London Borough of Ealing Air Quality Annual Status Report for 2020

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This report provides a detailed overview of air quality in London Borough of Ealing during 2020. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

Contact details:

Air Quality Officer	Sneha Patil
Department	Regulatory Services London Borough of Ealing Perceval House
Address	14-16 Uxbridge Road London W5 2HL
E-mail	pollution-technical@ealing.gov.uk

[1] LLAQM Policy and Technical Guidance 2019 (LLAQM.TG(19))

Contents

Tables

Abbreviations

Abbreviation	Description
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
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	Standard / 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
Nitrogen dioxide (NO_2)	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
Particles (PM_{10})	40 µg m^{-3}	Annual mean	31 Dec 2004
Particles ($PM_{2.5}$)	25 µg m^{-3}	Annual mean	2020
Particles ($PM_{2.5}$)	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
Sulphur dioxide (SO_2)	350 µg m^{-3} not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
Sulphur dioxide (SO_2)	125 µg m^{-3} not to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004

Notes:

(1) Date by which to be achieved by and maintained thereafter

1. Air Quality Monitoring

1.1 Locations

In 2020, four automatic monitoring stations were operated in the London Borough of Ealing. The most recent of these to be opened, on 23rd November 2017, was Ealing Acton Vale, which monitors nitrogen dioxide (NO_2) and Particulate Matter (PM_{10}) and is classified as an urban background site. Of the three remaining monitoring stations, two are roadside sites (Ealing Hanger Lane Gyratory and Ealing Western Avenue) and one is classified as an industrial site (Ealing Horn Lane).

All sites are operated as part of the London Air Quality Network. Two different analysers for PM_{10} are active at the Horn Lane monitoring station, a TEOM and a TEOM-FDMS. Consistent with the London Air Quality Network classification, data from the two instruments are reported as two separate stations (EA8 Horn Lane and EI8 Horn Lane TEOM). Details of the relevant Quality Assurance/Quality Control (QA/QC) procedures that were followed during the monitoring are provided in Appendix A.

Figure 1 and Table B provide details of the automatic monitoring sites located in the Borough. All the currently operational automatic monitoring sites measure NO_2 and PM_{10}.

Figure 1. Map of Automatic Monitoring Sites

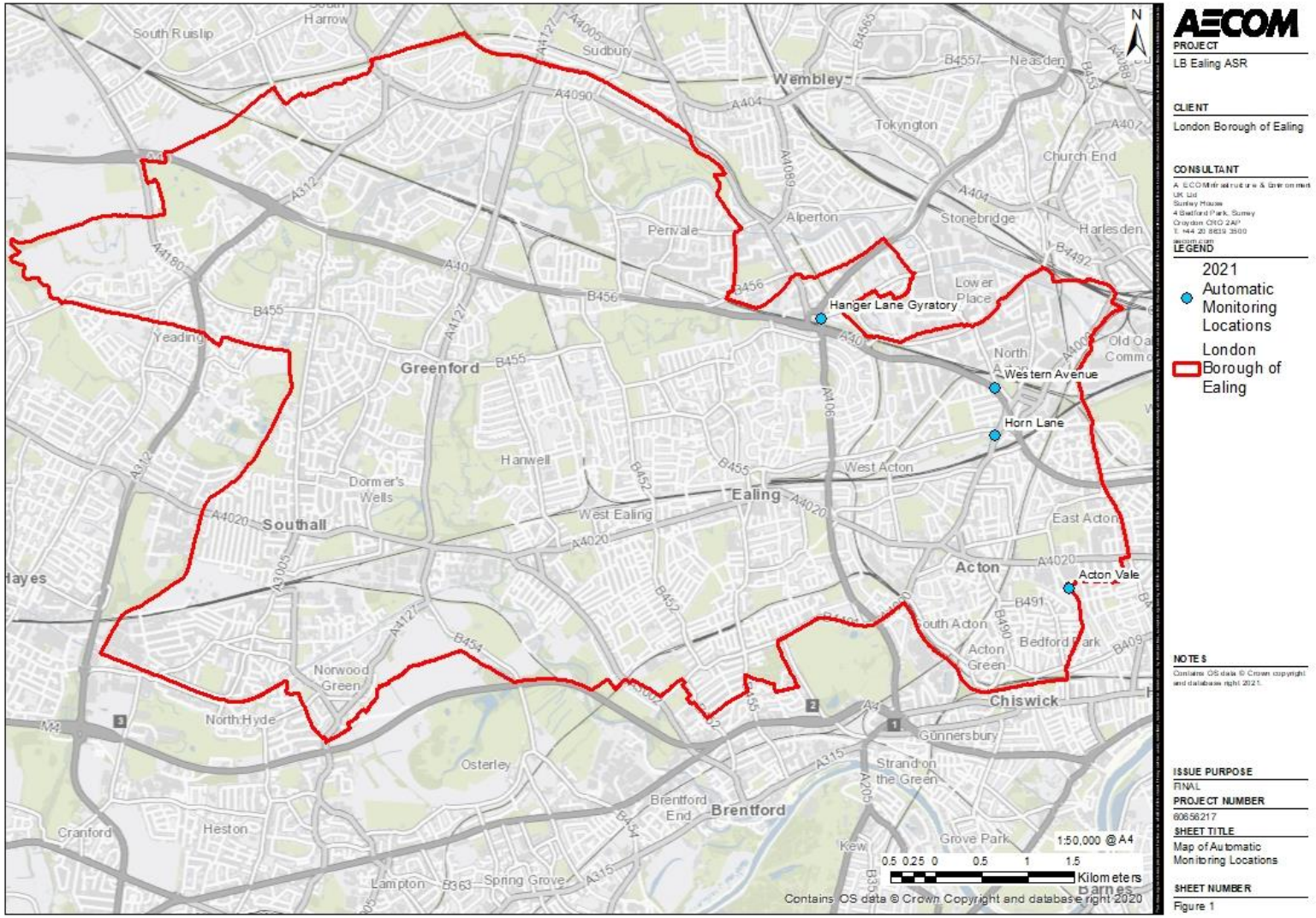


Table B. Details of Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
EA6 Hanger Lane Gyratory	Hanger Lane Gyratory	518537	182708	Roadside	Y- Ealing	4	3	2.0	NO_2, PM_{10}	Chemiluminescence, TEOM
EA8 Horn Lane	Horn Lane	520432	181428	Industrial	Y- Ealing	8	2.5	1.8	NO_2, PM_{10}	Chemiluminescence, PM_{10} by FDMS
EI8 Horn Lane TEOM	Horn Lane	520432	181428	Industrial	Y- Ealing	8	2.5	1.8	PM_{10}	TEOM
EI1 Western Avenue	Western Avenue	520430	181950	Roadside	Y- Ealing	4	4	2.0	NO_2, PM_{10}	Chemiluminescence, TEOM
EI3 Acton Vale	Acton Vale	521234	179771	Urban Background	Y- Ealing	N/A	N/A	2.55	NO_2, PM_{10}	Chemiluminescence, PM_{10} by FDMS

During 2020, the London Borough of Ealing monitored annual mean NO_2 concentrations using a network of 63 passive diffusion tubes across 57 locations. There are three triplicate sites, co-located with the three automatic air quality monitoring stations. Figure 2 and Table C provide details of the diffusion tube sites operated within the Borough during 2020. In recent years, the Council has decommissioned 23 sites to focus on locations of most relevant exposure by removing sites that had been compliant with the annual mean objective for several years.

Two new temporary diffusion sites located at St Mark's Primary School were added during May 2019 due to concerns expressed by parents about the exposure of their children to pollution from traffic on Lower Boston Road. The results for both 2019 and 2020 are included in this ASR.

The two locations at St Mark's Primary School (NWA1S1 and NWA1S2) only achieved 42% data capture in 2020. The data capture at these locations was impacted by the COVID-19 pandemic, with exposure periods varying depending on when the tube changeovers could be carried out. Where the exposure period was significantly outside of the recommended dates in the Defra diffusion tube calendar, i.e. significantly shorter or longer than the recommended 4-5 weeks in LLAQM TG(19) guidance, these were excluded from the annual mean. Full details of exclusions are provided in Appendix A.

Figure 2. Map of Non-Automatic Monitoring Sites

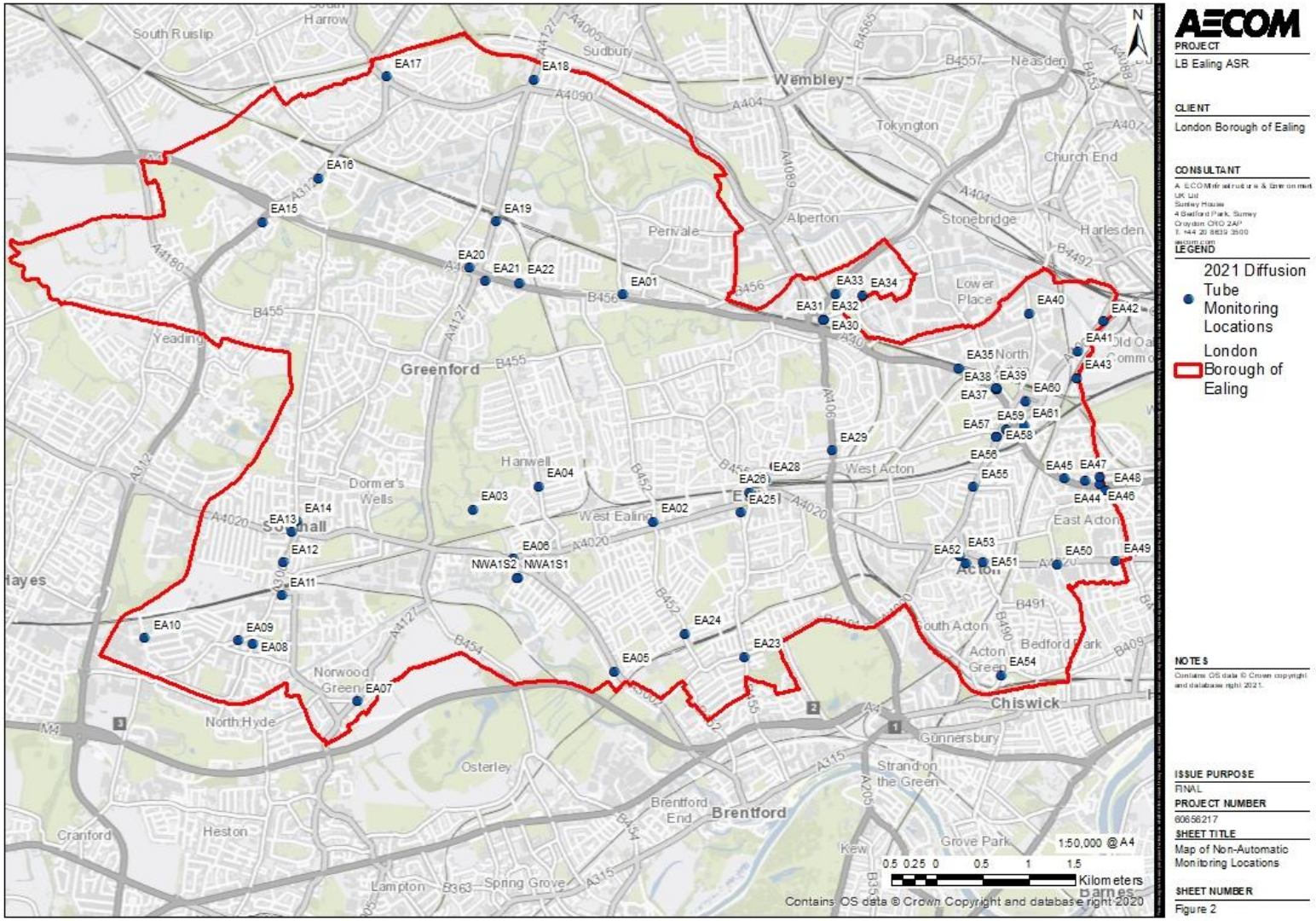


Table C. Details of Non-Automatic Monitoring Sites for 2020

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
EA01	2 Horsenden Lane South, Greenford, UB6 8AB	516368	182978	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA02	1 Kirn Road, West Ealing, W13 0UB	516699	180509	Roadside	Y- Ealing	0	2	2 – 2.5	NO_2	N
EA03	Brent Lodge Park, Church Road, Hanwell, W7 3BP	514740	180643	Background	Y- Ealing	0	30	2 – 2.5	NO_2	N
EA04	74a Greenford Avenue, Hanwell, W7 3QS	515451	180894	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA05	6 Boston Gardens, Boston Road, Hanwell, W7 2AN	516277	178882	Roadside	Y- Ealing	0	10	2 – 2.5	NO_2	N
EA06	200 Uxbridge Road, Hanwell, W7 3TB	515180	180111	Roadside	Y- Ealing	0	3.3	2 – 2.5	NO_2	N
EA07	2 St Marys Avenue South, Southall, UB2 4LS	513476	178561	Roadside	Y- Ealing	0	12	2 – 2.5	NO_2	N
EA08	55 King Street, Southall, UB2 4DQ	512341	179186	Roadside	Y- Ealing	0	3.3	2 – 2.5	NO_2	N
EA09	18 Western Road, Southall, UB2 5DU	512181	179219	Roadside	Y- Ealing	0	7.5	2 – 2.5	NO_2	N
EA10	150 Brent Road, Southall, UB2 5LD	511170	179251	Roadside	Y- Ealing	0	7.7	2 – 2.5	NO_2	N
EA11	2 Merrick Road, Southall, UB2 4AU	512657	179712	Roadside	Y- Ealing	0	12	2 – 2.5	NO_2	N
EA12	Hambrough Primary School, South Road, Southall, UB1 1SF	512673	180069	Roadside	Y- Ealing	0	10	2 – 2.5	NO_2	N
EA13	11 The Broadway, Southall, UB1 3PX	512768	180400	Roadside	Y- Ealing	0	4	2 – 2.5	NO_2	N
EA14	25 Lady Margaret Road, Southall, UB1 2RA	512812	180516	Roadside	Y- Ealing	0	6.3	2 – 2.5	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
EA15	213 Church Road, Northolt, UB5 5BE	512442	183769	Roadside	Y- Ealing	0	12.4	2 – 2.5	NO_2	N
EA16	31 Mandeville Road, Northolt, UB5 5HF	513056	184241	Roadside	Y- Ealing	0	9	2 – 2.5	NO_2	N
EA17	126 Petts Hill, Northolt, UB5 4NW	513794	185348	Roadside	Y- Ealing	0	9	2 – 2.5	NO_2	N
EA18	1504 Greenford Road, Greenford, UB6 0HR	515402	185313	Roadside	Y- Ealing	0	5.3	2 – 2.5	NO_2	N
EA19	914 Greenford Road, Greenford, UB6 8QN	514985	183770	Roadside	Y- Ealing	0	3.3	2 – 2.5	NO_2	N
EA20	6 Karoline Gardens, Greenford, UB6 9JP	514691	183269	Roadside	Y- Ealing	0	9.1	2 – 2.5	NO_2	N
EA21	12 Blenheim Close, Greenford, UB6 8ET	514863	183122	Roadside	Y- Ealing	0	9.5	2 – 2.5	NO_2	N
EA22	19 Runnymede Gardens, Greenford, UB6 8SX	515240	183102	Roadside	Y- Ealing	0	1.2	2 – 2.5	NO_2	N
EA23	158 South Ealing Road, Ealing, W5 4QL	517694	179045	Roadside	Y- Ealing	0	3.5	2 – 2.5	NO_2	N
EA24	213 Northfields Ave, West Ealing, W13 9QU	517045	179292	Roadside	Y- Ealing	0	5.2	2 – 2.5	NO_2	N
EA25	12 Bond Street, Ealing W5 5AP	517644	180613	Roadside	Y- Ealing	0	2.7	2 – 2.5	NO_2	N
EA26	8 Spring Bridge Road, Ealing, W5 2AA	517745	180826	Roadside	Y- Ealing	0	3	2 – 2.5	NO_2	N
EA27	21 Haven Lane, Ealing, W5 2HZ	518022	181114	Roadside	Y- Ealing	0	2.4	2 – 2.5	NO_2	N
EA28	41-42 Haven Green, Ealing, W5 2NX	517909	180971	Roadside	Y- Ealing	0	3	2 – 2.5	NO_2	N
EA29	64 Hanger Lane, Ealing, W5 2JH	518635	181288	Roadside	Y- Ealing	0	0.7	2 – 2.5	NO_2	N
EA30, EA31, EA32	Fernlea House, Hanger Lane, Ealing, W5 1EF (AQMS) (Tri)	518541	182707	Roadside	Y- Ealing	0	4	2 – 2.5	NO_2	Y

