London Borough of Merton
Air Quality Annual Status Report for 2019
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This report provides a detailed overview of air quality in the London Borough of Merton during 2019. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs

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Abbreviations

AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
CAZ	Central Activity Zone
EV	Electric Vehicle
GLA	Greater London Authority
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LLAQM	London Local Air Quality Management
NRMM	Non-Road Mobile Machinery
PM_{10}	Particulate matter less than 10 micron in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micron in diameter
TEB	Transport Emissions Benchmark
TfL	Transport for London

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	**Objective (UK)**	**Averaging Period**	**Date[1]**
Nitrogen dioxide - NO_2	200 μg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 μg m^{-3}	Annual mean	31 Dec 2005
Particles - PM_{10}	50 μg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 μg m^{-3}	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 μg m^{-3}	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020
Sulphur Dioxide (SO_2)	266 μg m^{-3} not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
	350 μg m^{-3} not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 μg m^{-3} mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

Note: [1] by which to be achieved by and maintained thereafter

1. Air Quality Monitoring

The latest monitoring results for 2019 confirm that air pollution in the London Borough of Merton still exceeds the Government Air Quality objectives, and therefore there is still a need for Merton to be designated as an AQMA and to pursue improvements in air quality. In 2019 Merton operated two automatic air quality monitoring sites and a diffusion tube network covering 50 locations around the borough.

All data from the automatic monitoring analysers undergoes quality assurance and quality control (QA/QC) procedures to ensure that the data is of a high quality. The standards of QA/QC at the London Air Quality Network (LAQN) sites are similar to those of the government's national Automatic Urban and Rural Network (AURN) sites. All data has traceability to national standards and operational procedures are defined for the London Air Quality Network (LAQN). For quality assurance purposes, all continuous analysers are manually checked and calibrated every two weeks, serviced every six months and audited by an independent auditor (National Physical Laboratory) every six months. With data ratification being undertaken by King's College London.

Merton Council also undertakes non-automatic monitoring of nitrogen dioxide using diffusion tubes, this provides a comprehensive coverage of all hotspots including most main roads and town centres throughout the borough. All sites are kept under constant review and a few will be amended or moved, often in response to requests for more relevant monitoring during the year. Diffusion tubes offer a relatively inexpensive means of gauging NO_2 concentrations at a number of locations across the borough. The results provide monthly NO_2 averages and can be used to compare measured concentrations with the annual mean NO_2 objective following annualisation. The accuracy of diffusion tube data is improved by comparing results with automatic monitoring data and a bias adjusted applied based on calculation of a local bias adjustment factor.

In August 2019 an extensive 'school air quality monitoring programme' was initiated by Merton Council to gather information about actual nitrogen dioxide exposure at schools and to determine where any necessary mitigation or additional measures are required. Diffusion tubes were located at all educational institutions in the borough recorded on the Gov.UK register of schools, the details of the monitoring programme are reported in Appendix C Diffusion tube results for additional school monitoring programme. Initial 'screening' data indicated that the vast majority of educational sites are 'low risk'. Where the

initial monitoring found nitrogen dioxide concentrations to be potentially close to, or in excess of the annual air quality objective, the monitoring period was extended to 12 months in order to allow more accurate data evaluation, this data will be reviewed in the next Annual Status Report (2020).

A number of community groups also carry out diffusion tube monitoring to investigate localised areas of concern, where this identifies new hot spots additional locations can then be considered for addition to the council's diffusion tube monitoring network. Details of the community monitoring programmes are reported in Appendix D Diffusion tube results for additional citizen science monitoring programmes. We would like to take the opportunity to thank all groups and the individuals who gave up their time to extend diffusion tube monitoring in the borough during 2019.

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2019

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
ME2	Merton Road, South Wimbledon	525808	170122	Roadside	Y	3	0.6	1.6	PM_{10}	BAM
ME9	Civic Centre, Morden	525588	168498	Roadside	Y	0.6	3.0	2.5	NO_2	chemiluminescent

Table C. Details of Non-Automatic Monitoring Sites for 2019

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance to kerb of nearest road (N/A if not applicable) (m)	Distance from monitoring site to relevant exposure (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
1	A298 Bushey Rd nr Bushey Ct, SW20	523139	169056	Roadside	Y	1.5	15.3	2.5	NO_2	N
2 (GA)	A24 Jct with Garth Drive Morden, SM3 9HU	524131	166112	Roadside	Y	1.7	12.2	2.4	NO_2	N

3	A24 Jct Tudor Drive, SM4 4PE	524137	166122	Kerbside	Y	0.7	9.6	2.4	NO_2	N
4 (FA)	154 Grand Drive Raynes Park	523315	168048	Kerbside	Y	0.9	3.6	2.4	NO_2	N
5 (BA)	Sacred Heart Sch, Burlington Road New Malden	522501	168235	Kerbside	Y	0.7	7.9	2.4	NO_2	N
6 (JC)	17 Grand Drive Raynes Park	523207	169195	Kerbside	Y	0.3	8.4	2.4	NO_2	N
7	A298 Kingston Rd, SW20 8LX	524401	169351	Roadside	Y	1.5	8.3	2.4	NO_2	N
8	A238 Coombe Lane, SW20 8NF	523246	169333	Kerbside	Y	0.6	2	2.2	NO_2	N
9	2 Lambton Rd, SW20	523241	169415	Kerbside	Y	0.5	3.6	2.2	NO_2	N
10	A238 Coombe Lane, SW20	521912	169806	Roadside	Y	1.7	16.4	2.4	NO_2	N
11	Kingston Rd SW20 1JW	525602	170042	Kerbside	Y	0.4	3.4	2.4	NO_2	N
12 (RA)	Pepys Road Morden	523357	169534	Kerbside	Y	0.6	10.1	2.4	NO_2	N
13	B281 Cottenham Pk Rd, SW20	522069	169765	Kerbside	Y	0.6	12.4	2.2	NO_2	N
14 (AC)	20 The Ridgeway Wimbledon	524120	170874	Kerbside	Y	0.4	1.5	2.4	NO_2	N
15	20 High St,Wimbledon, SW19 5BY	523808	171100	Kerbside	Y	0.5	2.8	2.2	NO_2	N
16	84 High St, Wimbledon, SW19	524071	171076	Kerbside	Y	0.6	2.9	2.2	NO_2	N
17 (WA)	Woodside Wimbledon	524608	170873	Kerbside	Y	0.5	6.7	2.4	NO_2	N

18	Hand & Racquet, Wimbledon Hill	524696	170725	Kerbside	Y	0.3	2.6	2.4	NO_2	N
19	Wimbledon Station	524770	170645	Roadside	Y	2.5	3.6	2.4	NO_2	N
20	Hartfield Rd, Wimbledon b	524867	170500	Kerbside	Y	0.4	4.8	2.2	NO_2	N
21 (EA)	246 Merton Rd, Sth Wimbledon A219	525798	170081	Roadside	Y	0.5	1.9	2.4	NO_2	N
22	12-16 Upper Green West, CR4 3AA	527785	169049	Roadside	Y	2	4.2	2.4	NO_2	N
23	183 Kingston Rd, SW19 1LH	525156	169935	Kerbside	Y	0.6	1.9	2.2	NO_2	N
24	75 Hartfield Rd SW19 3TJ	524994	170329	Kerbside	Y	0.7	4.1	2.4	NO_2	N
25	Alexander Rd, SW19 7LE	525132	171174	Roadside	Y	2.1	4	2.2	NO_2	N
26	Gap Rd, SW19 8JG	525708	171413	Roadside	Y	2.3	5.1	2.2	NO_2	N
27	Plough Lane	526035	171472	Roadside	Y	2.3	6.5	2.2	NO_2	N
28 (BC)	11 Haydons Road SW19 1HG	526158	170167	Roadside	Y	2.4	5.9	2.4	NO_2	N
29 (HA)	A24 - 44 High St Colliers Wood, SW19 2AB	526927	170654	Kerbside	Y	0.7	2.6	2.4	NO_2	N
30	A24 Christchurch Rd, SW19 2PB	526791	170087	Roadside	Y	0.3	3	2.4	NO_2	N
31 (LA)	Alley Charminster Ave Morden	525449	169152	Background	Y	15	9	2.4	NO_2	N
32	Merantum Way, SW19 2JY	526109	169818	Kerbside	Y	0.8	4.8	2.4	NO_2	N

33	A24 Morden Rd, SW19 3BP	525803	169467	Roadside	Y	2.7	3.6	2.2	NO_2	N
34 (GC)	Western Rd Colliers Wood	526840	169694	Roadside	Y	2	2.3	2.2	NO_2	N
35 (MA)	Lavender Ave Morden	527621	169646	Kerbside	Y	0.4	5.8	2.2	NO_2	N
36 (DC)	35 London Rd Tooting	527913	170518	Roadside	Y	1.5	1.9	2.4	NO_2	N
37 (CC)	107 London Rd Tooting	527932	169502	Kerbside	Y	0.6	2.4	2.4	NO_2	N
38 (EC)	BHF, 265 London Rd, Mitcham	527743	168874	Kerbside	Y	0.6	4.2	2.4	NO_2	N
39 (FC)	Church Rd, Mitcham	527158	168646	Kerbside	Y	0.6	3	2.4	NO_2	N
40	A217 London Rd, CR4 4BF	527370	168312	Kerbside	Y	0.8	5.4	2.4	NO_2	N
41	A239 Morden Rd, SM4 6AU	526395	168172	Roadside	Y	1.5	3.1	2.4	NO_2	N
42	St Hellier Rd, SM4 6JE	526211	167683	Roadside	Y	3.3	12.8	2.4	NO_2	N
43	Morden Hall Rd nr jct, SM4 5JG	526151	168293	Roadside	Y	2.4	22.2	2.3	NO_2	N
44 (AA)	Oxfam, London Rd, Morden	525817	168643	Kerbside	Y	0.6	4.9	2.4	NO_2	N
45 (IC)	HSBC, London Rd Morden	525778	169824	Kerbside	Y	0.9	2.6	2.4	NO_2	N
46 (HC)	80 Crown Lane Morden	525401	168502	Kerbside	Y	0.6	5	2.4	NO_2	N
47	Civic Centre, Morden	525588	168498	Roadside	Y	1.5	1.5	2.4	NO_2	Y
48	Aberconway Rd, SM4 5LF	525757	168509	Roadside	Y	1.2	7.7	2.4	NO_2	N

49	Crown Rd, Jcn Stanley Rd	525500	168470	Kerbside	Y	0.8	2.9	2.4	NO_2	N
50	Martin Way, SM4 4AR	524638	168616	Kerbside	Y	0.7	9.7	2.4	NO_2	N
51	A24 Streatham Rd nr Sandy Lane/Gorringe Pk Sch	528219	169782	Roadside	Y	1.6	5.2	2.4	NO_2	N
52	West Barnes Lane nr level crossing	522749	168500	Kerbside	Y	0.6	1.4	2.4	NO_2	N
53	A24 139 Epsom Rd, nr traffic lights, SM3 9EY	524621	166786	Kerbside	Y	0.7	3.6	2.4	NO_2	N
54	43 Upper Green East, Mitcham, CR4 2PF	527890	168920	Roadside	Y	2.4	2.0	2.3	NO_2	N
55	213 Manor Road, Mitcham, CR4 1JH	529661	168839	Kerbside	Y	0.6	5.2	2.2	NO_2	N

1.2 Comparison of Monitoring Results with AQOs

The results presented are after bias adjustment using the locally derived bias adjustment factor (refer to Appendix A2 for details). Annualisation was not required at any site in Merton for 2019 as all sites achieved a data capture rate of 75% or higher. For results that indicate the exposure estimate, calculated for the nearest residential façade see, Appendix A3.

Notes:

Any ID's from 2016 or earlier are in brackets. Full site descriptions and the 2019 monitoring data for the revised network are provided in Table C.

Table D. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results (μg m^{-3})

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (μg m^{-3})						
					2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
ME9	Civic Centre, Morden	RS Automatic	96	96	**40.1**	38 (37.9)	34	Faulty	Faulty	**48**	**51.0**
1	A298 Bushey Rd nr Bushey Ct, SW20	RS DT	100	100	not open	not open	not open	not open	**52**	**47.8**	**47.1**
2 (GA)	A24 Jct with Garth Drive Morden, SM3 9HU	RS DT	100	100	39.6	32.8	32	32[d]	**41[c]**	36.7	35.7
3	A24 Jct Tudor Drive, SM4 4PE	KS DT	closed	closed	not open	not open	not open	not open	34	closed	closed
4 (FA)	154 Grand Drive Raynes Park	KS DT	100	100	37.7	**43.4** (36.5)	32	39.3[d]	37	30.4	30.6
5 (BA)	Sacred Heart Sch, Burlington Road New Malden	KS DT	92	92	42	32.9	28	32[c]	**42**	38.0	33.0
6 (JC)	17 Grand Drive Raynes Park	KS DT	100	100	**42.1**	32.4	N/A	34[d]	**45**	**43.0**	**42.6**
7	A298 Kingston Rd, SW20 8LX	RS DT	92	92	not open	not open	not open	not open	**44**	**46.0**	**41.1**
8	A238 Coombe Lane, SW20 8NF	KS DT	100	100	not open	not open	not open	not open	**53**	**43.1**	**46.3**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
					2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
9	2 Lambton Rd, SW20	KS DT	100	100	not open	not open	not open	not open	**43**	**46.8**	**43.3**
10	A238 Coombe Lane, SW20	RS DT	closed	closed	not open	not open	not open	not open	38	**43.6**	closed
11	Kingston Rd SW20 1JW	KS DT	100	100	not open	not open	not open	not open	35	35.8	33.9
12 (RA)	Pepys Road Morden	KS DT	100	100	35.9	32.8	26	36	30	closed	closed
13	B281 Cottenham Pk Rd, SW20	KS DT	92	92	not open	not open	not open	not open	**44**	36.9	35.4
14 (AC)	20 The Ridgeway Wimbledon	KS DT	closed	closed	**47.6**	**41.6** (38)	N/A	**45**[d]	**44**	**42.2**	**43.7**
15	20 High St, Wimbledon, SW19 5BY	KS DT	100	100	not open	not open	not open	not open	26	26.2	closed
16	84 High St, Wimbledon, SW19	KS DT	closed	closed	not open	not open	not open	not open	39	**44.9**	**44.8**
17 (WA)	Woodside Wimbledon	KS DT	100	100	33.7	**40.5** (36.1)	25	37	30	closed	closed

