Wandsworth Borough Council
Air Quality Annual Status Report for 2018
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This report provides a detailed overview of air quality in the London Borough of Wandsworth during 2018. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

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

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Abbreviations

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

Table A. Summary of National Air Quality Standards and Objectives

Pollutant	Objective (UK)	Averaging Period	Date[1]
Nitrogen dioxide - NO_2	200 $\mu g\ m^{-3}$ not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 $\mu g\ m^{-3}$	Annual mean	31 Dec 2005
Particles - PM_{10}	50 $\mu g\ m^{-3}$ not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 $\mu g\ m^{-3}$	Annual mean	31 Dec 2004
Particles - $PM_{2.5}$	25 $\mu g\ m^{-3}$	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 $\mu g\ m^{-3}$ not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
	350 $\mu g\ m^{-3}$ not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 $\mu g\ m^{-3}$ mot to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004

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

1.   Air Quality Monitoring

1.1   Locations

Table B.   Details of Automatic Monitoring Sites for 2018

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	22m	22m	4.85m	CO, NO_2, O_3	Chemiluminescent
WA7	**Putney High Street**, 94A Putney High street (commissioned 9th July 2009). Denomination according to London Air website: **Putney high street kerbside**	524035	175334	Kerbside	Y	1m	0.85m	1.75m	NO_2, PM_{10}	Chemiluminescent; TEOM
WA8	**Putney High Street**, 94A Putney High street (commissioned 23rd July 2010). Denomination according to London Air website: **Putney**	524032	175335	Roadside	Y	1m	1m	4.85m	NO_2	Chemiluminescent

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
	high street façade roadside									
WA9	**Felsham Road**, Putney (commissioned 4th January 2011). Denomination according to London Air website: **Putney urban background**	524044	175495	Urban background	Y	4.8m from Felsham road; 46m from Putney high street kerb	1m	3.35m	NO_2, PM_{10}	Chemiluminescent; TEOM
WAA	**Thessaly Road**, Battersea (commissioned 4th January 2011). Denomination according to London Air website: **Battersea**	529137	177249	Roadside	Y	7.5m from Battersea Park road kerb	1m	1.75m	NO_2, PM_{10}	Chemiluminescent; TEOM
WAB	**Tooting High Street** (commissioned 11th June 2015)	527567	171628	Roadside	Y	2m	2m	1.75m	NO_2, PM_{10}	Chemiluminescent; TEOM
WAC	**313 Lavender Hill**, Clapham Junction (commissioned 14th April 2016; Denomination according to London Air website: Clapham Junction)	527430	175454	Roadside	Y	8m from Lavander Hill kerb; 3.75m Illminster Gardens kerb	1m	1.75m	NO_2, PM_{10}	Chemiluminescent; TEOM

Table C.   Details of Non-Automatic Monitoring Sites for 2018

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)
Across borough										
W23	**37 West Hill**, Wandsworth Town	525111	174619	Roadside	Y	2.20m	3.02m	2.52m	NO_2	No
W24	**Putney sign (Mac Donald's)**, Putney	524045	175366	Roadside	Y	2.35m	2.35m	2.3m	NO_2	N
W21 & W22	**Felsham Road tube 1 & tube 2**, Putney	524044	175495	Urban Background	Y	4.8m from Felsham road; 46m from Putney high street kerb	1m	3.35m	NO_2	Y
W6	**21 Daylesford Avenue**, Putney	522270,	175307	Urban Background	Y	11m	2.4m	2.85m	NO_2	N
W25	**Roehampton Church School** (on corner of Roehampton Lane), Roehampton	522542	173700	Roadside	Y	0.86m	0.53m	2.25m	NO_2	N
W26	**Replingham Road** (corner of Heythrope street), Southfield	524847	173282	Kerbside	Y	2.54m	0.62m	2.37m	NO_2	N
W27	**68-70 Sutherland Grove** (opposite St. Cecilia's school), Southfield	524633	173594	Urban Background	Y	2.00m	0.65m	2.83m	NO_2	N
W28	**61 Summerley Street**, Earlsfield	526011	172869	Urban background	Y	2.06m	0.60m	2.36m	NO_2	N
W29	**Junction Skelbrook Street / Garratt Lane**, Earlsfield	526099	172833	Roadside	Y	0.70m	3.29m	2.27m	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
W4	**108 Mitcham Road**, Tooting Broadway	527688	171204	Kerbside	Y	3m	0.6m	2.65m	NO_2	N
W8	**50 Bickely Street**, Tooting Broadway	527524	171239	Urban Background	Y	2.97m	1.85m	2.8m	NO_2	N
W30	**11B Elmbourne Road**, Balham	528900	172431	Urban Background	Y	4.50m	0.50m	2.56m	NO_2	N
W31	**Junction Hildreth Street / Bedford Hill**, Balham	528607	173333	Kerbside	Y	1.44m	3.64m	2.21m	NO_2	N
W32	**2-3 Balham High Road**, Balham	528436	173133	Kerbside	Y	4.40m	0.71m	2.30m	NO_2	N
W33	Now called **NE4 Lockington road**									
W34	**46 Shelgate Road**, Northcote	527569	174986	Urban Background	Y	2.14m	0.40m	2.38m	NO_2	N
W35	**47 Northcote Road**, Northcote	527487	174981	Kerbside	Y	4.21m	0.49m	2.37m	NO_2	N
W36	**St. Anne's Hill** (opposite St. Anne's School), Fairfield	525875	174616	Urban Background	Y	2.73m	0.89m	2.38m	NO_2	N
W37	**302A Merton Rd** (Riversdale School), Southfields	525278	173483	Roadside	Y	3.35m	3.35m	2.33m	NO_2	N
W38	**High View School**, Plough Terrace, Fairfield	526863	175239	Kerbside	Y	0.45m	0.45m	2.42m	NO_2	N
Nine Elms										
NE2	**Chesterton School**, Latchmere	528043	176618	Roadside	Y	2.85m	2.85m	2.20m	NO_2	N
NE3	**Queenstown Road**, Queenstown	528771,	176819	Kerbside	Y	1.05m	1.05m	2.30m	NO_2	N

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA?	Distance from monitoring site to relevant exposure (m)	Distance to kerb of nearest road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Tube co-located with an automatic monitor? (Y/N)
NE4	**Lockington Road**, Battersea (previously called as "W33 Lockington road" in 2017)	528871	176943	Urban Background	Y	1.22m	0.69m	2.37m	NO$_2$	N
NE5	**Kirtling Street**, Queenstown	529265	177353	Kerbside	Y	0.50m	0.50m	2.35m	NO$_2$	N
NE6	**Nine Elms Lane**, Queenstown	529413	177486	Kerbside	Y	0.53m	0.53m	2.40m	NO$_2$	N
NE7	**1 Nine Elms, Parry Street**, Queenstown	530129	177727		Y	0.5m	0.5m	2.35m	NO$_2$	N
NE8	**Battersea park**, Queenstown	528023	177176		Y	420m from Prince of Wales Drive	420m from Prince of Wales Drive	2.37m	NO$_2$	N
York Road										
YR1	**Trafalgar House**, St Mary's Park	526201	175340	Kerbside	Y	0.84m	0.84m	2. 30m	NO$_2$	N
YR2	**Royal Academy of Dance**, St Mary's Park	526581	175731	Kerbside	Y	0.70m	0.70m	2.26m	NO$_2$	N
YR3	**Cotton Row**, St Mary's Park	526480	175930	Urban background	Y	160m from York road	160m from York road	2.34m	NO$_2$	N
YR4	**York road, corner with Falcon Road**, Latchmere	527086	176119	Kerbside	Y	0.75m	0.75m	2.25m	NO$_2$	N
YR5	**256 Battersea Park Road**, St Mary's Park	527109	176022	Kerbside	Y	0.63m	0.63m	2.32m	NO$_2$	N
YR6	**31-32 Battersea Square**, St Mary's Park	526817	176686	Kerbside	Y	0.44m	0.44m	2.35m	NO$_2$	N

1.2 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for "annualisation" and for distance to a location of relevant public exposure, the details of which are described in Appendix A.

Table D. Annual Mean NO$_2$ Ratified and Bias-adjusted Monitoring Results (μg m^{-3})

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (μg m^{-3})						
				2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
WA2 (Wandsworth Town Hall)	Automatic	N/A	97%	48	48	43	36	43	40	38
WA7 (Putney High Street; Denomination according to London Air website: Putney high street kerbside)	Automatic	N/A	90%	155	124	123	123	124	76	68
WA8 (Putney High Street; Denomination according to London Air website: Putney high street façade roadside)	Automatic	N/A	85%	129	106	95	96	110	60	62

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2018 %[b]	Annual Mean Concentration (µg m^{-3})						
				2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
WA9 (Felsham Road; Denomination according to London Air website: Putney urban background)	Automatic	N/A	87%	40	40	**41**	40	**45**	31	35
WAA (Thessaly Road, Battersea; Denomination according to London Air website: Battersea)	Automatic	N/A	65%	N/A	**45**	**47**	40	40	33	33[c]
WAB (Tooting High Street)	Automatic	N/A	91%	N/A	N/A	N/A	**60** for monitoring period (**68** for 2015)	**59**	**55**	53
WAC (313 Lavender Hill; Denomination according to London Air website: Clapham Junction)	Automatic	N/A	94%	N/A	N/A	N/A	N/A	**46** (ratified)	**43**	42
W23 (37 West Hill)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	**57**	**55**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
				2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
W24 (Putney Sign Mac Donald's)	Diffusion tube	N/A	92%	N/A	N/A	N/A	N/A	N/A	**63**	**55**
W21 & W22 (Felsham road, tube 1 & 2)	Diffusion tube	N/A	100%	**42**	**44.3**	**40.3**	35	**41**	28	32
W6 (21 Daylesford Avenue)	Diffusion tube	N/A	92%	28	26	26	24	28	23	23
W25 (Roehampton Church School)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	32	29
W26 (Replingham Road)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	31	30
W27 (68-70 Sutherland Grove)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	24	25
W28 (61 Summerley street)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	27	28
W29 (Junction Skelbrook street / Garratt lane)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	31	32
W4 (108 Mitcham road)	Diffusion tube	N/A	100%	**91**	**97**	**96**	**79**	**80**	**66**	**64**
W8 (50 Bickely street)	Diffusion tube	N/A	100%	38	**41**	36	33	35	31	31

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
				2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
W30 (11B Elmbourne road)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	33	31
W31 (Junction Hildreth Street / Bedford Hill)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	39	39
W32 (2-3 Balham High road)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	**46**	**44**
W33	Now called **NE4 Lockington road**									
W34 (46 Shelgate road)	Diffusion tube	N/A	92%	N/A	N/A	N/A	N/A	N/A	31	30
W35 (47 Northcote road)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	34	35
W36 (St Anne's Hill)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	39	33
W37 (302A Merton Rd)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	N/A	37
W38 (High View School)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	N/A	32
NE2 (Chesterton School)	Diffusion tube	N/A	92%	N/A	N/A	N/A	N/A	N/A	N/A	35
NE3 (Queenstown Road)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	N/A	**63**

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
				2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
NE4 (Lockington Road)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	36	34
NE5 (Kirtling Street)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	N/A	**46**
NE6 (Nine Elms Lane)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	N/A	**54**
NE7 (1 Nine Elms, Parry)	Diffusion tube	N/A	83%	N/A	N/A	N/A	N/A	N/A	N/A	**49**
NE8 (Battersea park)	Diffusion tube	N/A	58%	N/A	N/A	N/A	N/A	N/A	N/A	24 [c]
YR1 (Trafalgar House)	Diffusion tube	N/A	83%	N/A	N/A	N/A	N/A	N/A	N/A	**53**
YR2 (Royal Academy of Dance)	Diffusion tube	N/A	100%	N/A	N/A	N/A	N/A	N/A	N/A	**75**
YR3 (Cotton Row)	Diffusion tube	N/A	92%	N/A	N/A	N/A	N/A	N/A	N/A	31
YR4 (York road, corner with Falcon Road)	Diffusion tube	N/A	83%	N/A	N/A	N/A	N/A	N/A	N/A	**49**
YR5 256 (Battersea Park Road)	Diffusion tube	N/A	92%	N/A	N/A	N/A	N/A	N/A	N/A	**73**
YR6 (31-32 Battersea Square)	Diffusion tube	N/A	92%	N/A	N/A	N/A	N/A	N/A	N/A	**44**
From 2011 to 2016										
W3 (Newton Preparatory School)	Diffusion tube	N/A	N/A	**54**	**65**	**60**	**57**	**63**	(Not existing anymore)	(Not existing anymore)

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration ($\mu g\ m^{-3}$)						
				2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
W5 (Upper Richmond Road)	Diffusion tube	N/A	N/A	51	60	51	48	52	(Not existing anymore)	(Not existing anymore)
W7 (Adjacent to Coop Petrol station)	Diffusion tube	N/A	N/A	57	53	47	49	51	(Not existing anymore)	(Not existing anymore)
W9 (Putney High street)	Diffusion tube	N/A	N/A	113	116	99	89	104	(Not existing anymore)	(Not existing anymore)
W12 & W13 (Wandsworth Plain)	Diffusion tube	N/A	N/A	73	71.5	69.5	58	63	(Not existing anymore)	(Not existing anymore)
W10 (Werter road)	Diffusion tube	N/A	N/A	38	36	34	35	35	(Not existing anymore)	(Not existing anymore)
W14 & W15 (Este road)	Diffusion tube	N/A	N/A	27	41.5	37.5	32	36	(Not existing anymore)	(Not existing anymore)
W16 & W17 (St John's Hill / Falcon road)	Diffusion tube	N/A	N/A	83.5	95.5	86	71	77	(Not existing anymore)	(Not existing anymore)
W18 & W19 (Totterdown street)	Diffusion tube	N/A	N/A	67.5	75.5	68	62	65	(Not existing anymore)	(Not existing anymore)
P1 & P2 (Façade First Floor, Putney High street	Diffusion tube	N/A	N/A	129	97	87	107	99	(Not existing anymore)	(Not existing anymore)
P3 & P4 (Façade Second Floor, Putney High street)	Diffusion tube	N/A	N/A	110	90	80	99	98	(Not existing anymore)	(Not existing anymore)

