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

Contact details

Chris Cockburn, Environmental Strategy Officer
Environment, Culture and Customer Services
3rd Floor, Hounslow House
7 Bath Road, TW3 3EB
T: 02085 836106
E: chris.cockburn@hounslow.gov.uk

[1] LLAQM Policy and Technical Guidance 2019 (LLAQM.TG(19)). https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs

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Abbreviations

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

Foreword

Hounslow Council's 2019 Air Quality Annual Status Report highlights that across the borough, concentration levels of NO_2, PM_{10} and $PM_{2.5}$ have gradually continued to decline when compared to previous years. The data has also shown that the number and frequency of exceedances of NO2 has also dropped Borough-wide, with fewer sites exceeding the 40 $\mu g\ m^{-3}$ annual objective. This reduction in part is due to the Councils continuing commitment to deliver the five-year Air Quality Action Plan (AQAP), published in 2018.

In 2019, we worked with partners on a regional level to promote Electric Vehicle (EV) use, installing 52 charging points. Hounslow have now installed more than 200 charging points across the Borough. We have been trailing electric vehicles to deliver council services and have retrofitted much of our social housing stock with energy efficient and less polluting boilers. We have continued our engagement with schools, pupils and parents, as we deliver anti-idling learning activities in order to improve the local environment around schools for young people. The 'Beat the Street' event encouraged walking and cycling in Hounslow.

Air quality and how we report on it and deliver improvements has now been incorporated into the wider Greener Borough Framework which brings together several corporate priorities to be delivered across Hounslow to ensure it is a cleaner, greener borough for all.

Earlier this year, we set up the Climate and Clean Air Community Reference Group to work with the Council to co-create and prioritise actions, as well as assist in increasing transparency and public understanding around the opportunities and constraints for action in relation to delivering cleaner air and achieving a net zero carbon reduction. The Group will also enable the council in galvanising the required wider civic support necessary to deliver the ambitious changes required to deliver the objectives of the AQAP as we continue to improve the environment for all.

Table A. Summary of National Air Quality Standards and Objectives

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

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

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2019

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
HS	Boston Manor Park	516915	178019	Background	Y	20	N/A	2.5	NO_2, PM_{10}	*Chemiluminescent; TEOM*
HS2	Cranford	510373	177199	Background	Y	20	N/A	3	NO_2, PM_{10}, O_3, SO_2	*Chemiluminescent; TEOM*
HS4	Chiswick	521084	178499	Roadside	Y	1	2	3	NO_2, PM_{10}, $PM_{2.5}$	*Chemiluminescent; TEOM; Spirant BAM*
HS5	Brentford	517425	178071	Roadside	Y	1	4	3	NO_2, PM_{10}, $PM_{2.5}$	*Chemiluminescent; TEOM; Spirant BAM*
HS6	Heston	513655	176842	Roadside	Y	1	3	1.5	NO_2, PM_{10}	*Chemiluminescent; TEOM*
HS7	Hatton Cross	509334	174997	Background	Y	10	11.5	2	NO_2, PM_{10}	*Chemiluminescent; Met One BAM 1020*
HS9	Feltham	510691	173247	Roadside	Y	1	1.5	1.5	NO_2, PM_{10}	*Chemiluminescent; TEOM*
HS8	Gunnersbury	519180	179369	Roadside	Y	4	4	2	NO_2, PM_{10}	*Chemiluminescent; Met One BAM 1020*

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

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
BREN A	Brentford, Great West Road	517425	178071	Roadside	Y	1	4	3	NO_2	Y
BREN B	Brentford, Great West Road	517425	178071	Roadside	Y	1	4	3	NO_2	Y
BREN C	Brentford, Great West Road	517425	178071	Roadside	Y	1	4	3	NO_2	Y
CHIS A	Chiswick High Road	521084	178499	Roadside	Y	1	2	3	NO_2	Y
CHIS B	Chiswick High Road	521084	178499	Roadside	Y	1	2	3	NO_2	Y
CHIS C	Chiswick High Road	521084	178499	Roadside	Y	1	2	3	NO_2	Y
CRAN A	Cranford Avenue Park	510373	177199	Background	Y	20	N/A	3	NO_2	Y
CRAN B	Cranford Avenue Park	510373	177199	Background	Y	20	N/A	3	NO_2	Y
CRAN C	Cranford Avenue Park	510373	177199	Background	Y	20	N/A	3	NO_2	Y
FELT A	Feltham High St / Hanworth Rd Jct	510691	173247	Roadside	Y	1	1.5	1.5	NO_2	Y
FELT B	Feltham High St / Hanworth Rd Jct	510691	173247	Roadside	Y	1	1.5	1.5	NO_2	Y
FELT C	Feltham High St / Hanworth Rd Jct	510691	173247	Roadside	Y	1	1.5	1.5	NO_2	Y
HAT A	Myrtle Avenue	509334	174997	Background	Y	10	11.5	2	NO_2	Y
HAT B	Myrtle Avenue	509334	174997	Background	Y	10	11.5	2	NO_2	Y
HAT C	Myrtle Avenue	509334	174997	Background	Y	10	11.5	2	NO_2	Y
HEST A	Heston Road	513655	176842	Roadside	Y	1	3	1.5	NO_2	Y
HEST B	Heston Road	513655	176842	Roadside	Y	1	3	1.5	NO_2	Y
HEST C	Heston Road	513655	176842	Roadside	Y	1	3	1.5	NO_2	Y
HS32	24 Adelaide Terrace	517551	178186	Roadside	Y	1	10	3	NO_2	N
HS33	30 Surrey Crescent	519452	178314	Roadside	Y	3	7	2	NO_2	N

HS34	Chiswick School	520876	177164	Intermediate	Y	3	15	2.5	NO_2	N
HS35	Wood Street	521220	178069	Roadside	Y	1	2	4	NO_2	N
HS41	Hanworth Library	512103	172506	Roadside	Y	2.5	5	2	NO_2	N
HS42	High Street, Hounslow	514090	175812	Background	Y	2	14	3	NO_2	N
HS43	Glenhurst Road	517436	178044	Roadside	Y	1	0.5	2	NO_2	N
HS51	Bedfont Sports Club	509249	174683	Intermediate	Y	3	28	2	NO_2	N
HS52	Bedfont Library	508868	173720	Roadside	Y	2	6	3	NO_2	N
HS53	Church of the Good Shepherd	510986	176031	Intermediate	Y	4	25	2.5	NO_2	N
HS54	Cranford Lane / Cranford High Street Jct.	510784	177460	Roadside	Y	2	2	2	NO_2	N
HS55	Cranford Library	510750	176684	Roadside	Y	3	6	3	NO_2	N
HS61	Twickenham Road	516208	175793	Roadside	Y	0	18	3	NO_2	N
HS62	Sutton Road	513619	176924	Roadside	Y	1	1	4	NO_2	N
HS63	Lampton Road	513528	175868	Roadside	Y	1	1	2.5	NO_2	N
HS64	Junction of Roseheath Road	512860	175013	Roadside	Y	2	2	5	NO_2	N
HS65	Eastbourne Road, Uxbridge Rd Jct	511840	172745	Roadside	Y	2	3	2	NO_2	N
HS66	Brainton Avenue	510957	173642	Roadside	Y	1	5	2	NO_2	N
HS67	Busch Corner	516590	176888	Roadside	Y	0	1	2.5	NO_2	N
HS68	Junction of Commerce Road	517278	177298	Roadside	Y	0	2	2	NO_2	N
HS69	Kew Bridge	519015	178018	Roadside	Y	0	0	2	NO_2	N
HS70	Eastbury Grove (Chiswick Lane)	521442	177980	Roadside	Y	1	1	2.5	NO_2	N
HS71	Gunnersbury Avenue	519178	179375	Roadside	Y	2	9	2	NO_2	N
HS72	Heston Crossroads	513064	177552	Roadside	Y	1	2.5	3	NO_2	N
HS73	Browells Lane, Feltham	510567	172857	Roadside	Y	2	4	2	NO_2	N
HS74	Swift Road, Hanworth	511989	171797	Roadside	Y	2	13.5	2	NO_2	N
HS76	Clements Court, Hounslow	511572	175015	Background	Y	3	N/A	4	NO_2	N

HS77	Beaversfield Park	512000	175970	Background	Y	5	N/A	2.5	NO_2	N
HS78	Staines / Wellington Road	512763	175312	Roadside	Y	1	3	4	NO_2	N
HS79	Whitton Road	513839	175316	Roadside	Y	2	1	3	NO_2	N
HS80	Hounslow East	514433	175950	Roadside	Y	0	3	3	NO_2	N
HS81	Woodlands	515035	175907	Intermediate	Y	10	2	2.5	NO_2	N
HS82	Church Street	516669	175998	Roadside	Y	0	1	2	NO_2	N
HS83	Osterley Park	514848	178068	Background	Y	2	N/A	1	NO_2	N
HS84	Apex Corner (York Way)	512709	172155	Roadside	Y	1	2	3	NO_2	N
HS85	Hospital Road	513213	175655	Roadside	Y	1	1	4	NO_2	N
HS86	Jolly Waggoners	510947	176564	Roadside	Y	2	1	4	NO_2	N
HS87A	Henlys Roundabout	511542	176426	Roadside	Y	2	1.5	4	NO_2	N
HS88	Thames Path, Duke's Meadows	521483	176692	Background	Y	2	N/A	2	NO_2	N
HS89	Mogden Sewage Works Gate	515424	174719	Roadside	Y	3	3	2	NO_2	N
HS90	The Butts	517585	177606	Intermediate	Y	2	3	2	NO_2	N
HS91	Hogarth Ln / Dukes Av	521041	177973	Roadside	Y	3	8	6	NO_2	N
HS92	St Mary's School	521110	177970	Intermediate	Y	2	13	5	NO_2	N
HS93	William Hogarth School	521110	177970	Intermediate	Y	2	13	5	NO_2	N
HSVF1	Vicarage Farm Road (S)	512367	176683	Roadside	*N*	1	1	3	NO_2	N
HSVF2	Vicarage Farm Road	512422	176817	Roadside	*N*	1	1	3	NO_2	N
HSVF3	Vicarage Farm Road (N)	512462	177051	Roadside	*N*	1	1	3	NO_2	N
HSVF4	Westbrook Road, The Warren Jct	512752	177400	Roadside	*N*	1	1	3	NO_2	N
HSVF5	Westbrook Road	512974	177160	Roadside	*N*	1	1	3	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, the details of which are described in Appendix A.

