Royal Borough of Greenwich Air Quality Annual Status Report for 2022

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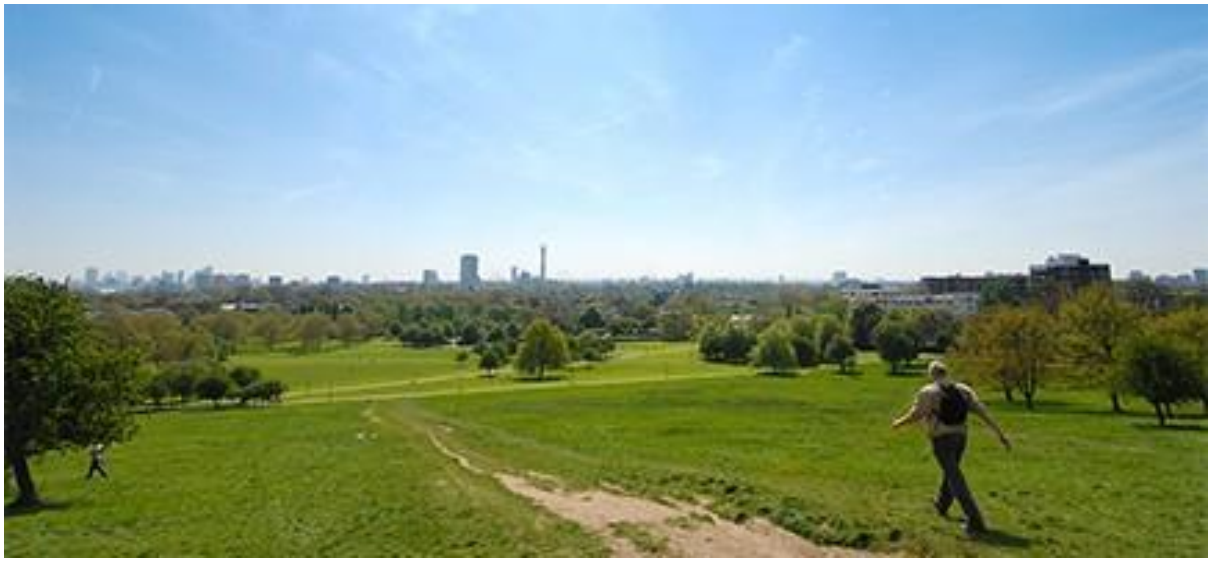

This report provides a detailed overview of air quality in the Royal Borough of Greenwich during 2022. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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[1] LLAQM Policy and Technical Guidance 2019 (LLAQM.TG(19))

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Abbreviations

Abbreviation	Description
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEB	Buildings Emission Benchmark
CAB	Cleaner Air Borough
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	Standard / Objective (UK)	Averaging Period	Date[(1)]
Nitrogen dioxide (NO_2)	200 µg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
Nitrogen dioxide (NO_2)	40 µg m^{-3}	Annual mean	31 Dec 2005
Particles (PM_{10})	50 µg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
Particles (PM_{10})	40 µg m^{-3}	Annual mean	31 Dec 2004
Particles ($PM_{2.5}$)	20 µg m^{-3}	Annual mean	2020
Particles ($PM_{2.5}$)	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
Sulphur dioxide (SO_2)	266 µg m^{-3} not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
Sulphur dioxide (SO_2)	350 µg m^{-3} not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
Sulphur dioxide (SO_2)	125 µg m^{-3} mot to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004

Notes:

(1) Date by which to be achieved by and maintained thereafter

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2022

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (N/A if not applicable) (m)	Inlet height (m)	Pollutants monitored	Monitoring technique
GR4	Eltham	543978	174655	Suburban	Y	Y (0)	N/A	5	NO_2 , $PM_{2.5}$ (and O_3)	Chemiluminescent FIDAS
GN5 (Operational October 2017)	Hoskins St (Trafalgar Rd)	539018	178007	Roadside	Y	Y (0)	5	3	NO_2 PM_{10} $PM_{2.5}$	Chemiluminescent TEOM
GB6	Falconwood	544997	175098	Roadside	Y	Y (5)	1.2	3	NO_2 PM_{10} $PM_{2.5}$ O_3	Chemiluminescent TEOM FDMS
GN6 (operational July 2018)	John Harrison Way	539687	179123	Roadside	Y	Y (0)	3	3	NO_2 PM_{10} $PM_{2.5}$	Chemiluminescent TEOM
GR7	Blackheath Hill	538141	176710	Roadside	Y	Y (0)	10	3	NO_2 PM_{10}	Chemiluminescent TEOM
GR8	Woolwich Flyover	540200	178367	Roadside	Y	Y (0)	3	3	NO_2 PM_{10} $PM_{2.5}$ (and O_3)	Chemiluminescent TEOM BAM

GR9	Westhorne Avenue	541879	175016	Roadside	Y	Y (0)	12	3	NO_2 PM_{10} $PM_{2.5}$ (and O_3)	Chemiluminescent TEOM
GNO Note- previously GR10	Burrage Grove	544084	178881	Roadside	Y	Y (1)	12	3	NO_2 PM_{10} $PM_{2.5}$	Chemiluminescent FDMS TEOM
GN3 Note - previously GR13	Plumstead High St	545560	178526	Roadside	Y	Y (0)	5	3	NO_2 PM_{10} $PM_{2.5}$ (and O_3)	Chemiluminescent FDMS TEOM
GN4 Note- previously GR14	Fiveways Sidcup Rd	543582	172653	Roadside	Y	Y (5)	2	3	NO_2 PM_{10}	Chemiluminescent TEOM

Changes to the Royal Borough of Greenwich Real Time Monitoring Stations

At the end of 2015, station GR5 on Trafalgar Road was closed. This was due to the sale of premises where the station was located. A new site on Trafalgar Road at the junction with Hoskins St was identified and the station relocated in October 2017.

During construction works, the power supply to station GN2 (Millennium Village) was damaged. As the site on which the station was located was due to be redeveloped, the decision was taken not to repair the power supply but to seek a new location for the station. A new site was identified on John Harrison Way, and the station was relocated in January 2018. GN6 in John Harrison Way became fully operational in July 2018.

Table C. Details of Non-Automatic Monitoring Sites for 2022

Site ID	Site Name	X (m)	Y (m)	Site Type	In AQMA? If so, which AQMA?	Distance 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)
GW23 (1)	Siebert Rd	540420	177706	Roadside	Y	Y	17.2	2	NO_2	N
GW24 (2)	Plumstead Common Rd	543806	177951	Roadside	Y	Y	3.0	2	NO_2	N
GW25 (3)	Eltham Rd	540099	174881	Roadside	Y	Y	3.0	2	NO_2	N
GW26 (4)	Foots Cray Rd	544015	173139	Roadside	Y	Y	0.5	2	NO_2	N
GW27 (5)	Charlton Village	541645	177874	Roadside	Y	Y	0.5	2	NO_2	N
GW28 (58)	Dunblane Rd	542656	176207	Roadside	Y	Y	7.5	2	NO_2	N
GW29 (6)	Woolwich Rd Charlton	541167	178512	Roadside	Y	Y	1.5	2	NO_2	N
GW30 (53)	Indus Rd	541372	177070	Roadside	Y	Y	5.0	2	NO_2	N
GW31 (57)	Deansfield School	543383	175664	Roadside	Y	Y	3.0	2	NO_2	N
GW32 (7)	Banchory Rd	540664	177235	Roadside	Y	Y	17.1	2	NO_2	N
GW33 (8)	Blackheath Hill	537971	176776	Roadside	Y	Y	1.5	2	NO_2	N
GW34 (9)	Bannockburn School	545490	178543	Roadside	Y	Y	3.0	2	NO_2	N
GW35 (10)	Woolwich Rd Greenwich	539527	178281	Roadside	Y	Y	1.5	2	NO_2	N
GW36 (11)	Boord St	539320	179234	Roadside	Y	N (50.0)	30.0	2	NO_2	N
GW37 (12)	De Lucy School	546630	179557	Background	Y	Y	215.0	2	NO_2	N

