Air quality monitoring results

2024

This document provides the results of air quality monitoring undertaken at and near to Manchester Airport in 2024. It also explains where and how we monitor air quality. Information is also provided about Government's health-based air quality objectives.

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MAG Manchester Airport

Air quality monitoring at Manchester Airport

Overview

We provide information about air quality and airport-related emissions on our website www.manchesterairport.co.uk/emissionsinfo. Here you can find our Emissions Information Pack which gives information on emissions from activities associated with Manchester Airport and how they contribute to local air quality. More information about air quality is also provided in our Sustainable Development Plan. The Sustainable Development Plan sets the airport's air quality objective which is to "closely monitor local air quality and seek ways to reduce emissions from our operations".

This document summarises the results of air quality monitoring undertaken at and near to Manchester Airport in 2024. It compares measured concentrations of air pollutants against health-based air quality objectives which are set by Government.

Methodology

We have been measuring air quality at the airport since the 1990's. We do this in two ways:

Continuous monitoring

Automatic analysers continuously measure real-time concentrations of air pollutants. These monitors are complex to install and operate, but allow detailed analysis of air quality, where this is required. Analysers are visited by service engineers at least once a month, and are independently calibrated twice a year. We undertake continuous air quality monitoring in partnership with Manchester City Council.

The UK-Air and Air Quality England websites provide near to real-time measurements of the following pollutants:

- nitrogen dioxide (NO_2)
- sulphur dioxide (SO_2)
- ozone (O_3)
- Particulate matter (PM_{10} and $PM_{2.5}$)

We used continuous monitoring equipment to measure air quality at Styal Road (Site 10) until January 2016, when the equipment moved to Daisy Bank Lane (Site 14) due to redevelopment at the old location.

Diffusion tubes

Diffusion tubes measure the average concentration of pollutants over longer periods of time. Pollutants are collected in an absorbent material within diffusion tubes which are chemically analysed at a laboratory to calculate the average concentration during the time that the tube was exposed.

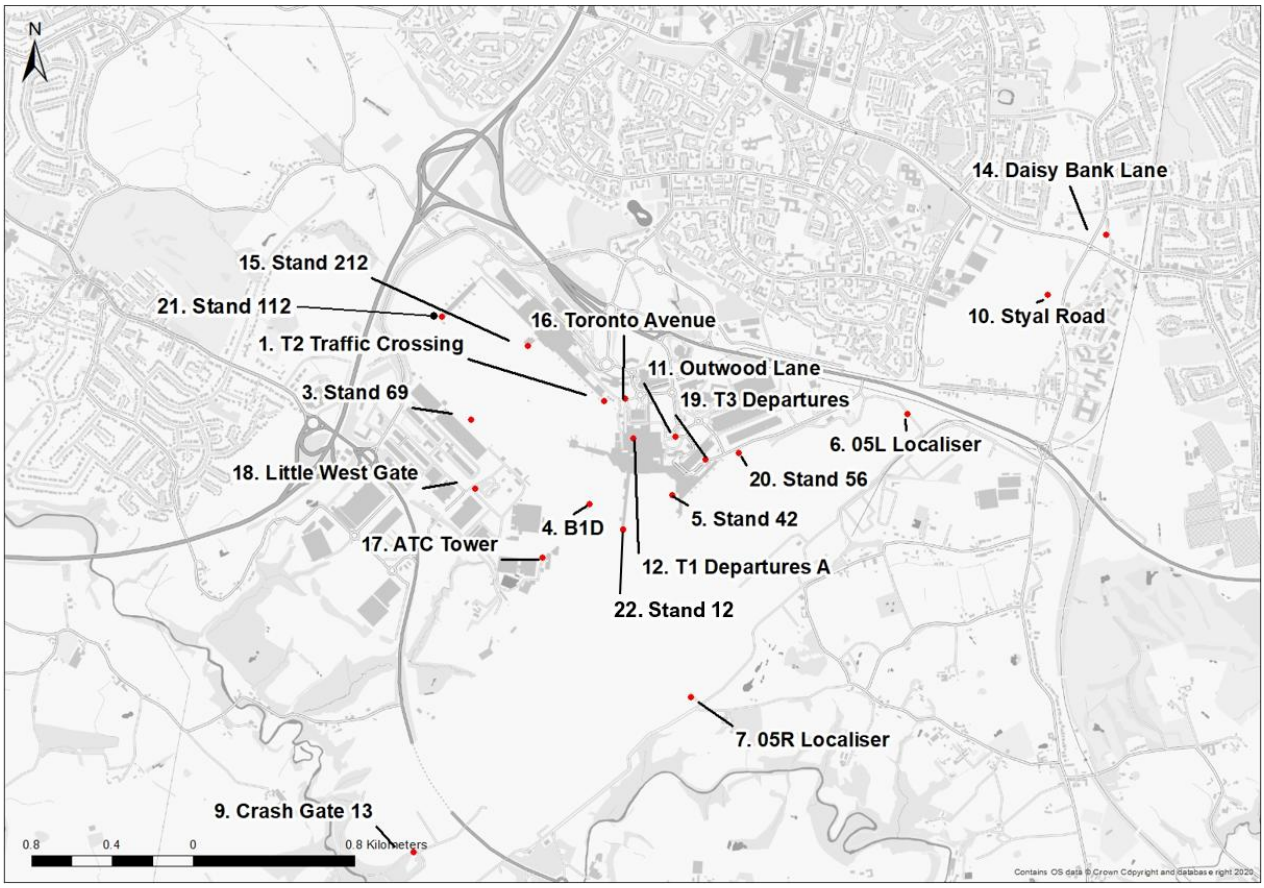
Diffusion tubes are quick and easy to install compared to continuous air quality monitors. They are useful for cost effective monitoring of air quality over a long period of time. We use diffusion tubes to measure indictive concentrations of nitrogen dioxide (NO_2).

