London Borough of Hounslow Air Quality Annual Status Report for 2021

Date of publication: 31st May 2022

This report provides a detailed overview of air quality in the London Borough of Hounslow during 2021. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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[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	2021
Particles ($PM_{2.5}$)	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
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} mot 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

Table B. Details of Automatic Monitoring Sites for 2021

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
HS4	Chiswick	521084	178499	Roadside	Hounslow	1	2	3	NO_2, PM_{10}, $PM_{2.5}$	*Chemiluminescent; TEOM; Spirant BAM*
HS5	Brentford	517425	178071	Roadside	Hounslow	1	4	3	NO_2, PM_{10}, $PM_{2.5}$	*Chemiluminescent; TEOM; Spirant BAM*
HS6	Heston	513655	176842	Roadside	Hounslow	1	3	1.5	NO_2, PM_{10}	*Chemiluminescent; TEOM*
HS7	Hatton Cross	509334	174997	Background	Hounslow	10	11.5	2	NO_2, PM_{10}	*Chemiluminescent; Met One BAM 1020*
HS9	Feltham	510691	173247	Roadside	Hounslow	1	1.5	1.5	NO_2, PM_{10}	*Chemiluminescent; TEOM*
HS8	Gunnersbury	519180	179369	Roadside	Hounslow	4	4	2	NO_2, PM_{10}	*Chemiluminescent; Met One BAM 1020*

Table C. Details of Non-Automatic Monitoring Sites for 2021

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)
BREN A BREN B BREN C	Brentford, Great West Road	517425	178071	Roadside	Hounslow	1	4	3	NO2	Yes
CHIS A CHIS B CHIS C	Chiswick High Road	521084	178499	Roadside	Hounslow	1	2	3	NO2	Yes
CRAN A CRAN B CRAN C	Cranford Avenue Park	510373	177199	Urban Background	Hounslow	20	N/A	3	NO2	No
FELT A FELT B FELT C	Feltham High St / Hanworth Rd Jct	510691	173247	Roadside	Hounslow	1	1.5	1.5	NO2	Yes
HAT A HAT B HAT C	Myrtle Avenue	509334	174997	Urban Background	Hounslow	10	12	2	NO2	Yes
HEST A HEST B HEST C	Heston Road	513655	176842	Roadside	Hounslow	1	3	1.5	NO2	Yes
HS32	24 Adelaide Terrace	517551	178186	Roadside	Hounslow	1	10	3	NO2	No
HS33	30 Surrey Crescent	519452	178314	Roadside	Hounslow	3	7	2	NO2	No
HS34	Chiswick School	520876	177164	Suburban	Hounslow	3	15	2.5	NO2	No
HS35	Wood Street	521220	178069	Roadside	Hounslow	1	2	4	NO2	No
HS41	Hanworth Library	512103	172506	Roadside	Hounslow	3	5	2	NO2	No
HS42	High Street, Hounslow	514090	175812	Urban Background	Hounslow	2	14	3	NO2	No

HS43	Glenhurst Road	517436	178044	Roadside	Hounslow	1	0.5	2	NO2	No
HS46	Swyncombe Avenue	516887	178637	Roadside	Hounslow	1	1	2	NO2	No
HS47	Boston Manor Road	516712	178588	Roadside	Hounslow	1	1	2	NO2	No
HS51	Bedfont Sports Club	509249	174683	Suburban	Hounslow	3	28	2	NO2	No
HS52	Bedfont Library	508868	173720	Roadside	Hounslow	2	6	3	NO2	No
HS53	Church of the Good Shepherd	510986	176031	Suburban	Hounslow	4	25	2.5	NO2	No
HS54	Cranford Lane / Cranford High Street Jct.	510784	177460	Roadside	Hounslow	2	2	2	NO2	No
HS55	Cranford Library	510750	176684	Roadside	Hounslow	3	6	3	NO2	No
HS61	Twickenham Road	516208	175793	Roadside	Hounslow	0	18	3	NO2	No
HS62	Sutton Road	513619	176924	Roadside	Hounslow	1	1	4	NO2	No
HS63	Lampton Road	513528	175868	Roadside	Hounslow	1	1	2.5	NO2	No
HS64	Junction of Roseheath Road	512860	175013	Roadside	Hounslow	2	2	5	NO2	No
HS65	Eastbourne Road, Uxbridge Rd Jct	511840	172745	Roadside	Hounslow	2	3	2	NO2	Yes
HS66	Brainton Avenue	510957	173642	Roadside	Hounslow	1	5	2	NO2	No
HS67	Busch Corner	516590	176888	Roadside	Hounslow	0	1	2.5	NO2	No
HS68	Junction of Commerce Road	517278	177298	Roadside	Hounslow	0	2	2	NO2	No
HS69	Kew Bridge	519015	178018	Roadside	Hounslow	0	0	2	NO2	No
HS70	Eastbury Grove (Chiswick Lane)	521442	177980	Roadside	Hounslow	1	1	2.5	NO2	No
HS71	Gunnersbury Avenue	519178	179375	Roadside	Hounslow	2	9	2	NO2	No
HS72	Heston Crossroads	513064	177552	Roadside	Hounslow	1	2.5	3	NO2	No
HS73	Browells Lane, Feltham	510567	172857	Roadside	Hounslow	2	4	2	NO2	No
HS74	Swift Road, Hanworth	511989	171797	Roadside	Hounslow	2	13.5	2	NO2	No
HS76	Clements Court, Hounslow	511572	175015	Urban Background	Hounslow	3	N/A	4	NO2	No
HS77	Beaversfield Park	512000	175970	Urban Background	Hounslow	5	N/A	2.5	NO2	No
HS78	Staines / Wellington Road	512763	175312	Roadside	Hounslow	1	3	4	NO2	No

HS79	Whitton Road	513839	175316	Roadside	Hounslow	2	1	3	NO2	No
HS80	Hounslow Bus Station	514433	175950	Roadside	Hounslow	0	3	3	NO2	No
HS81	Woodlands	515035	175907	Suburban	Hounslow	10	2	2.5	NO2	No
HS82	Church Street	516669	175998	Roadside	Hounslow	0	1	2	NO2	No
HS83	Osterley Park	514848	178068	Urban Background	Hounslow	2	N/A	1	NO2	No
HS84	Apex Corner (York Way)	512709	172155	Roadside	Hounslow	1	2	3	NO2	No
HS85	Hospital Road	513213	175655	Roadside	Hounslow	1	1	4	NO2	No
HS86	Jolly Waggoners	510947	176564	Roadside	Hounslow	2	1	4	NO2	No
HS87A	Henlys Roundabout	511542	176426	Roadside	Hounslow	2	1.5	4	NO2	No
HS88	Thames Path, Duke's Meadows	521483	176692	Urban Background	Hounslow	2	N/A	2	NO2	No
HS89	Mogden Sewage Works Gate	515424	174719	Roadside	Hounslow	3	3	2	NO2	No
HS90	The Butts	517585	177606	Suburban	Hounslow	2	3	2	NO2	No
HS91	Hogarth Ln / Dukes Av	521041	177973	Roadside	Hounslow	3	8	6	NO2	No
HS92	St Mary's School	521110	177970	Suburban	Hounslow	2	13	5	NO2	No
HS93	William Hogarth School	521110	177970	Suburban	Hounslow	2	13	5	NO2	No
HS94	Hogarth Roundabout	521490	177920	Roadside	Hounslow	2	1	2	NO2	No
SC01	Burlington Lane	521173	177470	Roadside	Hounslow	3	1	2	NO2	No
SC02	Edensor Road	521168	177325	Roadside	Hounslow	2	1	2	NO2	No
SC03	Burlington Lane Chiswick School	520923	177355	Roadside	Hounslow	2	1	2	NO2	No
SC04	Staveley Road	520734	177269	Roadside	Hounslow	2	1	2	NO2	No
SC05	Burlington Lane Tennis Club	520639	177257	Roadside	Hounslow	2	1	2	NO2	No
SC06	Grove Park Bridge	520206	177372	Roadside	Hounslow	2	1	2	NO2	No
SC07	Sutton Court Road	520261	177552	Roadside	Hounslow	2	1	2	NO2	No
SC08	Grove Park Terrace	520046	177636	Roadside	Hounslow	2	1	2	NO2	No
SC09	Park Road	520771	177886	Roadside	Hounslow	2	1	2	NO2	No

SC10	Milnthorpe Road	520612	177889	Roadside	Hounslow	2	1	2	NO2	No
SC11	Ellesmere Road	520526	177933	Roadside	Hounslow	2	1	2	NO2	No
SC12	Eastbourne Road	520506	177907	Roadside	Hounslow	2	1	2	NO2	No
SC13	Sutton Court Road Elmwood Road Jct	570367	177850	Roadside	Hounslow	2	1	2	NO2	No
SC14	Harvard Hill	519960	177989	Roadside	Hounslow	2	1	2	NO2	No

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, the details of which are described in Appendix A.

