

London Borough of Havering Air Quality Annual Status Report for 2023

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Photo: a man walking through grass with trees in a park in Havering

This report provides a detailed overview of air quality in the London Borough of Havering during 2023. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process¹.

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
AQN	Air Quality Neutral
AQO	Air Quality Objective
AQP	Air Quality Positive
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 and International Standards, Objectives and Guidelines

Pollutant	Standard / Objective / Guideline	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
Nitrogen dioxide (NO ₂)	WHO AQG ⁽²⁾ : 10 µg m ⁻³	Annual mean	
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)	WHO AQG ⁽²⁾ : 45 µg m ⁻³ not to be exceeded more than 3-4 times a year	24-hour mean	
Particles (PM ₁₀)	40 µg m ⁻³	Annual mean	31 Dec 2004
Particles (PM ₁₀)	WHO AQG ⁽²⁾ : 15 µg m ⁻³	Annual mean	
Particles (PM _{2.5})	20 µg m ⁻³	Annual mean	2020
Particles (PM _{2.5})	London Mayoral Objective ⁽³⁾ : 10 µg m ⁻³	Annual mean	2030
Particles (PM _{2.5})	WHO AQG ⁽²⁾ : 5 µg m ⁻³	Annual mean	
Particles (PM _{2.5})	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
Particles (PM _{2.5})	WHO AQG ⁽²⁾ : 15 µg m ⁻³	24-hour mean	
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
Sulphur dioxide (SO ₂)	WHO AQG ⁽²⁾ : 40 µg m ⁻³ not to be exceeded more than 3-4 times a year	24-hour mean	

Notes:

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

(2) 2021 World Health Organisation Air Quality Guidelines

(3) London Mayoral Objective

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2023

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
HV1	Rainham	Roadside	553127	182506	NO ₂ , PM ₁₀ , PM _{2.5}	Yes LB Havering	Chemiluminescent; TEOM, FDMS	3	10	3
HV3	Romford	Roadside	551108	188257	NO ₂ , PM ₁₀	Yes LB Havering	Chemiluminescent; FDMS	3	8	3

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table C. Details of Non-Automatic Monitoring Sites for 2023

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
2, 5, 6	Mercury Gardens	Urban Centre	551488	188993	NO2	Y (LB Havering)	1.0	3.0	No	2.0
1, 7, 8	Waterloo Road	Urban Centre	551108	188257	NO2	Y (LB Havering)	3.0	8.0	Yes	2.0
3	Nelson Road	Urban Background	551726	183462	NO2	Y (LB Havering)	3.0	1.0	No	2.0
4	Langtons	Urban Background	553724	187560	NO2	Y (LB Havering)	1.0	NA	No	2.0
9, 10, 11	Alexandra Road	Urban Centre	551629	188296	NO2	Y (LB Havering)	3.0	1.0	No	2.0
12	Main Road GPPS	Roadside	552096	189619	NO2	Y (LB Havering)	4.0	1.0	No	2.0
13, 14, 15	A12 Junction with North Street	Roadside	550607	189685	NO2	Y (LB Havering)	5.0	5.0	No	2.0
16, 17, 18	Rom Valley Way	Roadside	551414	187802	NO2	Y (LB Havering)	1.0	1.0	No	2.0
19, 20, 21	Collier Row	Kerbside	549837	191109	NO2	Y (LB Havering)	3.0	0.5	No	2.0
22, 23, 24	Ravensbourne School	Urban Background	553707	190817	NO2	Y (LB Havering)	1.0	1.0	No	2.0
25	Wincanton Road	Urban Background	553727	193161	NO2	Y (LB Havering)	1.0	3.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
26	Adj. 109 Cross Road	Urban Background	549532	189777	NO2	Y (LB Havering)	3.0	1.0	No	2.0
27, 28, 29	Rush Green Road	Kerbside	550942	187420	NO2	Y (LB Havering)	5.0	0.5	No	2.0
30	Marlborough Road	Urban Background	549318	189384	NO2	Y (LB Havering)	3.0	1.0	No	2.0
31	Danes Road	Industrial	550197	187908	NO2	Y (LB Havering)	4.0	1.0	No	2.0
32, 33, 34	Gallows Corner	Kerbside	553410	190558	NO2	Y (LB Havering)	4.0	0.5	No	2.0
35	Church Road	Urban Background	554204	193795	NO2	Y (LB Havering)	3.0	1.0	No	2.0
36	Bedford Park Entrance	Rural	551755	193022	NO2	Y (LB Havering)	1.0	NA	No	2.0
37	Colchester Road	Kerbside	555723	191750	NO2	Y (LB Havering)	3.0	0.5	No	2.0
38	Myrtle Road	Roadside	553434	191656	NO2	Y (LB Havering)	1.0	1.0	No	2.0
39	Rise Park Boulevard	Roadside	551616	190622	NO2	Y (LB Havering)	3.0	1.0	No	2.0
40	Main Road	Roadside	553174	190306	NO2	Y (LB Havering)	9.0	1.0	No	2.0
41	Main Road	Roadside	552517	189826	NO2	Y (LB Havering)	8.0	1.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
42	Mawney Road	Kerbside	550623	188890	NO2	Y (LB Havering)	2.0	1.0	No	2.0
43	Upminster School	Roadside	556072	186539	NO2	Y (LB Havering)	2.0	2.0	No	2.0
44	Ardleigh Green School	Kerbside	553952	189731	NO2	Y (LB Havering)	5.0	1.0	No	2.0
45	St. Marys School RC	Kerbside	552327	187422	NO2	Y (LB Havering)	10.0	1.0	No	2.0
46	Rainham Village School	Kerbside	552441	182337	NO2	Y (LB Havering)	1.0	1.0	No	2.0
47	Campion School off A127	Roadside	554730	189487	NO2	Y (LB Havering)	7.0	2.0	No	2.0
48	Parklands School	Urban Background	550602	189990	NO2	Y (LB Havering)	1.0	1.0	No	2.0
49	Newton's Primary	Roadside	550722	183294	NO2	Y (LB Havering)	2.0	1.0	No	2.0
50	Blewitts Cottages	Kerbside	551526	182672	NO2	Y (LB Havering)	12.0	0.5	No	2.0
51	St. Edwards School	Urban Background	551180	189432	NO2	Y (LB Havering)	1.0	1.0	No	2.0
52	Opp. Harold Wood Stn.	Roadside	554741	190626	NO2	Y (LB Havering)	0.0	2.0	No	2.0
53	R.J. Mitchel School	Roadside	552841	184966	NO2	Y (LB Havering)	15.0	2.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
54	Hilldene Infant School	Roadside	553135	191674	NO2	Y (LB Havering)	5.0	1.0	No	2.0
55	Butts Green Road	Kerbside	553830	188314	NO2	Y (LB Havering)	1.0	0.5	No	2.0
56	Rainham Broadway	Kerbside	552045	182222	NO2	Y (LB Havering)	1.0	0.5	No	2.0
57	Romford Taxi Rank	Urban Centre	551420	188526	NO2	Y (LB Havering)	1.0	0.2	No	2.0
58, 59, 60	Romford Battis	Urban Centre	551397	188509	NO2	Y (LB Havering)	1.0	0.2	No	2.0
61	Wennington Road	Urban Background	553719	180987	NO2	Y (LB Havering)	1.0	1.0	No	2.0
62	New Road Junction with South Street	Kerbside	550462	183013	NO2	Y (LB Havering)	10.0	0.5	No	2.0
63	New Road Junction with Spencer Road	Kerbside	550888	182884	NO2	Y (LB Havering)	10.0	0.5	No	2.0
64	New Road Junction with Betterton Road	Kerbside	551112	182811	NO2	Y (LB Havering)	10.0	0.5	No	2.0
65	Front Lane/Jnt Brunswick Ave LP40	Urban Centre	557323	187932	NO2	Y (LB Havering)	1.0	0.2	No	2.0
66	Station Lane LP6	Urban Centre	554013	187001	NO2	Y (LB Havering)	1.0	0.5	No	2.0

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

1.2 Comparison of Monitoring Results with AQOs

Concentration values are those at the location of the monitoring site (bias adjusted and annualised, as required), not those following any fall-off with distance correction.

Table D. Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	Site type	Valid data capture for monitoring period % ^(a)	Valid data capture 2023 % ^(b)	2017	2018	2019	2020	2021	2022	2023
HV1	Automatic	-	98.1	34.3	30	29.1	23	23	23	20.5
HV3	Automatic	-	99.6	40	38	35.8	29	28	30.4	24.6

Notes:

The annual mean concentrations are presented as µg m⁻³.

Exceedances of the NO₂ annual mean AQO of 40 µg m⁻³ are shown in **bold**.

NO₂ annual means in excess of 60 µg 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 25%.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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 D shows that NO₂ concentrations are comfortably compliant at the borough’s two air quality monitoring stations. The decline has been consistent, year on year. It appears that improvements made during the COVID19 pandemic have persisted into 2023.

