid and electric vehicles would reduce emissions (above and beyond ULEZ standards) but is dependent on availability. London City Airport will continue to review the Airport-owned fleet with the aim of maximising the use of hybrid and electric vehicles in line with its net zero ambitions..

Emissions from taxis (Black Cabs)

- 4.34. A black cab emissions study was submitted to LBN in July 2017 and approved in October 2018. In line with the outcome of this study, London City Airport will continue to monitor black cab idling. Vehicle Idling Action is a behavior change campaign supported by LBN.

MEASURE 10: Anti-Idling, Black Cabs. London City Airport will continue to monitor black cab idling and will report any issues or complaints to the Airport Transport Forum.

Publicity and Promotion

- 4.35. To ensure that measures identified within this Air Quality Management Strategy are fully implemented, it is important to communicate the importance of air quality issues to staff, passengers and cab drivers. London City Airport will introduce further measures to promote the understanding of air quality matters.

MEASURE 11: Review and Update Website. London City Airport will review and update the website to provide clear, concise information to the local and wider community on the performance of this Air Quality Management Plan. This will allow for more regular updates, details of the type of monitoring undertaken, prominent links to applicable documents and the opportunity for individuals and organisations to get in contact with the airport via an online interactive form. The outcome will be reported by June in each year

MEASURE 12: RAMP Sampling London City Airport will undertake on a two-year basis a RAMP¹¹ employee air quality monitoring assessment with direct individual recording apparatus and publish findings on the LCA website. The next study will be carried out by April 2025.

¹⁰ Vehicle emissions testing will be carried out on a minimum of 15 vehicles in each calendar year. Where a vehicle fails a test, a Vehicle Defect Notice will be issued. The responsible company will have 14 days to rectify the vehicle (with suitable documentation) or the Airside Vehicle Permit will be suspended. This accompanies the policy that all vehicles which have a permit to operate airside must provide a valid and in date MOT certificate.

¹¹ Airport apron area

MEASURE 13: Staff Communications. 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 eBulletin. Progress will be reported by June in each year.

Ultra-Fine Particles

- 4.36. Ultra-fine Particles (UFPs) are defined as particulate matter with a diameter of less than 100 nanometres (nm). Exposure to UFPs is of concern because of the potential deep penetration of particles into the respiratory system (Cassee et al, 2019); there is also a potential route for direct neurological exposure via the olfactory bulb (Hopkins et al, 2018).
- 4.37. There are currently no air quality standards, guidelines or targets for UFPs against which compliance can be assessed. In the revision to the WHO Guidelines in 2021, there was consensus from the guideline development group (GDG) that the body of epidemiological evidence was not yet sufficient to recommend an air quality guideline. It is not anticipated that standards or guidelines for UFPs in relation to the protection of human health will be developed in the near future.
- 4.38. Following the development of the CAEP/10 non-volatile (nvPM) mass concentration standard, ICAO continued the development of the nvPM mass and number standards. The CAEP/11 nvPM mass and number standards have now been formally adopted, and are incorporated into the ICAO Aircraft Emissions Databank¹². 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. 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 particles¹³.
- 4.39. In addition, there is no robust manner in which to quantify UFP emissions from other sectors such as road transport. In summary, at this stage there is no robust manner in which an emissions inventory could be compiled for UFPs, but this will be kept under review.
- 4.40. A report published by the Airports Council International (ACI)¹⁴ includes a section on mitigation options to minimise emissions of UFPs from airport operations. A summary of these measures, and the actions currently implemented by London City Airport are included in Appendix 4. Schiphol Airport has also introduced an action plan focused on minimising UFP emissions¹⁵, but there are no additional measures that are not feasibly implemented to London City Airport. In addition, trials to reduce UFPs using water mist sprays are being carried out at Schiphol Airport¹⁶. The results of these trials and other potential mitigation measures will be kept under review.

MEASURE 14: UFP Emissions Inventory. London City Airport will review the emerging evidence on UFPs related to aircraft emission inventories and will provide an update on an annual basis. London City Airport will also keep under review measures implemented at other airports to control UFP emissions and will provide an update on an annual basis.

¹²ICAO (2021) Aircraft Emissions Databank, version 28c. Available at <https://www.easa.europa.eu/domains/environment/icao-aircraft-emissions-databank>

¹³ Wey et al (2016). Over of the Aircraft Particles Emissions Experiment. Available at: https://scholarsmine.mst.edu/chem_facwork/161/

¹⁴ Airports Council International (ACI) Europe (2018) Ultrafine Particles at Airports.