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
					2013[c]	2014 [c]	2015[c]	2016 [c]	2017 [c]	2018 [c]	2019 [c]
18	Hand & Racquet, Wimbledon Hill	KS DT	92	92	not open	not open	not open	not open	**64**	**65.6**	**64.7**
19	Wimbledon Station	RS DT	100	100	not open	not open	not open	not open	**52**	**54.5**	**50.9**
20	Hartfield Rd, Wimbledon b	KS DT	83	83	not open	not open	not open	not open	**48**	**55.1**	**52.4**
21 (EA)	246 Merton Rd, Sth Wimbledon A219	KS DT	100	100	**57.5**	**61.1 (50.5)**	**65**	**61[d]**	**57**	**68.8**	**63.2**
22	12-16 Upper Green West, CR4 3AA	RS DT	100	100	not open	not open	not open	not open	**77**	**63.7**	**56.5**
23	183 Kingston Rd, SW19 1LH	KS DT	75	75	not open	not open	not open	not open	**61**	**58.3**	**54.8**
24	75 Hartfield Rd SW19 3TJ	KS DT	75	75	not open	not open	not open	not open	38	39.0	32.3
25	Alexander Rd, SW19 7LE	RS DT	100	100	not open	not open	not open	not open	**41**	39.1	40.0
26	Gap Rd, SW19 8JG	RS DT	100	100	not open	not open	not open	not open	**47**	**45.3**	**44.5**
27	Plough Lane	RS DT	100	100	not open	not open	not open	not open	**46**	**45.5**	**42.2**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
					2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
28 (BC)	11 Haydons Road SW19 1HG	RS DT	100	100	**48.3**	**43.6 (42.6)**	N/A	**54[d]**	**46**	**49.0**	**43.1**
29 (HA)	A24 - 44 High St Colliers Wood, SW19 2AB	KS DT	100	100	**52.2**	**49.8 (46.6)**	31	**49.9[c,d]**	**61**	**65.9**	**60.3**
30	A24 Christchurch Rd, SW19 2PB	KS DT	100	100	not open	not open	not open	not open	**48**	**50.9**	**51.0**
31 (LA)	Alley Charminster Ave Morden	BG DT	100	100	26.1	26	17	24	20	20.5	19.8
32	Merantum Way, SW19 2JY	KS DT	100	100	not open	not open	not open	not open	**42**	38.2	34.7
33	A24 Morden Rd, SW19 3BP	RS DT	100	100	not open	not open	not open	not open	**49**	**48.2**	**47.1**
34(GC)	Western Rd Colliers Wood	RS DT	100	100	N/A	N/A	**53**	**64[d]**	**59**	**55.4**	**53.8**
35 (MA)	Lavender Ave Morden	KS DT	100	100	35.2	32.2	32	39	31	31.2	28.8
36 (DC)	35 London Rd Tooting	RS DT	100	100	**59.3**	**55.5 (50.2)**	**45**	**57[d]**	**42**	**46.9**	**40.4**
37 (CC)	107 London Rd Tooting	KS DT	100	100	**72.6**	**67.2 (54.5)**	**64**	**62[d]**	**61**	**67.3**	**56.1**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
					2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
38 (EC)	BHF, 265 London Rd, Mitcham	KS DT	100	100	**40.4**	38	37	39[d]	**41**	**44.3**	**41.0**
39 (FC)	Church Rd Mitcham	KS DT	100	100	**45.2**	36.2	37	**41[d]**	**45**	**47.9**	**40.3**
40	A217 London Rd, CR4 4BF	KS DT	100	100	not open	not open	not open	not open	**46**	**51.9**	**41.0**
41	A239 Morden Rd, nr O, CR4 6AU	RS DT	92	92	not open	not open	not open	not open	**41**	**47.5**	**45.4**
42	St Hellier Rd, SM4 6JE	RS DT	100	100	not open	not open	not open	not open	35	37.9	**42.0**
43	Morden Hall Rd nr jct, SM4 5JG	RS DT	100	100	not open	not open	not open	not open	**44**	**50.1**	**44.5**
44 (AA)	Oxfam, London Rd, Morden	KS DT	100	100	**48.2**	**51 (48.7)**	N/A	38[c,d]	**57**	**61.9**	**62.2**
45 (IC)	HSBC, London Rd Morden	KS DT	100	100	N/A	N/A	**40**	**45[c,d]**	**45**	**48.2**	**47.8**
46 (HC)	80 Crown Lane Morden	KS DT	100	100	N/A	N/A	**46**	**48[d]**	61	**52.9**	**48.7**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
					2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
47	Civic Centre, Morden	RS DT	100	100	not open	not open	not open	not open	**51**	**51.3**	**51.7**
48	Aberconway Rd, SM4 5LF	RS DT	100	100	not open	not open	not open	not open	**41**	**42.1**	38.7
49	Crown Rd, Jcn Stanley Rd	KS DT	100	100	not open	not open	not open	not open	39	39.9	39.3
50	Martin Way, SM4 4AR	KS DT	100	100	not open	not open	not open	not open	**45**	**43.2**	40.0
51	A24 Streatham Rd nr Sandy Lane/Gorringe Pk Sch	RS DT	100	100	not open	not open	not open	not open	not open	37.8	33.3
52	West Barnes Lane nr level crossing	KS DT	92	92	not open	not open	not open	not open	not open	34.6	30.0
53	A24 139 Epsom Rd, nr traffic lights, SM3 9EY	KS DT	92	92	not open	not open	not open	not open	not open	**43.1**	**50.6**
54	43 Upper Green East, Mitcham, CR4 2PF	RS DT	100	100	not open	not open	not open	not open	not open	not open	**<u>61.5</u>**
55	213 Manor Road, Mitcham, CR4 1JH	KS DT	100	100	not open	not open	not open	not open	not open	not open	**44.5**

Notes: Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.

NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Table D shows the NO_2 diffusion tube monitoring results, with bias corrected values for each year from 2013 to 2019. (Note – see Table L for the uncorrected monthly data for 2019).

Note: Prior to 11th October 2017 continuous monitoring of nitrogen dioxide was measured by instrument ME1. The roadside site was located at Morden Civic Centre and suffered a series of faults during 2016, no data is available for 2016 and 2017 for this reason. A new chemiluminescent NO_2 analyser was installed on the 11th October 2017 identified as ME9.

The results in bold indicate an exceedance of the annual mean Air Quality Objective (AQO) of 40 μgm^{-3} and the results underlined indicate an NO_2 annual mean in excess of 60 μgm^{-3} highlighting a potential exceedance of the NO_2 hourly mean AQO. Diffusion tube data above 40 μgm^{-3} have been bias corrected (for details see Appendix A Details of Monitoring Site QA/QC), as the data capture was above 75% at all sites annualisation was not necessary. The data capture improved again in 2019, overall the data capture rate was 98% which is very good.

The distance correction calculations for monitoring sites that exceeded the annual mean objective are presented in Appendix A, Table K. Nitrogen dioxide concentration reduces rapidly with distance from the kerbside, the data in Table K shows what a dramatic effect distance has on a roadside / kerbside measurement. By correcting for distance 20% more sites are predicted to achieve compliance at the nearest sensitive receptor, that is the NO_2 concentration is predicted to be below the AQO of 40 μgm^{-3} at the façade of the nearest residential property.

Diffusion Tube Data Analysis

In 2019 the diffusion tube network consisted of 50 monitoring locations across Merton. The original diffusion tube network of 20 monitoring locations was incorporated into the 2017 revised network to help assess trends over time.

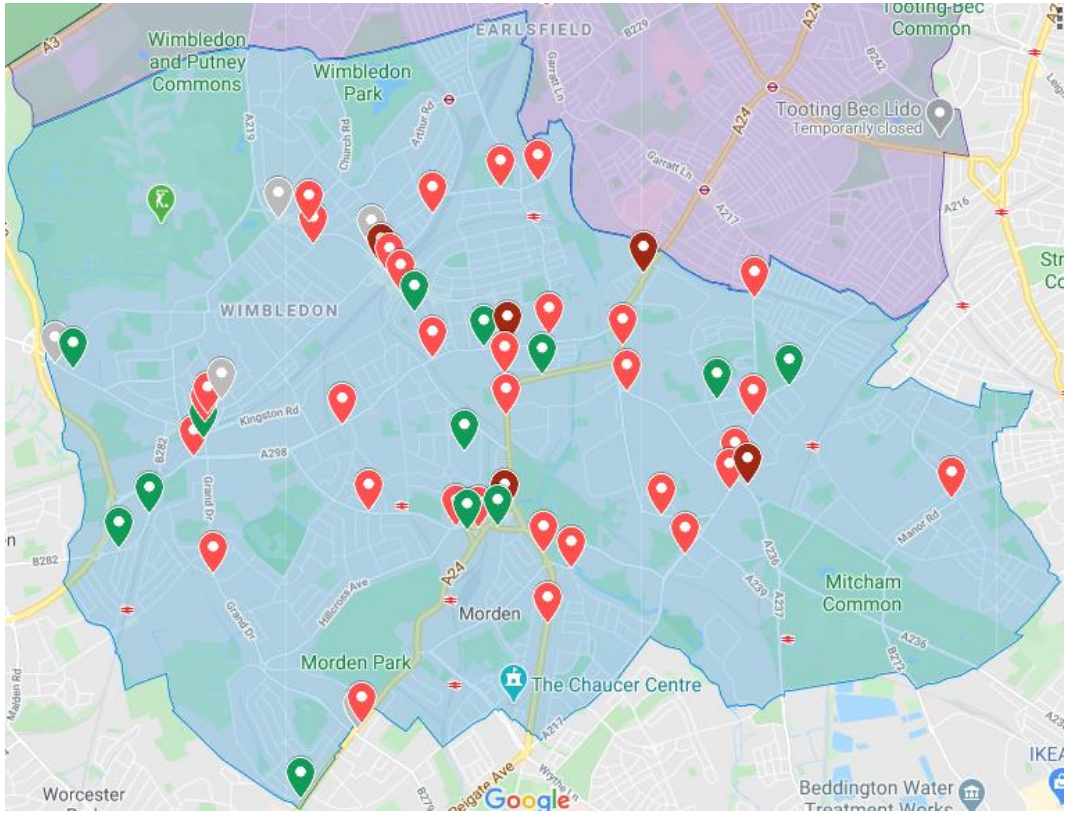
The results from the 2019 monitoring (Table D) show that the objective of 40 μgm^{-3} was exceeded at 37 monitored locations in the borough which is 74% of sites, concentrations are mapped in Figure 1. Five of these sites also exceeded an annual mean of 60 μgm^{-3} which indicates that the 1 hour-mean objective may also have been exceeded at these locations:

- **(18) Wimbledon Hill, 64.7 μgm^{-3}**
- **(21) Merton Road, South Wimbledon, 63.5 μgm^{-3}**
- **(29) High Street Colliers Wood, 60.3 μgm^{-3}**
- **(44) London Road, Morden, 62.2 μgm^{-3}**
- **(54) Upper Green East, Mitcham, 61.5 μgm^{-3}**

The sites in bold have exceeded 60 μgm^{-3} for a number of years but overall annual concentrations have remained relatively static. All of the monitoring sites that exceeded 60 μgm^{-3} are in town centre locations which indicate a high foot fall and population exposure affecting residents and visitors alike. The source of pollution in town centres remains road traffic, it is essential that bold measures are taken to remove the dirtiest vehicles and reduce vehicle numbers to relieve congestion. The boroughs Air Quality Action Plan 2018-2022 outlines a range of measures that are being undertaken to reduce transport based emissions, progress updates for 2019 are provided in Table H.

In 2018 sites at Upper Green West (Mitcham Town Centre) (Site ID 22) and London Road, Tooting (Site ID 37) were among the six sites exceeding an annual mean of 60 μgm^{-3}, concentrations fell below this threshold in 2019 indicating that an exceedance of the 1 hour-mean objective was unlikely to have occurred at these locations.

Figure 1: London Borough of Merton mapped 2019 NO_2 concentrations



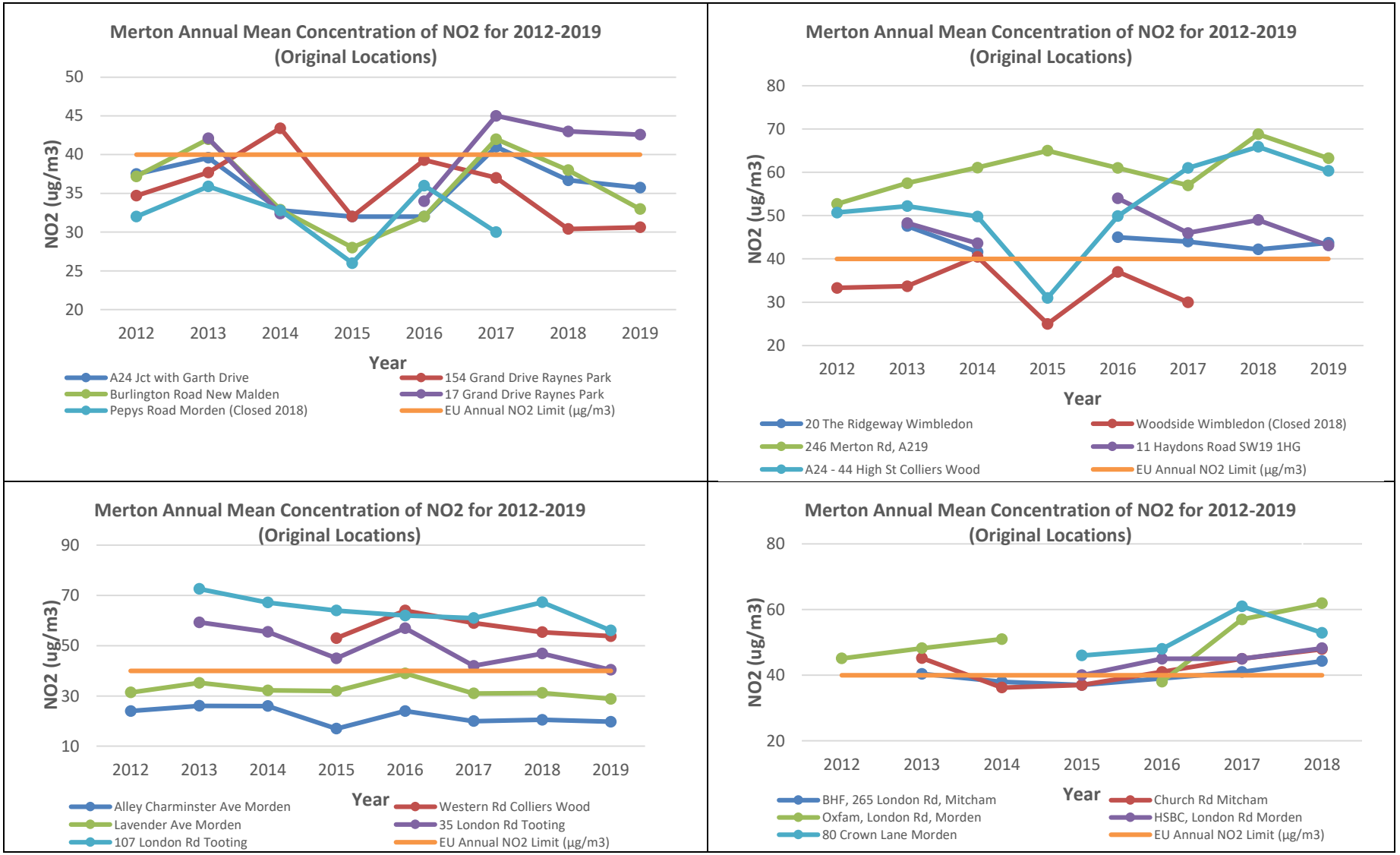
Compliant site: Annual mean NO_2 <40 μgm^{-3}

Non-compliant site: Annual mean NO_2 >40 μgm^{-3}

Non-compliant site: Annual mean NO_2 >60 μgm^{-3} indicating that the short term hourly NO_2 air quality objective may be exceeded.

Closed sites

Figure 2: Long term NO_2 concentration trends in Merton 2012-2019 (all data bias adjusted)



The overall monitoring results for the Borough show that NO_2 concentrations exceeded the UK annual mean objective (as it has done for each year since 2005), and improvements are still required. As the greatest exceedences occur in town centres and along arterial routes through the borough Clean Air Zones supported by other transport related measures such as lobbying TfL for cleaner buses quicker, the diesel levy and encouraging behaviour change of drivers towards more sustainable and lower emission vehicles is key in tackling air pollution.

Table E. NO_2 Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of Hourly Means > 200 µg m^{-3}						
			2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
ME9	96	96	No data	No data	No data	No data	No data	0	1

Notes: Exceedance of the NO_2 short term AQO of 200 µg m^{-3} over the permitted 18 days per year are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Table E provides results for the automatic monitoring station at the Civic Centre, Morden (ME9) site which houses a chemiluminescent NO_2 analyser. The automatic monitoring data are subject to correction by the Environmental Research Group at King's College London as part of the London Air Quality Network. At the time of reporting all data fully ratified.

The short term air quality objective of hourly mean concentration of 200 µgm^{-3} not to be exceeded more than 18 days per year was achieved at the Civic Centre site, just 1 hourly mean concentration exceeded the limit in 2019.

Note: Prior to 11th October 2017 continuous monitoring of nitrogen dioxide was measured by instrument ME1. The roadside site was located at Morden Civic Centre and suffered a series of faults during 2016, no data is available for 2016 and 2017 for this reason. A new chemiluminescent NO_2 analyser was installed on the 11th October 2017 identified as ME9.

Table F. Annual Mean PM_{10} Automatic Monitoring Results (μg m^{-3})

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (μg m^{-3})						
			2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
ME2	96	96	31	28	25	24[c]	24	34[c]	28

Notes: Exceedance of the PM_{10} annual mean AQO of 40 μg m^{-3} are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Table F provides results for the automatic monitoring station at the Merton Road, South Wimbledon (ME2) site which houses a Beta Attenuation Monitor (BAM) particulate analyser. The automatic monitoring data for the automatic monitoring stations are subject to correction by the Environmental Research Group at King's College London as part of the London Air Quality Network. At the time of reporting all data fully ratified. BAM particulate analysers are equivalent to the PM_{10} reference method and the applicable correction factor has been applied by Kings College for all data presented in this report.

The annual mean objective of 40 μgm^{-3} was achieved at the Merton Road (ME2) site, with an annual mean concentration of 28 μgm^{-3}, this correlates well with pre-2018 data. The data capture was poor for 2018 and the data required annualisation in accordance with LLAQM Technical Guidance which may have resulted in an artificial concentration 'spike'. Where data capture is below 75% no firm conclusions can be drawn as results may not be representative of the full year and should be used for guidance only.

Table G. PM_{10} Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of Daily Means > 50 µg m^{-3}						
			2013[c]	2014 [c]	2015[c]	2016 [c]	2017 [c]	2018 [c]	2019 [c]
ME2	96	96	31	17 (44.4)	21	8 (36.6)	10 (37.6)	13 (47.3)	20

Notes: Exceedance of the PM_{10} short term AQO of 50 µg m^{-3} over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m^{-3} are shown in **bold**.
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Table G provides a comparison of the 2019 monitoring data with the 24-hour mean objective. The objective of no more than 35 days exceeding 50 µgm^{-3} was achieved at the Merton Road (ME2) site in 2019, a total of 20 daily means exceeded 50µgm^{-3}.

