***Wandsworth Borough Council* Air Quality Annual Status Report for 2016**
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This report provides a detailed overview of air quality in *Wandsworth Borough Council* during 2016. 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
LEL	Low Emission Logistics
LLAQM	London Local Air Quality Management
LLECP	London Low Emission Construction Partnership
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

Executive Summary

Wandsworth is an inner London borough with both urban and suburban characteristics. It is bounded by the River Thames to the north, Vauxhall to the east, Richmond Park to the west and Wimbledon to the south. The borough has many parks and open spaces; with very little areas for industrial use the main land use is residential and the predominant source of air pollution is road traffic. In recent years there has been a surge in development particularly around Vauxhall with the Nine Elms development located around the site of the former Battersea Power Station.

An Air Quality Management Area (AQMA) for the whole of the borough was declared in 2001 for exceedances of the nitrogen dioxide (NO_2) annual mean air quality objective limit and the daily mean for particulate matter (PM_{10}). An Air Quality Action Plan (AQAP) was put in place detailing the actions the council would be taking to reduce pollutant concentrations to below the objective limits. Many of these actions have been completed and a new AQAP was written and adopted in 2016.

This annual status report (ASR) provides the first report on progress of actions from the Wandsworth Air Quality Action Plan 2016-2021. The report details trends in NO_2 and PM_{10} concentrations since 2010. Overall, a decrease in concentrations has been observed however the annual mean NO_2 objective continues to be exceeded at most roadside locations.

Results of monitoring for sulphur dioxide (SO_2), carbon monoxide (CO) and Benzene have been reported up to 2016. The objective limits for each of these pollutants have been met consistently since 2010 and therefore monitoring has now ceased and will not be reported on in future reports. A new automatic monitoring station has been located at Lavender Hill (Clapham Junction), results from the station have been annualised to compensate for only monitoring for part of the year. We expect to have a full year's ratified data in the next report.

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

The London borough of Wandsworth monitored air pollution using real-time air quality monitoring stations at seven locations within the borough in 2016, as detailed in Table B below. It should be noted that the air quality monitoring station in Tooting High Street was not commissioned until June 2015 and Clapham Junction was commissioned in April 2016.

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2016

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
WA2	**Wandsworth - Town Hall**, High Street, Wandsworth (commissioned 11th October 1994)	525779	174662	Urban Background	y	None	22m	4m 85	CO, NO2, O3, SO2	*Chemiluminescent*
WA7	**Putney High Street** 94a Putney High Street (commissioned 9th July 2009)	524035	175334	Urban Kerbside	y	1 m	0.85 m	1m 75	NO2, PM10	*Chemiluminescent ; TEOM*
WA8	**Putney High Street** 94a Putney	524032	175335	Urban Roadside	y	1m	4.5 m	4m 85	NO2	*Chemiluminescent*

	High Street (commissioned 23rd April 2010)									
WA9	**Felsham Road, Putney** (commissioned 4th January 2011)	524044	175495	Urban Background	y	1 m	4.8m from Felsham Road kerb; 46m from Putney High Street kerb	3m 35	NO2, PM10	*Chemiluminescent ; TEOM*
WAA	**Thessaly Road, Battersea** (commissioned 19th June 2012)	529137	177249	Urban Roadside	y	1 m	7.5m from Battersea Park Road kerb	1 m 75	NO2, PM10	*Chemiluminescent ; TEOM*
WAB	**Tooting High Street, Tooting** (commissioned 11th June 2015)	*527567*	*171628*	Urban Roadside	y	*0 m*	2 m	1 m 75	NO2, PM10	*Chemiluminescent ; TEOM*
WAC	**313 Lavender Hill, Clapham Junction** (commissioned 14th April 2016)	*527430*	*175454*	Urban Roadside	Y	*1 m*	8m from Lavender Hill kerb; 3.75m Illminster Gardens kerb	1 m 75	NO2, PM10	*Chemiluminescent ; TEOM*

Table C. Details of Non-Automatic Monitoring Sites for 2016 – Across Borough Survey

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)
W3	Newton Preparatory School, 149 Battersea Park Road	528866	177024	Kerbside	y	5	0.75	*2.65*	NO_2	N
W4	108 Mitcham Road	527688	171204	Roadside	y	3	0.6	*2.65*	NO_2	N
W5	Upper Richmond Road	522265	175470	Roadside	y	3.92	1.05	*2.95*	NO_2	N
W7	Adjacent to Co-op Petrol station, Roehampton Vale, SW15	522031	172699	Roadside (NO2 site)	y	22.51	3	*2.65*	NO_2	N
B1	Adjacent to Co-op Petrol station, Roehampton Vale, SW15	522058	172715	Roadside (Benzene site)	y	*24.9*	5.5 m	*2.65*	Benzene	N
W9	Putney High Street, Putney	524021	175258	Kerbside	y	0.75	1	*2.8*	NO_2	N
W12, W13	Wandsworth Plain, Wandsworth (2 tubes)	525493	174809	Roadside	y	6.55	2.1	*4*	NO_2	N

W6	Daylesford Avenue, Putney SW15	522270	175307	Urban Background	y	*11*	2.4	*2.85*	NO_2	N
W8	Bickley Street, Tooting	527524	171239	Urban Background	y	*2.97*	1.85	*2.8*	NO_2	N
W10	Werter Road, Putney	524156	175173	Urban Background	y	*3.13*	0.8	*2.8*	NO_2	N
W14, W15	Este Road, SW11	527307	175848	Urban Background	y	*9.77*	0.5	*2.5*	NO_2	N
W16, W17	St Johns Hill/ Falcon Road, SW11	527347	175452	Roadside	y	*64.9*	3.5	*2.3*	NO_2	N
W18, W19	Totterdown Street SW17	527588	171670	Roadside	y	*14.7*	6	*2.7*	NO_2	N
W20, W21, W22	Felsham Road SW15 (3 tubes)	524044	175495	Urban Background	y	*9.5*	4.8 (46 from Putney High Street)	*2.8*	NO_2	Y

Table D. Details of Non-Automatic Monitoring Sites for 2016 – Clapham Junction Study

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)
CJ1, CJ2	Falcon Road Bus Stop	527286	*175691*	Kerbside	y	28.3	1.10	*2.00*	NO_2	N
CJ3, CJ4	Falcon Road	527348	*175569*	Roadside	y	62	1.10	*2.00*	NO_2	N
CJ5, CJ6	Lavender Hill	527428	175464	Roadside	y	16.5	1.50	*2.00*	NO_2	N
CJ7, CJ8	Beauchamp Road	527508	175344	Urban Background	y	4.85	0.60	2.00	NO_2	N

CJ9, CJ10	St Johns Road	527388	175368	Roadside	y	61.59	3.40	2.55	NO_2	N
CJ11, CJ12	St Johns Hill	527209	175365	Roadside	y	4	2.70	2.34	NO_2	N

Table E. Details of Non-Automatic Monitoring Sites for June 2015 – May 2016 – Tooting Study

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)
T1, T2	Blakenham Road	527772	171701	Urban Background	y	*1.4*	*0.6*	*2.3*	NO_2	N
T3, T4, T5	Air Quality Monitoring Station	527561	171628	Roadside	y	*0*	*2*	*1.77*	NO_2	Y
T6, T7	Upper Tooting Road	527736	172019	Roadside	y	*33.68*	*2.1*	*2.7*	NO_2	N
T8, T9	Fircroft Road	527674	172542	Urban Background	y	*13.3*	*0.4*	*2.5*	NO_2	N
T10, T11	Broadwater Road	527072	171744	Roadside	y	*13.66*	*0.8*	*2.5*	NO_2	N
T12, T13	908 Garratt Lane	527222	171621	Roadside	y	*2.84*	*0.8*	*2.7*	NO_2	N
T14, T15	Gambole Road	527127	171569	Urban Background	y	*2.65*	*0.5*	*2.7*	NO_2	N
T16, T17	Sellingcourt Road	527320	171115	Urban Background	y	*2.8*	*0.6*	*2.4*	NO_2	N
T18, T19	Tooting High Street	527294	171207	Roadside	y	*5.85*	*0.9*	*2.6*	NO_2	N

1.2 Details of Non- Automatic Monitoring Sites – Putney High Street

As part of the Putney real-time monitoring study, NO_2 diffusion tubes have been co-located at the air quality monitoring station and in other areas of potential exposure, i.e in the centre of the pavement and at first, second and third floor levels at the façade of flats above the high street. These are shown in Table 2.3 below

All the following NO_2 diffusion tubes are located within an AQMA and are located between 0.9m and 4.6m from roadside. These positions represent worst-case locations.

The Putney High Street NO_2 diffusion tube study has been undertaken to better understand the potential exposure to individuals from NO_2 concentrations. As the area in question is a high street, with four storey tall buildings creating a canyon effect the study has been conducted with co-located NO_2 tubes on one building with first, second and third floor levels all being included. In addition the study has included NO_2 tubes located on the kerbside air quality monitoring station and on signage which represents the pavement and natural footfall of the public.

Table F. Details of Non-Automatic Monitoring Sites – Putney High Street Study

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)
P1, P2	Façade First Floor	524032	175335	Roadside	**Y**	0	4.6	4.7	NO_2	N
P3, P4	Façade Second Floor	524032	175335	Roadside	**Y**	0	4.6	8.1	NO_2	N
P5, P6	Façade Third Floor	524032	175335	Roadside	**Y**	0	4.6	12.05	NO_2	N
P7, P8, P9	Kerbside Air Quality Monitoring Station	524036	175336	Kerbside	**Y**	1.45	0.9	1.77	NO_2	Y
P10, P11	Sign in centre of pavement	524044	175363	Roadside	**Y**	0	2.35	2.3	NO_2	N

1.3 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for "annualisation". An adjustment for distance to a location of relevant public exposure has been undertaken, the details of which are described in Table H. The value given in table G below does **not** include this adjustment so that a true comparison of measured data can be seen against previous years' data.

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

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3}) – Objective limit 40 µgm^{-3}						
					2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WA2	Wandsworth - Town Hall	automatic	*98*	*98*	**53**	**46**	**48**	**48**	**43**	**36**	**43**
WA7	Putney High Street –Kerbside	automatic	*82*	*82*	**168**	**154**	**155**	**124**	**123**	**123**	**124**
WA8	Putney High Street -façade	automatic	*99*	*99*		**128**	**129**	**106**	**95**	**96**	**110**
WA9	Putney-Urban background	automatic	88	*88*		**43**	40	40	**41**	40	**45**
WAA	Thessaly Road, Battersea	automatic	88	88				**45**	**47**	40	40

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3}) – Objective limit 40 µgm^{-3}						
					2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WAB	Tooting High Street	automatic	73	89						**60** for monitoring period (**68** for 2015)	**59**
WAC	Lavender Hill, Clapham Junction	automatic	85	61							**47 (annualised)**
W3	Newton Preparatory School, 149 Battersea Park Road	Diffusion tube	92	92	**53**	**63**	**54**	**65**	**60**	**57**	**63**
W4	108 Mitcham Road	Diffusion tube	92	92	**88**	**80**[#]	**91**	**97**	**96**	**79**	**80**
W5	Upper Richmond Road	Diffusion tube	92	92	**49**	39	**51**	**60**	**51**	**48**	**52**
W7	Adjacent to Co-op Petrol station, Roehampton Vale, SW15	Diffusion tube	83	83	**56**	**53**	**57**	**53**	**47**	**49**	**51**
W9	Putney High Street, Putney	Diffusion tube	83	83	**101**	**105**	**113**	**116**	**99**	**89**	**104**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3}) – Objective limit 40 µgm^{-3}						
					2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
W12,W13	Wandsworth Plain, Wandsworth (2 tubes)	Diffusion tube	83	83	**63**	**60**	**73**	**71.5**	**69.5**	**58**	**63**
W16, W17	St Johns Hill/ Falcon Road	Diffusion tube	92	92			**83.5**	**95.5**	**86**	**71**	**77**
W18, W19	Totterdown Street SW17	Diffusion tube	83	83			**67.5**	**75.5**	**68**	**62**	**65**
W6	SW11Daylesford Avenue, Putney SW15	Diffusion tube	92	92	29	30	28	26	26	24	28
W8	Bickley Street, Tooting	Diffusion tube	92	92	43	33	38	41	36	33	35
W10	Werter Road, Putney	Diffusion tube	92	92	38	31[x]	38	36	34	35	35
W14, W15	Este Road, SW11	Diffusion tube	75	75			27	**41.5**	37.5	32	36
W20, W21, W22	Felsham Road SW15 (3 tubes)	Diffusion tube	83	83			42	**44.3**	40.3	35	**41**

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3}) – Objective limit 40 µgm^{-3}						
					2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
CJ1, CJ2	Falcon Road Bus Stop	Diffusion tube	92	92						Data not representative of public exposure, or valid for review and assessment purposes	Data not representative of public exposure, or valid for review and assessment purposes
CJ3, CJ4	Falcon Road	Diffusion tube	75	75						**71**	**79**
CJ5, CJ6	Lavender Hill	Diffusion tube	83	83						**67**	**78**
CJ7, CJ8	Beauchamp Road	Diffusion tube	92	92						39	**44**
CJ9, CJ10	St Johns Road	Diffusion tube	92	92						50	**60**
CJ11, CJ12	St Johns Hill	Diffusion tube	92	92						**71**	**80**
T1, T2	Blakenham Road	Diffusion tube	83	33						40	
T3, T4, T5	Air Quality Monitoring Station	Diffusion tube	100	41						**62**	
T6, T7	Upper Tooting Road	Diffusion tube	100	41						**62**	

Site ID	Site Name	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3}) – Objective limit 40 µgm^{-3}						
					2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
T8, T9	Fircroft Road	Diffusion tube	100	41						30	
T10, T11	Broadwater Road	Diffusion tube	100	41						38	
T12, T13	908 Garratt Lane	Diffusion tube	100	41						**52**	
T14, T15	Gambole Road	Diffusion tube	100	41						36	
T16, T17	Sellincourt Road	Diffusion tube	92	33						34	
T18, T19	Tooting High Street	Diffusion tube	83	41						**45**	
P1, P2	Façade First Floor	Diffusion tube	92	92	**136**	**128**	**129**	**97**	**87**	**107**	**99**
P3, P4	Façade Second Floor	Diffusion tube	92	92	**118**	**115**	**110**	**90**	**80**	**99**	**98**
P5, P6	Façade Third Floor	Diffusion tube	92	92	**107**	**110**	**99**	**70**	**65**	**72**	**67**
P7, P8, P9	Kerbside Air Quality Monitoring Station	Diffusion tube	83	83	**163**	**161**	**155**	**123**	**101**	**125**	**128**
P10, P11	Sign in centre of pavement	Diffusion tube	92	92	**142**	**150**	**140**	**106**	**85**	**112**	**108**

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

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

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

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

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

All data from the automatic monitoring stations has been fully ratified; data capture rates for all sites were above 85% except for the monitoring station at Clapham Junction where monitoring commenced on 14th April 2016. The measure results have been annualised in accordance with the procedure described in LAQM TG (16). Full details can be found in the Appendix. Overall, concentrations measured at the automatic monitoring stations have increased since 2015, the greatest increase being measured at Putney High Street Facade which went up from 96µg m^{-3} in 2015 to 110µg m^{-3} in 2016. The only station located in a background site is at Putney where an increase of 5µg m^{-3} was observed.

A nationally derived bias adjustment factor of 0.94 was used for all diffusion tube data as this presented the worst case when compared with the local derived factor obtained from local co-location studies (0.91) as the data capture for the monthly monitoring periods equivalent to the diffusion tube exposure periods was not satisfactory for a number of periods. Also that it was felt that a factor based on a number of studies was better suited to this study as the tubes are located at various locations across the borough and therefore we did not want the bias correction to be influenced by very local factors. Using a factor obtained from a number of studies minimises the effect of local factors and provides a more representative average factor that can be applied to a wide range of different tube locations. The choice of bias correction factor chosen in further described in Appendix A (A.2). All the results can be found in Appendix A, Table T.

