London City Airport
Get closer.

City Airport Development Programme (CADP1)

Condition 58: Air Quality Management Strategy

Air Quality CONSULTANTS

May 2017 v3.

CONTENTS

1 INTRODUCTION

1.1. The City Airport Development Programme (CADP1) planning 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. This Air Quality Management Strategy has been prepared to discharge Condition 58 of the CADP1 Permission, and covers the period 2017 – 2019. A summary of the Measures is set out in Box 1. This Air Quality Management Strategy should be read in conjunction with the Air Quality Monitoring Strategy that has been prepared to discharge Condition 57. It should also be read in conjunction with a number of other Plans and Strategies, as follows:

- Fixed Electrical Ground Power (FEGP) Strategy (related to Condition 44 of the CADP1 Permission);
- Ground Engine Running Strategy (related to Condition 48 of the CADP1 Permission);
- Ground Running, Testing and Maintenance Strategy (related to Condition 49 of the CADP1 Permission);

- Sustainability and Biodiversity Strategy (related to Condition 56 of the CADP1 Permission):
- Energy Assessment (related to Condition 61 of the CADP1 Permission);
- Taxi Management Plan (related to Condition 78 of the CADP1 Permission);
- Transport Management Plan (related to Condition 79 of the CADP1 Permission);
- The Airport's Surface Access Strategy; and
- The Airport's Carbon Management Plan.

1.4. 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.

BOX 1: AIR QUALITY MANAGEMENT STRATEGY (2017 – 2019)

Air Quality Measurement Strategy (2017 – 2019) Measures	Completed by
Measure 1: London City Airport will continue to routinely record the availability of FEGP on all stands where it is has been installed, and the time taken to effect repairs. It will also continue to record the use of FEGP within the online portal and document any contraventions of Airfield Operating Instruction AOI 07. The Standard Terms and Conditions will be amended to require mandatory use of FEGP on any Stand where it is available, as and when FEGP availability is increased.	June in each year
Measure 2: 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.	June in each year
Measure 3: With the continued procurement of Fixed Electrical Ground Power (FEGP) reliance on MGPUs will be phased out completely by December 2020 in accordance with the requirements of Condition 46 of the CADP1 Conditions. Prior to this date, the early decommissioning of the older MGPUs will minimise emissions; all remaining MGPUs with Stage II emissions will be decommissioned by March 2017.	Mar 2017
Measure 4: London City Airport will 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 5: London City Airport will work with the major airlines to explore the potential to introduce "Engine Out Taxi" (EOT) procedures i.e. single engine taxiing. A feasibility study will be submitted to LBN for approval. Pending the outcome of the feasibility study, a Code of Practice to encourage EOT will be introduced at a later date.	Sept 2017 (feasibility study) Dec 2017 (COP)
Measure 6: London City Airport will undertake a feasibility study to understand the potential of using Electric Taxiing Systems at LCA, without affecting time performance. A feasibility study will be submitted to LBN for approval, and will include, if practicable, timescales for implementation.	Dec 2018
Measure 7: London City Airport will 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 during CADP1 construction.	Within 2 months of GERT&M reports
Measure 8: London City Airport will continue to work with operators at the Airport (in accordance with AOI 12) to increase the percentage of London Low Emissions Zone (LLEZ) compliant vehicles year on year, with the target of achieving 100% compliance with the LLEZ by December 2017. If the ULEZ is expanded to encompass London City Airport, LCA will review AOI 12 with the intent of achieving ULEZ compliance for all airside vehicles as soon as December 2020.	Dec 2017
Measure 9: London City Airport will continue to enforce the 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	June in each year
Measure 10: London City Airport will continue to undertake routine annual, and periodic, random emissions testing for airside vehicles. The results of the testing will be reported to LBN on an annual basis.	June in each year
Measure 11: London City Airport will undertake a feasibility study for the procurement of low emission vehicles (hybrid or electric) to replace the existing fleet, together with a timescale for subsequent implementation. The feasibility report will be submitted to LBN for approval.	December 2018
Measure 12: London City Airport will investigate and implement provisions to reduce idling black cabs. This will involve liaison through the Airport's Transport Forum with the relevant service providers to understand the causes for such instances and implementation, if necessary, of methods to reduce such impacts occurring.	Dec 2017
Measure 13: 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 14: 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 2017 and April 2019
Measure 15: London City Airport will publish an article relating to air quality and airport operations at least once per year in the airport staff newsletter "Airport Life".	June in each year

2 CONTEXT

2.1 This Air Quality Management Strategy describes:

1. Why local air quality is of relevance to LCA;
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 is has good public transport links, with 69% of passengers travelling by public transport in 2015[1].

2.3 The pollutants of principal concern in the London Borough of Newham (LBN) are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} 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 (NOx). Nitrogen dioxide (NO_2) and nitric oxide (NO) are collectively referred to as NOx.

The most important source of NOx 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 PM_{10} 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 LCA is committed to minimising any negative environmental impacts for people living and working in the area, including impacts on local air quality. 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 In accordance with the requirements of the Section 106 Agreement attached to the Airport's 2009 planning permission (Ref. 07/01510/VAR) an Air Quality Action Plan was published by LCA in June 2012, which set out the measures it intended to progress over the three year period until 2015. A revised 2016-2018 Air Quality Action Plan was approved by LBN on 3

[1] London City Airport 2015 Annual Performance Report

October 2016. For clarity, this Strategy supersedes the 2012-2015 and 2016-2018 Air Quality Action Plans. LCA will continue to manage its operations over the three year period between 2017 and 2019, so as to minimise its air quality impacts. An annual statement on progress and performance, will be included within the Annual Performance Report (APR), and a review of this Air Quality Management Strategy will be carried out by the 1 June 2019.

2.6 Whilst producing this document, consideration has also been given to the Air Quality Action Plan produced by LBN in 2003 and the Updating and Screening Assessment published in 2015. 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 Airport lies outside of, but adjacent to, an 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 PM_{10} (see Figure 1). Developments within or close to AQMAs require particular attention to be paid to any potential air quality effects.

2.8 The Updated Environmental Statement (UES) that was prepared to accompany the CADP1 application identified a number of operational mitigation measures that are embedded in the CADP1 proposals. The UES committed to consolidating and retaining measures in the 2012 – 2015 Air Quality Action Plan (where they are outstanding or ongoing), and committed to the following additional measures that will reduce pollutant emissions:

a. Installation of Fixed Electrical Ground Power (FEGP) on all refurbished and new stands to substantially reduce reliance on diesel-fueled Mobile Ground Power Units (MGPUs);

b. The appointment of a third party transport management company to manage and regulate the taxi rank to marshal taxis in the new forecourt area and taxi feeder park, and to prevent unnecessary idling;

c. The provision of a CCHP plant with 95% catalytic reduction of NOx emissions and the use of ultra-low NOx boilers within the both the CADP1 proposed Western and Eastern Energy Centres; and

d. The development of an updated Airport Travel Plan(s) to increase the public transport (DLR) mode share and reduce the impact of road traffic.

2.9 These measures are either explicitly included within this Air Quality Management Strategy, or where appropriate, reference is made to other Strategies prepared by the Airport.

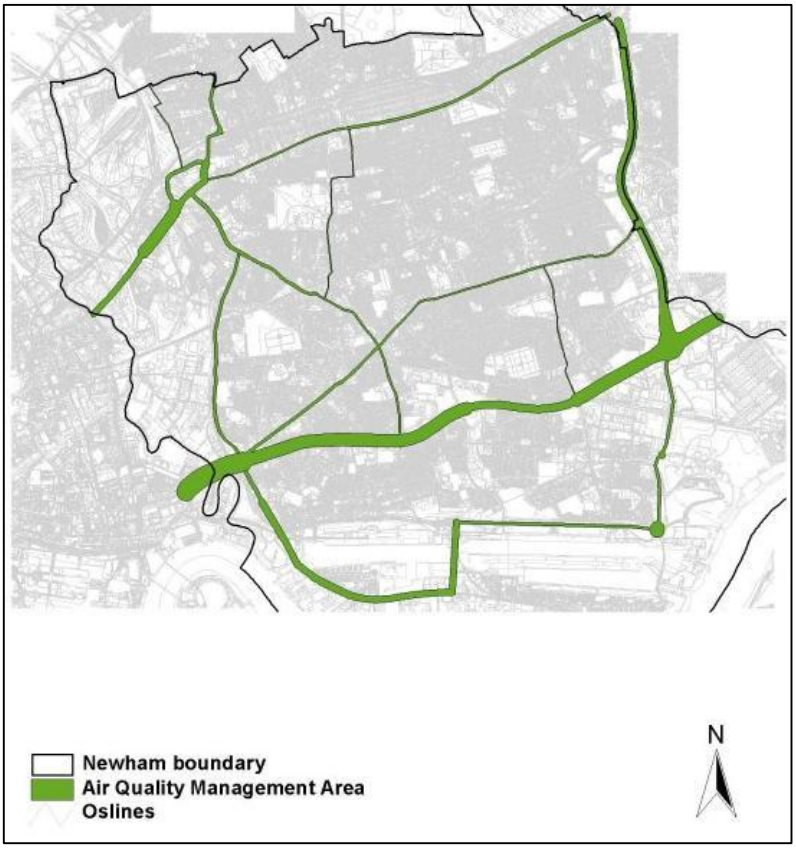


Figure 1: LBN AQMA Boundary (source https://uk-air.defra.gov.uk/images/aqma_maps/Newham.jpg

2.10 Following the designation of the AQMA as displayed in Figure 1, LBN published an Air Quality Action Plan (AQAP) in 2003. The LBN AQAP detailed a number of measures to be completed within the Borough, four of which are specifically related to LCA operations. These are detailed in Appendix 1.

