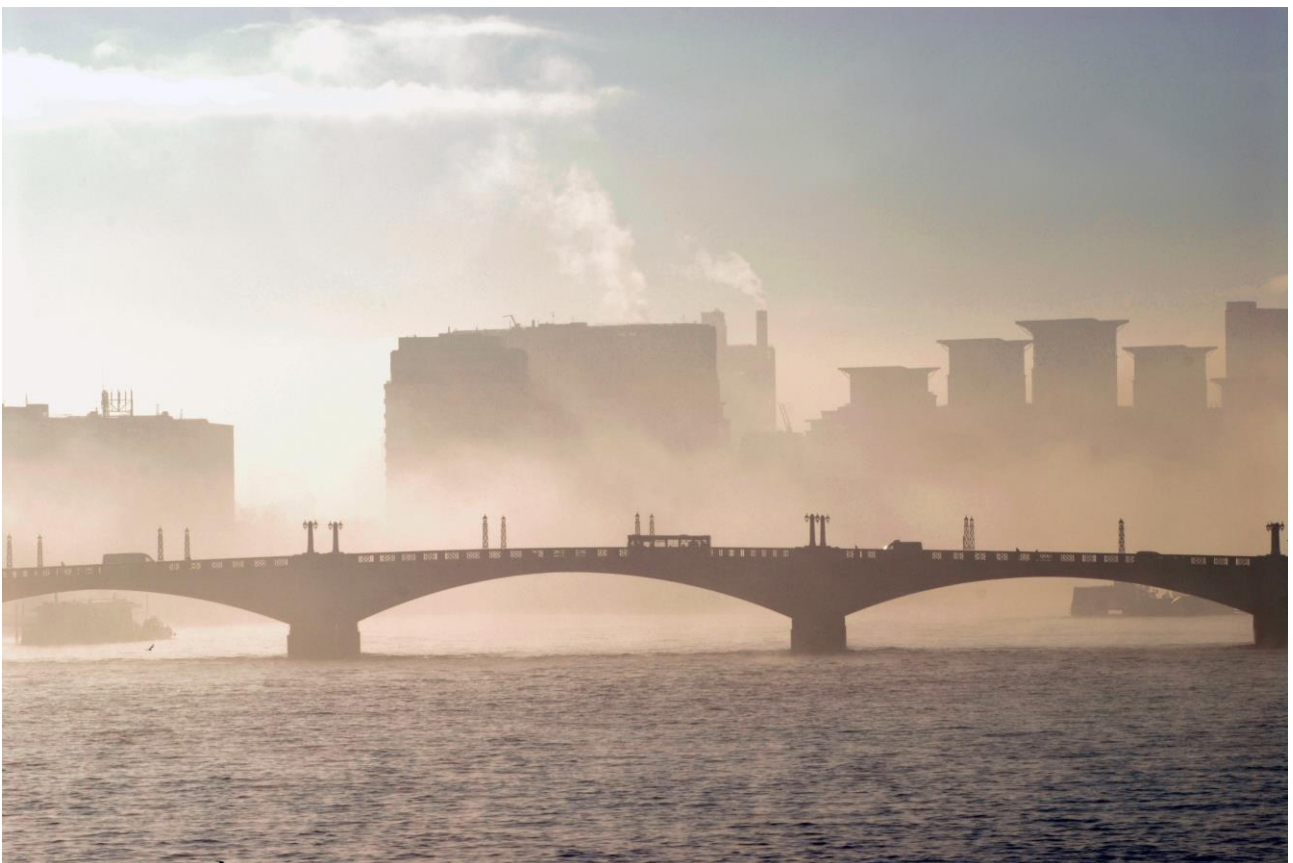


MAYOR OF LONDON

Air pollution monitoring data in London: 2016 to 2020

February 2020



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Key findings

This report evaluates four years of air quality data for monitoring sites across London between 2016 to 2020. This period coincides with the implementation of key air quality policies in London including the central London Ultra Low Emission Zone and the twelve Low Emission Bus Zones. Key findings include:

- Exceedances of the hourly limit value for NO₂ reduced by 97 per cent Londonwide;
 - Annual average NO₂ reduced by an average of 21 per cent at monitoring sites Londonwide between 2016 and 2019, with reductions as high as 50 per cent at Putney High Street Façade where the first Low Emission Bus Zone was introduced in 2017;
 - All monitoring sites recorded a reduction in annual average NO₂ and the number of monitoring sites exceeding annual limit for NO₂ fell by 40 per cent. However, there is still more work to be done. In 2019, 34 of the 86 comparable sites still exceeded the annual legal limit for NO₂;
 - The majority of sites recorded a reduction in annual mean PM₁₀ with an average reduction of 11 per cent across the network, rising to 14 per cent for roadside sites;
 - Less data is available for PM_{2.5} as there are fewer sites and more issues with data capture. However, the majority of sites recorded reductions in annual mean PM_{2.5} with an average reduction of 9 per cent across the network, rising to 16 per cent for roadside sites; and
 - More action is needed to tackle PM_{2.5}, as over 80 per cent of monitoring sites in 2019 still recorded levels of PM_{2.5} above the World Health Organization recommended limit. In London more action is needed particularly to address non-transport sources such as construction and wood burning, currently sources the Mayor does not have the powers to abate.
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Introduction

London's air quality is constantly monitored at over 120 different locations. These sites are operated and funded by the London boroughs, Transport for London and Heathrow Airport. These organisations make the data publicly available in real time via the two groups they contract to undertake the monitoring:

- King's College London record real time and historical monitoring data for the majority of boroughs and make the data available through the [London Air](#) website
- Ricardo Energy and Environment record real time and historical monitoring data for the remaining boroughs and make the data available from the [Air Quality England](#) website.

This report includes analysis of the data from these monitors from between 2016 and 2020. The report focuses on nitrogen dioxide (NO₂), coarse particulate matter (PM₁₀) and fine particulate matter (PM_{2.5}).

Nitrogen dioxide (NO₂)

Nitrogen dioxide is a toxic gas that is produced during combustion processes, such as in the engine of a car. NO₂ aggravates respiratory diseases – particularly asthma – and stunts the development of children's lungs. Around half of the NO₂ pollution in London comes from road transport, which is why the highest concentrations of NO₂ in London are recorded at busy roadside locations.

In the European Union (EU), the legal annual mean air quality limit value (the "legal limit") for NO₂ is 40 µg m⁻³. This limit has been transposed into UK law. This is the same as the

World Health Organization (WHO) guidelines¹. The EU also set a short-term hourly average limit of 200 $\mu\text{g m}^{-3}$ not to be exceeded more than 18 times per year.

Coarse particulate matter (PM₁₀)

Coarse particulate matter refers to a complex mixture of particles or liquid droplets in the air that have a diameter less than 10 micrometres across. Road transport accounts for around a quarter of PM_{2.5} in London, with a large proportion also coming from construction, wood burning and commercial cooking.

The EU sets legal limits for both long-term and short-term concentrations PM₁₀. The annual average legal limit is 40 $\mu\text{g m}^{-3}$. This is double the 20 $\mu\text{g m}^{-3}$ limit recommended by the World Health Organization. The EU short-term limits for PM₁₀ is 50 $\mu\text{g m}^{-3}$ average over 24-hours, not to be exceeded more than 35 times.

Fine particulate matter (PM_{2.5})

PM_{2.5}, also known as fine particulate matter, refers to particles or liquid droplets in the air that have a diameter less than 2.5 micrometres across (that's one 400th of a millimetre, about 3 per cent of the diameter of a human hair). Some PM_{2.5} is naturally occurring, such as dust and sea salt, and some is man-made, such as particulates from vehicle exhausts. Around a third of PM_{2.5} emitted in London comes from road transport, with a large proportion also coming from construction, wood burning and commercial cooking. However, around half of PM_{2.5} measured in London's air comes from transboundary sources outside of London.

Based on current evidence PM_{2.5} is thought to be the air pollutant which has the greatest impact on human health. Both short and long-term exposure to PM_{2.5} increases the risk of mortality from lung and heart diseases as well as increased hospital admissions. Children growing up exposed to PM_{2.5} are more likely to have reduced lung function and develop

¹ [Air quality guidelines – global update 2005, World Health Organization](#)

asthma. The UK government's Committee on the Medical Effects of Air Pollution (COMEAP) estimate exposure to PM_{2.5} attributes to 29,000 premature deaths in the UK every year².