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
				2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
P5 & P6 (Façade Third Floor, Putney High street)	Diffusion tube	N/A	N/A	99	70	65	72	67	(Not existing anymore)	(Not existing anymore)
P7, P8 & P9 (Kerbside Air Quality Monitoring Station, Putney High street)	Diffusion tube	N/A	N/A	155	123	101	125	128	(Not existing anymore)	(Not existing anymore)
P10 & P11 (Sign in centre of pavement, Putney High street)	Diffusion tube	N/A	N/A	140	106	85	112	108	(Not existing anymore)	In 2017, these two sites were replaced by the site W24 (Putney Sign Mac Donald's)
Clapham Junction 2015 and 2016										
CJ1 & CJ2 (Falcon road Bus Stop, Clapham Junction)	Diffusion tube	N/A	N/A	---	---	---	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	(Not existing anymore)	(Not existing anymore)
CJ3 & CJ4 (Falcon road, Clapham Junction)	Diffusion tube	N/A	N/A	---	---	---	71	79	(Not existing anymore)	(Not existing anymore)

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2018 %[b]	Annual Mean Concentration (µg m^{-3})						
				2012[c]	2013[c]	2014[c]	2015[c]	2016[c]	2017[c]	2018[c]
CJ5 & CJ6 (Lavender Hill, Clapham Junction)	Diffusion tube	N/A	N/A	---	---	---	**67**	**78**	(Not existing anymore)	(Not existing anymore)
CJ7 & CJ8 (Beauchamp road, Clapham Junction)	Diffusion tube	N/A	N/A	---	---	---	**39**	**44**	(Not existing anymore)	(Not existing anymore)
CJ9 & CJ10 (St John's road, Clapham Junction)	Diffusion tube	N/A	N/A	---	---	---	**50**	**60**	(Not existing anymore)	(Not existing anymore)
CJ11 & CJ12 (St John's Hill, Clapham Junction)	Diffusion tube	N/A	N/A	---	---	---	**71**	**80**	(Not existing anymore)	(Not existing anymore)

Tooting from June 2015 to May 2016

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2018 %[b]	Annual Mean Concentration (µg m^{-3})					
				2012[c]	2013[c]	2014[c]	2015[c] - 2016[c] (12 month period commencing 8 June 2015)	2017[c]	2018[c]
T1 & T2 (Blakenham road, Tooting)	Diffusion tube	N/A	N/A	---	---	---	40	(Not existing anymore)	(Not existing anymore)
T3, T4 & T5 (Air Quality Monitoring Station, Tooting)	Diffusion tube	N/A	N/A	---	---	---	**62**	(Not existing anymore)	(Not existing anymore)
T6 & T7 (Upper Tooting road, Tooting)	Diffusion tube	N/A	N/A	---	---	---	**62**	(Not existing anymore)	(Not existing anymore)

Site ID	Site type	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean Concentration (µg m^{-3})						
				2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
T8 & T9 (Fircroft road, Tooting)	Diffusion tube	N/A	N/A	---	---	---	30		(Not existing anymore)	(Not existing anymore)
T10 & T11 (Broadwater road, Tooting)	Diffusion tube	N/A	N/A	---	---	---	38		(Not existing anymore)	(Not existing anymore)
T12 & T13 (908 Garratt lane, Tooting)	Diffusion tube	N/A	N/A	---	---	---	**52**		(Not existing anymore)	(Not existing anymore)
T14 & T15 (Gambole road, Tooting)	Diffusion tube	N/A	N/A	---	---	---	36		(Not existing anymore)	(Not existing anymore)
T16 & T17 (Sellingcourt road, Tooting)	Diffusion tube	N/A	N/A	---	---	---	34		(Not existing anymore)	(Not existing anymore)
T18 & T19 (Tooting High street, Tooting)	Diffusion tube	N/A	N/A	---	---	---	**45**		(Not existing anymore)	(Not existing anymore)

Notes: Exceedance of the NO$_2$ annual mean AQO of 40 µg m^{-3} are shown in **bold**.

NO$_2$ annual means in excess of 60 µg m^{-3}, indicating a potential exceedance of the NO$_2$ hourly mean AQS objective are shown in bold and underlined.

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

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

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

All data from the automatic monitoring stations has been fully ratified.

Data capture rates for all sites were above 75%, expect for the following sites:
- NE8, Battersea park, Diffusion tube: 58% capture rate.
- WAA, Thessaly Road, Battersea, Automatic Monitoring Station: 65% capture rate.

The minimum data capture rate was not achieved at all nitrogen dioxide diffusion tube sites and automatic monitoring stations in 2018. Consequently, it has been necessary to annualise the results of NE8 in accordance with the procedure described in LAQM TG (16).

A nationally derived bias adjustment factor of 0.93 was used for all diffusion tube data. Bias Corrected (0.93) as per diffusion Tube Bias Factor 03/2019.

Full diffusion tube details can be found in the Appendix.

Concentrations measured at all of the automatic monitoring stations have decreased since 2016, and more generally over the 7-year period for which data is reported concentrations have reduced. The reduction is seen at all monitoring stations, i.e. kerbside, roadside and urban background classified sites. The annual mean objective was met at urban background locations and significant reductions were seen at the other monitoring stations between 2016 and 2017. The automatic monitoring station data is further described by Figure A. The red line indicates the Air Quality objective limit of 40 μgm^3.

The diffusion tube locations were reviewed in 2016 with monitoring ceasing in quite a number of the previous monitoring locations due to the air quality monitoring objectives being met or sufficient monitoring having been undertaken to establish a long-term trend. Monitoring by means of nitrogen dioxide diffusion tubes has continued at 5 existing locations. There were reduced concentrations in the majority of the locations between 2016 and 2018. In 2018, diffusion tubes along York Road and the Nine Elms area were added.

The diffusion tubes are exceeding the annual mean NO_2 air quality objective (40 μgm^3) at busy roadside locations but meeting the meeting the objective at all urban background locations and at other less busy roadside locations. The 60 μgm^{-3} concentration is being exceeded at certain roadside locations in Putney High Street, Mitcham Road (Tooting), Nine Elms area and York road. Both of the locations are within already identified air quality focus areas. The exceedance of the 60 μgm^3 concentration indicates that there is a risk of the hourly mean air quality objective being exceeded. The diffusion tube in West Hill, Wandsworth is close to this level, yielding an annual mean of 55 μgm^3. Once again this is in an air quality focus area and we are working with a member of the public to assess air quality in this area further, and identify possible actions to reduce exposure.

The annual mean NO_2 results are further illustrated by Figure A. The red line indicates the annual mean air quality objective of 40 μgm^{-3}.

Figure A. Annual mean NO$_2$ Ratified and Bias-adjusted Automatic Monitoring results (µg m^{-3})
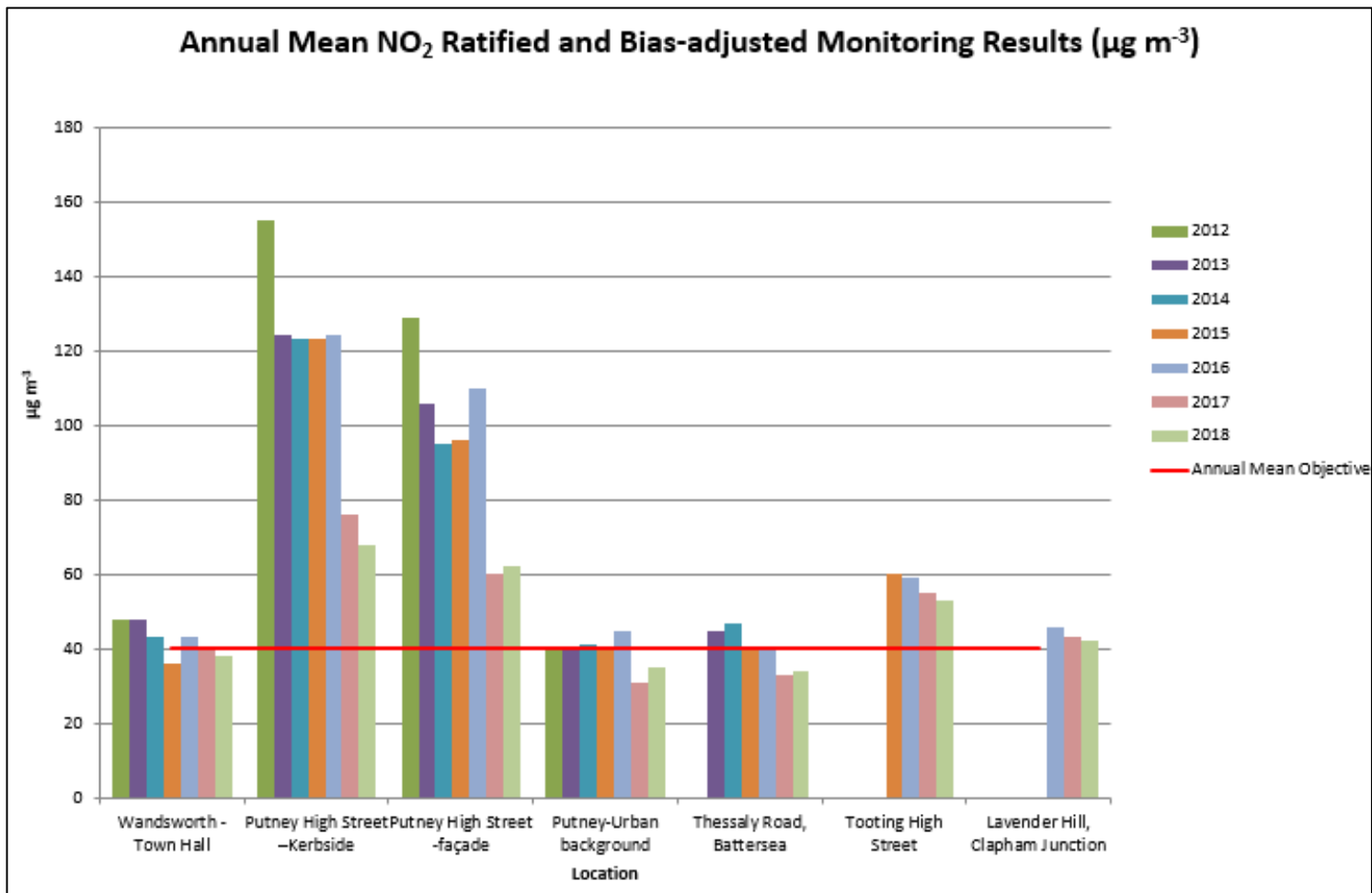
Table E.   NO₂ Automatic Monitor Results: Comparison with 1-hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 µg m⁻³						
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
WA2 (Wandsworth Town Hall)	N/A	97%	0	0	0 (124.4)	0 (108.1)	0	0	0
WA7 (Putney High Street; Denomination according to London Air website: Putney high street kerbside)	N/A	90%	**2740**	**1580**	**1537**	**1443**	**1248**	**76 (247)**	**26**
WA8 (Putney High Street; Denomination according to London Air website: Putney high street façade roadside)	N/A	85%	**1726**	**661**	**505**	**329**	**403**	9	5
WA9 (Felsham Road; Denomination according to London Air website: Putney urban background)	N/A	87%	0	2	0 (132.7)	0 (104)	**45**	7 (179)	0
WAA (Thessaly Road, Battersea; Denomination according to London Air website: Battersea)	N/A	65%	N/A	0	1	0 (113.6)	1	0 (98)	0 (0.97)
WAB (Tooting High Street)	N/A	91%	N/A	N/A	N/A	9	2	0	2

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Hourly Means > 200 μg m^{-3}						
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
WAC (313 Lavender Hill; Denomination according to London Air website: Clapham Junction)	N/A	94%	N/A	N/A	N/A	N/A	**23**	0	0

Notes: Exceedance of the NO$_2$ short term AQO of 200 μg m^{-3} over the permitted 18 days per year are shown in **bold**.

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

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

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

All data have been fully ratified for all the continuous monitoring stations.

Exceedances of the hourly mean objective limit were observed at the Putney High Street kerbside air quality monitoring station but the number of exceedances was significantly less than in previous years. The air quality objective was met at the other air quality monitoring stations including the Putney High street façade air quality monitory station Putney Urban Background air quality monitoring station.

The data capture for WAA (Thessaly Road, Battersea) was below 85% and therefore the 99.8[th] percentile was calculated in accordance with LLAQM.TG (16). This figure is given in brackets. Where the 99.8[th] percentile is greater than 200 μgm^3 this means that if there had been 100% data capture then there would have been greater than 18 exceedances of 200 μgm^{-3} per calendar year. In this case, the 99.8[th] percentile was below 200 μgm^3, meaning that the air quality objective would be met.

The exceedances of the 1-hour mean objective are further illustrated by Figures B and C. The red line indicates the short term air quality objective of no more than 18 exceedances of the 200 μgm^{-3}.

