



London Air Quality Network Summary Report 2016



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King's College London

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1 Introduction

This report details the results of air pollution measurements made on the London Air Quality Network during 2016. Measurements have been presented with specific reference to the UK Air Quality Strategy (AQS) Objectives and the EU Limit Values.

The London Air Quality Network (LAQN) is a unique resource, providing robust air pollution measurements that are essential to underpin air quality management and health studies. The public face of the network, the LondonAir web site (www.londonair.org.uk), is visited by thousands of Londoners seeking hourly updated air pollution information.

The LAQN was formed in 1993 to coordinate and improve air pollution monitoring in London. The majority of London's 33 boroughs supply measurements to the network and in addition these data are increasingly being supplemented by measurements from local authorities surrounding London, thereby providing an overall perspective of air pollution in London and the Home Counties.

The LAQN is operated and managed by the Environmental Research Group (ERG) at King's College London. QA/QC audits are carried out by the National Physical Laboratory (NPL). Each borough funds air quality monitoring in its own area. The Department of Environment, Food and Rural Affairs (Defra) funds King's to operate the Marylebone Road site and to maintain several of the LAQN sites as affiliate sites to the UK Automatic Urban and Rural Network (AURN). This Defra support assists the operation of the overall LAQN. Analysis of LAQN measurements has been augmented by measurements from directly-funded Defra sites in London. Measurements from Defra sites were provided by Ricardo Energy and Environment from the National Air Quality Archive and were included within the LAQN database. Transport for London has also funded monitoring to help assess the air pollution impacts of the Congestion Charging Scheme and Low Emission Zone.

2 Air quality Strategy Objectives and EU Limit Values

There is ample evidence of the adverse health effects caused by air pollution (WHO, 2006). In response to these health impacts, the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (Defra, 2008) sets out the UK’s way forward on air quality issues, details objectives to be achieved, and proposes measures to help reach them. These UK objectives largely reflect EU Limit Values (EC, 2008). The GLA and the London boroughs and district councils outside the capital have responsibilities for the management of air quality and must work towards the attainment of AQS objectives. The AQS Objectives and EU Limit Values are detailed in Table 1. Monitoring progress towards the attainment of these Objectives and Limit Values forms a core activity for the LAQN.

Pollutant	Air Quality Objective Concentration	Measured as	To be achieved by
Carbon Monoxide (CO)	10.0 mg m ⁻³	Maximum daily running 8-hour mean	31 December 2003
Nitrogen Dioxide (NO ₂)	200 µg m ⁻³ not to be exceeded more than 18 times a year	1-hour mean	31 December 2005
	40 µg m ⁻³	Annual mean	31 December 2005
Sulphur dioxide (SO ₂)	350 µg m ⁻³ , not to be exceeded more than 24 times a year	1-hour mean	31 December 2004
	125 µg m ⁻³ , not to be exceeded more than 3 times a year	24-hour mean	31 December 2004
	266 µg m ⁻³ , not to be exceeded more than 35 times a year	15-minute mean	31 December 2005
Ozone (O ₃)	100 µg m ⁻³ not to be exceeded more than 10 times a year	8 hourly running or hourly mean	31 December 2005
Particles (PM ₁₀) (gravimetric)	50 µg m ⁻³ , not to be exceeded more than 35 times a year	Daily mean	31 December 2004
	40 µg m ⁻³	Annual mean	31 December 2004
Particles (PM _{2.5}) (gravimetric)	25 µg m ⁻³ (target)	Annual mean	2020
	20% cut in urban background exposure	Annual mean	2010 - 2020

Table 1: AQS Objectives and EU Limit Values.

3 Results

The AQS Objective results measured at LAQN sites during 2016 are detailed in Tables 2 to 8.

Key to site types:

RU	=	Rural
S	=	Suburban
U	=	Urban background
R	=	Roadside
K	=	Kerbside
I	=	Industrial

Key to network status

AA	=	Affiliated to UK AURN. Final data set published by DEFRA
A	=	AURN DEFRA funded. Final data set published by DEFRA
T	=	TfL funded

All other instruments are LAQN only

3.1 Carbon Monoxide

Site Name	Type	Capture Rate (%)	No occurrences of rolling 8hr mean $\geq 10\text{mgm}^{-3}$ (8.6ppb)	Achieved?
Kensington and Chelsea - North Ken ^{AA}	U	98	0	yes
Wandsworth - Wandsworth Town Hall	U	53	0	n/a
Westminster - Marylebone Road ^{AA}	K	85	0	n/a

Table 2: AQS Objective results for CO

Summary

- All sites achieved the CO rolling 8 hourly mean objective.
- Large reductions in CO over last 20 years with the introduction of catalytic converters on petrol vehicles.
- Small number of sites still measuring CO.