The World Health Organization acknowledges that current evidence suggests no safe level for PM_{2.5}. However, the WHO set a guideline limit which reflects the level at which increased mortality from exposure to PM_{2.5} is likely. This recommended guideline limit is an annual mean concentration of 10 micrograms per cubic metre of air ($\mu\text{g m}^{-3}$)³.

In the EU, the legal annual mean air quality limit value for PM_{2.5} is 25 $\mu\text{g m}^{-3}$. This limit has been transposed into UK law. The Mayor does not think this limit goes far enough for the protection of human health. That is why in the London Environment Strategy the Mayor set out the ambition that all of London will have concentrations of PM_{2.5} within the World Health Organization guideline limit by 2030.

The UK Government has now published its Environment Bill, which does not yet include the legally binding WHO based PM_{2.5} limits needed for the protection of human health. Nor does it include the new powers for London and other UK cities needed to achieve them.

London action to tackle air pollution between 2016 and 2020

In May 2016 Sadiq Khan was elected Mayor of London identifying air pollution as one of the key challenges facing Londoners. The Mayor's plans to tackle London's toxic air are outlined in the [London Environment Strategy](#) and [Mayor's Transport Strategy](#). Key policies have included:

- Introducing the world's first Ultra Low Emission Zone (ULEZ) in April 2019 to help remove older polluting vehicles from central London. This is already seen 13,500 fewer, older more polluting vehicles each day entering the zone and harmful NO_x emissions from transport reduced by more than 30% so far. The ULEZ boundaries will be extended in 2021 to the North and South Circulars for all vehicles, and in 2020 tougher emissions standards will be introduced London-wide for lorries, coaches and buses;

² [The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom, COMEAP, 2010](#)

³ [WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, WHO, 2005](#)

- Transforming London's bus fleet by phasing out of pure diesel buses and a commitment to purchase only hybrid or zero-emission double decker buses from 2018, with the entire fleet becoming 'zero emission' by 2037 at the latest;
 - Introducing, ahead of schedule, twelve Low Emission Bus Zones in areas where Londoners are exposed to some of the highest levels of nitrogen dioxide (NO₂) pollution;
 - Making sure new diesel taxis are no longer licensed from 2018 and supporting the trade to upgrade to much cleaner 'zero emission capable' vehicles;
 - Funding 21 Low Emission Neighbourhoods (LENs), involving 15 boroughs and a range of local businesses. The LENs and the other projects supported by the £22 million Mayor's Air Quality Fund and a further £1.75 million from the London Economic Action Partnership are helping tackle some of the worst pollution hotspots across London;
 - A £48 million fund to support scrappage schemes that will help smaller business owners, sole traders, charities and low income Londoners make the switch to cleaner vehicles and greener forms of transport.
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Results

This section presents data from London's air quality monitoring network from 2016 to 2020.

Nitrogen dioxide (NO₂)

The number of sites recording NO₂ has increased from 115 in 2016 to 122 in 2019.

Table 1 shows the number of hourly exceedances for each year from 2016 to 2019 for the 25 sites that breached the legal hourly limit of NO₂ in 2016. The bottom row is the Londonwide total for all sites that recorded monitoring data in that year. For 2020 data is shown for the period to 20 February 2020.

In 2016 monitoring sites in London recorded over 4,000 hours above the safe threshold for NO₂. In 2019 this reduced to just over 100, a reduction of 97 per cent.

There were 25 monitoring sites in 2016 that breached the 18 permitted hours exceeding the safe threshold limit for NO₂. In 2019 there was only one, the monitoring site on the Strand in Westminster, which breached in July. From 2004 to 2017 the limit value has been breached within the first week of each year.

There have been huge improvements at sites such as Putney High Street, where thanks to the introduction of the Low Emission Bus Zone the number of hours exceeding the legal threshold for NO₂ fell from over 1,200 in 2016 to just 11 in 2019. In addition, 2019 was the first year since the monitor was installed at Putney High Street in 2009 that it did not breach the 18 permitted exceedances of legal hourly limit.

Similarly, at Brixton Road the introduction of the Low Emission Bus Zone has resulted in a large improvement in local air quality. In 2016 the monitor at Brixton Road recorded over 530 hours above the safe threshold limit. Technical difficulties meant the first quarter of the 2019 the monitor was offline, however in the last three quarters of the year the monitor did not record a single hour over the threshold limit.

Table 1. Number of hours exceeding the NO₂ hourly limit value

Name	Site Type	Borough	2020*	2019	2018	2017	2016
Wandsworth - Putney High Street	Kerbside	Wandsworth	0	11	26	76	1,270
Lambeth - Brixton Road	Kerbside	Lambeth	0	0	82	75	538
Wandsworth - Putney High Street Facade	Roadside	Wandsworth	0	0	5	9	401
Kensington and Chelsea - Knightsbridge	Roadside	Kensington and Chelsea	3	15	42	0	262
Westminster - Strand (Northbank BID)	Roadside	Westminster	0	20	33	26	233
Westminster - Oxford Street	Kerbside	Westminster	0	0	3	1	168
City of London - Walbrook Wharf	Roadside	City of London	0	7	36	126	144
City of London - Beech Street	Roadside	City of London	0	5	27	67	143
Kensington and Chelsea - Earls Court Road	Roadside	Kensington and Chelsea	0	2	28	24	121
Westminster - Marylebone Road	Kerbside	Westminster	0	0	29	38	62
Kensington and Chelsea - Chelsea	Roadside	Kensington and Chelsea	0	0	0	4	54
Camden - Holborn (Bee Midtown)	Kerbside	Camden	0	0	0	10	46
Ealing - Hanger Lane Gyratory	Roadside	Ealing	0	2	0	10	45
Wandsworth - Putney	Urban Background	Wandsworth	0	0	0	7	45
Camden - Euston Road	Roadside	Camden	0	6	18	25	39
Hounslow - Gunnersbury	Roadside	Hounslow	0	0	0	46	39
Camden - Swiss Cottage	Kerbside	Camden	0	1	2	1	37
Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	0	3	8	20	33
Brent - Ikea	Roadside	Brent	0	7	1	32	32
Brent - Neasden Lane	Industrial	Brent	0	2	0	17	25
Greenwich - Woolwich Flyover	Roadside	Greenwich	0	0	0	7	24
Sutton - Worcester Park	Kerbside	Sutton	0	9	7	11	24
Wandsworth - Lavender Hill	Roadside	Wandsworth	0	0	0	0	23
Ealing - Western Avenue	Roadside	Ealing	0	0	0	0	22
Sutton - Wallington	Kerbside	Sutton	0	0	0	1	22
Londonwide total			5	114	364	780	4,002

*to 20 February 2020

Sites across central London have seen huge reductions in the number of hourly exceedances, in part due to the central London Ultra Low Emission Zone and improvements to the bus fleet. For example, the monitor on Oxford Street recorded 180 hours over the safe threshold in 2016 and did not record a single hour over the limit in 2019.

The hourly exceedances from all sites that have recorded one hour over the threshold limit from 2016 to 2019 have been included in the Appendix.