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

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (μg m^{-3})						
				2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
Boston Manor Park	Automatic	93.14%	93.14%	–	–	–	–	–	–	26
Brentford	Automatic	98.38%	98.38%	**50.3**	**52.6**	**53.3**	**56.9**	**54**	**48**	**43.9**
Chiswick	Automatic	97.89%	97.89%	**56.4**	**51.7**	**44.8**	**49.8**	**53**	**47**	**41.7**
Cranford	Automatic	99.46%	99.46%	30.1	31.4	30.2	30.8	30	26	27.2
Feltham	Automatic	97.82%	97.82%	**43.7**	**43.3**	39.7	38.4	34	27	27.7
Gunnersbury	Automatic	97.53%	97.53%	**56.6**	**58.4**	**53**	**59.1**	**53**	**45**	**45**
Hatton Cross	Automatic	86.61%	86.61%	37.2	31.1	29.7	31.6	33	28	27.3
Heston	Automatic	98.32%	98.32%	**50.8**	**47.7**	**40.7**	**42.2**	**44**	**40**	37.7
BREN	Diffusion tube	100%	100%	**58.7**	**66.3**	**62.1**	**64.7**	**65.4**	**48.6**	**45.1**
CHIS	Diffusion tube	100%	100%	**59.3**	**68**	**58.1**	**55.5**	**58.8**	**43.8**	**41.4**
CRAN	Diffusion tube	100%	100%	28.1	29.7	26.8	28.4	28.1	24.3	22.7
FELT	Diffusion tube	91.7%	91.7%	**41.6**	**45.3**	**41.7**	**45.2**	**43.3**	28.5	26.6
HATT	Diffusion tube	91.7%	91.7%	38.9	38.1	35.2	**38.4**	**38.1**	29.2	30.3
HEST	Diffusion tube	100%	100%	**50.8**	**56.3**	**49.2**	**55.9**	**56.3**	**44.2**	39.5
HS32	Diffusion tube	58.3%	58.3%	**55.9**	**63.5**	**58.8**	**59.4**	**50.3**	**43.2**	**43.7**

HS33	Diffusion tube	100%	100%	**55.6**	**61.4**	**59.4**	**57.6**	**54.9**	**42.5**	38.9
HS34	Diffusion tube	100%	100%	33.4	39.2	32.8	34	28.8	25.8	25.9
HS35	Diffusion tube	100%	100%	33.9	37.3	34.6	**37.2**	32.3	27.3	26.4
HS41	Diffusion tube	75.0%	75.0%	34.4	38.2	35.6	**55.5**	**51.5**	**41.7**	**40.2**
HS42	Diffusion tube	50.0%	50.0%	32.3	35.2	30.1	**36.5**	**33.2**	28.3	27.3
HS43	Diffusion tube	91.7%	91.7%	**43.3**	**43.9**	**41.2**	**43.1**	**35.4**	33.2	30.6
HS51	Diffusion tube	83.3%	83.3%	28.8	31.5	26.9	31.8	28.2	25.5	24.1
HS52	Diffusion tube	100%	100%	27.5	29.8	27.4	29.7	25.2	23.3	23
HS53	Diffusion tube	100%	100%	33.6	33.7	34.1	34	33.5	25.6	28
HS54	Diffusion tube	100%	100%	**42.8**	**48.6**	**48.4**	**45.9**	**40.9**	35	38.4
HS55	Diffusion tube	100%	100%	**45.1**	**49.6**	**44.5**	**50.7**	**43.8**	33.7	33.9
HS61	Diffusion tube	83.3%	83.3%	38.4	**41.1**	**42.4**	**40.8**	**40**	32.1	31.4
HS62	Diffusion tube	100%	100%	**40.3**	**43.5**	38.9	**43.6**	37.6	33.5	33.6
HS63	Diffusion tube	83.3%	83.3%	**48.6**	**52.2**	**48.3**	**48.2**	37.3	34.1	30.9
HS64	Diffusion tube	100%	100%	34	35.9	33.3	35.3	33.2	28.7	27.1
HS65	Diffusion tube	100%	100%	33.9	36.9	30.8	35.4	28.3	25	25.1
HS66	Diffusion tube	91.7%	91.7%	39.1	**48.6**	**43.3**	**46.6**	**44.1**	37.9	34.3
HS67	Diffusion tube	83.3%	83.3%	**64.7**	**74.9**	**74.2**	**67.8**	**59.6**	**48.4**	**50**
HS68	Diffusion tube	100%	100%	**48.8**	**51.7**	**52.1**	**52.2**	**43.8**	36.5	36.6
HS69	Diffusion tube	91.7%	91.7%	**58.9**	**59.2**	**60.1**	**55.4**	**48**	39	36
HS70	Diffusion tube	100%	100%	**54.3**	**63**	**61.9**	**64.9**	**59.9**	**47.2**	**44.1**
HS71 (Gunn)	Diffusion tube	100%	100%	**47.8**	**59**	**57.3**	**54.1**	**48.3**	37.8	36.6
HS72	Diffusion tube	100%	100%	**41.1**	**47.1**	**46.6**	**51.7**	**48.7**	36.1	35
HS73	Diffusion tube	75.0%	75.0%	31.7	36.4	33	33.2	29.8	25.3	29.1
HS74	Diffusion tube	83.3%	83.3%	35.7	**40.1**	37.3	**41.8**	38.4	30.9	29.2
HS76	Diffusion tube	91.7%	91.7%	34.7	36.7	35.7	**40.6**	26.8	27	29
HS77	Diffusion tube	83.3%	83.3%	29.2	30.4	26.9	33.8	28	21.8	21.6
HS78	Diffusion tube	91.7%	91.7%	**47.2**	**59.3**	**56.1**	**57.7**	**47.5**	**42.7**	**40.7**

HS79	Diffusion tube	83.3%	83.3%	37.8	**41.8**	35.7	**42.3**	33.2	30.1	30.5
HS80	Diffusion tube	91.7%	91.7%	**57.7**	**65.1**	**61.1**	**79**	**71.1**	**58.7**	**46.4**
HS81	Diffusion tube	100.0%	100.0%	29	26.9	24.8	26.8	23	22	20.2
HS82	Diffusion tube	91.7%	91.7%	31.9	35.2	32.5	31.2	26.2	22.2	20.2
HS83	Diffusion tube	91.7%	91.7%	27.8	22.4	22	27	24.8	19.9	18.4
HS84	Diffusion tube	100%	100%	**40.5**	**47.6**	**43.7**	**45.3**	39.8	31.6	33.4
HS85	Diffusion tube	100%	100%	**43.9**	**51.3**	**49.3**	**50.4**	**47.7**	37.9	37.5
HS86	Diffusion tube	100%	100%	**49.5**	**54.2**	**50.8**	**54.7**	**53.5**	**41.3**	**43.5**
HS87A	Diffusion tube	100%	100%	**50.7**	**59.1**	**56**	**66**	**62.7**	**44.7**	**47.3**
HS88	Diffusion tube	91.7%	91.7%	26.4	27.3	25.4	26.8	23.4	20.7	22
HS89	Diffusion tube	100%	100%	39.3	39.7	**41.3**	**42**	32.1	28.8	27.4
HS90 (HS87B)	Diffusion tube	100%	100%	31.5	32.7	30.1	33.7	26.5	25.3	24.7
HS91	Diffusion tube	91.7%	91.7%	–	–	–	–	**62.1**	**45**	**43.7**
HS92	Diffusion tube	75.0%	75.0%	–	–	–	–	–	**56.3**	34.8
HS93	Diffusion tube	77.8%	77.8%	–	–	–	–	–	**56.3**	36.2
HSVF1	Diffusion tube	100%	41.7% (5 months)	–	–	–	–	–	–	39.4
HSVF2	Diffusion tube	100%	41.7% (5 months)	–	–	–	–	–	–	37.2
HSVF3	Diffusion tube	100%	41.7% (5 months)	–	–	–	–	–	–	38.5
HSVF4	Diffusion tube	100%	41.7% (5 months)	–	–	–	–	–	–	29
HSVF5	Diffusion tube	100%	41.7% (5 months)	–	–	–	–	–	–	28