Due to poor data capture in previous years it is not possible to accurately identify a trend in the data. As data capture was below 75% in 2016, 2017 and 2018, data was annualised in accordance with LLAQM Technical Guidance and the figure for annual comparison is bracketed. Where data capture is below 75% no firm conclusions can be drawn as results may not be representative of the full year and should be used for guidance only.

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table H provides a brief summary of the London Borough of Merton's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2019 are shown at the bottom of the table.

Table H. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress
Monitoring Air Quality		
1	Make available on the Council website all monitoring data in an accessible form.	Annual Status Reports containing tabulated and mapped data are publically available on the Council website. Air quality monitoring data and modelled air quality data from the London Atmospheric Emissions Inventory (LAEI 2016) has been added to the Council's mapping system (Merton Maps) to allow the data to be viewed spacially. A mapping system refresh is underway, procurement of a new council mapping system took place in 2019, implementation will continue through 2020. Existing maps will be migrated to the new system. It will be possible to embed web maps on the Council website for groups to view the data that they have collected, data will be uploaded by the Council.

2	Continue to annually review our diffusion tube network and identify additional priority locations.	A number of additional tube locations expanded through Citizen Science the results for which can be found in Appendix D Diffusion tube results for additional citizen science monitoring programmes. All schools in the borough were monitored from August to December 2019. A risk based approach was taken and schools which were found to have monthly nitrogen dioxide concentrations of 20% of the annual mean air quality objective (40 ugm^{-3}) and above (32 ugm^{-3} to <40 ugm^{-3}) were continued to be monitored into 2020. Schools which were found to have a monthly nitrogen dioxide concentration of below 32 μgm^{-3} were suspended as complaint with the annual mean national air quality objective. The results for which can be found in Appendix C Diffusion tube results for additional school monitoring programme.
3	Positively encourage and support citizen science activities where these actively contribute to identify and tackling air quality in the borough	Merton continue to support citizen science projects and provide training and resources including funding additional diffusion tubes. Handheld monitors available for loan for projects.
4	Invest in hand-held monitoring equipment that can be used by citizen science groups and schools.	Investment planned in a new calibrated mobile monitor to use for monitoring specific locations and support projects, including PM2.5 and sub PM1 monitors
5	Seek additional funding for a refresh and update of our monitoring network including grant funding, Section 106 and Community Infrastructure Levy.	Funding secured through Section 106 agreement at Wimbledon Stadium for an automated monitoring station. Quotes being submitted and need to concentrate on fine particulate matter PM2.5 as well as nitrogen dioxide. Timeframe of installation will be determined by access to budget. Location of monitoring will be (Plough Lane). The monitoring data will link into the London Air Quality Network.
6	Produce and update an interactive map of diffusion data that can be contributed to by groups and citizen science activities.	Map refresh underway with GIS Team, procurement took place in 2019 and implementation will continue through 2020. It will be possible to embed web maps on the Council website for groups to view the data they have collected, all data will be uploaded by the Council.

7	Assess and incorporate new technology in the world of air quality.	Officers attend the London Air Quality Network (LAQN) conference hosted by King's College London annually. The LAQN is a unique collaboration between the public, private and academic sectors and the annual conferences are a chance for air quality researchers and practitioners to discuss the latest findings and developments in the field. The Council has regular meetings with suppliers to discuss and evaluate new air quality monitoring equipment.
8	We will commission modelling of air quality in the borough up to 2022, by King's College London, including predicted trends and contributing sources.	An updated London Atmospheric Emissions Inventory (LAEI) for the base year 2016 was published by the Greater London Authority in 2019. The inventory provides emissions estimates of key pollutants (NOx, PM10, PM2.5 and CO2) by source type. The LAEI provides a best estimate of pollution across the borough where direct monitoring is not available. The GIS Team imported LAEI data onto the Council's mapping system to allow the data to be viewed, these maps will be migrated to the new system during 2020. Funding is to be sought in 2020 to complete borough specific air quality modelling.
9	Map Focus Areas & air quality 'hotspots' on planning GIS mapping to ensure these areas are highlighted	The GIS Team imported Air Quality Focus Area data onto the Council's mapping system to allow them to be easily viewed, these maps will be migrated to the new system during 2020.
Reducing Emissions from Buildings & Developments		
10	Ensure that air quality is a vital part of the Council's New Local Plan.	Improving air quality and mitigation in developments will be embedded in the new Local Plan and supporting (emerging) Air Quality Supplementary Planning Document (SPD).

		A commitment was made in 2019 to bring forward producing Merton's Air Quality Supplementary Planning Document (SPD). The SPD is expected to be adopted in 2021. Following rounds of public consultations and public examination Merton's Local Plan is expected to be adopted winter 2021. Next round of Local Plan public consultation is autumn 2020. The London Plan (Intend to Publish-2019) is expected be adopted in 2020. https://www.merton.gov.uk/planning-and-buildings/planning/local-plan/newlocalplan
11	Adoption of New AQ Supplementary Planning Document (SPD) to ensure emissions from new development are minimised and effective mitigation is integrated into the scheme of design.	The SPG will combine best practice across the Regulatory Services Partnership (London Boroughs of Merton, Richmond Upon Thames and Wandsworth).
12	Ensure air-quality-neutral development is required, and request where applicable an air quality assessment	This is now standard practice in the planning process.
13	Work with key partners in the GLA to explore the feasibility and delivery of air-quality-positive development particularly around our Focus Areas.	Ongoing. This has formed part of the New Local Plan and awaiting feedback from the Inspectorate.
14	Ensure that new development contributes to funding air quality measures in the borough through Section 106 and CIL payments.	Ongoing. This will be formalised in the Air Quality Supplementary Planning Document. The Council is also looking at including the costs of regulation in Section 106 contributions.
15	Ensure that new development have a scheme of mitigation for tackling air quality including traffic reduction and low emissions strategies.	Ongoing. This will be formalised in the Air Quality Supplementary Planning Document.

16	Produce and promote guidance to homeowners on what they can do to their homes to help reduce pollution in the borough.	Active climate change initiative discussions on partnership underway with the Climate Change Team to ensure that all building emissions are considered. In July 2019, Merton Council declared a Climate Emergency and since then the Council has been working with many groups to develop a Strategy and Action Plan that will deliver net zero greenhouse gas emissions for the Council by 2030, and the borough by 2050. Merton have undertaken a thorough evidence review, commissioned a technical study on Merton's greenhouse gas emissions and transition to low carbon, completed a public consultation and taken advice from the Climate Emergency Working Group which has been tasked to steer the development of the action plan. There has been a high level of support received from the public and within the Council on the development of the Climate Change Action Plan which is due for completion in 2020. https://www.merton.gov.uk/planning-and-buildings/sustainability-and-climate-change/climate-emergency
17	Consider how we can extend the provision of vehicle charging to smaller residential development to ensure the borough is ready for electric vehicles.	Ongoing. This will be formalised in the Air Quality Supplementary Planning Document.
18	Continue to run our NRMM Project across the south of London and extend this to other boroughs.	Initiated the 2019-2022 Pan London NRMM Project covering all 33 boroughs. Published updated industry guidance documentation and delivered many training events to industry stakeholders. Attended trade shows and ensured generator manufacturers were suitably signposted in regard to upcoming Stage V requirements. Nominated as Finalists for the Local Government Chronicle Environmental Services award.

19	Seek additional funding from DEFRA/GLA/Construction Industry to promote good practice on construction sites.	Funded as part of Action 18 – NRMM London Wide Project.
20	Request adoption of new techniques that have proven to be beneficial to air quality, such as Construction Logistics and Delivery and Service Planning.	Ongoing. This will be formalised in the Air Quality Supplementary Planning Document.
21	Review the Council's allocation of the Section 106 and CILs budget to see if this can provide funding to benefit air quality measures	Ongoing. Internal meetings underway funding streams identified.
22	Continue to request robust and enforceable measures to minimise the impact of developments during the construction phase	Ongoing. Planning Conditions to be reviewed in 2020 as part of the RSP Pollution Team initiatives.
Reducing Emissions from Road Transport		
23	Commitment to a cycle Quiet-way between Clapham Common & Wimbledon forming the Merton section of the Wandle trail.	Directional/Wayfinding linage and signage was installed in summer 2019 to assist cyclists move from Kingston to Clapham Common via Wimbledon and the Wandle Trail Note: the branding has since changed from "Quietway 4" to "Cycleway 5"
24	Review funding available through Section 106 and CILs around transport and travel infrastructure.	Merton's Local Implementation Plan (LIP) to deliver the Mayor of London's transport strategy was formally signed off by TfL in August 2019 https://www.merton.gov.uk/streets-parking-transport/lip3 Support for transport infrastructure from relevant substantial developments where meets Section 106 tests. Transport improvements around individual sites are provided through funding from developments (via Section 278 legal agreements)

		In 2018-19 and 2019-20 Merton's Neighbourhood fund sponsored Merton Chamber of Commerce's "Community Champions" programme, one of whose roles was raising awareness of actions residents could take to improve air quality.
25	Carryout a borough wide cycling network audit to review and update the network.	£1.5m is currently being spent on 18 initiatives with a focus on Cycling, Walking and Pedestrian safety. Cycling part of Merton's Local Improvement Plan 3, delivering the Mayor's Transport Strategy. Merton's Local Implementation Plan (LIP) to deliver the Mayor of London's transport strategy was formally signed off by TfL in August 2019 https://www.merton.gov.uk/streets-parking-transport/lip3
26	Programme of installing bicycle infrastructure	As above
27	Feasibility study to consider the use of Clean Air Zones (CAZ's) or a Merton Specific Ultra Low Emission Zone for Focus Areas and beyond.	Deferred. Funding secured from April 2020. Initial focus to be on Wimbledon Town Centre. Scoping report tenders 2020.
28	Air Quality Audit traffic and congestion in our three air quality focus areas.	Deferred. Funding secured from April 2020. Linked to scoping report Action 27.
29	Support and promote the use of a cleaner vehicle checker to inform the public of cleaner vehicle choice.	Electric vehicles Merton had 5 rapid chargers (50kw) on main roads (Transport for London Road Network), plus 2 approved in Wimbledon for installation in 2020. Fast chargers (7kw) 145 installed (a few may still be awaiting commissioning). Lamp column chargers - looking to procure 20 over the next few months for installation in 2020 (subject to lockdown) and availability of matched funding.

		The Council is also looking to bid for ORCs (On-street Residential Chargepoint Scheme) funding through London Council's.
30	Lobby for Cleaner Buses and Taxis	The Mayor's Transport Strategy (MTS) was published in March 2018. Proposal 29 sets outs timeframe as to how the Mayor will clean London's bus fleet and that by 2037 all TfL buses will be electric or hydrogen. Merton Council continues to lobby for a greater share of TfL bus fleet investment to be targeted towards providing zero emission vehicles on the most polluted routes passing through this borough. We believe that TfL's MTS target does not go far enough and that the bus procurement programme should be accelerated so that the whole of greater London can enjoy the benefits of cleaner buses much sooner. Individual bus route contracts are typically retendered on a rolling 5 to 7 year basis. This Council strongly believes that all new bus service contracts should explicitly stipulate the purchase of only electric or hydrogen buses now (or hybrid double deckers, if cleaner alternatives at not available at the time). It is also noted that from 2020 TfL will buy only electric or hydrogen single deck vehicles and all double deckers meet Euro VI standard as a minimum.
31	Introduce Air Quality initiatives, benefits and monitoring in the new South Wimbledon Junction design and build.	South Wimbledon junction will be reviewed in line with the Healthy Streets objectives, which include sustainable transport and improved air quality. All measures that are funded via the Mayor's Transport Strategy (LIP) will be considered against the healthy streets agenda and objectives.
32	Review the impact of our diesel levy* and consider a review of parking and charges to help reduce combustion engine vehicle use and the consequent emissions. ***Note:** The Sustainable Communities and Transport Overview and Scrutiny Panel to conduct pre-decision scrutiny on the scope of any reviews on parking levies.*	Merton consider the use of the parking agenda as key to delivering cleaner air. The diesel levy was one of a number of parking/Air Quality Initiatives which now include a review of parking charges throughout the borough and a future commitment to differential charges.

		In 2019 a 'Parking Charges' consultation began. The proposals seek to raise the costs of parking for more polluting vehicles to encourage a positive shift towards cleaner vehicles to improve air quality and health. https://www.merton.gov.uk/streets-parking-transport/parking/consultations/charges-consultation-2019/background
Raising Awareness		
33	We will continue to support, fund and promote airText and other health based initiatives in the borough.	Merton continues to fund airText a publically available air pollution forecast service. https://www.airtext.info/
34	We will continue to support and update information on our Love Clean Air Website.	Ongoing.
35	We will review and update our own corporate website to include themed initiatives.	Council Communications Plan reviewed to keep air quality a running feature. Dedicated Anti Idling webpage created https://www.merton.gov.uk/communities-and-neighbourhoods/pollution/air-quality-and-air-pollution/tackling-idling
36	We will play an active and co-ordinating role in national and regional campaigns such as National Clean Air Day.	We actively participated in Clean Air day and Car Free Day in 2019 and will continue to do so. A public engagement event was held in Wimbledon Town Centre Piazza in on Clean Air Day to promote active and sustainable travel and talk to residents about air quality in the borough. Car Free Day was marked with 14 resident led playstreets (application fees were waivered by the Council) and a LBM public engagement event at Morden station.

37	Continue to aspire to London's Cleaner Air Borough status award.	Ongoing and new criteria issued
38	Ensure that the good work and best practice we are delivering is publicised and disseminated to colleagues in the air quality industry.	This is ongoing, we are now running the NRMM project throughout London and pulling together best practice and a consistent approach.
39	Work closely with our Public Health colleagues around joint health benefits.	We work closely and meet regularly with colleagues in Public Health including Directorship. Almost all initiatives are now linked to the public health agenda.
Working Together		
40	Establish a borough-wide air quality group.	An Environmental Sub Group has been formed which brings together interested and influential people to help deliver the AQAP and help lobby for changes. The group meets on a quarterly basis.
41	Establish an internal steering group within the local authority.	The steering group includes colleagues from Public Health and Climate Change.
42	Provide internal training sessions on air quality to internal partners and Councillors.	Planning ties continue to be strengthened. Planning and Air Quality training session for Councillors deferred to 2020 due to the General Election.
43	Co-ordinate air quality funding and lobby national government to provide further financial and strategic support for local authorities to improve air quality.	We actively respond to all consultations and initiatives, locally, regionally and nationally to raise the issues of air quality and the support needed for Local Authorities.
44	Lobby Transport for London (TfL) for action on cleaner buses and taxis in our Air Quality Focus Areas.	This is a priority for the borough and an action we continue to do through partnership meetings with TfL. Active discussions were held at the end of 2019 with TfL to undertake partnership working to tackle taxi idling in Wimbledon Town Centre in 2020.

45	The Director of Public Health (DPH) to be kept fully updated on air quality status and initiatives.	See Action 39
46	Public Health teams to support engagement and projects aimed at local stakeholders (businesses, schools, community groups and healthcare providers).	Joint SNAP (School Neighbourhood Approach Pilot, formerly the Superzones project). The pilot involved identifying the potential the Council has to improve the urban environment in the 400 metres around a school, and then working with a selected school and local people and business to take action on issues that matter to them, such as air quality and a healthy environment, with the ultimate aim of reducing health inequalities. New schools are being scoped to join the programme. At the end of 2019 funding was obtained by the Council's Public Health Team from the Local Government Association (LGA) Behavioural Insights programme. This 12-month project will investigate the most effect form of anti-idling messaging at Primary Schools on a pilot study level. Joint Emissions Based Parking review to link together Public Health and Air Quality and how parking policy can deliver benefits to both agendas.
47	All air quality policies to be signed off by the DPH and to form close links to Public Health objectives.	Joint working and linking to sustainability
48	Make air quality part of The Health & Wellbeing Strategy / Joint Strategic Needs Assessment (JSNA) – the DPH to be retained as a member of the AQ steering group.	Deferred, to be reviewed in 2020.
Leading by Example		
49	Review our procurement contracts for outsourced transport services and incorporate policies to establish the best and most cost effective fleet possible.	The Council have around 90 vehicles which it owns and operates, and a similar number which it owns, but leases out such as those managing the waste collection and street cleaning services. Currently the majority of vehicles are petrol and diesel.