The minimum data capture rate was achieved at all nitrogen dioxide diffusion tube sites, except for 2016 for the Tooting diffusion tube study for the reasons outlined above. Where there was one tube missing from 2 co-located tubes the remaining tube value was used and so the data capture rate was not reduced.

It should be noted that the data for Tooting High Street (WA11) is for a 12 month period commencing 8 June 2015, from when the monitoring station began operating. Therefore the monitoring station was in operation for 5 months in 2015, and the data capture possible during the year was reduced to a maximum of 41%.

The 2016 data from automatic monitoring stations is quite consistent at all monitoring stations apart from the Putney High Street façade monitoring station (WA8) which yielded a considerably higher annual mean concentration of 110 µgm-3 compared with the previous two years. The Putney Urban background air quality monitoring station also yielded higher results than in all other years, exceeding the annual mean objective. On average the diffusion tube results yielded higher values in 2016 than in the previous year. However, this was not the case for the Putney High Street monitoring study where lower results were recorded in most cases.

The diffusion tubes are exceeding the annual mean NO2 air quality objective at busy roadside locations but meeting the meeting the objective at all urban background locations except in the case of Felsham Road. The 60 µgm-3 concentration is being exceeded at certain roadside locations in Putney High Street, Clapham Junction, Wandsworth and Tooting, with Putney High Street giving the highest results of the 4 focus areas. This indicates that there is a

likely exceedance of the hourly mean objective. However, only the automatic monitoring stations in Putney replicate this with similar annual mean readings.

Interestingly the levels in Putney High Street tended to fall year on year between 2010 and 2014 (inclusive), but in 2015 figures were comparable to those in 2013, and in 2016 levels were lower at each of these Putney High Street locations, apart from at the air quality monitoring station location. The Putney High Street data at the kerbside and at different heights is illustrated pictorially in Appendix F.

A number of the diffusion tube locations are not necessarily in locations of public exposure and therefore where an exceedence is measured at a monitoring site which is not representative of public exposure the procedure specified in LLAQM Technical Guidance document was followed to estimate the concentration at the nearest receptor. This is further described in A (A.3). The results for the tubes exceeding the annual mean air quality objective are given in Table H.

It should be noted that the levels are likely to be less at the area of public exposure closest to W3 due to the high wall between the road and the school grounds that will influence diffusion. For the sites W16, W17 & CJ3, CJ4 the calculator could not be used as the relevant exposure model was outside of the scope of the model parameters.

For site CJ1, CJ2 a calculation was carried out which gave a value of 59.2 at the nearest public exposure location. However this site is measuring very close to bus exhausts and is therefore can be argued to be measuring a point source rather the levels from the road as a whole (a line source). Therefore it is not suitable to use this data to estimate concentrations at a relevant exposure location further away from the roadside and therefore this data is not reported for review and assessment purposes. We will therefore stop monitoring at this location.

St Johns Road, Clapham Junction, Tooting High Street and Putney High Street are busy shopping streets and therefore the pavement has been used as the site for relevant public exposure as individuals are likely to be exposed for an hour or more at such locations. Site C9, C10 (St Johns Road) is located close to the building line and where individuals will walk therefore this location has been used for relevant public exposure and in the case Putney High Street and Tooting High Street the centre of the pavement has been used for the relevant exposure.

Table H. Calculation of NO2 at relevant exposure receptors (µg m-3)

Site ID	Site Name	X (m)	Y (m)	Site Type	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Distance from kerb to relevant exposure	NO_2 concentration	Background NO_2	NO_2 at relevant exposure receptor
W3	Newton Preparatory School, 149 Battersea Park Road	528866	177024	Kerbside	5	0.75	5.75	**63**	29.96353	**50**
W4	108 Mitcham Road	527688	171204	Kerbside	3	0.6	3.6	**80**	25.780848	**62**
W5	Upper Richmond Road	522265	175470	Roadside	3.92	1.05	4.97	**52**	25.915454	**44**
W7	Adjacent to Co-op Petrol station, Roehampton Vale, SW15	522031	172699	Roadside (NO2 site)	22.51	3	25.51	**51**	22.014808	35
W9	Putney High Street, Putney	524021	175258	Kerbside	0.75	1	1.75	**104**	26.76227	**95**

W12, W13	Wandsworth Plain, Wandsworth (2 tubes)	525493	174809	Roadside	6.55	2.1	8.65	**63**	28.069198	**51**
W6	Daylesford Avenue, Putney SW15	522270	175307	Urban Background	*11*	2.4	13.4	28	25.915454	27
W8	Bickley Street, Tooting	527524	171239	Urban Background	*2.97*	1.85	4.82	35	25.780848	33
W10	Werter Road, Putney	524156	175173	Urban Background	*3.13*	0.8	3.93	35	26.76227	33
W14, W15	Este Road, SW11	527307	175848	Urban Background	*9.77*	0.5	10.27	36	29.97712	33
W16, W17	St Johns Hill/ Falcon Road, SW11	527347	175452	Roadside	*64.9*	3.5	64.9	**77**	29.97712	N/A

W18, W19	Totterdown Street SW17	527588	171670	Roadside	*14.7*	6	6	**65**	25.780848	**65**
W20, W21, W22	Felsham Road SW15 (3 tubes)	524044	175495	Urban Background	*9.5*	4.8 (46 from Putney High Street)	9.5 (46 from Putney High Street)	41	26.76227	41
T1, T2	Blakenham Road	527772	171701	Urban Background	*1.4*	*0.6*	*2*	40	25.780848	37
T3, T4, T5	Air Quality Monitoring Station	*527561*	*171628*	Roadside	*0*	*2*	*2*	62	25.780848	62
T6, T7	Upper Tooting Road	527736	172019	Roadside	*33.68*	*2.1*	*35.78*	62	24.779752	N/A
T8, T9	Fircroft Road	527674	172542	Urban Background	*13.3*	*0.4*	*13.7*	30	24.779752	27
T10, T11	Broadwater Road	527072	171744	Roadside	*13.66*	*0.8*	*14.46*	38	25.780848	31

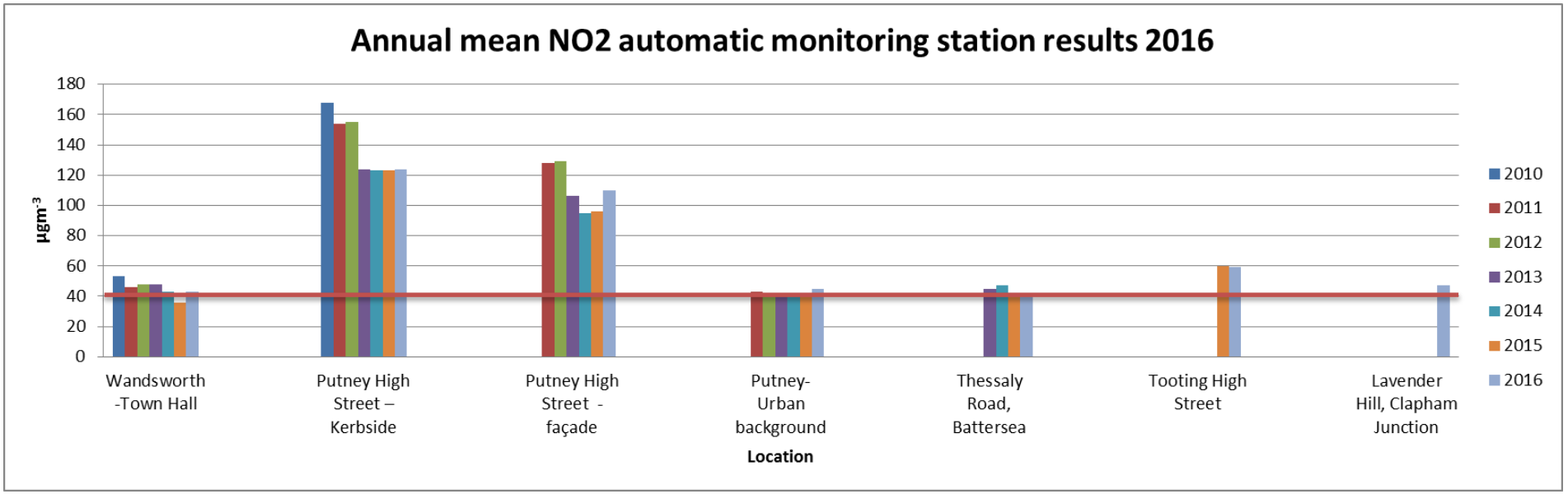
T12, T13	908 Garratt Lane	527222	171621	Roadside	*2.84*	*0.8*	*3.64*	**52**	25.780848	**44**
T14, T15	Gambole Road	527127	171569	Urban Background	*2.65*	*0.5*	*3.15*	36	25.780848	33
T16, T17	Sellincourt Road	*527320*	*171115*	Urban Background	*2.8*	*0.6*	3.4	34	25.780848	31
T18, T19	Tooting High Street	*527294*	*171207*	Roadside	*5.85*	*0.9*	6.75	**45**	25.780848	37
P1, P2	Façade First Floor	524032	175335	Roadside	0	4.6	4.6	**99**	26.76227	**99**
P3, P4	Façade Second Floor	524032	175335	Roadside	0	4.6	4.6	**98**	26.76227	**98**

P5, P6	Façade Third Floor	524032	175335	Roadside	0	4.6	4.6	**67**	26.76227	**67**
P7, P8, P9	Kerbside Air Quality Monitoring Station	524036	175336	Kerbside	1.45	0.9	2.35	**128**	26.76227	**109**
P10, P11	Sign in centre of pavement	524044	175363	Roadside	0	2.35	2.35	**108**	26.76227	**108**
CJ1, CJ2	Falcon Road Bus Stop	527286	175691	Roadside	28.3	1.1	29.4	**120**	29.97712	N/A
CJ3, CJ4	Falcon Road	527348	*175569*	Roadside	62	1.1	63.1	**79**	29.97712	N/A
CJ5, CJ6	Lavender Hill	527428	175464	Roadside	16.5	1.5	18	**78**	29.97712	**52**
CJ7, CJ8	Beauchamp Road	527508	175344	Urban Background	4.85	0.6	5.45	44	29.97712	38
CJ9, CJ10	St Johns Road	527388	175368	Roadside	61.59	3.4	3.4	**60**	29.97712	**60**

CJ11, CJ12	St Johns Hill	527209	175365	Roadside	4	2.7	6.7	**80**	29.97712	**69**

The data shows that there are still considerable exceedences of the annual mean objective at areas of relevant exposure in Putney High Street and also exceedences of the annual mean objective in the other NO2 focus areas of Tooting, Clapham Junction and Wandsworth. These have already been identified in previous reviews and assessments of air quality. In addition it should be noted that the diffusion tubes in St Johns Road (CJ9, CJ10) Clapham Junction are still yielding an average of 60 µg m-3 and this is on a road that is restricted to buses and access e.g. by delivery vehicles.

Figure A. Annual Mean NO_2 automatic monitoring station results



The red line indicates the Air Quality objective limit of 40 μgm^{-3}

Table I. 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}						
			2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WA2 (Wandsworth - Town Hall)	*98*	*98*	3	0 (143.3)	0	0	0 (124.4)	*0 (108.1)*	0
WA7 (Putney High Street – Kerbside)	*82*	*82*	**2480**	**2768**	**2740**	**1580**	**1537**	**1443**	**1248**
WA8 (Putney High Street -façade)	*99*	*99*		**1662**	**1726**	**661**	**505**	**336**	**807**
WA9 Putney (urban background) (Felsham Road)	88	*88*		10	0	2	0 (132.7)	0 (104)	**45**
WAA (Thessaly Road**,**Battersea)	88	88				0	1	0 (113.6)	1
WAB (Tooting High Street)	73	73						9	2

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Number of Hourly Means > 200 µgm^{-3}						
			2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WAC Lavender Hill (Clapham Junction)	85	61							**23**

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

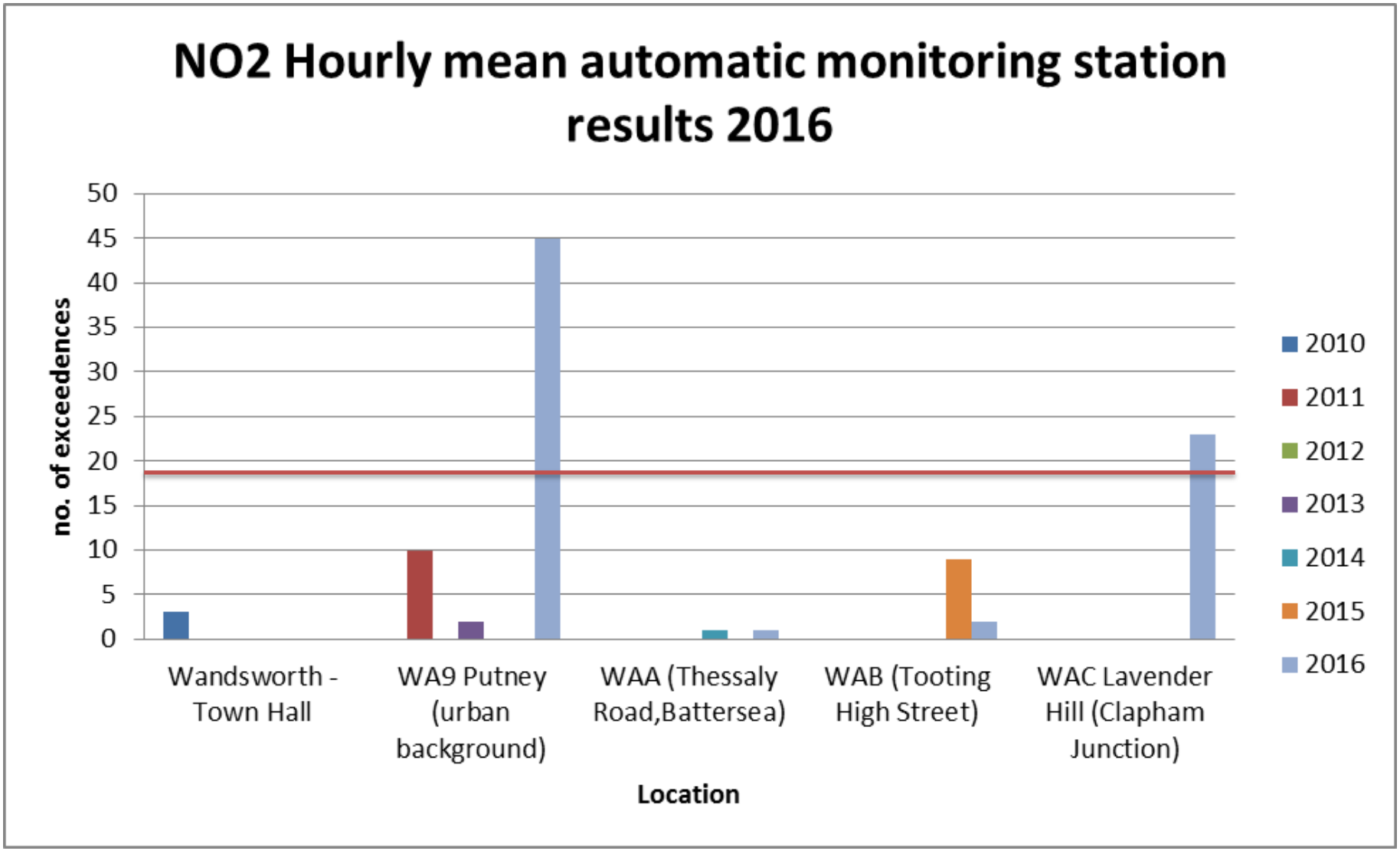
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