Table 2. Annual average NO₂, (legal limit 40 µg^m⁻³)

Name	Site type	Borough	2019	2018	2017	2016	Reduction 2016 - 2019
Wandsworth - Putney High Street Facade	Roadside	Wandsworth	49	61	60	98	50%
Wandsworth - Putney High Street	Kerbside	Wandsworth	69	68	76	125	45%
Westminster - Oxford Street	Kerbside	Westminster	53	63	72	87	39%
Camden - Swiss Cottage	Kerbside	Camden	41	54	53	66	37%
Camden - Holborn (Bee Midtown)	Kerbside	Camden	54	DC	74	84	36%
Kensington and Chelsea - Chelsea	Roadside	Kensington and Chelsea	53	60	63	78	32%
Kensington and Chelsea - Earls Court Road	Roadside	Kensington and Chelsea	59	79	78	86	32%
Kensington and Chelsea - Knightsbridge	Roadside	Kensington and Chelsea	55	66	66	80	31%
Lambeth - Bondway Interchange	Industrial	Lambeth	47	54	65	68	31%
Westminster - Marylebone Road	Kerbside	Westminster	63	85	84	89	29%
City of London - Beech Street	Roadside	City of London	60	69	80	85	29%
Sutton - Wallington	Kerbside	Sutton	46	47	53	63	28%
Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	58	71	77	79	27%
Westminster - Strand	Roadside	Westminster	74	88	92	101	26%
Kensington and Chelsea - Cromwell Road	Roadside	Kensington and Chelsea	44	48	51	58	25%
Hounslow - Gunnersbury	Roadside	Hounslow	45	45	53	59	24%
City of London - Walbrook Wharf	Roadside	City of London	71	87	92	92	23%
Hounslow - Brentford	Roadside	Hounslow	44	48	54	57	22%
Camden - Euston Road	Roadside	Camden	69	DC	83	88	21%
Tower Hamlets - Blackwall	Roadside	Tower Hamlets	47	51	56	59	20%
Ealing - Western Avenue	Roadside	Ealing	48	DC	51	60	19%
Greenwich - Woolwich Flyover	Roadside	Greenwich	52	57	65	64	18%
Hackney - Old Street	Roadside	Hackney	46	50	57	57	18%
Hounslow - Chiswick	Urban Background	Hounslow	41	47	53	50	18%
Brent - Ikea	Roadside	Brent	63	71	72	76	17%
Wandsworth - Tooting High Street	Roadside	Wandsworth	49	53	54	59	17%
Ealing - Hanger Lane Gyratory	Roadside	Ealing	64	68	72	75	15%
Hillingdon - Keats Way	Urban Background	Hillingdon	44	46	53	52	14%
Ealing - Horn Lane	Industrial	Ealing	42	44	45	48	13%
Waltham Forest - Crooked Billet	Kerbside	Waltham Forest	54	58	61	62	12%
Hillingdon - Hayes	Roadside	Hillingdon	41	43	47	47	12%
Hillingdon - Heathrow	Airport	Hillingdon	42	43	48	48	11%
Sutton - Worcester Park	Kerbside	Sutton	51	52	52	57	10%
Croydon - Norbury	Kerbside	Croydon	44	49	48	47	6%
Londonwide average			39	43	46	50	21%

This section only compares the 86 sites that have enough data capture in both 2016 and 2019 to ensure a fair comparison. To be included in this analysis monitoring sites had to collect data for over 75 per cent of the year, which is the requirement made by the European Environment Agency for annual statistics to be included in air quality assessments⁴.

Table 2 shows the annual average NO₂ from 2016 to 2019 at the 36 monitoring sites which still exceeded the limit value in 2019. A full list of the 86 sites with comparable data is included in the Appendix.

Between 2016 and 2019 there were large reductions in annual average NO₂ at monitoring sites across London, with an average reduction of 21 per cent across the network. The largest reduction was measured at Putney High Street Façade, with a reduction of 50 per cent. This shows the huge benefit of the first Low Emission Bus Zone which was introduced at Putney High Street in 2017.⁵

Every single one of the 86 monitoring sites that had sufficient data in both 2016 and 2019 recorded a reduction in annual average NO₂. The annual average NO₂ across all sites fell from 50 $\mu\text{g m}^{-3}$ in 2016 to 39 $\mu\text{g m}^{-3}$ in 2019, a reduction of around a quarter. This brings the average across the network below the legal limit for the first time

However, there is still more work to be done. In 2019, 34 of the 86 comparable sites exceeded the annual legal limit for NO₂. This is a significant reduction when compared to the 56 sites that exceeded in 2016, a reduction of 39 per cent, but it highlights the need for schemes such as ULEZ expansion that will further reduce NO₂ emission from road transport. In 2019 a number of roadside sites, including Euston Road and Marylebone Road, exceeded the 40 $\mu\text{g m}^{-3}$ limit for NO₂ by over 50 per cent

As seen with the short-term peaks in NO₂, one of the largest reductions was measured at Putney High Street, with annual mean NO₂ falling from 125 $\mu\text{g m}^{-3}$ in 2016 to 69 $\mu\text{g m}^{-3}$ in 2019, a reduction of 45 per cent.

⁴ [Air quality annual statistics calculated by the EEA](#)

⁵ [Low Emission Bus Zones Evaluation Report, GLA, 2019](#)

Coarse particulate matter (PM₁₀)

The number of monitoring sites recording PM₁₀ has risen from 109 in 2016 to 112 in 2019.

Table 3 shows the number of hours exceeding the 24-hour PM₁₀ limit for sites which exceeded the 35 permitted hours above 50 µg m⁻³. The number of exceedances for all sites across the network from 2016 to 2020 can be found in the Appendix.

In 2016 there were 995 recorded exceedances of the 24-hour limit value for PM_{2.5}. In 2019 this reduced to 802, a reduction of 19 per cent.

In 2016, four monitoring sites breached the 24-hour legal limit for PM₁₀. This reduced to just one in 2019, Lambeth Bondway Interchange which is also expected to exceed in 2020. Preliminary research indicates this monitoring site may be being impacted by a nearby ventilation shaft from the Tube. The Mayor has instructed TfL to trial new approaches to reduce pollution which is transported from the Tube network to the air above ground via ventilation systems.

Table 3. Number of days exceeding the PM₁₀ 24-hr limit

Name	Site type	Borough	2020	2019	2018	2017	2016
Brent - Ikea	Roadside	Brent	6	29	37	41	45
City of London - Upper Thames Street	Roadside	City of London	2	14	25	30	45
Lambeth - Bondway Interchange	Industrial	Lambeth	35	74	45	64	43
Wandsworth - Battersea	Roadside	Wandsworth	2	14	10	16	43
Londonwide			73	802	453	773	995

Table 4 shows the annual mean PM₁₀ concentrations from 2016 to 2019 for the 25 sites that still exceeded the WHO recommended limit of 20 µg m⁻³ in 2019. There were 72 monitoring sites that had sufficient data capture for both 2016 and 2019, data for all 72 sites is available in the Appendix.

Between 2016 and 2019 there were reductions in annual average PM₁₀ at the majority of monitoring sites across London, with an average reduction 11 per cent across the network, rising to 14 per cent for roadside sites. The annual average PM₁₀ across all sites fell from 22 µg m⁻³ in 2016 to 19 µg m⁻³ in 2019.

Of the 72 monitoring sites that had sufficient data for comparison, 8 of the sites recorded a small increase from 2016 to 2019. This highlights the need for more action to reduction particulate matter, particularly from non-transport sources.

Table 4. Annual mean PM₁₀ (WHO guideline limit 20 ug^m-³)

Name	Site type	Borough	2019	2018	2017	2016	Reduction 2016 - 2019
Brent - Ikea	Roadside	Brent	30	32	33	33	10%
Brent - Neasden Lane	Industrial	Brent	26	28	27	27	3%
Camden - Euston Road	Roadside	Camden	21	DC	20	24	12%
City of London - Beech Street	Roadside	City of London	22	25	23	25	14%
City of London - Upper Thames Street	Roadside	City of London	27	32	32	35	22%
Ealing - Hanger Lane Gyrotory	Roadside	Ealing	25	28	26	24	-4%
Ealing - Horn Lane	Industrial	Ealing	28	25	27	28	2%
Ealing - Horn Lane TEOM	Industrial	Ealing	25	26	26	26	3%
Ealing - Western Avenue	Roadside	Ealing	26	28	26	30	14%
Greenwich - Woolwich Flyover	Roadside	Greenwich	22	25	25	29	25%
Hackney - Old Street	Roadside	Hackney	22	22	19	24	11%
Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	24	26	27	26	10%
Havering - Romford	Roadside	Havering	21	20	DC	21	2%
Hillingdon - Hayes	Roadside	Hillingdon	28	30	27	28	2%
Hillingdon - Oxford Avenue	Urban Background	Hillingdon	24	24	19	20	-19%
Hounslow - Brentford	Roadside	Hounslow	21	25	28	30	30%
Hounslow - Heston	Roadside	Hounslow	21	21	22	25	16%
Islington - Holloway Road	Roadside	Islington	21	20	21	21	1%
Lambeth - Brixton Road	Kerbside	Lambeth	25	DC	35	36	30%
Southwark - A2 Old Kent Road	Roadside	Southwark	24	22	22	24	0%
Waltham Forest - Crooked Billet	Kerbside	Waltham Forest	26	27	27	29	10%
Wandsworth - Battersea	Roadside	Wandsworth	23	25	27	32	27%
Wandsworth - Putney High Street	Kerbside	Wandsworth	22	25	25	25	14%
Wandsworth - Tooting High Street	Roadside	Wandsworth	23	23	23	24	5%
Westminster - Marylebone Road FDMS	Kerbside	Westminster	22	24	24	26	14%
Londonwide			20	21	21	22	11%

*DC = insufficient data capture

Fine particulate matter (PM_{2.5})

The number of sites measuring PM_{2.5} has increased from 37 in 2016 to 39 in 2019, but many sites struggled with insufficient data capture. There are less PM_{2.5} monitors as due to its smaller size PM_{2.5} is more difficult to measure, this is also why there are more issues with data capture. There were 16 monitoring sites that had sufficient data capture in both 2016 and 2019. Data from all sites that reported PM_{2.5} in 2019 can be found in the Appendix.

