London Borough of Lewisham
Air Quality Annual Status Report for 2015
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This report provides a detailed overview of air quality in *London Borough of Lewisham* during 2015. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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

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Abbreviations

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

Table A. Summary of National Air Quality Standards and Objectives

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

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

1. Air Quality Monitoring

1.1 Locations

London Borough (LB) of Lewisham currently monitors air quality at 3 continuous monitoring stations. A fourth monitoring station (LW3) was operational until the end of 2015 when it was decommissioned. The details of the monitoring stations are given below in Table B.

Monitoring of NO_2 with diffusion tubes is carried out at 32 sites, including one triplicate site co-located with the LW2 continuous monitor. Diffusion tube L27 was relocated from Lawn Terrace to a more representative location on Montpelier Vale at the start of 2015. Details of the diffusion tube sites are given in Table C.

Table B. Details of Automatic Monitoring Sites for 2015

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
LW1	Lewisham1 (Catford)	537675	173689	Urban background	Y-AQMA3	n/a	3m	3.0m	NO_2 SO_2 O_3	Chemiluminescence UV fluorescence UV photometer
LW2	Lewisham 2 (New Cross)	536241	176932	Roadside	Y-AQMA3	0	6m	2.5m	NO_2 SO_2 PM_{10} $PM_{2.5}$	Chemiluminescence UV fluorescence TEOM-FDMS TEOM-FDMS
LW3	Lewisham 3 (Mercury Way)	535806	177612	Industrial	Y-AQMA4	n/a	2m	2m	PM_{10}	BAM
LW4	Lewisham 4 (Loampit Vale)	537912	175838	Roadside	Y-AQMA3	0	7m	2.5m	NO_2 PM_{10}	Chemiluminescence TEOM

Table C. Details of Non-Automatic Monitoring Sites for 2015

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)
L1	Chubworthy St	536109	177580	Roadside	Y	5	2	2.5	NO_2	N
L2	Bronze St	537540	177439	Urban Background	Y	0	6	2.5	NO_2	N
L3	Grove St	536561	178471	Urban Background	Y	n/a	2	2.5	NO_2	N
L4	Plough Way	536534	178926	Urban Background	Y	n/a	2	2.5	NO_2	N
L5	Lee High Rd	539678	175050	Roadside	Y	0	5	2.5	NO_2	N
L6	Le May Ave	540615	172337	Urban Background	N	0	5	2.5	NO_2	N
L7	Bell Green	536556	171810	Roadside	Y	0	3	2.5	NO_2	N
L8	Stondon Park	536229	174032	Roadside	Y	0	5	2.5	NO_2	N
L9	Ladywell Rd	537500	174925	Roadside	Y	0	3	2.5	NO_2	N
L10	Whitburn Rd	538062	175085	Roadside	Y	1	1	2.5	NO_2	N
L11	Sparta St	538007	176517	Roadside	Y	3	3	2.5	NO_2	N
L12	Montague Avenue, Hilly Fields	537132	175353	Urban Background	Y	n/a	60	2.5	NO_2	N
L13	Mayow Rd	535804	171567	Urban Background	N	0	5	2.5	NO_2	N
L14	Boyne Rd	538482	175792	Urban Background	Y	3	1	2.5	NO_2	N
L15	Lewisham Rd	538237	176101	Roadside	Y	0	10	2.5	NO_2	N
L16	Loampit Vale	537740	175930	Roadside	Y	0	1.5	2.5	NO_2	N
L17	New Cross Monitoring Station	536246	176934	Roadside	Y	0	6	2.5	NO_2	Y
L18	New Cross Monitoring Station	536246	176934	Roadside	Y	0	6	2.5	NO_2	Y

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)
L19	New Cross Monitoring Station	536246	176934	Roadside	Y	0	6	2.5	NO_2	Y
L20	Hatcham Park Rd	535746	176969	Roadside	Y	1	4	2.5	NO_2	N
L21	Brockley Rise	536133	173341	Roadside	Y	0	3	2.5	NO_2	N
L22	Ringstead Rd	538060	173816	Urban Background	Y	3	0.5	2.5	NO_2	N
L23	Catford Hill	537178	173365	Roadside	Y	6	0.5	2.5	NO_2	N
L24	Hazelbank Rd	538930	172713	Urban Background	N	4	2	2.5	NO_2	N
L25	Stanstead Rd	535530	173198	Urban Background	Y	0	10	2.5	NO_2	N
L26	Shardloes Rd	536527	175935	Roadside	Y	3	0.5	2.5	NO_2	N
L27	Montpelier Vale*	539604	176090	Roadside	Y	2	0.5	2.5	NO_2	N
L28	Baring Rd	540051	173769	Roadside	Y	5	0.5	2.5	NO_2	N
L29	Holy Cross, Sangley Rd	538165	173406	Roadside	Y	0	5	2.5	NO_2	N
L30	Christchurch, Perry Vale	535535	172679	Roadside	N	1	5	2.5	NO_2	N
L31	St Mary Magdalen's RC, Howson Rd	536399	175150	Urban Background	Y	2	2	2.5	NO_2	N
L32	Grinling Gibbons, Clyde St	536944	177665	Urban Background	Y	0	2	2.5	NO_2	N
L33	St Mary's CE, Lewisham High St	537979	174792	Roadside	Y	0	2	2.5	NO_2	N
L34	Sydenham, Dartmouth Rd	535071	172346	Urban Background	N	0	5	2.5	NO_2	N

* Diffusion tube was re-located from Lawn Terrace to Montpelier Vale in 2015

1.2 Comparison of Monitoring Results with AQOs

The results of nitrogen dioxide monitoring carried out by LB of Lewisham are presented in Table D. Data from the 3 automatic monitoring stations have been fully ratified. Data from diffusion tube monitoring sites have been adjusted for bias. Data capture for 2015 for the continuous monitors and all diffusion tube locations was greater than 75% and so it is not necessary to "annualise" any of the results.

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 2015 % [b]	Annual Mean Concentration (μgm^{-3})						
				2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 1.03)	2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 1.01)	2013 (Bias Adjustment Factor = 1.00)	2014 (Bias Adjustment Factor = 0.97)	2015 (Bias Adjustment Factor = 1.02)
LW1 (CM)	Urban Background	82	82	**56**	**55**	**51**	**50**	**48**	**54**	**43**
LW2 (CM)	Roadside	93	93	**63**	**59**	**51**	**50**	**51**	**42**	**47**
LW4 (CM)	Roadside	84	84	-	-	-	**64**[c]	**57**	**56**[c]	**51**
L1	Roadside	92	92	-	-	36.4	37.8	38.6	38.0	33.1
L2	Urban Background	83	83	-	-	29.7	31.0	29.6	29.2	28.1
L3	Urban Background	100	100	-	-	34.7	37.9	37.1	35.9	34.3
L4	Urban Background	100	100	-	-	37.2	34.9	37.3	34.9	34.4
L5	Roadside	100	100	-	-	36.6	39.0	**43.3**	37.7	33.4

