London Borough of Richmond upon Thames Air Quality Annual Status Report for 2025

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This report provides a detailed overview of air quality in the London borough of Richmond upon Thames during 2025. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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

Contact details:

Local Authority Officer	Mrs Carol Lee and Mr Tom Fiedosiuk
Department	Air Quality & Contaminated Land Team, Regulatory Services Partnership
Address	Civic Centre, 44 York Street, Twickenham, TW1 3BZ
Telephone	07917 307 206 02046055594
e-mail	carol.lee@merton.gov.uk tom.fiedosiuk@merton.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in the London Borough of Richmond upon Thames

This report reviews air quality monitoring data and action plan progress across the London Borough of Richmond upon Thames (LBRuT) for the 2025 calendar year.

For the first time since monitoring began 25 years ago, every monitoring site in the borough met the UK National Air Quality Objective of 40 µg m^{-3} for annual mean NO_2. All 71 diffusion tube sites and all three automatic monitoring stations recorded concentrations below this level. In 2019, 42% of sites exceeded the objective. The downward trend is sustained and significant.

Against the Council's own and more ambitious borough target of 20 µg m^{-3} (adopted in the 2025-2030 Air Quality Action Plan, in line with interim World Health Organization (WHO) objectives and now adopted by the EU), 63% of sites still exceed. The WHO guideline of 10 µg m^{-3} remains a longer-term aspiration as we need to see significant action across London to achieve this.

2025 was the first year of $PM_{2.5}$ monitoring at two Council sites. The annualised annual mean at Barnes Wetlands (RI2, urban background) was 7.9 µg m^{-3} and the annual mean at Richmond Town Centre (RH1, roadside) was 16.0 µg m^{-3}. The Teddington AURN site (TD5) managed by the National Physical Laboratory (NPL) recorded 8.1 µg m^{-3}. Background and suburban concentrations were below the national target and the London Mayor's commitment of 10 µg m^{-3} by 2030, but the roadside Town Centre site exceeded it, highlighting the continued local contribution of traffic emissions to particulate pollution.





Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality.

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Low-income communities are also disproportionately impacted by poor air quality, exacerbating health and social inequalities.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

Actions to Improve Air Quality

Key developments in 2025 included the opening of a new automatic monitoring site in Richmond town centre, the upgrade of the Barnes Wetlands site to measure $PM_{2.5}$, and the electrification of bus routes along Upper Richmond Road West, which coincided with notable air quality improvements in the East Sheen corridor.

In December 2025, the Council approved a borough-wide Public Spaces Protection Order (PSPO) for engine idling. This will mean drivers witnessed idling can be issued fines by traffic wardens without first being asked to switch off. Formerly, traffic wardens had to warn the driver and request switch off. This warning-first approach

did not appear to change future behaviour. During the last 6 years, Richmond traffic wardens engaged with over 67,000 drivers, only 1 fine was issued. It is hoped that stronger enforcement powers will help reduce idling.

The Council also continued its programme of School Streets, anti-idling events at railway level-crossing and schools, awareness raising events in Richmond, Teddington, Twickenham and Kew and active travel improvements across the borough.

Conclusions and Priorities

No exceedances of the outdated UK National Air Quality Objectives were recorded at any monitoring site in 2025 for NO_2, PM_{10}, or $PM_{2.5}$. This is the first year in which the borough has achieved full compliance across its entire monitoring network against current objectives, which is extremely good news. However, the Council's borough target of 20 µg m^{-3} for NO_2, the legally binding $PM_{2.5}$ target of 10 µg m^{-3} set under the Environment Act 2021 (to be met by 2040), and the Mayor of London's commitment to achieve this by 2030, are not yet met at all monitoring locations..

The significant trend is a sustained reduction in NO_2 concentrations across the borough. Levels have fallen considerably borough-wide over the past decade. The rate of improvement has now slowed somewhat compared to the sharp reductions seen between 2019 and 2022, suggesting that the easiest gains have been made, and further progress will require continued and targeted action.

New $PM_{2.5}$ monitoring at two Council sites provides the Borough's first local picture of fine particulate concentrations. The roadside annual mean (16.0 µg m^{-3} at RH1) was roughly double the background level (7.9 µg m^{-3} at RI2), suggesting a significant local traffic and urban source contribution to particulate pollution.

The borough-wide AQMA should be maintained. Although the national NO_2 objective is now met everywhere, 63% of monitoring sites still exceed the Council's 20 µg m^{-3} borough target and all sites exceed the WHO guidelines for both NO_2 and $PM_{2.5}$. The ambitious 2025 – 2030 Air Quality Action Plan was consulted and adopted on time and replaces the 2020- 2025 AQAP.

Priorities for 2026 include the launch of the Clean Air Schools Accreditation scheme, further electrification of bus routes serving the Borough, and installation of a new Airly indicative sensor network. The principal challenge is sustaining the rate of improvement now that the most polluting vehicles have largely been removed from the road. Further reductions will depend on the continued transition to zero-emission vehicles, but electrification alone will not address particulate emissions from tyre and brake wear, which now represent the largest vehicle-related source of PM. Reducing these emissions requires supporting modal shift to active travel and public transport alongside action on emissions from buildings and other non-transport sources.

How to get Involved

Residents can find out more about air pollution, its health effects, and what they can do to help at www.lovecleanair.org, the Regulatory Services Partnership's recently refreshed public information website or on the Council's Air Quality web pages https://www.richmond.gov.uk/services/environment/pollution/air_pollution. Residents can view real-time and historical air quality data for the Borough at londonair.org.uk. Near-real-time data from the Council's indicative sensor network is available on the Airly map at airly.org/map/en/. Air quality alerts are available through the airTEXT service (airtext.info/), which provides free pollution forecasts by text, email, or phone.





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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
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

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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 ($PM_{2.5}$)	10 µg m^{-3}[3]	Annual mean	2040
Particles ($PM_{2.5}$)	London Mayoral Commitment[4]: 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 Organization Air Quality Guidelines

(3) Environmental Target Regulations under the Environment Act 2021

(4) London Mayoral Commitment

1. Air Quality Monitoring

1.1 Locations

The Council uses two main methods to monitor air quality across the Borough: continuous automatic analysers which take measurements of various pollutants at 15-minute intervals at a small number of fixed sites, and passive NO_2 diffusion tubes, which are deployed in greater numbers to give Borough-wide coverage. Together these let us track short-term pollution episodes hour by hour while also building up a long-term picture of exposure across different neighbourhoods and road types. The Council also operates a network of real-time indicative sensors, which from 2022 – 2024 were part of the Breathe London network. Throughout 2025 and 2026 these were continued in-house and two remain supported by the Mayor of London as part of the Breathe London network. This supplements the two main methods with hourly pollution measurements across the Borough, with smaller, easier to locate sensors at lower costs than automatic monitors. Details of the indicative sensor network are provided in Appendix C Summary of Indicative Sensor Monitoring Data

Automatic Monitoring Sites

The continuous monitoring sites listed in Table B are representative of relevant exposure at or very close to the site. There are currently three Council operated sites which are reported on the Imperial College London Air Quality Network. Also included in this report is the National Physical Laboratory (NPL) site, which forms part of the government's UK Automatic Urban and Rural Network (AURN).

A new Council site was installed in Richmond town centre (RH1) on 5th February 2025. The Barnes Wetlands Centre site (RI2) was also upgraded on 15 July 2025. Richmond Council replaced the 25-year-old TEOM, measuring PM_{10} only, with a new combined PM_{10} and $PM_{2.5}$ Palas FIDAS 200E analyser.

All data undergoes quality assurance and quality control (QA/QC), with LAQN sites held to similar standards as AURN sites. Analysers are manually checked and calibrated every four weeks and serviced every six months. Further detail is at https://www.londonair.org.uk/LondonAir/Default.aspx.

Table B. Details of Automatic Monitoring Sites for 2025

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)
RI1	**Castelnau** Library	Roadside	522500	177166	NO_2; PM_{10}	Yes	LBRuT	Chemiluminescent; TEOM	8.0	3.3	2.4
RI2	**Barnes** Wetland Centre	Urban Background	522993	176731	NO_2; $PM_{2.5}$; PM_{10}; O_3	Yes	LBRuT	Chemiluminescent; FIDAS	10.0	482.52	3.2
RH1	**Richmond** Town Centre	Roadside	518074	175251	NO_2; $PM_{2.5}$; PM_{10}	Yes	LBRuT	Chemiluminescent; BAM	2.6	1.0	2.2
TD5	**NPL** Teddington AURN	Suburban	515542	170420	PM_{10}; $PM_{2.5}$	Yes	LBRuT	FDMS; FIDAS	2.0	13.0	12.0

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

Non-Automatic Monitoring Sites

Table C, below, lists the NO_2 diffusion tube sites which measures the average level of NO_2 at a location over one month. Tubes are a relatively cheap method that allows sampling across the whole Borough. The accuracy of their readings can be increased when the results are compared, and then bias-adjusted, with data from more accurate co-located continuous monitors. This produces the annual results provided in Table E. The monthly averages are provided in Appendix B. The Council maintained 71 permanent tube sites in 2025, three of

which are triplicate and co-located with Council automatic monitoring sites. Sites are kept under review, with a small number amended or relocated each year, often in response to requests for more area-specific monitoring.

Table C. Details of Non-Automatic Monitoring Sites for 2025

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 Continuous Analyser?	Tube Height (m)
1	Hampton Court Rd, Hampton (nr Bushy Pk gates)	Roadside	515824	168815	NO_2	LBRuT	1.9	1.7	No	2.2
2	Percy Rd, Hampton (nr. level crossing/Waitrose)	Roadside	513217	169746	NO_2	LBRuT	3.0	1.3	No	2.2
4	Hampton Rd, Hampton Hill (nr. Laurel Dene)	Kerbside	514607	171258	NO_2	LBRuT	9.8	0.6	No	2.2
7	Broad St, Teddington (o/s Boots)	Kerbside	515695	170983	NO_2	LBRuT	2.5	0.8	No	2.2
9	Hampton Rd, Twickenham (nr Fifth Cross Rd)	Kerbside	514846	172348	NO_2	LBRuT	2.0	0.6	No	2.2
10	Twickenham Rd, Twickenham (opp. Fulwell golf course)	Kerbside	513390	172233	NO_2	LBRuT	7.2	0.6	No	2.2
11	Percy Rd, Whitton (nr. Percy Way)	Kerbside	514136	173389	NO_2	LBRuT	9.1	0.6	No	2.2
12	Hanworth Rd, Whitton (nr Lyndhurst Ave)	Kerbside	512612	173439	NO_2	LBRuT	7.4	0.6	No	2.2
13	Whitton Rd, Whitton, (opp. rugby ground)	Kerbside	515228	174082	NO_2	LBRuT	6.3	0.8	No	2.2
14	Cross Deep, Twickenham (nr Poulett Gardens)	Kerbside	516153	173078	NO_2	LBRuT	2.7	0.3	No	2.2
15	Richmond Rd, Twickenham (opp. Marble Hill Pk)	Kerbside	517196	173933	NO_2	LBRuT	1.8	0.6	No	2.2
17	Red Lion Street, Richmond	Kerbside	517822	174755	NO_2	LBRuT	2.0	1.2	No	2.2

Air Quality Monitoring – Site Locations

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 Continuous Analyser?	Tube Height (m)
18	Lower Mortlake Rd, Richmond (nr Trinity Rd)	Kerbside	518822	175590	NO_2	LBRuT	9.3	0.9	No	2.2
19	Kew Rd, Kew (nr. Walpole Av)	Kerbside	518643	176156	NO_2	LBRuT	16.0	0.7	No	2.2
20	Mortlake Rd, Kew (nr. Kings Schl)	Kerbside	519205	177221	NO_2	LBRuT	2.8	0.6	No	2.2
22	Castelnau, Barnes (nr. Hammersmith Bridge)	Kerbside	522853	177908	NO_2	LBRuT	4.2	0.5	No	2.2
23(1), 23(2), 23(3)	Castelnau Library, Barnes (static site)	Roadside	522502	177166	NO_2	LBRuT	9.0	3.3	Yes	2.2
26	URRW, Sheen (nr. Courtland Estate)	Roadside	519168	175055	NO_2	LBRuT	11.8	3.2	No	2.2
28	Holly Lodge, Richmond Pk	Urban Background	519445	173991	NO_2	LBRuT	0.0	2175.0	No	2.2
30	Petersham Rd, nr The Russell Schl, TW10	Roadside	518022	173165	NO_2	LBRuT	1.3	1.9	No	2.2
31	A316 (nr. Chudleigh Rd)	Roadside	515434	174045	NO_2	LBRuT	6.4	1.0	No	2.2
32	Kings St, Twickenham (nr Iceland)	Roadside	516226	173195	NO_2	LBRuT	3.8	1.7	No	2.2
33	Heath Rd, Twickenham (nr M&S)	Roadside	515934	173126	NO_2	LBRuT	6.9	3.3	No	2.2
35	High St, Hampton Wick	Roadside	517524	169583	NO_2	LBRuT	1.4	1.3	No	2.2
36	Upper Richmond Road West (URRW), nr j/w Sheen Lane	Roadside	520540	175399	NO_2	LBRuT	2.2	2.1	No	2.2
37(1), 37(2), 37(3)	Wetlands, Barnes (static site)	Urban Background	522993	176731	NO_2	LBRuT	230.0	1160.0	Yes	2.2

Air Quality Monitoring – Site Locations

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 Continuous Analyser?	Tube Height (m)
39	Richmond Rd, nr Lidl, East Twickenham	Roadside	517516	174331	NO_2	LBRuT	2.7	1.2	No	2.2
40	Staines Rd, Twickenham	Kerbside	514068	172435	NO_2	LBRuT	11.4	1.0	No	2.2
42	The Quadrant/Kew Rd, Richmond	Kerbside	518080	175259	NO_2	LBRuT	2.9	0.7	No	2.2
43	Hill St, Richmond	Kerbside	517759	174757	NO_2	LBRuT	1.6	0.7	No	2.2
44	Sheen Rd, Richmond (near shops)	Kerbside	518489	175056	NO_2	LBRuT	0.5	0.5	No	2.2
45	High St, Teddington, (nr Cook)	Kerbside	516383	171154	NO_2	LBRuT	3.3	0.5	No	2.2
50	URRW, nr. Clifford Av, Sheen	Kerbside	519922	175324	NO_2	LBRuT	2.7	0.7	No	2.2
51	Sheen Lane, Sheen (nr Thomson Hse Schl)	Roadside	520492	175695	NO_2	LBRuT	2.0	2.0	No	2.2
52	Clifford Av, nr Chalkers Corner	Roadside	519773	175795	NO_2	LBRuT	2.1	2.0	No	2.2
53(1), 53(2), 53(3)	Richmond Town Centre (static site)	Roadside	518074	175251	NO_2	LBRuT	2.6	1.0	Yes	2.2
55	Mortlake Road, adj Cemetery Gates,	Kerbside	519793	176142	NO_2	LBRuT	4.1	0.6	No	2.2
57	A316 (nr Lincoln Avenue)	Kerbside	513915	172899	NO_2	LBRuT	16.4	1.0	No	2.2
58	London Road, Twickenham(nr Twickenham bridge)	Kerbside	516039	173766	NO_2	LBRuT	6.4	0.7	No	2.2
62	High Street, Barnes (nr Cook)	Kerbside	521651	176430	NO_2	LBRuT	2.3	0.4	No	2.2
63	High Street, Whitton (nr Tescos)	Kerbside	514188	173801	NO_2	LBRuT	3.2	0.8	No	2.2

Air Quality Monitoring – Site Locations

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 Continuous Analyser?	Tube Height (m)
64	High Street, Hampton Hill (nr Tescos)	Kerbside	514484	171251	NO_2	LBRuT	1.6	0.5	No	2.2
65	York Street, Twickenham	Kerbside	516339	173366	NO_2	LBRuT	2.7	0.5	No	2.2
66	South Circular, Kew Green	Kerbside	519060	177428	NO_2	LBRuT	3.3	2.1	No	2.2
67	Petersham Rd opp Poppy Factory,	Roadside	518042	174095	NO_2	LBRuT	2.7	1.4	No	2.2
68	Rocks Lane, SW13.	Roadside	522415	176537	NO_2	LBRuT	3.2	3.8	No	2.2
69	Uxbridge Rd, nr Longford Cl TW12	Roadside	513494	171729	NO_2	LBRuT	2.9	2.0	No	2.5
70	Stag Brewery, Lwr Richmond Rd	Roadside	520465	175965	NO_2	LBRuT	2.1	1.8	No	2.5
71	A316, nr St Stephens Primary	Roadside	516574	174456	NO_2	LBRuT	9.9	2.9	No	2.2
72	St Margarets Rd, St Margarets (nr. Crown Rd)	Kerbside	516839	174238	NO_2	LBRuT	2.5	0.8	No	2.2
73	Hospital Bridge Rd, nr Homelink	Roadside	513722	172873	NO_2	LBRuT	8.4	2.1	No	2.4
74	Lower Richmond Rd, Mortlake (nr. Chalker's Corner)	Roadside	519856	175856	NO_2	LBRuT	5.9	2.6	No	2.3
75	Hampton Rd (opp Tedd Mem Hosp)	Kerbside	515459	171029	NO_2	LBRuT	6.3	0.6	No	2.2
76	Manor Rd, nr Ferry Rd, TW11	Kerbside	516588	171357	NO_2	LBRuT	3.3	0.4	No	2.2
77	Sixth Cross Rd, nr Wellington Rd,TW2	Roadside	514705	172092	NO_2	LBRuT	4.5	0.6	No	2.2
79	South St, outside Lidl, TW2 5NJ	Kerbside	514810	172041	NO_2	LBRuT	6.6	1.0	No	2.3

Air Quality Monitoring – Site Locations

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 Continuous Analyser?	Tube Height (m)
80	Mortlake High St, SW14	Kerbside	520538	175926	NO_2	LBRuT	2.6	0.8	No	2.2
81	Chertsey Ct (A316),	Roadside	519912	175939	NO_2	LBRuT	9.2	1.6	No	2.4
82	Twickenham station development	Roadside	516060	173708	NO_2	LBRuT	4.8	2.5	No	2.4
83	Thames St, Hampton, nr Plevna Rd, TW12	Kerbside	513811	169510	NO_2	LBRuT	0.9	0.3	No	2.6
85	Richmond bus garage	Roadside	517911	174737	NO_2	LBRuT	8.4	1.7	No	2.5
87	A316, nr Larkfield Rd,Richmond	Roadside	518280	175367	NO_2	LBRuT	0.7	5.8	No	2.5
88	Kingston Rd, nr j/w High St/A313	Kerbside	516628	171286	NO_2	LBRuT	9.2	1.0	No	2.5
89	Sandycombe Rd, Kew,	Kerbside	519091	176375	NO_2	LBRuT	3.6	1.0	No	2.3
90	Manor Rd, Nth Richmond nr former Homebase	Kerbside	518976	175557	NO_2	LBRuT	2.5	1.0	No	2.5
105	outside East Sheen Primary School, URRW, SW14	Roadside	521315	175461	NO_2	LBRuT	4.8	2.5	No	2.2
211	Park Rd, Hampton Hill, (nr 6 Park Rd)	Roadside	514476	171310	NO_2	LBRuT	1.8	0.7	No	2.2
Rut01	Civic Centre, York St, Twickenham	Roadside	516415	173419	NO_2	LBRuT	3.0	2.9	No	3.5
Rut02	George Street, Richmond	Kerbside	517917	174928	NO_2	LBRuT	2.2	0.7	No	2.5
RP11	LC 189 Hmpt Ct Rd (nr Kingston)	Roadside	517456	169342	NO_2	LBRuT	1.6	0.9	No	2.3
RP12	LC 054 A308 nr Thames Motor Yatch	Roadside	515371	168705	NO_2	LBRuT	2.4	0.8	No	2.4

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

Table D. Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg m^{-3})

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site type	Valid data capture for monitoring period %[b]	Valid data capture 2025 %[b]	2019	2020	2021	2022	2023	2024	2025
Castelnau Library (RI1)	522500	177166	Roadside	99.4	99.4	27	20	21	23	16	19.2	18.4
Barnes Wetlands Centre (RI2)	522993	176731	Urban Background	94.8	94.8	21	15	14	14	14	12.3	12.7
Richmond Town Centre (RH1)	518074	175251	Roadside	95.0	85.8	Not open	Not open	Not open	Not open	Not open	Not open	25.1

Notes:

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

Sites that comply with the NO_2 annual mean objective of 40 µg m-3 are shown in green and sites that comply with the Richmond NO_2 annual mean objective of 20 µg m-3 are shown in blue.

Exceedances of the NO_2 annual mean AQO of 40 µg m^{-3} are shown in **bold**.

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

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

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%).

Discussion of Annual Mean NO_2 Automatic Monitoring Results

Table D provides the 2025 results of the NO_2 automatic monitoring and a comparison with the annual mean objective.

As mentioned in section 1, NO_2 is a specified pollutant for the whole Borough AQMA. The borough-wide AQMA, designated in 2000 for NO_2 and PM_{10}, should be maintained. Although the national NO_2 objective is now met everywhere, concentrations remain above the Council's target across much of the Borough.

A new automatic monitoring station was installed in Richmond Town Centre (RH1) on 5th February 2025. This achieved data capture of 95.0% between installation and year end, meaning it achieved data capture of 85.8% over the full year.

The 2025 NO_2 data capture rate for Castelnau (RI1) and Barnes Wetlands (RI2) were both excellent at 99.4% and 94.8% respectively for 2025. All are above the 75% data capture rate required by Defra. This means no sites require annualisation for NO_2. Both have been ratified by Imperial College London.

The 2025 results indicate that all sites met the national air quality objective of 40 µg m^{-3}. The 2025 raw annual mean for the RI2 (Wetlands) was 12.7 µg m^{-3}, slightly above but very similar to the mean from 2024 of 12.3 µg m^{-3}. That is still a reduction of around 1.4 µg m^{-3} from

2021, 2022, 2023 which consistently recorded around 14 µg m^{-3}. This site is a background site far from the main road and close to the River Thames and therefore representative of low pollution in the borough. Whilst this is welcome news, levels of NO_2 may go up or down slightly in future years, so we need to keep a close eye on results. It also demonstrates the real challenges of achieving 10 µg m^{-3} borough wide in line with 2021 WHO guidelines.

The annual mean at the RI1 (Castelnau) roadside site was 18.4 µg m^{-3}, a decrease of 0.8 µg m^{-3} from 2024 (19.2 µg m^{-3}) but still a slight increase of around 2.4 µg m^{-3} from its lowest annual result recorded in 2023 (16 µg m^{-3}). Although the general trend is downwards, air quality levels at certain sites can still go up and down over different years.

It must be remembered that RI1 (Castelnau) Air Quality station, although a roadside site, is not currently representative of typical roadside concentrations for LBRuT. This is because Hammersmith Bridge at the end of Castelnau was closed to all vehicles on 10th April 2019 for safety reasons until strengthening work was completed. From May 2016 buses were restricted and a weight restriction of 7.5 tonnes was placed on the bridge preventing many HGVs from crossing. Data from 2016 - 2024 reflects this, indicating more significant reductions than may otherwise be expected. Following extensive engineering work, Hammersmith bridge re-opened to pedestrians, cyclists, e-scooters, and other forms of pedalled transport in April 2025. The bridge now has dedicated cycle lanes and a wider pedestrian path. Whether or not it will ever re-open to vehicles and if so, to which types, is currently unknown.

Consideration has been given to relocating the site. On balance, following discussions with the Council and Imperial College London, for data continuity and trend data purposes, it has been decided to leave it in situ. This will be reviewed annually. The new roadside automatic monitoring site for Richmond town centre was installed in February 2025 and is representative of more typical/worst case scenario roadside emissions.