Table 5. Annual mean PM_{2.5} (WHO guideline limit 10 µg⁻³)

Name	Site type	Borough	2019	2018	2017	2016	Reduction 2016 - 2019
Hillingdon - Harmondsworth Os	Urban Background	Hillingdon	5.1	5.9	6.8	6.1	18%
Hillingdon - Heathrow	Airport	Hillingdon	8.6	9.1	9.1	9.4	8%
Greenwich - Westthorne Avenue	Roadside	Greenwich	10.5	10.9	11.4	12.8	18%
Greenwich - A206 Burrage Grove	Roadside	Greenwich	10.8	12.9	12.2	14.6	26%
Greenwich - Eltham	Urban Background	Greenwich	10.8	10.1	12.4	11.7	7%
Havering - Rainham	Roadside	Havering	11.1	10.9	11.5	12.2	9%
Camden - Swiss Cottage	Kerbside	Camden	11.1	11.3	15.9	15.0	26%
City of London - Sir John Cass School	Urban Background	City of London	11.4	12.2	DC	14.8	23%
Sutton - Beddington Lane north	Industrial	Sutton	11.7	11.6	DC	14.4	19%
Richmond - Teddington Bushy Park	Urban Background	Richmond	11.8	11.4	10.0	8.9	-32%
Camden - Bloomsbury	Urban Background	Camden	12.2	10.4	13.5	12.0	-2%
Greenwich - Plumstead High Street	Roadside	Greenwich	13.4	12.7	12.0	14.0	5%
Camden - Euston Road	Roadside	Camden	13.6	DC	13.6	16.7	18%
Bexley - Slade Green FDMS	Urban Background	Bexley	13.7	11.9	10.8	10.6	-29%
Westminster - Marylebone Road FDMS	Kerbside	Westminster	14.3	15.8	15.4	15.9	10%
Lewisham - New Cross	Roadside	Lewisham	15.2	15.0	15.5	18.9	20%
Londonwide average			11.6	11.5	12.2	13.0	9%

Between 2016 and 2019 there were reductions in annual average PM_{2.5} at most monitoring sites across London, with an average reduction 9 per cent across the network, rising to 16 per cent for roadside sites. The annual average PM_{2.5} across all sites fell from 13.0 µg⁻³ in 2016 to 11.6 µg⁻³ in 2019, a reduction of 11 per cent.

However, of the 16 monitoring sites that had sufficient data in both 2016 and 2019, three of the urban background sites recorded an increase from 2016 to 2019. This highlights the need for more action to reduce levels of PM_{2.5} regionally, nationally and internationally as over half of London's PM_{2.5} pollution comes from outside London.

Of the 27 sites with sufficient data capture in 2019, only 5 met the WHO limit of 10 $\mu\text{g m}^{-3}$ meaning over 80 per cent of sites recorded levels of PM_{2.5} above the WHO guideline limit – though all met of them met the EU limit of 25 $\mu\text{g m}^{-3}$.

Discussion

The data presented in this report outlines the progress that has been made between 2016 and 2020 in tackling London's toxic air pollution. The greatest progress has been made in reducing exceedances of the hourly limit for NO₂, with a reduction of 97 per cent in just four years. Similarly, good progress has been made in reducing annual average NO₂, with 2019 concentrations on average 21 per cent lower than in 2016 with reductions of up to 50 per cent at key hotspots such as Putney High Street, where the first Low Emission Bus Zone was introduced in 2017.

Progress in reducing NO₂ has been possible as in London the majority of NO₂ is traffic related. The Mayor and TfL have been able to take bold actions, such as introducing the world's first Ultra Low Emission Zone and cleaning up the bus and taxi fleets, that have delivered huge reductions in NO₂ in just four years. However, in 2019 many roadside sites still exceeded the annual legal limit for NO₂, some by more than 50 percent. This underlines the need for additional action to tackle transport emissions, including the tightening of emissions standards for the London wide Low Emission Zone for heavy vehicles and the expansion of the ULEZ to the North and South circular roads.

For particulate matter the picture is more complex. Whilst there have been reductions in both PM₁₀ and PM_{2.5} of around 10 per cent, more action is needed regionally, nationally and internationally because of the transboundary nature of PM_{2.5}. In London more action is needed particularly to address non-transport sources such as construction and wood burning (currently sources the Mayor does not have the powers to abate), if London is to meet the World Health Organization guideline limit for PM_{2.5}. More detail on this is included in the recently published [PM_{2.5} in London: Roadmap to meeting WHO guidelines by 2030](#).

Appendix

This Appendix includes the source data for the analysis included in this report. For annual average comparisons between 2016 and 2019 sites have only been included that had sufficient data capture for both. Tables in this Appendix are:

- The number of exceedances of NO₂ limit value by site per year for all sites that recorded at least one hour above the 200 $\mu\text{g m}^{-3}$ threshold limit;
 - The annual average NO₂ for all sites with sufficient data capture in 2016 and 2019;
 - The number of days exceeding the PM₁₀ 24-hr limit by site per year for all sites that recorded at least one hour above the 50 $\mu\text{g m}^{-3}$ threshold limit;
 - The annual mean PM₁₀ for all sites with sufficient data capture in 2016 to 2019; and
 - The annual mean PM_{2.5} for all sites recording PM_{2.5} in 2016 to 2019.
-

Table A 1. Number of hourly exceedances of NO₂ limit value

Name	Site type	Borough	2020	2019	2018	2017	2016
Barnet- Chalgrove School	Urban Background	Barnet	0	0	0	1	0
Barnet - Tally Ho	Kerbside	Barnet	0	0	0	2	0
Brent - Ikea	Roadside	Brent	0	7	1	32	32
Brent - Neasden Lane	Industrial	Brent	0	2	0	17	25
Camden - Euston Road	Roadside	Camden	0	6	18	25	39
Camden - Holborn (Bee Midtown)	Kerbside	Camden	0	0	0	10	46
Camden - Swiss Cottage	Kerbside	Camden	0	1	2	1	37
City of London - Beech Street	Roadside	City of London	0	5	27	67	143
City of London - Walbrook Wharf	Roadside	City of London	0	7	36	126	144
Croydon - Park Lane	Roadside	Croydon	0	3	0	0	14
Ealing - Hanger Lane Gyrotory	Roadside	Ealing	0	2	0	10	45
Ealing - Horn Lane	Industrial	Ealing	0	2	0	2	1
Ealing - Western Avenue	Roadside	Ealing	0	0	0	0	22
Enfield - Bowes Primary School	Roadside	Enfield	0	0	0	3	6
Enfield - Derby Road	Roadside	Enfield	0	0	0	0	1
Greenwich - A206 Burrage Grove	Roadside	Greenwich	0	0	0	0	1
Greenwich - Falconwood	Roadside	Greenwich	0	0	0	1	3
Greenwich - Trafalgar Road (Hoskins St)	Roadside	Greenwich	0	0	1	0	0
Greenwich - Westthorne Avenue	Roadside	Greenwich	0	0	0	2	8
Greenwich - Woolwich Flyover	Roadside	Greenwich	0	0	0	7	24
Hammersmith and Fulham - Hammersmith Town Centre	Roadside	Hammersmith and Fulham	2	2	0	0	0
Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	0	3	8	20	33
Haringey - Haringey Town Hall	Roadside	Haringey	0	0	0	5	6
Harrow - Pinner Road	Roadside	Harrow	0	0	0	5	11
Havering - Romford	Roadside	Havering	0	0	0	1	6
Hillingdon - Hayes	Roadside	Hillingdon	0	0	0	12	1
Hillingdon - Heathrow	Airport	Hillingdon	0	0	0	12	8
Hillingdon - Keats Way	Urban Background	Hillingdon	0	0	0	0	2
Hillingdon - Oxford Avenue	Urban Background	Hillingdon	0	0	0	1	0
Hillingdon - South Ruislip	Roadside	Hillingdon	0	0	0	2	7
Hounslow - Brentford	Roadside	Hounslow	0	0	0	12	7