3.2 Nitrogen Dioxide

Site Name	Type	Capture Rate (%)	Annual Mean $\leq 40 \mu\text{g m}^{-3}$	Annual Mean Achieved?	No more than 18 occurrences of hourly mean $> 200 \mu\text{g m}^{-3}$ (104.7ppb)	Hourly Mean Achieved?
Barking and Dagenham - Rush Green	S	80	21	n/a	0	n/a
Barking and Dagenham - Scrattons Farm	S	94	32	yes	0	yes
Bexley - Belvedere	S	94	29	yes	0	yes
Bexley - Belvedere West	U	92	24	yes	0	yes
Bexley - Slade Green ^A	S	97	25	yes	0	yes
Brent - Ikea	R	91	76	no	33	no
Brent - John Keble Primary School	R	60	45	n/a	0	n/a
Brent - Neasden Lane	I	55	44	n/a	25	no
Brentwood - Brentwood Town Hall	U	97	24	yes	0	yes
Camden – Bloomsbury ^A	U	97	42	no	0	yes
Camden - Euston Road	R	98	88	no	39	no
Camden - Holborn (inmidtown)	K	96	84	no	46	no
Camden - Swiss Cottage ^{AA}	K	99	66	no	37	no
Castle Point - Hadleigh	R	99	28	yes	1	yes
City of London - Beech Street	R	99	85	no	144	no
City of London - Sir John Cass School	U	99	42	no	0	yes
City of London - Walbrook Wharf	R	97	92	no	145	no
Croydon - Norbury	K	94	47	no	0	yes
Croydon - Park Lane	R	75	56	n/a	14	n/a
Croydon - Purley Way A23	R	81	31	n/a	0	n/a
Ealing - Hanger Lane Gyrotory	R	96	76	no	45	no
Ealing - Horn Lane	I	97	48	no	1	yes
Ealing - Western Avenue	R	88	60	n/a	22	no
Enfield - Bowes Primary School	R	95	47	no	6	yes
Enfield - Bush Hill Park	S	99	28	yes	0	yes
Enfield - Derby Road	R	99	43	no	1	yes
Enfield - Prince of Wales School	U	96	25	yes	0	yes
Greenwich - A206 Burrage Grove	R	99	39	yes	1	yes
Greenwich - Blackheath	R	98	46	no	0	yes
Greenwich - Eltham ^{AA}	S	98	21	yes	0	yes
Greenwich - Fiveways Sidcup Rd A20	R	99	46	no	0	yes
Greenwich - Millennium Village	I	75	30	n/a	0	n/a
Greenwich - Plumstead High Street	R	94	36	yes	0	yes
Greenwich - Westthorne Avenue	R	95	42	no	9	yes
Greenwich - Woolwich Flyover	R	96	64	no	24	no
Greenwich and Bexley - Falconwood	R	98	45	no	3	yes
Hackney - Old Street	R	98	57	no	0	yes
Hammersmith and Fulham - Shepherds Bush	R	82	79	n/a	33	no
Haringey - Priory Park South ^{AA}	U	98	26	yes	0	yes
Haringey - Haringey Town Hall ^{AA}	R	97	43	no	6	yes