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

3 AIR QUALITY MANAGEMENT STRATEGY 2017 - 2019

Contribution of Airport Operations to Local Pollution Levels

3.1. There have been no recorded exceedances of the nitrogen dioxide or PM_{10} 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.

3.2. A detailed analysis of trends in measured annual mean nitrogen dioxide concentrations has been carried out for monitoring sites in east London and this was published as part of the Airports 2015 APR[2]. This has shown a statistically significant downward trend at both the LCA-CAH and LCA-ND sites, and at other sites in east London (including Newham Cam Road, Newham Wren Close, Tower Hamlets Blackwall, and two sites in Greenwich).

3.3. The Updated Environmental Statement (UES), which was published in September 2015 to accompany the City Aviation Development Programme (CADP) 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 UES showed that Airport sources contribute a maximum of about 15% to nitrogen oxides concentrations at locations to the south of the Airport, and less than about 2% at most other locations. The contribution to PM_{10} concentrations is extremely small and less than about 0.3%.

3.4. Emissions from aircraft above about 100 metres altitude make very little contribution to ground-level pollutant concentrations (AQEG, 2004), and it is therefore appropriate to focus on emissions from sources at ground level. An estimate of the contributing factors to both NOx and $PM_{2.5}$ emissions arising from various ground-level Airport sources at London City Airport in 2014 is shown in Figures 2 and 3.

[2] Air Quality Consultants (2016) London City Airport Air Quality Measurement Programme: 2015 Annual Report

Figure 2: Estimated Source Contributions to Ground-level NOx emissions at London City Airport in 2014 (Note: Airside Vehicles contribution includes Mobile Ground Power Units MGPUs)

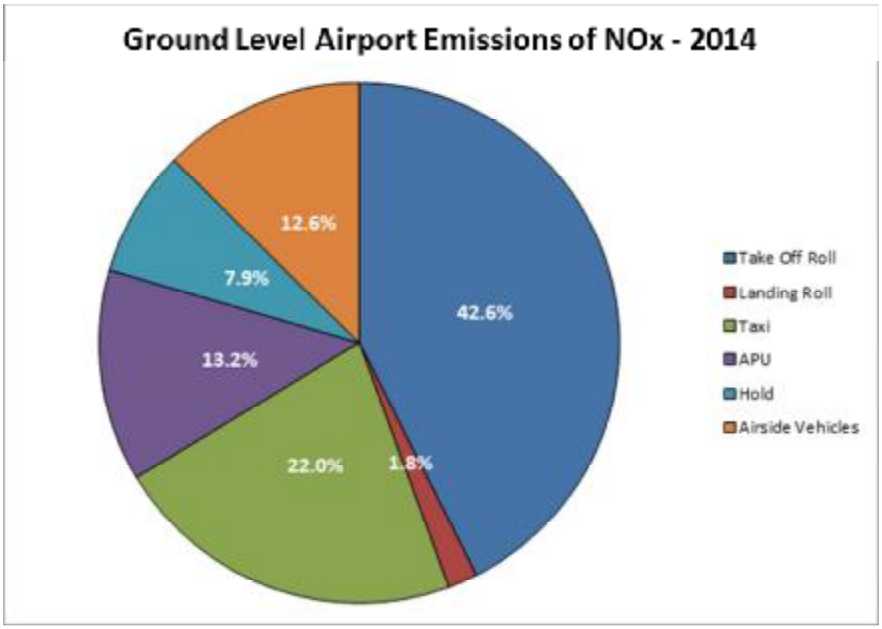
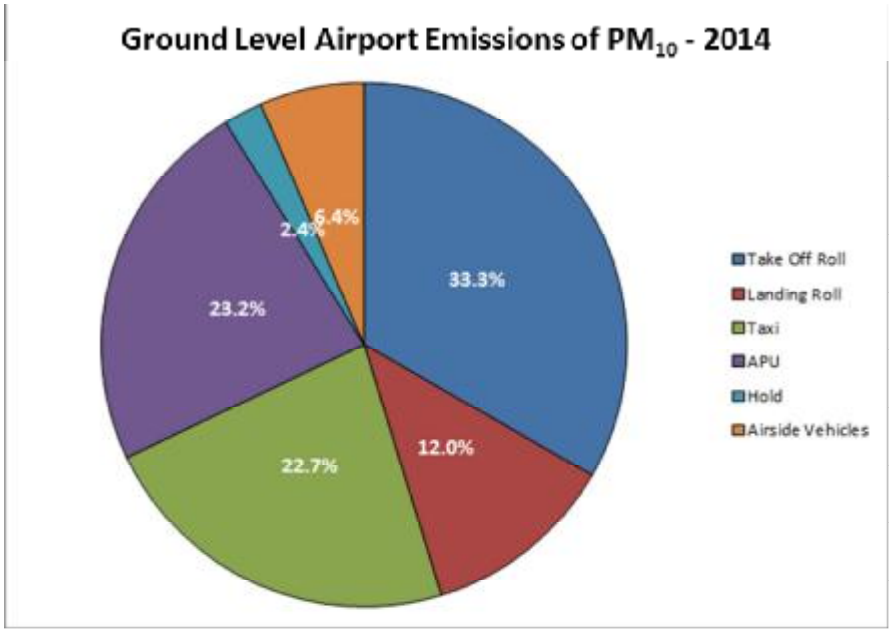


Figure 3: Estimated Source Contributions to Ground-level PM_{10} emissions at London City Airport in 2014 (Note: Airside Vehicles contribution includes MGPUs)



3.5. The majority of ground-based NOx and PM_{10} emissions occur during the Landing and Take-off (LTO) Cycle (which includes take-off and landing rolls, taxiing and aircraft hold), with the take-off roll dominating in each case. Emissions from Auxiliary Power Units (APUs), which are sometimes used provide power to the aircraft when the main engines are not switched on and which do not form part of the LTO Cycle, are also important, contributing almost 13% to total Airport emissions for NOx and 23% for PM_{10}.

Focus of the Air Quality Management Strategy

3.6. The focus of this Air Quality Management Strategy (AQMS) is on minimising emissions of nitrogen oxides (NOx)[3] 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 $PM_{2.5}$) even where concentrations are below the standards.

3.7. Measures to reduce emissions from fuel combustion sources (e.g. aircraft engines and road vehicles) will generally reduce emissions of both NOx and $PM_{2.5}$, but in drawing together this Strategy, careful consideration has been given to ensure that this is the case for all measures considered.

3.8. LCA 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.

3.9. This AQMS identifies measures that will be put into place to minimise both NOx and Particulate Matter (PM) emissions from Airport-related sources including:

i. Aircraft operations;
ii. Ground-based aircraft support equipment (e.g. Mobile Ground Power Units);
iii. Airside vehicles;
iv. Taxis (black cabs);
v. Staff travel

3.10. The AQMS also identifies measures that will be used to inform and promote practices to improve air quality.

3.11. 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.

[3] Emissions from combustion processes are primarily in the form of nitrogen oxides (NOx). Nitrogen oxides are transformed to nitrogen dioxide via chemical processes in the atmosphere.

Air Quality Management Strategy - Measures

Continuity of Previous Measures

3.12. To ensure continuity between the 2012-2015 Air Quality Action Plan, the recently approved 2016-2018 update, and this 2017-2019 Air Quality Management Strategy, it is important to ensure that any outstanding or ongoing measures are completed and progressed. Appendix 2 provides a list of previous measures, current progress to date, and the status of each Measure. Appendix 3 provides a direct comparison between each measure in the 2016-2018 AQAP and this 2017-2019 AQMS.