¹⁵ <https://news.schiphol.com/download/1093214/factsheetactionplanultrafineparticles.pdf>

¹⁶ <https://www.schiphol.nl/en/schiphol-group/blog/using-mist-to-reduce-ultrafine-particles/>

- 4.41. The role of sulphur in aviation fuel appears to be critical to UFP formation. Aviation fuel typically contains 600-900 ppm sulphur by volume, as compared to less than 10 ppm in road diesel. Several studies have investigated the improvements to local air quality associated with the introduction of Sustainable Aviation Fuel (SAF) blends. A key Airport Cooperative Research Programme (ACRP) study¹⁷ 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 #]. For a SAF 50% blend, [nvPM mass] was reduced by 65% and [nvPM #] reduced by 43%.
- 4.42. A more recent study¹⁸ 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% 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%.

MEASURE 15: UFP Emissions and SAFs. London City Airport will continue to review the emerging evidence on the link between the use of SAFs and UFP emissions, and will work with industry partners to assess the benefits and feasibility of introducing SAFs..

London City Airport Surface Access Strategy

- 4.43. Studies undertaken by the LBN have identified road traffic as the primary source of poor air quality in the borough. Road traffic accounted for 27% of NO_x emissions (from Airport-related ground-based sources) in 2019. Measures to reduce Airport-related traffic on the local road network therefore form an important link to this Air Quality Management Strategy.
- 4.44. It should, however, be recognised that 73% of passengers currently (2019) travel to the Airport by DLR, bus and black taxi. This is due to the excellent links to an integrated public transport system, specifically the Docklands Light Railway.
- 4.45. London City Airport's Airport Surface Access Strategy (ASAS) defines the long-term approach the Airport will take to encouraging air passengers, airport staff and other airport users to travel sustainably. The ASAS includes the following 2025 targets:
- Over 75% of air passengers travelling by public transport, with 70% by DLR;
 - Less than 40% of airport staff to travel by single occupancy private car.
- 4.46. The ASAS has identified six priorities that will be used to underpin these targets across all travel modes:
- Closing the information gap;
 - Offering the right travel services;
 - Equality of access;
 - Facilitating Healthy Streets;

¹⁷ Gladstone et al (2020). Sustainable Aviation Fuel: Greenhouse Gas Reductions from Bay Area Commercial Aircraft.

¹⁸ 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

- Offering low carbon alternatives;
- A collaborative approach.

4.47. From the ASAS objectives a suite of specific documents have been produced to set out how the airport will implement the strategy. The documents are the Travel Plan, Delivery and Servicing Plan, Taxi Management Plan and Traffic Management Plan. These documents detail how the Airport will develop its sustainable transport options. Such sustainable transport options will deliver improvements to local air quality by minimising reliance on private car use for both passengers and staff and consolidating delivery vehicle trips,

Sustainability and Biodiversity Strategy and Carbon Management Plan

4.48. The London City Airport Sustainability and Biodiversity Strategy was approved by the London Borough of Newham in 2017, and was subsequently reviewed in 2020. It considers the impact of operations at the Airport on matters such as energy, water and greenhouse gas emissions, and includes the Airport Sustainability Action Plan.

4.49. While primarily targeted at reducing emissions of carbon dioxide from Airport sources, the implementation of the Sustainability and Biodiversity Strategy and Carbon Management Plan is also expected to lead to a reduction of local emissions of NOx and PM through measures that reduce fuel and energy use, and will assist in the delivery of this Air Quality Management Strategy.

Box 4: Carbon Management Plan

The Carbon Management Plan has been produced to provide a clear approach as to how energy consumption and carbon emissions will be minimised at London City Airport. The Carbon Management Plan is based on the requirements of the Third Stage of the Airport Carbon Accreditation Scheme (commonly referred to as Stage 3: reduction).

The Airport has developed a key performance indicator which is measured against carbon emissions (kgCO₂) per passenger, which is an industry recognised metric. London City Airport's performance target is to reduce by 2020 the annual carbon (kgCO₂) emission per passenger by 20%, as compared to the 2013 baseline. London City Airport also achieved carbon neutrality in December 2019 through the Airport Carbon Accreditation Scheme (Level 3+), demonstrating that emissions that currently cannot be eliminated have been offset.

The scope of the carbon footprint currently includes the services and utilities that the Airport has direct control over, including electricity and mains gas supplied to onsite buildings, red diesel used for onsite vehicles and equipment, and fuel used on business trips. It also includes emissions that the Airport can influence, such as emissions with the aircraft Landing and Take-Off cycle, and passenger travel to the Airport.

Energy Strategy

4.50. The revised Energy Strategy for the Eastern Energy Centre (EEC) will use on-site heat pumps and photovoltaics, or will connect to a District Heating Heat Pump option. The 2015 UES in support of the CADP1 application calculated NOx emissions from the EEC to be 1,130 kg/annum. This will now be reduced to zero.