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

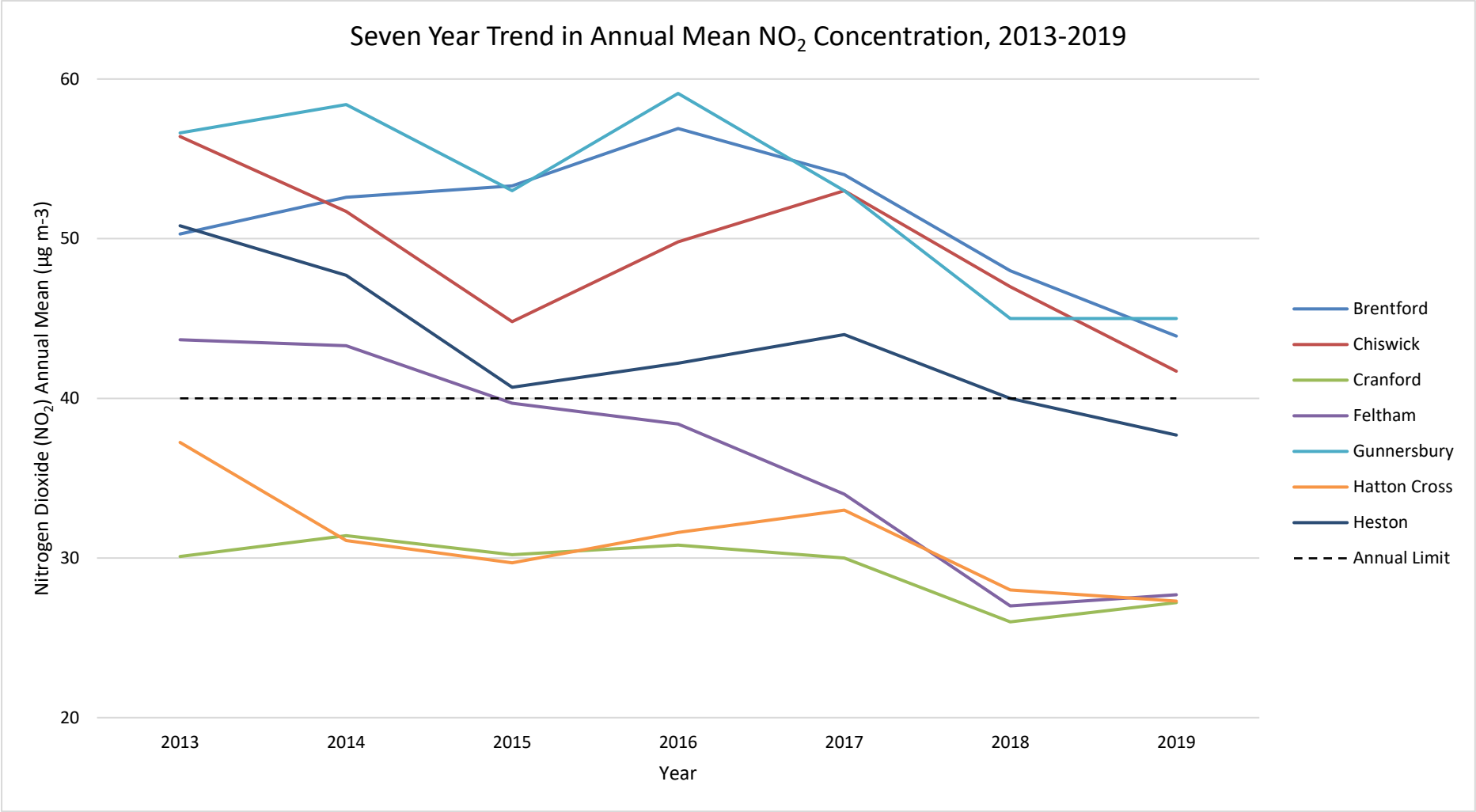
NO_2 annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in **bold and underlined**.

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

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

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

Graph 1. Seven Year Trend in Annual Mean NO_2 Concentration 2013-2019



Automatic Monitoring Stations

The data from Hounslow's 7 permanent automatic air quality monitoring stations shows a decrease at four sites including Brentford and Chiswick although both continue to exceed the annual mean limit of 40 µg m^{-3}. The reduction of 11% at Chiswick was the largest across all sites. The annual mean for the monitoring station at Heston, on the Great West Road, dropped below 40 µg m^{-3} for the first time. There was also a reduction at Hatton Cross.

There was no change at Gunnersbury, which remains at 45 µg m^{-3} and a slight increase on 2018 results at two sites, Cranford and Feltham. Feltham saw an above average decrease of 20.6% between 2017-2018 due to the closure of the level crossing, but ongoing construction works at the Feltham Bridge site may explain the 2.6% bounce back.

The mean change across all sites was -3%. These results are supported by the co-located diffusion tubes at Brentford, Chiswick, Cranford, Feltham, Hatton Cross and Heston.

Diffusion Tubes – [c]HS32 & HS42 annualised in accordance with LLAQM Technical Guidance. See appendix A.3

Hounslow had a total of 55 diffusion tube sites across the borough in 2019. There were 5 new (temporary) sites for 2019. Including the two automatic monitoring sites discussed above, there were exceedances of the 40 µg m^{-3} limit at 11 sites, and no exceedances of 60 µg m^{-3} for the second consecutive year. The mean change across all locations was a reduction of 2.4%.

The most significant decreases were of the two newest tubes, located together on the boundary of St Mary's and William Hogarth schools in Chiswick (HS93 & HS93), where the Chiswick Oasis project has mobilised air pollution awareness amongst pupils and parents of two schools on the Hogarth Roundabout (A4). The mean pollution at this site has dropped below the 40 µg m^{-3} annual limit.

A significant drop in pollution levels of 20% has been observed at Hounslow East station (HS80), and while this site still exceeds the annual limit value, the results of the past four years suggest significant improvement.

The most significant increases have been seen in Cranford (CRAN, HS53, HS54, HS55, HS86 & HS87A), where traffic and increased construction work may be to blame. A current proposal to restrict the movement of HGVs on Southall Lane is expected to have a positive impact here. Similarly, in Feltham (FELT & HS73) tubes at either end of the high street have registered increased levels of pollution, likely due to increased levels of traffic caused by the ongoing works in the area.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of Hourly Means > 200 µg m^{-3}						
			2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
Boston Manor Park	93.14%	93.14%	-	-	-	-	-	-	0
Brentford	98.38%	98.38%	0 (140)	4	0	7	12	0	0
Chiswick	97.89%	97.89%	1 (147)	0	0	6	12	0	0
Cranford	99.46%	99.46%	0 (113)	0	0	2	10	0 (0)	0
Feltham	97.82%	97.82%	17 (134)	0	0	0	0	0	0
Gunnersbury	97.53%	97.53%	4	**36**	0	**39**	**46**	0	0
Hatton Cross	86.61%	86.61%	0 (131)	0	0	0 (134)	0	0	0
Heston	98.32%	98.32%	1	4 (168)	0 (120)	1 (176)	6	0	0

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

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

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

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

For the second consecutive year, Hounslow had no exceedances of the hourly NO_2 limit.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
			2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
Boston Manor Park	93.14%	93.14%	-	-	-	-	-	-	20
Brentford	98.38%	98.38%	30	31	31	30	28	26	22
Chiswick	97.89%	97.89%	26	25	22	22	20	20	20
Cranford	99.46%	99.46%	19	18	17	17	18	15	18
Feltham	97.82%	97.82%	23	20	18	19	19	20	20
Gunnersbury	97.53%	97.53%	31	28	25	27	27	22	20
Hatton Cross	86.61%	86.61%	20	20	18	19	18	21	20
Heston	98.32%	98.32%	28	24	24	25	23	22	24

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

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

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

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

Annual mean PM_{10} is below objective limits. Most sites show a decrease or stable level, although increases have been seen at Cranford and Heston. Graph 2 shows the seven-year trend of all seven permanent sites, with average PM_{10} levels across the borough decreasing from 25.2 µg m^{-3} in 2013 to just 20.5 µg m^{-3} in 2019, a reduction of 19%.