Site Name	Type	Capture Rate (%)	Annual Mean <= 40 ug ^m ⁻³	Annual Mean Achieved?	No more than 18 occurrences of hourly mean > 200ug ^m ⁻³ (104.7ppb)	Hourly Mean Achieved?
Harrow - Pinner Road	R	98	44	no	11	yes
Harrow - Stanmore	U	99	26	yes	0	yes
Havering - Rainham	R	98	34	yes	0	yes
Havering - Romford	R	98	44	no	6	yes
Islington - Arsenal	U	99	33	yes	0	yes
Islington - Holloway Road	R	92	60	no	0	yes
Kensington and Chelsea - Cromwell Road	R	97	58	no	1	yes
Kensington and Chelsea - Earls Court Rd	K	99	86	no	120	no
Kensington and Chelsea - Kings Road	R	99	78	no	54	no
Kensington and Chelsea - Knightsbridge	R	96	80	no	262	no
Kensington and Chelsea - North Ken ^{AA}	U	99	35	yes	0	yes
Kingston Upon Thames - Sopwith Way	R	52	50	n/a	0	n/a
Kingston Upon Thames - Tolworth Broadway	R	62	59	n/a	5	n/a
Lambeth - Bondway Interchange	I	97	69	no	1	yes
Lambeth - Brixton Road	K	91	118	no	539	no
Lambeth - Streatham Green	U	66	39	n/a	0	n/a
Lewisham - Catford	U	85	45	n/a	0	n/a
Lewisham - Loampit Vale	R	68	60	n/a	9	n/a
Lewisham - New Cross	R	98	46	no	0	yes
Merton - Willow Lane Industrial Estate high level	I	24	35	n/a	0	n/a
Merton - Willow Lane Industrial Estate low level	I	24	36	n/a	0	n/a
Redbridge - Gardner Close	R	83	42	n/a	3	n/a
Redbridge - Ley Street	U	97	33	yes	0	yes
Reigate and Banstead - Horley ^{AA}	S	98	20	yes	0	yes
Reigate and Banstead - Horley South	S	97	29	yes	0	yes
Reigate and Banstead - Poles Lane	RU	98	17	yes	0	yes
Reigate and Banstead -Horley South East	S	26	31	n/a	0	n/a
Richmond Upon Thames - Barnes Wetlands	S	95	25	yes	0	yes
Richmond Upon Thames - Castelnuau	R	97	36	yes	0	yes
Richmond Upon Thames - Chertsey Road high level	R	54	42	n/a	1	n/a
Richmond Upon Thames - Chertsey Road low level	R	57	41	n/a	0	n/a
Richmond Upon Thames - Ntl Physical Lab ^A	S	56	22	n/a	0	n/a
Sevenoaks - Bat and Ball	R	98	31	yes	3	yes
Sevenoaks - Greatness Park	U	83	17	n/a	0	n/a
Southwark - A2 Old Kent Road ^{AA}	R	80	53	n/a	1	n/a
Southwark - Elephant and Castle	U	90	39	yes	0	yes
Sutton - Beddington Lane	I	96	30	yes	0	yes
Sutton - Beddington Lane north	I	89	36	n/a	0	n/a
Sutton - Carshalton	S	52	22	n/a	0	n/a
Sutton - Wallington	K	89	63	n/a	22	no

Site Name	Type	Capture Rate (%)	Annual Mean $\leq 40 \mu\text{g m}^{-3}$	Annual Mean Achieved?	No more than 18 occurrences of hourly mean $> 200 \mu\text{g m}^{-3}$ (104.7ppb)	Hourly Mean Achieved?
Sutton - Worcester Park	K	99	57	no	24	no
Thurrock - Calcutta Road Tilbury	R	99	33	yes	0	yes
Thurrock - London Road (Grays) ^A	U	98	28	yes	0	yes
Thurrock - London Road (Purfleet)	R	89	55	n/a	1	n/a
Thurrock - Stanford-le-Hope ^{AA}	R	97	27	yes	0	yes
Tower Hamlets – Blackwall ^T	R	88	59	n/a	9	n/a
Tower Hamlets - Mile End Road ^{AA}	R	87	52	n/a	0	n/a
Tower Hamlets - Millwall Park	U	89	25	n/a	0	n/a
Tower Hamlets - Victoria Park	U	64	31	n/a	0	n/a
Wandsworth - Battersea	R	87	40	n/a	1	n/a
Wandsworth - Lavender Hill (Clapham Jct)	R	61	45	n/a	23	no
Wandsworth - Putney	U	87	45	n/a	46	no
Wandsworth - Putney High Street	K	81	124	n/a	1248	no
Wandsworth - Putney High Street Facade	R	99	110	no	807	no
Wandsworth - Tooting High Street	R	88	59	n/a	2	n/a
Wandsworth - Wandsworth Town Hall	U	98	43	no	0	yes
Westminster - Horseferry Road ^A	U	60	35	n/a	0	n/a
Westminster - Marylebone Road ^{AA}	K	98	89	no	64	no
Westminster - Oxford Street	K	94	87	no	168	no
Westminster - Strand (Northbank BID)	R	90	106	no	335	no
Westminster - Victoria	U	24	56	n/a	0	n/a
Westminster - Victoria (Victoria BID)	R	11	53	n/a	0	n/a
Windsor and Maidenhead - Aldebury Road	U	95	18	yes	0	yes
Windsor and Maidenhead - Clarence Road	R	98	39	yes	0	yes
Windsor and Maidenhead - Frascati Way	R	99	43	no	0	yes