GW38 (13)	Westhorne Avenue	541885	175045	Background	Y	Y	30.0	2	NO_2	N
GW39 (14,15,16)	Bexley Rd ECC (Triplicate co-located site)	543986	174660	Background	Y	N	N/A	2	NO_2	Y
GW40 (17)	Shrewsbury House	544065	176996	Background	Y	Y	575.0	2	NO_2	N
GW41 (18)	Sidcup Rd	543391	172765	Roadside	Y	Y	3.0	2	NO_2	N
GW42 (19)	Greenwich Church St	538317	177652	Roadside	Y	Y	2.0	2	NO_2	N
GW43 (20)	Creek Rd	537353	177632	Roadside	Y	Y	2.0	2	NO_2	N
GW44 (21)	Eltham High St	543096	174439	Roadside	Y	Y	3.6	2	NO_2	N
GW48 (23)	Greenwich South St	538044	176960	Roadside	Y	Y	2.5	2	NO_2	N
GW49 (24)	Woolwich High St	543472	179217	Roadside	Y	Y	1.0	2	NO_2	N
GW50 (25,26,27)	Woolwich Flyover (Triplicate co-located site)	540203	178367	Roadside	Y	Y	3	2	NO_2	Y
GW51 (28)	Bugsbys Way	539638	179024	Roadside	Y	Y	2.0	2	NO_2	N
GW52 (29)	Woolwich High St	542842	179108	Roadside	Y	Y	1.5	2	NO_2	N

GW53 (30)	Shooters Hill Rd	542181	176878	Roadside	Y	Y	1.5	2	NO_2	N
GW54 (31)	Westhorne Av	541915	175039	Roadside	Y	Y	2.5	2	NO_2	N
GW55 (32,33,34)	Crown Woods Way (Triplicate site)	545005	175097	Roadside	Y	Y	1.2	2	NO_2	Y
GW56 (35)	Sidcup Rd	543679	172598	Roadside	Y	Y	1.5	2	NO_2	N
GW57a (36)	Trafalgar Rd	538968	177955	Roadside	Y	Y	7.0	2	NO_2	N
GW58 (39,40,41)	Blackheath Hill (Triplicate co-located site)	538143	176712	Roadside	Y	Y	10	2	NO_2	Y
GW59 (42,43,44)	Westhorne Av (Triplicate co-located site)	541883	175016	Roadside	Y	Y	12	2	NO_2	Y
GW60 (45,46,47)	Burrage Grove (Triplicate co-located site)	544086	178882	Roadside	Y	Y	12	2	NO_2	Y
GW61 (50,51,52)	John Harrison Way (Triplicate co-located site)	539687	179123	Roadside	Y	Y	3	2	NO_2	Y
GW101 (48)	Plumstead Rd	544727	178884	Roadside	Y	Y	1.0	2	NO_2	N
GW102 (49)	Plumstead Rd	544075	178898	Roadside	Y	Y	1.0	2	NO_2	N
GW103 (54)	Wricklemarsh Rd	540935	176575	Roadside	Y	Y	9.0	2	NO_2	N
GW104 (55)	Sun Lane	540743	177072	Roadside	Y	Y	12.5	2	NO_2	N

GW105 (56)	Cliftons Roundabout	541143	174294	Roadside	Y	Y	5.0	2	NO_2	N
GW106 (22)	Grand Depot Rd	543505	178576	Roadside	Y	Y	1.0	2	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 (if required), the details of which are described in Appendix A.

Table D. Annual Mean NO_2 Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period %[(a)]	Valid data capture 2022 %[(b)]	2016	2017	2018	2019	2020	2021	2022
GR4 Eltham	Automatic	54	54	21	20	16	17	15	15	10.3
GR5 Trafalgar Road	Automatic	N/A	N/A	Closed	Closed	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (Operational October 2017)	Automatic		91	N/A	N/A	**43**	**41**	34	33	32
GN6 John Harrison Way (operational July 2018)	Automatic		91	N/A	N/A	34	33	26	25	23
GB6 Falconwood	Automatic		100	**45**	40	39	36	27	27	22
GR7 Blackheath	Automatic		94	**46**	38	35	38	29	30	27
GR8 Woolwich Flyover	Automatic		98	**64**	**65**	**57**	**52**	**43**	40	40

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
GR9 Westhorne Av	Automatic	73	73	**42**	39	38	34	25	26	23.6
GN0 (GR10) Burrage Grove	Automatic		100	39	35	35	33	26	27	26
GN2(GR12) Millennium Village	Automatic			30	Closed	Closed	Closed	Closed	Closed	Closed
GN3(GR13) Plumstead High St	Automatic		100	36	34	33	34	30	25	25
GN4(GR14) Fiveways	Automatic		100	**46**	**41**	40	37	26	31	27
GW23	Diffusion tube		92	**41.43**	36.6	31.1	34.6	27	28	23
GW24	Diffusion tube		100	**54.95**	**50.1**	**45.8**	**44.8**	35	37	29
GW25	Diffusion tube		100	**38.79**	35.1	32.2	32.2	27	27	23
GW26	Diffusion tube		100	28.26	28.4	23.8	26.5	22	22	18
GW27	Diffusion tube		100	**41.48**	38.6	31.9	34.9	26	26	23
GW28	Diffusion tube		82	**41.03**	32.6	31.3	29.8	22	23	19
GW29	Diffusion tube		100	**58.14**	**56.2**	**53.8**	**49.2**	39	38	29

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
GW30	Diffusion tube		100	**40.47**	35.9	33.6	32.7	27	26	23
GW31	Diffusion tube		92	**40.37**	30.3	26.3	26.0	20	21	19
GW32	Diffusion tube		92	**47.42**	**45.9**	39.3	39.5	32	30	26
GW33	Diffusion tube		92	**60.96**	**53.9**	**46.6**	**47.4**	37	37	31
GW34	Diffusion tube		100	39.11	37.2	33.9	35.3	30	28	26
GW35	Diffusion tube		92	**56.01**	**53.6**	**48.9**	**52.9**	42	34	29
GW36	Diffusion tube		92	**58.13**	**56.4**	**46.9**	**49.3**	**41**	30.5	23
GW37	Diffusion tube		83	22.91	23.3	21	21.9	18	18	14
GW38	Diffusion tube		100	34.92	32.1	28.3	29.0	22	23	21
GW39	Diffusion tube		86	19.17	19.1	17.2	18.5	15	15	14
GW40	Diffusion tube	67	67	19.19	16.5	16.9	18.2	16	15	13.4
GW41	Diffusion tube		92	**55.56**	**54.5**	**44.9**	**47.7**	36	31	27
GW42	Diffusion tube		100	**48.90**	**44.8**	**40.1**	**39.8**	32	32	27
GW43	Diffusion tube		100	**56.30**	**50.4**	**43.5**	**44.2**	33	29	26

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
GW44	Diffusion tube		92	**48.84**	**48.0**	**43.5**	**47.8**	39	**42**	34
GW48	Diffusion tube		100	38.24	38.5	33.1	37.8	31	28	26
GW49	Diffusion tube		100	**54.80**	**58.1**	**41.8**	**43.8**	33	31	28
GW50	Diffusion tube		100	**67.11**	**69.5**	**54.3**	**53.2**	**49**	**41**	36
GW51	Diffusion tube		92	**45.80**	**43.6**	37.0	39.0	30	29	26
GW52	Diffusion tube		92	39.03	39.2	37.2	36.6	24	24	20
GW53	Diffusion tube		100	37.08	34.0	29.0	29.8	24	24	22
GW54	Diffusion tube		75	**52.08**	**48.7**	**50.6**	**53.0**	**41**	40	34
GW55	Diffusion tube		95	**58.78**	**44.6**	**42.1**	**39.9**	30	29	27
GW56	Diffusion tube		83	**51.31**	**47.5**	**40.6**	39.1	32	29	25
GW57a	Diffusion tube		100	36.02	33.7	29.5	29.7	24	24	20
GW58	Diffusion tube		100	**43.86**	**41.7**	37.9	36.6	29	30	27
GW59	Diffusion tube		97	**38.12**	37.6	35.4	33.7	25	25	23
GW60	Diffusion tube		98	40.04	32.2	29.5	29.3	24	21.3	21

Site ID	Site type	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
GW61	Diffusion tube		97	*32.12*	*28.1*	*31.9*	*32.8*	*26*	*23*	23
GW101	Diffusion tube		92	***50.03***	***58.1***	***56.5***	***53.8***	***44***	***41***	36
GW102	Diffusion tube	67	67	***43.76***	***48.0***	***50.5***	***51.5***	***50***	***42***	18.3
GW103	Diffusion tube		100	***43.87***	***41.2***	*35.9*	*35.1*	*29*	*28*	21
GW104	Diffusion tube		92	***48.96***	***49.8***	***43.7***	***44.9***	*40*	*31*	28
GW105	Diffusion tube		92	***46.79***	***52.4***	***46.5***	***46.0***	*36*	*35*	29
GW106	Diffusion tube		100	***43.44***	*38.4*	*35.5*	*36.0*	*31*	*30*	27

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances 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**.