Graph 2. Seven Year Trend in Annual Mean PM_{10} Concentration 2013-2019

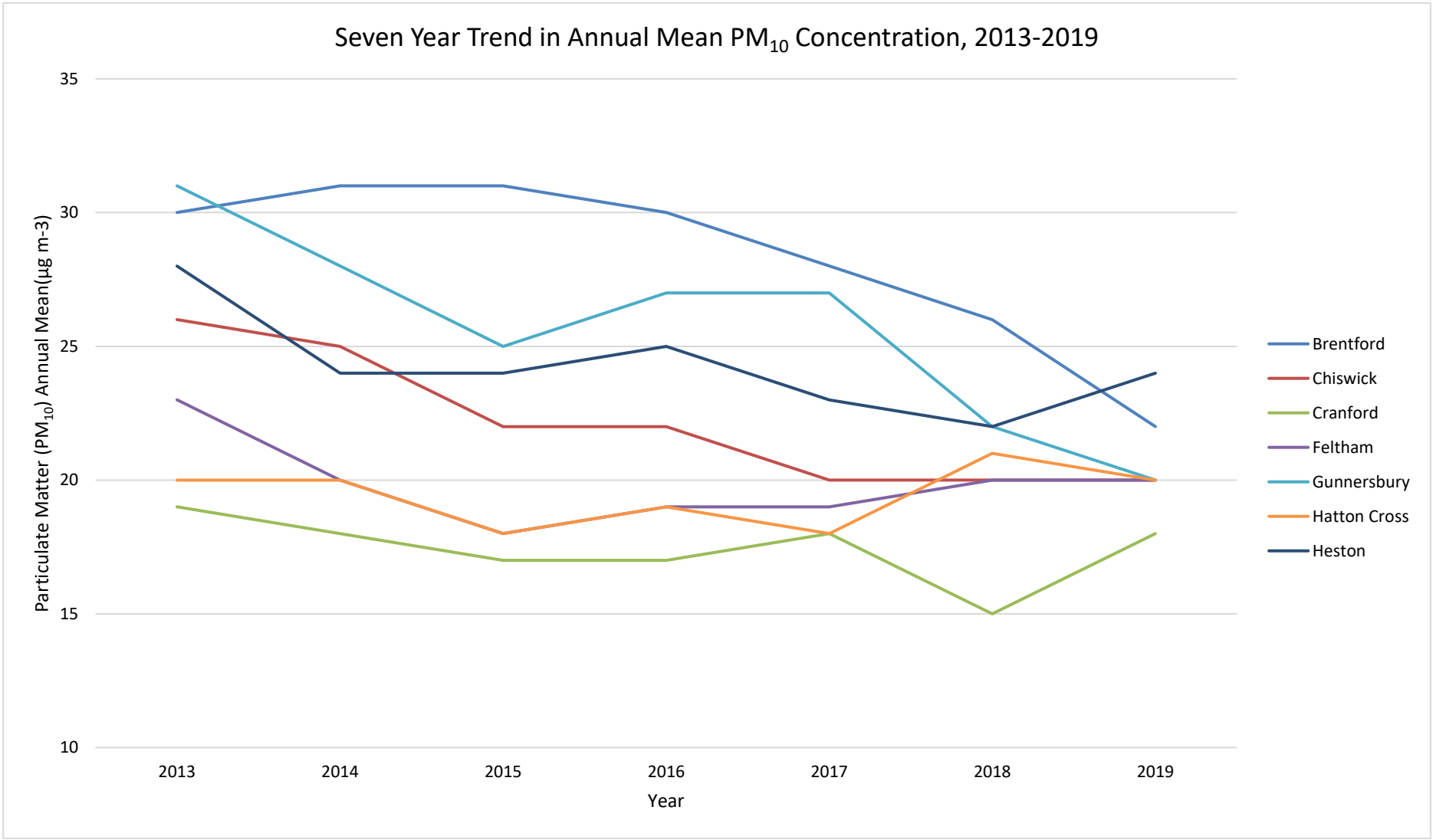


Table G. PM_{10} Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of Daily Means > 50 µg m^{-3}						
			2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
Boston Manor Park	93.14%	93.14%	-	-	-	-	-	-	12
Brentford	98.38%	98.38%	28	42	30	28	24	4	8
Chiswick	97.89%	97.89%	15	15	5	9	6	1	3
Cranford	99.46%	99.46%	1 (19)	5	4	8	5	0 (23)	7
Feltham	97.82%	97.82%	16	17	4	7	4	4	7
Gunnersbury	97.53%	97.53%	1 (22)	7	15	15	15	1	5
Hatton Cross	86.61%	86.61%	1 (21)	6	4	6	3	2	7
Heston	98.32%	98.32%	9	18	10	17 (42)	9	2	5

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

The number of short-term exceedances of PM_{10} limits increased between 2018 and 2019, but total exceedance days was still below the 2017 levels despite an additional monitoring station being used in 2019.

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 2019 % [b]	Annual Mean Concentration (µg m^{-3})						
			2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]	2019[c]
Brentford	98.38%	98.38%	-	-	-	-	15	15	13
Chiswick	97.89%	97.89%	-	-	-	-	14	14	13

Notes: Exceedance of the $PM_{2.5}$ annual mean AQO of 25 µg m^{-3} are shown in **bold**.

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

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

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

Annual mean concentrations of $PM_{2.5}$ at Brentford and Chiswick have decreased from 2017 and 2018 levels. It is still difficult to establish a reliable trend given a lack of historical data.

Table I. SO_2 Automatic Monitor Results: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Number of: [c]		
			15-minute means > 266 µg m^{-3}	1-hour mean > 350 µg m^{-3}	24-hour mean > 125 µg m^{-3}
Cranford	99.46%	99.46%	0	0	0

Notes: Exceedance of the SO_2 AQOs are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed / year)
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

SO_2 concentrations were recorded at the Cranford automatic monitoring station in the north west of the Borough. There were no exceedances of any of the mean concentration limits for the second consecutive year. Data capture for 2019 was above 99% at this site.

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 2019 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress Emissions/concentration data; benefits; negative impacts/complaints	Further information
In 2019, Hounslow Council agreed a Greener Borough Framework that brought together several corporate priorities that will be delivered across Hounslow to ensure it is a cleaner greener borough. The Hounslow Air Quality Action Plan now forms part the wider Greener Borough Framework. As part of the governance arrangements for the Framework, the Council has set up three Community Reference Groups that will work with the officer led boards to co-create and prioritise actions, as well as assist in increasing transparency and public understanding around the Council's opportunities and constraints for action. The Groups will also assist the Council in galvanising the required wider civic support necessary to deliver the ambitious changes required to deliver the objectives of the Framework. This process has already been established in respect to the Air Quality Action Plan through the associated Steering Group which includes a range of community representatives. The remit for this group will now be widened to encompass monitoring and implementation of the Climate Emergency Action Plan and its membership reviewed accordingly. Here on, the group will now be called the Climate and Clean Air Community Reference Group. The officer led group will meet quarterly and the Community Reference Group will meet twice yearly. Both groups will be coordinated by the Environmental Strategy Team. An annual report which will review the delivery of the actions as set out in the Action Plans that form part of the Greener Cleaner Framework will be submitted to Cabinet. The first annual report is estimated for summer 2021. The first meeting of the Climate and Clean Air CRG took place in February 2020 and focused on the action taken to date to reduce emissions from the council's vehicle fleet and the progress made to date to develop and implement the priorities set out in the AQAP in relation to borough fleet management. Progress has been reported in the table below. The next meeting of the Group is scheduled to take place in September 2020.			

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	Domestic boilers = 609 individual domestic boiler upgrades District and communal heating network upgrades = £2.4m upgrade across the heating and hot water risers on the Ivybridge estate (affecting three tower blocks) and an additional £530k spend on upgrading the assets (boilers and plate heat exchangers) as well as the pipework infrastructure. Insulation upgrades across social housing = £2.8m spent on external wall insulation (and some damp works) across various social housing properties on the Worton and Worple estates in Isleworth.	
7 - Emissions from developments and buildings	Hounslow Highways are leading on LED street lighting upgrades: circa 1200 lamps to be upgraded to LED.	LED street lighting (Housing) upgrades = 1195 lamp columns on housing estates upgrades to LED. For the below, there are over 12,000 street lights in the borough and in the public highway. Most of the lights (about 94% were completed during the first five years of the contract during CIP. The remaining 6% or so, not by design, have been and are being replaced as we come across them. As it stands, up to 1 March, there were less than 50 lights remaining to be replaced.	
7.1 - Emissions	The Council has identified over 30 schools to identify suitable measures	12 schools have had measures installed and two are at the survey stage. Projected savings for	

from developments and buildings	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	these 14 schools are around £136k per annum with an average payback time for 5.5 years.	
9 - Public health and awareness raising	The council's Public Health Team will support engagement with local stakeholders (businesses, 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 DoPH when projects are being developed. The Public Health team engage with stakeholders via the Health & Wellbeing Board and regular meetings with CCG. Working with DoPH, the	Tackling the health risk associated with air quality is an objective agreed with PH and set by the CCG for 2020/2021. Within this objective are two projects: work to identify vulnerable residents in air quality hotspots and work to increase uptake of airTEXT by vulnerable residents. Working with the CCG, the acute trust and the LBH intelligence team, Public Health has identified the GP offices located within air	

	council will do two presentations on air quality issues, during lifetime of this action plan.	quality hotspots to target interventions to support affected service users.	
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	The JSNA 2017 is the latest version, there is work taking place to update this via a platform where data can be updated regularly via PowerBI rather than static reporting. When this does happen, Public Health will ensure that air quality has been considered.	
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)	Through targeted promotion at a COPD support group meeting and a CCG Respiratory event in May 2019, Public Health increased sign-ups for air text from 178 to 415 (as of November 2019).	
14 - Public health and awareness raising	The Council will act to raise awareness of Air Quality amongst the business community with 1x briefing to the Hounslow Economic Business Forum. This is made up of the 30 largest businesses in the borough and the local chambers of commerce who together disseminate information to circ. 12,000 local contacts. The briefing will look to promote the Mayor's new Cleaner Vehicle Checker	The Hounslow Economic Business Forum has temporarily paused, though members were consulted on the AQAP. Through the Invest Hounslow business database over 3,000 subscribers were informed of the consultation. Information on the consultation was also distributed by the Hounslow Chamber of Commerce and West London Business, with the former being supported by the Local Authority in establishing its Green Energy Summit events	
16 - Public health and	The council will encourage schools to join the TfL STARS accredited travel planning programme by providing	We have 35 schools currently accredited and a further 10 are working towards accreditation this year. Activities related to AQ include 'Car	

awareness raising	information on the benefits to schools and 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.	Free Fridays', anti-idling campaigns and pursuing Eco School status. Beat the Street also took place this year with participants walking 96,849 miles collectively over 6 weeks.	
17 - Public health and awareness raising	The council will raise the issue of air quality with school pupils and communities through STARS accreditation, and 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)	2 schools have taken part in Idling Action workshops and events this year which also involves distributing information leaflets. Air text cards were also distributed. Several other schools have included air quality messages in their newsletters to encourage active travel and remind parents to switch off engines if driving.	
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	Three schools were audited: Cavendish Primary, The William Hogarth School and St Mary's in Chiswick. Several actions have been implemented such as green infrastructure, air filtration and reengaging with STARS, collaboration with other schools, etc. Other actions are in the pipeline, e.g. trialling a School Street on Duke Rd.	
20 - Delivery servicing and freight	The council's 'New Civic team' will explore options to reduce freight deliveries to new Civic centre site. Deliveries reduced by circ. 50% on 2017 base reported on in 2020. Delivery reduction target to be agreed with Procurement.	SYSTRA conducted research into the feasibility of a commercial electric cargo bike trial in the borough. They found several businesses in Chiswick who would be interested in making deliveries via cargo bike.	