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Annual Mean Concentration (µgm^{-3})						
				2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 1.03)	2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 1.01)	2013 (Bias Adjustment Factor = 1.00)	2014 (Bias Adjustment Factor = 0.97)	2015 (Bias Adjustment Factor = 1.02)
L6	Urban Background	83	83	-	-	35.9	37.5	38.3	36.0	35.2
L7	Roadside	100	100	-	-	**48.3**	**53.4**	**53.8**	**55.4**	**48.3**
L8	Roadside	100	100	-	-	**44.5**	**44.8**	**48.6**	**42.2**	**42.2**
L9	Roadside	100	100	-	-	39.9	**40.6**	**40.5**	**40.8**	37.5
L10	Roadside	92	92	-	-	**43.2**	**44.0**	**46.2**	**40.3**	39.4
L11	Roadside	92	92	-	-	**44.9**	**40.0**	**47.4**	38.6	36.1
L12	Urban Background	83	83	-	-	30.7	33.7	34.9	30.5	26.9
L13	Urban Background	100	100	-	34.9	29.7	32.3	33.3	28.3	27.3
L14	Urban Background	100	100	35.7	33.3	33.5	34.5	34.7	31.2	29.9
L15	Roadside	100	100	**49.2**	**47.8**	**43.6**	**44.3**	**47.6**	**46.5**	**46.6**
L16	Roadside	100	100	**59.4**	**61.3**	**48.7**	**55.0**	**58.6**	**52.5**	**48.7**
L17	Roadside	100	100	**72.8**	**75.2**	**75.4**	**59.2**	**53.7**	**49.1**	**50.6**
L18	Roadside	100	100	**73.1**	**75.2**	**75.4**	**59.2**	**53.7**	**51.1**	**49.1**
L19	Roadside	83	83	**71.2**	**75.2**	**75.4**	**59.2**	**53.7**	**49.6**	**49.7**
L20	Roadside	92	92	-	**54.1**	**42.4**	**45.4**	**44.7**	**43.6**	**43.2**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Annual Mean Concentration (µgm^{-3})						
				2009 (Bias Adjustment Factor = 0.99)	2010 (Bias Adjustment Factor = 1.03)	2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 1.01)	2013 (Bias Adjustment Factor = 1.00)	2014 (Bias Adjustment Factor = 0.97)	2015 (Bias Adjustment Factor = 1.02)
L21	Roadside	100	100	**56.6**	**60.9**	**52.6**	**54.0**	**54.0**	**54.6**	**50.3**
L22	Urban Background	100	100	37.9	33.1	35.4	34.3	33.5	32.2	30.3
L23	Roadside	100	100	**57.1**	**56.1**	**54.0**	**56.5**	**59.9**	**55.1**	**51.8**
L24	Urban Background	92	92	30.8	33.4	29.0	35.1	36.3	35.6	32.4
L25	Urban Background	100	100	27.1	30.8	28.3	28.3	27.5	25.5	23.3
L26	Roadside	92	92	**60.0**	**53.8**	**49.7**	**48.0**	**51.9**	**53.7**	**47.2**
L27a*	Roadside	-	-	**40.5**	38.5	34.6	37.3	37.2	36.2	-
L27b*	Roadside	100	100	-	-	-	-	-	-	**57.1**
L28	Roadside	100	100	**49.1**	**60.7**	**51.9**	**59.3**	**61.9**	**51.0**	**58.6**
L29	Roadside	100	100	31.3	35.1	29.9	32.1	33.3	33.0	28.6
L30	Roadside	83	83	31.0	33.0	27.8	31.1	34.3	31.3	32.3
L31	Urban Background	100	100	28.7	30.7	23.2	25.4	29.6	25.7	23.5
L32	Urban Background	92	92	33.0	35.3	29.7	29.6	31.6	30.6	28.6
L33	Roadside	100	100	**60.7**	**54.7**	**47.1**	**51.4**	**51.0**	**44.6**	**41.8**
L34	Urban Background	100	100	34.3	32.7	27.6	30.4	34.0	31.8	27.0

Notes: Exceedances of the NO_2 annual mean AQO of 40 µgm^{-3} are shown in bold. NO_2 annual means greater than 60 µg m^{-3}, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined. *L27a refers to previous site location, L27b refers to new site location.

[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 2015 annual mean NO_2 concentrations at the three continuous monitoring stations all exceeded the annual mean NO_2 AQO of 40 µgm^{-3}. The highest concentration was 51 µgm^{-3} at LW4. Between 2009 and 2015 there has been a downward trend in annual mean NO_2 concentrations at the automatic monitoring stations. At LW1 annual mean NO_2 concentrations have fallen from 56 µgm^{-3} in 2009 to 43 µgm^{-3} in 2015. A similar trend is seen in the data from LW2 where annual mean NO_2 concentrations have fallen from 63 µgm^{-3} in 2009 to 47 µgm^{-3} in 2015, and LW4 (operational since 2012).

The annual mean NO_2 AQO of 40 µgm^{-3} was exceeded at 12 diffusion tube monitoring locations in 2015. The highest concentration was measured at site L28 (58.6 µgm^{-3}). In terms of temporal trends there is considerable variability between the diffusion tube monitoring locations over the 2009 to 2015 period. A number of sites (L1, L4, L6, L9, L15, L20, L21, L29, L30) have shown no significant changes in annual mean NO_2 concentrations between 2009 and 2015, in particular since 2011, and only small variations in concentrations from one year to the next. Sites L22, L26, L33 and the triplicate tubes co-located with the LW2 continuous monitor at New Cross (L17, L18, L19) showed evidence of decreasing NO_2 concentrations from 2009 to 2015. The L27 site recorded one of the highest NO_2 concentrations in 2015, in contrast to the lower concentrations of previous years, but this is due to the site having been re-located to a busy area with worst-case exposure (marked as L27b). The remaining sites show no evidence of increasing or decreasing concentrations over time but the year-to-year variations in NO_2 concentrations are quite pronounced.

Over the last 7 years annual mean NO_2 concentration measured at all urban background sites have remained below the annual mean NO_2 AQO of 40 µgm^{-3} whereas roadside locations have exceeded the AQO. However, on average, annual mean NO_2 concentrations at roadside and urban background monitoring locations have decreased between 2009 and 2015. The reduction is most apparent for the roadside sites. For the urban background locations annual mean NO_2 concentrations decreased between 2009 and 2011, followed by increases in 2012 and 2013, before decreasing again in 2014 and 2015.

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 2015 % [b]	Number of Hourly Means > 200 µgm^{-3}						
			2009	2010	2011	2012	2013	2014	2015
LW1	82	82	4	1	0	2	3	0	0
LW2	93	93	6	0	0	0	0	0	7
LW4	84	84	-	-	-	16 (**221**)[c]	**26**	5 (180)[c]	0

Notes: Exceedance of the NO_2 short term AQO of 200 µg m^{-3} over the permitted 18 hours 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%

In 2015, no exceedances of the hourly mean NO_2 AQO value (200 µgm^{-3}) were recorded at the LW1 and LW4 automatic monitoring locations. At LW2, 7 exceedances of the hourly mean NO_2 AQO value were recorded during the year, which is within the 18 permitted hours for compliance with the hourly NO_2 AQO. In the last 7 years, at all of the automatic monitoring sites, there has been considerable variability in the numbers of hours of exceedances from one year to the next with no clear upward or downward trend.

At LW1, the urban background site, there have been fewer than 5 exceedances of the hourly NO_2 AQO value in all years since 2009, with no exceedances recorded in 2011, 2014 and 2015. At LW2 there were no recorded exceedances of the hourly NO_2 AQO value in any year between 2010 and 2014, inclusive. In 2009 there were 6 hours exceeding the hourly NO_2 AQO value, whilst in 2015 there were 7 hours exceeding the hourly NO_2 AQO value. These results are within the permitted 18 hours of exceedance per year and so the 1-hour mean objective was achieved. At LW4, in 2013 there were 26 hours exceeding the hourly NO_2 AQO value and so the 1-hour mean objective was not achieved. In 2013 at this location, there were 16 hours exceeding the hourly NO_2 AQO value; however, the data capture was below 75% and so it is more appropriate to calculate the 99.8th percentile of hourly NO_2 concentrations for comparing against the 1-hour mean objective. The 99.8th percentile result was 221 µg m^{-3} – a value of greater than 200 µg m^{-3} indicates that the 1-hour mean objective is likely to have been exceeded. These are the only recorded exceedances of the 1-hour mean NO_2 objective since 2009. The results for 2014 and 2015 indicate that the 1-hour mean NO_2 objective was achieved in both years at LW4.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Annual Mean Concentration (µgm^{-3})						
			2009	2010	2011	2012	2013	2014	2015
LW2	92	92	25	25	26	26	23	23 [c]	23
LW3	92	92	-	23	23	22	24	24	22
LW4	97	97	-	-	-	24	28	25 [c]	17

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%

The annual mean PM_{10} concentrations recorded the three automatic monitoring stations within the LB of Lewisham that measure particulate matter were well below the AQO of 40 µg m^{-3} in 2015, and in all years since 2009. The highest annual mean PM_{10} concentration in 2015 was 23 µg m^{-3} at LW2. The highest recorded annual mean PM_{10} concentration since 2009 was 28 µg m^{-3} at LW4 in 2013.