Table 3: AQS Objective results for NO₂

Summary

- 67 sites achieved the 90% data capture requirement.
- 30 sites achieved the annual mean objective for nitrogen dioxide (NO₂) of 40 $\mu\text{g m}^{-3}$.
- 37 of the 67 sites did not achieve the annual mean objective.
- 11 sites recorded an annual mean of twice the legal limit or above.
- 50 sites achieved the hourly mean objective of no more than 18 occurrences of an hourly mean greater than 200 $\mu\text{g m}^{-3}$.
- 24 sites exceeded the hourly mean objective for NO₂.
- One site measured more than 1000 hours with mean NO₂ greater than 200 $\mu\text{g m}^{-3}$.
- The main source of NO₂ in London is diesel traffic emissions.

3.3 Nitrogen Oxides

Site Name	Type	Capture Rate (%)	Annual Mean NO _x as NO ₂ ug m ⁻³
Barking and Dagenham - Rush Green	S	80	34
Barking and Dagenham - Scrattons Farm	S	94	60
Bexley - Belvedere	S	94	50
Bexley - Belvedere West	U	92	37
Bexley - Slade Green ^A	S	97	44
Brent - Ikea	R	91	243
Brent - John Keble Primary School	R	60	100
Brent - Neasden Lane	I	55	124
Brentwood - Brentwood Town Hall	U	97	35
Camden - Bloomsbury ^A	U	97	75
Camden - Euston Road	R	98	295
Camden - Holborn (inmidtown)	K	96	243
Camden - Swiss Cottage ^{AA}	K	99	179
Castle Point - Hadleigh	R	99	47
City of London - Beech Street	R	99	352
City of London - Sir John Cass School	U	99	76
City of London - Walbrook Wharf	R	97	332
Croydon - Norbury	K	94	146
Croydon - Park Lane	R	75	154
Croydon - Purley Way A23	R	81	91
Ealing - Hanger Lane Gyratory	R	96	276
Ealing - Horn Lane	I	97	125
Ealing - Western Avenue	R	88	163
Enfield - Bowes Primary School	R	95	125
Enfield - Bush Hill Park	S	99	47
Enfield - Derby Road	R	99	105
Enfield - Prince of Wales School	U	96	56
Greenwich - A206 Burrage Grove	R	99	76
Greenwich - Blackheath	R	98	108
Greenwich - Eltham ^{AA}	S	98	35
Greenwich - Fiveways Sidcup Rd A20	R	99	134
Greenwich - Millennium Village	I	75	52
Greenwich - Plumstead High Street	R	94	77
Greenwich - Westthorne Avenue	R	95	105
Greenwich - Woolwich Flyover	R	96	219
Greenwich and Bexley - Falconwood	R	98	105
Hackney - Old Street	R	98	144
Hammersmith and Fulham - Shepherds Bush	R	82	207
Haringey - Priory Park South ^{AA}	U	98	43
Haringey - Haringey Town Hall ^{AA}	R	97	98
Harrow - Pinner Road	R	98	109
Harrow - Stanmore	U	99	43

Site Name	Type	Capture Rate (%)	Annual Mean NO _x as NO ₂ µg m ⁻³
Havering - Rainham	R	98	76
Havering - Romford	R	98	97
Islington - Arsenal	U	99	55
Islington - Holloway Road	R	92	150
Kensington and Chelsea - Cromwell Road	R	97	125
Kensington and Chelsea - Earls Court Rd	K	99	275
Kensington and Chelsea - Kings Road	R	99	194
Kensington and Chelsea - Knightsbridge	R	96	213
Kensington and Chelsea - North Ken ^{AA}	U	99	59
Kingston Upon Thames - Sopwith Way	R	52	114
Kingston Upon Thames - Tolworth Broadway	R	62	156
Lambeth - Bondway Interchange	I	97	188
Lambeth - Brixton Road	K	91	395
Lambeth - Streatham Green	U	66	82
Lewisham - Catford	U	85	103
Lewisham - Loampit Vale	R	68	154
Lewisham - New Cross	R	98	120
Merton - Willow Lane Industrial Estate high level	I	24	65
Merton - Willow Lane Industrial Estate low level	I	24	67
Redbridge - Gardner Close	R	83	89
Redbridge - Ley Street	U	97	65
Reigate and Banstead - Horley ^{AA}	S	98	37
Reigate and Banstead - Horley South	S	97	53
Reigate and Banstead - Poles Lane	RU	98	25
Reigate and Banstead -Horley South East	S	26	73
Richmond Upon Thames - Barnes Wetlands	S	95	43
Richmond Upon Thames - Castelnau	R	97	81
Richmond Upon Thames - Chertsey Road high level	R	54	100
Richmond Upon Thames - Chertsey Road low level	R	57	90
Richmond Upon Thames - Ntl Physical Lab ^A	S	56	31
Sevenoaks - Bat and Ball	R	98	73
Sevenoaks - Greatness Park	U	83	26
Southwark - A2 Old Kent Road	R	80	136
Southwark - Elephant and Castle	U	90	72
Sutton - Beddington Lane	I	96	62
Sutton - Beddington Lane north	I	89	79
Sutton - Carshalton	S	52	33
Sutton - Wallington	K	89	154
Sutton - Worcester Park	K	99	148
Thurrock - Calcutta Road Tilbury	R	99	69
Thurrock - London Road (Grays) ^A	U	98	53
Thurrock - London Road (Purfleet)	R	89	184
Thurrock - Stanford-le-Hope ^{AA}	R	97	59
Tower Hamlets – Blackwall ^T	R	88	159
Tower Hamlets - Mile End Road ^{AA}	R	87	125