Hounslow - Chiswick	Urban Background	Hounslow	0	0	0	12	6
Hounslow - Cranford	Urban Background	Hounslow	0	0	0	10	2
Hounslow - Gunnersbury	Roadside	Hounslow	0	0	0	46	39
Hounslow - Heston	Roadside	Hounslow	0	0	0	6	1
Islington - Arsel	Urban Background	Islington	0	0	0	1	0
Kensington and Chelsea - Chelsea	Roadside	Kensington and Chelsea	0	0	0	4	54
Kensington and Chelsea - Cromwell Road	Roadside	Kensington and Chelsea	0	0	0	0	2
Kensington and Chelsea - Earls Court Road	Roadside	Kensington and Chelsea	0	2	28	24	121
Kensington and Chelsea - Knightsbridge	Roadside	Kensington and Chelsea	3	15	42	0	262
Kensington and Chelsea - North Ken	Urban Background	Kensington and Chelsea	0	0	0	1	0
Kingston - Cromwell Road	Roadside	Kingston	0	5	1	0	0
Kingston - Tolworth Broadway	Roadside	Kingston	0	0	0	7	4
Lambeth - Bondway Interchange	Industrial	Lambeth	0	0	0	0	1
Lambeth - Brixton Road	Kerbside	Lambeth	0	0	82	75	538
Lewisham - Loampit Vale	Roadside	Lewisham	0	0	0	4	9
Merton - Morden Civic Centre 2	Roadside	Merton	0	6	0	0	0
Newham - Wren Close	Urban Background	Newham	0	0	0	13	0
Redbridge - Gardner Close	Roadside	Redbridge	0	0	0	0	3
Redbridge - Ley Street	Urban Background	Redbridge	0	1	0	0	0
Richmond - Chertsey Road	Roadside	Richmond	0	0	0	0	1
Southwark - A2 Old Kent Road	Roadside	Southwark	0	0	0	0	1
Sutton - Wallington	Kerbside	Sutton	0	0	0	1	22
Sutton - Worcester Park	Kerbside	Sutton	0	9	7	11	24
Tower Hamlets - Blackwall	Roadside	Tower Hamlets	0	0	0	0	9
Tower Hamlets - Mile End Road	Roadside	Tower Hamlets	0	1	0	2	0
Tower Hamlets - Victoria Park	Urban Background	Tower Hamlets	0	0	1	24	11
Waltham Forest - Crooked Billet	Kerbside	Waltham Forest	0	0	0	0	15

Waltham Forest - Leyton	Urban Background	Waltham Forest	0	0	0	4	0
Wandsworth - Battersea	Roadside	Wandsworth	0	0	0	0	1
Wandsworth - Lavender Hill (Clapham Jct)	Roadside	Wandsworth	0	0	0	0	23
Wandsworth - Putney	Urban Background	Wandsworth	0	0	0	7	45
Wandsworth - Putney High Street	Kerbside	Wandsworth	0	11	26	76	1,270
Wandsworth - Putney High Street Facade	Roadside	Wandsworth	0	0	5	9	401
Wandsworth - Tooting High Street	Roadside	Wandsworth	0	1	2	0	2
Westminster - Buckingham Palace Road	Roadside	Westminster	0	0	1	0	0
Westminster - Marylebone Road	Kerbside	Westminster	0	0	29	38	62
Westminster - Oxford Street	Kerbside	Westminster	0	0	3	1	168
Westminster - Oxford Street East	Roadside	Westminster	0	3	11	0	0
Westminster - Strand (Northbank BID)	Roadside	Westminster	0	20	33	26	233
Westminster - Victoria (Victoria BID)	Roadside	Westminster	0	0	0	2	0
Londonwide total			5	114	364	780	4002

Table A 2. Annual average NO₂ for all sites with sufficient data capture in 2016 and 2019

Name	Site type	Borough	2019	2018	2017	2016	Reduction
Barking and Dagenham - Scrattons Farm	Urban Background	Barking and Dagenham	23	26	28	32	29%
Barnet - Chalgrove School	Urban Background	Barnet	24	27	DC	28	16%
Barnet - Tally Ho	Kerbside	Barnet	37	42	DC	44	15%
Bexley - Belvedere	Urban Background	Bexley	22	28	28	29	23%
Bexley - Belvedere West	Urban Background	Bexley	20	21	21	24	16%
Bexley - Slade Green	Urban Background	Bexley	24	23	24	25	4%
Brent - Ikea	Roadside	Brent	63	71	72	76	17%
Camden - Bloomsbury	Urban Background	Camden	31	36	38	42	27%
Camden - Euston Road	Roadside	Camden	69	DC	83	88	21%
Camden - Holborn (Bee Midtown)	Kerbside	Camden	54	DC	74	84	36%
Camden - Swiss Cottage	Kerbside	Camden	41	54	53	66	37%
City of London - Beech Street	Roadside	City of London	60	69	80	85	29%
City of London - Sir John Cass School	Urban Background	City of London	32	32	38	42	23%
City of London - Walbrook Wharf	Roadside	City of London	71	87	92	92	23%
Croydon - Norbury	Kerbside	Croydon	44	49	48	47	6%
Croydon - Purley Way A23	Roadside	Croydon	29	31	31	31	8%
Ealing - Hanger Lane Gyrotory	Roadside	Ealing	64	68	72	75	15%
Ealing - Horn Lane	Industrial	Ealing	42	44	45	48	13%
Ealing - Western Avenue	Roadside	Ealing	48	DC	51	60	19%
Enfield - Bowes Primary School	Roadside	Enfield	39	44	45	47	17%
Enfield - Bush Hill Park	Urban Background	Enfield	25	26	27	28	10%
Enfield - Derby Road	Roadside	Enfield	32	35	38	43	27%
Enfield - Prince of Wales School	Urban Background	Enfield	21	23	23	25	15%
Greenwich - A206 Burrage Grove	Roadside	Greenwich	33	35	35	39	15%
Greenwich - Blackheath	Roadside	Greenwich	38	35	38	46	16%
Greenwich - Eltham	Urban Background	Greenwich	17	16	19	21	18%
Greenwich - Falconwood	Roadside	Greenwich	36	38	40	45	20%
Greenwich - Fiveways Sidcup Rd A20	Roadside	Greenwich	37	40	41	46	20%
Greenwich - Plumstead High Street	Roadside	Greenwich	34	33	34	36	6%