Over the last 7 years PM_{10} concentrations at LW2 and LW3 automatic monitoring stations have been quite stable with very small changes from one year to the next. At LW4, where monitoring commenced in 2012, there have been larger variations in concentrations but without any clear evidence of an increasing or decreasing tendency.

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 2015 % [b]	Number of Daily Means > 50 µgm^{-3}						
			2009	2010	2011	2012	2013	2014	2015
LW2	92	92	12	6	19	15 (47) [c]	15	14 (38) [c]	8
LW3	92	92	-	4 (39) [c]	22	20	13	27	16
LW4	97	97	-	-	-	3 (36) [c]	19	13 (41) [c]	1

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 90% 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%

All sites achieved the 24-hour mean PM_{10} AQO in 2015. In all years since 2009 all of the PM_{10} monitoring locations have achieved the 24-hour mean PM_{10} AQO. The highest numbers of exceedances of the daily mean PM_{10} objective value (50 µg m^{-3}) was 16 days at site LW3. This is well below the 35 permitted exceedances per year for compliance with the objective. In comparison to 2014, the numbers of daily exceedances recorded in 2015 were fewer at all sites. At LW2 and LW3 there does appear to be some evidence to suggest a longer-term downward trend in the numbers of days of exceedances since 2009, despite there being variations from one year to the next.

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 2015 % [b]	Annual Mean Concentration (µgm^{-3})						
			2009	2010	2011	2012	2013	2014	2015
LW2	89	89	-	-	-	-	17.6	16.5	15.5

Notes: Exceedance of the $PM_{2.5}$ annual mean AQO of 25 µgm^{-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%

Since 2013, the LB of Lewisham has been continuously monitoring $PM_{2.5}$ concentrations at site LW2. In 2015, the annual mean $PM_{2.5}$ concentration measured was 15.5 µg m^{-3}, which is below the annual mean $PM_{2.5}$ AQO of 25 µg m^{-3} and the lowest recorded since monitoring began. The annual mean $PM_{2.5}$ concentration has been below the annual mean $PM_{2.5}$ AQO in all years since monitoring commenced and has a decrease of approximately 1 µg m^{-3} each year.

Table I. SO_2 Automatic Monitor Results for 2015: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [b]	Number of: [c]		
			15-minute means > 266 µgm^{-3}	1-hour mean > 350 µgm^{-3}	24-hour mean > 125 µgm^{-3}
LW1	98	98	0	0	0
LW2	96	96	0	0	0

Exceedances 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" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

Automatic monitoring of SO_2 is carried out at 2 locations in the LB of Lewisham. The results of the monitoring during 2015 are summarised in Table I. There were no exceedances of any of the AQOs or standards relating to SO_2 during 2015.

2. Action to Improve Air Quality

Table J. Commitment to Cleaner Air Borough Criteria

Theme	Criteria		Achieved (Y/N)	Evidence
1. Political leadership	***1.a***	Pledged to become a Cleaner Air for London Borough (at cabinet level) by taking significant action to improve local air quality and signing up to specific delivery targets.	Y	No evidence required
	1.b	Provided an up-to-date Air Quality Action Plan (AQAP), fully incorporated into LIP funding and core strategies.	Y	The Draft AQAP for 2016-2021 is out for consultation, and will replace the 2008 AQAP that is available online at http://www.lewisham.gov.uk/myservices/environment/air-pollution/Documents/LewishamAirQualityActionPlan.pdf
2. Taking action	**2.a**	Taken decisive action to address air pollution, especially where human exposure and vulnerability (e.g. schools, older people, hospitals etc.) is highest.	Y	LB Lewisham has produced a Joint Strategic Needs Assessment (JSNA), with Public Health and Environmental Protection collaboration
	2.b	Developed plans for business engagement (including optimising deliveries and supply chain), retrofitting public buildings using the RE:FIT framework, integrating no engine idling awareness raising into the work of civil enforcement officers.	N	Business engagement projects are due to be carried out as part of the requirements under the JSNA.
	2.c	Integrated transport and air quality, including by improving traffic flows on borough roads to reduce stop/start conditions	Y	Evelyn Street Corridor major regeneration project, which includes major changes to road network to improve traffic conditions and congestion. Introducing 20 mph speed limits on all Borough highways.
	2.d	Made additional resources available to improve local air quality, including by pooling its collective resources (s106 funding, LIPs, parking revenue, etc.).	Y	The Borough has won funding for schemes to improve air quality from the Mayor's Air Quality Fund (MAQF), with funding matched as part of the LIP programme.
3. Leading by example	**3.a**	Invested sufficient resources to complement and drive action from others	Y	One full time post equivalent with an increase to one and half post during the MAQF R2 2016-2019

	3.b	Maintained an appropriate monitoring network so that air quality impacts within the borough can be properly understood	Y	All existing Air Quality monitoring locations have been maintained (32 diffusion tube locations and 4 automatic monitors)
	3.c	Reduced emissions from council operations, including emissions from buildings, vehicles and all activities.	Y	Reductions in Borough's own vehicle fleet emissions through selection of lower emission vehicles
	3.d	Adopted a procurement code which reduces emissions from its own and its suppliers activities, including from buildings and vehicles operated by and on their behalf (e.g. rubbish trucks).	Y	Plans in place for 40% of diesel vehicles to meet Euro VI standard, with the potential to increase in subsequent year.
4. Using the planning system	**4.a**	Fully implemented the Mayor's policies relating to air quality neutral, combined heat and power and biomass.	Y	All approved planning applications must meet the Mayor's requirements relating to 'Air Quality neutral' and CHPs
	4.b	Collected s106 from new developments to ensure air quality neutral development, ***where possible***	N	Where AQ neutral has not be met, compliance has been achieved by changes to schemes, so S106 money has not been required.
	4.c	Provided additional enforcement of construction and demolition guidance, with regular checks on medium and high risk building sites.	Y	Sites are visited periodically based on risk. An increase in visits will occur from the end of 2016 as MAQF money becomes available to resource.
5. Integrating air quality into the public health system	**5**	Included air quality in the borough's Health and Wellbeing Strategy and/or the Joint Strategic Needs Assessment	Y	Raising awareness of air quality issues through education at 5 local primary schools through the Joint Strategic Needs Assessment
6. Informing the public	**6.a**	Raised awareness about air quality locally	Y	A public art project has been developed to raise air quality issues and will be implemented in 2016 (www.tompearman.co.uk/brockley-corridor-arts)

2.1 Air Quality Action Plan Progress

Table K provides a brief summary of LB of Lewisham's progress against the 2008 Air Quality Action Plan (AQAP), showing progress made this year. New projects which commenced in 2015 are shown at the bottom of the table. A draft AQAP for Lewisham has been prepared, which, once approved, will replace the 2008 AQAP. The table also highlights new measures that will be included in this new AQAP.

Highlights of successful projects delivered through the 2008 AQAP include:

- Plans for the expansion of the electric vehicle charging points throughout the borough
- 20 mph speed limit being introduced on all of LB of Lewisham's highways
- The North Lewisham links project which is improving walking and cycling routes across Deptford and New Cross, which also includes the Quietways project (cycle routes through quieter side streets and parks, aimed at encouraging less-confident cyclists)
- Planning Policy that is encouraging car-free developments
- Reductions in the Council's own emissions through fleet vehicle selection
- Raising awareness on air quality issues through school education programmes and a public art project.