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

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

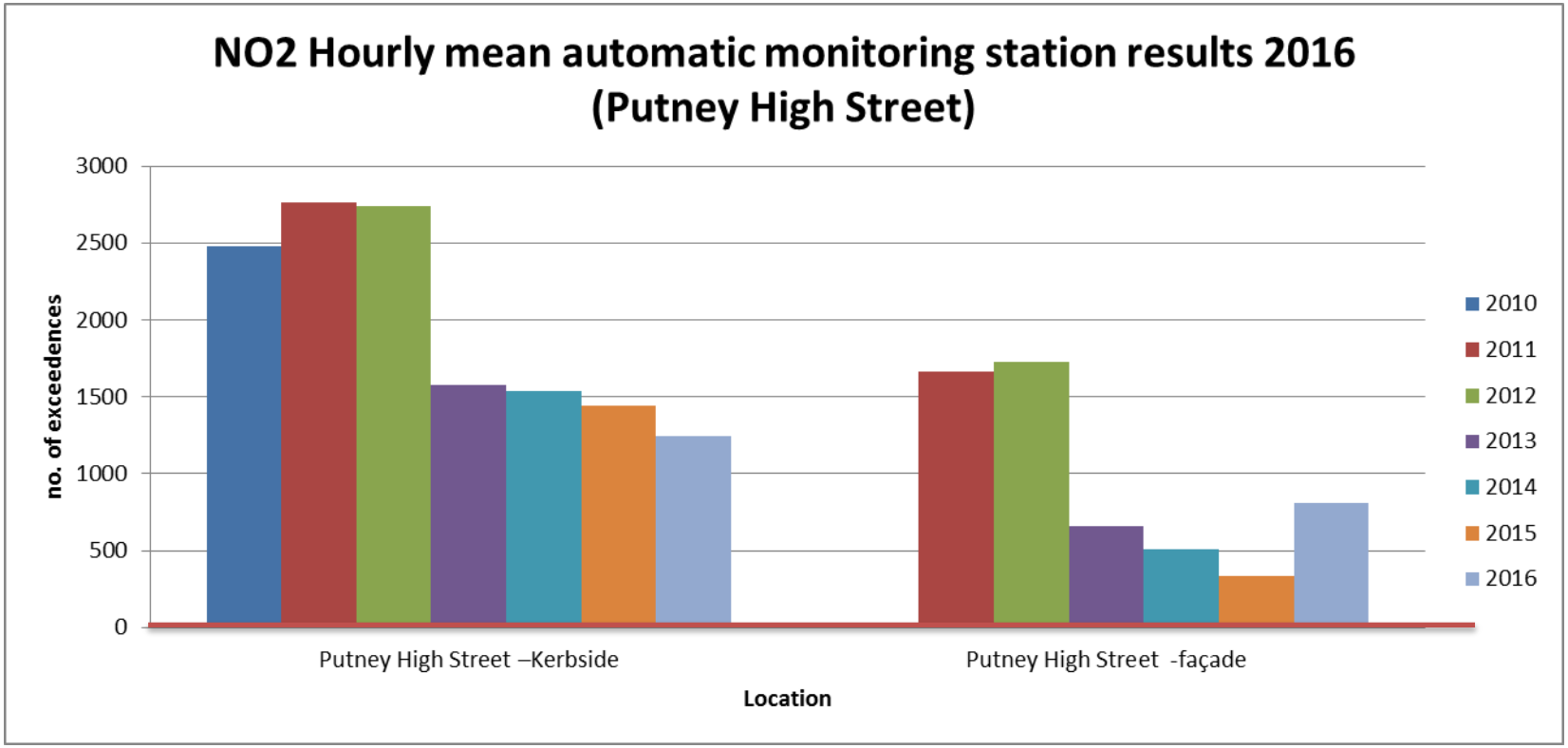
Exceedances of the hourly mean objective limit were observed at all three of the stations in Putney and also at the newly installed station at Clapham Junction. The greatest increase was observed at the Putney High Street Façade station where the limit was exceeded 807 times compared with 336 times in 2015.

Figure B. **NO_2 Hourly mean automatic monitoring station results 2016**



The red line indicates the Air Quality objective limit of 18 exceedences.

Figure C. **NO_2 Hourly mean automatic monitoring station results 2016 (Putney High Street)**



The red line indicates the Air Quality objective limit of 18 exceedences

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Annual Mean Concentration (µgm^{-3})						
			2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WA7 (Putney High Street – Kerbside)	*95*	*95*	29	32	29	28	24	25	21
WA9 (Putney urban-background) (Felsham Road)	*94*	*94*		22	24	24	20	18	18
WAA (Thessaly Road,Battersea)	*89*	*89*				31	28	27	32
WAB (Tooting High Street)	*89*	*91*						25	24
WAC Lavender Hill (Clapham Junction)	*69*	*69*							18

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

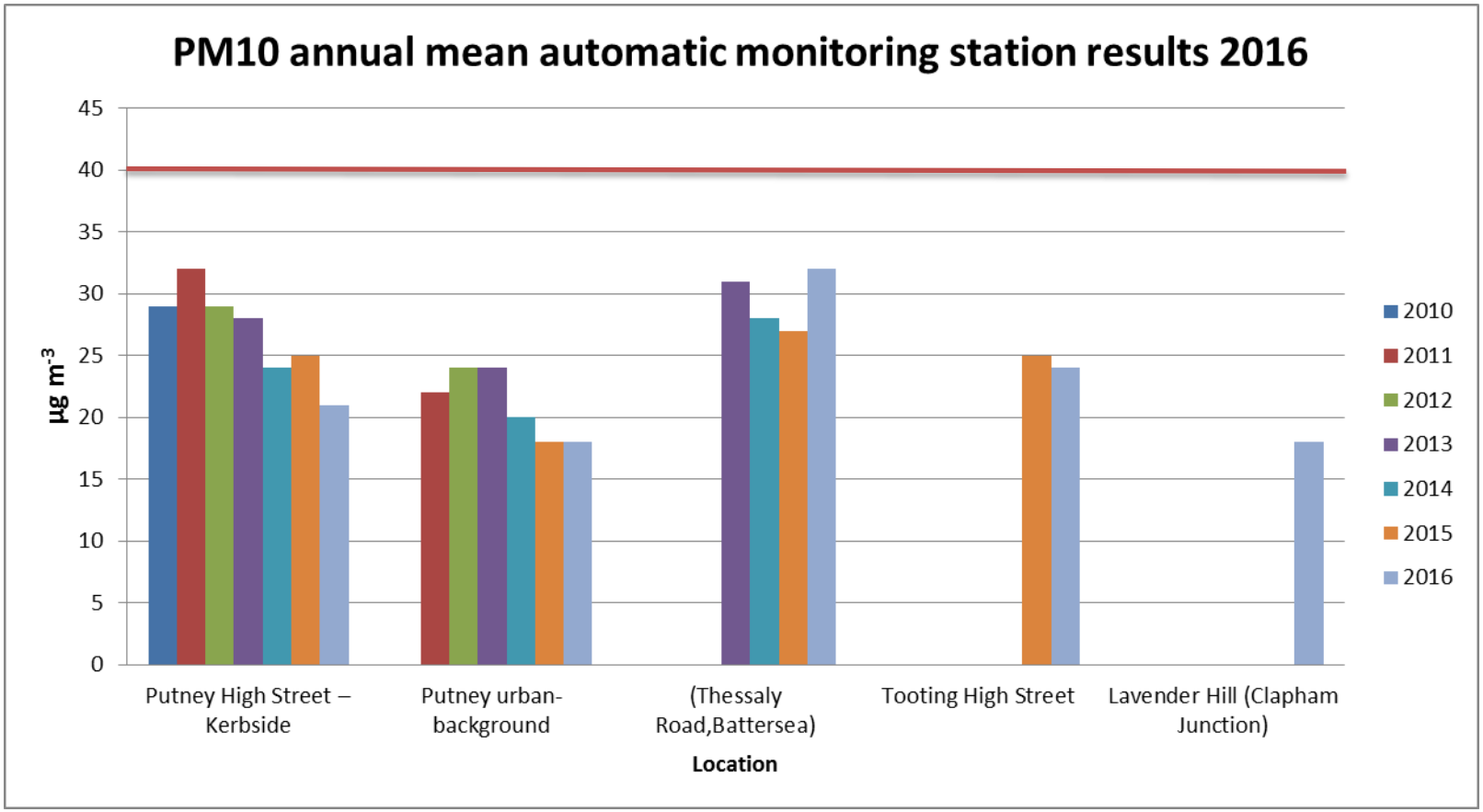
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[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%

It should be noted that the data capture for WAC Lavender Hill (Clapham Junction) was 69% and therefore may not be representative of the full year and should be used for guidance only. This site commenced operating on 14th April 2016.

Figure D. **PM_{10} annual mean automatic monitoring station results 2016**



The red line indicates the Air Quality objective limit. The annual mean objective for PM_{10} continues to be met at all monitoring stations, however the measured concentrations at the roadside sites still exceed the World Health Organisation (WHO) limit of 20µg m^{-3}. The daily mean objective limit was met at all sites except for Thessaly Road, Battersea where 43 exceedances of the daily mean were observed. This is described in Table K and Figure E.

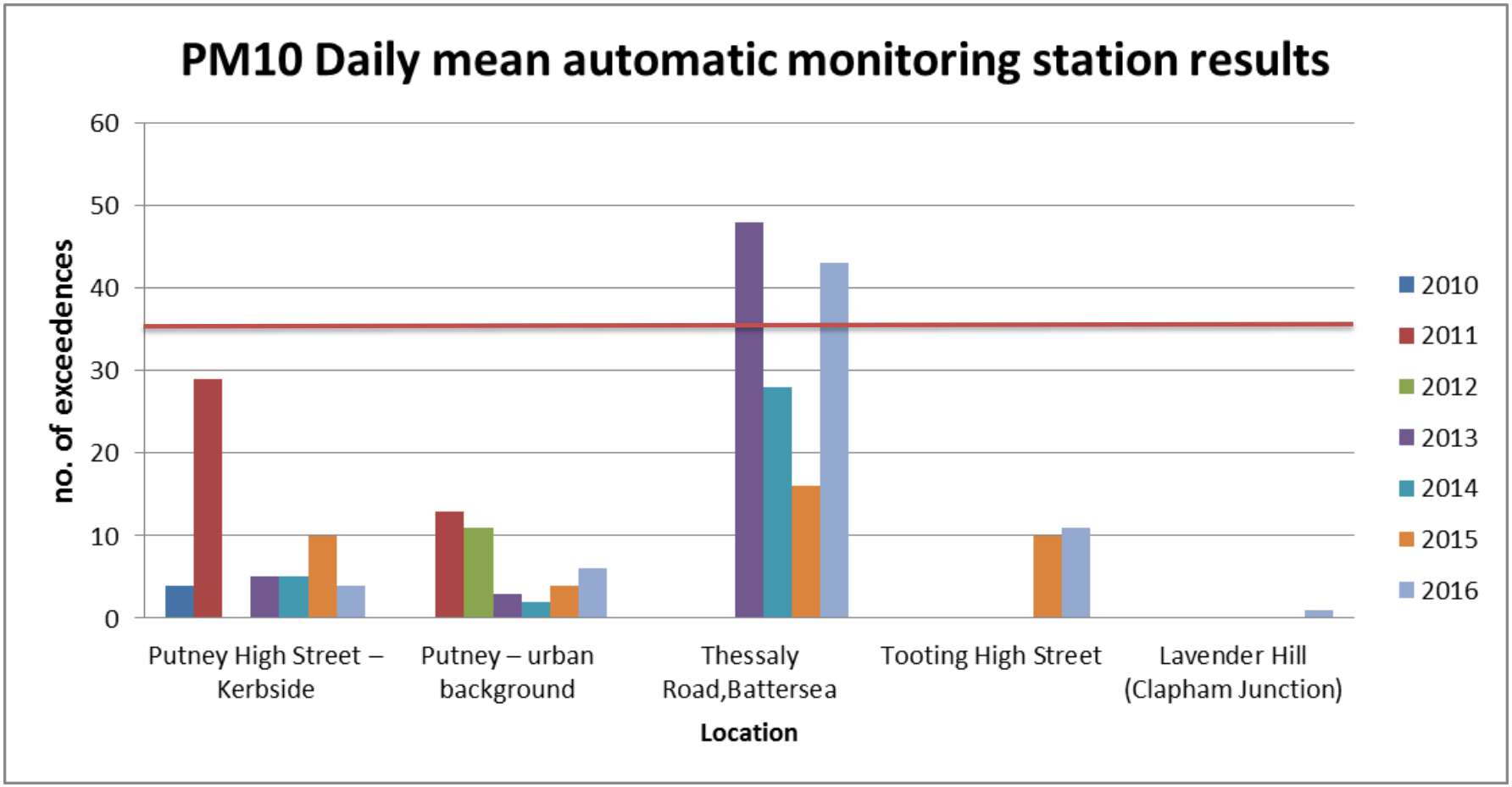
Table K. PM_{10} Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Number of Daily Means > 50 µgm^{-3}						
			2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WA7 (Putney High Street –Kerbside)	*95*	*95*	4	29	10 (40.5)	5	5	10	4
WA9 (Putney – urban background)(Felsham Road)	*94*	*94*		13 (42.6)	11 (39)	3 (41.7)	2 (31)	4 (21.2)	6
WAA (Thessaly Road,Battersea)	*89*	*89*				**48**	28	16	**43**
WAB (Tooting High Street)	*89*	*91*						10	11
WAC (Lavender Hill)	*69*	*69*							1 (27.5)

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 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%

It should be noted that the data capture for WAC Lavender Hill (Clapham Junction) was 69% and therefore may not be representative of the full year and should be used for guidance only. This site commenced operating on 14th April 2016.

Figure E **PM_{10} Daily mean automatic monitoring station results**



The red line indicates the Air Quality objective limit

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Number of: [c]		
			15-minute means > 266 µgm^{-3}	1-hour mean > 350 µgm^{-3}	24-hour mean > 125 µgm^{-3}
WA2 (Wandsworth - Town Hall)	58	58	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%

No exceedances of the SO_2 objective limits were observed. This monitoring has now ceased and we will not be reporting on this in future reports. As the data capture was below 75% it should be noted that this data will not be representative of the full calendar year and hence should be used for guidance only.

Carbon Monoxide

Table M. CO Automatic Monitor Results for 2010 - 2016: Comparison with Objectives

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Objective: 10mgm^{-3} as a maximum daily running8 hour mean						
			2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
WA2 (Wandsworth - Town Hall)	*53*	*53*	2.7	1.9	1.9	2.3	2.3	1.1	2

Exceedances of the CO AQO is 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" 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%

No exceedances of the CO objective limits were observed. This monitoring ceased on the 1st August 2016 and we will not be reporting on this in the future. As the data capture was below 75% it should be noted that this data will not be representative of the full calendar year and hence should be used for guidance only.

Benzene

Table N. Benzene Diffusion tube Results for 2010 - 2016: Comparison with annual mean objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2016 % [b]	Objective: 5 µgm^{-3} as an annual mean						
			2010 [c]	2011 [c]	2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016
B1 (Adjacent to Co-op Petrol station, Roehampton Vale, SW15)	*75*	*75*	2	1.6	1.3	1.4	1.5	1.5	1.6

No exceedances of the Benzene objective limits were observed. This monitoring has now ceased and we will not be reporting on this in future reports.