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

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2021 %[(b)]	2015	2016	2017	2018	2019	2020	2021
Brentford	Automatic	99.2	99.2	**53.3**	**56.9**	**54**	**48**	**43.9**	33	35.8
Chiswick	Automatic	99.85	99.85	**44.8**	**49.8**	**53**	**47**	**41.7**	32	32.9
Feltham	Automatic	97.71	97.71	39.7	38.4	34	27	27.7	26	27.8
Gunnersbury	Automatic	98.52	98.52	**53**	**59.1**	**53**	**45**	**45**	37	35.9
Hatton Cross	Automatic	91.86	91.86	29.7	31.6	33	28	27.3	17	18.2
Heston	Automatic	89.76	89.76	**40.7**	**42.2**	**44**	**40**	37.7	31	28.8
BREN	Diffusion tube	82.6	82.6	**64.2**	**64.8**	**58.3**	**48.3**	**44.1**	33.6	37
CHIS	Diffusion tube	82.6	82.6	**60.1**	**49**	**52.4**	**43.9**	**41.8**	31.9	32.2
CRAN	Diffusion tube	100.0	100.0	27.7	28.4	25	24.1	26.6	16	16.6
FELT	Diffusion tube	87.1	87.1	**43.1**	**46**	38.6	25.8	27.8	24.6	25.4
MYR	Diffusion tube	100.0	100.0	36.4	37.7	33.9	29.9	27.2	17.5	21.4
HEST	Diffusion tube	100.0	100.0	**50.9**	**56.9**	**50.1**	**43.6**	38.2	29.7	30.0
HS32	Diffusion tube	92.6	92.6	**58.8**	**59.5**	**50.2**	**43.2**	**42.5**	35.5	33.0
HS33	Diffusion tube	100.0	100.0	**59.4**	**57.8**	**54.8**	**42.5**	38.9	30.2	31.1
HS34	Diffusion tube	89.8	89.8	32.8	34.1	28.7	25.9	25.9	20	21.3
HS35	Diffusion tube	100.0	100.0	34.6	37.3	32.2	27.3	26.4	19.9	19.3

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2021 %[b]	2015	2016	2017	2018	2019	2020	2021
HS41	Diffusion tube	50.4	50.4	35.6	**55.7**	**51.4**	**41.8**	**40.2**	33.9	29.8
HS42	Diffusion tube	77.4	77.4	30.1	36.6	33.1	28.4	29.9	22.8	25.5
HS43	Diffusion tube	100.0	100.0	**41.2**	**43.2**	35.4	33.3	30.6	22.8	25.5
HS46	Diffusion tube	66.6	17.6	-	-	-	-	-	-	-
HS47	Diffusion tube	100.0	24.8	-	-	-	-	-	-	33.1
HS51	Diffusion tube	84.8	84.8	26.9	31.9	28.2	25.6	24.1	16.3	17.1
HS52	Diffusion tube	100.0	100.0	27.4	29.7	25.1	23.3	23	16.9	19.2
HS53	Diffusion tube	100.0	100.0	34.1	34	33.4	25.6	28	18.7	20.5
HS54	Diffusion tube	90.4	90.4	**48.4**	**46**	**40.8**	35	38.4	28.5	29.5
HS55	Diffusion tube	100.0	100.0	**44.5**	**50.8**	**43.7**	33.8	33.9	23.7	27.3
HS61	Diffusion tube	85.4	85.4	**42.4**	**40.9**	34.8	32.1	31.4	21.4	23.4
HS62	Diffusion tube	100.0	100.0	38.9	**43.7**	37.5	33.6	33.6	23	24.9
HS63	Diffusion tube	100.0	100.0	**48.3**	**48.4**	37.3	34.1	30.9	24.6	27.1
HS64	Diffusion tube	100.0	100.0	33.3	35.4	33.1	28.7	27.1	20.1	20.6
HS65	Diffusion tube	84.8	84.8	33.5	35.4	28.3	25.1	25.1	18.7	19.2
HS66	Diffusion tube	89.8	89.8	**43.3**	**46.7**	**44**	37.9	34.3	26	27.4
HS67	Diffusion tube	73.3	73.3	**74.2**	**68**	**59.5**	**48.5**	**50**	**40.5**	**44.1**
HS68	Diffusion tube	100.0	100.0	**52.1**	**52.3**	**43.7**	36.6	36.6	30.8	36.3
HS69	Diffusion tube	90.4	90.4	**60.1**	**55.5**	**47.9**	39	36	26.5	28.8
HS70	Diffusion tube	89.8	89.8	**61.9**	**65.1**	**59.7**	**47.2**	**44.1**	30.5	33.9
HS71	Diffusion tube	100.0	100.0	**57.3**	**54.2**	**48.3**	37.9	36.6	29.1	28.7
HS72	Diffusion tube	100.0	100.0	**46.6**	**51.8**	**48.6**	36.2	35	26.1	25.5

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2021 %[b]	2015	2016	2017	2018	2019	2020	2021
HS73	Diffusion tube	100.0	100.0	33	33.3	29.7	25.3	29.1	21.4	22.6
HS74	Diffusion tube	87.1	87.1	37.3	**41.9**	38.4	31	29.2	21.7	23.2
HS76	Diffusion tube	75.2	75.2	35.7	**40.7**	26.8	27	29	21.7	21.9
HS77	Diffusion tube	100.0	40.2	26.9	33.8	27.9	21.8	21.6	14.8	16.4
HS78	Diffusion tube	82.6	82.6	**56.1**	**57.8**	**47.4**	**42.7**	**40.7**	32.7	36.6
HS79	Diffusion tube	70.0	70.0	35.7	**42.4**	33.1	30.1	30.5	22	23.2
HS80	Diffusion tube	100.0	100.0	**63.2**	**79.2**	**59.6**	**58.8**	**46.4**	36.7	**45.7**
HS81	Diffusion tube	100.0	100.0	24.8	26.9	23	22	20.2	15.4	15.7
HS82	Diffusion tube	100.0	100.0	32.5	31.3	26.2	22.2	20.2	15.6	16.7
HS83	Diffusion tube	74.9	74.9	24.2	27	19.9	19.9	18.4	14	12.7
HS84	Diffusion tube	100.0	100.0	**43.7**	**45.4**	39.7	31.6	33.4	24.6	27.3
HS85	Diffusion tube	100.0	100.0	**49.3**	**50.5**	**47.6**	38	37.5	30.4	31.5
HS86	Diffusion tube	89.8	89.8	**50.8**	**54.9**	**53.4**	**41.4**	**43.5**	30.1	31.7
HS87A	Diffusion tube	100.0	100.0	**56**	**66.2**	**65.7**	**44.8**	**47.3**	31.5	33.5
HS88	Diffusion tube	92.0	92.0	25.4	26.9	23.3	20.7	22	16.1	15.6
HS89	Diffusion tube	92.0	92.0	**41.3**	**42.1**	32.1	28.9	27.4	22.5	21.9
HS90	Diffusion tube	100.0	100.0	30.1	33.8	26.5	25.3	24.7	20.4	20.6
HS91	Diffusion tube	73.0	73.0	-	-	**62**	**49.1**	**43.7**	30.5	32.7
HS92	Diffusion tube	82.6	82.6	-	-	-	-	34.8	26.1	26.3
HS93	Diffusion tube	73.0	73.0	-	-	-	**56.3**	36.2	25.5	25.2
HS94	Diffusion tube	75.0	24.8	-	-	-	-	-	-	36.2
SC01	Diffusion tube	100.0	24.8	-	-	-	-	-	-	30.0

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2021 %[(b)]	2015	2016	2017	2018	2019	2020	2021
SC02	Diffusion tube	100.0	24.8	-	-	-	-	-	-	19.2
SC03	Diffusion tube	100.0	24.8	-	-	-	-	-	-	15.7
SC04	Diffusion tube	100.0	24.8	-	-	-	-	-	-	19.1
SC05	Diffusion tube	100.0	24.8	-	-	-	-	-	-	20.4
SC06	Diffusion tube	100.0	24.8	-	-	-	-	-	-	22.5
SC07	Diffusion tube	100.0	24.8	-	-	-	-	-	-	23.7
SC08	Diffusion tube	100.0	24.8	-	-	-	-	-	-	16.0
SC09	Diffusion tube	100.0	24.8	-	-	-	-	-	-	21.6
SC10	Diffusion tube	100.0	24.8	-	-	-	-	-	-	16.8
SC11	Diffusion tube	100.0	24.8	-	-	-	-	-	-	29.7
SC12	Diffusion tube	100.0	24.8	-	-	-	-	-	-	18.7
SC13	Diffusion tube	100.0	24.8	-	-	-	-	-	-	23.9
SC14	Diffusion tube	100.0	24.8	-	-	-	-	-	-	19.3

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.