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
EA33	25 Waverley Gardens, Park Royal, NW10 7EX	518673	182982	Roadside	Y- Ealing	0	1.8	2 – 2.5	NO_2	N
EA34	3 Iveagh Terrace, Park Royal, NW10 7SY	518976	182963	Roadside	Y- Ealing	0	33	2 – 2.5	NO_2	N
EA35	Wendover Court, Western Avenue, Acton, W3 0TG	520020	182180	Roadside	Y- Ealing	0	11	2 – 2.5	NO_2	N
EA36, EA37, EA38	322 & 324 Western Avenue, Acton, W3 OPL (AQMS) (Tri)	520430	181950	Roadside	Y- Ealing	3.5	5	2 – 2.5	NO_2	Y
EA39	326 Western Avenue, Acton, W3 0PL	520426	181958	Roadside	Y- Ealing	0	11.4	2 – 2.5	NO_2	N
EA40	94 North Acton Road, Park Royal, NW10 7AY	520780	182775	Roadside	Y- Ealing	0	6	2 – 2.5	NO_2	N
EA41	1 Shaftesbury Gardens, Park Royal, NW10 6LJ	521312	182366	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA42	39 Old Oak Lane, Park Royal, NW10 6EJ	521587	182685	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA43	165 Wells House Road, Park Royal, NW10 6EA	521301	182076	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA44	4 St Andrews Road, Acton, W3 7NE	521389	180953	Roadside	Y- Ealing	0	8.6	2 – 2.5	NO_2	N
EA45	98 Western Avenue, Acton, W3 7TZ	521173	180981	Roadside	Y- Ealing	0	10	2 – 2.5	NO_2	N
EA46	6 Western Avenue, Acton, W3 7UD	521549	180923	Roadside	Y- Ealing	0	4.6	2 – 2.5	NO_2	N
EA47	71 Old Oak Common Lane (PO), Acton, W37DD	521557	180996	Roadside	Y- Ealing	0	11	2 – 2.5	NO_2	N
EA48	205 Old Oak Road, Acton, W3 7HH	521614	180852	Roadside	Y- Ealing	0	4.7	2 – 2.5	NO_2	N
EA49	17 The Vale, Acton, W3 7SH	521720	180084	Roadside	Y- Ealing	0	19.4	2 – 2.5	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor. (Y/N)
EA50	Warple Way, Acton, W3 0RH	521088	180046	Roadside	Y- Ealing	0	2.2	2 – 2.5	NO_2	N
EA51	88 High Street, Acton, W3 6QX	520285	180075	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA52	15a Church Road, Acton, W3 8QE	520092	180063	Roadside	Y- Ealing	0	10	2 – 2.5	NO_2	N
EA53	182 High Street, Acton, W3 9NN	520026	180141	Roadside	Y- Ealing	0	4	2 – 2.5	NO_2	N
EA54	44 Acton Lane, Chiswick, W4 5ED	520484	178847	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA55	156 Horn Lane, Acton, W3 6PH	520180	180896	Roadside	Y- Ealing	0	6	2 – 2.5	NO_2	N
EA56, EA57, EA58	317 Horn Lane, Acton, W3 0BU (AQMS) (Tri)	520432	181428	Roadside	Y- Ealing	10	3	2 – 2.5	NO_2	Y
EA59	5 Leamington Park, Acton, W3 6TJ	520532	181517	Roadside	Y- Ealing	0	11	2 – 2.5	NO_2	N
EA60	Lyra Court, Portal Way, Acton, W3 6DB	520739	181824	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
EA61	36 Wales Farm Road, Acton, W3 6UE	520724	181552	Roadside	Y- Ealing	0	5	2 – 2.5	NO_2	N
NWA1 S1	St Mark's Primary School, Fit for sport classroom	515231	179900	Background	Y- Ealing	0	N/A	2-2.5	NO_2	N
NWA1 S2	St Mark's Primary School, o/s Early Years Building	515210	179901	Background	Y- Ealing	0	N/A	2-2.5	NO_2	N

1.2 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for “annualisation” and for distance to a location of relevant public exposure (if required), the details of which are described in Appendix A.

The annual mean NO_2 concentration results from automatic monitoring stations and diffusion tube monitoring locations since 2014 are presented in Table D.

Data capture was good at Hanger Lane Gyratory, Horn Lane and Western Avenue (EA6, EA8, EI1) automatic monitors in 2020, with all three achieving a data capture rate above 95%. Data capture at Acton Lane (EI3) was 55.8% and thus the results required annualisation. Data capture at most diffusion tubes sites was good in 2020, with at least 9 months of valid data (i.e. 75% data capture or greater).

There have been exceedances of the NO_2 annual mean objective of 40 µg m^{-3} observed at automatic monitoring stations Hanger Lane Gyratory, Horn Lane and Western Avenue in all years since 2014. However, 2020 was the first year which Horn Lane and Western Avenue remained below the objective, with only Hanger Lane Gyratory measuring an exceedance (51.0 µg m^{-3}). The NO_2 annual mean was 18.9 µg m^{-3} at Acton Vale monitoring station. None of the automatic sites exceeded the 1 hour mean NO_2 objective (200 µg m^{-3} not to be exceeded more than 18 times a year) in 2020.

Amongst the diffusion tubes, there were 4 exceedances of the NO_2 annual mean objective (at sites EA26, EA30-32, EA33 and EA46). There were no diffusion tube locations which saw annual mean concentrations above 60 µg m^{-3}. Concentrations greater than 60 µg m^{-3} indicate the likelihood of the 1 hour mean NO_2 objective being exceeded. The maximum NO_2 concentration recorded at diffusion tube sites in 2020 was 50.2 µg m^{-3} at triplicate site EA30-32 at Fernlea House, Hanger Lane, Ealing. This location has historically seen high concentrations in excess of 70 µg m^{-3} but has shown a decreasing trend since 2014. It is likely that lower concentrations

noted in 2020 were impacted by the COVID-19 pandemic. However, this resulted in the significant outcome that the number of monitoring locations with exceedances of the NO_2 annual mean objective dropped from 24 sites in 2019 to just 5 sites in 2020.

Table D.A. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	2014	2015	2016	2017	2018	2019	2020
EA6 Hanger Lane Gyratory	Automatic	99.5	99.5	**70.8**	**85**	**76**	**72.3**	**67.9**	**64.5**	**51.0**
EA8 Horn Lane	Automatic	96.7	96.7	**47.6**	**48**	**48**	**44.2**	**43.9**	**41.8**	33.2
EI1 Western Avenue	Automatic	97.5	97.5	**65.7**	**60.3**	**60.1**	**51.2**	**47.7**	**48.6**	35.2
EI3 Acton Vale	Automatic	55.8	55.8	-	-	-	-	29.0	26.5	19.7
EA1	Diffusion tube	100.0	100.0	**61.7**	**64.3**	**61.0**	**54.0**	**49.4**	**50.3**	36.1
EA2	Diffusion tube	100.0	100.0	**48.9**	**50.1**	**47.9**	**40.1**	**42.0**	38.7	27.7
EA3	Diffusion tube	100.0	100.0	23.5	24.7	23.8	20.2	21.0	20.5	15.2
EA4	Diffusion tube	100.0	100.0	37.4	36.4	36.2	32.4	30.1	34.4	24.4
EA5	Diffusion tube	100.0	100.0	32.4	33.5	34.2	29.7	30.7	29.8	21.2
EA6	Diffusion tube	100.0	100.0	**54.5**	**49.5**	**49.8**	**42.8**	**42.8**	**43.0**	33.5
EA7	Diffusion tube	100.0	100.0	25.0	25.6	31.9	29.4	30.5	28.9	21.0
EA8	Diffusion tube	100.0	100.0	**47.9**	**48.6**	**48.9**	**50.6**	**41.1**	**40.5**	27.0
EA9	Diffusion tube	100.0	100.0	36.3	36.7	36.6	31.9	30.9	31.5	22.4
EA10	Diffusion tube	100.0	100.0	39.5	**40.3**	38.5	34.6	35.0	33.2	23.4

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020
EA11	Diffusion tube	100.0	100.0	30.5	31.9	33.4	28.6	28.6	27.5	17.6
EA12	Diffusion tube	100.0	100.0	39.2	37.1	39.3	31.4	34.4	32.5	24.0
EA13	Diffusion tube	100.0	100.0	**54.2**	**53.5**	**52.7**	**45.1**	**46.0**	**44.3**	35.2
EA14	Diffusion tube	100.0	100.0	**-**	**-**	**48.0**	**44.1**	**40.2**	**41.2**	29.6
EA15	Diffusion tube	100.0	100.0	**41.7**	**42.5**	**42.5**	36.2	37.2	35.2	24.3
EA16	Diffusion tube	100.0	100.0	39.6	**42.5**	40.0	37.1	33.9	34.6	28.3
EA17	Diffusion tube	100.0	100.0	35.6	37.5	37.3	33.4	33.4	32.8	24.8
EA18	Diffusion tube	91.0	91.0	34.4	34.5	33.9	31.5	31.8	31.7	24.1
EA19	Diffusion tube	100.0	100.0	39.1	**40.6**	39.3	34.7	35.0	34.3	24.4
EA20	Diffusion tube	100.0	100.0	**47.5**	**48.8**	**42.2**	**41.0**	**41.6**	39.1	28.7
EA21	Diffusion tube	92.7	92.7	36.6	39.4	39.0	34.2	34.4	30.0	20.2
EA22	Diffusion tube	100.0	100.0	**41.2**	**41.9**	39.1	37.9	33.1	33.1	24.6
EA23	Diffusion tube	100.0	100.0	**60.3**	**62.4**	**62.1**	**53.5**	**50.6**	**52.0**	35.2
EA24	Diffusion tube	100.0	100.0	34.6	35.4	36.6	36.1	33.5	32.7	24.3
EA25	Diffusion tube	100.0	100.0	**47.3**	**49.0**	**48.6**	**44.3**	**52.5**	**42.2**	30.9
EA26	Diffusion tube	100.0	100.0	**61.3**	**62.3**	**61.9**	**54.4**	**60.4**	**56.2**	**42.5**
EA27	Diffusion tube	100.0	100.0	32.4	35.2	35.4	31.2	31.2	30.2	22.6

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020
EA28	Diffusion tube	100.0	100.0	**51.4**	**49.4**	**48.0**	39.8	**42.3**	**42.1**	33.3
EA29	Diffusion tube	100.0	100.0	39.4	38.4	39.5	35.6	36.4	35.1	27.1
EA30, EA31, EA32	Diffusion tube	100.0	100.0	**80.3**	**79.7**	**73.2**	**71.9**	**69.4**	**66.2**	**50.2**
EA33	Diffusion tube	100.0	100.0	**50.0**	**52.6**	**49.8**	**43.3**	**54.5**	**56.0**	**44.5**
EA34	Diffusion tube	90.5	90.5	**40.9**	**41.1**	39.6	34.6	35.2	33.9	28.1
EA35	Diffusion tube	100.0	100.0	**56.0**	**56.4**	**55.7**	**47.3**	**49.7**	**46.6**	35.7
EA36, EA37, EA38	Diffusion tube	100.0	100.0	**70.4**	**68.9**	**60.2**	**56.0**	**54.4**	**49.4**	36.5
EA39	Diffusion tube	100.0	100.0	**55.6**	**58.1**	**52.1**	**45.0**	**48.3**	**41.4**	31.2
EA40	Diffusion tube	100.0	100.0	35.5	38.0	38.1	33.4	33.1	30.6	22.0
EA41	Diffusion tube	100.0	100.0	36.5	**40.2**	37.7	32.6	32.6	30.0	25.2
EA42	Diffusion tube	92.4	92.4	**53.0**	**54.4**	**49.6**	**45.3**	**44.4**	**45.9**	32.0
EA43	Diffusion tube	100.0	100.0	**41.3**	**45.7**	**40.5**	36.9	36.6	33.2	24.9
EA44	Diffusion tube	100.0	100.0	**40.2**	40.0	38.1	34.7	32.0	31.4	22.6
EA45	Diffusion tube	100.0	100.0	**50.8**	**49.8**	**49.9**	**43.9**	**46.7**	39.6	29.3
EA46	Diffusion tube	81.5	81.5	**77.4**	**82.5**	**75.3**	**67.9**	**67.6**	**59.6**	**46.1**
EA47	Diffusion tube	100.0	100.0	**47.8**	**49.4**	**49.2**	**43.7**	**43.0**	**41.4**	32.9
EA48	Diffusion tube	100.0	100.0	**57.4**	**60.7**	**58.9**	**50.9**	**52.6**	**47.1**	37.8

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	2014	2015	2016	2017	2018	2019	2020
EA49	Diffusion tube	100.0	100.0	**40.3**	**41.4**	**40.9**	34.6	37.5	35.3	26.7
EA50	Diffusion tube	100.0	100.0	39.8	38.2	39.4	32.6	36.2	34.3	25.7
EA51	Diffusion tube	100.0	100.0	**56.9**	**55.5**	**56.0**	**49.0**	**48.1**	**48.8**	39.0
EA52	Diffusion tube	100.0	100.0	36.4	33.7	35.1	28.6	29.6	27.5	22.5
EA53	Diffusion tube	100.0	100.0	**53.9**	**55.8**	**54.7**	**44.4**	**47.7**	**47.5**	36.2
EA54	Diffusion tube	100.0	100.0	38.0	**41.1**	37.8	37.6	**44.3**	39.3	28.2
EA55	Diffusion tube	100.0	100.0	**42.3**	**42.2**	**43.1**	36.5	**40.5**	34.9	27.6
EA56, EA57, EA58	Diffusion tube	100.0	100.0	**48.4**	**52.0**	**50.8**	**44.1**	**44.3**	**41.2**	31.3
EA59	Diffusion tube	100.0	100.0	**40.9**	**43.7**	**43.7**	36.4	38.4	34.1	26.6
EA60	Diffusion tube	100.0	100.0	**43.1**	**47.8**	**47.5**	40.0	39.2	39.8	29.7
EA61	Diffusion tube	100.0	100.0	**43.2**	**45.6**	**43.9**	38.9	37.6	37.1	28.6

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances 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**.