Means for diffusion tubes have been corrected for bias.

All means have been "annualised" in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

Results have been distance corrected where applicable.

(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%).

Note: Table D. includes provisional data (GR4, Eltham)

A correction for distance has been carried out for GW40 and GW102 because of a data capture rate of 67%. An image showing the data used in the calculations is provided in Appendix A3

Table D2. Annual Mean NO2 Ratified and Bias-adjusted Monitoring Results (ug/m3). Correction for Distance

Site ID	Site Type	Measured annual mean NO2 concentration (ug/m3)	Predicted annual mean NO2 concentration (ug/m3)
GW40 Shrewbury House	Diffusion Tube Background	15	13.4
GW102 Plumstead Road	Diffusion Tube Roadside	31	18.3

Table E. NO_2 Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m^{-3}

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2022 %([b])	2016	2017	2018	2019	2020	2021	2022
GR4 Eltham	54	54	0	0	0	*0*	0	0	0
GR5 Trafalgar Road			Closed	Closed	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (operational Oct 2017)		91	N/A	N/A	1	0	0	0	0
GN6 John Harrison Way (operational July 2018)		91	N/A	N/A	0	0	0	0	0
GB6 Falconwood		100	3	1	0	0	0	0	0
GR7 Blackheath		94	0	0	0	0	0	0	0
GR8 Woolwich Flyover		98	24	7	0	0	0	0	0
GR9 Westhorne Av	73	73	9	2	0	0	0	0	0
GN0 Burrage Grove		100	1	0	0	0	0	0	0

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2022 %([b])	2016	2017	2018	2019	2020	2021	2022
GN2 Millennium Village			0	Closed	Closed	Closed	Closed	Closed	Closed
GN3 Plumstead High St		100	0	0	0	0	0	0	0
GN4 Fiveways		100	0	0	0	0	1	0	0

Notes

Results are presented as the number of 1-hour periods where concentrations greater than 200 µg m^{-3} have been recorded.

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

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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%)

Note: Table E includes provisional data (GR4,Eltham)

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

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2022 %([b])	2016	2017	2018	2019	2020	2021	2022
GR4 Eltham			18	19	17	14	14	12	N/A
GR5 Trafalgar Road			Closed	Closed	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (operational Oct2017)	48	48	N/A	N/A	22	22	19	19	18.8
GN6 John Harrison Way (operational July 2018)		99	N/A	N/A	15	14	19	20	19
GB6 Falconwood	73	73	18	18	21	19	18	19	17.7
GR7 Blackheath		95	24	23	22	20	19	19	17
GR8 Woolwich Flyover		82	30	25	25	23	21	20	18
GR9 Westhorne Av		97	23	21	18	15	19	17	19
GN0 Burrage Grove	64	64	23	18	18	17	15	13	14.3

Site ID	Valid data capture for monitoring period %([a])	Valid data capture 2022 %([b])	2016	2017	2018	2019	2020	2021	2022
GN2 Millennium Village		N/A	20	Closed	Closed	Closed	Closed	Closed	Closed
GN3 Plumstead High Street	41	41	19	20	18	16	15	13	13.9
GN4 Fiveways			23	21	25	25	23	21	15

Notes

The annual mean concentrations are presented as µg m^{-3}.

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

All means have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 25%.

(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%).

Table G. PM_{10} Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM_{10} 24-Hour Means > 50 µg m^{-3}

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
GR4 Eltham			6	4	1	2	1	0	N/A
GR5 Trafalgar Rd		N/A	Closed	Closed	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (operational Oct2017)	48	48	N/A	N/A	4	12	6	2	4
GN6 John Harrison Way (operational July 2018)		99	N/A	N/A	0	6	3	3	3
GB6 Falconwood	73	73	1	2	2	8	6	4	4
GR7 Blackheath		95	14	15	5	7	5	2	3
GR8 Woolwich Flyover		82	22	9	6	10	5	5	5
GR9 Westhorne Av		97	15	16	4	2	5	1	5
GN0 Burrage Grove	64	64	10	8	3	7	0	0	3

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	2016	2017	2018	2019	2020	2021	2022
GN2 Millennium Village		N/A	6	Closed	Closed	Closed	Closed	Closed	Closed
GN3 Plumstead High Street	41	41	8	2	1	5	4	0	0
GN4 Fiveways		94	2	1	10	17	8	3	3

Notes

Exceedances of the PM_{10} 24-hour mean objective (50 µg m^{-3} over the permitted 35 days per year) are shown in **bold.**

Where the period of valid data is less than 85% of a full year, the 90.4th percentile is provided in brackets.

(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%).

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

Site ID	Valid data capture for monitoring period %[(a)]	Valid data capture 2022 %[(b)]	2016	2017	2018	2019	2020	2021	2022
GR4 Eltham	49	49	11.7	12	10	11	10	8	7.6
GN5 Hoskins Street (operational Oct2017)		80	N/A	N/A	9	9	8	7.7	8
GN6 John Harrison Way (operational July 2018)		85	N/A	N/A	10	11	9	11	10
GB6 Falconwood	37	37	15.3	13	13	12	10	13	9.5
GR8 Woolwich Flyover	56	56	13.4	13.1	12	11	10	11.5	12
GR9 Westhorne Av	58	58	12.9	11	11	10	8	7	8.7
GN0 Burrage Grove		95	14.5	12	13	11	12	11	12
GN2 Millennium Village		N/A	11.4	Closed	Closed	Closed	Closed	Closed	Closed
GN3 Plumstead High St	60	60	14	12	13	13	9	9.4	8.2

Notes

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the $PM_{2.5}$ annual mean AQO of 20 µg m^{-3} are shown in **bold**.

All means have been “annualised” in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 25%.

(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%).

Note: Table H includes provisional data (GR4,Eltham)

2. Action to Improve Air Quality

2.1 Air Quality Action Plan Progress

Table J provides a brief summary of The Royal Borough of Greenwich progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2022 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
1.1	Monitoring and other core statutory duties		The Royal Borough has one of the largest real-time monitoring network in London with ten automatic monitoring station sites. A map showing the locations of the monitoring stations, and the sets of our monitoring data can be accessed here. We have 42 diffusion tube sites, with a total of 56 diffusion tubes. Full location and monitoring details can be accessed in our Annual Status Reports, which can be downloaded from our website. In addition to existing sites, which have been retained and properly maintained, we implemented a further six diffusion tubes at the Woolwich Ferry roundabout from January 2019, and two diffusion tubes outside Hawksmoor primary school in August 2019, as part of the Public Health 'Superzone' initiative. Further to this, in May 2019 the Port of London Authority (PLA) installed a number of continuous air pollution monitors near Greenwich Ship Tier

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			to assess the impact of short-term, local river activity on air quality in the area, including cruise visits. This project is in partnership with Breathe London and LB Tower Hamlets. The Royal Borough is participating in a trial air quality sensor network funded by the Mayor of London for London's communities; making air quality data easily accessible. https://www.breathelondon.org/ We currently have 6 solar powered trial air quality sensors, including ones located at the following schools; St. Mary Magdalene CE School, Peninsula; Royal Hill, adjacent to James Wolfe Primary School; and Bannockburn Road - Bannockburn Primary School, Greenwich University. Some have also been co-located with our continuous monitors so that their accuracy can be assessed over a number of years. (Example. John Harrison Way) Air Quality Action Plan - a new Air Quality Action Plan is needed and the draft is at its final stages, preparing for public consultation and engagement events.
2.1	Emissions from developments and buildings	Action 1: Ensuring emissions from construction are minimised	The Council's website contains information for developers on controlling dust emissions during demolition and construction. Planning officers either receive comments on applications requiring, through condition, the submission of a Construction Management Plan or will direct developers to the information on the webpage. Planners have also been made aware of the Low Emission Zone for Non-Road Mobile Machinery (NRMM) and a condition has been created and been used by Planning throughout 2021 requiring compliance of NRMM with LEZ standard

