

# Air Quality around Heathrow Airport

## Q4 2018 Briefing

### Background

Heathrow Airport Ltd (HAL) began an air quality monitoring programme in 1993. Today HAL owns and operates one on-airport monitor and funds three other monitors around the airport. Data from these four continuous monitoring stations, as well as over 20 other continuous monitors operated by local authorities and DEFRA, are shared and summarised on [heathrowairwatch.org.uk](http://heathrowairwatch.org.uk).

Air quality management is a key priority for HAL and we continue to work in partnership with our key stakeholders – especially local authorities and national Government – to reduce emissions from all sources in the area in order to meet the EU & UK limit values. The main pollutants of concern around Heathrow are measured at all HAL stations – nitrogen dioxide (NO<sub>2</sub>) and particles (measured as PM<sub>10</sub> and PM<sub>2.5</sub>).

### Headlines

Key information for this quarter is:

- There was no exceedance of the hourly NO<sub>2</sub> mean of 200µg/m<sup>3</sup> recorded in 2018 at a HAL monitoring station. At relevant locations, 18 exceedances are allowed per year before the limit value is breached for a given location.
- There was one exceedance of the PM<sub>10</sub> daily mean of 50µg/m<sup>3</sup> recorded in 2018 at each HAL monitoring site. At relevant locations, 35 exceedances are allowed per year before the limit value is breached for a given location.
- NO<sub>2</sub> concentrations slightly increased only at two of the 12 monitoring sites in the wider area between 2017 and 2018. They decreased or remained the same at every other site.
- The annual mean NO<sub>2</sub> concentration remained below the annual mean EU limit value of 40µg/m<sup>3</sup> at 9 of the 11 monitoring sites outside the airport boundary within 2km of Heathrow. NO<sub>2</sub> concentrations only remain above EU limits at Hillingdon and Hayes monitoring stations, north of the M4 (airport emissions from all sources contribute 16% and 6% of total NO<sub>x</sub> at these stations, respectively).
- The number of aircraft movements made by the newest aircraft (CAEP8) has increased to 28.6% at the end of Q4 and the percentage continues to rise (see Fig.2).

### Year-to-date monitoring

NO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> are measured at HAL-funded monitoring sites. In addition, ozone is measured at the Harlington station. For a strict comparison against air quality objectives, data capture should be >90% over a calendar year. The hourly mean limit value for NO<sub>2</sub> is 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per calendar year. The daily mean limit value for PM<sub>10</sub> is 50µg/m<sup>3</sup>, not to be exceeded on more than 35 days per calendar year. Table 1 provides a summary of measured data capture from HAL's four monitoring sites as well as 2018 exceedances of the hourly NO<sub>2</sub> and daily PM<sub>10</sub> limits. Data capture for all pollutants at all HAL-funded monitoring sites has been >90%. Fig.1 provides the NO<sub>2</sub> rolling 12-month means since 2010.

Table 2 provides a summary of the results from each station within 2km of Heathrow's boundary as well as the location type describing the environment. The data shown are provisional. Fig. 2 presents annual average NO<sub>2</sub> measurement trends at sites either on or close to the airport.

Key information from the data is:

- Data for 2018 are still provisional;
- NO<sub>2</sub> concentrations slightly increased only at two of the monitoring sites between 2017 and 2018 (Oaks Road and Harlington). They decreased or remained the same at every other site;
- Two sites exceeded the NO<sub>2</sub> annual mean EU limit value outside of the airport boundary:
  - London Hillingdon is mainly affected by emissions from traffic on the M4. The NO<sub>2</sub> concentration recorded in 2018 was 47µg/m<sup>3</sup> (decrease from 53µg/m<sup>3</sup> in 2017). Modelling has shown that airport related emissions (including airport-related traffic) contribute 16% of measured NO<sub>x</sub> concentrations at this site;
  - The concentration at Hayes, located 1.9 km to the northeast of the airport, decreased from 47 to 43µg/m<sup>3</sup> between 2017 and 2018. Emissions at Hayes are also dominated by road traffic. Heathrow emissions contribute less than 6% of total NO<sub>x</sub> measured at this site; and