Greenwich - Westthorne Avenue	Roadside	Greenwich	34	38	39	42	19%
Greenwich - Woolwich Flyover	Roadside	Greenwich	52	57	65	64	18%
Hackney - Old Street	Roadside	Hackney	46	50	57	57	18%
Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	58	71	77	79	27%
Haringey - Priory Park South	Urban Background	Haringey	22	22	24	26	16%
Haringey - Haringey Town Hall	Roadside	Haringey	37	39	40	42	14%
Harrow - Pinner Road	Roadside	Harrow	39	39	41	44	11%
Harrow - Stanmore	Urban Background	Harrow	20	DC	DC	26	23%
Havering - Rainham	Roadside	Havering	29	30	34	34	15%
Havering - Romford	Roadside	Havering	36	38	40	44	19%
Hillingdon - Harmondsworth	Urban Background	Hillingdon	23	25	27	27	13%
Hillingdon - Hayes	Roadside	Hillingdon	41	43	47	47	12%
Hillingdon - Heathrow	Airport	Hillingdon	42	43	48	48	11%
Hillingdon - Keats Way	Urban Background	Hillingdon	44	46	53	52	14%
Hillingdon - Oxford Avenue	Urban Background	Hillingdon	33	35	35	39	14%
Hillingdon - Sipson	Urban Background	Hillingdon	30	30	34	36	17%
Hillingdon - South Ruislip	Roadside	Hillingdon	35	36	46	44	21%
Hounslow - Brentford	Roadside	Hounslow	44	48	54	57	22%
Hounslow - Chiswick	Urban Background	Hounslow	41	47	53	50	18%
Hounslow - Cranford	Urban Background	Hounslow	27	DC	30	31	12%
Hounslow - Feltham	Urban Background	Hounslow	29	27	34	38	24%
Hounslow - Gunnersbury	Roadside	Hounslow	45	45	53	59	24%
Hounslow - Hatton Cross	Urban Background	Hounslow	28	28	33	32	12%
Islington - Arsel	Urban Background	Islington	24	27	31	33	26%
Islington - Holloway Road	Roadside	Islington	40	47	49	60	33%
Kensington and Chelsea - Chelsea	Roadside	Kensington and Chelsea	53	60	63	78	32%
Kensington and Chelsea - Cromwell Road	Roadside	Kensington and Chelsea	44	48	51	58	25%
Kensington and Chelsea - Earls Court Road	Roadside	Kensington and Chelsea	59	79	78	86	32%
Kensington and Chelsea - Knightsbridge	Roadside	Kensington and Chelsea	55	66	66	80	31%
Kensington and Chelsea - North Ken	Urban Background	Kensington and Chelsea	26	DC	33	35	25%
Lambeth - Bondway Interchange	Industrial	Lambeth	47	54	65	68	31%

Lewisham - Catford	Urban Background	Lewisham	37	37	43	45	19%
Lewisham - New Cross	Roadside	Lewisham	38	42	48	46	17%
Newham - Cam Road	Roadside	Newham	27	29	38	42	34%
Redbridge - Gardner Close	Roadside	Redbridge	36	37	39	42	15%
Redbridge - Ley Street	Urban Background	Redbridge	29	30	30	33	13%
Richmond - Barnes Wetlands	Urban Background	Richmond	21	20	21	25	17%
Richmond - Castelu	Roadside	Richmond	27	31	31	36	25%
Southwark - A2 Old Kent Road	Roadside	Southwark	35	41	42	53	34%
Southwark - Elephant and Castle	Urban Background	Southwark	30	32	34	39	21%
Sutton - Beddington Lane	Industrial	Sutton	25	25	25	30	19%
Sutton - Beddington Lane north	Industrial	Sutton	29	29	32	36	19%
Sutton - Wallington	Kerbside	Sutton	46	47	53	63	28%
Sutton - Worcester Park	Kerbside	Sutton	51	52	52	57	10%
Tower Hamlets - Blackwall	Roadside	Tower Hamlets	47	51	56	59	20%
Tower Hamlets - Mile End Road	Roadside	Tower Hamlets	34	47	48	52	34%
Waltham Forest - Crooked Billet	Kerbside	Waltham Forest	54	58	61	62	12%
Waltham Forest - Dawlish Road	Urban Background	Waltham Forest	24	23	28	30	19%
Waltham Forest - Leyton	Urban Background	Waltham Forest	29		33	35	16%
Wandsworth - Putney	Urban Background	Wandsworth	35	35	31	45	21%
Wandsworth - Putney High Street	Kerbside	Wandsworth	69	68	76	125	45%
Wandsworth - Putney High Street Facade	Roadside	Wandsworth	49	61	60	98	50%
Wandsworth - Tooting High Street	Roadside	Wandsworth	49	53	54	59	17%
Wandsworth - Wandsworth Town Hall	Urban Background	Wandsworth	39	38	40	43	10%
Westminster - Marylebone Road	Kerbside	Westminster	63	85	84	89	29%
Westminster - Oxford Street	Kerbside	Westminster	53	63	72	87	39%
Westminster - Strand (Northbank BID)	Roadside	Westminster	74	88	92	101	26%
Londonwide average			39	43	46	50	21%

*DC=insufficient data capture

Table A 3. Number of days exceeding the PM10 24-hr limit

Name	Site type	Borough	2020	2019	2018	2017	2016
Barking and Dagenham - Scrattons Farm	Urban Background	Barking and Dagenham	0	2	0	4	4
Barnet - Chalgrove School	Urban Background	Barnet	0	3	1	4	3
Barnet - Tally Ho	Kerbside	Barnet	0	3	1	6	4
Bexley - Belvedere	Urban Background	Bexley	0	10	3	0	0
Bexley - Belvedere FDMS	Urban Background	Bexley	0	11	7	7	5
Bexley - Belvedere West	Urban Background	Bexley	0	6	3	2	3
Bexley - Belvedere West FDMS	Urban Background	Bexley	0	4	1	3	3
Bexley - Slade Green	Urban Background	Bexley	0	8	1	3	3
Brent - ARK Franklin Primary Academy	Roadside	Brent	0	5	1	0	
Brent - Ikea	Roadside	Brent	6	29	37	41	45
Brent - John Keble Primary School	Roadside	Brent	0	4	1	5	9
Brent - Neasden Lane	Industrial	Brent	0	16	22	18	23
Camden - Bloomsbury	Urban Background	Camden	0	9	1	6	9
Camden - Coopers Lane	Industrial	Camden	0	0	1	5	6
Camden - Euston Road	Roadside	Camden	0	8	2	3	10
Camden - Swiss Cottage	Kerbside	Camden	0	8	4	8	7
City of London - Beech Street	Roadside	City of London	1	6	9	8	16
City of London - Sir John Cass School	Urban Background	City of London	0	7	3	8	11
City of London - Upper Thames Street	Roadside	City of London	2	14	25	30	45
Croydon - Park Lane	Roadside	Croydon		8	1	4	3
Ealing - Acton Vale	Urban Background	Ealing	0	9	2	0	
Ealing - Hanger Lane Gyratory	Roadside	Ealing	4	13	12	10	11
Ealing - Horn Lane	Industrial	Ealing	2	15	7	15	19
Ealing - Horn Lane TEOM	Industrial	Ealing	0	15	6	10	17
Ealing - Western Avenue	Roadside	Ealing	4	20	14	9	24
Enfield - Bowes Primary School	Roadside	Enfield	0	7	2	9	10
Enfield - Derby Road	Roadside	Enfield	0	0	0	0	6
Greenwich - A206 Burrage Grove	Roadside	Greenwich	0	7	3	8	10
Greenwich - Blackheath	Roadside	Greenwich	0	7	5	15	14
Greenwich - Eltham	Urban Background	Greenwich	0	2	1	4	6
Greenwich - Falconwood	Roadside	Greenwich	0	8	2	12	7
Greenwich - Fiveways Sidcup Rd A20	Roadside	Greenwich	0	17	10	1	2
Greenwich - John Harrison Way	Roadside	Greenwich	0	4	0		