We have followed Government guidance and 'bias adjusted' the diffusion tube monitoring results we publish. This means that the results can be compared to other locations. We calculate our 'local bias adjustment factor' by co-locating three diffusion tubes at the independently calibrated Daisy Bank Lane continuous monitor. The bias adjustment factor is then applied to the results of our diffusion tube monitoring. The local bias adjustment has been compared against the most recent 'national bias adjustment factor' released by the Government's Department for Environment, Food and Rural Affairs (Defra) in March 2024. This step compares the laboratory's national diffusion tube performance against diffusion tubes co-located at the Daisy Bank Lane continuous monitoring site. The local bias adjustment resulted in a factor of 1.058 and the national bias adjustment is 0.80. The local bias adjustment factor calculated for 2024 is higher than expected, therefore this year the national bias adjustment factor has been applied as the results are considered more representative compared to those using the local bias adjustment factor. Following Government guidance, we also remove monitoring results which are unusually high or low. Removing 'outliers' in this way avoids annual air quality results from being skewed by unrepresentative results. All monitoring locations had sufficient data capture for the year for the results to be representative of the entire year (≥75%). However, in May and December 2024, the exposure period for 11 out of the 22 diffusion tubes was greater than the recommended 3 to 5 week exposure period. Therefore a time weighted annual mean was

calculated for these monitoring locations to account for the extended exposure periods. The bias adjustment factor was then applied to the time weighted annual mean.

Where we measure air quality

The locations where we currently monitor air quality are shown below. Diffusion tubes are used to monitor nitrogen dioxide (NO_2) at all locations. Both continuous monitoring and diffusion tubes are used at Site 14. Daisy Bank Lane.



Air quality objectives

The Government has set health-based air quality objectives. Local authorities have a responsibility to monitor air quality and put plans in place to meet health-based objectives in areas where members of the public may spend a significant amount of time. These locations are generally homes or care homes for example. Air quality objectives do not necessarily apply in a workplace, or at the airport itself as people only spend short times here.

Air quality objectives are set individually for different air pollutants. They apply to a calendar year, running from January to December. Some types of air pollution have more than one objective, although all must be met, these are often reported individually - for example:

- long-term averages which must be met over a whole year.
- short-term averages, such as hourly or daily averages, which cannot be exceeded more than a certain number of times a year.

What are µg/m^3?

Air quality is measured in micrograms per cubic meter (µg/m^3). This is a measure of the weight of a pollutant in a space of air.

There are a thousand micrograms (µg) in a gram, or a billion micrograms in a kilogram.

A cubic meter (m^3) is a thousand liters of air.

One microgram per cubic (1µg/m^3) meter of pollutant is a billionth of a kilogram in a thousand liters of air.

Below are the air quality objectives for the pollutants we monitor.