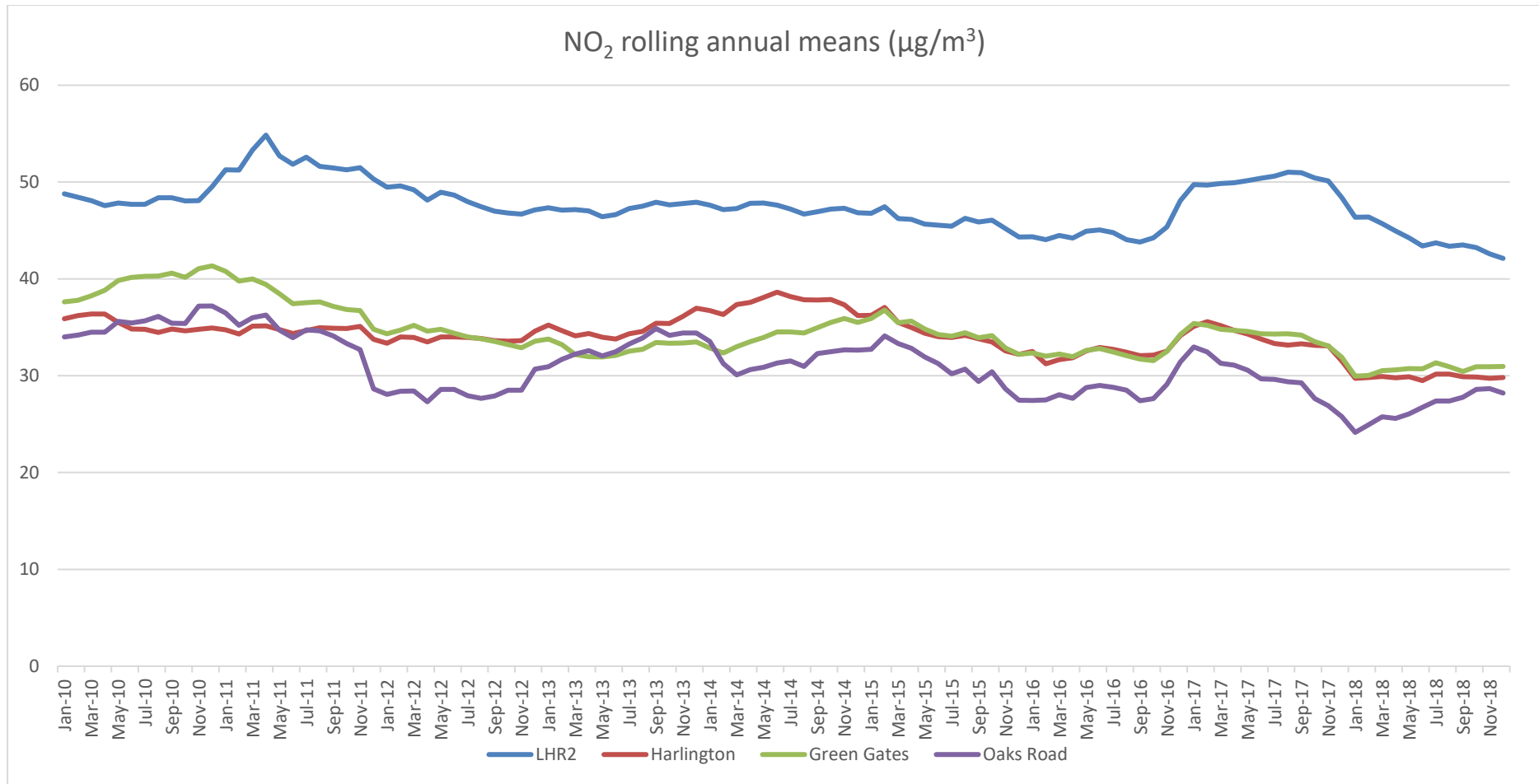
LHR2 (blue dotted line in Figure 2), located on the airport next to the northern runway, has shown a general decline in concentration since installation in 1993, even though air transport movements (ATMs) have increased over the same period.

Annual average NO<sub>2</sub> was 43µg/m<sup>3</sup> in 2018, showing a reduction in concentration compared to 2017. The EU limit values for ambient air quality are not applicable at LHR2 as members of the public do not have access to the site.

