

Royal Borough of Greenwich Air Quality Annual Status Report for 2020

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This report provides a detailed overview of air quality in the Royal Borough of Greenwich during 2020. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process¹.

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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})	25 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 2020
Sulphur dioxide (SO ₂)	266 µg m ⁻³ not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
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 not 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 2020

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 ₁₀ PM _{2.5} (and O ₃)	Chemiluminescent FDMS
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 FDMS
GN6 (operational July 2018)	John Harrison Way	539687	179123	Roadside	Y	Y (0)	3	3	NO ₂ PM ₁₀ PM _{2.5}	Chemiluminescent FDMS
GB6	Falconwood	544997	175098	Roadside	Y	Y (5)	1.2	3	NO ₂ PM ₁₀ PM _{2.5} O ₃	Chemiluminescent FDMS

GR7	Blackheath Hill	538141	176710	Roadside	Y	Y (0)	10	3	NO ₂ PM ₁₀	Chemiluminescent FDMS
GR8	Woolwich Flyover	540200	178367	Roadside	Y	Y (0)	3	3	NO ₂ PM ₁₀ PM _{2.5} (and O ₃)	Chemiluminescent TEOM
GR9	Westhorne Avenue	541879	175016	Roadside	Y	Y (0)	12	3	NO ₂ PM ₁₀ PM _{2.5} (and O ₃)	Chemiluminescent FDMS
GNO Note- previously GR10	Burrage Grove	544084	178881	Roadside	Y	Y (1)	12	3	NO ₂ PM ₁₀ PM _{2.5}	Chemiluminescent FDMS
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
GN4 Note- previously GR14	Fiveways Sidcup Rd	543582	172653	Roadside	Y	Y (5)	2	3	NO ₂ PM ₁₀	Chemiluminescent FDMS

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 2020

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	540203	178367	Roadside	Y	Y	3	2	NO ₂	Y

	(Triplicate co-located site)									
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)	Westthorne 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)	Westthorne 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 NO₂ Ratified and Bias-adjusted Monitoring Results

Site ID	Site type	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GR4 Eltham	Automatic		97	20	20	21	20	16	17	15
GR5 Trafalgar Road	Automatic	N/A	N/A	38	36	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (Operational October 2017)	Automatic		99	N/A	N/A	N/A	N/A	43	41	34
GN6 John Harrison Way (operational July 2018)	Automatic		100	N/A	N/A	N/A	N/A	34	33	26
GB6 Falconwood	Automatic		100	45	41	45	40	39	36	27
GR7 Blackheath	Automatic		94	44	39	46	38	35	38	29
GR8 Woolwich Flyover	Automatic		98	75	66	64	65	57	52	43

Site ID	Site type	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GR9 Westhorne Av	Automatic	N/A	99	43	40	42	39	38	34	25
GN0 (GR10) Burrage Grove	Automatic	N/A	99	38	35	39	35	35	33	26
GN2(GR12) Millennium Village	Automatic	N/A	N/A	36	28	30	Closed	Closed	Closed	Closed
GN3(GR13) Plumstead High St	Automatic	N/A	100	37	34	36	34	33	34	30
GN4(GR14) Fiveways	Automatic	79	79	53	44	46	41	40	37	26
GW23	Diffusion tube	67	67	42.7	41.5	41.43	36.6	31.1	34.6	27
GW24	Diffusion tube	67	67	54.8	53.5	54.95	50.1	45.8	44.8	35
GW25	Diffusion tube	67	67	45.2	38.4	38.79	35.1	32.2	32.2	27
GW26	Diffusion tube	67	67	31.2	28.6	28.26	28.4	23.8	26.5	22
GW27	Diffusion tube	67	67	43.7	39.7	41.48	38.6	31.9	34.9	26
GW28	Diffusion tube	67	67	36.9	35.8	41.03	32.6	31.3	29.8	22
GW29	Diffusion tube	58	58	61.8	62.3	58.14	56.2	53.8	49.2	39

Site ID	Site type	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GW30	Diffusion tube	67	67	38.3	35.0	40.47	35.9	33.6	32.7	27
GW31	Diffusion tube	58	58	37.5	35.7	40.37	30.3	26.3	26.0	20
GW32	Diffusion tube	67	67	51.9	49.6	47.42	45.9	39.3	39.5	32
GW33	Diffusion tube	67	67	<u>63.4</u>	<u>60.8</u>	<u>60.96</u>	53.9	46.6	47.4	37
GW34	Diffusion tube	67	67	44.0	38.9	39.11	37.2	33.9	35.3	30
GW35	Diffusion tube	58	58	<u>69.4</u>	59.1	56.01	53.6	48.9	52.9	42
GW36	Diffusion tube	67	67	<u>60.1</u>	57.2	58.13	56.4	46.9	49.3	41
GW37	Diffusion tube	50	50	23.6	21.8	22.91	23.3	21	21.9	18
GW38	Diffusion tube	67	67	35.9	34.2	34.92	32.1	28.3	29.0	22
GW39	Diffusion tube	67	67	20.0	19.1	19.17	19.1	17.2	18.5	15
GW40	Diffusion tube	33	33	19.4	18.8	19.19	16.5	16.9	18.2	16
GW41	Diffusion tube	33	33	44.7	50.0	55.56	54.5	44.9	47.7	36
GW42	Diffusion tube	67	67	52.8	49.9	48.90	44.8	40.1	39.8	32
GW43	Diffusion tube	67	67	57.0	57.3	56.30	50.4	43.5	44.2	33