Table K. Delivery of Air Quality Action Plan Measures

Action Category	Action	Progress	Further information
Emissions from developments and buildings	Ensuring emissions from construction are minimised	IN PROGRESS • Already in operation. • Benefits potentially significant but unquantifiable. • Impact of reduction will be ongoing.	Local Policy and Local List requirement.
Emissions from developments and buildings	Ensuring enforcement of Non Road Mobile Machinery (NRMM) air quality policies	IN PROGRESS • Condition already introduced. • Benefits potentially significant but unquantifiable. • Impact of reduction will be ongoing.	Only used for Major sites.
Emissions from developments and buildings	Enforcing alternative clean and efficient energy supplies (to replace Enforcing CHP and biomass air quality policies)	IN PROGRESS • In operation however continuing to consider best practice and alternative heat and power supplies. • Benefits potentially significant but unquantifiable. • Abatement conditions review via planning.	Only used in limited circumstances, where the tests for conditions are met.
Emissions from developments and buildings	Enforcing Air Quality Neutral policies	IN PROGRESS • Already in operation. • Impact of reduction will be ongoing. • Benefits potentially significant but unquantifiable	Considered on a site by site basis as new development is proposed. (Core Strategy Policy 12)
Emissions from developments and buildings	Ensuring adequate, appropriate, and well located green space and infrastructure is included in new developments	IN PROGRESS • Considered as part of the design of schemes that come forward. • Benefits potentially significant but unquantifiable	Urban greening strategies. Considered on a site by site basis as new development is proposed. (Core Strategy Policy 12)

Action Category	Action	Progress	Further information
Emissions from developments and buildings	Ensuring that Smoke Control Zones are appropriately identified and fully promoted and enforced	COMPLETED • Whole of borough is already a Smoke Control Area. (Smoke Control Order 2010) • There was specific publicity promotion at the time of the order in 2010 IN PROGRESS • Respond and report on complaints and action taken. • Further publicity, will review in April 2017	
Emissions from developments and buildings	Promoting and delivering energy efficiency retrofitting projects in workplaces and homes, including through using the GLA RE:NEW and RE:FIT programmes, where appropriate, to replace old boilers /top-up loft insulation in combination with other energy conservation measures.	IN PROGRESS • The biannual Home Energy Conservation Act report is due in 2017 which will provide progress on measures.	Lewisham Council Corporate Sustainability Use of Resources Statement is provided on a periodic basis and could be used to provide input to monitoring.
Emissions from developments and buildings	Introduce a requirement for a minimum EPC rating for privately rented sector HMOs covered by both the mandatory and additional licensing schemes	IN PROGRESS • Timescale for implementation is April 2017, with monitoring of action considered after this date.	
Emissions from developments and buildings	Introduce a requirement for any works covered by the Disabled Facilities Grant or discretionary housing improvement grants to meet level D EPC rating in privately owned accommodation	IN PROGRESS • Timescale for implementation is December 2016, with monitoring of action considered after this date.	

Action Category	Action	Progress	Further information
Public health and awareness raising	Ensure that Directors of Public Health (DsPHs) have been fully briefed on the scale of the problem in the local authority area, what is being done, and what is needed.	COMPLETED • Already provided as part of the consultation for the draft Air Quality Action Plan	
Public health and awareness raising	Public Health Teams should be supporting engagement with local stakeholders (businesses, schools, community groups and healthcare providers). They should be asked for their support via the DsPH when projects are being developed.	IN PROGRESS • Different initiatives being considered and developed over period of Air Quality Action Plan.	
Public health and awareness raising	Director of Public Health to have responsibility for ensuring their Joint Strategic Needs Assessment (JSNA) has up to date information on air quality impacts on the population	ONGOING • Already have a JSNA. • Health Protection Committee will review at time of sign off	
Public health and awareness raising	Strengthening 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	IN PROGRESS • This is part of the health protection remit of one of the Consultants in Public Health. • Health and Wellbeing Strategy delivery plan will be reviewed for 2018 – 2020 to incorporate air quality.	
Public health and awareness raising	Engagement with businesses	IN PROGRESS • Different initiatives being considered and developed over period of Action Plan. Cost will be dependent on project initiated.	
Public health and awareness raising	Promotion of availability of airTEXT	IN PROGRESS • Reviewing opportunities for communication by April 2017.	

Action Category	Action	Progress	Further information
Public health and awareness raising	Encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme	IN PROGRESS • Already in operation with 78.5% of schools in the borough having an accreditation	
Public health and awareness raising	Air quality at schools	IN PROGRESS • Review opportunities for School engagement by April 2017.	
Delivery servicing and freight	Update local authority Procurement policies to include a requirement for suppliers with large fleets to have attained silver Fleet Operator Recognition Scheme (FORS) accreditation	IN PROGRESS • Already part of policy. Review of PPQ and ITT by April 2017 for implementation.	
Delivery servicing and freight	Update Procurement policies to ensure sustainable logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainability criteria)	IN PROGRESS • Asset Management Strategy 2015-2020 produced. Procurement to review by April 2017	
Delivery servicing and freight	Re-organisation of freight to support consolidation (or micro-consolidation) of deliveries, by setting up or participating in new logistics facilities, and/or requiring that council suppliers participate in these	IN PROGRESS • Review construction freight consolidation by April 2017 for MAQF area. Review sites available for Council suppliers by April 2017	
Delivery servicing and freight	Virtual Loading Bays and priority loading for ultra-low emission delivery vehicles	IN PROGRESS To be considered at next Parking review in 2017	
Borough fleet actions	Join the Fleet Operator Recognition Scheme (FORS) for the borough's own fleet and obtain Gold accreditation	IN PROGRESS • Applied for FORS membership. Reviewing accreditation April 2017	
Borough fleet actions	Increasing the number of hydrogen, electric, hybrid, bio-methane and cleaner vehicles in the boroughs' fleet	IN PROGRESS • Working with LoCITY to increase the availability and uptake of low emission commercial vehicles.	

Action Category	Action	Progress	Further information
Borough fleet actions	Accelerate uptake of new Euro VI vehicles in borough fleet	IN PROGRESS • 49 trucks to be changed to Euro VI by April 2017.	
Borough fleet actions	Smarter Driver Training, or equivalent, for drivers of vehicles in Borough Own Fleet i.e. through training of fuel efficient driving and providing regular re-training of staff	ONGOING • Already provided through 'Safe City Driving' course.	
Localised solutions	Improvement and Introduction of green spaces in new developments through the Planning process by conditions and S106 obligations.	ONGOING • Already in operation. Impact of reduction will be ongoing. Greenspace provision is proportionate to scale of development and will be monitored through the approval & discharge of conditions & obligations.	Urban greening strategies. Considered on a site by site basis as new development is proposed. (Core Strategy Policy 12)
Cleaner transport	Discouraging unnecessary idling by vehicles near schools	IN PROGRESS • Install 'anti idling signs' at schools and review any possible campaign in April 2017	
Cleaner transport	Speed control measures e.g. lowering the legal speed limit to 20mph in built up residential areas	IN PROGRESS • All Lewisham Roads to introduce 20 mph zone September 2016	
Cleaner transport	Increasing the proportion of electric, hydrogen and ultra-low emission vehicles in Car Clubs	IN PROGRESS • Work with car clubs towards compliment of electric vehicles. Review April 2017.	Introduced as part of Travel Plans for new development
Cleaner transport	Very Important Pedestrian Days (e.g. no vehicles on certain roads on a Sunday) and similar initiatives	IN PROGRESS • Review opportunities through community groups by April 2017.	
Cleaner transport	Free or discounted parking charges at existing parking meters for zero emission cars	IN PROGRESS • Only achieved through the cashless meter's model. To be considered at next Parking review in 2017	