Figure B.   NO₂ Automatic Monitor results: Comparison with 1-hour Mean Objective

NO₂ Automatic Monitor Results: Comparison with 1-hour Mean Objective
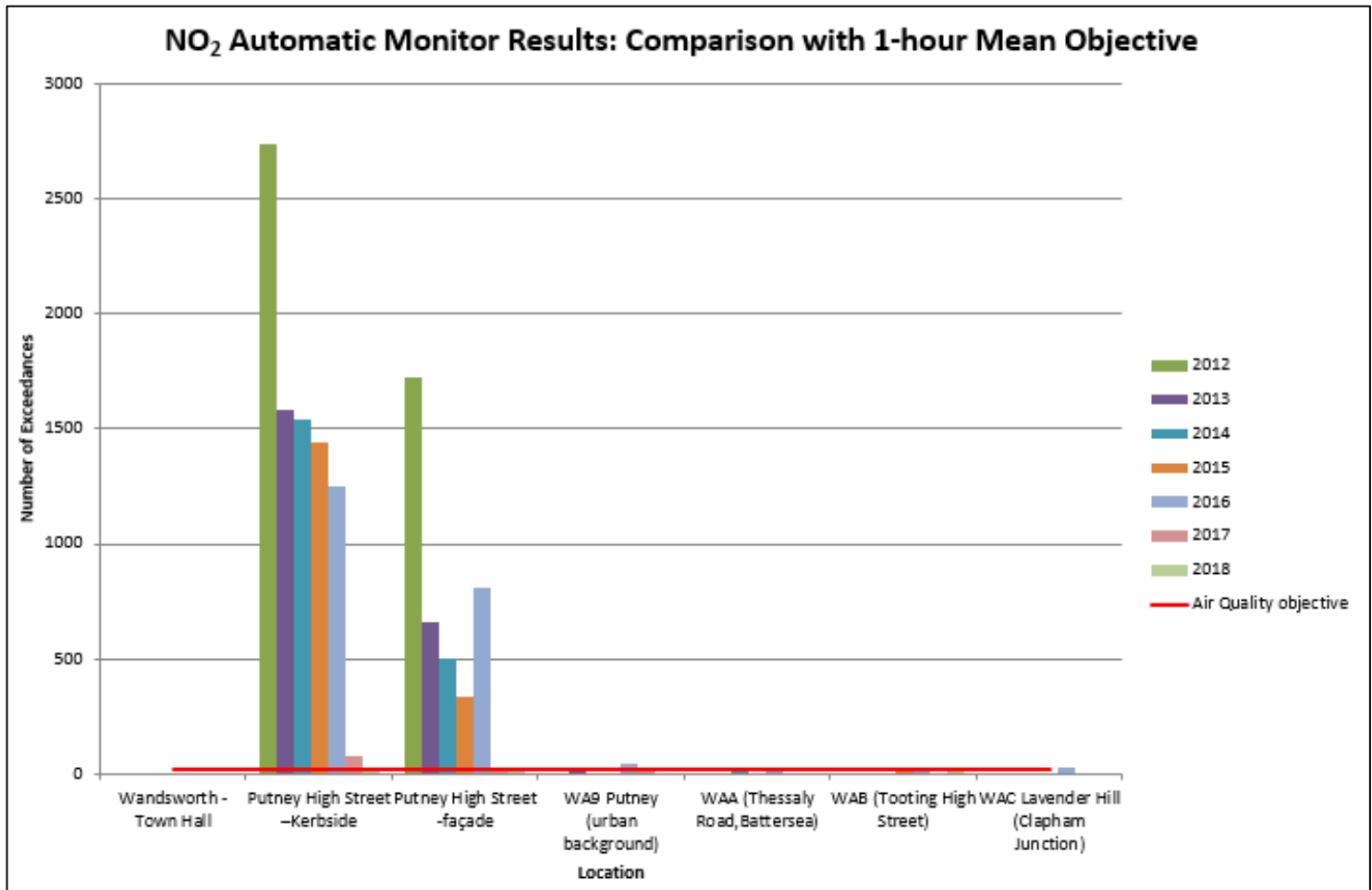
Figure C.   NO₂ Automatic Monitor results: Comparison with 1-hour Mean Objective excluding Putney high street automatic monitoring stations
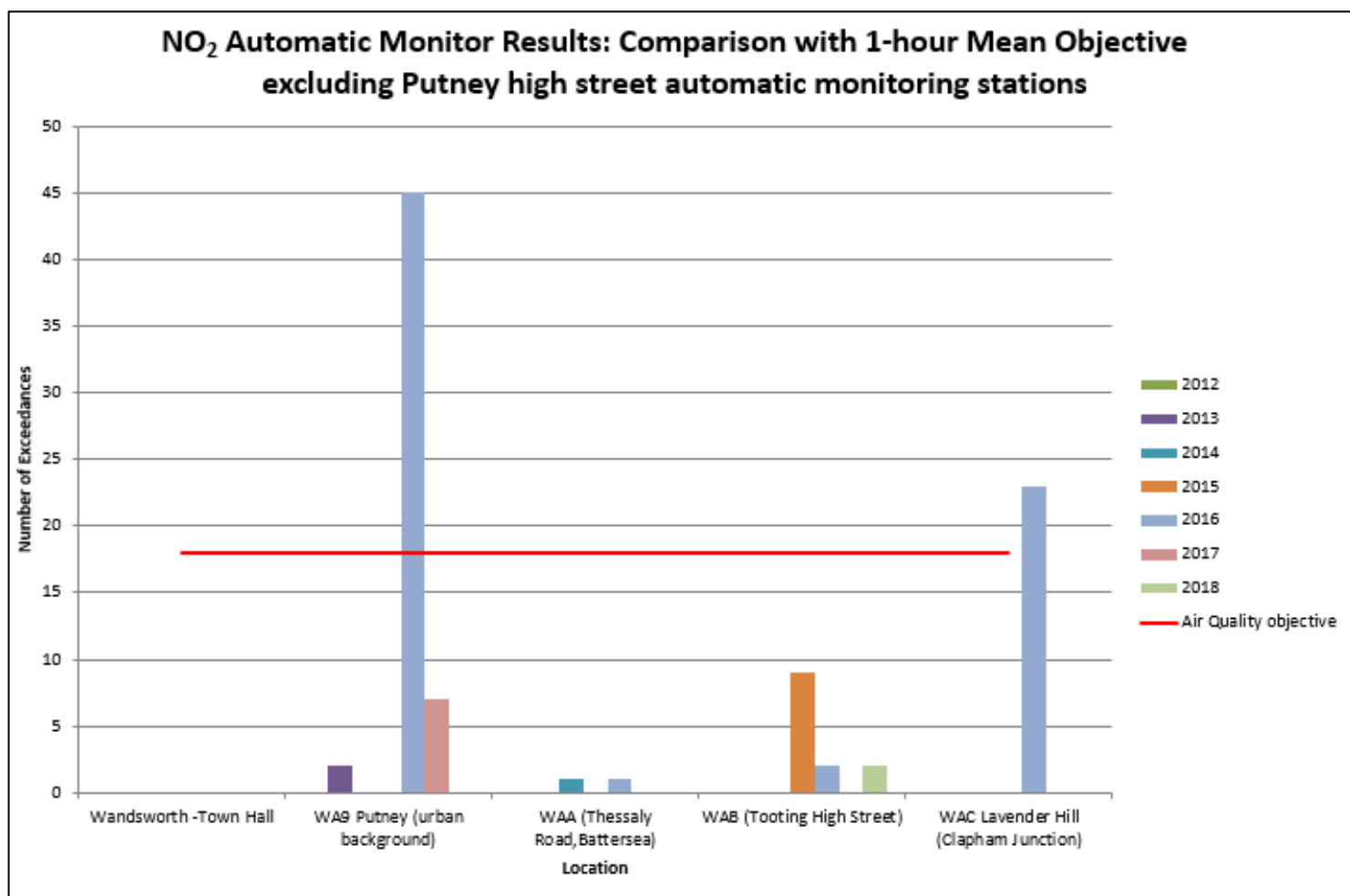

Table F.   Annual Mean PM₁₀ Automatic Monitoring Results (µg m⁻³)

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018% [b]	Annual Mean Concentration (µg m⁻³)						
			2012 [c]	2013 [c]	2013⁴ᶜ	2015 [c]	2016 [c]	2017 [c]	2018 [c]
WA7 (Putney High Street; Denomination according to London Air website: Putney high street kerbside)	N/A	96%	29	28	24	25	21	21	25

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018% [b]	Annual Mean Concentration (µg m⁻³)						
			2012 [c]	2013 [c]	2013⁴[c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
WA9 (Felsham Road; Denomination according to London Air website: Putney urban background)	N/A	95%	24	24	20	18	18	17	17
WAA (Thessaly Road; Denomination according to London Air website: Battersea)	N/A	99%	N/A	31	28	27	32	27	25
WAB (Tooting High Street)	N/A	97%	N/A	N/A	N/A	25	24	23	23
WAC (313 Lavender Hill; Denomination according to London Air website: Clapham Junction)	N/A	99%	N/A	N/A	N/A	N/A	18	20	21

Notes: Exceedance of the PM_{10} annual mean AQO of 40 µg m³ 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%

All data have been fully ratified for all the continuous monitoring stations. The data capture is in excess 75% for all monitoring stations and in fact the data for all monitoring stations is in excess of 85%.

The annual mean objective for PM_{10} continues to be met at all monitoring stations, however the measured concentrations at Putney High Street, Battersea, Tooting High Street and slightly Lavender Hill (Clapham Junction) exceed the World Health organisation (WHO) limit of 20 µgm⁻³.

The annual mean PM_{10} results are further illustrated by Figure D. The red line indicates the air quality objective of no more than 40 µgm⁻³.

Figure D   Annual Mean PM$_{10}$ Automatic Monitoring Results (µg m^{-3})
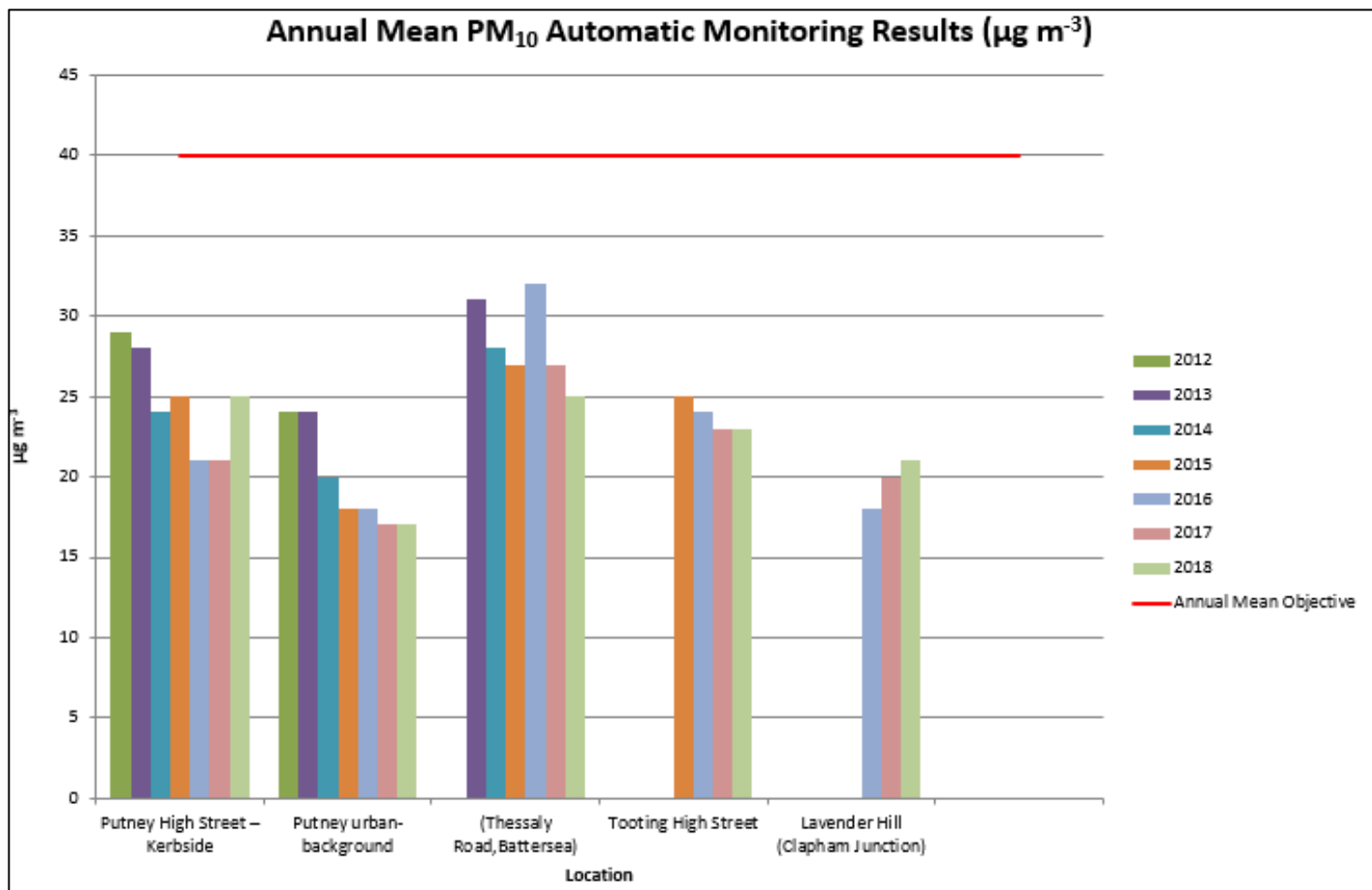

Table G.   PM$_{10}$ Automatic Monitor Results: Comparison with 24-Hour Mean Objective

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µg m^{-3}						
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
WA7 (Putney High Street; Denomination according to London Air website: Putney high street kerbside)	N/A	96%	10 (40.5)	5	5	10	4	2	3

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Number of Daily Means > 50 µg m^{-3}						
			2012 [c]	2013 [c]	2014 [c]	2015 [c]	2016 [c]	2017 [c]	2018 [c]
WA9 (Felsham Road; Denomination according to London Air website: Putney urban background)	N/A	95%	11 (39)	3 (41.7)	2 (31)	4 (21.2)	6	5	1
WAA (Thessaly Road; Denomination according to London Air website: Battersea)	N/A	99%	N/A	**48**	28	16	**43**	16	10
WAB (Tooting High Street)	N/A	97%	N/A	N/A	N/A	10	11	11	3
WAC (313 Lavender Hill; Denomination according to London Air website: Clapham Junction)	N/A	99%	N/A	N/A	N/A	N/A	1 (27.5)	4	3

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

All data have been fully ratified for all the continuous monitoring stations. The data capture at all monitoring stations is in excess of 85% at all monitoring stations.