		For the Council-owned fleet, a business case was made to replace two buses. A cost benefit review of diesel versus electric was completed which considered the higher capital costs of electric buses, improved running costs and air pollution and emission savings versus a standard Euro-6 diesel bus. In the end the decision was to include all of the low carbon options in the business case, including things like leasing, hydrogen etc. Action in progress.
50	Review our maintenance and servicing arrangements for our buildings to ensure that these are as energy efficient and cost effective as possible.	Underway and part of Facilities Management activities. In July 2019, Merton Council declared a Climate Emergency and since then the Council has been working with many groups to develop a Strategy and Action Plan that will deliver net zero greenhouse gas emissions for the Council by 2030, and the borough by 2050. Merton have undertaken a thorough evidence review, commissioned a technical study on Merton's greenhouse gas emissions and transition to low carbon, completed a public consultation and taken advice from the Climate Emergency Working Group which has been tasked to steer the development of the action plan. There has been a high level of support received from the public and within the Council on the development of the Climate Change Action Plan which is due for completion in 2020.
51	Ensure all new build and extensions within the council portfolio are to the highest, most efficient standards possible within the allocated budget.	See Action 50
52	Encourage more walking, cycling and use of public transport for council business and review active travel plan for all staff.	Complete review of active travel plan and parking arrangements for staff across the council. Final report due in 2020.

		We have a fleet of electric and non-electric bikes for staff and investment in new Brompton bikes that can be taken on public transport to move staff away from private vehicle use. Merton also offer a business mileage scheme for cycling, to push staff towards cycling. Our Cleaner construction project (NRMM) operates a Brompton loan scheme for travel across London
53	Review staff parking to reduce the use of personal vehicles.	Project currently underway to reduce use of private vehicles by staff. This will include any emission charging for staff permits.
54	Recruit an Air Quality Officer, funded by our Diesel Surcharge.	Completed. Air Quality Officer appointed in 2018 and funded fulltime on a permanent contract.
Innovation & Technology		
55	We will work closely with our Public Health colleagues to keep up-to-date with the latest research relating to air quality and health.	Monthly meetings are held.
56	We will work closely with King's College London, the Greater London Authority and APRIL (Air Pollution Research in London – air quality expert group) to review the latest monitoring techniques	Annual meetings attended. Discussions underway with private companies to test low cost sensor technology.
57	Apply for grant schemes and incorporate new technologies and best practice.	The Council successfully bid for a number of projects. Those supported by the third round of the Mayor's Air Quality Fund (2019-2022). Funding was announced on the 7th June 2019 and ends in 2022:

		• Idling Action – a project to take action on idling (including enforcement), spanning 27 boroughs. • South London Construction Consolidation Centre – an initiative to consolidate construction deliveries across six south London boroughs, cutting at least 150 construction vehicle movements per day. • Non-Road Mobile Machinery Zone enforcement – a pan-London project to inspect construction sites in every borough to ensure they are using the cleanest construction equipment. • Healthy Streets Everyday – a project spanning 16 boroughs, which will deliver 250 car free and pedestrianisation initiatives or events over three years Funding awarded from Defra's Air Quality Grant scheme: • Clean Air Villages 3 (CAV3) - to deliver a CAV in Wimbledon Town Centre 2020/21. The year-long project spanning 12 London boroughs and 4 Business Improvement Districts, aims to improve air quality in 16 different London 'villages', where both air pollution and population density levels are high. Funding awarded from Local Government Association (LGA) Behavioural Insights programme. This 12-month pilot project will investigate the most effect form of anti-idling messaging at Primary Schools.
58	Disseminate and publicise our ground-breaking work around schools and NRMM.	This is ongoing through working with partner boroughs, the South London Air Quality Cluster Group and the Greater London Authority.
Tackling Pollution in our Borough		

59	Anti-idling to be adopted as an enforcement action in the borough with associated signage in problem areas.	To date over 200 anti-idling signs have been installed in the borough at schools, level crossings and taxi ranks. Currently 50% of schools have anti-idling signage installed. The roll out of signage to all remaining schools is on hold until the findings of the Behavioural Insights project are published in March 2021. Refer to Action 46/57. Civil Enforcement Officers (CEOs) have been trained to engage with idling drivers during their daily duties with a particular focus at schools during drop-off and pick-up times.
60	Start partnership working with the GLA and surrounding boroughs on anti-idling campaigns.	Merton were successful in its bid to the Pan London Idling Action project. Additional resources being sought from Cllr's and Community Leaders to supplement our internal anti-idling campaigns.
61	Work with neighbouring boroughs to consider tighter restrictions on bonfires.	Considering options and lobbying for greater powers.
62	Conduct campaigns relating to wood burning appliances and seek additional funding from DEFRA to carry out an impact assessment and explore further controls	Future action. We continue to lobby for tighter regulations on wood burning appliances.
62	Deliver cleaner construction throughout South London through our NRMM project and extend this nationally.	Project now London wide and funded by MAQF/GLA and match funding from London Boroughs.
64	Assess and inspect newly installed CHPs to ensure compliance with planning conditions	No staff for this function. Future action.
Our Schools		
65	Maintain our ongoing commitment to school travel plans and the STARS review.	Merton employ staff specifically for this function also supported by SusTrans, we are coordinating action and linking this to our schools work

		particularly around anti-idling to minimise duplication and maximise resources. Out of 79 institutions the accreditation split is as follows: Gold: 14 Silver: 4 Bronze: 12 Of the remaining institutions 10 have been engaged by the council, 2 will not engage and some of the other 37 schools listed with an EAN number will not have or chose to have a STARS School Travel Plan.
66	Carry out audits of schools in the most polluted areas of the borough and help provide a scheme of mitigation where necessary and possible.	Action deferred to 2020 following air quality monitoring data from the 'school monitoring programme' which commenced in August 2019. Screening data provided in Appendix C Diffusion tube results for additional school monitoring programme.
67	Review and assess annually the necessity for audits at schools and nurseries in areas subject to high levels of pollution.	As Action 66.
68	Incorporate schools in areas of poor air quality into our monitoring network and regime.	As Action 66 Action due for completion in summer 2020.
69	Joint working arrangements with Public Health partners around schools to deliver joint health benefits.	SNAP project (School Neighbourhood Approach Pilot, formerly the Superzones project) is underway at Merton Abbey Primary School. Expansion to further school sites are being investigated. The operation of three School Safety Zones commenced in 2019, located at St Thomas of Canterbury Catholic Primary School, Harris Primary Academy and Links Primary School. Singlegate Primary School was also due to be implemented in 2019 but has been delayed. Feedback is that the program is working well and parents and affected residents in these roads are coping

		with the restricted access times. Plans are to extend to other schools and consideration is being given to new sites. The Council hopes to identify four more sites in 2020.
70	Work with and provide specialist advice and support to schools around air quality issues.	There is much collaborative working internally at LBM to maximise the resources available, share knowledge and avoid unnecessary duplication. Various examples of this have been provided in previous specific action updates.
New Projects commenced in 2019		
	Healthy Streets Everyday	Funding awarded by the Mayor of London: A project spanning 16 boroughs, which will deliver 250 car free and pedestrianisation initiatives or events over three years
	Clean Air Villages (3)	Funding warded from Defra: Delivery of a Clean Air Village in Wimbledon Town Centre 2020/21. The year-long project spanning 12 London boroughs and 4 Business Improvement Districts, aims to improve air quality in 16 different London 'villages', where both air pollution and population density levels are high. Funding awarded from Local Government Association: Behavioural Insights programme. This 12-month pilot project will investigate the most effect form of anti-idling messaging at Primary Schools.

3. Planning Update and Other New Sources of Emissions

Table I. Planning requirements met by planning applications in the London Borough of Merton in 2019

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	A total of 275 planning applications were referred internally by the Planning Team for comment.
Number of planning applications required to monitor for construction dust	3
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	0
Number of developments required to install Ultra-Low NO_x boilers	6
Number of developments where an AQ Neutral building and/or transport assessments undertaken	6
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0
Number of planning applications with S106 agreements including other requirements to improve air quality	Unfortunately, records for 2019 are incomplete, two agreements were made in early 2019 – the Harris Academy Secondary School development planning ref 18/P1921, which included an air quality contribution and a development at Bushey Road planning ref 18/P2619 including a car club requirement. We expect the information to be updated in time for our first annual statutory report due by the end of December 2020.

Number of planning applications with CIL payments that include a contribution to improve air quality	Under the CIL Regulations 2010 CIL expenditure is not accounted for at the planning application level.
NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	The London Borough of Merton is entirely outside of the Central Activity Zone and Canary Wharf.
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.	Cleaner Construction for London undertook 5 site audit(s) in the London Borough of Merton between April and December 2019. • 0 site(s) achieved Self-Compliant status, 3 site(s) worked towards and achieved Compliance and 2 site(s) failed and were recorded as non-Compliant. • 0 site(s) upon arrival/engagement were completed and 0 site(s) had no NRMM within scope (37-560kW) presently deployed. • 20% of sites audited were cold engaged and therefore not registered prior to auditing. • 33% of Non-Compliant sites have refused our officers access and/or stated that they will not cooperate with the NRMM Scheme. This caused their sites to be recorded as 'Declined Audit'. • 33% of Site Non-compliance is due to sites being unable to evidence a machine's compliance. This means that the Type Approval Number was not found on the engine, and further, suitable supporting documentation was not available for the machine.

	• 33% of Non-compliance is due to sites not using the online NRMM London Register, even though all their machinery is of the stage required by the Mayor's SPG.

3.1 New or significantly changed industrial or other sources

No new sources identified in 2019.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

All data undergoes quality assurance and quality control (QA/QC) procedures to ensure that the data obtained are of a high quality.

The NO_2 continuous analyser is automatically calibrated every night and also manually checked and calibrated every two weeks by the contractor, TRL, employed by LBM for LSO visits during 2019. There is a need for frequent calibration adjustments as the gradual build-up of dirt within the analyser reduces the response rate. This fall off in response needs appropriate correction, to ensure the recording of the true concentrations. The calibration process involves checking the monitoring accuracy against a known concentration of span gas. The span gas used is nitric oxide and is certified to an accuracy of 5%. Both the automatic and manual calibrations use this same certified span gas (i.e. the automatic overnight one does not use the less accurate permeation tube method).

The NO_2 continuous analysers is serviced every six months by TRL and also audited by NPL every six months as part of the King's LAQN QA/QC procedure, to ensure optimum data quality.

PM_{10} Monitoring Adjustment

PM_{10} particulates are measured using a Tapered Element Oscillating Microbalance (TEOM) analyser, with the data presented as the gravimetric equivalent.

No automatic or fortnightly calibrations are carried out on the TEOM. Calibrations are only carried as part of the routine servicing and regular independent audits. The on-going performance of the monitor is checked on-line, by the King's College London Duty Officer. The role of the LSO at the fortnightly visits is to make more detailed performance checks. The LSO is also on standby at other times, to change the TEOM's monitoring filter as required, depending on the filter loading.

Since 2009, TEOM data have been improved by routine adjustments, using the volatile correction method (VCM). This corrects for the loss of any volatile mass, which has been driven off by the heat applied in the TEOM's inlet column. The VCM adjustments are carried out by King's College London, prior to dissemination of the data.

The TEOM equipment is serviced every six months by TRL and also audited by NPL every six months as part of the King's LAQN QA/QC procedure, to ensure optimum data quality. Both sites are part of the LAQN and KCL are responsible for the daily data collection, storage, validation and dissemination

via the LAQN website (www.londonair.org.uk). KCL ratifies the data periodically, viewing data over longer time periods and using the results from fortnightly checks, equipment services and equipment audits.

A.2 Diffusion Tube Quality Assurance / Quality Control

Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (EC, 2008) sets air quality objectives for NO_2 along with other pollutants. Under the Directive, annual mean NO_2 concentration data derived from diffusion tube measurements must demonstrate an accuracy of ±25 % to enable comparison with the NO_2 air quality objectives of the Directive.

In order to ensure that NO_2 concentrations reported are of a high quality, strict performance criteria need to be met through the execution of QA and QC procedures. A number of factors have been identified as influencing the performance of NO_2 diffusion tubes including the laboratory preparing and analysing the tubes, and the tube preparation method (AEA, 2008). QA and QC procedures are therefore an integral feature of any monitoring programme, ensuring that uncertainties in the data are minimised and allowing the best estimate of true concentrations to be determined.

Our NO_2 diffusion tubes are analysed for us by Gradko using 50% TEA in acetone method of preparation. Gradko take an active role in developing rigorous QA and QC procedures in order to maintain the highest degree of confidence in their laboratory measurements. Gradko were involved in the production of the Harmonisation Practical Guidance for NO_2 diffusion tubes (AEA, 2008) and have been following the procedures set out in the guidance since January 2009. Since April 2014 Gradko has taken part in a new scheme AIR-PT, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Details of Gradko International Limited's laboratory precision results

- Performance in AIR NO_2 PT Scheme (Jan 2018 – November 2019)

- Summary of Precision Scores for 2017 – 2019

- UKAS schedule of accreditation (April 2020)

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO2 concentrations reported are of a high calibre.

Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (Jan 2018 – November 2019)

Gradko participate in the AIR PT NO_2 diffusion tube scheme which uses artificially spiked diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis. The scheme is designed to help laboratories meet the European Standard. Gradko demonstrated "good" laboratory performance in 2019 for 50% TEA in Acetone.

The laboratory follows the procedures set out in the Harmonisation Practical Guidance and participates in the AIR proficiency-testing (AIR-PT) scheme. Previously to the Air-PT scheme, Gradko participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis. Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme.

Laboratory performance in the AIR-PT is also assessed by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Inter-Comparison Exercise carried out at for Gradko at Marylebone Road, central London. A laboratory is assessed and given a 'z' score, a score of ± 2 or less indicates satisfactory laboratory performance. Gradko International limited's performance for 2019 is covered by rounds AR024 to AR034 of the AIR-PT scheme. For 2019 the laboratories results were deemed to be good for 96 participating local authorities and poor for 7 participating local authorities based upon a z score of ≤ ± 2.

In 2019, the tube precision for NO_2 Annual Field Inter-Comparison for Gradko International using the 50% TEA in acetone method was 'good' for the results of all 8 participating local authorities, none of the participating local authorities were deemed to be 'poor'.

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR0024, 25, 27, 28, 30, 31, 33 and 34

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

AIR PT Round	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034
Round conducted in the period	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019	April – May 2019	July – August 2019	September – November 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [2]	100 %	25 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	100 %	50 %	100 %	100 %	100 %	100 %	50 %
Gradko International [1]	100 % [1]	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [2]	NR [2]	NR [2]	25 %	50 %	100 %	50 %	100 %
Milton Keynes Council	100 %	75 %	100 %	100 %	100 %	100 %	50 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Staffordshire County Council	50 %	100 %	100 %	100 %	100 %	75 %	75 %	75 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	50 %	75 %	100 %	100 %	100 %	100 %	100 %	50 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.
[2] NR No results reported
[3] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.

2017 - 2019 Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies for Gradko Laboratory 50% TEA in Acetone.

Results 2017 Study

2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	G
2017	P
2017	P

Results of 2018 Study

2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	G
2018	P

Results of 2019 Study

2019	G
2019	G
2019	G
2019	G
2019	G
2019	G
2019	G
2019	G

P Poor Precision

G Good Precision

Numerical results for this data are contained in the National Bias Adjustment Spreadsheet version 03/19

Gradko is accredited by UKAS for the analysis of NO_2 diffusion tubes. It undertakes the analysis of the exposed diffusion tubes by ultra violet spectrophotometry.