2. Action to Improve Air Quality

Table O. 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*	New air quality action plan actions and measures were adopted by committee in February 2016. These actions are available on the Council website at the following location http://www.wandsworth.gov.uk/info/200485/air_quality/1584/monitoring_and_assessment/7 Air Quality is fully incorporated in to the Local Implementation Plan (LIP) and funding for air quality measures is provided annually through the LIP. Air quality is incorporated in to public health policies. It is included in the Joint Strategic Needs Assessment. http://www.wandsworth.gov.uk/jsna Air Quality policies are included in the Local Plan including the Core Strategy and

Theme	Criteria		Achieved (Y/N)	Evidence
				Development Management Policies Document (DMPD), both of which were adopted in March 2016. http://www.wandsworth.gov.uk/info/1004/planning_policy/1366/local_plan
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*	The council is taking decisive action to improve air quality where human exposure and vulnerability is highest. This is demonstrated through continued intervention on Putney High Street and other NO_2 focus areas. During 2016 a Car Free Day event was held, theatre production to raise awareness of the cause and effect or air pollution took place in local schools, a further schools campaign was delivered in partnership with other South London boroughs and we continue to work closely with the School Travel Plan officer to ensure exposure to poor air quality is considered through planning sustainable travel measures. Signage requesting drivers to switch off their engines whilst stationary has been erected at each school in the borough. Civil enforcement officers are employed to facilitate compliance. Air Quality champions have been recruited from across the borough who volunteer to take part in anti-idling events at schools; this programme is to be continued to encourage involvement in other air quality awareness raising events. We are an active member of the AirText consortium and have employed resources to promote this to vulnerable groups. The Council have recently developed an internal air quality task force. The group was initially set up to discuss the Nine Elms area but now covers the borough as a whole. The group is attended by the cabinet member for the Environment and directors, section heads and officers with a responsibility for actions that can have a positive impact on air quality within the borough. The group will ensure that the Air Quality Action Plan is implemented effectively and additional actions are taken to reduce emissions and exposure. We are taking a strategic approach to improving air quality in areas where there is significant human exposure. We are actively working with schools to support them to reduce emissions through the school travel plan. We are also developing plans for Tooting and

Theme	Criteria		Achieved (Y/N)	Evidence
				Clapham Junction town centres where there is high footfall and therefore high exposure to traffic emissions.
	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, (etc.).	Y	The Council have undertaken business engagement in Putney High Street, raising awareness of the issue and how businesses can help to reduce emissions and improve air quality. http://www.wandsworth.gov.uk/info/200485/air_quality/1584/monitoring_and_assessment/4 Business engagement across the borough has been undertaken through the Low emission Logistic project to encourage businesses to reduce emission from their delivery and servicing activity. Civil enforcement offices in the borough also carry out idling engines enforcement.
	2.c	Integrated transport and air quality, such as: improving traffic flows on borough roads to reduce stop/start conditions, improving the public realm for walking and cycling, and introducing traffic	Y	In January 2016 the Council introduced delivery restrictions in Putney High Street between 7:00 am and 7:00 pm in a bid to reduce congestion, associated emissions and improve air quality. Anecdotal evidence suggests that there is now less congestion and to reduce stop/start conditions. http://www.wandsworth.gov.uk/news/article/13112/putney_air_quality_drive_sees_end_to_daytime_lorry_deliveries_in_the_high_street The Council is also to introduce 20 mph zones in residential streets as part of integrated transport and air quality actions within the borough. Consultation has taken place and the scheme will be implemented by the end of May 2017. http://www.wandsworth.gov.uk/news/article/13411/residents_back_20mph_speed_limit_p

Theme	Criteria		Achieved (Y/N)	Evidence
		reduction measures.		roposal
	2.d	Made additional resources available to improve local air quality, including by pooling its collective resources (s106 funding, LIPs, parking revenue, etc.).	Y	Funding is made available via a variety of sources to improve air quality including through the LIP allocation. LIP funding has been used to fund Air Quality Awareness activities including Environmental Theatre Productions in Primary Schools and Voluntary Vehicle Emissions testing. LIP funding has been used to fund air Quality Monitoring within the borough and provide match funding for MAQF projects. LIP funding is also used by the Council to promote walking and cycling, for instance through the work of the School Travel Planning Officers. In July 2016 member approval was provided for s106 funds for air quality contributions to be used for air quality monitoring. Additional resources have been made available through the employment of a Construction site compliance officer (CSCO). The officer works proactively to ensure emissions from construction activity at Nine Elms are minimised and best practice is used in accordance with the GLA supplementary planning guidance. We are developing a schools air quality action plan and are currently prioritising schools located in the most polluted locations for these interventions.
3. Leading by example	**3.a**	Invested sufficient resources to complement and drive action from others.	Y	Local Air Quality Management and implementing actions to improve air quality falls within the remit of the Environmental Protection Team within Environmental Services. The team manager works to improve air quality with the support of 3 officers within the team. Approximately 2 – 2 ½ FTE are dedicated to air quality actions across the team as a whole (including the regulation of Industrial Activities for emissions to Air, responding to planning applications in relation to air quality and responding to complaints). Also at least 0.25 FTE is provided by the Residential Services Manager and there is input from the Head of Environmental Services & Strategic Management. The Director of Public Health is the Council's Air Quality Champion, and additional resources are also provided from the Public Health directorate.

Theme	Criteria		Achieved (Y/N)	Evidence
				The Environmental Protection team provided a budget of £37,810 for Air Quality actions, including Air Quality Monitoring. The overall budget for the Environmental Protection Team is far greater than this and includes staff and running costs. There was also funding from Transport Planning through the LIP fund. We applied for funding through the Mayors Air Quality Fund and received £35,000 for work in Putney High Street. We also applied to the DEFRA air quality grant but were unsuccessful. This budget is supplemented by funding as described in 2d.
	3.b	Maintained an appropriate monitoring network so that air quality impacts within the borough can be properly understood	*Y*	The air quality monitoring network across the borough consists of seven automatic monitoring stations including at least one real-time monitoring station in each of the NO_2 focus areas and one in the Nine Elms Opportunity Area. Data from the Clapham Junction station is not available for a full calendar year but results to date have been provided in the ASR.
	3.c	Reduced emissions from council operations, including from buildings, vehicles and all activities.	Y	The Council has undertaken measures to reduce emissions from its own buildings and vehicle Fleet. We have purchased 2 electric cars and two electric vans and the Council's Air Quality Action Plan states that every new vehicle weighing under 1.205 tonnes unladen gross vehicle weight does not operate on diesel. Projects as identified in the Carbon Management Plan have been implemented; in 2016 photovoltaic panels have been fitted on four council buildings. 100% of the housing stock now has low NOx boilers installed; the boilers replaced were approximately 10-15 years old. Cavity wall insulation is complete in around 95% of the housing stock which reduced the need to use energy thus reducing emissions and supporting residents that may otherwise experience fuel poverty.

Theme	Criteria		Achieved (Y/N)	Evidence
	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	The Council has a procurement code. Air Quality is considered as part of the procurement considerations for all new goods, services and works, and is included in the procurement guide. This requirement is included within the revised air quality action plan actions and measures (Action 3.3). The new Action 3.1 states that every new vehicle weighing under 1.205 tonnes unladen gross vehicle weight does not operate on diesel. This policy is being implemented as stated and a business plan to consider removing diesel from the council fleet will be produced in 2017. A Sustainability Impact Assessment is required for all 'major projects', those over £100,000. The use of this assessment is stated in the procurement code of practice. Air Quality is one of the elements taken in to account.
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	The mayor's policies relating to air quality neutral, combined heat and power and biomass are being implemented. Air Quality policies, including that of air quality neutral, are included in the Local Plan including the Core Strategy and Development Management Policies Document (DMPD), both of which were adopted in March 2016. http://www.wandsworth.gov.uk/info/1004/planning_policy/1366/local_plan
	4.b	Collected s106 from new developments to ensure air quality neutral development, ***where possible***.	*Y*	The requirements of the air quality neutral guidance are being followed, and developers are asked to complete this assessment as part of their air quality assessment and provide mitigation/s106 contribution as required. The CSCO works proactively to ensure compliance with the GLA supplementary planning guidance.

Theme	Criteria		Achieved (Y/N)	Evidence
	4.c	Provided additional enforcement of construction and demolition guidance, with regular checks on medium and high risk building sites.	*Y*	The requirement to comply with the control of Dust and Emissions during Construction and Demolition SPG is stipulated in planning conditions. Developers are required to submit a construction management plan/environmental management plan. In the event of complaints being received offices will investigate to ensure the requirements of the guidance are being met. Wandsworth is a founder member of the London Low Emission Construction Partnership (LLECP), action is taken through this partnership to promote best practice techniques on construction and demolition sites and identify new methods for reducing emissions such as the use of hybrid generators. A Construction Site Compliance Officer (CSCO) has been appointed to proactively monitor environmental impacts from works at Nine Elms.
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	Air quality is incorporated in to public health policies. It is included in the Joint Strategic Needs Assessment. http://www.wandsworth.gov.uk/jsna The Director of Public Health (DPH) is the council air quality champion and is the policy lead for the air quality taskforce. This is an internal group made up of directors and heads of service who are working to take collective actions to improve air quality.
6. Informing the public	**6.a**	Raised awareness about air quality locally.	*Y*	An air quality communications plan is being written to ensure messages are communicated effectively within Wandsworth and further afield. Information is available on the council's website and also the shared Love Clean Air site. A number of promotional events to raise awareness have taken place including the environmental theatre productions in primary schools, South London schools air quality awareness campaign, Putney car free day in July 2016 and vehicles emission testing days. We continue to hold workshops to with vulnerable individuals to raise awareness of poor air quality and encourage individuals to sign up to Air Text.

2.1 Air Quality Action Plan Progress

Table P provides a brief summary of Wandsworth Borough Council's progress against the Air Quality Action Plan, showing progress made this year. It should be noted that this plan was adopted in February 2016 and this is the first reporting against the measures adopted.

Table P. Delivery of Air Quality Action Plan Measures

Demonstrating the council's commitment to improving air quality					
Measure 1: Taking cost effective measures to minimise emissions of air pollution from the councils activities					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
1.1	Installation of low NO_x boilers on replacement	All boiler replacements in council buildings, maintained schools and council housing properties will continue to be with low NO_x boilers. Ultra Low NO_x boilers will be considered when opportunities arise.	On-going to report annually on %low and ultra-low NO_x boilers installed in public council buildings % low and ultra-low boilers installed in council housing properties.	83% of the boilers in Wandsworths' housing stock have been replaced with low NO_x boilers. All (100%) boilers now specified for housing stock are ultra-low NO_x boilers (less than 40mg/kwh). All (100%) boilers installed in council buildings are ultra low Nox (less than 40mg/kwh). 95% of what is installed in public buildings will be ultra low Nox boilers and remaining 5% are different systems that do not use boilers. We will continue to replace boilers with the efficient ultra-low Nox boilers.	**SECTION/DEPT. RESPONSIBLE** Housing, Carbon Reduction Group **COST/IMPACT** Low/Medium **FUNDING** Using existing resources
1.2	Installation of energy saving measures in council buildings	Through the carbon management plan. Governance is provided through the workings of the Carbon reduction Group.	Target to reduce carbon emissions by 20% by 2025 from a 2008/09 baseline.	The Carbon Reduction Group (CRG) is working to reducing carbon emissions from the councils' own operations. During 2016 window and roof replacement works have begun on a number of properties as well as work	**SECTION/DEPT. RESPONSIBLE** Housing, Carbon Reduction Group **COST/IMPACT**

				towards upgrading heating systems. Four schemes to install photovoltaic panels on council owned buildings used for sheltered housing were also completed in 2016. Since the 2008/09 baseline CO2 has been reduced by 32%.	Low/Medium **FUNDING** Using existing resources
1.3	Policy change to use petrol/LPG/CNG/hybrid/electric instead of diesel for council fleet vehicles and contracted vehicles.	Through the adoption of a procurement policy for all new vehicles whereby every vehicle purchased weighing less than 1.205 tonnes unladen gross vehicle weight does not operate on diesel. Diesel alternatives will also be considered for vehicles over this size.	% of vehicles less than 1.205 tonnes not using diesel (reported annually).	A fleet review is currently underway; this will aid the business plan to demonstrate how and when the fleet with be diesel free. The business plan will be available in the nest ASR. 13% of the current vehicle fleet is non-diesel.	**SECTION/DEPT. RESPONSIBLE** Fleet management **COST/IMPACT** Low/Medium **FUNDING** Using existing resources
1.4	Upgrading of vehicles to reduce emissions, retrofitting of vehicles with technology to reduce emissions where appropriate such as in-cab telematics.	Through the adoption of these measures in the fleet as appropriate. To be supplemented by eco-driver training.	% of vehicles that technology has been fitted to reduce emissions (reported annually) 10% target by December 2016 and 10% annual target on-going.	A fleet review is currently underway; this will aid the business plan to demonstrate how and when the fleet with be diesel free. 16% of the current fleet has telematics that review driver behaviour and can support eco-driving to reduce emissions. The business plan will be available in the next ASR.	**SECTION/DEPT. RESPONSIBLE** Fleet management **COST/IMPACT** Low/Medium **FUNDING** Using existing resources

Measure 2: To continue to implement and review the Council Service Transport Plan (CSTP) – promoting alternative modes of transport to the car, for both journeys to work and business related journeys.					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
2.1	To encourage active travel by staff (and/or discouraging travel by car).	Through the implementation of CSTP, including maintaining mileage rates for cycling.	% of staff using active travel (staff travel survey figures where available) % of staff travelling by car	CSTP promoted via staff intranet. Cycle to Work Scheme (tax-efficient access to bicycles) launched for the first time in 2016. Only 34% of Wandsworth staff travel to work by car, the remaining 66% use public transport and active travel modes.	**SECTION/DEPT. RESPONSIBLE** Transport planning **COST/IMPACT** Low/Low **FUNDING** Using existing resources
2.2	Reducing the need for staff to drive to work, if a car is needed for work.	Pool cars to be made available on replacement lower emission vehicles to be provided, e.g. hybrid vehicles/efficient petrol engines/electric.	Provision of number of pool cars and potential emissions improvements to be reported annually.	Seeking to replace current provision of two diesel fuelled pool cars with petrol. Also Investigating the use of car clubs for pool car provision.	**SECTION/DEPT. RESPONSIBLE** Fleet management **COST/IMPACT** Low/Low **FUNDING** Using existing resources
Measure 3: Ensuring air pollution is embedded in corporate policy					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
3.1	Policy review has been undertaken. This measure seeks to implement the findings of the review to ensure that air quality is embedded	To implement the findings of the policy review, including incorporating the new Public Health Outcomes Framework (PHOF) indicator on air	01/04/2017	Policy has been reviewed and we are now incorporating consideration of air quality impacts into all work areas. This work is on-going and will be included in each policy revision.	**SECTION/DEPT. RESPONSIBLE** Environmental Services

	into corporate policies, maintaining commitment to air quality and cleaner borough status.	pollution into forward actions. The policy review will be re-assessed to ensure that the latest strategies are included, e.g. cycling strategy, Wandsworth strategy for older people.			**COST/IMPACT** Low/Medium **FUNDING** Using existing resources
3.2	Report Authors to consider the inclusion of relevant Air Quality impacts comments in committee reports.	To be introduced in departments with the support of Committee Services	From 01/04/16	Request sent to service heads and directors to consider air quality in committee reports.	**SECTION/DEPT. RESPONSIBLE** Committee Services **COST/IMPACT** Low/Medium **FUNDING** Using existing resources
3.3	Air quality to be considered as part of the procurement of goods, services and works.	Air quality to be considered as part of the procurement considerations for all new goods, services and works, including adding it to the procurement guide.	From 01/04/2016	Procurement policy updated to include a requirement for sustainable products to be sourced. This includes consideration of transport costs, pollution, energy savings, disposal, maintenance/lifecycle costs. Contract negotiations also include reducing the number of deliveries for products as per the recommendations on the Low Emission Logistics feasibility study.	**SECTION/DEPT. RESPONSIBLE** Procurement **COST/IMPACT** Low/Medium **FUNDING** Using existing resources
3.4	Consolidation of goods and services.	A feasibility study on consolidation of goods and services is being considered with potential	To report on progress annually	This is a joint project between Wandsworth, Lambeth, Southwark and Croydon, with Kensington and Chelsea, Hammersmith and Fulham and	**SECTION/DEPT. RESPONSIBLE** Environmental Services,

		implementation dependent upon outcomes (Dependent on external funding becoming available).		Greenwich joining the project in April 2017. The feasibility study into the set-up and management of a consolidation centre for use by boroughs and businesses in South London is complete and will be considered by directors and members in each participating borough. All boroughs will spend 2017/18 reviewing their purchasing behaviour to ensure the most efficient delivery process is in place.	Procurement **COST/IMPACT** Medium/Medium **FUNDING** Funded through MAQF2 and LIP
Communicating about Air Quality					
Measure 4: Production of a council air pollution strategy, bringing together internal and external communications					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
4.1	Establish role of air quality champion	To have a senior officer appointed to this role. Appointment and provision of training to community champions/air quality change makers in the local community	July 2016: establish role of air quality champion. January 2017: appointment of community champions	The Director of Public Health is our lead Air Quality Champion; she has ensured that air quality improvement initiatives are considered by all departments. 22 community air quality champions have been appointed and have assisted with events to raise awareness of poor air quality mainly around anti-idling as part of the London wide project funded through the MAQF2. This action is being developed to support and assist champions to develop further actions in the community	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Low/Low **FUNDING** Funded through existing resources
4.2	Production and maintenance of and air quality communications strategy including an annual	To develop the programme by December 2016 and update it annually	From 01/12/2016	Draft communication plan has been written, to be developed further in partnership with communications team	**SECTION/DEPT. RESPONSIBLE** Environmental

	update and training for officers			and implemented efficiently.	Services, Communications **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
4.3	Provision of air quality information	Maintaining websites/webpages of information on air quality and provision of updates as necessary. To avoid duplication where possible we will signpost to information elsewhere, such as on the LondonAir and Love Clean Air websites	On-going	Review of webpages undertaken. New pages to be added as projects develop.	**SECTION/DEPT. RESPONSIBLE** Environmental Services, Communications **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
4.4	Undertaking of events to raise awareness of air quality and active travel	Undertaking of a number of events throughout the borough, including voluntary vehicle emissions testing and a programme to raise awareness of air quality amongst school children and their parents or guardians.	On-going and reported on annually	In 2016, 28 cars had their emissions tested for free at Asda in Clapham Junction over 2 days. All vehicles passed the test. 10 schools were visited by a theatre group to raise awareness of poor air quality and the importance of active travel, impacts of traffic, air pollution and congestion in the local area for primary schools etc. coupled with global concerns with carbon production	**SECTION/DEPT. RESPONSIBLE** Environmental Services, Communications **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