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%.

Results have been distance corrected where applicable.

(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. 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 2021 %(b)	2015	2016	2017	2018	2019	2020	2021
Brentford	99.2	99.2	0	7	12	0	0	0	0
Chiswick	99.85	99.85	0	6	12	0	0	0	0
Feltham	97.71	97.71	0	0	0	0	0	0	0
Gunnersbury	98.52	98.52	0	**39**	**46**	0	0	0	0
Hatton Cross	91.86	91.86	0	0	0	0	0	0	0
Heston	89.76	89.76	0	1	6	0	0	0	0

Notes

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

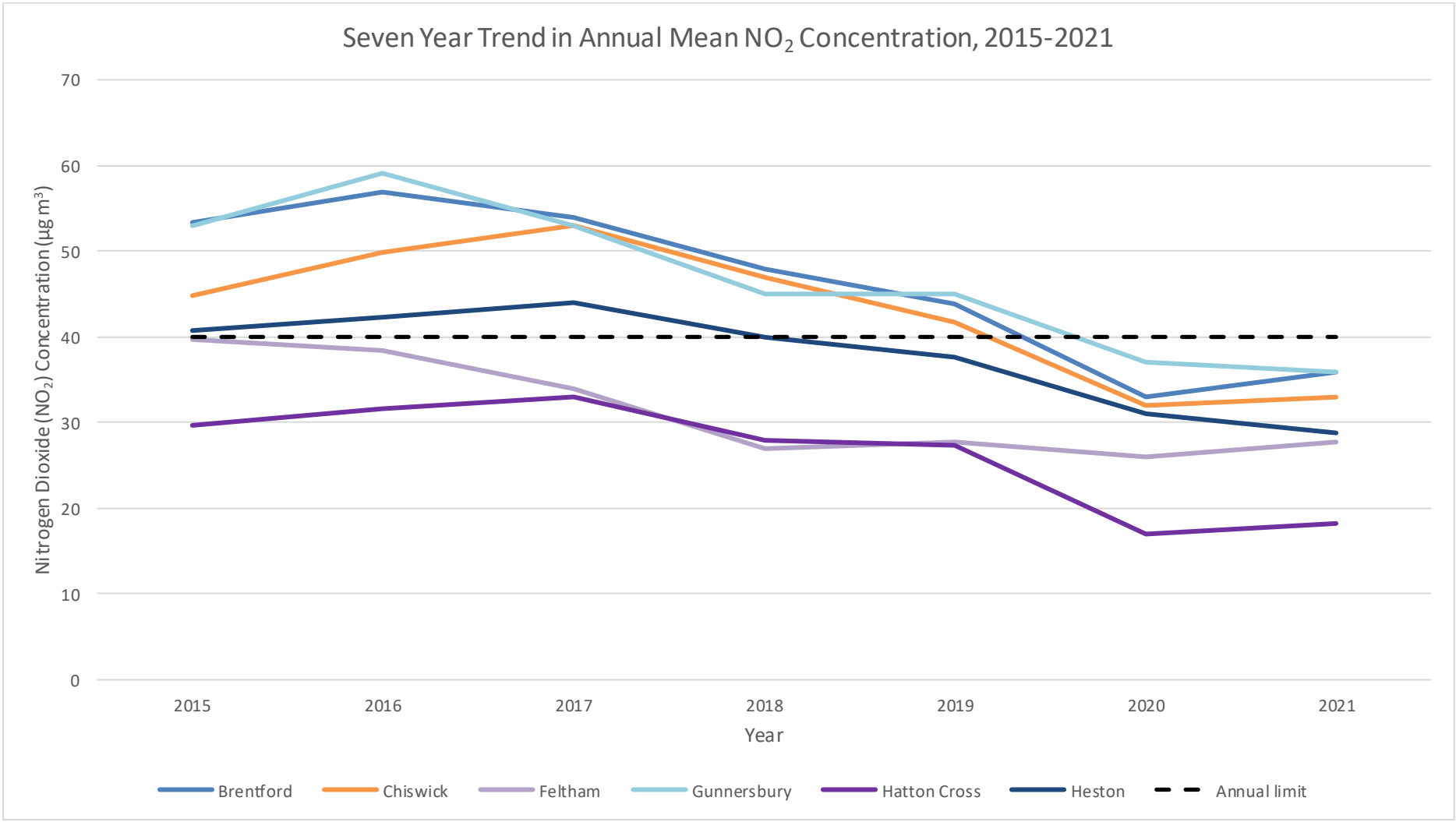
Exceedance of the NO_2 short term AQO of 200 µg m^{-3} over the permitted 18 hours per year are shown in **bold**.

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%)

Graph 1. Seven Year Trend in Annual Mean NO_2 Concentration, 2015-2021



Nitrogen Dioxide:

Annual mean NO_2 levels measured at four of the six automatic monitoring stations in Hounslow increased marginally from the lockdown-affected levels of 2020. Despite this increase, five sites remained significantly below 2019 levels, continuing a borough-wide trend of declining NO_2 concentrations over the past five years. For the second consecutive year, all of Hounslow's automatic monitoring sites registered an annual mean value of less than the UK limit of 40 micrograms (µg).

Diffusion tubes:

Two diffusion tube sites recorded an annual mean concentration higher than the 40 µg limit, with the highest value, 45.7 µg m^{-3}, exceeding the highest annual concentration recorded in 2020. This is an increase from just one measured exceedance in 2020. Of 50 diffusion sites monitored in both 2020 and 2021, 41 (82%) recorded an increased in 2021 over 2020 levels. The average change was an increase of 5.8%, with the largest increase at HS80 Hounslow Bus Station (24.4%). This is likely to be due in part to the significant impact of the pandemic and national lockdowns across the UK in 2020. However, all sites monitored in both 2019 and 2021 showed a decrease in 2021, with an average reduction of over 27% between these years.

17 new diffusion tube sites were established in late 2021, and data from these sites has been annualised in accordance with LLAQM Technical Guidance. These new tube locations were identified to aid Hounslow's understanding of the impact of traffic schemes in South Chiswick and Boston Manor Road.

Exceedances:

For the fourth consecutive year, no automatic monitoring sites in Hounslow recorded any exceedances of the 1-hour mean limit of 200 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 2021 %([b])	2015	2016	2017	2018	2019	2020	2021
Brentford	94.87	94.87	31	30	28	26	22	25	21
Chiswick	96.66	96.66	22	22	20	20	20	21	16
Feltham	96.77	96.77	18	19	19	20	20	21	16
Gunnersbury	96.72	96.72	25	27	27	22	20	22	21
Hatton Cross	90.33	90.33	18	19	18	21	20	18	19
Heston	93.03	93.03	24	25	23	22	24	23	17

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%).

