London Borough of Sutton Air Quality Annual Status Report for 2017

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This report provides a detailed overview of air quality in Sutton during 2017. 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 and maintained thereafter

1. Air Quality Monitoring

1.1 Locations

The London Borough of Sutton operated four automatic monitoring stations in 2017:

- two kerbside sites: ST4 Sutton – Wallington and ST6 Sutton - Worcester Park, both measuring NO_2 and PM10;
- two industrial sites: ST8 Sutton - Beddington Lane measuring NO_2 and PM10 and ST5 Sutton - Beddington Lane (north) measuring NO_2, PM10 and PM2.5.

Table B. Details of Automatic Monitoring Sites for 2017

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
ST4	Wallington	528925	163804	Kerbside	Y	5	0.8	*1.5*	NO_2, PM10	Chemiluminescence, BAM
ST5	Beddington Lane (north)	529400	167224	Industrial	Y	6	4.5	*1.5*	NO_2, PM10, $PM_{2.5}$	Chemiluminescence, BAM
ST6	Worcester Park	522557	165787	Kerbside	Y	2	1.3	*1.5*	NO_2, PM10	Chemiluminescence, TEOM/FDMS
ST8	Beddington Lane	529781	166597	Industrial	Y	330	N/A	*1.5*	NO_2, PM10	Chemiluminescence, BAM

In addition, Sutton Council undertook non-automatic monitoring at twenty five locations in 2017, with no additional sites from the previous year.

Long term monitoring, i.e. more than three years has been carried out at only four sites as follows:

- ST32 - Alcorn Close
- ST33 - Carshalton Road
- ST36 - Croydon Rd, Beddington
- ST40 - 38 High Street, Cheam

Map of Non-Automatic Monitoring Sites

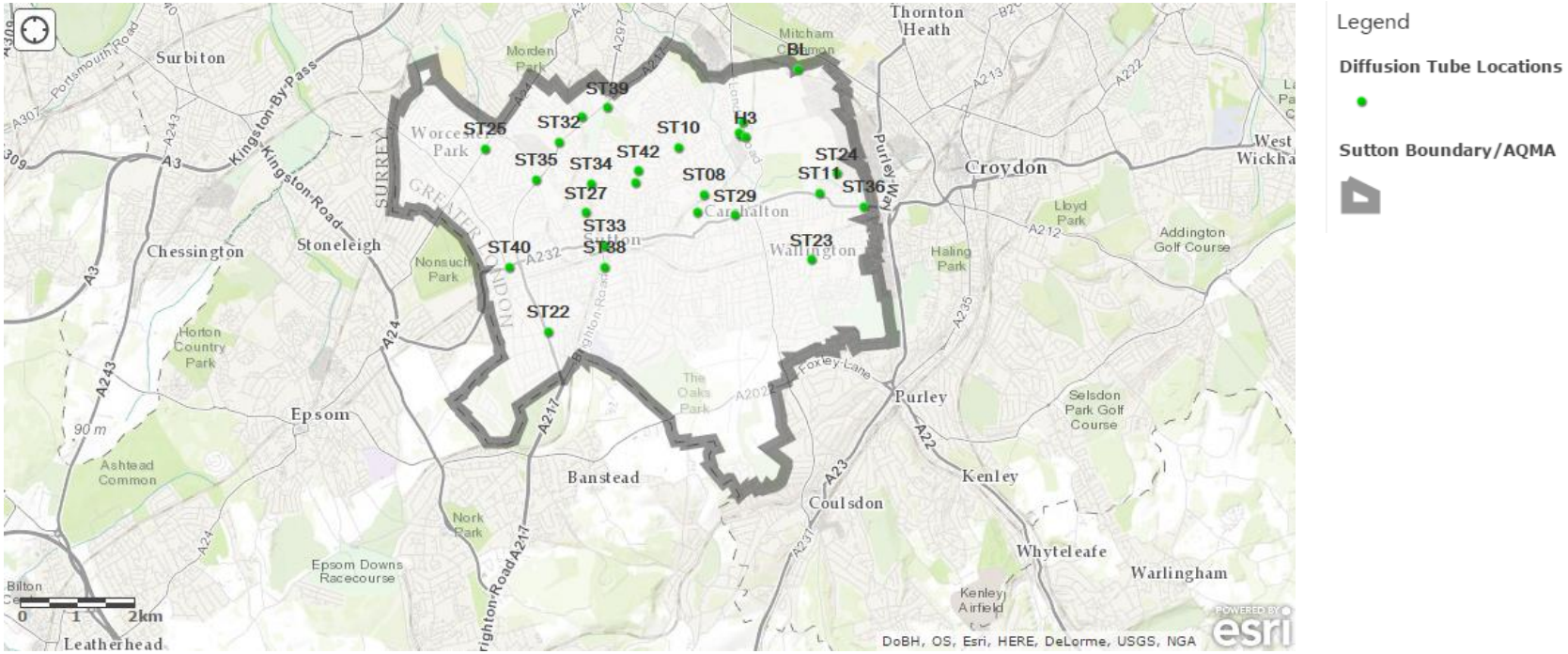


Table C. Details of Non-Automatic Monitoring Sites for 2017

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)
ST21	Glastonbury Road	525567	166291	Urban Background	*Y*	*6*	*2*	2	NO_2	*N*
ST22	Dorset Road, Belmont	525063	162474	Roadside	Y	12	2	2	NO_2	N
ST23	Sandy Lane South	529734	163868	Roadside	Y	5	2	2	NO_2	N
ST24	Derry Road	530130	165404	Roadside	Y	7	2	2	NO_2	N
ST25	Staines Avenue	523874	165778	Roadside	Y	15	2	2	NO_2	N
ST26	West Street	527680	164662	Roadside	Y	2	2	2	NO_2	N
ST07	Hackbridge Primary	528401	166038	Urban background	Y	0	56	2	NO_2	N
ST08	Victor Seymour	527788	164982	Urban background	Y	0	33	2	NO_2	N
ST29	Park Lane	528339	164615	Roadside	Y	2	6	2	NO_2	N

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)
ST10	Muschamp Priory	527299	165789	Urban background	Y	0	20	2	NO_2	N
ST11	Sherwood Park School	529835	165041	Urban background	Y	0	35	2	NO_2	N
ST32	Alcorn Close	525184	165845	Urban background	Y	40	25	2	NO_2	N
ST33	Carshalton Road	526048	164032	Roadside	Y	3	1	2	NO_2	N
ST34	Oakhill Road	525772	165118	Roadside	Y	10	1	2	NO_2	N
ST35	Gander Green Lane	524782	165167	Roadside	Y	10	1	2	NO_2	N
ST36	Croydon Rd, Beddington	530645	164839	Roadside	Y	0	11	2	NO_2	N
ST27	Haddon Road/St Nicholas Way	525691	164599	Roadside	Y	11	2	2	NO_2	N
ST38	Brighton Road, Sutton	526046	163636	Roadside	Y	2	10	2	NO_2	N

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)
ST39	Rose Hill roundabout	526019	166469	Roadside	Y	6	2	2	NO_2	N
ST40	38 High Street, Cheam	524357	163599	Roadside	Y	2	1	2	NO_2	N
ST42	Royston Park	526605	165364	Urban Background	Y	20	95	2	NO_2	N
H1	Hackbridge Road	528373	166077	Roadside	Y	0.5	17	2	NO_2	N
H2	Clover Way	528437	166275	Urban background	Y	0	25	2	NO_2	N
H3	57 London Rd	528499	166004	Roadside	Y	0	5	2	NO_2	N
BL	Beddington Lane	529781	166597	Roadside	Y	15	2	2	NO_2	N

1.2 Comparison of Monitoring Results with AQOs

The results presented are after bias adjustments, the details of which are described in Appendix A.