Means for diffusion tubes have been corrected for bias, but are NOT distance corrected.

All means have been “annualised” in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

(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%).

The two new temporary background sites at St Mark's Primary School also show a decrease between 2019 and 2020, although there are not enough years of data to be able to consider a trend. Concentrations at the background sites have continually been within the annual mean objective of 40 µg m^{-3}; suggesting that background concentrations are not the cause of exceedances at other locations. As these sites are additional to the core of the monitoring network, these are presented in the additional Table D.B below

Table D.B. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results – St Marks School

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	2014	2015	2016	2017	2018	2019	2020
NWA1S1	Diffusion tube	42.0	42.0	-	-	-	-	-	23.8	14.3
NWA1S2	Diffusion tube	42.0	42.0	-	-	-	-	-	24.5	9.4

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Means for diffusion tubes have been corrected for bias, but are NOT distance corrected.

All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

(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%).

Figure 3 shows the trends in NO_2 concentrations at automatic monitoring sites in the Borough for the 2014 – 2020 period, whilst Figure 4 to Figure 11 show the trends in NO_2 concentrations for the same period at diffusion tube monitoring sites grouped by monitoring site type: urban background, near road sites and roadside sites.

At automatic monitoring sites (Figure 3), there is evidence of reductions in NO_2 concentrations since 2014, albeit with some natural variations. There has been a stark decrease in concentrations in 2020, with Horn Lane and Western Avenue falling below the annual mean NO_2 objective for the first time since 2014.

At the urban background diffusion tube site Brent Lodge Park (Figure 4), there is evidence of a slight decrease in NO_2 concentrations between 2014 and 2020, although with periods of stabilising trends. The near-road and roadside sites (Figure 5 to Figure 11) also show reductions in NO_2 concentrations between 2014 and 2020. The majority of near-road and roadside sites show a stabilisation between 2014 and 2016, and between 2017 and 2019. Figure 12 shows NO_2 concentrations at the two sites at St Mark's Primary School.

All monitoring locations show a notable decrease in NO_2 concentrations between 2019 and 2020. This is likely to be the impact of COVID-19 and resulting lockdowns leading to a decrease in road traffic emissions.

Figure 3. Annual Mean NO_2 concentrations at Automatic Monitoring Sites

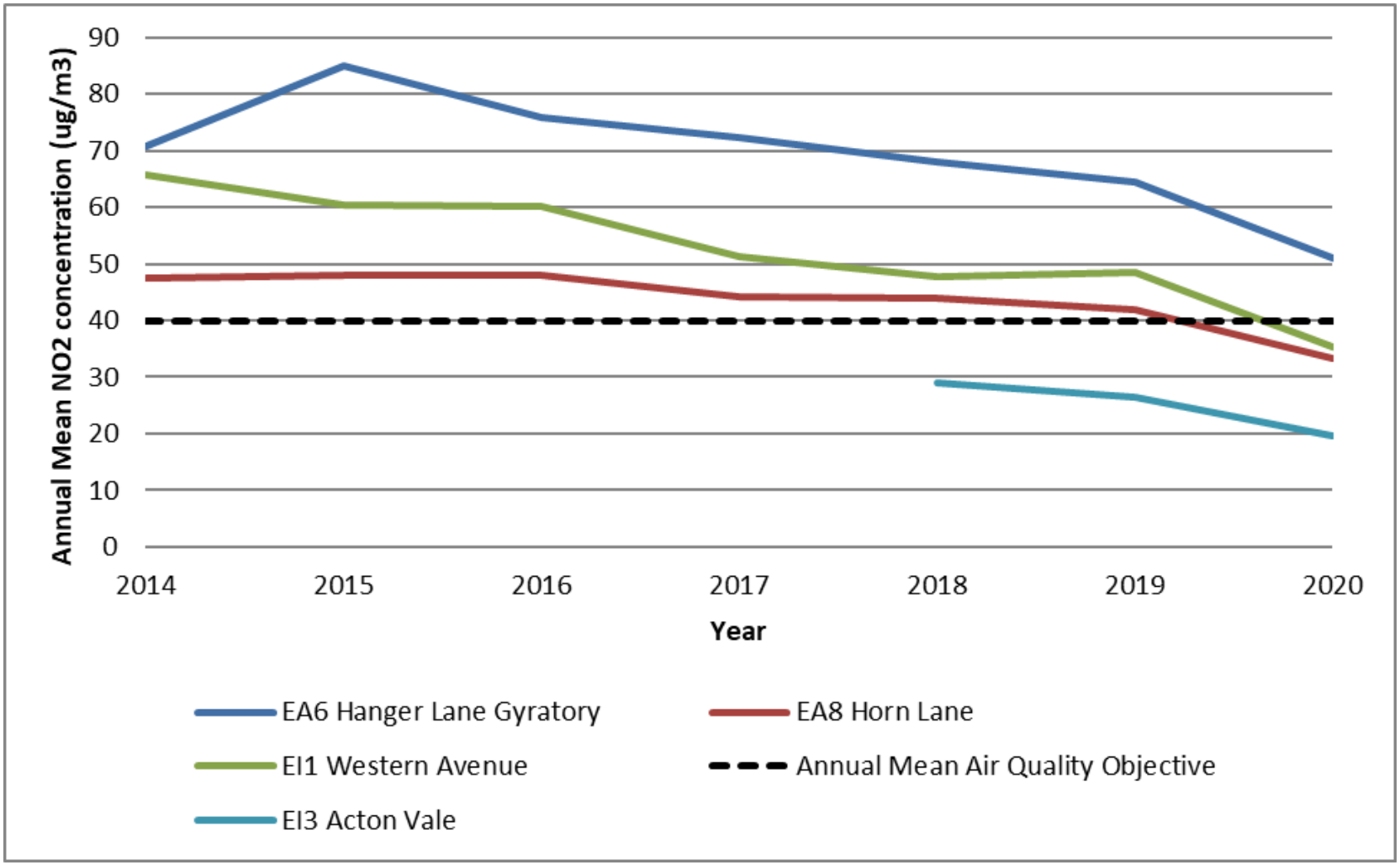


Figure 4. Annual Mean NO_2 concentrations at Urban Background Sites

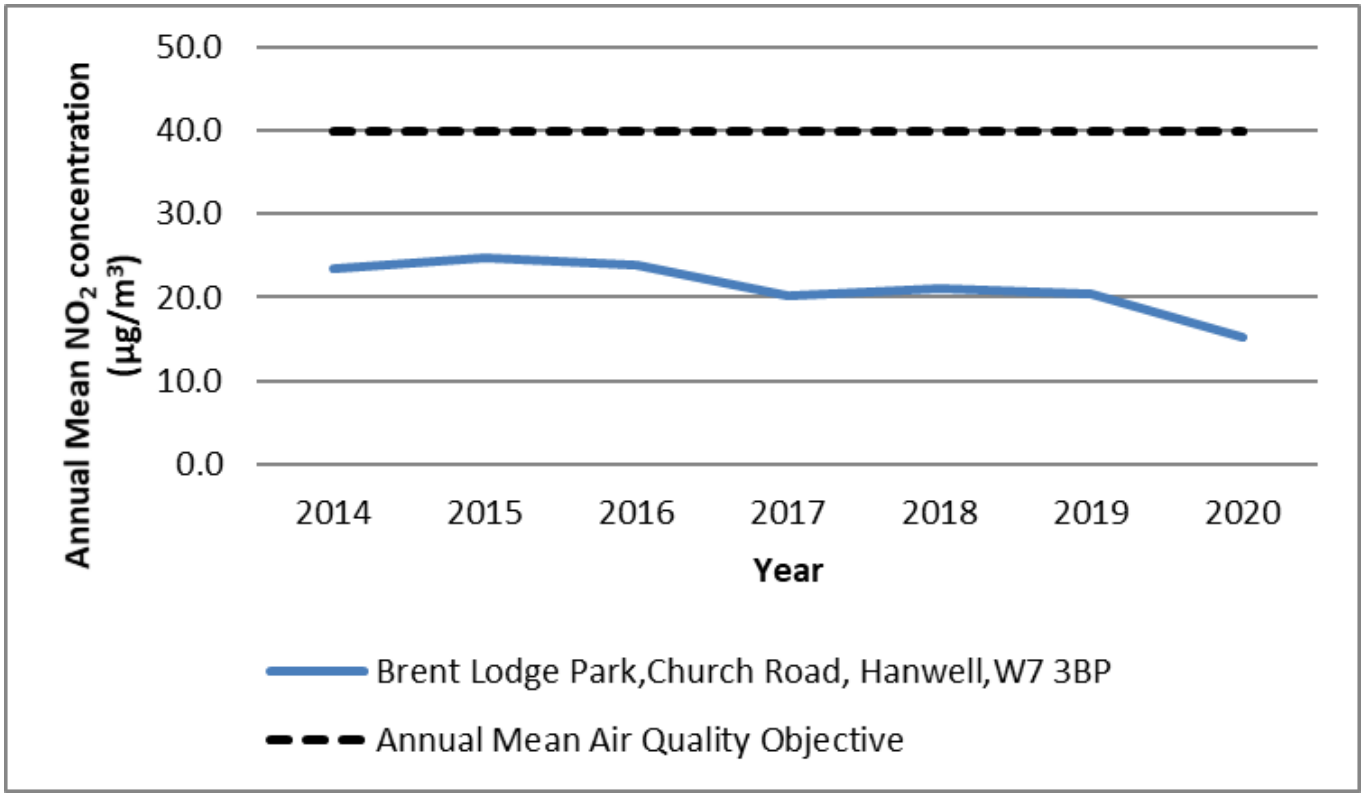


Figure 5. Annual Mean NO_2 concentrations at Near-Road Sites

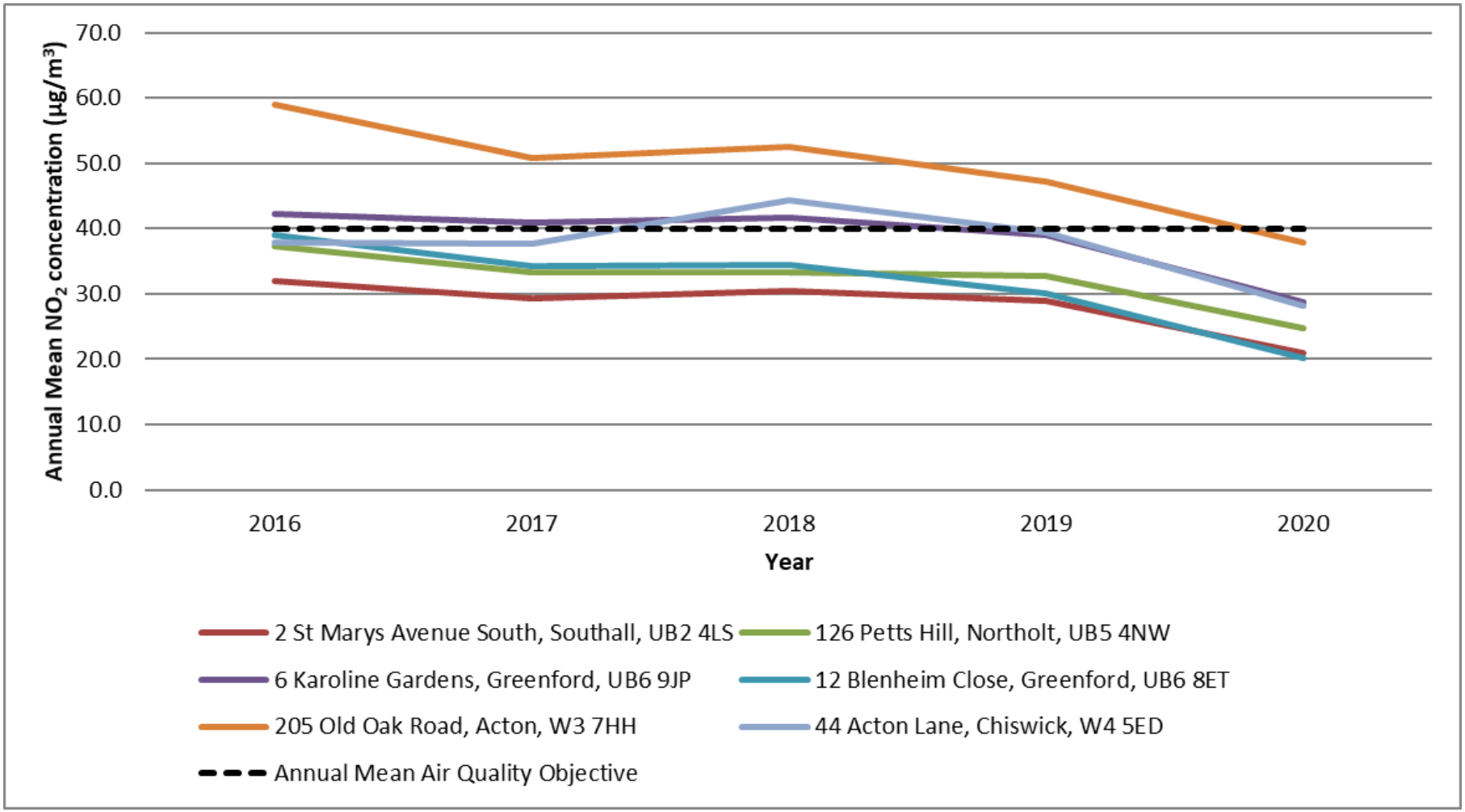


Figure 6. Annual Mean NO_2 concentrations at Roadside Sites (1)