Minimising use of APU and MGPU

3.13. Both APUs[4] and MGPUs[5] are used to provide power to the aircraft at times when the main engines are not running. Such power 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 and MGPU use include improving the availability of, and extending the facilities for Fixed Electrical Ground Power (FEGP), limiting the use and/or running times of both APUs and MGPUs, and using electric ground power units (Mobile Electrical Ground Power Units – MEGPU).

3.14. During the period of the 2012-2015 AQAP, LCA decommissioned 11 of the oldest MGPUs. Of the nine MGPUs that are currently operational, seven meet the Stage IIIA emissions standard, whilst only two MGPUs are Stage II compliant[6].

3.15. LCA has already installed FEGP on Stands 1-10 (Powervamp MEGPUs which are "zero emission"), and on Stand 15. Coupled with the implementation of the FEGP Strategy (see below – CADP1 Condition 44), it is anticipated that emissions from MGPU use will be reduced by at least 50% in forthcoming years.

3.16. An FEGP Strategy has been prepared to discharge Condition 44 of the CADP1 permission and this aligns with the Construction Phasing Plan prepared to discharge Condition 4. The FEGP Strategy commits to the installation of FEGP on Stands 12 to 14 within one year of all of the reconfigured and new CADP1 stands becoming operational.

[4] 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.
[5] Mobile Ground Power Units are small vehicles capable of supplying electrical power to aircraft parked on the ground.
[6] European emissions standards for non-road mobile machinery (which include MGPUs) are structured into progressively more stringent tiers, from Stage I to Stage V. The Stage II standards were introduced in 2002. All remaining diesel MGPUs at LCA in use after March 2017 will comply to Stage IIIA (with NOx emissions approximately 40% lower than Stage II)

In order to minimise pollutant emissions, it is important to ensure that FEGP is available, that Airport Operating Instruction AOI/07 is not contravened[7], and that any malfunction of FEGP is rectified as soon as possible. AOI/07 will be amended to reflect changes to FEGP availability on new stands.

3.17. The current Standard Terms and Conditions for Airlines at London City Airport require the mandatory use of FEGP on Stands 1-10, subject to the power supply being available and the equipment being serviceable. These Standard Terms and Conditions will be amended to require mandatory use of FEGP on any stand, where it is available.

Box 3: FEGP Strategy

Stands 1-10 and Stand 15 have operational FEGP and no further works are required. FEGP on Stands 1-10 and 15 was upgraded in 2014/15. See details provided under CADP1 Condition 44 relating to reconfiguration of two stands and temporary deferral of FEGP pending completion of CADP1 works.

FEGP will be installed on all reconfigured and new CADP1 stands prior to use. Within one year of the operation of all of the re-configured and new stands, FEGP will be installed on stands 12-14.

The Airport will continue to monitor the use and performance of all FEGP. This will include recording non-availability, maintenance of training records, routinely testing the equipment, and agreeing and implementing measures to rectify and outages.

MEASURE 1: London City Airport will continue to routinely record the availability of FEGP on all stands where it is has been installed, and the time taken to effect repairs. It will also continue to record the use of FEGP within the online portal and document any contraventions of AOI/07. The Standard Terms and Conditions will be amended to require mandatory use of FEGP on any Stand where it is available, as and when FEGP availability is increased. Completed in June each year.

3.18. 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. London City Airport will continue to operate and enforce these instructions. The AOI which contain directions on APU use is AOI 07 Aircraft Noise & Maintenance[8]. In order to discharge Condition 47 of the CADP 1 Conditions, an APU Strategy is to be prepared before any new phase of the CADP1 development becomes operational.

[7] Airside Operating Instruction AOI 07 Aircraft Noise and Maintenance, requires that Fixed Electrical Ground Power or Mobile Ground Power should be used wherever possible (para 2.6).

[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 are disclosed to the local authority on request.

3.19. Condition 46 of the CADP Conditions requires that no MGPU shall be used after 31 December 2020, and up to and including 31 December 2020, MGPU shall only be used during, and in the period 30 minutes before and the period 30 minutes after the permitted take-off and landing times.

MEASURE 2: London City Airport will monitor the use of APU in accordance with AOI 07. LCA will continue to record APU use via the Airport's "Qlickview" online reporting tool, and document any contraventions of the Airfield Operating Instructions, updated as necessary to comply with any requirements within the forthcoming APU Strategy. Completed by June in each year.

MEASURE 3: With the continued procurement of Fixed Electrical Ground Power (FEGP), reliance on MGPUs will be phased out completely by December 2020 in accordance with the requirements of Condition 46 of the CADP1 Conditions. Prior to this date, the early decommissioning of the older MGPUs will minimise emissions; all remaining MGPUs with Stage II emissions will be decommissioned by March 2017.

Minimising Emissions From Aircraft Taxiing Operations

3.20. Emissions from aircraft taxiing to and from stand, and when aircraft are held on the taxiway, represent a significant proportion of the ground-level NOx and PM_{10} emissions from aircraft.

3.21. 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.

3.22. 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.

3.23. London City Airport will continue to operate and enforce these instructions. Since March 2010, London City Airport has operated 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.

3.24. Harnessing these data has allowed improvements to occur. For instance, improving turnaround times for aircraft by improving the efficiency of the various checks and requirements an aircraft must undergo before either departing or arriving. For example, the Embraer 170 has seen average turnaround times fall by almost 3 minutes when comparing the Summer 2012 and Summer 2014 periods, and the E190, a 2 minute reduction over the same period. This is expected to reduce engine running on stand.

3.25. 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 4: 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 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 4: London City Airport will 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 exceeds agreed targets. Completed within two months of GERS quarterly reports.

3.26. Further to these improvements, this AQMS presents two additional measures.

3.27. 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. Recently, the Departures and Ground Operations Code of Practice Working Group[9] published an Industry Code of Practice for *Reducing the Environmental Impacts of Ground Operations*

[9] Available at: http://www.sustainableaviation.co.uk/wp-content/uploads/2015/09/Departures-Code-of-Practice-June-2012.pdf

and Departing Aircraft. This encourages airport operators to review their Standard Operating Procedures to investigate the feasibility of allowing taxiing with fewer than all engines operating, provided all safety and procedural concerns can be met. There is also the possibility to introduce Electric Taxiing Systems, i.e. electric hybrid aircraft and other electric taxiing options.

MEASURE 5: London City Airport will work with the major airlines to explore the potential to introduce "Engine Out Taxi" (EOT) procedures i.e. single engine taxiing, and a feasibility report will be submitted to LBN for approval by September 2017. Pending the outcome of the feasibility study, a Code of Practice to encourage EOT will be introduced and any actions will be implemented and progress reported, by December 2017.

MEASURE 6: London City Airport will undertake a feasibility study via the Pilot's Forum to understand the potential of using Electric Taxiing Systems at LCA, without affecting time performance. The feasibility report will be submitted to LBN for approval by December 2018, and will include, if practicable, timescales for implementation.

Ground Running, Testing and Maintenance

3.28. Issues related to ground running, testing and maintenance are most commonly linked with noise effects as opposed to air quality (as the frequency of ground testing is low), but this has been included for completeness. A Ground Running, Testing and Maintenance Strategy has been prepared to discharge Condition 49 of the CADP1 Permission.

MEASURE 7: London City Airport will review the outcomes of the Ground Engine Running, Testing and Maintenance Strategy and will advise on the air quality implications, specifically with regard to proposals for relocation of the engine ground run positions during CADP1 construction. Completed with two months of GRT&M reports.

Airside Vehicles and Plant

3.29. 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.

3.30. 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.

Introduction of cleaner vehicles and plant

3.31. London City Airport directly owns a small fleet of vehicles as described in Appendix 5. 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). Only a small proportion of the fleet could potentially be considered for replacement to low-emission or zero-emission vehicles, but there are over-riding operational and safety issues that preclude this at present.

3.32. 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.

3.33. With specific regard to vehicle emissions, AOI 12 notes that

"*LCA 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).

3.34. In June 2015, 88% of vehicles operating airside and owned by LCA had achieved compliance with the London Low Emissions Zone (LLEZ) standard; this is an improvement of 14% since 2012. Although vehicles solely operating airside are officially exempt from the LLEZ, in order to achieve minimum emissions standards for existing LCA owned airside vehicles, LCA will work to achieve 100% compliance with the LLEZ standard[10] as soon as December 2017.

[10] At the time of writing the only vehicles which are not compliant are the three of the four LCA owned fire engines. These vehicles are only used for fire training and responding to an aerodrome emergency. The

3.35. The Mayor of London has recently consulted on proposals to extend the Ultra Low Emissions Zone (ULEZ) to the North/South Circular Road, which would encompass London City Airport. If these proposals for the ULEZ are implemented, LCA will review AOI 12 with the target of achieving ULEZ compliance for all LCA owned airside vehicles as soon as December 2020.