Site ID	Site type	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GW44	Diffusion tube	67	67	50.7	48.9	48.84	48.0	43.5	47.8	39
GW48	Diffusion tube	67	67	42.0	42.2	38.24	38.5	33.1	37.8	31
GW49	Diffusion tube	67	67	44.6	44.2	54.80	58.1	41.8	43.8	33
GW50	Diffusion tube	67	67	<u>73.9</u>	<u>70.7</u>	<u>67.11</u>	69.5	54.3	53.2	49
GW51	Diffusion tube	58	58	46.9	44.9	45.80	43.6	37.0	39.0	30
GW52	Diffusion tube	58	58	43.9	39.6	39.03	39.2	37.2	36.6	24
GW53	Diffusion tube	67	67	37.0	36.1	37.08	34.0	29.0	29.8	24
GW54	Diffusion tube	67	67	56.4	52.5	52.08	48.7	50.6	53.0	41
GW55	Diffusion tube	67	67	57.6	51.7	58.78	44.6	42.1	39.9	30
GW56	Diffusion tube	67	67	56.7	51.0	51.31	47.5	40.6	39.1	32
GW57a	Diffusion tube	67	67	36.4	35.0	36.02	33.7	29.5	29.7	24
GW58	Diffusion tube	67	67	48.5	46.3	43.86	41.7	37.9	36.6	29
GW59	Diffusion tube	67	67	44.7	40.8	38.12	37.6	35.4	33.7	25
GW60	Diffusion tube	67	67	32.7	31.6	40.04	32.2	29.5	29.3	24

Site ID	Site type	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GW61	Diffusion tube	67	67	35.2	30.5	32.12	28.1	31.9	32.8	26
GW101	Diffusion tube	50	50	81.8	68.1	50.03	58.1	56.5	53.8	44
GW102	Diffusion tube	50	50	67.1	57.7	43.76	48.0	50.5	51.5	50
GW103	Diffusion tube	58	58	47.3	48.9	43.87	41.2	35.9	35.1	29
GW104	Diffusion tube	67	67	52.0	53.1	48.96	49.8	43.7	44.9	40
GW105	Diffusion tube	67	67	55.7	52.2	46.79	52.4	46.5	46.0	36
GW106	Diffusion tube	67	67	45.4	39.9	43.44	38.4	35.5	36.0	31

Notes:

The annual mean concentrations are presented as $\mu\text{g m}^{-3}$.

Exceedances of the NO₂ annual mean AQO of $40 \mu\text{g m}^{-3}$ are shown in **bold**.

NO₂ annual means in excess of $60 \mu\text{g m}^{-3}$, indicating a potential exceedance of the NO₂ 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 33%.

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%).

The majority of diffusion tubes are located where there is relevant exposure and there is little difference between the distance of the tube from the kerb and that of the relevant receptor from the kerb. The exceptions are GW36 Boord Street and GW39 Bexley Road ECC. GW36 is situated in a more industrial area although there is a residential block approximately 50m from its location. GW39 is a background location and is a significant distance (>70m) from the nearest residential receptor. Therefore, a correction for distance has been carried out only for GW36 to estimate the concentrations at the façade of the nearest residential receptors. An image showing the data used in the calculation is provided at Appendix A3.

Table D2. Annual Mean NO₂ Ratified and Bias-adjusted Monitoring Results ($\mu\text{g m}^{-3}$) - Correction for Distance

Site ID	Site Type	Measured annual mean NO ₂ concentration (in $\mu\text{g}/\text{m}^3$)	Predicted annual mean NO ₂ concentration (in $\mu\text{g}/\text{m}^3$)
GW36 Boord Street	Diffusion Tube	41	32.8

Table E. NO₂ 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 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GR4 Eltham	N/A	97	0	0	0	0	0	0	0
GR5 Trafalgar Road	N/A	N/A	5	0	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (operational Oct 2017)	N/A	99	N/A	N/A	N/A	N/A	1	0	0
GN6 John Harrison Way (operational July 2018)	N/A	100	N/A	N/A	N/A	N/A	0	0	0
GB6 Falconwood	N/A	100	10	2	3	1	0	0	0
GR7 Blackheath	N/A	94	0	0	0	0	0	0	0
GR8 Woolwich Flyover	N/A	98	26	6	24	7	0	0	0
GR9 Westhorne Av	N/A	99	1	0	9	2	0	0	0
GN0 Burrage Grove	N/A	99	0	0	1	0	0	0	0
GN2 Millennium Village	N/A	N/A	0	0	0	Closed	Closed	Closed	Closed

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GN3 Plumstead High St	N/A	100	0	0	0	0	0	0	0
GN4 Fiveways	N/A	79	2	1	0	0	0	0	1

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 NO₂ 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%)

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

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GR4 Eltham	N/A	99	18	17	18	19	17	14	14
GR5 Trafalgar Road	N/A	N/A	20	19	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (operational Oct2017)	N/A	98	N/A	N/A	N/A	N/A	22	22	19
GN6 John Harrison Way (operational July 2018)	N/A	88	N/A	N/A	N/A	N/A	15	14	19
GB6 Falconwood	N/A	97	25	17	18	18	21	19	18
GR7 Blackheath	65	65	27	25	24	23	22	20	19
GR8 Woolwich Flyover	N/A	98	29	29	30	25	25	23	21
GR9 Westhorne Av	N/A	81	25	22	23	21	18	15	19
GN0 Burrage Grove	51	51	23	22	23	18	18	17	15

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GN2 Millennium Village	N/A	N/A	26	17	20	Closed	Closed	Closed	Closed
GN3 Plumstead High St	74	74	23	18	19	20	18	16	15
GN4 Fiveways	N/A	83	29	23	23	21	25	25	23

Notes

The annual mean concentrations are presented as $\mu\text{g m}^{-3}$.