APPENDIX 1 – NATIONAL, REGIONAL, LOCAL POLICY AND LEGISLATIVE CONTEXT

All European legislation referred to in this Appendix is written into UK law and remains in place

Air Quality Strategy (2007)

The 2007 Air Quality Strategy¹⁹ provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors, industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The Strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular Reviews and Assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area and prepare an action plan.

Air Quality Strategy (2023)

Defra published its Air Quality Strategy in May 2023. It sets a framework to enable local authorities to deliver for their communities and contribute to our long-term air quality goals, including new targets for fine particulate matter (PM_{2.5}). It fulfils the statutory requirement of the Environment Act 1995 as amended by the Environment Act 2021 to publish an Air Quality Strategy setting out air quality standards, objectives, and measures for improving ambient air quality every five years. It does not replicate or replace our other air quality guidance documents relevant to local authorities, a summary of which is set out in Annex B. The Clean Air chapter of the 2023 Environmental Improvement Plan builds on and updates the 2019 Clean Air Strategy, setting out a delivery plan to achieve targets. These existing documents set out national government action to improve air quality. This Air Quality Strategy sets out responsibilities and duties for local government to take in improving air quality across England

Aviation Policy Framework (2013)

The Aviation Policy Framework⁷ sets out the Government's high-level strategy and overall objectives for aviation, and replaces the 2003 Air Transport White Paper. With regards to air quality, the policy is to seek improved international standards to reduce emissions from aircraft and vehicles, and to work with airports and local authorities to improve air quality, including encouraging transport operators to introduce less polluting vehicles. The Framework places a particular importance on areas where the EU Limit Values and air quality objectives are exceeded, but recognises that nitrogen oxides (NOx) concentrations from aviation-related activities reduce rapidly beyond the immediate area of the runway, and places emphasis on reducing emissions associated with surface access. In particular, the preparation of Airport Surface Access Strategies (ASASs) is strongly encouraged, together with the development of targets to reduce the air quality impacts of surface access.

Airports National Policy Statement (2018)

The Airports NPS⁸ provides the primary basis for decision making on development consent applications for a Northwest Runway at Heathrow Airport, and will be an important and

¹⁹ Defra (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007.

relevant consideration in respect of applications for new runway capacity and other airport infrastructure in London and the South east of England. It declares that, in regard to the Heathrow Airport proposals:

“The Secretary of State will consider air quality impacts over the wider area likely to be affected, as well as in the vicinity of the scheme. In order to grant development consent, the Secretary of State will need to be satisfied that, with mitigation, the scheme would be compliant with legal obligations that provide for the protection of human health and the environment.

Air quality considerations are likely to be particularly relevant where the proposed scheme:

- is within or adjacent to Air Quality Management Areas, roads identified as being above limit values, or nature conservation sites (including Natura 2000 sites and Sites of Special Scientific Interest);*
- would have effects sufficient to bring about the need for new Air Quality Management Areas or change the size of an existing Air Quality Management Area, or bring about changes to exceedances of the limit values, or have the potential to have an impact on nature conservation sites; and*
- after taking into account mitigation, would lead to a significant air quality impact in relation to Environmental Impact Assessment and / or to a deterioration in air quality in a zone or agglomeration.”*

The Airports NPS does not affect Government policy on wider aviation issues, as set out in the 2013 Aviation Policy Framework and the expected Aviation Strategy.

Beyond the horizon: The future of UK aviation: Making Best Use of Existing Runways (2019)

Beyond the Horizon - The Future of UK Aviation: Making Best Use of Existing Runways⁹ confirms the Government's support for airports beyond Heathrow making best use of their existing runways, subject to consideration of economic and environmental impacts. It states (at paragraph 1.22/23):

“The government recognises the impact on communities living near airports and understands their concerns over local environmental issues, particularly noise, air quality and surface access. As airports look to make the best use of their existing runways, it is important that communities surrounding those airports share in the economic benefits of this, and that adverse impacts such as noise are mitigated where possible.

For the majority of local environmental concerns, the government expects these to be taken into account as part of existing local planning application processes.”

Aviation 2050 Consultation (2019)

In 2018–2019, the Government consulted on its Green Paper, Aviation 2050¹⁰. In relation to air quality, the strategy proposes the following measures:

- Improving the monitoring of air pollution, including ultrafine particles (UFP), in order to improve understanding of aviation's impact on local air quality;

- Ensuring comprehensive information on aviation-related air quality issues is made available to better inform interested parties;
- Requiring all major airports to develop air quality plans to manage emissions within local air quality targets;
- Validation of air quality monitoring to ensure consistent and robust monitoring standards that enable the identification of long-term trends; and
- Supporting industry in the development of cleaner fuels to reduce the air quality impacts of aviation fuels.