3.36. **MEASURE 8:** London City Airport will continue (in accordance with AOI 12) to increase the percentage of London Low Emissions Zone (LLEZ) compliant vehicles year on year, with the target of achieving 100% compliance with the LLEZ by December 2017[11]. If the ULEZ is expanded to encompass London City Airport, LCA will review AOI 12 with the intent of achieving ULEZ compliance for all airside vehicles as soon as December 2020.

MEASURE 9: 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 10: London City Airport will continue to undertake routine annual, and periodic, random emissions testing for airside vehicles[12]. The results of the testing will be reported to LBN on an annual basis, by June of each year.

3.37. **MEASURE 11:** London City Airport will undertake a feasibility study for the procurement of low emission vehicles (hybrid or electric) to replace the existing fleet, together with a timescale for subsequent implementation. The feasibility report will be submitted to LBN for approval by December 2018 as agreed in previous meetings dated 15th May 2018 with LBN.

Emissions from Taxis (Black Cabs)

3.38. Condition 78 of the CADP1 Conditions requires that a Taxi Management Plan is submitted to LBN and approved prior to the relevant phase of CADP commencing.

Box 5: Taxi Management Plan
Upon arrival at London City Airport, taxis will wait in a holding area (with a capacity of 120 vehicles) located approximately 600m to the east. Once in the holding area, the taxi does not need to move until called to the main feeder rank, and drivers are required to switch off their engines to reduce emissions. The main feeder rank has capacity for 15 vehicles; a CCTV screen at the front of the rank informs the taxi when it can progress to the Forecourt area.

Airport will seek to gain exemptions for these vehicles as they are permanently situated airside. Such an exemption will only apply if granted by either TfL or agreed with LBN.

[11] As per footnote 10.

[12] Random 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 Pass will be suspended. This accompanies LCA policy that all vehicles which have a permit to operate airside must provide a valid and in date MOT certificate.

Taxi marshals will be provided during peak hours to manage taxi and passenger queues. The Airport has appointed a Taxi Coordinator resource to resolve any issues that arise. The results of monitoring will be fed back to the Airport Transport Forum and thereby to LBN and TfL.

3.39. The current arrangements for black cabs will be maintained during the construction works. A call forward system to the forecourt operates at all times. Once CADP 1 is fully built out it is proposed that a new taxi feeder park will be provided in which taxis wait in a holding area approximately 600m to the east of the existing forecourt, reducing engine idling along the main feeder rank and forecourt area. Marshalling will be used during peak hours, and engine idling in the feeder park prohibited.

3.40. The Airport will continue to positively manage the operation of black cabs to ensure that no engine idling occurs. This causes annoyance and adds to local pollution emissions. The Airport will review any complaints, and liaise through the Airport's Transport Forum and, if necessary, review methods to reduce such impacts occurring.

3.41. The Transport Management Strategy, submitted to discharge Condition 79 of the CADP1 Conditions, commits to "measures to promote and provide for sustainable transport". This commitment is to be brought forward with LBN/TfL consultation and the Airport Transport Forum. It is anticipated that the provision of EV charging points for black cabs will be implemented. This is consistent with the Mayor's target to provide 90 electric taxis charging points across London, and to have all black cabs as "zero emission capable" by 2018.

MEASURE 12: London City Airport will investigate and implement provisions to reduce idling black cabs. This will involve liaison through the Airport's Transport Forum with the relevant service providers to understand the causes for such instances, and implementation, if necessary, of methods to reduce such impacts occurring. The outcome will be reported to LBN by December 2017.

Publicity and Promotion

3.42. 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 13: 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 14: London City Airport will undertake on a two year basis a RAMP[13] employee air quality monitoring assessment with direct individual recording apparatus, and publish findings on the LCA website. Studies will be carried out by April 2017 and 2019.

MEASURE 15: London City Airport will publish an article relating to air quality and airport operations at least once per year in the airport staff newsletter "Airport Life". Progress will be reported by June in each year.

London City Airport Surface Access Approach

3.43. Studies undertaken by the LBN have identified road traffic as the primary source of poor air quality in the borough. This is evidenced by the shape of the Air Quality Management Area (see Figure A1.1 in Appendix 1), which effectively mirrors the major road network. Measures to reduce Airport-related traffic on the local road network therefore form an important link to this Air Quality Management Strategy.

3.44. It should, however, be recognised that 69% of passengers currently (2015) travel to the Airport by public transport (including black cabs). This is due to the excellent links to an integrated public transport system, specifically the Docklands Light Railway.

3.45. London City Airport published its draft Airport Surface Access Strategy (ASAS), *Connecting the Airport*, in December 2013. The draft ASAS defines the long term approach the airport will take to encouraging air passengers, airport staff and other airport users to travel sustainably. The draft ASAS includes the following 2023 targets:

- Over 70% of air passengers travelling by public transport;
- Less than 40% of airport staff to travel by single occupancy private car.

3.46. The draft ASAS reflects the Airport's future growth aspirations as proposed by City Airport Development Programme (CADP). This is in the process of being updated in light of the planning permission for CADP1. The input into the ASAS of the Transport Forum will be sought in 2017, with a new ASAS due for publication in August 2017.

3.47. From the development of the draft ASAS, the following 6 key transport objectives have been set out to be worked with members of the Airport's Transport Forum:

- Enhancing customer service;
- Offering the right services;
- Improving integrated journey;

[13] Airport apron area

- Facilitating local connectivity;
- Offering low carbon alternatives;
- A collaborative approach.

3.48. These main areas of approach will be used to develop key action plans that will allow further progress in sustainable transport options by the Airport via direct actions and discussions with key stakeholders. Such sustainable transport options will deliver improvements to local air quality by minimising reliance on private car use for both passengers and staff.

3.49. The ASAS will include a section on Air Quality that considers the potential air quality implications of the surface access measures, including a quantitative or qualitative comment, as appropriate. Progress on measures will be cross-referenced to the APR with respect to this Air Quality Management Strategy.

Sustainability Strategy and Carbon Management Plan

3.50. The London City Airport Sustainability Strategy was approved by the London Borough of Newham in July 2012. 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. A Sustainability and Biodiversity Strategy has been prepared to discharge Condition 56 of the CADP1 Conditions.

3.51. In addition, London City Airport has produced a Carbon Management Plan to provide a clear approach as to how energy consumption and carbon emissions will be minimised. To achieve this, the Carbon Management Plan is based on the requirements of the second stage of the Airports Carbon Accreditation Scheme (commonly known as Stage 2: Reduction).

3.52. While primarily targeted at reducing emissions of carbon dioxide from Airport sources, the implementation of the Sustainability 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[14], and will assist in the delivery of this Air Quality Management Strategy.

Box 6: 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 Second Stage of the Airport Carbon Accreditation Scheme (commonly referred to as Stage 2: reduction).

The Airport has developed a key performance indicator which is measured against

[14] The measures will lead to a reduction in NOx and PM emissions per passenger, and potentially to an absolute reduction.

carbon emissions ($kgCO_2$) per passenger, which is an industry recognised metric. London City Airport's performance target is to reduce the annual carbon ($kgCO_2$) emission per passenger by 20%, as compared to the 2013 baseline.

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. In future years it is intended to expand the scope of the carbon footprint to include emissions that the Airport can influence, such as emissions with the aircraft Landing and Take-Off cycle, and passenger travel to the Airport.

Energy Assessment

3.53. An Energy Assessment has been prepared to discharge Condition 61 of the CADP Conditions. This sets out the commitments to meet the installation of ultra-low NOx boilers and Selective Catalytic Reduction to the CCHP that was assumed within the UES. The CCHP will meet an emissions level of <40 mgNOx/Nm^3, as compared to the emissions standard in the GLA SPG of 95 mgNOx/Nm^3 (i.e. a reduction of 58%). This will deliver a reduction in NOx emissions of approximately 1,420 kgNOx/annum[15].

[15] Based on operation for 18 hours per day, and at less than 75% load for 12 hours per day (as assumed in the UES)

4. SUMMARY OF MEASURES AND TIMESCALES

4.1. A summary of the measures, together with associated indicative timescales is set out in Table 3 below. The outcome and progress on each measure will be set out in future Annual Performance Reports, and within the Quarterly Compliance Meetings.