Exceedances of the PM₁₀ annual mean AQO of $40 \mu\text{g m}^{-3}$ 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 33%.

(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. PM₁₀ Automatic Monitoring Results: Comparison with 24-Hour Mean Objective, Number of PM₁₀ 24-Hour Means > 50 µg m⁻³

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GR4 Eltham	N/A	99	7	4	6	4	1	2	1
GR5 Trafalgar Road	N/A	N/A	5	2	Closed	Closed	Closed	Closed	Closed
GN5 Hoskins Street (operational Oct2017)	N/A	98	N/A	N/A	N/A	N/A	4	12	6
GN6 John Harrison Way (operational July 2018)	N/A	88	N/A	N/A	N/A	N/A	0	6	3
GB6 Falconwood	N/A	97	13	1	1	2	2	8	6
GR7 Blackheath	65	65	18	12	14	15	5	7	5
GR8 Woolwich Flyover	N/A	98	17	18	22	9	6	10	5
GR9 Westhorne Av	N/A	81	19	9	15	16	4	2	5
GN0 Burrage Grove	51	51	15	5	10	8	3	7	0

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GN2 Millennium Village	N/A	N/A	16	1	6	Closed	Closed	Closed	Closed
GN3 Plumstead High St	N/A	75	14	3	8	2	1	5	4
GN4 Fiveways	N/A	83	25	3	2	1	10	17	8

Notes

Exceedances of the PM₁₀ 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 ($\mu\text{g m}^{-3}$)

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	2014	2015	2016	2017	2018	2019	2020
GR4 Eltham	N/A	95	11.5	10.6	11.7	12	10	11	10
GN5 Hoskins Street (operational Oct2017)	N/A	99	N/A	N/A	N/A	N/A	9	9	8
GN6 John Harrison Way (operational July 2018)	N/A	85	N/A	N/A	N/A	N/A	10	11	9
GB6 Falconwood	N/A	79	14.4	14.3	15.3	13	13	12	10
GR8 Woolwich Flyover	N/A	99	14.6	12.2	13.4	13.1	12	11	10
GR9 Westhorne Av	N/A	89	15.8	12.7	12.9	11	11	10	8
GN0 Burrage Grove	N/A	90	17.1	12.1	14.5	12	13	11	12
GN2 Millennium Village	N/A	N/A	15.5	11.5	11.4	Closed	Closed	Closed	Closed
GN3 Plumstead High St	N/A	93	16.3	14.7	14	12	13	13	9

Notes

The annual mean concentrations are presented as $\mu\text{g m}^{-3}$.

Exceedances of the $\text{PM}_{2.5}$ annual mean AQO of $25 \mu\text{g m}^{-3}$ 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 33%.

(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%).

Option to include some narrative on the 7-year trend here. If trend charts are added ensure these adhere to accessibility regulations.

2. Impact of COVID-19 upon LAQM

Covid-19 has had a significant impact on local government finances, which were already in a difficult position following a decade in which overall resources were cut by more than a quarter. London boroughs have been at the forefront of the response to both the public health and economic crises caused by Covid-19, having mobilised rapidly and played a central part in coordinating the emergency response across public services in the capital.

The government's initial response has been to provide direct funding and other supportive financial measures to lessen the impact on local government since March. Whilst the financial implications will be reported, they will not necessarily reflect the impact on particular departments budgets, and much of the air quality work that will be impacted will be the time taken locally for engagement in behavioural change projects. That said, Active Travel funds have supported the AQAP objectives to allow more space to be given to cyclists and pedestrians, and there is some evidence that increases in walking seen during lock down may be continued.

3. Action to Improve Air Quality

3.1 Air Quality Action Plan Progress

Table J provides a brief summary of Royal Borough of Greenwich progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2020 are shown at the bottom of the table.

Table J. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
1.1	Monitoring and other core statutory duties		<ul style="list-style-type: none"> • The Royal Borough has 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. <p>Further to this, in May 2019 the Port of London Authority (PLA) installed a number of continuous air pollution monitors near Greenwich Ship Tier 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.</p>
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