4.5	Provide GPs and pharmacists with information to provide to individuals with pre-existing conditions and those vulnerable due to age or lifestyle	Provision of airTEXT information for wider dissemination and to provide information on health effects of air pollution and actions being taken to reduce emissions and exposure through engagement with public health leads, CCG (Clinical Commissioning Group) and other health professionals – provision of talks etc.	On-going, reporting annually on number subscribed to service within borough	airTEXT leaflets produced specifically for dissemination to pharmacies. Air quality champions will deliver these and speak to pharmacists to encourage them to give these to patients especially those collecting respiratory and heart medicine. Six presentations were delivered to local groups to advise them of the airText service and how they can protect themselves from exposure to air pollution.	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
4.6	Undertaking engagement with local businesses in hotspot area	Provision of information on local air quality issues and making them aware that they are part of the solution to improving air quality, including encouragement of active travel through delivery and servicing plans.	On-going, reporting on number of businesses engaged	A draft Air Quality Action plan has been written for Tooting Town Centre. This has been written in partnership with the town centre manager. Business engagement in the area will take place from May 2017. This is to be further developed to include transport planning and engineering services. Business engagement done in Putney High Street to raise awareness of poor air quality. MAQF funded work to encourage businesses to reduce their own emissions; this will be reported on next year.	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Medium/Medium **FUNDING** Funded through existing resources
4.7	To undertake joint working with other organisation such as the GLA, TfL, health professionals such as	Through the attendance of air quality cluster group, London air quality steering group and partnership projects	Reporting annually on work undertaken	We have worked with Lambeth, Southwark and Croydon councils on LEL. Working with Richmond, Croydon and	**SECTION/DEPT. RESPONSIBLE** Environmental Services

	Wandsworth CCG and other local authorities such as neighbouring authorities and others, for instance through externally funded joint projects			Merton to engage with schools on the cause and effect of poor air quality. Working with LLECP as part of the pan-London construction work. This project uses large scale construction sites as living labs to carry out trials for mitigation of emissions under real world conditions. Work with other boroughs to promote anti-idling, chair of the South London Air Quality Cluster Group where information pertaining to air quality improvement actions and best practice is shared.	**COST/IMPACT** Low/High **FUNDING** Funded through existing resources
Reducing emissions and exposure					
Measure 5:Call for actions from Mayor of London, TfL and national government to take actions to improve air quality					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
5.1	Campaign for the Mayor and TfL for cleaner buses to operate on routes throughout the borough using local monitoring data	Through portfolio holder /elected members and communications team (working in partnership with GLA/TfL to deliver air quality benefits wherever possible)	On-going reported on annually	Continuing to collate monitoring data in hotspot location to provide evidence for having cleaner buses across the borough. We have successfully campaigned to get cleaner buses in Putney and we will now continue to achieve this for other town centres such as Clapham junction in the next phase	**SECTION/DEPT. RESPONSIBLE** Environmental Services/Members/ Communications **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

5.2	Campaign to the Mayor and TfL for cleaner taxis to operate on borough roads and stricter controls to reduce emissions from vehicles – Low Emission Zone (LEZ), Ultra Low emission Zone (ULEZ), policies to reduce diesel vehicle use	Through portfolio holder/elected members and communications team. Support development of ULEZ and be involved in engagement on future changes/tightening/expansion of ULEZ, assessing the benefits for air quality within the borough.	On-going reported on annually	We have responded to all of the ULEZ consultations. We have requested further information as the data supplied within the consultation does not provide sufficient information to make an accurate assessment of how the ULEZ will affect Wandsworth in particular as the South Circular road where the new boundary is proposed cuts through the borough and this may lead to more polluting vehicles avoiding the zone and travelling through the borough.	**SECTION/DEPT. RESPONSIBLE** Environmental Services/Members/ Communications **COST/IMPACT** Low/High **FUNDING** Funded through existing resources
5.3	Campaign to national government towards a "non-diesel economy"	Through portfolio holder/elected members and communications team	On-going reported on annually	To be introduced upon a full evaluation of the parking policy including assessing the impact of the charges and their potential benefits. We are undertaking this process and considering the available options. The differential parking charges will be kept under constant review. We are watching with interest the schemes being implemented by other local authorities and will look to evaluate their potential benefits for air quality.	**SECTION/DEPT. RESPONSIBLE** Environmental Services/Members/ Communications **COST/IMPACT** Low/High **FUNDING** Funded through existing resources

Measure 6: Encouraging walking and cycling and the use of public transport, and discouraging people driving to stations					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
6.1	Use of transport and planning policies to encourage walking and cycling	Travel plans for new developments, voluntary plans, and travel awareness campaigns, promotion of the availability and use of the cycle hire scheme in the borough and policies and action under the Local Implementation Plan (LIP), implementing the Cycling Strategy (2015), increase awareness of availability of cycle training courses.	On-going reported on annually cycling and walking schemes and promotion including promotion of route planning to minimise exposure to pollution (e.g. walkit.com) and cycle hire scheme (demonstrated by London Travel demand Survey data)	Activity in 2016 included: 8 travel plans secured through the planning process; a total of 863,000 cycle hire docks and hires were made in the borough in 2016, up from 759,000 in 2015 (13.7% increase). Cycle strategy actions including development of first two Quietway cycle routes. 1,026 children and 84 adults received cycle training in 2016.	**SECTION/DEPT. RESPONSIBLE** Environmental Services/Members/ Communications **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
6.2	Promote the use of public transport	Working with public transport operators (TfL buses, bus operators, London Underground, London Overground, Network Rail and railway operators, and sub-regional partnerships) to facilitate improvements to both the quantity and quality of public transport	On-going reported on annually	The Council continues to lobby for - the relief of overcrowding on local trains and stations through engagement with Network Rail and the Department for Transport (DfT). This includes the Wessex Capacity upgrade at Waterloo International Terminal and the introduction of 10 car trains on	**SECTION/DEPT. RESPONSIBLE** Transport Planning **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

				the Windsor Lines throughout 2017 and beyond - a second entrance at Putney station from Oxford Road, which has been acknowledged. - An Access for All scheme at Barnes Station, to serve the Wandsworth and Richmond. We have continued to engage proactively with Network Rail and DfT on the Crossrail 2 project and proposals for improved rail access to Heathrow from the south. We are working with TfL and Network Rail to develop plans for major capacity improvements to Battersea Park Station and Nine Elms / Embassy Gardens area. This also offers potential improvements to Queenstown Road Station. Tunnelling has now commenced for the extension of the Northern Line to Battersea Power Station, and we will continue to work closely with TfL, London Underground Ltd and developers on access to the new developments being constructed. We are also implementing a Legible	

				London wayfinding scheme in the Battersea Park/Nine Elms area to improve access for pedestrians to key local attractions and open up the river frontage, as well as signpost them to public transport (including TfL River services) and the cycle hire scheme. The Council continues to assist bus operators and TfL, and has met TfL's target for 95% of bus stops fully accessible. We have negotiated funding from local developments to secure improvements to bus services and infrastructure, including increased service frequencies, alterations to school services and the provision of additional "Countdown" displays at bus stops at key locations. Plans are being developed with TfL for improvements in the bus network in the Riverside Quarter, Battersea Power Station, and Roehampton areas to provide greater access to and from the south.	

6.3	Promote sustainable travel to schools – working with schools to implement packages of measures	Through the school travel strategy and school travel plans. In addition to the target more information on the schools that retain/maintain their accreditation will be provided annually	The number of schools that have improved their status in TfL's school travel plan accreditation scheme. Target 5 schools each year	In 2016, 28 schools achieved Bronze STARS status, seven achieved Silver and four were awarded Gold. We continue to work with all schools in the borough to encourage active travel and have utilised the Sustrans BikeIt scheme. A scheme called "walk one mile" whereby children walk one mile per day on school premises is on-going – we are looking to extend this to other schools and for the journey to/from school.	**SECTION/DEPT. RESPONSIBLE** Transport Planning **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
6.4	Use of on-street parking controls to reduce the number of people driving to stations in the borough to continue their journey by rail into Central London	Maintenance and review of controlled parking zones (CPZs) that are in operation within the borough	Policy reviewed annually, percentage of borough roads where CPZs in operation	Approximately 60 percent of borough roads are covered by a CPZ. Requests continue to be received from residents to have a Controlled Parking Zone introduced in their road to alleviate parking problems as well as from those who live in roads where a CPZ is already in operation and would like the scheme amended in some way. A summary of the activity this year is below: Barchard Street: extended times to 0930-2000 from January 2016 Battersea B6 sub-zone area extended in June 2016 Roehampton extended area to create R2 sub-zone in June 2016 Wandsworth Town: extended times to 0930-1830 from November 2016 Holgate Avenue: a consultation was held but no change was made.	**SECTION/DEPT. RESPONSIBLE** Transport Planning **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

6.5	Facilitate a higher proportion of travel by sustainable transport modes including cycling and walking	Where possible to redesign and maintain road layouts for the benefit of cyclists and pedestrians when a road improvement takes place	On-going reported on annually	Cyclist and pedestrian safety is considered in all road improvements works. Evidence of this success can be seen in the change in travel behaviour. Mode share by car (all trips) has fallen to 31% (2013/14-2015/16) from 36% (2006/07-2008/09 – Local Implementation Plan baseline year). Combined walking and cycling mode share over the same period has risen from 34% to 38% of trips. (Data is from the London Travel Demand Survey published by TfL)	**SECTION/DEPT. RESPONSIBLE** Transport Planning **COST/IMPACT** Medium/Medium **FUNDING** Funded through existing resources
6.6	Promote and enable car clubs as an alternative to private car ownership, via; - provision of on – street car club parking spaces - planning obligations for car club parking/membership in new residential developments	Via car club contracts with four operators to July 2018; and via on-going planning obligations required with planning consents	LIP target to increase car club membership by an average of 150 members per month (1,800 per year)	Four planning applications approved with requirement for a total of 8 car club spaces. On-street car club spaces increased 124 to 152 in 2016, with membership rising from 12,000 to 13,500. Wandsworth currently has London's highest car club membership.	**SECTION/DEPT. RESPONSIBLE** Transport Planning **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
6.7	Introduction of 20mph speed limit areas on borough residential roads	To be implemented in all borough residential roads	100% to be completed by 31/03/2017	A 20 mph speed limit will be introduced on all borough roads except A, B and TFL roads. Full implementation on boroughs roads will be complete by the end of May 2017. Signage and line	**SECTION/DEPT. RESPONSIBLE** Transport Planning **COST/IMPACT**

				markings are in place to inform drivers of the change. Additional communications will be sent out via council newsletters and social media.	Low/Medium **FUNDING** Funded through existing resources
Measure 7: To encourage the uptake of low emission vehicles					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
7.1	Provision of green infrastructure/electric vehicle charging points	Provision of infrastructure. Also to provide details of 7kW/fast charges installed, in addition to target	Target to install 45 electric vehicle charging points by April 2019, 15 per year (working with Source London to achieve on-going	Reviewed potential locations for electric charge points. 17 locations have been identified and EVCPs will be installed in 2017/18.	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
7.2	Maintain provision of information on cleaner fuels, technologies and vehicles	Provision of information on council website	On-going review and update as necessary	Website pages review underway, the most up to date information will be provided	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Low/High **FUNDING** Funded through existing resources
7.3	Review of differential car parking charges based on emissions, ULEZ criteria, with	To consider implementing the charges and their potential benefits if considered	To implement by April 2017 depending upon	Initial review of the parking policy to consider introducing diesel surcharge for parking permits pending	**SECTION/DEPT. RESPONSIBLE** Environmental

	diesel vehicles paying more	positive, introduce	outcome of initial investigations	consultation results.	Services **COST/IMPACT** Medium/Medium **FUNDING** Funded through existing resources
Measure 8: Freight/delivery actions					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
8.1	Enabling more delivery and servicing to be made outside peak hours	Through business engagement in hot spots/NO_2 focus areas	On-going reported on annually	The introduction of loading restrictions on Putney High Street has allowed traffic to flow freely and reduced congestion. Pollutant concentrations have reduced as a result of continued intervention in this area.	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Medium/High **FUNDING** Funded through existing resources
8.2	Better management/prohibition of deliveries at "hotspots" such as Putney High Street	Through business engagement in hot spot/NO_2 focus areas	On-going reported on annually	Wandsworth continues to enforce the restrictions introduced on Putney High Street to prevent delivery drivers from causing congestion by stopping on the High Street during the day.	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Medium/High **FUNDING** Funded through existing resources

8.3	To investigate consolidation of goods and services in hot spot areas, exploring options such as joint procurement and sharing of services supplied to businesses and low emission last mile delivery	Through engagement with businesses, looking at wider impacts such as home deliveries, working with others to provide drop off lockers and TfL freight unit (Putney High Street potentially to be first study area). Dependent upon external funding, linked to action 3.3	To provide update on servicing and deliveries actions undertaken April 2017; to provide further updates on this action and potential for consolidation – April 2018 and on-going	Feasibility study into the set-up and management of a consolidation centre for use by boroughs and businesses has been completed. During 2017/18 we will review our purchasing behaviour to ensure the most efficient delivery process is in place. Once deliveries have been consolidated through soft measures we will calculate how much money has been saved and consider the use of a consolidation centre from 2018/19 onwards in partnership with the other boroughs in the LEL consortium.	**SECTION/DEPT. RESPONSIBLE** Environmental Services **COST/IMPACT** Medium/Medium **FUNDING** Funded through MAQF2
Development and buildings					
Measure 9: Ensuring that air quality and in particular reducing emissions is included in planning policy and implemented					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
9.1	Encouraging energy efficient measures and energy efficient design in new buildings	Implementation of Part L of the Building Regulations in relation to energy efficiency measures	On-going, reporting on annually	53 planning applications were commented on for energy efficiency measures during 2016 to encourage energy efficient design. Part L of the Building Regulations is implemented as required.	**SECTION/DEPT. RESPONSIBLE** Building Control **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
9.2	Boilers installed as part of development must have low NO_x ratings in accordance with the standards set out in the Mayor of London's sustainable	To implement in line with the London Plan Mayor of London's sustainable design and construction supplementary planning	On-going, reporting on annually	This information is not recorded by planning. We will review our monitoring process to ensure it is included next year. Consultation responses made by environmental	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services

	design and construction supplementary planning guidance	guidance		services specify low NO_x boilers to be installed on every relevant application.	**COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
9.3	Air quality assessments for major developments and developments where exposure is likely or a creation of significant new emissions	Through planning policy – core strategy and associated documents – core strategy and associated documents	As planning documents are revised, report on annually.	177 applications were reviewed for air quality impacts in 2016.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
9.4	Ensuring that new major developments are air quality neutral in line with the London Plan and Mayor of London's sustainable design and construction supplementary planning guidance	Through planning policy – core strategy and associated documents	As planning documents are revised, report on annually.	13 applications were conditioned to ensure compliance with the GLA AQ neutral policy. 36 applications were condition for monitoring of dust in line with the GLA supplementary planning guidance.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