Table E. Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg m^{-3})

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 2025 (%)(2)	2019	2020	2021	2022	2023	2024	2025
1	515824	168815	Roadside	90.4	90.4	35	25	26	22	19.6	16.1	17.1
2	513217	169746	Roadside	100.0	100.0	29	21	24	21	18.6	16.5	15.9
4	514607	171258	Kerbside	100.0	100.0	31	27	28	24	22.5	21.1	21.4
7	515695	170983	Kerbside	100.0	100.0	39	34	37	26	25.5	26.4	26.4
9	514846	172348	Kerbside	100.0	100.0	35	31	31	23	20.9	17.7	19.6
10	513390	172233	Kerbside	100.0	100.0	**40**	33	33	26	24.5	24.2	21.9
11	514136	173389	Kerbside	100.0	100.0	34	27	27	24	22.8	19.8	18.9
12	512612	173439	Kerbside	100.0	100.0	**40**	31	30	26	23.2	20.7	20.2
13	515228	174082	Kerbside	100.0	100.0	39	36	30	24	21.0	18.6	18.6
14	516153	173078	Kerbside	92.3	92.3	33	Not open	Not open	Not open	Not open	Not open	21.3
15	517196	173933	Kerbside	100.0	100.0	32	26	26	21	19.6	19.1	17.4
17	517822	174755	Kerbside	100.0	100.0	**50**	**40**	**46**	31	26.8	24.9	21.3
18	518822	175590	Kerbside	100.0	100.0	**46**	**41**	39	30	30.0	27.6	24.9
19	518643	176156	Kerbside	100.0	100.0	37	30	28	21	22.5	19.9	18.3

Air Quality Monitoring – Nitrogen Dioxide

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 2025 (%)(2)	2019	2020	2021	2022	2023	2024	2025
20	519205	177221	Kerbside	100.0	100.0	38	30	28	32	30.2	25.0	23.9
22	522853	177908	Kerbside	100.0	100.0	32	21	22	17	17.1	15.2	15.1
23(1), 23(2), 23(3)	522502	177166	Roadside	100.0	100.0	26	20	21	17	16.4	15.5	13.8
26	519168	175055	Roadside	100.0	100.0	34	32	33	28	27.5	26.4	21.0
28	519445	173991	Urban Background	100.0	100.0	17	12	12.0	11	11.0	9.7	10.8
30	518022	173165	Roadside	100.0	100.0	Not open	Not open	25	20	18.8	16.7	17.6
31	515434	174045	Roadside	100.0	100.0	**45**	35	35	31	30.8	27.4	26.4
32	516226	173195	Roadside	100.0	100.0	**47**	**40**	**40**	31	29.7	26.6	25.3
33	515934	173126	Roadside	100.0	100.0	**40**	34	39	28	26.8	24.6	23.0
35	517524	169583	Roadside	100.0	100.0	36	32	30	25	22.3	19.5	19.4
36	520540	175399	Roadside	84.6	84.6	**61**	**56**	**55**	**52**	**48.3**	**45.3**	36.9
37(1), 37(2), 37(3)	522993	176731	Urban Background	100.0	100.0	20	14	14	14	13.4	11.7	13.0
39	517516	174331	Roadside	100.0	100.0	39	32	32	30	31.6	29.7	27.0
40	514068	172435	Kerbside	100.0	100.0	35	29	29	24	23.0	19.8	18.9

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 2025 (%)(2)	2019	2020	2021	2022	2023	2024	2025
42	518080	175259	Kerbside	100.0	100.0	**62**	**60**	**54**	**41**	37.8	36.6	30.7
43	517759	174757	Kerbside	100.0	100.0	**46**	**41**	**43**	39	36.4	34.0	29.6
44	518489	175056	Kerbside	100.0	100.0	37	33	32	29	28.6	26.5	22.9
45	516383	171154	Kerbside	100.0	100.0	32	26	26	20	20.0	17.1	18.1
50	519922	175324	Kerbside	100.0	100.0	**50**	**45**	**46**	39	38.2	33.9	29.9
51	520492	175695	Roadside	100.0	100.0	30	24	23	19	19.4	18.3	17.6
52	519773	175795	Roadside	100.0	100.0	**55**	**46**	**45**	39	36.4	32.2	30.2
53(1), 53(2), 53(3)	518074	175251	Roadside	100.0	100.0	Not open	Not open	Not open	Not open	Not open	Not open	27.6
55	519793	176142	Kerbside	100.0	100.0	**40**	33	29	26	25.6	21.2	19.9
57	513915	172899	Kerbside	100.0	100.0	37	29	29	23	23.2	19.9	18.1
58	516039	173766	Kerbside	100.0	100.0	**40**	33	31	25	21.9	19.7	18.8
62	521651	176430	Kerbside	100.0	100.0	**43**	32	32	25	24.2	21.3	21.8
63	514188	173801	Kerbside	100.0	100.0	33	27.0	27	30	24.7	21.4	21.3
64	514484	171251	Kerbside	100.0	100.0	**41**	34.0	35	30	27.6	23.1	23.9

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 2025 (%)(2)	2019	2020	2021	2022	2023	2024	2025
65	516339	173366	Kerbside	100.0	100.0	**50**	**40**	**40**	33	30.2	30.5	27.8
66	519060	177428	Kerbside	100.0	100.0	**40**	32	30	27	24.9	23.6	21.9
67	518042	174095	Roadside	100.0	100.0	32	23	23	21	20.4	17.2	18.4
68	522415	176537	Roadside	100.0	100.0	**40**	31	30	25	23.6	22.3	18.3
69	513494	171729	Roadside	100.0	100.0	31	22	23	20	19.5	17.2	17.9
70	520465	175965	Roadside	100.0	100.0	**42**	33	34	27	30.2	26.6	24.5
71	516574	174456	Roadside	100.0	100.0	**52**	**43**	39	34	33.0	2s8.3	26.3
72	516839	174238	Kerbside	100.0	100.0	**42**	33	30	26	23.3	20.6	21.9
73	513722	172873	Roadside	100.0	100.0	**43**	36	34	28	26.8	23.4	22.1
74	519856	175856	Roadside	100.0	100.0	**52**	**43**	**44**	32	31.1	28.3	25.7
75	515459	171029	Kerbside	100.0	100.0	Not open	29	29	25	25.3	23.0	23.5
76	516588	171357	Kerbside	100.0	100.0	Not open	35	35	30	23.1	21.6	21.8
77	514705	172092	Roadside	100.0	100.0	Not open	38	37	31	27.2	23.5	23.5
79	514810	172041	Kerbside	100.0	100.0	Not open	33	32	25	23.2	21.4	18.9
80	520538	175926	Kerbside	100.0	100.0	Not open	Not open	30	24	23.2	20.3	21.1

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 2025 (%)(2)	2019	2020	2021	2022	2023	2024	2025
81	519912	175939	Roadside	100.0	100.0	Not open	Not open	30	32	32.0	29.0	25.0
82	516060	173708	Roadside	100.0	100.0	Not open	Not open	Not open	21	19.9	17.9	18.8
83	513811	169510	Kerbside	82.7	82.7	Not open	Not open	Not open	30	27.6	23.1	24.7
85	517911	174737	Roadside	100.0	100.0	Not open	Not open	Not open	Not open	39.5	35.8	25.6
87	518280	175367	Roadside	100.0	100.0	Not open	Not open	Not open	Not open	Not open	33.7	29.7
88	516628	171286	Kerbside	100.0	100.0	Not open	Not open	Not open	Not open	Not open	Not open	15.3
89	519091	176375	Kerbside	100.0	100.0	Not open	Not open	Not open	Not open	Not open	Not open	20.9
90	518976	175557	Kerbside	100.0	100.0	Not open	Not open	Not open	Not open	20.0	17.8	18.9
105	521315	175461	Roadside	100.0	100.0	**47**	**40**	38.5	38.5	33.1	30.8	25.2
211	514476	171310	Roadside	100.0	100.0	Not open	Not open	31.7	29.3	27.8	24.8	26.5
Rut01	516415	173419	Roadside	100.0	100.0	36	29	27	24	23.0	21.4	21.1
Rut02	517917	174928	Kerbside	100.0	100.0	**72**	**63**	**52**	**43**	**40.0**	36.0	28.2
RP11	517456	169342	Roadside	100.0	100.0	**Not open**	**Not open**	**40.2**	36.4	30.7	26.7	27.0
RP12	515371	168705	Roadside	100.0	100.0	**Not open**	**Not open**	39.7	37.2	31.6	28.4	29.1

☒ **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 µg m^{-3}.

Sites that comply with the NO_2 annual mean objective of 40 µg m-3 are shown in green and sites that comply with the Richmond NO_2 annual mean objective of 20 µg m-3 are shown in blue.

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Exceedances of the NO_2 annual mean objective of 40µg m^{-3} are shown in **bold** and yellow

NO_2 annual means exceeding 60µg m^{-3}, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined** in red.

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%).

Bias Adjustment

Diffusion tube results have been bias adjusted using the national combined factor of 0.92 for all roadside and kerbside sites. A local factor of 0.99, derived from the Barnes Wetlands (RI2) co-location study, has been applied to the two urban background sites (28 and 37). See Appendix A Details of Monitoring Site Quality QA/QC for a full discussion of the choice of bias adjustment factor.

Site Changes

2025 Site 53 became a triplicate site (co-located with RH1 automatic monitor); site 86 closed (near and similar readings to 87); site 56 closed (near and similar to 71); sites 88 and 89 opened; site 14 reopened; site 90 included in ASR (existing temporary site '220' became permanent). Automatic site RH1 opened; site RI2 upgraded to include $PM_{2.5}$ monitoring.

2024 Site 54 closed (close and similar to 55); site 25 closed (close to 105); Site 87 opened (Richmond town centre); Sites 105, 211, RP11, RP12 included in ASR (existing temporary sites became permanent)

2023 Site 27 closed (relocated and renamed to 87); site 51 relocated (co-located with Breathe London sensor); 85 opened.

2022 Site 29 closed; site 81 included in ASR (existing temporary site made permanent); site 63 adjusted (moved <20m along Whitton High St.); site 61 renamed to 82 (relocated >20m closer to Twickenham station development); site 78 renamed to 83 (relocated >20m)

2021 Site 59 closed; site 80 opened.

2020 Sites 14, 24, 41 closed; sites 75, 76, 77 opened; sites 2, 4, 27, 29 adjusted (moved <20m to better represent worse-case scenario); site 34 renamed to 78 (relocated >20m); site 45 renamed to 79 (relocated >20m). Air Quality Mobile Automatic Station was stolen.

2019 Sites 6, 16, 47, 60 closed; sites 70, 71, 72, 73 opened.

2018 Sites 3, 49 closed; sites 68, 69 opened; site 21 renamed to 74 (relocated 200m closer to Chalker's corner); Sites 36, 51 adjusted (moved <20m)

Discussion of Annual Mean NO_2 Non-Automatic Monitoring Results

The 2025 monitoring results represent a significant milestone in the Borough's air quality progress. For the first time, every monitoring site in LBRuT complied with the UK National Air Quality Objective of 40 µg m^{-3} for annual mean NO_2. All 71 diffusion tube sites and all three automatic monitoring sites recorded concentrations below this threshold after bias-adjustment. This is the fifth consecutive year in which no site has breached 60 µg m^{-3}, (a level which would indicate a potential exceedance of the hourly limit value).

To put this in context: in 2019 (pre-COVID), 27 of the Borough's 64 diffusion tube sites (42%) exceeded 40 µg m^{-3}, including three above 60 µg m^{-3}. In 2024, a single site (site 36, Upper Richmond Road West) still exceeded. In 2025, none do. The downward trajectory is clear and sustained.

Valid data capture across the diffusion tube network was very good in 2025. All 71 sites were monitored for 12 months. Sites 36 and 83 had the lowest data capture around 83-85% due to two missing monthly results, but both were well above the 75% threshold so no annualisation was required at any diffusion tube site.

Borough target and WHO guideline

The Council adopted a borough-wide target of 20 µg m^{-3} for annual mean NO_2 in its 2025–2030 Air Quality Action Plan, in line with the World Health Organizations interim objectives, now adopted by the EU. This level reflects the council's commitment to protecting public health based on the latest evidence that adverse effects occur below the legal limit. Against this more ambitious benchmark, 45 of the 71 diffusion tube sites (63%) still exceed 20 µg m^{-3}. 26 sites (37%) now meet the 20 µg m^{-3} target, compared with 23 sites (34%) below 20 µg m^{-3} in 2024. Progress is being made, but most sites remain above the borough target level. The 2021 WHO Air Quality Guideline of 10 µg m^{-3} remains a longer-term aspiration. In 2024, one site (site 28, Holly Lodge in Richmond Park) achieved this level for the first time at 9.7 µg m^{-3}. In 2025, that site recorded 10.8 µg m^{-3}, marginally above the guideline. No site met the WHO guideline in 2025.

While compliance with the national objective is welcome, the extent to which concentrations remain above the Council's own target and the WHO guideline confirms that the borough-wide AQMA should be maintained and that further action to reduce NO_2 remains necessary.

Spatial patterns

From the 66 monitoring sites that were operational in both 2024 and 2025, 59 sites recorded reductions, six sites saw increases, and one remained the same in 2025 compared to 2024. The largest relative increase this year was 11% at site 9 (Hampton Rd, Twickenham nr

Fifth Cross Rd) increasing from 17.7 to 19.6 µg m^{-3} in 2025. However, this follows from a 15% decrease last year so this site is still below 2023 levels. On-going roadworks to improve the safety profile of the road created a temporary disruption to traffic flow in the area.

Some of the largest relative reductions in NO_2 were seen along Upper Richmond Road West (URRW) in Sheen. Sites 26, 36, 105 recorded reductions of NO_2 of between 19% to 21% in 2025 compared to 2024. These sites are all located on URRW between Manor Road and East Sheen Primary School. In recent years this has remained one of the higher pollution areas in the borough, with site 36 (URRW nr Sheen Lane) only complying with the UK limit of 40 µg m^{-3} for the first time in 2025. Site 68 on Rocks Lane, leading from URRW to Kew Bridge also recorded a significant decrease this year of 18%. The electrification of bus routes along URRW is expected to have contributed to the air quality improvement here. Both the 337 and 33 routes have been served by electric buses since mid-2025. The monthly data from diffusion tubes appears to show a decline in NO_2 along URRW in the second half of 2025 (after electric buses were introduced) which was larger than decreases in other areas of the borough. This is encouraging and we hope to see the trend continue through 2026.

The largest relative decrease in NO_2 measured in 2025 was at Richmond bus garage (85) which was a 29% decrease from 35.8 µg m^{-3} in 2024 to 25.6 µg m^{-3} in 2025. This is good news as much effort had been put in by the Council and TfL to encourage bus drivers to reduce vehicle idling, and to upgrade the TfL bus fleet to electric buses with prioritisation for higher frequency routes through town centres like Richmond.

All monitoring sites in Richmond town centre complied with the 40 µg m^{-3} objective for the second consecutive year. Compliance was first achieved in 2024. In 2025, all sites recorded a further reduction in NO_2 levels. The most notable improvement was at site Rut02 (George St), which has fallen from 72 µg m^{-3} in 2019 to 28.2 µg m^{-3} in 2025, a reduction of 61%. The new automatic monitoring site (RH1) and co-located triplicate (site 53), which began operation in February 2025, recorded annual means of 25.1 and 27.6 µg m^{-3} respectively.

Additional Monitoring

The Council has carried out considerable extra monitoring in 2024 and 2025 linked to proposed road changes, such as the LTN in Hampton Hill, and has continued to measure around Bushy Park to monitor displacement traffic in response to the closure of Chestnut Avenue within Bushy Park, as well as ad hoc monitoring to address residents' concerns such as TfL road works on the A316 near Manor Circus and on the A316 near London Rd, Twickenham. These are not permanent sites, and so they are not included in the ASR. Four sites (211, RP11, RP12, 90) from such temporary monitoring schemes have been made permanent and included in this ASR. More data published on the Council's website here.

From Jan 2022 – Dec 2024, the Council organised a 3-year programme to monitor worst-case scenario for a full year outside all state schools in the borough. Results are available on the Council website here.

Contributing Factors

Trend graphs in Figure 3 clearly demonstrate this sustained downward trajectory across the network. While individual sites show some year-on-year fluctuation, the overall direction of travel is consistently downward. This reflects the combined effect of action at national, regional, and local level.

Richmond Council is regularly asked about the effects on air quality from the extension of the ULEZ to outer London. It is difficult to quantify emission reductions solely from the extended ULEZ. Some vehicle upgrades will inevitably result from the central and inner London ULEZ. We know it removed many older more polluting vehicles from the fleet but we are aware, that some of these vehicles travelled very few miles weekly or annually, so any emission reduction would be small. The Mayor has issued the London-wide Ultra Low Emission Zone (ULEZ) One Year Report, which includes a lot of information on all aspects of the London wide ULEZ – LWULEZ. The report advises that the extended ULEZ resulted in an overall 1.4% increase in compliant vehicles seen driving in outer London on an

average day up from 95.3% in September 2023 to 96.7% in September 2024. Compliant cars in outer London were up by 1% from 96.4% to 97.4% and vans up by 4.5% from 86.2 to 90.7%. Vans are probably a more important sector since they tend to travel more miles daily/weekly/annually so if not electrified are likely to emit more from the tailpipe, when non-compliant. The report includes many charts and data some comparing different time frames 2010 – 2024, 2019 – 2024 (all phases of the ULEZ), 2023-2024 (with and without ULEZ) and some comparing rest of England to central, inner and outer London. There isno actual data for “without ULEZ” to compare to data “with ULEZ” for the relevant Sept 2023 – Sept 2024 period, so the GLA have used well qualified professionals to employ the most robust methodology to estimate the likely emissions with and without an extended ULEZ. The ULEZ is a huge area - the London-wide zone measures 1,500 km2 and covers nine million people and is the same zone as the LEZ for heavy vehicles, making it the largest zone of its kind in the world. Moreover, outer boroughs within the “extended ULEZ” vary significantly, sometimes within each borough, and air quality levels are affected by very many variables. Comparison is therefore complex. The report concludes that “After one year of operation of the London-wide ULEZ, our estimates show that roadside NO_2 concentrations in outer London were on average 4.8 per cent (1.1 µg m-3) lower than would have been expected without the London-wide ULEZ expansion”. This takes account of expected vehicle churn, weather and more. Evidence suggests that the ULEZ in all its forms has speeded up the upgrade of the fleet and in so doing has reduced emissions. Whilst upgraded vehicles will have helped to speed up reductions, Richmond Council’s local policies will also contribute. The Council’s Good Move Scheme provides discounts for sustainable transport such as cycle and car hire schemes, and may have encouraged some residents to give up private vehicles in favour of cycling or public transport. More broadly, the growing visibility of cargo bike and e-bike hire schemes, school air quality workshops, and anti-idling action events at schools and level crossings all contribute to shifting social norms around car use in the borough, helping to reduce both emissions and congestion..

For occupations where it is possible, COVID changed the way many people work, with the acceptance and encouragement of hybrid working by many employers. Changes in working practices are likely to some extent to affect traffic and with it, air quality. It was feared that gains made to air quality during lockdown would be lost once life returned to normal. There is no evidence of this. Levels in 2025 are

significantly below those recorded in 2019, the last full pre-pandemic year, when 27 sites (42%) exceeded the UK limit value of 40 µg m^{-3}. Even 2020, when lockdown substantially reduced traffic, still saw 9 sites exceeding the objective.

From a central government perspective, dieselgate back in September 2015 resulted in measures that should not be underestimated for their continuing benefits on air quality. It led to the replacement of laboratory-based emission testing with more accurate and realistic real-world driving cycle tests. This provided differing, more robust data about vehicle performance and emissions in actual driving conditions. This has benefited levels of air quality ever since, as motoring manufacturers were forced to produce vehicles which met certification values under real on-road driving conditions. This continues to deliver improvements in later Euro 6 vehicles which really are much cleaner when compared to earlier Euro 6 versions. It also helped raise the profile of air quality nationally, making it a consideration for more people when purchasing vehicles.

Many households are switching to electric or hybrid cars, helped by the government's new Zero Emission Vehicle (ZEV) Mandate. This mandates that car manufacturers sell a certain percentage of zero-emission vehicles each year which started at 22% of cars and 10% of vans in 2024 and will increase to 80% of cars by 2030 and 100% by 2035. The government is now committed to phasing out the sale of new cars powered solely by internal combustion engines from 2030. It will permit the sale of Hybrid Electric Vehicles (HEVs) and Plug in Hybrid Electric Vehicles (PHEVs), alongside ZEVs in the 2030 to 2035 period. The ZEV mandate is designed to encourage the transition to electric vehicles and reduce emissions. According to the SMMT (Society of Motor Manufacturers and Traders) 2025 witnessed a 3.5% overall increase in car sales in 2025 compared to 2024 up to nearly 2,000,000. BEV (battery electric vehicles) sales reached new record numbers, achieving 23.9% of all new car sales in 2025. However, this was still below the government target of 28% that year (Manufacturers can shift EV sales to later years when demand is expected to be stronger). Increases of market share were reported in BEV, (battery electric vehicle), HEV (Hybrid Electric Vehicle) and PHEV (Plug-in Hybrid Electric Vehicle) whilst decreases were reported in petrol and diesel. Petrol cars fell to 46% of total sales – less than 50% of total sales - for the first time last year. Diesels dropped to around

5% - now the smallest market share by fuel type. Combined BEV, PHEV and HEV rose to over 978,000 making up almost half of new car registrations. The ZEV mandate appears to be working but some manufacturers think more government incentives are needed. Richmond, one of the highest per capita car ownership London boroughs. To meet the Council's ambitious air quality targets, including the borough-wide NO_2 objective of 20 µg/m³ and the $PM_{2.5}$ target of 10 µg/m³, further progress will depend not only on fleet electrification but on reducing overall vehicle use through better public transport coverage, greater uptake of cycling and walking, and a shift from private car ownership towards car clubs where car journeys remain necessary. The Council has various policies to encourage all of these including installing a total of 1,148 public EV chargers by the end of 2025.

Figure 1 Map of NO_2 diffusion tube sites in LBRUT in 2025

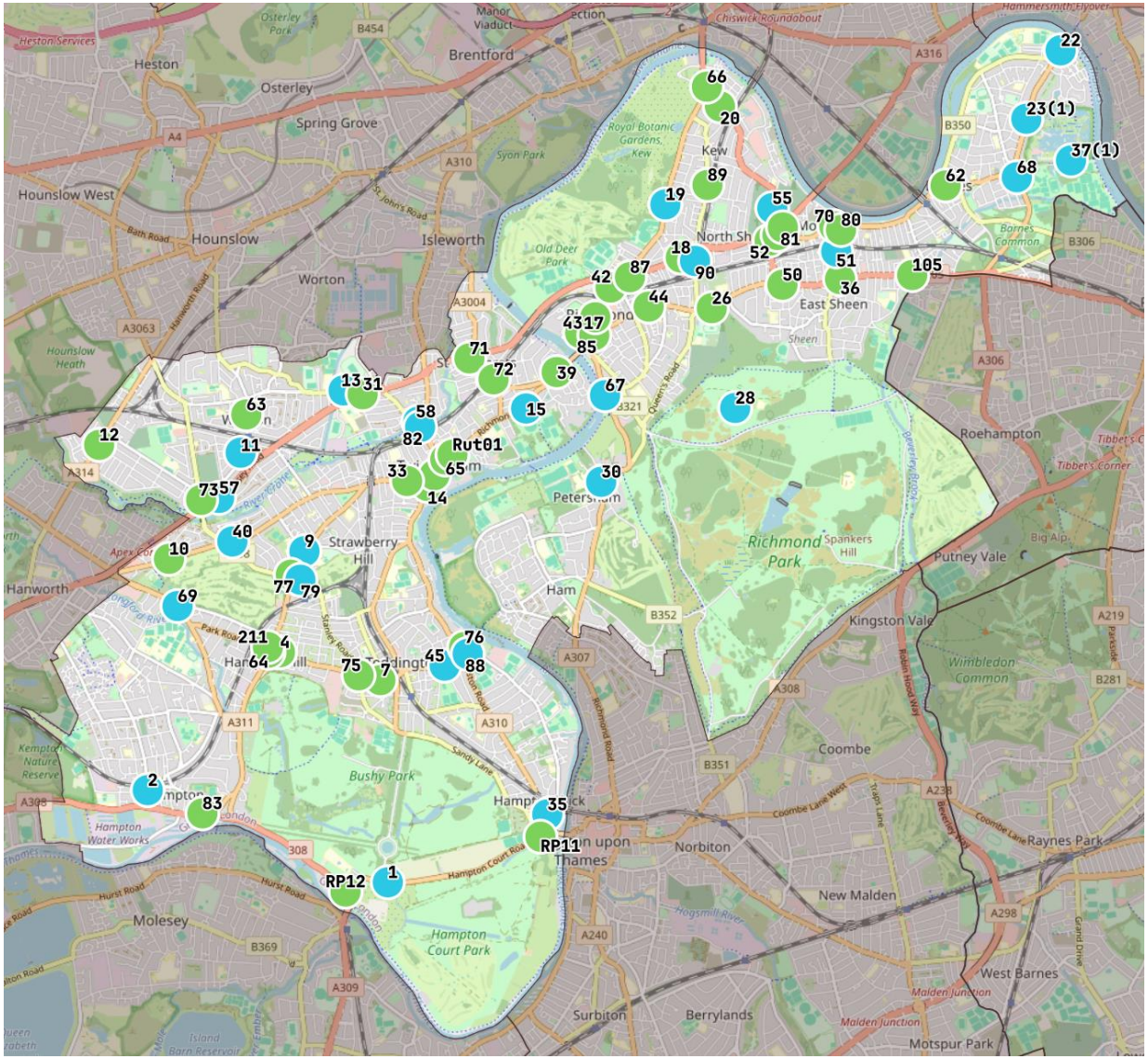
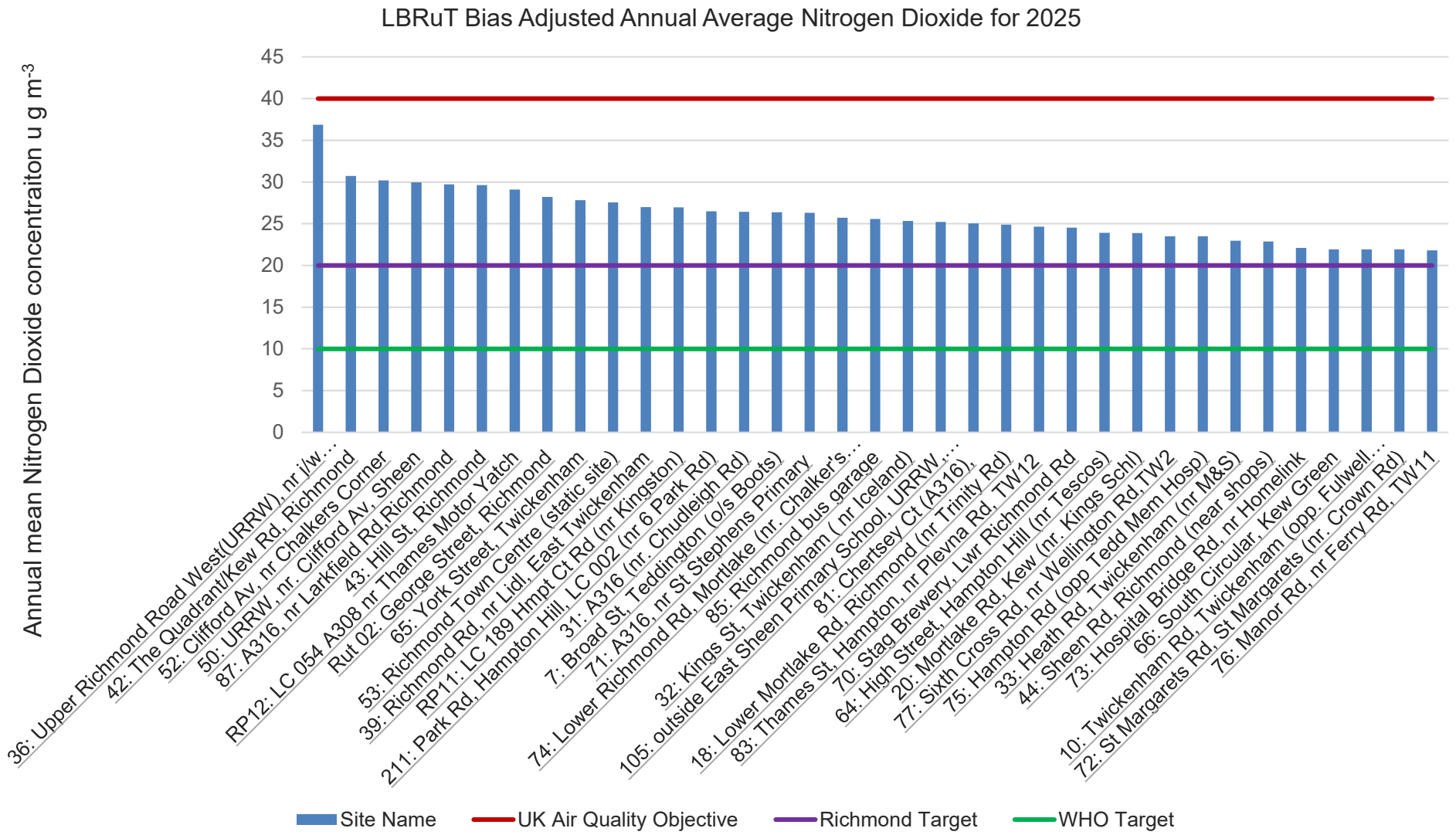


Figure 2 Bias Adjusted Annual Average NO_2 Concentrations for 2025 at all Non-Automatic Sites (split over 2 graphs)