The 24-hour mean objective for PM$_{10}$ of 50 µgm^{-3} has not been exceeded more than 35 times per year in all our monitoring stations in 2018. Therefore, the 24-hour mean objective for PM$_{10}$ has been met.

The trend data from 2010 to 2017 and the PM$_{10}$ comparison with 24-hour mean objective results are further illustrated by Figure E. The red line indicates the air quality objective of no more than 35 exceedances of 50 µgm^{-3}.

Figure E. PM$_{10}$ Automatic Monitor Results: Comparison with 24-Hour Mean Objective
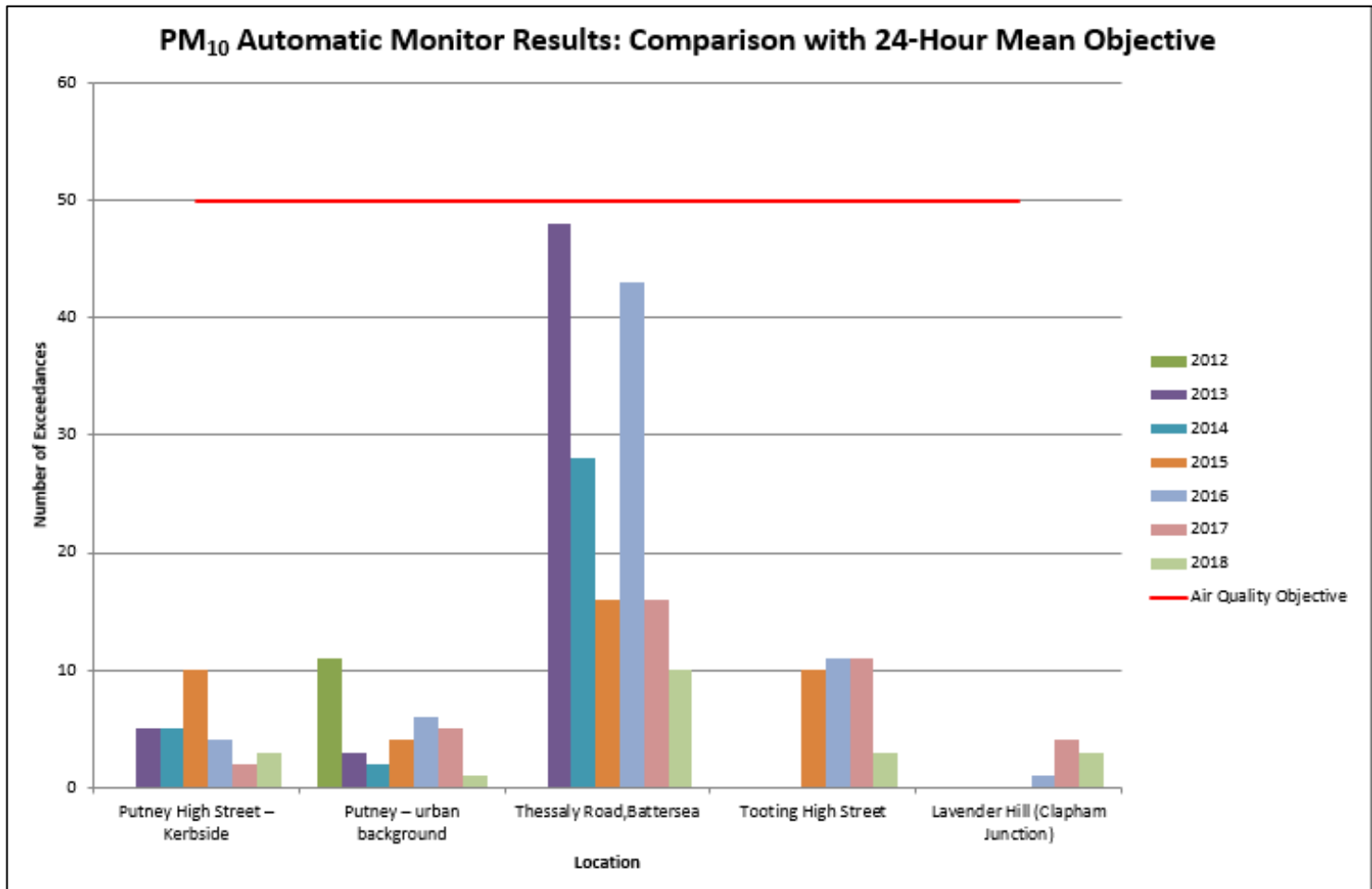
2.   Action to Improve Air Quality

2.1   Air Quality Action Plan Progress

Table H provides a brief summary of London Borough of Wandsworth progress against the Air Quality Action Plan, showing progress made this year. Wandsworth borough remains committed to tackling air quality.

Table H.   Delivery of Air Quality Action Plan Measures

Air Quality Action Plan Measures - Demonstrating the council's commitment to improving air quality

Measure 1: taking cost effective measures to minimise emissions from Council activities						
No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
1.1	Installation of low NOx boilers on replacement	Medium	Low	Low	+36 months	Local	The Council continues to use high specification low NOx boilers and evaluates innovative energy saving appliances and applications. All (100%) boilers now specified for housing stock are ultra-low NOx boilers (less than 40mg/kwh) and all (100%) boilers installed in council buildings are ultra-low NOx. 95% of the operating systems installed in public buildings will be ultra-low NOx boilers and remaining 5% are different systems that do not use boilers.
1.2	Installation of energy saving measures in Council buildings	Medium	Medium	Low	+36 months	Borough	Our Carbon Reduction Group (CRG) is committed to reducing Wandsworth Borough Council's carbon emission. The group continuously activates programs to reduce carbon impacts from our services and activities across the councils' operations. These strategies form part of a

							borough wide program to reduce the total annual carbon footprint which has been reduced by 32% since the 2008/9 baseline. In 2008-2009 carbon emissions within Council buildings were 43,505 tCO2e, while in 20017-2018 they were 28,934 tCO2e. The Council have undertaken several strategies to reduce carbon emissions. These include installation of secondary glazing, low NOx boilers, solar panels, CHP units (in leisure centres), TRVs, a building management system (BMS), several comprehensive LED lighting replacement projects As part of the CRC, an audit is conducted annually of a sample of the Council buildings managed by the Energy Wandsworth have established a Carbon Off-set and reduction fund via planning and will use this fund to support projects that reduce carbon and improve air quality.
1.3	Policy change to use petrol/LPG/CNG/hybrid/electric instead of diesel for Council fleet vehicles and contracted vehicles.	Low	Medium	Medium	+36 months	Borough	To use petrol/hybrid/electric vehicles for replacement of council fleet where possible. All vehicles purchased under 1.205 tonnes will not be diesel driven. We continue in our ambition to replace 50% of current vehicles with alternative fuel to diesel by October 2020.

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
1.4	Upgrading of vehicles to reduce emissions, retrofitting of vehicles with technology to reduce emissions where appropriate such as in-cab telematics	Low	Medium	Medium	12-36 months	Borough	Replacement of existing commercial vehicles to be compliant with ULEZ (Ultra Low Emission Zone) by October 2021. Vehicle specification to include use of telematics. Driver training in place to include Safe and Green/ Safe Urban Driving. Procurement to include in future contracts where transport utilised environmental compliance.
Measure 2: to continue to implement and review the Council Service Transport Plan – promoting alternatives modes of transport to the car							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe for Delivery**	**Over what Geographical Level**	**Progress**
2.1	To encourage active travel by staff (and/or discouraging travel by car)	Low	Low	Low	+36 months	Borough	New SSA staff travel activities launched in 2017 by Public Health including cycle and walking promotions. Cycle to Work Scheme offered across both boroughs
2.2	Reducing the need for staff to drive to work, if a car is needed for work	Low	Low	Low	+36 months	Borough	The Council has available 3 pool cars which are all petrol low emission vehicles, they can be used by staff and booked through the online form on the Loop.
Measure 3: ensuring air quality is embedded in corporate policy							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe for Delivery**	**Over what Geographical Level**	**Progress**

3.1	This measure seeks to implement the findings of the policy review undertaken to ensure that air quality is embedded into corporate policies, maintaining commitment to air quality and cleaner borough status	Medium	Medium	Low	<12 months	Borough	Actions are being undertaken to ensure that air quality is taken in to account in each policy revision. A strategic air quality task group (attended by senior managers across the Council, the Director of Public Health and the cabinet member for the responsibility for the Environment) attempts to ensure that air quality is taken account in all aspects of the local authority's work. The Director for Public Health is the Clean Air Champion.
3.2	Report Authors to consider the inclusion of relevant Air Quality impacts comments in committee reports	Low	Medium	Low	<12 months	Borough	Every committee report must include air quality comments and air quality implications.
3.3	Air quality to be considered as part of the procurement of goods, services and works	Medium	Medium	Low	12-36 months	Borough	Our Procurement policy has been updated to include a requirement for sustainable products to be sourced. This includes consideration of transport costs, pollution, energy savings, disposal, maintenance/lifecycle costs. The Council is committed to minimising its impact on the environment and continually improving its environmental performance. As part of this commitment the Council has adopted Environmental Ambition Statement, Environmental Action Plan and Environmental Purchasing Policy, which can be downloaded from www.wandsworth.gov.uk/sustainability

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
							In order to enable the Council to comply with relevant regulatory requirements, including Climate Change Act 2008 .
Measure 4: production of a Council air pollution communications strategy, bringing together internal and external communications							
4.1	Establish role of air quality champion	Low	Low	Low	+36 months	Borough	In 2018 our Director of Public Health was our lead Air Quality Champion; she has ensured that air quality improvement initiatives are considered by all departments. In 2018 we encouraged people to sign up as air quality champions through various campaigns including an online portal. We have a number of Champions that help with action days and anti-idling actions. We are currently exploring a number of possible additional activates that Champions can help with, particularly around communications and distribution of information.
4.2	Production and maintenance of an air quality communications strategy including an annual update and training for officers	Low	Low	Low	<12 months	Borough	In 2018 our Air Quality Board has been working closely with our Corporate Communications team to design a new communications plan for Air Quality.

							This new Plan includes regular press releases sent to the local, regional and specialist press on measures such as anti-idling events. Proactive work with schools, measures taken to improve air quality, such as lobbying for cleaner buses, and the promotion of cleaner transport options such as river transport, 20mph zones and electric cars. This has resulted in extensive media coverage with regular features in the Councils Brightside magazine, which goes to all borough homes. There has also be extensive coverage on the council social media feeds.
4.3	Provision of air quality information	Low	Medium	Medium	+36 months	Borough	The review of webpages (for instance, Wandsworth Council webpage, or the Love Clean Air website which is part of the South London air quality network https://lovecleanair.org) are undertaken in line with the developments of new projects.
4.4	Undertaking of events to raise awareness of air quality and active travel	Medium	High	Medium	<12 months	Borough	Raising awareness and empowering people to make positive changes is a key part of the Council's work on air pollution. In order to improve air quality and raise awareness in schools, Wandsworth Council has been

							undertaking air quality awareness raising activities with schools within the Borough. These activities are part of the Council's wide-ranging air quality improvement programme and they aim to increase awareness among children and parents of changes they can make to reduce air pollution, and inspire them to adopt more sustainable means of transport such as walking, cycling and taking less polluted routes. Examples of activities / initiatives include: - The anti-idling campaigns - The interactive air quality theatre show: eco-themed stage plays have been performed in front of children at primary schools to help teach youngsters about climate change, air pollution and the effect that transport choices can have on the environment.
4.6	Provide GPs and pharmacists with information to provide to individuals with pre-existing conditions and those vulnerable due to age or lifestyle	Low	Medium	Low	<12 months	Borough	Articles about the airTEXT service have been published several times in the Council school circular system, together with articles to improve air quality and raise awareness in schools. We continue to support and subscribe to AirTEXT This service uses state-of-the-art technology to provide air pollution alerts when levels are likely to exceed moderate readings. These alerts are sent via text message, email and/or voicemail. AirTEXT

							alerts can help reduce the effects of pollution on the individual subscribing to it or someone they look after. Individuals can register for free alerts. Messages contain air quality alert, brief information about likely symptoms and health advice. AirTEXT is an independent service, operated by Cambridge Environmental Research Consultants (CERC) Ltd in We also partner a consortium made up of representatives from all the member local authorities, the GLA, Public Health England and the Environment Agency.
4.7	Undertaking engagement with local businesses in hotspot area	Medium	Medium	Medium	<12 months	Borough	The Low Emission Logistics project (as explained in Action 3.4) has given the opportunity of meeting with local businesses of the Tooting Town centre and Clapham Junction Town centre. Discussions with businesses focused on cleaner and greener vehicles, retiming of deliveries to decrease traffic, helping staff get active (cycling, walking), encouraging staff to use public transport to go to work, buying local instead of collecting goods further away to reduce deliveries and air emissions, joining forces with the neighbours by using the same suppliers as neighbouring businesses, to consolidate deliveries, to reduce the number of delivery vehicles on local streets and to reduce costs.

| 4.8 | To undertake joint working with other organisations such as the GLA, TfL, health professionals such as Wandsworth CCG and other local authorities such as neighbouring authorities and others, for instance, through externally funded joint projects | Medium | Medium | Low | +36 months | City | Wandsworth are a key partner in the South London Air Quality Cluster Group made up of a number of boroughs where coordinated action and joint projects delivered.