21	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.		
27.1 - Cleaner transport	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.	2 workshops and 2 idling action events (max number allowed for this financial year) were held in Hanworth and Isleworth, involving 90 KS2 pupils. 3rd event was scheduled at Lionel Primary but will be rescheduled due to COVID-19. Additionally, 6 PCNs have been issued for idling. Business in Hounslow will be offered fleet training which will include information on fuel efficiency, idling, etc.	
29	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.	Hounslow are due to change our fleet to fully electric vehicles. We anticipate this to happen once the government guidelines on Covid-19 ease. We currently have 3 hybrid EV's operating as car clubs in the borough so this will total 15 electric vehicles	
Borough Fleet Management	The council will look to increase the number of hydrogen, electric, hybrid, bio-methane and cleaner vehicles in the boroughs' fleet. The council will explore opportunities to introduce EVs and make future vehicle fleet as clean as possible in future, however noting that the in-house fleet is now quite small. Action to procure 4x electric	We've identified around 10% of the fleet that can move to fully electric with limited barriers, and believe the potential may be higher. We are trialling electric minibuses for SEN transport. In early 2019, the Council began trialling an electric vehicle for use by the Pest Control and Animal Warden Teams. progress will be reported in Q1 2020/21.	• We are working on proposals for a new depot to ensure that is fit for the future – e.g. can refuel and service a largely electric fleet.

	vehicles (EV) for use by Pest Control & Animal Wardens. Future report to AQAP Steering Group Q1 20/21.	• We are working with subcontractors who run their own fleet (e.g. SERCO) to move to 100% electric through provision of EV charging points at the depot. Hounslow Highways have an aggressive electrification agenda.	
34 – Cleaner Transport	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 the number of lamp column charging (from 47 to 100) by end 2020	We have installed 52 new charge points in 2019/20. This is a mix of lamp column and floor-mounted charge points by Ubitricity and Source London respectively. Over 200 total lamp column and Source London charging points installed across Hounslow, with a goal to double this by the end of 2021.	
35 – Cleaner Transport	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.	We have a total of 7 rapid charge points (4 installed and operational and 3 pending installation) with 1 ultra-charger in the borough (BP station at Henleys roundabout).	
37 – Cleaner Transport	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	Legible London signage has been implemented in all town centres excluding Feltham which is in the process – currently with TfL. Junction entry treatments on Bedfont Road, Boston Manor Road, Prince Regent Road and High Street. Toucan crossing installed on Bedfont Road and zebra crossing on Prince Regent Road. Examples of improved walking and cycling facilities include Boston Manor Road cycle track, Bedfont Rd and Carville Hall Park North. Construction of C9 has begun at Kew Bridge although currently on hold due to COVID-19. Relevant consultations include Kew Bridge underpass, Bretford-Twickenham cycleway and South Chiswick Liveable Neighbourhood scheme.	

	upgrades being progressed by TfL); (4) Improvements to cycling facilities, Priority projects include, (i) Partnership working with TfL to deliver a 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.		
Additional measures	The council will continue to work in partnership with Heathrow Airport Limited (HAL), seeking clear strategy and framework to: (i) Delivering better surface access strategy (passenger & freight); (ii) Seek contributions for	The Council has been working proactively with HAL to better understand the airport operators expansion proposals for an additional third runway and the impact this will have on the air pollution levels in Hounslow and the areas neighbouring the borough. The Council has continued to push for a better surface access	

	identifying & implementing mitigation measures locally, aimed at reducing exposure to harmful emissions NO2/PM (particularly in schools & community buildings), mitigate adverse effects, including health impacts of harmful emissions associated with their business and operations and implement measures to improve local air quality within Hounslow.	strategy (for passenger and freight) for an existing and expanded airport by engaging with the airport directly, through the Heathrow Strategic Planning Group, the Heathrow Airport Transport Forum and the Heathrow Airport Air Quality Working Group.	
Borough Fleet Management	The council will look to increase the number of hydrogen, electric, hybrid, bio-methane and cleaner vehicles in the boroughs' fleet. The council will explore opportunities to introduce EVs and make future vehicle fleet as clean as possible in future, however noting that the in-house fleet is now quite small. Action to procure 4x electric vehicles (EV) for use by Pest Control & Animal Wardens. Future report to AQAP Steering Group Q1 20/21.	We've identified around 10% of the fleet that can move to fully electric with limited barriers, and believe the potential may be higher. We are trialling electric minibuses for SEN transport. In early 2019, the Council began trialling an electric vehicle for use by the Pest Control and Animal Warden Teams. progress will be reported in Q1 2020/21. • We are working with subcontractors who run their own fleet (e.g. SERCO) to move to 100% electric through provision of EV charging points at the depot. Hounslow Highways have an aggressive electrification agenda.	• We are working on proposals for a new depot to ensure that is fit for the future – e.g. can refuel and service a largely electric fleet.

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in Hounslow in 2019

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	25
Number of planning applications required to monitor for construction dust	0
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	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	65
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	Unknown
Number of planning applications with S106 agreements including other requirements to improve air quality	5
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 at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	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.	0 conditions related to NRMM included 31 site audits undertaken by *Cleaner Construction for London* 4 sites achieved self-compliance 16 sites achieved compliance 5 sites failed, recorded non-compliant 6 sites had no NRMM in scope

3.1 New or significantly changed industrial or other sources

No new sources identified

Appendix A Details of Monitoring Site 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
- Ongoing works at Feltham Bridge may have had an impact on data captured at this station

PM_{10} Monitoring Adjustment

N/A

A.2 Diffusion Tube Quality Assurance / Quality Control

- Gradko International supplied and analysed the diffusion tubes used by the London Borough of Hounslow in 2019
- 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 03/20: **0.93**
- Local bias adjustment factor from six co-location studies: **0.89**
- As in previous years, the bias adjustment factor being used in the analysis of 2019 diffusion tube data is the local BAF of **0.89**

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 six co-location studies at automatic monitoring stations across Hounslow. The average bias adjustment factor of these six studies (from B factor) was 0.89. Details of each co-location study are listed below. The local bias adjustment factor of 0.89 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 2019 is 0.93 (Database 03/20).

Site	Bias Adjustment B	Factor	Plus 1	Bias adjustment factor (inverse)
Brentford	15%			
Chiswick	11%			
Cranford	-4%			
Feltham	8%			
Hatton Cross	24%			
Heston	20%			
AVERAGE	**12%**	0.12	1.12	**0.89**

Factor from Local Co-location Studies (if available)

Brentford – 0.87

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	05/12/2018	06/02/2019	50.76	52.09	48.63	50	1.7	3	4.3
2	06/02/2019	06/03/2019	56.17	54.99	57.42	56	1.2	2	3.0
3	06/03/2019	03/04/2019	51.25	54.67	51.96	53	1.8	3	4.5
4	03/04/2019	09/05/2019	55.20	53.29	51.60	53	1.8	3	4.5
5	09/05/2019	05/06/2019	51.74	49.25	49.81	50	1.3	3	3.2
6	05/06/2019	04/07/2019	52.76	51.24	51.63	52	0.8	2	2.0
7	04/07/2019	07/08/2019	49.25	41.32	54.19	48	6.5	13	16.1
8	07/08/2019	05/09/2019	46.46	44.27	42.48	44	2.0	4	5.0
9	05/09/2019	09/10/2019	40.87	48.38	48.19	46	4.3	9	10.6
10	09/10/2019	07/11/2019	49.70	54.53	50.69	52	2.6	5	6.3
11	07/11/2019	02/12/2019	62.01	58.10	63.66	61	2.9	5	7.1
12	02/12/2019	07/01/2020	40.78	42.65	42.58	42	1.1	3	2.6
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
49.11	100.00	Good	Good
51.84	100.00	Good	Good
46.13	99.41	Good	Good
50.27	98.38	Good	Good
43.98	100.00	Good	Good
39.63	100.00	Good	Good
38.28	87.88	Good	Good
36.25	100.00	Good	Good
38.75	98.90	Good	Good
42.07	99.71	Good	Good
50.76	100.00	Good	Good
39.79	98.38	Good	Good
Overall survey -->		Good precision	Good Overall DC

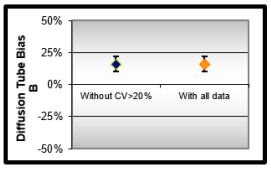
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Hounslow Brentford