Greenwich - Millennium Village	Industrial	Greenwich					6
Greenwich - Plumstead High Street	Roadside	Greenwich	0	5	1	7	8
Greenwich - Trafalgar Road (Hoskins St)	Roadside	Greenwich	0	11	4	0	
Greenwich - Westthorne Avenue	Roadside	Greenwich	0	3	4	16	15
Greenwich - Woolwich Flyover	Roadside	Greenwich	2	9	6	9	22
Hackney - Old Street	Roadside	Hackney	0	7	2	1	8
Hammersmith and Fulham - Hammersmith Town Centre	Roadside	Hammersmith and Fulham	0	5			
Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	0	11	2	8	12
Harrow - Pinner Road	Roadside	Harrow	0	1	1	6	9
Harrow - Stanmore	Urban Background	Harrow	0	1	0	3	2
Havering - Rainham	Roadside	Havering	0	4	1	4	6
Havering - Romford	Roadside	Havering	1	9	2	5	7
Hillingdon - Harlington	Urban Background	Hillingdon		3	1	3	5
Hillingdon - Harmondsworth	Urban Background	Hillingdon	0	0	1	6	3
Hillingdon - Harmondsworth Os	Urban Background	Hillingdon	0	1	0	1	0
Hillingdon - Hayes	Roadside	Hillingdon	2	25	22	26	32
Hillingdon - Heathrow	Airport	Hillingdon	0	6	1	7	3
Hillingdon - Heathrow Green Gates	Airport	Hillingdon	0	4	1	3	3
Hillingdon - Oxford Avenue	Urban Background	Hillingdon	0	4	2	4	10
Hillingdon - South Ruislip	Roadside	Hillingdon	0	3	1	6	9
Hounslow - Boston Manor Park	Roadside	Hounslow	0	5	0		
Hounslow - Brentford	Roadside	Hounslow	0	7	4	21	25
Hounslow - Chiswick	Urban Background	Hounslow	0	6	1	5	9
Hounslow - Cranford	Urban Background	Hounslow	0	7	0	5	8
Hounslow - Feltham	Urban Background	Hounslow	1	7	4	4	7
Hounslow - Gunnersbury	Roadside	Hounslow	0	5	1	14	15
Hounslow - Hatton Cross	Urban Background	Hounslow	0	7	2	3	5
Hounslow - Heston	Roadside	Hounslow	1	10	2	9	17
Islington - Arsel	Urban Background	Islington	0	8	1	3	3
Islington - Holloway Road	Roadside	Islington	0	7	2	6	7
Kensington and Chelsea - Cromwell Road	Roadside	Kensington and Chelsea	0	0	0	6	8
Kensington and Chelsea - Earls Court Road	Roadside	Kensington and Chelsea	3	13	4	0	0
Kensington and Chelsea - North Ken	Urban Background	Kensington and Chelsea	0	0	0	0	7

Kensington and Chelsea - North Ken FDMS	Urban Background	Kensington and Chelsea		1	1	1	10
Kensington and Chelsea - North Ken FIDAS	Urban Background	Kensington and Chelsea	0	5	1	0	
Kingston - Cromwell Road	Roadside	Kingston	0	1	15		
Kingston - Kingston Vale	Roadside	Kingston	0	0	2		
Kingston - Sopwith Way	Roadside	Kingston					4
Kingston - Tolworth Broadway	Roadside	Kingston	0	0	2	5	10
Lambeth - Bondway Interchange	Industrial	Lambeth	35	74	45	64	43
Lambeth - Brixton Road	Kerbside	Lambeth	2	10	13	27	35
Lambeth - Streatham Green	Urban Background	Lambeth	0	0	3	10	2
Lewisham - Honor Oak Park	Urban Background	Lewisham	0	7	0		
Lewisham - Loampit Vale	Roadside	Lewisham	0	9	1	6	9
Lewisham - Mercury Way	Industrial	Lewisham					3
Lewisham - New Cross	Roadside	Lewisham	0	7	3	9	9
Merton - Merton Road	Roadside	Merton	2	20	13	10	8
Merton - Willow Lane Industrial Estate	Industrial	Merton					8
Newham - Cam Road	Roadside	Newham	1	3	1	0	9
Newham - Wren Close	Urban Background	Newham	0	4	2	0	
Redbridge - Gardner Close	Roadside	Redbridge	0	2	1	2	6
Redbridge - Ley Street	Urban Background	Redbridge	0	0	1	2	3
Richmond - Barnes Wetlands	Urban Background	Richmond	0	3	1	4	3
Richmond - Castelu	Roadside	Richmond	0	2	1	4	7
Richmond - Chertsey Road	Roadside	Richmond	0	10	1	6	5
Southwark - A2 Old Kent Road	Roadside	Southwark	0	14	8	18	18
Southwark - Elephant and Castle	Urban Background	Southwark	0	2	2	5	21
Sutton - Beddington Lane	Industrial	Sutton	0	4	7	5	8
Sutton - Beddington Lane north	Industrial	Sutton	0	0	2	21	8
Sutton - Wallington	Kerbside	Sutton	0	6	4	10	3
Sutton - Worcester Park	Kerbside	Sutton	0	9	2	2	5
Tower Hamlets - Blackwall	Roadside	Tower Hamlets	1	8	10	10	10
Tower Hamlets - Millwall Park	Urban Background	Tower Hamlets	0	7	1	8	0
Tower Hamlets - Millwall Park	Urban Background	Tower Hamlets					1
Tower Hamlets - Victoria Park	Urban Background	Tower Hamlets	0	7	1	2	0
Tower Hamlets - Victoria Park	Urban Background	Tower Hamlets					3
Waltham Forest - Crooked Billet	Kerbside	Waltham Forest	1	15	5	15	20

Waltham Forest - Dawlish Road	Urban Background	Waltham Forest	0	3	1	4	3
Waltham Forest - Leyton	Urban Background	Waltham Forest	0	3	1	6	6
Wandsworth - Battersea	Roadside	Wandsworth	2	14	10	16	43
Wandsworth - Lavender Hill (Clapham Jct)	Roadside	Wandsworth	0	2	3	4	6
Wandsworth - Putney	Urban Background	Wandsworth	0	5	1	5	6
Wandsworth - Putney High Street	Kerbside	Wandsworth	0	9	3	6	9
Wandsworth - Tooting High Street	Roadside	Wandsworth	0	9	3	11	11
Westminster - Cavendish Square	Roadside	Westminster	0	10	4		
Westminster - Horseferry Road	Urban Background	Westminster	0	7	1	6	6
Westminster - Marylebone Road	Kerbside	Westminster	0	2	5	12	14
Westminster - Marylebone Road FDMS	Kerbside	Westminster	0	10	7	8	14
Westminster - Oxford Street	Kerbside	Westminster	0	17	3	0	0
Westminster - Oxford Street East	Roadside	Westminster	0	2	1		
Londonwide total			73	802	453	773	995

Table A 4. Annual mean PM₁₀ by site from 2016 to 2019

Name	Site Type	Borough	2019	2018	2017	2016	Reduction 2016 - 2019
Barking and Dagenham - Scrattons Farm	Urban Background	Barking and Dagenham	17	DC	19	20	14%
Barnet - Chalgrove School	Urban Background	Barnet	17	17	DC	17	2%
Barnet - Tally Ho	Kerbside	Barnet	19	21	DC	22	14%
Bexley - Belvedere	Urban Background	Bexley	18	19	14	15	-25%
Bexley - Belvedere FDMS	Urban Background	Bexley	19	19	17	18	-6%
Bexley - Belvedere West	Urban Background	Bexley	18	19	17	18	2%
Bexley - Belvedere West FDMS	Urban Background	Bexley	14	15	15	15	6%
Bexley - Slade Green	Urban Background	Bexley	17	18	17	18	2%
Brent - Ikea	Roadside	Brent	30	32	33	33	10%
Brent - John Keble Primary School	Roadside	Brent	20	20	20	20	2%
Brent - Neasden Lane	Industrial	Brent	26	28	27	27	3%
Camden - Bloomsbury	Urban Background	Camden	18	17	19	20	11%
Camden - Coopers Lane	Industrial	Camden	14	15	16	18	23%
Camden - Euston Road	Roadside	Camden	21	DC	20	24	12%
Camden - Swiss Cottage	Kerbside	Camden	19	21	20	21	7%
City of London - Beech Street	Roadside	City of London	22	25	23	25	14%
City of London - Sir John Cass School	Urban Background	City of London	19	21	23	25	24%
City of London - Upper Thames Street	Roadside	City of London	27	32	32	35	22%
Ealing - Hanger Lane Gyrotory	Roadside	Ealing	25	28	26	24	-4%
Ealing - Horn Lane	Industrial	Ealing	28	25	27	28	2%
Ealing - Horn Lane TEOM	Industrial	Ealing	25	26	26	26	3%
Ealing - Western Avenue	Roadside	Ealing	26	28	26	30	14%
Enfield - Bowes Primary School	Roadside	Enfield	19	18	19	22	10%
Greenwich - A206 Burrage Grove	Roadside	Greenwich	16	18	18	23	29%
Greenwich - Blackheath	Roadside	Greenwich	20	22	23	24	16%
Greenwich - Eltham	Urban Background	Greenwich	14	DC	19	19	24%
Greenwich - Falconwood	Roadside	Greenwich	20	21	20	22	8%
Greenwich - Westhorne Avenue	Roadside	Greenwich	15	18	21	23	35%
Greenwich - Woolwich Flyover	Roadside	Greenwich	22	25	25	29	25%
Hackney - Old Street	Roadside	Hackney	22	22	19	24	11%