Action Category	Action	Progress	Further information
Cleaner transport	Free or discounted residential parking permits for zero emission cars	ONGOING • Discounted residential parking permits already available for zero emission vehicles.	The annual parking report provides a percentage against total permits issued.
Cleaner transport	Surcharge on diesel vehicles below Euro 6 standards for Resident and Controlled Parking Zone permits	IN PROGRESS • To be considered at next Parking review in 2017	
Cleaner transport	Installation of residential electric charge points	IN PROGRESS • For all planning major site developments 20% active charging points and 20% passive installed. Through Source London, Blue Point maintain EVCPs and expanding network from 10 sites. • By April 2017 to include at least an additional 14 locations.	Local Policy and Local List requirement.
Cleaner transport	Installation of rapid chargers to help encourage the take-up of electric taxis, cabs and commercial vehicles (in partnership with TfL and/or OLEV)	IN PROGRESS • Already in communication with TfL in potential for establishing points.	
Cleaner transport	Reprioritisation of road space; reducing parking at some destinations and/or restricting parking on congested high streets and A roads to improve bus journey times, cycling experience, and reduce emissions caused by congested traffic	IN PROGRESS • The proposed Controlled Parking Zone (CPZ) Programme will be approved annually at Executive Director level in line with its Parking policy	Lewisham's Annual Parking Report will provide progress and delivery of CPZs

Action Category	Action	Progress	Further information
Cleaner transport	Provision of infrastructure to support walking and cycling	IN PROGRESS • The North Lewisham links project which is improving walking and cycling routes across Deptford and New Cross, which also includes the Quietways project (cycle routes through quieter side streets and parks, aimed at encouraging less-confident cyclists)	
GLA AQ FOCUS AREA 1 Cleaner Transport	Development of a Zonal Construction Logistic Framework for the Evelyn Street Corridor	IN PROGRESS • Quarterly review with GLA on progress. Air Quality benefits to be quantified during progress. • £305,250 over 3 years 2016-2019. funded through MAQF R2 and part match funded by Lewisham Transport	
GLA AQ FOCUS AREA 3 Public health and awareness raising	Provision of public art along the Brockley Corridor to raise awareness on air quality	IN PROGRESS • Consultation with Local Assembly and local community, to be installed by the end of 2016 • £17,000 provided as part of the MAQF R1 fund	
GLA AQ FOCUS AREA 3 Cleaner Transport	Road Layout changes along the Crofton Park area of the Brockley corridor	IN PROGRESS • Works planned for 2017/18 • Originally part of the MAQF R1 funding, but now through Local Transport Fund	

3. Planning Update and Other New Sources of Emissions

3.1 New or significantly changed industrial or other sources

In 2015, the LB of Lewisham has not identified any new or significantly changed road traffic or industrial sources of emissions. However, there a number of developments identified as emission sources in the 2015 Updating and Screening Assessment that are still ongoing. The most significant of these include:

- Lewisham Gateway – a large development scheme aiming to better connect Lewisham town centre with nearby residential communities, the DLR and mainline rail stations. The scheme involves a major realignment of the A20/A21 roundabout and the construction of a number of new homes.
- Plough Way (a.k.a. Surrey Wharves) incorporates four separate development sites**.** *Marine Wharf West*, which includes 532 new homes plus space for shops and businesses. *Marine Wharf West* which is awaiting approval but will create a further 183 homes and commercial floorspace. *Cannon Wharf,* which includes 679 new homes (including two tall buildings of 20 and 23 storeys), a purpose-built business centre which is expected to create at least 80 new jobs on the site (25% more than previously), a children's nursery, and landscaping along the former route of the Surrey Canal. *7-17 Yeoman Street* where Planning has been granted for 33 new homes.
- Convoys Wharf – The largest development site within the borough consisting of up to 3,500 new homes, retail space, public open areas and transport improvements in the area received approval and by the end of 2015 was at the early stage with some demolition. The redevelopment of the site has the potential to provide public access to a major part of the borough's riverfront for the first time in centuries.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

Calibrations of continuous gas monitors are carried out with certified calibration gases for each analyser. Routine calibrations are undertaken manually every 2 weeks by the Local Authority Officer for LW1 and LW4. At LW2, a nightly auto-calibration is invoked.

The calibration data are sent to ERG-King's College London who are responsible for Data Management, data validation and ratification. Site Audits are carried out annually, and includes UKAS accredited on-site gas cylinder certification and on-site testing of sampling system efficiency.

PM_{10} Monitoring Adjustment

TEOM PM_{10} measurements are corrected using the Volatile Correction Model (VCM) by ERG-King's College London.

A.2 Diffusion Tube Quality Assurance / Quality Control

Diffusion tubes for NO_2 in LB of Lewisham are provided by Gradko International Ltd, using a preparation method of 50% Triethanolamine (TEA) in acetone.

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

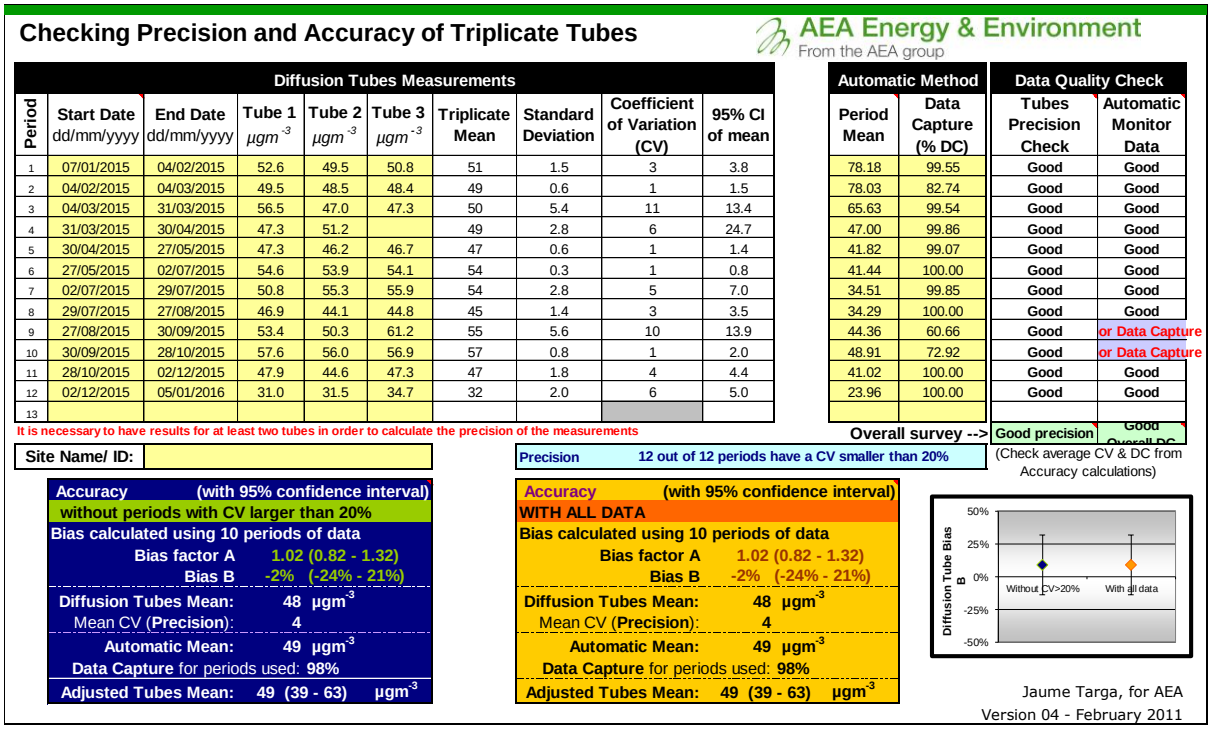
AIR NO2 PT forms an integral part of the UK NO_2 Network's QA/QC, and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme.