Table E. Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2017	2018	2019	2020	2021	2022	2023
2, 5, 6	551488	188993	Urban Centre	-	92.3	51.1	47.9	42.0	38.2	38.8	44.0	39.5
1, 7, 8	551108	188257	Urban Centre	-	92.3	40.3	39.6	36.7	38.6	32.8	34.9	29.9
3	551726	183462	Urban Background	-	92.3	31.7	26.5	26.0	25.1	19.8	21.4	19.0
4	553724	187560	Urban Background	-	92.3	20.1	17.3	19.7	16.7	14.7	15.3	14.0
9, 10, 11	551629	188296	Urban Centre	-	92.3	29.6	29.0	26.1	26.7	23.0	22.9	21.0
12	552096	189619	Roadside	-	92.3	41.6	36.6	32.4	28.3	29.1	26.0	24.1
13, 14, 15	550607	189685	Roadside	-	92.3	40.5	38.7	35.4	32.2	31.1	31.8	27.7
16, 17, 18	551414	187802	Roadside	-	92.3	39.8	34.8	33.6	29.1	28.8	32.6	26.5
19, 20, 21	549837	191109	Kerbside	-	92.3	49.2	40.4	37.2	35.7	33.7	38.6	39.9
22, 23, 24	553707	190817	Urban Background	-	92.3	30.4	25.3	24.5	16.6	19.9	19.3	17.3
25	553727	193161	Urban Background	-	92.3	26.6	22.1	20.8	19.7	18.4	18.3	15.5
26	549532	189777	Urban Background	-	92.3	27.3	21.4	21.3	19.5	17.1	16.7	14.9
27, 28, 29	550942	187420	Kerbside	-	92.3	54.1	51.4	47.3	44.4	40.4	42.3	35.8
30	549318	189384	Urban Background	-	67.3	29.1	21.6	21.9	21.3	18.6	15.7	13.5
31	550197	187908	Industrial	-	92.3	30.6	26.4	25.2	22.0	20.3	20.6	17.3
32, 33, 34	553410	190558	Kerbside	-	92.3	52.9	50.3	49.4	45.2	40.6	39.6	34.2
35	554204	193795	Urban Background	-	92.3	27.2	26.2	23.0	19.8	20.1	18.4	15.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2017	2018	2019	2020	2021	2022	2023
36	551755	193022	Rural	-	92.3	23.9	18.3	18.9	20.9	13.8	14.5	11.9
37	555723	191750	Kerbside	-	92.3	55.3	48.0	41.6	34.5	36.1	36.8	31.9
38	553434	191656	Roadside	-	92.3	25.3	22.2	21.0	20.5	16.4	17.2	14.7
39	551616	190622	Roadside	-	92.3	38.8	29.0	28.9	30.9	23.5	22.5	19.7
40	553174	190306	Roadside	-	92.3	52.1	49.2	44.4	36.8	31.7	33.9	29.4
41	552517	189826	Roadside	-	92.3	49.6	40.9	39.3	32.2	32.4	31.8	25.8
42	550623	188890	Kerbside	-	92.3	31.6	30.8	29.7	26.5	23.9	26.2	24.5
43	556072	186539	Roadside	-	92.3	35.6	32.2	34.3	27.2	25.7	25.5	21.9
44	553952	189731	Kerbside	-	92.3	36.7	34.4	31.6	30.1	28.5	30.1	25.7
45	552327	187422	Kerbside	-	92.3	37.7	35.6	31.8	26.5	26.7	27.9	24.9
46	552441	182337	Kerbside	-	84.6	33.0	32.2	30.0	27.8	24.4	25.3	23.6
47	554730	189487	Roadside	-	84.6	42.3	36.8	41.0	35.6	36.5	35.8	27.8
48	550602	189990	Urban Background	-	84.6	37.8	25.0	26.4	21.4	19.8	19.9	17.4
49	550722	183294	Roadside	-	84.6	28.0	34.3	26.6	23.6	22.0	22.9	17.7
50	551526	182672	Kerbside	-	84.6	46.1	39.8	36.6	32.5	30.5	30.4	26.9
51	551180	189432	Urban Background	-	92.3	24.9	23.4	21.6	20.7	17.9	18.2	17.0
52	554741	190626	Roadside	-	92.3	47.8	41.1	32.2	26.1	29.5	30.9	29.8
53	552841	184966	Roadside	-	92.3	-	-	-	29.1	24.6	26.4	24.6
54	553135	191674	Roadside	-	82.7	-	-	-	21.4	22.0	21.9	20.5
55	553830	188314	Kerbside	-	92.3	-	-	-	35.9	40.2	42.2	38.3
56	552045	182222	Kerbside	-	92.3	-	-	-	35.7	32.7	30.8	28.1
57	551420	188526	Urban Centre	-	84.6	61.0	64.7	53.1	52.9	53.4	65.5	60.3
58, 59, 60	551397	188509	Urban Centre	-	84.6	71.7	71.4	71.3	66.9	71.3	82.7	82.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2017	2018	2019	2020	2021	2022	2023
61	553719	180987	Urban Background	-	92.3	-	27.5	26.2	22.8	20.9	20.3	18.2
62	550462	183013	Kerbside	-	92.3	-	-	-	34.1	28.8	31.2	27.6
63	550888	182884	Kerbside	-	92.3	-	-	-	30.5	31.0	32.3	27.7
64	551112	182811	Kerbside	-	92.3	-	-	-	30.9	29.3	28.9	26.5
65	557323	187932	Urban Centre	-	84.6	-	-	-	28.8	26.4	26.4	22.6
66	554013	187001	Urban Centre	-	92.3	-	-	-	34.6	31.6	32.2	30.6

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LLAQM.TG19.

☒ Diffusion tube data has been bias adjusted.

☒ Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.

Notes:

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

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

NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean 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%.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

The data in 2023 exhibits a general downward trend in NO₂ concentrations. Only two locations in Romford town centre exceeded the NO₂ annual mean limit value. Collier Row HAV21 and Butts Green Road HAV55 were within 10% of the limit value.

Table F. 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 2023 % ^(b)	2017	2018	2019	2020	2021	2022	2023
HV1	-	98.1	0	0	0	0	0	0	0
HV3	-	99.6	1	0	0	0	0	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 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 shows that exceedances of the 1hr mean objective for NO₂ have been non-existent at the borough's two automatic monitoring stations for the last six years.

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

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2023 % ^(b)	2017	2018	2019	2020	2021	2022	2023
HV1	-	91.8	18	17	17.4	15	13.6	17	13.5
HV3	-	90.1	19	20	20.5	21	18.9	17.8	17.5

Notes

The annual mean concentrations are presented as µg m⁻³.

Exceedances of the PM₁₀ 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%).

The annual mean objective for PM₁₀ is 40 µg m⁻³. Table G shows that the highest monitored annual mean concentration in 2023 was considerably less than half of that. Compliance has been met at both monitoring sites for at least the last seven years. There has been a slight decline since at least 2017 although concentrations were affected by the COVID19 pandemic, particularly at site HV1, in Rainham.

Table H. 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 2023 % ^(b)	2017	2018	2019	2020	2021	2022	2023
HV1	-	91.8	4	1	4	1	0 (23.8)	4	0
HV3	-	90.1	N/A	2	9	5	0 (29.6)	4	4

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%).

Havering's borough-wide AQMA was declared in 2006 for exceedances of the annual mean objective of NO₂ and the 24 hour mean objective for PM₁₀. Table H shows that both monitoring sites have been substantially compliant with the latter for at least the last seven years, although there is no clear trend in the data.

Table I. Annual Mean PM_{2.5} Automatic Monitoring Results (µg m⁻³)

Site ID	Valid data capture for monitoring period % ^(a)	Valid data capture 2023 % ^(b)	2017	2018	2019	2020	2021	2022	2023
HV1	-	92.2	12	11	11.1	9	8.8	10.2	7.4

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%).

The Environment Act (2021) created a new objective for annual mean PM_{2.5} concentrations. While there is only one site monitoring this pollutant in Havering, Table I shows that in 2023 it was compliant with both the interim and 2040 objective. There is also a clear downward trend over the last seven years.

2. Action to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMA) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMA declared by the London Borough of Havering can be found in Table J. The table presents a description of the borough-wide AQMA that is currently designated within Havering. Appendix C provides maps of the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO₂ annual mean;
- <PM₁₀ 24-hour mean.

Table J. Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
LB Havering AQMA	11 th September 2006	NO ₂ annual mean	Whole borough AQMA due to widespread exceedances	Yes	Not known	82.5 µg m ⁻³	Non-compliant	London Borough of Havering Air Quality Action Plan 2018-2023	Visit the AQAP

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
LB Havering AQMA	11 th September 2006	PM ₁₀ 24h limit	Whole borough AQMA due to widespread exceedances	Yes	No known	Compliant	>7 years	London Borough of Havering Air Quality Action Plan 2018-2023	Visit the AQAP

☒ The London Borough of Havering confirm the information on UK-Air regarding their AQMA(s) is up to date.

☒ The London Borough of Havering confirm that all current AQAPs have been submitted to GLA.

2.2 Air Quality Action Plan Progress

Table K provides a brief summary of the London Borough of Havering progress against the Air Quality Action Plan, showing progress made this year. Havering's current AQAP was adopted in 2018 and is overdue for renewal. Despite this, actions to improve local air quality are ongoing.

Table K.1 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	Undertake detailed computer modelling of air quality in Havering.	<i>Action completed</i> , as reported in 2021.
1.2	Monitoring and other core statutory duties	Use AQ Mesh Pods to provide real time air quality measurements for schools to use as part of air quality publicity campaigns and to encourage walking to school.	<i>Action ongoing.</i> AQ Mesh pods are used to support local projects (e.g. School Streets), as well as when dealing with complaints / requests. In 2021, baseline monitoring was carried out at selected school locations, to support the expansion of the Council's School Streets Scheme. Once the scheme is in place at the new locations, further monitoring will be carried out, in order to be able to compare the 'before' and 'after' data and quantify the benefits of the scheme to local air quality. Although it is recognised that the accuracy of the AQMesh pods readings is not as high as other monitoring equipment, which has been officially approved by DEFRA, the use of the AQMesh pods gives a picture of air quality and has been found useful for keeping the public up to date on local air quality and raise awareness and knowledge. Also getting continuous readings allows us to correlate NO2 levels with potential causes (e.g. higher NO2 levels at pick up/drop of times on the school run) and identify areas of poor air quality outside of schools that were previously unknown.
1.3	Monitoring and other core statutory duties	Undertake feasibility study into the location and start-up of a new permanent continuous monitoring location.	<i>Action completed</i> , as reported in 2021.
1.4	Monitoring and other core statutory duties	Expand the current Diffusion Tube Network.	<i>Action completed</i> , as reported in 2021.
1.5	Monitoring and other core statutory duties	Model likely air quality impact of planned major strategic schemes.	<i>Action ongoing.</i> All major strategic developments required to do air quality modelling (part of a detailed Air Quality Assessment at the planning application stage).