Table D1. 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 2017 % [b]	Annual Mean Concentration (μgm^{-3})						
				2011[c]	2012 [c]	2013[c]	2014 [c]	2015	2016	2017
ST4	Automatic	*94*	*94*	**69.7c** (60%)	**71.8** (95%)	**69.6c** (53%)	**66.6c** (20.5%)	**61.4c** (59%)	**63** (92%)	**53**
ST5	Automatic	*97*	*97*	38.2 (99%)	39.0c (17%)	-	36.4c (42.8%)	32 (95%)	36 (89%)	32
ST6	Automatic	*99*	*99*	**56.5** (99%)	**54.5** (97%)	**49.0** (99%)	**53.5** (99%)	**52** (98%)	**57** (50%)	**52**
ST8	Automatic	*95*	*95*	-	35.7c (44%)	36.0 (93%)	30.5 (76%)	27 (86%)	30 (89%)	25
ST21	Urban Background	100	100	-	-	-	-	27.3	32.1	27.2
ST22	Roadside	100	100	-	-	-	-	37.3	37.2	38.6
ST23	Roadside	100	100	-	-	-	-	32.2	35.0	33.6
ST24	Roadside	100	100	-	-	-	-	26.7	30.6	26.3
ST25	Roadside	100	100	-	-	-	-	32.0	34.6	32.6
ST26	Roadside	92	92	-	-	-	-	36.6	**41.3**	38.5
ST07	Urban background	92	92	-	-	-	22.3	22.0	24.2	22.0

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
				2011[c]	2012[c]	2013[c]	2014[c]	2015	2016	2017
ST08	Urban background	100	100	-	-	-	24.9	23.6	28.5	26.3
ST29	Roadside	100	100	-	-	-	-	37.9	**41.5**	39.5
ST10	Urban background	100	100	-	-	-	23.0	21.1	24.3	21.8
ST11	Urban background	92	92	-	-	-	26.6	23.4	26.4	24.4
ST32	Urban background	100	100	30.8	31.5	25.3	27.0	22.4	27.0	22.4
ST33	Roadside	100	100	36.6	36.1	39.6	**42.8**	37.3	38.8	33.2
ST34	Roadside	92	92	-	-	-	**48.1**	39.4	**42.8**	**42.3**
ST35	Roadside	100	100	-	-	-	**46.3**	31.5	34.1	30.5
ST36	Roadside	100	100	30.6	32.5	34.1	35.9	29.0	32.8	28.8
ST27	Roadside	92	92	-	-	-	-	36.8	39.6	36.1
ST38	Roadside	92	92	-	-	-	38.9	34.7	36.8	34.6
ST39	Roadside	100	100	-	-	-	36.2	37.1	39.3	38.9
ST40	Roadside	100	100	**47.4**	**50.0**	**46.5**	**48.3**	**42.9**	**44.8**	39.8
ST42	Urban background	75	75	-	-	-	24.7	21.0	21.8	23.1
H1	Roadside	100	100	-	-	-	33.7	28.9	32.3	29.9

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
				2011[c]	2012 [c]	2013[c]	2014 [c]	2015	2016	2017
H2	Urban background	92	92	-	-	-	29.3	26.5	29.3	25.4
H3	Roadside	92	92	-	-	-	36.6	32.9	32.3	**40.3**
BL	Roadside	92	92	-	-	-	-	-	34.1	32.2

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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture is less than 75%

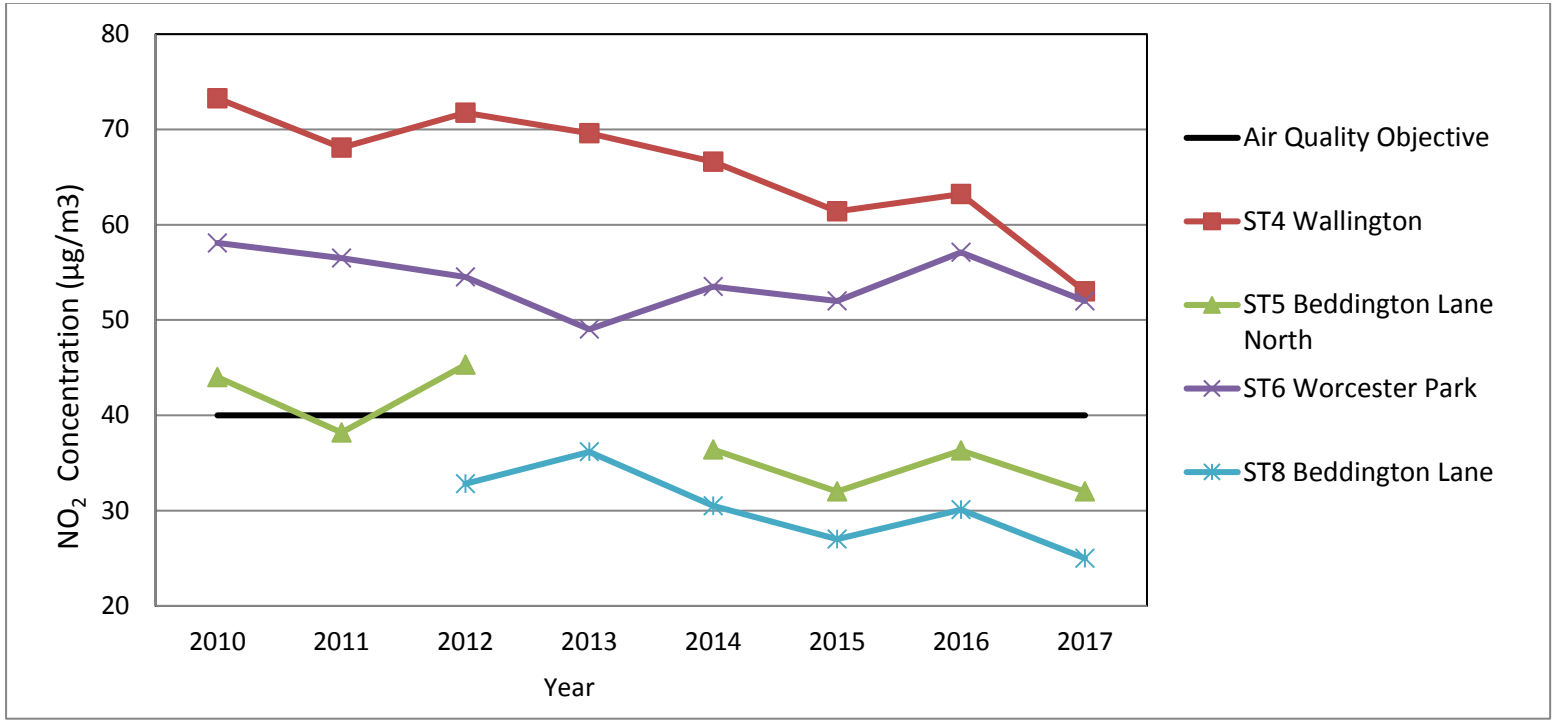
Table D2. Calculation of NO_2 at relevant exposure receptors (µg m^{-3})