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS TESTING 2187 **Accredited to ISO/IEC 17025:2017**	**Gradko International Ltd** **(Trading as Gradko Environmental)** **Issue No:** 024 **Issue date:** 15 April 2020
St Martins House **77 Wales Street** **Winchester** **Hampshire** **SO23 0RH**	**Contact: Mr A Poole** **Tel: +44 (0)1962 860331** **Fax: +44 (0)1962 841339** **E-Mail: diffusion@gradko.co.uk** **Website: www.gradko.co.uk**
Testing performed at the above address only	

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors	Chemical Tests	Documented In-House Methods
	Ammonia as ammonium (NH_4^+)	GLM 8 by Ion Chromatography
	Benzene Toluene Ethyl benzene Xylene	GLM 4 by Thermal Desorption/ FID Gas Chromatography
	Hydrogen chloride as chloride (Cl^-) Nitrogen dioxide as nitrite (NO_2^-) Sulphur dioxide as sulphate (SO_4^{2-}) Hydrogen fluoride as fluoride (F^-)	GLM 3 by Ion Chromatography
	Hydrogen sulphide	GLM 5 by Colorimetric determination (UV Spectrophotometry)
	Ozone as nitrate (NO_3^-)	GLM 2 by Ion Chromatography
	Nitrogen Dioxide as nitrite (NO_2^-)	GLM 7 by Colorimetric determination (UV Spectrophotometry)
	Sulphur dioxide as sulphate (SO_4^{2-})	GLM 1 by Ion Chromatography
	Formaldehyde as formaldehyde-DNPH	GLM 18 by HPLC
	Volatile Organic Compounds including: Benzene Toluene Ethylbenzene p-Xylene o-Xylene	GLM 13 by Thermal Desorption GC-Mass Spectrometry

UKAS TESTING 2187 Accredited to ISO/IEC 17025:2017	**Schedule of Accreditation** issued by **United Kingdom Accreditation Service** 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK **Gradko International Ltd** **(Trading as Gradko Environmental)** **Issue No:** 024 **Issue date:** 15 April 2020

Testing performed at main address only

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors (cont'd)	Chemical Tests (cont'd)	
	Qualitative Analysis and Estimation of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors	GLM 13 by Thermal Desorption GC-Mass Spectrometry with estimations in accordance with ISO standard 16000-6
	Naphthalene	GLM 13-1 by Thermal Desorption GC-Mass Spectrometry
	Tetrachloroethylene Trichloroethylene	GLM 13-2 by Thermal Desorption GC-Mass Spectrometry
	trans-1,2-Dichloroethene cis-1,2-Dichloroethene	GLM 13-3 by Thermal Desorption GC-Mass Spectrometry
	Indane Styrene	GLM 13-4 by Thermal Desorption GC-Mass Spectrometry
	1,2,3-Trimethylbenzene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene	GLM 13-5 by Thermal Desorption GC-Mass Spectrometry
	1,3-Butadiene	GLM 13-6 by Thermal Desorption GC-Mass Spectrometry
	Carbon Disulphide	GLM 13-7 by Thermal Desorption GC-Mass Spectrometry
	Vinyl Chloride	GLM 13-8 by Thermal Desorption GC-Mass Spectrometry
	Flexible scope for quantitative analysis of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors in accordance with methods developed and validated by in-house procedure LWI 47	LWI 47 by Thermal Desorption GC-Mass Spectrometry
END		

NO_2 diffusion tube analysis method

NO_2 diffusion tubes are passive monitoring devices. They are made up of a Perspex cylinder, with two stainless steel mesh discs, coated with triethanolamine (TEA) absorbent held inside a polythene cap, which is sealed onto one end of the tube. Diffusion tubes operate on the principle of molecular diffusion, with molecules of a gas diffusing from a region of high concentration (open end of the tube) to a region of low concentration (absorbent end of the tube) (AEA, 2008). NO_2 diffuses up the tube because of a concentration gradient and is absorbed by the TEA, which is present on the coated discs in the sealed end of the tube. All of Merton's NO_2 diffusion tubes are prepared by Gradko using 50% v/v TEA with Acetone as the absorbent.

Prior to and after sampling, an opaque polythene cap is placed over the end of the diffusion tube opposite the TEA coated discs to prevent absorption. The NO_2 diffusion tubes are labelled and kept refrigerated in plastic bags prior to and after exposure.

In the laboratory, the steel mesh is removed and washed with distilled water which is then analysed. The concentration of nitrogen dioxide is found by shining ultra violet light (UV) through the water sample. The amount of light absorbed is equivalent to the concentration of nitrogen dioxide that was present in the air during the monitoring period.

Factor from Local Co-location Studies

In 2019 the Borough undertook a co-location study placing with three NO_2 diffusion tubes (Site IDs 47, 47/2, 47/3) with the continuous NO_2 monitoring equipment at the Civic Centre Morden (ME2). The local bias adjustment factor calculated using the AEA Energy & Environment spreadsheet is **0.89.**

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2019	04/02/2019	61.5	72.4	68.7	68	5.6	8	13.9	55.7	100	Good	Good
2	04/02/2019	08/03/2019	69.2	85.3	68.6	74	9.5	13	23.5	69.3	100	Good	Good
3	08/03/2019	05/04/2019	50.2	43.8	47.2	47	3.2	7	8.0	49.2	100	Good	Good
4	05/04/2019	02/05/2019	55.3	51.3	53.3	53	2.0	4	4.9	57.4	99	Good	Good
5	02/05/2019	06/06/2019	58.4	52.1	48.4	53	5.1	10	12.6	47	93	Good	Good
6	06/06/2019	04/07/2019	53.0	56.4	53.7	54	1.8	3	4.5	43	71	Good	or Data Capture
7	04/07/2019	08/08/2019	51.1	58.6	57.2	56	4.0	7	9.9	45	100	Good	Good
8	08/08/2019	02/09/2019	59.3	56.7	63.2	60	3.3	6	8.2	49	100	Good	Good
9	02/09/2019	01/10/2019	53.6	53.0	55.6	54	1.3	2	3.3	42	100	Good	Good
10	01/10/2019	05/11/2019	56.2	60.2	52.5	56	3.9	7	9.6	52	100	Good	Good
11	05/11/2019	02/12/2019	68.8	58.2	66.2	64	5.5	9	13.7	56.8	98	Good	Good
12	02/12/2019	10/01/2020	60.3	52.7	59.9	58	4.3	7	10.6	50	100	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

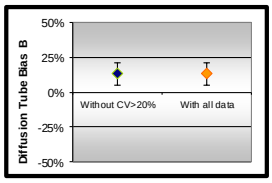
Site Name/ ID:	47, 47/2, 47/3 (ME2)

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.89 (0.83 - 0.96)
Bias B	12% (5% - 20%)
Diffusion Tubes Mean:	58 μgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	52 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	52 (49 - 56) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.89 (0.83 - 0.96)
Bias B	12% (5% - 20%)
Diffusion Tubes Mean:	58 μgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	52 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	52 (49 - 56) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Discussion of Choice of Factor to Use

The national bias adjustment factor for Gradko using 50% TEA in acetone for 2019 was 0.87.

The local bias adjustment factor calculated using co-location data as described above was 0.89.

The local bias adjustment factor has been used to correct the 2019 diffusion tube data as slightly more conservative than using the national Gradko factor. It is important to avoid the under or over reporting of NO_2 concentrations in the borough however, the factors are reassuringly close.

Table J. Bias Adjustment Factors

Year	2013	2014	2015	2016	2017	2018	2019
Bias Adjustment Factor	0.83	0.80	0.96	1.03	0.97	0.92	0.89
National or Local Factor	National	National	National	National	National	National	Local

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

For monitoring sites where data capture is less than 75% of a full calendar year (less than 9 months), the mean unadjusted concentrations required to be "annualised" using the methodology outlined in in Box 7.10 of the LLAQM Technical Guidance (TG16) before being compared to annual mean objectives. in accordance with Box 7.10 of the LLAQM

NO_2 Adjustment

Data capture for the automatic analyser ME9 in 2019 was 96% and as such annualisation was not required.

PM_{10} Adjustment

Data capture for the automatic analyser ME2 in 2019 was 96% and as such annualisation was not required.

Distance Adjustment

Where an exceedance has been measured at a monitoring site which is not representative of public exposure, the procedure specified in LLAQM.TG(19) and NO_2 fall-off with distance calculator (Version 4.2) Excel tool has been used to estimate the concentration at the nearest receptor.

NO_2 fall-off with distance calculator

This Excel tool has been developed to help local authorities derive the NO_2 concentration at locations relevant for exposure as it is not always possible to measure concentrations at precisely the desired location. The calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site. The monitoring can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be.

The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source.

Limitations

1. Each distance inputted should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitoring is closer to the kerb than this is likely to be reasonable).
2. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other.
3. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.
4. Distances should be measured perpendicular to the kerb and the calculator assumes that the monitor and receptor have similar elevations.
5. The results of the calculator will have a greater uncertainty than measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.
6. The measurement and the background must be for the same year. The background concentration could come from the national maps published at https://uk-air.defra.gov.uk/data/laqm-background-home , or alternatively from a nearby monitor in a background location.
7. The calculator can only be used where the influence of one road source is present i.e. an increasing distance from a road source in one direction cannot lead to a decreased distance toward a secondary road source.

Table K. Distance Adjustment

Site Name/ID		Distance (m)		NO_2 Annual Mean Concentration (μgm^{-3})			Comment
	Site Description	Monitoring Site to Kerb	Receptor to Kerb	Background (Merton Site ID 31)	Monitored at Site (bias adjusted)	Predicted at Receptor	
1	A298 Bushey Road nr Bushey Court, SW20 0JN	1.5	16.8	19.8	**47.1**	32.6	
6 (JC)	17 Grand Drive, Raynes Park, SW20 0JB	0.3	8.7	19.8	**42.6**	30.1	
7	A298 276-288 Kingston Road, SW20 8LX	1.5	9.8	19.8	**41.1**	32.3	
8	A238 28 Coombe Lane, SW20 8NF	0.6	2.6	19.8	**46.3**	*39.2*	Predicted concentration at Receptor within 10% the AQS objective.
9	2 Lambton Road, SW20 9LR	0.5	4.1	19.8	**43.3**	34.5	
14 (AC)	20 The Ridgeway, Wimbledon, SW19 4SQ	0.4	1.9	19.8	**43.7**	*37.4*	Predicted concentration at Receptor within 10% the AQS objective.

16	84 High Street, Wimbledon, SW19 5EG	0.6	3.5	19.8	**44.8**	*36.7*	Predicted concentration at Receptor within 10% the AQS objective.
18	25-27 Wimbledon Hill Road, SW19 7NE	0.3	2.9	19.8	**64.7**	**48.2**	Predicted concentration at Receptor above AQS objective.
19	Wimbledon Station, SW19 3SE	2.5	6.1	19.8	**50.9**	**44.1**	Predicted concentration at Receptor above AQS objective.
20	27 Hartfield Rd, Wimbledon, SW19 3SG	0.4	5.2	19.8	**52.4**	*38.2*	Predicted concentration at Receptor within 10% the AQS objective.
21 (EA)	A219 246 Merton Rd, South Wimbledon, SW19 1AU	0.5	2.4	19.8	**63.2**	**51.2**	Predicted concentration at Receptor above AQS objective.
22	12-16 Upper Green West, CR4 3AA	2.0	6.2	19.8	**56.5**	**46.8**	Predicted concentration at Receptor above AQS objective.
23	183 Kingston Road, SW19 1LH	0.6	2.5	19.8	**54.8**	**45.7**	Predicted concentration at Receptor above AQS objective.
25	25 Alexander Road, SW19 7LE	2.1	6.1	19.8	40.0	34.9	
26	22 Gap Road, SW19 8JG	2.3	7.4	19.8	**44.5**	*37.5*	Predicted concentration at Receptor within 10% the AQS objective.
27	56 Plough Lane, SW19 8HA	2.3	8.8	19.8	**42.2**	34.9	

28 (BC)	11 Haydons Road, SW19 1HG	2.4	8.3	19.8	**43.1**	*36.0*	Predicted concentration at Receptor within 10% the AQS objective.
29 (HA)	44 High Street (A24), Colliers Wood, SW19 2AB	0.7	3.3	19.8	**60.3**	**48.5**	Predicted concentration at Receptor above AQS objective.
30	A24 Christchurch Rd - Christchurch Close junction, SW19 2PB	0.3	3.3	19.8	**51.0**	*38.9*	Predicted concentration at Receptor within 10% the AQS objective.
33	A24 Morden Road, SW19 3BP	2.7	6.3	19.8	**47.1**	**41.2**	Predicted concentration at Receptor above AQS objective.
34 (GC)	211 Western Road, Colliers Wood, SW19 2QD	2.0	4.3	19.8	**53.8**	**47.7**	Predicted concentration at Receptor above AQS objective.
36 (DC)	35 London Road, Tooting, SW17 9JR	1.5	3.4	19.8	**40.4**	*36.7*	Predicted concentration at Receptor within 10% the AQS objective.
37 (CC)	107 London Road, Tooting, CR4 3JA	0.6	3.0	19.8	**56.1**	**45.4**	Predicted concentration at Receptor above AQS objective.
38 (EC)	265 London Road, Mitcham, CR4 3NH	0.6	4.8	19.8	**41.0**	32.9	
39 (FC)	80 Church Road, Mitcham, CR4 3BE	0.6	3.6	19.8	**40.3**	33.6	

40	A217 361 London Road, Mitcham, CR4 4BF	0.8	6.2	19.8	**41.0**	32.6	
41	A239 Morden Road, Morden, SM4 6AU	1.5	4.6	19.8	**45.4**	*39.1*	Predicted concentration at Receptor within 10% the AQS objective.
42	155 St Hellier Road, Morden, SM4 6JE	3.3	16.1	19.8	**42.0**	32.6	
43	86 Morden Hall Road, Morden, SM4 5JG	2.4	24.6	19.8	**44.5**	30.5	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
44 (AA)	31, London Road, Morden, SM4 5HT	0.6	5.5	19.8	**62.2**	**45.1**	Predicted concentration at Receptor above AQS objective.
45 (IC)	192-110 London Road, Morden, SM4 5AX	0.9	3.5	19.8	**47.8**	**40.3**	Predicted concentration at Receptor above AQS objective.
46 (HC)	80 Crown Lane, Morden, SM4 5BN	0.6	5.6	19.8	**48.7**	*36.9*	Predicted concentration at Receptor within 10% the AQS objective.
47	Civic Centre, Morden, SM4 5DX	1.5	3.0	19.8	**51.7**	**46.8**	Predicted concentration at Receptor above AQS objective.
47/2	Civic Centre, Morden, SM4 5DX	1.5	3.0	19.8	**52.0**	**47.1**	Predicted concentration at Receptor above AQS objective.

47/3	Civic Centre, Morden, SM4 5DX	1.5	3.0	19.8	**51.5**	**46.7**	Predicted concentration at Receptor above AQS objective.
50	75 Martin Way, SM4 4AR	0.7	10.4	19.8	40.0	29.7	
53	A24 139 Epsom Rd, SM3 9EY	0.7	4.3	19.8	**50.6**	**40.1**	Predicted concentration at Receptor above AQS objective.
54	43 Upper Green East, Mitcham, CR4 2PF	2.4	4.4	19.8	**61.5**	**55.3**	Predicted concentration at Receptor above AQS objective.
55	213 Manor Road, Mitcham, CR4 1JH	0.6	5.8	19.8	**44.5**	34.3	

Notes:

For an NO_2 concentration within 10% of the annual mean objective of 40 μgm^{-3} (between 36.0 μgm^{-3} and <40 μgm^{-3}) the concentration is shown in italics.

Exceedances of the NO_2 annual mean objective of 40 μgm^{-3} are shown in bold.

NO_2 annual means exceeding 60 μgm^{-3}, indicating a potential exceedance of the NO_2 1-hour mean objective, are shown in bold and underlined.

Appendix B Full Monthly Diffusion Tube Results for the Merton Council Network 2019

Table L. Monthly NO_2 Diffusion Tube Results

				Annual Mean NO_2 (ugm^{-3})													
Site Code	**Site Description**	**Valid data capture for monitoring period % a**	**Valid data capture 2019 % b**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual mean – raw data c**	**Annual mean – bias adjusted c**
1	A298 Bushey Road nr Bushey Court, SW20 0JN	100	100	60.3	64.1	49.9	59.1	46.3	45.1	46.4	44.1	50.5	56.1	63.4	49.9	**52.9**	**47.1**
2 (GA)	A24 7 Stonecot Hill, SM3 9HB	100	100	51.6	46.1	31.3	47.3	33.4	36.3	34.3	31.5	35.2	41.7	49.5	43.6	**40.2**	35.7
4 (FA)	154 Grand Drive, Raynes Park, SW20 9NQ	100	100	13.6	44.0	33.8	41.4	36.8	34.6	32.1	33.1	30.2	36.3	43.8	33.2	34.4	30.6
5 (BA)	Sacred Heart School, Burlington Road, New Malden, KT3 4NE	92	92	56.4	42.1	19.6	32.9	E	48.7	4.8	32.5	36.3	40.7	47.2	46.2	37.0	33.0
6 (JC)	17 Grand Drive, Raynes Park, SW20 0JB	100	100	60.5	56.8	38.5	50.0	46.4	44.4	42.3	38.0	43.9	47.5	54.5	51.3	**47.8**	**42.6**
7	A298 276-288 Kingston Road, SW20 8LX	92	92	63.3	56.5	52.2	45.7	40.1	46.8	26.1	40.8	M	40.8	51.5	44.7	**46.2**	**41.1**
8	A238 28 Coombe Lane, SW20 8NF	100	100	70.5	58.3	46.4	53.3	49.9	49.5	45.9	39.2	47.2	52.2	59.1	52.8	**52.0**	**46.3**
9	2 Lambton Road, SW20 9LR	100	100	55.5	55.2	33.7	64.4	42.9	48.7	38.5	32.8	42.0	53.9	60.6	55.5	**48.6**	**43.3**
11	51-55 Kingston Road, SW20 1JW	100	100	47.0	38.3	32.2	53.6	33.7	35.7	31.7	27.1	37.2	40.6	43.8	36.3	38.1	33.9
13	B281 4 Cottenham Park Rd, SW20 0RZ	100	100	36.5	45.7	28.3	38.9	31.5	32.9	40.0	48.6	51.6	37.5	46.3	39.2	39.8	35.4
14 (AC)	20 The Ridgeway, Wimbledon, SW19 4SQ	92	92	62.7	53.6	42.0	47.7	42.1	42.7	M	49.3	62.2	43.8	47.5	46.6	**49.1**	**43.7**
16	84 High Street, Wimbledon, SW19 5EG	100	100	64.1	54.3	46.3	66.7	43.4	45.0	45.9	40.1	46.8	47.7	62.1	41.8	**50.3**	**44.8**