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
2.1	Public health and awareness raising	Promote walking and cycling. Engage with over 50's forum to form a walking club and organised led rides	<i>Action ongoing.</i> The over 50s programme is run by trained volunteers with support from the Council's Sports Development Service. In 2021, no face to face sessions and events were held. Once TfL funding is available to organise led rides, they could be arranged again for the Over 50's Forum and other groups in the borough.
2.2	Public health and awareness raising	Continue to use Miles the Mole as an air quality champion and educational prop.	<i>Action ongoing.</i> Miles the Mole continues visiting schools as part of the Council's Air Quality Campaign. Active travel and air quality themed Theatre in Education production is an interactive programme aimed at year 6 pupils. Miles the Mole is still burrowing his way around the borough. The campaign increases awareness and knowledge of children/staff/parents around air quality and promotes small changes people can make to reduce their contribution to air pollution and reduce their exposure to poor air quality.
2.3	Public health and awareness raising	Support Transport for London led initiative to commission a cross borough bus rapid transit study which would include looking at options for improving access to the London Riverside BID.	<i>Action on hold.</i> No progress was made in 2021 due to financial constraints. The continuation of the project will depend on the ability of TfL to support it.
2.4	Public health and awareness raising	Public Health input into delivery of AQAP.	<i>Action ongoing.</i> The Public Health Service supports the Council to achieve its aims to improve air quality. This has included (a) contributing to the evidence base for the local strategy (b) actively participating in the Council's Air Quality Working Group meetings and (c) providing financial contributions to air quality monitoring. Havering's JSNA includes a recommendation that health and care partners should '<i>work together to minimise the direct contribution of health and social care services to air pollution; put in place the infrastructure / encourage residents to switch to electric vehicles and public transport, or better still, walk and cycle, choosing routes that minimise their exposure to pollutants</i>'

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
2.5	Public health and awareness raising	Continue to promote the TfL STARS (Sustainable Travel: Active, Responsible, Safe) accredited travel planning programme with schools to reduce car use on school run.	<i>Action ongoing.</i> All schools in Havering are encouraged to maintain active School Travel Plans (STP) and report their activities annually via the Transport for London Travel for Life Accreditation Programme website. 55 schools out of 84 participated in the TfL Travel for Life Accreditation scheme. Of these, 35 were accredited at the highest Gold level, four at Silver and 13 at Bronze. Promotion of the TfL Travel for Life programme is ongoing. From 2022 to 2023, nearly £30k worth of Small and Cycle Grants were offered to 10 schools which included bikes, balanced bikes, scooters, safety equipment, EY road safety role play equipment and storage facilities. From 2022 to 2023, over £100k was spent on cycle parking facilities at 13 schools providing over 148 cycle parking spaces and 314 scooter parking spaces.
2.6	Public health and awareness raising	Promote Smarter Travel initiatives with businesses and encourage local business to adopt workplace travel plans.	<i>Action partly on hold.</i> The lack of funding from TfL to support business engagement in recent years has put activities on hold. If funding is available then meaningful engagement can resume. Without funding it makes progress significantly harder to achieve. Contact with CEME and the NHS has resumed though progress is again hindered by a lack of funding. Talks with CEME about a site wide Travel Plan will resume in 2022.
2.7	Public health and awareness raising	Continue to promote airTEXT to make sure vulnerable residents are aware of the tool and how to use it.	<i>Action ongoing.</i> Havering has signed up to provide information via SMS on air pollution episodes through the AirTEXT software. We promote AirTEXT through the Council's social media platforms a few times per year, particularly in winter, as well as on Havering's website. Havering's Communication team puts out alerts on social media when we get notified of pollution episodes by Imperial College.

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
2.8	Public health and awareness raising	Investigate the feasibility of introducing Car Clubs and associated facilities in Havering.	<i>Action on hold.</i> Havering is not taking forward the plan for a Council run Car Club programme, as it has not been considered a priority right now. There are currently a few car clubs operating around new developments, sourced by the developers.
2.9	Public health and awareness raising	Support the LIP cycle training budget to promote “bike ability” in schools and also to adults and families.	<i>Action ongoing.</i> Despite low levels of funding from TfL the borough was still able to deliver bikeability training to a large number of residents (pupils and adults). In total, bikeability training was carried out for 932 pupils and cycle skills training for 392 adults.
2.10	Public health and awareness raising	Encourage greater use of the Council’s staff travelling to work sustainably through adequate provision of cycle infrastructure at Council buildings.	<i>Action completed,</i> as reported in 2021.
2.11	Public health and awareness raising	Successful delivery of annual Local Implementation Plan (LIP) programme to deliver schemes that support the Healthy Streets agenda and provide options for people to travel sustainably.	<i>Action ongoing.</i> Two walking zone maps for two schools (Drapers Pyrgo and Harold Wood primary) were developed and successfully launched in 2021, encouraging pupils to travel to school actively. Cycle Parking has been delivered at Hall Mead school to support this secondary school working towards Bronze STARS Accreditation.
2.12	Public health and awareness raising	Offer workplace grants to businesses for infrastructure (e.g. cycle parking, lockers and showering facilities)	<i>Action on hold.</i> Active travel grants were put on hold because of the limited LIP funding from TfL. The continuation of the scheme will depend on financial resources available.
3.1	Emissions from developments and buildings	Creation of an Air Quality Supplementary Planning Guidance (SPG).	<i>Action partly on hold.</i> A Draft SPG has been created, but it could not be progressed until Havering’s Local Plan is adopted.
3.2	Emissions from developments and buildings	Review current planning conditions, in relation to air quality, to ensure they are fit for purpose.	<i>Action completed.</i> Planning conditions have been reviewed and are in line with the requirements set out in the New London Plan.
3.3	Emissions from developments and buildings	Adopt and implement planning controls on combined heat and power (CHP) or biomass systems	<i>Action ongoing.</i> Havering uses a condition requiring the emissions limits for CHP and Biomass set out in Appendix 7 of the GLA Sustainable Design and Construction SPG.

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
			For all new developments Havering requires ultra-low NOx boilers to be installed, if alternative heating strategies are not employed.
3.4	Emissions from developments and buildings	Adopt and implement planning controls on air quality neutral development.	<i>Action ongoing.</i> Havering requires all new developments to undertake an air quality neutral assessment, in line with the New London Plan and the Draft Air Quality Neutral London Plan Guidance.
3.5	Emissions from developments and buildings	To ensure that new Housing Estate Regeneration Programme for LBH housing developments obtain the commitment from developers to a strategy of future reduction of reduced carbon foot print and minimal impact on air quality.	<i>Action ongoing.</i> Havering's regeneration team is committed to reduced carbon foot print and air quality neutral development. Public Protection, Regeneration Services and the appointed consultants and contractors collaborate and are aware that an air quality assessment is required on validation of any regeneration planning applications.
3.6	Emissions from developments and buildings	Adopt and implement planning controls for innovative and recognised green space and planting in new developments. Planning to work with grounds maintenance and parks at design stage for advice on greening and planting	<i>Action ongoing</i> , through inter-departmental work with Havering's Strategic Development and Public Realm. Both the London Plan 2021 and Local Plan 2021 have policies relating to green infrastructure. London Plan policy now requires minimum achievement against the Urban Greening Factor (UGF). The Council tries to strike a balance between decent green infrastructure on sites and their associated maintenance costs.
3.7	Emissions from developments and buildings	Promote and enforce the Smoke Control Areas to reduce the amount of unlicensed burning.	<i>Action ongoing.</i> Havering provides information to residents about Smoke Control Areas on its website https://www.havering.gov.uk/airquality Chimney smoke complaints are investigated to determine if authorised fuels are being used by the resident. If non-authorised fuels are being used, our enforcement officers educate the residents and for a first time complaint, provide details from the DEFRA website. If further complaints are made and substantiated, then enforcement action is taken.
3.8	Emissions from developments and buildings	Monitoring and implementation of Non Road Mobile Machinery (NRMM)	<i>Action ongoing.</i> A planning condition with the NRMM requirements is applied to all major developments in Havering. As part of the London-wide NRMM scheme, 17 audits were undertaken in 2023. 11 sites