This does not represent adopted policy. The Government issued a response on certain aspects of the Aviation 2050 consultation, related to airspace change proposals, but other aspects were effectively superseded or subsumed by the Flightpath to the Future policy (see below).

Flightpath to the Future (2022)

'Flightpath to the future' is described as a strategic framework for the aviation sector that supports DfT's vision for a modern, innovative and efficient sector over the next 10 years. It builds on the responses to the Aviation 2050 consultation. It sets out a ten-point plan to support growth in the aviation sector while *"continuing to lead the way globally on key issues such as decarbonisation, safety and security"* and bringing benefits to the UK and users. Among the ten points are:

"3. Support growth in airport capacity where it is justified, ensuring that capacity is used in a way that delivers for the UK – airport expansion has a key role to play in enhancing the UK's global connectivity and we remain supportive of sustainable airport growth..."

4. Put the sector on course to achieve Jet Zero by 2050... We will also continue to work with the sector to reduce the localised impacts of aviation from noise and air pollution."

Jet Zero Strategy (2022)

In 2022 the Government published the Jet Zero Strategy¹¹. Whilst focussed on decarbonising the aviation industry, it recognises that Sustainable Aviation Fuels (SAF) are one of the key technologies available to government and industry to achieve Jet Zero. In respect of SAF, the document identifies four Strategic Objectives as follows:

- A commitment to have a SAF mandate in place by 2025, reducing greenhouse gas emissions of aviation fuel by the equivalent of at least 10% SAF use by 2030;
- Working with the private sector to build a thriving domestic SAF industry, with a commitment to have at least five commercial scale UK plants under construction by 2025;
- Working in partnership with industry and investors to build long term supply; and
- Establishing world-class testing and certifying facilities for SAF in the UK.

The Strategy also recognises the future, potential benefits of Zero emission flights (ZEF), and identifies six Strategic Objectives as follows:

- Grow UK share of the global aerospace manufacturing market as new forms of aircraft emerge;

- Facilitate collaboration between aviation, other transport modes and sectors of the economy on the adoption of hydrogen;
- Ensure parallel development of aircraft with the energy and ground infrastructure required for their cooperation;
- Ensure the aviation sector workforce is prepared for the introduction of new aircraft;
- Stimulate the future innovation by promoting diversity and accessibility in the sector; and
- Put in place the policy and regulatory system to enable zero emission aircraft to enter commercial service and deliver our aspiration of zero emission routes connecting different parts of the United Kingdom to be realised by 2030.

Air Quality Criteria

The pollutants of principal concern in the London Borough of Newham are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).

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 Regulations 2000 (Stationery Office, 2000) and the Air Quality (England) (Amendment) Regulations 2002 (Stationery Office, 2002). The relevant objectives are provided in Table A1.1.

The objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively and continue to apply in all future years thereafter.

Table A1.1: Air Quality Objectives for Nitrogen Dioxide and PM₁₀

Pollutant	Time Period	Objective
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 (PM₁₀)	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual mean	40 µg/m ³

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, currently set at 20 µg/m³.

Defra has also recently set two new targets, and two new (non-statutory) interim targets, for PM_{2.5} concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean PM_{2.5} concentration of 10 µg/m³ by the

end of 2040, with the interim target being a value of 12 µg/m³ by the start of 2028²⁰. The second set of targets relate to reducing overall population exposure. By the end of 2040, overall population exposure should be reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

Defra will assess compliance with the population exposure targets by averaging concentrations measured at its own background monitoring stations. This will not consider small changes over time to precisely where people are exposed (such as would relate to exposure introduced by a new development). While local authorities have an important role delivering the required improvements, the actions required of local authorities, which will be clarified within future guidance, relate to controlling emissions and not to directly assessing PM_{2.5} concentrations against the targets.

Regional Policy and Guidance

The London Plan

The London Plan (GLA, 2021) sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The key policy relating to air quality is Policy SI 1 on Improving air quality, Part B1 of which sets out three key requirements for developments:

“Development proposals should not:

- a) lead to further deterioration of existing poor air quality*
- b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits*
- c) create unacceptable risk of high levels of exposure to poor air quality”.*

The explanatory text around Policy SI 1 of the London Plan states the following with regard to assessment criteria:

“The Mayor is committed to making air quality in London the best of any major world city, which means not only achieving compliance with legal limits for Nitrogen Dioxide as soon as possible and maintaining compliance where it is already achieved, but also achieving World Health Organisation targets for other pollutants such as Particulate Matter.

The aim of this policy is to ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality. This means that new developments, as a minimum, must not cause new exceedances of legal air quality standards, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits. Where limit values are already met, or are predicted to be met at the time of completion, new developments must endeavour to maintain the best ambient air quality compatible with sustainable development principles.