18	25-27 Wimbledon Hill Road, SW19 7NE	100	100	85.7	77.8	64.7	81.5	66.9	76.2	62.3	57.0	66.5	77.6	82.4	73.4	**72.7**	**64.7**
19	Wimbledon Station, SW19 3SE	92	92	67.6	68.7	43.4	67.1	53.0	63.1	52.8	48.6	52.5	54.2	M	58.6	**57.2**	**50.9**
20	27 Hartfield Rd, Wimbledon, SW19 3SG	100	100	70.6	65.9	47.9	71.6	55.6	55.5	53.2	41.1	55.6	57.8	71.5	59.6	**58.8**	**52.4**
21 (EA)	A219 246 Merton Rd, South Wimbledon, SW19 1AU	83	83	76.0	77.1	59.9	M	67.7	77.5	M	56.0	69.8	74.7	86.5	65.4	**71.1**	**63.2**
22	12-16 Upper Green West, CR4 3AA	100	100	73.9	77.3	58.1	59.8	55.6	55.9	63.9	65.9	61.1	60.2	60.3	69.7	**63.5**	**56.5**
23	183 Kingston Road, SW19 1LH	100	100	78.4	69.7	54.2	64.0	58.3	59.5	56.0	52.7	67.4	62.8	57.9	58.2	**61.6**	**54.8**
24	75 Hartfield Road, SW19 3TJ	75	75	48.0	40.0	32.3	39.9	28.6	31.0	35.5	31.0	M	M	M	40.6	36.3	32.3
25	25 Alexander Road, SW19 7LE	75	75	58.6	56.1	40.5	43.7	M	M	35.2	38.9	43.2	M	46.9	41.1	**44.9**	**40.0**
26	22 Gap Road, SW19 8JG	100	100	59.7	62.0	47.2	55.8	39.7	45.0	40.1	42.0	43.6	47.8	59.9	56.7	**50.0**	**44.5**
27	56 Plough Lane, SW19 8HA	100	100	60.9	52.4	61.2	51.1	41.8	40.9	39.2	32.6	44.9	37.9	57.3	49.1	**47.4**	**42.2**
28 (BC)	11 Haydons Road, SW19 1HG	100	100	52.4	52.0	41.3	63.5	37.2	44.6	45.1	44.3	46.3	46.9	58.6	49.2	**48.4**	**43.1**
29 (HA)	44 High Street (A24), Colliers Wood, SW19 2AB	100	100	71.7	71.2	61.1	76.9	63.9	71.6	68.2	59.7	75.2	62.2	69.6	62.2	**67.8**	**60.3**
30	A24 Christchurch Rd - Christchurch Close junction, SW19 2PB	100	100	75.3	70.0	44.1	52.4	49.5	51.8	52.8	59.9	59.3	55.8	57.1	59.9	**57.3**	**51.0**
31 (LA)	28 Charminster Avenue, Morden, SW19 3FL	100	100	30.9	31.3	24.6	25.4	15.8	16.0	14.4	14.5	18.8	15.4	35.6	23.5	22.2	19.8
32	Merantum Way, SW19 2JY	100	100	46.4	53.3	43.5	22.7	31.2	36.9	33.6	38.9	41.6	23.4	52.9	43.9	39.0	34.7
33	A24 Morden Road, SW19 3BP	100	100	49.5	61.2	46.6	52.8	47.6	53.4	52.3	48.3	50.5	57.6	57.8	56.9	**52.9**	**47.1**
34 (GC)	211 Western Road, Colliers Wood, SW19 2QD	100	100	68.6	80.4	61.2	54.8	51.4	48.9	56.2	58.3	54.1	58.4	63.9	68.9	**60.4**	**53.8**
35 (MA)	53 Lavender Avenue, Morden, CR4 3HL	100	100	48.2	40.5	29.5	34.5	28.0	25.5	22.5	24.7	29.7	33.2	39.6	32.6	32.4	28.8
36 (DC)	35 London Road, Tooting, SW17 9JR	100	100	53.0	48.9	38.3	53.3	40.6	47.7	39.0	34.2	42.3	46.3	58.2	42.7	**45.4**	**40.4**
37 (CC)	107 London Road, Tooting, CR4 3JA	100	100	73.3	74.1	47.0	90.4	58.9	72.3	60.8	49.8	55.6	57.2	64.9	51.7	**63.0**	**56.1**
38 (EC)	265 London Road, Mitcham, CR4 3NH	100	100	56.5	53.8	45.4	42.0	44.1	47.1	42.8	40.3	44.8	47.6	49.0	38.7	**46.0**	**41.0**
39 (FC)	80 Church Road, Mitcham, CR4 3BE	100	100	67.6	48.8	38.2	51.7	39.7	43.4	39.1	37.4	48.6	40.2	49.2	39.3	**45.3**	**40.3**
40	A217 361 London Road, Mitcham, CR4 4BF	100	100	69.4	54.0	42.6	51.9	39.0	45.8	38.0	38.8	37.3	41.7	49.5	44.5	**46.0**	**41.0**
41	A239 Morden Road, Morden, SM4 6AU	100	100	62.0	46.9	34.3	55.0	48.4	50.8	51.5	46.4	53.4	49.0	63.6	51.1	**51.0**	**45.4**

42	155 St Hellier Road, Morden, SM4 6JE	92	92	56.5	52.8	32.8	41.7	M	48.3	41.6	39.6	46.2	47.1	62.2	50.0	**47.2**	**42.0**
43	86 Morden Hall Road, Morden, SM4 5JG	100	100	60.2	57.7	42.8	65.8	46.1	53.8	47.2	37.6	45.9	43.6	57.5	42.1	**50.0**	**44.5**
44 (AA)	31, London Road, Morden, SM4 5HT	100	100	67.1	83.8	51.0	71.8	60.4	69.4	76.0	81.5	66.2	68.8	70.9	72.4	**69.9**	**62.2**
45 (IC)	192-110 London Road, Morden, SM4 5AX	100	100	68.6	54.9	50.2	56.6	47.2	50.8	51.7	48.0	51.2	51.0	70.0	44.6	**53.7**	**47.8**
46 (HC)	80 Crown Lane, Morden, SM4 5BN	100	100	57.6	53.3	50.5	59.6	58.4	50.1	54.6	50.6	55.5	50.9	61.9	53.5	**54.7**	**48.7**
47	Civic Centre, Morden, SM4 5DX	100	100	61.5	69.2	50.2	55.3	58.4	53.0	51.1	59.3	53.6	56.2	68.8	60.3	**58.1**	**51.7**
47/2	Civic Centre, Morden, SM4 5DX	100	100	72.4	85.3	43.8	51.3	52.1	56.4	58.6	56.7	53.0	60.2	58.2	52.7	**58.4**	**52.0**
47/3	Civic Centre, Morden, SM4 5DX	100	100	68.7	68.6	47.2	53.3	48.4	53.7	57.2	63.2	55.6	52.5	66.2	59.9	**57.9**	**51.5**
48	28 Aberconway Road, Morden, SM4 5LF	100	100	62.3	51.3	40.5	45.8	38.0	40.3	40.0	37.1	40.3	38.1	45.7	42.0	**43.4**	38.7
49	37 Crown Road, Morden, SM4 5DD	100	100	54.5	54.0	45.0	54.4	35.9	41.9	39.7	39.0	39.6	40.1	54.7	31.8	**44.2**	39.3
50	75 Martin Way, SM4 4AR	100	100	59.7	52.0	44.2	47.5	43.5	38.8	36.2	37.5	42.6	47.2	41.7	47.9	**44.9**	40.0
51	A24 49 Streatham Rd, Mitcham, CR4 2AD	100	100	47.7	47.5	33.7	39.5	26.9	33.7	30.4	32.8	34.5	36.3	46.2	39.5	37.4	33.3
52	50 West Barnes Lane, New Malden, KT3 4PS	100	100	51.8	46.4	36.5	34.4	6.0	30.1	25.7	27.6	29.7	38.9	43.3	34.7	33.8	30.0
53	A24 139 Epsom Rd, SM3 9EY	92	92	62.6	66.8	M	49.9	49.7	51.3	54.7	60.4	56.0	58.3	58.5	57.7	**56.9**	**50.6**
54	43 Upper Green East, Mitcham, CR4 2PF	92	92	79.0	70.4	55.6	82.4	65.1	64.8	M	63.3	67.7	71.0	77.0	63.4	**69.1**	**61.5**
55	213 Manor Road, Mitcham, CR4 1JH	100	100	64.4	52.5	46.3	55.4	45.8	42.7	46.2	41.6	50.2	49.4	56.3	49.7	**50.0**	**44.5**

Notes:
M = Missing diffusion tube
E = Erroneous concentration. Low concentrations (3 µg m^{-3} or less) are rare at urban background or roadside sites in built up areas. Where such a low concentration is measured at an urban site, where measured NO_2 concentrations are usually much higher, it is unlikely to be genuine, and more likely due to a faulty diffusion tube. In this instance the result has been removed from the annual analysis and marked as erroneous. High concentrations: unless there is a reason why the result is likely to be spurious, it is best to err on the side of including high values rather than rejecting them. As such higher than 'normal' concentrations have been left in the annual analysis.

Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in bold.
a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
b Data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
c Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Table M. Monthly triplicate NO_2 diffusion tube results for co-location site Civic Centre Morden

Site ID	Data Capture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unadjusted annual mean	Bias adjusted (Local factor = 0.89)
47	100	61.5	69.2	50.2	55.3	58.4	53.0	51.1	59.3	53.6	56.2	68.8	60.3	58.1	**51.7**
47/2	100	72.4	85.3	43.8	51.3	52.1	56.4	58.6	56.7	53.0	60.2	58.2	52.7	58.4	**52.0**
47/3	100	68.7	68.6	47.2	53.3	48.4	53.7	57.2	63.2	55.6	52.5	66.2	59.9	57.9	**51.5**

Appendix C Diffusion tube results for additional school monitoring programme

In August 2019 an extensive school air quality monitoring programme was initiated by LBM. Diffusion tubes were located at all educational institutions in the borough recorded on the Gov.UK register of schools https://get-information-schools.service.gov.uk/ . Where there were two road sources tubes were installed on both school/road boundaries.

Due to the large number of sites it was decided the monitoring programme would be split into two phases:

- A screening phase August to December 2019.
  The screening phase was used to establish which schools were low risk and could be removed from the programme. Low risk sites were characterised as having an averageNO_2 concentration of at least 20% below the annual AQO (32 μgm^{-3} 'raw' unadjusted value).
- Full 12 months monitoring programme.
  At schools where an average NO_2 concentration was found to be more than 32 μgm^{-3} ('raw' unadjusted value) monitoring was continued and is due to end in July 2020.

It was a massive monthly undertaking to complete tube changeovers, due to the nature of the monitoring locations (outside schools) pick up and drop off times were avoided and several days were needed to complete a full changeover. Due to the large amount of data generated the scoping phase data was not annualised, nor was data corrected for bias as bias adjustment factors are not published until March. For schools where monitoring has been completed for a full 12 months, data will be fully corrected and reported in the 2020 Annual Status Report.

As the screening data shows, the vast majority of educational sites are 'low risk'. Upon completion of 12 months monitoring at educational sites where air quality may be above the annual AQO, any site that is found to exceed the AQO will be audited in line with Action 66 of the AQAP, and will also be added to the Council's main diffusion tube network from January 2021.

Table N. Diffusion tube results: Scoping phase - school air quality monitoring programme 2019

			NO_2 concentration μgm^{-3}						
School Name	**Site ID**	**Data Capture**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Raw unadjusted average concentration**	**Continue monitoring for 12 months (y/n)**
Abbey Children's Centre / Merton Abbey Primary School	S1/S2	33%	20.03	25.85	28.81	31.10	M	26	y
Abbotsbury Primary School	S52	33%	14.55	22.45	M	31.44	23.98	23	n
Acacia Childrens Centre / Lonesome Primary Shool	S28/S29	42%	26.92	31.84	32.20	31.09	31.82	31	n
All Saints' CofE Primary School / opposite Bumble Bees Day Nursery	S4B	42%	29.65	42.75	48.95	53.58	54.72	**46**	y
All Saints First School	S4	42%	17.62	21.46	23.00	30.45	26.41	24	n
Aragon Primary School / Lower Morden Childrens Centre	S31/S32	33%	13.48	19.29	23.75	23.57	M	20	n
Beecholme Primary School	S23	42%	17.95	22.65	26.18		25.14	23	n
Benedict Primary School	S13	42%	17.89	22.22	26.09	39.63	24.54	26	n
Bishop Gilpin CofE Primary School / Richards Lodge	S57/58	42%	14.95	20.18	25.31	30.05	29.10	24	n
Blossom House School	S80	25%	15.39	E	M	28.13	M	22	n
Bond Primary School	S26	33%	16.43	26.65	M	38.14	29.13	28	n
Church Road Children's Centre	S24	42%	27.77	32.39	36.30	42.27	30.94	34	y
Cranmer Primary School	S11	42%	27.17	33.37	36.37	32.65	31.00	32	y
Cricket Green School	S64	42%	20.23	26.50	30.61	49.70	31.03	32	y
Date Valley School	S65	42%	21.38	25.81	28.44	55.01	29.85	32	n
Donhead Preparatory School/Wimbledon College	S62/S83	42%	18.22	24.89	24.20	31.27	26.98	25	n
Dundonald Primary School	S15	33%	12.52	22.47	26.27	30.68	M	23	n
Eagle House School	S68	42%	43.18	54.41	51.32	70.93	47.03	**53**	y
Garfield Primary School	S53	25%	M	M	25.31	33.04	27.35	29	n

Gorringe Park Primary School	S19	33%	19.20	26.23	M	33.67	27.98	27	n
Harris Academy Merton	S42	33%	26.43	31.15	M	36.63	38.18	33	n
Harris Academy Morden	S46	42%	14.66	18.64	21.51	36.05	22.53	23	n
Harris Primary Academy Merton / Ivy Garden Children's Centre	S41/S38	42%	15.60	21.30	24.92	45.58	24.94	26	n
Haslemere Primary School	S10	33%	M	20.53	22.43	31.90	24.25	25	n
Hatfeild Primary School	S33	25%	20.34	25.45	M	31.16	M	26	n
Hillcross Primary School	S7	33%	16.73	14.35	25.16	28.51	M	21	n
Hollymount School	S47	25%	19.00	20.81	M	38.61	M	26	n
Holy Trinity CofE Primary School	S54	33%	18.02	26.26	29.89	36.12	M	28	n
Joseph Hood Primary School / The Avenue CC / Harris Academy Wimbledon	S14 / S59 / S6	33%	17.75	23.44	23.00	31.49	M	24	n
Just Learn	S69	42%	35.16	49.70	48.16	34.20	46.43	**43**	y
King's College School	S76	42%	23.14	28.67	32.99	28.76	31.65	29	n
Lavender Children's Centre - car park	S8	42%	16.45	21.14	24.85	31.40	27.35	24	y - 2nd location
Lavender Children's Centre - London Rd	S8B	42%	16.68	38.48	38.44	44.92	36.00	35	y
Liberty Primary	S27	42%	27.63	30.39	35.26	36.52	36.88	33	y
Links Primary School	S22	33%	16.15	23.35	25.50	M	26.61	23	n
Malmesbury Primary School / Newminister Childrens Centre	S44/S43	42%	15.90	22.83	28.10	39.02	28.46	27	n
Melrose School	S66	42%	14.08	20.55	25.67	34.14	22.62	23	n
Merton Park Primary School	S34	33%	11.38	17.60	18.92	26.85	M	19	n
Morden Primary School	S51	42%	36.60	36.15	43.31	54.42	41.32	**42**	y
Park Community School - Dorset Rd	S36	33%	21.65	26.22	33.30	32.93	M	29	y - 2nd location
Park Community School - Merton Rd	S36B	17%	29.67	M	M	47.36	M	39	y
Pelham Primary School	S3	33%	17.70	27.28	25.67	34.01	M	26	n
Perseid School	S81	25%	14.64	M	19.48	45.60	M	27	n
Poplar Primary School	S35	17%	14.33	M	M	30.15	M	22	y - insufficient data
Raynes Park High School	S49	33%	23.84	36.01	43.40	44.09	M	37	y
RISE Education	S67	42%	39.36	45.37	52.46	28.87	46.50	**43**	y
Rutlish School	S37	17%	12.21	M	20.43	M	M	16	n