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
			were compliant (36% self-compliant, 43% compliant following engagement with inspectors).
3.9	Emissions from developments and buildings	Promote public sector landlords (homes and public buildings) to take air quality and energy efficiency advice before refits, via the GLA RE:NEW and RE:FIT Programmes.	<i>Action ongoing.</i> The Council's Asset Management Strategy 2021-26, was adopted in November 2021. 2,620 homes have been found below the standard required by 2030 (based on a SAP - Standard Assessment Procedure - rating below 69). The solutions for these properties will vary based on different property types. An Energy Management Plan is expected to be finalised in 2022.
3.10	Emissions from developments and buildings	Deliver infrastructure to ensure that Romford, Rainham and Beam Park Housing Zones are accessible by means other than the car and that residents are provided with options to travel sustainably (Including the Beam Parkway Major scheme and Beam Park station)	<i>Action ongoing.</i> The design for the proposed A1306 has been completed. Beam Park Station is going ahead. Whilst some design work has been undertaken on Romford Ring Road, the pace of progress has lessened due to TfL not being able to provide further funding to support the scheme because of its wider financial situation.
3.11	Emissions from developments and buildings	Identify previously unknown and new premises that require permitting under PPC. Determine these properties that require permitting for Pollution Prevention Control (PPC).	<i>Action ongoing.</i> The industrial area surrounding the A1306 towards Rainham was surveyed and no unpermitted premises were found here or across the borough.
3.12	Emissions from developments and buildings	Signpost business contact and residents to the appropriate boiler scrappage schemes and energy efficiency grants; Promote businesses and residents to take air quality and energy efficiency advice; embed this practice as part of business as usual activity of the department	<i>Action ongoing.</i> The LB Havering website https://www.havering.gov.uk/info/20013/environment/137/energy currently signposts businesses and residents to the following schemes: Big London Energy Switch; Warm Home Discount; Solar Together; Green Homes Grant; Cleaner Heat Cashback for Small or Medium-Size Businesses and information about other energy advice and grants. There is no capacity at present within the Energy Management service to provide advice to businesses and residents on air quality and energy efficiency advice. The focus of the service is on the delivery of Havering's corporate energy contract.

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
4.1	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Include requirement for suppliers of large council contracts that they have attained silver or gold FORS accreditation for their organisation and vehicles	<i>Action completed</i> , as reported in 2021.
4.2	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Investigate the feasibility of introducing dedicated drop off zones outside all schools for buses & coaches.	<i>Action cancelled</i> , as reported in 2021.
4.3	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Renewal of Taxi Framework, with suppliers complying to the Ultra Low Emission Zone (ULEZ) & exploring ZEC (Zero Emission Capable) Standards	<i>Action ongoing</i> . The ULEZ has now been implemented and TfL was liaising with organisations such as taxi companies prior to the ULEZ being enforced to make sure vehicles are compliant.
4.4	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Provide Smarter Driver Training for all vocational drivers of the Council's fleet vehicles. Delivered by CPC training and FTA Van excellence accreditation	<i>Action ongoing</i> . The Council recommenced driver Certificate of Professional Competence (CPC) and LoCity training in 2022-23. It is also intending to investigate investment in fleet vehicles which can use electric power. The Council's current fleet uses fuel Gas-to-liquid fuel (GTL) and this is not expected to change in the short-term, as (Green) Hydrogen and Hydrogen powered vehicles are not yet widely available for fleet use. The Mayoral Diesel Car has now been replaced with a full Battery Electric Vehicle (BEV).

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
4.5	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Investigate the feasibility on the delivery of Electric Vehicle Charging Point (EVCP) infrastructure across the borough.	<i>Action ongoing.</i> Since the survey went out Havering Council has received £346k of Government funding from the Office of Zero Emission Vehicles (OZEV) to deliver 68 Charge Points in Council operated car parks and up to 80 on street charging points across the borough in 2023. The Council will soon begin a procurement exercise to appoint a Charge Point Operator and the intention is to begin delivery of the charging infrastructure in 2023.
4.6	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Review parking charges policy (controlled parking zones)	<i>Action cancelled,</i> as reported in 2021.
4.7	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Engage with businesses in the borough through business forums to discuss the options for upgrading/retrofitting to accommodate ULEZ requirements.	<i>Action on hold.</i> TfL are proposing to expand the ULEZ out to the GLA boundary and will be consulting on this proposal in May 2022. Officers are currently assessing what the likely impact of this would be on the borough and businesses. Once the consultation is published the Council will ensure businesses are aware of it and have an opportunity to respond.
4.8	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Plant greenery and trees (e.g. hedgerows and trees such as ash, common alder, field maple, larch, Norway maple, scots pine and silver birch) along main roads and town centres, which can lead to an improvement in air quality based on available evidence	<i>Action ongoing.</i> Planting was not carried out in 2021 due to lack of funding, however, there is a plan to plant 205 trees per year, as part of Havering's Climate Change Action Plan, which was adopted in 2021. Where possible, trees will be sought that have a positive impact on carbon and particulates capture.
4.9	Emissions from transport (covers the Matrix themes: Delivery servicing and freight,	Develop Local Implementation Plan to support improvements in local air quality; together with working with TfL to ensure pollution sources	<i>Action completed,</i> as reported in 2021.

Measure	LLAQM Action Matrix Theme	Action	Progress - Emissions/Concentration data - Benefits - Negative impacts / Complaints
	borough fleet actions, localised solutions and cleaner transport)	outside of local control i.e. buses and commuter traffic are dealt with.	
4.10	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Undertake feasibility work to examine the air quality implications of re- routing of bus services away from Romford town centre and look options for improving sustainable travel access into Romford town centre.	<i>Action on hold.</i> This is an action that was tied to the Romford Masterplan. Action to be reviewed to establish whether it should continue to be part of the AQAP.
4.11	Emissions from transport (covers the Matrix themes: Delivery servicing and freight, borough fleet actions, localised solutions and cleaner transport)	Continue to routinely check the weighbridges used commercially by (usually large) vehicles	<i>Action ongoing.</i> This action aims to reduce the number of overloaded vehicles and is expected to lead to a reduction in emissions. Due to restrictions, no inspections were carried out in 2021.

The London Borough of Havering's Climate Change Action Plan was adopted in 2024. This strategy document contains numerous actions which will benefit local air quality and is therefore copied below, highlighting those actions that benefit both carbon reduction and local air quality.

Table K.2 The London Borough of Havering Climate Change Action Plan (2024-27)

No.	Theme	Measure	Update
B7b	New developments achieve best practice standards to minimise their	Explore options and draft a Climate Change Checklist for developers to submit with major planning applications.	Draft checklist created

No.	Theme	Measure	Update
B7c	whole life carbon and air quality impact.	Embed zero carbon negotiations in the Pre-App process (applying Policy S1 2 of the London Plan) including sustainability focused meetings for referable schemes.	80% of new strategic applications to include sustainability focused pre-app meeting
B14		Review major planning applications with LBH Energy and Sustainability Consultant to ensure that zero carbon policies set out in the London Plan and LBH Local Plan are enforced and exceeded where feasible.	80% of major planning applications reviewed
B15		Develop, seek funding and evaluate the feasibility of introducing a local heat network within Havering.	Feasibility study carried out
B7f		Consider feasibility of including a Net Zero Carbon policy in the next Local Plan.	New Local Plan published
B8c	The Council takes clear and ambitious action to reduce the carbon emissions associated with their buildings and activities.	Promote Green Infrastructure through Urban Green Factor (London Plan Policy G5), SUDS (London Plan Policy SI 13) and min 10% improvement to Biodiversity Net Gain applied to all major developments. Further Greening of the Borough to be promoted through relevant projects including tree planting to Romford Ring Road and greening of central Romford. Feasibilities to be developed for funding other schemes including Rom Valley Way.	Planning applications assessed against Local Plan and London Plan policies. 2 greening projects completed. Feasibility and funding strategy development for Rom Valley Way and Rainham Gateway
B9a		Lobby to improve funding and resourcing for Local Planning Authorities to fully verify developer adherence to sustainability, energy efficiency, urban greening factor, SUDS and biodiversity net gain commitments in planning applications.	Lobbying undertaken
B16		Explore potential and review funding options for a River Strategy.	Options Paper produced
B17		Develop a plan to record and monitor Energy Performance Certificate (EPC) ratings for licensable properties, such as Houses in Multiple Occupation (HMO).	Plan in place

No.	Theme	Measure	Update
B18		Implement actions in Surface Water Management Plan (SWMP).	75% of actions completed
B19		Establish Sustainable Urban Drainage Systems (SUDS) approval body and carry out responsibilities.	Governance in place
B20		Formally extend the Thames Chase Trust Community Forest so that it includes urban areas.	98 square miles of Community Forest in Havering
E1	Harness opportunities for the corporate estate to use energy from low and zero carbon sources.	Review contract with energy supplier.	Supplier confirmed
E3		Develop Energy Management Plan for Corporate Estate.	Energy Management Plan published
E4		Improve energy efficiency of corporate estate.	10% reduction in gas and electric consumption
E5		Measure and report annual carbon emissions for the borough and for the corporate estate.	Emissions published annually
E8		Reduce energy use by IT.	Moving to virtual servers hosted in the public cloud to see a 90% reduction in carbon emission over our on-site data centre's current physical server estate
E9		Install smart meters in corporate buildings managed by the Council to provide better monitoring of energy consumption.	95% of buildings with smart meters installed
E10		Conduct water, electric and gas meter audits and reviews with the aim of reducing water, gas and electricity usage and consolidating and reducing bills in the corporate estate.	Audit carried out at 100% of larger sites
E11		Review criteria for constructions standards applicable to Council developments to increase environmental standards beyond those required by Building Regulations.	Construction standards updated