Table 3: Summary of Measures and Indicative Timescales

Measure	Indicative Timescale
Measure 1: Record availability of FEGP on all Stands	June in each year
Measure 2: Record APU use in line with Airfield Operating Instructions and forthcoming APU Strategy	June in each year
Measure 3: Decommission all Stage II MGPUs by March 2017	Mar 2017
Measure 4: Review outcomes of Ground Engine Running Strategy and advise on air quality implications	Within 2 months of GERS quarterly reports
Measure 5: Work with the major airlines to explore the potential for "Engine Out Taxi" procedures	Sept 2017 (feasibility study) Dec 2017 (COP)
Measure 6: Undertake a feasibility study related to Electric Taxiing Systems	Dec 2018
Measure 7: Review the outcomes of Ground Engine Running, Testing and Maintenance Strategy and advise on air quality implications	Within 2 months of GERT&M reports
Measure 8: Work with Airport operators to increase the percentage of LLEZ compliant vehicles, with a target to achieve 100% compliance by December 2017. If the ULEZ is expanded. To encompass London City Airport, LCA will review AOI 12 with the target of achieving ULEZ compliance for all airside vehicles as soon as December 2010.	Dec 2017/Dec 2020
Measure 9: London City Airport will continue to enforce a requirement in AOI 12 that all new vehicles issued with AVP comply with the latest emissions standards.	June in each year
Measure 10: Undertake routine annual, and periodic, random emissions testing of airside vehicles.	June in each year
Measure 11: Undertake a feasibility study for the procurement of low emission vehicles.	December 2018
Measure 12: Investigate and implement measures to reduce idling black cabs	Dec 2017
Measure 13: Review and update the website to provide clear and concise information on the performance of the Air Quality Management Strategy	June in each year
Measure 14: Undertake on a two year basis a RAMP employee air quality monitoring assessment	April 2017 and 2019
Measure 15: Publish an article related to air quality and airport operations in "Airport Life"	June in each year

4.2. Every three years from the date of written approval of the Air Quality Management Strategy, London City Airport will submit for the approval of the LBN a review of the Strategy in accordance with Condition 58 of the CADP1 Conditions which states that *"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".

4.3. If the implementation of any measures against the timescales prescribed are delayed, formal written approval will be sought by the Airport from the Local Planning Authority at least 3 months prior of the delivery date of that measure.

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

European Legislation

Directive 2008/50/EC[16] Ambient Air Quality and Cleaner Air for Europe, came into force on 11 June 2008, with Member States required to incorporate the provisions into national legislation before 11 June 2010. The principal aim of the Directive is to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants, by the establishment of limit and target values; by the assessment of air quality in a uniform manner; by making air quality information available to the public; and by setting out plans and programmes to maintain or improve ambient air quality conditions.

National Regulations

Air Quality Strategy (2007)

The 2007 Air Quality Strategy [17] 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 (AQMA), and prepare an action plan that identifies appropriate measures that will be introduced in pursuit of the objectives.
The objectives defined in the Strategy are linked to the air quality Limit Values set at a European level in the Ambient Air Quality Directive.

Aviation Policy Framework (2013)

The Aviation Policy Framework[18] sets out the Government's high level strategy and overall objectives for aviation, and replaces the 2003 Air Transport White Paper[19]. 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.

[16] European Union (2008). Ambient Air Quality and Cleaner Air for Europe (2008/50/EC).
[17] Defra (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007.
[18] The Stationery Office (2013). Aviation Policy Framework
[19] DfT (2003) The Future of Air Transport

Airports Commission

The Government established the Airports Commission in 2012 to propose measures to maintain the UK's status as a global hub for aviation. The focus was on delivering new capacity by 2030 and the final report issued in July 2015 examined three options for new capacity: two separate runway options at Heathrow and one at Gatwick. A detailed Air Quality report[20] was produced that supported the analysis of the three options. This focused on nitrogen dioxide, with some attention also given to particulate matter (PM_{10} and $PM_{2.5}$). For nitrogen dioxide a clear distinction was made between an assessment against the objectives and the Limit Values, following the methodology set out in the National Networks National Policy Statement..

Air Quality Criteria

The pollutants of principal concern in the London Borough of Newham are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} 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 PM_{10} 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 PM_{10}

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 (PM_{10})	24-hour mean	50 μg/m^3 not to be exceeded more than 35 times a year
	Annual mean	40 μg/m^3

[20] Jacobs (2015 Module 6: Air Quality Local Assessment, Available at: www.gov.uk/government/uploads/system/uploads/attachment_data/file/426241/air-quality-local-assessment-report.pdf

More recently, new health criteria have been introduced for $PM_{2.5}$ and these are shown summarised in Table A1.2. The 2007 Air Quality Strategy (Defra, 2007) sets out both an exposure-reduction approach and a "backstop" annual mean objective for $PM_{2.5}$. The former is an objective focused on reducing average exposures across the most heavily populated areas of the country, and is not directly applicable to individual schemes. It is supported by the "backstop objective" or concentration cap to ensure a minimum environmental standard. These $PM_{2.5}$ objectives have not been included in Regulations.

Table A1.2: Relevant Air Quality Criteria for $PM_{2.5}$

	Time Period	Objective/Obligation	To be achieved by
UK objectives	Annual mean	25 µg/m^3	2020
	3 year running annual mean	15% reduction in concentrations measured at urban background sites	Between 2010 and 2020

Regional Policy and Guidance

The London Plan (2015)

The London Plan 2015[21] was published in March 2015 and consolidates the London Plan 2011 with the Revised Early Minor Alterations to the London Plan and the Further Alterations to the London Plan. It sets out the spatial development strategy for London over the next 20-25 years, and brings together all relevant strategies, including those relating to air quality.

Policy 7.14, *'Improving Air Quality'*, addresses the spatial implications of the Mayor's Air Quality Strategy and how development and land use can help achieve its objectives. It recognises that Boroughs should have policies in place to reduce pollutant concentrations, having regard to the Mayor's Air Quality Strategy. It encourages greater use of sustainable transport modes through implementation of travel plans, and promotes the use of measures on-site to reduce emissions from developments.

The Mayor's Air Quality Strategy

The revised Mayor's Air Quality Strategy (MAQS) was published in December 2010 (GLA, 2010). The overarching aim of the Strategy is to reduce pollution concentrations in London to achieve compliance with the EU limit values as soon as possible. The Strategy commits to the continuation of measures identified in the 2002 MAQS, and sets out a series of additional measures:

Policy 1 – Encouraging smarter choices and sustainable travel;

Measures to reduce emissions from idling vehicles focusing on buses, taxis, coaches, taxis, PHVs and delivery vehicles;

[21] GLA (2015) The London Plan: The Spatial Development Strategy for London Consolidated with Alterations Since 2011.

Using spatial planning powers to support a shift to public transport;

Supporting car free developments.

Policy 2 – Promoting technological change and cleaner vehicles:

Supporting the uptake of cleaner vehicles.

Policy 4 – Reducing emissions from public transport:

Introducing age limits for taxis and Private Hire Vehicles (PHVs).

Policy 5 – Schemes that control emissions to air:

Implementing Phases 3 and 4 of the Low Emissions Zone (LEZ) from January 2012

Introducing a NOx emissions standard (Euro IV) into the LEZ for Heavy Goods Vehicles (HGVs), buses and coaches, from 2015.

Policy 7 – Using the planning process to improve air quality:

Minimising increased exposure to poor air quality, particularly within AQMAs or where a development is likely to be used by a large number of people who are particularly vulnerable to air quality;

Ensuring air quality benefits are realised through planning conditions and section 106 agreements and the Community Infrastructure Levy.

Low Emission Zone (LEZ) and Ultra Low Emission Zone (ULEZ)
A key measure to improve air quality in Greater London is the Low Emission Zone (LEZ). This entails charges for vehicles entering Greater London not meeting certain emissions criteria, and affects older, diesel-engined lorries, buses, coaches, large vans, minibuses and other specialist vehicles derived from lorries and vans. London City Airport lies within the LEZ. The LEZ was introduced on 4th February 2008 in a phased approach. In January 2012 a standard of Euro IV was implemented for lorries over 12 tonnes, buses and coaches. Cars and lighter LGVs are excluded.

There have been a number of assessments of the LEZ as the scheme has developed. The latest assessment can be found at the TfL website (www.tfl.gov.uk) in the Environmental Appraisal of the Proposed London Low Emissions Zone. This states that the LEZ is expected to reduce the area within Greater London above the annual mean nitrogen dioxide objective by about 16%, and the area above the daily mean PM_{10} objective by about 27%, in 2012.

The Ultra Low Emission Zone (ULEZ) is an area where all cars, motorcycles, vans, minibuses, buses, coaches and heavy goods vehicles will have to meet ULEZ emissions standards or pay a daily charge to travel. The ULEZ covers the area currently defined by the

Congestion Charge Zone in Central London. The ULEZ standard is Euro 3 for motorcycles, Euro 4 for petrol cars, vans and minibuses, Euro 6 for diesel cars, vans and minibuses, and Euro VI for lorries, buses and coaches. It comes into force in September 2020.