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			<p>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 2020 requiring compliance of NRMM with LEZ standards</p>
		<p>Action 2: Ensuring enforcement of Non-Road Mobile Machinery (NRMM) air quality policies</p>	<p>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.</p>
		<p>Action 3: Enforcing CHP and biomass air quality policies</p>	<p>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 public consultation stage is expected in 2021.</p>
		<p>Action 4: Enforcing Air Quality Neutral policies</p>	<p>Planning officers consult Environmental Health 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.</p>
		<p>Action 5: Development which may increase air pollution or introduce receptors to polluted areas make a financial contribution to deliver air quality improvements.</p>	<p>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.</p>
		<p>Action 6: Ensuring adequate, appropriate, and well-located green space and</p>	<p>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.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		infrastructure is included in new developments	<p>From August - October 2019, 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.</p> <p>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 submitted to the Secretary of State for Examination in Public.</p> <p>As part of Local Plan review, a borough-wide Characterisation and Tall Buildings Study will be finalised in 2021. 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.</p>
		Action 7: Ensuring that Smoke Control Zones are appropriately identified and fully promoted and enforced	<p>The information on smoke control zones on the website was reviewed.</p> <p>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.</p>
		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 or the Agency	<p>Progress has been made with the Environment Agency in terms of working in partnership with regard to regulated processes.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		<p>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 insulation in combination with other energy conservation measures</p>	<p>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 annually.</p> <p>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.</p> <p>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 <u>evidence base</u> has been prepared, detailing the trajectories to achieve the target. Carbon Neutral Actions were adopted in 2020</p> <p>The Council has supported South East London Community Energy in commencing a project to install renewable energy on Thamesmere and Coldharbour Leisure centers. Preparations began in 2019, with installation commencing in 2020.</p> <p>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.</p> <p>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. Works are expected to be complete by the middle of 2021.</p> <p>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</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			<p>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</p> <p>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, up-front costs and lifetime costs. The report can be reviewed here.</p> <p>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 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).</p>
3.1	Public health and awareness raising	<p>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. A briefing should be provided</p>	<p>Directors of Public Health (DsPH) sign off Air Quality Action Plans and review Annual Status Reports.</p>
		<p>Action 11: Public Health Teams should be supporting engagement with local stakeholders (businesses, schools, community groups and healthcare providers). They</p>	<p>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.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		should be asked for their support via the DsPH when projects are being developed	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.
		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	<p>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.</p> <p>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 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.</p>
		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	<p>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.</p> <p>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.</p>
		Action 14: Director of Public Health to sign off Statutory Annual	Please refer to actions 10, 11, 12, and 13 above

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		Status Reports and all new Air Quality Action Plans	
		<p>Action 15: Ensure that the Head of Transport and Head of Planning 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.</p>	<p>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.</p> <p>There has also been continued partnership working between the directorates, with combined Air Quality Task force meetings taking place in 2020. New Air Quality Working groups were also formed in 2020 to better focus on partnerships and policies with specific teams. One of those working groups is 'Active Travel and Transportation'.</p> <p>Further examples of partnership working in 2020 include participating in the Mayor of London's Anti-idling campaign.</p>
		<p>Action 16: Engagement with businesses</p>	<p>Our new Council air pollution website was includes a <u>section</u> '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.</p> <p>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.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			<p>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.</p>
		<p>Action 17: Promotion of availability of airTEXT and the London Air Quality Network</p>	<p>Promote airTEXT</p> <p>airTEXT and the London Air Quality Network were promoted via the Council's website, the Greenwich Community Directory, and Public Health's Live Well Greenwich site. 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. The page includes the promotion of airTEXT and the London Air Quality Network.</p>
		<p>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</p>	<p>This action has not been updated for 2020 due to COVID-19 school closures but will be picked up again in September 2021.</p> <p>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.</p> <p>As part of Transportation's work to encourage active and sustainable travel to school, the Transport team launched a trial School Streets scheme for six months in four schools, to remove motor vehicles from outside school gates at peak times.</p> <p>Roads outside the following four schools are closed to motor vehicles:</p> <ul style="list-style-type: none"> - De Lucy School - the whole of Cookhill Rd. - Gordon School - Grangehill Rd between Earlshall Rd and Craigton Rd. - Haimo School - Haimo Rd between Froissart Rd and South Circular (A205) Slip Rd. - St Joseph's School - Commerell Street until Pelton Road.

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			<p>The trial scheme was reviewed in 2019 and has been made permanent. A further 3 sites are currently being assessed for suitability for School Streets, trials will be launched in 2021 delayed due to COVID-19 school closures.</p>
		<p>Action 19: Raising awareness of Air Quality</p>	<p>This action has not been updated for 2020 due to COVID-19 school closures but will be picked up again in September 2021.</p> <p>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</p> <p>A National centre for excellence for connected and autonomous vehicles is currently being delivered in the Borough.</p>
<p style="text-align: center;">4.1</p>	<p>Delivery servicing and freight</p>	<p>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</p>	<p>The Council's Procurement Team have produced a new draft Procurement Strategy, which includes the objective of "Sustainable Procurement":</p> <ul style="list-style-type: none"> • 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.

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		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 bronze Fleet Operator Recognition Scheme (FORS) accreditation) or EcoStars equivalent	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.
		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	The evidence base for the Carbon Neutral Plan, being developed to support the Council's response to the Climate Emergency, identified a number of options relevant to this objective. These include the following priority actions, which it suggests should be developed further between 2020 and 2023 following the completion of the Carbon Neutral Plan: "Y. Beginning to convert the Council's fleet to ZEVs where feasible Z. Assessing the feasibility of ZEZs, access restrictions, consolidations opportunities and larger cycling infrastructure projects." Please also refer to Action 20 above.
		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 includes encouraging the switch to ULEVs through access to parking and/or loading
5.1	Borough fleet	Action 24:	The Council's fleet has retained FORS Bronze accreditation for 2020.