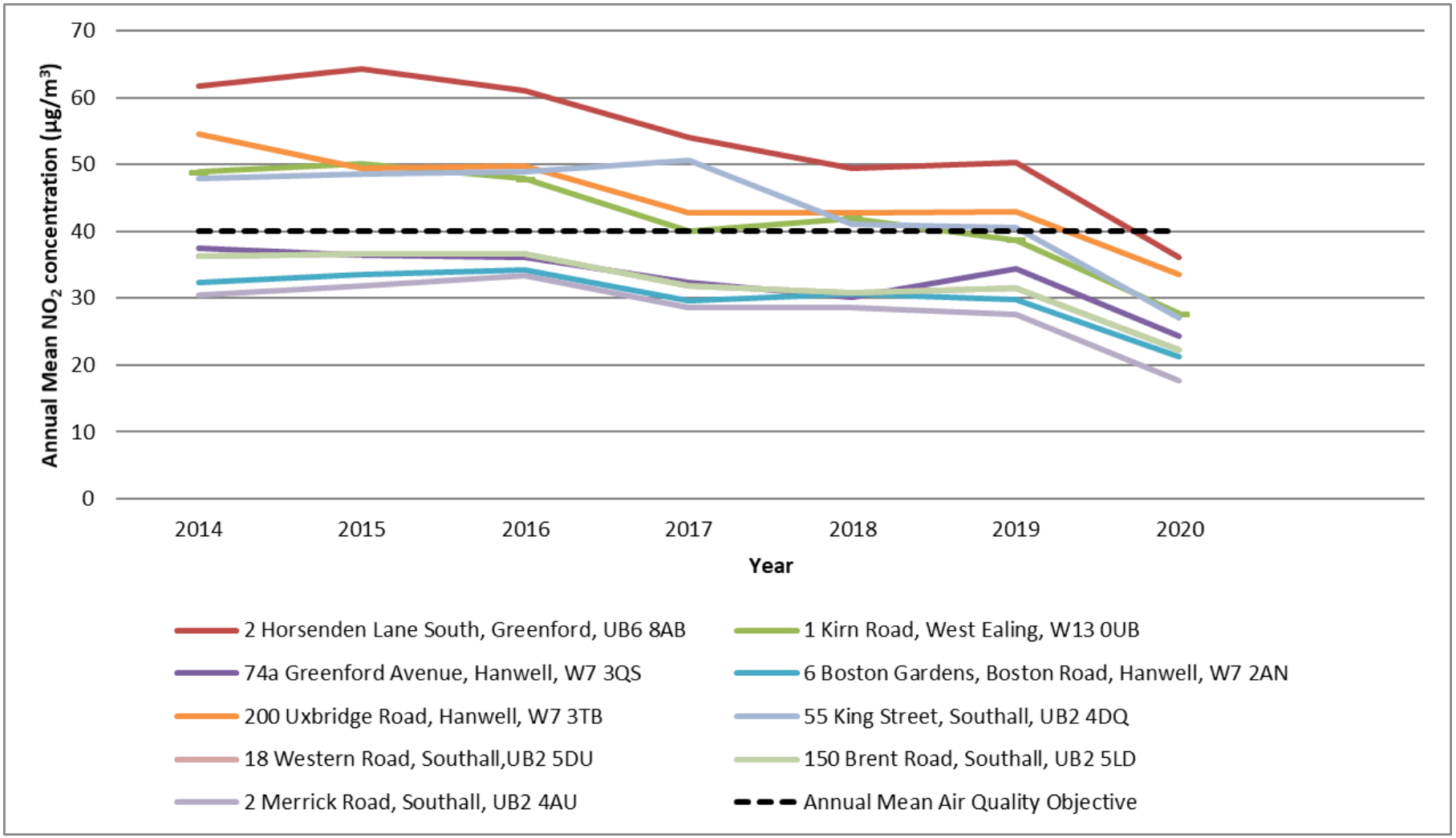


Figure 7. Annual Mean NO_2 concentrations at Roadside Sites (2)

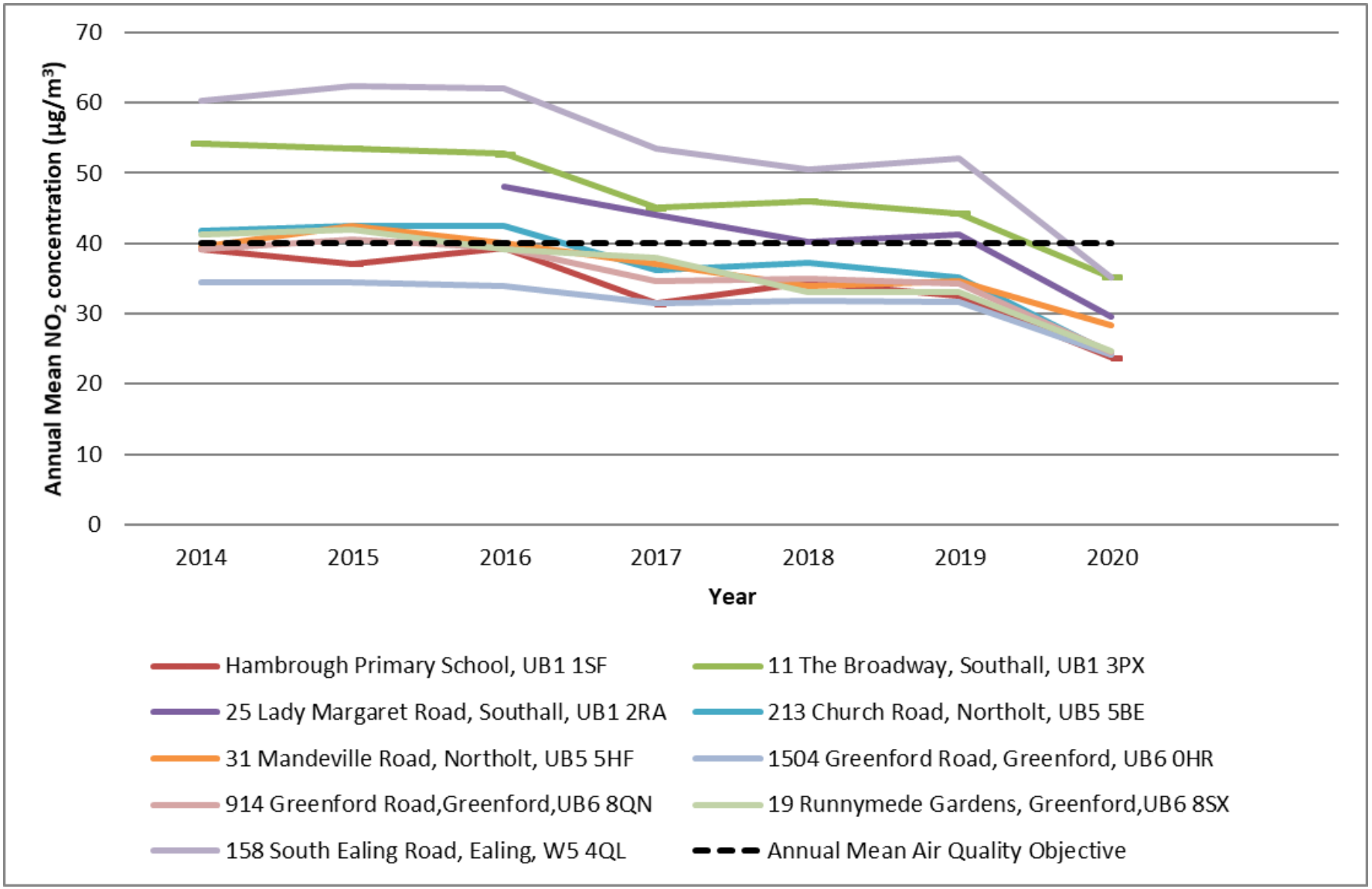


Figure 8. Annual Mean NO_2 concentrations at Roadside Sites (3)

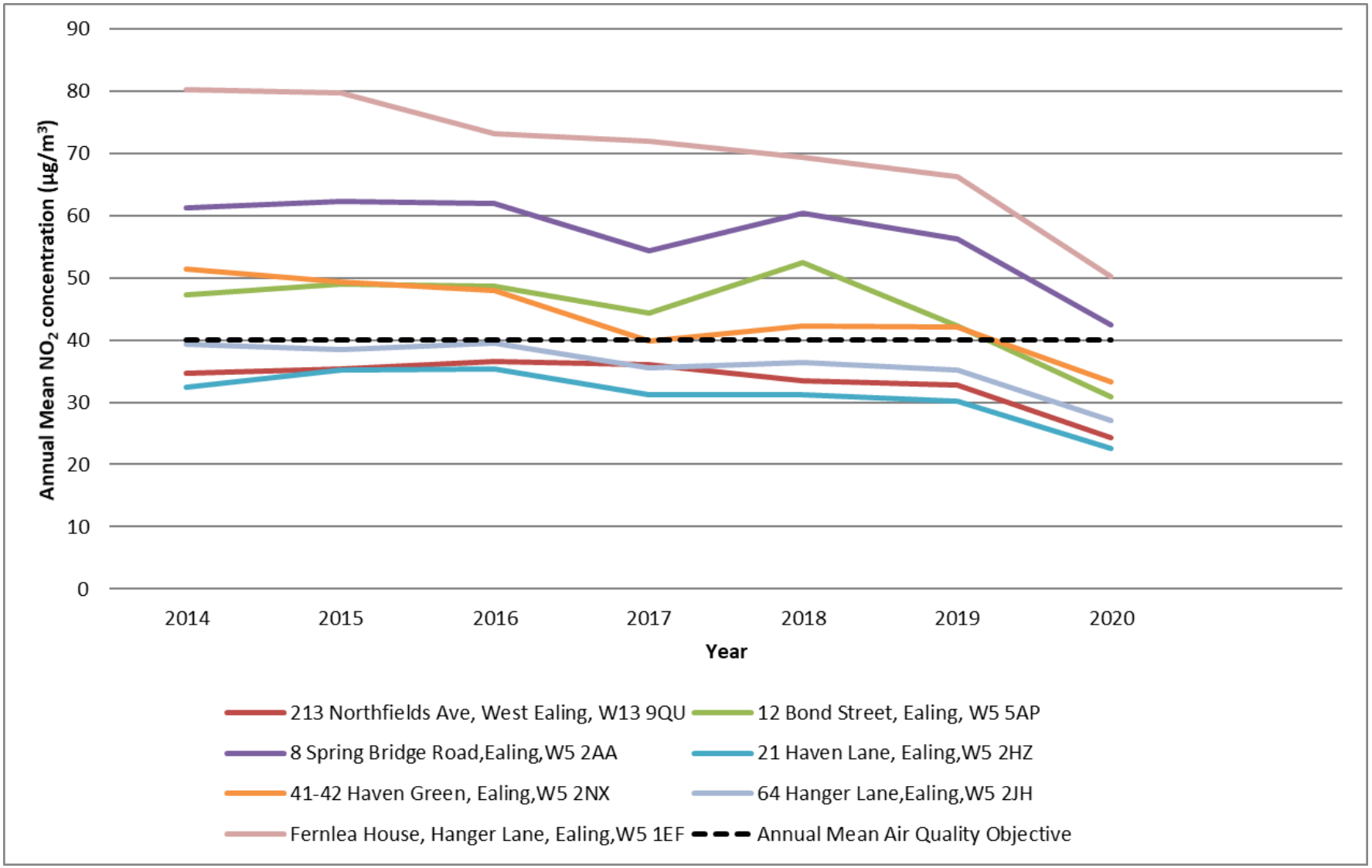


Figure 9. Annual Mean NO_2 concentrations at Roadside Sites (4)

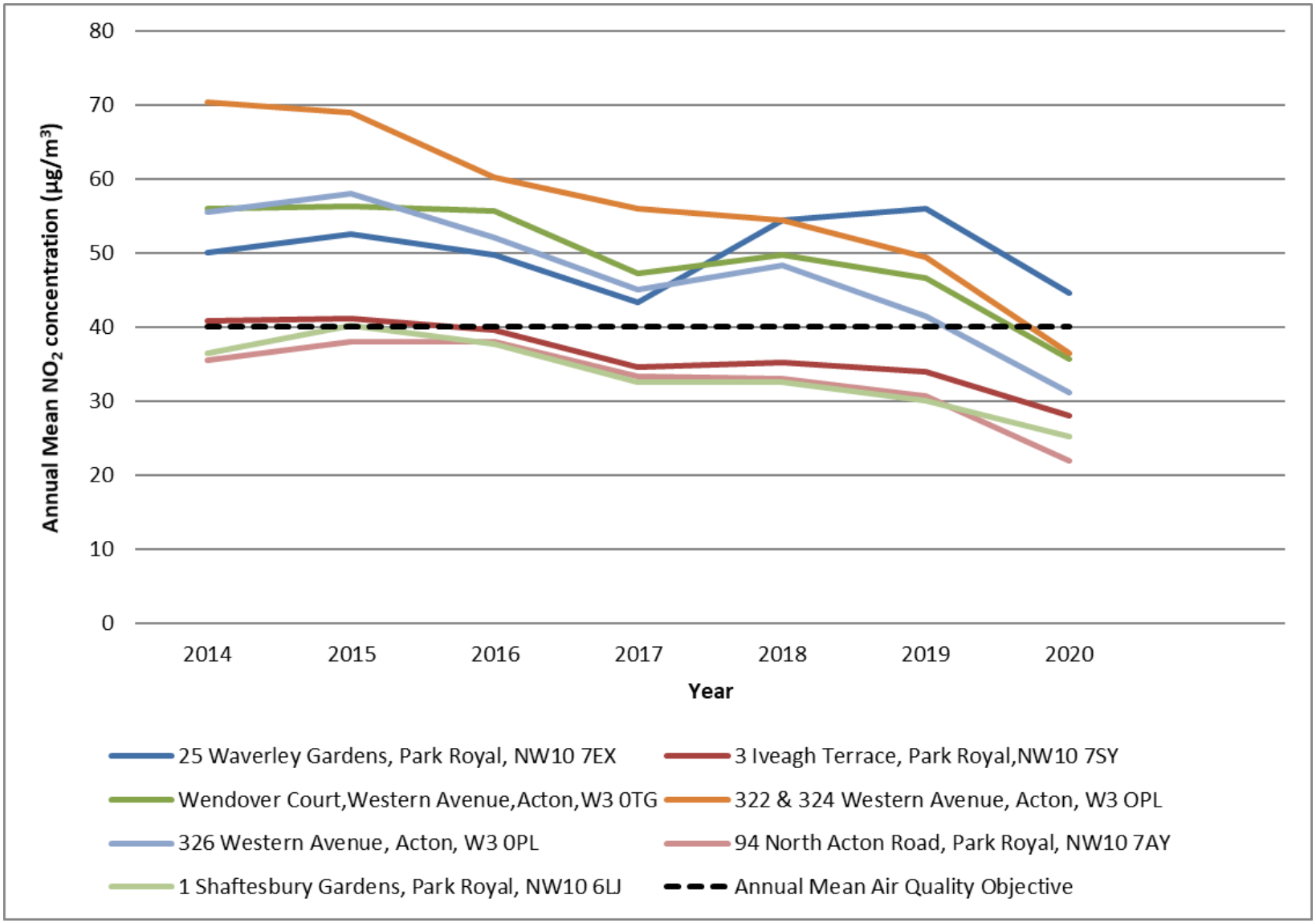


Figure 10. Annual Mean NO_2 concentrations at Roadside Sites (5)