Air Quality Monitoring – Nitrogen Dioxide

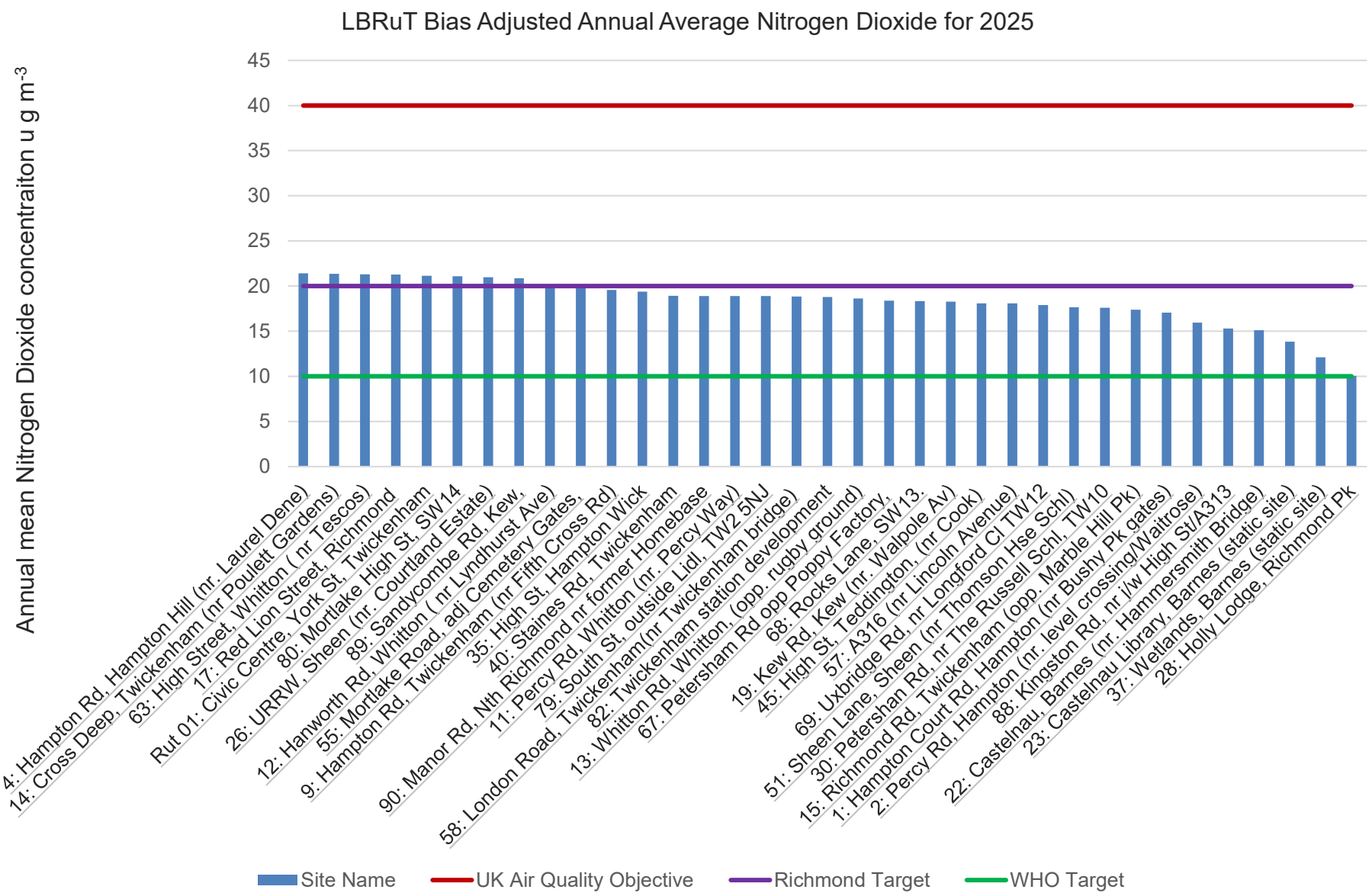
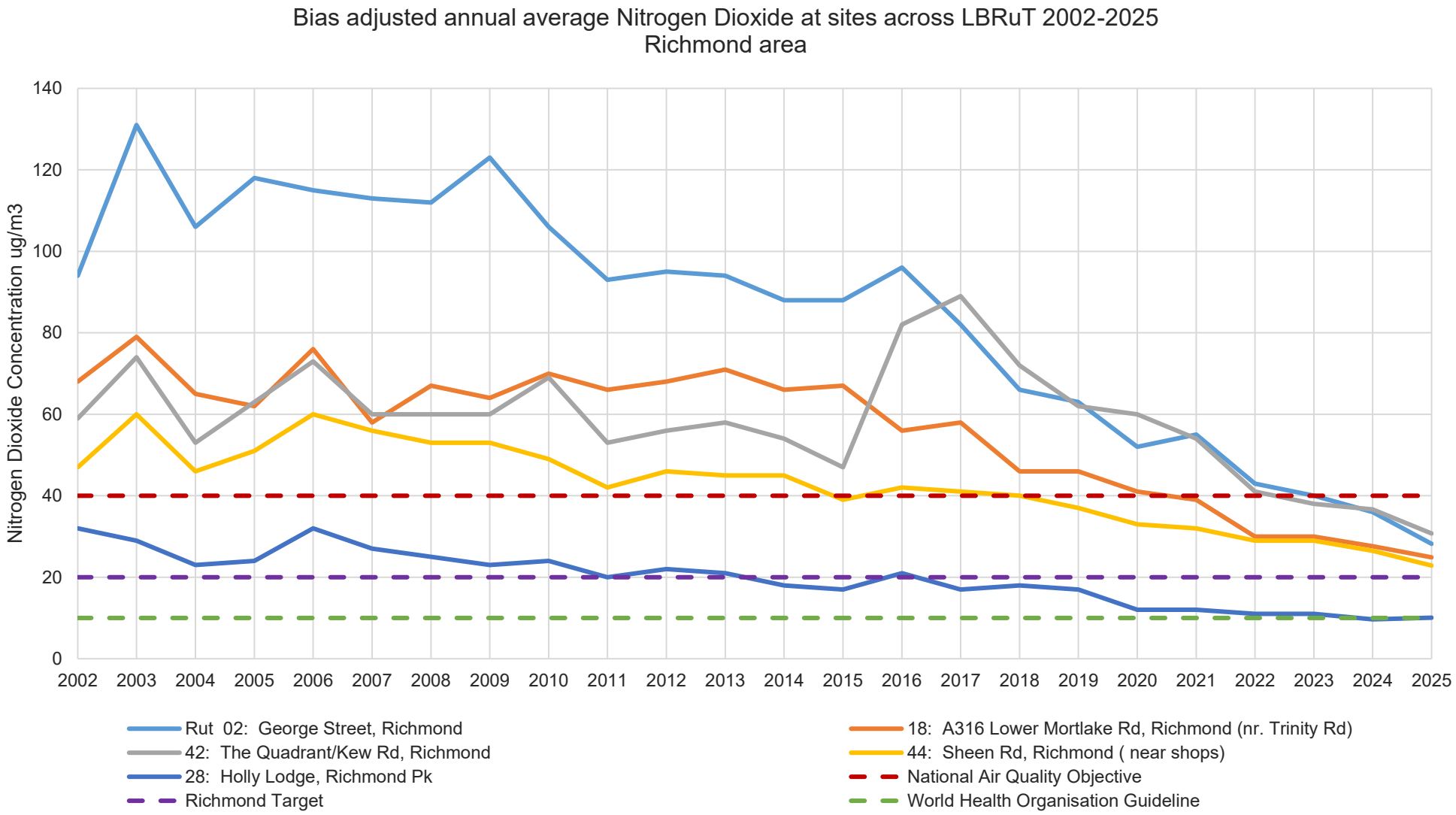
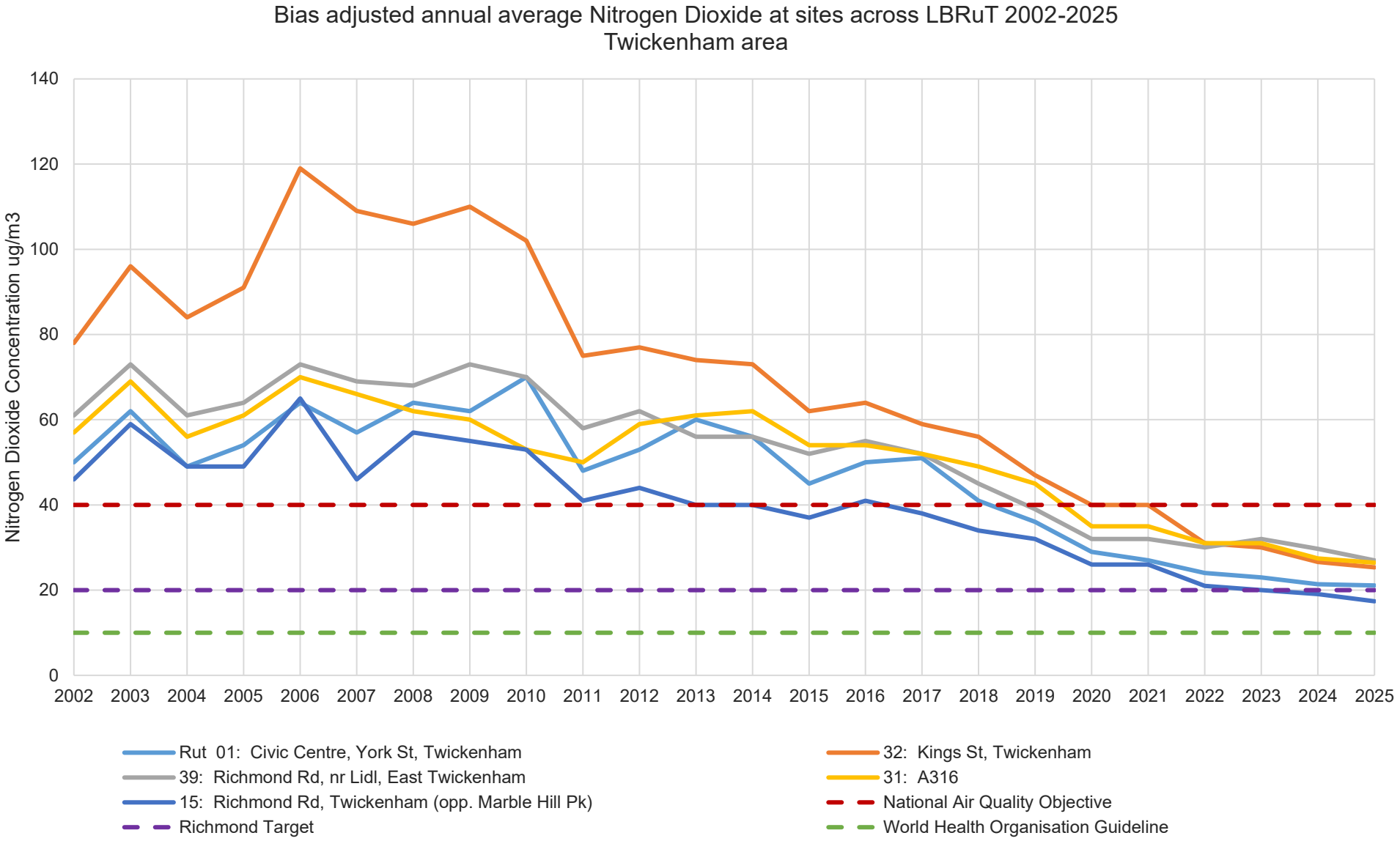
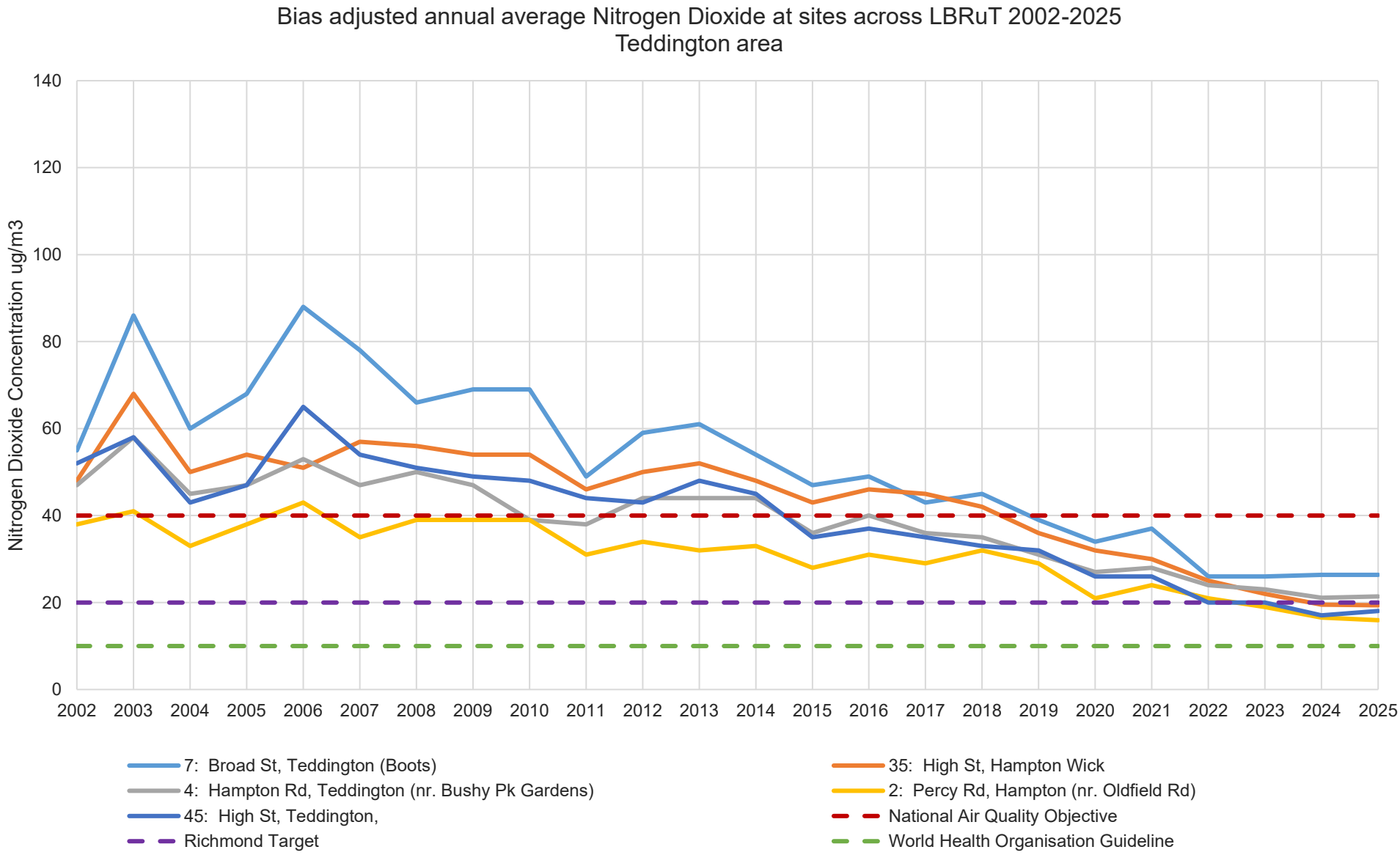


Figure 3 Bias Adjusted Annual Average NO_2 Long-Term Trends at Non-Automatic Sites Across LBRuT




Bias adjusted annual average Nitrogen Dioxide at sites across LBRuT 2002-2025
Twickenham area
Nitrogen Dioxide Concentration ug/m3
140
120
100
80
60
40
20
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Rut 01: Civic Centre, York St, Twickenham
32: Kings St, Twickenham
39: Richmond Rd, nr Lidl, East Twickenham
31: A316
15: Richmond Rd, Twickenham (opp. Marble Hill Pk)
National Air Quality Objective
Richmond Target
World Health Organisation Guideline


Bias adjusted annual average Nitrogen Dioxide at sites across LBRuT 2002-2025
Teddington area
Nitrogen Dioxide Concentration ug/m3
140
120
100
80
60
40
20
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
7: Broad St, Teddington (Boots)
4: Hampton Rd, Teddington (nr. Bushy Pk Gardens)
45: High St, Teddington,
Richmond Target
35: High St, Hampton Wick
2: Percy Rd, Hampton (nr. Oldfield Rd)
National Air Quality Objective
World Health Organisation Guideline

Bias adjusted annual average Nitrogen Dioxide at sites across LBRuT 2002-2025
Mortlake and Barnes area

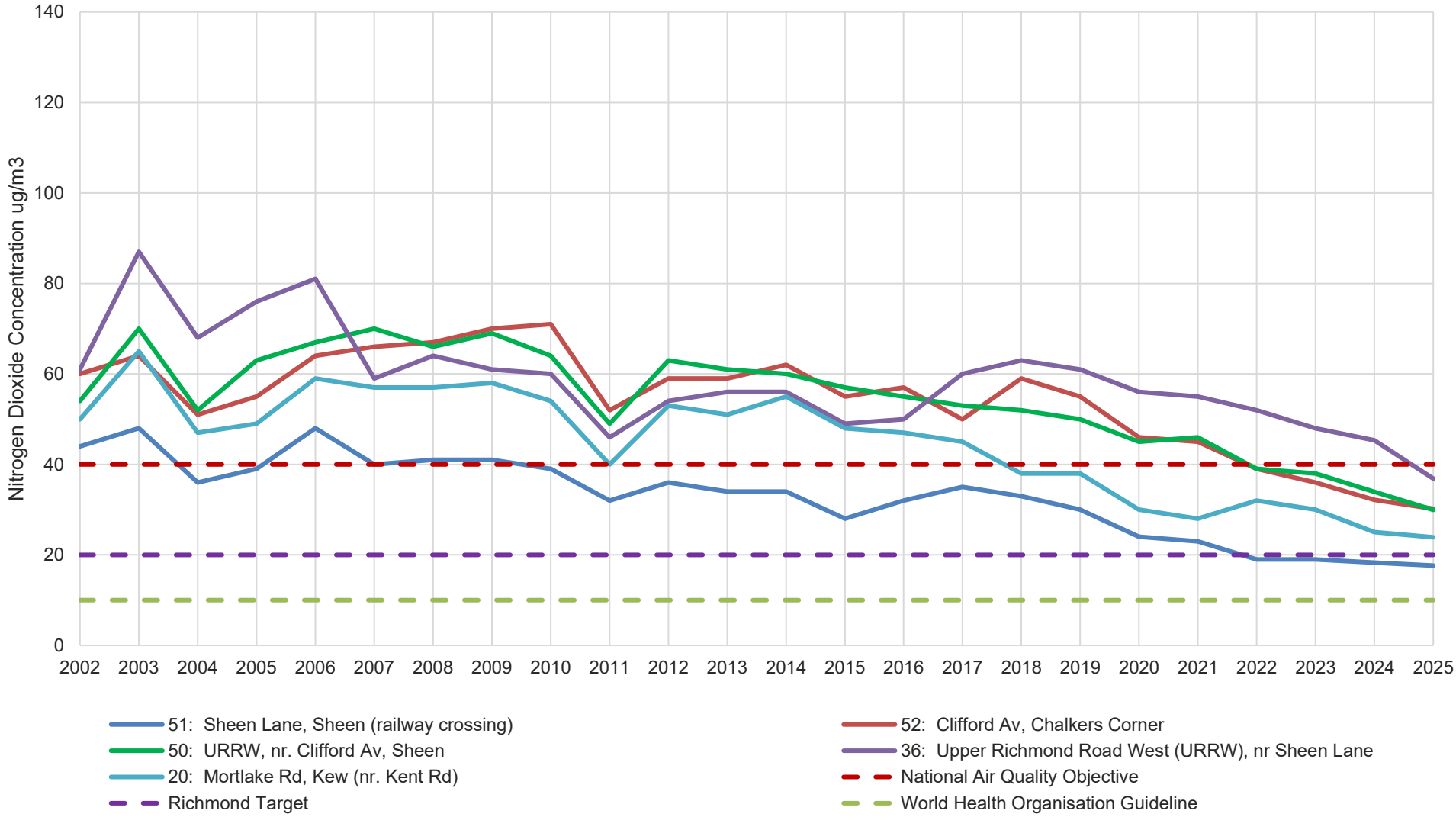


Table F NO_2 Automatic Monitoring Results: Comparison with 1-hour Mean Objective, Number of 1-Hour Means > 200 µg m^{-3}

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period %(a)	Valid data capture 2025 %(b)	2019	2020	2021	2022	2023	2024	2025
Castelnau Library (RI1)	522500	177166	Roadside	99.4	99.4	0	0	0	0	0	0	0
Barnes Wetlands Centre (RI2)	522993	176731	Urban Background	94.8	94.8	0	0	0	0	0	0	0
Richmond Town Centre (RH1)	518074	175251	Roadside	95.0	85.8	N/A	N/A	N/A	N/A	N/A	N/A	0

Notes

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period%(a)	Valid data capture 2025 %(b)	2019	2020	2021	2022	2023	2024	2025
Castelnau Library (RI1)	522500	177166	Roadside	91.7	91.7	15	15	16	15	15	16	17
Barnes Wetlands Centre (RI2)	522993	176731	Urban Background	88.4	88.4	16	16	15	14	12	15	14
Richmond Town Centre (RH1)	518074	175251	Roadside	95.1	85.8	N/A	N/A	N/A	N/A	N/A	N/A	27
NPL Teddington AURN (TD5)	515542	170420	Suburban	99.0	99.0	N/A	13	12	14	16	N/A	14

Notes

At the time of publishing, PM_{10} data for RH1 is not fully ratified and therefore may be subject to change. Results based on provisional data must be considered with care.

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

Exceedances of the PM_{10} annual mean AQO of 40 µg m^{-3} are shown in **bold** and yellow, compliance is shown in green.

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%).

PM_{10} monitoring at RI2 Barnes Wetland Centre transitioned from a Rupprecht & Patashnick 1400AB TEOM to a Palas FIDAS 200E optical aerosol spectrometer on 15 July 2025. The FIDAS 200E is EN 16450 type-approved as a reference-equivalent method and requires no correction. The 2025 annual mean is reported as a single continuous series as ratified by ERG.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period %(a)	Valid data capture 2025 %(b)	2019	2020	2021	2022	2023	2024	2025
Castelnau Library (RI1)	522500	177166	Roadside	91.7	91.7	3	0	0	1	1	0	3
Barnes Wetlands Centre (RI2)	522993	176731	Urban Background	88.4	88.4	3	0	0	1	1	0 (26.3)	1
Richmond Town Centre (RH1)	518074	175251	Roadside	95.1	85.8	N/A	N/A	N/A	N/A	N/A	N/A	12
NPL Teddington AURN (TD5)	515542	170420	Suburban	99.0	99.0	N/A	2	0	1	2	N/A	2

Notes

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

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

All PM_{10} data for 2025 is fully ratified.

(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%).

Discussion of PM_{10} Automatic Monitoring Results

All automatic monitoring sites complied with both PM_{10} air quality objectives in 2025. Annual mean concentrations were well below the 40 µg m^{-3} objective at all sites: Castelnau (RI1) recorded 17 µg m^{-3}, Barnes Wetlands (RI2) 14, NPL Teddington (TD5) 14, and Richmond Town Centre (RH1) 27 µg m^{-3}.

PM_{10} concentrations at the three longer-running sites remain broadly stable, with no clear upward or downward trend over the past five years, although an increase at Castlenau (RI1) from 16 µg m^{-3} in 2024 to 17 µg m^{-3} in 2025 is noted. This is consistent with the London-wide picture, where PM_{10} reductions have been slower than those for NO_2, reflecting the significant contribution of non-exhaust sources (brake, tyre, and road surface wear), domestic and commercial heating, construction activity, and regional background pollution, which are less affected by improving vehicle engine efficiency and electrification.

The new Richmond Town Centre site (RH1) recorded a notably higher annual mean than the other sites. This is expected for a kerbside monitor at a busy location, where resuspended road dust and mechanical particulate sources are concentrated. RH1 also recorded 12 exceedances of the 24-hour mean of 50 µg m^{-3}.

There was a small increase in the number of exceedances of 50 µg m^{-3} as a 24-hour mean at Castlenau (RI1), although this was still well within the objective limit of 35 per year. Exceedances were recorded around 11th January, 5th March, 10th March. A sustained pollution episode ran through early March 2025 across London, with daily means at RI1 remaining above 25 µg m^{-3} for over a week. While source apportionment is not possible from concentration data alone, the character of the exceedance days varied. The January exceedance and some days in early March saw both NO_2 and PM_{10} elevated together, suggesting local emissions were being trapped by poor dispersion conditions

On other days within the March episode, PM_{10} became elevated when NO_2 was not unusually high, suggesting additional contributions from sources other than local traffic and combustion. The timing during the spring fertiliser season is consistent with a contribution from transported continental European agricultural pollution, and Saharan dust was tracked reaching the UK by CAMS during March 2025. More generally, rising evening and overnight PM_{10} concentrations also suggest a local contribution from domestic solid fuel burning.

The 2021 WHO guideline for PM_{10} (annual mean of 15 µg m^{-3}) was met at RI2 and TD5 but exceeded at RI1 and substantially exceeded at RH1, underlining the continued impact of road traffic on local particulate levels.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period %[(a)]	Valid data capture 2025 %[(b)]	2019	2020	2021	2022	2023	2024	2025
Barnes Wetlands Centre (RI2)	522993	176731	Urban Background	99.6	43.2	N/A	N/A	N/A	N/A	N/A	N/A	7.9
Richmond Town Centre (RH1)	518074	175251	Roadside	94.0	84.8	N/A	N/A	N/A	N/A	N/A	N/A	*See Appendix A
NPL Teddington AURN (TD5)	515542	170420	Suburban	99.0	99.0	**12**	8	8	9	**12**	N/A	8.1

Notes

At the time of publishing, $PM_{2.5}$ data for RH1 is not ratified and therefore may be subject to change. Provisional $PM_{2.5}$ data for RH1 are presented Appendix A Details of Monitoring Site Quality QA/QC. Results based on provisional data must be considered with care.

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

Exceedances of the $PM_{2.5}$ annual mean concentration target of 10 µg m^{-3} are shown in **bold** and yellow, compliance is shown in green.

$PM_{2.5}$ monitoring RI2 Barnes Wetland commenced 15 July 2025 following commissioning of a new Palas FIDAS 200E combined PM_{10} and $PM_{2.5}$ analyser, replacing the previous TEOM (PM_{10} only). The 2025 value presented is annualised in accordance with LAQM.TG19 using reference sites NPL Teddington (suburban) and Honor Oak Park, Lewisham (urban background). 2026 will be the first full calendar year of $PM_{2.5}$ data at this site.

(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%).

$PM_{2.5}$ Monitoring Data Quality Review

During 2026, a review of the Council's $PM_{2.5}$ monitoring network identified configuration and equipment issues affecting BAM particulate matter analysers. This type of sensor was installed in the new Richmond Town Centre analyser in February 2025. These issues related to the operation of internal humidity-control systems and associated sensors, which are used to ensure that measurements are collected under standardised conditions.

The review found that some instruments may not have been operating in their intended configuration for part of the monitoring period. As a result, a proportion of historic $PM_{2.5}$ measurements may not be directly comparable with data from correctly configured instruments and could be subject to measurement bias. Evidence from network comparisons indicated that affected instruments generally reported higher $PM_{2.5}$ concentrations than nearby comparison sites.

To maintain the integrity of the monitoring programme, the affected datasets have been reviewed and are being assessed in accordance with established quality assurance and quality control procedures. Where data are considered unreliable, they will be excluded from reporting and analysis. This process ensures that published air quality information remains robust and that any conclusions drawn from the monitoring data are based on the best available evidence.

A programme of corrective actions has been implemented across the monitoring network. This includes reconfiguring instruments to the correct operational settings, calibrating and testing sensors, undertaking additional background and performance checks, and strengthening routine maintenance and audit procedures. Enhanced monitoring of instrument performance has also been introduced to enable potential issues to be identified and addressed more quickly in the future.

The Council remains committed to maintaining a high-quality monitoring network and ensuring that reported air quality data are accurate, reliable and transparent.

Provisional $PM_{2.5}$ data are presented Appendix A Details of Monitoring Site Quality QA/QC. For the reasons outlined above, the data should be viewed with caution. If validated $PM_{2.5}$ data becomes available, the Annual Status Report will be updated.

Discussion of $PM_{2.5}$ Automatic Monitoring Results

2025 was the first year of $PM_{2.5}$ monitoring at two Council operated sites (RH1 and RI2), as well as the NLP Teddington ARUN site (TD5). The annualised annual mean at Barnes Wetlands (RI2) was 7.9 µg m^{-3}, based on data from 15 July (when the new FIDAS analyser was commissioned) to year end. The annual mean at Richmond Town Centre (RH1) is reported in Appendix A, for reasons outlined above. The NPL Teddington AURN site (TD5) recorded 8.1 µg m^{-3}, consistent with its longer-term range of 8-12 µg m^{-3}. TD5 data was unavailable for 2024.

The two background/suburban sites (RI2 and TD5) met the Mayor of London's commitment of 10 µg m^{-3}. Both sites exceeded the 2021 WHO guideline of 5 µg m^{-3}.

The RI2 result should be treated with caution as it is derived from less than six months of data and has been annualised using the TG19 methodology (see Appendix A Details of Monitoring Site Quality QA/QC3 for details). 2026 will be the first full calendar year of $PM_{2.5}$ data at this site. The LAEI source apportionment for Richmond indicates that $PM_{2.5}$ emissions in the Borough are dominated by road transport (both exhaust and non-exhaust), domestic wood burning, and commercial cooking, with a substantial additional contribution from the regional background originating beyond the borough's boundaries. Vehicle electrification will eliminate particulate emissions from exhausts but may not reduce, and could potentially increase, non-exhaust emissions from brake, tyre, and road surface wear due to the greater weight of electric vehicles.