Where this policy refers to ‘existing poor air quality’ this should be taken to include areas where legal limits for any pollutant, or World Health Organisation targets for Particulate

²⁰ Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 µg/m³ would not exceed the 10 µg/m³ target.

*Matter, are already exceeded and areas where current pollution levels are within 5 per cent of these limits*²¹.

London Environment Strategy

The London Environment Strategy was published in May 2018. The strategy considers air quality in Chapter 4; the Mayor's main objective is to create a "zero emission London by 2050". Policy 4.2.1 aims to "reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport". An implementation plan for the Strategy has also been published which sets out what the Mayor will do between 2018 and 2023 to help achieve the ambitions in the Strategy. The Strategy also sets out the Mayor's ambition to achieve the WHO Guidelines for PM_{2.5} by 2030.

With specific regard to airports, the Strategy states (Proposal 4.2.2b):

- *demonstrating airport expansion will not cause new exceedances or increase exposure to pollution where improvements have been secured; and*
- *airports increasing passenger numbers without expanding infrastructure should continue to review their actions to reduce impacts on or offsite*".

Regulating Emissions from Airport Sources

Pollutant emissions from aircraft operations at London City Airport are regulated by both the European Aviation Safety Agency²² and the Civil Aviation Authority who provide certification of aircraft including the compliance with emissions performance. Agreed standards for aircraft engine emissions are published by the International Civil Aviation Organisation (ICAO). Through its Committee on Aviation Environmental Protection (CAEP), ICAO has set progressively tighter certification standards for air pollutant emissions from new and future civil aircraft, which are commonly referred to as the "CAEP standards". The latest standard is CAEP11.

Local Air Quality Management

The London Borough of Newham has investigated air quality within its area as part of its responsibilities under the LAQM regime and has identified road traffic as the primary source of poor air quality in the borough. In 2002, the Council concluded that it would not meet the statutory objectives for two pollutants²³ - nitrogen dioxide (annual mean) and PM₁₀ (24-hour mean), and designated an Air Quality Management Area (AQMA) extending alongside the major roads in the Borough including North Woolwich Road, Connaught Crossing, Silvertown Way, Royal Albert Way and Royal Docks Road.

The Air Quality Management Area (AQMA) was amended in 2019 to encompass the whole borough, and by definition, London City Airport lies within this AQMA. The LBN Air Quality Action Plan presents modelled pollutant concentrations from the London Atmospheric Emissions Inventory 2016 and notes that:

- *Nitrogen dioxide concentrations exceed the air quality objective in the locality of all major roads in the borough;*

²¹ The London Plan was developed based on a World Health Organisation guideline for PM_{2.5} of 10 µg/m³

²² The UK will no longer participate in the EASA systems after the end of the transition period on 31 December 2020. It is anticipated that UK-EU aviation agreements will be in place after this time.

²³ The objectives for PM_{2.5} have not been included in Regulations, and the London Borough of Newham is not required to carry out reviews and assessments for this pollutant.

- *PM₁₀ concentrations exceed the objective around some major roads, with the most significant source of PM₁₀ being road transport and other sources associated with central London; and*
- *Concentrations of PM_{2.5} exceed the WHO guideline of 10 µg/m³ across the borough. Levels in the vicinity of major roads are higher, particularly in Stratford, Canning Town and at Prince Regent Lane.*

The 10 key priorities identified in the Action Plan are:

- *Enforcing the Non-Road Mobile Machinery (NRMM) Low Emission Zone;*
- *Promoting and enforcing smoke control zones;*
- *Promoting and delivering energy efficiency retrofitting projects in workplaces and homes;*
- *Supporting alert services such as airTEXT and promoting the Mayor's air pollution forecasts;*
- *Reducing pollution in and around schools, and extending school audits;*
- *Installing Ultra Low Emission Vehicle infrastructure;*
- *Improving walking and cycling infrastructure;*
- *Regular car free days/temporary road closures in high footfall areas;*
- *Reducing emissions from Council fleets; and*
- *Ensuring Master planning and development areas are aligned with Air Quality Positive and Healthy Streets approaches.*

APPENDIX 2: REVIEW OF ACTION PLAN MEASURES AT OTHER UK AIRPORTS

A review of air quality measures at other UK airports has been undertaken. A summary of these measures, and the actions currently taken, or proposed, by London City Airport indicated.