Site Name	Type	Capture Rate (%)	Annual Mean NO _x as NO ₂ µg m ⁻³
Tower Hamlets - Millwall Park	U	89	37
Tower Hamlets - Victoria Park	U	64	45
Wandsworth - Battersea	R	87	91
Wandsworth - Lavender Hill (Clapham Jct)	R	61	118
Wandsworth - Putney	U	87	66
Wandsworth - Putney High Street	K	81	331
Wandsworth - Putney High Street Facade	R	99	270
Wandsworth - Tooting High Street	R	88	146
Wandsworth - Wandsworth Town Hall	U	98	93
Westminster - Horseferry Road ^A	U	60	58
Westminster - Marylebone Road ^{AA}	K	98	297
Westminster - Oxford Street	K	94	283
Westminster - Strand (Northbank BID)	R	90	340
Westminster - Victoria	U	24	116
Westminster - Victoria (Victoria BID)	R	11	144
Windsor and Maidenhead - Aldebury Road	U	95	34
Windsor and Maidenhead - Clarence Road	R	98	89
Windsor and Maidenhead - Frascati Way	R	99	106

Table 4: Annual Mean values for NO_x

3.4 Ozone

Site Name	Type	Capture Rate (%)	No more than 10 days where maximum rolling 8hr mean $\geq 100 \mu\text{g}\text{m}^{-3}$ (50ppb)	Achieved?
Bexley - Belvedere West	U	83	3	n/a
Bexley - Slade Green	S	91	5	yes
Brent – Ikea ^T	R	94	0	yes
Camden - Bloomsbury ^A	U	99	1	yes
Greenwich - Eltham ^{AA}	S	97	8	yes
Greenwich - Plumstead High Street	R	94	0	yes
Greenwich - Westthorne Avenue ^T	R	96	0	yes
Greenwich - Woolwich Flyover ^T	R	99	0	yes
Greenwich and Bexley - Falconwood	R	97	0	yes
Hackney - Old Street ^T	R	98	1	yes
Haringey - Priory Park South ^{AA}	U	99	10	yes
Kensington and Chelsea - North Ken ^{AA}	U	99	7	yes
Lewisham - Catford	U	30	0	n/a
Merton - Willow Lane Industrial Estate	I	13	0	n/a
Reading - New Town	U	98	7	yes
Redbridge - Ley Street	U	61	3	n/a
Reigate and Banstead - Poles Lane	RU	98	19	no
Richmond Upon Thames - Barnes Wetlands	S	97	8	yes
Richmond Upon Thames - Ntl Physical Lab ^A	S	57	10	n/a
Sevenoaks - Greatness Park	U	81	10	n/a
Southwark - Elephant and Castle	U	89	0	n/a
Sutton - Carshalton	S	53	2	n/a
Thurrock - London Road (Grays) ^A	U	99	5	yes
Tower Hamlets – Blackwall ^T	R	97	1	yes
Tower Hamlets - Millwall Park	U	40	4	n/a
Wandsworth - Wandsworth Town Hall	U	99	3	yes
Westminster - Marylebone Road ^{AA}	K	97	0	yes

Table 5: AQS Objective results for O₃

Summary

- 17 sites out of 18 which achieved the 90% data capture requirement achieved the 8 hourly mean AQS objective for O₃ of no more than ten days measuring a daily mean greater than or equal to 100 $\mu\text{g}\text{m}^{-3}$.
- One rural site did not achieve the objective.
- O₃ is a regional pollutant. It is greater away from busy roads as it is scavenged by NO_x from traffic.