The percentage of results submitted by Gradko International Ltd which were subsequently determined to be satisfactory was 100% for all tests in AIR-PT Rounds AR001-AR010 (April 2014 - November 2015).

Factor from Local Co-location Studies (if available)

A local bias adjustment factor of 1.02 was calculated from a triplicate of diffusion tubes co-located with the continuous NO_2 monitoring site at New Cross Road (LW2). Figure A.1 shows details of the calculation of the local bias adjustment factor for 2015.

Figure A.1: Local bias adjustment factor calculation



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2015	04/02/2015	52.6	49.5	50.8	51	1.5	3	3.8	78.18	99.55	Good	Good
2	04/02/2015	04/03/2015	49.5	48.5	48.4	49	0.6	1	1.5	78.03	82.74	Good	Good
3	04/03/2015	31/03/2015	56.5	47.0	47.3	50	5.4	11	13.4	65.63	99.54	Good	Good
4	31/03/2015	30/04/2015	47.3	51.2		49	2.8	6	24.7	47.00	99.86	Good	Good
5	30/04/2015	27/05/2015	47.3	46.2	46.7	47	0.6	1	1.4	41.82	99.07	Good	Good
6	27/05/2015	02/07/2015	54.6	53.9	54.1	54	0.3	1	0.8	41.44	100.00	Good	Good
7	02/07/2015	29/07/2015	50.8	55.3	55.9	54	2.8	5	7.0	34.51	99.85	Good	Good
8	29/07/2015	27/08/2015	46.9	44.1	44.8	45	1.4	3	3.5	34.29	100.00	Good	Good
9	27/08/2015	30/09/2015	53.4	50.3	61.2	55	5.6	10	13.9	44.36	60.66	Good	or Data Capture
10	30/09/2015	28/10/2015	57.6	56.0	56.9	57	0.8	1	2.0	48.91	72.92	Good	or Data Capture
11	28/10/2015	02/12/2015	47.9	44.6	47.3	47	1.8	4	4.4	41.02	100.00	Good	Good
12	02/12/2015	05/01/2016	31.0	31.5	34.7	32	2.0	6	5.0	23.96	100.00	Good	Good
13													
											Overall survey -->	Good precision	Good

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

Site Name/ ID:

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A 1.02 (0.82 - 1.32)
Bias B -2% (-24% - 21%)
Diffusion Tubes Mean: 48 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 49 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 49 (39 - 63) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 10 periods of data
Bias factor A 1.02 (0.82 - 1.32)
Bias B -2% (-24% - 21%)
Diffusion Tubes Mean: 48 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 49 µgm^{-3}
Data Capture for periods used: 98%
Adjusted Tubes Mean: 49 (39 - 63) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

National Bias Adjustment Factor

The national bias adjustment factor spreadsheet is available from the Defra website. The national bias adjustment factor is the average of all bias adjustment factors uploaded by local authorities that use the same laboratory and preparation method for the year in question. The national bias adjustment factor for 50% TEA/Acetone preparation, supplied and analysed by Gradko in 2015 is shown in Figure A.2.

Figure A.2: National bias adjustment factor spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/16

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

This spreadsheet will be updated at the end of June 2016

LAQM Helpdesk Website

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

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

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in **blue** at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop- up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	50% TEA in acetone	2015	R	Bedford Borough Council	12	35	33	6.4%	G	**0.94**
Gradko	50% TEA in acetone	2015	UB	Norwich City Council	9	12	12	-3.3%	G	**1.03**
Gradko	50% TEA in acetone	2015	R	West Berkshire Council	11	38	35	10.7%	G	**0.90**
Gradko	50% TEA in acetone	2015	R	East Hampshire District Council	11	22	20	9.5%	G	**0.91**
Gradko	50% TEA in acetone	2015	R	LB Haringey	12	37	40	-9.1%	S	**1.10**
Gradko	50% TEA in acetone	2015	KS	London Borough of Croydon	12	54	52	4.7%	G	**0.96**
Gradko	50% TEA in acetone	2015	B	London Borough of Richmond upon Thames	12	21	21	-0.2%	G	**1.00**
Gradko	50% TEA in acetone	2015	R	London Borough of Richmond upon Thames	12	36	33	8.9%	G	**0.92**
Gradko	50% TEA in acetone	2015	KS	Marylebone Road Intercomparison	12	86	81	6.4%	G	**0.94**
Gradko	50% TEA in acetone	2015	UI	Middlesbrough	11	16	14	11.7%	G	**0.90**
Gradko	50% TEA in acetone	2015	SI	Redcar & Cleveland	12	12	12	0.1%	G	**1.00**
Gradko	50% TEA in acetone	2015	R	West Dorset District Council	12	12	11	15.5%	G	**0.87**
Gradko	50% TEA in acetone	2015	R	Worthing Borough Council	11	42	37	14.5%	G	**0.87**
Gradko	50% TEA in acetone	2015	R	Royal Borough of Windsor and Maidenhead	12	34	37	-8.4%	G	**1.09**
Gradko	50% TEA in acetone	2015	R	Royal Borough of Windsor and Maidenhead	12	40	38	4.2%	G	**0.96**
Gradko	50% TEA in acetone	2015		**Overall Factor[3] (15 studies)**				Use		**0.95**

Discussion of Choice of Factor to Use

It was decided to use the local bias adjustment factor of 1.02, rather than the national factor of 0.95, as the local factor should better represent local conditions in LB Lewisham, and is also more conservative.

A.3 Adjustments to the Ratified Monitoring Data

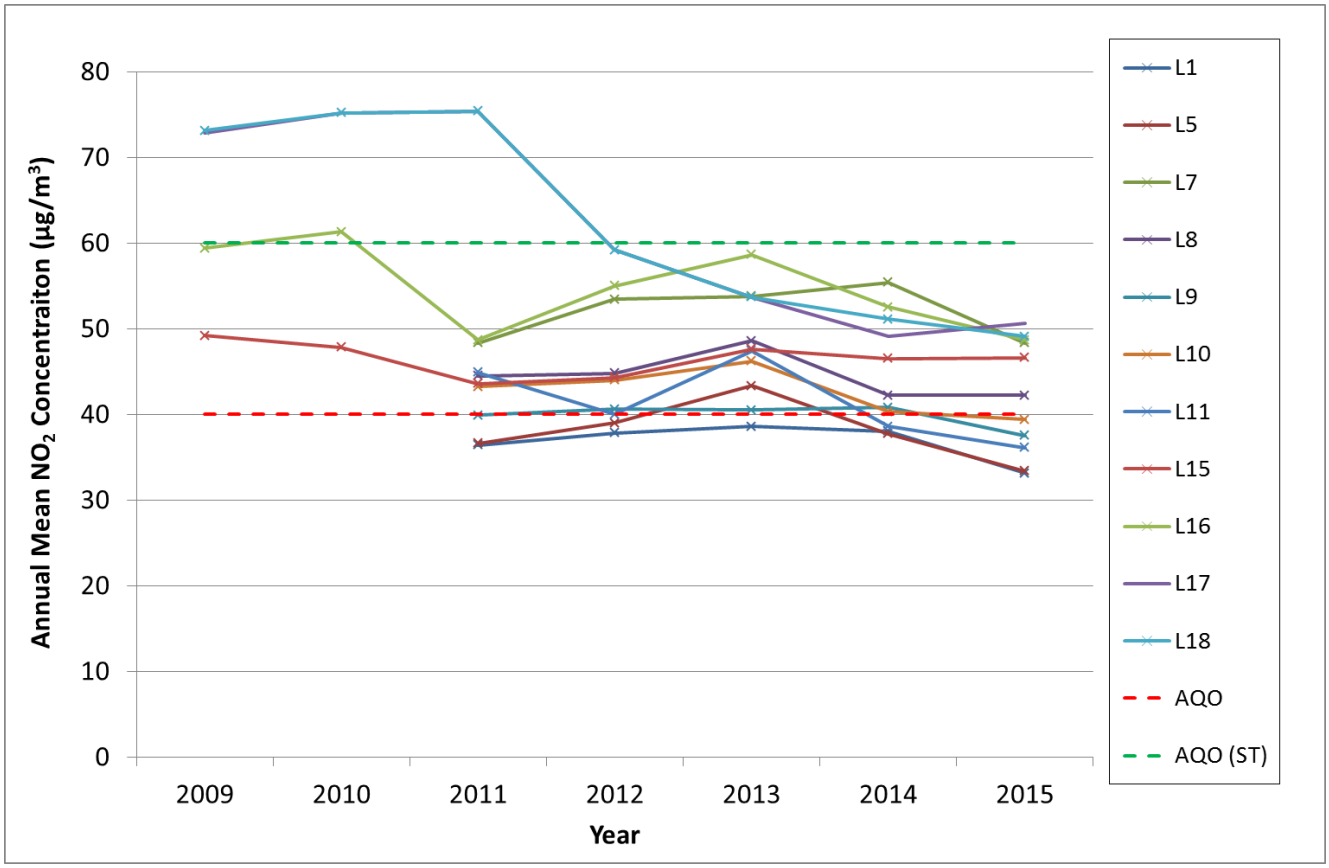
Distance Adjustment of Diffusion Tube locations