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		<p>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</p>	<p>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.</p>
		<p>Action 25: Increasing the number of hydrogen, electric, hybrid, bio-methane and cleaner (e.g. Euro VI) vehicles in the boroughs' fleet.</p>	<p>Part of the Carbon Neutral Plan: "Beginning to convert the Council's fleet to EVs where feasible" and "Assessing the feasibility of Zero Emissions Zones, access restrictions, consolidations opportunities and larger cycling infrastructure projects."</p> <p>The fleet continues to be replaced with zero emission or LEZ/ULEZ-compliant vehicles. There are now 12 electric vehicles on the fleet, 1 plug-in petrol hybrid and 3 diesel hybrids.</p> <p>The following fleet mix is in operation:</p> <ul style="list-style-type: none"> - 25.50% Euro 6/VI ICE diesel (excluding hybrids) - 0.89% hybrids (diesel/PHEV) - 2.66% full electric <p>Overall:</p> <ul style="list-style-type: none"> - 33.92% fleet ULEZ compliant - 79.49% HGV fleet LEZ compliant <p>A longer-term strategy is in place to ensure that 98% of our non-HGV fleet will be ULEZ compliant by October'21. We will be replacing approximately 300 vehicles over the next 18 months.</p> <p>The Council joined the E-flex project which shall see the installation of Vehicle-to-Grid (V2G) chargers in a bid to increase the electrification of its fleet despite constrained electrical capacity.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		<p>Action 26: Accelerate uptake of new Euro VI vehicles in borough fleet</p>	<p>A tender has been accepted to replace the last remaining Euro V RCVs for Euro VI variants. Delivery expected in 2020. Other HGVs also being replaced ahead of the LEZ deadline.</p>
<p style="text-align: center;">6.1</p>	<p style="text-align: center;">Localised solutions</p>	<p>Action 28: Green Infrastructure</p>	<p>Funding from the Mayor of London will see public realm work along White Hart Road adjust the nature of the highway, introducing green infrastructure and tree planting where possible and improving cycle and pedestrian routes</p> <p>Council's target to plant 2022 trees by 2022: A total of 2,022 trees have now been planted in Greenwich, a key goal in the borough's bid to become carbon neutral and was completed ahead of target in 2020. The 2,022nd tree was a dawn redwood tree planted in East Greenwich. The deciduous conifer tree is an endangered species and can reach at least 50 metres in height.</p> <p>Royal Borough of Greenwich has been working with Park Friends Groups to seek external funding to support tree planting initiatives. A number of bids have been successful to the Mayor of London's Greener City Funding in the first two rounds and new trees have been planted in Glyndon, Abbey Wood and Eltham areas supported by this funding.</p>
		<p>Action 29: Low Emission Neighbourhoods (LENs)</p>	<p>The Borough's third Local Implementation Plan for transport incorporates case studies of successful LEN pilots, which are being mainstreamed into our general transport improvements. These include:</p> <ul style="list-style-type: none"> • 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.

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			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)	<p>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.</p> <p>A report has been drafted that will assist the Council's Cabinet in 2020 with authorising the use of powers to enforce against drivers who allow their vehicle engines to run unnecessarily when parked anywhere in the Borough.</p>
		Action 31: Speed control measures e.g. lowering the legal speed limit to 20mph in built up residential areas	<p>Further expansions of 20mph zones. A 20mph zone has been completed at Waterdale Road (Plumstead). Work on another 20mph zone at Colepits Wood Road (Avery Hill) has been consulted on and work was due to start in April 2020.</p> <p>The Borough's third Local Implementation Plan for transport sets out the Council's aspiration to include all residential areas in 20mph zones (and some of the more strategic links, on a case by case basis) in the Borough by 2023. This includes:</p> <ul style="list-style-type: none"> • Further expansions of 20 mph zones. A 20mph zone has been completed at Waterdale Road (Plumstead). Work on another 20mph zone at Colepits Wood Road (Avery Hill) has been consulted on and work is due to start in April 2020. • Proposals for the first 20 mph limit on a strategic route in Royal Greenwich, through a local safety scheme on the A206 near Windrush School. <p>Improvements to programme management and governance processes to ensure transport schemes are holistic, encouraging the spread of experience in lowering speeds in 20mph zones across all schemes.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		Action 32: Expanding Car Clubs and increasing the proportion of electric, hydrogen and ultra-low emission vehicles in their fleet.	'Free floating' one-way car clubs is on the Royal Borough's forward plan. '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.
		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	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 36: Installation of residential electric charge points	Work as part of the European Horizon2020 smart cities programme to introduce Electric Vehicle (EV) lamp post charging. EV lamp post charging- 1st phase up and running with 26 points installed. The first phase has so far delivered over 4000 kWh energy charged, this is the equivalent of saving about ~2,400 kg CO2e emissions The second phase of engagement with residents has concluded and this looked at where charge points should be located. The delivery of further EV lamp post charge points in phase 2 has been delayed due to covid but points are expected to be installed by the end of 2021.