Domestic wood burning is the second largest local source of $PM_{2.5}$. The entire Borough is designated a Smoke Control Area, meaning that only approved appliances and authorised fuels may be used. The Council continues to enforce these restrictions and to discourage all forms of internal burning on grounds of harm to health. It is an active member of the pan-London wood burning project, collaborating with other boroughs on public education and awareness campaigns to reduce emissions from stoves and open fires. Addressing the remaining major sources, including commercial cooking and the regional background component, will require sustained action.

Table J 2025 SO_2 Automatic Monitoring Results: Comparison with Objectives

No SO_2 monitoring was carried out in 2025

Table K Other Pollutants - Ozone

Site ID	Valid data capture for monitoring period %[a]	Valid data capture 2025 %[b]	Annual Mean 2025	Exceedances 2025 [C]
Barnes Wetlands Centre (RI2)	86	86	51.9	18

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

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

(c) Number of days where the maximum daily running 8-hour mean exceeded 100 µg/m³ (UK objective: not more than 10 per year)

Discussion of Ozone Monitoring Results

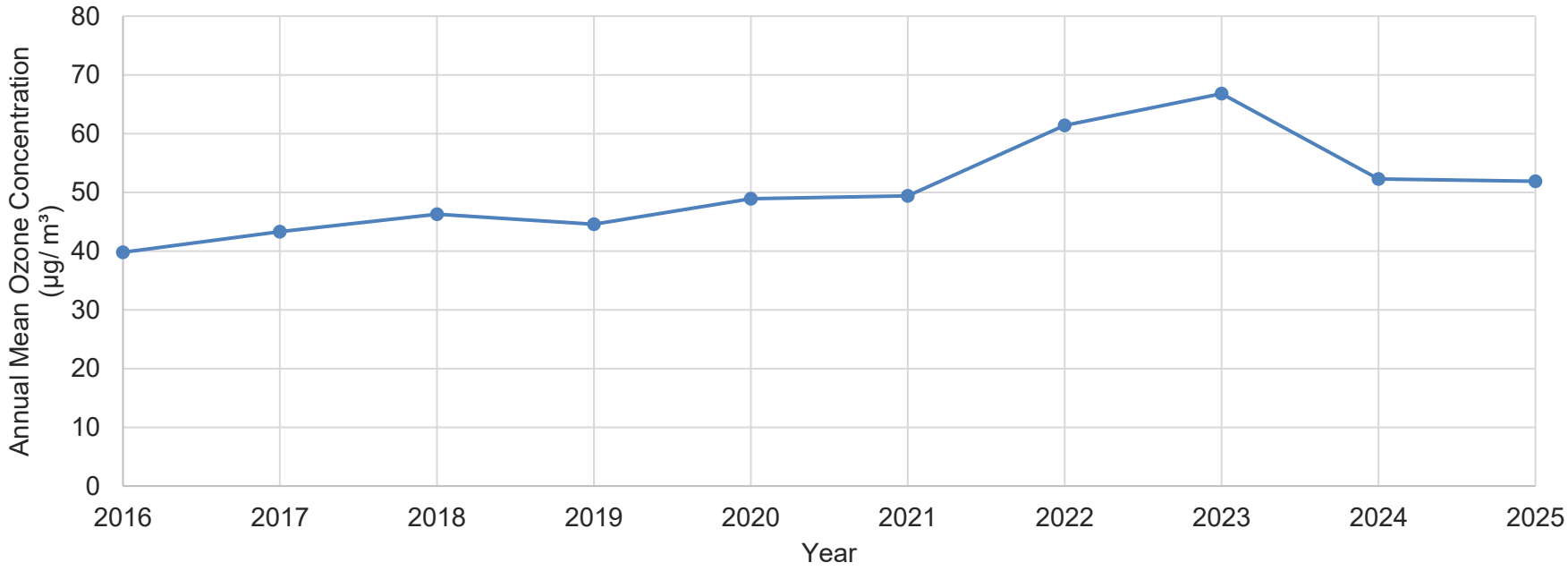
Ozone (O_3) is monitored at the Barnes Wetlands background site (RI2). In 2025, the annual mean was 51.9 µg m^{-3} and there were 18 days on which the maximum daily 8-hour running mean exceeded 100 µg m^{-3}, against a UK objective of no more than 10 such days per year. This represents an exceedance of the ozone objective.

As shown in Figure 4 below, annual mean ozone at RI2 has risen from approximately 40 µg m^{-3} in 2016 to over 50 µg m^{-3} in recent years, with a peak of 67 µg m^{-3} in 2023. This upward trend is consistent with the pattern observed across London and nationally. As NOx emissions from traffic decline, there is less nitric oxide (NO) available to react with and remove ozone at ground level,

resulting in higher background ozone concentrations. Improving NO_x levels can unfortunately therefore lead to rising ozone. The year-to-year variation is strongly influenced by meteorology, with warmer, sunnier summers producing more photochemical ozone.

Ozone is not a pollutant included in Richmond Borough's AQMA designation and is not directly controllable at local level as concentrations are strongly influenced by regional sources. The Council will continue to monitor ozone at RI2 and to promote the airTEXT alert service, which provides forecasts of high ozone days so that vulnerable residents, particularly those with asthma and other respiratory conditions, can take appropriate precautions. The Council's 2025-2030 Air Quality Action Plan identifies ozone as an emerging concern linked to climate change, with rising temperatures expected to increase the frequency of high-ozone episodes in future years.

Figure 4 Annual Mean Ozone Concentration at Barnes Wetland Centre (RI2), 2016-2025 (µg m⁻³)



2. Action to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) 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 AQMAs declared by the London Borough of Richmond upon Thames can be found in Table L. The table presents a description of the single whole borough AQMA that is currently designated within the London Borough of Richmond upon Thames Appendix D Map(s) of Monitoring Locations and AQMAs provides maps of the AQMA and also the air quality monitoring locations in relation to the AQMA

The air quality objectives pertinent to the current AQMA designation(s) are as follows:

NO_2 annual mean with an annual air quality objective of 40 µg m^{-3}.
PM_{10} annual mean with an annual air quality objective of 40 µg m^{-3}.

The London Borough of Richmond upon Thames whole borough AQMA is located in the Southwest corner of Outer London. In air quality terms, this means that the prevailing south-westerly wind (roughly 75% of the year) brings in relatively fresh air to the LBRuT, before it blows towards the centre of London. In practice, the wind blows from all points of the compass, and this includes receiving air blowing out from the centre of London.

Table L. 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
London Borough of Richmond upon Thames	31 December 2000	NO_2 annual mean	Whole borough of LBRuT	No	90.6 in 2002, following Stage 4 assessment, in May 2002 46 exceedances out of 57 sites	0 exceedance out of 71 sites 2025 Highest concentration 36.9 (within 10% of objective)	0	London Borough of Richmond upon Thames Air Quality Action Plan (2025-2030). Published April 2025	https://www.richmond.gov.uk/services/environment/pollution/air_pollution/air_quality_action_plan
	31 December 2000	PM_{10} annual mean	Whole borough of LBRuT	No	0 annual mean exceedences out of 3 sites; Highest concentration 28.0 µg m^{-3} (6 exceedances of the 24-hour mean)	0 exceedances out of 3 sites. 2025 Highest concentration is 27 (12 exceedances of the 24-hour mean)	25		

☒ **The London Borough of Richmond upon Thames confirm the information on UK-Air regarding their AQMA is up to date**

☒ **The London Borough of Richmond upon Thames confirm that all current AQAPs have been submitted to GLA**

2.2 Air Quality Action Plan Progress

On 7th April 2025 Richmond Council approved a new ambitious AQAP for 2025 – 2030, a little earlier than required, reflecting the ambitions and priorities of the borough. This is the first year of reporting on this AQAP. Although only adopted in April 2025, many policies are already progressing well.

The 2025 – 2030 AQAP involved significant direct consultation and engagement with community groups both in person - covering as diverse a population as was possible and all areas of the borough - as well as online, at webinars and on social media. For their efforts, Richmond Air Quality Team were rewarded by winning Air Quality Strategy of the year at the Fleet Vision International Awards. The result is an ambitious, robust, transparent, public facing AQAP that involves more joint working including with Public Health and Climate Change teams. Improving air quality in the borough is a top political priority and will remain so following the local May 2026 elections. The AQAP has adopted a new local target of 20 ug m^{-3} for annual NO_2 to be achieved borough wide by 2030. This reflects current thinking on harms to health of air pollution something now adopted by the EU. It also identified specific bold and brave measures to tackle pollution in local ‘hot spots’ by setting in action a consultation to improve enforcement to discourage and reduce engine idling via a new Public Space Protection Order (PSPO). The new AQAP will help create an environment that is welcoming to sustainable transport and aimed at the pedestrian and/or cyclist, within the borough and will prioritise schools.

The AQAP 2025 – 2030 is supported by the departmental Heads of Service for Environmental Health, Transport and Planning, Public Health, the Director of Public Health, the Director of Environment and Cabinet members.

Actions to Improve Air Quality - Action Plan Progress

Table M provides a brief summary of the London Borough of Richmond upon Thames' progress against the Air Quality Action Plan, showing progress made during 2025. New projects which commenced in 2025 are shown at the bottom of the table.

Table M. Delivery of Air Quality Action Plan Measures

NB - Top Three Measures are included at the top of the matrix and explained in more detail under relevant measure.

LLAQM measure / LBRuT Priority Number	LLAQM Action Matrix Theme	Action	Priority. Estimated/Actual Completion Date	Organisations Involved	Progress Emissions/Concentration data /Benefits Negative impacts / Complaints
1.1 **LBRUT 1**	Setting the right policy context/ Monitoring and other core statutory duties	We will set an ambitious goal to achieve 20µg/m3 for annual mean NO_2 by 2030 in line with the WHO guidelines	HIGH/1 Q4 24/25: Finalise policy. Q4 29/30: Achieve objective.	Environmental Health (AQ), Planning Policy	In our latest Air Quality Action Plan 2025-2030 Richmond Council has set an ambitious goal to achieve 20µg/m3 for annual mean NO_2 borough wide by 2030 in line with the WHO guidelines to regulate developments and assess projects. Discussions with Planning are ongoing.
7.2 **LBRUT 6**	Cleaner transport	We will discourage engine idling by engagement, enforcement and adoption of PSPO's.	MED/2 Q4 2025/26: to adopt new Public Service Protection Order for engine idling. At least 10 no idling events per year.	Environmental Health (AQ), Parking Enforcement,	Discouraging engine idling continues to be a top political priority for Richmond. Daily engagement by traffic wardens continued in 2025, plus monthly awareness raising events by officers. After full consultation, in Dec 2025, PSPO's were adopted for idling. Idling awareness raising was carried out at 14 locations.
1.2 **LBRUT 23**	Monitoring and other core statutory duties	We will monitor air quality to a high standard and invest in new equipment.	HIGH/2 Ongoing Q4 2024/5 – install new Air Quality station 2025 – increase monitoring of $PM_{2.5}$	Environmental Health Planning	In 2025 we installed a new AQ station in Richmond town centre, which included a new $PM_{2.5}$ monitor. We added a new $PM_{2.5}$ monitor to our background site at Wetlands. We secured funding for 15 x real time sensors to be installed in 2026. This will increase and maintain our network in line with latest thinking.

			Q1 2026 - secure funding for a replacement real time sensor network		
1.1 **LBRUT 1**	Setting the right policy context/ Monitoring and other core statutory duties	We will set an ambitious goal to achieve 20µg/m3 for annual mean NO_2 by 2030 in line with the WHO guidelines	HIGH/1 Q4 24/25: Finalise policy. Q3 29/30:Achieve objective.	Environmental Health (AQ), Planning Policy	In our latest Air Quality Action Plan 2025-2030 Richmond Council has set an ambitious goal to achieve 20µg/m3 for annual mean NO_2 borough wide by 2030 in line with the WHO guidelines to regulate developments and assess projects. Discussions with Planning are ongoing.
1.2 **LBRUT 23**	Monitoring and other core statutory duties	We will monitor air quality to a high standard, invest in new equipment, analyse and disseminate results widely, deliver targeted projects.	HIGH/2 Ongoing Q4 2024/5 – install new Air Quality station 2025 – increase monitoring of $PM_{2.5}$ 2026 - secure funding for a replacement real time sensor network	Environmental Health Planning	Ongoing. In February 2025 the Council installed a new high quality long term automatic Air Quality station in Richmond town centre monitoring NO_2, PM_{10} and $PM_{2.5}$. It maintained 2 x high quality automatic stations in Castlenau and Wetlands monitoring NO_2 and PM_{10} and added a $PM_{2.5}$ monitor to the Wetlands station which also monitors ozone. It secured in-house funding to continue monitoring NO_2 and $PM_{2.5}$ with 20 x real time Clarity sensors, in addition to 2 x Breathe London Airly sensors It maintained 68 x permanent passive NO_2 diffusion tube sites borough wide. It reviews and adjusts the network quarterly and will respond quickly to requests for data or additional monitoring from all, including schools, residents or Highway engineers. It strives to achieve at least 90% data capture rate at all sites. This is vital to raise awareness for residents and inform solutions and interventions for policy makers, including, our Highways and Public health teams. LBRUT was part of the LAQN (London Air Quality Network) throughout 2025 and has been a member since 2001. It

					values the work done by Imperial College to help achieve and maintain the highest possible standards. Bias adjusted annual results in ASR's are published on the council website as soon as approval is received here Annual Status Reports and Air Quality Action Plans - London Borough of Richmond upon Thames
2.1 **LBRUT 3**	Setting the right policy context/ Emissions from developments and buildings	We will continue opposition to Heathrow expansion by working with other councils and the Mayor of London.	MED/3 Continue to monitor development around Heathrow expansion and respond to all consultations	Assistant Chief Executive	Richmond Council remains firmly opposed to any expansion at Heathrow, including a third runway, which would have a detrimental impact on noise and air quality for Richmond residents. The Council's Special Standing Committee on Heathrow met in February 2026 to discuss the implications of recent developments, including the Government's announcement that it was minded to back Heathrow Airport Ltd's proposals for a third runway and the Government's planned review of the ANPS (Airports National Policy Statement), and reaffirm its opposition. The Council also continues to be an active member of the No 3rd Runway Coalition which coordinates opposition.
2.2 **LBRUT 16**	Emissions from developments and buildings	We will deliver London's programme to enforce Non Road Mobile Machinery (NRMM) air quality policies during construction and development. (3)	HIGH/1 Ongoing: Q4 24/25: manage the transition to EU Stage IV, 2025 onwards to condition 100% of major planning apps for NRMM, dust management and request non combustion for heating/cooling	Environmental Health (AQ)	LBRUT, together with LB Merton are mindful of the large proportion of emissions contributed by Non-Road Mobile Machinery (NRMM). All major sites are therefore visited and requirements enforced by our London wide NRMM team based in our LB Merton offices. Latest NRMM regulations are routinely applied, and planning officers are updated. In 2025, as in 2024, EH at LBRUT requested from Planning that NRMM conditions be imposed on 100% of all major construction sites. Initial compliance rates for NRMM equipment, on arrival at inspection by the NRMM team was 71% which was reasonable. As time goes on, construction appear more aware of requirements. Continued inspection, however, is considered very important.

					For NRMM details, see table N.
2.3 **LBRUT 17**	Emissions from developments and buildings	We will enforce National, Mayoral and local planning policies to minimise emissions from developments and encourage sustainable transport	HIGH/2 Ongoing:	Environmental Health (AQ) Planning	Air Quality officers respond to all major planning applications and require that all comply with the National Planning Policy Framework, the London and UK CHP and biomass air quality policies, the GLA Air Quality Neutral and Air Quality Positive policies, alongside Richmond's own AQ Supplementary Planning Document (2020). Where possible officers encourage adequate, appropriate, and well-located green space and that active travel infrastructure is included in new developments. Officers also condition to minimise emissions during demolition and construction.
2.4 **LBRUT 18**	Emissions from developments and buildings	We will enforce the borough wide Smoke Control Zone; including raising awareness for domestic burning, commercial kitchens and boat dwellers. (7)	MED/2 ongoing 2025/26 baseline data for Health Waterways programme 2027/28 establish annual commercial kitchens air quality awards programme, working with the Food EH Team.	Environmental Health (AQ) Communiactions, Commercial EH	LBRUT accept that solid fuel burning is a major source of $PM_{2.5}$ (23 -31% in London) that must be controlled at the local level. Addressing this source is crucial for achieving the LES target to meet WHO guideline levels for $PM_{2.5}$ by 2030. Wood burning stoves and open fires are popular in LBRUT. In 2025 EH investigated all complaints on smoke control. LBRUT is part of the Mayoral funded London Wood Burning Project 2 (LWBP2) and is a member of the GLA engagement group on wood burning. In Autumn/Winter 2024/5 and 2025/6 Richmond with the LWBP2 raised awareness of the health impacts from internal solid fuel burning on radio, local billboards, backs of buses, on social media and on the Council website. The campaign was informed by research by Imperial College London. This culminated with an online webinar and stall in Teddington hospital and at the borough-wide "Community Conversation "in Richmond town centre for Clean Air Night on 22/1/26. More information is available here https://woodburning.london/.

					For the last 6 years, including 2025/6 Richmond communications team ran a campaign on the Council website and on social media to remind residents and businesses of new requirements in smoke control areas. In 2020, bonfires were banned on all Council allotments at all times. In 2025 Richmond was part of a new Mayoral funded Healthy Waterways project to gain baseline data on energy needs on London's waterways, including the River Thames. Progress will be reported in ASR 2027. 2026.
2.5 **LBRUT 19**	Emissions from developments and buildings	We will deliver a new Local Plan with improved planning requirements for climate change; promote the replacement of old boilers and insulation schemes,	HIGH/3 ongoing Q4 24/25: Deliver new Local Plan; Launch ECO4 based home efficiency scheme; promote GLAs HUG2 scheme for low-income homes and HMG Boiler Upgrade Grant; promote retrofit advice for 'able to pay' residents.	Climate Change, Planning Policy and Communications	A Retrofit Strategy for the borough was adopted in February 2025 which sets out the priority areas for retrofit and energy efficiency. A new service, the Smarter Homes Hub has been developed and will be launched in March 2026, which will provide a central hub for retrofit information for residents, including case studies, access to tailored retrofit information and promotion of the BUS. Also in development is a Retrofit Supplementary Planning Document which will provide detailed technical planning information for retrofit. Following the closure of ECO4 and HUG2, Richmond has secured funding from central government's Warm Homes Local Grant as part of a pan-London consortium. Delivery of this scheme targeted at fuel poor residents will start in 2026.
2.6 **LBRUT 20**	Emissions from developments and buildings	We will increase provision of Retrofit Skills Training for Energy Efficiency and Carbon Reduction.	MED/3 Ongoing Work with local education and training providers to increase provision of retrofit skills and training.	Climate Change/ Business Development, Policy and Communications	Work has continued throughout 2025 with key partners on the delivery of a programme to support, develop and promote retrofit skills and training. Links with University of Roehampton's SETEC have been developed, and work with South London Partnership on skills has now concluded following the end of government funding.

3.1 **LBRUT 24**	Public health and awareness raising	We will encourage and support citizen science activities that identify and tackle air pollution. (12)	LOW/4 Ongoing:	Environmental Health (AQ)	Richmond encourages and supports citizen science activities. Officers ran public walks for Car Free Day doing PM monitoring and studying lichens at grey, green and blue sites, so residents could identify local pollution variations and discuss how best to avoid hotspots. At Clean Air Day art workshops residents were taught about using lichens as air pollution indicators and how and where to spot them.
3.2 **LBRUT 8**	Public health and awareness raising	We will deliver an annual Clean Air Day event in an area of high footfall, engage schools in Clean Air Day, support Car Free Day and events that promote improved indoor and outdoor air quality. Encourage play streets.	MED/4 Ongoing 2025 – 30 - Annual Clean Air Day event. 2025 target: 5 x Play for Car Free Day 2026 -30 target: 10 x Play Streets for Car Free Day	Environmental Health(AQ),	Richmond aim for at least 4 campaigns and events a year on air quality. Richmond ran a public campaign over the winter period to raise awareness of health impacts for indoor burning, which included a pop up event on 22nd Jan 2025 for Clean Air Night in Richmond town centre. In March 2025 officers raised awareness of indoor burning and all things air quality at the well attended Kew Eco-Fair. Officers held a public pop-up stall at Teddington hospital on Earth Day providing information and activities, supported by PH and Climate colleagues. Officers ran a stall in Richmond town centre, a poster competition for schools and 3 x public creative “Trees, the lungs of Richmond” workshops (~50 registered) for Clean Air Day, followed by a public display of the art works coupled with a community conversation event. In Sept 2025 Richmond Council ran 2 public walks for Car Free Day to raise awareness of localised pollution and how to avoid pollution hotspots and closed 23 x streets for play streets. It led an Interactive session with borough Youth Council to educate and hear their concerns; it ran 2 sessions for parents of under 5s for our “Clean Air Strong Starts” programme delivered by MP Smarter travel plus 3 in person sessions to

					communicate key points of AQAP to residents and get their feedback.
3.3 **LBRUT 25**	Public health and awareness raising	We will promote airTEXT at events, workshops and online through the Council and Love Clean Air websites	LOW/2 Ongoing Target promote at 8 x events a year. Re-share GLA/airTEXT high alert day tweets on all high alert days on X or Threads.	Environmental Health (AQ) Communications	LBRuT promotes airTEXT through the Council and the newly refreshed Love Clean Air websites, plus in many communications, events and workshops throughout the year with residents and schools. Airtext is also promoted at school workshops and events. In 2025 airText was promoted at least 10 events and workshops. EH is in contact with PH to try to expand the re-sharing of alert days. Public Health have been promoting the use of airTEXT amongst healthcare professionals, encouraging its promotion with groups most vulnerable to the health effects of air pollution.
3.4 **LBRUT 26**	Public health and awareness raising	We will improve children's asthma management by combining personalized air quality monitoring with expert medical guidance to empower families with actionable, environment specific insights. (12)	LOW/2 Ongoing: training 2025/26/27: review delivery of the programme and seek additional funding	Public Health & NHS Environmental Health (AQ)	Training on Indoor Air Quality and risks to the most vulnerable provided to over 380 healthcare professional and home visitors. Training to be delivered quarterly and include expanded audience to include parents. Pilot scheme working with the most vulnerable to assess air pollution in the home, its impact and mitigation. Initial cases do show a proof of concept and have found high levels of pollution created in the home. Joint working with health care partners to expand the scheme Environmental Pollution now part of London Asthma care plans. Indoor air quality leaflets have been distributed widely including through family hubs and primary care settings, and as part of the Borough's Warm Packs scheme. Indoor air quality messaging was also incorporated into the Council's public health messaging across the cold weather perio

					Materials provided for vulnerable people and health care providers on the dangers and impact of pollution in the home and now available on our new Love Clean Air Website.
3.5 **LBRUT 27**	Public health and awareness raising	We will conduct assessments of indoor air quality and promote this information to residents and vulnerable groups.	LOW/2 Q4 24/25: complete purchase of indoor AQ monitoring equipment Ongoing: conduct assessments, events and communications.	Environmental Health (AQ) Public Health & NHS	Indoor monitoring equipment was purchased and arrived Feb 2025. Preparatory work was undertaken throughout January–December 2025 on Indoor Air Quality messaging which was incorporated into the MPST Clean Air Strong Starts programme. In Dec 2025, a pop-up session at a Baby Sensory group was held at Old Deer Park Sports Ground, Richmond followed by a 2nd in South Richmond in March 2026. Following low uptake for planned in-person workshops in targeted wards, delivery shifted to a series of three bite sized air quality information videos, available on our new Love Clean Air website plus wider dissemination through Baby Sensory's February 2026 newsletter.
3.6 **LBRUT 28**	Public health and awareness raising	We will deliver a programme of business engagement, consolidated deliveries, loading bays and an awards scheme for commercial kitchens.	LOW/4 Q4 25/26:engage with 20 x businesses 2027/28: Pilot commercial kitchens award scheme.	Environmental Health(AQ) Commercial EH	During 2025 our Business Section has engaged with businesses to help reduce emissions and save costs for local traders (see 4.3); work is ongoing with the air quality team on parcel lockers to reduce emissions from deliveries, whilst increasing convenience for residents (see 4.2); Virtual loading bays to make more efficient use of limited kerb space in Richmond and East Sheen and reduce emissions from abortive deliveries continues (see 4.1) and an awards scheme for commercial kitchens is planned from 2027-30.
3.7 **LBRUT 29**	Public health and awareness raising	We will regularly brief and the Director of Transport on health impact of air pollution and their role for	HIGH/1 Quarterly: update meetings Ongoing: AQ support for Transport Strategy	Environmental Health(AQ), Traffic and Engineering Management	AQ is embedded in the decision-making process cutting across Transport, infrastructure and active travel. Officers and Cabinet Members meet every 2 weeks, including Director of Transport where risks and opportunities are discussed.

		delivering their public health duties.			
3.8 **LBRUT 30**	Public health and awareness raising	We will meet quarterly with Public Health to update on air quality actions and needs. , Support PH on development of the JSNA, latest AQ information and consult PH on developing air quality policies. Director of Public Health to sign off Statutory Annual Status Report and new Air Quality Action Plans.	MED/2 Ongoing Quarterly: AQ-PH meetings to ensure information and projects are aligned; Annual: PH-AQ consultation/sign-off re ASR, JSNA updates and other major milestones.	Environmental Health(AQ), Public Health	Monthly meetings with officers from Public Health and Climate Change to deliver joint opportunities and co-benefits. Air quality now forms part of the borough's Joint Local Health and Wellbeing Strategy and is a key Step delivering direct health benefits including our work on indoor air quality with the most vulnerable, and training of health care professionals and home visitors. Air Quality is also embedded in the South West London Asthma Partnership and the South West London ICB. Our new Love Clean Air Website has health specific pages and resources built in partnership with our Public Health and NHS colleagues. https://www.lovecleanair.org/
3.9 **LBRUT 31**	Public health and awareness raising	We will work jointly with the Public Health Team and SW London NHS on air quality information for medical services and professionals, to cascade information to patients and vulnerable groups.	MED/2 Ongoing. Quarterly: Alignment meetings AQ-PH on joint projects delivery. Q4 2025: Incorporation of AQ and vulnerabilities data in climate risk mapping.	Public Health, Environmental Health(AQ), Climate Change and SW London NHS Cluster	Implement a series of projects with the Public Health Team and with the SW London NHS Cluster on air quality information for medical services and professionals, and cascading information to patients and vulnerable groups. This includes engagement with social prescribers in the borough to raise awareness of indoor air pollution impacts on vulnerable patients and sign posting to health advice. Mapping risks and impacts of air pollution in combination with climate and other risks. This includes updating of the risk map

		Map risks and impacts of air pollution with climate and other risks.			website and assessment of how useful for council services in terms of public engagement.
3.10 **LBRUT 32**	Public health and awareness raising	The School Travel Plan Advisor will promote healthy, safe, and active travel to school, to help schools meet their School Travel Plan (STP) targets and achieve STARS accreditation.	MED/3 ongoing	The School Travel Plan Advisor Transport Strategy	In 2025 with 36 schools accredited with Travel for Life, the School Travel Plan Advisor (STA) increased awareness of the programme with non-accredited schools and continued to improve the visibility of Richmond's existing 21 School Streets through the installation of the boroughs new School Street enhanced gateway features at all permanent School Streets. For the academic year 25/26, the STA will continue to work towards renewing accreditations before the submission deadline in July 2026. The STA is also liaising with engineers to plan phase 7 school streets for consultation after the May 2026 elections. 2 school streets were consulted on in calendar year 2025 and both are now being trialled.
3.11 **LBRuT 33**	Public health and awareness raising	We will deliver a programme of air quality related interventions in schools.	LOW/4 KPI: 15 interventions per year including 6 primary school workshops, visits for idling campaign, and other interventions such as assessments. Annual: Report to AQ & Transport Committee on effectiveness	Environmental Health(AQ),	Delivered Air Pollution Detectives workshop to 7 x primary schools, for 270 x yr 5 and 6 pupils; Gave mini-workshops to 10 x primary schools as part of our borough eco-summit; Made dedicated idling action visits to roads around 14 x primary and secondary schools with follow-up summary of findings and suggested actions for schools to take; Ran 5 activities including workshops, assemblies at secondary schools for our "Our Air, Our Action workshops" programme delivered by MP Smarter travel; airText information cards (with verbal support) provided or topped-up at 17 schools to provide alerts for predicted medium/high pollution days, especially for vulnerable children and those with asthma. Ran a schools poster competition (KS1 & KS2) for Clean Air Day, ran school travel activities for Car Free Day and encouraged schools to support #AskAboutAsthma with articles in Schools newsletter advertising events, blogs and info etc, plus info on our website and a socials campaign. Provided a dedicated schools air

					quality page on the Council website with information and external links, which is used in tandem with the weekly schools newsletter to highlight relevant activities and offerings, especially during campaigns. Ran 3 sessions at primary schools and a youth centre about our new AQAP to get feedback on content and priorities prior to finalising AQAP.
3.12 **LBRuT 34**	Public health and awareness raising	We will strengthen coordination with Public Health by ensuring a Consultant-grade public health specialist has air specific quality responsibilities and set up joint PH + AQ meetings.	LOW/5 Ongoing Q2 2025 – appoint PH Consultant with specialist AQ responsibilities. Q1 2025 -Set up quarterly joint meetings to progress AQ.	Public Health	In 2025 PH appointed a Health Protection Consultant with specific air quality responsibilities as part of their role. PH is now involved in the development of the direction and approval of the air quality action plan. Following the adoption of the new AQAP in Apr 2025, quarterly meetings were set up with the Air Quality Team and Public Health to review joint public health and air quality programmes, in particular those linking to the NHS. Established annual review of the air quality and public health joint programmes
4.1 **LBRUT 13**	Delivery servicing and freight	Virtual Loading Bays and priority loading for ultra-low emission delivery vehicles.	HIGH/4 Q4 25/26: virtual loading bay schemes at Richmond, Twickenham & East Sheen to be evaluated and expanded, contingent on funding.	Local Authority Environmental Health(AQ), Parking	Throughout 2025, Transport and Air Quality Officers have trialled Virtual Loading Bays (VLBs) to better manage limited parking, provide timed delivery slots and avoid re-visits/ vehicles partly blocking the carriageway due to lack of parking space in Richmond town centre and in East Sheen. All help provide useful data whilst reducing emissions. This commenced as a Defra funded project but has been successfully continued in house throughout 2025, smoothing the flow and reducing emissions. As part of the “Richmond Vision” kerbside activities and uses will be reviewed to improve servicing and reduce air quality impacts from these activities (see 7.7) Once Twickenham Riverside development is completed, Twickenham will be assessed with a view to including.