Singlegate Primary School	S9	42%	28.05	34.10	32.91	32.95	35.78	33	y
St John Fisher RC Primary School	S60	25%	M	23.08	28.68	30.17	M	27	n
St Marks Academy	S21	42%	19.21	24.55	28.30	42.87	26.33	28	n
St Marks Primary School / Children Centre	S17/S18	42%	23.01	26.96	32.57	42.88	29.48	31	y
St Mary's Catholic Primary School	S5	33%	15.05	22.32	24.31	32.81	M	24	n
St Matthew's CofE Primary School	S56	17%	15.20	M	21.56	28.01	M	22	n
St Peter and Paul Catholic Primary School	S12	42%	35.10	41.04	45.22	28.02	39.15	38	y
St Teresa's Catholic Primary School	S45	42%	19.47	22.54	28.72	36.99	24.91	27	n
St Thomas of Canterbury Catholic Primary School	S20	42%	28.42	29.61	35.64	40.57	26.13	32	y
St Thomas of Canterbury Catholic Primary School - Early Years (REAR)	S20B	42%	17.62	21.08	27.50	36.85	28.01	26	y - 2nd location
Stanford Primary School	S30	42%	16.78	18.73	24.98	35.17	21.96	24	n
Steers Mead Children's Centres	S25	33%	27.24	M	33.54	39.28	35.09	34	y
The London Acorn School	S73	42%	15.51	16.83	21.72	29.56	20.76	21	n
The Norwegian School / Kindergarten	S74/S77	33%	19.29	24.12	26.31	45.24	M	29	n
The Priory CofE Primary School	S55	42%	23.40	21.57	32.37	32.05	32.45	28	n
The Rowans School	S78	42%	14.30	20.54	17.65	32.31	23.68	22	n
The Sherwood School	S39	42%	13.57	18.82	23.67	35.74	21.58	23	n
The Smart Centre	S75	33%	14.25	19.52	M	38.22	24.10	24	n
The Study Preparatory School	S79	42%	16.20	22.52	24.18	35.68	25.31	25	n
Ursuline High School Wimbledon	S50	33%	14.93	17.69	22.97	27.85	M	21	n
Ursuline Preparatory School Wimbledon	S70	42%	19.39	23.77	25.34	36.01	29.93	27	n
West Wimbledon Primary School	S48	33%	25.12	31.56	35.79	33.88	M	32	y
West Wimbledon Primary School	S48B	33%	19.07	23.70	27.92	31.19	M	25	y - 2nd location
William Morris Primary School	S40	33%	M	20.20	24.43	36.86	29.03	28	n
Willington School	S71	42%	20.22	23.52	32.36	31.85	48.64	31	n
Wimbledon Chase Primary School / Arts College	S16/S82	33%	16.88	23.63	27.52	29.94	M	24	n
Wimbledon Common Preparatory School	S72	33%	46.96	48.29	41.55	29.68	M	**42**	y
Wimbledon High School	S63	42%	52.36	54.96	55.08	57.35	59.81	56	y
Wimbledon Park Primary School	S61	33%	16.54	21.15	25.40	E	25.29	22	n

Notes:
M = Missing diffusion tube
E = Erroneous concentration. Low concentrations (3 µg m^{-3} or less) are rare at urban background or roadside sites in built up areas. Where such a low concentration is measured at an urban site, where measured NO_2 concentrations are usually much higher, it is unlikely to be genuine, and more likely due to a faulty diffusion tube. In this instance the result has been removed from the annual analysis and marked as erroneous.
High concentrations: unless there is a reason why the result is likely to be spurious, it is best to err on the side of including high values rather than rejecting them. As such higher than 'normal' concentrations have been left in the annual analysis.

Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in bold.

Figure 3. Extended monitoring programme school distribution map

Table O. Schools extended air quality monitoring programme

School	ID	Postcode	Street
Abbey Children's Centre Merton Abbey Primary School	S1/2	SW19 2JY	High Path
All Saints' C of E Primary School	S4B	SW19 1HL	Haydons Road
Church Road Children's Centre	S24	CR4 3BH	Church Road
Cranmer Primary School	S11	CR4 4XU	Cranmer Road
Cricket Green School	S64	CR4 3AF	Church Road
Eagle House School	S68	CR4 3HD	London Road
Just Learn	S69	CR4 2QA	Commonside East
Lavender Children's Centre (car park / London Road)	S8 / S8B	CR4 3LA	London Road
Liberty Primary School	S27	CR4 3EB	Western Road
Morden Primary School	S51	SM4 5PX	London Road
Park Community School (Dorset Rd / Merton Road)	S36 / S36B	SW19 3EF	Dorset Road
Poplar Primary School	S35	SW19 3JZ	Poplar Road South
Raynes Park High School	S49	SW20 0JL	West Barnes Lane
RISE Education	S67	CR4 3ED	Western Road

Singlegate Primary School	S9	SW19 2NT	South Gardens
St Marks Primary School / Children's Centre	S17/ S18	CR4 2LF	St Marks Road
St Peter and Paul Catholic Primary School	S12	CR4 4LA	Cricket Green
St Thomas of Canterbury Catholic Primary School (Commonside East / Early Years, Gatson Road)	S20 / S20B	CR4 1YG	Commonside East
Steers Mead Children's Centre	S25	CR4 3HL	Lavender Avenue
West Wimbledon Primary School (West Barnes Lane and Bodnant Gardens)	S48 / S48B	SW20 0BZ	West Barnes Lane
Wimbledon Common Preparatory School	S72	SW19 4TA	Ridgeway
Wimbledon High School	S63	SW19 4AB	Wimbledon Hill

Appendix D Diffusion tube results for additional citizen science monitoring programmes

In 2019 diffusion tubes were supplied by LBM to three community groups in the borough:

- Mitcham Society
- Wimbledon Park Residents Association
- Wimbledon Park Ward

We would like to take the opportunity to thank all groups and the individuals who gave up their time to extend diffusion tube monitoring in the borough.

While monitoring instructions were provided to a representative of each group the monitoring locations have not been verified by LBM, nor can the correct usage and storage be confirmed.

All tubes were prepared and analysed by Gradko Limited, refer to Appendix A Details of Monitoring Site QA/QC for quality assurance/quality control procedures. Tubes were supplied to a representative of the group on a monthly basis in to allow monitoring to follow the Defra diffusion tube exposure calendar and returned to LBM for collation and onward shipping to Gradko. All analysis reports were sent directly to LBM for checking and the distributed to a representative of each group.

D.1. Mitcham Society

Diffusion tubes were largely used by the Mitcham Society to 'spot check' various locations of local concern in Mitcham predominately where traffic and congestion and foot fall is the highest in and around the town centre.

All data collected by the Mitcham Society is presented in Table P and can be split into two categories;

- Corrected data – a minimum of 3 months of diffusion data can be 'annualised' in accordance with LLAQM Technical Guidance, to estimate an annual mean concentration which can then be compared to the AQO to assess compliance.

- Spot check – where only 1 or 2 sets of data are available at a monitoring location. It should be noted that 1 or 2 monthly averages are not directly comparable to either the hourly or annual mean air quality objectives and as such should be used for information only as an indication of air quality at the particular location at the time monitored. Monitoring has been bias adjusted using the local bias adjustment factor of 0.89.

A total of 6 monitoring locations had sufficient data to annualise, the monthly concentrations are identified in italics in Table P. The final annualised and bias adjusted concentrations are provided in Table Q and annualisation calculations are provided in Table R. A distance correction calculation should be performed where the AQO is exceeded to estimate relevant exposure however it was not possible to complete due to incomplete location information. The annual AQO was exceeded at Site IDs Mitcham 1 and Mitcham 2, it is however unlikely that there are residential receptors to be accounted for nearby. Where an annual concentration of 60 μgm^{-3} or above is measured by diffusion tube an exceedance of the hourly AQO is likely, Mitcham 1 is close to this objective. The monitoring carried out by the Mitcham Society has highlighted that additional monitoring may be required in Mitcham Town Centre. All borough monitoring locations are reviewed annually at the end of the year, any amendments to the Council monitoring network comes into effect in January.

Table P. Mitcham Society diffusion tube data 2019

			NO_2 concentration μgm^{-3}	
Monitoring location	**Date on**	**Date off**	**Unadjusted**	**Bias adjusted (0.89)**
January				
Mitcham 2 Nail Bar, 213 London Road	14/01/2019	11/02/2019	56.93	**50.67**
Mitcham 3 Tag Elezz café, Upper Green East	14/01/2019	11/02/2019	50.57	**45.00**
Mitcham 4 Pound Stretcher, 283 London Road	14/01/2019	11/02/2019	55.81	**49.67**
Mitcham 5 Barnard Marcus Estate Agents, Langdale Parade	14/01/2019	11/02/2019	50.68	**45.10**
Mitcham 6 Three Kings Pond	14/01/2019	11/02/2019	48.98	**43.60**
February				
Not monitored				
March				
Bus Stop Glebe Court CR4 3NU	18/03/2019	18/04/2019	58.29	**51.88**
White Hart London Rd Mitcham	18/03/2019	16/04/2019	68.02	**60.54**
Mitcham 5 Barnard Marcus Estate Agents, Langdale Parade	18/03/2019	16/04/2019	46.26	**41.17**
Bus Stop Glebe Square Mitcham	18/03/2019	16/04/2019	46.09	**41.02**
Caxton House Lower Green West CR4 3AF	18/03/2019	16/04/2019	48.01	**42.73**
Mitcham 6 Three Kings Pond	18/03/2019	16/04/2019	48.49	**43.16**
Lamp post Just Before ASDA Western Road	18/03/2019	16/04/2019	51.85	**46.15**
April				
Mitcham 2 Nail Bar, 213 London Road	16/04/2019	14/05/2019	72.86	**64.85**
JCTN Lower Green West London Rd	16/04/2019	14/05/2019	67.72	**60.27**
Mitcham 5 Barnard Marcus Estate Agents, Langdale Parade	16/04/2019	14/05/2019	47.67	**42.43**
Mitcham 6 Three Kings Pond	16/04/2019	14/05/2019	45.50	**40.50**
Dessert House Notice Board London Rd	16/04/2019	14/05/2019	59.41	**52.87**
Mitcham 1 Holborn Way (back of Lidl)	16/04/2019	14/05/2019	62.75	**55.85**
May				
Not monitored				
June				

Mitcham 6 Three Kings Pond	29/05/2019	25/06/2019	37.79	33.63
Mitcham 5 Barnard Marcus Estate Agents, Langdale Parade	29/05/2019	25/06/2019	31.67	28.18
Lamp post Opp Albarmile Pawn BKS CR4 3NA	29/05/2019	25/06/2019	60.26	**53.63**
Mitcham 2 Nail Bar, 213 London Road	29/05/2019	25/06/2019	76.06	**67.69**
Mitcham 1 Holborn Way (back of Lidl)	29/05/2019	25/06/2019	51.05	**45.44**
Notice Board o/s Old Tesco on London Road	29/05/2019	25/06/2019	43.01	38.28
July				
Not monitored				
August				
Junction of London Road + Mitcham Cricket Green	29/07/2019	27/08/2019	43.26	38.50
Cricket Green Pavilion	29/07/2019	27/08/2019	62.49	**55.62**
Mary Tate Cottages SS Peter + Paul School	29/07/2019	27/08/2019	27.30	24.30
Bus Stop Junction Bramcote Avenue + Cricket Green	29/07/2019	27/08/2019	40.17	35.75
Roundabout opposite SS Peter + Paul RC Church Cranmer Rd	29/07/2019	27/08/2019	33.29	29.63
Cranmer School	29/07/2019	27/08/2019	19.69	17.52
Mitcham 6 Three Kings Pond	29/07/2019	27/08/2019	36.71	32.67
Mitcham 5 Barnard Marcus Estate Agents, Langdale Parade	29/07/2019	27/08/2019	30.28	26.95
Notice Board o/s Old Tesco on London Road CR4	29/07/2019	27/08/2019	43.72	38.91
Mitcham 1 Holborn Way (back of Lidl)	29/07/2019	27/08/2019	46.80	**41.65**
Mitcham 2 Nail Bar, 213 London Road	29/07/2019	27/08/2019	64.28	**57.21**
Pawn Brokers	29/07/2019	27/08/2019	67.60	**60.16**
September				
Lamp Post outside Cranmer School CR4 4XU	09/09/2019	09/10/2019	22.88	20.36
Lamp Post Opposite Obelist	09/09/2019	09/10/2019	35.34	31.46
Mary Tate Cottages Cricket Green	09/09/2019	09/10/2019	34.10	30.35
Bus Stop by Bramcote Road	09/09/2019	09/10/2019	44.36	39.48
Lamp Post at Mitcham Cricket Club	09/09/2019	09/10/2019	46.10	**41.03**
Outside White Hart Pub Mitcham	09/09/2019	09/10/2019	57.11	**50.82**
October				

Not monitored				
November				
Mitcham 6 Three Kings Pond	01/11/2019	03/12/2019	51.41	**45.75**
Mitcham 2 Nail Bar, 213 London Road	01/11/2019	03/12/2019	70.85	**63.06**
Outside Lidl on Lamppost Western Road, Mitcham	01/11/2019	03/12/2019	58.74	**52.28**
Mitcham 4 Pound Stretcher, 283 London Road	01/11/2019	03/12/2019	60.48	**53.83**
Mitcham 3 Tag Elezz café, Upper Green East	01/11/2019	03/12/2019	58.83	**52.36**
December				
Sign Post Opposite Kings Arms Pub 260 London Rd CR4 3HD	03/12/2019	06/01/2020	34.98	31.13
Mitcham 2 Nail Bar, 213 London Road	03/12/2019	06/01/2020	60.48	**53.82**
Lamp Post Outside Pondland Majestic Way CR4 2JS	03/12/2019	06/01/2020	62.93	**56.01**
Mitcham 3 Tag Elezz café, Upper Green East	03/12/2019	06/01/2020	56.53	**50.31**
Notice Board 283 London Rd CR4 2NB	03/12/2019	06/01/2020	53.25	**47.40**
Mitcham 1 Holborn Way (back of Lidl)	03/12/2019	06/01/2020	51.22	**45.58**

Notes: Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.

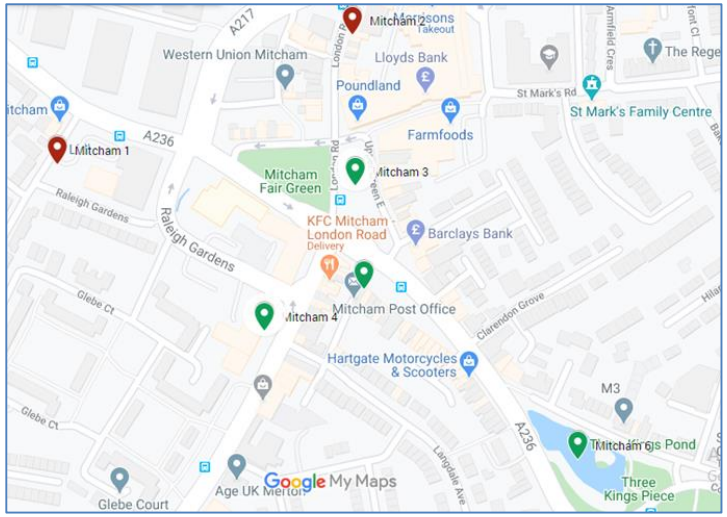
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

Table Q. Mitcham Society corrected diffusion tube data 2019

			NO_2 concentration (μgm^{-3})		
Site ID	**Site Description**	**Data Capture**	**Unadjusted 'raw' average concentration**	**Annualised concentration**	**Annualised and bias adjusted concentration**
Mitcham 1	Lidl (rear), Holborn Way	33%	52.96	66.41	**59.10**
Mitcham 2	Nail Bar, 213 London Road	50%	59.56	59.72	**53.15**
Mitcham 3	Tag Elezz Café, Upper Green East	25%	55.31	43.71	38.90
Mitcham 4	Pound Stretcher, 283 London Road	25%	56.51	44.66	39.75
Mitcham 5	Barnard Marcus Estate Agents, Langdale Parade	42%	36.77	38.04	33.86
Mitcham 6	Three Kings Pond	50%	39.89	37.26	33.16

Notes: Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

Figure 4 Map of annual mean NO2 concentrations in Mitcham



Annual mean NO_2 concentration >40 μgm^{-3}

Annual mean NO_2 concentration <40 μgm^{-3}

Table R. Mitcham Society annualisation

Mitcham 1 Lidl (rear) Holborn Way

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	11/02/2019	28.6			
11/02/2019	18/03/2019	25.7			
18/03/2019	16/04/2019	26.9			
16/04/2019	14/05/2019	18.6	62.75	18.6	
14/05/2019	29/05/2019	17.7			
29/05/2019	25/06/2019	14.2	51.05	14.2	
26/06/2019	27/07/2019	14.5			
29/07/2019	27/08/2019	12.9	46.80	12.9	
09/09/2019	09/10/2019	18.4			
09/10/2019	01/11/2019	22.9			
01/11/2019	03/12/2019	29.8			
03/12/2019	06/01/2020	21.1	51.22	21.1	
	Averages	20.94	52.96	16.70	
			Annualisation Ratio	1.25399202	**66.41**