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
		<p>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)</p>	<p>The Royal Borough aims to help deliver 11 new rapid chargers (including a new rapid charging hub at Glass Yard).</p>
		<p>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</p>	<p>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.</p> <p>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.</p> <p>Action 39 below details the significant work undertaken to provide better walking and cycling infrastructure, which increasingly includes expanded and segregated provision for cycling.</p> <p>Work on the Greenwich Town Centre Liveable Neighbourhood scheme will help create far more space for walking and cycling.</p> <p>Bus Priority –Works at Charlton Station (Charlton Church Lane) commenced in 2020.</p> <p>Improvements to programme management and governance processes to ensure transport schemes are holistic, should help to enable a wider range of schemes to re-prioritise road space. An early example is the increased use of carriageway space (rather than footway) for proposed new cycle parking.</p>
		<p>Action 39: Provision of infrastructure to support walking and cycling</p>	<p>E-Z Cycle, managed by Charlton Athletic Community Trust, opens e-bikes up to anyone who lives, works or studies in the entire borough.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			<p>RBG have commissioned a cycle network analysis and a walking network analysis to develop the key priorities for the coming years. A cycling strategy and walking strategy are being prepared and will provide a delivery plan to the findings of these commissions.</p> <p>As well as providing high quality cycling facilities, the proposals also included improved pedestrian crossings and new bus lanes - to create a sustainable transport corridor between two of the biggest commercial centres and transport hubs in Royal Greenwich.</p> <p>Work on the Greenwich Town Centre Liveable Neighbourhood scheme will help create far more space for walking and cycling.</p> <p>New strategic cycle routes: We continue to work with TfL on Cycleway 4 (formerly Cycle Superhighway 4) to connect Greenwich with Tower Bridge.</p> <p>The borough will continue to consult residents about new proposed cycle routes to make cycling a more attractive and safer option for our residents.</p> <p>New cycle routes will connect with other existing high-quality cycle routes and those in development. These include the Greenwich to Waterloo Quietway (also known as Quietway 1); and Greenwich to Woolwich Cycleway; The extension of Cycleway 4 will be a 5km two-way segregated cycle route connecting the Tower Bridge to Greenwich section of the route to Woolwich, creating a safer route into the city for borough residents. Making it easier for people in the area to walk, cycle and use public transport is vital to the capital's recovery from coronavirus. In order to ensure the best design, a two-way cycle track, could be built, Greenwich contributed £500,000 from developer contributions, known as 'Section 106 (S106) funding', to secure the best option.</p> <p>The new cycle routes are also designed to provide safer cycle routes to primary and secondary schools.</p>

Measure	LLAQM Action Matrix Theme	Action	<p style="text-align: center;">Progress</p> <ul style="list-style-type: none"> • Emissions/Concentration data <ul style="list-style-type: none"> • Benefits • Negative impacts / Complaints
			<p>Delivery of strategic cycle routes from Greenwich Park to Shooters Hill Phase 2, and Eltham to Greenwich Park through the London Streetspace Programme. Routes due to be constructed as a trial in Summer 2021. Greenwich Park to Shooters Hill Phase 1 between Baker Road and Weyman Road delivered in October 2020.</p> <p>Greenwich to Woolwich Cycleway (Cycleway 4 extension) - ongoing liaison with TfL, securing best solutions for residents at concept design, overseeing all features of detailed design and build programme, including the future of the scheme (currently installed using a Temporary Traffic Management Order). Scheme built in phases between December 2020 and April 2021, fully operational along A206 corridor between Park Row and Anchor and Hope Lane.</p> <p>Development of Low Traffic Neighbourhoods. West and East Greenwich LTNs delivered through the London Streetspace Programme in Summer 2020, more proposed and due for delivery in 2021/22 financial year subject to traffic modelling and further engagement</p> <p>Greenwich Town Centre Liveable Neighbourhood - scheme progressing to Gate 3 (concept design) subject to additional funding being secured through the Liveable Neighbourhood programme. Public consultation on the design in early 2022.</p>
		Action 40: Local Low Emission Zones (LEZ)	Lobbying continues, at all levels.

4. Planning Update and Other New Sources of Emissions

Table K. Planning requirements met by planning applications in Royal Borough of Greenwich in 2020

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	13 applications reviewed for AQ impacts in 2020
Number of planning applications required to monitor for construction dust	18
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	5
Number of developments required to install Ultra-Low NO _x boilers	11
Number of developments where an AQ Neutral building and/or transport assessments undertaken	3
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	0
Number of planning applications with S106 agreements including other requirements to improve air quality	1
Number of planning applications with CIL payments that include a contribution to improve air quality	Not current practice at Greenwich
<p>NRMM: Central Activity Zone and Canary Wharf</p> <p>Number of conditions related to NRMM included.</p> <p>Number of developments registered and compliant.</p> <p>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 IIIB of the Directive and/or exemptions to the policy.</p>	N/A
<p>NRMM: Greater London (excluding Central Activity Zone and Canary Wharf)</p> <p>Number of conditions related to NRMM included.</p> <p>Number of developments registered and compliant.</p> <p>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.</p>	<p>3 applications included a request for a separate NRMM condition.</p> <p>27 sites were audited in 2020.</p> <p>5 site(s) achieved Self-Compliant status, 8 site(s) worked towards and achieved Compliance and 2 site(s) failed and were recorded as non-Compliant.</p> <p>10 site(s) upon arrival/engagement were completed and 2 site(s)</p>

Condition	Number
	had No NRMM within scope (37-560kW) presently deployed. 41% of sites audited were cold engaged and therefore not registered prior to auditing.

All planning officers send email requests for comments to the Environment Protection Team, for allocation to specialist air quality officers to review and comment. Officers from the Environmental Protection Team who have experience in air quality are requested to attend pre-application meetings for major developments where appropriate.

Some applications include a condition requiring the submission of a Construction Management Plan and compliance with the Low Emission Zone standards for Non-Road Mobile Machinery (NRMM) was being secured through this approach. During 2019, officers switched to an approach where compliance with the NRMM Low Emission Zone was requested as a separate condition. The figure in the above table represents only the latter. The borough participates in the pan-London project to monitor compliance with these standards.

Environment Protection Officers regulate dust emissions from construction sites and work closely with Planning Enforcement. Where required, major construction sites, often with COPA 1974 section 61 Construction Site Noise agreements in place, provide dust monitoring results.