4.2 **LBRUT 14**	Delivery servicing and freight	Facilitate parcel lockers. 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.	LOW/4 ongoing Roll out parcel lockers, deliver at least 6 new parcel lockers with DLL per year across LBRuT.	Environmental Health(AQ), Transport Strategy	Throughout 2023/4 Richmond Council was part of a Smarter Greener Logistics project funder by Defra to install agnostic parcel lockers borough wide, particularly in residential areas far from shops. This was to improve convenience for residents for the safe delivery of parcels close by, without the need to wait in. From an air quality perspective it reduced the number of miles and idling from delivery vehicles by delivering to one place rather than 10-20 homes. Due to various issues, including licensing, the project ran out of time. Richmond decided to continue in house. During 2025 the delivery partner Yeep/DLL saw a complete restructure of staff. Contacts were re-established and potential sites investigated. It is hoped that phase 1 of 10 x parcel lockers will be installed in Autumn/Winter 2026.Progress will be reported in ASR 2027.
4.3 **LBRUT 15**	Delivery servicing and freight	Establish and launch a pilot programme with businesses and community groups to reduce their carbon footprint and increase sustainability.	. LOW/4 Q3 2025 launch new Greening Your Business programme. Q2/3 2026 end of programme report on savings/reductions. Q1/2 2026 – launch new programme	Business Growth, Climate Change,	We have been running the Greening Your Business programme in Richmond for 15 businesses. To date 12 of those have been audited and two more are due to be audited shortly. These have included a good mix of companies ranging from shops/restaurants and clinics to theatres and companies in the health and construction sectors. An end of programme report will be received in the late Summer 2026 which should provide some data on what has been achieved – e.g energy and water savings; landfill reduction ; carbon footprint reduction and environmental management practices. A new programme will be starting in April 2026.
4.4 **LBRUT 35**	Delivery servicing and freight	Ensure sustainable Procurement policies are implemented	LOW/5 Ongoing Implement the West London Low Carbon Procurement Policy for	Procurement	In 2025 Richmond Council published a new 5-year Responsible Procurement Strategy, which supports the Council's broader vehicle decarbonisation strategy and encourages the procurement of low- and no-emission vehicles

			100% of procurement which are in scope		wherever possible, as well as the inclusion of scoring criteria based on environmental and sustainability'
4.5 **LBRUT 39**	Delivery servicing and freight	Update local authority Procurement policies to require suppliers of large fleets to attain silver Fleet Operator Recognition Scheme (FORS) accreditation.	LOW/5 Ensure 100% of relevant procurements are compliant with the requirement	Procurement	The Council has achieved FORS bronze for the DSO Fleet in Richmond. In 2026 it will undergo a procurement exercise to replace the Council fleet. Although it has started undertaking all the required training for Silver, this cannot be achieved until the Fleet is replaced.
5.0 **LBRUT 5**	Borough fleet	Accelerate uptake of hydrogen, electric, hybrid, bio-methane and cleaner vehicles in the boroughs' fleet.	LOW/4 Ongoing	Borough Fleet, Climate Change,	Reducing emissions from LBRUT's own fleet and that of contractors is seen as key. Council's vehicle decarbonisation plan replaces vehicles at end of-life with EVs. By Dec 2025 LBRUT had 73 vehicles, 71 (97.2%) are Euro VI, 1 x hybrid (1.4%) and 1 x EV (1.4%)– zero emission. Issues regarding the installation of EVCP at the Council depot is delaying fleet upgrades. Contractors are incentivised to use clean fleet via procurement (see 4.4)
5.1 **LBRUT 17**	Borough fleet	Smarter Driver Training for drivers of vehicles in Borough Own Fleet i.e. through training of fuel efficient driving and providing regular retraining of staff.	LOW/5 Continue annual training updates for Council fleet drivers (including waste), with all new drivers trained on joining.	Borough Fleet,	CPC driver training courses attended by 10 x Richmond Council's fleet drivers in 2025.

5.2 **LBRUT 37**	Borough fleet	Borough fleet to join the Fleet Operator Recognition Scheme (FORS)and obtain Gold accreditation.	LOW/5 Ongoing. Target of Gold by 2030	Borough Fleet, Financial Services	All borough fleet drivers trained/receive annual updated training for FORS. All new drivers trained on joining (where not already FORS trained). Currently FOR's Bronze accredited, will apply for silver once current fleet is replaced (currently with procurement).
6.1 **LBRUT 21**	Localised solutions	Junction improvements and schemes to reduce high traffic on local roads	LOW/3 Ongoing	Traffic and Engineering Management	We continue to design for and introduce schemes to provide improved and enhanced cycle, pedestrian and bus accessibility. Design work undertaken in 2025-26 includes Kingston Bridge Rbt, Hampton Court Road outside the Palace and Hospital Bridge Road north of the A316. These scheme look to provide for enhanced pedestrian and cycle measures aimed at reducing reliance on the private motor vehicle. We have also implemented experimental traffic restriction schemes on Rivermeads, Twickenham and Kew Green, Kew to remove high traffic volumes from residential roads.
6.2 **LBRUT 22**	Localised solutions	Identify locations for tree plantings and hedges to mitigate air pollutants; lobby TfL to introduce hedging on major roads; request green infrastructure in new developments.	MED/4 Q4 25/26: Develop Tree Planting Strategy; Ongoing	Parks Traffic and Engineering Management	The tree planting strategy "Trees for Richmond" was adopted by committee in June 2024. Following this locations were identified for planting trees and and hedges to mitigate air pollutants; Parks are on target to plant in excess of 800 trees across Richmond in the 2025-26 planting season that will improve air quality and support biodiversity objectives in conjunction with the Ecology Team. Throughout 2025 EH have requested green infrastructure in new developments wherever possible.
6.3 **LBRUT 22**	Localised solutions	Eliminate diesel emissions from non-itinerant food trading, including ice cream vans. by providing battery "generators" or	MED/4 Ongoing – technology dependent. The target is to eliminate all diesel emissions from this		By December 2024, all viable static sites for mobile food vendors, including 2 challenging sites requiring running cable within the structure of Hampton Court bridge, had plug in points. All are now required to be used. The 3 remaining sites are all riverside locations in Petersham, Ham and Twickenham. Twickenham Riversite development is well

		shore supply for active trading stands.	source over the lifetime of this AQAP.		underway and Twickenham ice cream van site is incorporated into the new development plans. Distance from a UKPN jointing point makes Petersham and Ham sites cost prohibitive, so battery alternatives are under consideration. Weight and speed of developing technology are the main stumbling points. Discussions with the industry are ongoing.
6.4 **LBRUT 4**	Setting the right policy context/ Localised solutions	Develop a new Richmond Climate Emergency Strategy 2025-2030, with the goal of being a carbon neutral council by 2030 and net zero borough by 2043.	HIGH/3: Q 2 2025 – New Climate Strategy Ongoing By 2030 – target - carbon neutral Council	Climate Change, Policy and Communications	The Richmond Climate and Nature Strategy 2025-30 and accompanying action plan was approved at full Council in July 2025, with a launch event attended by over 100 residents the following week.
7.1 **LBRUT 2**	Setting the right policy context/ Cleaner transport	Pressing for TfL to prioritise electrification of bus routes through Richmond Town Centre and Upper Richmond Road West,	HIGH/1 Q3 29/30 ZEV upgrade of routes H22, 190, 337, 419, 490, 493 and R68: Target 100% ZEV buses	Environmental Health(AQ), Traffic and Engineering Management	In collaboration with London Councils and neighbouring boroughs, Richmond Council is pressing TfL to prioritise electrification of bus routes through Richmond Town Centre and Upper Richmond Road West in East Sheen. In May 2025 bus route 190 converted to electric. Bus routes 490 and 493 are due to convert to electric in spring and summer 2026 respectively. The other bus routes remain euro 6 diesel (ULEZ compliant) – they do not currently have a firm conversion date. A paper reviewing bus service performance is due to be considered by the Transport and Air quality Committee in June 2026.
7.2 **LBRUT 6**	Cleaner transport	Discourage engine idling by taxis, coaches and other vehicles by anti-idling campaigns	MED/2 Q4 2025/26: to adopt new Public Service Protection Order for engine idling.	Environmental Health(AQ), Parking Enforcement,	Discouraging engine idling continues to be a top political priority for Richmond. In 2025, traffic wardens engaged with 6,163 drivers across LBRUT, requiring switch off. This was the 6th year of CEO enforcement and a total of over 67,000

		and enforcement activity.	At least 10 no idling events per year.		warnings have now been issued. This is far higher than many other London authorities. Throughout 2025 Richmond Council continued its in-house Idling Action Events Programme, speaking to drivers and raising awareness not to idle at 16 locations, mainly around schools and level crossings. However, it was considered that Richmond needed a more effective tool to stop unnecessary idling, so in 2025 it consulted on the use of PSPO's for idling. After consideration by full Council Committee on 2 December 2025 it approved the trial of the Public Spaces Protection Order (PSPO) for idling vehicles. In 2026 the Council plans to update its enforcement protocol, appoint a service provider and deliver the scheme.
7.3 **LBRUT 7**	Cleaner transport	Programme of EVCP installations, including rapid chargers for taxis, cabs and commercial vehicles and chargers in gullies for residents.	MED/3 Ongoing 2025/26 target of 100 x 22kW chargers + additional EVCP's using LEVI (Local Electric Vehicle Infrastructure) funding. 2025 - 2030 footway channels and dedicated EV bays at selected lamp columns	Transport Strategy	109 lamp column chargepoints installed in 2025 bringing the total number of lamp column chargepoints delivered to 1,062. Total chargepoints at year end 1,148 including faster 7kW and 22kW locations. Procurement of another 100 higher power 22kW chargers completed for delivery from 2026. Applications for footway channels to allow charging from home commenced summer 2025. Dedicated bays planned at selected lamp column charging sites in 2026 to increase access to existing infrastructure.
7.4 **LBRUT 9**	Cleaner transport	Increasing the proportion of electric, hydrogen and ultra-low emission vehicles in Car Clubs.	MED/4 Q4 24/25: confirm new operator, provide additional on-street spaces, enforce planning obligations for car	Transport Strategy	In 2025 the Good Move scheme offered 8 x free car club memberships to local residents. Since adopting the latest AQAP in April 2025, the market for car clubs has changed. Richmond Council values car clubs and the increase in sustainable transport/reduction in private car ownership that

			club spaces and membership. Ongoing: Good Move scheme offering car club memberships.		they support. It accepts that in 2025/6 the market for car clubs was not conducive to growth, illustrated by the main operator Zipcar's withdrawal from the UK in December 2025. Richmond is encouraging the occupation of car club bays by other accredited operators. To help incentivise this, in Feb 2026 it waived car club parking permit fees for car club spaces until April 2027 and is agreeing a new Service Level Agreement for potential operators. It is considering alternative sustainable transport uses of the bays and will review the situation later in 2026. EH continue to encourage car club membership in new developments through Planning.
7.5 **LBRUT 10**	Cleaner transport	Surcharge on vehicles based on emissions for standards for parking related permits.	LOW/4 ongoing	Environmental Health(AQ), Growth and Place Traffic and Engineering Management	This is regularly reconsidered by Richmond Council. At the last review of parking charges, the decision was made to set the new charges aimed at encouraging less car usage/ownership to increase the wider use of sustainable transport modes such as public transport, walking and cycling. An emission-based charging structure has not been taken forward at this time but the efficacy of emissions based permitting schemes will remain under consideration for future reviews of parking charges.
7.6 **LBRUT 11**		Deliver sustainable travel initiatives, including infrastructure and reallocation of road space. Deliver LIP goals including reduction of overall vehicle-kms in the borough.	MED/3 Q4 2025: 700 bike parking hub at Richmond Station. Q4 2025: 33 new bike hangars. Q4 2025: Implement 11 e-cargo bike bays; monitor hire of dockless e-bikes and cargo-bikes Ongoing:	Traffic and Engineering Management, Transport Strategy	In Oct 2025 the new multi-storey, green cycle hub with 24 hour CCTV and more than 650 spaces opened at Richmond station. This will enable more to cycle to the station and park securely. This is the third largest facility of its kind anywhere in the UK. In 2025 11 x cargo bike parking bays were delivered, and more are planned in 2026/27. A number of new crossings were implemented in 2025-26 including two on London Road Twickenham, Hampton Road by Wellesley Road, Hanworth Road by the River Crane and

			Good Move scheme; 2041: target of 5%-10% reduction in vehicle-kms.		Hanworth Road Hampton. In addition, improvements were made to existing toucan crossings on Hampton Road/Stanley Road junction and Rocks Lane/Ranelagh Avenue junction. We have also actively introduced new waiting restrictions at various locations on and around junctions to enhance sightlines and visibility for all road users. We have provided dropped kerbs and tactile paving as part of essential footway maintenance works including new dropped kerbs on request, such as at the junction of Grove Road/Hampton Road Twickenham. The school street programme was also continued with two new school streets in Kew and Barnes and the introduction of measures to enhance the gateways into the school streets. These school streets limit vehicle movement past school frontages around drop off and collection times, encouraging greater numbers of children to walk or scooter to school..
7.7 **LBRUT 11**	Cleaner transport	Support delivery of Richmond Vision to transform Richmond town centre, reducing pollution from through traffic.	. Q4 25/26: Ongoing.	Traffic and Engineering Management Transport Strategy	Traffic reduction measures are being considered as part of the Richmond Vision in the medium and long term development plans for the entire town centre. Data analysis of through traffic and parking usage has been undertaken to influence modelling and future design work. Initial reassignment modelling has commenced to understand impacts of traffic re-routing. (See also 4.1 – virtual loading bays)
7.8 **LBRUT 12**	Cleaner transport	Increase staff and Elected Member knowledge, skills and collaboration on climate change and sustainability;	LOW/3 Roll out sustainability training across all staff and councillors Q4 2025; Increase communications on staff	Climate Change, Policy and Communications	In early 2025, Richmond Council achieved Bronze Carbon Literate Organisation status. 10 training sessions have been delivered, bringing total staff trained to date to over 250. So far there are over 140 Carbon Literate Certified employees and the Council is working towards the goal of becoming a Silver Carbon Literate

		Support staff to travel sustainably.	sustainable transport options.		Organisation. 8 council staff are now Certified Carbon Literacy Facilitators. A staff travel survey was carried out in 2025 which has informed recommendations on how to improve sustainable staff travel
7.9 **LBRUT 38**	Cleaner transport	Continue speed control measures e.g. lowering the legal speed limit to 20mph in built up residential areas.	MED/5 Ongoing. Continue the programme of improvements to existing 20mph zones with safer crossings, passive and flashing signage, road pillows etc	Traffic and Engineering Management	A 20mph limit is now in force on 95% of borough roads including TfL. Richmond continues to enhance its 20mph speed limit roads with additional signage and lining as and when requests are received. Existing 20mph road markings are renewed and increased as and when roads get resurfaced. We are actively working on a new policy for flashing signage to ensure that those roads with the highest speeds/vulnerable users are prioritised for action. This new priority listing will feed directly into the Council Road Safety Plan, due for renewal in 2026/27.
New projects for 2025					
2.7	Emissions from developments and buildings	Reduce emissions from council buildings buildings	Q4 2030 ongoing	Climate Change	Total carbon emissions from Council buildings decreased by 3.35% between 2023/24 and 2024/25 from 2010tCO2e to 1943tCO2e. There has been an overall decrease in carbon emissions of 69.71% since the baseline year of 2018/19

3. Planning Update and Other New Sources of Emissions

Table N. Planning requirements met by planning applications LBRuT in 2025

Condition	Number
Planning	
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	19
Number of planning applications required to undertake construction dust monitoring and reporting (Please specify how you get access to dust monitoring data i.e. online tool or CSV file)	7
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 as detailed in Air Quality Neutral LPG (london.gov.uk) point 3.1.5.	0
Number of developments required to install Ultra-Low NO_X boilers	19 (all 19 likely to install non combustion, ASHP etc)
Number of developments where an AQ Positive, AQ Neutral building and/or transport assessments undertaken	19
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	6
Number of planning applications with S106 agreements including other requirements to improve air quality	2
Number of planning applications with CIL payments that include a contribution to improve air quality	0
NRMM	
Number of planning applications with conditions related to NRMM included.	19
Number of developments registered at www.nrmm.london.	17
Number of audits (based on the pan-London project report and / or inhouse auditing programme)	31
% of sites unregistered prior to audit	29%
% of sites compliant with the NRMM LEZ policy standards.	71%

LBRuT received no applications for use of CHP/biomass in 2025, which have been actively discouraged. Consultants and developers are more often proposing non-combustion, ASHP, maximum insulation and renewables to increase BREEAM ratings and only occasionally request ultra low NOx boilers, which are now discouraged. District heat networks are considered for larger developments but to date have proved inefficient, usually due to distance. Requirements are as per London Plan, which meant none could be refused on grounds of AQ in 2025, although mitigation was required.

3.1 New or significantly changed industrial or other sources

Richmond Council remains firmly opposed to any expansion at Heathrow, including a third runway, which would have a detrimental impact on noise and air quality for Richmond residents..

4. Additional Activities to Improve Air Quality

4.1 London Borough of Richmond upon Thames Fleet

The London Borough of Richmond upon Thames has a relatively small fleet; it has no Council housing; Waste and Recycling and Parks are contracted out.

By Dec 2025 LBRUT had 73 vehicles, 71 (97.2%) are Euro VI, 1 x hybrid (1.4%) and 1 x EV (1.4%) zero emission.

Issues around the installation of EVCP at the Council depot have hampered fleet upgrades which are hoped to be resolved shortly. Updates will be provided in ASR 2027.

4.2 Planning Enforcement

NRMM is a standard planning condition applied to all major developments. All sites are requested to register on the NRMM website and all NRMM used on-site is compliant with Stage IV of the Directive and/or exemptions to the policy. In 2024 and again in 2025, the Principal Air Quality Officer emailed current NRMM conditions to the Head of Planning and ensured all Planning Officers were reminded of requirement to add NRMM to all planning applications.

All major developments are passed to the Noise and Air Quality Officers in Environmental Health for comment. All major developments are required to submit an AQA. All relevant national, Mayoral and LBRUT local policies are applied by Environmental Health to all responses to Planning in all cases. Sites are considered for construction dust on a case-by-case basis, monitoring required and locations agreed between EH, Planning Officers and the developer prior to commencement of any work on site, where a moderate or high risk to receptors is predicted. Any complaint is investigated, mitigation agreed and additional dust suppressant systems required where necessary. This is carried out by EH and Planning Enforcement.

The RSP (LB Merton, LBRUT and LB Wandsworth) have 6 designated Officers based in Merton, who assess all major sites for NRMM compliance, visit sites and check the NRMM database for compliance in line with the Mayor’s Supplementary Planning Guidance for Control of Dust and Emissions during Construction and Demolition.

4.3 Pan-London NRMM Auditing Project

The London Borough of Richmond upon Thames is continuing to support the pan-London NRMM auditing project in 2025-2026.

The standard wording for NRMM conditions is:

“All Non-Road Mobile Machinery (NRMM) of net power of 37kW and up to and including 560kW used during the course of the demolition, site preparation and construction phases shall comply with the emission standards as published on the NRMM Website (Non-Road Mobile Machinery (NRMM) | London City Hall) Unless it complies with the standards set out on the website, no NRMM shall be on site, at any time, whether in use or not, without the prior written consent of the local planning authority. The developer shall keep an up to date list of all NRMM used during the demolition, site preparation and construction phases of the development on the online register.

All NRMM should be regularly serviced and service logs kept on site for inspection. Records should be kept on site which detail proof of emission limits for all equipment. The development shall be constructed in accordance with the approved details. All sites will be inspected for compliance.”

The wording is provided by the Air Quality Officer to the Planning Officer and is applied to all major planning applications by them. It is generally included in the Construction Management Plan/Environmental Management Plan which is discharged by EH, usually by the original Air Quality Officer.

This is applied to all major construction sites.

4.4 Air Quality Alerts

The London Borough of Richmond upon Thames continues to support airTEXT (https://www.airtext.info/) and the Mayor of London’s air quality alert programme run by Imperial College London, which sends alerts to all schools, GP surgeries and care homes in LBRUT. Advice is based on Defra's national Daily Air Quality Index

4.5 Air Quality Positive

The London Borough of Richmond upon Thames has no innovative mitigation measures committed as part of a submitted Air Quality Positive Matrix which aligns with the Air Quality Positive London Plan Guidance.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

All data undergo rigorous quality assurance and quality control (QA/QC) procedures to ensure the highest standards of accuracy and reliability. Continuous automatic monitoring was conducted throughout the entire 12-month period in 2025.

NO_2 Monitoring Adjustment

The NO_2 chemiluminescent continuous analyser is checked regularly online by Imperial College London and calibrated by the newly appointed contractor, We Care 4 Air (WC4A), (appointed on 1st April 2024) by the London Borough of Richmond upon Thames for Local Support Officer (LSO) and Service and Maintenance visits during 2025. Regular 4 weekly calibration visits were maintained throughout 2025.There is a need for frequent calibration adjustments as the gradual build-up of dirt within the analyser reduces the response rate. This fall off in response needs appropriate correction, to ensure the recording of the true concentrations.

Calibration involves comparing the analyser's readings against a known concentration of span gas. The span gas used is nitric oxide, certified to an accuracy of ±5%. This avoids the less precise permeation tube method.

Additionally, the NO_2 continuous analyser is serviced biannually by WC4A and audited every six months by the Ricardo. These activities are part of the London Air Quality Network (LAQN) quality assurance and quality control (QA/QC) procedures, managed by the Environmental Research Group (ERG) at Imperial College London, to maintain high data quality standards.

PM_{10} Monitoring Adjustment

BAM

Particulate matter is continuously monitored using a Beta Attenuation Monitor (BAM). To ensure accurate reporting, automatic scaling is applied to measurements from PM_{10} instruments, adjusting 'base' dust readings to align with EU reference-equivalent

PM_{10} values before dissemination. The scaling process is specific to the instrument type. For PM_{10} BAMs, standard correction factors are used according to the slope correction outlined in their reference equivalence certification, with adjustments made based on whether the inlet is heated or unheated.

TEOM

PM_{10} particulates are measured using Tapered Element Oscillating Microbalance (TEOM) analysers, with the data reported as gravimetric equivalents. These instruments are not subject to automatic or fortnightly calibrations; instead, calibration occurs during routine servicing and through regular independent audits.

The ongoing performance of each monitor is remotely assessed by the Duty Officer at the Environmental Research Group (ERG), Imperial College London. During monthly visits, the Local Support Officer (LSO) conducts more detailed performance checks and is also available on standby to replace the TEOM's monitoring filter as needed, based on filter loading.

Since 2009, TEOM data have been routinely adjusted using the Volatile Correction Method (VCM), which compensates for the loss of volatile compounds driven off by the heat in the instrument's inlet column. These corrections are applied by Imperial College London before data dissemination.

The TEOM analysers are serviced every six months by WC4A and audited biannually by Ricardo as part of the London Air Quality Network (LAQN) quality assurance and control procedures managed by Imperial. All monitoring sites are part of the LAQN, with Imperial responsible for the daily data collection, storage, validation, and publication via the LAQN website (www.londonair.org.uk). Data are periodically ratified by Imperial, using long-term data reviews alongside results from LSO checks, servicing, and audits to ensure data integrity and accuracy.

$PM_{2.5}$ Monitoring

BAM

During 2026, a review of the Council's $PM_{2.5}$ monitoring network identified that the Met One Beta Attenuation Monitor (BAM) $PM_{2.5}$ monitor at RH1 Richmond Town Centre may have been operating with incorrect Smart Heater and humidity-control settings, including likely use of US default configurations and faulty Relative Humidity (RH) sensors, which caused sampled air to be over-dried and potentially biased $PM_{2.5}$ measurements. Data from affected periods may not be fully representative, with some data requiring further validation or exclusion. To prevent a recurrence, BAMs are being reconfigured to EU settings, relative humidity and temperature sensors are being calibrated and checked routinely, and enhanced QA/QC procedures, including Filter Relative Humidity (FRH) monitoring, High Efficiency Particulate Air (HEPA) background testing and post-maintenance configuration audits, are being implemented.

The Council operates one $PM_{2.5}$ BAM, at Richmond Town Centre (RH1). The analyser was installed with the new monitoring site in February 2025, so 2025 is the first year of record at this site. The provisional 2025 result is presented below. It has been reported separately from the other $PM_{2.5}$ monitoring results, which are given in Table I of the main report and are not affected.

Table 15 Provisional Annual Mean $PM_{2.5}$, Richmond Town Centre (RH1), 2025 (µg m^{-3})

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period %[a]	Valid data capture 2025 %[b]	2019	2020	2021	2022	2023	2024	2025

Richmond Town Centre (RH1)	518074	175251	Roadside	94.0	84.8	N/A	N/A	N/A	N/A	N/A	N/A	16.0*

Caveat: *$PM_{2.5}$ data at RH1 in 2025 is provisional. Data may not be fully representative, with some data requiring further validation or exclusion. When/if validated $PM_{2.5}$ data becomes available the Annual Status Report will be updated.