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Action 2: Ensuring enforcement of Non-Road Mobile Machinery (NRMM) air quality policies	The Royal Borough is actively participating in the Non-Road Mobile Machinery (NRMM) enforcement scheme led by Merton to minimise emissions and dust from machinery on construction sites.
		Action 3: Enforcing CHP and biomass air quality policies	In Summer 2019, Planning Policy commenced the Local Plan review. The first stage is focusing on scoping and evaluating options to go beyond new London Plan Policies and/or to provide further borough-specific guidance on new London Plan Policies. The pubic consultation stage is ongoing.
		Action 4: Enforcing Air Quality Neutral policies	Planning officers consult Environmental Protection on planning applications and, where appropriate, an Air Quality Neutral Assessment has been required. Where benchmarks have not been met, mitigation measures have been secured before any permission is granted.
		Action 5: Development which may increase air pollution or introduce receptors to polluted areas make a financial contribution to deliver air quality improvements.	Money from previous S106 contributions has been used to fund the NRMM project (see action 2), and the promotion of Clean Air Day. More recently, the focus has been on securing developments that do not contribute to air pollution as opposed to expenditure of receipts.
		Action 6: Ensuring adequate, appropriate, and well-located green space and infrastructure is included in new developments	Planning currently secures green spaces (roofs, walls, buffer zones) in line with London Plan/Local Plan policies and supplementary guidance. This includes, as appropriate, green roofs, new amenity space and open space. The council consulted on the Site Allocations Preferred Approach Local Plan. Where localised sources of pollution were identified, for example a site adjacent to main road corridors, the draft allocations identified requirement for new soft landscaped open space and/or encouraged the use of green infrastructure to mitigate poor air quality. The Draft Site Allocations Proposed Submission version was published for a final round of public consultation in early 2020. The next step is for this to be

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			submitted to the Secretary of State for Examination in Public. As part of Local Plan review, a borough-wide Characterisation and Tall Buildings Study is ongoing. This is a detailed baseline assessment of the borough, and will identify areas capable of intensification for residential/other types of development. It will ensure that new development is directed to the most sustainable locations, and is a key evidence base document to inform Local Plan review, which will seek to further strengthen the policy framework for securing urban greening for air quality improvements.
		Action 7: Ensuring that Smoke Control Zones are appropriately identified and fully promoted and enforced	The information on smoke control zones on the website was reviewed. Meanwhile, we have ensured that information on smoke control zones and the Clean Air Act goes out to members of the public who make enquiries or complaints. We have created a standard smoke control letter that outlines the offence and provides information on exempt appliances and authorised fuels. The Royal Borough is in receipt of funding of £11,710 for 2023/2024 to support measures introduced through the Environment Act to improve the enforcement and management of smoke emissions in smoke control areas.
		Action 8: The Council will work closely with the Environment Agency to drive up environmental standards in processes with an Environmental Permit enforced either by the Council of the Agency	Progress has been made with the Environment Agency in terms of working in partnership with regard to regulated processes.
		Action 9: Promoting and delivering energy efficiency retrofitting projects in workplaces and homes using the GLA RE:NEW and RE:FIT programmes to replace old boilers /top-up lost	Retrofit works are currently underway in two housing estates in the East Greenwich area, including energy efficiency measures and new technologies The Council joined the RE:FIT framework in 2019, and installations at Greenacres school were completed in 2019. The implementation achieves an estimated savings of 15 tonnes CO2

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		insulation in combination with other energy conservation measures	annually. The Council joined the RE:FIT framework in 2019, and preparation of the PV installation on Greenacres school was completed in 2019. The implementation will be completed in early 2020 to achieve an estimated savings of 15 tonnes CO2 annually. In June 2019, the Council set a carbon reduction target of Net Zero carbon by 2030 for all of the borough's emissions. The Carbon Neutral Plan evidence base has been prepared, detailing the trajectories to achieve the target. Carbon Neutral Actions were adopted in 2020 The Council has supported South East London Community Energy in commencing a project to install renewable energy on Thamesmead and Coldharbour Leisure centres. Preparations began in 2019, with installation commencing in 2020. Furthermore, through its Capital Programme in 2019, the Council has delivered energy efficiency measures on its own housing stock, including retrofitting six properties with increased loft insulation and upgrading over 627 boilers to A rated boilers. Retrofit works are currently underway in two social housing estates in the East Greenwich area, including energy efficiency measures and new technologies. This includes the exploration of an innovative water source heat pump heating system, providing a first of its kind low emission source of heating. The Council has a Stay Warm Stay Safe programme, which includes an energy efficiency assessment and help on keeping fuel bills down to residents who are over 60, caring for a young or vulnerable person or having problems paying their winter fuel bills. Public Health promotes the Stay Warm Stay Safe scheme through the Live Well Greenwich website, the Greenwich Community Directory and communications campaigns Participation in research by the Carbon Trust for the Ernest Dence Estate, Greenwich options appraisal, assessing the potential for the retrofit of heat pumps and energy efficiency measures and modelling the CO2 savings, fuel bills, upfront costs and lifetime costs. The report can be reviewed here. Commissioning of an Integrated Dwelling Level Housing Stock Modelling and Database for the Royal Borough of Greenwich, completed in June 2020. Modelling of private sector stock including information on EPC

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			ratings, Energy efficiency variables for the private sector stock (wall and loft insulation), and Energy planning variables (SimpleCO2, energy and heat demand, energy and heat cost). Regarding the GLA and the promotion of the retrofit framework, we are supporting the Mayor's sustainable warmth programme by promoting the GLA's scheme to private sector homeowners, marketing activity will start in September.
3.1	Public health and awareness raising	Actions 10: Ensure that Directors of Public Health (DsPHs) are fully briefed on the scale of the problem in RBG; what is being done, and what is needed.	DsPH sign off previous Air Quality Action Plan (AQAP). Currently a new AQAP is under review and this is an ongoing process.
		Action 11: Public Health Teams should be supporting engagement with local stakeholders (businesses, schools, community groups and healthcare providers). They should be asked for their support via the DsPH when projects are being developed	Diffusion tubes were placed outside of Hawksmoor Primary School and will monitor local air pollution for 12 months, as part of Public Health's 'Superzone' pilot. The Superzone aims to make the area safer and healthier for children through targeted interventions to tackle a number of challenges, including air quality. Air Quality and Public Health Officers also worked together to develop information and content for the new air quality website. This includes information for vulnerable groups, and what the public can do to reduce their contribution and exposure to air pollution. This is an ongoing process.
		Action 12: Director of Public Health to have responsibility for ensuring their Joint Strategic Needs Assessment (JSNA) has up to date information on air quality impacts on the population.	The Air quality Joint Strategic Needs Assessment (JSNA) highlights the scale of the problem and what is being done /needs to be done. There is a rolling, responsive approach to updating elements of the JSNA as evidence and local needs and priorities shift. DsPH access links to London Air and ASR reports on the Royal Borough's website and the Live Well Greenwich site for current monitoring data. In 2019, Public Health conducted a

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			detailed geographical examination of hospital activity data over a 5year period (2013-2018), which indicated that there are greater numbers of cases of respiratory admissions for 0-19year olds amongst Greenwich residents living near to main roads, and the higher rates are often seen close to big intersections. Links were also made to regeneration areas.
		Action 13: Strengthening co-ordination with Public Health by ensuring that at least one public health specialist within the borough has air quality responsibilities outlined in their job profile	The Director of Public Health is part of the Air Quality and Climate Change Task Force, a strategic-led group made up of Councillors and senior leaders, which discusses air quality issues, priorities and resources. The Head of Public Health Development attends the Air Quality and Climate Change Working group, where Council Officers discuss the Air Quality Action Plan, statutory requirements, and wider projects and funding opportunities.
		Action 14: Director of Public Health to sign off Statutory Annual Status Reports and all new Air Quality Action Plans	Please refer to actions 10-13 above
		Action 15: Ensure that the Assistant Director for Transport is fully briefed on the Public Health duties and the fact that all directors (not just Director of Public Health) are responsible for delivering them, as well as on air quality opportunities and risks related to transport in the borough. Provide a briefing which can be disseminated amongst the Transport and Planning teams.	The Borough's third Local Implementation Plan for transport has a Strategic Objective of a 'Healthier Greenwich'. This envisages a transport network, places and streets that encourage active travel, keeping us all fit and healthy, mentally and physically. This provides a plan for the directorate to meet its public health duties and assess its progress in this field. The programme of work is detailed in other entries here. The continued partnership working is ongoing. The Royal Borough's adopted Carbon Neutral Plan sets out a number of transport related objectives, which also provide related air quality benefits. Work is underway on a new borough-wide