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.87 (0.82 - 0.91)
Bias B: 15% (10% - 21%)
Diffusion Tubes Mean: 51.0 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 43.9 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 44 (42 - 46) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.87 (0.82 - 0.91)
Bias B: 15% (10% - 21%)
Diffusion Tubes Mean: 51.0 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 43.9 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 44 (42 - 46) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Chiswick – 0.9

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	05/12/2018	06/02/2019		48.23	49.44	49	0.8	2	7.6
2	06/02/2019	06/03/2019	58.90	61.35	54.10	58	3.7	6	9.2
3	06/03/2019	03/04/2019	44.10	41.93	44.00	43	1.2	3	3.0
4	03/04/2019	09/05/2019	45.54	46.76	47.76	47	1.1	2	2.8
5	09/05/2019	05/06/2019	36.60	43.03	38.69	39	3.3	8	8.1
6	05/06/2019	04/07/2019	44.49	39.99	42.07	42	2.3	5	5.6
7	04/07/2019	07/08/2019	39.61	37.24		38	1.7	4	15.0
8	07/08/2019	05/09/2019		40.05	39.58	40	0.3	1	3.0
9	05/09/2019	09/10/2019	43.66	45.42	44.45	45	0.9	2	2.2
10	09/10/2019	07/11/2019	52.14	47.16	50.98	50	2.6	5	6.5
11	07/11/2019	02/12/2019	54.47	60.67	56.08	57	3.2	6	8.0
12	02/12/2019	07/01/2020	45.05	45.76	43.94	45	0.9	2	2.3
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
48.47	99.74	Good	Good
59.05	100.00	Good	Good
45.21	77.27	Good	Good
37.74	100.00	Good	Good
33.00	99.85	Good	Good
33.05	99.86	Good	Good
31.32	100.00	Good	Good
35.44	99.86	Good	Good
38.99	98.41	Good	Good
43.87	100.00	Good	Good
48.83	98.00	Good	Good
45.45	100.00	Good	Good
Overall survey -->		Good precision	Good Overall DC

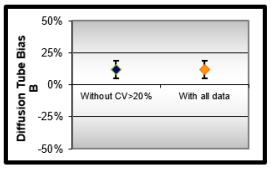
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Hounslow Chiswick

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.9 (0.85 - 0.97)
Bias B: 11% (4% - 18%)
Diffusion Tubes Mean: 46.0 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 41.7 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 42 (39 - 45) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.9 (0.85 - 0.97)
Bias B: 11% (4% - 18%)
Diffusion Tubes Mean: 46.0 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 41.7 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 42 (39 - 45) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Cranford – 1.04

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	04/12/2018	05/02/2019	30.90	32.37	29.08	31	1.6	5	4.1
2	05/02/2019	05/03/2019	28.53	30.26		29	1.2	4	11.0
3	05/03/2019	02/04/2019	22.44	25.84		24	2.4	10	21.6
4	02/04/2019	08/05/2019	27.12	25.82	23.46	25	1.9	7	4.6
5	08/05/2019	04/06/2019	21.98	21.62	21.53	22	0.2	1	0.6
6	04/06/2019	03/07/2019	21.82	22.41	19.96	21	1.3	6	3.2
7	03/07/2019	06/08/2019	20.53	20.90	20.85	21	0.2	1	0.5
8	06/08/2019	03/09/2019	24.01	22.88	23.82	24	0.6	3	1.5
9	03/09/2019	08/10/2019	25.49	14.45	23.80	21	5.9	28	14.8
10	08/10/2019	04/11/2019	27.96	29.13		29	0.8	3	7.4
11	04/11/2019	02/12/2019	32.31	30.77	30.36	31	1.0	3	2.6
12	02/12/2019	07/01/2020	33.22	31.94	28.27	31	2.6	8	6.4
13									

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

Automatic Method	
Period Mean	Data Capture (% DC)
32.12	99.93
37.50	99.85
26.98	99.55
27.22	97.92
22.15	100.00
19.67	99.86
17.88	99.39
22.02	100.00
23.74	97.98
28.74	99.85
34.28	100.00
30.83	99.88

Data Quality Check	
Tubes Precision Check	Automatic Monitor Data
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Poor Precision	Good
Good	Good
Good	Good
Good	Good
Good precision	Good Overall DC

Overall survey -->

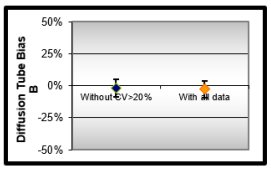
Site Name/ ID: **Hounslow Cranford**

Precision: 11 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 1.04 (0.97 - 1.12)
Bias B -4% (-11% - 3%)
Diffusion Tubes Mean: 26.0 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 27.2 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 27 (25 - 29) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 1.04 (0.98 - 1.12)
Bias B -4% (-11% - 2%)
Diffusion Tubes Mean: 26.0 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 26.9 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 27 (25 - 29) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Feltham – 0.93

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/12/2018	05/02/2019							
2	05/02/2019	05/03/2019	37.43	37.49	42.08	39	2.7	7	6.6
3	05/03/2019	02/04/2019	34.67	33.18	30.34	33	2.2	7	5.5
4	02/04/2019	08/05/2019	32.06	32.13	29.09	31	1.7	6	4.3
5	08/05/2019	04/06/2019	23.73	24.46	25.18	24	0.7	3	1.8
6	04/06/2019	03/07/2019	24.03	23.72	23.97	24	0.2	1	0.4
7	03/07/2019	06/08/2019	22.60	20.79	22.16	22	0.9	4	2.3
8	06/08/2019	03/09/2019	22.72	25.68	22.93	24	1.7	7	4.1
9	03/09/2019	08/10/2019	23.96	27.28	26.58	26	1.8	7	4.3
10	08/10/2019	06/11/2019	29.06	29.18	31.48	30	1.4	5	3.4
11	06/11/2019	02/12/2019	40.82	39.74	38.84	40	1.0	2	2.5
12	02/12/2019	07/01/2020	33.40	36.60	38.24	36	2.5	7	6.1
13									

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

Automatic Method	
Period Mean	Data Capture (% DC)
38.58	100.00
38.01	100.00
28.80	96.14
29.95	100.00
23.10	99.85
19.12	77.47
17.41	100.00
20.30	99.85
25.39	99.29
30.78	100.00
38.12	100.00
33.76	99.88

Data Quality Check	
Tubes Precision Check	Automatic Monitor Data
	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good	Good
Good precision	Good Overall DC

Overall survey -->

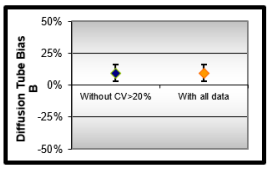
Site Name/ ID: **Hounslow Feltham**

Precision: 11 out of 11 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 0.93 (0.88 - 0.99)
Bias B 8% (1% - 14%)
Diffusion Tubes Mean: 30.0 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 27.7 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 28 (26 - 30) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A 0.93 (0.88 - 0.99)
Bias B 8% (1% - 14%)
Diffusion Tubes Mean: 30.0 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 27.7 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 28 (26 - 30) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Hatton Cross – 0.8

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	04/12/2018	05/02/2019	48.80	44.93	38.91	44	5.0	11	12.4
2	05/02/2019	05/03/2019	37.12	36.84	35.12	36	1.1	3	2.7
3	05/03/2019	02/04/2019	42.77	38.02	54.27	45	8.4	19	20.8
4	02/04/2019	08/05/2019	37.69	36.76	36.10	37	0.8	2	2.0
5	08/05/2019	04/06/2019	28.58	29.05	27.20	28	1.0	3	2.4
6	04/06/2019	03/07/2019	22.92	22.78	25.21	24	1.4	6	3.4
7	03/07/2019	06/08/2019	28.16	23.80	25.95	26	2.2	8	5.4
8	06/08/2019	03/09/2019	24.34	25.28	24.40	25	0.5	2	1.3
9	03/09/2019	08/10/2019	30.85	33.65	31.02	32	1.6	5	3.9
10	08/10/2019	06/11/2019							
11	06/11/2019	02/12/2019	44.82	31.93	45.15	41	7.5	19	18.7
12	02/12/2019	07/01/2020	33.16	32.97	43.99	37	6.3	17	15.7
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
37.59	99.87	Good	Good
33.93	99.26	Good	Good
30.77	94.65	Good	Good
34.19	51.33	Good	or Data Capture
24.07	95.22	Good	Good
17.81	95.27	Good	Good
18.43	90.45	Good	Good
18.42	96.73	Good	Good
25.46	65.28	Good	or Data Capture
22.22	73.03		or Data Capture
37.15	94.08	Good	Good
27.30	95.95	Good	Good
Overall survey -->		Good precision	Poor Overall DC

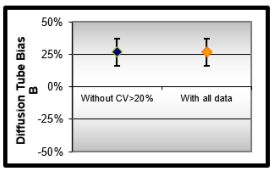
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Hounslow Hatton Cross

Precision: 11 out of 11 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 9 periods of data	
Bias factor A	0.8 (0.74 - 0.88)
Bias B	24% (14% - 35%)
Diffusion Tubes Mean:	34.0 µgm^{-3}
Mean CV (Precision):	10
Automatic Mean:	27.3 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	27 (25 - 30) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 9 periods of data	
Bias factor A	0.8 (0.74 - 0.88)
Bias B	24% (14% - 35%)
Diffusion Tubes Mean:	34.0 µgm^{-3}
Mean CV (Precision):	10
Automatic Mean:	27.3 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	27 (25 - 30) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Heston – 0.86