Airport Action Plans	London City Airport AQMS
Gatwick Airport	
Newer Aircraft: 26% of aircraft are CAEP8 and 68% are CAEP 6	The CADP1 project is primarily intended to provide the infrastructure to accommodate new generation aircraft such as the Airbus A220-100 and the Embraer E190-E2. This is expected to phase out the older generation aircraft such as the Avro RJ and Embraer E1.
FEGP on all stands	All main stands are equipped with FEGP, and installation on remaining stands will be completed as part of the CADP timescales.
200 airfield charging points for GSE	As part of the CADP development new electrical infrastructure is to be completed to allow additional capacity for electrical charging points and will be delivered to the CADP build-out timetable. CADP has been designed to safeguard for 50 fast charging units and 9 rapid charge units. These will be shared between cars and taxis (daytime peak hours) and airport vehicles (evening off peak hours).
Airport supporting projects on Government's Future Fuels and Freight competition to accelerate commercial production of sustainable aviation fuel.	London City Airport continues to hold discussions with suppliers and is considering how it might encourage and incentivise innovations
Manchester Airport	
Sustainable Vehicle Policy related to Airport-owned vehicles; aim to have vehicles no more than 6 years old, or retrofitting exhaust abatement equipment where appropriate.	All Airport-owned vehicles are ULEZ compliant.
Work with third-party operators of airside vehicles and equipment to encourage the operation of cleaner fleets. Regular vehicle inspections including emissions testing; banning vehicles that do not meet MOT emissions standards. Enforcement of no-idling policy.	A strategy to bring the entire airside fleet into compliance with the ULEZ has been developed and submitted to LBN. It is the intent that all airside vehicles will be electric (or zero emission) or use renewable fuels by 2030. Routine and periodic, random emissions testing of airside vehicles is carried out, and the results reported to LBN. AOI12 prevents unnecessary engine idling.
Promotion of sustainable transport by staff and passengers via Economy and Surface Access Plan.	Surface Access Strategy (2017-2025) sets targets for 75% of passengers travelling by public transport, with 70% by DLR, and fewer than 40% of staff travelling by single occupancy car.
Birmingham Airport	
Working with airlines and air traffic control to encourage reduced engine taxiing and limiting holding of aircraft where possible.	A series of safety and operational concerns have been identified with reduced engine taxiing, but engagement will be continued with the pilots at bi-annual forums.
Reduce use of APU and MGPU by providing FEGP on stands.	All main stands are equipped with FEGP, and installation on remaining stands will be completed as part of the CADP timescales. Reliance on diesel MGPUs has been phased out
Increase public transport access to the Airport.	CADP1 is delivering financial contributions

	towards new DLR rolling stock and additional Travel Ambassadors to advise passengers. In the longer terms, the Airport is committed to working with stakeholders to deliver the new Crossrail Station on the Elizabeth Line south of the Airport.
Increase use of electric vehicles on the Airport site.	LCY continues to review the use of hybrid and electric vehicles in order to reach its net zero ambitions.
Heathrow Airport	
Regular review of landing charges in order to encourage the use of cleaner aircraft	The potential to introduce an emissions-based landing charge has been previously investigated. However, due to the short runway and steeper approach angle, the types of aircraft that can operate from the Airport is limited, and an emissions-charging scheme is not considered viable.
Minimising use of APUs by maximising use of both FEGP and Pre-Conditioned Air (PCA)	All main stands are equipped with FEGP, and installation on remaining stands will be completed as part of the CADP timescales. Use of PCA was explored during CADP design, but there is no room on the apron to fit PCA from the air bridge, and many aircraft in use at LCY cannot use PCA.
Encouraging airlines to sign up to a Departures and Ground Operations Code of Practice	The Standard Terms and Conditions of Use require that all Operators do not seek approval from Air Traffic Control for engine start-up until necessary; shut down all engines as soon as possible on arrival; and, where delays occur, to shut down engines wherever possible.
Working with NATS to reduce emissions during taxiing, hold and use of reduced engine taxiing.	A series of safety and operational concerns have been identified with reduced engine taxiing, but engagement will be continued with the pilots at bi-annual forums. Electric pushback tugs will be required as new CADP stands become operational.
All airside vehicle operators to comply with Operational Safety Instruction (OSI)	Airport Operating Instruction AOI 12 controls the operation of airside vehicles and includes measures to reduce the environmental impacts of their operation.
Reducing emissions from airside fleet through use of hybrids, electric, biofuel and hydrogen alternatives.	A feasibility study for the procurement of low emission (hybrid or electric) vehicles has been submitted to LBN and implementation being considered through the procurement process.
Exhaust emission checks on airside vehicles to VOSA standards	Routine and periodic, random emissions testing of airside vehicles is carried out (to VOSA standards), and the results reported to LBN.
Encouraging eco driving training for users of airside vehicles.	AOI 12 includes the provision of driver employee awareness to reduce vehicle emissions.
Reviewing of OSI with regard to introducing minimum emissions standards.	AOI 12 requires that all new vehicles issued with an Airside Vehicle Permit must comply with the latest EU emissions standards for road vehicles in force at the time.
Seeking to provide adequate infrastructure to encourage use of low and zero emission vehicles airside.	As part of the CADP development new electrical infrastructure is to be completed by December 2021 and this will allow additional capacity for electrical charging points. CADP has been designed to safeguard for 52 fast charging units and 9 rapid charge units. These will be shared