Measure 10: Creation of a design guide of best practice on reducing emissions and exposure for developments and streets					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
10	Develop a design guide of best practice. This project aims to take the well-established science of how air pollution is distributed in street canyons and translate it into design guidance that design engineers/planners can use in language that is familiar to them	Subject to funding, engaging of a consultant to undertake this piece of work.	April 2017	No funding available to progress this action. Action will progress if and when funding becomes available.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
Measure 11: Proactive work to reduce PM_{10} emissions from new developments					
11	To undertake a project with a developer to assess the effectiveness of measures designed to reduce emissions from major construction sites and to develop a construction hub to disseminate best practice	To work with King's College London and other local authorities to implement the project to help reduce fine particle emissions from construction sites. To include raising awareness of the Non Road Mobile Machinery (NRMM) regulations	To report on progress annually	We are working with Kings College London in partnership with a consortium of other London boroughs on the London Low Emission Construction Partnership (LLECP). A construction site compliance officer (CSCO) has been appointed to proactively manage environmental impacts from major development. The priority area for compliance is currently the Nine Elms development in Vauxhall. Air quality monitoring data collated by the developer is analysed to check for exceedances above the agreed limit. Further analysis is conducted to observe the effect the development is having on air quality concentrations in	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Medium/High **FUNDING** Funded through existing resources

				the wider vicinity and then compared with other locations across London. The CSCO also advises on the requirement to comply with NRMM regulations despite many of the developments having been granted planning permission prior to the regulations coming into force. Officers are also employed to ensure NRMM compliance at major developments across South London; this project is conducted in partnership with neighbouring boroughs.	
Regulation and Monitoring					
Measure 12: Actions to reduce emissions by enforcement of regulatory powers					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
12.1	Regulation of industrial activities to control their emissions to air	Inspecting all permitted installations in accordance with inspection plans; ensuring compliance with permit conditions; investigation of complaints in a timely manner; taking of action when non-compliance takes place; and ensuring upgrading takes place as necessary	On-going, reporting on annually	As of 31st December 2016 there were 82 industrial activities regulated by the Council through Environmental Permits. During 2016, all required inspections were carried out to ensure that the installations were complying with their permits. Permits are reviewed periodically in line with statutory guidance and varied as necessary. The activities that are currently regulated are concrete batchers, mobile concrete crushers, crematoria, dry cleaners, vehicle re-sprayers and, petrol stations and waste	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

				oil burners.	
12.2	Continue the thorough investigation and resolution of nuisance complaints with an air pollution component, such as bonfires and from demolition and building work dust	Investigate and resolve complaints when necessary by enforcement of section 80 of the Environmental Protection Act 1990. Give advice on website including links between bonfire information and green waste collections, composting etc. to reduce incidents of bonfires	On-going compliance with response targets	Being implemented as stated. Response target requires same day response for complaints of bonfires, dust and fumes. In 2016 we received 143 complaints related to smoke from chimneys or bonfires and dust from construction sites, 100% were responded to within the required timeframe.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
12.3	Proactive response to reducing emissions from demolition and construction work	Updating of code of practice; provision of codes of practice information to all construction sites when complaints received and GLA SPG through planning process for major developments. Implementation of the NRMM regulations	On-going reporting on annually	The CSCO proactively works with major developments to ensure emissions to air are kept to a minimum and best practice is used, and compliance with eth GLA best practice guidance on the control of dust and emissions form construction sites. In partnership with other South London boroughs officers are employed to work with developers to ensure NRMM regulations are complied with.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
12.4	Continue to enforce and raise awareness of the fact that the whole borough is covered by a smoke control order and that the use of some solid fuel is prohibited	Provision of information through website and council publications	On-going reporting on annually	We received just five complaints regarding smoke from chimneys in 2016. All complaints were responded to with no enforcement action being necessary.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT**

					Low/Medium **FUNDING** Funded through existing resources
12.5	Use of vehicle idling powers where appropriate and awareness raising of increased pollution through vehicle idling	Investigation of complaints, taking appropriate action and provision of information on pollution focus areas. To be supported by an awareness campaign that idling vehicles can be reported and the pollution that unnecessary idling generates (working in partnership with the Mayor of London and TfL as appropriate)	On-going reporting on annually	Three civil enforcement officers have been authorised to enforce the fixed penalty regulations for idling vehicles. In addition to enforcement, community air quality champions proactively approach drivers who leave their engines running whilst stationary to ask them to switch off.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources
Measure 13: Air quality monitoring to review and assess air quality and evaluate actions					
Ref	**Action**	**Implementation**	**Target date and Indicators**	**Progress**	**Resource & Impact**
13.1	To continue to monitor air quality across the borough measuring nitrogen dioxide (NO_2) and fine particles (PM_{10})	Measurement of air quality through continuous monitoring and using screening techniques (working with the local community). Dissemination of results. Reporting of results	On-going reporting on annually	We continue to monitor pollutants from seven automatic monitoring stations and 33 locations using diffusion tubes. In addition we have supported the community to carry out citizen science air quality monitoring campaigns in Putney and Tooting town centres.	**SECTION/DEPT. RESPONSIBLE** Planning/ Environmental Services **COST/IMPACT** Low/Medium **FUNDING** Funded through existing resources

13.2	To monitor air pollution to assess and evaluate action in hot spot areas (as identified by the Mayor of London) as part of the project to improve air quality	Measurement of air quality through continuous monitoring and using screening techniques (working with the local community). Dissemination of results. Reporting of results	On-going reporting on annually	Wandsworth has four Air quality focus areas for high NO_2 with considerable exposure. Tooting High Street: A traffic study has been conducted to ascertain the apportionment of vehicle types in this area. A draft air quality action plan for Tooting Town centre has been drafted and will be further developed with input from transport planning and highways engineering colleagues. We will work with businesses and local residents to deliver this in 2017/18. Clapham Junction: A traffic study has been conducted to ascertain the apportionment of vehicle types in this area. An action plan will be developed in 2017/18. Wandsworth gyratory: We are working with TfL on the plans to remove Wandsworth gyratory to ensure the new road layout provides for a positive air quality impact. Putney High Street: we have worked extensively with TfL and the Mayor's office to campaign for cleaner buses along Putney High Street, this is now to become the first clean bus corridor. In addition we will continue to monitor air quality to assess the effectiveness of our interventions. We have also implemented additional restrictions on deliveries to this area to ensure the	SECTION/DEPT. RESPONSIBLE Planning/ Environmental Services COST/IMPACT Medium/Medium FUNDING Funded through existing resources

				smooth flow of traffic to reduce stop/start driving.	

3. Planning Update and Other New Sources of Emissions

Table Q. Planning requirements met by planning applications in *Wandsworth Borough Council* in 2016

Condition	Number
Number of planning applications reviewed for air quality impacts	177
Number of planning applications required to monitor for construction dust	36
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	13
Number of AQ Neutral building and/or transport assessments undertaken	13
Number of AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0
Number of planning applications with S106 agreements including other requirements to improve air quality	3
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Central Activity Zone and Canary Wharf Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	8
NRMM: Greater London (excluding Central Activity Zone and Canary Wharf) Number of conditions related to NRMM included. Number of developments registered and compliant. Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy.	23

N.B These figures are estimated from a search of our records. The monitoring process for reviewing planning application is to be revised to ensure more accurate data is provided next year. The data relating to NRMM conditions is accurate.

All planning applications are referred from the planning department to the Environmental Services Team. A dedicated officer will review the application and make comments and recommend conditions as necessary. In partnership with other South London boroughs we have employed officers to monitor constriction sites to check for NRMM compliance. In the event that any sites are non-complaint, the officers will support the site to become compliant and refer any refusal to adjust to the planning enforcement team of the relevant authority.

3.1 New or significantly changed industrial or other sources

No new sources identified.

Appendix A Details of Monitoring Site QA/QC

A.1 Automatic Monitoring Sites

Routine calibrations of our air quality monitoring stations are carried out by the local site operator, currently ESU1, on a fortnightly basis. Site audits are undertaken on a six monthly basis by The National Physical Laboratory's (NPL).

Servicing and maintenance of the air quality monitoring stations was undertaken by TRL (Transport Research Laboratories) in 2016 and continues to be undertaken by them.

Data ratification and air quality support services were undertaken by King's College London in 2016 and continues to be undertaken by them.

There are no relevant issues to be highlighted.

PM_{10} Monitoring Adjustment

For the monitoring data collected from the monitoring stations located in Putney High Street (kerbside, WA 7); Thessaly Road , Battersea (WAA); Tooting High Street (WAB) and Lavender Hill, Clapham Junction (WAC) the volatile Correction Method (VCM) has been used to correct the data. An FDMS was installed at the Felsham Road, Putney background monitoring station, WA 9 until 21 January 2015, this has now been converted to a TEOM, and therefore for 2016 the Volatile Correction Method (VCM) was used to correct the data.

A.2 Diffusion Tube Quality Assurance / Quality Control

NO_2 monitoring by means of passive diffusion tubes has been undertaken within the borough since 2004. Monitoring using diffusion tubes has advantages over continuous monitoring in that it is far cheaper and therefore more sites can be established and assessed. The main disadvantage is that the method is less precise and accurate than continuous monitoring. The recommended methods to reduce these errors include the use of good QA/QC practices and bias adjustment factors that are derived from co-location studies between continuous analysers and diffusion tubes.

The bias adjustment factors are specific to each year, analysing laboratory, method of analysis and location. The factors are therefore also limited to the data supplied. The Review and Assessment website advises that "in many cases, using an overall correction factor derived from as many co-location studies as possible will provide the 'best estimate' of the 'true' annual mean concentration, it is important to recognise that there will still be uncertainty associated with this bias adjusted annual mean. One analysis has shown that the uncertainty for tubes bias adjusted in this way is ± 20% (at 95% confidence level). This compares with a typical value of ± 10% for chemiluminescence monitors subject to appropriate QA/QC procedures."

In addition, one benzene diffusion tube was included in the monthly programme. From the beginning of January 2007 the supply and analysis of all diffusion tubes has been undertaken by Gradko International.

NO_2 diffusion tubes are located in the grid reference locations given in Tables C, D, E and F. A location map illustrating the distribution of sites across the borough is provided in Appendix E. The diffusion tubes were either located at kerbside sites, roadside sites or urban background sites, as described in Tables C, D, E and F. The diffusion tubes have been located in accordance with the siting criteria in the UK NO_2 Diffusion Tube Network Instruction Manual, and the AEA Energy & Environment guidance entitled "Diffusion tubes for ambient NO_2 monitoring: Practical Guidance".

The diffusion tubes exposed from the beginning of the calendar year 2007 onwards were supplied and analysed by Gradko. They participate in the AIR Proficiency testing (PT) scheme, which combines the materials previously offered by the WASP (Workplace Analysis Scheme for Proficiency) PT scheme, operated by HSL, and the STACKS PT scheme, provided by LGC. LGC is the accredited PT provider of the Air PT scheme, which is an independent analytical performance testing scheme. The scheme is an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). In the quarterly rounds AIR PT 7 to AIR PT 18 (from April 2015 to February 2017) the laboratory demonstrated a satisfactory performance in a QA/QC scheme for analysis of NO_2 diffusion tubes. The results from this and all the other years for which diffusion tubes have been used in the borough are given in chronological order below.

A co-location study carried out at the Putney High Street urban background air quality monitoring station was conducted to measure the accuracy of the diffusion tube monitoring. The locally derived bias adjustment factor was calculated at 0.91; due to poor data capture we have used the nationally derived bias adjustments factor of 0.94 taken from the spreadsheet 03/17 V2 available on the DEFRA website was used to calculate NO_2 concentrations measured using diffusion tubes. We chose to use the nationally derived bias adjustment factor as the guidance states this will provide the best estimate of the true annual mean concentration. In addition, the nationally derived bias adjustment factor is higher than the local one therefore providing a worst case result.

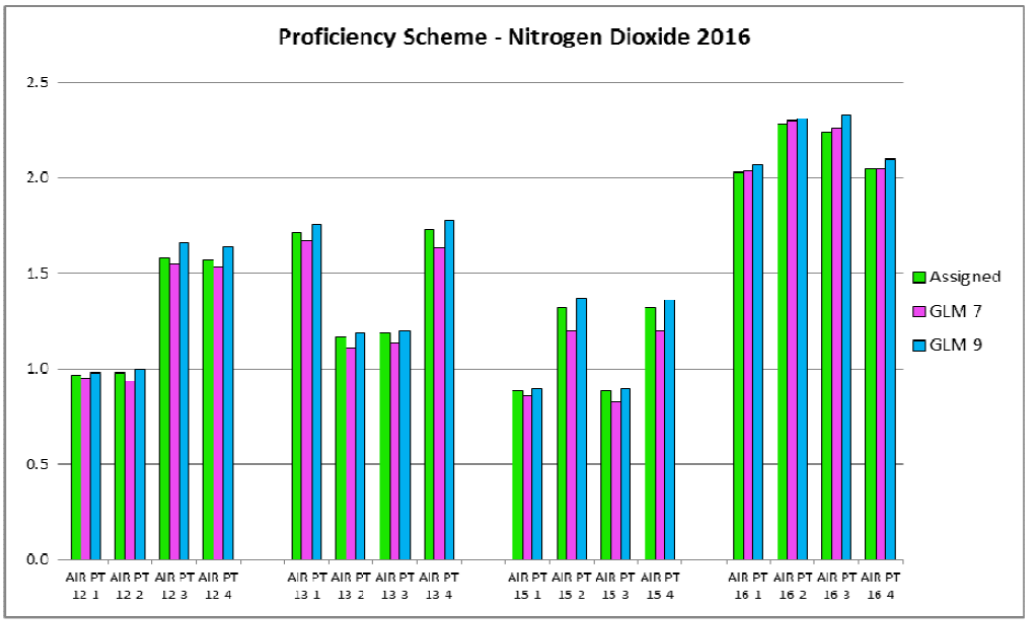
Table R **Gradko nitrogen dioxide proficiency scheme results**

AIR PT Nitrogen Dioxide Proficiency Scheme Results 2016

Methods: GLM 7 – Camspec M550 Spectrophotometer, GLM 9 – QuAAtro Continuous Flow analyser

AIR PT Proficiency Scheme - Nitrogen Dioxide 2016								
			Camspec M550 - GLM 7			QuAAtro - GLM 9		
Date	Round	Assigned value	Measured concentration	z-Score	% Bias	Measured concentration	z-Score	% Bias
Feb-16	AIR PT 12-1	0.97	0.95	-0.28	-2.1%	0.98	0.14	1.0%
Feb-16	AIR PT 12-2	0.98	0.94	-0.54	-4.1%	1.00	0.27	2.0%
Feb-16	AIR PT 12-3	1.58	1.55	-0.25	-1.9%	1.66	0.67	5.1%
Feb-16	AIR PT 12-4	1.57	1.53	-0.34	-2.5%	1.64	0.60	4.5%
May-16	AIR PT 13-1	1.72	1.67	-0.39	-2.9%	1.76	0.31	2.3%
May-16	AIR PT 13-2	1.17	1.11	-0.68	-5.1%	1.19	0.23	1.7%
May-16	AIR PT 13-3	1.19	1.14	-0.56	-4.2%	1.2	0.11	0.8%
May-16	AIR PT 13-4	1.73	1.63	-0.74	-5.8%	1.78	0.37	2.9%
Aug-16	AIR PT 15-1	0.89	0.86	-0.45	-3.4%	0.90	0.15	1.1%
Aug-16	AIR PT 15-2	1.32	1.20	-1.16	-9.1%	1.37	0.48	3.8%
Aug-16	AIR PT 15-3	0.89	0.83	-0.90	-6.7%	0.90	0.15	1.1%
Aug-16	AIR PT 15-4	1.32	1.20	-1.21	-9.1%	1.36	0.40	3.0%
Oct-16	AIR PT 16-1	2.03	2.04	0.07	0.5%	2.07	0.26	2.0%
Oct-16	AIR PT 16-2	2.28	2.3	0.12	0.9%	2.31	0.18	1.3%
Oct-16	AIR PT 16-3	2.24	2.26	0.12	0.9%	2.33	0.54	4.0%
Oct-16	AIR PT 16-4	2.05	2.05	0.0	0.0%	2.1	0.31	2.4%

Figure F **Gradko nitrogen dioxide proficiency scheme results graph**



A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Where data capture is less than 75% of a full calendar year (less than 9 months), the mean should be "annualised" – i.e. adjusted using the methodology outlined in LLAQM.TG(16) before being compared to annual mean objectives.