The results presented in the table below are after adjustments for distance to a location of relevant public exposure. To estimate the concentration at the nearest receptor, the procedure specified in LLAQM.TG(16) has been applied to all monitoring locations that record an annual mean concentration above the NO2 annual objective of 40µg/m3 . The calculation has been applied also to monitoring locations that record an annual mean concentration that is within 10% of the NO2 annual objective of 40µg/m3 (i.e. above 36µg/m3), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

Site ID	Site Name	X (m)	Y (m)	Site Type	Distance from monitoring site to relevant exposure	Distance to kerb of nearest road (N/A if not applicable)	Distance from kerb to relevant exposure	NO_2 Results 2017	Background NO_2	NO_2 at relevant exposure receptor
ST4	Wallington	528925	163804	Kerbside	5	0.8	5.8	**53**	16.46275	39.0
ST6	Worcester Park	522557	165787	Kerbside	2	1.3	1.5	**52**	17.65668	**51.0**
ST22	Dorset Road, Belmont	525063	162474	Roadside	12	2	14	38.6	13.10942	27.0
ST26	West Street	527680	164662	Roadside	2	2	4	38.5	18.14714	35.2
ST29	Park Lane	528339	164615	Roadside	2	6	8	39.5	19.28171	37.7
ST34	Oakhill Road	525772	165118	Roadside	10	1	11	**42.3**	19.16243	31.1
ST27	Haddon Road/St Nicholas Way	525691	164599	Roadside	11	2	13	36.1	19.16243	28.7
ST39	Rose Hill roundabout	526019	166469	Roadside	6	2	8	38.9	19.28171	32.5
ST40	38 High Street, Cheam	524357	163599	Roadside	2	1	3	39.8	14.573	34.2
H3	57 London Rd	528499	166004	Roadside	0	5	5	**40.3**	17.67804	39.8

The diffusion tube monitoring data shows that there are no exceedances of the annual mean objective where there is relevant exposure at these locations. By contrast, the ST6 Worcester automatic monitoring site result shows an exceedance of 51 μg m^{-3} at the relevant exposure receptor.

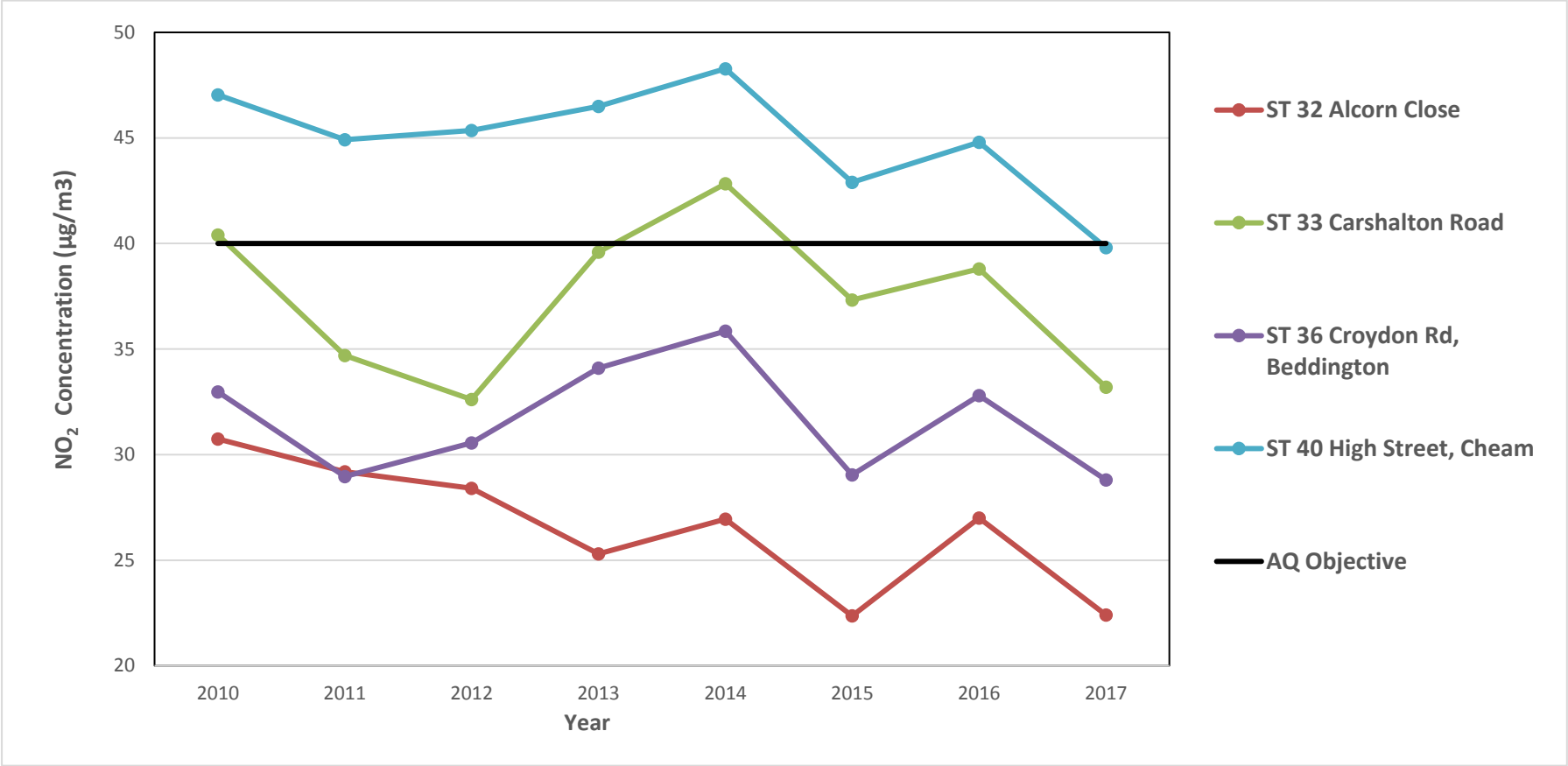
Trends in Annual Mean Nitrogen Dioxide (NO_2) Concentrations measured at the four Continuous Monitoring Sites from 2010.