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

(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%).

FIDAS

Particulate matter (PM_{10} and $PM_{2.5}$) is continuously and simultaneously monitored at the Barnes Wetlands Centre site (RI2) using a Palas FIDAS 200E, commissioned on 15 July 2025 to replace the previous TEOM. The FIDAS is equipped with an Intelligent Aerosol Drying System (IADS) to remove particle-bound water before measurement. The instrument holds EN 16450 type approval and MCERTS certification as a reference-equivalent method for both PM_{10} and $PM_{2.5}$, and no additional correction factor is applied before dissemination. The FIDAS is serviced every six months by WC4A and audited biannually by Ricardo as part of the LAQN quality assurance and quality control procedures managed by the Environmental Research Group (ERG) at Imperial College London.

A.2 Diffusion Tubes

The Air Quality Standards Regulations 2010 (as amended), which transposed EU Directive 2008/50/EC into domestic law and were retained following the UK's exit from the EU, establish air quality standards for NO_2 and other pollutants. Under this directive, annual mean NO_2 concentration data obtained from diffusion tube measurements must meet an accuracy requirement of ±25% to be comparable with the NO_2 air quality objectives.

To ensure high-quality NO_2 concentration data, it is essential to meet stringent performance criteria through comprehensive quality assurance (QA) and quality control (QC) procedures. Several factors influence the performance of NO_2 diffusion tubes, including the laboratory conducting the analysis and the method used to prepare the tubes (AEA, 2008). As such, QA and QC procedures are a fundamental part of any monitoring programme, minimizing data uncertainties and ensuring the most accurate estimate of true concentrations.

Preparation Method Used

The laboratory supplying diffusion tubes to LBRUT throughout 2025 (and in the preceding 20 years plus) is Gradko International Ltd, using the 50% TEA in acetone preparation method. Gradko actively contributes to the development of rigorous QA and QC procedures to maintain the highest level of confidence in their laboratory measurements. They played a key role in the creation of the Harmonisation Practical Guidance for NO_2 diffusion tubes (AEA, 2008) and have adhered to these guidelines since January 2009. Additionally, since April 2014, Gradko has participated in the AIR-PT scheme, which combines two long-established proficiency testing schemes: the LGC Standards STACKS PT scheme and the HSL WASP PT scheme.

Gradko International Ltd.’s Results of Laboratory Precision.

I. Performance in Air NO_2 PT Scheme (February 2024 – February 2026)

II. Summary of Precision Scores for 2023-2025

III. United Kingdom Accreditation Service (UKAS) schedule of accreditation (September 2025)

Gradko International Ltd is a UKAS-accredited laboratory that actively participates in laboratory performance and proficiency testing schemes. These schemes establish rigorous performance standards for participating laboratories, ensuring that the reported NO_2 concentrations are of the highest quality.

Summary of Laboratory Performance in AIR NO_2 Proficiency Testing Scheme

(February 2024 – February 2026)

Gradko participates in the AIR-PT scheme for NO_2 diffusion tube analysis, which involves the quarterly testing of laboratory performance using artificially spiked diffusion tubes. This scheme is designed to help laboratories meet the requirements of the European Standard. In 2025, Gradko demonstrated **satisfactory** performance for the 50% TEA in acetone preparation method.

The laboratory adheres to the procedures outlined in the *Harmonisation Practical Guidance* and is an active participant in the AIR-PT proficiency testing scheme. Prior to AIR-PT, Gradko took part in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis. DEFRA and the Devolved Administrations recommend that diffusion tubes used for Local Air Quality Management (LAQM) should be sourced from laboratories that have shown consistent, satisfactory performance in the AIR-PT scheme.

Gradko's laboratory performance is further evaluated by the National Physical Laboratory (NPL), which assesses results from the AIR-PT scheme in conjunction with data from the monthly NPL Field Inter-Comparison Exercise, conducted at Marylebone Road in central London. Laboratories are assigned a ‘z’ score, where a score of ±2 or less indicates satisfactory performance. Gradko International Ltd.’s performance in 2025 is covered under AIR-PT rounds AR062 to AR074.

Based on the latest available data, the five-round performance window used to evaluate Gradko's laboratory quality spans AIR-PT rounds AR055 to AR068.

During this time, 100% of the results submitted by Gradko were determined to be satisfactory other than the results for Jan-Feb 2025 and April-June 2025.

AIR PT Round	AIR PT AR062	AIR PT AR063	AIR PT AR065	AIR PT AR066	AIR PT AR068	AIR PT AR069	AIR PT AR071	AIR PT AR072	AIR PT AR074
Round conducted in the period	January – February 2024	April – June 2024	July – August 2024	September – October 2024	January – February 2025	April – June 2025	July – September 2025	October – December 2025	January – February 2026
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	0 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	75 %	100 %	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Gradko International	100 %	100 %	100 %	100 %	50 %	75 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	50 %	50 %	50 %	50 %	100 %	100 %	75 %	50 %	100 %
Milton Keynes Council	100 %	NR [2]	50 %	100 %	100 %	75 %	75 %	50 %	75 %
Northampton Borough	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	NR [2]
South Yorkshire Air Quality Samplers	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]
Staffordshire County Council, Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [2]	NR [2]	100 %	NR [2]	NR [2]	NR [2]	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]

Precision Summary Results

The summary of diffusion tube precision results is provided below, outlining the total number of good and bad precision results over the past three years for laboratories currently conducting diffusion tube analysis.

2023 - 2025 Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies UK Laboratories including for Gradko Laboratory 50% TEA in Acetone.

Precision Summary Table

Diffusion Tube Preparation Method	2023 Good	2023 Bad	2024 Good	2024 Bad	2025 Good	2025 Bad
Gradko, 50% TEA in Acetone	16	0	11	0	18	0
Gradko, 20% TEA in Water	25	0	30	0	28	0
ESG Didcot / SOCOTEC, 50% TEA in Acetone	33	2	33	4	17	0
ESG Didcot / SOCOTEC, 20% TEA in Water	8	0	1	1	4	0
Staffordshire Scientific Services	12	0	20	0	14	0
Glasgow Scientific Services	1	0	1	0	1	0
Edinburgh Scientific Services	4	2	5	2	1	0
Milton Keynes Council	1	0	1	0	1	0
Tayside Scientific Services	1	0	1	0	1	0
Lambeth Scientific Services	10	1	7	1	2	0
Aberdeen Scientific Services	7	0	6	0	6	0
ESG Glasgow, 50% TEA in Acetone	1	0	1	0	0	0
ESG Glasgow, 20% TEA in Water	1	0	1	0	0	0
Somerset County Council	12	0	4	0	4	0

Appendix A - Details of Monitoring Site Quality QA/QC

Numerical results for this data are contained in the National Bias Adjustment Spreadsheet version 03/26

Numerical results for this data are contained in the National Bias Adjustment Spreadsheet version 03/26. In 2025, the tube precision for NO_2 Annual Field Inter-Comparison for Gradko International using the 50% TEA in acetone method was 'good' for the results of 18/18 participating local authorities.

Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (mg/m^3)	Automatic Monitor Mean Conc. (Cm) (mg/m^3)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	50% TEA in acetone	2025	UB	City Of London Corporation	12	24	22	8.4%	G	**0.92**
Gradko	50% TEA in acetone	2025	R	City Of London Corporation	12	31	28	9.8%	G	**0.91**
Gradko	50% TEA in acetone	2025	R	Lb Hounslow	10	31	25	22.1%	G	**0.82**
Gradko	50% TEA in Acetone	2025	UC	Falkirk Council	11	27	25	6.1%	G	**0.94**
Gradko	50% TEA in Acetone	2025	UB	Falkirk Council	11	11	15	-22.6%	G	**1.29**

Appendix A - Details of Monitoring Site Quality QA/QC

Gradko	50% TEA in acetone	2025	KS	Marylebone Road Intercomparison	12	37	31	17.7%	G	**0.85**
Gradko	50% TEA in acetone	2025	SU	Redcar And Cleveland Borough Council	12	11	9	29.0%	G	**0.78**
Gradko	50% TEA in Acetone	2025	R	London Borough Of Merton	12	27	22	22.7%	G	**0.81**
Gradko	50% TEA in acetone	2025	UB	London Borough Of Wandsworth	12	20	18	9.0%	G	**0.92**
Gradko	50% TEA in acetone	2025	R	London Borough Of Richmond Upon Thames	12	15	18	-17.8%	G	**1.22**
Gradko	50% TEA in acetone	2025	KS	London Borough Of Richmond Upon Thames	10	30	26	15.9%	G	**0.86**
Gradko	50% TEA in acetone	2025	B	London Borough Of Richmond Upon Thames	12	13	13	1.5%	G	**0.99**
Gradko	50% TEA in acetone	2025	R	Sandwell Mbc	11	28	24	16.6%	G	**0.86**
Gradko	50% TEA in acetone	2025	UB	Sandwell Mbc	11	19	20	-5.2%	G	**1.05**

Appendix A - Details of Monitoring Site Quality QA/QC

Gradko	50% TEA in acetone	2025	UB	City Of York Council	12	13	12	13.4%	G	**0.88**
Gradko	50% TEA in acetone	2025	R	City Of York Council	12	20	19	6.6%	G	**0.94**
Gradko	50% TEA in acetone	2025	R	City Of York Council	10	16	15	7.0%	G	**0.93**
Gradko	**50% TEA in acetone**	**2025**		**Overall Factor (18 studies)**				**Use**		**0.92**

Notes:

Tube precision is determined as follows: G = Good precision – coefficient of variation (CV) of diffusion tube replicates is considered G when the CV of eight or more periods is less than 20%, and the average CV of all monitoring periods is less than 10%; P = Poor precision – CV of four or more periods >20% and/or average CV >10%; S = Single tube, therefore not applicable; na = not available.

Overall factors have been calculated using orthogonal regression to allow for uncertainty in both the automatic monitor and diffusion tube. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor.

Appendix A - Details of Monitoring Site Quality QA/QC

Schedule of Accreditation issued by United Kingdom Accreditation Service (UKAS)

Gradko is UKAS-accredited for the analysis of NO_2 diffusion tubes, utilising ultra-violet spectrophotometry for the analysis of exposed tubes. The relevant test is outlined in the UKAS Schedule of Accreditation, issued on 2nd September 2025 which is provided on the next page.

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

UKAS TESTING

2187

Accredited to ISO/IEC 17025:2017

Gradko International Ltd
(Trading as Gradko Environmental)

Issue No: 028 **Issue date:** 02 September 2025

St Martins House	Contact: Mr A Poole
77 Wales Street	Tel: +44 (0)1962 860331
Winchester	Fax: +44 (0)1962 841339
Hampshire	E-Mail: diffusion@gradko.co.uk
SO23 0RH	Website: www.gradko.co.uk

Testing performed at the above address only

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors	Chemical Tests	Documented In-House Methods
	Ammonia as ammonium (NH_4^+)	GLM 8 by Ion Chromatography
	Benzene Toluene Ethyl benzene Xylene	GLM 4 by Thermal Desorption/ FID Gas Chromatography
	Hydrogen chloride as chloride (Cl^-) Nitrogen dioxide as nitrite (NO_2^-) Sulphur dioxide as sulphate (SO_4^{2-}) Hydrogen fluoride as fluoride (F^-)	GLM 3 by Ion Chromatography
	Hydrogen sulphide	GLM 5 by Colorimetric determination (UV Spectrophotometry)
	Ozone as nitrate (NO_3^-)	GLM 2 by Ion Chromatography
	Nitrogen Dioxide as nitrite (NO_2^-)	GLM 7 by Colorimetric determination (UV Spectrophotometry)
	Sulphur dioxide as sulphate (SO_4^{2-})	GLM 1 by Ion Chromatography
	Formaldehyde as formaldehyde-DNPH	GLM 18 by HPLC
	Volatile Organic Compounds including: Benzene Toluene Ethylbenzene p-Xylene o-Xylene	GLM 13 by Thermal Desorption GC-Mass Spectrometry

Assessment Manager: RR1 Page 1 of 2

Appendix A - Details of Monitoring Site Quality QA/QC

UKAS TESTING 2187 Accredited to ISO/IEC 17025:2017	**Schedule of Accreditation** issued by **United Kingdom Accreditation Service** 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK **Gradko International Ltd** **(Trading as Gradko Environmental)** **Issue No:** 028 **Issue date:**
Testing performed at main address only	

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors (cont'd)	Chemical Tests (cont'd)	
	Qualitative Analysis and Estimation of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors	GLM 13 by Thermal Desorption GC-Mass Spectrometry with estimations in accordance with ISO standard 16000-6
	Naphthalene Tetrachloroethylene Trichloroethylene Styrene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Chlorobenzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 4-Isopropyltoluene (p-cymene)	GLM 13-1 by Thermal Desorption GC-Mass Spectrometry
	1,3-Butadiene	GLM 13-6 by Thermal Desorption GC-Mass Spectrometry
	Carbon Disulphide	GLM 13-7 by Thermal Desorption GC-Mass Spectrometry
	Flexible scope for quantitative analysis of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors in accordance with methods developed and validated by in-house procedure LWI 47	LWI 47 by Thermal Desorption GC-Mass Spectrometry
END		

NO_2 diffusion tube analysis method

NO_2 diffusion tubes are passive monitoring devices. They are made up of a Perspex cylinder, with two stainless steel mesh discs, coated with TEA absorbent held inside a polythene cap, which is sealed onto one end of the tube. Diffusion tubes operate on the principle of molecular diffusion, with molecules of a gas diffusing from a region of high concentration (open end of the tube) to a region of low concentration (absorbent end of the tube) (AEA, 2008). NO_2 diffuses up the tube because of a concentration gradient and is absorbed by the TEA, which is present on the coated discs in the sealed end of the tube.

All the London Borough of Richmond upon Thames' NO_2 diffusion tubes are prepared by Gradko using a 50% v/v solution of TEA in acetone as the absorbent. To prevent premature absorption, an opaque polythene cap is placed over the end of the diffusion tube opposite the TEA-coated discs before and after sampling. The tubes are labelled and stored in plastic bags, refrigerated, both prior to and after exposure.

In the laboratory, the steel mesh is removed and washed with distilled water, which is then analysed. The concentration of nitrogen dioxide is determined by passing ultraviolet (UV) light through the water sample. The amount of light absorbed correlates to the concentration of nitrogen dioxide present in the air during the monitoring period.

Bias Adjustment Factor from Local Co-location Studies

LBRuT has historically operated two co-location studies, with triplicate diffusion tubes exposed alongside automatic chemiluminescent analysers at Castelnau (RI1, roadside) and Barnes Wetlands (RI2, urban background). A third co-location site at Richmond Town Centre (roadside) became operational in February 2025, so this will become a 3rd permanent site for co-located results. A mobile monitoring station has also previously been used in years when it was placed as a static installation. The Gradko 50% TEA/acetone preparation method is used throughout the network.

For 2025, the three local co-location studies produced the following bias adjustment factors: Barnes Wetlands 0.99 (urban background), Castelnau 1.22 (roadside), and Richmond Town Centre 0.86 (roadside).

Discussion of Choice of Bias Adjustment Factor to Use

Choice of bias adjustment factor is always given very careful consideration. As shown in Table P, the Council has in previous years used either a local or national bias adjustment factor partly depending on the robustness of the available local co-location data and partly on consideration of which is the most conservative. On one occasion, it took an average of local sites. Where a reliable local study has been available, the Council has preferred the local factor in line with the hierarchy set out in LAQM.TG22. This means using the local background site at Wetlands, site 37 to bias correct background sites and the local roadside sites – either 23 or 53 or an average of the two to bias correct roadside sites For 2025 data, the Council used the local factor of 0.99 to bias correct sites 37 and 28 and the national factor of 0.92 to bias correct all roadside/kerbside sites due to concerns with the result at Castelnau and the wish to err on the conservative side. It should be noted that we wish to neither underestimate or over report levels of NO_2 in the borough.

The three local co-location studies available for 2025 return factors that differ from one another. The Castelnau co-location has returned a higher bias adjustment factor in the last two years (1.10 in 2024, 1.22 in 2025). A factor above 1.0 is less common nationally for this preparation method, where a value somewhat below 1.0 is more common, reflecting the tendency of Gradko 50% TEA/acetone tubes to slightly over-read compared to automatic monitors. This was examined in detail in a technical note appended to the 2025 Annual Status Report, and is republished in Appendix E Technical Note - Bias Correction Review for 2024 Data – Dr I. Kilbane-Dawe.

The analyser continues to pass routine calibration and audit checks. However, a hypothesis under investigation relates to possible drift in the molybdenum converter temperature, which could affect the relationship between the automatic reading and the co-located tubes without being detected through standard calibration procedures. Until the cause of the unusual local factor is better understood, the Council does not consider it appropriate to apply this figure across the network.

The Richmond Town Centre co-location returned 0.86 for 2025, but as this is the site's first partial year of operation, the result is not yet considered sufficiently robust for use as the primary local factor, though it may become so as data accumulates.

The Barnes Wetlands co-location produced a local bias-adjustment figure close to 1.0 (0.99 for 2025), suggesting good agreement between the diffusion tubes and the

analyser at this site. As in earlier years and for consistency, this has been used to bias correct the 2 x background sites – 37 and 28. However, as an urban background site the absolute concentrations measured are low, with an annual mean of approximately 12.9 ug m^{-3}. At these levels, small variations in either the tube or analyser readings represent a larger proportion of the measured value and can have a disproportionate influence on the calculated bias adjustment factor. This makes it harder to derive a factor that can be applied with confidence across the wider network of roadside and kerbside sites, which measure concentrations two to three times higher.

With the three local factors spanning a wide range (0.86 to 1.22), the Council does not have a single consistent local figure on which to base the network-wide adjustment. In previous years when local factors from the Castelnau and Wetlands co-locations were in closer agreement, it was possible to derive a representative local figure with confidence. That is not currently the case for the 2025 measurements.

In the absence of a reliable local factor for roadside sites, the national combined figure of 0.92 provides the most robust approach, drawing on the largest available sample of co-location studies for the laboratory and preparation methods used in LBRuT. It is consistent with the approach taken by partner boroughs in the Regulatory Services Partnership, including Wandsworth, whose own local co-location also returned 0.92 for 2025. In recent years LBRuT's local factors have ranged from 0.86 to 0.97. The national figure of 0.92 sits in the middle of this range and is a conservative approach that is unlikely to underestimate actual concentrations at any site.

The choice of bias-adjustment factor has become increasingly significant as NO_2 concentrations across the borough have fallen and are starting to stabilise at lower levels. With most sites now recording annual means in the range of 15 to 30 µg m^{-3}, and the Council having adopted a borough-wide target of 20 µg m^{-3} in its 2025-2030 Air Quality Action Plan, the choice of bias-adjustment figure can determine whether a site falls above or below the target, and if it records an increase or decrease in value for the year. Consistency in the factor applied is also important for the integrity of trend analysis. The national factor provides a stable and well-evidenced basis for year-on-year comparison.

Table P. Bias Adjustment Factor

Year	Local or National	If Local, Version of National Spreadsheet	Adjustment Factor Roadside	Adjustment Factor Background
2025	National	03/25	0.92	0.99
2024	National	03/24	0.88	0.88
2023	Local	03/24	0.86	0.86
2022	National	03/23	0.82	0.82
2021	Local	03/22	0.87	0.83
2020	Local	03/21	0.91	0.83
2019	Local	03/20	0.90	0.99
2018	National	03/19	0.92	0.93
2017	National	03/18	0.97	1.00

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

It is not always possible to measure for a whole year to obtain an annual mean for a pollutant. For monitoring sites where data capture is less than 75% and greater than 25% of a full calendar year (between 3 and 9 months), the mean of the 'raw' concentrations should be "annualised" i.e. adjusted using the methodology outlined in LLAQM Technical Guidance (TG19) before being compared to annual mean objectives.

In 2025, data capture at all non-automatic (diffusion tube) NO_2 sites was very good and above 75% so this was not necessary.

The only automatic monitor to require annualisation was at Barnes Wetland Centre (RI2) for $PM_{2.5}$. This was due to the $PM_{2.5}$ monitoring commencing on 15 July 2025 following the commissioning of a new Palas FIDAS 200E combined PM_{10} and $PM_{2.5}$ analyser. Previously the site had monitored PM_{10}, NO_2, and O_3. The $PM_{2.5}$ monitoring at Barnes Wetlands Centre achieved 99.6 % valid data captured for its installed monitoring period, resulting in 43.2% data capture over 2025.

Table Q. Non-Automatic Monitoring Data Adjustment

All non-automatic monitors (diffusion tubes) achieved above 75% data capture for NO_2 in 2025. As a result, no annualisation adjustments were required.

Table R. Automatic NO_2 Monitoring Data Adjustment

All automatic monitors achieved above 75% data capture for NO_2 in 2025. As a result, no annualisation adjustments were required.

Table S. Automatic PM_{10} Monitoring Data Adjustment

All automatic monitors achieved above 75% data capture for PM_{10} in 2025. As a result, no annualisation adjustments were required.

Table T. Automatic $PM_{2.5}$ Monitoring Data Adjustment

The only automatic monitor to require annualisation was at Barnes Wetland Centre (RI2) for $PM_{2.5}$. This was due to the $PM_{2.5}$ monitoring commencing on 15 July 2025 following the commissioning of a new Palas FIDAS 200E combined PM_{10} and $PM_{2.5}$ analyser. Previously the site had monitored PM_{10} , NO_2, and O_3. The $PM_{2.5}$ monitoring at Barnes Wetlands Centre achieved 99.6 % valid data capture for its installed monitoring period, resulting in 43.2% data capture over 2025.

Background Site	Annual Data Capture (%)	Annual Mean (A_m)	RI2	
			Period Mean (P_m)	Ratio (A_m / P_m)
NPL - Teddington AURN	99.7	8.1	5.4	1.486
Lewisham - Honor Oak Park	98.5	8.1	5.7	1.412
Average (R_a)			1.449	
Raw Data Annual Mean (M)			5.5	
Annualised Annual Mean (M x R_a)			7.9	

Distance Adjustment

Where an exceedance (within 10%) is measured at a monitoring site which is not representative of public exposure, the procedure specified in LLAQM.TG(19) to estimate the concentration at the nearest receptor has been deployed.

For this first time, all monitoring sites in LBRuT complied with the UK National Air Quality Objective for NO_2 (40 µg m^{-3}). Only site 36 (Upper Richmond Road West(URRW), nr j/w Sheen Lane) was within 10% of the Objective level.

Distance correction was completed for site 36 where the annual mean exceeded 36 µg m^{-3}. Following distance correction this location was 36.6 µg m^{-3} at the receptor, – not quite within 10% of the objective but below 40 µg m^{-3}. Results are reported in Table U.

NO_2 diffusion tube results have been adjusted to represent exposure at the nearest façade, where required by DEFRA. The concentration at the nearest receptor has been estimated using the LAQM NO_2 Fall-off with Distance Calculator (Version 4.1) in line with the procedure detailed in LLAQM.TG (19). The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source. The monitored annual mean value has been bias-adjusted and annualised where necessary. The background concentration is the annual value for Barnes Wetlands derived from the annualised bias-adjusted mean of the co-located automatic analyser and diffusion tube site, all of which achieved data capture rates above 85% for 2025 as per LLAQM (TG19) guidance.

Table U. NO_2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})
36	2.1	2.2	36.9	12.4	36.6

Appendix B Full Monthly Diffusion Tube Results for 2025

Table V. NO_2 2025 Diffusion Tube Results (µg m^{-3})

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 (0.92 or 0.99)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	515824	168815	29.0	26.1	23.1	17.7	11.8	14.8		12.9	12.0	13.4	21.6	21.7	18.5	17.1	-	
2	513217	169746	22.8	26.7	22.1	16.2	11.6	13.4	14.3	12.2	15.1	15.8	20.4	17.2	17.3	15.9	-	
4	514607	171258	33.4	33.7	31.5	25.9	18.4	18.3	20.9	17.1	19.2	19.1	20.9	20.8	23.3	21.4	-	
7	515695	170983	30.6	39.9	43.9	33.8	31.0	20.0	26.2	23.4	21.9	22.3	23.6	27.4	28.7	26.4	-	
9	514846	172348	31.1	30.0	28.8	24.3	15.6	15.2	15.7	14.9	13.2	20.0	23.0	23.4	21.3	19.6	-	
10	513390	172233	31.5	30.2	34.3	23.2	18.4	18.6	22.4	18.9	21.1	20.4	21.4	25.7	23.8	21.9	-	
11	514136	173389	25.4	31.7	30.6	20.9	14.7	14.5	15.9	14.0	16.6	16.2	22.8	23.2	20.5	18.9	-	
12	512612	173439	31.3	29.9	32.0	21.3	18.1	16.3	19.3	16.9	15.7	19.3	20.8	22.2	21.9	20.2	-	
13	515228	174082	26.5	28.7	29.2	23.0	14.9	13.6	15.2	14.3	14.0	17.4	23.1	23.1	20.2	18.6	-	
14	516153	173078		28.8	32.9	26.4	22.2	20.7	19.0	18.9	16.9	21.8	26.4	21.3	23.2	21.3	-	
15	517196	173933	24.5	14.1	27.4	21.8	15.6	15.5	16.7	16.1	15.5	14.8	22.2	22.6	18.9	17.4	-	
17	517822	174755	29.7	32.7	29.8	26.1	19.2	19.6	23.0	17.7	18.5	16.0	22.2	23.1	23.1	21.3	-	
18	518822	175590	36.0	32.0	32.4	27.6	24.6	22.5	23.4	22.7	22.0	26.5	26.1	28.9	27.0	24.9	-	
19	518643	176156	26.4	27.7	27.2	23.1	14.8	16.0	16.1	16.1	14.6	17.3	17.0	22.1	19.9	18.3	-	
20	519205	177221	36.3	34.6	34.0	25.6	25.4	22.1	20.8	19.8	18.1	23.2	26.4	25.3	26.0	23.9	-	
22	522853	177908	26.8	25.7	24.1	18.8	12.1	9.4	10.6	11.0	10.3	13.3	16.9	18.0	16.4	15.1	-	
23(1)	522502	177166	25.8	23.0	23.3	16.7	12.2	10.0	10.6	10.9	10.0	12.3	16.5	18.0	-	-	-	Triplicate Site with 23(1), 23(2) and 23(3) - Annual data provided for 23(3) only
23(2)	522502	177166	26.1	22.8	20.9	14.3	12.2	6.7	10.1	10.4	10.1	12.0	16.8	17.7	-	-	-	Triplicate Site with 23(1), 23(2) and 23(3) - Annual data provided for 23(3) only