The Council joined the anti-idling campaign funded by the GLA. As explained in Action 4.4, events were organised at primary schools to promote anti-idling behaviour both to the students and to their parents. Assemblies were prepared to explain air quality pollution, as well as idling issues. Air quality games were organised for students the same day.

The Mayor of London's School Air Quality Audits initiative has been commissioned to identify hard-hitting measures to minimise the impacts of toxic air on primary school children in some of the worse affected areas across London. This is both in terms of reducing the sources of harmful emissions, as well as reducing the exposure to these emissions.

Wandsworth are also a key Partner of the GLA NRMM project having been delivered trough the Cluster Group.

Putney high street improvement:
In February 2018 was approved.. The plan will see a radical revamp of Putney High |
|---|---|---|---|---|---|---|---|

							Street and it was drawn up following extensive consultation with local people, groups, and TFL collaboration. These include further improvements to the cycle network, exploring opportunities for relocating the taxi rank, installing more public art, creating more public open spaces and enhancing bus Tfl Tooting centre developing scheme: The Council is developing a scheme with Transport for London (TfL) to create a safer and rejuvenated town centre for pedestrians in Tooting. The scheme will cost about £4.5 million and will add to the vitality of the town centre.
Measure 5: call for actions from the Mayor of London, TfL and national government to improve air quality							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe for Delivery**	**Over what Geographical Level**	**Progress**
5.1	Campaign for the Mayor and TfL for cleaner buses to operate on routes throughout the borough using local monitoring data	Medium	Medium	Low	12-36 months	Borough	The Council continues to collate monitoring data in hotspot locations to provide evidence for having cleaner buses across the borough. Automatic monitoring of NO_2 and PM_{10} is being undertaken in 4 focus areas and NO_2 diffusion tubes are installed in the newer focus area of York Road as of January 2018 to evaluate as to whether

							further more accurate real-time monitoring is required. After having successfully campaigned for cleaner buses in Putney High street, the Council will continue to campaign to the Mayor and TfL for cleaner buses in the five Air Quality Focus areas heavily affected by air pollution. Communication with Tfl is ongoing. This was raised as part of the consultation responses on the ULEZ.
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	High	Low	Low	+36 months	City	The Council supports the Mayor of London's consultation Ultra Low Emission Zone (ULEZ) and Low Emission Zone (LEZ), which concerns two proposals: - Tightening the standards of the existing London-wide Low Emission Zone from 2020, which affects heavy vehicles – buses, coaches and HGVs and other heavy specialist vehicles - Expanding the ULEZ for light vehicles (cars, vans and motorcycles) from central London to inner London up to, but not including the North and South Circular roads in 2021 so that all vehicles in this area are subject to emissions standards.
5.3	Campaign to national government towards a "non-diesel economy"	High	Low	Low	+36 months	National	The Council responded to the Defra consultation on their revised plan to reduce nitrogen dioxide around rounds in the shortest time possible. The document

							detailed high NO$_2$ emissions from diesel vehicles. Therefore action at a national level to road tax from diesel vehicles is essential. We added our voice to the road tax and diesel scrappage policy (perhaps targeting low income families, charities and small businesses, and older taxis) to be implemented as soon as possible to support the actions that are being undertaken in Wandsworth and across London as a whole.
Measure 6: encouraging walking and cycling and the use of public transport and discouraging driving to stations							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe for Delivery**	**Over what Geographical Level**	**Progress**
6.1	Use of transport and planning policies to encourage walking and cycling	Medium	Medium	Low	12-36 months	Borough	The borough continue to secure travel plans through the planning process we continue to see an increase in the number of hires in the borough
6.2	Promote the use of public transport	Medium	Medium	Low	+36 months	City	•**Wandsworth Town Station and Putney Station:** Second entrance - acknowledged •**Network Rail & DfT engagement:** Overcrowding relief on local trains & stations including South Western timetable changes in 2018

							• **TfL and Network Rail engagement:** Crossrail 2, LHR improved rail access, improving capacity at Battersea Park Station & Nine Elms/Embassy Gardens: •Bus Service Improvements: increasing service frequencies and addition live-information displays at bus stops in key locations. Tunnelling has commenced for the extension of the Northern Line to Battersea Power Station, with the two new stations due to be operational by 2020. The Council is 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	High	Medium	Low	12-36 months	Borough	The Council continues to offer support to all schools in the borough to develop and implement school travel plans. •Annual target: 5 schools per year that have improved their status on in TfL's school travel plan accreditation scheme
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	Medium	Medium	Low	12-36 months	Borough	Approximately 77% 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.
6.5	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	Medium	Medium	Medium	12-36 months	Borough	2018 - now 4 car club operators with over 50000 members. 1 x free-floating - Carflex. Total car club membership rose from13,500 at the end of 2016 to 16,400 at the end of 2017, exceeding the LIP target of 1,800 new members per year. Over 200 car club spaces
6.6	Introduction of 20mph speed limit areas on borough residential roads	Medium	Low	Low	<12 months	Borough	The Council completed the roll out of 20mph across the Borough in June 2017. The Council is presently undertaking 'after' surveys looking primarily at changes in speeds and at the end of this year will

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
							report back to OSC with this data as well as an update on accident levels.
Measure 7: to encourage the uptake of low emission vehicles							
7.1	Provision of electric vehicle charging points	High	Medium	Medium	12-36 months	Borough	In 2018 there were a total of 270 Electric Vehicle Charging Points (EVCPs) in the borough. We produce a map of locations and scheme details provided on our website. A number of other additional locations have been identified for 2019. In addtion Wandsworth has already begun installing charging equipment to just under 630 lamposts in the borough. This means that Wandsworth is on course to deliver nearly 850 on-street charging points in total. The installation of so much charging infrastructure is the first phase of a comprehensive £3m council initiative designed to encourage much greater take-up of this greener and cleaner form of transport, and also to support those who have already made the switch.
7.2	Review of differential car parking charges based on emissions, ULEZ criteria, with diesel vehicles paying more	Medium	Medium	Medium	12-36 months	Borough	As yet a substantial review of car parking charges has not been undertaken. The last review of parking charges undertaken and approved in October 2016 agreed that

| | | | | | | most charges increase to take account of increased costs and reflect policies aimed at reducing and managing traffic levels, promoting the use of sustainable transport and ensuring a regular turnover of vehicles in places where there is high demand. The potential use of differential parking charges will be kept under 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. |

Measure 8: actions around freight and deliveries							
No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
8.1	Enabling more delivery and servicing to be made outside peak hours	High	Medium	Medium	12-36 months	Borough	After loading restrictions in Putney High Street, the Council is working to have reduced traffic congestions in other areas, such as Tooting High Street. This will help traffic to flow freely and to reduce air pollutant concentrations. Surveys of businesses have been undertaken in Tooting and Putney and Action Plans have been produced and are being implemented to reduce emissions in each area.
8.2	Better management/prohibition of deliveries at "hotspots" such as Putney High Street	High	Medium	Medium	12-36 months	Borough	Wandsworth continues to enforce the restrictions introduced in Putney High street to prevent delivery drivers from

							causing congestion by stopping on the High Street during the day. As explained in Action 3.4, the Council is trying to achieve similar results in other 'hotspots' areas such as Clapham Junction and Tooting High Street.
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	High	Medium	Medium	12-36 months	Borough	As explained in Action 3.4, the Low Emission Logistics project is a feasibility study to improve the local air quality in specific areas within the borough. The areas have been selected due to their elevated levels of air pollution. There are no current plans for an actual consolidation centre. This would only be taken forward if it were viable and had tangible benefits for air quality. We will be funding A Cargo Bike project in 2019 and exploring Smart deliveries once Smart City/innovation work develops Members of the South London Air Quality Cluster Group won a bid to consider the feasibility and scoping of a consolidation centre in South London

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
8.4 *	Improve green infrastructure in and around high streets and areas of high footfall in Borough	Medium	Medium	High	12-36 months	Borough	Wandsworth are currently exploring ideas around Putney High Street Appoint a "healthy streets" champion that works to help reduce street clutter and create new pocket parks, as part of a total safety approach Work with businesses and developers to deliver an attractive High Street. Improve environment and shopping at Tooting Bec and Trinity Road, including off-street parking in business yards on Balham High Road. Plant 500 new trees by April 2019 and provide 100 trees to community organisations to plant on their own land.
Measure 9: ensuring that air quality and reducing emission is included in planning policy and implemented							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe for Delivery**	**Over what Geographical Level**	**Progress**
9.1	Encouraging energy efficient measures and energy efficient design in new buildings	Medium	Low	Low	+36 months	Borough	Wands worth continue to lead the sustainability agenda it has set out clear targets, objectives and aspirations for the borough from 2018 onwards. The details of this work can be found here: https://www.wandsworth.gov.uk/planning-and-building-control/sustainability/

9.2	Boilers installed as part of development must have low NOx ratings in accordance with the standards set out in the Mayor of London's sustainable design and construction supplementary planning guidance	Medium	Low	Low	+36 months	Borough	All (100%) boilers now specified for housing stock are ultra-low NOx boilers (less than 40mg/kwh) and all (100%) boilers installed in council buildings are ultra low NOx. 95% of the operating systems installed in public buildings will be ultra-low NOx boilers and remaining 5% are different systems that do not use boilers. The Council continues to use high specification low NOx boilers and evaluates cutting edge energy saving appliances and applications to suit our operations and projects. The Council requires Energy Assessments reports for Major Developments only (both Residential and Non-Residential), however the reports not necessarily include details about boilers to be installed. Non-Residential Developments submitted an Energy Assessments report).
9.3	Air quality assessments for major developments and developments where exposure is likely or a creation of significant new emissions	Medium	Low	Medium	<12 months	Borough	In 2018, within the Environmental Protection Team, officers review planning applications in terms of air quality for both minor and major developments. As defined in Part 1 of The Town and Country Planning (Development Management Procedure) (England) Order 2015, major developments are development of dwellings where 10 or more dwellings are to be provided, or the site area is 0.5 hectares or more; Development of other uses, where the

							floor space is 1,000sq metres or more, or the site area is 1 hectare or more. The Air Quality Team reviews air quality assessments, air quality neutral reports, dust management plans, construction environmental management plans, schemes for monitoring dust on construction sites, method statements for the reduction of emissions from construction vehicles in compliance with the London Low Emission Zone, schemes of air pollution mitigation measures to protect future occupiers from air pollution exposure while living in their properties, etc.
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	Medium	Low	Low	+36 months	Borough	An Air Quality Neutral Assessment is mandatory for all new major developments (taken to be 10 or more dwellings or 1,000sq metres or more floor space as defined in Part 1 of The Town and Country Planning - Development Management Procedure - England Order 2015) in line with the London Plan and Mayor of London's Sustainable Design and Construction Supplementary Planning Guidance. The Air Quality Team reviews air quality neutral reports to determine whether major developments meet the benchmark or if they require to include additional mitigations. An air quality neutral report has to calculate the building and transport

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
							emissions and compare these with a benchmark for development. The calculations cover the emissions of nitrogen oxides and PM_{10}.
9.5 *	Ensure actions from previous air quality GLA audits of schools are being implemented	Medium	Medium	Medium	12-36 months	Borough	Actions to install green screens is underway and additional funding has been allocated to ensure any additional measures are supported
9.6 *	Undertake more school air quality audits in line with GLA audits	Medium	Medium	Medium	12-36 months	Borough	The Council are committed to auditing three schools per year and making recommendations. 3 additional schools and one nursery were audited in 2018

Measure 10: creation of a design guide of best practice on reducing emissions and exposure for developments and streets

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
10.1	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	Low	Medium	Medium	+36 months	Borough	Action transferred to new Air Quality team in the Regulatory Services Partnership

Measure 11: proactive work to reduce particulate emissions from new developments							
No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
11.1	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	High	Medium	Medium	12-36 months	City	We worked with Kings College London in partnership with a consortium of other London boroughs on the London Low Emission Construction Partnership (LLECP). Two construction site compliance officers (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 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. Kings College and the CSCO have been working with developers within the Nine Elms development in Vauxhall in order to trial new technology designed to reduce pollution and exposure to pollution from sites. The data obtained from these trials is intended to be developed into a case study and shared with the LLECP and the wider construction industry.