New Proposals to Improve Air Quality in London

The Mayor of London has developed detailed proposals to improve air quality in London through the introduction of a new emissions surcharge and expansion of the ULEZ. The first of these proposals would introduce an emissions surcharge (commonly referred to as a "T-charge") for the older, more polluting vehicles, ahead of the full introduction of the ULEZ. This would affect diesel and petrol vehicles that do not meet the Euro 4/IV emissions standard. With regard to the ULEZ, the Mayor proposes to bring forward the implementation date by one year (to 2019), extending the ULEZ from Central London to London wide for heavy duty vehicles as early as 2019, but possibly later, and extending the ULEZ from Central London to the North and South Circular roads for all other vehicles, from as early as 2019, but possibly later. These proposals are currently out for public consultation.

Regulating Emissions from Airport Sources

Pollutant emissions from aircraft operations at London City Airport are regulated by both the European Aviation Safety Agency 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 the Committee on Aviation Environmental Protection (CAEP). Emissions standards for many current aircraft in service were agreed at the CAEP/4 meeting in 1998; new engines, certified after 31st December 2007 have to meet the more stringent CAEP/6 standards.

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 pollutants[22] - nitrogen dioxide (annual mean) and PM_{10} (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 AQMA boundary is shown in Figure A1.1. The Airport, and the roads to the south of it including Hartmann Road and Albert Road, lie outside the AQMA boundary.

[22] 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.

Figure A1.1: Location of Air Quality Management Area in Newham

The London Borough of Newham prepared a draft Air Quality Action Plan in 2005 which sets out the measures that it intends to apply in order to improve local air quality conditions. This Action Plan includes a number of measures that are related to London City Airport. A summary of these measures (LBN, 2008), and the progress that has been achieved by the Airport, is provided in Table A1.3 below.

Table A1.3: Summary of Progress on Airport-Related Measures in LBN Action Plan

Measure	Progress
The Airport to carry out a detailed study of the impact of the Airport on local air quality conditions.	As part of the 2007 planning application (07/01510/VAR) for expansion of operations to 120,000 'noise factored' movements per annum, a detailed air quality assessment was undertaken by LCA to quantify the impact of airport operations. Subsequent detailed assessments have been undertaken to accompany the CADP proposal (including the Updated Environmental Statement).
Green Transport Plan to be regularly updated.	The Airport's Travel Plan 2011 will be replaced by new Travel Plans being prepared under the CADP1 planning permission.
LBN to liaise with the Airport for the Vehicle Inspectorate to carry out random emission checks of queuing taxis at the Airport.	The Airport has indicated its willingness to support emissions testing. LBN is still in discussions with the Vehicle Inspectorate.

The Airport to meet its commitments under the S106 Agreement to carry out a programme of air quality monitoring.	The Airport carries out an extensive Air Quality Monitoring Programme that meets the legal obligations.
LBN and the Airport to continue to lobby for a Crossrail proposal that includes access to the Airport.	The Airport and its Transport Forum is investigating how to best link the Airport to the Crossrail Network. It also continues to explore the feasibility of a new Crossrail station at Silvertown.

APPENDIX 2 – PROGRESS ON MEASURES IN 2012-2015 AQAP

A summary of progress on measures within the 2012-2015 Air Quality Action Plan is set out in the table below (as reported in the 2015 Annual Progress Report). Where measures are incomplete or are ongoing, the status with regard to this Air Quality Management Plan is indicated.

Measure	Progress (June 2016)	Current Status
1. Establish and implement a new system to routinely record the availability of Fixed Electrical Ground Power on Stands 1-10 and log the time taken to effect repairs	This has continued since 2014 with the FEGP units being covered by a warranty, RAMP services log faults and FM request repairs. FEGP faults during 2015 have been minor. The introduction of FEGP has resulted in fewer emissions occurring, with the reduction of MGPU's being used. As a result, in 2015 only 3 (4.1%) of the 73 FM call outs airside were related to FEGP – on average, these were rectified in approximately 5 working days. With this in mind FEGP was available for 95% of the time.	Ongoing. FEGP availability will be reported to LBN on an annual basis. Incorporated as a commitment into Measure 1 of the Air Quality Management Strategy (2017-2019)
2. Refurbish FEGP facilities on Stands 1-10	FEGP has been installed on Stands 1-10 and is operational	Complete. No further action required.
3. Install FEGP to Stands 21-24 during any future stage of apron improvements and in any event by 2013	There are logistical and sequencing issues that require these FEGP to be provided on stands 21-24 as part of the CADP build out under which stands 21-24 will be reconfigured and FEGP delivered. If CADP is granted permission, these and all stands will have FEGP installed, if CADP isn't provided for then a timescale will be determined, but no longer than 18 months after the decision has been made.	Ongoing. As part of the CADP1 development, FEGP will be installed on Stands 21-24. This is incorporated into the FEGP Strategy (Condition 44).
4. Replace of decommission all Mobile Ground Power Units (MGPU) that do not comply with a minimum of Stage II emissions standards	All MGPU's that were below the Stage II emissions standard have been decommissioned. The remaining MGPUs are all Stage II compliant and used as contingency for breakdown/operational recovery purposes. There are a total of 9 MGPU's remaining. The last 2 MGPU's, used on stands 1-10, will be removed by the end of 2016.	All Stage II MGPUs will be decommissioned by March 2017. Incorporated into Measure 3 of the Air Quality Management Strategy (2017-2019)
5. Conduct an assessment of Auxiliary Power Unit (APU) use over a period of 8 hours at selected stands on two separate days during the summer months	The original assessment was completed in September 2013, however the airport has been monitoring APU usage in 2015 via the Airport's Qlickview online reporting tool. In 2015, there were 730 recorded instances where APU's were required to be used due to various reasons, such as acclimatising the aircraft cabin before departing from stand due to high or cold temperatures. The average running time was approx. 10 - 11 minutes. This indicates, as percentage of aircraft on stand i.e. all departures in 2015, that APU usage was only utilised by 1.8% of aircraft whilst on stand.	Ongoing. Incorporated into Measure 2 of the Air Quality Management Strategy (2017 – 2019)
6. The Airport Operations and	This was introduced in 2015 and use of FEGP is	Ongoing. Incorporated as a

Safety Unit (AOSU) to maintain a documented record of any observations where mandatory use of FEGP or OSIN 09/04 is contravened	recorded by AOSU within an online portal. This directly relates to where APU use is also utilised in the absence of MGPU's or FEGP provision due to breakdowns as reported Measure 1.	commitment into Measure 1 of the Air Quality Management Strategy (2017-2019)
7. Inclusion of APU use as a topic on the agenda of the Pilots Forum and the Flight Ops Governance Meetings. Reference to minimising APU use will be included in an article for the UK Air Pilot publication.	This was detailed at the Pilot Forum's held in April and November 2015. As such, unnecessary APU usage is not commonplace hence the low levels of use and minimal duration APU's are used as reported in Measure 5.	Complete. No further action required.
8. Produce analysis of trends in aircraft ground operational times, and, where significant increases are identified, investigate procedures to reduce times.	This is monitored as part of the airports Turnaround Improvement Group. In 2015 a new RAMP services tool known as RATT (Real-time Aircraft Tracking Tool) was introduced, this allows the time stamping of aircraft to be linked with associated services to understand on-stand trends including potential delays. Overall the introduction of the RATT has helped with minimising delays with the provision of on-stand services such as refuelling and baggage load/off load. It is difficult however to pin-point a time improvement solely down to the introduction of RATT at this early stage. The CAA publishes on time performance statistics for 10 UK airports including London City Airport. This indicates how delays to departures are having an effect at the Airport. Efficient Ground Operations, to reduce possible delays, is a prominent driver as to the airports performance in these rankings. London City Airport was ranked the most punctual airport in the UK in 2015 with 88% of flights leaving on time. In addition the Airport achieved the shortest delay average of 7 minutes. In 2016 the airport will also report on ground operational times, for instance the time it takes on average, maximum and minimum timings for aircraft manoeuvring from stand to start of roll (beginning of runway take off). This will enable direct comparisons and formalise improvements made in actual time reductions where possible, meaning as a result fewer ground emissions.	Ongoing. Incorporated into Measure 4 of the Air Quality Management Strategy (2017 – 2019)
9. Requirement for all third party airside vehicle operators to prepare and submit a fleet management strategy	An airside vehicle fleet policy was published in early 2015, this prescribes requirements for vehicle idling and also need basis of vehicles that operate at LCY. Obtaining a fleet management strategy from third parties has proved to be ineffective hence the need for a policy to be introduced. The airport will report back on this policy implementation and	Completed. Progress related to Measures 9 and 11 of the Air Quality Management Strategy (2017 – 2019)