Appendix B – Monthly Diffusion Tube Results

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 (0.92 or 0.99)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
23(3)	522502	177166	18.0	18.5	22.7	15.6	12.1	9.0	10.4	10.8	11.1	11.6	15.7	17.0	15.0	13.8	-	Triplicate Site with 23(1), 23(2) and 23(3) - Annual data provided for 23(3) only
26	519168	175055	33.5	34.0	36.6	27.5	20.0	17.2	17.3	15.4	13.4	14.9	21.4	22.3	22.8	21.0	-	
28	519445	173991	11.9	19.0	17.9	11.5	7.3	6.9	7.4	7.2	8.1	8.2	12.1	13.7	10.9	10.8	-	Background site used local bias adjustment 0.99
30	518022	173165	24.4	26.4	27.9	20.1	15.2	13.0	14.6	13.8	16.6	15.8	19.7	21.9	19.1	17.6	-	
31	515434	174045	38.7	35.6	34.2	28.5	20.9	26.7	25.3	28.2	22.0	23.3	31.8	29.8	28.7	26.4	-	
32	516226	173195	37.5	37.1	31.1	32.6	24.7	24.7	20.9	22.1	23.0	19.8	27.7	29.4	27.6	25.3	-	
33	515934	173126	30.4	31.3	32.3	30.4	24.0	19.4	25.0	20.8	20.7	18.8	24.9	21.5	25.0	23.0	-	
35	517524	169583	34.7	24.7	28.4	18.0	12.2	16.6	17.0	15.8	16.9	17.6	26.2	24.7	21.1	19.4	-	
36	520540	175399	53.4		51.4	44.8	40.4	42.7	35.2	37.2	35.3	29.5		31.0	40.1	36.9	36.6	
37(1)	522993	176731	18.7	20.7	21.5	12.3	10.4	7.3		8.8	8.4	9.7	13.1	14.1	-	-	-	Triplicate Site with 37(1), 37(2) and 37(3) - Annual data provided for 37(3) only.
37(2)	522993	176731	17.0	22.8	23.1	13.6	9.7	8.5	7.2	8.5	9.9	9.9	14.7	13.0	-	-	-	Triplicate Site with 37(1), 37(2) and 37(3) - Annual data provided for 37(3) only
37(3)	522993	176731	18.4	21.7	23.9	13.4	9.2	8.0	8.6	9.1	9.7	10.1	14.7	16.6	13.2	13.0	-	Triplicate Site with 37(1), 37(2) and 37(3) - Annual data provided for 37(3) only. Background site used local bias adjustment 0.99
39	517516	174331	37.0	35.8	38.8	28.7	27.1	28.4	27.3	23.6	24.8	23.2	27.2	30.1	29.3	27.0	-	
40	514068	172435	29.7		28.3	21.2	17.3	16.5	19.8	16.2	17.3	18.5	21.0		20.6	18.9	-	
42	518080	175259	38.2	42.0	41.9	33.8	27.9	31.9	30.7	30.4	28.4	25.3	34.9	35.6	33.4	30.7	-	
43	517759	174757	39.4	42.6	38.2	38.4	28.1	29.1	27.4	25.7	26.0	26.5	33.2	32.1	32.2	29.6	-	
44	518489	175056	38.1	37.3	36.9	29.5	21.2	17.0	19.6	15.9	17.7	19.6	22.1	23.1	24.8	22.9	-	

Appendix B – Monthly Diffusion Tube Results

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 (0.92 or 0.99)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
45	516383	171154	26.1	23.7	25.9	20.4	13.6	16.8	16.3	15.5	15.6	18.0	21.5	22.4	19.6	18.1	-	
50	519922	175324	42.9	36.6	45.6	37.8	32.4	28.3	27.6		24.3	27.7	29.7	25.3	32.6	29.9	-	
51	520492	175695	30.4	26.5	27.3	17.0	15.5	14.3	15.1	14.2	12.3	14.6	21.5	21.5	19.2	17.6	-	
52	519773	175795	43.7	38.0	41.4	32.6	27.0	32.2	33.9	27.4	29.2	30.0	31.1	27.5	32.8	30.2	-	
53(1)	518074	175251	38.3	35.7	36.4	32.4	25.9	33.0	30.2	25.7	18.3	24.3	32.4	29.1	-	-	-	Triplicate Site with 53(1), 53(2) and 53(3) - Annual data provided for 53(3) only
53(2)	518074	175251	38.7	36.1	35.3	27.8	27.4	34.6	27.7	25.7	25.4	24.2	28.8	28.4	-	-	-	Triplicate Site with 53(1), 53(2) and 53(3) - Annual data provided for 53(3) only
53(3)	518074	175251	37.2	34.7	36.2	30.2	27.0	31.5	29.1	19.5	24.2	23.9	34.8	28.7	30.0	27.6	-	Triplicate Site with 53(1), 53(2) and 53(3) - Annual data provided for 53(3) only
55	519793	176142		29.7	27.9	20.9	19.1	18.5	19.7	19.3	16.0	21.6	24.9	20.5	21.7	19.9	-	
57	513915	172899	22.0	28.2	27.0	10.3	16.0	14.8	19.6	16.3	18.4	21.3	19.8	22.2	19.6	18.1	-	
58	516039	173766	29.1	32.2	30.3	19.6	15.0	15.2	16.5	15.5	9.7	18.0	23.7	21.0	20.5	18.8	-	
62	521651	176430	29.9	33.5	32.2	21.5	17.5	18.7	21.4		18.8	19.7	24.5	22.9	23.7	21.8	-	
63	514188	173801	33.5	32.5	29.7	14.3	15.2	17.7	19.7	17.3	21.3	23.0	27.1	26.5	23.1	21.3	-	
64	514484	171251	38.1	31.6	30.0	24.3	22.9	22.0	26.0	21.3	22.6	20.5	26.8		26.0	23.9	-	
65	516339	173366	40.7	39.0		31.5	26.8	26.7	24.7	22.1	28.1	29.6	32.2	31.3	30.2	27.8	-	
66	519060	177428	32.0	26.9	30.2	21.4	19.0	20.6	23.9	19.7	17.2	23.2	24.7	27.5	23.8	21.9	-	
67	518042	174095	30.2	25.8	25.1	17.9	14.1	14.9	15.8	13.7	12.9	18.6	24.8	26.2	20.0	18.4	-	
68	522415	176537	31.7	27.1	29.1	18.4	17.7	16.8	11.3	14.6	14.4	17.0	20.1	21.0	19.9	18.3	-	
69	513494	171729	27.0	29.6	26.1	23.8	12.8	11.1	16.4	14.6	12.7	16.4	22.9	19.9	19.4	17.9	-	
70	520465	175965	35.8	33.3	36.7	21.8	22.0	24.5	19.7	20.9	24.1	25.7	30.0	25.4	26.7	24.5	-	
71	516574	174456	30.0	35.9	36.5	32.1	22.9		22.4	25.9	23.3	25.1	29.4	31.2	28.6	26.3	-	

Appendix B – Monthly Diffusion Tube Results

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 (0.92 or 0.99)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
72	516839	174238	37.0	30.8	31.3	21.4	14.8	25.4	17.8	17.3	16.4	22.8	24.8	26.5	23.8	21.9	-	
73	513722	172873	34.2	27.6	27.1	21.8	16.9	20.2	23.6	18.9	22.7	20.4	28.7	26.3	24.0	22.1	-	
74	519856	175856	36.1	35.8	38.9	25.6	24.5	26.6	22.7	25.1	19.6	24.5	28.5	27.7	28.0	25.7	-	
75	515459	171029	37.5	31.7	32.3	24.3	22.4	24.5	23.2	21.0	23.9	22.0	22.7	20.9	25.5	23.5	-	
76	516588	171357	34.9	31.6	30.1	25.0	18.7	19.5	19.2	9.6	21.8	23.0	28.4	22.7	23.7	21.8	-	
77	514705	172092	27.4	33.4	35.1	27.8	19.5	20.9	19.1	20.9	23.5	23.2	27.1	28.7	25.5	23.5	-	
79	514810	172041	20.6	26.5	32.1	19.9	18.4	17.4	19.2	16.5	14.5	18.8	21.0	21.6	20.5	18.9	-	
80	520538	175926	34.1	24.4	29.6	20.9	23.6	20.2	15.4	16.9	24.5	18.0	25.2	22.4	22.9	21.1	-	
81	519912	175939	36.1	32.2	37.2	31.7	16.1	26.9	23.6	25.3	23.8	24.4	26.1	23.2	27.2	25.0	-	
82	516060	173708	33.2	29.6	28.7	22.4	13.8	13.7	16.4	14.0	14.0	17.0	21.8	20.6	20.4	18.8	-	
83	513811	169510	35.7	35.6	37.5	28.4	22.2		23.7	18.6	18.6	23.0	25.0		26.8	24.7	-	
85	517911	174737	34.2	41.7	39.1	34.1	23.1	22.6	22.6	20.4	20.2	22.3	25.4		27.8	25.6	-	
87	518280	175367	46.2	34.9	33.2	28.4	26.9	30.3	28.8	28.1	32.0	29.0	35.6	34.3	32.3	29.7	-	
88	516628	171286	26.4	22.0	25.0	18.4	11.9	10.6	10.5	11.1	11.1	15.2	17.3	20.3	16.6	15.3	-	
89	519091	176375	32.3	30.4	31.7	21.4	18.2	18.0	18.5	18.0	19.0	20.2	22.0	22.3	22.7	20.9	-	
90	518976	175557	29.7	24.7	31.6	27.1	20.4	14.7	15.2	15.2	12.8	16.0	19.3	19.8	20.5	18.9	-	
105	521315	175461	34.3	40.2	39.0	31.2	25.2	26.4	24.9	21.3	18.3	22.7	21.5	24.1	27.4	25.2	-	
211	514476	171310	35.7	40.6	39.6	34.8	26.4	20.9	22.6	24.4	25.9	24.8	25.4	24.4	28.8	26.5	-	
Rut01	516415	173419	33.3	31.0	30.3	27.6	17.4	21.2	17.8	17.4	15.0	21.0	23.4	20.4	23.0	21.1	-	
Rut02	517917	174928	40.4	37.4	38.8	39.2	30.7	25.8	26.4	26.5	21.3	24.3	28.6	28.7	30.7	28.2	-	
RP11	517456	169342	33.5	41.7	36.8	31.6	29.1	29.0	21.8	24.5	23.7	25.1	26.2	28.9	29.3	27.0	-	
RP12	515371	168705	40.7	39.6	33.1	32.1	25.7	28.7	29.7	31.9	28.1	24.9	33.7	31.4	31.6	29.1	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table V.**

Appendix B – Monthly Diffusion Tube Results

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

☒ **Local bias adjustment factor used (for background sites only)**

☒ **National bias adjustment factor used.**

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

☒**LBRuT confirm that all 2025 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System** .

Notes:

Exceedances of the NO_2 annual mean objective of 40µg m^{-3} are shown in **bold** and yellow, compliance is shown in green, sites that comply with the Richmond NO_2 annual mean objective of 20 µg m-3 are shown in blue.

NO_2 annual means exceeding 60µg m^{-3}, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix A Details of Monitoring Site Quality QA/QC for details on bias adjustment and annualisation.

Appendix C Summary of Indicative Sensor Monitoring Data

No Breathe London nodes were operating in LBRuT during 2025. Following the end of LBRuT's contract with Breathe London in late 2024, data for 2025 was provided directly by Clarity (the sensor manufacturer). Sensor locations were unchanged; some sites were closed. This was in anticipation of the Breathe London sensor network being replaced London-wide. The LBRuT's network of Clarity sensors, and the London-wide Breathe London network, were then both upgraded in early 2026, with replacement sensors provided by Airly.

Table W - Monthly Indicative Sensor Monitoring Results for $PM_{2.5}$

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Valid Data Capture for Monitoring Period (%)([1]	Valid Data Capture 2025 (%)([2])	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean Data
CLDX0136	Kew Rd, Richmond, nr taxi rank/opposite Richmond station	518080	175259	99.0	85.1	20.9	19.6	17.4	11.6	7.2	5.9	5.7	5.6	4.6	6.6	7.2		**10.2**
CLDX0139	Park Rd, Hampton Hill, nr j/w High St, TW11	514475	171308	99.9	85.9	15.0	14.9	14.1	9.2	5.1	4.4	3.9	4.0	3.2	5.0	5.6		7.8
CLDX0146	Broad St, Teddington, nr Tescos + j/w Queens Rd TW11	515572	170977	99.7	85.7	19.4	18.8	17.4	10.6	6.0	5.3	4.7	4.6	3.8	6.0	6.7		9.5
CLDX0148	Deer Park Schl/Lidl, Richmond Rd, opp j/w Morley Rd, E Twickenham	517489	174305	95.6	81.8	17.1	16.0	14.1	9.2	4.9	4.2	3.5	3.6	2.7	4.6	5.1		7.4
CLDX0176	St Margaret's Road, Twickenham	516628	174832	100.0	86.0	20.3	20.0	17.7	10.8	5.6	4.7	4.0	4.2	3.5	5.7	6.8		9.5
CLDX0180	King St, Twickenham	516257	173257	97.9	84.2	22.3	20.3	17.9	11.3	6.0	5.0	4.3	4.6	3.7	5.9	6.4		9.7
CLDX0185	High St, Whitton	514204	173724	100.0	86.0	19.5	19.8	17.8	11.4	6.3	5.3	4.5	4.8	4.1	6.2	7.3		9.8
CLDX0196	Church Rd A311	514128	169495	99.9	85.9	18.6	16.9	15.6	9.6	5.1	4.2	3.5	4.1	3.2	4.9	5.7		8.4
CLDX0202	Lwr Rich Rd, Chertsy Corner, nr j/w houses, opp cnr of Chtsy Ct	519853	175856	100.0	86.0	17.9	17.8	16.0	10.4	5.7	4.9	4.2	4.4	3.4	5.5	6.0		8.9
CLDX0203	High St, Barnes, nr j/w St Anns Rd, SW13	521686	176436	98.0	84.2	16.5	16.7	14.2	9.2	4.7	4.0	3.3	3.5	2.7	4.7	5.7		7.6
CLDX0206	Kew Rd, before j/w South Circ/ Kew Green	519044	177353	99.9	85.9	17.3	18.7	16.7	11.2	6.2	5.1	4.7	4.8	3.8	6.2	6.6		9.3
CLDX0429	Nelson Primary School, Nelson Rd TW2	513927	173928	99.9	85.9	15.6	15.1	14.5	9.2	4.9	4.2	3.6	3.8	2.9	4.8	5.8		7.7
CLDX0430	The Vineyard Schl, Friars Stile Rd, TW10 6NE	518354	174235	94.4	81.2	21.2	21.8	18.0	11.4	6.0	5.1	4.3	4.6	3.7	6.1	6.7		9.5
CLDX0431	Thomson House Sch, Sheen Lane, SW14	520508	175798	100.0	86.0	16.9	17.5	15.5	9.8	5.0	4.2	3.5	3.7	2.8	4.8	5.3		8.2
CLDX0432	St Richards CE Prim Schl, Ashburnham Rd, TW10 7NL	516945	172124	96.8	83.2	17.4	18.5	16.9	10.5	5.6	4.5	3.9	4.1	3.1	5.1	5.8		8.5
CLDX0434	Archdeacon Cambridge's CofE Prim Sch, The Green, Twickenham TW2 5TU	515293	172836	94.6	81.3	21.8	21.4	18.5	11.3	5.8	4.7	4.1	4.3	3.4	5.7	6.8		9.4
CLDX0436	Chase Bridge Primary School, Kneller Rd, TW2	515074	174049	97.8	80.8	16.9	17.5	16.1	9.6	5.2	4.5	3.8	4.0	3.1	5.1	6.1		7.9
CLDX0437	Richmond bus garage, Wakefield Rd, Richmond	517914	174738	99.6	85.6	19.8	19.1	17.2	10.8	5.8	5.1	4.3	4.5	3.5	5.8	6.3		9.4
CLDX0577	Holy Trinity CE Prim Sch, Carrington Rd, TW10 5AA	519181	175201	99.7	85.7	18.3	18.9	16.6	10.1	5.2	4.2	3.6	3.8	2.9	4.9	5.3		8.6

Exceedances of the $PM_{2.5}$ annual mean concentration target of 10 µg m^{-3} are shown in **bold** and yellow, compliance is shown in green

Appendix C – Monthly Indicative Sensor Results

Eastings/Northings (BNG, EPSG:27700) derived from reference latitude and longitude via Helmert transform with accuracy ≈ 5 m

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%).

Table W - Monthly Indicative Sensor Monitoring Results for PM_{10}

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Valid Data Capture for Monitoring Period (%)(1	Valid Data Capture 2025 (%)(2)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean Data
CLDX0136	Kew Rd, Richmond, nr taxi rank/opposite Richmond station	518080	175259	99.0	85.1	33.1	31.2	26.6	16.5	10.1	8.1	8.0	7.9	6.8	9.5	10.7		15.3
CLDX0139	Park Rd, Hampton Hill, nr j/w High St, TW11	514475	171308	99.9	85.9	23.0	23.0	20.9	12.8	7.0	5.9	5.1	5.5	4.5	6.9	8.2		11.3
CLDX0146	Broad St, Teddington, nr Tescos + j/w Queens Rd TW11	515572	170977	99.7	85.7	33.6	32.8	28.8	16.4	9.2	7.7	6.6	7.0	6.1	9.0	10.6		15.4
CLDX0148	Deer Park Schl/Lidl, Richmond Rd, opp j/w Morley Rd, E Twickenham	517489	174305	95.6	81.8	30.4	30.4	25.1	15.6	8.8	7.5	6.3	6.8	5.8	8.6	10.0		13.5
CLDX0176	St Margaret's Road, Twickenham	516628	174832	100.0	86.0	36.4	35.9	30.5	17.5	9.3	7.7	6.4	7.1	6.5	9.8	12.1		16.5
CLDX0180	King St, Twickenham	516257	173257	97.9	84.2	36.1	33.4	28.3	17.6	9.9	8.2	7.1	7.9	6.8	10.1	11.4		15.8
CLDX0185	High St, Whitton	514204	173724	100.0	86.0	29.5	29.9	25.5	15.5	8.5	7.0	5.8	6.6	5.8	8.6	10.4		14.1
CLDX0196	Church Rd A311	514128	169495	99.9	85.9	31.7	28.9	25.4	15.0	8.1	6.6	5.5	6.8	5.6	8.1	9.8		13.9
CLDX0202	Lwr Rich Rd, Chertsy Corner, nr j/w houses, opp cnr of Chtsy Ct	519853	175856	100.0	86.0	25.9	26.2	22.5	14.1	7.5	6.4	5.4	5.9	4.7	7.4	8.5		12.4
CLDX0203	High St, Barnes, nr j/w St Anns Rd, SW13	521686	176436	98.0	84.2	31.0	31.2	24.8	15.3	8.3	7.1	5.9	6.6	5.7	8.7	10.9		13.9
CLDX0206	Kew Rd, before j/w South Circ/ Kew Green	519044	177353	99.9	85.9	28.6	31.4	26.4	16.4	8.9	7.2	6.4	6.8	5.6	9.1	10.1		14.4
CLDX0429	Nelson Primary School, Nelson Rd TW2	513927	173928	99.9	85.9	27.4	26.8	25.1	16.7	10.1	8.7	7.5	8.4	7.2	10.0	12.2		14.6
CLDX0430	The Vineyard Schl, Friars Stile Rd, TW10 6NE	518354	174235	94.4	81.2	31.5	32.9	25.9	15.6	8.2	6.8	5.6	6.3	5.3	8.5	9.7		13.5
CLDX0431	Thomson House Sch, Sheen Lane, SW14	520508	175798	100.0	86.0	34.1	34.8	29.4	17.5	9.6	8.0	6.6	7.5	6.4	9.7	11.4		16.1
CLDX0432	St Richards CE Prim Schl, Ashburnham Rd, TW10 7NL	516945	172124	96.8	83.2	38.7	40.4	34.7	20.3	11.4	9.2	7.8	8.9	8.0	11.2	13.5		18.1
CLDX0434	Archdeacon Cambridge's CofE Prim Sch, The Green, Twickenham TW2 5TU	515293	172836	94.6	81.3	34.2	34.3	29.0	17.0	9.0	7.2	6.2	6.8	6.0	9.3	11.4		14.8
CLDX0436	Chase Bridge Primary School, Kneller Rd, TW2	515074	174049	97.8	80.8	26.6	27.4	24.0	13.4	7.2	6.1	5.1	5.5	4.5	7.2	8.8		11.6
CLDX0437	Richmond bus garage, Wakefield Rd, Richmond	517914	174738	99.6	85.6	32.1	31.1	26.8	16.2	9.0	7.8	6.5	7.1	5.9	9.2	10.5		14.9
CLDX0577	Holy Trinity CE Prim Sch, Carrington Rd, TW10 5AA	519181	175201	99.7	85.7	30.2	31.0	26.2	15.7	8.6	6.6	5.7	6.3	5.3	8.0	9.1		14.0

Exceedances of the PM_{10} annual mean AQO of 40 µg m^{-3} are shown in **bold** and yellow, compliance is shown in green.

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%).

Eastings/Northings (BNG, EPSG:27700) derived from reference lat/lon via Helmert transform with accuracy ≈ 5 m

Discussion of Indicative Monitoring Results

The Clarity sensors in this network are the same units previously used by Breathe London. Data for 2025 was provided directly by Clarity (the manufacturer) following the end of the Council's Breathe London contract. The Clarity contract ended in November 2025, which is why December data is not available. Both networks were then replaced in early 2026, with new sensors being installed by Airly.

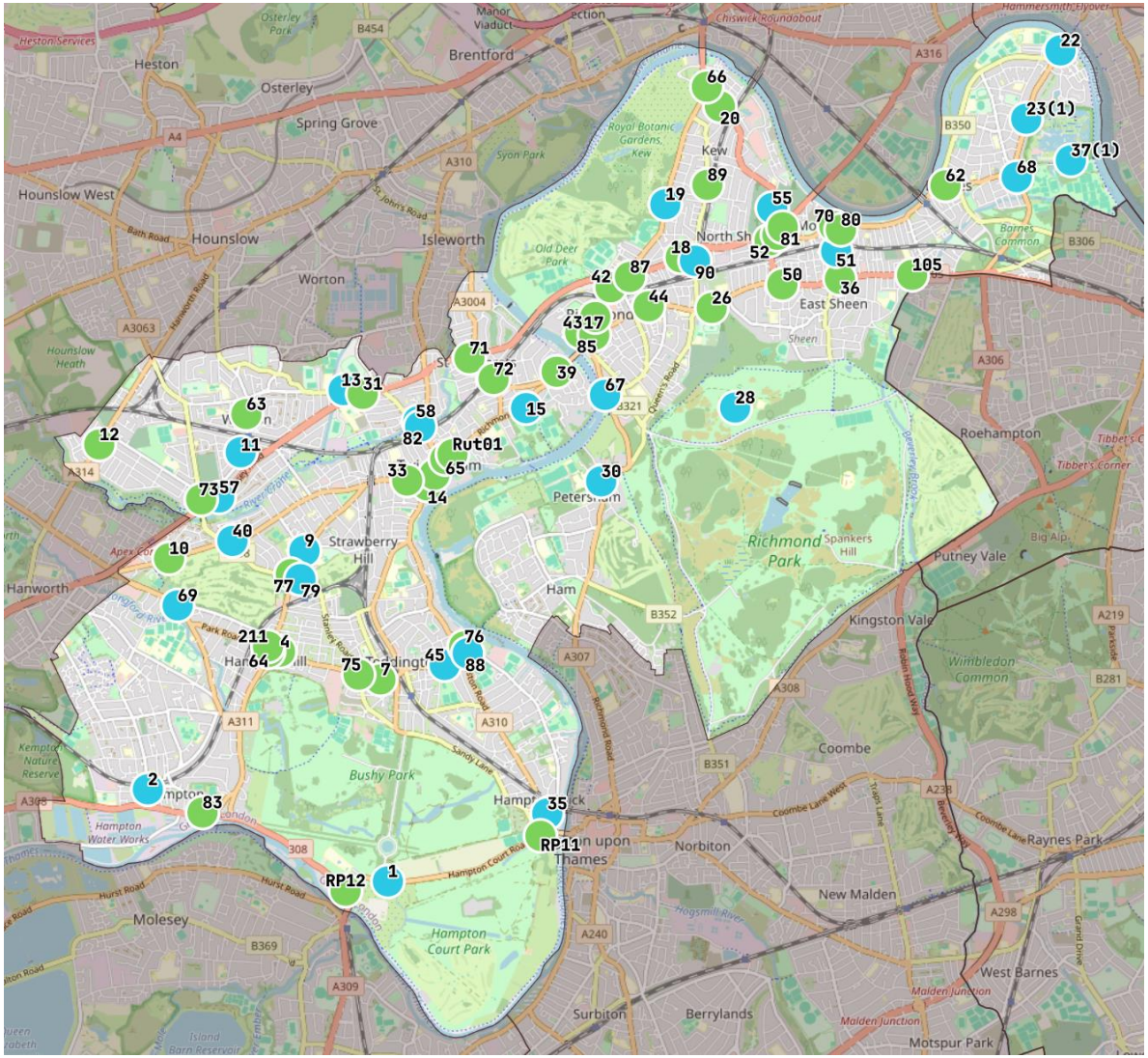
These are low-cost, real-time, indicative sensors rather than reference-grade monitors. Officers use them to track trends, daily patterns and relative differences between sites. The optical measurement principle is sensitive to seasonal conditions, particularly humidity and temperature. Reported concentrations also depend on the correction algorithm the data provider applies to the raw signal, which embeds assumptions about particle density and seasonal aerosol composition. These assumptions vary between providers, which is why two networks (or the same network under different providers) can report different values for the same air.

The monthly means from the Clarity sensors show broadly similar seasonal patterns to the nearest LAQN reference sites, with higher concentrations in winter and lower in summer. However, some month-to-month changes in the sensor data do not fully align with the reference monitors. For example, the drop around April in the Clarity data is larger than the change seen at LAQN sites over the same period.

For these reasons, Clarity monthly figures are best used to compare sites against each other and to understand temporal patterns across hours and days, rather than read as exact concentrations or compared digit-for-digit with LAQN annual means or statutory objectives.