The graph above shows the trend in annual mean NO_2 concentrations at the continuous monitoring sites between 2010 and 2017. This shows that concentrations have been on a generally downward trend. ST4 and ST6 have exceeded the NO_2 annual mean AQS objective for all monitored years, but all other sites were compliant in 2017. ST4 Wallington has consistently monitored the highest concentrations of all the monitoring sites, but concentrations have been reducing between 2010 and 2017 which may be attributable to the implementation of measures included in the AQAP. In 2017, ST4 Wallington monitoring station has recorded a significant decrease of 10 µg/m3 in comparison with the previous year.

For 2017, all four stations have showed a general downtrend in comparison to the previous year. However, concentrations can fluctuate from year to year according to external factors. Where this is the case, we would expect the trend to be replicated at other sites. From looking at the diffusion tube monitoring data in both RBK and a neighbouring borough, this indicates that the regional trend for 2017 was a decrease of an average of 5 µg/m3 in NO_2 concentrations.

Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube long term Monitoring Sites



The NO_2 diffusion tube data are summarised in Table D. The full dataset for 2017 (monthly mean values) is included in Appendix B.
The diffusion tube results for 2017 have been adjusted using the national bias adjustment factor of 0.89; further details are provided in Appendix A.
Many of the indicative monitors have been relocated during recent years so there is less continuity in the data collected than with the automatic monitors. The concentrations recorded by the diffusion tubes also have a lesser degree of accuracy so the results tend to have more fluctuations from one year to the next. However, for those sites where monitoring has continued for 6 years or more, a fluctuating trend over the period similar to that recorded at the automatic monitoring sites has been observed. In all sites, the concentrations recorded in 2017 were lower than the previous year. For 2017, there were two

sites where the annual mean AQS objective for NO_2 was exceeded; These were ST34 (Oakhill Road) and H3 (London Road, Hackbridge). The concentration recorded at H3 has exceeded the AQS objective for NO_2 for the first time as a result of a temporary increase of road traffic in the vicinity. However, it is to be noted that the annual mean objective has not been exceeded where there is relevant exposure. Overall, there are no sites exceeding 60 µg/m3, which would be an indication of a potential exceedance of the 1-hour NO2 objective.

Figure 1: Map of NO_2 diffusion tubes monitoring sites in the *London Borough of Sutton*, showing annual mean results for 2017.

Legend

Diffusion tubes (<40µg m^{-3}**)**

Diffusion tubes (>40µg m^{-3}**)**

On this map, the squares represent NO_2 diffusion tubes. The EU limit value for annual mean NO_2 is 40µg m^{-3}. All monitoring sites that recorded NO_2 concentrations above this level are coloured in red and all that are below this level are coloured in green. The numbers adjacent to each square are the annual mean NO_2 concentration for 2017.

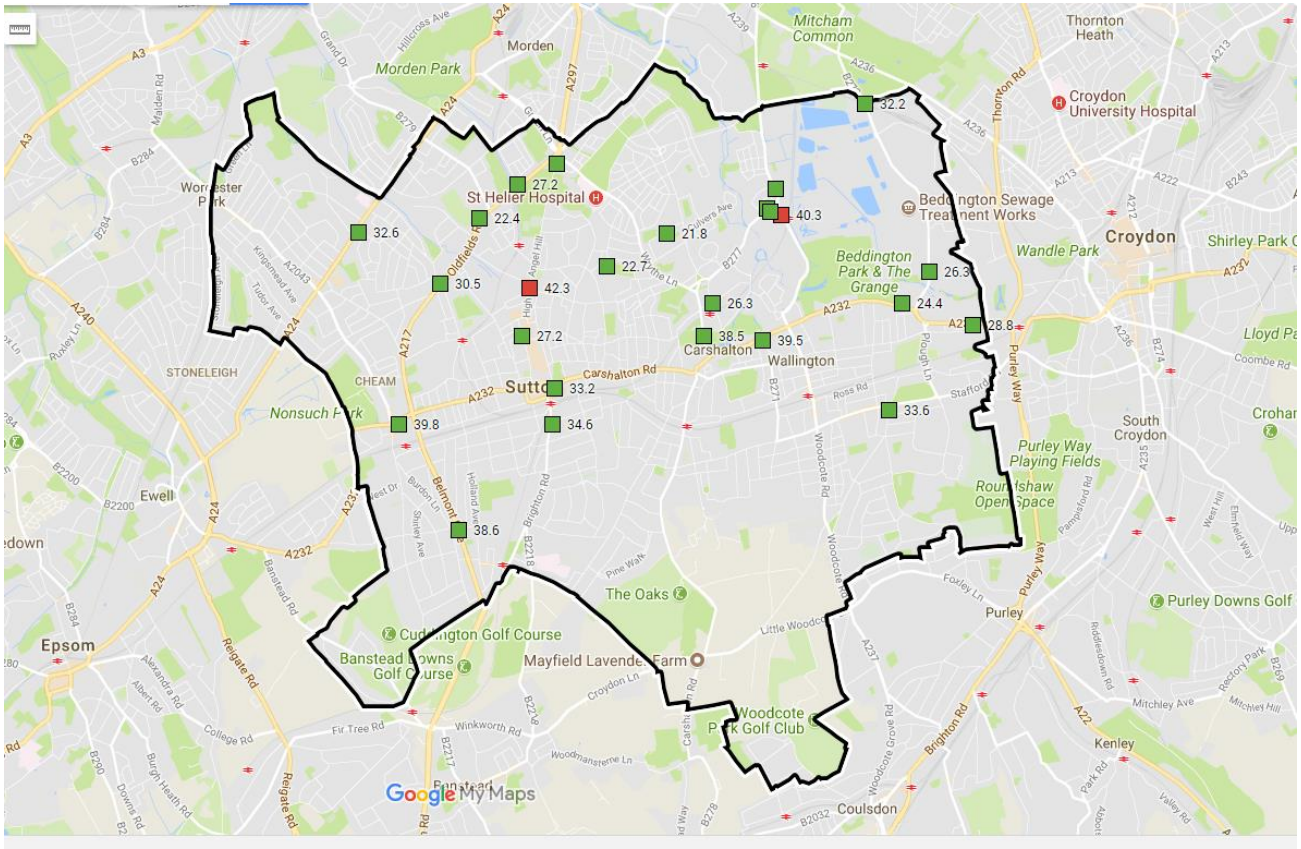


Table E. NO_2 Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Number of Hourly Means > 200 µgm^{-3}						
			2011[c]	2012 [c]	2013[c]	2014 [c]	2015 [c]	2016	2017
ST4 Wallington	*94*	*94*	**47** (218.8)	**133**	**69** (248.7)	10 (227.8)	9 (198.7)	**22**	1
ST5 Beddington Lane (north)	*97*	*97*	0	2 (179.6)	-	0 (99.8)	0	0	0
ST6 Worcester Park	*99*	*99*	10	13	8	3	11	**24**	11
ST8 Beddington Lane	*95*	*95*	-	0 (132.6)	9	0	0	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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture is less than 75%