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			draft Transport Strategy, which will be consulted on this year and build on the above-mentioned strategies.
		Action 16: Engagement with businesses	Our new Council air pollution website was includes a section 'What can Businesses Do?', which provides information and advice on how businesses can improve air quality. This information includes disposing of waste in a sustainable way and avoiding having bonfires. Public Health has been promoting and supporting the London Healthy Workplace Award, (accreditation scheme led by the Mayor of London's office), across Royal Greenwich. Under this framework, businesses working towards the accreditation have been required to demonstrate how active travel has been incorporated into their action plan to improve staff health and wellbeing. Where possible, the Council worked with local businesses to run events, such as the Royal Greenwich Get Together, using existing power sources and solar powered units in order to reduce generator use and emissions.
		Action 17: Promotion of availability of the London Air Quality Network	The network was promoted via the Council's website. The Live Well Greenwich website, which provides local information, events and support to improve health and wellbeing, includes a page dedicated to air pollution and health.
		Action 18: Encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme including reducing car use	The STARS accreditation scheme has been paused to accommodate the impact of COVID-19 school closures, with 2019 status effectively being frozen. In 2019, 55 schools achieved STARS accreditation: 14 x Bronze; 2 x Silver; and 39 x Gold. In addition, another 25 schools engaged in at least one active travel activity. RBG's School Travel Plan Coordinator worked with schools to prepare

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			submissions for new STP accreditation in July 2022. The results of these submissions are not yet available. As part of our work to encourage safe, sustainable and more active ways to travel, we have worked with schools to create School Streets in Royal Greenwich. A School Street is closed to motor vehicles at drop-off and pick-up times, encouraging families to walk, cycle or scoot to school instead. School Streets provide a range of benefits, including: • reducing traffic around schools at peak times • improving air quality • encouraging more exercise which will help to reduce child obesity • reducing road traffic collisions **Permanent School Streets** There are four permanent School Streets at: • De Lucy School • Gordon School • Haimo School • St Joseph's School **Experimental School Streets** Seven experimental School Street are also in place: -Charlton Manor Primary -Invicta Primary -Wyborne Primary -Montbelle Primary School -Deansfield Primary School -St Thomas More Catholic Primary School -Invicta Primary School (Deptford)

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Action 19: Raising awareness of Air Quality	The borough launched a trial School Streets scheme for six months in four schools, to remove motor vehicles from outside school gates at peak times. The placement of diffusion tubes outside of Hawksmoor Primary School, for a one-year assessment, as part of Public Health's 'Superzone' pilot A. National centre for excellence for connected and autonomous vehicles is currently being delivered in the Borough.
4.1	Delivery servicing and freight	Action 20: Update procurement policies to include a requirement for suppliers with large fleets to have attained at least Bronze Fleet Operator Recognition Scheme (FORS) and Construction Logistics Cycle Safety (CLoCS) accreditation when appropriate	The Council's Procurement Team have produced a new draft Procurement Strategy, which includes the objective of "Sustainable Procurement": • Apply relevant environmental and sustainability standards to support delivery of target outcomes relating to climate change mitigation and energy, air quality, materials and waste, water, biodiversity and adaptation. • Encourage suppliers through selection processes to adopt processes and procedures that reduce their environmental impact • Ensure that the need to meet Council's ambitious greenhouse gas and air pollution reduction targets are given appropriate priority in procurement decisions. This includes sourcing of low carbon energy wherever possible and phasing-out the fossil fuel use in our fleet. This action is ongoing.
		Action 21: Update RBG Procurement policies to ensure sustainable logistical measures are implemented (including requirements for preferentially scoring bidders based on their sustainability criteria, and requirements for suppliers with large fleets to have attained	Updated procurement policies to include a requirement for suppliers with large fleets to have attained at least Bronze FORS and Construction Logistics Cycle Safety (CLoCS) accreditation when appropriate.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		bronze Fleet Operator Recognition Scheme (FORS) accreditation) or EcoStars	
		Action 22: Re-organisation of freight to support consolidation (or micro-consolidation) of deliveries, by setting up or participating in new logistics facilities, and/or requiring that council suppliers participate in these process	The Royal Borough's adopted Carbon Neutral Plan sets out the Council's response to the Climate Emergency. It identifies a number of options relevant to this objective, including: • Assess feasibility of freight consolidation centres • Review Council vehicles and deliveries to understand if some journeys can be shifted to cycle freight • Develop and adopt a route-map for replacing all Council-owned vehicles with zero emissions options • Transition the vehicle fleet to using greener alternative fuels in the interim.
		Action 23: priority loading for ultra-low emission delivery vehicles	The Council has commissioned a new Parking & Kerbside Strategy, which will help it to better use parking as a tool for achieving its objectives. This will consider how we encouraging the switch to ULEVs through access to parking and/or loading.
5.1	Borough fleet	Action 24: Assess and gain accreditation for RBG's fleet and fleet management against schemes such as the Fleet Operator Recognition Scheme (FORS), aiming for Gold accreditation; and the EcoStars accreditation	Additional funding for hardware improvements to bring the fleet to silver standard has been secured for 20/21. The LIP funding for 19/20 has been spent on bringing a number of vehicles to FORS silver standard.
		Action 25: Increasing the number of hydrogen, electric, hybrid, bio-methane and cleaner (e.g. Euro VI) vehicles in the boroughs' fleet.	The fleet continues to be replaced with zero emission or LEZ/ULEZ-compliant vehicles. There are now 30 electric vehicles