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 2021 %[b]	2015	2016	2017	2018	2019	2020	2021
Brentford	94.87	94.87	30	28	24	4	8	9	3
Chiswick	96.66	96.66	5	9	6	1	3	3	0
Feltham	96.77	96.77	4	7	4	4	7	2	0
Gunnersbury	96.72	96.72	15	15	15	1	5	2	2
Hatton Cross	90.33	90.33	4	6	3	2	7	4	2
Heston	93.03	93.03	10	17 (42)	9	2	5	4	0

Notes

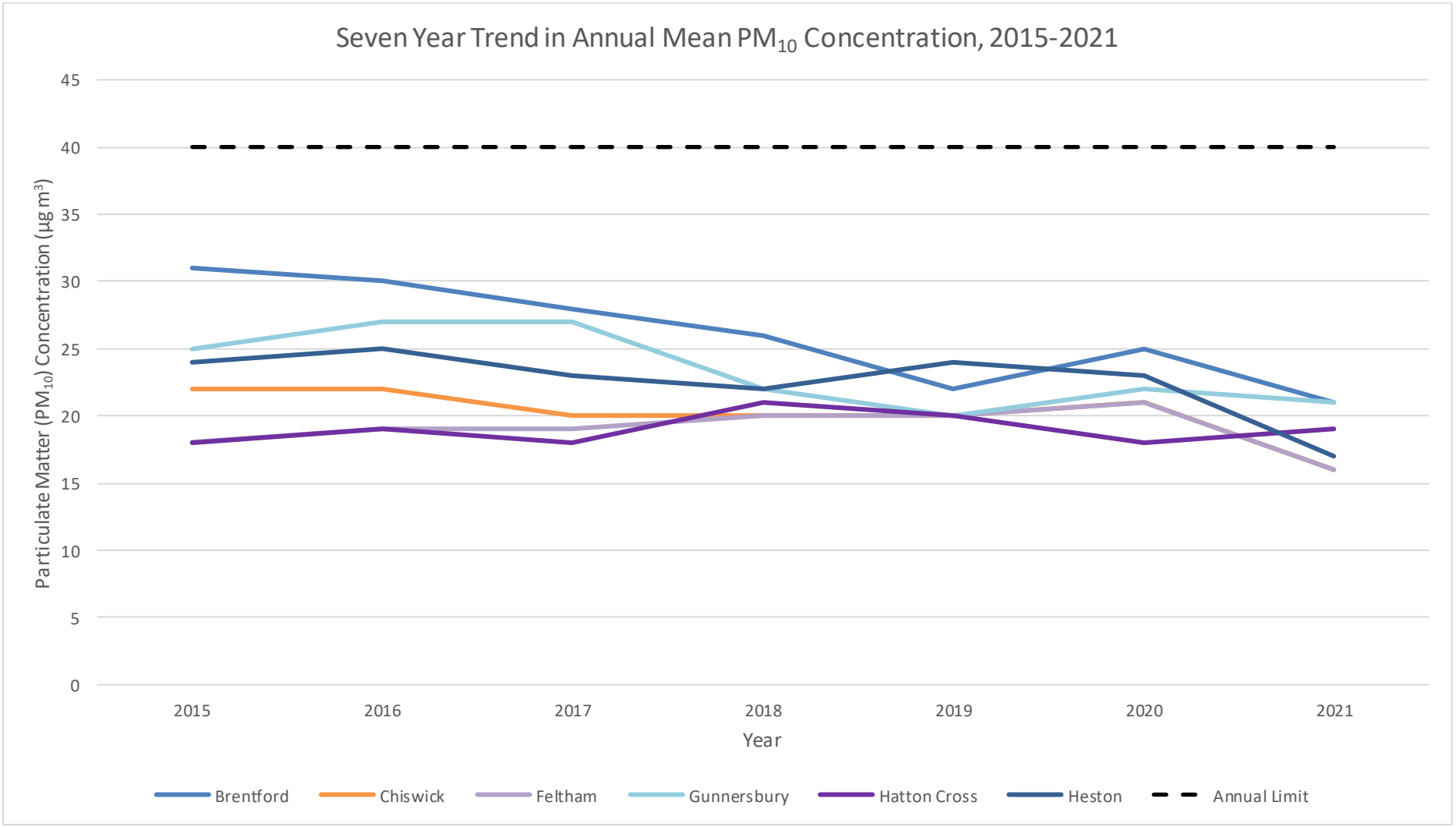
Exceedances of the PM_{10} 24-hour mean objective (50 µg m^{-3} over the permitted 35 days per year) are shown in **bold.**

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%).

Graph 2. Seven Year Trend in Annual Mean PM_{10} Concentration, 2015-2021



Particulate Matter:

Five roadside sites recorded a reduction in particulate matter (PM_{10}) from 2020 to 2021. The average reduction was over 18%, with a 5% increase recorded at Hatton Cross, a background site. Four sites, Brentford, Chiswick, Feltham and Heston, recorded their lowest ever annual mean PM_{10} concentration in 2021.

Exceedances:

There were just seven exceedances of the 24-hour mean PM_{10} limit of 50 µg m^{-3}. This is well below the maximum permitted number of 35 days, and a reduction of 17 from 2020. There were no exceedances of this short-term limit at Chiswick, Feltham or Heston, the first time any of these locations have registered a year with no exceedance. There were three 24-hour periods of exceedance at Brentford and two at Hatton Cross, in both cases a reduction of 50% or more over the previous two years.

Table H. Annual Mean $PM_{2.5}$ Automatic Monitoring Results (µg m^{-3})

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2021 %[(b)]	2015	2016	2017	2018	2019	2020	2021
Brentford	93.29	93.29	-	-	15	15	13	12	10
Chiswick	95.09	95.09	-	-	14	14	13	10	10

Notes

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

Exceedances of the $PM_{2.5}$ annual mean AQO of 25 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.

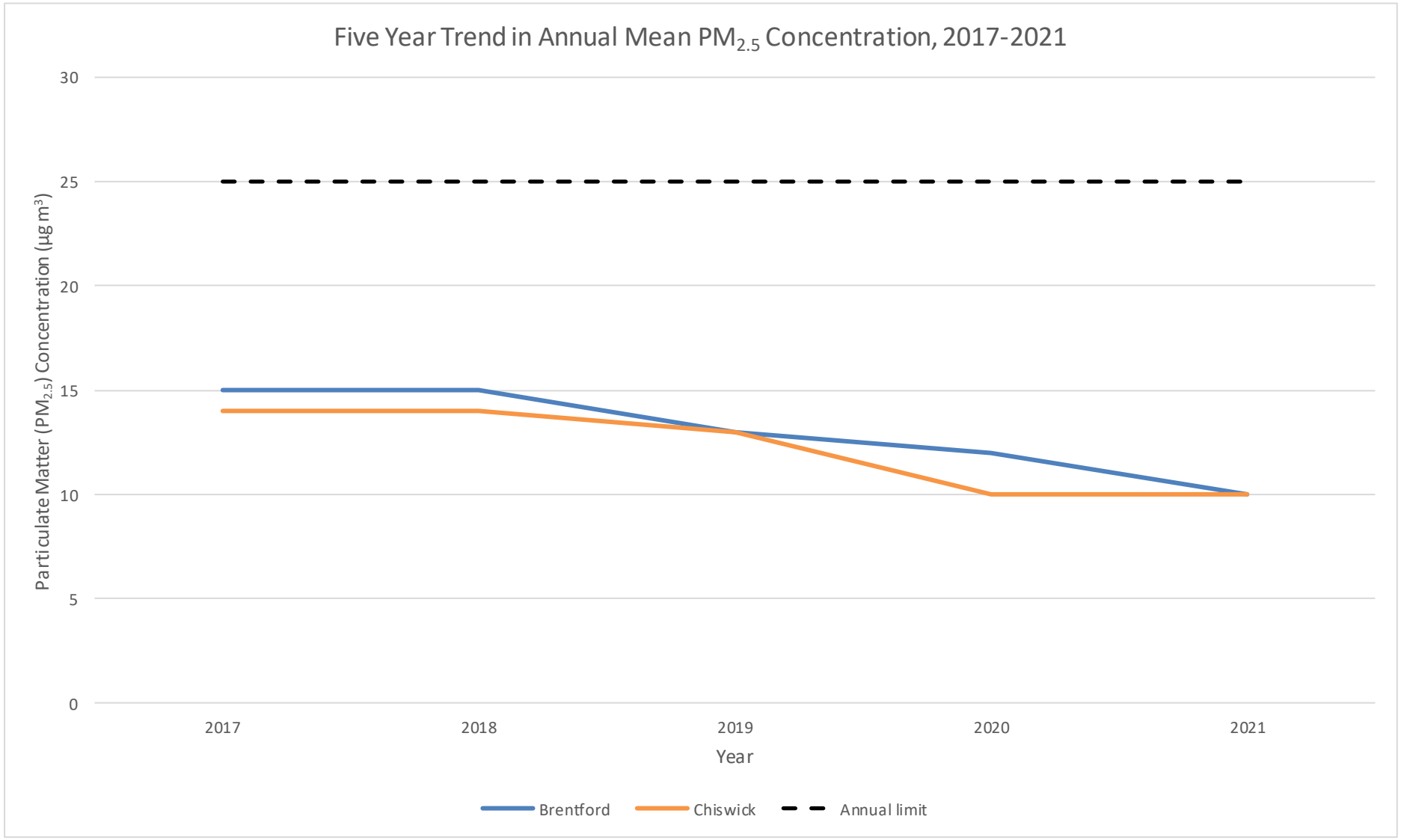
(b) Data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).