The data capture for 2016 for Wandsworth WAC (lavender Hill, Clapham Junction) was 61%. Therefore the data for this site has been annualised. The details of the calculation of the annualisation ratio using local background monitoring sites is given in table S below.

Table S

Site	**Site Type**	**Annual Mean ($\mu g/m^3$)**	**Period Mean ($\mu g/m^3$)**	**Ratio**
Wandsworth Town Hall	Automatic Urban Background	43	42.6	1.01
Wandsworth Putney	Automatic Urban Background	45	42.5	1.06
Southwark (Elephant and Castle)	Automatic Urban Background	39	37.4	1.04
Average				1.04

Distance Adjustment

The procedure for calculating relevant exposure was used as described in LAQM TG(16) and the calculation tool on the DEFRA website https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html , the results are shown in the table H.

Appendix B Full Monthly Diffusion Tube Results for 2016

Table T **NO_2 Diffusion Tube Results**

	Data Capture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	Bias adj.	Bias Corrected	National Bias	National adjusted mean	Adjusted mean (NB)
Clapham Junction																			
Falcon Road Bus Stop	92	140	114	136	90	122	121	126	112	160	120		165	128	0.91	116	0.94	120	120
Falcon Road Bus Stop	92	139	123	139	98	124	101	120	117	157	124		166	128	0.91	116	0.94	120	
Falcon Road	75	101	88	86	58	84			46	90	75		115	83	0.91	75	0.94	78	79
Falcon Road	75	95	87	107	63	93			48	91	74		115	86	0.91	78	0.94	81	
Lavender Hill	83	82		86	59	87	78	70	73	81	79		121	82	0.91	74	0.94	77	78
Lavender Hill	75	90		87	70	85	77	78	76	82			120	85	0.91	77	0.94	80	
Beauchamp Road	92	55	51	55	36	44	37	32	31	45	48		83	47	0.91	43	0.94	44	44
Beauchamp Road	92	50	50	53	33	41	40	35	28	46	46		91	47	0.91	42	0.94	44	
St Johns Road	92	55	56	80	55	71	62	43	48	65	65		101	64	0.91	58	0.94	60	60
St Johns Road	92	60	52	77	47	75	67	39	45	68	68		100	63	0.91	58	0.94	60	
St Johns Hill	92	82	71	93	68	96	58	80	75	95	73		129	84	0.91	76	0.94	79	80
St Johns Hill	92	84	71	104	67	90	79	76	71	105	81		119	86	0.91	78	0.94	81	

	Data Capture	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	Bias adj.	Bias Corrected	National Bias	National adjusted mean	Adjusted mean (NB)
General																			
Newton Prep	92	77	70	85	54	68	54	57	56	71	57		88	67	0.91	61	0.94	63	63
Este Road	75		39	41	25	32	28	Value under 1	25	43	37		62	37	0.91	34	0.94	35	36
Este Road	66		43		31	36		28	52	39	38		54	40	0.91	37	0.94	38	
St Johns Hill/Falcon Rd (Falcon Pub)	92	84	85	101	72	88	69	84	75	89	60		99	82	0.91	74	0.94	77	77
St Johns Hill/ Falcon Road (Falcon Pub)	83	74		108	72	89	68	85	79	89	60		95	81	0.91	74	0.94	76	
Totterdown Street	83	76	77		46	71	56	69	59	83	51		94	68	0.91	62	0.94	64	65
Totterdown Street	75	81	76		53	62		66	60	82	54		92	70	0.91	63	0.94	65	
Bickley Street	92	42	41	45	32	38	28	28	28	35	37		61	38	0.91	34	0.94	35	35
Mitcham Road	92	107	96	101	71	82	66	82	74	95	64		95	85	0.91	77	0.94	80	80
Werter Road	92	44	45	47	30	34	25	26	26	47	30		59	38	0.91	34	0.94	35	35
Putney High Street	83	136	120		86	125	102	99	90	161	73		112	110	0.91	100	0.94	104	104
Felsham Road	83	56	46	54	31	37	32	30		76	33		56	45	0.91	41	0.94	42	41
Felsham Road	75	52	47	53	30	44	33	32			31		71	44	0.91	40	0.94	41	
Felsham Road	75	58	47	55	28	40	32	33			33		57	43	0.91	39	0.94	40	
Upper Richmond Road	92	54	59	67	47	57	46	48	47	58	45		77	55	0.91	50	0.94	52	52
Daylesford Avenue	92	32	38	37	24	28	21	19	20	29	31		48	30	0.91	27	0.94	28	28

Roehampton Lane, A3	83	80	59	77	45	53	42	47	Value under 1	26	44		72	55	0.91	50	0.94	51	51
Wandsworth Plain	83	78	72	76	53	67	58	74	Value under 1	88	19		89	67	0.91	61	0.94	63	63
Wandsworth Plain	83	77	77	77	52	67	53	67	Value under 1	93	21		82	67	0.91	61	0.94	63	
Putney																			
vodafone FF	92	130	114	128	92	113	116	123	101	141	57		40	105	0.91	96	0.94	99	99
vodafone FF	92	122	128	122	89	113	110	124	99	139	59		55	105	0.91	96	0.94	99	
vodafone SF	92	114	107	112	85	105	113	109	90	127	55		120	103	0.91	94	0.94	97	98
vodafone SF	92	110	104	117	89	108	108	111	90	122	60		134	105	0.91	95	0.94	99	
vodafone TF	92	70	59	93	60	81	57	53	75	79	32		146	73	0.91	67	0.94	69	67
vodafone TF	92	74	57	90	34	74	70	45	69	73	27		148	69	0.91	63	0.94	65	
AQMS 1	83	140	133	150	105	134	130	136	114	148			203	139	0.91	127	0.94	131	128
AQMS 2	83	150	145	154	101	131	131	133	112	152			199	141	0.91	128	0.94	132	
AQMS 3	75	139	132	148	88	119	137	143	112	142				129	0.91	117	0.94	121	
Sign 1	92	130	117	124	86	119	120	127	103	143	64		134	115	0.91	105	0.94	108	108
Sign 2	92	119	119	118	97	121	116	122	106	141	69		128	114	0.91	104	0.94	107	

	Data Capture	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	mean	Bias adj	Bias corrected	Adjusted mean
Blakenham Road	75	37	39	42	36	53	44	34				32	42	40	0.98	39	
Blakenham Road	83	39	34	39	39	50	41		40	50		30	65	43	0.98	42	40
AQMS 1	100	65	59	73	62	74	54	51	68	62	73	44	63	62	0.98	61	
AQMS 2	100	63	57	76	62	75	61	53	68	64	67	45	69	63	0.98	62	
AQMS 3	83	70	61	76		75	54	44	64	67	76	44		63	0.98	62	62
Upper Tooting Road	100	60	64	73	62	80	51	44	66	74	65	50	66	63	0.98	62	
Upper Tooting Road	100	61	52	72	65	79	59	46	68	72	67	47	66	63	0.98	62	62
Fircroft Road	100	23	20	30	32	46	25	25	31	40	38	25	31	31	0.98	30	
Fircroft Road	100	23	20	31	32	42	29	26	40	40	38	21	29	31	0.98	30	30
Broadwater Road	100	29	31	39	34	49	37	32	48	76	40	29	35	40	0.98	39	
Broadwater Road	100	32	32	40	37	43	43	30	43	39	45	28	33	37	0.98	36	38
Garratt Lane	100	49	48	61	40	61	59	44	66	56	61	45	51	53	0.98	52	
Garratt Lane	100	47	49	62	48	67	52	41	59	57	57	37	51	52	0.98	51	52
Gambole Road	100	31	29	37	37	51	39	27	34	45	47	29	34	37	0.98	36	
Gambole Road	100	31	26	35	39	50	33	27	34	41	47	30	38	36	0.98	35	36
Sellincourt Road	92	33	28	36	12	48	34	25	37		45	30	39	33	0.98	33	
Sellincourt Road	92	30	30	36	35	52	38	27	46		47	26	39	37	0.98	36	34

Tooting High Street	83	40	37	50	42	63	45		61		55	34	46	47	0.98	46	
Tooting High Street	83	39	38	53	43	62	41	38		52		32	48	45	0.98	44	45

Exceedance of the NO_2 annual mean AQO of 40 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%

Appendix C – Calculation of local bias correction factors

Table U **Precision and accuracy of diffusion tubes**

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	06/01/2016	03/02/2016	140.0	150.0	139.0	143	6.1	4	15.1	129.6	66	Good	or Data Capture
2	03/02/2016	02/03/2016	133.0	144.0	132.0	136	6.7	5	16.5	132.0	100	Good	Good
3	02/03/2016	31/03/2016	150.0	154.0	148.0	151	3.1	2	7.6	136.7	100	Good	Good
4	30/03/2016	27/04/2016	105.0	101.0	88.0	98	8.9	9	22.1	132.4	100	Good	Good
5	27/04/2016	25/05/2016	134.0	131.0	119.0	128	7.9	6	19.7	135.2	100	Good	Good
6	25/05/2016	29/06/2016	130.0	131.0	137.0	133	3.8	3	9.4	126.8	80	Good	Good
7	29/06/2016	28/07/2016	136.0	133.0	143.0	137	5.1	4	12.7	126.5	100	Good	Good
8	27/07/2016	22/08/2016	114.0	112.0	112.0	113	1.2	1	2.9	145.4	14	Good	or Data Capture
9	24/08/2016	28/09/2016	148.0	152.0	142.0	147	5.0	3	12.5	109.9	44	Good	or Data Capture
10	28/09/2016	26/10/2016											
11	26/10/2016	02/12/2016											
12	02/12/2016	04/01/2017	203.0	199.0		201	2.8	1	25.4	107.1	100	Good	Good
13													
										Overall survey -->		Good precision	Poor Overall DC

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

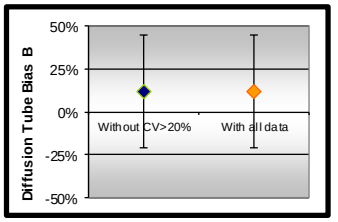
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	

Precision	10 out of 10 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 7 periods of data	
Bias factor A	0.91 (0.7 - 1.3)
Bias B	10% (-23% - 43%)
Diffusion Tubes Mean:	141 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	128 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	128 (98 - 183) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 7 periods of data	
Bias factor A	0.91 (0.7 - 1.3)
Bias B	10% (-23% - 43%)
Diffusion Tubes Mean:	141 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	128 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	128 (98 - 183) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Table V1 Single Tube Bias Adjustment

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements															
Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
Falcon Road Bus Stop	140	114	136	90	122	121	126	112	160	120		165		127.8	11
Falcon Road Bus Stop	139	123	139	98	124	101	120	117	157	124		166		128.0	11
Falcon Road	101	88	86	58	84			46	90	75		115		82.6	9
Falcon Road	95	87	107	63	93			48	91	74		115		85.9	9
Lavender Hill	82		86	59	87	78	70	73	81	79		121		81.6	10
Lavender Hill	90		87	70	85	77	78	76	82			120		85.0	9
Beauchamp Road	55	51	55	36	44	37	32	31	45	48		83		47.0	11
Beauchamp Road	50	50	53	33	41	40	35	28	46	46		91		46.6	11
TK maxx	55	56	80	55	71	62	43	48	65	65		101		63.7	11
TK maxx	60	52	77	47	75	67	39	45	68	68		100		63.5	11
St Johns Hill	82	71	93	68	96	58	80	75	95	73		129		83.6	11
St Johns Hill	84	71	104	67	90	79	76	71	105	81		119		86.1	11

Adjusted measurement (95% confidence interval)
with all the data
7 periods used in this calcuations

Bias Factor A 0.91 (0.7 - 1.3)
Bias B 10% (-23%- 42%)
Tube Precision: 4 Automatic DC: 97%

Adjusted with 95% CI	**116 (89 - 166)**
Adjusted with 95% CI	**116 (90 - 166)**
Adjusted with 95% CI	**75 (58 - 107)**
Adjusted with 95% CI	**78 (60 - 112)**
Adjusted with 95% CI	**74 (57 - 106)**
Adjusted with 95% CI	**77 (60 - 111)**
Adjusted with 95% CI	**43 (33 - 61)**
Adjusted with 95% CI	**42 (33 - 61)**
Adjusted with 95% CI	**58 (45 - 83)**
Adjusted with 95% CI	**58 (44 - 82)**
Adjusted with 95% CI	**76 (59 - 109)**
Adjusted with 95% CI	**78 (60 - 112)**

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.

Table V2 Single Tube Bias Adjustment

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements

Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
vodafone FF	130	114	128	92	113	116	123	101	141	57		40		105.0	11
vodafone FF	122	128	122	89	113	110	124	99	139	59		55		105.5	11
vodafone SF	114	107	112	85	105	113	109	90	127	55		120		103.4	11
vodafone SF	110	104	117	89	108	108	111	90	122	60		134		104.8	11
vodafone TF	70	59	93	60	81	57	53	75	79	32		146		73.2	11
vodafone TF	74	57	90	34	74	70	45	69	73	27		148		69.2	11
AQMS 1	140	133	150	105	134	130	136	114	148			203		139.3	10
AQMS 2	150	145	154	101	131	131	133	112	152			199		140.8	10
AQMS 3	139	132	148	88	119	137	143	112	142					128.9	9
Sign 1	130	117	124	86	119	120	127	103	143	64		134		115.2	11
Sign 2	119	119	118	97	121	116	122	106	141	69		128		114.2	11

Adjusted measurement
(95% confidence interval)
with all the data
7 periods used in this calcuations

Bias Factor A 0.91 (0.7 - 1.3)
Bias B 10% (-23% - 42%)

Tube Precision: 4 Automatic DC: 97%

Adjusted with 95% CI	**96 (74 - 137)**
Adjusted with 95% CI	**96 (74 - 137)**
Adjusted with 95% CI	**94 (72 - 134)**
Adjusted with 95% CI	**95 (73 - 136)**
Adjusted with 95% CI	**67 (51 - 95)**
Adjusted with 95% CI	**63 (48 - 90)**
Adjusted with 95% CI	**127 (98 - 181)**
Adjusted with 95% CI	**128 (99 - 183)**
Adjusted with 95% CI	**117 (90 - 168)**
Adjusted with 95% CI	**105 (81 - 150)**
Adjusted with 95% CI	**104 (80 - 148)**

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.