	between cars and taxis (daytime peak hours) and airport vehicles (evening off peak hours).
Working with Clean Vehicle Programme and Sustainability Partnership members to reduce emissions from airport-related landside fleets.	Provision of 300 parking spaces with electric charging points, as well as provision for electric charging or zero emission vehicles on all other spaces by 2035.
Incorporating Sustainable Transport Plan air quality objectives to support transport provision relevant to Heathrow.	The Airport Surface Access Strategy commits to a target of 75% of passenger travel by sustainable transport by 2025, and less than 40% staff travel by single occupancy cars. In the longer term the Airport is committed to working with stakeholders to deliver a new Crossrail station.
Supporting the Hytec Project for 15 hydrogen taxis in London	The Hytec Project was closed in 2015.

APPENDIX 3 – PROGRESS ON 2020-2023 AQMS AND STATUS

Measure	Progress	Status
Measure 1 - Maximising availability of Fixed Electrical Ground Power (FEGP): London City Airport will continue to routinely record the availability of FEGP on all stands where it is has been installed. It will also continue to record the use of FEGP within the online portal and document any contraventions of Airfield Operating Instruction AOI 07	Use of FEGP where available is mandatory, and no contraventions to this have been recorded. Eight faults were recorded during the year relating failure of the FEGP supply, all of which were rectified within 24 hours. A further 79 faults were reported with the Powervamp units.	Ongoing
Measure 2 - Minimising APU Use.: London City Airport will monitor the use of APU in accordance with the relevant Airfield Operating Instruction 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.	APU use continues to be recorded via Qlickview. 223 instances of extended APU use were recorded in 2022	Ongoing
Measure 3 - Phasing Out Diesel MGPUs: 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	All diesel MGPUs have been decommissioned as of end August 2021. Battery-powered (eMGPUs) have been operating after initial delivery delays. FEGP remains in use	Completed
Measure 4 - Ground Engine Running Strategy – air quality implications: 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	There was no exceedance of the targets. This will be continually monitored.	Ongoing
Measure 5 - Reduced thrust during taxiing.: 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	Engagement with the airlines identified operational and safety constraints for the use of reduced thrust during taxiing, but for some major airlines including BACF. A report was provided to LBN on 21/12/2021	Completed
Measure 6 - Electric Taxiing System: London City Airport will review emerging technologies related to Electric Taxiing Systems and will provide an updated report on feasibility.	Electric pushback tugs will be required as and when the new CADP stands become operational. A report was provided to LBN on 20/12/2021	Ongoing
Measure 7- Ground Engine Running, Testing and Maintenance: 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.	The review has concluded that the distance from the engine testing location to the closest receptor location will remain unchanged so there will be no air quality implications	Completed
Measure 8- ULEZ Compliance – Airport owned vehicles: 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	All airport-owned vehicles on the airfield were compliant with the ULEZ as of 31/10/2021	Closed
Measure 9 - : ULEZ Compliance – Third Party Operators: London City Airport will work with third-party operators of airside vehicles and undertake a feasibility study for achievement of full ULEZ compliance	All suppliers with non-compliant ULEZ vehicles (16%) have been contacted for their plans to upgrade their fleet and which is monitored on an annual basis. An updated report was submitted to LBN on 21/12/2021.	Ongoing
Measure 10 - Airside Vehicle Permits (AVP) – Promote Earlier Introduction of Cleaner Vehicles: London City	This applies to new vehicle permits. Following internal discussions,	Ongoing

Airport will continue to enforce a requirement in AOI 12 that all new vehicles issued with a 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.	dispensations may be granted inf ULEZ-compliant vehicles cannot be deployed on the grounds of documented technical, safety, operational and financial grounds.	
Measure 11 – Vehicle Emissions Testing: 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.	No airport or third party owned vehicles failed the emissions test.	Ongoing
Measure 12 – Introduction of Hybrid and Electric Vehicles: London City Airport will review 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.	The airport has been reviewing its vehicle fleet with the aim of maximising the number of hybrid and electric vehicles to reach its net zero aspirations.	Ongoing
Measure 13 – Anti-idling black cabs: London City Airport will continue to monitor idling by black cabs and will report any issues to the Airport Transport Forum	Signs are in place to advise drivers to turn off engines, and drivers are compliant with this. No issues or complaints have been received.	Ongoing
Measure 14 – Review and update website: 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	The website has been reviewed regularly and updated throughout the Strategy period.	Ongoing
Measure 15 – RAMP sampling: London City Airport will continue to undertake, on a two year basis, a RAMP employee air quality monitoring assessment with direct, individual recording apparatus.	It was agreed with LBN to delay the RAMP sampling in 2021 due to the impacts of the pandemic. Sampling was carried out on 2 May 2023.	Ongoing
Measure 16 – Staff Communications: 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..	A communication on the electric car scheme was published in the e-Bulletin in Q1 2021.	Ongoing
Measure 17 – Emission Inventories for Ultra Fine Particles: London City Airport will review the emerging evidence on UFPs related to aircraft emission inventories and will provide an update on an annual basis	Due to the effects of the pandemic there was no change in status during the period 2020 – 2022. A review was sent to LBN in April 2022	Ongoing
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.	Due to the effects of the pandemic there was no change in status during the period 2020 – 2022. A review was sent to LBN in April 2022	Ongoing