Measure 12: actions to reduce emissions by enforcement of regulatory powers

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe for Delivery	Over what Geographical Level	Progress
12.1	Regulation of industrial activities to control their emissions to air	Medium	Medium	Low	<12 months	Borough	There were 76 industrial activities regulated by the Council through Environmental Permits. During 2018, all required inspections were carried out as per inspection plan 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.
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	Medium	Medium	Low	<12 months	Borough	The council continue to take robust action on complaints relating to bonfires, dust and fumes.
12.3	Proactive response to reducing emissions from demolition and construction work	Medium	Medium	Low	<12 months	Borough	The Nine Elms Construction Site Compliance Officers (Nine Elms CSCO) works with the major developments in nine Elms to ensure emissions to air are kept to a minimum, best practice is used, and compliance with the GLA best practice guidance on the control of dust and emissions from construction sites. We work in partnership with other South London boroughs on NRMM (Non-road Mobile Machinery), having an officer to work across the boroughs to improve compliance and reduce emissions. The Code of Practice has been reviewed during the year but not been updated yet and it will be further reviewed to bring it into line with Codes of Practice of the central London boroughs. This will be a comprehensive document incorporating templates such as those for construction management plans and construction logistics plans.

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	Medium	Low	Low	<12 months	Borough	A wood burning campaign was carried out in December 2017, targeting retailers selling fuels. A follow-up was then carried in February 2018. The campaign included a letter to retailers and an eye-catching poster to be displayed by the fuel sold. The details of the campaign were discussed with the London borough of Richmond and Merton. We remain committed to continuing this campaing
12.5	Use of vehicle idling powers where appropriate and awareness raising of increased pollution through vehicle idling	Medium	Low	Low	<12 months	Borough	Wandworth continues to be pro-active in anti-idling work. The Civil Enforcement Team has been continuously receiving complaints about idling vehicles (schools coaches, taxis, and private vehicles) which were promptly investigated. All 70 Civil Enforcement Officers have been trained and all of them can enforce idling and serve penalties. Idling vehicles when they are stationary can be issued with a Fixed Penalty Notice (FPN) of £20. The notice must be paid within 28 days, or it will increase to £40. In addition to enforcement, community air quality champions proactively approach drivers who leave their engines running whilst stationary to ask them to switch off. The GLA anti-idling campaign 2017-2018 was carried out for the second consecutive

							year. The anti-idling campaign was funded by the GLA and organised by the Air Quality Team. Events were organised at four primary schools together with an independently-owned sustainability agency to promote anti-idling behaviour both to the students and to their parents outside the schools. Assemblies were prepared to explain air quality pollution, as well as idling issues, to the students. Air quality games were organised for students the same day. Outside the schools, parents and/or drivers were engaged to explain what idling is and how we can improve the local air quality by switching off car engines. Both students and parents were encouraged to use alternatives solutions to cars, such as public transport, cycling and walking.
Measure 13: air quality monitoring to review and assess and evaluate actions							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe for Delivery**	**Over what Geographical Level**	**Progress**
13.1	To continue to monitor air quality across the borough measuring nitrogen dioxide (NO2) and fine particles (PM10)	Medium	Medium	Low	<12 months	Borough	In 2018, the Council continued to monitor air quality pollutants (NO_2 and PM_{10}) from 7 automatic monitoring stations as well as a diffusion tube network. In addition, the Council continued to support the community to carry out citizen science of air quality monitoring within the borough. The air quality team also worked with Public Health for a pilot project, monitoring

							air quality pollutants in 4 primary schools located in areas where air quality pollution levels are above the national objectives.
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	Medium	Medium	Medium	<12 months	Borough	Wandsworth has 5 Air Quality Focus Areas for high levels of NO_2 with considerable exposure: Putney, Tooting, Clapham Junction, Wandsworth gyratory, and York road. Air Quality (NO_2 and PM_{10} is monitored in all apart from the newer focus area of York Road, where diffusion tubes are employed – described further below) Tooting High street: after a traffic study conducted to ascertain the apportionment of vehicle types in this area, Air Quality Action Plan for Tooting Town Centre was prepared and it will be further developed with input from Transport Planning, Tfl, Highways Engineers, local businesses and local residents. Clapham Junction: After a traffic study conducted to ascertain the Apportionment of vehicle types in this area, Air Quality Plan for Clapham Junction was prepared and it was prepared and local actions delivered. Wandsworth gyratory: the Council is working with Tfl on the plans to remove Wandsworth gyratory to ensure the new

No.	Action	Estimated Impact on AQ	Estimated Effort to Implement	Potential level of Cost	Anticipated Timeframe	Over what Geographical Level	Progress
							road layout provides improvements in the local air quality. Putney High street: The Council worked extensively with Tfl and the Mayor's office for cleaner buses along Putney High street. This has now become the first clean bus corridor. Air quality is still assessed to monitor the effectiveness of the interventions. Furthermore, additional restrictions on deliveries have been implemented to reduce the flow of traffic. The Council is now implementing a MAQF funded project to reduce emissions still further. In 2018, in York road, The Council started screening technique to monitor for one year NO_2 through diffusion tubes. Actions required will be assessed at the end of 2018 depending on the results.
13.3 *	create a monthly dashboard of air pollutant levels in Borough using data from real-time stations	Medium	Low	Low	<12 months	Borough	Wandsworth has created a dashboard of air quality monitoring which is updated regularly and reported to the Air Quality Board. This shows the current status of Air Quality in the borough
13.4 *	do heat map of air pollution in Borough	Medium	Medium	Low	12-36 months	Borough	Previous heat map generated but needs updating in line with new mapped data.
Measure 14: air quality innovation							
No.	**Action**	**Estimated Impact on AQ**	**Estimated Effort to Implement**	**Potential level of Cost**	**Anticipated Timeframe**	**Over what Geographical Level**	**Progress**

					for Delivery		
14.1 *	set up a Workshop on use of digital and technology in air quality improvements to bring clean tech companies to Borough to pilot new ideas	Medium	Medium	Low	<12 months	Borough	We are currently using a consultant to deliver monitoring using new automated measures.

* Denotes new action

3. Planning Update and Other New Sources of Emissions

Table I. Planning requirements met by planning applications in London Borough of Wandsworth in 2018

Action	Number	Notes
a) Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	35	
b) Number of planning applications required to monitor for construction dust	87	
c) Number of CHPs/Biomass boilers refused on air quality grounds	0	
d) Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	10 CHPs 0 Biomass boilers	
e) Number of developments required to install Ultra-Low NO_x boilers	No definitive record	No conditions related to Ultra-Low NO_x boilers.
f) Number of developments where an AQ Neutral building and/or transport assessments undertaken	35	
g) Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	5	
h) Number of planning applications with S106 agreements including other requirements to improve air quality	6	
Number of planning applications with CIL payments that include a	No definitive record	Cannot identify individual planning applications where contribution to

contribution to improve air quality		improve air quality has been included. However, there have been contributions made across the Borough.
i) 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.	- No definitive record for conditions. - No definitive record for developments registered. - No definitive record for compliance.	The website has been checked to ensure that NRMM is compliant with Stage IIIB of the Directive and/or exemptions to the policy. Some sites require further follow up to ensure compliance, such as where there is a miss match or engine plate failure indicated.
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.	- No definitive record for conditions. - No definitive record for developments registered. - Compliance status of 67% of 30 sites audited.	The website has been checked to ensure that NRMM is compliant with Stage IIIA of the Directive and/or exemptions to the policy. Some sites require further follow up to ensure compliance, such as where there is a miss match or engine plate failure indicated.

We recognise that this table has been difficult for some boroughs to complete, either because planning data is not collected or not collected in a form that is easily translatable into the table. The purpose of each row in the table is to assess implementation of GLA planning or policies. An additional column has been added for notes where you can note any qualifications to the data or local policies that are relevant (e.g. use of standard conditions).

Notes on the table:

a. The purpose of this row is to identify whether all applications that are submitted with an air quality assessment or EIA are checked by the air quality officer/team. The requirement to submit an assessment is subject to local validation criteria, however the new London Plan specifies that all major developments should be accompanied by an assessment, so this should equal at least the number of major applications received once the new London Plan is finalised.

b. The purpose of this row is to understand how widely active dust monitoring is used on construction sites. Dust monitoring is recommended in the GLA Control of Dust and Emissions during Construction and Demolition SPG for some high-risk sites. This number should include all sites where monitoring is required by condition or secured as part of a construction management plan or similar.

c. This purpose of this row is to understand how far air quality policies are influencing the design or choice of communal heating systems. For the purposes of recording, "refused" should include applications where air quality impacts from the heating system are included in the reasons for formal refusal and applications where the energy strategy has been revised post-submission to remove CHP or biomass as a result of air quality concerns raised during the decision-making process.

d. The purpose of this row is to ensure that the emissions limits for CHP and Biomass set out in Appendix 7 of the GLA Sustainable Design and Construction SPG are implemented. You should only count instances where compliance with these limits (or tighter limits, if required) have been secured by condition. You may want to note instances where conditions have not been imposed in the notes column.

e. This row should record the number of planning permissions where use of ultra-low NO_x boilers were required as a direct condition or as a condition securing conformity with submitted documents, not the total number of boilers. Where standard conditions are used it is sufficient to say all developments, or all developments that meet a particular threshold (or however the decision to use standard conditions is done.)

f. The purpose of this row is to identify how well applicants are implementing the requirement to undertake an air quality neutral assessment as part of the overall air quality assessment for developments.

g. This row is intended to identify how challenging it is for developers to meet air quality neutral and should count the number of applications where the initial air quality neutral calculation showed the benchmarks were not met and additional on-site mitigation measures were agreed with the developer prior to grant of consent.

h. These rows should be used to record the number of developments where payments of off-site measures were secured from the developments. This could be measures in lieu of meeting Air Quality Neutral on-site or other actions and payments relating to local policies or needs. It is not necessary to provide the amount of financial contributions.

i. These rows should record the number of planning permissions where compliance with the NRMM LEZ is required as a direct condition or as a condition securing conformity a code of practice or a CMS requiring compliance. Where standard conditions are used it is sufficient to say all developments, or all developments that meet a particular threshold (or however the decision to use standard conditions is done.)

3.1 New or significantly changed industrial or other sources

No new sources have been 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 on a fortnightly basis. This was ESU1 until 30th November 2017 and then by TRL (Transport Research Laboratories) from 1st December 2017 onwards. 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 2018 and it continues to be undertaken by them.

Data ratification and air quality support services were undertaken by King's College London in 2018 and it 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 (WA7), Thessaly Road (WAA), Tooting High Street (WAB) and Lavender Hill (WAC), the Volatile Correction Method (VCM) has been used to correct the data. An FDMS was installed at the Felsham Road (WA9) monitoring station until 21 January 2015. This has now been converted to a TEOM, and therefore for 2017 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 because it is 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 a 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".

From the beginning of January 2007 the supply and analysis of all diffusion tubes has been undertaken by Gradko International. The diffusion tubes exposed in 2018 were still supplied and analysed by Gradko International. 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 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).

Gradko International laboratory demonstrated a satisfactory performance in a QA/QC scheme for analysis of NO_2 diffusion tubes. The AIR PT Nitrogen Dioxide Proficiency Scheme Results 2018 is shown in Table J.

Table J. **Gradko Nitrogen Dioxide Proficiency Scheme Results**

Methods: GLM 7 – CARY 60 Spectrophotometer					
AIR PT Proficiency Scheme - Nitrogen Dioxide 2018					
Date	**Round**	**Assigned value**	**Procedure GLM 7**		
			Measured concentration	**z-Score**	**% Bias**
Feb-18	AIR PT 24-1	2.09	1.94	-0.91	-7.2%
Feb-18	AIR PT 24-2	1.63	1.64	0.08	0.6%
Feb-18	AIR PT 24-3	1.63	1.63	0	0.0%
Feb-18	AIR PT 24-4	2.05	1.94	-0.72	-5.4%
May-18	AIR PT 25-1	1.02	1.05	0.39	2.9%
May-18	AIR PT 25-2	1.02	1.04	0.26	2.0%
May-18	AIR PT 25-3	1.47	1.46	-0.09	-0.7%
May-18	AIR PT 25-4	1.5	1.45	-0.44	-3.3%
Aug-18	AIR PT 27-1	1.21	1.21	0.00	0.0%
Aug-18	AIR PT 27-2	1.22	1.13	-0.99	-7.4%
Aug-18	AIR PT 27-3	1.99	1.94	-0.34	-2.5%
Aug-18	AIR PT 27-4	1.98	2.07	0.60	4.5%
Oct-18	AIR PT 22-1	2.47	2.22	-1.35	-10.1%
Oct-18	AIR PT 22-2	2.51	2.56	0.27	2.0%
Oct-18	AIR PT 22-3	1.51	1.53	0.18	1.3%
Oct-18	AIR PT 22-4	1.5	1.49	-0.1	-0.7%