**Table 1. Annual means, data capture and exceedances of hourly NO<sub>2</sub> and daily PM<sub>10</sub> at HAL-funded monitoring sites in 2018**

Monitoring station	2018 mean (µg/m <sup>3</sup> )			2018 Data capture (%)			Exceedances in 2018	
	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>2</sub> (Hourly)	PM <sub>10</sub> (Daily)
Heathrow LHR2	43	14	9	94.5	99.7	99.7	0	1
Harlington	30	15	10	92.4	96.7	96.7	0	1
Green Gates	30	14	9	98.3	99.8	99.8	0	1
Oaks Road	28	15	10	99.8	99.6	99.6	0	1

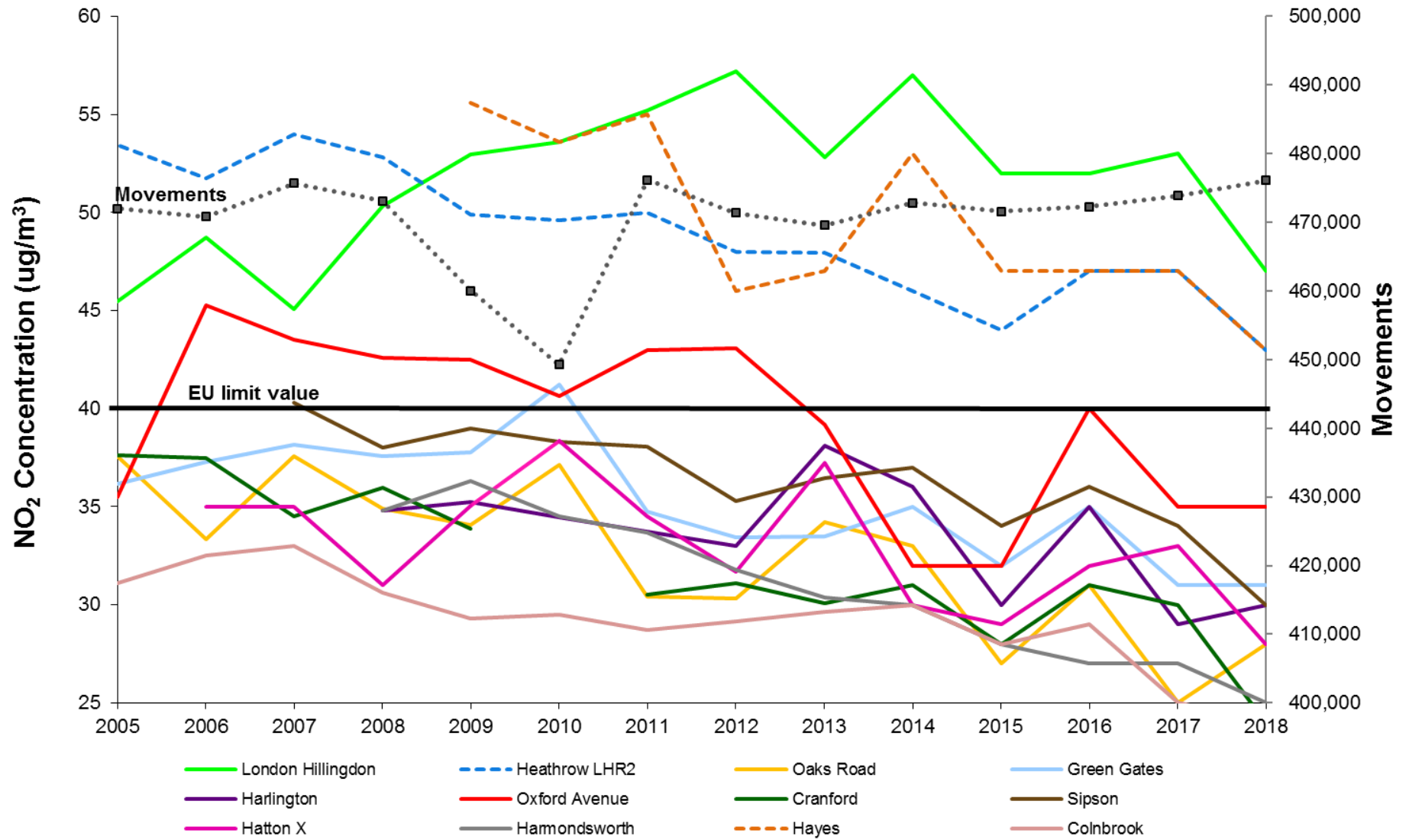
Figure 1. NO<sub>2</sub> rolling annual means at HAL funded sites since 2010 (µg/m<sup>3</sup>)