Particulate Matter ($PM_{2.5}$):

$PM_{2.5}$ has been monitored at two roadside sites in Hounslow since 2017. Annual mean concentrations at these locations have reduced in the past five years, from 14-15 µg m^{-3} in 2017 to 10 µg m^{-3} in 2021. This is well below the existing UK annual limit value of 25 µg m^{-3}.

Concentrations monitored at Brentford decreased 16% in 2021, while the concentration at Chiswick remained static.

Graph 3. Five Year Trend in Annual Mean $PM_{2.5}$ Concentration, 2017-2021



2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of Hounslow's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2021 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
5	Emissions from developments and buildings	The council will seek to secure adequate, appropriate, and well located green space and infrastructure is included in new developments. Report on this to be provided to AQAP Steering Group in Q1 2021/22 to provide detail on the number of schemes where green infrastructure is used or enhanced to provide low exposure walking and cycling routes	7 Bike hangars were installed in 2021. 2 on-street Sheffield stands were reinstated/installed. 2 bike shelters (14 sheffield stands in total) were installed at a school.
7	Emissions from developments and buildings	The council will promote and deliver 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; Hounslow Housing is continuing to invest in measures including: Domestic boilers replacement scheme with high efficiency boilers across social housing: circa £6.5m between 18/19 and 21/22; District and communal heating network upgrades across social housing: circa £5.5m between 18/19 and 21/22; Insulation upgrades across social housing: circa £4m primarily for EWI programmes between 18/19 and 21/22; LED street lighting upgrades: circa 1200 lamps	The remaining circa 300 street lights are still to be upgraded but have been delayed due to logistical issues of shipments between China, Holland and the UK. However these lights are all expected to have been completed by Q3 this year (so before Christmas). Charles- Hounslow Corporate Buildings (29) – Practical completion 30th June 2022 (£11.3m) • ASHPs all installed • PV – all planned in with programme dates • LED all planned in with programme dates • Green Lane Sports Centre – Final Designs now on going, all surveys complete • Leisure Centres - Completion date 30th June 2022

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		to be upgraded to LED. Update presented to Air Quality Action Plan Steering Group in Q1 2022/23	• Hanworth, Heston are nearing practical completion 99%; Isleworth, New Chiswick and Brentford are now in commissioning. Measures for both school and council property projects include multiple energy efficiency measures such Air Source Heat Pumps, Solar PV, LED Lighting, Battery Storage and Smart Metering CO2& kWh savings for PSDS1 (All Savings underpinned by guarantees by ESCo) : Corporate buildings Energy saving =11,578,897kWh/pa; Corporate buildings Carbon saving: 2,099.53 tCO2/pa
7.1	Emissions from developments and buildings	The Council has identified over 30 schools to identify suitable measures for energy efficiency & emissions reduction. 70 schools responsible for 70% CO2 emissions targeted under GLA's RE-FIT programme; 11 schools have now completed the Investment Grade Proposal (IGP) that provides 320kWp of Solar PV (Phases 1 & 2); Further 13 schools have signed-up (agreed works to commence) to IGP and agreement is in pipeline with further 10 schools – these 23 schools are projected to save ~£230k/ann. (with < 8yr. payback), which accounts for ~ 23% of CO2 emission reductions and similar order of magnitude of NOx emissions. High Level Appraisal survey completed (for energy savings under RE-FIT) in 42 schools in the past 18 months: 10 schools have taken up this initiative;	Hounslow Schools (32) – Practical completion 30th April 2022 (£7.7m). All decarbonisation measures fully installed with commissioning ongoing. C02 & kWh Savings from PSDS 1 (All Savings underpinned by guarantees by ESCo): Schools Energy saving= 6,033,665kWh/pa; Schools Carbon saving= 1,264 tCO2/pa.
9	Public health and awareness raising	The council's Public Health Team will support engagement with local stakeholders (businesses,	Work by Public Health on Air Quality and the associated impacts on health was paused across 2021

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		schools, community groups and healthcare providers) by helping raise awareness about air quality issues and what can be done to reduce emissions. They will be asked for their support via the DsPH when projects are being developed. The Public Health team engage with stakeholders via the Health & Wellbeing Board and regular meetings with CCG. Working with DPH, the council will do two presentations on air quality issues, during lifetime of this action plan.	due to the ongoing COVID-19 response. ICP (Integrated Care Partnership) Public Health and Prevention workstream was established involving LBH Public Health, NWL CCG, Chelsea & Westminster NHS Trust & HRCH. One of the core groups within this workstream focuses on respiratory conditions such as asthma and COPD. Work has commenced on integrating air quality and environment into the respiratory agenda. Supported COP26 events by raising awareness around the impacts of Climate Change on Health with a focus on Air Pollution.
10	Public health and awareness raising	The council's Director of Public Health will have responsibility for ensuring their Joint Strategic Needs Assessment (JSNA) has up to date information on air quality impacts on the population and that this is published and updated when required	ICP (Integrated Care Partnership) Public Health and Prevention workstream was established involving LBH Public Health, NWL CCG, Chelsea & Westminster NHS Trust & HRCH. One of the core groups within this workstream focuses on respiratory conditions such as asthma and COPD. Work has commenced on integrating air quality and environment into the respiratory agenda.
11	Public health and awareness raising	The council's Environmental Strategy team will seek to strengthen co-ordination with Public Health by ensuring that at least one Consultant-grade public health specialist within the borough has air quality responsibilities outlined in their job profile (as part of a wider role, not a dedicated air quality post)	Supported COP26 events by raising awareness around the impacts of Climate Change on Health with a focus on Air Pollution.
16	Public health and awareness raising	The council will encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and	41 schools in Hounslow were accredited by TfL in Autumn 2021, majority at Gold level (25). 9 schools