In 2017, the NO_2 short term air quality objective was met at all four locations compared to the 2016 results where it was met at only two of the locations. The data indicates that the ST4 Wallington site has exceeded the 200 µgm-3 concentration on only one occasion within the year while ST6 Worcester Park has exceeded on 11 occasions.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
			2011	2012	2013	2014	2015	2016	2017
ST4 Wallington	*82*	*82*	28.9a (59%)	27.2 (99%)	25.5c (57%)	20.6c (21%)	16 (86%)	23 (92%)	25
ST5 Beddington Lane (north)	*93*	*93*	28.0 (100%)	24.1a (26%)	-	20.5c (36%)	24 (91%)	24 (86%)	31
ST6 Worcester Park	*84*	*84*	31.4 (79%)	28.3 (98%)	27.7c (73%)	26.2c (41%)	23 (94%)	22 (82%)	20
ST8 Beddington Lane	*97*	*97*	-	29.8a (56%)	22.2 (94%)	22.8c (73%)	19c (48%)	23 (94%)	23

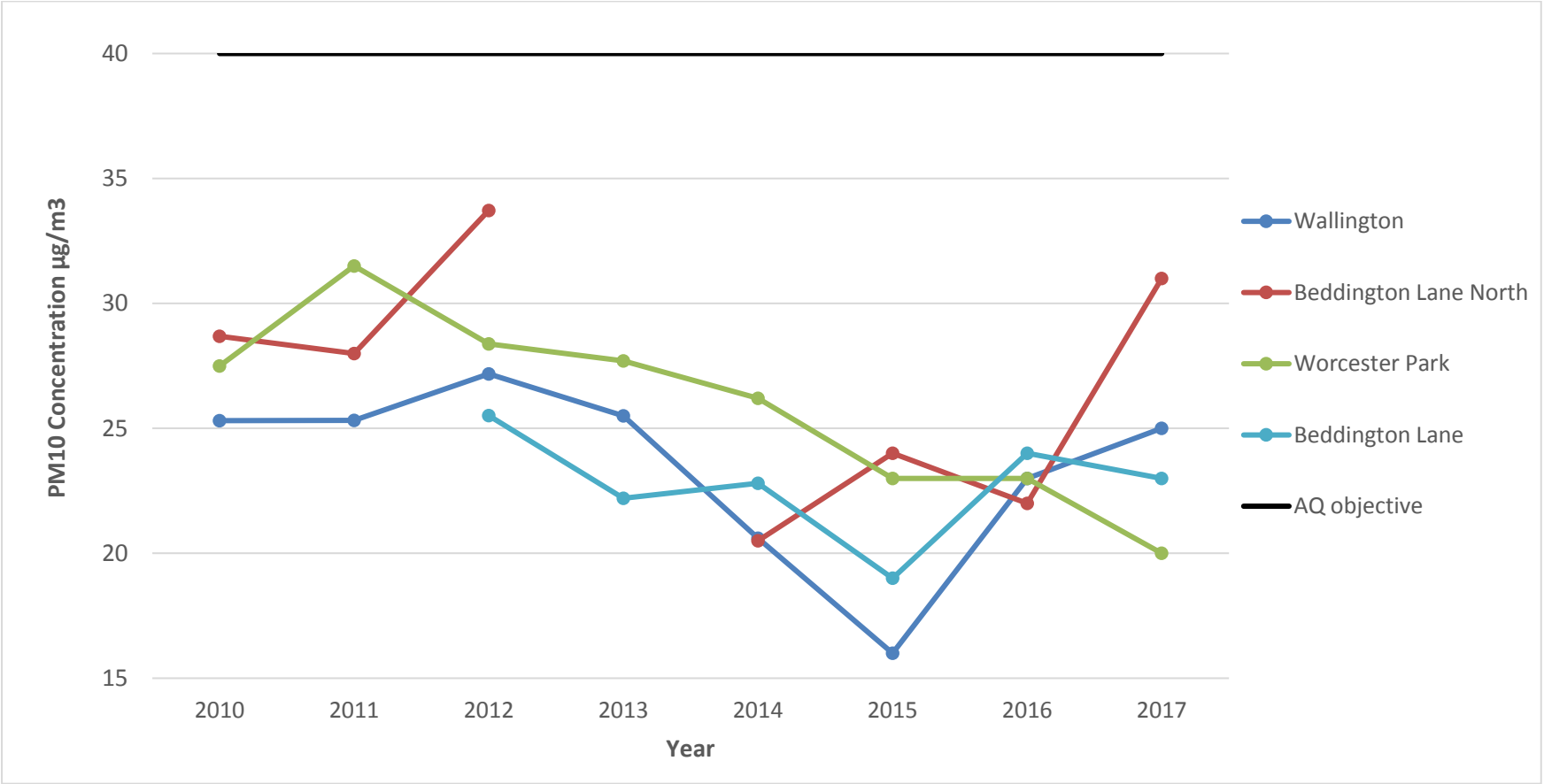
Notes: Exceedance of the PM_{10} annual mean AQO of 40 µg m^{-3} are shown in **bold**.

[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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture is less than 75%

Trends in Annual Mean PM_{10} Concentrations measured at the Continuous Monitoring Sites



The graph above shows the trend in annual mean PM10 concentrations at the continuous monitoring sites between 2010 and 2017. ST5 Beddington Lane (North) and ST4 Wallington showed an increase in 2017 respectively of 9µgm^{-3} and 2µgm^{-3} compared to the previous year. The increase at ST5 monitoring site is believed to be attributable to temporary highways improvements and associated road closures. A decrease of 3µgm^{-3} from 2016 results has been recorded at Worcester Park monitoring station and of 1µgm^{-3} at the ST8 Beddington Lane monitoring station.

The monitored concentrations at all sites are well below the annual mean air quality objective for all years. ST6 Worcester Park has generally recorded higher concentrations than the other sites but in 2017 has recorded the lowest of the 4 sites. This site has shown a steady decrease in concentrations since 2010.

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 2017 % [b]	Number of Daily Means > 50 µgm^{-3}						
			2011[c]	2012 [c]	2013[c]	2014 [c]	2015	2016	2017
ST4 Wallington	*82*	*82*	4 (37.8)	23	6 (39.3)	0 (27.5)	0 (25.3)	5	6
ST6 Worcester Park	*93*	93	31 (50.3)	21	20 (44.3)	7 (42.4)	13	5 (34)	21
ST8 Beddington Lane	*84*	84	-	10 (43.6)	5	10 (35.9)	3 (33)	8	2
ST5 Beddington Lane (north)	*97*	97	25	17 (59.2)	-	0 (30.4)	8	8 (37)	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 have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture was less than 75%

The data shows that the objective was met at all sites in 2017 as in previous years.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [b]	Annual Mean Concentration (µgm^{-3})						
			2011	2012	2013	2014	2015	2016	2017
ST5 Beddington Lane North	*71*	*71*	-	-	-	12.7 [c]	14.8	14.4	15.2[c]

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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture is less than 75%

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of London Borough of Sutton's progress against the Air Quality Action Plan, showing progress made this year.