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			on the fleet, 1 plug-in petrol hybrid, 1 petrol hybrid and 6 diesel hybrids. The following fleet mix is in operation: - 77.77% Euro 6/VI ICE (excluding hybrids) - 1.78% hybrids (diesel/PHEV) - 6.68% full electric Overall: - 86.86% fleet ULEZ compliant - 93.59% HGV fleet LEZ compliant A longer-term strategy is in place to increase power capacity at the Birchmere Centre that will enable further electrification of the fleet. The Council has so far installed 29 charging sockets to support the fleet's electric vehicles.
		Action 26: Accelerate uptake of new Euro VI vehicles in borough fleet	A tender has been accepted and the process is ongoing. All HGVs in the fleet are Euro VI except for the Winter Gritting vehicles. These vehicles are on a longer replacement cycle due to their limited use for only part of the year. Euro VI replacements will be sought over the next financial year.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
6.1	Localised solution	Action 28: Green Infrastructure	From April to December 2022 we planted 322 trees across Parks, Estates and Highways. From Jan 2023 to present we have planted 2288 trees (which includes small whips).
		Action 29: Low Emission Neighbourhoods (LENs)	The Borough's third Local Implementation Plan for transport incorporates case studies of successful LEN pilots, which have been mainstreamed into our general transport improvements. These include: • Increased use of greening and 'place making' features in transport schemes. • Light segregation of cyclists (using bollards instead of heavy infrastructure). • Continuous footways, which give pedestrian's priority at small side roads. • Doubling of the E-Z ride electric bike scheme fleet. The significant expansion of electric vehicle chargers is described under Action 36.
7.1	Cleaner transport	Action 30: Discouraging unnecessary idling of vehicle engines (e.g. through anti-idling campaigns and enforcement activity)	Greenwich is a member of the Mayor's funded Idling Action London project, which will include running a number of idling action events in the borough; holding workshops at schools and with businesses; as well as developing a media and advertising campaign. The project aims to discourage unnecessary idling of vehicle engines. Greenwich, like all London Boroughs welcomed the much-publicised legislation in 2020 which allowed Local Authority Civil Enforcement Officers to issued Penalty Charge Notices to cars that left engines idling unnecessarily.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			We began the process of taking on this power. Unfortunately, that legislation relies on the Department for Transport producing an approved sign, which to date they have not done. In the absence of this sign unfortunately we cannot enforce the legislation. London Councils have on behalf of all London Local Authorities made representations to the DfT on this matter and are planning to do so again.
		Action 31: Speed control measures e.g. lowering the legal speed limit to 20mph in built up residential areas	Further expansion of the borough wide residential roads 20mph zone programme has been undertaken, with zones completed in the Blanmerle Road area and St John's Park area in 2021. Zones are planned for implementation in the Greenhaven Drive area and Sparrow's Lane area during 2022-2023. The first 20 mph limit on a strategic route in Royal Greenwich on part of the A206 has now been implemented and 20 mph limits on other strategic links will be considered as part of future schemes.
		Action 32: Expanding Car Clubs and increasing the proportion of electric, hydrogen and ultra-low emission vehicles in their fleet.	The Council is working with providers to understand the options for significantly expanding car club provision (and increasing the proportion of zero emissions vehicles in the car club fleet). It is anticipated that this could include encouraging competition between multiple operators and/or Free floating' one-way car clubs, like Zip Car's Flex scheme, are an exciting opportunity. They allow people to make one-way trips, from A to B, without having to return the car back to where they started.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		Action 34: Free or discounted residential parking permits for zero emission cars	The Council has commissioned a new Parking and Kerbside Strategy, which will help it to better use parking as a tool for achieving its objectives. Proposals for the Strategy are expected to include variable parking charges based on vehicles' emissions levels.
		Action 35: Surcharge on diesel vehicles below Euro 6 standards for Resident and Controlled Parking Zone permits	Since this action was incorporated in the Plan, TfL has expanded the Ultra Low Emission Zone (ULEZ) to the South Circular, meaning that diesel vehicles below Euro 6 standards must pay a charge to enter this area. TfL is also consulting on a further expansion of the ULEZ to cover all of Royal Greenwich. These measures may affect the relevance of such a surcharge, but the developing Parking and Kerbside Management strategy will continue to consider emissions based charging as appropriate.
		Action 36: Installation of residential electric charge points	The Royal Borough's adopted Carbon Neutral Plan sets out a number of transport related objectives, including to: *"Increase the number of residential electric vehicle charging points in the borough and assess business charging needs".* The Royal borough has undertaken the first phase of technical work to create a roadmap for a significant expansion of electric vehicle charging provision.
		Action 37: Installation of rapid chargers to help enable the take up of electric taxis, cabs and commercial vehicles (in partnership with TfL and/or OLEV)	One of London's first rapid charging hubs opened at Glass Yard, near Woolwich Ferry Roundabout. The Royal Borough's adopted Carbon Neutral Plan sets out several transport related objectives, including to:

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			"Increase the number of residential electric vehicle charging points in the borough and assess business charging needs". The Royal borough has undertaken the first phase of technical work to create a roadmap for a significant expansion of electric vehicle charging provision, including the role of rapid chargers.
		Action 38 Reprioritisation of road space; reducing parking at some destinations and or restricting parking on congested high streets and A roads to improve bus journey times, cycling experience, and reduce emissions caused by congested traffic	The Council has commissioned a new Parking and Kerbside Strategy, which will help it to better use parking as a tool for achieving its objectives. The proposed Strategy is expected to include proposals to significantly re-balance the use of our kerbside space, to encourage walking, cycling, public transport and ULEVs. Action 39 below details the significant work undertaken to provide better walking and cycling infrastructure, which increasingly includes expanded and segregated provision for cycling. We worked with TfL to deliver a new trial strategic cycle route between Greenwich and Woolwich. This reallocates a significant amount of road space to more sustainable modes on the A206 (on one of the top five per cent of routes in London in terms of potential for cycling to increase).
		Action 39: Provision of infrastructure to support walking and cycling	As detailed in Action 38, we worked with TfL to agree changes to improve the trial route between Greenwich and Woolwich which will be subject to further monitoring to understand how the scheme is performing against strategic objectives. We made the Peninsula low traffic neighbourhood, introduced under an experimental traffic order in 2020, permanent in 2021.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			This will reduce through traffic in the area and make walking and cycling easier and more attractive. We continued to work with TfL to progress the opening of the Creek Road section of Cycleway 4.
		Action 40: Local Low Emission Zones (LEZ)	Lobbying continues, at all levels. As detailed under Action 35, since this action was incorporated in the Plan, TfL has expanded the Ultra Low Emission Zone (ULEZ) to the South Circular. TfL is also consulting on a further expansion of the ULEZ to cover all of Royal Greenwich. This will need to be considered in any further development of a Local Low Emission Zone.

3. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in Royal Greenwich in 2022

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	61
Number of planning applications required to monitor for construction dust	183
Number of CHPs/Biomass boilers refused on air quality grounds	0
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	4
Number of developments required to install Ultra-Low NO_x boilers	2
Number of developments where an AQ Neutral building and/or transport assessments undertaken	16
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	7
Number of planning applications with S106 agreements including other requirements to improve air quality	2
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM: Central Activity Zone , Canary Wharf and Opportunity Areas Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit Please include confirmation that you have checked that the development has been registered with the GLA through the relevant NRMM website and that all NRMM used on-site is compliant with Stage Stage IV of the Directive and/or exemptions to the policy.	N/A
NRMM: Greater London (excluding Central Activity Zone, Canary Wharf and Opportunity Areas) Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit 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.	4 conditions included 18 Audits completed Self-compliant 4 Compliant 11 Non-compliant 3 0% of sites unregistered prior to audit

3.1 New or significantly changed industrial or other sources

No new point source identified. However, the Silvertown Tunnel infrastructure project requires ongoing engagement with the council.

4. Additional Activities to Improve Air Quality

5. 4.1 Additional Activities to Improve Air Quality

4.1 London Borough of Greenwich Fleet

The Borough fleet has 30 zero emission vehicles (6.68%) and 1 zero emission capable vehicle (0.22%).

4.2 NRMM Enforcement Project

The borough is continuing to support the NRMM Enforcement project in 2023-24

4.2 Air Quality Alerts

The borough support *air*TEXT (https://www.airtext.info/) and information provided on the website as below:

https://www.royalgreenwich.gov.uk/info/200205/pollution_and_noise/885/air_pollution_warnings_by_text

The website also provides advice for people susceptible to air pollution.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

A Local Site Operator (LSO) visits the monitoring sites every two weeks to visually inspect and check the site operation and to carry out zero/span calibration of the gas analysers. Six monthly UKAS accredited independent equipment audits are carried out by the National Physical Laboratory (NPL) which also carry out on-site certification of gas cylinders. Additionally, six monthly equipment service visits are carried out by Enviro Technology Services Plc.

PM_{10} Monitoring Adjustment

PM10 measurements are automatically recalculated as EU reference equivalent using the Volatile Correction Model (VCM) – Correction applied to TEOM measurements

A.2 Diffusion Tubes

- Diffusion Tubes are prepared and analysed by UKAS accredited Gradko International Ltd
- Diffusion Tubes are prepared using 50% triethanolamine with acetone method and analysed using UV spectrometry
- The lab follows the procedures set out in the Defra Technical Guidance for LAQM TG(16)
- Laboratory Precision Results:
- During 2022, diffusion tubes were supplied to the Royal Borough of Greenwich by Gradko International. These diffusion tubes were prepared using the 50% TEA in acetone preparation method. In 2022, all 14 of Gradko International studies that used diffusion tubes that were prepared using the 50% TEA in Acetone preparation method were awarded good precision. No studies were awarded bad precision. The good precision of these studies means that the results reported by Gradko International do not show a coefficient of variation (CV) greater than 20% for eight or more periods and that the average CV is not greater than 10% over all monitoring periods.

Discussion of Choice of Factor to Use

A local bias adjustment factor calculated from Royal Borough of Greenwich co-location diffusion tubes was used . The local bias adjustment factor is 0.82. The impact of this will mean that our readings will be the same is the National Bias Adjustment factor (0.82) were used. 5 co-location studies were used to calculate the local bias adjustment factor of 0.82. Despite there being 7 co-location studies within the Royal Borough of Greenwich, 2 were excluded from the analysis due to insufficient data capture (below 85%). These included Eltham and Westhorne Avenue.