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	04/12/2018	04/02/2019	48.68	48.72	47.11	48	0.9	2	2.3
2	04/02/2019	04/03/2019	55.38	53.04	54.36	54	1.2	2	2.9
3	04/03/2019	01/04/2019	43.53	42.46	41.34	42	1.1	3	2.7
4	01/04/2019	07/05/2019	44.50	46.75	41.64	44	2.6	6	6.4
5	07/05/2019	03/06/2019	35.77	41.06	41.85	40	3.3	8	8.2
6	03/06/2019	04/07/2019	37.07	36.92	37.92	37	0.5	1	1.3
7	04/07/2019	05/08/2019	37.99	62.20		50	17.1	34	153.8
8	05/08/2019	02/09/2019	32.88	36.82	32.15	34	2.5	7	6.2
9	02/09/2019	07/10/2019	40.78	39.11	43.04	41	2.0	5	4.9
10	07/10/2019	04/11/2019	45.19	45.19	45.84	45	0.4	1	0.9
11	04/11/2019	02/12/2019	55.41	61.47	55.53	57	3.5	6	8.6
12	02/12/2019	07/01/2020	43.79	40.14	40.29	41	2.1	5	5.1
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
44.19	96.31	Good	Good
49.93	100.00	Good	Good
42.00	99.55	Good	Good
43.41	92.49	Good	Good
31.89	100.00	Good	Good
32.78	100.00	Good	Good
29.23	100.00	Poor Precision	Good
25.49	100.00	Good	Good
31.58	99.05	Good	Good
32.29	99.85	Good	Good
46.39	99.85	Good	Good
35.15	98.27	Good	Good
Overall survey -->		Good precision	Good Overall DC

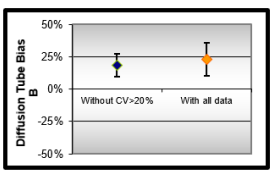
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Hounslow Heston

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.86 (0.8 - 0.92)
Bias B	17% (8% - 26%)
Diffusion Tubes Mean:	44.0 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	37.7 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	38 (35 - 41) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.83 (0.75 - 0.93)
Bias B	20% (8% - 33%)
Diffusion Tubes Mean:	45.0 µgm^{-3}
Mean CV (Precision):	7
Automatic Mean:	37.0 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	37 (33 - 41) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Two diffusion tube sites in Hounslow needed to be annualised.

Site ID	Site Type	Valid data capture 2019 %	Bias Adjustment Factor	Annualised, bias adjusted mean
HS32	**Diffusion Tube**	**58.3%**	**0.89**	**43.7**
HS42	**Diffusion Tube**	**50%**	**0.89**	**27.3**

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

Annualised results for HS32

Site	**Site Type**	**Annual Mean (µg/m^3)**	**Period Mean (µg/m^3)**	**Ratio**
Brentford	Urban Background	26.93	26.41	1.019
Chiswick	Roadside	41.7	39.88	1.045
Cranford	Roadside	43.91	43.42	1.011
Heston	Roadside	37.03	35.15	1.037
			Average Ratio	1.028
			Annualised Average	49.11

Annualised results for HS42

Site	**Site Type**	**Annual Mean (µg/m^3)**	**Period Mean (µg/m^3)**	**Ratio**
Brentford	Urban Background	26.93	29.93	0.899
Chiswick	Roadside	41.7	46.39	0.898
Cranford	Roadside	43.91	45.98	0.954
Heston	Roadside	37.03	41.15	0.899
			Average Ratio	0.913
			Annualised Average	30.7

Distance Adjustment

Brentford

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	10	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	30.3	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	43.9	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	39.7	$\mu g/m^3$

Chiswick

Enter data into the red cells

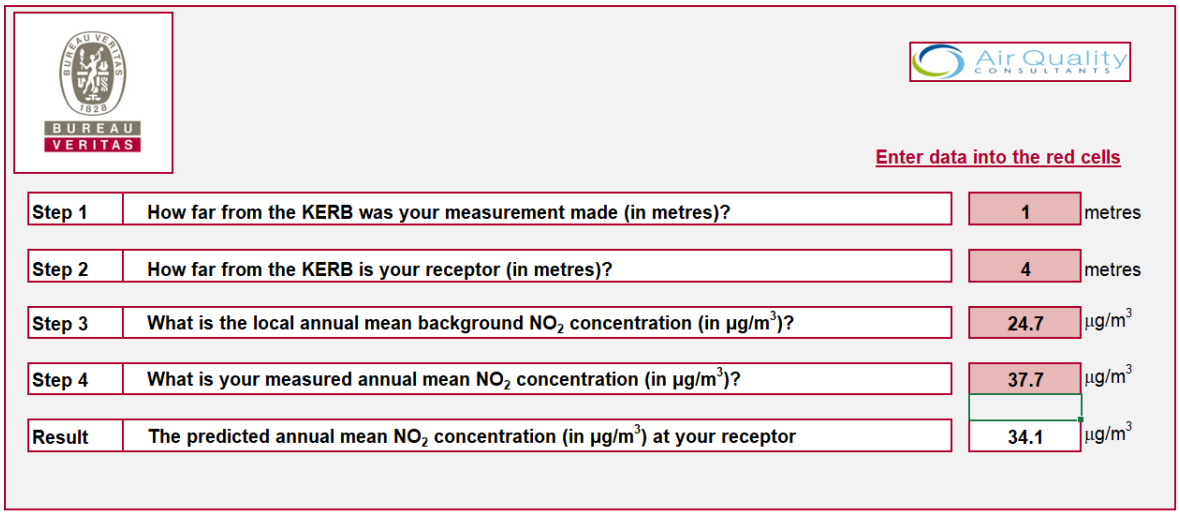
Step 1	How far from the KERB was your measurement made (in metres)?	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	10	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	29.1	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	41.7	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	38.5	$\mu g/m^3$

Gunnersbury

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	5	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	27	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	45	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	43.9	$\mu g/m^3$

Heston



Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	4	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	24.7	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	37.7	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	34.1	$\mu g/m^3$

Appendix B Full Monthly Diffusion Tube Results for 2019

Table M. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data[c]	Annual mean – bias adjusted[c]
BREN A	100.0%	100.0%	**50.76**	**56.17**	**51.25**	**55.20**	**51.74**	**52.76**	**49.25**	**46.46**	**40.87**	**49.70**	**62.01**	**40.78**	**50.6**	**45.0**
BREN B	100.0%	100.0%	**52.09**	**54.99**	**54.67**	**53.29**	**49.25**	**51.24**	**41.32**	**44.27**	**48.38**	**54.53**	**58.10**	**42.65**	**50.4**	**44.9**
BREN C	100.0%	100.0%	**48.63**	**57.42**	**51.96**	**51.60**	**49.81**	**51.63**	**54.19**	**42.48**	**48.19**	**50.69**	**63.66**	**42.58**	**51.1**	**45.5**
CHIS A	83.3%	83.3%		**58.90**	**44.10**	**45.54**	36.60	**44.49**	39.61		**43.66**	**52.14**	**54.47**	**45.05**	**46.5**	**41.3**
CHIS B	100.0%	100.0%	**48.23**	**61.35**	**41.93**	**46.76**	**43.03**	39.99	37.24	**40.05**	**45.42**	**47.16**	**60.67**	**45.76**	**46.5**	**41.4**
CHIS C	91.7%	91.7%	**49.44**	**54.10**	**44.00**	**47.76**	38.69	**42.07**		39.58	**44.45**	**50.98**	**56.08**	**43.94**	**46.5**	**41.4**
CRAN A	100.0%	100.0%	30.90	28.53	22.44	27.12	21.98	21.82	20.53	24.01	25.49	27.96	32.31	33.22	26.4	23.5
CRAN B	100.0%	100.0%	32.37	30.26	25.84	25.82	21.62	22.41	20.90	22.88	14.45	29.13	30.77	31.94	25.7	22.9
CRAN C	75.0%	75.0%	29.08			23.46	21.53	19.96	20.85	23.82	23.80		30.36	28.27	24.6	21.9
FELT A	91.7%	91.7%		37.43	34.67	32.06	23.73	24.03	22.60	22.72	23.96	29.06	40.82	33.40	29.5	26.3
FELT B	91.7%	91.7%		37.49	33.18	32.13	24.46	23.72	20.79	25.68	27.28	29.18	39.74	36.60	30.0	26.7
FELT C	91.7%	91.7%		**42.08**	30.34	29.09	25.18	23.97	22.16	22.93	26.58	31.48	38.84	38.24	30.1	26.8
HAT A	91.7%	91.7%	**48.80**	37.12	**42.77**	37.69	28.58	22.92	28.16	24.34	30.85		**44.82**	33.16	34.5	30.7
HAT B	91.7%	91.7%	**44.93**	36.84	38.02	36.76	29.05	22.78	23.80	25.28	33.65		31.93	32.97	32.4	28.8
HAT C	91.7%	91.7%	38.91	35.12	**54.27**	36.10	27.20	25.21	25.95	24.40	31.02		**45.15**	**43.99**	35.2	31.3