No.	Theme	Measure	Update
E13		Install web portal to monitor energy consumption in the Corporate Estate.	Web portal in place in 60% of corporate buildings
E14		Promote energy efficiency within schools newsletter.	Climate change feature in 100% of newsletters
E17		Sustainability Action Plans to be adopted and maintained for all Corporate Landlord sites.	75% of Corporate Landlord sites have a Sustainability Action Plan
E19		Publish a reduced IT carbon and ecological footprint, based on the services consumed, on the corporate estate and with suppliers, encompassing embodied / embedded carbon.	Emissions published annually
E29		Dim street lights on main roads from midnight to 5am.	90% street lights dimmed on main roads from midnight to 5am
E31		Introduce environmental savings through the use of Acrobat Sign across Council departments.	3,000 kg of CO ₂ saved
E32		PV installation to roof of a new SEMH ARP Facility at Suttons Primary School.	PV with 20.025kWp anticipated installation
E33		School Energy Efficiency and Decarbonisation (SEED) project to develop an estate-wide heat decarbonisation plan for maintained schools estate. This is funded by an LCSF5 grant from SALIX. (Low Carbon Skills Fund)	Decarbonisation plan for maintained schools
E20	Harness opportunities for Housing to use energy from low and zero carbon sources.	Develop a programme to upgrade communal lighting in Community Housing to LED lighting.	20% of communal lighting upgraded to LEDs
E21		Apply for grant funding from Wave 3 of the Social Housing Decarbonisation Fund to deliver fabric retrofits to properties over the next two years, helping to cut fuel bills for social housing tenants, increase their EPC rating to a C or above and reduce carbon emissions. Funding and Application timelines to be confirmed.	All properties within project to reach EPC C

No.	Theme	Measure	Update
E22		To continue with fabric led retrofit project work to bring properties up to an EPC C rating working on a self delivery approach with no government funding.	Numbers TBC subject to budget
E23		Install a heat pump as the primary source of heating and hot water in the new Family Welcome Centre in Harold Hill, plus in two new supported accommodation schemes for Social Services at Mawney Close and Mowbrays Close.	3 heat pumps installed
E24	Harness opportunities for residents to use energy from low and zero carbon sources.	Development of a zero carbon visitor centre at Raphaels Park Lodge. Engage with the Havering Volunteer Centre to develop the capacity to manage the facility.	Demonstrator centre open to the public
E30		Encourage green energy solutions with residents and businesses and point to any funding incentives available via the zero carbon visitor centre. Where we know of businesses who promote such generation reach out and encourage them to promote those initiatives in Havering.	Green energy section in exhibition space at zero carbon visitor centre
E25		To publish the impacts of the Energy Doctors Programme on matters pertaining to climate change.	90 homes visited
E26		Use the HUG2 grant to tackle fuel poverty in 30 low-income households, improve the energy efficiency of these homes and cut energy costs.	30 homes receiving grant award
E27	Harness opportunities for partners and local businesses to use energy from low and zero carbon sources.	Monitor Phase 2 (capital) of the Swimming Pool Support Fund. Reduce carbon emissions and make swimming pools more energy efficient.	Solar panels installed at 100% of leisure centres
E28		Submit bid to Carbon Offset Fund to support community halls with implementing energy efficiency measures.	Funding awarded
P4	Prepare businesses for skills needed in a net zero economy and borough.	Create a 'Business' page on the website – a "Trusted site"	Webpage published
P12		Identify high-tech environmental companies who might wish to establish a presence within Havering.	Companies identified

No.	Theme	Measure	Update
P20		Use UK Shared Prosperity Fund (UKSPF) Skills Funding to provide training for local business in fundamentals of sustainability with the objective of the businesses adopting greener processes within their ways of working.	Training delivered to 160 businesses / 320 staff
P21		Establish a Best Sustainable Business Award.	Award part of Havering Business Awards
P23		Create a Directory of Green Services - providing businesses with a resource from which they can identify services to support the business to implement tackling climate change activities.	Directory published on Council website
P8	Prepare residents for skills needed in a net zero economy and borough.	Explore the feasibility of setting up a Local Housing Skills Centre to deliver practical green actions within the borough.	Feasibility study completed
P11		Undertake sector focussed research on key sectors in Havering's economy to identify green skills gaps and support the development of solutions.	Three sectors engaged with
P13		Joint ventures with local colleges on research and development of green strategies.	Connecting people across the borough
P14	Prepare workforce for skills needed in a climate active council and net zero economy.	Design and develop a culture change programme to include climate issues for officers and a review of all HR policies.	90% of policies include climate considerations
P24		Work with London Councils to develop and integrate regional learning into the everyday practice of the Council and brief Members on the outcomes.	2 workshops
P25		Hold a Member Workshop on climate change issues to establish consensus around the climate change agenda.	1 workshop 1 All Member Briefing
P26		Incorporate climate change PDR actions into the top three tiers of Council management and analyse their effectiveness.	Mandatory PDR objective in PDR library
P27		Incorporate an optional climate change PDR action for all staff and analyse take up and effectiveness. Consider making this mandatory for all staff in the new PDR cycle.	Optional PDR objective in PDR library

No.	Theme	Measure	Update
P28		Introduce a climate action toolkit to provide practical guidance on considerations for reducing the Council's carbon footprint across all decisions and projects.	Toolkit available on intranet
P29		Secure, access and make available climate change training for all staff and categorise courses by awareness raising and/or professional skills development.	Climate change courses part of learning catalogue. Council's climate ambitions part of induction process. Let's Talk session with CE.
P30		Promote actions for tackling climate change to staff not on the computer network.	Individual actions promoted to staff not on computer network
P31		Introduce a salary sacrifice electric car benefit scheme for staff.	Scheme available as a benefit to employees
PR2	Adopt sustainable purchasing practices and products.	Agree a vision statement for sustainable procurement that aligns with national and Havering targets.	Vision statement agreed
PR3		Establish a framework to identify current spending against associated carbon emissions and agree a target for reduction. Investigate opportunities for divesting from fossil fuel.	Framework published on intranet
PR4		Include sections in revised Contract Standing Orders to ensure sustainability issues are incorporated into the procurement of goods, services and works.	Contract Standing Orders template updated
PR6		Identify and prioritise local supply chains and work with them to ensure they understand, disclose and cut carbon emissions.	10% of suppliers reporting their carbon emissions
PR7		Reduce pensions investment in environmentally unsustainable companies.	40% of assets invested in environmentally sustainable companies
PR8		Evaluate funding strategy for tackling climate change, including green bonds and grant availability.	Strategy evaluated

No.	Theme	Measure	Update
PR9		Develop a bespoke framework for IT to evaluate the impact of IT developments and purchases on the environment and measure carbon emissions.	Part of Gateway Review and PIF
PR14		Only procure with IT suppliers who have committed to, or are in the process of, setting science-based targets that match the Council's sustainability aims.	50% of IT suppliers are aligned with Council's sustainability aims
PR15		Write a Procurement Plan / Strategy to include a climate change and procurement 'road map' that actively encourages suppliers to operate and provide goods and services that offer maximum social, environmental and health benefits to Havering residents and community (e.g. eliminate, substitute and reduce emissions, measuring and monitoring, reporting emissions).	Plan published
PR16		Monitor the delivery of measures against grant schemes and record outcomes.	75% of grant funding tracked
PR5	Prepare Havering Council workforce for skills needed in a climate active council and net zero economy.	Deliver staff training on sustainability procurement to ensure that Havering has a low carbon procurement framework, so that staff can advise and support companies with whom they do business.	100% of Procurement Team trained
PR17		Contract managers are trained to evaluate and act on the environmental provisions made as part of the contract process.	75% of contract managers trained
PR18		Share knowledge of sustainable suppliers and promote good practice case studies.	Sustainable suppliers intranet page. 1 case study created
PP2	Residents live in comfortable, affordably heated and well-adapted homes that are cost-efficient with low or zero greenhouse gas emissions	Explore how the Private Sector Housing licensing process can help promote energy efficiency measures in rental properties by signposting advice and guidance to landlords	Awareness campaign
PP5		Promote energy efficiency schemes to landlords.	Attended landlord forum
PP7		Identify new premises for Pollution Prevention and Control Permitting.	3 premises identified

No.	Theme	Measure	Update
PP10		Promote ideas for tackling climate change to social housing tenants.	Information shared
PP3	Protect and improve the environmental health of the borough	Update Air Quality Action Plan.	Updated plan published
PP11		Explore how food and trading standards inspections can help promote climate change activity in the business sector and leave advice and guidance for business owners.	Awareness campaign
PP12		Investigate options to increase public access to drinking water to reduce single use plastic bottles.	Refill stations publicised on Council website and in Living
SC8	Continue to develop initiatives to protect Havering's green heritage and natural environment.	Publish new Parks Strategy.	Strategy published
SC12		Produce an updated Havering Nature Conservation and Biodiversity Plan following production of the GLA's Local Nature Recovery Plan.	Plan published
SC13		Management of nature conservation areas within Council owned land and encouragement of private land owners to manage biodiversity.	Evaluation of land management to encourage biodiversity along with a balance of other amenity usage
SC14		Re-design planting schemes to include drought tolerant species.	Landscaping carried out to include more sustainable planting
SC15		Adopt deer management plan to improve biodiversity in parks.	Plan adopted
SC16		Review the use of herbicides across all Council services, including those containing glyphosate.	100% compliance with use of herbicides only where necessary and as per legislation
SC17		Create a walking trail for ancient and veteran trees across the north of the borough.	1 walking trail published on website
SC35		Creation of a community garden as part of the Waterloo Estate regeneration.	1 community garden created