Appendix D Map(s) of Monitoring Locations and AQMAs

Figure 5. Map of Non-Automatic Monitoring Sites 2025



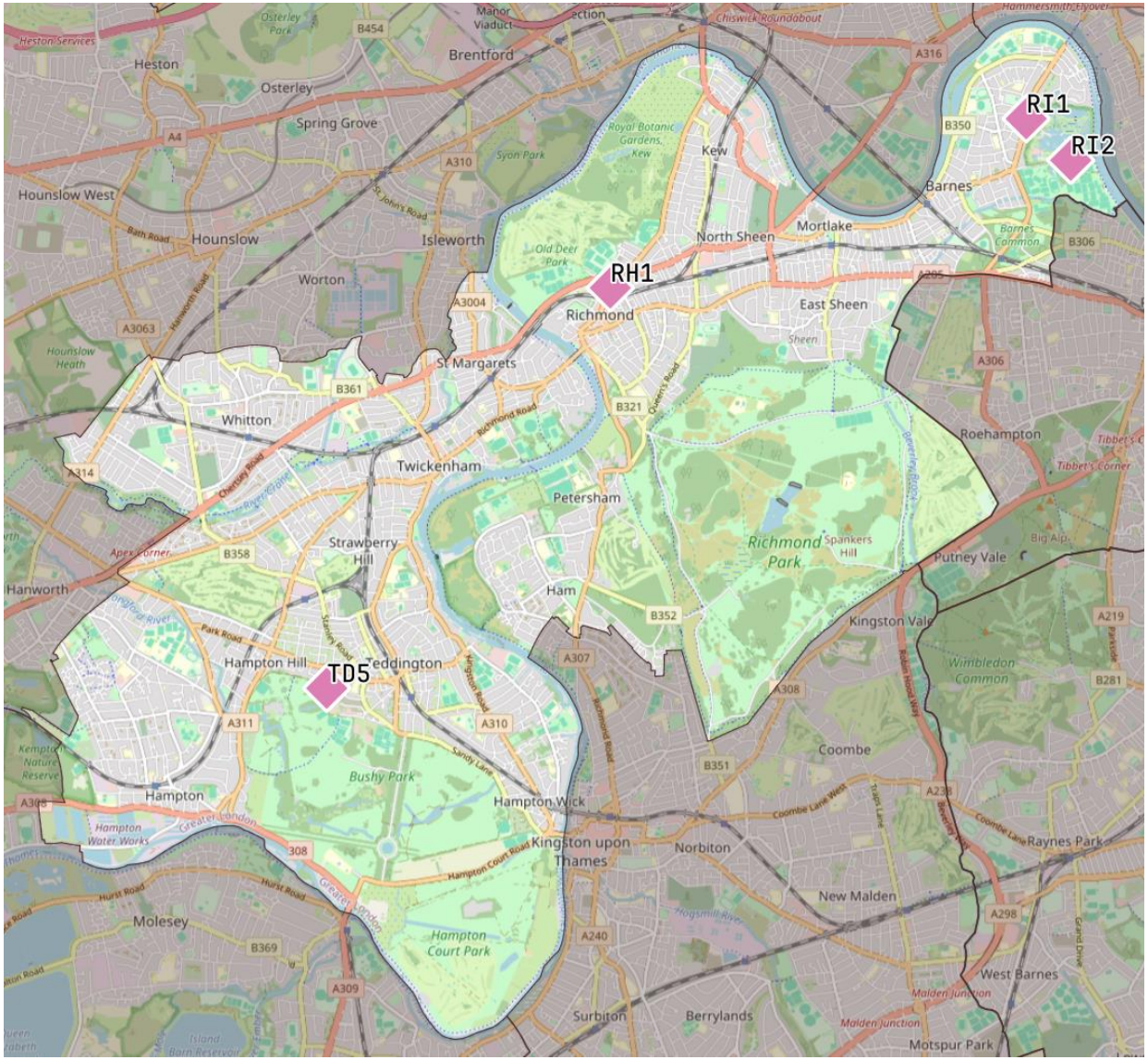
Legend

Annual average NO_2 concentration ($\mu g\ m^{-3}$)

0-9	WHO objective compliant (10 $\mu g\ m^{-3}$)
10-19	Richmond target compliant (20 $\mu g\ m^{-3}$)
20-39	National air quality objective compliant (40 $\mu g\ m^{-3}$)
40+	Non-compliant

Labelled by Site ID

Figure 6. Map of Automatic Monitoring Sites 2025



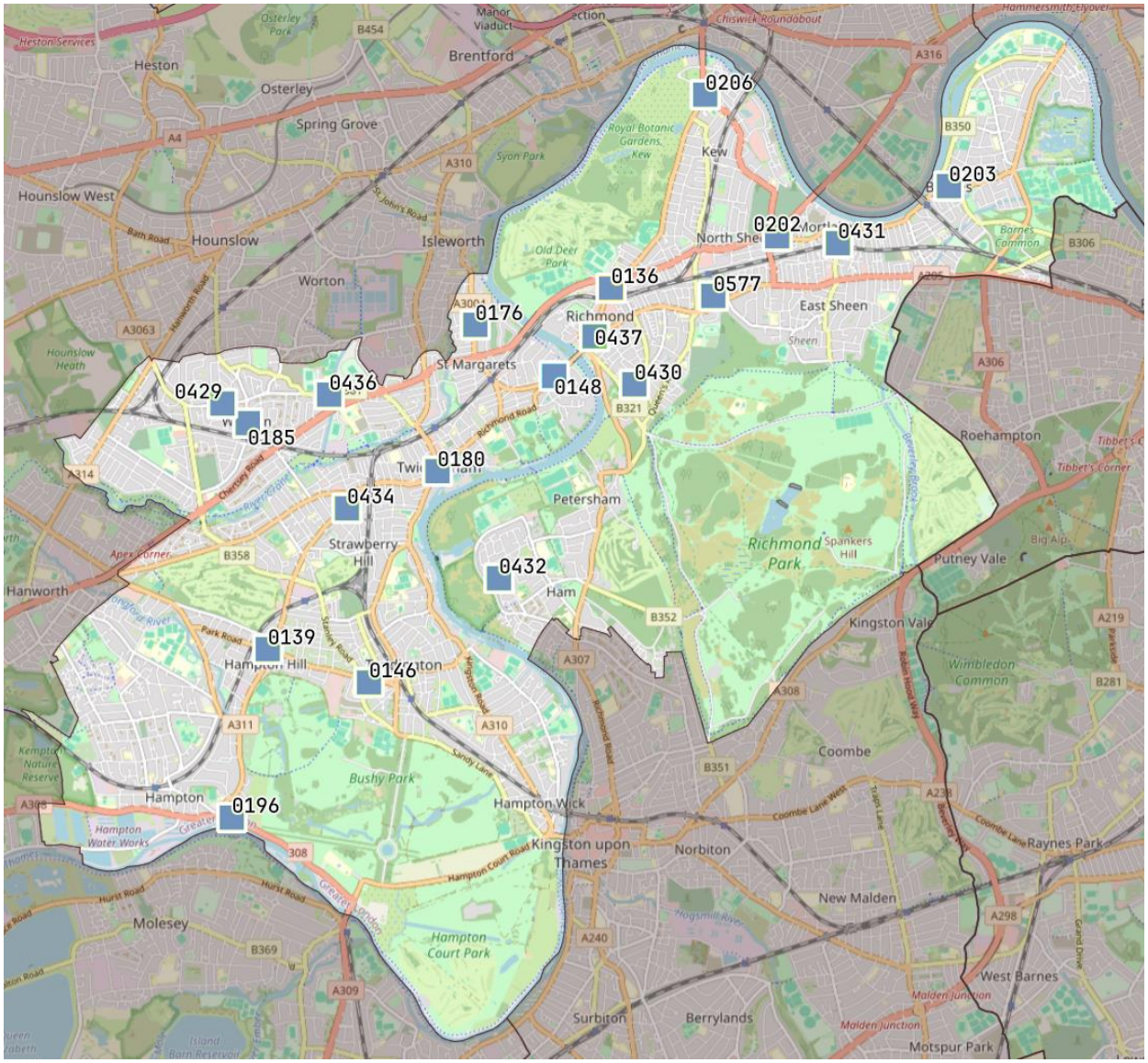
Legend

Automatic Monitoring Site

Labelled by Site ID

Figure 7. Map of Indicative Monitoring Sites 2025

Appendix D - Monitoring Location Maps



Legend

Indicative Monitoring Site (Clarity sensor)

Labelled with site ID suffix

Appendix E Technical Note - Bias Correction Review for 2024 Data – Dr I. Kilbane-Dawe[2]

This technical note was first published as an appendix to the 2024 Annual Status Report (published May 2025). It is reproduced here because the issue it identifies - a statistically significant upward trend in diffusion tube bias at the Castelnau (RI1) co-location site - remains unresolved. The findings directly informed the Council's decision to use the national bias adjustment factor for roadside and kerbside sites in both the 2024 and 2025 data years, rather than applying the Castelnau local factor. A full discussion of the 2025 bias adjustment factor choice is provided in Appendix A Details of Monitoring Site Quality QA/QC*.*

Summary

This technical note analyses nitrogen dioxide (NO_2) bias between co-located diffusion tubes and automatic monitors at four sites. At three sites, no statistically significant trend was found. At the fourth site, Castelnau, a strong and statistically significant upward trend in bias was identified. This trend is unexpected for the 50% TEA-acetone tubes used and suggests possible experimental or environmental issues. Further investigation is recommended, and the use of national correction factors should be considered until the cause is resolved.

Introduction

Bias in diffusion tube measurements of NO_2 when compared with high accuracy automatic monitors are well documented, and technical approaches for correction between the biases is set out by Government. This approach typically requires that biases are determined by co-locating three diffusion tubes (a triplet) at the inlet of a highly accurate automatic monitor, and comparing them using an annual average of monthly average measurements. This work is important for local and national policy purposes, as correction for these biases can substantially alter the NO_2 values determined using diffusion tubes, significantly affecting local and national policy. Unexpected behaviours in these biases can be a cause for concern about the experimental setup. This is the subject of this technical note.

2 *Dr Kilbane-Dawe has 33 years' experience in air quality, environment policy, and sustainable transport. He led the DfT Office for Science, AEA's 125-strong air quality team, and founded*

2

ESA's AI for environment programme. He has delivered over £100M in projects, including the GCSA's VW emissions inquiry, the first AI-enabled environmental satellite, and airTEXT, the first public air pollution alert system. His background is in atmospheric physics and chemistry, with a PhD from Cambridge on atmospheric modelling and measurement.

Causes of diffusion tube bias

The main sources of diffusion tube bias (see literature review section) are:

- Differences in laboratory setup, being the primary source of bias;
- Winds strong enough to cause turbulent flow in the tubes;
- Ambient UV and temperature, most notable by season;
- NO_2 concentrations.

Correcting for differences in laboratory setup is the main purpose of diffusion tube bias correction, rather than factors such as distance from the road.

Seasonal variability in NO_2 diffusion tube bias is well-documented. Bias tends to be more negative in warmer months due to increased photochemical degradation by UV, while colder months often show less negative or even positive bias. This seasonal pattern is attributed to temperature-dependent reactions and varying atmospheric conditions affecting NO_2 uptake and retention in the tubes.

Reviews of biases from multiple laboratories suggests that:

> The acetone-50% TEA mix when prepared by Gradko, is the most stable versus seasonal variation, with an essentially flat profile, and modest changes in a 10-20% band (see figure 1).
>
> Water TEA solutions have more seasonal dependence.

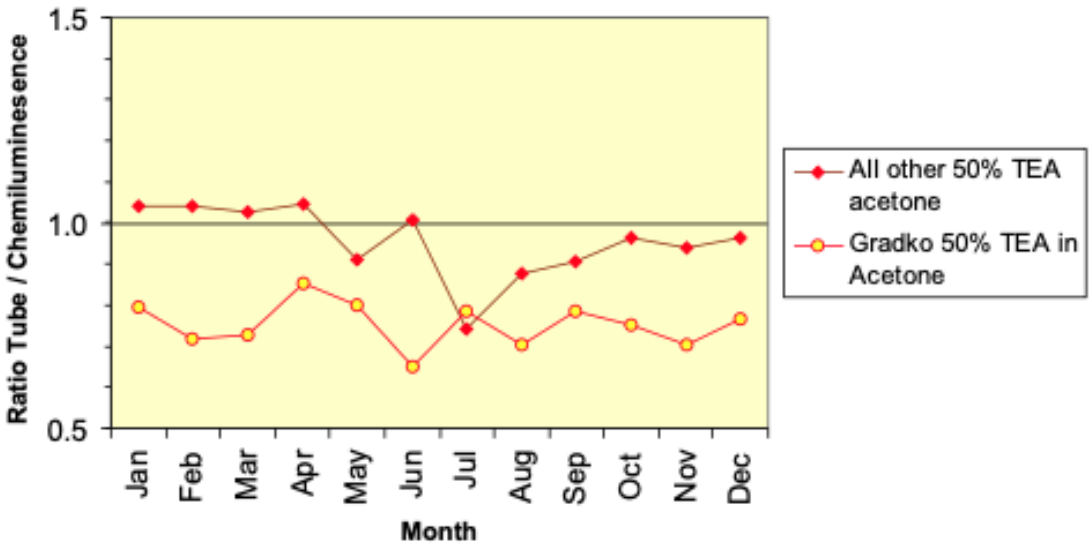


Figure 1. Seasonal variation observed in diffusion tube measurements using 50% TEA acetone doping, to a chemiluminescent detector. *Reproduced from "Compilation of Diffusion Tube Collocation Studies Carried out by Local Authorities," report for Defra by Duncan Laxen & Penny Wilson, 2002. Original caption: Ratio of tube to chemiluminescence vs time of year for tube prepares and analysed by other laboratories and by Gradko, using 50% TEA in acetone. Tubes exposed for one month intervals.*

Sustained changes in bias, for example a consistent increase or decrease over time, may indicate issues with the experimental setup (see literature review section). Potential causes include changes in laboratory analysis methods, alterations in tube preparation protocols, shifts in local environmental conditions or degradation of equipment. Such trends warrant a review to identify potential underlying issues.

Observed biases in 2023 and 2024

Monthly average biases compared with a co-located diffusion tube triplet or doublet using the 50% TEA-acetone technique were calculated for the following co-location sites, where diffusion tube monthly measurements were obtained following national technical guidance:

- Castelnau automatic chemiluminescent monitor vs 3 diffusion tubes
- Merton Civic Centre automatic chemiluminescent monitor vs 3 diffusion tubes
- Barnes Wetlands automatic chemiluminescent monitor vs 3 diffusion tubes
- Felsham Road automatic chemiluminescent monitor vs 2 diffusion tubes
- Euston Road MCERTs automatic monitor vs 3 diffusion tubes.

The variation in monthly biases and secular trends in the same are shown in the figure below. This excludes Felsham Road station, which has insufficient automatic data to include in the analysis. The laboratory used for the Euston Road site was Socotec, the others were processed by Gradko.

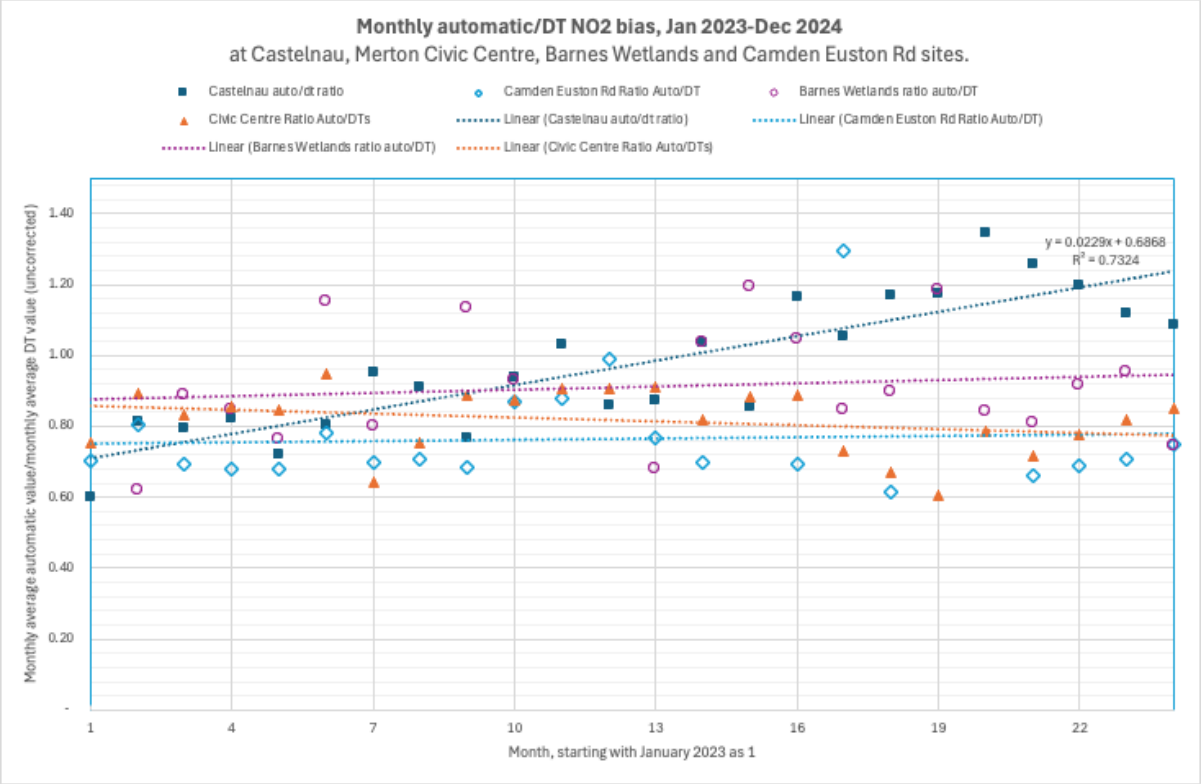


Figure 2. Observed bias between average monthly measurements of NO_2 using co-located automatic measurements and unadjusted diffusion tube data Jan 2023-Dec 2024.

Castelnau: blue solid squares; Merton Civic Centre: orange triangles; Barnes Wetlands: purple rings; Euston Road: blue diamonds. Estimated secular trends in the bias shown with dashed lines of the same colour.

Visual inspection of the monthly data from January 2023 to December 2024 (circles and squares in the figure above) suggests no or very slight trend in the bias ratios at Euston Road, Merton Civic Centre and Barnes Wetlands, and a probable secular trends in the biases at Castelnau. This has significant policy implications as Castelnau is the local bias reference site, used for diffusion tube bias correction for all of LB Richmond upon Thames for many years. Problems at this site would therefore affect measurements across the whole borough.

A linear trend in the bias was calculated for each measurement site, using the least squares method. This is also plotted in the figure above as the dotted lines.

Statistical significance of the Castelnau trend

To investigate the likelihood that the Castelnau trend is real rather than a product of random variations in the bias (Figure 3, with raw data in the appendix), significance testing was conducted. From the 24 months of measurements, significance was tested using both a linear, least squares regression and a Bayesian linear model to statistically test the probability the observed trend results from random variability in the data.

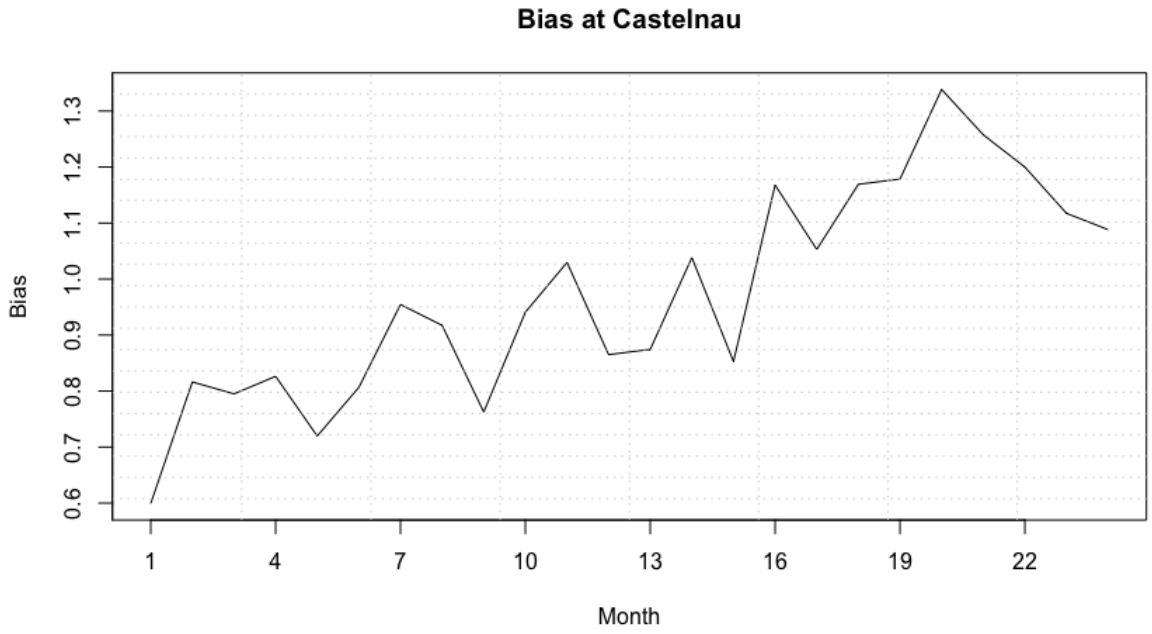


Figure 3. Bias between the automatic monitoring and diffusion tube triplet at Castelnau over the period January 2023 to December 2024.

For the linear regression, a t-test was conducted on the bias, giving a t-value of 7.73, and a likelihood that this is due to chance (p-value) around 1/10,000,000. This suggests is it exceptionally improbable that the trend is due to random data. This also estimated that around 73% of the observed changes in the bias were due to the secular trend.

Using a Bayesian approach, the probability of a trend being present is effectively 100%.

While these statistics do not explain the underlying cause of the trend, they confirm the visual suggestion that the trend is real. Since such a trend is not expected in an experimentally sounds setup, this offers a good reason to investigate the site to determine possible causes for this trend.

Conclusions

Diffusion tube biases are primarily intended to correct for inconsistencies between laboratories, with a lesser effect of correcting for local conditions. For 50%TEA-acetone mixtures, a seasonal variation in bias is not usually expected. A consistent trend in biases between a co-located diffusion tube triplet and an automatic monitor is considered a cause for investigation of the experimental setup. At the Castelnau site a statistically significant positive trend was found in the bias, which would not be expected from a normally operating co-location site.

Recommendations

Sustained changes in bias have the potential to be indicative of problems with the experimental setup, either of the diffusion tubes or the automatic monitors. Biases identified in data for two years at Castelnau were found to be highly likely to be caused by some uncontrolled factor causing a steady shift over time between the measurements made using the automatic monitor and the diffusion tubes, thus creating a trend in the biases. Further work should be conducted to investigate the source of these changes, and consideration given as to whether diffusion tube statistics for 2023 and 2024 should be corrected based on national correction factors pending resolution of these investigations. Given the policy implications of the use of biases at this site for correction of both diffusion tube data in LB Richmond upon Thames and in the national bias estimation, it is recommended that the average bias at this site not be used until the underlying causes of the secular trend are determined.

Acknowledgements

Thanks to Tom Parkes and LB Camden for sharing raw data at Euston Rd, and David Butterfield at National Physical Laboratory for useful feedback on initial calculations.

Linear analysis of the data was conducted in the R language using the LM model developed by the R Core Team (2024), described in *R: A Language and*

Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

Bayesian analysis of the data was conducted in the R language using the brms package developed by Bürkner, P.-C. (2017). *brms: An R Package for Bayesian Multilevel Models Using Stan*. *J. Stat. Softw.*, 80(1), 1–28. https://doi.org/10.18637/jss.v080.i01

Appendix: Literature reviewed and notable points

(1) Compilation of Diffusion Tube Collocation Studies Carried out by Local Authorities, Duncan Laxen & Penny Wilson (2002)

Original studies by Tony Bush, Steven Moorcroft, Smith S, Stevenson K (2001) Validation of NO_2 Diffusion Tube Methodology in the UK, Atmos. Environ., 35, 289-296.

See also Review & Assessment: Pollutant Specific Guidance, LAQM.TG4(00), DETR (2000)

Gradko and 50% TEA in acetone the least seasonal variability in bias, so this suggests that for this setup we should not expect a bias drift over time.

No evidence of any pattern of differences in bias between roadside and other sites.

In 8 out of the 9 data sets there is a more negative bias at higher concentrations so there may be a relationship between tube performance and concentration.

The exception is for Gradko 50% TEA in water tubes whose pattern is quite variable and no firm conclusions are possible.

(2) The Relationship Between Diffusion Tube Bias and Distance From the Road, Duncan Laxen & Ben Marner, AQC, 2006

PDT bias adjustment is primarily for laboratory techniques.

Roadside distance correction isn't required although it exists.

Corrections for chemistry in the tube can be done but this is pointless at or below 40µg/m3.

(3) Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users, Defra (2008)

> Diffusion tubes are categorised as an “indicative” monitoring technique. This refers to a technique with relatively high uncertainty, in the case of diffusion tubes quoted as ± 25%. By contrast, the chemiluminescence method, used in most automatic ambient monitoring apparatus for NO_2, is defined as the reference method for this pollutant. There is a CEN standard for the chemiluminescent method14 (EN 14211:2005 “Ambient air quality - Standard method for the measurement of the concentration of NO_2 and nitrogen monoxide by chemiluminescence”) and its uncertainty is typically quoted as ± 15%.
>
> For diffusion tubes the determination of the absorbed NO_2 to for nitrite is temperature dependent, proportion with a power law of T^1.81. Accounting for different months temperatures was not recommended in 2008, as these were only being used for indicative monitoring (my emphasis).
>
> The standing recommendation is to assume an average UK T of 11 C (giving 1.07412). If T was 25 C this would be 1.17186, a 9% difference.
>
> Reject any DTs where there have been bonfires etc. near the site, or unusual traffic activity. Also those found on the ground or with dirt, insects or spiders inside.

(4) Investigation of the Effects of Harmonising Diffusion Tube Methodology, 2011

> Performance of labs in preparing and analysing diffusion tubes varies wildly.

(5) Biases in the Measurement of Ambient NO_2 (NO_2) by Palmes Passive Diffusion Tube: A Review of Current Understanding, Mathew R. Heal, Duncan P. H. Laxen, Ben B. Marner, Atmosphere 10(7), 357 (2019);

> Strong evidence that measurement of NO_2 by PDT can be subject to bias from a number of sources. The most significant positive biases in normal usage are ambient wind flow at the entrance of the tube potentially leading to bias of tens of percent, and within-tube chemical reaction between NO and O_3 causing bias

up to ~25% at urban background locations (but much less at roadside and rural locations). Sources of potentially significant negative bias are associated with deployments in atmospheres with relative humidities <~75% that cause incomplete conversion of NO_2 to NO_2, and with long deployment times (i.e., several weeks) in warm and sunny conditions. There is also evidence to suggest that biases (positive or negative) can be introduced by individual laboratories in the PDT preparation and NO_2 quantification steps.

More than one bias may be present in any given PDT deployment. The biases act independently so the net effect on PDT NO_2 determination is the linear summation of individual biases acting in a particular deployment. For some PDT deployments, positive and negative biases may offset each other leading to smaller net bias.

Studies examining experimental evidence for potential biases arising in PDT preparation have usually involved a spread of laboratories preparing and analysing the PDTs, and have concluded that PDT performance varied more with the laboratory than with any particular preparation variable.

The individual and net magnitude of bias that may impact NO_2 determination in an individual PDT deployment cannot easily be predicted or quantified. In theory, laboratory-derived biases can be minimised by adherence to good QA/QC procedures and participation in inter-analyst comparisons. Positive bias from wind effects can be substantially reduced either by use of a coarse mesh across the tube and/or with the tubes placed within a shelter. Membranes across the mouth of the tube should not be used since these may overcompensate for wind-induced positive bias by providing resistance to free molecular diffusion.

The positive bias from within-tube chemical reaction between NO and O_3 can, in principle, be eliminated by use of tube material that fully transmits the UV wavelengths relevant to NO_2 photolysis, but in practice this is hard to achieve and is likely incompatible with placing the tubes within a wind shelter.

There is also an unresolved question concerning the accuracy of the value of the diffusion coefficient for NO_2 in air that is used to covert the mass of absorbed NO_2– to average ambient NO_2 concentration. Any inaccuracy in D would proportionally apply universally to all NO_2 passive sampler measurements.

The effect of net bias can be reduced by application of a local "bias adjustment" factor derived from co-locations of PDTs with chemiluminescence analyser. When this is carried out, the PDT is suitable as an indicative measure of NO_2 for air quality assessments. However, it must be recognised that individual PDT exposures may be subject to unknown variation in the true bias adjustment factor for that exposure.

(6) Methodology review of the NO_2 Compliance Assessment: Evidence for using high quality measurements over PCM modelled concentrations (2020)

PCM performs less well than diffusion tubes, hence switch to PDTs.

(7) Environment Agency/Joint Air Quality Unit UK Urban NO_2 Network Operational Annual Report 2021 (2022)

There are 34 sites with collocated PDTs and automatic AURN monitors, but the monthly bias data are not available.

Appendix: Automatic measurements using a chemiluminescent monitor and unadjusted diffusion tube triplet data at Castelnau, months 1-24 of 2023-2024.

Month	Average of Castelnau Diffusion Tubes 23/1,2,3	Castelnau automatic	Month	Average of Castelnau Diffusion Tubes 23/1,2,3	Castelnau automatic
1	28.7	17.2	13	24.7	21.6
2	28.3	23.1	14	18.3	19.0
3	20.0	15.9	15	19.7	16.8
4	19.0	15.7	16	14.3	16.7
5	15.7	11.3	17	17.0	17.9
6	15.0	12.1	18	13.0	15.2
7	11.0	10.5	19	14.0	16.5
8	13.3	12.2	20	12.7	17.0
9	17.7	13.5	21	16.3	20.5
10	20.3	19.1	22	20.0	24.0
11	23.7	24.4	23	24.7	27.6
12	16.3	14.1	24	17.0	18.5

2 Dr Kilbane-Dawe has 33 years' experience in air quality, environment policy, and sustainable transport. He led the DfT Office for Science, AEA's 125-strong air quality team, and founded ESA's AI for environment programme. He has delivered over £100M in projects, including the GCSA's VW emissions inquiry, the first AI-enabled environmental satellite, and airTEXT, the first public air pollution alert system. His background is in atmospheric physics and chemistry, with a PhD from Cambridge on atmospheric modelling and measurement.