Although a small number of diffusion tubes are not located at relevant exposure (e.g. building facades), to maintain consistency for analysing diffusion tube trends over several years, NO_2 concentrations at these locations have not been distance corrected.

A.4 Annual Mean NO_2 concentration Trend Analysis

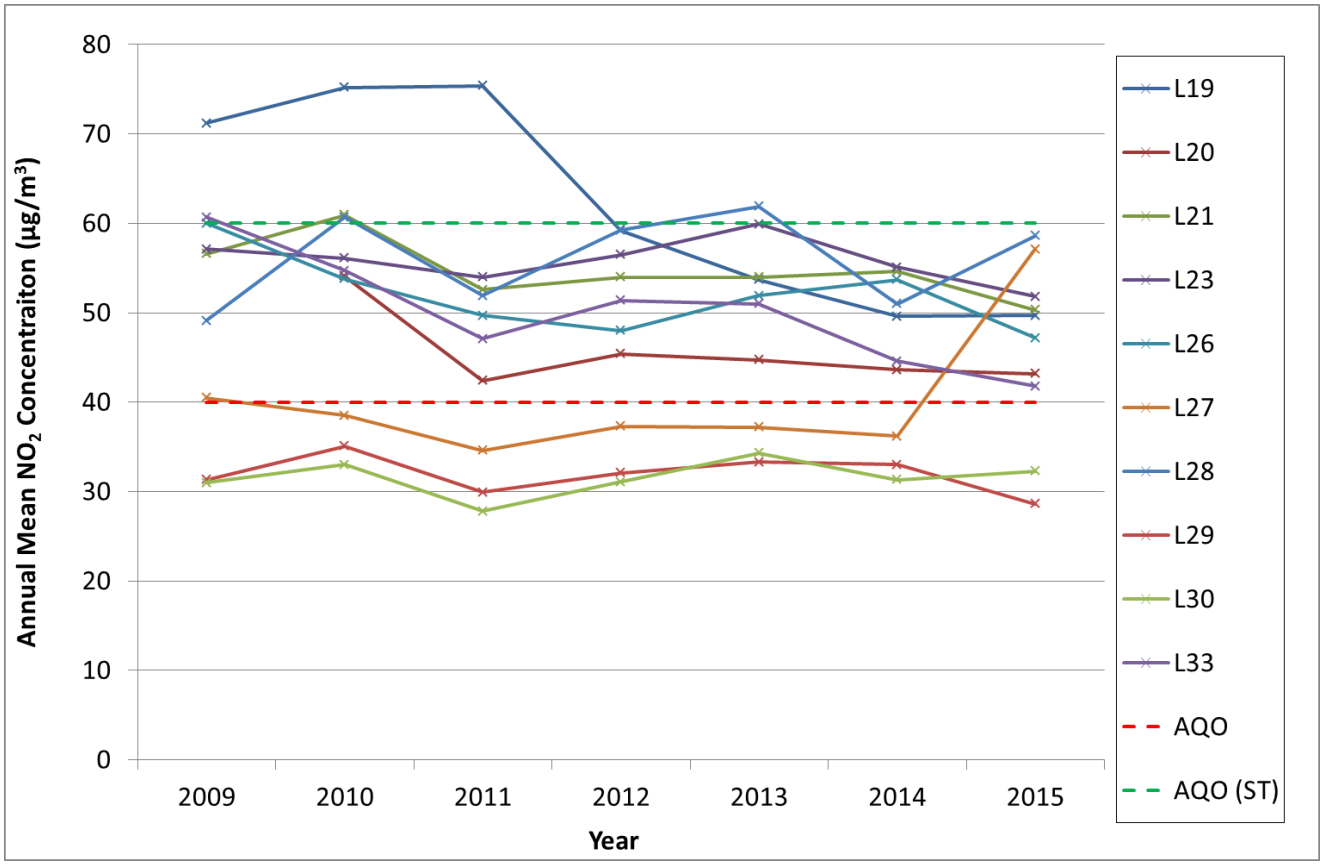
To clearly understand and visualise the trends in annual mean NO_2 concentration over the last 7 years, plots of the annual concentrations recorded at all non-automatic monitoring locations have been produced and are shown below.

Figure A.3: Annual mean NO_2 concentrations at roadside diffusion tube sites (1)



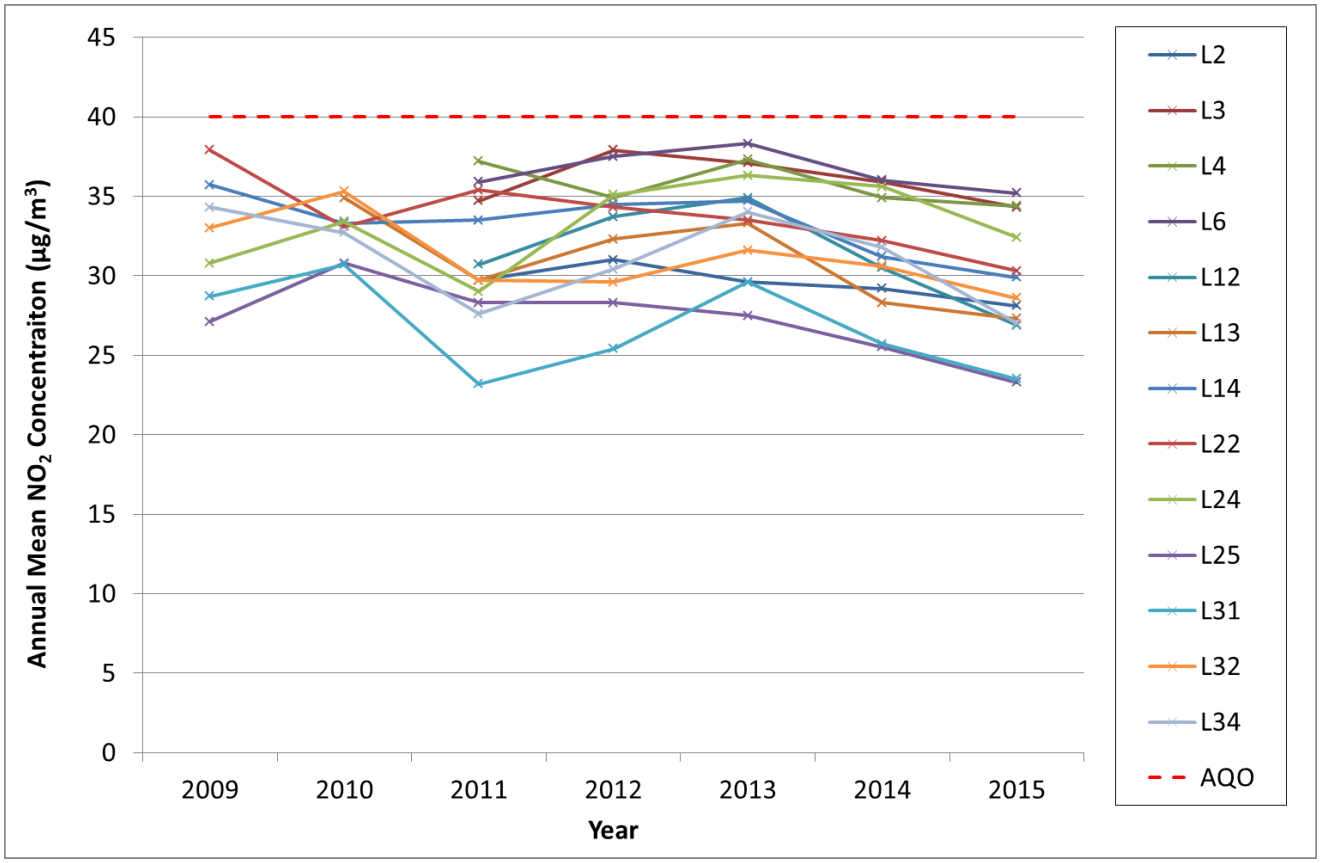
Note: AQO (ST) = 60 µgm^{-3}. Diffusion tubes cannot be used to directly compare against the 1-hour mean NO_2 objective. However, LLAQM.TG16 states that at locations where annual mean NO_2 concentrations of greater than 60 µgm^{-3} are monitored the 1-hour mean NO_2 objective is likely to be exceeded.