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data[c]	Annual mean – bias adjusted[c]
HEST A	100.0%	100.0%	**48.68**	**55.38**	**43.53**	**44.50**	35.77	37.07	37.99	32.88	**40.78**	**45.19**	**55.41**	**43.79**	**43.4**	38.6
HEST B	100.0%	100.0%	**48.72**	**53.04**	**42.46**	**46.75**	**41.06**	36.92	**62.20**	36.82	39.11	**45.19**	**61.47**	**40.14**	**46.2**	**41.1**
HEST C	91.7%	91.7%	**47.11**	**54.36**	**41.34**	**41.64**	**41.85**	37.92		32.15	**43.04**	**45.84**	**55.53**	**40.29**	**43.7**	38.9
HS32	58.3%	58.3%				**49.03**	28.28		**51.58**		**47.10**	**54.90**	**51.44**	**51.96**	**47.8**	**43.7**
HS33	100.0%	100.0%	**46.51**	**50.31**	**47.15**	**40.25**	**45.15**	**40.65**	39.72	39.32	**42.11**	**45.07**	**45.81**	**42.47**	**43.7**	38.9
HS34	100.0%	100.0%	34.71	36.62	25.75	27.45	24.94	25.47	15.62	25.87	28.32	34.87	39.48	29.68	29.1	25.9
HS35	100.0%	100.0%	34.70	36.52	32.09	30.13	23.53	23.65	20.69	22.77	28.14	34.50	38.99	29.84	29.6	26.4
HS41	75.0%	75.0%	**44.18**	**59.63**	**41.19**	**43.14**	**45.52**	**42.69**		**45.86**			**41.76**	**42.07**	**45.1**	**40.2**
HS42	50.0%	50.0%	36.41	**44.05**	31.29				26.50				33.76	29.84	33.6	27.3
HS43	91.7%	91.7%	38.80	37.65		37.21	33.68	31.18	26.84	25.53	33.88	35.95	**46.96**	30.34	34.4	30.6
HS51	83.3%	83.3%	34.09		28.34		26.52	21.87	21.57	18.78	26.51	26.06	37.33	29.63	27.1	24.1
HS52	100.0%	100.0%	32.30	27.39	27.34	28.62	25.18	20.23	19.30	18.62	25.00	24.24	33.98	28.29	25.9	23.0
HS53	100.0%	100.0%	36.99	36.13	36.31	30.90	30.73	23.87	25.34	26.86	28.35	33.67	34.71	34.15	31.5	28.0
HS54	100.0%	100.0%	**48.98**	**50.48**	**46.73**	39.04	39.60	38.62	32.93	**41.40**	39.45	**46.17**	**47.51**	**46.52**	**43.1**	38.4
HS55	100.0%	100.0%	**47.05**	**41.12**	**40.71**	**47.13**	36.24	32.54	28.93	25.68	31.73	39.76	**43.70**	**42.24**	38.1	33.9
HS61	83.3%	83.3%	39.41	**41.70**	33.09	30.92	27.80			29.54	32.09	35.27	**45.31**	37.45	35.3	31.4
HS62	100.0%	100.0%	**49.35**	**51.32**	37.98	34.89	32.03	31.90	28.39	31.00	33.60	34.66	**46.06**	**41.75**	37.7	33.6
HS63	83.3%	83.3%	36.82			36.38	34.40	32.97	28.35	26.95	34.56	38.58	**41.99**	36.50	34.7	30.9
HS64	100.0%	100.0%	37.65	**40.59**	25.57	31.62	26.58	25.00	24.28	22.36	27.91	29.91	**46.73**	27.84	30.5	27.1

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data[c]	Annual mean – bias adjusted[c]
HS65	100.0%	100.0%	32.49	34.52	28.91	28.79	22.49	20.57	22.87	23.91	25.37	30.19	37.27	30.67	28.2	25.1
HS66	91.7%	91.7%	**49.68**	**46.53**	**45.77**	**44.85**	**46.24**	36.92	**40.15**	28.51	4.21	28.22	**52.56**		38.5	34.3
HS67	83.3%	83.3%	**59.48**	**70.04**	**59.71**	**43.98**	**54.72**		**50.88**	**54.97**	**44.77**	**59.40**	**63.37**		**56.1**	**50.0**
HS68	100.0%	100.0%	**46.02**	**52.47**	**46.93**	35.52	39.00	31.47	35.48	**41.09**	**48.24**	**43.24**	33.55	**40.70**	**41.1**	36.6
HS69	91.7%	91.7%	**46.87**	**45.62**		**46.04**	38.04	38.26	34.42	28.00	39.77	39.25	50.63	37.81	**40.4**	36.0
HS70	100.0%	100.0%	**51.54**	**65.12**	**43.99**	**59.37**	37.88	**48.55**	**43.97**	**42.08**	**46.48**	**50.00**	**56.44**	**48.64**	**49.5**	**44.1**
HS71	100.0%	100.0%	**55.85**	**49.63**	**42.59**	37.60	36.15	35.90	37.93	37.19	38.41	**42.64**	**41.75**	38.35	**41.2**	36.6
HS72	100.0%	100.0%	**47.97**	**56.48**	**43.49**	33.25	28.91	26.87	37.55	37.80	36.68	38.01	**46.63**	37.85	39.3	35.0
HS73	75.0%	75.0%	33.59	33.39		22.87			31.20	28.13	33.18	36.14	39.13	36.87	32.7	29.1
HS74	83.3%	83.3%	39.91			30.77	29.42	27.92	25.40	29.01	30.91	37.82	38.46	38.20	32.8	29.2
HS76	91.7%	91.7%	34.98	37.52	37.24	37.10	30.09	24.40		26.47	17.25	32.22	**45.32**	35.33	32.5	29.0
HS77	83.3%	83.3%	34.75	32.17	28.83	25.04		19.31		17.08	3.80	22.71	32.15	26.95	24.3	21.6
HS78	91.7%	91.7%	**47.09**	**54.80**	**48.00**	**48.99**	**43.73**	**42.87**	**47.61**	**44.85**	37.37	**44.75**		**43.34**	**45.8**	**40.7**
HS79	83.3%	83.3%	37.92	**47.14**	32.40		26.20		24.83	24.79	22.19	**45.09**	**47.14**	34.63	34.2	30.5
HS80	91.7%	91.7%	**60.88**	**71.00**	**50.85**	**55.43**	**50.92**		**48.72**	**40.75**	**44.64**	**50.30**	**58.43**	**41.50**	**52.1**	**46.4**
HS81	100.0%	100.0%	29.84	28.36	22.13	22.86	16.66	14.85	14.66	16.59	19.05	26.59	34.85	25.68	22.7	20.2
HS82	91.7%	91.7%	29.56		22.97	21.66	19.15	17.02	16.02	16.66	20.32	24.98	35.68	25.55	22.7	20.2
HS83	91.7%	91.7%	23.85	24.16	20.78		15.69	17.09	15.00	13.78	14.01	24.91	31.86	25.88	20.6	18.4
HS84	100.0%	100.0%	39.98	**45.93**	**41.12**	35.00	35.40	32.04	31.70	30.68	33.68	**40.61**	**43.34**	**41.11**	37.5	33.4

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2019 % [b]	Annual Mean NO_2													
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data[c]	Annual mean – bias adjusted[c]
HS85	100.0%	100.0%	**44.42**	**49.65**	**44.28**	36.24	33.93	37.20	**40.24**	**42.05**	37.91	**45.54**	**50.05**	**43.47**	**42.1**	37.5
HS86	100.0%	100.0%	**57.46**	**56.98**	**59.45**	**48.27**	**40.94**	**41.99**	**41.78**	37.82	**45.22**	**48.76**	**51.50**	**56.14**	**48.9**	**43.5**
HS87A	100.0%	100.0%	**57.38**	**67.52**	**62.10**	**41.19**	**46.41**	**45.41**	**48.97**	**47.03**	**45.93**	**54.09**	**49.96**	**71.17**	**53.1**	**47.3**
HS88	91.7%	91.7%	23.55	32.32	26.56	22.93	22.94	17.99	15.34		21.56	27.58	38.22	22.78	24.7	22.0
HS89	100.0%	100.0%	32.28	**40.61**	28.33	33.37	27.10	26.31	25.83	27.70	28.53	33.88	34.49	31.55	30.8	27.4
HS90	100.0%	100.0%	33.79	35.46	27.27	28.60	23.72	22.99	19.57	20.59	26.91	30.13	38.27	25.51	27.7	24.7
HS91	91.7%	91.7%		**57.92**	28.89	**54.07**	**44.60**	**49.84**	**52.59**	**46.68**	**45.85**	**52.82**	**53.09**	**54.06**	**49.1**	**43.7**
HS92	100.0%	75.0%	–	–	–	39.86	32.84	33.03	31.99	33.16	35.12	**48.97**	**59.86**	37.52	39.2	34.8
HS93	77.8%	58.3%	–	–	–	38.50	33.35	35.71			33.67	**41.64**	**65.30**	36.79	**41.5**	36.2
HSVF1	100.0%	41.7%	–	–	–	–	–	–	–	**43.30**	**41.12**	**43.35**	**52.34**	**41.44**	**44.3**	39.4
HSVF2	100.0%	41.7%	–	–	–	–	–	–	–	22.76	**42.43**	**45.76**	**51.51**	**46.80**	**41.9**	37.2
HSVF3	100.0%	41.7%	–	–	–	–	–	–	–	38.87	**43.67**	33.40	**57.70**	**42.83**	**43.3**	38.5
HSVF4	100.0%	41.7%	–	–	–	–	–	–	–	36.37	27.02	31.40	38.48	29.54	32.6	29.0
HSVF5	100.0%	41.7%	–	–	–	–	–	–	–	22.65	27.38	31.79	**43.39**	31.89	31.4	28.0

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

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

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

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