No.	Theme	Measure	Update
SC36		Take part in surveys by Natural England and RSPB to record data on vegetation, habitats, soils, landscape and butterflies and compare how these are changing over time.	2 surveys carried out
SC18	Foster effective partnerships with community groups and the voluntary sector to raise community awareness about the role everyone has to play in tackling climate change.	Develop programme for Climate Change Champions and continue to seek funding to maintain the scheme.	10 more Climate Change Champions recruited
SC19		Meet and engage with the Faith sector to agree a set of actions to spread the message of climate action within their communities. This will include establishing measures of impact of the activities, new faith material communications and inter-faith activities.	Meeting and action plan
SC20		Explore possibility of establishing a community fridge/s.	Decision made
SC21		Identify, secure and promote grant funding opportunities.	At least 4 grant awards secured
SC22	Increase engagement and communications about sustainability with residents, schools, businesses, visitors and other stakeholders.	Work with 2 schools to raise awareness of tackling climate change.	2 schools engaged with
SC11		Continue Healthy Schools programme as a mode of engaging with schools.	60% of schools engaged with
SC23		Develop and implement a 2 year programme of media activity in respect of climate change.	Communications Plan produced
SC24		Redesign webpages so that the climate offer is prominent and distinct on the Havering Council website.	All climate change webpages updated
SC25		Utilise smart technology to provide help and advice on climate activities.	QR codes available on website and letters to customers
SC26		Create a knowledge hub on the website on transport, housing, circular economy for staff and public so that ideas can be shared.	Knowledge hub webpage produced
SC27		Create an environmental dashboard to share headline information about environmental change and track progress towards sustainability goals.	Reports available on Havering Council Data Intelligence Hub

No.	Theme	Measure	Update
SC29		Establish Green Information Hubs at each library in the borough.	Green Information Hubs in 10 libraries
SC30		Establish a Green Reading Group in libraries.	Green Reading Group established
SC31		Promotion of water harvesting to residents and businesses where practical as part of our comms strategy. Investigate initiatives in other local authorities to identify best practice.	Water harvesting regular comms message over next three years
SC32		Provide residents with a choice of environmental activities to get involved in and information to be more engaged with green issues.	1% of residents across the borough engaged with
SC33		'Seeds of Change' programme of wellbeing activities, exploring healthy food ecologies, placing physical and environmental activism within the programme. Part of A Good Life Cultural Strategy.	Programme delivered
SC34		Promote the adoption of balanced diets (and the associated reduced meat consumption), maintain freedom of choice, while still delivering health co-benefits, and increase consumption of local and seasonal food.	Regular features in comms campaigns
SC37		Communicate how the Council is meeting its actions through the dedicated climate emergency page on Well Havering, the climate pages on the Council's website and in Living, the Council's e-newsletter.	Well Havering webpage published
T2	Accelerate the transition to electric vehicles across the borough.	Replacement of pool cars with electric vehicles and associated infrastructure.	75% pool cars electric
T13		Deliver an Electric Vehicle Charging Strategy.	Strategy published
T16		Delivery of 68 electric vehicle charging points in 9 Council owned car parks, and up to 80 on street charging points connected to lamp columns across the borough.	100 charging points installed

No.	Theme	Measure	Update
T31		Trial of GTL (Gas to Liquid) / HVO (Hydrotreated Vegetable Oil) 50/50 mix to reduce CO ₂ across the fleet.	GTL mixed with HVO reduces CO ₂ emissions by 45 -50% - aim to have in place in March/April 2024
T32		Replacement of 17 diesel Parks vehicles with Battery Electric Vehicles.	17 vehicles ordered
T33		Switch from petrol to electric mowing equipment.	100% of mowers electric
T6	Cut 'dirty' fuel vehicle trips and increase sustainable and active travel.	Work with schools in the borough to set travel plans which deliver modal shift away from single occupancy car use.	Single occupancy car use down to 15%
T8		Awareness campaign to promote sustainable travel to our staff and contractors.	Campaign delivered
T10		Deliver an Active Travel Strategy for Havering.	Strategy published
T14		Produce a feasibility assessment and produce a paper to Cabinet on a Last Mile Delivery proposal.	Feasibility study completed
T17		Review feasibility study and develop next steps for a new north / south public transport link providing a link between Rainham and Beam Park and the Romford housing zone with a further connection to Collier Row.	Study reviewed
T18		Delivery of Walking Zone maps in two schools (locations to be decided) across the borough. The model will be one which can be used as a template for other schools.	2 walking zone maps created
T19		Promote and lead an active travel conference for schools. Each school to develop an active travel plan.	Conference took place
T20		London Riverside Bid - public transport access as none currently/pedestrian crossings.	1 bus stop installed
T21		Integrate need to reduce car use in Local Plan through restrictive car parking, extensive walking and cycling routes etc.	Reduction in car use included in Local Plan

No.	Theme	Measure	Update
T22		Work with and advise the local NHS partners on their Active Travel Plans and monitor and report effectiveness.	4 meetings attended
T34		Implementation of new cycle routes to improve connectivity between minor and district centres	10% increase in residents partaking in active travel
T23	Reduce vehicle emissions across the borough.	Continue to work with National Highways to secure mitigation measures for Havering and its residents to reduce the impact of the Lower Thames Crossing project.	4 meetings attended
T25		Upcoming highways procurement, e.g. Highways to review carbon benefits such as recycling targets, sustainable materials etc. options through procurement process.	Contract awarded
T27		Bring together the transport actions into a strategic high level action statement which shows what is being progressed, what is aspirational and what the Council would like to do when funding becomes available. The purpose is to coordinate actions, measure progress and publicly explain what is being achieved.	Action statement published
T28		Monitor and manage carbon emissions from transport across the borough which will model the impacts of actions taken.	Emissions published annually
T29		Prepare a regular report on car anti-idling activity to evidence action, improvement and enforcement of the Council Policy.	Include in Balanced Scorecard
T30	Adopt responsible and social values measures into large scale contracts.	Work with the highways contractors to explore how their social value offer can benefit the residents of Havering by addressing climate issues.	Engagement with Marlborough

3. Planning Update and Other New Sources of Emissions

Table L. Planning requirements met by planning applications in the London Borough of Havering in 2023

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	39
Number of planning applications required to monitor for construction dust	26
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	0
Number of developments required to install Ultra-Low NO _x boilers	49
Number of developments where an AQ Neutral building and/or transport assessments undertaken	29
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	0
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 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.	20 17 17 6

The Public Protection team is consulted on all appropriate planning applications and recommends conditions to mitigate air quality impacts where necessary to meet requirements of local, regional and national planning policy in relation to air quality.

Planning conditions that relate to the enforcement of the Mayor's LEZ for NRMM are enforced by the pan-London NRMM Enforcement Project. Other conditions are enforced by the Council's own Planning Enforcement team.

3.1 New or significantly changed industrial or other sources

The only change to the Council's environmental permitting activities during 2023 was that "Universal Wood Products", was issued a permit for manufacturing wood products and the combustion of waste wood in a biomass appliance.

4. Additional Activities to Improve Air Quality

4.1 London Borough of Havering Fleet

The Havering fleet includes a total of 18 zero emission vehicles and 18 zero emission capable vehicles. This accounts for a total of just over 10% of the Borough's fleet. It is also important to note that the fleet has zero diesel vehicles.

4.2 NRMM Enforcement Project

The London Borough of Havering proudly supports the pan-London NRMM Enforcement Project and fully intends to continue this support in 2024/25. The standard planning condition used by Havering to secure compliance with the Mayor's LEZ for NRMM reads as follows:

- a) *Prior to the commencement of the development hereby approved, the developer or contractor must be signed up to the Non Road Mobile Machinery (NRMM) register.*
- b) *The development site must be entered onto the register alongside all the NRMM equipment details.*
- c) *The register must be kept up-to-date for the duration of the construction of development.*
- d) *All NRMM used during the course of the development that is within the scope of the Greater London Authority 'Control of Dust and Emissions during Construction and Demolition' Supplementary Planning Guidance (SPG) dated July 2014, or any subsequent amendment or guidance, shall comply with the emission requirements therein.*
- e) *An inventory of all NRMM to be kept on-site stating the emission limits for all equipment.*

Reason: To reduce emissions from construction and demolition activities and comply with current NRMM emission standards, in accordance with the Greater London Authority 'Control of Dust and Emissions during Construction and Demolition' Supplementary Planning Guidance (SPG) and any subsequent amendment or guidance.

The above wording is applied first as a consultation response and then within the decision notice, if the application is approved. The condition is applied to all applications which involve construction/demolition.

4.2 Air Quality Alerts

Havering is an active supporter of the AirTEXT air quality alert system. To prevent duplication of alerts and therefore confusion, we do not directly cascade the Mayor's air quality alerts.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

HV1 and HV3 are representative of roadside exposure within the Borough. All the sites are part of the London Air Quality Network and therefore the standards of QA/QC are similar to those of the government's AURN sites. Regular monthly calibrations are carried out, with subsequent data ratification undertaken by ERG at Imperial College London. The data for 2023 have been ratified.

Data capture from the NO_x analysers at HV1 and HV3 in 2023 were 98.1% and 99.6% respectively.

PM₁₀ Monitoring Adjustment

PM₁₀ at HV3, and PM₁₀ and PM_{2.5} at HV1 are measured by FDMS, consequently correction is not necessary.

A.2 Diffusion Tubes

Diffusion Tubes are supplied and analysed by Socotec, Didcot. For 2023 tubes were prepared by spiking acetone: triethanolamine (50:50) onto grids prior to the tubes being assembled. The tubes are desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection. The tubes were analysed in accordance with Socotec's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance'. As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11°C, the reported values have been adjusted to 20°C to allow for direct comparison with EU limits. As set out in the current Precision Summary Table, Socotec Didcot is listed in the table of laboratories with Good Precision.

The bias adjustment factor for Socotec, for the 50% TEA in Acetone preparation method in 2023, taken from the National Bias Adjustment Factor Spread sheet (v03_24) is 0.77.