4.1 New or significantly changed industrial or other sources

No new sources identified but plans for the new Silvertown Tunnel will involve RBG engagement.

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.

PM₁₀ 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)
- For details attaining to 'results' – precision, bias adjustment factors; and reference methods please refer to - 'London Wide Environment Program Nitrogen Dioxide diffusion tube survey report,2020.

Discussion of Choice of Factor to Use

The Royal Borough of Greenwich has used the London Wide Environment Program (LWEP) Bias Adjustment Factor for the last few years because it was the factor used across Greater London as part of the London Wider Environment Program.

The LWEP bias adjustment cannot be used for 2020, due different Boroughs taking different actions during the first national lockdown. Therefore, 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.

Table L. Bias Adjustment Factor

Year	Local or National	If Local, Version of National Spreadsheet	Adjustment Factor
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
2014	LWEP		0.95

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 81 – to 100%, with the exception of the PM10 analyser at site GR7 (Blackheath), which has a data capture rate of 65% , the PM10 analyser at site GR13 (Plumstead High St) which has a data capture rate of 74% and the PM10 analyser at site GR10 (Burrage Grove) which has a data capture rate of 51%. The low capture rate in all three cases is due to a failure of the FDMS Units. Due to ongoing manufacturing and supply issues it took few months to source a new dryer.

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

Annualisation of PM10 for GR7 Blackheath

Original Annual Mean	Annualisation Factor	Annualised Mean
19	0.97	18

Site	Site Type	Annual Mean (ug/m3)	Period Mean (ug/m3)	Ratio
Bexley- Belvedere	Background	17.4	17.6	0.987
Greenwich Eltham	Background	13.5	14.1	0.957
Lewisham – Honor Oak Park	Background	13.8	14.4	0.962
Average				0.968

Annualisation of PM10 for GN3 Plumstead High Street

Original Annual Mean	Annualisation Factor	Annualised Mean
15	0.998	15

Site	Site Type	Annual Mean (ug/m3)	Period Mean (ug/m3)	Ratio
Bexley- Belvedere	Background	17.4	17.8	0.976
Greenwich Eltham	Background	13.5	13.4	1.011
Lewisham – Honor Oak Park	Background	13.8	13.7	1.006
Average				0.997

Annualisation of PM10 for GR10 Burrage Grove

Original Annual Mean	Annualisation Factor	Annualised Mean
15	0.984	14.8


Site	Site Type	Annual Mean (ug/m3)	Period Mean (ug/m3)	Ratio
Bexley- Belvedere	Background	17.4	17.6	0.959
Greenwich Eltham	Background	13.5	13.5	0.997
Lewisham – Honor Oak Park	Background	13.8	13.9	0.997
Average				0.984

Table N. NO₂ Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted ($\mu\text{g m}^{-3}$))	Background Concentration ($\mu\text{g m}^{-3}$)	Concentration Predicted at Receptor ($\mu\text{g m}^{-3}$)	Comments
GW36 Brord Street	30	50	41	16	32.8	

Distance Adjustment

As set out in Table D2, a calculation to correct for distance was carried out for GW36 Boord Street. 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 GW40 Shrewsbury House



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 $\mu\text{g}/\text{m}^3$)?	16	$\mu\text{g}/\text{m}^3$
Step 4	What is your measured annual mean NO ₂ concentration (in $\mu\text{g}/\text{m}^3$)?	41	$\mu\text{g}/\text{m}^3$
Result	The predicted annual mean NO ₂ concentration (in $\mu\text{g}/\text{m}^3$) at your receptor	32.8	$\mu\text{g}/\text{m}^3$