Figure A.4: Annual mean NO_2 concentrations at roadside diffusion tube sites (2)



Note: AQO (ST) = 60 µgm^{-3}. Diffusion tubes cannot be used to directly compare against the 1-hour mean NO_2 objective. However, LLAQM.TG16 states that at locations where annual mean NO_2 concentrations of greater than 60 µgm^{-3} are monitored the 1-hour mean NO_2 objective is likely to be exceeded.

Figure A.5: Annual mean NO_2 concentrations at urban background diffusion tube sites



Appendix B Full Monthly Diffusion Tube Results for 2015

Table N. NO_2 Diffusion Tube Results

Site ID	*Valid data capture for monitoring period %* [a]	*Valid data capture 2015 %* [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]
L1	92	92	40.3	41.5	37.3	-	22.1	26.5	27.0	30.8	36.2	41.2	31.2	23.5	32.5	33.1
L2	83	83	30.7	31.4	25.2	-	19.5	-	22.2	27.0	28.4	35.3	32.0	23.9	27.6	28.1
L3	100	100	45.0	39.8	32.3	35.0	25.6	27.6	28.6	30.5	34.6	41.2	38.1	25.1	33.6	34.3
L4	100	100	37.2	34.8	38.9	33.6	25.9	29.4	25.8	33.3	34.7	41.4	39.6	30.6	33.8	34.4
L5	100	100	36.1	33.4	36.5	42.1	26.1	31.5	23.1	31.9	37.1	44.8	29.0	21.8	32.8	33.4
L6	83	83	37.7	39.0	31.2	34.5	29.5	29.5	29.8	34.6	36.5	42.5	-	-	34.5	35.2
L7	100	100	51.2	47.8	44.5	44.5	43.9	46.4	41.8	48.3	56.7	59.5	46.5	37.5	47.4	**48.3**
L8	100	100	39.1	51.4	43.3	46.8	37.4	37.3	36.9	41.8	46.1	49.2	38.3	29.0	41.4	**42.2**
L9	100	100	38.0	39.1	40.5	41.6	32.2	35.4	30.7	34.2	42.7	50.1	32.3	24.7	36.8	37.5
L10	92	92	38.6	42.0	50.8	-	28.5	34.9	26.9	39.6	45.8	53.1	37.7	27.2	38.7	39.4
L11	92	92	-	41.3	38.6	36.7	26.6	31.8	24.3	38.7	44.8	47.4	32.8	26.7	35.4	36.1
L12	83	83	40.2	33.1	26.4	24.0	19.4	20.7	-	21.0	27.2	-	30.2	21.3	26.4	26.9
L13	100	100	38.0	29.3	32.9	26.8	20.2	20.9	21.5	24.7	26.5	30.0	30.3	20.2	26.8	27.3
L14	100	100	33.8	36.4	28.6	27.1	19.7	21.8	23.1	26.9	28.4	37.2	38.9	30.5	29.4	29.9
L15	100	100	41.6	45.7	36.7	43.5	39.4	41.9	38.1	51.9	62.8	58.4	40.2	48.4	45.7	**46.6**
L16	100	100	46.6	50.1	47.7	49.9	41.2	51.4	38.2	50.0	58.7	67.4	41.6	29.6	47.7	**48.7**

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2015 % [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]
L17	100	100	52.6	49.5	56.5	47.3	47.3	54.6	50.8	46.9	53.4	57.6	47.9	31.0	49.6	**50.6**
L18	100	100	49.5	48.5	47.0	51.2	46.2	53.9	55.3	44.1	50.3	56.0	44.6	31.5	48.2	**49.1**
L19	83	83	50.8	48.4	47.3	-	46.7	54.1	55.9	44.8	-	56.9	47.3	34.7	48.7	**49.7**
L20	92	92	46.0	43.4	44.1	38.5	37.4	33.3	44.9	42.1	40.9	48.2	47.0	-	42.3	**43.2**
L21	100	100	54.8	52.4	46.5	46.5	46.9	52.3	55.3	54.2	46.4	49.7	50.4	36.2	49.3	**50.3**
L22	100	100	34.8	40.0	27.8	30.0	22.0	22.3	26.3	28.7	31.3	34.3	35.4	23.5	29.7	30.3
L23	100	100	47.0	51.3	61.0	60.5	41.8	46.5	45.8	55.8	54.9	57.6	48.1	39.4	50.8	**51.8**
L24	92	92	37.9	37.8	30.9	38.7	23.9	27.6	24.6	30.3	33.4	39.8	-	24.3	31.8	32.4
L25	100	100	30.4	27.6	23.8	22.1	16.5	17.9	16.3	19.6	23.5	28.2	27.2	20.6	22.8	23.3
L26	92	92	48.8	49.3	48.0	51.6	37.1	44.5	50.6	44.8	49.1	-	47.3	37.7	46.2	**47.2**
L27	100	100	59.7	57.8	57.7	54.7	51.3	59.7	49.9	52.3	64.5	63.5	59.3	41.9	56.0	**57.1**
L28	100	100	51.6	63.7	63.9	56.2	51.6	58.2	60.6	63.1	59.1	68.3	52.1	41.2	57.5	**58.6**
L29	100	100	40.6	30.2	31.5	29.9	20.3	23.4	18.7	24.6	30.3	37.4	28.2	21.8	28.1	28.6
L30	83	83	34.9	36.3	32.3	31.1	21.8	23.9	-	-	36.1	42.4	33.4	24.3	31.7	32.3
L31	100	100	28.1	29.5	25.9	24.0	15.9	15.8	15.4	20.2	25.8	32.1	25.0	18.9	23.1	23.5
L32	92	92	-	32.8	31.0	30.4	22.1	21.8	23.0	25.7	30.1	35.3	32.0	23.9	28.0	28.6
L33	100	100	44.4	46.1	43.8	36.4	37.0	36.1	34.1	38.4	44.3	53.0	44.0	34.2	41.0	**41.8**
L34	100	100	30.5	32.1	29.9	26.5	18.2	20.6	19.8	23.8	31.7	33.5	28.7	22.3	26.5	27.0

[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%