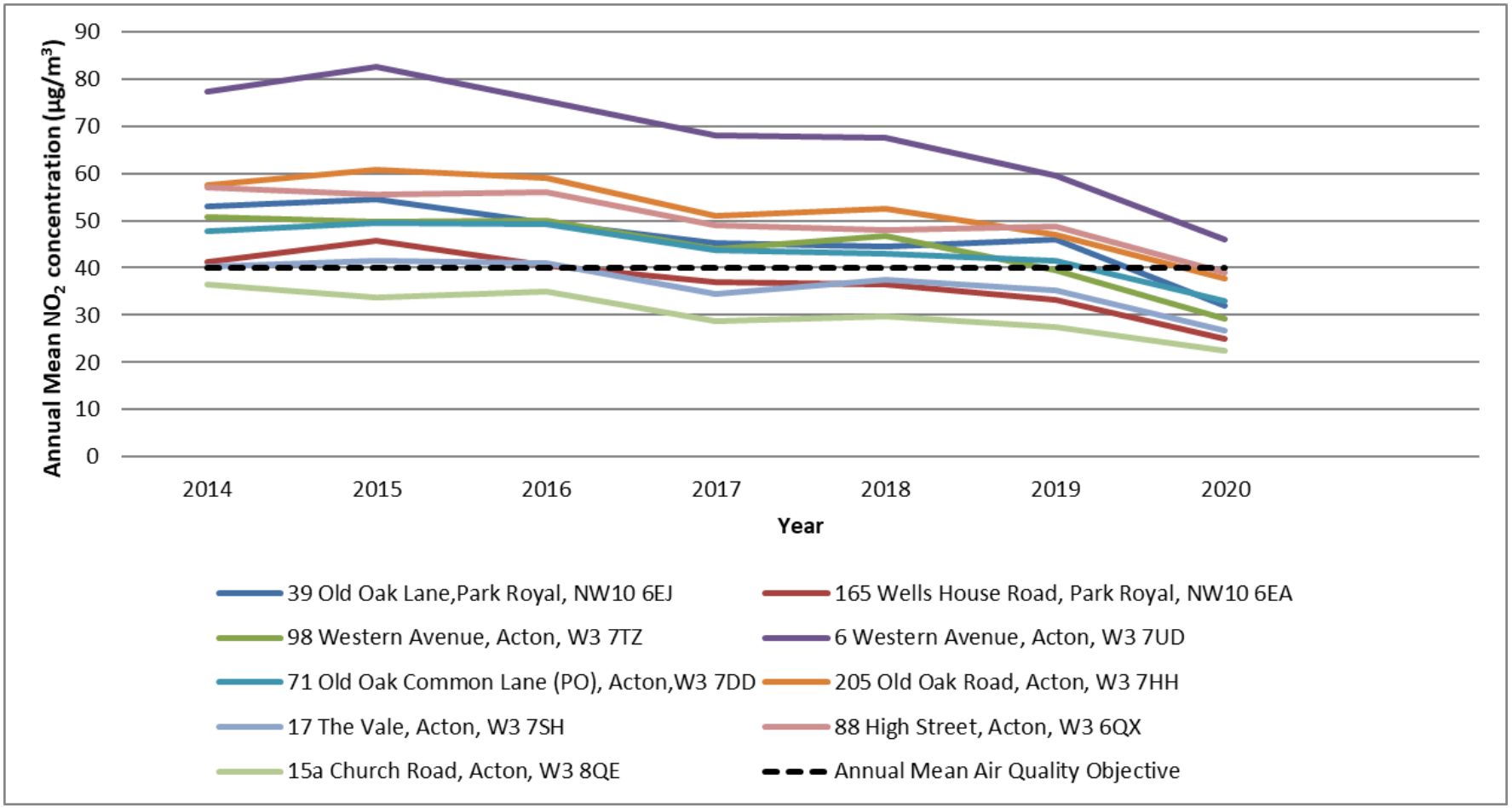


Figure 11. Annual Mean NO_2 concentrations at Roadside Sites (6)

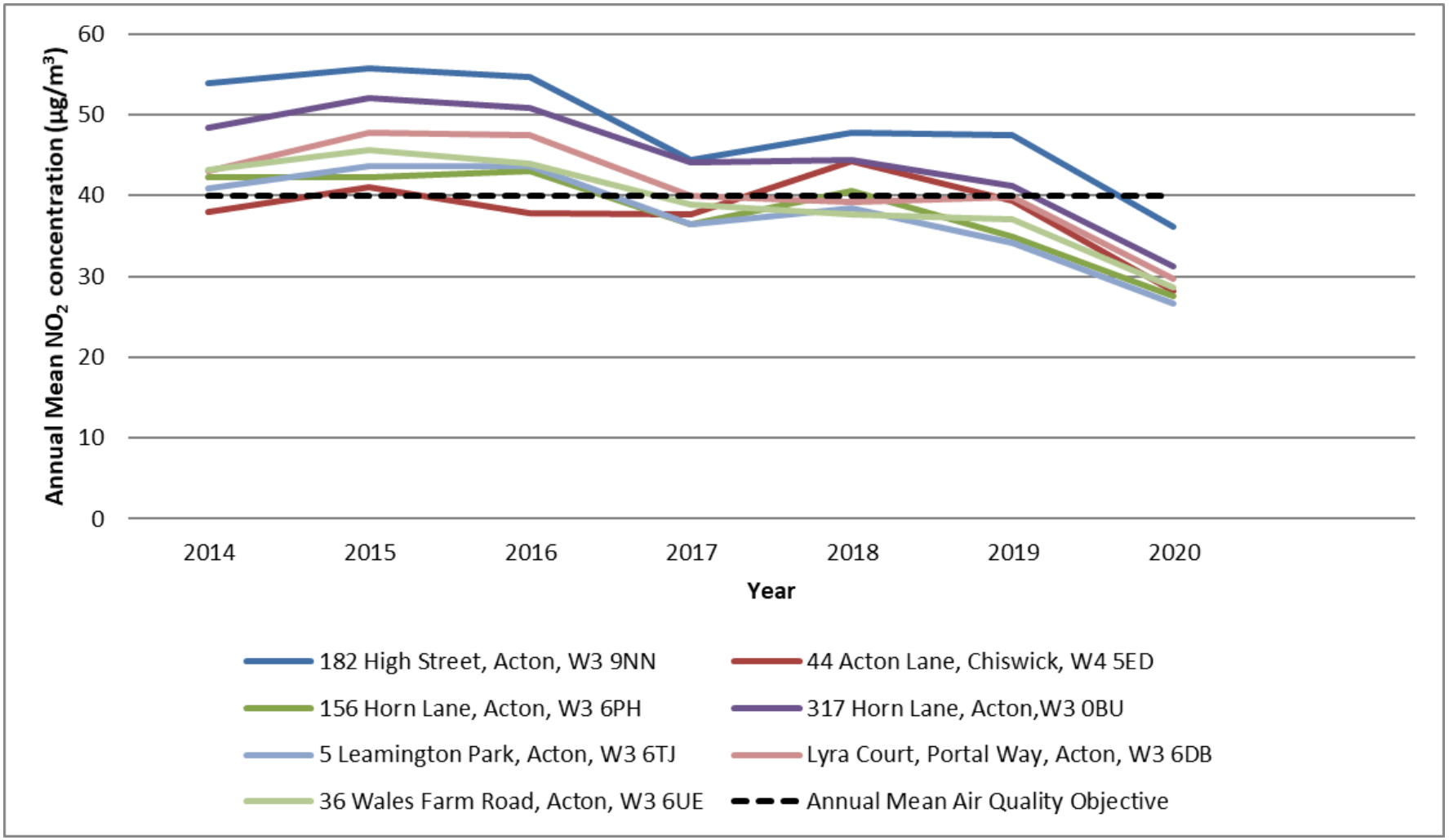


Figure 12. Annual Mean NO_2 concentrations at St Mark's Primary School Sites

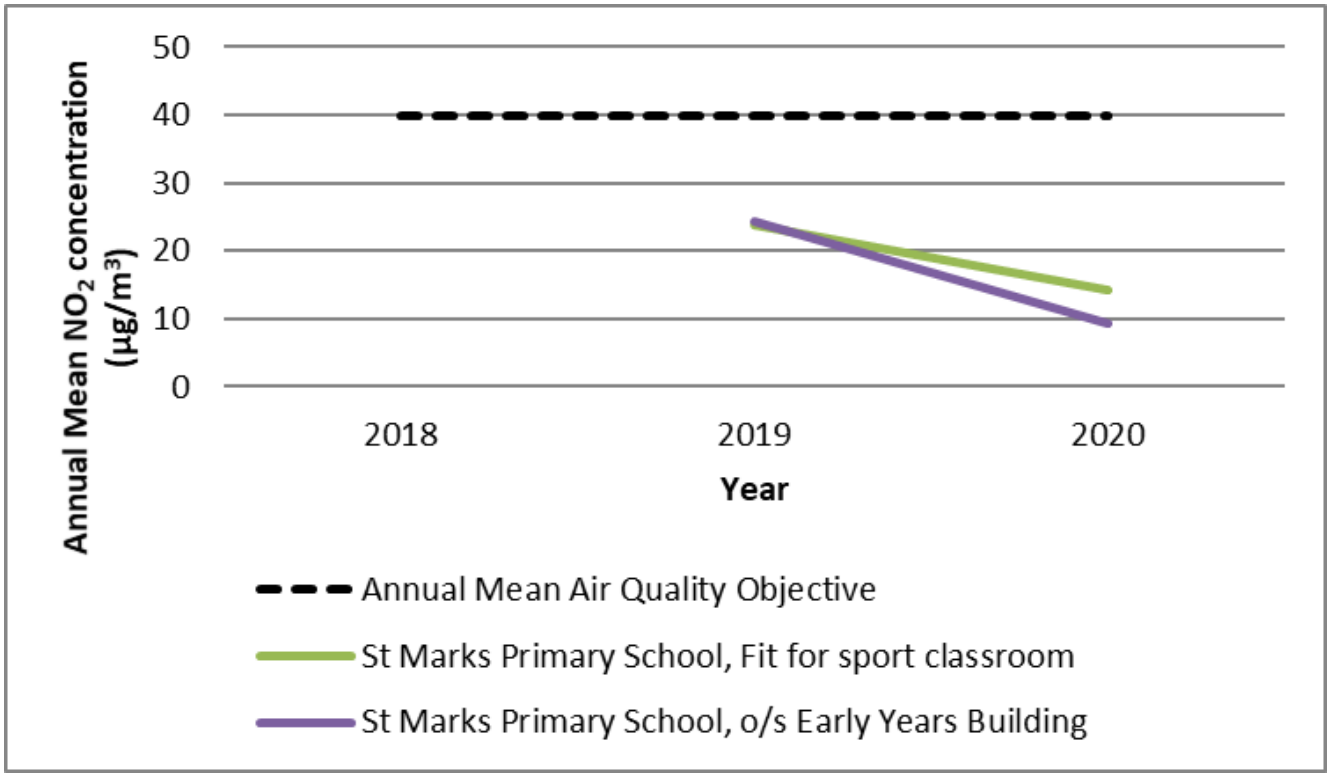


Table E. NO_2 Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m^{-3}

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2020 %([b])	2014	2015	2016	2017	2018	2019	2020
EA6 Hanger Lane Gyratory	99.5	99.5	17 (**205**)	**98**	**45**	9	0	3	0
EA8 Horn Lane	96.7	96.7	0	3	1	2	0	2	0
EI1 Western Avenue	97.5	97.5	17	2 (179)	**22**	0	0	0	0
EI3 Acton Vale	55.8	55.8	-	-	-	-	0	0	0 (82)

Notes

Results are presented as the number of 1-hour periods where concentrations greater than 200 µg m^{-3} have been recorded.

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

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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%)

Table E presents the 1-hour mean NO_2 monitoring results at automatic monitoring stations between 2014 to 2020. None of the automatic sites exceeded the 1 hour mean NO_2 objective (200 µg m^{-3} not to be exceeded more than 18 times a year) in 2020. Whilst there were exceedances of the 200 µg m^{-3} threshold in 2019, all monitoring sites have been compliant with the objective since 2017.

PM_{10} concentrations are currently measured at all automatic monitoring locations in the London Borough of Ealing. TEOMs are used to monitor PM_{10} at all sites. The Horn Lane station is equipped with both TEOM and TEOM-FDMS analysers for PM_{10} monitoring and results from both are presented separately. The annual mean PM_{10} results are shown in Table F and the 24-hour mean PM_{10} results are presented in Table G. Data capture in 2020 was good (i.e. >85%) at most locations, however Acton Vale (EI3) had a lower data capture rate of 49.4%.