3.5 Sulphur Dioxide

Site Name	Type	Capture Rate (%)	No more than 35 occurrences of 15min mean $\geq 350\mu\text{g}\text{m}^{-3}$ (100ppb)	Achieved?
Barking and Dagenham - Rush Green	S	99	0	yes
Camden - Bloomsbury ^A	U	82	0	n/a
Enfield - Derby Road	R	98	0	yes
Greenwich - Eltham	S	88	0	n/a
Kensington and Chelsea - North Ken ^{AA}	U	90	0	yes
Lambeth - Bondway Interchange	I	85	0	n/a
Lewisham - Catford	U	72	0	n/a
Lewisham - New Cross	R	78	0	n/a
Thurrock - Calcutta Road Tilbury	R	46	0	n/a
Thurrock - London Road (Grays) ^A	U	97	0	yes
Tower Hamlets - Victoria Park	U	63	0	n/a
Wandsworth - Wandsworth Town Hall	U	57	0	n/a
Westminster - Marylebone Road ^{AA}	K	98	0	yes

Table 6: AQS Objective results for SO₂

Summary

- All five sites that achieved the 90% data capture requirement achieved the AQS objective of no more than 35 occurrences of 15 minute mean greater than 350 $\mu\text{g}\text{m}^{-3}$ for SO₂.
- No 15 minute mean SO₂ measurements greater than 350 $\mu\text{g}\text{m}^{-3}$ were recorded at any LAQN site.
- The 15 minute mean objective is the most stringent of the current AQS objectives for SO₂.
- The WHO Guidelines (WHO, 2006) recommended a significant reduction in the maximum daily mean concentration from the current 125 $\mu\text{g}\text{m}^{-3}$ to an eventual 20 $\mu\text{g}\text{m}^{-3}$. One site exceeded this target in 2016.

3.6 Particulate Matter PM₁₀

Site Name	Type	Capture Rate (%)	Annual Mean <= 40 ug ^m - ³	Annual Mean Achieved?	No more than 35 occurrences of daily mean >= 50ug ^m - ³	Daily Mean Achieved?
Barking and Dagenham - Scrattons Farm	S	96	20	yes	4	yes
Bexley - Belvedere	S	89	19	n/a	0	n/a
Bexley - Belvedere FDMS	S	78	18	n/a	5	n/a
Bexley - Belvedere West TEOM	U	98	18	yes	3	yes
Bexley - Belvedere West FDMS	U	95	15	yes	3	yes
Bexley - Slade Green	S	97	18	yes	0	yes
Brent - Ikea	R	94	33	yes	45	no
Brent - John Keble Primary School	R	97	20	yes	9	yes
Brent - Neasden Lane	I	84	31	n/a	37	no
Camden - Bloomsbury ^A	U	96	20	yes	9	yes
Camden - Euston Road	R	91	24	yes	10	yes
Camden - Shaftesbury Avenue	R	3	18	n/a	0	n/a
Camden - Swiss Cottage ^{AA}	K	93	21	yes	7	yes
City of London - Beech Street	R	98	25	yes	16	yes
City of London - Sir John Cass School	U	99	25	yes	11	yes
City of London - Upper Thames Street	R	97	35	yes	46	no
Croydon - Park Lane	R	71	22	n/a	3	n/a
Ealing - Hanger Lane Gyrotary	R	89	24	n/a	11	n/a
Ealing - Horn Lane FDMS ^{AA}	I	89	28	n/a	19	n/a
Ealing - Horn Lane TEOM	I	97	26	yes	17	yes
Ealing - Southall	U	4	12	n/a	0	n/a
Ealing - Western Avenue	R	96	30	yes	25	yes
Enfield - Bowes Primary School	R	86	22	n/a	10	n/a
Enfield - Derby Road	R	17	33	n/a	6	n/a
Greenwich - A206 Burrage Grove	R	94	23	yes	10	yes
Greenwich - Blackheath	R	99	24	yes	14	yes
Greenwich - Eltham	S	81	18	n/a	6	n/a
Greenwich - Fiveways Sidcup Rd A20	R	11	23	n/a	2	n/a
Greenwich - Millennium Village	I	67	20	n/a	6	n/a
Greenwich - Plumstead High Street	R	92	19	yes	8	yes
Greenwich - Westthorne Avenue	R	95	23	yes	15	yes
Greenwich - Woolwich Flyover	R	86	29	n/a	22	n/a
Greenwich and Bexley - Falconwood	R	97	22	yes	7	yes
Hackney - Old Street ^T	R	85	24	n/a	8	n/a
Hammersmith and Fulham - Shepherds Bush	R	97	27	yes	16	yes
Harrow - Pinner Road	R	96	21	yes	9	yes
Harrow - Stanmore	U	95	16	yes	2	yes
Havering - Rainham	R	95	19	yes	6	yes
Havering - Romford	R	75	21	n/a	7	n/a
Islington - Arsenal	U	92	18	yes	5	yes
Islington - Holloway Road	R	98	21	yes	7	yes