APPENDIX 4: Particle Emission Mitigation Options at Airports. Source: ACI (2018) Ultrafine Particles at Airports

Group	Emission Source	Mitigation Option	London City Airport Action
Aircraft	Aircraft taxiing	Reduce congestion, ease flow of traffic through support software	London City Airport operates an Electronic Flight Process System (EFPS) which monitors the progress of each aircraft from engine start-up, to start-up roll, and then from touch down to engine shut-down on stand.
		Change of fuel properties (lower sulphur and aromatics)	London City Airport has been in discussion with suppliers and will continue to investigate the feasibility of introducing lower sulphur aviation fuels [Measure 18]
		Support for aircraft taxiing with less than all engines operating	
		Modify push back operations to avoid engine start up procedures in sensitive areas	The Standard Terms and Conditions of Use require that operators should not seek approval for engine start-up until strictly necessary, and where push-back delays occur subsequent to start-up, to shut down engines wherever possible.
	Auxiliary Power Units (APUs)	Provide stationary electricity and Pre-conditioned air	FEGP is to be provided on all main stands. PCA is not a feasible option due to space on the apron, and inability of many aircraft types to connect to PCA.
		Impose APU operating procedures	Airport Operating Instruction AOI07 provides APU procedures. Contraventions monitored via "Qlickview" reporting tool
	Ground Handling	Ground Support Equipment and airside vehicles	Electrify GSE fleet or provide electric charging stations
Modernise fleet (Stage II to Stage IV)			All MGPUs with Stage II emissions have been decommissioned. Reliance on diesel MGPUs will be phased out completely by December 2020.
Install diesel particle filters on diesel GSE			Reliance on diesel MGPUs will be phased out completely by December 2020.
Change to fuel with lower emissions			Reliance on diesel MGPUs will be phased out completely by December 2020.
Airport Infrastructure	Diesel generators	Limitation on operating times	There are no diesel generators on site
		Change to fuel with lower emissions	There are no diesel generators on site
		Alternative systems	There are no diesel generators on site
	Heating plant	Change to fuel with lower emissions	All boiler plant are gas fired and conform to ultra-low NOx requirements. CHP plant are equipped with SCR.
		Reduce usage through installation of alternative heating systems and development of renewables	The Energy Strategy for CADP includes the provision of photovoltaic panels.
Landside traffic	Vehicles	Incentives to use public transport and car-pooling. Provision of electric charging points	A target of 75% of passenger journeys by sustainable transport by 2025 has been set. 300 electric charging points are to be provided, with provision for electric charging or zero emission vehicles on all other spaces by 2035.
		Prioritising low emission vehicles	Initiatives to deliver low emission or zero emission capable taxis are primarily driven TfL policies, including changes to

		(taxi, shuttles)	taxi and PHV licencing requirements
		No-idling polices at kerbside	A black cab emissions study, including provisions to reduce idling, was approved by LBN in October 2018.

APPENDIX 5 - REFERENCES

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APPENDIX 6 - ABBREVIATIONS

APU	Auxiliary Power Unit
AQMA	Air Quality Management Area
CAA	Civil Aviation Authority
CAEP	Committee on Aviation Environmental Protection
EU	European Union
FEGP	Fixed Electrical Ground Power
GLA	Greater London Authority
GSE	Ground Support Equipment
ICAO	International Civil Aviation Organisation
LBN	London Borough of Newham
LCA	London City Airport
LCACC	London City Airport Consultative Committee
LTO	Landing and take-off cycle
$\mu\text{g}/\text{m}^3$	Micrograms per cubic metre of air
μm	Micrometre (or micron) – one-millionth of a metre
MGPU	Mobile Ground Power Units
NO	Nitric Oxide
NO ₂	Nitrogen dioxide
Nm	Nanometre – one-billionth of a metre
NO _x	Nitrogen oxides (NO + NO ₂)
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10 μm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 μm
UFP	Ultra Fine Particles. Particulate matter with a mobility diameter less than 100 nanometres (0.1 μm)