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		supporting the implementation of such a programme. With the aim of having 50% Schools accredited by end of 2018/19, 55% by end 2019/20 60% by end 2020/21, 65% by end 2021/22.	reached Silver and 7 achieved Bronze. Work is ongoing in preparation for 2022 renewal.
17	Public health and awareness raising	The council will raise the issue of air quality with school pupils and communities through STARS accreditation, and also via a dedicated Theatre in Education intervention run in 2019/20 for all primary schools on the subject of air quality (target 60% of eligible schools to take up). Letters home to all parents of primary age pupils in 2019/20 on actions they can take to reduce pollution outside school gates and generally (note action 27.1)	distributing leaflets has not been a priority given Covid related risks, but digital posters have been shared with schools to circulate via parent comms. Schools also engaged in Clean Air Day 2021, attended webinars, and used resources from Global Action Plan and Idling Action.
17.1	Public health and awareness raising	The council will work with schools to implement proposals contained in GLA/TfL air quality audit reports for schools in poor air quality areas. Key recommendations implemented at audited schools by April 2020	No further audits have been carried out as part of the Mayor's Air Quality Fund, but the borough's Environment and Climate team has begun to audit schools in-house to understand how each site operates and which mitigation measures would help reduce exposure to pollutants.
21	Delivery servicing and freight	The Council will consider best practice from schemes to incentivise low emission freight delivery options implemented elsewhere. This will be progressed via a liveable neighbourhoods bid to TfL in 2019/20.	In partnership with Peddle My Wheels, Hounslow Council is running a rental scheme to provide businesses with access to an e-cargo bike to help with low emission and local deliveries. Consultation is also ongoing to understand other business functions which an e-cargo bike could assist with. A separate offer is also available to residents and schools to give them the opportunity to try out an e-cargo bike for the school run, shopping, etc.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
26	Localised solutions	The council will submit an application for a 'Low Emission Neighbourhood' if funding becomes available.	Liveable Neighbourhoods work in the South Chiswick Area is ongoing with many measures now permanent and a number of others in place on a trial basis. Bids were submitted to TfL/GLA for their Green & Healthy Streets fund in Feb 22 and outcomes are to be announced. Applications proposed plans to green several School Streets and improve access to greenspace around Gunnersbury Park's southern entrance on Lionel Rd North. This includes the installation of 14 new diffusion tubes in the South Chiswick area in 2021.
27.1	Localised solutions	The Council has signed up to the City of London's anti-idling campaign idlingaction.london. Two anti-idling events to be held across the borough: One event was held at William Hogarth & St Mary's schools combined on Clean Air Day; Second event is waiting to be finalised, but may held at a local hospital or other suitable venue.	Idling Action events have been held at Lionel Primary and Nishkam School in 2021/22. Online engagement also took place with Osterley Tesco to discuss how idling in the supermarket car park could be addressed. The borough promoted the #EnginesOffEveryStop campaign to raise awareness and remind drivers to switch off when stationary.
29	Localised solutions	The council will look to increase the proportion of electric, hydrogen and ultra-low emission vehicles in Car Clubs. The council aims to have 2 EV car clubs in place by end 2019 and will continue to promote the 'Blue City' EV car club associated with Source London with a view to having a minimum of 10 vehicles active in the borough by 2019.	There are currently 3 hybrid vehicles in the fleet at 3 locations in the borough.
34	Localised solutions	The Council will continue to support installation of residential electric charge points to cater for EV charging solution for those without off-street parking. The council aims to double the number of public EV charging points by end 2020 (from 27 to 54) and double	There were 149 residential charge point installations in 2021 with another 71 expected before summer 2022. Overall there are over 400 charge points in the borough.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		the number of lamp column charging (from 47 to 100) by end 2020.	
35	Localised solutions	The council will help facilitate the installation of 10 rapid chargers in the borough to help enable the take up of electric taxis etc by 2020.	There are 12 rapid chargers in the borough.
36	Localised solutions	The Council, in line with GLA strategies, will continue to explore ways to reduce dominance of vehicular traffic on residential streets through road closures & banned entries, where such measures are supported by residents; Town Centre development will continue to provide low or no level of car parking, and in many cases this will take place where existing parking stock will not be renewed;The council will work in partnership with TfL to improve bus journey times through active or passive bus priority measures, work will be monitored as part of new LIP. Report to Air Quality Action Plan Steering Group Q2 2021/22	Most Streetspace measures, including School Streets were made permanent in November 2021 to retain the benefits of the schemes. A number of trials (e.g. Staveley Rd / Burlington Lane access restrictions) are currently running as trials and a decision will be made on their permanency later in 2022. Latest information on various schemes is available here. Consultation on the next School Streets will begin in June 2022.
37	Localised solutions	As part of the new LIP, the Council will continue to improve provision of its infrastructure to support walking & cycling. Emerging proposals would be consulted upon in Oct. 2018, including: (1) Provision of legible wayfinding at all town centres by 2020; (2) Improved accessibility for pedestrians (junction entry treatment, dropped curbs, tactile paving etc.), particularly for those with mobility impairments, through our 'better streets' programme; (3) Pedestrian countdown at all town centre located controlled crossings by 2020 (subject to relevant controller upgrades being progressed by TfL); (4) Improvements to cycling facilities, Priority projects include, (i) Partnership working with TfL to deliver a	Various schemes were made permanent in Autumn 2021 including 20+ School Streets. A more ambitious scheme has been introduced on Staveley Road and a new trial is currently in place for Burlington Lane, Chiswick to reduce through traffic. Construction of Cycleway 9 between Hammersmith and Kew Bridge is complete with minor changes currently being implemented during summer 2022 along Chiswick High Road. Public consultation on the extension of C9 from Brentford to Hounslow town centre was undertaken in early 2022. Additionally, the roll out of 20mph zones is now complete and covers 90% of roads in the borough. The 65 bus fleet is now fully electric and the 235 route

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		substantially segregated facility between Chiswick, Brentford and Hounslow Town Centre (CS9) in place by 2022; (ii) Substantially segregated cycle facility between Hounslow and Feltham town centre via Staines, expected to be in place by 2022/23; (iii) Completion of west area greenways network, including appropriate wayfinding to promote the network, by 2019/20; (iv) Completion of a quietway between Brentford & Twickenham, via Church St, by 2020/21; (v) Further specifications for priority cycle routes linking borough town centres with neighbouring metropolitan town centres and Heathrow, by 2020/21; (vi) Continue roll out of 20MPH limit on residential roads and other busy roads with high footfall, by 2020 (see action 28 also); AQAP would be reviewed & updated to reflect approved LIP.	between Brentford and Feltham will be the next to go electric. The ULEZ expanded to the east of Hounslow in October 2021 and officers have begun discussions on what a London-wide scheme could mean for the borough. Lastly, there are now 5 cycle hubs operating across the borough, providing residents with access to cycle training and Dr Bike maintenance sessions.
NEW	Public health and awareness raising	The council has committed to the delivery of a new programme of works named Clean Air for All This will involve upgrading the existing air quality monitoring reference equipment and expanding PM2.5 monitoring; expanding the monitoring network through the installation of a new network of automatic sensors and additional diffusion tubes; undertaking air pollution audits in schools and their surrounding environment; and increasing stakeholder engagement and collaboration in relation to raising awareness of the air quality agenda. Implementation of the programme will continue to improve the boroughs air quality and improve resident's health and wellbeing; and following a recent coroner	

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		decision that poor Air Quality played a direct part in the death of a London young person, this project will also prevent the loss of lives and reduce health inequalities by adopting the World Health Organisations (WHO) limit values for measuring progress for Particulate Matter 2.5 and 10 across the borough.	

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in Hounslow in 2021

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	37
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	Unknown
Number of developments required to install Ultra-Low NO_x boilers	Unknown
Number of developments where an AQ Neutral building and/or transport assessments undertaken	3
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	Unknown
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. 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.	N/A
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.	Total 27 audits undertaken by Cleaner Construction for London 0 achieved self-compliance 15 achieved compliance 6 sites recorded non-compliant 2 had no NRMM 4 sites were complete

Please note that all major planning applications with issues of air quality or noise, including environmental statements and CEMPs, are reviewed on Hounslow's behalf by an external consultant, Tetra Tech Ltd (formerly WYG).

3.1 New or significantly changed industrial or other sources

No new sources identified

4. Additional Activities to Improve Air Quality

4.1 London Borough of Hounslow Fleet

The London Borough of Hounslow fleet included one owned and one hired zero-emission vehicle, representing 0.6% of the total fleet of 340 vehicles.

4.2 NRMM Enforcement Project

Hounslow continues to support the NRMM Enforcement Project. Details in Table K.

4.2 Air Quality Alerts

Hounslow is a member of the CERC airTEXT service.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

- Routine calibrations carried out monthly by LSO from Hounslow Council
- Biannual audits completed by Ricardo
- Ad hoc servicing provided by Matts Monitors

PM_{10} Monitoring Adjustment

N/A

A.2 Diffusion Tubes

- Gradko International supplied and analysed the diffusion tubes used by the London Borough of Hounslow in 2021
- The preparation method used was 20% TEA in water
- Gradko is a UKAS accredited laboratory (2187) with ISO 17025
- Laboratory precision results:
    - Precision: Good (http://laqm.defra.gov.uk/diffusion-tubes/precision.html)
    - AIR-PT: 100% (http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html)
- National bias adjustment factor from database v03/22: **0.84**
- Local bias adjustment factor from five co-location studies: **0.87**
- As in previous years, the bias adjustment factor being used in the analysis of 2021 diffusion tube data is the local BAF of **0.87**

Factor from Local Co-location Studies

	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	10	10	10	11	9
Bias Adjustment Factor A	0.84 (0.78 - 0.91)	0.94 (0.86 - 1.03)	0.99 (0.88 - 1.14)	0.75 (0.69 - 0.82)	0.86 (0.8 - 0.93)
Diffusion Tube Bias B	19% (10% - 28%)	7% (-3% - 16%)	1% (-12% - 14%)	34% (22% - 46%)	16% (7% - 25%)
Diffusion Tube Mean (µg/m^3)	44.3	37.2	29.3	23.8	34.2
Mean CV (Precision)	3.3%	4.9%	3.0%	8.7%	6.5%
Automatic Mean (µg/m^3)	37.3	34.9	29.0	17.8	29.5
Data Capture	98%	99%	96%	96%	97%
Adjusted Tube Mean (µg/m^3)	37 (35 - 40)	35 (32 - 38)	29 (26 - 33)	18 (16 - 20)	29 (27 - 32)

Overall Diffusion Tube Precision	**Good Overall Precision**	**Good Overall 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**	**Good Overall Data Capture**	**Poor Overall Data Capture**

Discussion of Choice of Factor to Use

Per section 7.193 of LAQM TG.16:

"If there is more than one local collocation study, then the A factors should not be averaged. Instead, a reasonable approximation can be derived by averaging the B values. For example, if there were 2 studies of 22% and 28%, then the average would be 25%. This is then expressed as a factor, e.g. 25% is 0.25. Next add 1 to this value, e.g. 0.25 + 1.00 = 1.25. Finally, take the inverse to give the bias adjustment factor, e.g. 1/1.25 = 0.80."