	progress achieved in 2016, and reflect further measures as a result in the forthcoming revised Air Quality Action Plan and Strategy.	
10. LCY will work with operators at the Airport to increase the percentage of LLEZ compliant vehicles year on year, with the target of achieving 100% compliance by 2015 (unless an exemption is granted by TfL or agreed with LBN)	This is on-going and features as part of the emissions testing occurring on the airfield. This requirement is to be enhanced in the 2016 – 2018 AQAP. It is recognised that the vast majority of LCY's vehicle fleet is electrical, newly leased or doesn't enter on the public highway. As such it is predominantly third party vehicles that have required testing. The airport has assessed the number of vehicles which comply with the LLEZ which operate on airport (including third party vehicles). Overall, 11 vehicles operating at LCY do not meet the LLEZ standard. This is only 7.9% of the total fleet. These include 3 of the 4 fire station trucks (do not use the public highway), 1 catering vehicle and 7 fuel tankers. Due to the cost of these vehicles, they are currently going through a phased fleet renewal.	Ongoing. Incorporated into Measure 8 of the Air Quality Management Strategy (2017 – 2019)
11. LCY will require that all new vehicles issued with an Airside Vehicle Permit (i.e. not renewal applications for existing AVPs) comply with the latest EU emissions standards for road vehicles (Euro Standard) defined as the date by which the Euro Standard comes into force for the registration and sale of new types of vehicles	Airside Vehicle Policy amended. This has meant all new vehicles are required to meet Euro 6 standards which were brought in to place in September 2015 for new vehicles. This standard is being applied to all new vehicles requiring a permit. There were no vehicles between September 2015 and December 2015 which required a new permit.	Ongoing. Incorporated into Measure 9 of the Air Quality Management Strategy (2017 – 2019)
12. Routine annual and periodic, random emissions testing for airside vehicles	Full emissions testing schedule began in 2014 and continued in 2015. An Operations Safety Instruction Notice (OSIN) was sent to all airside companies in 2014. In 2015, staff changes in Airfield Operations resulted in a reduced number of tests being conducted. Of the vehicles tested, 100% passed the emissions test and all are LLEZ compliant. In 2016, the airports Airfield Operations department has undertaken a desk top study of active registrations and checking on the LLEZ website if they comply. Letters will be sent to those companies operating noncompliant vehicles and these will be prioritised for emissions testing. Also routine testing will be undertaken i.e. at least 12 annual tests plus random emissions testing. Once again follow-up correspondence based on the results of such testing will be sent to the relevant companies.	Ongoing. Incorporated into Measure 10 of the Air Quality Management Strategy (2017 – 2019)
13. Amend the Airside Driving	Action Completed in 2015.	Completed. No further

Policy to make specific reference to vehicle emissions testing and the actions that must be taken in the event of failure	Policy commitment ongoing.	action necessary
14. Publish a notice in "Taxi" which is published by the London Taxi Drivers Association. This will set out the concerns associated with unnecessary idling, and will seek to encourage taxi drivers to turn off engines wherever practicable	Not applicable to 2015 due to the Taxi publication no longer being in circulation, however, in 2016 LCY notified taxi drivers concerning idling in the set down and drop off areas on airport. This is being monitored via the Airport Transport Forum.	The Taxi Management Plan, which has been prepared to discharge Condition 78 addresses issues to minimise taxi idling
15. During any future infrastructure developments to the airport forecourt take into consideration the potential for redesign of the taxi rank to minimise idling.	Not applicable to 2015 however has featured in design associated to the City Airport Development Programme.	The Taxi Management Plan, which has been prepared to discharge Condition 78 sets out the proposals for the taxi feeder park and taxi forecourt areas
16. Continue to lobby the Mayor of London and TfL to provide a direct DLR service between Canary Wharf and LCY stations.	DLR service improvements have partly addressed this issue. LCY is currently seeking for in-principle support for a new Crossrail Station at Silvertown.	Ongoing. Incorporated as Measure 16 of the Air Quality Management Strategy (2017 – 2019)
17. Publish an article relating to air quality and airport operations at least once per year in the airport staff newsletter "The Chronicle".	'The Chronicle' has been replaced with Airport Life and an article was published in 2015 both in December and during the Summer.	Ongoing. Incorporated as Measure 15 of the Air Quality Management Strategy (2017 – 2019)
18. Amend the LCY website to promote the measures it is taking to minimise air quality impacts, and include links to the AQMP Annual Report and the AQAP.	Completed in 2012 and the website content was refreshed in 2014. In 2016, further updates are being progressed the LCY website including Environment and Air Quality sections.	Ongoing. Incorporated as Measure 12 of the Air Quality Management Strategy (2017 – 2019)
19. Amend the LCY website to provide advice to passengers to use public transport.	Completed in 2012 and the website content was refreshed in 2014. Further updates have occurred in 2015, all updates can be found at http://www.londoncityairport.com/aboutandcorporate/page/sustainabletransport	Ongoing. Incorporated as Measure 13 of the Air Quality Management Strategy (2017 – 2019)

APPENDIX 3 – COMPARISON OF MEASURES IN THE 2016-2018 AIR QUALITY ACTION PLAN AND THE 2017-2019 AIR QUALITY MANAGEMENT STRATEGY

The intent of this Appendix is to set out in detail a comparison of the measures within the 2016-2018 Air Quality Action Plan and this 2017-2019 Air Quality Management Strategy. It provides a tracking system to historic measures, and how these have been refined taking into account the CADP1 planning conditions that require the publication of other Strategies.

Measures in 2016 – 2018 AQAP	Measures in 2017 – 2019 AQMS
MEASURE 1: Any outstanding or continuous actions from the 2012 – 2015 Air Quality Action Plan to be completed and progressed (be it monitoring or otherwise) to be reported to the Local Authority on an annual basis. Please refer to Appendix 1 for list of previous actions and current progress to date.	All outstanding or ongoing measures have been explicitly included in the 2017-2019 AQMS.
MEASURE 2: Undertake a feasibility study to install FEGP on stands/apron areas currently without FEGP at LCA and introduce FEGP to those areas based on findings of the feasibility study.	Para 3.20 states that "An FEGP Strategy has been prepared to discharge Condition 44 of the CADP1 Conditions. This commits to the installation of FEGP on Stands 12 to 14 by October 2018; the introduction of FEGP to Stands 21-24 as they are reconfigured within the CADP1 programme; and the introduction of FEGP on all new CADP1 stands before they become operational. It is not appropriate for the AQMS to commit to the delivery of the FEGP Strategy. It is, however, important for the AQMS to report on FEGP availability: MEASURE 1: London City Airport will continue to routinely record the availability of FEGP on all stands where it is has been installed, and the time taken to effect repairs. It will also continue to record the use of FEGP within the online portal and document any contraventions of OSIN 04/12.
MEASURE 3: Continue assessing APU use over a period of 8 hours at selected stands, on separate days, during both the summer and winter months. This study will log the use and operating times of APUs and will be used to inform future strategies to reduce APU use.	APU use is now recorded using the Airport's "Qlickview" online reporting tool, and there is no benefit to continue undertaking 8-hour studies. In order to discharge Condition 47 of the CADP Conditions, an APU Strategy is to be prepared before any new phase of the CADP development becomes operational. MEASURE 2: London City Airport will monitor the use of APU in accordance with the relevant Airfield Operating Instructions. LCA will continue to record APU use via the Airport's "Qlickview"