Table V3 Single Tube Bias Adjustment

Diffusion Tube Measurements															
Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
Newton Prep	77	70	85	54	68	54	57	56	71	57		88		67.0	11
Este Road		39	41	25	32	28	ue und	25	43	37		62		36.9	9
Este Road		43		31	36		28	52	39	38		54		40.1	8
St Johns Hill/Falcon Rd (Falcon Pub)	84	85	101	72	88	69	84	75	89	60		99		81.8	10
St Johns Hill/ Falcon Road (Falcon Pu	74		108	72	89	68	85	79	89	60		95		81.1	9
Totterdown Street	76	77		46	71	56	69	59	83	51		94		68.2	10
Totterdown Street	81	76		53	62		66	60	82	54		92		69.6	9
Bickley Street	42	41	45	32	38	28	28	28	35	37		61		37.7	11
Mitcham Road	107	96	101	71	82	66	82	74	95	64		95		84.8	11
Werter Road	44	45	47	30	34	25	26	26	47	30		59		37.5	11
Putney High Street	136	120		86	125	102	99	90	161	73		112		110.4	10
Felsham Road	56	46	54	31	37	32	30		76	33		56		45.1	10
Felsham Road	52	47	53	30	44	33	32			31		71		43.7	9
Felsham Road	58	47	55	28	40	32	33			33		57		42.6	9
Upper Richmond Road	54	59	67	47	57	46	48	47	58	45		77		55.0	11
Daylesford Avenue	32	38	37	24	28	21	19	20	29	31		48		29.7	11
Roehampton Lane, A3	80	59	77	45	53	42	47	ue und	26	44		72		54.5	10
Wandsworth Plain	78	72	76	53	67	58	74	ue und	88	19		89		67.4	10
Wandsworth Plain	77	77	77	52	67	53	67	ue und	93	21		82		66.6	10

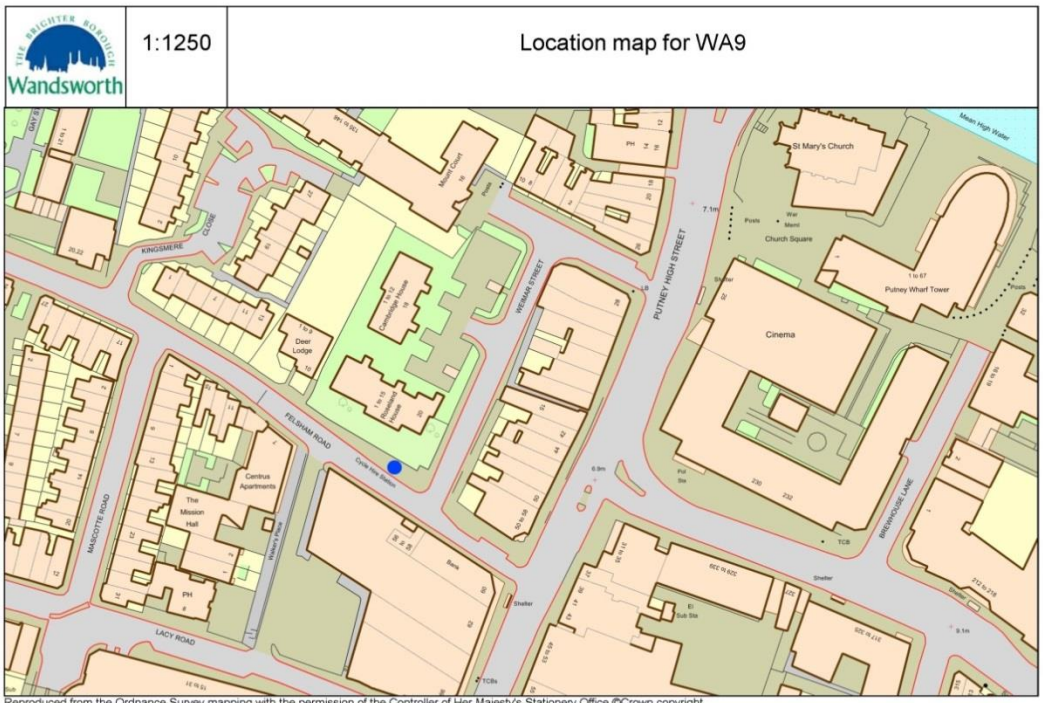
Adjusted measurement (95% confidence interval) with all the data 7 periods used in this calcuations

Bias Factor A 0.91 (0.7 - 1.3)
Bias B 10% (-23% - 42%)
Tube Precision: 4 Automatic DC: 97%

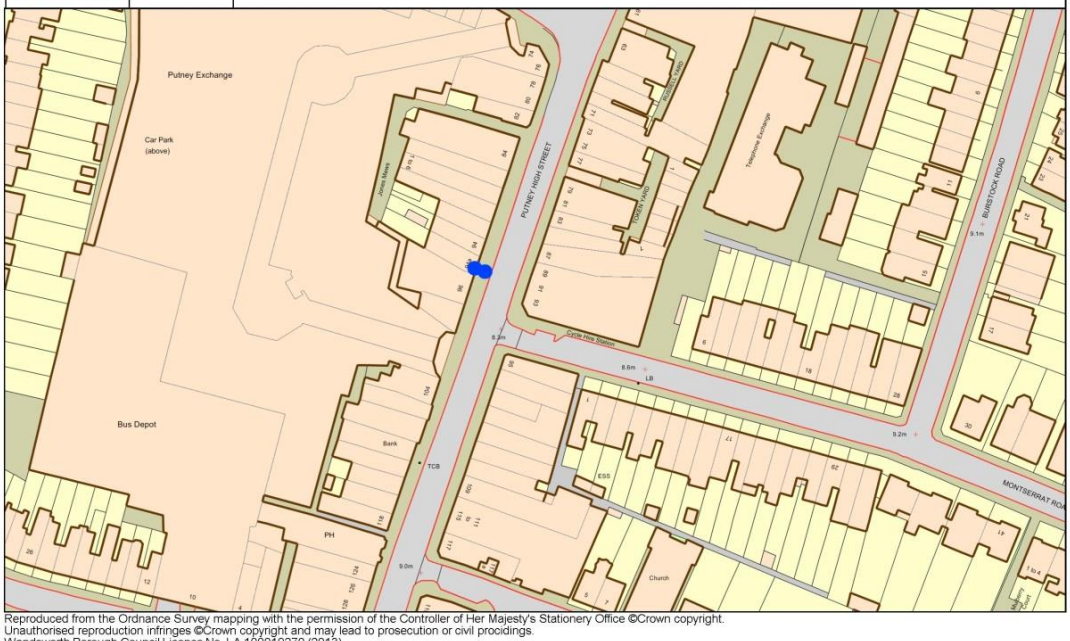
Adjusted with 95% CI	**61 (47 - 87)**
Adjusted with 95% CI	**34 (26 - 48)**
Adjusted with 95% CI	**37 (28 - 52)**
Adjusted with 95% CI	**74 (57 - 106)**
Adjusted with 95% CI	**74 (57 - 105)**
Adjusted with 95% CI	**62 (48 - 89)**
Adjusted with 95% CI	**63 (49 - 90)**
Adjusted with 95% CI	**34 (26 - 49)**
Adjusted with 95% CI	**77 (59 - 110)**
Adjusted with 95% CI	**34 (26 - 49)**
Adjusted with 95% CI	**100 (77 - 144)**
Adjusted with 95% CI	**41 (32 - 59)**
Adjusted with 95% CI	**40 (31 - 57)**
Adjusted with 95% CI	**39 (30 - 55)**
Adjusted with 95% CI	**50 (39 - 72)**
Adjusted with 95% CI	**27 (21 - 39)**
Adjusted with 95% CI	**50 (38 - 71)**
Adjusted with 95% CI	**61 (47 - 88)**
Adjusted with 95% CI	**61 (47 - 87)**

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.

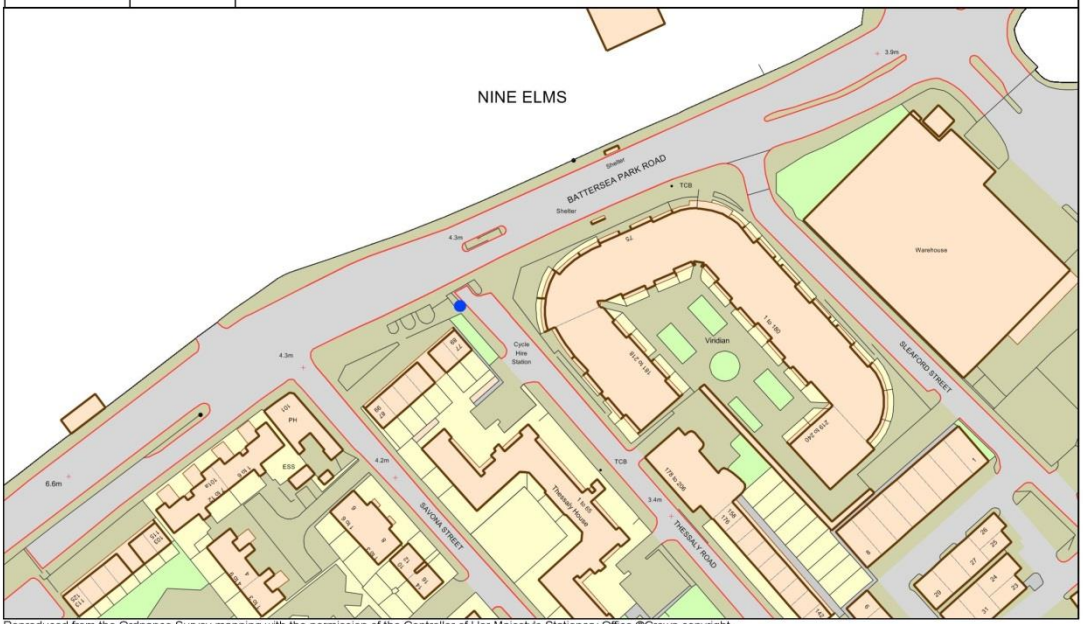
Appendix D – Locations of automatic monitoring sites for 2016



	1:1250	Location map for WA7 and WA8

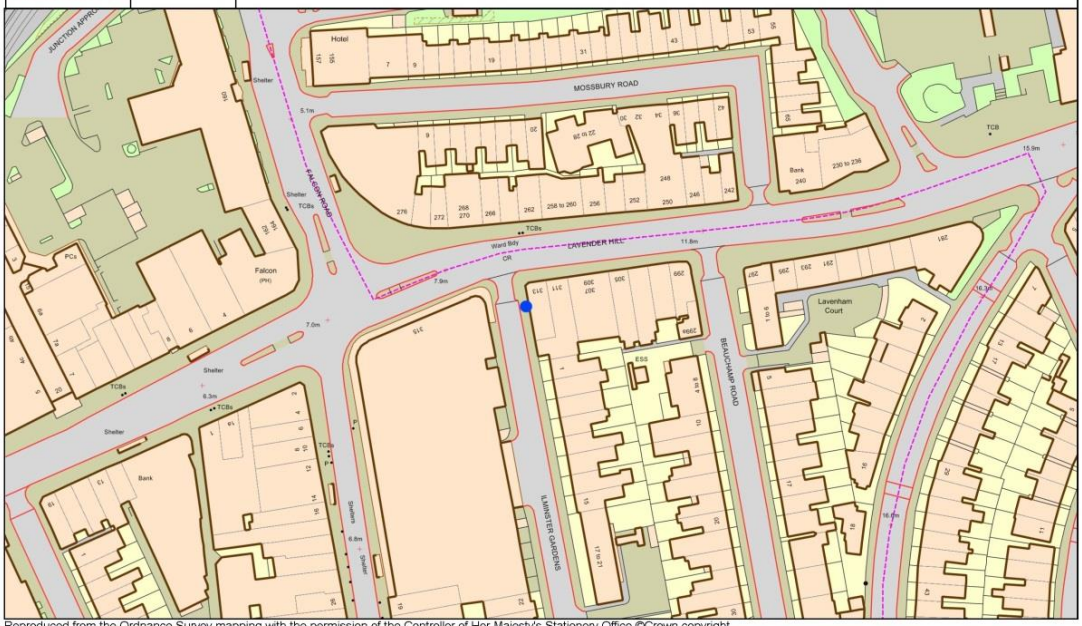


	1:1250	Location map for WAA

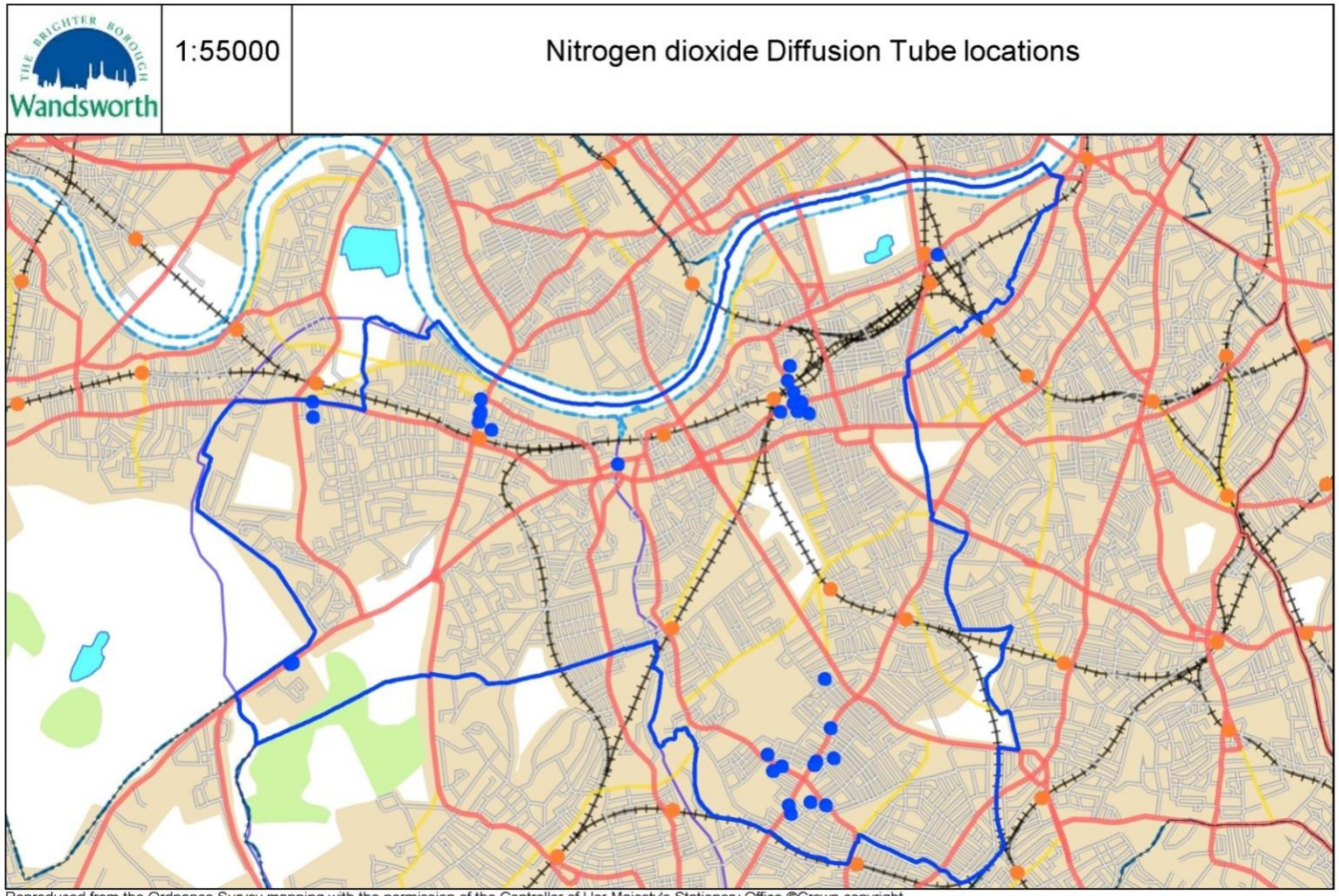


Wandsworth	1:1250	Location map for WAB

Wandsworth	1:1250	Location map for WAC



Appendix E – Locations of non-automatic monitoring sites for 2016 (shown by blue dots)



Appendix F – Illustration of diffusion results in Putney High Street for 2016