Table J. Delivery of Air Quality Action Plan Measures

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Sustainable Transport Strategy	Develop a strategy for promoting and supporting sustainable transport options within the borough.	A revised Sustainable Transport Strategy was approved in March 2015 and a report is prepared in June each year which includes a summary of the progress against targets for all 7 areas. The most recent report indicated that by last year cycling remained static at 2%. However, the proportion of people using public transport or walking has increased to 17% and 26% respectively (T1). By contrast, the percentage of children travelling to school by sustainable means of transport (T6) has declined from 80% to 75%. Similarly, the percentage of council staff travelling to work by sustainable transport has dropped from 50% to 46.5% (T7). The indicator on bus waiting times (T3) has improved to 0.9 but is still above the target. Targets are also included for air quality which align with the National Air Quality Objectives.	The Sustainable Transport Strategy can be viewed here: https://www.sutton.gov.uk/downloads/file/2339/sustainable_transport_strategy
Delivery and Servicing Plans	Develop and implement a plan for reducing the environmental impact of the Council's delivery and servicing activity.	The council continues to deliver this action via its sustainable purchasing policy. The policy includes a commitment to consider the transportation impacts of purchases and where possible purchase items in bulk and negotiate efficient delivery patterns. Examples of this include the councils stationery contract which delivers on set days of the week (rather than daily).	
Parking Policy	Have a parking policy in place that ensures	Parking Strategy was approved at Committee in November 2016 and has been adopted for implementation over a 5 year period. The Strategy includes	The Sutton Parking Strategy and Policy can

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
	consideration of air quality impacts are an inherent part of the decision-making on parking controls.	offering free / discounted parking charges on permits and in Council car parks for electric vehicles. The Strategy also includes implementation of a progressively higher charge for permits for additional vehicles within a household and a tiered charging system for parking permits that is aligned with the DVLA tax bandings. Consultations with residents about parking policies and changes to the charges were carried out in 2017 and this helped to raise awareness of the need to improve air quality.	be viewed here: https://drive.google.com/file/d/0B19JvLvJMV1RaTR4TENfWkFIR2M/view
Sutton Transport Plan	To have a Transport Plan in place that supports air quality objectives.	A Transport Plan or LIP is in place which was published in 2011 and covers the period up to 2031. Strategic Objective 14 includes the aim of reducing the impact of air pollution. In 2017, a number of schemes were delivered that aimed to ease traffic flow and improve facilities for pedestrians and cyclists. A number of improvements have taken place in Sutton Town Centre as part of various projects aimed at enhancing the environment for pedestrians and cyclists and thus deterring car use. The borough has been working closely with other stakeholders to ensure that proposals to extend the existing Tramlink through the borough are delivered. In 2017, the proposals were included in the Mayor of London's draft Transport Plan.	
Workplace Travel Plans	To promote the uptake of WTPs in workplaces throughout the borough.	A new strategy for workplace engagement called Workplace Scorecard has been developed. This includes a short staff travel survey, travel audit and assessment of the workplaces requirements in order to increase sustainable travel by staff with a reward of £1000 of investment by the borough into any new sustainable travel measures that have been recommended. One large employer in Sutton town centre (Quadrant House) has been approached and has agreed to run a pilot.	
Council Employee Travel Plan	To have a Travel Plan in place for Council employees and encourage a reduction in travel by motor vehicles to/from and during work.	The most recent Staff Travel Survey was undertaken in 2017 and showed that 46 per cent of council staff are now travelling to work using sustainable modes of transport. This is a decrease of 4 per cent since 2015. The next Survey will be carried out in Summer 2019. The decrease is thought to be, in part, due to problems with train services provided by Southern Rail during the period prior to the survey. However, walking and cycling also decreased by 1 per cent each.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		The council continues to provide bikes to staff for work journeys as well as cycle lockers, drying facilities and secure cycle parking for staff who cycle to work. Staff can also apply for an interest-free loan to help cover the costs of an annual ticket if using the train, to travel to work and a cycle to Work loan to buy a bicycle through a salary sacrifice scheme.	
School Travel Plans	To have an active Travel Plan in place at Council schools and encourage a reduction in travel to/from schools by motor vehicles.	The percentage of all schools within the borough that have an active Travel Plan in place has fallen to 51%. According to STARS data, of the schools that have been accredited, 15 have gold status, 9 have silver and 7 have bronze. Engagement with schools has focused on scooting and walking as well as identifying any improvements in street design or traffic schemes that may encourage children and parents to walk more.	
Car Clubs	To promote use of car clubs as an alternative to individual car ownership.	The Council engaged with ZipCar and Enterprise to develop the Car Club network in the borough. The locations where demand is greatest are being identified in order to make the most effective use of the vehicles available. There are currently 3 off-street double bays and 3 Enterprise Car Clubs operating at housing developments. A s.106 agreement to include provision of Car Club bays and a minimum of 2 Car Club vehicles was reached previously with a mixed residential / commercial development. The development has now been completed and is starting to be occupied. On first occupation, eligible new occupants will be given 2 years free membership of the Car Club. A car club SPD is currently in development. Opportunities for car clubs continue to be considered in new developments in the borough.	
Heart of Hackbridge regeneration project	To smooth traffic flow and reduce dominance of motor vehicles in Hackbridge	The project to smooth traffic flow is now COMPLETE.	As the area is being regenerated and this includes a high number of new developments, we continue to monitor air quality and work with developers to try