Hammersmith and Fulham - Shepherd's Bush	Roadside	Hammersmith and Fulham	24	26	27	26	10%
Harrow - Pinner Road	Roadside	Harrow	17	19	20	21	18%
Harrow - Stanmore	Urban Background	Harrow	15	DC	DC	16	8%
Havering - Rainham	Roadside	Havering	17	17	18	19	6%
Havering - Romford	Roadside	Havering	21	20	DC	21	2%
Hillingdon - Harmondsworth	Urban Background	Hillingdon	15	DC	23	23	35%
Hillingdon - Harmondsworth Os	Urban Background	Hillingdon	14	16	14	16	12%
Hillingdon - Hayes	Roadside	Hillingdon	28	30	27	28	2%
Hillingdon - Heathrow	Airport	Hillingdon	13	14	15	15	8%
Hillingdon - Heathrow Green Gates	Airport	Hillingdon	13	14	13	14	9%
Hillingdon - Oxford Avenue	Urban Background	Hillingdon	24	24	19	20	-19%
Hillingdon - South Ruislip	Roadside	Hillingdon	16	16	17	21	24%
Hounslow - Brentford	Roadside	Hounslow	21	25	28	30	30%
Hounslow - Chiswick	Urban Background	Hounslow	19	20	20	22	14%
Hounslow - Cranford	Urban Background	Hounslow	17	DC	17	17	2%
Hounslow - Feltham	Urban Background	Hounslow	20	20	18	19	-5%
Hounslow - Gunnersbury	Roadside	Hounslow	20	22	27	26	24%
Hounslow - Hatton Cross	Urban Background	Hounslow	20	21	18	18	-7%
Hounslow - Heston	Roadside	Hounslow	21	21	22	25	16%
Islington - Arsel	Urban Background	Islington	19	19	18	18	-7%
Islington - Holloway Road	Roadside	Islington	21	20	21	21	1%
Lambeth - Brixton Road	Kerbside	Lambeth	25	DC	35	36	30%
Lewisham - New Cross	Roadside	Lewisham	20	21	23	24	17%
Newham - Cam Road	Roadside	Newham	18	17	DC	19	6%
Redbridge - Gardner Close	Roadside	Redbridge	19	18	17	19	-2%
Richmond - Barnes Wetlands	Urban Background	Richmond	16	14	16	16	0%
Richmond - Castelu	Roadside	Richmond	15	17	18	19	19%
Southwark - A2 Old Kent Road	Roadside	Southwark	24	22	22	24	0%
Southwark - Elephant and Castle	Urban Background	Southwark	17	20	19	26	36%
Sutton - Beddington Lane	Industrial	Sutton	17	22	23	23	27%
Sutton - Wallington	Kerbside	Sutton	20	23	28	21	5%
Sutton - Worcester Park	Kerbside	Sutton	18	20	20	22	19%
Tower Hamlets - Blackwall	Roadside	Tower Hamlets	18	24	25	23	20%

Waltham Forest - Crooked Billet	Kerbside	Waltham Forest	26	27	27	29	10%
Waltham Forest - Dawlish Road	Urban Background	Waltham Forest	16	17	17	18	8%
Waltham Forest - Leyton	Urban Background	Waltham Forest	17	18	18	19	10%
Wandsworth - Battersea	Roadside	Wandsworth	23	25	27	32	27%
Wandsworth - Putney	Urban Background	Wandsworth	18	17	17	18	1%
Wandsworth - Putney High Street	Kerbside	Wandsworth	22	25	25	25	14%
Wandsworth - Tooting High Street	Roadside	Wandsworth	23	23	23	24	5%
Westminster - Horseferry Road	Urban Background	Westminster	17	17	17	17	3%
Westminster - Marylebone Road FDMS	Kerbside	Westminster	22	24	24	26	14%
Londonwide average			20	21	21	22	11%

Table A 5. Annual mean PM_{2.5} by site from 2016 to 2019

Name	Site_Type	Borough	2019	2018	2017	2016
Bexley - Slade Green	Urban Background	Bexley	DC	DC	10.8	10.7
Bexley - Slade Green FDMS	Urban Background	Bexley	13.7	11.9	10.8	10.6
Camden - Bloomsbury	Urban Background	Camden	12.2	10.4	13.5	12.0
Camden - Euston Road	Roadside	Camden	13.6	DC	13.6	16.7
Camden - Swiss Cottage	Kerbside	Camden	11.1	11.3	15.9	15.0
City of London - Farringdon Street	Kerbside	City of London	14.0	15.6	16.4	DC
City of London - Sir John Cass School	Urban Background	City of London	11.4	12.2	DC	14.8
Croydon - Norbury Manor	Urban Background	Croydon	10.2	11.6	11.6	DC
Greenwich - A206 Burrage Grove	Roadside	Greenwich	10.8	12.9	12.2	14.6
Greenwich - Eltham	Urban Background	Greenwich	10.8	10.1	12.4	11.7
Greenwich - Falconwood FDMS	Roadside	Greenwich	12.2	13.1	12.8	DC
Greenwich - John Harrison Way	Roadside	Greenwich	10.7	DC		
Greenwich - Plumstead High Street	Roadside	Greenwich	13.4	12.7	12.0	14.0
Greenwich - Westthorne Avenue	Roadside	Greenwich	10.5	10.9	11.4	12.8
Hammersmith and Fulham - Hammersmith Town Centre	Roadside	Hammersmith and Fulham	15.1			
Haringey - Haringey Town Hall	Roadside	Haringey	DC	DC	DC	DC
Harrow - Stanmore	Urban Background	Harrow	DC	DC	DC	11.2
Havering - Rainham	Roadside	Havering	11.1	10.9	11.5	12.2
Hillingdon - Harlington	Urban Background	Hillingdon	DC	9.4	9.3	10.2
Hillingdon - Harmondsworth Os	Urban Background	Hillingdon	5.1	5.9	6.8	6.1
Hillingdon - Heathrow	Airport	Hillingdon	8.6	9.1	9.1	9.4
Hillingdon - Heathrow Green Gates	Airport	Hillingdon	8.3	8.7	8.4	9.5
Hounslow - Brentford	Roadside	Hounslow	13.0	13.0	DC	DC
Hounslow - Chiswick	Urban Background	Hounslow	13.4	14.9	DC	DC
Kensington and Chelsea - Cromwell Road	Roadside	Kensington and Chelsea	DC	DC	DC	17.5
Kensington and Chelsea - North Ken	Urban Background	Kensington and Chelsea	DC	8.5	11.6	12.1

Kensington and Chelsea - North Ken FIDAS	Urban Background	Kensington and Chelsea	9.6	9.2	DC	
Lewisham - Honor Oak Park	Urban Background	Lewisham	9.9	DC		
Lewisham - New Cross	Roadside	Lewisham	15.2	15.0	15.5	18.9
Newham - Cam Road	Roadside	Newham	DC	DC	DC	DC
Newham - Wren Close	Urban Background	Newham	DC	DC	DC	
Redbridge - Ley Street	Urban Background	Redbridge	DC	DC	DC	DC
Richmond - Teddington Bushy Park	Urban Background	Richmond	11.8	11.4	10.0	8.9
Sutton - Beddington Lane north	Industrial	Sutton	11.7	11.6	DC	14.4
Tower Hamlets - Blackwall	Roadside	Tower Hamlets	DC	13.1	13.2	DC
Tower Hamlets - Roadside	Roadside	Tower Hamlets	DC			
Tower Hamlets - Victoria Park	Urban Background	Tower Hamlets	10.4	DC	DC	DC
Waltham Forest - Dawlish Road	Urban Background	Waltham Forest	12.1	DC	DC	DC
Westminster - Horseferry Road	Urban Background	Westminster	DC	DC	DC	DC
Westminster - Marylebone Road FDMS	Kerbside	Westminster	14.3	15.8	15.4	15.9

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