Figure F. **Gradko Nitrogen Dioxide Proficiency Scheme Graph**

Proficiency Scheme - Nitrogen Dioxide 2018
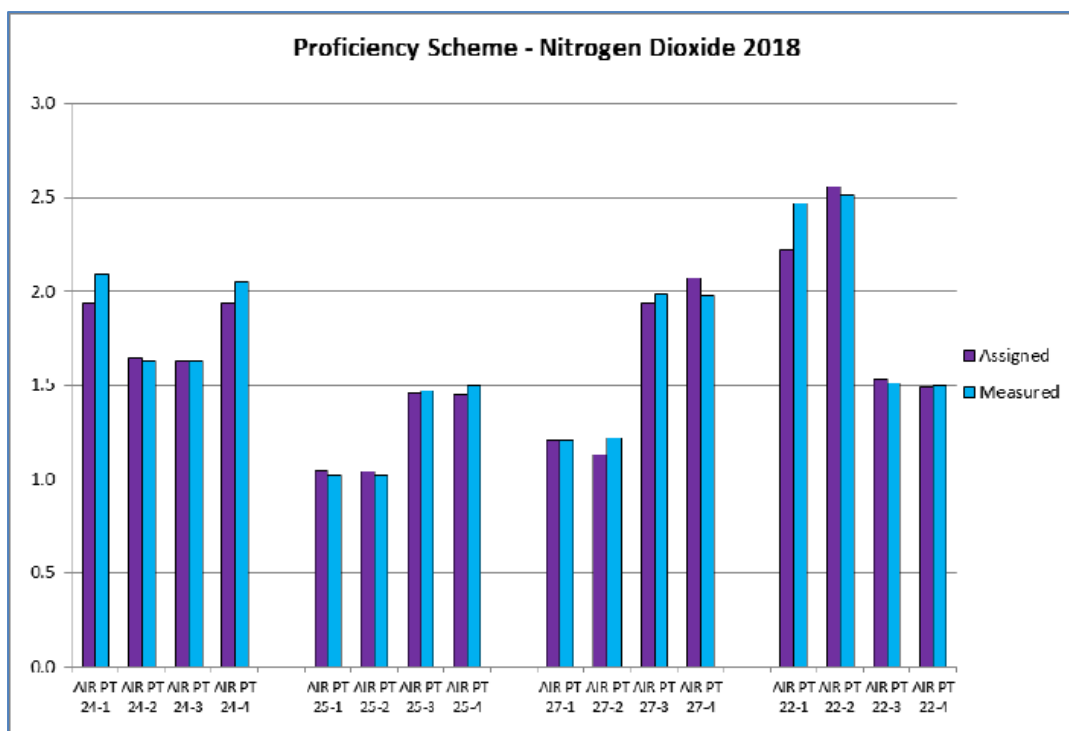
A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

A.3.1 Continuous monitoring station WAA Thessaly Road, Battersea

NO_2 data at the continuous monitoring station WAA Thessaly Road (Battersea) had data capture of 65% of a full calendar year. Therefore, NO_2 data have been "annualised" using the methodology outlined in LLAQM.TG(16) before being compared to annual mean objectives.

Table K. **Short-Term to Long-Term Monitoring Data Adjustment for the continuous monitoring station WAA Thessaly Road, Battersea**

Site	Site Type	Annual Mean (µg/m³)	Period Mean (µg/m³)	Ratio
WA2 Wandsworth Town Hall	Urban background	38	41.12	0.92
WA9 Felsham road (Putney urban background)	Urban background	35	41.46	0.84

Site	Site Type	Annual Mean (µg/m³)	Period Mean (µg/m³)	Ratio
Average (Estimate of mean of WAA Thessaly Road, Battersea)				34

Measured mean concentration (M)	38.04
Annualisation factor (Ra)	0.882261
Estimate of annual mean	33.56

A.3.2 Diffusion tube station NE8 Battersea Park

NO_2 data at the diffusion tube station NE8 Battersea Park had data capture of 58% of a full calendar year. Therefore, NO_2 data have been "annualised" using the methodology outlined in LLAQM.TG(16) before being compared to annual mean objectives.

Table L. **Short-Term to Long-Term Monitoring Data Adjustment for the diffusion tube station NE8 Battersea park**

Site	Site Type	Annual Mean (µg/m³)	Period Mean (µg/m³)	Ratio
WA2 Wandsworth Town Hall	Urban background	38.42	38.71	0.99
Average (Estimate of Mean of NE8 Battersea park)				24

	Start Date	End Date	B1	D1	B1 when D1 is available				
1	04/01/2018	31/01/2018	37	29	37		Am/Pm = Annualisation Factor = Ra =	0.99
2	31/01/2018	28/02/2018	46				Estimate of Mean = M x Ra =	24.38
3	28/02/2018	29/03/2018	43	25	43			
4	29/03/2018	02/05/2018	35					
5	02/05/2018	07/06/2018	45					
6	07/06/2018	03/07/2018	31					
7	03/07/2018	31/07/2018	33					
8	31/07/2018	05/09/2018	32	19	32			
9	05/09/2018	03/10/2018	36	23	36			
10	03/10/2018	06/11/2018	42	27	42			
11	06/11/2018	05/12/2018	39	30	39			
12	05/12/2018	09/01/2019	42	19	42			
Avarage			38.42	24.57	38.71			
			Am	M	Pm			

Appendix B   Full Monthly Diffusion Tube Results for 2018

Table M.   NO₂ Diffusion Tube Results

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO₂												Annual mean – raw data [c]	Annual mean – bias adjusted [c]
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec		
W23 (37 West Hill)	N/A	100%	67	59	61	61	62	58	68	49	50	60	70	42	59	55
W24 (Putney Sign Mac Donald's)	N/A	92%	70	58	42	56	63	---	70	62	64	60	56	49	59	55
W21 (Felsham road)	N/A	100%	72	39	33	36	32	26	28	26	29	37	45	27	36	33
W22 (Felsham road)	N/A	100%	40	37	37	35	30	25	27	24	28	32	46	26	32	30
W6 (21 Daylesford Avenue)	N/A	92%	28	32	32	24	24	19	19	18	22	---	28	24	25	23
W25 (Roehampton Church School)	N/A	100	36	36	33	29	32	25	34	24	28	33	39	28	31	29
W26 (Replingham Road)	N/A	100%	40	38	36	32	35	28	32	26	24	34	36	29	32	30
W27 (68-70 Sutherland Grove)	N/A	100%	33	33	31	25	23	19	21	20	22	32	34	25	26	25
W28 (61 Summerley street)	N/A	100%	35	33	37	32	29	23	24	21	25	33	40	31	30	29

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO$_2$												Annual mean – raw data [c]	Annual mean – bias adjusted [c]
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec		
W29 (Junction Skelbrook street / Garratt lane)	N/A	100%	42	36	39	36	36	27	28	25	31	34	42	38	35	32
W4 (108 Mitcham road)	N/A	100%	84	81	74	73	65	52	74	61	65	67	71	62	69	64
W8 (50 Bickely street)	N/A	100%	42	37	39	28	33	25	28	25	33	35	36	38	33	31
W30 (11B Elmbourne road)	N/A	100%	43	33	38	34	31	25	29	28	31	38	42	33	34	31
W31 (Junction Hildreth Street / Bedford Hill)	N/A	100%	46	43	46	41	43	31	44	35	40	44	53	35	42	39
W32 (2-3 Balham High road)	N/A	100%	49	58	56	49	52	40	47	38	39	48	56	41	48	44
W34 (46 Shelgate road)	N/A	92%	41	37	36	33	34	26	27	25	28	36	36	---	33	30
W35 (47 Northcote road)	N/A	100%	44	36	44	42	39	31	34	24	35	38	48	37	38	35
W36 (St Anne's Hill)	N/A	100%	44	37	37	33	38	27	32	28	37	35	39	32	35	33
W37 (302A Merton Rd, Riversdale School)	N/A	100%	41	47	48	38	41	33	39	35	32	39	44	41	40	37

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO$_2$												Annual mean – raw data [c]	Annual mean – bias adjusted [c]
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec		
W38 (High View School, Plough Terrace)	N/A	100%	41	42	41	36	32	26	28	25	29	38	42	31	34	32
NE2 (Chesterton School)	N/A	92%	39	40	43	42	46	---	39	32	38	32	39	28	38	35
NE3 (Queenstown Road)	N/A	100%	52	58	65	62	84	66	72	61	66	78	77	71	68	65
NE4 (Lockington Road)	N/A	100%	45	35	40	34	40	28	33	30	35	45	47	31	37	34
NE5 (Kirtling Street)	N/A	100%	52	46	49	51	53	44	52	41	49	47	54	51	49	46
NE6 (Nine Elms Lane)	N/A	100%	75	48	54	59	52	46	58	62	59	62	65	59	58	54
NE7 (1 Nine Elms, Parry Street)	N/A	83%	47	49	49	61	58	48	---	---	51	56	61	46	53	49
NE8 (Battersea park)	N/A	58%	29	---	25	---	---	---	---	19	23	27	30	19	25	23
YR1 (Trafalgar House)	N/A	83%	---	---	59	61	66	50	59	49	56	62	58	51	57	53
YR2 (Royal Academy of Dance)	N/A	100%	73	122	77	88	89	63	80	70	78	85	77	65	81	75
YR3 (Cotton Row)	N/A	92%	34	---	38	35	33	23	27	27	33	43	42	34	34	31
YR4 (York road, corner with Falcon Road)	N/A	83%	49	---	---	59	52	43	57	51	61	58	49	50	53	49

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2018 % [b]	Annual Mean NO$_2$												Annual mean – raw data [c]	Annual mean – bias adjusted [c]
			Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec		
YR5 (256 Battersea Park Road)	N/A	92%	60	81	81	79	95	87	99	76	83	---	83	41	79	73
YR6 (31-32 Battersea Square)	N/A	92%	30	52	55	---	59	47	60	44	49	50	57	22	48	44

Exceedance of the NO$_2$ annual mean AQO of 40 µg m^{-3} are shown in **bold**.

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

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

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

[d] Notes:

Sample W6 October 2018 was not found at collection.
Sample W24 June 2018 was not found at collection.
Sample W34 December 2018 was not found at collection.
Sample YR1 February 2018 was not found at collection.
Samples YR4 February 2018 and March 2018 were not found at collection.
Sample YR5 October 2018 was not found at collection.
Sample YR 6 April 2018 was not found at collection.
Sample NE2 June 2018 was not found at collection.
Samples NE7 July and August 2018 were not found at collection.
Sample NE8 July 2018 was not found at collection.

Sample NE8 April 2018 and May 2018 were not representative, so the values have been deleted.
Sample NE8 February 2018 and June 2018 were contaminated.
Sample YR1 January 2018 had not representative values as the tube contained 2 sets of grids.
Sample YR3 Feb 2018 could not be analysed as it did not contain any grids.

Bias Corrected (0.93) as per diffusion Tube Bias Factor 03/2019.

Colorimetric Analysis Of Nitrogen Dioxide

Analysis carried out in accordance with documented in-house Laboratory Method GLM9 - QuAAtro Analyser

Results have been corrected to a temperature of 293 K (20 °C)

Overall M.U. ±5.1%

Tube Preparation: 20% TEA /Water

Limit of Detection

0.020µg NO2

Appendix C. Locations of automatic monitoring sites for 2017

Site ID	Site Name	Grid reference (X,Y)
WA2	Wandsworth Town Hall, High street Wandsworth	525779, 174662
WA7	Putney High Street, 94A Putney High street (Denomination according to London Air website: Putney high street kerbside)	524035, 175334
WA8	Putney High Street, 94A Putney High street (Denomination according to London Air website: Putney high street façade roadside)	524032, 175335
WA9	Felsham Road, Putney (Denomination according to London Air website: Putney urban background)	524044, 175495
WAA	Thessaly Road, Battersea	529137, 177249
WAB	Tooting High Street	527567, 171628
WAC	313 Lavender Hill, Clapham Junction	527430, 175454