Site Name	Type	Capture Rate (%)	Annual Mean <= 40 ug ^m - ³	Annual Mean Achieved?	No more than 35 occurrences of daily mean >= 50ug ^m - ³	Daily Mean Achieved?
Kensington and Chelsea - Cromwell Road	R	95	22	yes	8	yes
Kensington and Chelsea - Earls Court Rd	K	96	28	yes	19	yes
Kensington and Chelsea - North Ken TEOM	U	98	18	yes	7	yes
Kensington and Chelsea - North Ken FDMS ^{AA}	U	88	20	n/a	10	n/a
Kensington and Chelsea - North Ken Partisol	U	46	15	n/a	4	n/a
Kingston Upon Thames - Sopwith Way	R	47	21	n/a	4	n/a
Kingston Upon Thames - Tolworth Broadway	R	93	24	yes	10	yes
Lambeth - Bondway Interchange	I	58	38	n/a	43	no
Lambeth - Brixton Road	K	92	40	yes	57	no
Lambeth - Streatham Green	U	27	22	n/a	2	n/a
Lewisham - Loampit Vale	R	72	23	n/a	8	n/a
Lewisham - Mercury Way	I	5	31	n/a	2	n/a
Lewisham - New Cross	R	92	24	yes	9	yes
Merton - Merton Road	R	71	23	n/a	8	n/a
Merton - Willow Lane Industrial Estate	I	24	26	n/a	8	n/a
Redbridge - Gardner Close	R	96	19	yes	6	yes
Redbridge - Ley Street	U	86	17	n/a	2	n/a
Reigate and Banstead – Horley TEOM	S	97	17	yes	3	yes
Reigate and Banstead – Horley FDMS	S	98	17	yes	3	yes
Richmond Upon Thames - Barnes Wetlands	S	97	16	yes	3	yes
Richmond Upon Thames - Castelnau	R	97	19	yes	7	yes
Richmond Upon Thames - Chertsey Road	R	59	20	n/a	5	n/a
Sevenoaks - Bat and Ball	R	93	21	yes	7	yes
Sevenoaks - Greatness Park	U	94	18	yes	0	yes
Sevenoaks - Sevenoaks Quarry	I	61	27	n/a	14	n/a
Southwark - A2 Old Kent Road ^{AA}	R	94	24	yes	18	yes
Southwark - Elephant and Castle	U	80	26	n/a	21	n/a
Sutton - Beddington Lane	I	94	23	yes	8	yes
Sutton - Beddington Lane north	I	85	24	n/a	8	n/a
Sutton - Wallington	K	94	21	yes	3	yes
Sutton - Worcester Park	K	82	22	n/a	5	n/a
Thurrock - London Road (Grays) ^A	U	96	17	yes	4	yes
Thurrock - London Road (Purfleet)	R	99	25	yes	9	yes
Thurrock - Stanford-le-Hope ^{AA}	R	81	20	n/a	4	n/a
Tower Hamlets – Blackwall ^T	R	92	23	yes	10	yes
Tower Hamlets - Millwall Park	U	60	17	n/a	1	n/a
Tower Hamlets - Victoria Park	U	61	17	n/a	3	n/a
Wandsworth - Battersea	R	88	32	n/a	43	no
Wandsworth - Lavender Hill (Clapham Jct)	R	69	21	n/a	6	n/a
Wandsworth - Putney	U	98	18	yes	6	yes
Wandsworth - Putney High Street	K	95	25	yes	9	yes

Site Name	Type	Capture Rate (%)	Annual Mean <= 40 $\mu\text{g}\text{m}^{-3}$	Annual Mean Achieved?	No more than 35 occurrences of daily mean $\geq 50\mu\text{g}\text{m}^{-3}$	Daily Mean Achieved?
Wandsworth - Tooting High Street	R	92	24	yes	11	yes
Westminster - Horseferry Road	U	95	17	yes	6	yes
Westminster - Marylebone Road TEOM	K	90	29	yes	14	yes
Westminster - Marylebone Road FDMS ^{AA}	K	95	26	yes	14	yes
Windsor and Maidenhead - Frascati Way	R	94	25	yes	15	yes

Table 7: AQS Objective results for PM₁₀.