The London Borough of Havering has a triplicate diffusion tube co-location study at one of the roadside automatic monitoring sites, operational since 2015. Due to

Waterloo Road being a high concentration site (roadside site) any bias adjustment factors derived should not be used for any low concentration monitoring sites.

Discussion of Choice of Factor to Use

The national bias adjustment factor was used for bias adjustment of Havering's 2023 diffusion tube results to ensure consistency with previous years.

Table M. Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.77
2022	National	03/24	0.76
2021	National	03/22	0.78
2020	National	06/21	0.77
2019	National	09/20	0.77
2018	National	06/19	0.76
2017	National	03/18	0.77
2016	National		0.77

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

All monitoring sites for all pollutants met the data capture requirements except for NO₂ diffusion tube HAV30 (Marlborough Road) for which four months of data were missing. Annualisation for this site was carried out in accordance with the methodology found in LLAQM.TG(19) before comparing the data with the relevant annual mean objective. Four sites were used to provide data for annualisation: Bexley Belvedere West, Tower Hamlets Jubilee Park, Enfield Prince of Wales School and Islington Arsenal. Defra's Diffusion Tube Data Processing Tool was used to perform the necessary calculations. Details can be found in Table N, below.

Distance Adjustment

Where an exceedance was measured at a monitoring site which is not representative of public exposure, the procedure specified in LLAQM.TG(19) was used to estimate the concentration at the nearest receptor. Details can be found in Table O, below.

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

Site ID	Annualisation Factor Bexley Belvedere West	Annualisation Factor LBTH Jubilee Park	Annualisation Factor Enfield Prince of Wales School	Annualisation Factor Islington Arsenal	Average Annualisation Factor	Raw Data Annual Mean ($\mu\text{g m}^{-3}$)	Annualised Annual Mean ($\mu\text{g m}^{-3}$)	Comments
30	1.0562	1.0095	1.0176	1.0073	1.0227	17.1	17.5	

Table O. 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
2, 5, 6	3.0	4.0	39.5	16.9	37.8	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>
19, 20, 21	0.5	3.5	39.9	14.4	31.1	
55	0.5	1.5	38.3	15.2	33.8	
57	0.2	1.2	60.3	16.91859	48.4	<i>Predicted concentration at Receptor above AQS objective.</i>
58, 59, 60	0.2	1.2	82.5	16.91859	<u>64.6</u>	<i>Predicted concentration at Receptor above AQS objective.</i>

Appendix B Full Monthly Diffusion Tube Results for 2023

Table P. NO₂ 2023 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
2	551488	188993	53.4	52.5	52.3	63.0	54.4	56.0	40.1	51.1	59.8	58.1	49.6		-	-		Triplicate Site with 2, 5 and 6 - Annual data provided for 6 only
5	551488	188993	45.6	41.4	54.8	55.7	54.2	47.8	42.0	52.6	59.2	58.1	54.9		-	-		Triplicate Site with 2, 5 and 6 - Annual data provided for 6 only
6	551488	188993	51.9	25.5	50.1	59.7	54.0	48.2	42.9	49.8	51.8	54.3	58.0	47.9	51.3	39.5	37.8	Triplicate Site with 2, 5 and 6 - Annual data provided for 6 only
1	551108	188257	42.5	9.4	48.9	36.7	81.0	33.9	39.4	36.1	40.3	44.7	34.2	34.2	-	-		Triplicate Site with 1, 7 and 8 - Annual data provided for 8 only
7	551108	188257	26.0	46.2	45.2	37.2	28.7	33.1	40.6	17.9	42.8	45.1	32.0	34.2	-	-		Triplicate Site with 1, 7 and 8 - Annual data provided for 8 only
8	551108	188257	47.4	48.5	49.9	39.1	23.6	30.8	44.1	36.9	43.1	44.7	43.1	35.0	38.8	29.9		Triplicate Site with 1, 7 and 8 - Annual data provided for 8 only
3	551726	183462	37.0	33.7	25.3	20.0	15.1	16.2	18.6	19.0	22.3	27.3	35.8	25.3	24.6	19.0		
4	553724	187560	25.9	24.5	19.0	15.2	11.7	11.8	12.1	14.5	16.0	20.3	28.0	19.6	18.2	14.0		
9	551629	188296	37.8	33.3	30.1	22.6	18.7	18.6	25.4	21.3	25.3	33.6	29.3	32.5	-	-		Triplicate Site with 9, 10 and 11 - Annual data provided for 11 only
10	551629	188296	30.7	40.6	32.4	23.3	18.5	18.9	22.7	21.2	26.2	35.1	35.7	30.8	-	-		Triplicate Site with 9, 10 and 11 - Annual data provided for 11 only

11	551629	188296	36.4	34.1	30.2	21.9	16.7	18.2	22.6	22.6	24.1	34.8	27.1	28.0	27.3	21.0		Triplicate Site with 9, 10 and 11 - Annual data provided for 11 only
12	552096	189619	40.1	41.4	40.8	27.8	25.7	25.0	22.3	24.2	29.4	29.3	36.9	32.1	31.3	24.1		
13	550607	189685	25.8	44.3	34.4	35.2	39.6	28.2	24.7	28.4	36.8	40.5	46.6	32.6	-	-		Triplicate Site with 13, 14 and 15 - Annual data provided for 15 only
14	550607	189685		52.3	40.2	38.1			26.3	28.8	35.7	38.6	43.4	33.7	-	-		Triplicate Site with 13, 14 and 15 - Annual data provided for 15 only
15	550607	189685	47.7	51.4	30.2	36.6	37.4	29.5	26.4	31.6	37.4	42.5	41.9	25.9	36.0	27.7		Triplicate Site with 13, 14 and 15 - Annual data provided for 15 only
16	551414	187802		39.4	35.3	36.3	40.0	27.5	26.0	28.6	37.4	43.9	36.0	33.4	-	-		Triplicate Site with 16, 17 and 18 - Annual data provided for 18 only
17	551414	187802		47.5	34.5	26.9	32.9	30.3	24.3	29.0	40.5	38.8	37.7	27.2	-	-		Triplicate Site with 16, 17 and 18 - Annual data provided for 18 only
18	551414	187802	38.2	31.5	33.3	34.6	30.3	32.1	26.4	29.7	38.0	43.3	35.3	35.1	34.4	26.5		Triplicate Site with 16, 17 and 18 - Annual data provided for 18 only
19	549837	191109	61.0	29.4	47.3	39.8	38.6	44.6	61.1	53.9	56.9	55.4	53.5	51.9	-	-		Triplicate Site with 19, 20 and 21 - Annual data provided for 21 only
20	549837	191109	43.5	61.8	46.9	41.1	34.1	43.3	63.5	50.5	52.3	63.1	92.8	49.1	-	-		Triplicate Site with 19, 20 and 21 - Annual data provided for 21 only

21	549837	191109	57.7	56.3	59.2	43.5	36.1	44.1	56.7	48.4	57.0	65.3	54.3		51.8	39.9	31.1	Triplicate Site with 19, 20 and 21 - Annual data provided for 21 only
22	553707	190817	28.4	21.4	20.1	18.0	14.5	12.2	15.3	16.6	21.9	26.9	31.6	20.4	-	-		Triplicate Site with 22, 23 and 24 - Annual data provided for 24 only
23	553707	190817	36.3	34.0	23.8	19.0	12.1	13.1	18.4	17.9	18.5	26.0	33.1		-	-		Triplicate Site with 22, 23 and 24 - Annual data provided for 24 only
24	553707	190817	30.6	27.0	23.9	16.6	14.1	13.3	15.1	16.3	21.6	29.3	54.4	23.9	22.4	17.3		Triplicate Site with 22, 23 and 24 - Annual data provided for 24 only
25	553727	193161	31.1	24.3	23.0		14.2	12.3	14.9	15.4	16.8	23.1	26.0	20.1	20.1	15.5		
26	549532	189777	28.1	23.6	27.1	15.4	13.4	12.5	13.4	12.8	18.1	24.0	23.7	20.2	19.4	14.9		
27	550942	187420	63.8	62.5	52.4	45.5	48.6	44.8	40.5	27.8	45.3	55.0		44.7	-	-		Triplicate Site with 27, 28 and 29 - Annual data provided for 29 only
28	550942	187420	57.5	9.7	48.6	45.9	48.8	40.1	37.5	50.3	50.9	50.4	51.4	47.2	-	-		Triplicate Site with 27, 28 and 29 - Annual data provided for 29 only
29	550942	187420	58.0	34.0	53.3	46.4	50.1	46.4	38.7	37.2	46.8	48.9	50.1	43.9	46.5	35.8		Triplicate Site with 27, 28 and 29 - Annual data provided for 29 only
30	549318	189384		18.7				11.4	12.5	12.9	14.6	22.2	24.8	19.8	17.1	13.5		
31	550197	187908	34.6	26.5	19.9	16.7	16.3	15.7	17.0	18.0	25.1	29.9	28.6	22.0	22.5	17.3		
32	553410	190558	57.7	55.1	47.9	37.5	28.0	23.5	37.4	40.2	47.6	48.8	45.5		-	-		Triplicate Site with 32, 33 and 34 - Annual data provided for 34 only