	online reporting tool, and document any contraventions of the Airfield Operating Instructions, updated as necessary to comply with any requirements within the forthcoming APU Strategy.
MEASURE 4: To have approved by the Local Planning Authority an Auxiliary Power Unit (APU) strategy in order to reduce air quality impacts from such activities.	In order to discharge Condition 47 of the CADP Conditions, an APU Strategy is to be prepared before any new phase of the CADP1 development becomes operational. It is not appropriate for the AQMS to commit to the development of the APU Strategy.
MEASURE 5: To report and monitor the performance of Measure 4 once implemented as part of the Airport's Annual Monitoring Report.	There is an overall commitment to report progress in the APR on the AQMS, so a specific Measure is not required to deliver this. The outcome of Measure 2 (above) will be reported in the APR. The implementation of the APU Strategy will be reported separately to discharge Condition 47.
MEASURE 6: To decommission all remaining Stage II MGPUs.	MEASURE 3: With the continued procurement of Fixed Electrical Ground Power (FEGP), reliance on MGPUs will be phased out completely by December 2020 in accordance with the requirements of Condition 46 of the CADP1 Conditions. Prior to this date, the early decommissioning of the older MGPUs will minimise emissions; all remaining MGPUs with Stage II emissions will be decommissioned by March 2017.
MEASURE 9: London City Airport will work with the major airlines to explore the potential to introduce "Engine Out Taxi" (EOT) procedures i.e. single engine taxiing. If feasible, a Code of Practice to encourage EOT will be introduced and any actions will be implemented and progress reported through the Airport's Annual Performance Report.	MEASURE 5: London City Airport will work with the major airlines to explore the potential to introduce "Engine Out Taxi" (EOT) procedures i.e. single engine taxiing. Pending the outcome of the feasibility study, a Code of Practice to encourage EOT will be introduced and any actions will be implemented and progress reported.
MEASURE 10: Undertake a feasibility study with airlines via the Pilot's Forum, to understand the potential of using Electric Taxiing Systems at LCA, i.e. electric hybrid aircraft and other electric taxiing options, without affecting on time performance.	MEASURE 6: London City Airport will undertake a feasibility study via the Pilot's Forum to understand the potential of using Electric Taxiing Systems at LCA, without affecting time performance. Any actions will be implemented and progress reported.
MEASURE 7: To have written approval by the Local Planning Authority of a Ground Running, Testing and Maintenance Strategy in order to reduce air quality impacts from such activities. Any actions will be implemented and progress reported through the Airport's Annual Performance Report. To report and monitor the	The Ground Engine Running, Testing and Maintenance Strategy is being delivered to discharge Condition 49. MEASURE 7: London City Airport will review the outcomes of the Ground Engine Running, Testing and Maintenance Strategy and will advise on the air quality implications, specifically with regard

performance of this measure once implemented as part of the Airport's Annual Monitoring Report.	to proposals for relocation of the engine ground run positions during CADP1 construction.
MEASURE 11: London City Airport will continue to work with operators at the Airport (in accordance with ADI 01/15) to increase the percentage of London Low Emissions Zone (LLEZ) compliant vehicles year on year, with the target of achieving 100% compliance with the LLEZ by December 2018.	MEASURE 8: London City Airport will continue to work with operators at the Airport (in accordance with ADI 01/15) to increase the percentage of London Low Emissions Zone (LLEZ) compliant vehicles year on year, with the target of achieving 100% compliance with the LLEZ by December 2017. MEASURE 11: London City Airport will explore options to procure hybrid vehicles and if they can meet the specific airport requirements, dependent upon market availability and cost.
MEASURE 12: London City Airport will investigate and implement provisions to reduce idling black cab and taxis in residential areas and associated emissions adjacent to the Airport boundary. Any actions will be implemented and progress reported through the Airport's Annual Performance Report.	MEASURE 12: London City Airport will investigate and implement provisions to reduce idling black cabs. This will involve liaison through the Airport's Transport Forum with the relevant service providers to understand the causes for such instances and implementation, if necessary of methods to reduce such impacts occurring.
MEASURE 14: Introduce an online portal to provide public access to real-time information and statistics on air quality information gathered by LCA through this AQMP.	This Measure is now being delivered via the Air Quality Monitoring Strategy (to discharge Condition 57).
MEASURE 16: Update the London City Airport website to provide clear, concise information to the local and wider community on the performance of this Air Quality Action Plan and the Air Quality Management Plan. Progress will be reported through the Airport's Annual Performance Report.	MEASURE 13: 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.
MEASURE 7: To undertake a study of the Fine Particulates ($PM_{2.5}$) to enhance AQMP coverage of emerging levels of air quality testing. Any actions will be implemented and progress reported through the Airport's Annual Performance Report.	This Measure is now being delivered via the Air Quality Monitoring Strategy (to discharge Condition 57).
MEASURE 13: Install a new continuous Air Quality Monitor at KGV House in order to enhance air quality data capture site wide including $PM_{2.5}$. This information will be reported on a quarterly basis and annually via	This Measure is now being delivered via the Air Quality Monitoring Strategy (to discharge Condition 57).

the Annual Performance Report.	
MEASURE 15: Undertake on a two year basis a RAMP employee air quality monitoring assessment with direct individual recording apparatus and publish findings on the LCA website.	MEASURE 14: London City Airport will undertake on a two year basis a RAMP employee air quality monitoring assessment with direct individual recording apparatus and publish findings on the LCA website. This measure is another way to see how factors, such as the installation and upgrade of FEGP at the airport, affect employees in particular roles, such as ramp operatives.

APPENDIX 4 – REVIEW OF MGPU EMISSIONS

Emissions from non-road mobile diesel engines are regulated under a series of EU directives. The regulations have been introduced in stages[23]:

- Stage I was implemented in 1999
- Stage II was implemented in 2002
- Stage IIIA was implemented in 2006
- Stage IIIB was implemented in 2011

A summary of the emissions limits associated with each Stage is provided in Table A3.1 below.

Table A3.1: Summary of NOx and Hydrocarbon (HC) Emissions for Non-road Engines

EU Stage	Emissions (g/kWh		
	NOx	HC	NOx + HC
Stage I	9.2	1.3	-
Stage II	6.0	1.0	-
Stage IIIA	N/A	N/A	4.0
Stage IIIB	2.0	0.19	-

Note: Emissions limits for Stage IIIA are only provided as NOx + HC. Based on the other Stages, it is estimated that NOx emissions are approximately 90% of the combined NOx+HC emission.

A summary of the MGPUs currently operational at the Airport is provided in Table A3.2.

Table A3.2: Current MGPUs in use at London City Airport

Fleet No.	Year of Manufacture	Model	EU Stage
8	2002	Houchins C690	Stage II
10	2005	Houchins C690	Stage II
14	2008	Houchins C690	Stage IIIA
15	2008	Houchins C690	Stage IIIA
16	2008	Houchins C690	Stage IIIA
17	2012	Houchins C490 EU3A	Stage IIIA
18	2012	Houchins C490 EU3A	Stage IIIA
19	2012	Houchins C490 EU3A	Stage IIIA
20	2012	Houchins C490 EU3A	Stage IIIA

[23] The date of implementation is dependent on the engine power output. For MGPUs operational at the Airport, the 130<P<560 kW emissions limits and implementation dates apply.

APPENDIX 5 – SUMMARY OF LCY - OWNED VEHICLES

Table A5.1: Summary of vehicles directly owned by LCY

No	Vehicle Registration	Make	Model	Department
1	EU10 AGO (C)	Sides	Fire App	Firestation
2	MJ12 OMV (C)	Toyota	Hilux	Firestation
3	EU04 BRX (NC)	Sides	Fire App	Firestation
4	EU06 WDR (NC)	Sides	Fire App	Firestation
5	S752 JLM (NC)	Kronenburg	Fire App	Firestation
6	LK59 DYM (C)	Kubota	RTV900	Airfield Operations
7	ST11 ERX (C)	Toyota	Hilux	Airfield Operations
8	EO13 FHG (C)	Toyota	Hilux	Airfield Operations
9	EO13 FHF (C)	Toyota	Hilux	Airfield Operations
10	KX14 CYH (C)	Manatou	Forklift	Airfield Operations
11	WN65 UKB (C)	Mitsubishi	Shogun	Airfield Operations
12	WN65 UKA (C)	Mitsubishi	Shogun	Airfield Operations
13	AJ11 XMO (C)	Toyota	Dyna	Facilities Management
14	GF07 MLL (C)	Renault	Kangoo	Facilities Management
15	RJ15XHH (C)	VW	Transporter	Facilities Management
16	RJ15XHO (C)	VW	Transporter	Facilities Management
17	HV58 OZC (C)	Citroen	Dispatch	Facilities Management
18	HV58 OZD (C)	Citroen	Dispatch	Facilities Management
19	LL59 YHP (C)	Mercedes	Viano	Jet Centre
20	LL59YHO (C)	Mercedes	Viano	Jet Centre
21	313 FLY (C)	Mercedes	Vito	Motor Transport
22	RJ61 RZK (C)	VW	Transporter	Motor Transport
23	MJ60 ECF (C)	Toyota	Hilux	Motor Transport
24	RF15 XCH (C)	VW	Transporter	Motor Transport
25	OU58 EOB (C)	John Deere	Gator	Motor Transport
26	WN65 UKC (C)	Mitsubishi	ASX	Security

Vehicles marked as Compliant (C) either meet the required LLEZ emissions standard, or are exempt from the scheme. Vehicles marked as Non-Compliant (NC) do not meet the LLEZ emissions standard, but due to the very low annual mileage incurred by these vehicles, the Airport will seek from TfL and/or LBN exemptions for these.

Source: Airside Permit Log, December 2015.

APPENDIX 6 - REFERENCES

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APPENDIX 7 - 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
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
$\mu g/m^3$	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
NOx	Nitrogen oxides (NO + NO_2)
PM_{10}	Particulate matter with an aerodynamic diameter of less then 10 µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less then 2.5 µm