All PM₁₀ measurements have been converted to reference equivalent by the methods recommended in Defra’s Local Air Quality Management Technical Guidance (Defra, 2016), i.e. TEOM measurements have been corrected using the Volatile Correction Model (VCM) and unheated BAM measurements have been multiplied by 0.833. Report revised June 2018

Summary

- All of the 53 sites achieving the 90% data capture requirement, met the annual mean AQS objective of 40 $\mu\text{g}\text{m}^{-3}$ for PM₁₀.
- Six sites did not meet the daily mean objective of no more than 35 days with a daily mean greater than 50 $\mu\text{g}\text{m}^{-3}$. Several of these were affected by local construction or waste management activities. One site measured more than 50 days greater than 50 $\mu\text{g}\text{m}^{-3}$.

3.7 Particulate Matter PM_{2.5}

Site Name	Type	Instrument	Capture Rate (%)	Annual Mean $\mu\text{g m}^{-3}$ uncorrected
Bexley - Belvedere	S	TEOM*	97	9
Bexley - Belvedere West	U	TEOM*	99	8
Bexley - Slade Green ^{AA}	S	FDMS	92	11
Bexley - Thamesmead	S	TEOM*	97	9
Brent – Ikea ^T	R	TEOM*	93	12
Camden - Bloomsbury ^A	U	FDMS	95	12
Camden - Euston Road	R	FDMS	91	17
Camden - Swiss Cottage ^{AA}	K	FDMS	96	15
City of London - Farringdon Street	K	BAMH	40	18
City of London - Sir John Cass School	U	BAMH	86	15
Croydon - Norbury Manor	U	BAMH	67	15
Greenwich - A206 Burrage Grove	R	FDMS	81	15
Greenwich - Eltham ^{AA}	S	FDMS	87	12
Greenwich - Millennium Village	I	FDMS	75	12
Greenwich - Plumstead High Street	R	FDMS	97	14
Greenwich - Westthorne Avenue	R	FDMS	93	13
Greenwich - Woolwich Flyover ^T	R	TEOM*	91	13
Greenwich and Bexley - Falconwood	R	FDMS	42	15
Hackney - Old Street ^T	R	TEOM*	95	12
Haringey - Haringey Town Hall ^{AA}	R	FDMS	10	14
Harrow - Stanmore ^{AA}	U	FDMS	90	11
Havering - Rainham	R	FDMS	98	12
Kensington and Chelsea – North Ken Partisol	U	GRAV	49	9
Kensington and Chelsea - North Ken ^{AA}	U	FDMS	93	12
Kensington and Chelsea - Cromwell Road	R	FDMS	92	17
Lewisham - New Cross	R	FDMS	93	19
Redbridge - Gardner Close	R	BAM *	93	13
Redbridge - Ley Street	U	BAMH	57	13
Richmond Upon Thames - Bushy Park	S	FDMS	92	9
Sutton - Beddington Lane north	I	BAM *	86	14
Thurrock - Stanford-le-Hope ^{AA}	R	FDMS	91	13
Tower Hamlets – Blackwall ^T	R	FDMS	17	20
Westminster - Marylebone Road ^{AA}	K	FDMS	96	16

Table 8: Annual mean results for PM_{2.5}

n.b. instruments marked with a * are not considered a reference equivalent measurement method

Summary

- All 14 sites with data capture of 90% or more that used a reference equivalent measurement method achieved the EU target value of 25 $\mu\text{g m}^{-3}$ as an annual mean. This target value should be met by 2020.
- Only one site using a reference equivalent measurement method achieved the WHO guideline value of 10 $\mu\text{g m}^{-3}$ (WHO, 2006).

4 References

European Commission (EC) 2008. Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe. Commission of the European Community, Brussels.

Department of Environment Food and Rural Affairs (Defra), 2016. Local Air Quality Management, Technical Guidance LAQM.TG(16).

Department of Environment Food and Rural Affairs (Defra), 2008. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

World Health Organisation (WHO), 2006. WHO air quality guidelines for nitrogen dioxide, ozone, sulphur dioxide and particulate matter. Global update 2005. Summary of risk assessment. WHO, Geneva.