**Table 2. Summary of continuous monitoring sites within 2km of Heathrow and provisional results in 2018**

Monitoring station	Owner	Location Type	2018 Average NO <sub>2</sub> (µg/m <sup>3</sup> )	Hourly NO <sub>2</sub> exceedances (hours)	Daily PM <sub>10</sub> exceedances (days)
Heathrow LHR2	Heathrow	Airport	43	0	1
Harlington	Heathrow	Urban Industrial	30	0	1
Green Gates	Heathrow	Airport	30	0	1
Oaks Road	Heathrow	Airport	28	0	1
London Hillingdon	Defra	Urban Background	47	1	N/A
Hayes	Hillingdon	Roadside	43	0	22
Harmondsworth	Hillingdon	Urban Background	25	0	1
Oxford Ave	Hillingdon	Urban Background	35	0	2
Sipson	Hillingdon	Urban Background	30	0	N/A
Hatton Cross	Hounslow	Roadside	28	0	2
Cranford	Hounslow	Suburban	24	0	0
Colnbrook	Slough	Suburban	24	0	1

Figure 2. Measured annual average NO<sub>2</sub> concentrations around Heathrow since 2005



## Emission Reduction Efforts

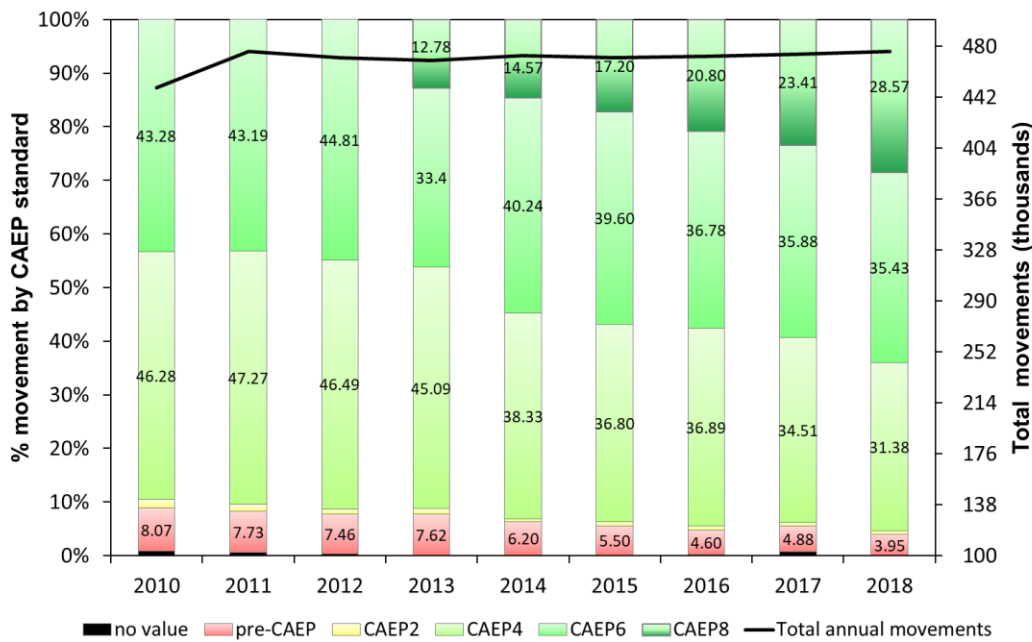
Heathrow successfully reduced annual ground-based nitrogen oxides (NO<sub>x</sub>) emissions by 430 tonnes (16%) between 2009 and 2013<sup>1</sup> as part of our commitment to playing our part in improving local air quality. These reductions have been achieved through a combination of efforts to reduce emissions from every major source, including aircraft, vehicles, and heating.

### CAEP standard of aircraft movements

Through its Committee on Aviation Environmental Protection (CAEP), the International Civil Aviation Organization (ICAO) sets new emission standards for aircraft engines – including for NO<sub>x</sub>. Engine models which were certified on or after 1 January 2014 must meet CAEP8, the latest standard for NO<sub>x</sub>.

Figure 3 shows the proportion of aircraft movements at Heathrow based by CAEP standards. The proportion of flights made by newer, cleaner CAEP8 aircraft increased from 27.7% in 2017 to 28.6% at the end of Q4 2018. The trend is expected to continue as airlines proceed in replacing their older, higher emission aircraft and Heathrow’s NO<sub>x</sub> emission landing charges and engagement encourages the use of best-in-class aircraft.

**Figure 3. Total aircraft movements since 2010 by CAEP standard**



<sup>1</sup>[http://www.heathrowairwatch.org.uk/documents/Heathrow\\_Airport\\_2013\\_Air\\_Quality\\_Assessment\\_Detailed\\_Emissions\\_Inventory.pdf](http://www.heathrowairwatch.org.uk/documents/Heathrow_Airport_2013_Air_Quality_Assessment_Detailed_Emissions_Inventory.pdf)