The local bias adjustment factor was calculated at five co-location studies at automatic monitoring stations across Hounslow. The BAF was calculated using the LAQM Diffusion Tube Data Processing Tool. The average bias adjustment factor of these six studies (from B factor) was 0.87. Details of each co-location study are listed below. The local bias adjustment factor of 0.87 was applied to all single diffusion tube sites, as is consistent with analysis in previous years. The national BAF for 20% TEA in water tubes analysed by Gradko in 2021 is 0.84 (Database v03/22).

Table L. Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	*Local*	*03/22 (0.84)*	*0.87*
2020	Local	03/21 (0.81)	0.83
2019	Local	03/20 (0.93)	0.89
2018	Local	Unknown	0.87
2017	Local	Unknown	0.89
2016	Local	Unknown	0.87
2015	Local	Unknown	0.91

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Data from 19 diffusion tube sites in Hounslow have been annualised. Annualisation has been completed using the LAQM Diffusion Tube Data Processing Tool in line with the methodology outlined in LLAQM.TG(19).

Site ID	Site Type	Valid data capture 2021 (%)	Annualisation Factor	Annualised, bias adjusted mean
HS41	Diffusion Tube	50.4	0.841909	34.4
HS47	Diffusion Tube	24.8	0.799896	38.2
HS77	Diffusion Tube	40.2	0.928882	18.9
HS79	Diffusion Tube	70	1.004233	26.8
HS94	Diffusion Tube	24.8	0.869856	47.8
SC01	Diffusion Tube	24.8	0.799896	34.6
SC02	Diffusion Tube	24.8	0.799896	22.2
SC03	Diffusion Tube	24.8	0.799896	18.1
SC04	Diffusion Tube	24.8	0.799896	22.1
SC05	Diffusion Tube	24.8	0.799896	23.6
SC06	Diffusion Tube	24.8	0.799896	25.9
SC07	Diffusion Tube	24.8	0.799896	27.4
SC08	Diffusion Tube	24.8	0.799896	18.4
SC09	Diffusion Tube	24.8	0.799896	24.9
SC10	Diffusion Tube	24.8	0.799896	19.4
SC11	Diffusion Tube	24.8	0.799896	34.3
SC12	Diffusion Tube	24.8	0.799896	21.6
SC13	Diffusion Tube	24.8	0.799896	27.5
SC14	Diffusion Tube	24.8	0.799896	22.2

Distance Adjustment

Data from four diffusion tube sites in Hounslow have been distance adjusted. Adjustment has been completed using the LAQM Diffusion Tube Data Processing Tool in line with the methodology outlined in LLAQM.TG(19).

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

Diffusion Tube ID	Annualisation Factor Feltham	Annualisation Factor Hatton Cross	Average Annualisation Factor	Raw Data Time Weighted Annual Mean (µg/m3)	Annualised Data Time Weighted Annual Mean (µg/m3)
HS41	0.8661	0.8177	0.8419	40.9	34.4
HS47	0.7981	0.8017	0.7999	47.8	38.2
HS77	0.9510	0.9068	0.9289	20.4	18.9
HS79	1.0071	1.0014	1.0042	26.7	26.8
HS94	0.8180	0.9217	0.8699	54.9	47.8
SC01	0.7981	0.8017	0.7999	43.3	34.6
SC02	0.7981	0.8017	0.7999	27.7	22.2
SC03	0.7981	0.8017	0.7999	22.7	18.1
SC04	0.7981	0.8017	0.7999	27.6	22.1
SC05	0.7981	0.8017	0.7999	29.5	23.6
SC06	0.7981	0.8017	0.7999	32.4	25.9
SC07	0.7981	0.8017	0.7999	34.2	27.4
SC08	0.7981	0.8017	0.7999	23.0	18.4

SC09	0.7981	0.8017	0.7999	31.2	24.9
SC10	0.7981	0.8017	0.7999	24.3	19.4
SC11	0.7981	0.8017	0.7999	42.8	34.3
SC12	0.7981	0.8017	0.7999	27.0	21.6
SC13	0.7981	0.8017	0.7999	34.4	27.5
SC14	0.7981	0.8017	0.7999	27.8	22.2

Table N. NO_2 Fall off With Distance Calculations

Diffusion Tube ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)		
	Monitoring Site to Kerb	Receptor to Kerb	Bias Adjusted and Annualised	Background	Predicted at Receptor
BREN A, BREN B, BREN C	4.0	5.0	38.3	17.9	*37.0*
HS70	1.0	2.0	36.5	17.9	*33.9*
HS78	3.0	4.0	38.2	17.9	*36.6*
HS94	1.0	3.0	41.4	17.887	*36.2*

Appendix B Full Monthly Diffusion Tube Results for 2021

Table O. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2021 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
BREN A	83	83	**50.1**	**47.7**	**45.4**	**42.9**	**43.1**	**41.5**			**48.9**	**42.5**	**44.8**	39.4	**44.6**	38.8
BREN B	83	83	**46.4**	**49.0**	**43.2**	**41.4**	**43.7**	**44.9**			**47.7**	**44.1**	**46.7**	38.4	**44.5**	38.8
BREN C	83	83	**42.3**	**46.4**	**42.6**	**40.7**	**42.7**	**46.6**			**49.1**	**44.8**	**44.0**	38.6	**43.8**	38.1
CHIS A	83	83	35.3	**41.6**	29.9	28.3	**41.2**	31.2			**43.2**	**40.1**	39.5	38.5	36.9	32.1
CHIS B	83	83	**40.4**	**40.3**	33.8	32.0	39.7	32.6			**41.0**	37.3	38.3	**40.9**	37.6	32.7
CHIS C	83	83	**42.3**	**40.6**	32.7	30.4	38.3	31.3			**41.5**	**42.2**	34.3	38.7	37.2	32.4
CRAN A	100	100	26.6	23.0	19.0	20.5	5.7	13.5	16.2	13.8	20.3	21.2	23.1	22.1	18.7	16.3
CRAN B	100	100	22.9	21.7	19.8	20.2	14.6	14.5	15.1	12.7	19.6	19.8	25.0	22.7	19.1	16.6
CRAN C	100	100	24.4	22.4	14.2	20.1	15.5	14.8	15.2	12.9	20.8	22.4	24.8	22.6	19.2	16.7
FELT A	87	92	33.5	29.2	27.7	28.5	25.6	27.7		24.0	28.6	29.9	35.9	30.1	29.2	25.4
FELT B	87	67	33.2			32.1	24.1	27.1		24.2	28.5		34.6	28.9	29.1	25.3
FELT C	87	83	34.5	30.5		29.7	26.2	26.6		24.8	29.8	27.9	34.9	29.4	29.4	25.6
HAT A	100	100	32.8	29.6	23.6	19.4	19.1	21.0	18.2	21.0	25.6	27.0	39.4	30.7	25.6	22.3
HAT B	100	100	32.9	26.2	26.5	25.6	18.6	20.6	17.1	19.6	26.6	27.3	32.7	22.4	24.7	21.5
HAT C	100	100	25.3	22.4	22.9	26.7	18.3	18.5	17.2	21.4	26.6	24.5	34.6	31.5	24.2	21.0
HEST A	100	100	**40.1**	**41.5**	31.6	37.1	30.6	31.5	29.5	27.7	38.3	36.7	35.7	35.7	34.7	30.2
HEST B	100	100	32.8	34.3	31.7	33.8	33.5	29.6	29.4	24.1	35.1	34.7	39.7	34.4	32.8	28.5
HEST C	100	100	**40.7**	**40.9**	26.7	35.8	32.6	27.9	30.4	25.5	38.4	35.9	**61.5**	33.9	35.8	31.2
HS32	93	92	**46.6**	**44.1**	5.1	38.8		32.4	**40.0**	28.6	**49.3**	**42.8**	**40.3**	**41.3**	37.2	33.0
HS33	100	100	39.3	35.0	38.4	33.9	31.5	**41.3**	32.9	36.3	37.4	**40.3**	34.7	33.6	36.2	31.1
HS34	90	92	26.3	30.9	24.3		21.3	20.1	20.2	14.8	28.7	27.7	30.2	24.4	24.4	21.3