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
			to secure measures that will improve air quality.
Reduction of energy use in Council-owned buildings	To reduce the energy consumption within Council-owned buildings through energy efficiency measures and increased use of renewable energy sources.	During the year the council installed a 40kw system of Solar Photovoltaic (PV) on its Civic Offices thus reducing the demand for energy from fossil fuels and the Council's own emissions of NOx and particulates. The council also procured a new energy monitoring platform which has been used to identify potential energy savings, targeting the most cost-effective interventions. We have initiated an ambitious project of expanding the use of the platform to monitor not only our most energy-intensive sites but our entire portfolio. It is also expected to include in this platform all the buildings we own, even if they have been leased. The monitoring service will be offered to Council's partners and schools, to achieve an active and proactive energy monitoring system across the Council. Updates to both the LED lighting and gas boiler were completed at the Cheam Resource Centre in May 2017. At Denmark Road a new LED upgrade was initiated in the offices with a pilot project being launched in a small section of the building in August 2017.	
Alternative Refuelling Sites	To promote cleaner vehicles by ensuring infrastructure for refuelling is in place	There are 15 separate locations within the borough at which an electric vehicle charging point is installed and these points form part of the Source London network. In November 2017, the Council adopted an Ultra Low Emission Vehicles policy for the borough to guide the development of electric vehicle infrastructure and promotion of low emission vehicles. The Council is currently undertaking a lamp column charging feasibility study to understand if and how lamp column charging could be provided in the borough. The Council is also working with TfL to develop the rapid charging network including site assessment and potential locations.	
Cleaning Council Fleet	To reduce the emissions to air from Council's own fleet	Sutton Council Fleet Services now have twenty two (22) vehicles. These vehicles are made up of sixteen light goods vehicles, two mini buses, three mini coaches	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		and a pick-up. All vehicles are Euro 6 diesel. The number of vehicles within the Council's fleet has been reduced as contracts to deliver services have been outsourced. Therefore, the focus of this action is to ensure that procurement policies require contractors to use vehicles with lower emissions.	
Smoke Control Areas	To ensure emissions from domestic fuel burning are controlled	Historically, a number of Smoke Control Orders were put in place and these cover the whole of the borough. Therefore, we continue to enforce the regulations on emissions from chimneys using these Smoke Control Orders. In 2016, the Council received 16 service requests about smoke from chimneys and multi-fuel burners. These were a mix of complaints and enquiries from people wishing to purchase a stove who wanted to ensure compliance with the regulations.	
Air Quality Management Areas	To ensure that the designated Air Quality Management Areas are appropriate and relevant	The borough continues to keep the designation of its Air Quality Management Area under review based on sources of emissions within the borough and its air quality monitoring data. While exceedances of the Air Quality Objective for nitrogen dioxide continue to be recorded, the designation remains for both nitrogen dioxide and particulate matter. This is due to the health impacts of particulate matter at levels below the objective and that the sources of the pollutants are largely the same.	
Industrial Processes	To ensure that all processes that require an Environmental Permit are permitted and comply with their conditions	All processes were inspected in accordance with the Regulations and at the required frequency. 38 installations had a permit in place at the end of December 2016. At the end of 2017, this had increased to 39 as a new cement batch plant was permitted in October 2017. No enforcement action was required in 2017.	
Bonfires & Waste Disposal	To reduce the number of bonfires and ensure waste is disposed of appropriately	Enforcement of dark smoke bonfires is carried out under the Clean Air Act while nuisances arising from bonfires is dealt with under the Environmental Protection Act. The Council received 313 complaints about bonfires in 2017 which is more than a 30% increase on the previous year. Information on bonfires is available on the Council website and residents are encouraged to	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		compost their garden waste or subscribe to the Green Waste Collection scheme that became a paid-for service in 2015.	
Demolition and Construction	To minimise the dust emissions generated during demolition and construction	For larger developments that have the potential to impact on local air quality, the local authority has requested that mitigation measures are employed to control dust in line with the GLA's Supplementary Planning Guidance. In 2017, Construction Management Plans were agreed for 33 separate developments. The submission of a Construction Management Plan was recommended for 37 separate developments.	
Engine Idling	To discourage unnecessary engine idling of vehicles while stationary.	The number of complaints received about engine idling is low compared to other types of complaint. However, the locations are now being mapped so that action can focus on these specific areas. Agreement on the design of a street sign was reached and an order placed for a number of signs to be erected at these locations in 2018.	
Regulating Waste Sites	To work with the Environment Agency on regulating waste sites to minimise fugitive emissions from sites	The number of complaints received and cases of non-compliance with regulations at waste sites within the borough has significantly reduced. Where complaints have been received, the borough has ensured active communication with the Environment Agency so that the regulatory approach is coordinated. Borough officers and officers from the EA have attended the meetings regularly held at the Viridor landfill site where an Energy Recovery Facility is currently being constructed.	
Development Control	To minimise impacts on air quality and existing residents from new developments	In 2017, there was an independent examination of the borough's Local Plan which lays out what we intend to do over the next 15 years in planning the borough. Following the examination, the Local Plan was adopted. The Plan includes Policy 34 which contains a section setting out requirements with regards to air quality considerations. A webpage has been created on the Council's website providing Information for Developers in relation to air quality. This includes details on when an Air Quality Assessment / Air Quality Neutral Assessment would be required. All relevant applications are sent to Environmental Health for comment and mitigation	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
		measures have been secured where appropriate. See Table K below for further details.	
Planning Obligations	To secure planning obligations to improve air quality where appropriate.	No s.106 agreements were put in place to secure funding specifically for air quality improvements in 2017. However, negotiations continued with a developer regarding the provision of Car Club facilities at a development that was completed in the previous year.	
Low NOx boilers	To promote the use of low NOx boilers where appropriate in new developments	Low NOx boilers have been recommended in new developments through a planning condition where appropriate. See Table K below for further details.	
Air Quality Monitoring	To maintain a network of air quality monitors to provide meaningful air quality data	The borough continued to operate a network of automatic air quality monitoring stations supplemented with a network of passive monitors. There were no changes to the network in 2017. A briefing note providing details of sources of information on air quality monitoring and a step-by-step guide to obtaining data was produced and circulated to Councillors so that they could better answer queries from residents about the borough's air quality.	
AirText	To promote the uptake of airText service to enable people to better manage their exposure to poor air quality	At the request of Public Health Sutton the CCG's Primary Care Team continued to promote AirText to GPs practices and to the Respiratory Clinical Reference Group, which includes respiratory physicians and nurses. In 2017, the number of subscribers to AirText registering with Sutton as their home borough increased to 170.	
Public Health partnership	To work in partnership with Public Health on projects that can improve air quality	Environmental Health has worked closely with Public Health to provide up-to-date information for inclusion in the borough's Joint Strategic Needs Assessment. Following a period of development and consultation, Sutton's Health and Wellbeing Strategy Action Plan was approved in December 2017 and this includes air quality as one of its themes.	
Beddington Lane	To implement specific measures in the area to	Double Yellow lines and parking restrictions were implemented in the Beddington Industrial area to address pinch-points.	

Measure	Action	Progress (-Emissions/Concentration data - Benefits - Negative impacts / Complaints)	Further information
Industrial Area	tackle emissions from industry and fleet	In partnership with Croydon, the "Croydon Sutton Electric Freight" project was launched which offered local firms the opportunity to try out an electric van or truck. This project forms part of London's Go Ultra Low City scheme and funding from the Office for Low Emission Vehicles is being used to support trials of electric vans. Four vans were leased in 2017 on either a six monthly or a yearly basis. Their use is being monitored.	
Beddington Renewal and Regeneration Programme	To complement action 33 with improvements to enhance the environment for pedestrians and other road users	The council secured £1.86m of TfL funding for the Beddington North TfL Major Scheme project. This is being matched by council funding of £1.7m, to provide a total budget of £3.56m. The scheme focuses on delivering improvements for pedestrians and cyclists along Beddington Lane and Hilliers Lane thus providing more travel choices for local businesses and residents. The project will also significantly enhance the appearance of the area and restrict HGV's through the village area to achieve better air quality. The Beddington Industrial Area way-finding and signage strategy was finalised and this is scheduled for implementation in 2018.	

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in London borough of *Sutton* in 2017

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	*10*
Number of planning applications required to monitor for construction dust	0
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	4
Number of developments required to install Ultra-Low NO_x boilers	4
Number of developments where an AQ Neutral building and/or transport assessments undertaken	9
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	1
Number of planning applications with S106 agreements including other requirements to improve air quality	0
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant. The NRMM database has been checked and 10 development sites were registered at www.nrmm.london Details of the visits to check that NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy are provided.	16 NRMM informative conditions were requested along with the construction method statement conditions Sites Audited 5 Cold Engaged 3 Returned Compliance 3 n{visits} 6 Recs delivered Compliance 1 Non-compliant 2 Self Compliant 2

3.1 New or significantly changed industrial or other sources

For 2017 no new sources have been identified.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

The Council's monitoring stations fall within the LAQN and QA/QC standards are delivered accordingly. This is considered close, if not equal to, AURN standard.