Pollutant	Long-term annual objective (limit as an annual average)	Short term objective(s)
Nitrogen dioxide (NO_2)	40 µg/m^3	No more than 18 cases of an hourly average > 200 µg/m^3 each year
Particulate matter (PM_{10})	40 µg/m^3	No more than 35 cases of a daily average > 50 µg/m^3 each year
Particulate matter ($PM_{2.5}$)	20 µg/m^3	-
Sulphur dioxide (SO_2)	-	No more than 35 cases of a 15-minute average > 266 µg/m^3 each year No more than 24 cases of an hourly mean > 350 µg/m^3 each year No more than 3 cases of a daily mean > 125 µg/m^3 each year
Ozone (O_3)	-	Cases of 8hr mean > 100 µg/m^3, not to be exceeded on more than 10 days each year

Air quality monitoring results

Air quality recorded this year

The results of our air quality monitoring during 2024 are outlined below. The results also show whether health-based air quality objectives apply at that location, and if the objectives have been met at the relevant locations where objectives apply.

A comparison between concentrations measured in 2023 and 2024 show concentrations decreased at a majority of the diffusion tube monitoring locations between 0.3% and 12.3%. Annual mean NO2 concentrations increased at six diffusion tube monitoring locations between 0.3% and 20%. Manchester Airport served over 30 million passengers in 2024, which is an increase of 9.5% compared to the total number of passengers in 2023. The long-term air quality monitoring record shows that NO_2 concentrations measured in 2024 are higher than those concentrations measured during the COVID-19 Pandemic (2020). However, when compared to NO_2 concentrations measured prior to the COVID-19 pandemic in 2019, annual mean NO_2 concentrations in 2024 are still between 25% and 59% lower than the pre-COVID peak.

Results of nitrogen dioxide (NO_2) monitoring using diffusion tubes:

Monitoring location	Recorded annual average ($\mu g/m^3$)	Air quality objectives apply?	Air quality objectives met?
1. T2 Traffic Crossing	33.6*	No	-
3. Stand 69	20.9*	No	-
5. Stand 42	25.3*	No	-
6. 05L Localiser	15.7*	No	-
7. 05R Localiser	11.5*	No	-
8. 05R Glidepath	7.7*	No	-
9. Crash Gate 13	13.0*	No	-
10. Styal Road	10.6	No	-
11. Outwood Lane	29.4	No	-
12. T1 Departures A	40.1	No	-
14. Daisy Bank Lane	10.9	Yes	Yes
15. Stand 212	20.8*	No	-
16. Toronto Avenue	29.1	No	-
17. ATC Tower	22.1	No	-
18. Little West Gate	19.5	No	-
19. T3 Departures	27.6	No	-
20. Stand 56	23.0*	No	-
21. Stand 112	25.6*	No	-
22. Stand 12	24.2*	No	-

* Time weighted annual mean NO_2 concentration calculated due to diffusion tube exposure period greater than 5 weeks

Results of continuous air quality monitoring:

	Recorded annual average ($\mu g/m^3$)	Air quality objectives apply?	Short term objective exceedances	Air quality objectives met?
Nitrogen dioxide (NO_2)	14.2	Yes	Hourly Means > 200 µg/m3 = 0	Yes
Particulate matter (PM_{10})	10.7	Yes	Daily Means > 50 µg/m3 = 0	Yes
Particulate matter ($PM_{2.5}$)	6.5	Yes	N/A	Yes
Sulphur dioxide (SO_2)	1.2	Yes	15min Means > 266 $\mu g/m^3$ = 0 Hourly Means > 350 $\mu g/m^3$ = 0 Daily Means > 125 $\mu g/m^3$ = 0	Yes
Ozone (O_3)	48.5	Yes	8hr Means > 100 $\mu g/m^3$ (on more than 10 days) = 6 days	Yes

Long term air quality monitoring results

Previous years monitoring data can be downloaded from our website. Using this information, you can see how air quality has changed over time.

Our website also provides links to websites where you can see detailed results of continuous air quality monitoring in Manchester and the rest of the UK. Please be aware that these websites use different names to describe our monitoring sites: Styal Road (our monitoring site 10) is called 'Manchester South'; and, Daisy Bank Lane (our monitoring site 14) is called 'Manchester Sharston'.

Want to know more?

Our website (www.manchesterairport.co.uk/emissionsinfo) provides more information in a range of formats. These include information sheets, progress reports and useful internet links.

Sign up for our Community newsletter to receive regular updates on our community and noise management activity https://forms.office.com/r/r9kP56nekc

If you would like to talk to us you could:

- phone our Freephone number (08000 967 967);
- send an email to community.relations@manairport.co.uk;