Mitcham 2 Nail Bar 213 London Road

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	11/02/2019	28.6	50.67	28.6	
11/02/2019	18/03/2019	25.7			
18/03/2019	16/04/2019	26.9			
16/04/2019	14/05/2019	18.6	64.85	18.6	
14/05/2019	29/05/2019	17.7			
29/05/2019	25/06/2019	14.2	67.69	14.2	
26/06/2019	27/07/2019	14.5			
29/07/2019	27/08/2019	12.9	57.21	12.9	
09/09/2019	09/10/2019	18.4			
09/10/2019	01/11/2019	22.9			
01/11/2019	03/12/2019	29.8	63.09	29.8	
03/12/2019	06/01/2020	21.1	53.82	21.2	
	Averages	20.94	59.56	20.88	
			Annualisation Ratio	1.0027933	**59.72**

Mitcham 3 Tag Elezz Café, Upper Green East

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	11/02/2019	28.6	50.57	28.6	

11/02/2019	18/03/2019	25.7			
18/03/2019	16/04/2019	26.9			
16/04/2019	14/05/2019	18.6			
14/05/2019	29/05/2019	17.7			
29/05/2019	25/06/2019	14.2			
26/06/2019	27/07/2019	14.5			
29/07/2019	27/08/2019	12.9			
09/09/2019	09/10/2019	18.4			
09/10/2019	01/11/2019	22.9			
01/11/2019	03/12/2019	29.8	58.83	29.8	
03/12/2019	06/01/2020	21.1	56.53	21.1	
	Averages	20.94	55.31	26.50	
			Annualisation Ratio	0.79025157	**43.71**

Mitcham 4 Pound Stretcher 283 London Road

Start Date	**End date**	**Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)**	**D1**	**B1 when D1 available**	**Annualised Concentration**
14/01/2019	11/02/2019	28.6	55.81	28.6	
11/02/2019	18/03/2019	25.7			
18/03/2019	16/04/2019	26.9			
16/04/2019	14/05/2019	18.6			

14/05/2019	29/05/2019	17.7			
29/05/2019	25/06/2019	14.2			
26/06/2019	27/07/2019	14.5			
29/07/2019	27/08/2019	12.9			
09/09/2019	09/10/2019	18.4			
09/10/2019	01/11/2019	22.9			
01/11/2019	03/12/2019	29.8	60.48	29.8	
03/12/2019	06/01/2020	21.1	53.25	21.1	
	Averages	20.94	56.51	26.50	
			Annualisation Ratio	0.79025157	**44.66**

Mitcham 5 Barnard Marcus Estate Agents Langdale Parade

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	11/02/2019	28.6	45.1	28.6	
11/02/2019	18/03/2019	25.7			
18/03/2019	16/04/2019	26.9	41.17	26.9	
16/04/2019	14/05/2019	18.6	42.43	18.6	
14/05/2019	29/05/2019	17.7			
29/05/2019	25/06/2019	14.2	28.18	14.2	

26/06/2019	27/07/2019	14.5			
29/07/2019	27/08/2019	12.9	26.95	12.9	
09/09/2019	09/10/2019	18.4			
09/10/2019	01/11/2019	22.9			
01/11/2019	03/12/2019	29.8			
03/12/2019	06/01/2020	21.1			
	Averages	20.94	36.77	20.24	
			Annualisation Ratio	1.03466733	**38.04**

Mitcham 6 Three Kings Pond

Start Date	**End date**	**Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)**	**D1**	**B1 when D1 available**	**Annualised Concentration**
14/01/2019	11/02/2019	28.6	43.60	28.6	
11/02/2019	18/03/2019	25.7			
18/03/2019	16/04/2019	26.9	43.16	26.9	
16/04/2019	14/05/2019	18.6	40.50	18.6	
14/05/2019	29/05/2019	17.7	33.63	17.7	
29/05/2019	25/06/2019	14.2			
26/06/2019	27/07/2019	14.5			
29/07/2019	27/08/2019	12.9	32.67	12.9	
09/09/2019	09/10/2019	18.4			

09/10/2019	01/11/2019	22.9			
01/11/2019	03/12/2019	29.8	45.75	29.8	
03/12/2019	06/01/2020	21.1			
	Averages	20.94	39.89	22.42	
			Annualisation Ratio	0.93420074	**37.26**

D.2. Wimbledon Park Residents Association

The Wimbledon Park Residents Association (WPRA) monitor air quality at set locations on a quarterly basis. As data capture is less than 75% (8 months) data has been annualised' in accordance with LLAQM Technical Guidance, to estimate an annual mean concentration which can then be compared to the AQO to assess compliance. A comprehensive list of monitoring locations and descriptions provided by WPRA is presented Table S. The final annualised and bias adjusted concentrations are provided in Table T. Annualisation calculations are provided in Table U. Correction for distance calculation was not required as none of the annual concentrations exceeded the AQO. The annual mean AQO was achieved at all monitoring locations.

Table S. Wimbledon Park Residents Association monitoring locations

Site ID	Location	Description	Distance from tube to kerb (m)	Distance to nearest receptor	Height to tube inlet (m)
Wimbledon Park 1	12A Ravensbury Terrace SW18 4RL	 On lamppost 009. Between 2 large housing construction sites 1 of 24 dwellings the other 129 dwellings on the old Haslemere Industrial site. Opposite an allotment, nearest current housing 50 metres.	At kerb		2m

Wimbledon Park 2	37 Wellington Road SW19 8EQ	 On lamp post 001. Near the junction with Havana Road. Outside WP Primary school in a residential area. Road used by vehicles entering the Wellington Road Industrial Estate.	At kerb		2m
Wimbledon Park 3	363 Durnsford Road SW19 8EF	 On lamppost 045. On the main road by a pelican crossing used by children to access the primary school. Housing both sides of the road.	2m		2m

Wimbledon Park 4	Opposite 162 Durnsford Road SW19 8GY	 On lamp post 018. On the junction with Endeavour Way. Entry to an industrial estate used by very large wagons eg Occado, Reston Waste and others. Housing other side of the road.	At kerb		2m
Wimbledon Park 5	147 Arthur Road SW19 8AB	 On the zebra crossing outside Wimbledon Park tube station	At kerb		2m

Wimbledon Park 6	44 Home Park Road SW19 7HN	 Residential area. Road links WP with Wimbledon town centre therefore a lot of through traffic.	At kerb		2m

Table T. Wimbledon Park Residents Association corrected diffusion tube data 2019

							NO_2 concentration μgm^{-3}		
Site Code	**Site Description**	**Data Capture**	**January**	**April**	**July**	**October**	**Unadjusted 'raw' average concentration**	**Annualised Concentration**	**Annualised and bias adjusted concentration**
Wimbledon Park 1	12a Ravensbury Terrace	33%	38.74	29.90	23.64	34.20	31.62	31.53	28.06
Wimbledon Park 2	33 Wellington road	25%	35.81	Missing	16.14	29.26	27.07	26.04	23.18

Wimbledon Park 3	363 Durnsford Road	33%	50.69	48.82	34.43	44.87	44.70	44.58	39.68
Wimbledon Park 4	162 Durnsford road	33%	46.42	30.75	24.74	38.53	35.11	35.01	31.16
Wimbledon Park 5	141 Arthur Road	33%	47.65	40.23	27.60	35.57	37.76	37.66	33.52
Wimbledon Park 6	44 Home Park Road	33%	34.52	31.77	18.87	32.36	29.38	29.3	26.08

Notes: Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

Figure 5 Map of annual mean NO2 concentrations in Wimbledon Park (WPRA)

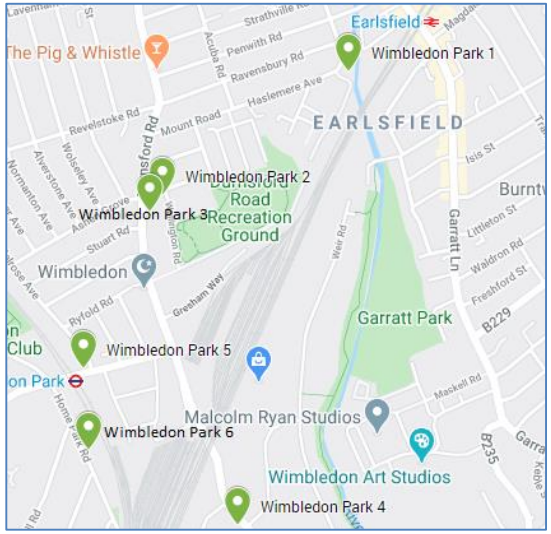


Table U. Wimbledon Park Residents Association annualisation

Wimbledon Park 1

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	**10/02/2019**	29	38.74	29	
10/02/2019	06/03/2019	31.8			
06/03/2019	16/04/2019	21.9			
16/04/2019	**14/05/2019**	18.6	29.90	18.6	
14/05/2019	05/06/2020	15.3			
05/06/2019	03/07/2019	15			
03/07/2019	**07/08/2010**	14.2	23.64	14.2	
07/08/2019	04/09/2019	12.8			
04/09/2019	02/10/2019	17.8			
02/10/2019	**06/11/2019**	21.8	34.20	21.8	
06/11/2019	04/12/2019	32			
04/12/2019	08/01/2020	19.9			
	Averages	20.84	31.62	20.90	
			Annualisation Ratio	0.99720893	**31.53**

Wimbledon Park 2

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	**10/02/2019**	29	35.81	29	
10/02/2019	06/03/2019	31.8			
06/03/2019	16/04/2019	21.9			
16/04/2019	**14/05/2019**	18.6			
14/05/2019	05/06/2020	15.3			
05/06/2019	03/07/2019	15			
03/07/2019	**07/08/2010**	14.2	16.14	14.2	
07/08/2019	04/09/2019	12.8			
04/09/2019	02/10/2019	17.8			
02/10/2019	**06/11/2019**	21.8	29.26	21.8	
06/11/2019	04/12/2019	32			
04/12/2019	08/01/2020	19.9			
	Averages	20.84	27.07	21.67	
			Annualisation Ratio	0.96192308	**26.04**

Wimbledon Park 3

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	**10/02/2019**	29	50.69	29	

10/02/2019	06/03/2019	31.8			
06/03/2019	16/04/2019	21.9			
16/04/2019	**14/05/2019**	18.6	48.82	18.6	
14/05/2019	05/06/2020	15.3			
05/06/2019	03/07/2019	15			
03/07/2019	**07/08/2010**	14.2	34.43	14.2	
07/08/2019	04/09/2019	12.8			
04/09/2019	02/10/2019	17.8			
02/10/2019	**06/11/2019**	21.8	44.87	21.8	
06/11/2019	04/12/2019	32			
04/12/2019	08/01/2020	19.9			
	Averages	20.84	44.70	20.90	
			Annualisation Ratio	0.99720893	**44.58**

Wimbledon Park 4

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	**10/02/2019**	29	46.42	29	
10/02/2019	06/03/2019	31.8			
06/03/2019	16/04/2019	21.9			
16/04/2019	**14/05/2019**	18.6	30.75	18.6	

14/05/2019	05/06/2020	15.3			
05/06/2019	03/07/2019	15			
03/07/2019	**07/08/2010**	14.2	24.74	14.2	
07/08/2019	04/09/2019	12.8			
04/09/2019	02/10/2019	17.8			
02/10/2019	**06/11/2019**	21.8	38.53	21.8	
06/11/2019	04/12/2019	32			
04/12/2019	08/01/2020	19.9			
	Averages	20.84	35.11	20.90	
			Annualisation Ratio	0.99720893	**35.01**

Wimbledon Park 5

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	**10/02/2019**	29	47.65	29	
10/02/2019	06/03/2019	31.8			
06/03/2019	16/04/2019	21.9			
16/04/2019	**14/05/2019**	18.6	40.23	18.6	
14/05/2019	05/06/2020	15.3			
05/06/2019	03/07/2019	15			
03/07/2019	**07/08/2010**	14.2	27.60	14.2	

07/08/2019	04/09/2019	12.8			
04/09/2019	02/10/2019	17.8			
02/10/2019	**06/11/2019**	21.8	35.57	21.8	
06/11/2019	04/12/2019	32			
04/12/2019	08/01/2020	19.9			
	Averages	20.84	37.76	20.90	
			Annualisation Ratio	0.99720893	**37.66**

Wimbledon Park 6

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration
14/01/2019	**10/02/2019**	29	34.52	29	
10/02/2019	06/03/2019	31.8			
06/03/2019	16/04/2019	21.9			
16/04/2019	**14/05/2019**	18.6	31.77	18.6	
14/05/2019	05/06/2020	15.3			
05/06/2019	03/07/2019	15			
03/07/2019	**07/08/2010**	14.2	18.87	14.2	
07/08/2019	04/09/2019	12.8			
04/09/2019	02/10/2019	17.8			
02/10/2019	**06/11/2019**	21.8	32.36	21.8	

06/11/2019	04/12/2019	32			
04/12/2019	08/01/2020	19.9			
	Averages	20.84	29.38	20.90	
			Annualisation Ratio	0.99720893	**29.30**

D.3. Wimbledon Park Ward

Additional monitoring is undertaken in the Wimbledon Park ward on a monthly basis. All locations were verified by an LBM Air Quality Officer in February 2019.

Where data capture was less than 75% (8 months) a data annualisation calculation has been performed in accordance with LLAQM Technical Guidance to estimate an annual mean concentration. An annualised concentration can be compared to the annual AQO to assess compliance. The final annualised and bias adjusted concentrations are provided in Table U. Annualisation calculations are provided in Table V. The annual AQO was exceeded at one monitoring location (Site ID 105), as there is no associated residential receptor distance correction has not been applied. As this monitoring site (Site ID 105) is in close proximity to the Wimbledon Stadium redevelopment the location will be added to the London Borough of Merton diffusion tube network in January 2021. It is likely that the exceedance has resulted from the large number of construction vehicles serving the construction site but ongoing monitoring is required to confirm this.

Table V. Wimbledon Park Ward diffusion corrected tube data 2019

															NO_2 concentration μgm^{-3}		
Site Code	**Site Description**	**Data Capture**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Unadjusted 'raw' average**	**Annualised Concentration**	**Annualised and bias adjusted concentration**
101	SW19 8HF 53 Kingsley Road	83%	NM	34.88	29.49	27.32	M	20.29	15.18	33.25	24.31	26.58	37.39	27.88	27.66		24.61

102	SW19 8JZ Haydons Road / Cromwell Rd Junction	83%	NM	41.87	46.15	46.80	34.17	35.75	30.94	M	40.99	42.23	52.29	36.68	40.79		36.30
103	SW19 8GU Opposite 8 Durnsford Road	67%	NM	50.46	M	52.21	M	40.35	M	49.72	39.66	35.03	47.17	29.74	43.04	41.85	37.25
104	SW19 8LA Outside 335 Haydons Road	83%	NM	53.93	44.91	51.48	34.73	M	38.16	33.70	43.08	43.37	51.32	37.86	43.25		38.50
105	SW17 0BQ 75-85 Summerstown	83%	NM	65.28	51.52	46.44	42.63	48.88	48.30	M	58.31	43.19	58.64	50.08	51.33		**45.68**
106	SW19 8TX 295 Haydons Road	92%	NM	59.91	48.09	56.95	35.23	43.17	38.87	19.35	44.31	44.47	57.40	36.85	44.06		39.21

Notes: Exceedance of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.

NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

NM Not monitored

M Missing

Figure 6 Map of annual mean NO_2 concentrations in Wimbledon Park Ward

Annual mean NO_2 concentration >40 μgm^{-3}

Annual mean NO_2 concentration <40 μgm^{-3}

Table W Wimbledon Park Ward annualisation

Site ID 103

Start Date	End date	Barnes Wetland Suburban Continuous Monitor DC for 2019 = 94% (B1)	D1	B1 when D1 available	Annualised Concentration

15/01/2019	12/02/2019	28.9	NM	28.9	
12/02/2019	12/03/2019	28.1	50.46		
15/03/2019	05/04/2019	25.3	Missing	25.3	
06/04/2019	03/05/2019	19.7	52.21		
04/05/2019	07/06/2019	16.1	Missing	16.1	
08/06/2019	04/07/2019	14.8	40.35		
08/07/2019	07/08/2019	13.7	Missing	13.7	
09/08/2019	05/09/2019	12.9	49.72		
07/09/2019	02/10/2019	18.1	39.66		
05/10/2019	06/11/2019	21.7	35.03		
11/10/2019	12/10/2019	30.6	47.17		
12/13/2019	01/09/2020	15.1	29.74		
	Averages	20.42	43.04	21.00	
			Annualisation Ratio	0.972222	**41.85**