HS35	100	100	30.6	26.2	21.1	21.7	20.1	16.0	15.4	14.1	25.3	26.2	28.6	23.0	22.4	19.3
HS41	50	50	**44.9**	**40.4**	**41.9**	39.2							**44.5**	36.5	**41.2**	29.8
HS42	77	83	36.0	31.6	25.3	26.2	27.5	26.8		24.9		31.2	31.7	31.5	29.3	25.5
HS43	100	100	33.4	31.5	33.2	31.1	23.3	26.2	21.8	27.7	29.0	31.4	35.2	32.3	29.7	25.5
HS46	67	17											31.1	29.4	30.2	-
HS47	100	25										**51.8**	**48.6**	**44.1**	**48.2**	33.1
HS51	85	83			20.7	19.6	17.1	17.9	15.6	17.0	16.6	18.8	29.8	24.7	19.8	17.1
HS52	100	100	24.4	24.7	24.4	22.9	17.7	19.5	16.1	18.6	20.9	22.3	31.0	25.0	22.3	19.2
HS53	100	100	31.2	22.8	24.8	25.3	16.8	21.0	18.2	18.5	21.9	25.9	30.8	27.0	23.7	20.5
HS54	90	92	**41.4**	37.5	33.5	35.2	32.4	29.2	30.5	24.4		36.4	36.8	35.7	33.9	29.5
HS55	100	100	36.0	32.6	30.4	35.9	28.7	26.8	23.6	36.9	30.3	32.4	35.4	34.9	32.0	27.3
HS61	85	83	33.4	29.6		25.8	25.3	22.9	21.7	19.2	27.4		33.0	31.4	27.0	23.4
HS62	100	100	38.3	35.4	26.3	28.9	25.0	21.8	23.0	21.3	30.6	30.1	32.5	31.8	28.8	24.9
HS63	100	100	38.6	37.0	27.5	28.8	26.6	24.8	26.6	24.1	37.1	36.3	37.7	30.8	31.3	27.1
HS64	100	100	28.7	29.1	20.5	30.1	22.7	21.1	18.4	18.7	24.9	28.6	27.8	15.9	23.9	20.6
HS65	85	83	29.4	27.5	22.3	24.4	17.7	18.6	17.5	15.1	21.4			26.1	22.0	19.2
HS66	90	92	**40.7**	28.9	35.0		24.9	29.8	25.9	29.2	31.5	33.3	**41.0**	30.9	31.9	27.4
HS67	73	75	**58.4**	**54.3**	**55.4**	**52.2**		**52.7**	**50.9**	37.3		27.1	**61.7**		**50.0**	**44.1**
HS68	100	100	**54.0**	**42.4**	**42.2**	36.8	37.1	35.7	34.6	27.8	**44.8**	**48.3**	**54.4**	**44.9**	**41.9**	36.3
HS69	90	92	36.1	34.4	33.9	32.5	30.2	34.2	26.5	37.0	34.4	35.2	37.0		33.8	28.8
HS70	90	92	35.1	**44.2**	35.1		**43.7**	33.1	**40.2**	34.1	**54.8**	**51.6**	**44.5**	**41.5**	**41.6**	36.5
HS71	100	100	39.4	35.2	37.7	31.6	31.0	28.0	27.6	23.0	33.4	36.2	39.2	35.2	33.1	28.7
HS72	100	100	33.1	31.6	34.2	26.9	26.3	25.3	24.3	19.9	27.8	32.8	38.2	32.9	29.4	25.5
HS73	100	100	27.9	28.8	26.7	23.2	22.5	22.9	23.6	19.4	26.2	29.6	34.7	27.5	26.1	22.6
HS74	87	92	34.0	31.7	25.9	27.2	23.4	20.5		16.6	26.8	27.2	29.7	27.3	26.4	23.2
HS76	75	75		30.8	27.4	25.3	22.5		19.2	18.3		27.5	30.4	26.7	25.3	21.9
HS77	100	42	26.0	23.1	19.0	19.6	14.6								20.4	16.4
HS78	83	83	**49.8**	**45.2**	**43.0**	**50.0**	39.2	**42.0**			**41.5**	**44.7**	**47.4**	37.9	**44.1**	38.2
HS79	70	67	34.6	32.3	26.4	26.3	21.7		19.9		27.5	30.2			27.3	23.2
HS80	100	100	22.6	**49.5**	**57.2**	**50.6**	**49.5**	**54.2**	**48.8**	**63.9**	**59.7**	**56.0**	**68.1**	**55.8**	**53.0**	**45.7**

HS81	100	100	26.3	23.3	18.3	18.8	15.1	13.2	12.6	10.0	17.1	19.5	21.9	21.4	18.1	15.7
HS82	100	100	27.1	23.6	18.9	19.7	13.7	14.8	13.7	13.0	18.6	19.8	25.9	22.4	19.3	16.7
HS83	75	75	22.4	18.6				8.1	9.4	9.5	16.1	13.4	17.3	18.0	14.7	12.7
HS84	100	100	37.2	31.8	31.5	32.9	28.7	25.9	27.5	20.2	31.2	36.7	39.9	32.7	31.4	27.3
HS85	100	100	**48.4**	35.7	33.5	35.0	31.8	31.3	30.8	26.0	36.4	**40.4**	39.4	**45.8**	36.2	31.5
HS86	90	92	**41.8**	39.8	**42.1**		32.2	33.5	33.2	24.6	36.0	34.8	**41.2**	**40.3**	36.3	31.7
HS87A	100	100	**41.4**	39.6	36.5	36.7	32.4	30.2	35.2	25.7	**43.2**	**46.1**	**50.4**	**42.8**	38.3	33.5
HS88	92	92	27.3	20.7	19.8	17.6	14.4		4.6	9.9	18.6	20.8	25.2	23.7	18.4	15.6
HS89	92	92	28.3	31.0	25.6	26.2	21.0		21.0	20.0	25.2	23.9	29.3	25.9	25.2	21.9
HS90	100	100	28.4	28.2	27.6	23.5	21.4	17.6	16.6	16.5	25.3	23.8	27.1	29.4	23.8	20.6
HS91	73	75	**40.9**	**43.4**	36.4	29.4	39.3	30.1			**42.2**	**40.1**	40.0		38.0	32.7
HS92	83	83	37.3	37.0	27.2	25.9	29.8	20.4			31.7	32.4	30.3	32.2	30.4	26.3
HS93	73	75	34.4	39.3	26.9	23.9	24.3	24.3				33.9	29.6	27.6	29.3	25.2
HS94	75	25									**52.7**	**53.6**	**58.8**		**55.1**	**41.4**
SC01	100	25										**46.6**	**42.2**	**41.7**	**43.5**	30.0
SC02	100	25										27.8	26.5	28.7	27.7	19.2
SC03	100	25										20.9	21.9	24.7	22.5	15.7
SC04	100	25										25.5	29.6	27.5	27.5	19.1
SC05	100	25										27.0	31.5	29.6	29.4	20.4
SC06	100	25										32.8	32.8	31.8	32.4	22.5
SC07	100	25										36.5	35.0	32.0	34.5	23.7
SC08	100	25										20.2	26.5	22.3	23.0	16.0
SC09	100	25										**52.6**	20.4	24.3	32.4	21.6
SC10	100	25										20.3	27.0	25.0	24.1	16.8
SC11	100	25										20.8	**53.6**	**50.2**	**41.6**	29.7
SC12	100	25										24.4	29.5	26.7	26.9	18.7
SC13	100	25										33.2	33.4	36.1	34.3	23.9
SC14	100	25										27.4	31.2	25.3	28.0	19.3

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%).