Annual mean PM_{10} concentrations in 2020 at all sites were found to achieve the annual mean objective of 40 µg m^{-3}. The annual mean objective has been achieved at all automatic monitoring locations in the Borough since 2014. The highest annual mean PM_{10} concentration in 2020 was recorded at EA8 Horn Lane (24.4 µg m^{-3}).

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

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2020 %([b])	2014	2015	2016	2017	2018	2019	2020
EA6 Hanger Lane Gyratory	99.4	99.4	26	25	24	26	28	25	22.6
EA8 Horn Lane	89.5	89.5	31	31	28	27	25	28	24.4
EI8 Horn Lane TEOM	89.9	89.9	34	27	26	26	26	25	21.3
EI1 Western Avenue	92.5	92.5	28	29	30	26	28	26	22.8
EI3 Acton Vale	49.4	49.4	-	-	-	-	19	18	16.0

Notes

The annual mean concentrations are presented as µg m^{-3}.

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

All means have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 25%.

(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%).

The 24-hour mean PM_{10} monitoring results are shown in Table G. The 24-hour mean air quality objective (50 µg m^{-3}, not to be exceeded more than 35 times a year) was achieved at all monitoring locations in 2020. This has been achieved at all sites since 2015.

Table G. PM_{10} Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM_{10} 24-Hour Means > 50 µg m^{-3}

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2020 %[(b)]	2014	2015	2016	2017	2018	2019	2020
EA6 Hanger Lane Gyratory	99.4	99.4	10	6	12	10	12	13	7
EA8 Horn Lane	89.5	89.5	22 (**51**)	11 (46)	19	16	7	15	9
EI8 Horn Lane TEOM	89.9	89.9	**55**	17	17	10	7	16	5
EI1 Western Avenue	92.5	92.5	22	22 (43)	24	9	14	21	11
EI3 Acton Vale	49.4	49.4	-	-	-	-	2	9	3 (30)

Notes

Exceedances of the PM_{10} 24-hour mean objective (50 µg m^{-3} over the permitted 35 days per year) are shown in **bold.**

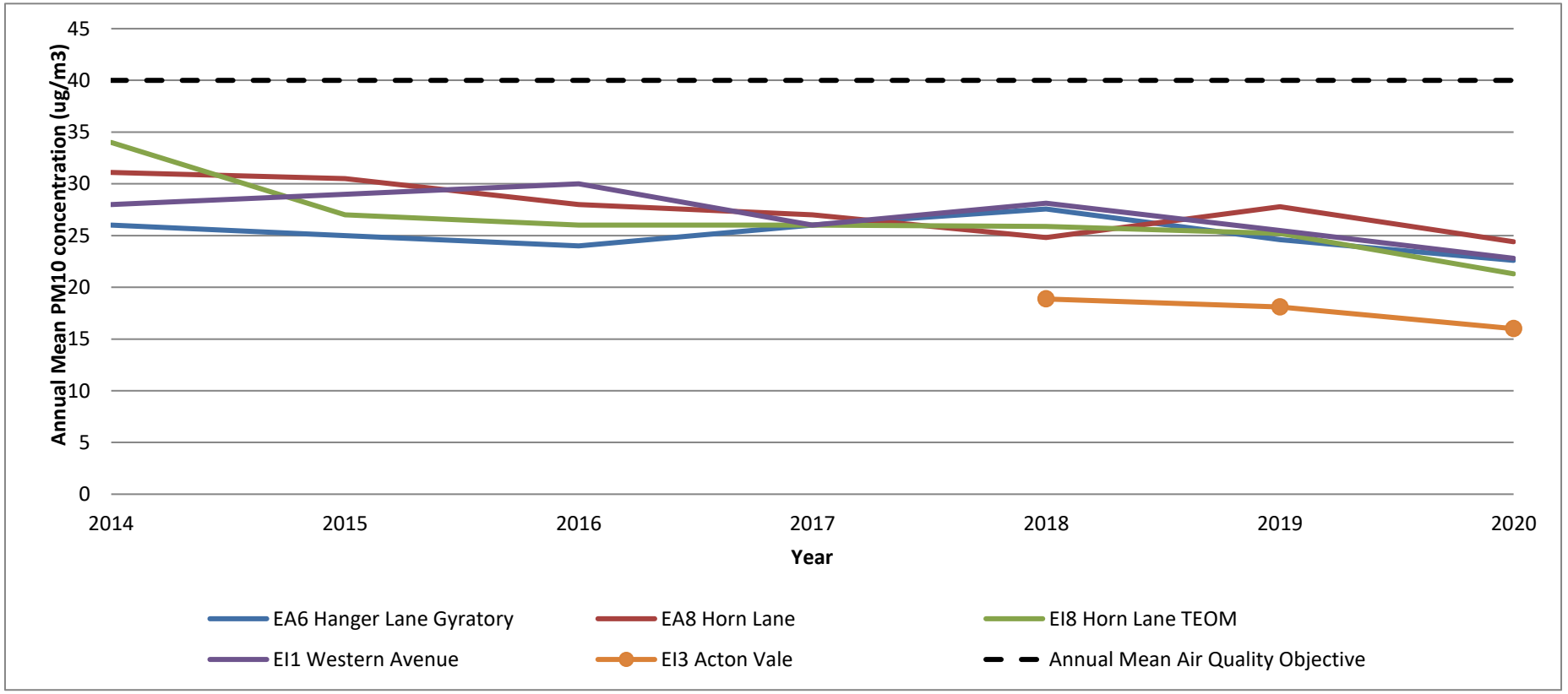
Where the period of valid data is less than 85% of a full year, the 90.4th percentile is provided in brackets.

(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%).

Figure 13 shows the trends in PM_{10} concentrations between 2014 and 2020 for all currently operational monitoring sites. All monitoring locations show evidence of a slight reduction in annual PM_{10} concentrations since 2014.

Figure 13. Annual Mean PM_{10} concentrations at Automatic Monitoring sites



2. Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra has provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[2] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[3] has estimated that during

[2] Prime Minister's Office, COVID-19 briefing on the 31st May 2020

[3] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute reduction of between 10 to 20 µg m^{-3} if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period were in the order of 2 to 5 µg m^{-3} lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

In order to communicate clearly with the public on the potential impact of COVID-19 on the data capture and quality of monitoring data collected during 2020, Defra has provided an impact matrix in the supplementary guidance for LAQM reporting in 2021 (see Appendix C). This matrix is used as a framework for assessing the severity of impacts.

Impact of COVID-19 within London Borough of Ealing

The COVID-19 pandemic and associated lockdown restrictions affected LAQM duties within London Borough of Ealing.

There was generally limited impact on the Boroughs air quality monitoring duties. However, the pandemic did impact the ability to perform diffusion tube changeovers at the two locations at St Mark's Primary School (NWA1S1 and NWA1S2) that are managed by the school itself (not Ealing Council), resulting in data capture rates of 42% at both locations. Additionally, the tubes were left out for over three months between July and November. This is considered a medium impact.

The pandemic also impacted London Borough of Ealing's abilities to implement and progress measures from their Action plan. Due to COVID-19 lockdown and restricted access to schools, the council was unable to deliver air quality awareness workshops which had a target of 6 schools per academic year. The council might be unable to meet this target in 2021 due to being unable to implement anti-idling campaigns and

other initiatives because of social distancing and other pandemic restrictions that prohibited full engagement amongst different stakeholders. Furthermore, funding for West Ealing Liveable Neighbourhood (WELN) was paused by TfL in 2020 and is uncertain for 2021 and as such no activities are currently planned. With no progression in the implementation of both of these measures, the impact can be deemed large.

Most other Action Plan measures saw no or small rated impacts.

Despite the constraints faced by the council, COVID-19 related transport schemes were implemented in 2020 including:

- 12 School Streets
- 9 Low Traffic Neighbourhoods
- Cycle improvements
- 24/7 bus lanes

Ealing Council did detailed analysis of air quality during the first COVID-19 lockdown for the period 1st February 2020 to 30th April 2020 from data obtained from the continuous air monitoring stations at Western Avenue, Hanger Lane, Horn Lane and Acton Vale. NO_2 mean concentration levels fell by 33% at Western Avenue, 25% at Hanger Lane, 19% at Horn Lane and 22% at Acton Vale, during February to April 2020 when compared with the same quarter to April 2019. Similar analysis of 2020 data shows that particulate matter (PM_{10}) annual mean concentration levels fell only marginally by 4% at both Western Avenue and Hanger Lane and concentration levels fell by 11% at Horn Lane. There was no change at Acton Vale.

3. Action to Improve Air Quality

3.1 Air Quality Action Plan Progress

Table H provides a brief summary of London Borough of Ealing progress against the Air Quality Action Plan, showing progress made this year.

Table H. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
1	Emissions from Development and Buildings	Further actions to mitigate PM_{10} and $PM_{2.5}$ emissions from industrial sources and resuspension in Horn Lane, Acton	**ONGOING** Indicative monitoring continued in Acton Goods Yard in 2020/21 and is ongoing. Data is online at www.llecp.org.uk	Contact air quality officer for updates
2	Localised Solutions	Ealing Broadway Station -Forecourt improvements at Ealing Broadway Station	**ONGOING** Works to improve pedestrian and cycle access to Ealing Broadway Station was expected to complete by the end of 2020 as part of Crossrail works, however this was impacted due to COVID-19 with completion expected in late 2021.	https://www.ealing.gov.uk/downloads/download/3256/ealing_broadway_station_forecourt_improvement_plans
3	Cleaner Transport	Cycling	**COMPLETE** • Installed 158 Sheffield stands across the borough at key underground stations. • Installed Ealing's first car bike port in West Ealing as part of the LN. • Delivered the following permanent schemes under London Streetspace Programme (LSP) at: The Acton-Chiswick cycleway, Acton Town Centre and The Vale, Ealing Common (east of A406), Hanwell Bridge and Greenford Road (north from Uxbridge Road).	http://www.westtrans.org/WLA/wt2.nsf/Files/WTA201/$file/Ealing+Cycling+Plan.pdf

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
			• Completion of CS10 A40 Cycleway in 2020 including closure of side roads to through traffic. • Successful bid to TfL in December 2020 has provided for over 150 cycle parking spaces to serve high streets installed in March 2021. • A programme of events to promote cycling and active travel at sites across West London including West Thames College and Imperial College. The events ran in autumn and spring 2019-20, and offered free cycle training, loan bikes, bike maintenance and led rides. They also promoted active travel through Twitter and giveaways. Hundreds of students interacted with the events and some took part in the cycle loan scheme. Outcomes: In total at the autumn events there were 31 bike repairs, 27 bike light giveaways, 35 cycle surveys completed, 12 one-to-one cycle training sessions, 79 obstacle course completions, and 216 general cycling interactions. **ONGOING** • Work on Ealing - Greenford Quietway to restart in 2021/22. Feasibility on other routes including Southall to Heathrow to be undertaken in 2021/22 • Implemented experimental closures of Fishers Lane, Chiswick and Church Road, Northolt to all traffic except buses and cyclists (and emergency vehicles). These schemes will be reviewed at the end of the year prior to a decision on whether to make them permanent.	

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
4	Cleaner Transport	West London Student Cycling Champion project	• Due to Covid restrictions, with campuses closed, the usual Higher and Further Education programme could not run in 2020. Instead the programme shifted to the NHS, delivering events at hospitals and other NHS sites across West London. One series ran September-October 2020 and a second from March-April 2021. Further events are being prepared for May-July 2021, with a larger focus on working with the sites to reach non-cycling staff, improve cycling facilities and gain a better understanding of how to encourage more staff to cycle. Outcomes: 21 events: over 220 bike repairs, 400 staff engaged with, 145 surveys completed.	Contact WestTrans for further information.
5	Cleaner Transport	Electric Bike Trial to encourage more sustainable journeys	**COMPLETE** • WestTrans ran an electric bike trial from June 2018 to spring 2020. Staff from Harrow and Hounslow Councils took part, which led to both boroughs having a permanent pool of e-bikes for staff journeys, reducing their car dependency. • The Council trialled the bikes with organisations across the sub-region including a yoga studio, estate agent and sports charity, encouraging them to switch their car journeys to e-bikes. The e-bikes were tracked using GPS trackers to gather data on the journeys. Outcomes: The ebikes have been ridden over 4,270 miles. 569 hours spent using the ebikes. Over 150 people trialled them. Approximately 4-5% of participants purchased their own ebike as a result of the trial. • Trialled a cargo bike delivery service for businesses for several months helping to deliver	shovlare@ealing.gov.uk

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
			over 400 parcels to residents, travelling a distance of 450km helping to save approximately 125kg of CO2 emissions should these journeys have been made by car. **ONGOING** Two e-bikes remain on trial within the NHS, further review is being conducted on how to best deploy for 2021.	
6	Cleaner Transport	Improved access to public transport	**ONGOING** • Ongoing work at Acton Mainline, Ealing Broadway, Hanwell, Southall and West Ealing Stations along the Paddington Main Line as part of the Crossrail programme. • Hanwell station was completed in 2020. All stations to be completed by 2023.	For details of access improvements at these stations, see http://www.crossrail.co.uk/route/western-section/http://www.crossrail.co.uk/route/western-section/
7	Emissions from Developments and Buildings	Control of emissions from developments and buildings	**ONGOING** During 2020, planning conditions were imposed to: • Ensure that particulate emissions from construction and demolition are minimised. • Control emissions from NRMM. • Control emissions from CHP and biomass boilers and to ensure that smaller developments use ultra-low NO_x gas boilers. Enforce Air Quality Neutral policies.	
8	Emissions from Developments and Buildings	Ensuring adequate, appropriate, and well-located green space and infrastructure is included in new developments	**ONGOING** The London Borough of Ealing's Development (Core) Strategy DPD includes a chapter "Protecting and Enhancing Ealing's Green and Open Spaces".	The focus is on larger developments to implement on-site green space.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
9	Emissions from Developments and Buildings	Investigate the potential for larger development areas to proactively assess air quality impacts cumulatively	**COMPLETE** Contractors sent invitation to tender to develop a Low Emission Strategy (LES) for the Southall Waterside development in April 2020. The objective of the LES is to promote the inclusion of initiatives within the development to minimise local air quality effects and limit contributions to climate change. **ONGOING** • Monitoring of the air quality project is expected to continue till the conclusion of the project. • Prospect of independent air quality monitoring at Green Quarter albeit for a short period of two years.	LES project due to commence in August 2020
10	Emissions from Developments and Buildings	Promoting and delivering energy efficiency retrofitting projects in workplaces and homes using the GLA RE:NEW and RE:FIT programmes to replace old boilers/top-up loft insulation in combination with other energy conservation measures.	**ONGOING** • In 2020/21 the council was successful in bidding for £2.995m to retrofit 30 corporate buildings to reduce carbon emissions and decarbonise heating systems. Work will be completed in summer 2021. • The council was successful in bidding for £2.04m to complete whole house retrofits on 40 of its own council houses, with the aim of making them carbon neutral. • Finally, the council led a West London partnership to secure £4.8m to deliver a home retrofit programme for low income homes across West London. It is estimated that Ealing will see 50-100 homes retrofitted under the scheme, by June 2021. A further top up of £10m has been bid, extending delivery to December 2021 if successful.	