33	553410	190558	64.7	62.7	51.9	36.5	34.5	35.3	38.4	37.5	42.9	50.7	51.6	41.0	-	-		Triplicate Site with 32, 33 and 34 - Annual data provided for 34 only
34	553410	190558	64.5	57.7	51.1	37.4	32.3	32.6	40.9	37.3	44.2	47.8	47.1	45.9	44.4	34.2		Triplicate Site with 32, 33 and 34 - Annual data provided for 34 only
35	554204	193795	27.3	31.4	21.6	18.6	14.3	15.6	13.9	18.6	20.1	24.9	27.0	10.6	20.3	15.7		
36	551755	193022	23.1	23.7	16.7	10.9	11.1	10.0	10.5	11.9	14.0	17.8	19.8	15.8	15.4	11.9		
37	555723	191750	57.5	59.7	42.4	34.3	33.9	31.8	38.1	35.6	39.2	38.2	51.1	35.2	41.4	31.9		
38	553434	191656	28.7	28.7	20.4	13.1	14.5	9.9	13.1	16.2	19.4	21.1	24.6	20.0	19.1	14.7		
39	551616	190622	30.9	35.7	29.6	22.6	16.0	16.6	21.7	22.5	26.9	32.1	30.3	22.2	25.6	19.7		
40	553174	190306	57.5	47.6	35.2	28.9	27.9	28.9	33.1	32.9	40.1	41.8	45.5	38.2	38.1	29.4		
41	552517	189826	41.9	44.1	37.3	23.4	36.6	33.7	27.5	23.5	35.6	26.3	40.0	31.7	33.5	25.8		
42	550623	188890	41.3	42.2	31.7	27.9	24.5	22.5	24.1	25.0	33.3	40.3	37.4	31.3	31.8	24.5		
43	556072	186539	41.8	43.7	30.7	23.2	18.5	19.5	23.8	23.7	24.7	28.6	38.7	24.2	28.4	21.9		
44	553952	189731	43.3	45.9	38.0	31.3	29.9	27.9	28.1	27.0	35.3	23.8	38.8	31.5	33.4	25.7		
45	552327	187422	39.5	39.2	31.2		29.9	25.4	22.3	26.3	28.0	45.2	41.1	27.2	32.3	24.9		
46	552441	182337	40.1	42.7	27.4	22.8	21.4	25.5	23.8	28.2	32.9	38.5	34.4		30.7	23.6		
47	554730	189487	47.1	40.3	35.3	42.5	35.7	31.5	21.9	31.0	38.2		42.2	30.9	36.1	27.8		
48	550602	189990	29.1	35.2	25.8	18.7	15.9	13.9	15.7	19.8	22.4		29.1	23.0	22.6	17.4		
49	550722	183294	36.9	5.9	28.8	14.5	18.3	18.8	22.5	22.8	22.3		35.7	26.3	23.0	17.7		
50	551526	182672	27.2	45.6	42.5	34.0	27.1	26.7	27.6	29.0	36.2		48.4	39.9	34.9	26.9		
51	551180	189432	27.2	22.6	20.4	16.3	13.6	13.6	16.6	15.6	24.1	48.8	26.2	20.7	22.1	17.0		
52	554741	190626	45.1	46.1	51.0	32.6	31.5	27.4	32.1	32.1	39.6	50.2	40.0	36.0	38.6	29.8		
53	552841	184966	42.3	33.6	33.1	23.1	25.7	23.4	26.0	23.5	30.6	51.4	42.0	28.6	31.9	24.6		
54	553135	191674	32.1	35.7	26.8	24.3	22.8	17.8	16.6	18.3	25.8	50.5		22.3	26.6	20.5		
55	553830	188314	59.2	61.9	50.8	48.7	52.7	46.3	43.6	46.2	53.5	38.4	50.3	44.9	49.7	38.3	33.8	
56	552045	182222	35.5	46.0	33.7	33.7	32.0	28.8	29.2	32.3	34.4	45.1	50.0	38.0	36.6	28.1		
57	551420	188526	71.4	42.1	87.4	88.1	70.9	77.9	88.6	90.1	108.6		71.7	64.2	78.3	60.3	48.4	

58	551397	188509	95.6	127.9	107.7	97.2	105.3	107.3	104.3	106.3	139.9		119.4	107.0	-	-		Triplicate Site with 58, 59 and 60 - Annual data provided for 60 only
59	551397	188509	102.6		93.7	107.1	30.9	107.6	106.6	120.3	105.6		113.7	100.6	-	-		Triplicate Site with 58, 59 and 60 - Annual data provided for 60 only
60	551397	188509	95.9	124.2	102.4	105.2	101.1	100.3	119.2	112.7	130.4		111.5	100.6	107.2	82.5	<u>64.6</u>	Triplicate Site with 58, 59 and 60 - Annual data provided for 60 only
61	553719	180987	29.3	23.7	24.8	20.5	14.6	17.1	17.2	21.6	23.8	32.0	35.2	24.3	23.7	18.2		
62	550462	183013	39.7	46.9	34.4	33.5	29.4	30.7	32.4	22.2	39.9	35.2	48.4	37.2	35.8	27.6		
63	550888	182884	47.4	49.1	39.3	36.6	36.2	30.5	31.4	35.5	41.2	7.5	40.3	36.5	36.0	27.7		
64	551112	182811	41.9	49.7	34.9	32.0	28.6	33.4	30.8	32.3	38.4	11.2	41.0	38.8	34.4	26.5		
65	557323	187932	37.7	39.9	30.0	26.6	22.0	20.2	21.1	29.0		35.2	36.4	25.3	29.4	22.6		
66	554013	187001	46.2	56.1	28.9	37.5	32.2	36.4	34.2	33.9	41.9	40.7	49.8	39.3	39.8	30.6		

☒ All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table P.

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

☐ Local bias adjustment factor used.

☒ National bias adjustment factor used.

☒ Where applicable, data has been distance corrected for relevant exposure in the final column.

☒ The London Borough of Havering confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix A for details on bias adjustment and annualisation.

Appendix C Map(s) of Monitoring Locations

Figure A. Map of Non-Automatic Monitoring Site(s)

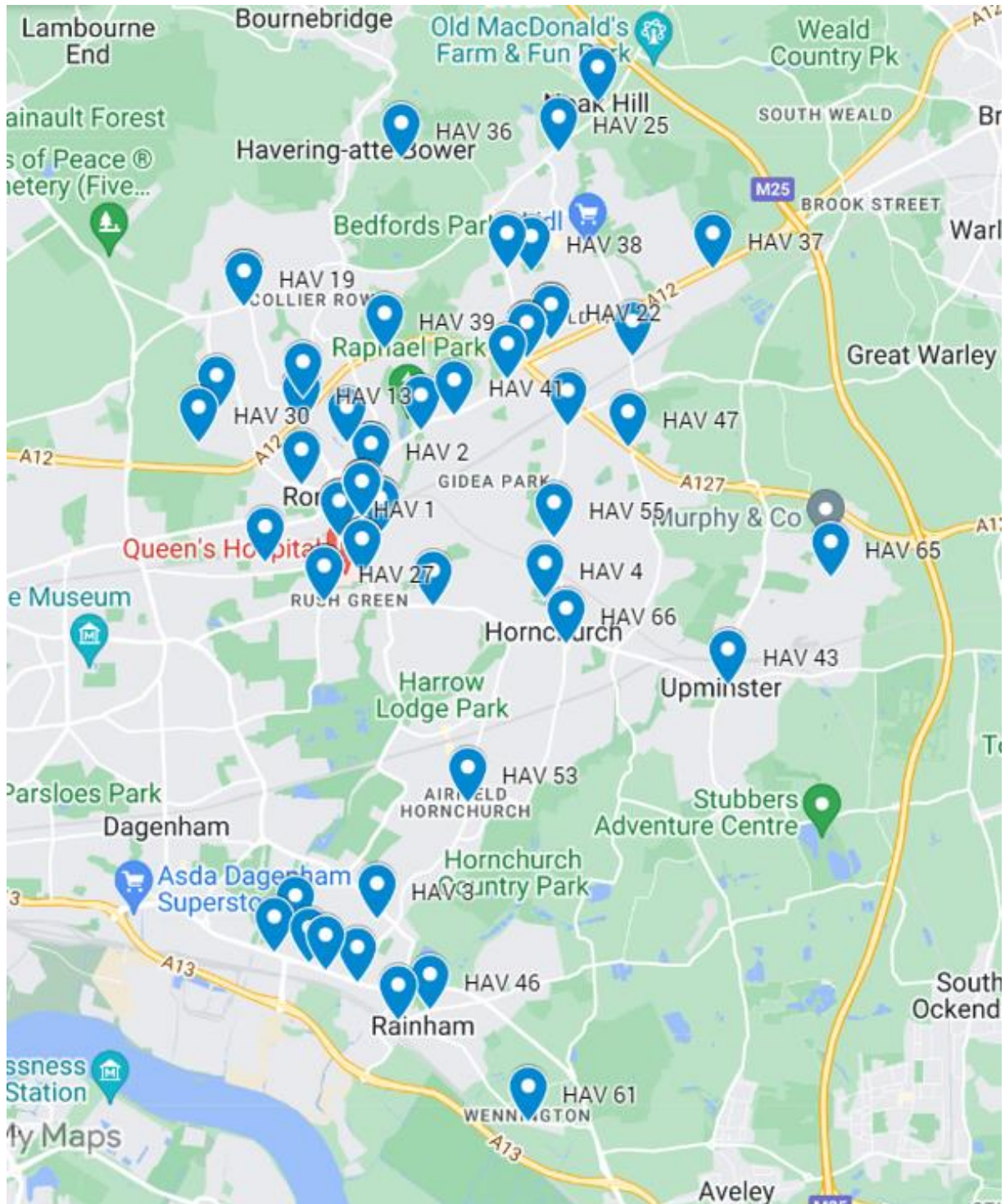


Figure B. Map of Automatic Monitoring Site(s)