Site ID: WA9

1:1250

Site ID: WAA

1:1250

NINE ELMS

Site ID: WAB
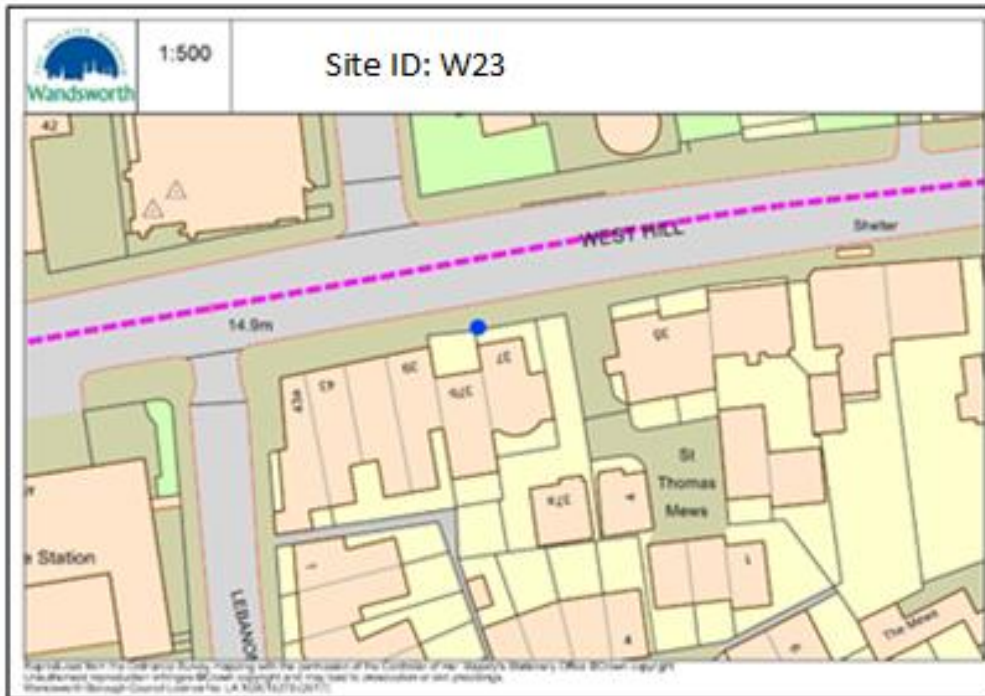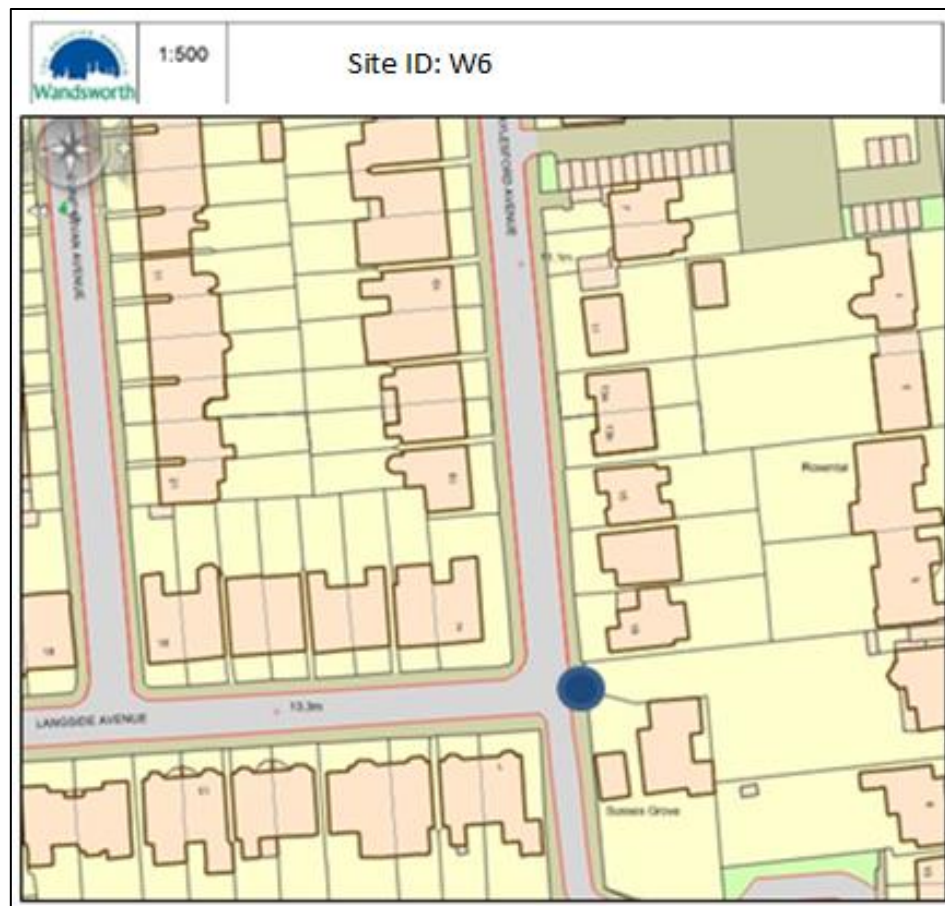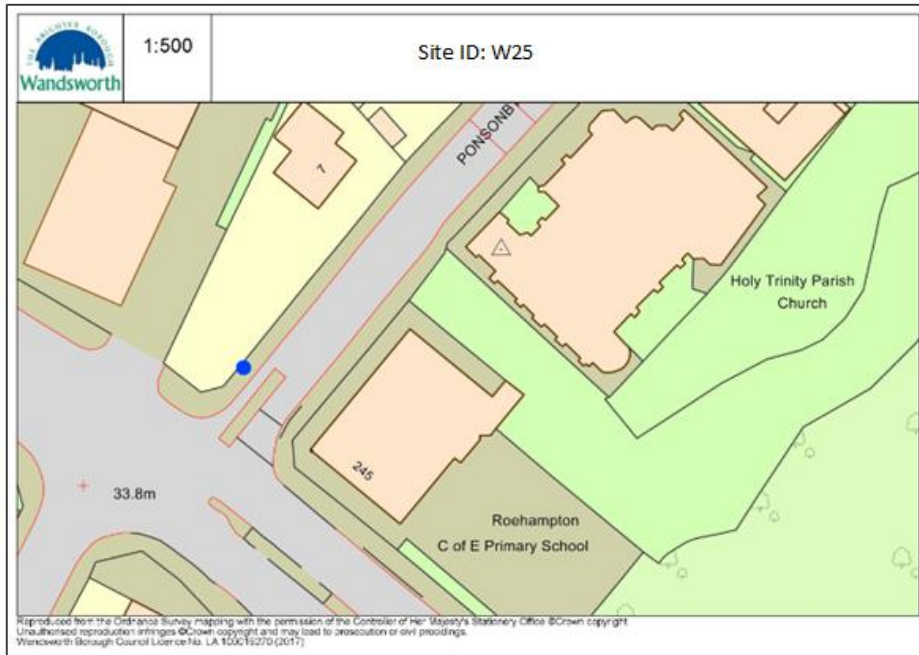
1:1250

Site ID: WAC

1:1250

Appendix D   Locations of non-automatic monitoring sites for 2018

1. Across Borough

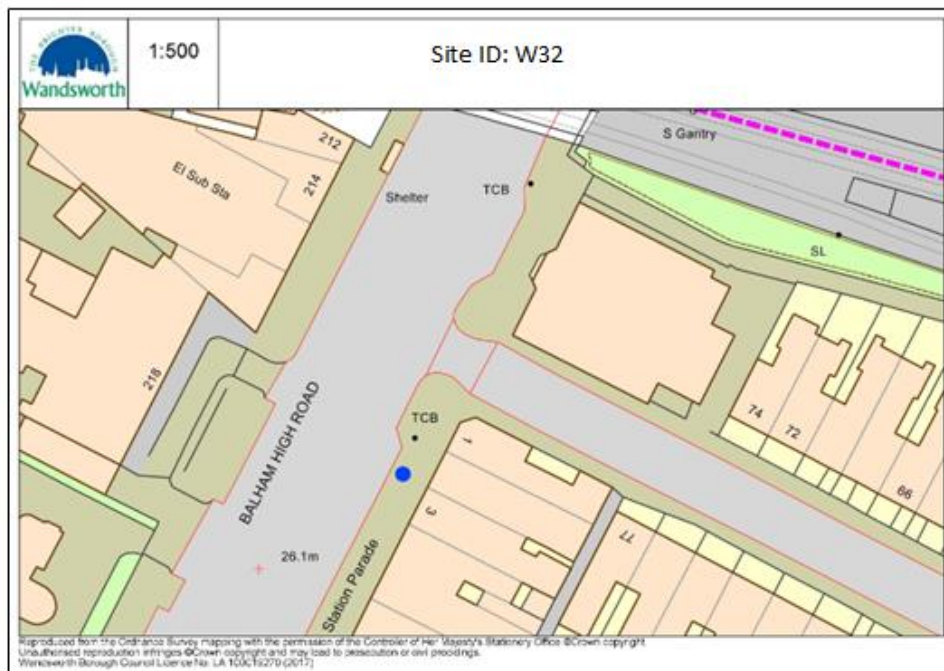| ID	Name	Area	Grid Reference (X,Y)
W23	37 West Hill	Wandsworth Town	525111, 174619
W24	Putney Sign (MacDonald's)	Putney	524045, 175366
W21	Felsham Rd (tube 1)	Putney	524044, 175495
W22	Felsham Rd (tube 2)	Putney	524044, 175495
W6	21 Daylesford Avenue	Putney	522270, 175307
W25	Roehampton Church School (on corner of Roehampton Lane)	Roehampton	522542, 173700
W26	Replingham Road (corner of Heythrope street)	Southfields	524847, 173282
W27	68-70 Sutherland Grove (opposite St. Cecilia's School)	Southfields	524633, 173594
W28	61 Summerley Street	Earlsfield	526011, 172869
W29	Junction Skelbrook Street / Garratt Lane	Earlsfield	526099, 172833
W4	108 Mitcham Road	Tooting Broadway	527688, 171204
W8	50 Bickely Street	Tooting Broadway	527524, 171239
W30	11b Elmbourne Road	Balham	528900, 172431
W31	Junction Hildreth Street / Bedford Hill	Balham	528607, 173333
W32	2-3 Balham High Road	Balham	528436, 173133
W33	Lockington Road	Battersea	528871, 176943
W34	46 Shelgate Road	Northcote	527569, 174986
W35	47 Northcote Road	Northcote	527487, 174981
W36	208 St Anne's Hill (opposite St Anne's School)	Fairfield	525875, 174616
W37	302A Merton Rd (Riversdale School Gate)	Southfields	525278, 173483
W38	High View School, Plough Terrace (No Stopping Sign o/s school)	Fairfield	526863, 175239

Site ID: W23

1:500

Wandsworth

Site ID: W24

1:500

Wandsworth

Site ID: W21 and W22

Site ID: W6

Site ID: W25

1:500

Wandsworth

PONSONB

Holy Trinity Parish Church

33.8m

245

Roehampton C of E Primary School

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Site ID: W26

1:500

Wandsworth

45

39

31

TCBs

23

REPLINGHAM ROAD

34

5

11

17

24

22

20

2

10

Bank

22

2

1a

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1:500 Site ID: W29

1:500 Site ID: W4

BICKLEY STREET

Site ID: W31
1:500
Wandsworth

Site ID: W32
1:500
Wandsworth

Site ID: W33
1:500
Wandsworth

Newton Preparatory School

ST JOSEPH'S STREET

4.2m

Site ID: W34 and W35
1:500
Wandsworth

SHELGATE ROAD

8.9m

9.0m

Site ID: W36

1:500

Site ID: W37

1:500

2. Nine Elms

Map ID	Site ID	Name	Area	Grid Reference (X,Y)
2	NE2	Chesterton School	Latchmere	528043, 176618
3	NE3	Queenstown Road	Queenstown	528771, 176819
4	NE4	Lockington Road	Battersea	528871, 176943
5	NE5	Kirtling Street	Queenstown	529265, 177353
6	NE6	Nine Elms Lane	Queenstown	529413, 177486
7	NE7	1 Nine Elms, Parry Street	Queenstown	530129, 177727
8	NE8	Battersea park	Queenstown	528023, 177176
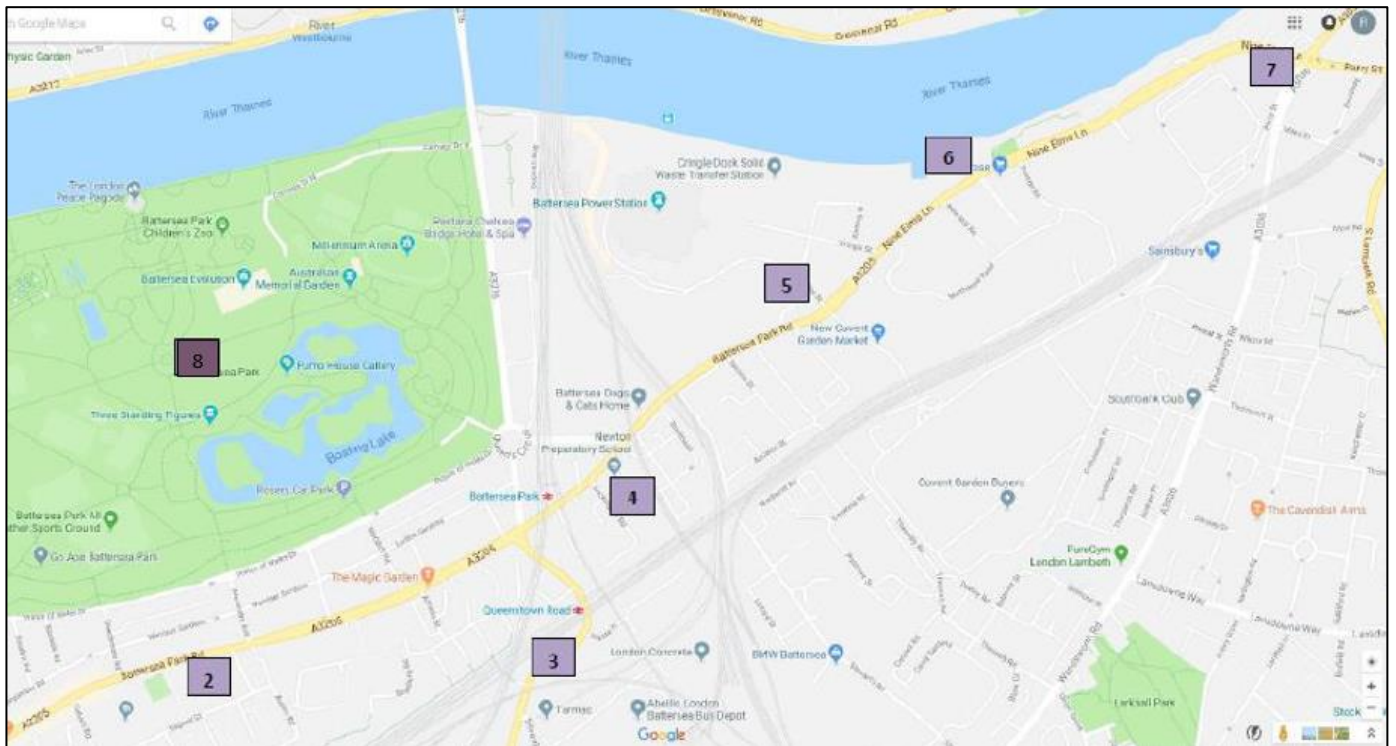
3. York Road

Map ID	Site ID	Name	Area	Grid Reference (X,Y)
1	YR1	Trafalgar House	St. Mary's Park	526201, 175340
2	YR2	Royal Academy of Dance	St. Mary's Park	526581, 175731
3	YR3	Cotton Row	St. Mary's Park	526480, 175930
4	YR4	York Road, corner with Falcon Road	Latchmere	527086, 176119
5	YR5	256 Battersea Park Road	St. Mary's Park	527109, 176022
6	Y6	31-32 Battersea Square	St. Mary's Park	526817, 176686