	STEP 3a Local Bias Adjustment Input 1	STEP 3b Local Bias Adjustment Input 2	STEP 3c Local Bias Adjustment Input 3	STEP 3d Local Bias Adjustment Input 4	STEP 3e Local Bias Adjustment Input 5
Periods used to calculate bias	12	12	9	12	7
Bias Adjustment Factor A	0.91 (0.82 - 1.03)	0.66 (0.6 - 0.74)	0.82 (0.77 - 0.88)	1.01 (0.9 - 1.14)	0.79 (0.73 - 0.87)
Diffusion Tube Bias B	10% (-3% - 22%)	51% (35% - 67%)	22% (14% - 29%)	-1% (-12% - 11%)	27% (15% - 38%)
Diffusion Tube Mean (µg/m³)	44.1	33.0	32.0	26.0	25.9
Mean CV (Precision)	4.8%	6.0%	3.6%	4.2%	5.5%
Automatic Mean (µg/m³)	40.1	21.9	26.3	26.2	20.4
Data Capture	98%	100%	100%	100%	100%
Adjusted Tube Mean (µg/m³)	40 (36 - 45)	22 (20 - 24)	26 (25 - 28)	26 (23 - 30)	20 (19 - 22)

Overall Diffusion Tube Precision	Good Overall Precision	Good Overall Precision	Good Overall Precision	Good Overall Precision	Good Overall Precision
Overall Continuous Monitor Data Capture	Good Overall Data Capture	Good Overall Data Capture	Good Overall Data Capture	Good Overall Data Capture	Good Overall Data Capture

Combined Local Bias Adjustment Factor	0.82	

Table L. Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.82
2021	Local	Bureau Veritas in house calculation	0.83
2020	Local	Bureau Veritas in house calculation	0.82
2019	LWEP	-	0.90
2018	LWEP	-	0.85
2017	LWEP	-	0.93
2016	LWEP	-	0.97
2015	LWEP	-	0.98

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

The data capture rate for all of our monitoring sites is between 75 – to 100%, with the exception of the PM10 at:

GN5 (Hoskins St) 45%

GB6 (Falconwood) 73%

GR10 (Burrage Grove) 64%

GR13 (Plumstead High St) 41%

The data capture rate for the PM2.5 was lower than 75% at:

GB6 (Falconwood) 37%

GR8 (Woolwich Flyover) 56%

GR9 (Westhorne Av)58%

GR13 (Plumstead High St) 60%

The low capture rate at GB6, GR10, GR13 and GR9 is due to a failure of the FDMS Units . Due to the ongoing manufacturing and supply issues it took few months to source a new dryer.

The low capture rate at GN5 is due to technical problems with the PM10 analyser which occurred over a period of two months .

At GR8 the low capture rate is due to technical issues with the BAM analyser . The repair of the BAM took few months to be resolved.

Please note that due to an electrical fault that occurred on the premises where GR4, Eltham is located the monitoring station was powered down for 4 months from January 2023 to April 2023.Therefore the data capture rate at this site for NOX and PM2.5 is respectively 54% and 49% . Due to technical issues the data capture rate for the NOX analyser at GR9 Westhorne Av was 73%

Table M. Short-term to Long-Term Monitoring Data Adjustment

Annualisation of NO2 for GR4 Eltham

Original Annual Mean	Annualisation Factor	Annualised Mean
9	1.146	10.3

Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Bexley - Belvedere	Background	15.9	13.7	1.161
Southwark- Elephant & Castle	Background	21.9	19.4	1.132
Average				1.146

Annualisation of NO2 for GR9 Westhorne Av

Original Annual Mean	Annualisation Factor	Annualised Mean
23	1.026	23.6

Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Bexley - Belvedere	Background	15.9	15.2	1.045
Southwark- Elephant & Castle	Background	21.9	21.4	1.024
Average				1.034

Annualisation of PM10 for GN5 Hoskins Street

Original Annual Mean	Annualisation Factor	Annualised Mean
20	0.939	18.8

Site	Site Type	Annual Mean (ug/m3)	Period mean (ug/m3)	Ratio
Newham-Wren close	Background	17.8	19.1	0.932
Southwark-Elephant & Castle	Background	16.1	17	0.945
Average				0.9385

Annualisation of PM10 for GB6 Falconwood

Original Annual Mean	Annualisation Factor	Annualised Mean
18	0.983	17.7

Site	Site Type	Annual Mean (ug/m3)	Period mean (ug/m3)	Ratio
Newham-Wren close	Background	17.8	18.1	0.984

Southwark-Elephant & Castle	Background	16.1	16.4	0.982
Average				0.983

Annualisation of PM10 for GR10 Burrage Grove

Original Annual Mean		Annualisation Factor		Annualised Mean
15		0.955		14.3
Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Newham-Wren close	Background	17.8	18.6	0.96
Southwark-Elephant & Castle	Background	16.1	17	0.95

Average				0.95

Annualisation of PM10 for GR13 Plumstead High Street

Original Annual Mean	Annualisation Factor	Annualised Mean
13	1.07	13.9

Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Newham-Wren close	Background	17.8	15.7	1.134
Southwark-Elephant & Castle	Background	16.1	16	1.006
Average				1.07

Annualisation of PM2.5 for GR4 Eltham

Original Annual Mean	Annualisation Factor	Annualised Mean
6	1.265	7.6

Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Lewisham-Deptford	Background	10.4	8.6	1.218
Southwark-Elephant & Castle	Background	9.4	7.1	1.312
Average				1.265

Annualisation of PM2.5 for GB6 Falconwood

Original Annual Mean	Annualisation Factor	Annualised Mean
9	1.055	9.5

Site	Site Type	Annual Mean (ug/m3)	Period mean (ug/m3)	Ratio
Lewisham-Deptford	Background	10.4	10	1.047
Southwark-Elephant & Castle	Background	9.4	8.8	1.063
Average				1.055

Annualisation of PM2.5 for GR8 Woolwich Flyover

Original Annual Mean	Annualisation Factor	Annualised Mean
12	0.998	12

Site	Site Type	Annual Mean (ug/m3)	Period mean (ug/m3)	Ratio

Lewisham-Deptford	Background	10.4	10.4	0.999
Southwark-Elephant & Castle	Background	9.4	9.4	0.997
Average				0.998

Annualisation of PM2.5 for GR9 Westhorne Av

Original Annual Mean	Annualisation Factor	Annualised Mean
10	0.874	8.7

Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Lewisham-Deptford	Background	10.4	11.8	0.884

Southwark-Elephant & Castle	Background	9.4	10.8	0.865
Average				0.874

Annualisation of PM2.5 for GR13 Plumstead High Stret

Original Annual Mean	Annualisation Factor	Annualised Mean
8	1.025	8.2

Site	**Site Type**	**Annual Mean (ug/m3)**	**Period mean (ug/m3)**	**Ratio**
Lewisham-Deptford	Background	10.4	10.3	1.016
Southwark-Elephant & Castle	Background	9.4	9.1	1.034

Average				1.025

Distance Adjustment

As set out in Table D2, a calculation to correct for distance was carried out for GW40 Shrewsbury House and GW102 Plumstead Road . The procedure used was that which is specified in LLAQM.TG(19). The data used in the calculation are shown below. The local annual mean background NO2 concentration was taken from GR4 Eltham.