Table O. NO₂ Diffusion Tube Results

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2020 % ^(b)	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual mean – raw data	Annual mean – bias adjusted
GW23	67	67	33.30	26.97					22.69	34.43	37.81	29.60	39.23	39.13	32.9	27.0
GW24	67	67	43.21	39.77					36.93	43.06	49.48	40.32	49.63	40.37	42.8	35.1
GW25	67	67	34.27	29.14					26.66	34.86	37.19	31.13	41.00	28.86	32.9	27.0
GW26	67	67	26.97	26.06					16.95	27.36	26.44	25.56	37.46	25.51	26.5	21.8
GW27	67	67	38.33	34.78					24.68	29.32	32.63	28.99	37.56	30.43	32.1	26.3
GW29	58	58	62.83	53.48					34.84	50.06	49.32	33.80	-	47.60	47.4	38.9
GW32	67	67	49.17	39.52					27.18	29.98	39.11	37.17	47.19	41.85	38.9	31.9
GW33	67	67	44.96	36.13					34.56	50.97	49.98	44.39	54.23	45.10	45.0	36.9
GW34	67	67	44.36	34.54					27.43	34.55	38.14	34.82	46.22	34.03	36.8	30.1
GW35	58	58	66.59	54.14					46.87	55.87	57.47	36.72	-	42.51	51.5	42.2
GW36	67	67	64.08	49.80					34.57	44.20	48.62	50.43	55.37	42.40	49.6	40.7
GW37	50	50	24.88	23.03					13.83	-	-	20.75	28.24	23.87	22.4	18.4
GW38	67	67	30.92	21.47					16.50	28.89	29.26	24.41	36.29	29.92	27.2	22.3
GW39a	67	67	23.15	18.34					7.86	15.04	17.77	16.66	25.08	19.28	17.9	14.7
GW39b	67	67	20.11	15.57					9.07	14.95	17.93	16.38	24.04	17.39	16.9	13.9
GW39c	67	67	23.76	17.86					-	15.16	19.00	15.54	24.28	19.13	19.2	15.8
GW40	33	33	20.97	16.95					-	-	-	15.34	24.31	-	19.4	15.9
GW41	67	67	48.89	48.44					36.25	45.26	40.49	39.21	49.34	36.03	44.0	36.1
GW42	67	67	41.96	32.01					31.53	43.37	45.72	37.30	40.71	39.58	39.0	32.0
GW43	67	67	46.05	34.99					29.07	40.99	43.48	43.91	45.03	39.94	40.4	33.2
GW44	67	67	50.78	44.27					35.74	50.02	55.84	43.97	61.23	44.83	47.8	39.2
GW106	67	67	43.07	38.43					26.82	35.76	39.07	37.56	49.90	34.49	38.1	31.3
GW48	67	67	47.06	33.80					25.51	30.53	35.89	31.46	46.31	40.70	37.5	30.8
GW49	67	67	47.94	47.19					31.25	36.39	-	37.32	48.59	35.42	40.6	33.3
GW50a	67	67	69.61	62.87					52.03	51.98	59.94	61.00	68.65	49.12	62.4	51.1
GW50b	67	67	59.09	71.87					54.39	60.27	59.65	54.58	58.66	62.94	60.2	49.3
GW50c	67	67	64.80	64.48					55.61	60.74	60.99	55.02	61.46	49.55	59.1	48.4
GW51	58	58	47.61	31.17					26.83	34.40	38.05	37.84	-	37.94	36.3	29.7
GW52	58	58	34.08	33.48					23.98	30.01	33.63	26.72	-	27.03	29.8	24.5
GW53	67	67	35.63	30.72					20.40	24.43	29.58	24.11	38.07	29.18	29.0	23.8

GW54	67	67	62.77	48.31					31.32	48.51	47.04	43.31	64.87	53.74	50.0	41.0
GW55a	67	67	38.66	35.57					27.49	37.29	40.15	30.72	46.60	37.26	36.7	30.1
GW55b	67	67	38.07	33.45					27.74	39.93	45.72	36.43	46.32	36.43	38.0	31.2
GW55c	67	67	36.47	28.04					27.45	40.47	40.89	34.36	43.98	35.08	35.8	29.4
GW56	67	67	37.73	44.12					32.79	36.12	44.25	37.66	42.90	32.97	38.6	31.6
GW57a	67	67	30.85	33.21					20.66	24.02	30.25	27.52	37.68	28.63	29.1	23.9
GW58a	67	67	38.86	37.09					24.75	35.55	42.46	33.33	40.81	37.98	36.2	29.7
GW58b	67	67	37.29	31.72					26.68	37.36	40.49	31.33	42.75	35.96	35.4	29.1
GW58c	67	67	38.16	34.55					26.45	34.44	41.39	35.84	42.63	37.11	36.3	29.8
GW59a	67	67	35.52	28.73					18.86	32.70	35.51	29.13	41.32	29.92	31.5	25.8
GW59b	67	67	36.37	21.09					18.90	32.33	32.17	26.98	34.12	32.23	29.3	24.0
GW59c	67	67	31.78	25.79					18.20	32.84	35.38	28.93	39.62	32.08	30.6	25.1
GW60a	67	67	29.47	27.27					22.32	28.65	34.46	23.81	34.64	27.83	28.6	23.4
GW60b	67	67	33.10	27.50					21.95	28.44	34.80	27.17	35.98	26.41	29.4	24.1
GW60c	67	67	28.86	27.42					22.07	29.35	32.40	25.35	35.87	29.88	28.9	23.7
GW101	50	50	62.59	50.21					44.92	56.62	-	58.72	-	59.60	54.1	44.4
GW102	50	50	58.43	49.76					42.25	-	-	47.57	60.82	48.22	51.5	42.2
GW61a	67	67	40.38	40.09					23.02	26.33	32.85	29.55	39.07	27.72	33.0	27.1
GW61b	67	67	40.87	40.38					22.85	27.58	24.89	30.19	34.88	30.67	31.5	25.9
GW61c	67	67	43.25	36.90					23.36	26.08	23.45	31.78	39.85	-	32.1	26.3
GW31	58	58	28.95	25.24					15.38	22.58	18.74	-	35.28	26.89	24.7	20.3
GW103	58	58	44.62	41.03					27.81	28.86	27.97	-	43.84	35.59	35.7	29.3
GW104	67	67	68.50	64.73					35.50	38.63	37.45	45.93	54.19	45.35	48.8	40.0
GW105	67	67	47.66	48.17					45.33	44.61	42.12	43.43	49.47	36.11	44.6	36.6
GW30	67	67	35.95	35.34					24.92	29.47	26.78	30.65	43.57	33.85	32.6	26.7
GW28	67	67	34.35	25.26					16.75	24.75	29.90	25.08	34.59	30.84	27.7	22.7

Please refer to -London Wide Environment Program Nitrogen Dioxide diffusion tube survey report, 2020

Notes

Concentrations are presented as $\mu\text{g m}^{-3}$.

Exceedances of the NO_2 annual mean AQO of $40 \mu\text{g m}^{-3}$ are shown in **bold**.

NO_2 annual means in excess of $60 \mu\text{g m}^{-3}$, 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 33%.

(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%).