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
11	Public Health and Awareness Raising	Ensure that Directors of Public Health (DsPH) have been fully briefed on the scale of the problem in your local authority area; what is being done, and what is needed. A briefing should be provided.	**ONGOING** Public Health (led by the DPH) has led a Joint Strategic Needs Assessment in this area to inform local decision making.	
12	Public Health and Awareness Raising	Public Health through the health protection forum that there is engagement with wider stakeholders in this agenda).	**ONGOING** • The Council are working with Ealing's Clinical Commission Group, through the JSNA and its recommendations. • Air Quality is now a standing item on the Council's Health Protection Forum.	
13	Public Health and Awareness Raising	Encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme	**ONGOING** STARS Accreditation to August 2020 Update • Gold: **16** schools • Silver: **8** schools • Bronze: **11** schools • Engaged (registered on STARS only): **5** school **6** STARS Surgeries and STARS training workshop were held between September 2019 and July 2020, to support schools in progression towards accreditation. 11 x school street schemes involving 12 schools (funded by London Streetspace Programme as part of the government COVID response) and 1 x school street scheme involving 2 schools (funded through LIP implemented).	For information on the London-wide STARS scheme, see https://stars.tfl.gov.uk

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
14	Public Health and Awareness Raising	Air quality at schools	**COMPLETE** • LBE's Active Travel Officer delivered five air quality workshops, relating the sessions to the impact of transport, to the two schools involved in our first School Streets programme. • The School Travel Team promoted Go Green for Clean Air Day, to all schools in the Borough, on 8th October 2020.	Focus on minimising further exposure by siting new schools away from busy roads. See Ealing Council's *Sustainable Modes of Travel to School Strategy* https://www.ealing.gov.uk downloads/201182/transport_ strategies_and_plans
15	Emissions from Development and Buildings	Update Procurement policies to ensure sustainable logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainability criteria)	**ONGOING** • The new Greener Ealing London waste service provider procured a new fleet that significantly improves performance related to impacts on local air quality. They have also made commitments in the climate strategy that all heavy vehicles will run on alternative fuels or electric by 2030 and all light vehicles to be electric by 2026. • The parks team made similar commitments, with 29% of their current vehicle fleet electric/hybrid and a commitment to increase to 50% by 2026. Further they have committed that 100% of their maintenance equipment will have zero carbon output by 2025, current baseline is 60%. • The contract for waste handling includes sustainable logistics. During 2019 (and since 1st April 2016), all suppliers of WestTrans member boroughs have been required to comply with WRRR requirements. This is a Responsible Procurement project designed to ensure greater road safety for vulnerable road users and improve air quality via lower emissions from heavy goods vehicles used by our suppliers.	Most significant measure identified as reducing trip distance (and hence emissions) http://www.westtrans.org /wla/wt2.nsf/pages/WT-211

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
16	Delivery Servicing and Freight	Re-organisation of freight to support consolidation (or micro-consolidation) of deliveries, by setting up or participating in new logistics facilities, and/or requiring that council suppliers participate in these	**ONGOING** Ealing Broadway Business Improvement District Air Quality Exemplar project undertaken with MAQF funding project has continued and is now fully funded by Ealing BID. This project has saved around 9,000 diesel vehicle trips each year.	See https://www.london.gov.uk/sites/default/files/mayors_air_quality_fund_report_2016.pdf
17	Emissions from Development and Buildings	Green Infrastructure	**ONGOING** • Planning policies encourage green roofs, green walls, Sustainable Urban Drainage Systems etc. • West Ealing Liveable Neighbourhood initial prototype phase implemented (includes parklets, decorative pedestrian crossing points and street art) to promote walking and cycling journeys.	
18	Public Health and Awareness Raising	Discouraging unnecessary idling by taxis, coaches and other vehicles (e.g. through anti-idling campaigns or enforcement activity)	**COMPLETE** • In 2019, new anti-Idling sign was installed at Madeley Road. **ONGOING** • Ongoing community engagement with parents and residents re anti-idling measures. • Delivering activities and events as a participating council of the anti-idling Mayor's Air Quality Fund.	
19	Cleaner Transport	Increasing the proportion of electric, hydrogen and ultra-low emission vehicles in Car Clubs	**ONGOING** • Work undertaken within WestTrans Partnership to increase EV fleet within car clubs. • The Council and partners Source London and Siemens/Ubitricity have installed 175 on-street and car park EVCPs since 2019. There are also	https://www.ealing.gov.uk/info/201173/transport_and_parking/1316/electric_vehicles_and_charging_points/1

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
			additional EVCPs on private land open to the public see Map of charging points for electric car drivers in UK: Zap-Map (zap-map.com) • We also be installing 80 further EVCPs on-street this summer and autumn with more likely to follow later. • Zipcar Flex car club planned for launch in July 2021, expected to have 25% of the fleet as EVs.	
20	Cleaner Transport	Very Important Pedestrian Days (e.g. no vehicles on certain roads on a Sunday) and similar initiatives	**ONGOING** • 9 LTNs installed in 2020 and a further 3 LTNs are currently out for consultation, with implementation programmed for 2021.	
21	Public Health and Awareness Raising	Ensure that the Head of Transport has been fully briefed on the Public Health duties and the fact that all directors (not just Director of Public Health) are responsible for delivering them, as well as on air quality opportunities and risks related to transport in the borough. Provide a briefing which can be disseminated amongst the Transport team.	**ONGOING** • Through the Healthy Weight, Healthy Lives Strategy group, Public Health works closely with transport colleagues, particularly in relation to active travel. • Transport staff are closely involved in air quality initiatives and projects and have been involved in JSNA development. Recommendations of the JSNA are shared across Council services and the Council aims to incorporate them in all relevant strategies.	

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints	Further Information
22	Monitoring and Other Core Statutory Duties	$PM_{2.5}$ Monitoring	**ONGOING** • The council is currently evaluating resources required to monitor for $PM_{2.5}$ at Horn Lane, including installation of a new $PM_{2.5}$ monitor at the site. • Although there are no specific measures targeting the reduction of $PM_{2.5}$ currently, it is expected that the combination of actions and that are currently in force or coming into force will help to bring about a reduction of $PM_{2.5}$. However, discussions are being held with Public Health to devise policies that will specifically target the reduction of $PM_{2.5}$.	

4. Planning Update and Other New Sources of Emissions

Table K gives a summary of planning requirements relating to air quality in the London Borough of Ealing in 2020. All planning applications, including those for the discharge of conditions relating to air quality, are logged and validated by the Planning Support Team. A consultation request for each application is sent to the Planning Enforcement and Environment Team, where air quality officers will identify matters needing their input and will recommend appropriate conditions to the planning case officer. The air quality officer will, if necessary, request further details and will liaise as required with the applicant and/or their air quality consultant to ensure that any recommendations to the case officer are soundly based and provide the necessary coverage of all air quality matters.

Currently planning conditions relating to air quality will be investigated and enforced in response to complaint, for example where there is a dust issue at a construction site and a construction management plan is in place that was required by a planning condition.

Table I. Planning requirements met by planning applications in London Borough of Ealing in 2020

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	532 *(See Note 1)*
Number of planning applications required to monitor for construction dust	94 *(See Note 2)*
Number of CHPs/Biomass boilers refused on air quality grounds	1
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	9
Number of developments required to install Ultra-Low NO_x boilers	5
Number of developments where an AQ Neutral building and/or transport assessments undertaken	25
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	6
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant.	N/A

Condition	Number
Please include confirmation that you have checked that the development has been registered with the GLA through the relevant NRMM website and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	
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.	18 conditions included (NRMM informative included for other applications where plant used) 20 sites were audited, 3 were self-compliant, 4 compliant, 1 was non-compliant and 6 did not require to be registered on NRMM website.

Notes:

1. This is the number of full planning applications initially reviewed by officers for air quality impacts. It does not include condition discharge applications where an air quality condition has been set and details are submitted in compliance with the condition.

2. Monitoring is taken to include visual monitoring.

4.1 New or significantly changed industrial or other sources

No new sources identified.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

The four active automatic monitoring sites in the Borough were operated as part of the London Air Quality Network (LAQN). Data have traceability to national standards and operational procedures defined for the LAQN. The Horn Lane site is also part of the national Automatic Urban and Rural Network (AURN), operated by the Environment Agency to monitor compliance with the EU Directives. AURN QA/QC procedures involve 4-weekly calibration of NO_x and SO_2 analysers and maintenance of particulate samplers, and quarterly calibration of O_3 analysers.

PM_{10} Monitoring Adjustment

Monitoring is conducted using TEOMs at two of the four automatic monitoring stations. There is therefore a need to eliminate the effect of changing humidity on the mass measurement; the TEOM is required to maintain the sample filter at an elevated temperature, which may lead to losses of semi-volatile species such as ammonium nitrate. The Volatile Correction Model (VCM) uses local FDMS monitoring sites to correct TEOM measurements for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. This adjustment to PM_{10} data is provided by the London Air Quality Network.

A.2 Diffusion Tubes

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme.

AIR NO_2 PT forms an integral part of the UK NO_2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). 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.

The results for Socotec (formerly Environmental Scientifics Group (ESG) Didcot) were overall satisfactory. The laboratory scored 100% satisfactory results between January 2020 to February 2020 (AR036), and 100% satisfactory results between September 2020 and October 2020 (AR040).

Factor from Local Co-location Studies

Bias adjustment is a calculated factor, which shows whether diffusion tubes are over or under reading ambient concentrations and therefore allows for a correction to be made.

Ealing carries out studies at three sites where triplicate diffusion tubes are co-located with automatic monitors for the purpose of deriving a local bias adjustment factor. In 2020, the average local bias adjustment factor, derived from these studies, was 0.80.

The automatic monitor at Hanger Lane and Western Avenue had very good data capture (100% of months had a data capture >90%). At Horn Lane, 91.7% of months (11 out of 12) had a data capture >90%. Fig. 14 shows the details of the calculation of the local bias adjustment factors. The calculation of local bias adjustment factors takes into account both data capture from diffusion tubes and automatic monitors, and also the coefficient of variation (CV) of the triplicate diffusion tubes. If the CV is too high for a particular period, that period is not taken into account when calculating the local bias adjustment factor. Periods where automatic monitoring data capture rates are less than 90% are also excluded.

Figure 14. Local bias adjustment factor calculation

Local Bias Adjustment Outputs - Information Only

Go back to STEP 3 - Bias Adjustment to define factor

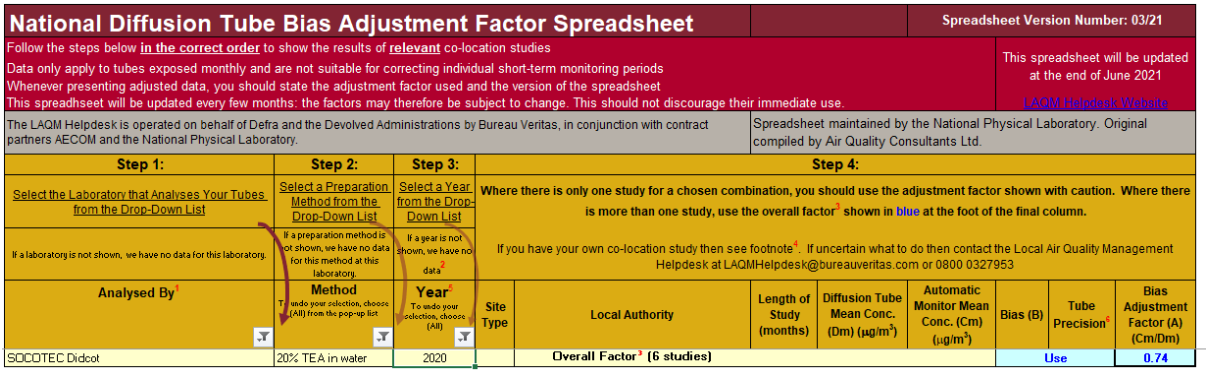
	STEP 3a Local Bias Adjustment Input 1	STEP 3b Local Bias Adjustment Input 2	STEP 3c Local Bias Adjustment Input 3	STEP 3d Local Bias Adjustment Input 4	STEP 3e Local Bias Adjustment Input 5
Periods used to calculate bias	11	12	11		
Bias Adjustment Factor A	0.79 (0.75 - 0.82)	0.76 (0.73 - 0.8)	0.84 (0.79 - 0.9)		
Diffusion Tube Bias B	27% (21% - 33%)	31% (25% - 38%)	19% (11% - 27%)		
Diffusion Tube Mean (µg/m^3)	64.7	45.8	40.0		
Mean CV (Precision)	4.0%	4.9%	6.2%		
Automatic Mean (µg/m^3)	50.9	34.9	33.6		
Data Capture	100%	98%	99%		
Adjusted Tube Mean (µg/m^3)	51 (49 - 53)	35 (33 - 37)	34 (32 - 36)		

Overall Diffusion Tube Precision	Good Overall Precision	Good Overall Precision	Good Overall Precision		
Overall Continuous Monitor Data Capture	Good Overall Data Capture	Good Overall Data Capture	Good Overall Data Capture		

Combined Local Bias Adjustment Factor	0.80

The national bias adjustment factor for co-location diffusion tube studies in 2020 analysed by Socotec (formerly Environmental Scientifics Group (ESG) Didcot) using a preparation method of 20% TEA/water was calculated to be 0.74. This has been taken from the national bias adjustment spreadsheet 03/21, as shown in Figure 15.

Figure 15. 2020 National bias adjustment factor



National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/21

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2021
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	20% TEA in water	2020		Overall Factor[3] (6 studies)				Use		0.74

Discussion of Choice of Factor to Use

The local bias adjustment factor was applied to the 2020 monitoring data. This was chosen on the basis that:

- it is locally-derived from co-location sites, and therefore considered most representative of local conditions; and
- it is a more conservative factor, as it is greater than the national bias factor (0.80 compared to 0.74).