Table N. NO_2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
GW40	30	50	15	10	13.4	
GW102	1	20	31	10	18.3	

Enter data into the pink cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	30	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	50	metres
Step 3	**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	10	µg/m^3
Step 4	**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	15	µg/m^3
Result	**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	13.4	µg/m^3

Enter data into the pink cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	1	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	20	metres
Step 3	**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	10	µg/m^3

Step 4	**What is your measured annual mean NO_2 concentration (in µg/m³)?**	31	µg/m³
Result	**The predicted annual mean NO_2 concentration (in µg/m³) at your receptor**	18.3	µg/m³

Appendix B Full Monthly Diffusion Tube Results for 2022

Table O. NO_2 Diffusion Tube Results

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2022 %[b]	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
GW23		92	24.00	19.98	41.88	35.49	21.92	22.45	28.55	33.44		18.22	27.77	31.34	27.73	22.74
GW24		100	46.82	30.56	33.41	43.07	36.20	33.59	40.22	41.33	41.08	14.45	32.18	36.83	35.81	29.37
GW25		100	42.95	21.33	34.12	25.56	25.31	24.15	24.11	29.16	31.87	17.59	30.41	32.58	28.26	23.17
GW26		100	37.22	11.37	32.97	20.97	16.50	15.61	16.85	19.92	22.76	10.03	24.50	29.08	21.48	17.61
GW27		100	35.87	24.35	40.37	27.22	26.34	26.03	26.97	28.94	28.92	15.94	29.15	34.66	28.73	23.56
GW29		100	35.32	37.11	51.37	39.48	34.45	31.13	34.69	38.36	33.61	15.61	38.91	41.24	35.94	29.47
GW32		92	53.70	31.47		29.01	26.98	24.74	26.27	27.90	30.61	19.16	34.67	40.07	31.33	25.69
GW33		92	30.17		34.11	41.20	38.38	36.94	42.28	48.63	32.45	26.46	43.27	41.44	37.76	30.96
GW34		100	44.87	28.35	44.03	25.50	28.03	24.85	27.23	28.33	29.38	30.40	32.91	39.00	31.91	26.16
GW35		92	60.80	34.67	39.88	32.94	32.69	30.27		34.63	31.58	16.27	37.02	41.28	35.64	29.22
GW36		92	47.70		35.18	22.69	25.08	26.59	23.38	24.00	29.05	13.92	32.75	33.83	28.56	23.42
GW37		83	36.41	16.27	27.53	17.07	14.45	12.19	14.34	14.57	16.65	8.22			17.77	14.57

GW38a		100	44.38	19.80	49.65	20.82	19.84	19.53	20.85	25.51	24.89	11.48	24.99	27.18	25.74	21.11
GW39a		92	39.52	12.56	19.78	11.41	11.25		10.70	12.41	12.22	10.10	15.53	18.36	15.80	12.96
GW39b		83	46.00	15.54	21.75	13.22	12.06		10.85	12.37	13.78	9.03		19.19	17.38	14.25
GW39c		83	50.34	14.57	19.33	13.45	10.60		11.11	12.12	13.32		14.70	20.28	17.98	14.74
GW40		67	42.88	12.92	22.17	13.75				11.91	14.62	8.87	16.89		18.00	14.76
GW41		92	39.69	30.72	43.23	32.34	28.57		31.27	29.49	50.60	16.53	29.51	32.31	33.12	27.15
GW42		100	33.20	26.45	39.20	37.42	31.02	29.41	34.17	34.98	39.66	18.88	35.24	38.03	33.14	27.17
GW43		100	62.31	22.01	43.27	27.96	28.22	23.80	27.30	27.51	34.26	16.25	32.52	36.04	31.79	26.07
GW44		92	54.71		54.45	45.21	40.99	36.65	46.50	39.15	41.19	16.42	37.50	43.12	41.44	33.98
GW106		100	58.97	29.96	40.60	32.16	30.22	23.88	29.29	32.29	34.86	19.50	34.19	37.33	33.60	27.56
GW48		92	46.48	25.69	38.53	27.51	28.14	25.93	29.58	30.57	36.99	15.74	38.94		31.28	25.65
GW49		100	42.54	29.71	54.45	27.79	33.08	28.63	30.27	32.10	34.98	18.14	36.13	37.32	33.76	27.68
GW50a		100	44.12	49.14	43.89	35.86	48.63	48.73	42.09	40.34	47.51	27.27	52.96	44.43	43.75	35.87
GW50b		100	41.04	49.31	43.83	37.98	48.33	48.89	42.30	39.42	45.02	34.39	53.87	49.81	44.52	36.50
GW50c		100	50.42	44.88	45.65	39.09	45.32	45.34	42.70	37.74	47.84	29.46	54.30	44.54	43.94	36.03
GW51		92	48.58		39.21	25.69	30.69	27.45	29.43	28.67	35.49	17.07	34.99	39.48	32.43	26.59
GW52		92	36.70	21.07	44.26	26.65	20.77	17.36	23.59	24.81	24.33	13.25	22.48		25.03	20.52
GW53		100	40.96	30.32	32.96	21.98	25.52	22.52	24.21	24.35	25.80	15.54	25.46	31.42	26.75	21.94
GW54		75	43.76		55.02	44.07	35.63	31.87	37.95	43.39			43.34	42.03	41.90	34.36
GW55a		92		25.81	53.00	32.76	27.07	23.25	29.81	36.18	31.74	18.70	29.71	33.76	31.07	25.48
GW55b		92	47.50	23.06	57.55	35.41	27.15	26.43	33.34	35.55	32.68		30.29	34.34	34.85	28.57
GW55c		100	38.65	24.97	57.61	37.73	29.43	26.18	29.81	39.40	35.04	20.39	28.31	34.07	33.47	27.44
GW56		83	42.81	29.80	32.20	28.70		28.39		26.56	30.61	16.60	34.53	39.59	30.98	25.40
GW57a		100	38.14	22.19	29.81	26.75	22.29	17.94	21.33	23.04	24.03	13.63	29.55	32.63	25.11	20.59
GW58a		100	37.34	27.08	43.58	31.44	28.19	24.83	31.23	34.50	37.00	14.98	31.95	35.56	31.47	25.81
GW58b		100	45.90	26.80	40.58	31.78	27.35	24.15	28.87	36.00	32.63	29.56	32.74	34.05	32.53	26.68
GW58c		100	55.99	26.83	41.08	34.57	28.12	26.55	29.87	33.61	36.45	16.67	35.96	35.43	33.43	27.41
GW59a		92		20.39	43.40	29.67	24.84	24.12	27.65	31.35	29.41	16.86	27.50	31.95	27.92	22.90
GW59b		100	51.08	18.89	43.72	29.33	22.66	22.27	27.88	19.94	28.93	15.49	28.45	32.11	28.40	23.29
GW59c		100	45.88	20.23	41.84	28.79	22.14	23.52	28.54	31.44	29.04	14.63	26.59	29.66	28.52	23.39
GW60a		100	40.60	24.44	29.35	27.78	21.97	17.16	25.08	26.17	28.40	13.18	25.09	28.58	25.65	21.03
GW60b		82	43.48	23.35	33.15	27.86	23.94		25.00	24.91	28.75	11.22	24.65	30.24	26.96	22.11

GW60c		100	39.10	21.79	35.18	28.74	23.85	17.92	24.85	26.37	28.56	11.35	26.35	30.92	26.25	21.52
GW101		92	17.57	44.23	34.26	48.81	51.18	48.04	48.40		53.68	28.65	55.56	52.95	43.94	36.03
GW102		67	25.61	41.88	35.48			38.94			45.95	27.69	45.12	46.14	38.35	31.45
GW61a		100	23.42	29.36	69.30	24.48	27.82	24.11	20.51	20.65	25.39	18.34	31.49	32.53	28.95	23.74
GW61b		100	32.03	28.22	70.39	20.48	23.64	23.52	20.70	21.95	25.08	18.92	33.21	35.49	29.47	24.16
GW61c		92		13.34	33.14	24.68	25.64	22.11	20.61	20.45	24.92	14.16	36.03	32.92	24.36	19.98
GW31		92	35.68	20.93	28.51	22.67	17.17	16.06	16.90	26.03	26.04	15.94		33.70	23.60	19.35
GW103		100	34.79	28.01	27.88	20.21	24.59	23.58	22.74	22.19	27.84	17.36	33.38	33.37	26.33	21.59
GW104		92	37.81	42.21	39.63	29.77	31.41	32.35	27.65		32.29	17.61	43.18	40.32	34.02	27.90
GW105		92	32.68		32.71	40.99	39.06	22.72	40.17	41.64	42.12	19.12	36.09	39.25	35.14	28.82
GW30		100	35.92	25.63	43.36	27.29	26.44	19.76	24.53	26.27	29.07	15.38	30.87	34.87	28.28	23.19
GW28		92		19.74	39.56	23.01	19.86	18.41	19.02	21.70	22.51	17.65	26.53	32.76	23.71	19.44

Notes

Concentrations are presented as µg m^{-3}.

Exceedances 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**.

All means have been “annualised” in accordance with LLAQM Technical Guidance if valid data capture for the calendar year is less than 75% and greater than 25%.

(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%).