PM_{10} Monitoring Adjustment

The monitoring data for the London Borough of Sutton is part of the London Air Quality Network, managed by ERG (Environmental Research Group).

A.2 Diffusion Tube Quality Assurance / Quality Control

The diffusion tubes are supplied and analysed by Gradko utilising the 20% triethanolamine (TEA) in water preparation method. A bias adjustment factor of 0.89 for the year 2017 (based on 34 studies) has been derived from the national bias adjustment calculator dated March 2018.

Diffusion Tube Bias Adjustment Factors 03/18 Issue of the Spreadsheet				
			New (03/18) Factor	
Laboratory	Method	Year	No. of Studies	Factor
Aberdeen Scientific Services	20% TEA in water	2017	7	0.78
Edinburgh Scientific Services	50% TEA in acetone	2017	2	0.89
ESG Didcot	20% TEA in water	2017	2	0.71
ESG Didcot	50% TEA in acetone	2017	27	0.77
ESG Glasgow	20% TEA in water	2017	1	0.80
ESG Glasgow	50% TEA in acetone	2017	1	0.78
Glasgow Scientific Services	20% TEA in water	2017	6	0.91
Gradko	20% TEA in water	2017	34	0.89
Gradko	50% TEA in acetone	2017	22	0.97
Lambeth Scientific Services	50% TEA in acetone	2017	1	0.90
Milton Keynes Council	20% TEA in water	2017	1	0.89
Somerset County Council	20% TEA in water	2017	2	0.77
South Yorkshire Air Quality Samplers	50% TEA in acetone	2017	2	0.88
Staffordshire Scientific Services	20% TEA in water	2017	14	0.89
Tayside Scientific Services	20% TEA in water	2017	5	0.72
West Yorkshire Analytical Services	50% TEA in acetone	2017	4	0.78
Number of Studies Included			**131**	

London Borough of Sutton did not conduct any co-location studies in 2017, so it was not possible to calculate a local adjustment factor. As a result, the national adjustment factor of 0.89 is applied to diffusion tube monitoring results in this report.

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. Gradko previously participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis and the Annual Field Inter Comparison Exercise. In April 2014, a new scheme, AIR PT13, was introduced. This is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

Gradko International Ltd's performance for 2017 for 100% of samples submitted by Gradko were deemed satisfactory.

The laboratory has also achieved a "good" precision result for 2017. Tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%.

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

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

Annualisation for PM2.5 at ST5 (Beddington Lane North)

Site	Site Type	Annual Mean (µg/m³)	Period Mean (µg/m³)	Ratio
Croydon - Norbury Manor (CR8)	Urban Background	11.6	11.9	0.97
London Greenwich Eltham (GR4)	Suburban	12.3	13.4	0.92
Bexley - Slade Green (BX9)	Suburban	10.8	11.4	0.95
			Average	**0.95**

Appendix B Full Monthly Diffusion Tube Results for 2017 -

Table M. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [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 (0.89) [c]
ST21	100	100	49.4	36.1	30.0	29.8	21.5	8.9	24.1	27.8	29.2	30.5	39.9	39.2	30.5	27.2
ST22	100	100	60.8	44.9	42.5	48.7	33.3	43.1	35.1	38.6	42.1	37.1	47.1	46.7	43.3	38.6
ST23	100	100	56.2	39.4	35.2	42.2	36.2	38.7	33.2	31.0	21.3	32.4	44.7	42.6	37.8	33.6
ST24	100	100	51.5	29.6	29.0	34.0	31.5	23.6	21.8	19.5	27.6	23.9	33.1	29.3	29.5	26.3
ST25	100	100	70.1	37.8	35.9	34.7	26.2	30.9	24.0	28.6	31.4	33.3	44.3	42.6	36.6	32.6
ST26	92	92	67.5	43.8	40.3	42.3	34.2	42.5	35.3	38.6	44.0	42.3	45.9	-	43.3	38.5
ST07	92	92	40.3	28.5	23.8	22.2	22.3	14.6	-	18.0	22.9	22.2	28.2	28.6	24.7	22.0
ST08	100	100	51.4	31.4	24.6	29.1	24.4	23.2	21.8	22.2	26.6	26.6	38.3	34.9	29.5	26.3
ST29	100	100	68.7	46.7	43.3	47.3	40.5	46.1	34.3	36.4	43.1	39.5	44.1	42.5	44.4	39.5
ST10	100	100	47.0	30.5	25.5	20.6	21.8	16.2	15.4	16.2	21.7	19.0	30.9	29.2	24.5	21.8
ST11	92	92	49.1	31.0	26.4	22.7	25.0	20.7	18.7	21.7	-	25.8	29.4	31.6	27.5	24.4
ST32	100	100	42.6	28.8	27.1	14.4	22.8	25.5	18.1	20.4	25.1	23.4	28.3	25.4	25.2	22.4
ST33	100	100	65.9	36.1	32.2	37.2	33.2	41.2	28.6	31.4	31.7	33.4	40.8	35.6	37.3	33.2

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2017 % [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 (0.89) [c]
ST34	92	92	68.6	43.4	42.2	50.8	38.5	52.3	38.6	-	43.6	45.2	48.1	51.4	47.5	**42.3**
ST35	100	100	59.6	36.5	34.7	33.1	27.7	31.8	26.3	25.4	31.6	29.1	37.8	38.0	34.3	30.5
ST36	100	100	53.4	35.3	32.7	28.5	29.6	29.2	25.1	23.4	31.8	27.1	36.6	35.7	32.4	28.8
ST27	92	92	70.7	40.1	38.8	40.4	33.9	39.3	32.1	37.1	37.1	34.3	41.9	-	40.5	36.1
ST38	92	92	68.8	38.0	35.2	41.7	33.3	40.5	30.2	31.5	-	30.0	42.2	36.4	38.9	34.6
ST39	100	100	60.7	40.4	39.8	50.5	38.3	42.7	34.5	40.0	41.9	38.1	51.7	46.3	43.7	38.9
ST40	100	100	62.9	44.9	40.0	46.4	41.6	53.3	38.4	39.4	40.6	34.9	50.8	44.1	44.8	39.8
ST42	75	75	46.2	29.5	29.8	-	-	-	12.7	14.6	20.0	20.9	29.3	30.2	25.9	23.1
H1	100	100	57.2	34.4	30.2	31.3	28.4	30.8	25.3	25.2	32.8	29.0	41.9	36.9	33.6	29.9
H2	92	92		31.3	28.4	29.9	24.8	25.9	23.7	23.9	29.8	27.6	36.0	32.7	28.5	25.4
H3	92	92	53.5	37.9	31.4	-	32.1	49.1	39.9	41.3	50.7	47.6	56.7	58.2	45.3	**40.3**
BL	92	92	60.4	-	35.3	36.9	27.2	34.4	28.3	30.2	26.6	37.2	39.7	42.1	36.2	32.2

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 have been "annualised" in accordance with LLAQM Technical Guidance, where valid data capture is less than 75%