Table J. presents the bias adjustment factors used for LAQM purposes in the Borough since 2014.

Table J. Bias Adjustment Factor

Year	Local or National	If Local, Version of National Spreadsheet	Adjustment Factor
2014	-	-	0.78
2015	-	-	0.83
2016	-	-	0.81
2017	-	-	0.72
2018	-	-	0.84
2019	Local	03/20	0.79
2020	Local	03/21	0.80

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Where data capture is less than 75% and greater than 25% of a full calendar year (between 3 and 9 months), the mean should be "annualised" – i.e. adjusted using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives.

There were a total of three monitoring locations which required annualisation: the two St Mark's Primary School diffusion tubes (NWA1S1 and NWA1S2) and the automatic monitor at Acton Vale (EI3). Acton Vale was annualised for both NO_2 and PM_{10} annual means.

The three continuous monitoring sites chosen for annualisation were Hillingdon Harlington, Wandsworth Putney and North Kensington (or North Kensington FIDAS for PM_{10}).

Table K. outlines the calculations for the annualisation factor applied to the monitoring data.

Distance Adjustment

Where an exceedance is located at a site which is not representative of public exposure, the mean must be "distance-corrected" using the procedure specified in LLAQM.TG(19) to estimate the concentration at the nearest receptor. Distance correction was required at one site, triplicate EA30-32. This is detailed in Table L.

2020 Schools Data

The two locations at St Mark's Primary School (NWA1S1 and NWA1S2) only achieved 42% data capture. The data capture at these locations was impacted by the COVID-19 pandemic, with exposure periods varying depending on when the tube changeovers could be carried out.

Where the exposure periods are shorter or longer than the recommended 4-5 weeks, LLAQM TG(19) guidance states a time weighted average should be calculated. However, there were periods which were significantly shorter or longer than the 4-5 week recommendation. These periods were excluded from the annual mean and details are provided in Table M.

For December 2020, the exposure period was longer than the 4-5 weeks recommended and predominately covered January 2021 (period 11th December 2020 to 29th January 2021). To avoid double counting, these results will be considered as January 2021 results and included in the 2021 average in next year's ASR.

Table M details the exposure periods at St Mark's Primary School diffusion tube sites, and summaries the reasons for exclusion from the annual average.

Table K. Short-Term to Long-Term Monitoring Data Adjustment

Site ID	**Annualisation Factor** Wandsworth Putney	**Annualisation Factor** North Kensington	**Annualisation Factor** Hillingdon Harlington	**Annualisation Factor** North Kenisington FIDAS	Average Annualisation Factor	Raw Data Annual Mean (µg m^{-3})	Annualised Annual Mean (µg m^{-3})	Comments
NWA1S1	0.96	0.96	0.94	-	0.95	18.8	17.9	
NWA1S2	0.96	0.96	0.94	-	0.95	12.3	11.7	
EI3 (NO_2)	1.08	1.05	1.00	-	1.04	18.9	19.7	
EI3 (PM_{10})	0.98	-	0.97	1.0	0.98	16.3	16.0	

Table L. NO_2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
EA36, EA37, EA38	5.0	8.5	36.5	27.9	35.1	Predicted concentration at Receptor within 10% the AQS objective.

Table M. St. Mark's Primary School Diffusion Tube Exposure Periods and Exclusions

Month	Date On	Date Off	Exposure Period (Days)	Decision
January	07 January 2020	10 January 2020	3	Excluded – too short
February	10 January 2020	05 March 2020	55	
March	06 March 2020	07 April 2020	32	
April	07 April 2020	20 May 2020	43	
May	20 May 2020	02 June 2020	13	Excluded – too short
June	02 June 2020	03 July 2020	31	
July to October	03 July 2020	02 November 2020	122	Excluded – too long
November	02 November 2020	03 December 2020	31	
December	11 December 2020	29 January 2021	49	Excluded – primarily covers January 2021

Appendix B Full Monthly Diffusion Tube Results

Table N. NO_2 Diffusion Tube Results 2020

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
EA1	100	100	66.3	62.5	45.6	29.7	37.7	38.5	33.9	43.2	58.3	44.7	35.6	48.5	45.4	36.1
EA2	100	100	50.9	40.6	33.4	16.3	28.1	31.8	29.6	36.2	38.3	40.5	30.4	42.1	34.9	27.7
EA3	100	100	27.7	25.1	17.3	15.7	11.8	12.7	14.0	15.9	17.6	21.2	27.8	22.8	19.0	15.1
EA4	100	100	44.7	36.0	28.2	27.8	26.2	25.6	23.5	26.1	30.2	27.2	38.5	33.5	30.6	24.4
EA5	100	100	37.1	33.9	27.4	19.5	19.0	18.0	17.5	23.8	26.1	25.4	40.5	31.0	26.6	21.2
EA6	100	100	49.2	44.1	37.7	38.4	34.9	42.5	29.5	43.5	45.4	42.8	54.8	42.6	42.1	33.5
EA7	100	100	34.5	33.3	22.8	13.1	19.4	17.6	19.7	23.5	35.9	30.2	36.7	29.7	26.4	21.0
EA8	100	100	48.2	41.7	37.0	19.4	31.1	28.4	23.5	31.7	34.2	28.6	41.2	42.4	34.0	27.0
EA9	100	100	40.6	35.6	28.5	21.5	21.6	21.5	19.5	24.7	31.3	25.8	37.3	29.3	28.1	22.4
EA10	100	100	39.8	39.8	29.9	14.5	20.8	22.6	20.0	26.9	32.6	27.0	41.7	34.2	29.2	23.2
EA11	100	100	35.7	32.7	10.2	17.4	19.2	13.5	0.7	17.9	27.6	24.1	39.1	27.5	22.1	17.6
EA12	100	100	30.5	32.9	29.2	25.8	21.4	27.6	20.0	30.7	32.1	31.2	39.3	38.2	29.9	23.8
EA13	100	100	59.0	48.7	34.9	36.9	30.3	46.5	36.8	46.0	45.7	44.0	55.2	47.0	44.3	35.2
EA14	100	100	51.6	45.1	17.1	26.1	29.3	36.8	32.6	37.8	40.6	41.0	46.3	41.7	37.2	29.6
EA15	100	100	45.0	34.2	24.3	19.1	24.3	21.4	22.1	29.5	34.5	33.3	40.2	38.3	30.5	24.3
EA16	100	100	48.3	41.7	35.5	19.1	23.4	25.9	27.7	31.6	38.2	34.9	69.8	30.1	35.5	28.3
EA17	100	100	47.4	36.8	28.4	10.8	19.4	26.7	24.6	34.7	30.7	30.8	45.4	37.8	31.1	24.8
EA18	91	91	43.5	36.0	19.4	18.0	21.8	25.7		29.8	31.4	32.2	46.3	28.9	30.3	24.1
EA19	100	100	44.7	38.6	25.5	19.0	24.4	25.3	22.5	28.3	37.6	31.1	41.8	29.4	30.7	24.4
EA20	100	100	51.6	41.8	25.7	10.3	27.8	37.2	33.5	37.4	37.3	46.7	45.9	38.3	36.1	28.7
EA21	93	93	35.5	29.3	1.3		24.5	22.0	20.0	24.7	29.8	25.8	36.0	30.5	25.4	20.2
EA22	100	100	46.8	38.2	21.4	23.8	21.2	25.3	23.1	28.5	30.0	34.1	44.0	35.1	31.0	24.6
EA23	100	100	67.4	57.4	30.6	28.0	32.7	40.7	39.9	43.1	47.1	48.1	56.2	39.4	44.2	35.2
EA24	100	100	42.2	32.5	30.2	30.9	22.4	22.8	18.5	30.2	29.9	30.5	46.4	30.4	30.6	24.3
EA25	100	100	55.8	44.8	33.2	27.9	25.7	31.7	30.7	40.7	40.9	43.9	49.3	41.1	38.8	30.9
EA26	100	100	81.0	64.5	50.3	43.5	40.7	44.7	41.5	54.7	54.8	46.1	63.2	56.1	53.4	**42.5**
EA27	100	100	41.0	38.3	30.1	22.1	17.5	21.2	16.5	22.4	27.9	30.5	39.1	34.5	28.4	22.6
EA28	100	100	56.5	48.3	38.3	31.8	28.7	30.6	33.3	43.7	47.9	42.5	54.8	45.2	41.8	33.3
EA29	100	100	46.6	40.5	30.4	27.2	24.6	29.7	24.7	31.8	33.3	35.9	45.3	38.0	34.0	27.1

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
EA30 (Triplicate)	100	100	92.0	79.4	26.3	44.2	50.9	61.3	58.2	60.3	63.9	61.0	76.2	68.7	**63.1**	**50.2**
EA31 (Triplicate)	100	100	94.2	66.9	45.7	48.5	50.0	63.9	62.7	61.2	60.1	61.5	77.4	57.5		
EA32 (Triplicate)	100	100	93.5	74.3	64.3	47.7	49.2	59.4	61.9	64.6	63.3	65.1	76.8	60.8		
EA33	100	100	69.4	67.2	62.4	52.6	49.3	48.3	44.8	56.5	55.7	55.9	60.4	49.1	56.0	**44.5**
EA34	90	90	43.4	30.6	31.5	39.1		30.5	28.4	31.4	38.3	31.9	41.4	41.8	35.3	28.1
EA35	100	100	55.3	43.4	48.3	42.9	37.3	44.2	27.8	47.4	49.6	42.2	54.5	44.9	44.8	35.7
EA36 (Triplicate)	100	100	63.4	47.9	40.5	32.2	34.1	42.1	34.8	43.8	48.2	50.9	48.5	51.2	**45.8**	36.5
EA37 (Triplicate)	100	100	64.0	53.7	40.4	33.2	33.1	41.2	34.0	48.7	43.6	48.9	58.1	55.9		
EA38 (Triplicate)	100	100	66.0	50.0	39.0	33.9	31.1	42.6	33.0	48.6	51.0	48.5	64.9	49.2		
EA39	100	100	53.2	44.0	37.6	25.4	31.0	30.7	26.7	40.0	45.2	43.6	49.4	43.1	39.2	31.2
EA40	100	100	42.2	36.5	27.1	22.0	22.0	23.0	21.7	26.2	30.5	33.6	45.3	1.0	27.6	22.0
EA41	100	100	46.6	42.2	29.7	23.4	22.8	24.3	21.4	25.8	31.3	31.4	46.3	34.6	31.7	25.2
EA42	92	92		47.2	37.0	35.3	33.0	38.0	28.8	42.6	40.6	42.5	53.5	44.3	40.3	32.0
EA43	100	100	45.0	35.2	27.7	28.1	25.9	26.7	20.4	29.5	29.1	30.9	43.8	32.9	31.3	24.9
EA44	100	100	42.3	34.6	28.4	21.2	19.5	22.2	16.6	26.5	27.9	32.1	39.6	30.2	28.4	22.6
EA45	100	100	46.8	40.6	35.3	31.9	31.8	29.1	25.4	38.4	44.0	33.6	45.2	39.0	36.8	29.3
EA46	82	82	71.4	61.0	47.0	40.2		51.6		53.5	69.6	61.4	63.8	59.9	57.9	**46.1**
EA47	100	100	57.3	49.3	38.2	28.6	33.5	33.9	32.0	37.8	43.9	47.0	52.3	42.2	41.3	32.9
EA48	100	100	59.8	49.7	45.8	39.7	41.1	39.9	46.2	48.7	51.6	47.5	53.7	46.0	47.5	37.8
EA49	100	100	42.8	36.8	32.6	32.0	26.2	25.1	24.1	29.5	34.6	32.6	47.9	38.4	33.6	26.7
EA50	100	100	43.6	35.7	34.3	27.5	24.9	24.5	24.0	34.4	34.6	30.6	39.3	34.0	32.3	25.7
EA51	100	100	61.9	52.8	48.5	43.2	44.5	38.8	40.6	47.1	57.3	47.6	58.7	47.8	49.1	39.0
EA52	100	100	37.8	30.1	27.2	24.7	21.9	18.9	19.8	23.8	28.3	29.7	42.4	34.2	28.2	22.5
EA53	100	100	43.7	38.0	47.1	54.0	45.4	40.0	33.7	50.3	52.2	42.4	56.7	42.4	45.5	36.2
EA54	100	100	53.1	41.9	33.7	26.1	21.7	30.0	27.0	36.0	43.4	41.1	38.1	32.8	35.4	28.2
EA55	100	100	47.4	37.1	34.2	31.7	25.9	28.3	25.4	33.7	36.0	33.4	43.4	39.5	34.7	27.6
EA56 (Triplicate)	100	100	47.9	45.5	35.6	30.5	31.5	30.1	26.3	36.0	38.8	34.8	49.3	41.7	39.3	31.3
EA57 (Triplicate)	100	100	59.1	45.1	40.2	33.3	34.0	33.9	30.2	38.0	38.1	40.9	55.0	43.7		

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2020 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
EA58 (Triplicate)	100	100	52.9	40.3	40.0	32.1	32.0	30.4	30.2	38.4	44.1	40.3	51.1	43.1		
EA59	100	100	43.2	37.0	34.2	29.4	27.1	30.0	24.3	33.4	35.3	34.5	46.8	25.6	33.4	29.4
EA60	100	100	51.4	45.6	37.5	28.9	31.8	30.7	25.4	33.9	37.8	36.7	49.0	39.7	37.4	32.9
EA61	100	100	53.1	44.5	32.9	27.9	28.3	29.0	26.1	31.9	34.9	39.8	44.7	37.6	35.9	31.6
NWA1S1	50	50	-	10.1	20.3	18.4	-	16.2	-	-	-	-	35.8	-	17.9	14.3
NWA1S2	50	50	-	11.8	20.4	12.6	-	12.6	-	-	-	-	30.6	-	11.7	9.4

Notes

Concentrations are presented as µg m^{-3}.

Exceedances 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**.

All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

Where the tubes are part of a triplicate or duplicate, annual data is provided for the mean of the tubes only.

(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%).

Table O. NO_2 Diffusion Tube Results 2019 (School Results Only)

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2019 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
NWA1S1	75	50	-	-	-	-	25.9	18.1	-	-	33.9	29.2	41.3	29.1	29.1	23.8
NWA1S2	88	58	-	-	-	-	19.7	27.0	21.7	-	29.7	34.2	35.4	34.0	28.6	24.5

Notes

Concentrations are presented as µg m^{-3}.

Exceedances 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**.

All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

(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%).

Appendix C. Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP