Royal Borough of Kingston upon Thames Air Quality Annual Status Report for 2023

Date of publication: August 2024

This report provides a detailed overview of air quality in Royal Borough of Kingston upon Thames during 2023. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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

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Abbreviations

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

Table A. Summary of National Air Quality and International Standards, Objectives and Guidelines

Pollutant	Standard / Objective / Guideline	Averaging Period	Date[1]
Nitrogen dioxide (NO_2)	200 µg m^{-3} not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
Nitrogen dioxide (NO_2)	40 µg m^{-3}	Annual mean	31 Dec 2005
Nitrogen dioxide (NO_2)	WHO AQG[2]: 10 µg m^{-3}	Annual mean	
Particles (PM_{10})	50 µg m^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
Particles (PM_{10})	WHO AQG[2]: 45 µg m^{-3} not to be exceeded more than 3-4 times a year	24-hour mean	
Particles (PM_{10})	40 µg m^{-3}	Annual mean	31 Dec 2004
Particles (PM_{10})	WHO AQG[2]: 15 µg m^{-3}	Annual mean	
Particles ($PM_{2.5}$)	20 µg m^{-3}	Annual mean	2020
Particles ($PM_{2.5}$)	London Mayoral Objective[3]: 10 µg m^{-3}	Annual mean	2030
Particles ($PM_{2.5}$)	WHO AQG[2]: 5 µg m^{-3}	Annual mean	
Particles ($PM_{2.5}$)	Target of 15% reduction in concentration at urban background locations	3-year mean	Between 2010 and 2021
Particles ($PM_{2.5}$)	WHO AQG[2]: 15 µg m^{-3}	24-hour mean	
Sulphur dioxide (SO_2)	266 µg m^{-3} not to be exceeded more than 35 times a year	15-minute mean	31 Dec 2005
Sulphur dioxide (SO_2)	350 µg m^{-3} not to be exceeded more than 24 times a year	1-hour mean	31 Dec 2004
Sulphur dioxide (SO_2)	125 µg m^{-3} mot to be exceeded more than 3 times a year	24-hour mean	31 Dec 2004
Sulphur dioxide (SO_2)	WHO AQG[2]: 40 µg m^{-3} not to be exceeded more than 3-4 times a year	24-hour mean	

Notes:

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

(2) 2021 World Health Organisation Air Quality Guidelines

(3) London Mayoral Objective

1. Air Quality Monitoring

1.1 Locations

Table B. Details of Automatic Monitoring Sites for 2023

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
KT4	Tolworth Broadway	Roadside	519706	165885	NO_2, PM_{10}/$PM_{2.5}$ (3)	Yes	Chemiluminescent; BAM	7	4.2	1.6
KT5	Cromwell Road	Roadside	518562	169519	NO_2, PM_{10}	Yes	Chemiluminescent; BAM	3	2.7	1.6
KT6	Kingston Vale	Roadside	521251	172166	NO_2, PM_{10}	Yes	Chemiluminescent; BAM	10	3	1.6

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

(3) Site KT4 was changed from PM_{10} to $PM_{2.5}$ in April 2022

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	Guildhall Complex	Kerbside	517951	169029	NO_2	Yes	15	1	No	2.5
2	17-19 Penrhyn Road	Roadside	518067	168672	NO_2	Yes	3	2	No	2.5
3	52 Portsmouth Road	Roadside	517565	167715	NO_2	Yes	5	2	No	2.5
4	88 Brighton Road	Kerbside	517532	167296	NO_2	Yes	4	0.5	No	2.5
5	Victoria Road/Brighton Road	Kerbside	517765	167143	NO_2	Yes	1	3	No	2.5
6	St. Mark's Hill/Ewell Road	Roadside	518424	167604	NO_2	Yes	2.5	5	No	2.5
7	Victoria Road near Surbiton Station	Kerbside	518039	167346	NO_2	Yes	2	0.5	No	2.5
8	Upper Brighton Road/Langley Road	Roadside	518336	166655	NO_2	Yes	2.5	2	No	2.5
9	199 Douglas Road/Thornhill Road	Kerbside	518737	165768	NO_2	Yes	3	0.5	No	2.5
10	Ewell Road near jct Elgar Avenue	Kerbside	519365	166230	NO_2	Yes	4	0.5	No	2.5
11	53 Elgar Avenue	Kerbside	519664	166505	NO_2	Yes	6	0.5	No	2.5
12	136 Tolworth Broadway/ Service Road	Roadside	519714	165886	NO_2	Yes	3	2	No	2.5
13	Tolworth Roundabout (Sundial Court)	Kerbside	519808	165873	NO_2	Yes	1.5	1	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
14	Kingston Road (near station)	Kerbside	519872	165692	NO_2	Yes	14	0.5	No	2.5
15	A240 Kingston Road/Old Kingston Road	Kerbside	520192	165264	NO_2	Yes	30	0.5	No	2.5
16	Hook Road South/Hunters Road	Kerbside	518087	165096	NO_2	Yes	6	1	No	2.5
17	Hook Road (St Paul's Primary)	Roadside	518026	164785	NO_2	Yes	2.5	2	No	2.5
18	Hook Centre	Kerbside	517991	164532	NO_2	Yes	4	0.5	No	2.5
19	Garrison Lane/Reynolds Avenue	Kerbside	518155	163395	NO_2	Yes	5	0.5	No	2.5
20	353 Malden Rushett Crossroads	Roadside	517256	161578	NO_2	Yes	2	2.5	No	2.5
21	Opposite 148 Leatherhead Road	Roadside	517683	163465	NO_2	Yes	2	3	No	2.5
22	Hook Rise North/Tolworth Rec Centre	Roadside	518601	165270	NO_2	Yes	3	1.5	No	2.5
23	40 Fife Road	Kerbside	518147	169455	NO_2	Yes	4	0.5	No	2.5
24	14-16 Cromwell Road	Roadside	518467	169509	NO_2	Yes	2	2	No	2.5
25	Queen Elizabeth Road/London Road	Kerbside	518533	169348	NO_2	Yes	4	0.5	No	2.5
26	Richmond Road/Kings Road	Roadside	518199	170056	NO_2	Yes	4	1.5	No	2.5
27	Fire Station, Richmond Road	Roadside	517800	171423	NO_2	Yes	12	1	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
28	41 Kingston Hill	Kerbside	519353	169895	NO_2	Yes	3	1	No	2.5
29	240 Kingston Vale near Robin Hood Lane	Kerbside	521107	172055	NO_2	Yes	6	0.5	No	2.5
30	Coombe Hill School	Roadside	520611	169889	NO_2	Yes	10	2.5	No	2.5
31	248 Malden Road near A3	Kerbside	521651	167397	NO_2	Yes	8	0.5	No	2.5
32	South Lane	Kerbside	521252	166877	NO_2	Yes	7	0.5	No	2.5
33	96 Burlington Road	Roadside	521873	168117	NO_2	Yes	3	1.5	No	2.5
34	66 New Malden High Street	Roadside	521416	168373	NO_2	Yes	7	1.5	No	2.5
35	113-115 Clarence Avenue	Roadside	520708	169258	NO_2	Yes	4	1	No	2.5
36	38 Coombe Lane West near A3 junction	Roadside	520047	169651	NO_2	Yes	3	2	No	2.5
37	51 Elm Road	Kerbside	520764	169525	NO_2	Yes	6	0.5	No	2.5
38	Kingston Road (Carpet Right)	Roadside	520503	168388	NO_2	Yes	15	2	No	2.5
39	Cambridge Road/ Gloucester Road	Kerbside	519372	169098	NO_2	Yes	1	8	No	2.5
40	Cambridge Road/Hawks Road	Roadside	519064	169244	NO_2	Yes	1.5	1.5	No	2.5

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.6

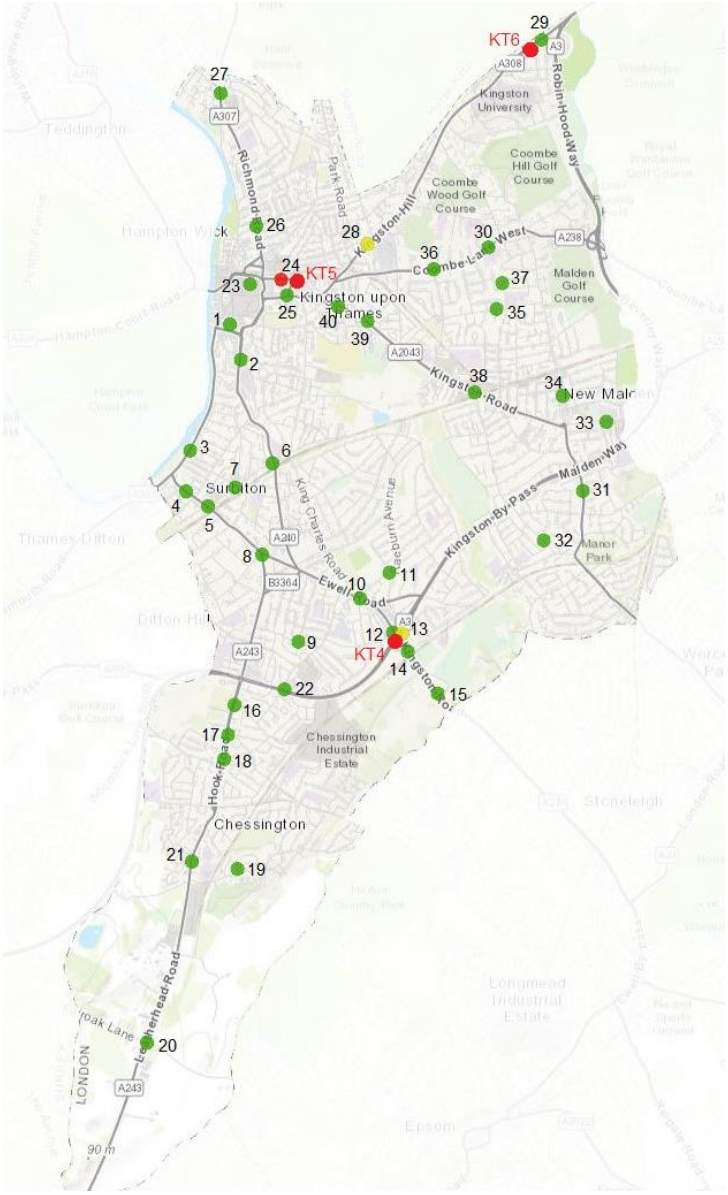

Figure 1. Air Quality Monitoring Locations in the Royal Borough of Kingston upon Thames

1.2 Comparison of Monitoring Results with AQOs

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

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

Site ID	Site Type	Valid data capture for monitoring period % [a]	Valid data capture 2023 % [b]	2017	2018	2019	2020	2021	2022	2023
KT4 Tolworth Broadway	Roadside	96	96	**48.9**	**44.0**	**41.4**	32.8	30.9	34.9 (32.7) *Ann	28.1
KT5 Cromwell Road	Roadside	99	99	-	**57.0 *Ann**	**57.2**	**40.6 (44.7)**	**50.5**	**43.4 (42.3)**	34.8
KT6 Kingston Vale	Roadside	100	100	-	36.0	33.2	24.6	25.5	24.5	19.1

Notes:

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

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

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

NO_2 annual data has been distance adjusted for data within 10% of the NO_2 annual mean objective. The adjusted results are shown in brackets.

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%. The unadjusted results are shown in asterisks and brackets. Where data capture was too low for annualisation, double asterisks were used.

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%).

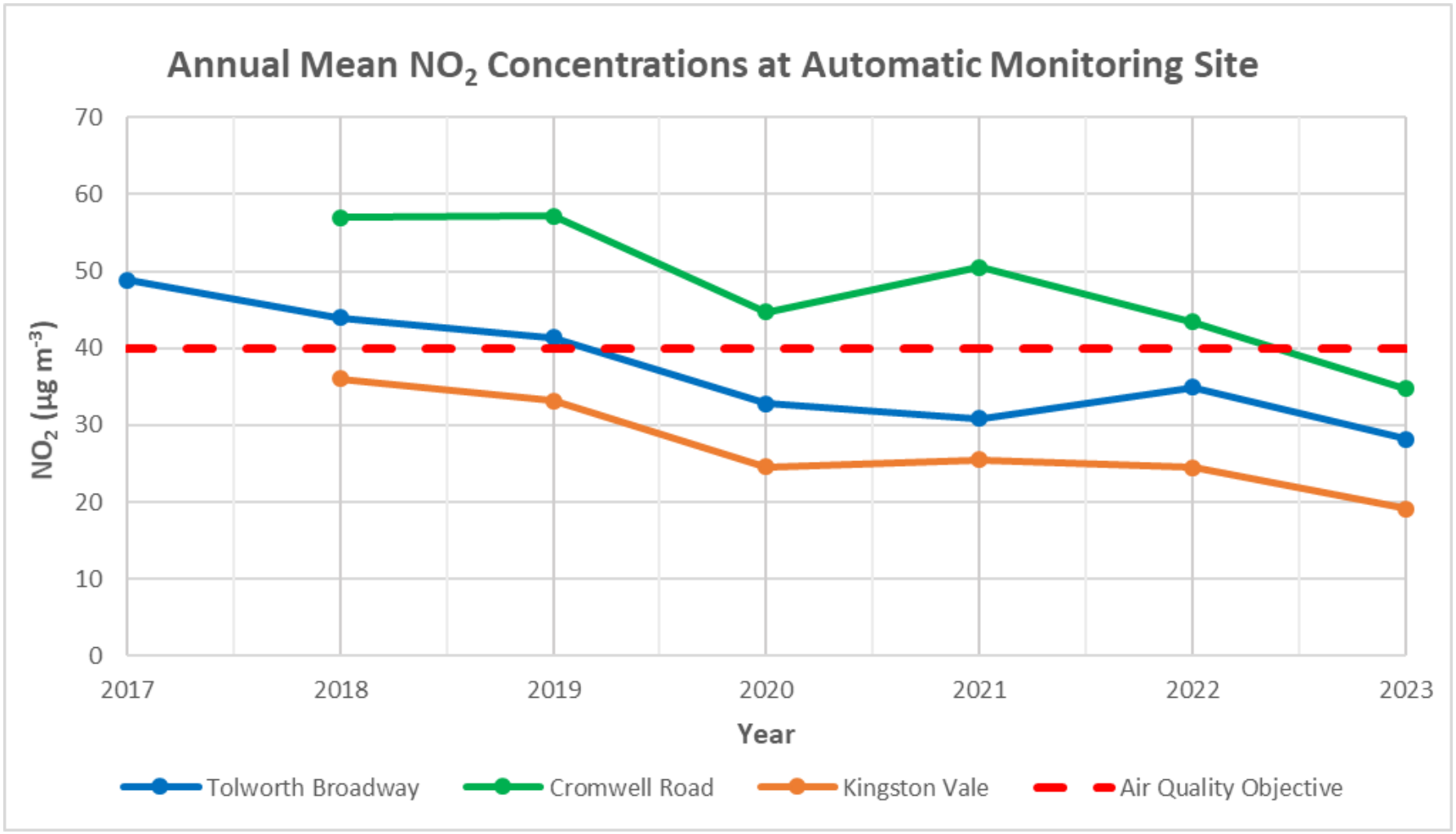

Figure 2. Annual Mean NO_2 Concentrations at Automatic Monitoring Sites

Discussion

In 2023, the NO_2 annual mean objective was met across all automatic monitoring sites in the Royal Borough of Kingston upon Thames, as all annual mean concentrations were under 40 µg m^{-3}. All three monitoring sites show a general decrease in annual mean NO_2 concentrations over the last 7 years, with the greatest fall occurring between 2019 and 2020, as expected due to the impact of COVID restrictions. This was followed by minor concentration increases between 2020 and 2022. Finally, in 2023, annual mean NO_2 concentrations fell to their lowest levels. The general fall in NO_2 concentrations may have been caused by many factors including the decreased use of high emission vehicles, improved traffic systems, and post-COVID hybrid working.

In late August 2023, the Ultra-Low Emission Zone (ULEZ) was expanded to include most of the Kingston borough. The effects of this expansion cannot be accurately predicted or examined in this report, given the relatively short length of time the new zone has been in place, however impacts will likely be shown in the 2024 Annual Status Report.

The Cromwell Road (KT5) site has always been shown to have the highest annual mean NO_2 concentrations of monitored sites in the borough, with the Air Quality Objective having been exceeded every year until 2023. The high concentrations may be attributed to the location of the site, the area has a congested, 3-lane, one way road with a bus station (Cromwell Road Bus Station). The fall in NO_2 concentrations over the years may be attributed to the factors stated above as well as the increased use of electric buses. However, it is important to note that in August 2023, Cromwell Road Bus Station was temporarily closed (to be rebuilt) until August 2024, this may have contributed to the relatively high fall in NO_2 annual mean concentration in 2023. The effect will be made clearer in the 2024 and 2025 Annual Status Reports.

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 (%) [(a)]	Valid data capture 2023 (%) [(b)]	2017	2018	2019	2020	2021	2022	2023
1	517951	169029	Kerbside	100	100	21.6	21.7	20.1	16.3	15.2	14.6	11.5
2	518067	168672	Roadside	100	100	**40.3**	**44.0**	**41.0**	33.2	28.3	26.4	20.6
3	517565	167715	Roadside	100	100	34.6	30.7	28.6	23.1	22.2	20.6	17.0
4	517532	167296	Kerbside	100	100	26.5	27.6	25.6	20.8	19.6	18.3	14.9
5	517765	167143	Kerbside	100	100	35.8	36.9	34.3	27.8	26.5	26.3	20.5
6	518424	167604	Roadside	100	100	37.5	36.4	33.9	27.4	22.2	19.8	15.8
7	518039	167346	Kerbside	92	92	**44.3**	**43.5**	**40.5**	32.8	27.1	27.5	21.4
8	518336	166655	Roadside	100	100	38.1	37.6	35.0	28.3	26.0	23.9	18.5
9	518737	165768	Kerbside	100	100	24.7	22.2	20.6	16.7	17.0	14.7	12.9
10	519365	166230	Kerbside	81	81	**45.7**	38.1	35.4	28.7	26.3	23.7	20.6
11	519664	166505	Kerbside	92	92	26.7	26.1	24.3	19.7	17.7	17.2	14.3
12	519714	165886	Roadside	85	85	**51.3**	**43.8**	**40.7**	33.0	34.1	29.6	22.6
13	519808	165873	Kerbside	92	92	**72.2**	**65.1**	**60.5**	**42.7 (44.4)**	**45.6**	**40.7 (39.1)**	35.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period (%) [a]	Valid data capture 2023 (%) [b]	2017	2018	2019	2020	2021	2022	2023
14	519872	165692	Kerbside	92	92	**54.3**	**41.6**	38.6	31.3	31.6	28.4	27.8
15	520192	165264	Kerbside	100	100	**46.4**	**41.0**	38.1	30.9	34.2	31.7	23.7
16	518087	165096	Kerbside	100	100	**40.6**	38.5	35.8	29.0	25.0	24.0	19.6
17	518026	164785	Roadside	100	100	36.0	37.0	34.4	27.9	22.8	24.0	18.5
18	517991	164532	Kerbside	100	100	**46.4**	**42.7**	39.7	32.2	24.7	25.5	21.0
19	518155	163395	Kerbside	92	92	27.4	29.5	27.4	22.2	19.4	18.4	14.8
20	517256	161578	Roadside	100	100	36.4	34.9	32.5	26.3	22.2	22.5	18.7
21	517683	163465	Roadside	100	100	35.1	36.1	33.5	27.2	24.2	21.9	18.3
22	518601	165270	Roadside	100	100	**54.6**	**44.8**	**41.7**	33.8	31.1	28.5	25.3
23	518147	169455	Kerbside	92	92	31.1	39.6	36.8	29.8	23.5	22.7	18.3
24	518467	169509	Roadside	100	100	**84.5**	**75.9**	**70.6**	**60.1 (51.2)**	**52.6**	**50.0 (51.1)**	39.3 (36.2)
25	518533	169348	Kerbside	100	100	**43.1**	**40.0**	37.2	30.2	25.1	23.8	21.4
26	518199	170056	Roadside	100	100	35.5	34.7	32.3	26.1	23.9	21.4	17.1
27	517800	171423	Roadside	92	92	31.6	34.8	32.4	26.2	14.1	13.1	11.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid data capture for monitoring period (%) [a]	Valid data capture 2023 (%) [b]	2017	2018	2019	2020	2021	2022	2023
28	519353	169895	Kerbside	100	100	**51.0**	**49.6**	**46.1**	37.4 (33.3)	**43.3**	**40.0**	29.9
29	521107	172055	Kerbside	100	100	34.7	31.5	29.3	23.8	21.3	22.3	19.0
30	520611	169889	Roadside	100	100	39.0	38.9	36.2	29.3	31.0	28.2	23.8
31	521651	167397	Kerbside	100	100	**42.0**	38.6	35.9	29.1	33.3	28.8	23.8
32	521252	166877	Kerbside	100	100	25.0	27.1	25.2	20.4	16.3	15.9	13.3
33	521873	168117	Roadside	100	100	**40.3**	38.9	36.2	29.3	31.2	28.6	23.9
34	521416	168373	Roadside	100	100	35.7	37.8	35.1	28.4	27.9	26.3	19.7
35	520708	169258	Roadside	100	100	29.9	30.7	28.5	23.1	24.9	22.5	17.2
36	520047	169651	Roadside	100	100	35.0	32.2	30.0	24.3	27.2	25.2	20.3
37	520764	169525	Kerbside	100	100	28.3	26.0	24.1	19.6	18.5	17.5	14.4
38	520503	168388	Roadside	100	100	32.9	36.1	33.6	27.2	33.8	31.4	26.2
39	519372	169098	Kerbside	100	100	**48.3**	**46.8**	**43.5**	35.2	35.1	32.7	28.6
40	519064	169244	Roadside	100	100	**43.6**	**42.3**	39.3	31.9	31.0	29.9	25.0

Notes:

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

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

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

NO_2 annual data has been distance adjusted for data within 10% of the NO_2 annual mean objective. The adjusted results are shown in brackets.

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%. The unadjusted results are shown in asterisks and brackets. Where data capture was too low for annualisation, double asterisks were used.

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 6 months, the maximum data capture for the full calendar year is 50%).

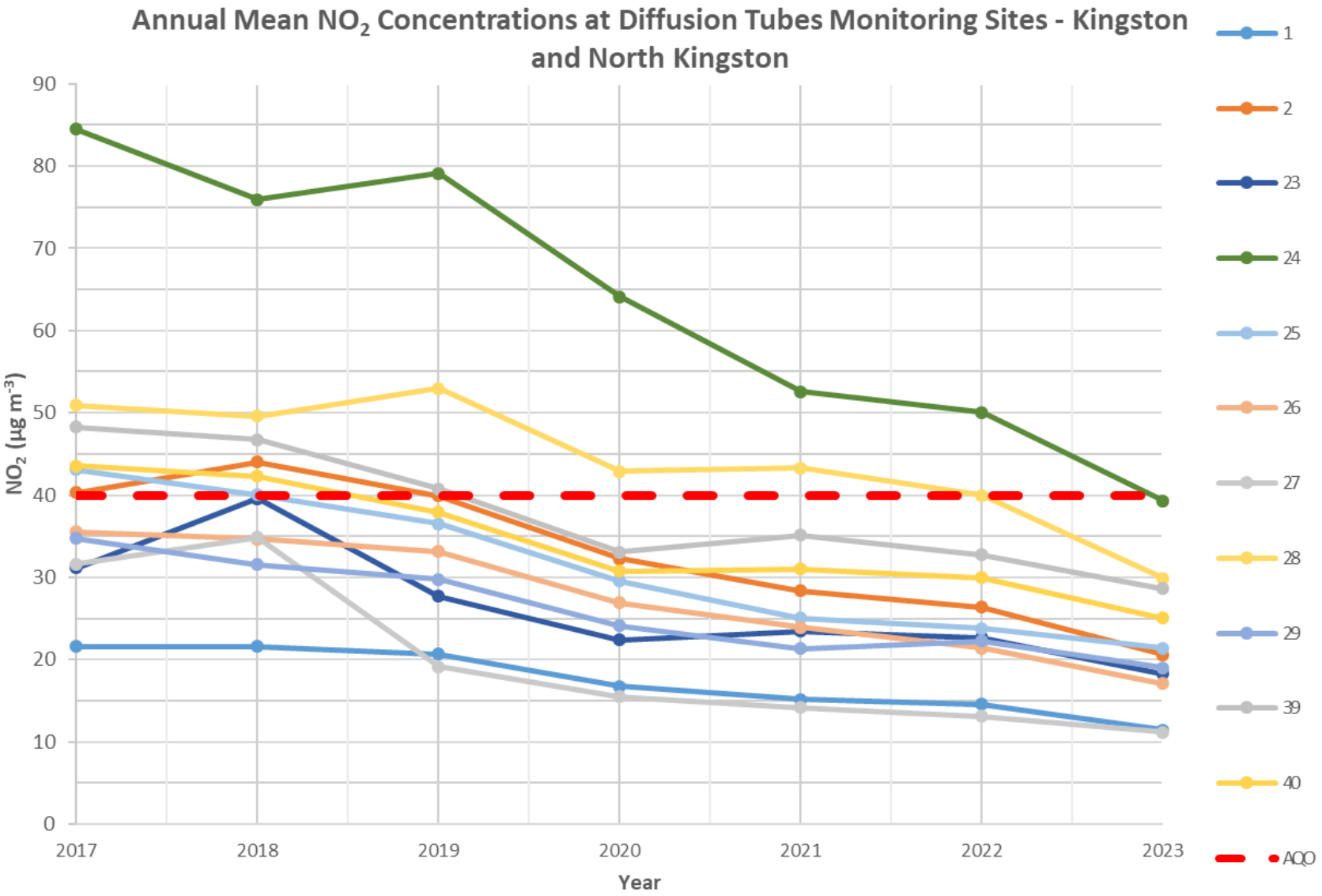

Figure 3. Annual Mean NO_2 Concentrations at Diffusion Tube Monitoring Sites in Kingston and North Kingston

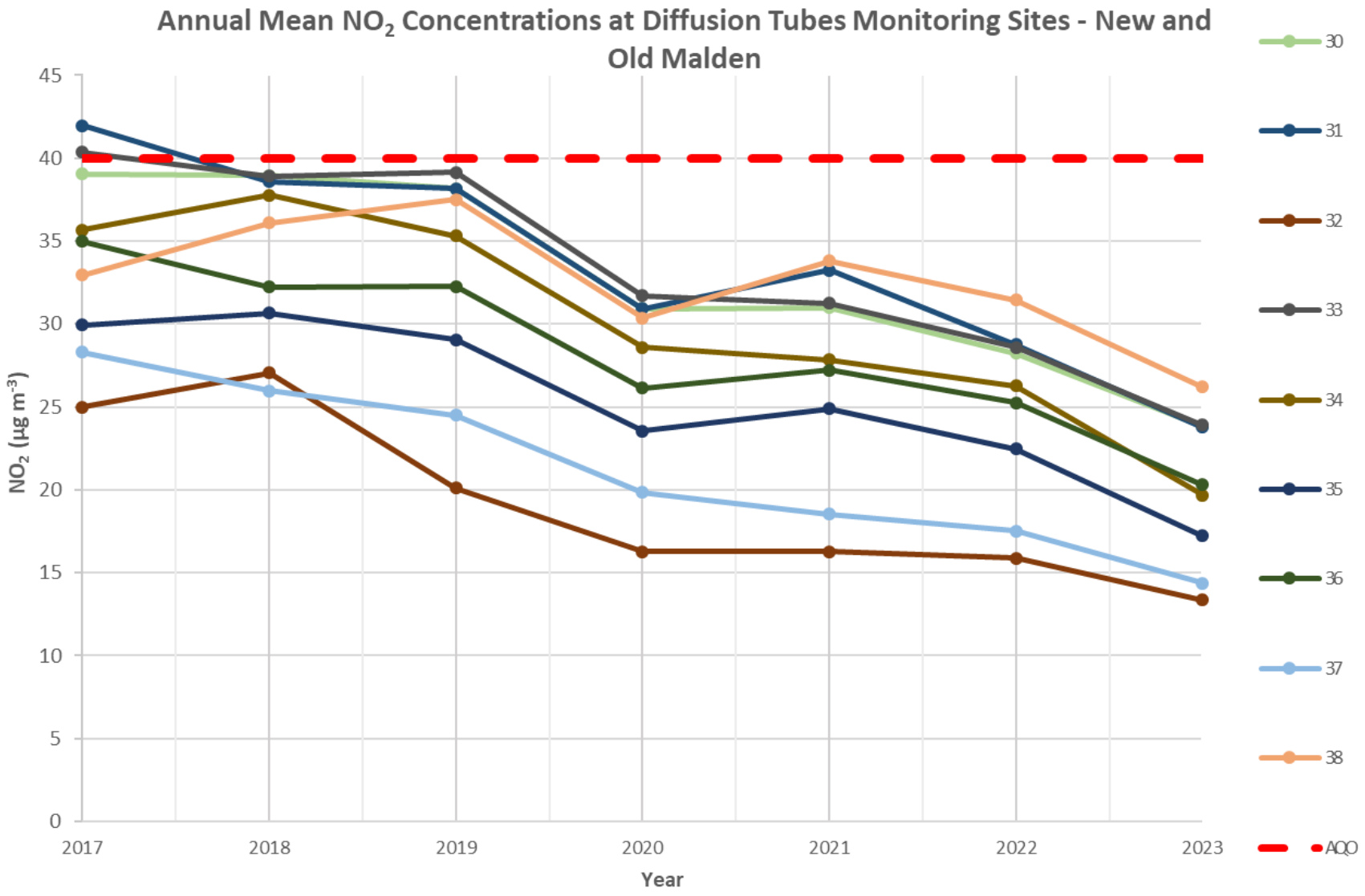

Figure 4. Annual Mean NO_2 Concentrations at Diffusion Tube Monitoring Sites in New and Old Malden

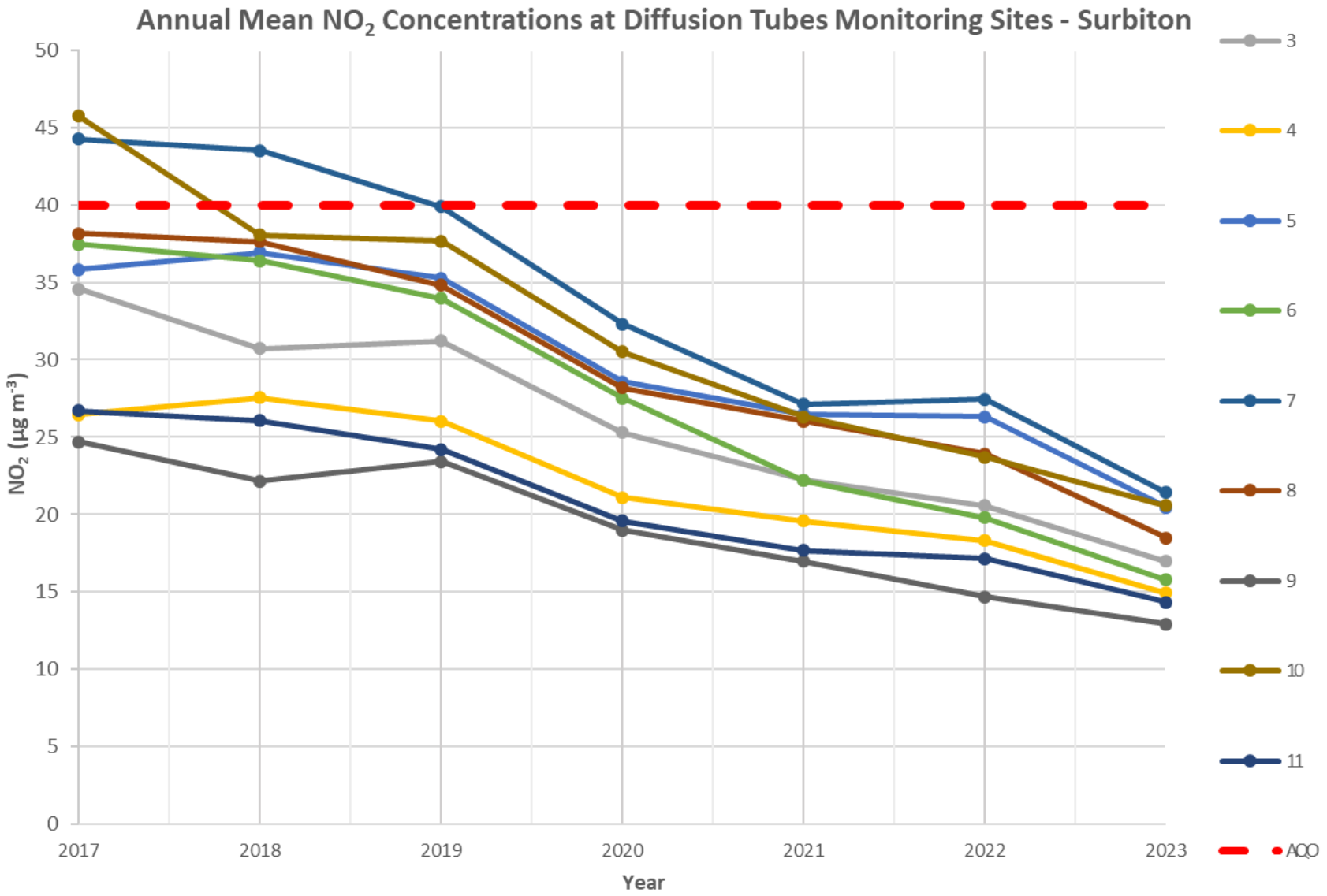

Figure 5. Annual Mean NO_2 Concentrations at Diffusion Tube Monitoring Sites in Surbiton

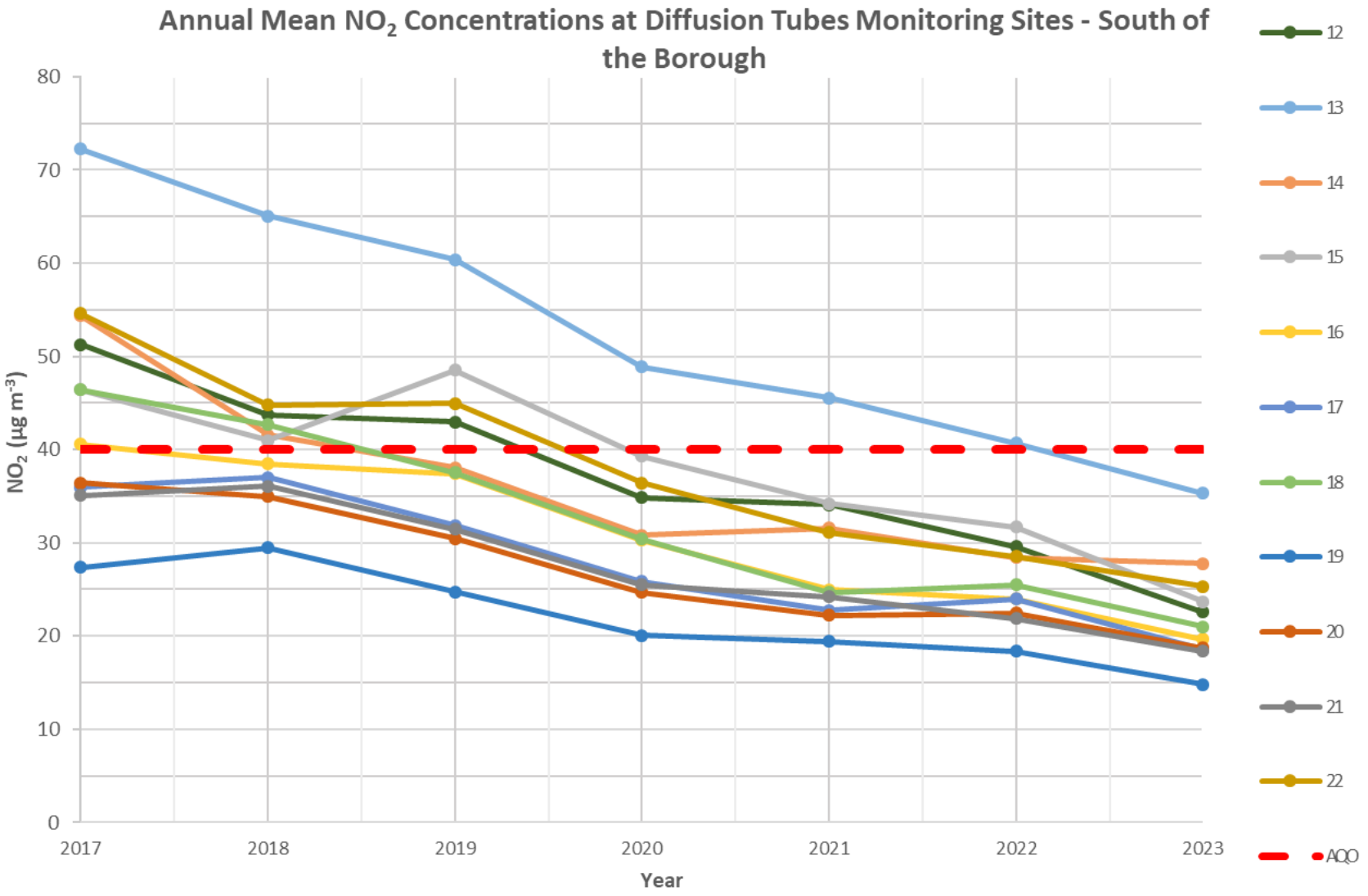

Figure 6. Annual Mean NO_2 Concentrations at Diffusion Tube Monitoring Sites in South of the Borough

Discussion

General Overview

In 2023, the NO_2 Annual Mean Air Quality Objective was reached across all diffusion tube sites in the Royal Borough of Kingston upon Thames. The annual mean NO_2 concentrations across all diffusion tube sites have also decreased in the last year.

In late August 2023, the London Ultra Low Emission Zone (ULEZ) was expanded to include the majority of the Royal Borough of Kingston. The effects of this expansion cannot be accurately predicted or examined in this report, given the relatively short length of time the new zone has been in place, however impacts will likely be shown in the 2024 Annual Status Report. In the last 7 years, diffusion tube sites have all shown a fall in annual mean NO_2 concentration, with a significant decrease in the number of sites exceeding the Air Quality Objective. In 2017, 17 sites exceeded the objective, with 3 sites exceeding 60 µg m^{-3}, while in 2023, no diffusion tube sites exceeded the objective.

The three most significant sites with both the highest annual NO_2 concentration and the most significant fall in annual NO_2 concentrations were sites 24 (Cromwell Road), 13 (Tolworth Roundabout), and 28 (Kingston Hill).

Cromwell Road

The Cromwell Road (24) site in 2017 had an annual NO_2 concentration of 84.5 µg m^{-3} and this has fallen to 39.4 µg m^{-3} in 2023, a fall of over 50% at 45.1 µg m^{-3}. The fall of NO_2 concentration at this site has been steady over the last 7 years, with the most significant fall occurring between 2019 and 2021, expected to be a result of COVID restrictions. However, concentration levels have continued to fall post-COVID. There can be many possible factors may be attributed to this concentration fall, such as the introduction of electric buses to Cromwell Road Bus Station, the decreased use of high emission vehicles by the general public, and traffic improvements. It is important to note that Cromwell Road Bus Station, the busiest bus station in the borough, has been

temporarily closed since August 2023 for rebuilding, and this would have likely had an impact on the annual mean NO_2 concentration. The effect of this closure and the reopening (in August 2024) will be determined in the 2024 and 2025 Air Quality report.

Tolworth Broadway

The Tolworth Broadway (13) site had an annual NO_2 concentration of 72.2 µg m^{-3} in 2017 and has fallen to 35.3 µg m^{-3} in 2023. This was another fall in concentration of over 50% at 36.9 µg m^{-3}. The fall of annual NO_2 concentration at this site was very consistent across the 7 years, with the lowest fall having been between 2019 and 2020, once again expected due to COVID restrictions. However, the concentration fall between 2019 and 2020 was not significantly different to the fall between other years at this site. Site 13 is located on a key junction of the A3, an essential transport route and was likely much less impacted by COVID restrictions as other sites across the borough.

Sites close to site 13, such as diffusion tube site 12 (Tolworth Broadway) and automatic monitoring site KT4 (Tolworth Broadway) have consistently shown lower annual mean NO_2 concentrations than site 13, this is likely due to site 13 being located close to the outer lane of the roundabout while sites 12 and KT4 are located further away from the road in Tolworth Broadway. In 2023, sites 12 and KT4 had NO_2 annual mean concentrations of 22.6 µg m^{-3} and 28.1 µg m^{-3}, respectively.

Between November 2023 and May 2024, Tolworth Roundabout had undergone lane closures due to planned road works, this may have had some impact on the annual mean NO_2 concentrations.

The continued fall of annual mean NO_2 concentrations at diffusion tube sites 12 and 13 may have been affected by various factors including the decreased use of high emission cars by the general public, improved traffic, post-COVID hybrid working, ULEZ expansion (will be discussed in 2024 report), and the A3 lane closure.

Kingston Hill

Over the 7 years, the Kingston Hill (28) site had shown an unsteady fall in annual mean NO_2 concentrations. Beginning with consistent high concentrations between the years 2017 and 2019, in the range of 50 and 53 µg m^{-3}. Followed by the site's first significant fall in concentrations from 53.0 µg m^{-3} (2019) to 43.0 µg m^{-3} (2020) and remained steady in 2021 (43.2 µg m^{-3}). This fall was aligned with other diffusion tube sites and was likely due to COVID restrictions. In 2022, the Kingston Hill site had shown a fall in NO_2 concentrations to 40.0 µg m^{-3}, on the borderline of the NO_2 objective. However, it was in 2023 that the site showed its second significant fall in annual mean NO_2 at 30.0 µg m^{-3}.

Site 28 is located in Kingston Hill, near Kingston Hospital, is a heavily used route in the borough that connects many essential places such as Kingston town centre, Richmond Park (Kingston entrance), Kingston Hospital, access to Kingston Vale (A3 entrance), Kingston University (Kingston Hill Campus), as well as many school. The heavy use and congestion have very likely caused the high annual mean NO_2 concentrations over the years.

When comparing the falls in annual mean NO_2 concentration between 2022 and 2023 of site 28 and other diffusion tube sites around Kingston Hill, it was made clear that site 28 had a much more significant fall in concentration. The reason for the magnitude of this fall remains unclear. This is not observed at surrounding sites; 29 (Kingston Vale), 36 (Coombe Lane), 39 (Cambridge Road - Gloucester), and 40 (Cambridge Road – Hawks Lane).

Site 29 (Kingston Vale), 36 (Coombe Lane), 39 (Cambridge Road - Gloucester), and 40 (Cambridge Road – Hawks Lane) had all shown falls in annual mean NO_2 concentrations prior to 2020, contrasting site 28. Between 2017 and 2019, these diffusion tube sites had shown steady falls in concentrations with two (of four) sites exceeding the NO_2 air quality objective in 2017 and by 2019 there were no exceedances. The sites reached their lowest annual mean NO_2 concentrations in 2020, followed by minor increases in 2021, and constant concentrations in 2022. Finally, in 2023, all sites had shown falls in annual mean NO_2 concentrations.

There are various factors that may have affected the fall in annual mean NO_2 concentrations across the sites surrounding Kingston Hill, these include, be the decreased use of high emission vehicles by the general public, post-COVID hybrid working, and traffic improvements.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2023 % [b]	2017	2018	2019	2020	2021	2022	2023
KT4 Tolworth Broadway	96	96	8	0	0	0 (109.5)	0	0 (106.8)	0
KT5 Cromwell Road	99	99	-	1	5	0	0	0	0
KT6 Kingston Vale	100	100	-	0	0	0	0	0	0

Notes:

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

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

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

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

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

Discussion

In 2023, the NO_2 1-hour mean objective was met across all automatic monitoring sites in the Royal Borough of Kingston upon Thames, as no site had NO_2 concentrations exceeding 200 µg m^{-3}. Across the 7 years, the objective of 200 µg m^{-3} over 18 hours per year has never been exceeded. For sites Tolworth Broadway (KT4) and Kingston Vale (KT6), the NO_2 concentrations have never exceeded 200 µg m^{-3} since 2018. The site Cromwell Road (KT5), had a few exceedances between 2018 and 2019, however, since 2020 NO_2 concentrations have never exceeded 200 µg m^{-3}.

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

Site ID	Valid data capture for monitoring period % [a]	Valid data capture 2023 % [b]	2017	2018	2019	2020	2021	2022	2023
KT4 [1] Tolworth Broadway	-	-	23	23	22	21.7	21.6	23	-
KT5 Cromwell Road	98	98	-	30	26	23.9	27.7	30.1	28.6
KT6 Kingston Vale	91	91	-	22	20	17.7	17.7	16.7	16.5

Notes:

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

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

All means have been "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75% and more than 25%. The unadjusted results are shown in asterisk and brackets. Where data capture was too low for annualisation, double asterisks were used.

(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%).

(1) Site KT4 Tolworth Broadway monitoring site changed from PM_{10} to $PM_{2.5}$ in April 2022.

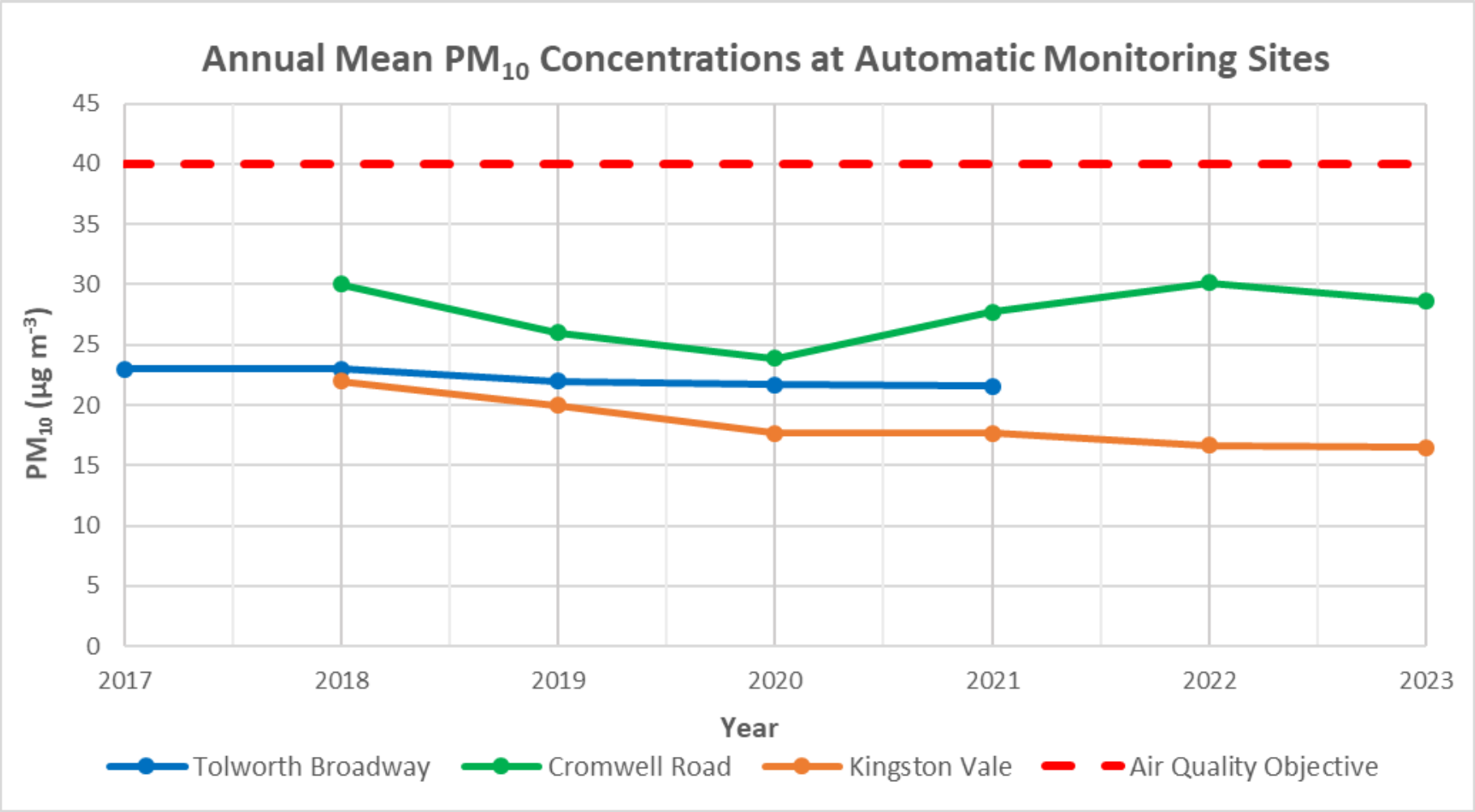

Figure 7. Annual Mean PM_{10} Concentrations at Automatic Monitoring Sites

Discussion

The main source of PM_{10} is dust from construction sites, wood burning, car tyres, brake and road wear, dust resuspension and various other activities in industrial sites. In 2023, the PM_{10} annual mean air quality objective was met across all automatic monitoring sites across the Royal Borough of Kingston upon Thames. This was expected as the objective had always been met across the 7 year trend.

The site Tolworth Broadway (KT4) had been changed into a $PM_{2.5}$ monitor in 2022. Before then, the annual mean PM_{10} concentrations were steady between 21-23 µg m^{-3}.

The Cromwell Road (KT5) site has consistently shown the highest annual mean PM_{10} concentrations in the borough. Between 2018 and 2020, PM_{10} concentrations were falling, reaching their lowest level in 2020 at 23.9 µg m^{-3}. However, between 2020 and 2022 there were PM_{10} concentration increases, as the 2022 annual mean PM_{10} concentration equated that of 2018, at 30.1 µg m^{-3} and 30 µg m^{-3}, respectively. Finally, in 2023, there was a minor fall in PM_{10} concentration to 28.6 µg m^{-3}. The high annual mean PM_{10} concentrations at this site may be caused by the congested traffic of the A307 road. As PM_{10} concentrations have remained steady unlike NO_2 concentrations it's implied that traffic volumes have not decreased but traffic composition has changed, i.e. the proportion of hybrid and electric cars have risen. Future ASRs may shed more light on this.

As previously discussed in the automatic sites annual mean NO_2 concentration section, Cromwell Road Bus Station has been temporarily closed since August 2023 and remains closed until August 2024, this may have had some effect on the fall of PM_{10} annual mean concentration in 2023.

The Kingston Vale (KT6) site has consistently shown the lowest annual mean PM_{10} concentrations in the borough. Across the 6 years, there has been a gradual fall in PM_{10} concentrations.

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	Valid data capture for monitoring period % [a]	Valid data capture 2023 % [b]	2017	2018	2019	2020	2021	2022	2023
KT4 [1] Tolworth Broadway	-	-	6	2	7	6	5	-	-
KT5 Cromwell Road	98	98	-	15 (50)	15	9	14	21	16
KT6 Kingston Vale	91	91	-	2 (35)	4	3	2	1 (29)	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.**

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

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

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

(1) Site KT4 Tolworth Broadway monitoring site changed from PM_{10} to $PM_{2.5}$ in April 2022.

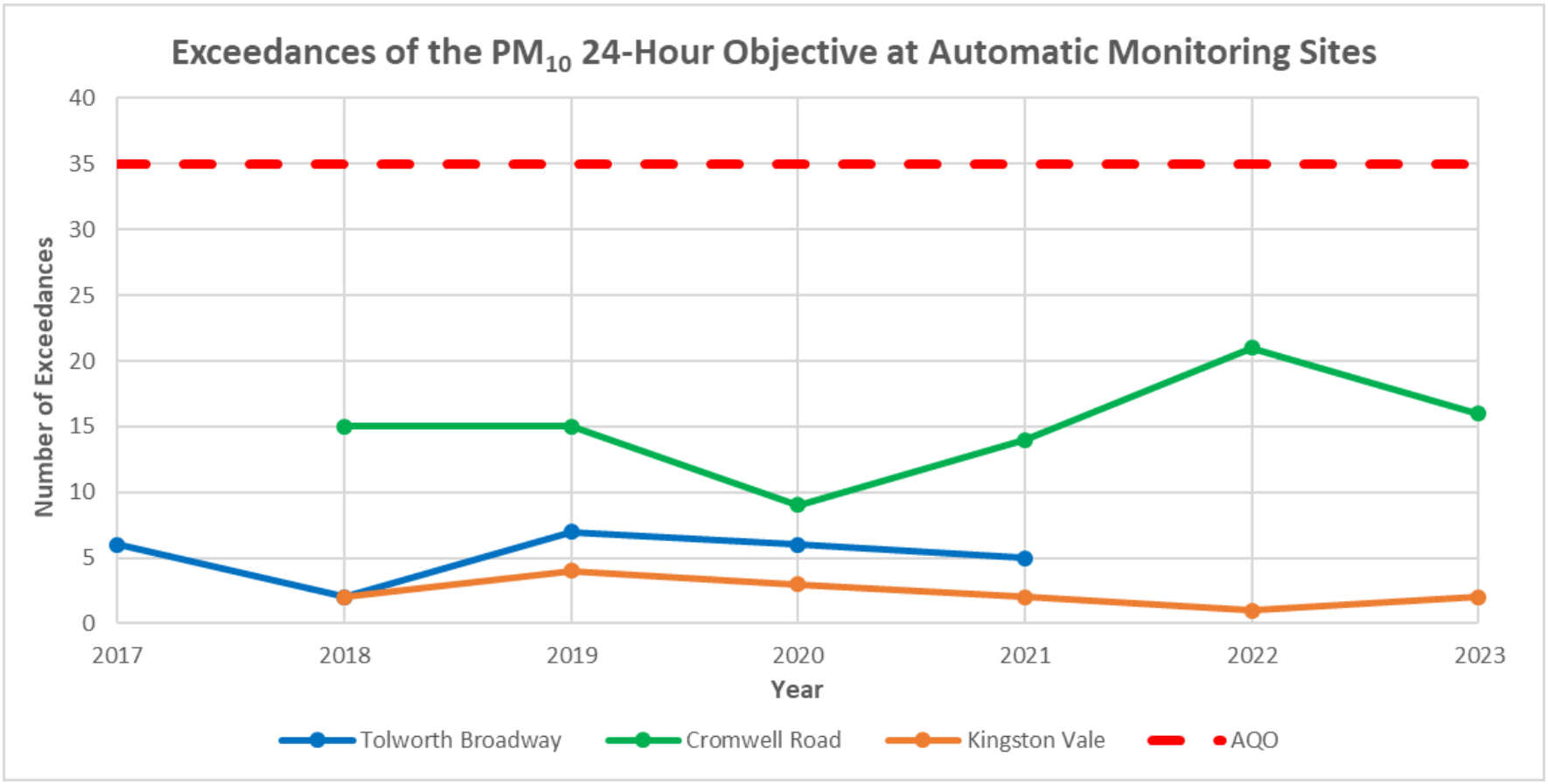

Figure 8. Exceedances of the PM_{10} 24-Hour Mean Objective at Automatic Monitoring Sites

Discussion

In 2023, all automatic monitoring sites in the Royal Borough of Kingston upon Thames had met the PM_{10} 24-hour mean objective, as no site had exceeded the 24-hour mean exceedance of 50 µg m^{-3} for over 35 days.

The Tolworth Broadway (KT4) site was been changed to a $PM_{2.5}$ monitoring site in 2022, before this, the number of PM_{10} 24-hour mean exceedances was between 2 and 6.

The Cromwell Road (KT5) site had consistently shown the highest number of PM_{10} exceedances. Between 2018 and 2019, the number of exceedances was steady at 15, there was a fall in number of exceedances to 9 in 2020, followed by an increased number as exceedances reached their highest in 2022 at 21 days. Finally, in 2023, the number of exceedances has fallen to 16, which is around the average number for this site. As discussed in the annual mean PM_{10} concentrations section, site KT5 is located near the congested A307 road, this may explain the high values of PM_{10} 24-hour mean exceedances. Again, the temporary closure of the Cromwell Road Bus Station may have had an effect on the number of 24-hour mean exceedances, this will be discussed further in the 2024 Annual Status Report.

The Kingston Vale (KT5) site has consistently had the lowest number of PM_{10} 24-hour mean exceedances, with the highest shown in 2019 at 4 exceedances. Since 2019, the number of exceedances has fallen and remain consistent around 2 exceedances per year.

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

Site ID	Valid data capture for monitoring period % [(a)]	Valid data capture 2023 % [(b)]	2017	2018	2019	2020	2021	2022	2023
KT4 [(1)] Tolworth Broadway	91	91	-	-	-	-	**-**	8.3 (9.3) *Ann	9.2

Notes

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

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

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

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

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

(1) Site KT4 Tolworth Broadway monitoring site changed from PM_{10} to $PM_{2.5}$ in April 2022.

Discussion

The Tolworth Broadway (KT4) site started monitoring $PM_{2.5}$ in April 2022. Across both years, 2022 and 2023, the $PM_{2.5}$ annual mean air quality objective was met. As only 2 years' worth of data are available, it is not possible to comment on a trend.

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 Royal Borough of Kingston upon Thames can be found in Table J. The table presents a description of the one borough wide AQMA that is currently designated within Royal Borough of Kingston upon Thames Appendix C provides maps of 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:

- Particulate Matter PM_{10} – Annual Mean and 24-Hour Mean
- Nitrogen dioxide NO_2 - Annual Mean

Table J. Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Kingston upon Thames AQMA	02/01/2003	NO_2 (annual mean) PM_{10} (annual mean, 24 hour mean)	Entire borough	No	NO_2 - annual mean - 73 µg m^{-3} (Kingston Bypass A3) PM_{10} - annual mean - 33 µg	None	1 year	Royal Borough of Kingston upon Thames AQAP 2021-2026 (June 2021)	https://www.kingston.gov.uk/downloads/file/1054/air-quality-action-plan-2021-2026

					m^{-3} (Kingston Bypass A3) PM_{10} - 24 hour mean - 42 exceedances (Kingston Bypass A3)				

2.2 Air Quality Action Plan Progress

Table K provides a brief summary of Royal Borough of Kingston upon Thames progress against the Air Quality Action Plan, showing progress made this year.

Table K. Delivery of Air Quality Action Plan Measures

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
1	Borough Fleet Action	Ensure that all SEND Vehicles are Euro 6 Complaint with a reissued fleet of vehicles by Sept. 2021 and transition to all electric vehicles as soon as a suitable replacement is available to match current specification.	No progress
2	Borough Fleet Action	Kingston to sign the Clean Van Commitment from Global Action Plan and commit to swapping fleet vehicles for zero emission versions, where they exist and are suitable, by 2028. Kingston to lobby vehicle providers.	The Council transferred to an all-electric refuse fleet which was delivered between September and November 2023 with 27 fully electric vehicles operating on the waste contract.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
3	Borough Fleet Action	Replace all remaining housing fleet to electric when suitable cost-effective electric vehicles are available. Ensure that housing fleet vehicles for which like for like EV options do not yet exist are Euro VI-compliant.	Ongoing project as vehicle contracts are renewed and technology offers suitable vehicles.
4	Borough Fleet Action	Devise and implement a driver training system to promote efficient driving practice amongst Council employees.	A failed procurement process in 2023 led to the delay of the delivery of this project. Agreement to extend was secured from Defra, and the project is planned for delivery by September 2025
5	Cleaner Transport	Continue to lobby TfL and Surrey CC to increase the rate at which ultra-low emission buses are introduced in Kingston.	The Council lobbies for emission improvements to the bus fleet through Kingston at regular meetings with colleagues at TfL, and welcomes that some routes passing through Kingston are now being serviced by electric buses.
6	Cleaner Transport	Carry out a public consultation process to maximise quality of the bus service by optimising routes and frequencies.	Expected progress on this action in 2023 was not possible due to vacancies within the sustainable transport team.
7	Cleaner Transport	Lobby Transport for London and South Western Railways for changes to the zones system for Kingston, Surbiton and Chessington resulting in cheaper, Zone 5 fares.	The Council lobbies for changes to the zone system for the borough at regular meetings with TfL colleagues
8	Cleaner Transport	Implement a public e-bike hire scheme in the borough in 2021.	Concession contract renewed for 12 months from Sept. 2023. Since inception, 93,247 journeys have been made using Forest bikes, covering a total distance of 207,506 miles and avoiding 24.84 tons CO_2.
9	Cleaner Transport	Working with schools to carry out an Active Travel Challenge over one month with rewards on offer for entrants. Possibly targeting parents and guardians with children at schools with school streets.	This action links closely to the STARS (Travel for Life) scheme. The project operates over an academic year, and in 2022/23 13 schools were working towards or had achieved accreditation (5 gold, 1 silver, 2 bronze and 5 in progress). In 2023/24 (to date) 15 schools were working towards or had achieved accreditation (5 gold, 2 silver, 3

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			bronze and 5 in progress). Of these 6 were schools with established School Streets.
10	Cleaner Transport	In conjunction with recommendation 4.3, run a rewards programme for Active Travel Employers, offering rewards to employers with the greatest commitment to active travel (e.g. showers at work, secure cycle parking, Cycle Scheme uptake, etc.).	This action is not being taken forward and will be deleted. It has not proved possible to recruit to a role for which this action was identified as a key deliverable, and the post has been removed from the relevant service structure.
11	Cleaner Transport	Encourage businesses to sign up to a green pledge for Kingston. Hold a healthy green workplaces conference to encourage the use of sustainable transport.	Part of the Climate Emergency Action Plan, Theme 6, Green Economy and the Corporate Head of Strategy and Engagement is responsible for the Delivery: https://www.kingston.gov.uk/downloads/file/1694/kingston-s-climate-action-plan
12	Cleaner Transport	Investigate simplifying payment methods for newly installed charge points in the borough. This is likely to take the form of a 'one app' approach to payments. This aim will be taken into consideration for all future procurement of charging points.	Completed
13	Cleaner Transport	Discouraging unnecessary idling through continued participation with the Idling Action campaign if possible, installation of anti-idling road signs at known hotspots, promotion of anti-idling online workshops provided by Idling Action with schools, businesses, and borough drivers.	Continued promotion of vehicle idling and carried out localised investigations and education. A number of additional hot stops were identified and 45 signs have been installed.
14	Cleaner Transport	Assess the feasibility of changing all borough residential roads to 20mph.	Progress was made across RBK - 98% of roads in RBK are 20mph.
15	Cleaner Transport	Increasing the proportion of electric and hydrogen vehicles and low emission vehicles in Car Clubs.	Development of new contract documents pending release to the market in 2024. New contract will include targets to introduce EV and hybrid vehicles within a two year time frame

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
16	Cleaner Transport	4 Very Important Pedestrian Days a year on weekdays leading to trials of play streets in residential areas. In business areas, target one a year on a Sunday.	Very Important Pedestrian days were not delivered in 20203, however three Play Streets were supported, namely: Piper Road - third Sunday of the month between September and November Sycamore Grove - first Sunday of the month from July to November. Homersham Road - third Sunday of every month from February - September.
17	Cleaner Transport	Surcharge on diesel vehicles below Euro 6 standards for Resident's and Controlled Parking Zone permits.	Free permits for electric vehicles continue, further review required on options for pricing parking permits based on emissions or other relevant measures.
18	Cleaner Transport	Installation of 100 resident charge points close to homes on targeted residential streets in 2021.	Delivered
19	Cleaner Transport	Installation of rapid electric vehicle chargers in 3 RBK town centre car parks.	Planned for 2024
20	Cleaner Transport	Reallocation of road space; reducing parking in accessible destinations and or restricting parking on congested high streets and busy roads to improve bus journey times, cycling experience, and reduce emissions caused by congested traffic.	No update available
21	Cleaner Transport	Provision of infrastructure to support walking and cycling.	7 hangars purchased with 22/23 TfL funding were installed on RBK Housing developments. 14 on-street residential hangars have been purchased with 23/24 TfL funding and are in the process Traffic

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			Management Orders being obtained to enable installation in 2024. A further award of £56k for Local Authority hangars was awarded by TfL for 24/25 and procurement will be carried out in 2024.
22	Delivery Servicing & Freight	Update of local authority Procurement policies to include a requirement for suppliers with large fleets to have attained silver FORS accreditation.	This is the provision that specifically relates to this point: Where applicable, and in any case where it concerns Providers with fleet, the Provider shall have Silver Fleet Operator Recognition Scheme (FORS) accreditation.
23	Delivery Servicing & Freight	Update of Procurement policies to ensure sustainable logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainable criteria).	Social value and sustainable criteria is assigned up to 10-20% of the total score. For more details please see contract regulation number 5 of the RBK contract regulations.
24	Delivery Servicing & Freight	Secure delivery and servicing plans and monitoring via planning obligations for large traffic generators, including commercial developments, new and expanded schools, other community facilities and major residential developments.	Standard Activity for the team responsible. We already request Planning to condition a DSP for all larger developments and review them once submitted.
25	Emissions from developments and buildings	Construction Management Plans imposed by planning obligation on all major and other sensitive development in consultation with advice from Transport/Highways and Air Quality.	Standard Activity for the team responsible. Planning requests to condition a DSP for all larger developments and review them once submitted.
26	Emissions from developments and buildings	London Plan policies on energy efficiency applied to relevant development; Aspiration to adopt BREEAM	Development applications are evaluated based on relevant development plan policies, including the requirements of the London Plan.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		target policies for development in RBK new Local Plan in Q4 2023 subject to viability testing.	For major development proposals, Policy SI2 of the London Plan requires a minimum 35% reduction in carbon emissions compared to the standards outlined in Part L of the Building Regulations, which primarily focuses on building energy efficiency. Additionally, major residential development should achieve at least a 10% reduction through energy efficiency measures, while non-residential development should achieve at least 15%. The Council's Draft Local Plan proposes that non-residential developments comprising an area of 500m2 or more should achieve a BREEAM rating of 'Excellent' or above. The evidence of viability suggests that requiring the BREEAM 'Excellent' rating and achieving net zero carbon on developments could have a significant impact in some cases.
27	Emissions from developments and buildings	Ensuring enforcement of Non Road Mobile Machinery (NRMM) air quality policies through continuing membership of the NRMM enforcement project.	The use of our standard NRMM planning condition during 2023 is summarised in Table N. The Council continued taking part in the pan-London NRMM part project, funded by the MAQF.
28	Emissions from developments and buildings	Apply London Plan CHP and biomass air quality policies to relevant development.	Ongoing
29	Emissions from developments and buildings	Applying London Plan 2022 Air Quality Neutral policies to new major development.	Ongoing
30	Emissions from developments and buildings	Urban Greening Factor requirement for relevant development in line with London Plan; Maintenance	Ongoing

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		plans for green infrastructure secured by planning condition.	
31	Emissions from developments and buildings	Ensuring that Smoke Control Zones are fully promoted and enforced through investigating complaints of smoke, consolidating the smoke control zones into a single zone that encompasses the entire borough, and investigating fuel retailers for compliance.	The consolidation of historic Smoke Control Orders was agreed and sealed in October 2023, there is a 6 month delay between approval and implementation so the new orders will come in effect from April 2024. Action now complete.
32	Emissions from developments and buildings	Promoting and delivering energy efficiency retrofitting projects in workplaces and homes using the GLA RE:NEW and RE:FIT programmes to replace old boilers /top-up loft insulation in combination with other energy conservation measures.	Following the completion of the initial retrofit initiatives in previous years, the retrofit focus has developed through Kingston Efficient Homes Shows, covering residential and commercial retrofit, along with GLA funded Energy Audits of businesses, and green skills development. As part of the Voluntary, Community and Social Enterprise (VCSE) grant scheme Kingston Council is also offering half price energy audits to 60 homes in the borough each year for the next 3 years. These will give personalised options for each property's owners as to new technologies such as insulation and heating equipment as well as their relative cost and payback periods.
33	Emissions from developments and buildings	Ensure that planning and development within the borough are compliant with relevant planning policies in relation to air quality in order to mitigate the potential impacts of development on air quality and to protect the health and amenity of the population.	Ongoing
34	Localised Solutions	Carry out air quality audits on the three schools in Kingston where NO_2 concentrations are the highest	Due to reduced availability of resources, this project has not commenced in 2023. Successful recruitment of a new

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
		in accordance with the GLA audit toolkit. Promote Schools Pollution Helpdesk and GLA audit toolkit.	Air Quality Officer will ensure that this project can start in 2024.
35	Localised Solutions	Bid for funding to be able to implement 3 experimental schools streets per year and seek to make existing experimental schemes permanent.	2 Experimental Traffic Management Orders (ETMO). 2 schools commitment to deliver another 2.
36	Localised Solutions	Liaise with South West London boroughs not covered by the inner London ULEZ regarding the potential for a south London ULEZ.	Greater London ULEZ was implemented in August 2023, meaning that this Action is now obsolete.
37	Localised Solutions	Carry out study to assess feasibility of implementing Kingston's first Zero Emissions Zone.	Ongoing discussions with a plan to engage with Kingston First (BID) in 24/25 as part of accessibility study of Kingston town centre.
38	Localised Solutions	Continue to ensure that streets are designed in line with Healthy Streets Guidance with a specific focus on promoting sustainable transport by making highways safer, more accessible, and attractive through design, maintenance and greening. Implement a framework to ensure that all planned maintenance works consider Healthy Streets impacts.	Scores have risen across a number of the indicators in 2023. The proportion of Borough roads with a default 20mph speed limit has increased to 98% (from 48% last year). The proportion of trips made by sustainable modes of transport has risen from 54% in 2019 to 63% at the end of 2023. The number of residents who are cycling regularly is now 14%. Work has been undertaken on developing Healthy Streets, including - Tolworth Healthy Street and, Berrylands Healthy Street.
40	Monitoring and other core statutory duties	Collect and publish air quality monitoring data in line with the requirements of the London Local Air Quality Management framework.	Air Quality Monitoring network has been has been maintained and data has been published.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			There have been no additional monitors added in 2023.
41	Public Health and Awareness Raising	Design and deliver a clean air communications campaign to raise awareness of the harm caused by poor air quality and how individuals can take action to reduce their emissions.	The council has promoted and supported a variety of campaigns which have an impact on air quality, including: Promoting electric vehicles and electric vehicle charging points, the councils new electric waste fleet, tree planting and community orchards which can help to filter air pollution, Clean Air Day, Walk to School Month, the Forest e-bike hire scheme and community cycle rides.
42	Public Health and Awareness Raising	Develop a communications strategy which raises awareness of the harm caused by solid fuel burning. Material to be published early every winter for maximum impact.	Continued with the Pan London Wood Burning project which included further research into the effects of wood burning in domestic premises. A communications campaign was run from September till December 2023 with Bill Board, Radio and bus signage throughout the Borough.
43	Public Health and Awareness Raising	Implement a schools outreach programme designed to raise awareness of the impacts of air pollution and help them to create clean air route plans. Provide this service to at least five schools in the borough and produce an article outlining findings for the head's newsletter.	This has not taken place due to lack of resources, however it is hoped that the project will commence in 2024/24.
44	Public Health and Awareness Raising	Ensure that the Director of Public Health is fully briefed on the content of the Annual Status Reports on air quality in relation to the current situation in our local authority area, actions that have been taken thus far, and what is needed to reduce the health impacts of poor air quality in the future.	The Director of Public Health is provided with a copy of the Annual Status Report and is updated on progress against actions taken. The Public Health team are invited to contribute to relevant projects and initiatives that have a direct or indirect public health impact.

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
45	Public Health and Awareness Raising	Director of PH will be consulted on all relevant air quality projects to liaise with key stakeholders.	Ongoing as needed, for example Public Health support was provided to the VCSE Climate Awareness Workshop December 2023.
46	Public Health and Awareness Raising	In relevant Public Health publications and in the statutory Annual Public Health Report, the Public Health DPH will have responsibility to ensure inclusion of up to date information on air quality impacts on the population.	Kingston JSNA 2023 published in August 2023, includes an Air Quality section See https://data.kingston.gov.uk/jsna/
47	Public Health and Awareness Raising	Strengthening co-ordination with Public Health by ensuring that at least one Consultant grade public health specialist within the borough has air quality responsibilities outlined in their job profile (as part of a wider role, not a dedicated air quality post).	The Kingston Consultant in Public Health, along with team members in the Healthy & Safe team, gives input on Air Quality projects and initiatives as required.
48	Public Health and Awareness Raising	Director of Public Health/relevant CHoS to sign off Statutory Annual Status Reports and all new Air Quality Action Plans.	Ongoing
49	Public Health and Awareness Raising	Provide a briefing which can be disseminated amongst the Transport team detailing their responsibilities in relation to air quality improvement as well as risks and opportunities relevant to their service area that relate to air quality.	Due to limited resources, this project has not commenced in 2023. With the recruitment of a new Air Quality Officer this will be undertaken in 2024.
50	Public Health and Awareness Raising	Promotion of availability of airTEXT air pollution alert system on the website, doctor's surgeries, hospitals, and schools. Mayor's air quality alerts to be disseminated using social media.	Continued to promote the AirTEXT service as well as recommending ways in which residents can reduce their exposure to, and emissions of, air pollution. Due to limited resources, this project has not commenced in 2023. With the recent recruitment of a new Air Quality

Measure	LLAQM Action Matrix Theme	Action	Progress • Emissions/Concentration data • Benefits • Negative impacts / Complaints
			Officer further work on the promotion of alerts will commence in 2024.
51	Public Health and Awareness Raising	Support five schools to join and achieve bronze accreditation in the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme.	Castle Hill Primary School, Ellingham Primary School, Latchmere School, St Agatha's Catholic Primary School, and St Philip's School are all on track to receive their first TfL Travel for Life accreditation in 2023/24.

3. Planning Update and Other New Sources of Emissions

Table L. Planning requirements met by planning applications in Royal Borough of Kingston upon Thames in 2023

Condition	Number
Number of planning applications where an air quality impact assessment was reviewed for air quality impacts	All Major developments are assessed for air quality; including operational air quality, air quality neutral, and construction impacts. The number so assessed was not recorded in 2023.
Number of planning applications required to monitor for construction dust	All major developments with demolitions and Air Quality Dust Management Plans perform monitoring, visual or otherwise. Out database is not currently set up to record the number of sites
Number of CHPs/Biomass boilers refused on air quality grounds	0 (context: no applications were submitted which included CHP/Biomass)
Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions	0 (context: no applications were submitted which included CHP/Biomass)
Number of developments required to install Ultra-Low NO_X boilers	This information is not collected. All developments are required to install boilers with NOx emissions below 40 mg/kWh, in adherence to the London Plan 2021
Number of developments where an AQ Neutral building and/or transport assessments undertaken	154 planning applications were assessed by the pollution control team in 2023 – all applications submitted to the Pollution Control team for consultation are screened for the requirement of an AQN assessment as a minimum.
Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation	This information is not recorded
Number of planning applications with S106 agreements including other requirements to improve air quality	1
Number of planning applications with CIL payments that include a contribution to improve air quality	0

Condition	Number
NRMM: Greater London (excluding Central Activity Zone, Canary Wharf and Opportunity Areas) Number of conditions related to NRMM included. Number of developments registered and compliant. Number of audits % of sites unregistered prior to audit Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy.	14 conditions included 20 registered and compliant 1 unregistered/uncompliant and being chased. 21 audits 9.5% sites unregistered prior to audit

The Royal Borough of Kingston upon Thames Planning Department consults the Environmental Protection Team on all major planning applications as well as some non-major applications that are likely to be of interest. Applications are reviewed by officers within the team in respect of contaminated land, noise and air quality. Typically, one officer coordinates the team's response and records data such as the air quality conditions that were recommended.

The enforcement of air quality conditions is largely the responsibility of the Planning Enforcement Team unless environmental nuisance issues arise. However, NRMM enforcement is carried out by the LB Merton-led pan-London NRMM enforcement project, funded by the Mayor's Air Quality Fund.

3.1 New or significantly changed industrial or other sources

No new sources identified

4. Additional Activities to Improve Air Quality

4.1 Royal Borough of Kingston upon Thames Fleet

There are a small number of zero emission and zero emission capable vehicles within the borough's fleet in 2023**.**

Through our waste contractor, Kingston is serviced by a fully electric waste management fleet following the delivery and activation of 27 electric vehicles between September and November 2023.

4.2 NRMM Enforcement Project

The Royal Borough of Kingston upon Thames will continue to support the NRMM Enforcement project in 2024.

4.2 Air Quality Alerts

The Council website promotes the AirTEXT (https://www.airtext.info/) service as well as recommends ways in which residents can reduce their exposure to and emissions of air pollution. The Council has also shared pollution episode alerts from the GLA forecasting service.

Appendix A Details of Monitoring Site Quality QA/QC

A.1 Automatic Monitoring Sites

The Council's monitoring stations form part of the London Air Quality Network and QA/QC standards are delivered accordingly. These are considered close, if not equivalent to, the AURN standards. QA/QC is carried out by contractors.

PM_{10} Monitoring Adjustment

The monitoring stations in the Royal Borough of Kingston upon Thames are part of the London Air Quality Network, and the data is collected and managed (including ratification) by ERG (Environmental Research Group).

A.2 Diffusion Tubes

The diffusion tubes used by the Royal Borough of Kingston upon Thames are supplied and analysed by Gradko utilising the 20% triethanolamine (TEA) in water preparation method. A bias adjustment factor of 0.81 for the year 2023 has been derived from the national bias adjustment calculator dated June 2024.

The Royal Borough of Kingston upon Thames did not conduct any co-location studies in 2023, so it was not possible to calculate a local adjustment factor. As a result, the national adjustment factor of 0.81 is applied to diffusion tube monitoring results in this report.

Gradko International Ltd is a UKAS-accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. Gradko previously participated in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis Page 38 and the Annual Field Inter Comparison Exercise. In April 2014, a new scheme, AIR PT13, was introduced. This is an independent analytical proficiency-testing (PT) scheme operated by LGC Standards and supported by the Health and

Safety Laboratory (HSL). AIR PT combines two long-running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Laboratory performance in AIR PT is also assessed by the National Physical Laboratory (NPL) alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

Gradko International Ltd.'s performance for 2023 for 100% of samples submitted by Gradko was deemed satisfactory.

The laboratory has also achieved a "good" precision result for 2023. Tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%.

Table M. Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	06/24	0.81
2022	National	06/23	0.84
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.93
2018	National	03/19	0.93
2017	National	03/18	0.89
2016	National	04/17	0.94

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 06/24

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2024
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2023	R	Nottingham City Council	11	30	21	41.8%	G	0.71
Gradko	20% TEA in water	2023	R	Belfast City Council	12	46	35	29.3%	G	0.77
Gradko	20% TEA in water	2023	R	Belfast City Council	12	25	21	18.6%	G	0.84
Gradko	20% TEA in water	2023	R	Belfast City Council	12	37	28	30.2%	G	0.77
Gradko	20% TEA in water	2023		Overall Factor[3] (27 studies)				Use		0.81

A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

In 2023, no air quality monitoring sites (automatic and diffusion tube) in the Royal Borough of Kingston upon Thames required Annualisation.

Distance Adjustment

In 2023, the diffusion tube site 24 (Cromwell Road) was distance adjusted as the NO_2 annual mean concentration was within 10% of the Air Quality Objective. The DEFRA Diffusion Tube Data Processing Tool (October 2021) was used to calculate the distance adjustment.

The monitored concentration was 39.3 µg m^{-3}, the background concentration was 20.5 µg m^{-3}, and the predicted concentration at receptor was calculated to be 36.2 µg m^{-3}. The predicted concentration at receptor was within 10% of the NO_2 annual mean objective. The calculation can be found in Table Q.

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

Site ID	Annualisation Factor	Annualisation Factor	Annualisation Factor	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean (µg m^{-3})	Annualised Annual Mean (µg m^{-3})	Comments
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table O. NO_2 Fall off With Distance Calculations

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted (µg m^{-3})	Background Concentration (µg m^{-3})	Concentration Predicted at Receptor (µg m^{-3})	Comments
24	2.0	4.0	39.3	20.5	36.2	Predicted concentration at Receptor within 10% the AQS objective.

Appendix B Full Monthly Diffusion Tube Results for 2023

Table P. NO_2 2023 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	Annual Mean: Distance Corrected to Nearest Exposure
1	517951	169029	23.0	21.6	14.9	15.3	12.0	11.3	7.7	12.1	11.7	15.7	14.3	10.0	14.1	11.5	-
2	518067	168672	37.1	34.4	28.0	25.3	24.2	20.8	18.3	20.0	25.7	29.0	22.6	19.5	25.4	20.6	-
3	517565	167715	33.3	29.9	22.3	22.1	19.0	15.8	14.0	17.1	19.2	22.0	21.2	16.0	21.0	17.0	-
4	517532	167296	28.1	27.9	19.7	21.1	17.8	16.9	10.0	15.9	14.6	19.4	18.4	11.6	18.4	14.9	-
5	517765	167143	33.8	34.4	24.5	31.1	26.2	25.3	16.6	23.4	23.4	25.0	23.8	15.8	25.3	20.5	-
6	518424	167604	28.7	27.7	20.9	20.9	17.8	18.5	12.2	17.0	17.7	21.7	17.3	13.4	19.5	15.8	-
7	518039	167346	38.6	38.1	28.6	28.0	25.0	24.7	18.5	22.7		26.7	21.0	18.8	26.4	21.4	-
8	518336	166655	35.3	34.6	25.4	23.3	20.4	21.9	16.6	19.7	21.9	23.0	18.7	13.1	22.8	18.5	-
9	518737	165768	27.0	25.9	16.8	16.6	13.2	11.5	9.3	13.1	13.9	17.0	15.4	11.8	16.0	12.9	-
10	519365	166230	36.0	34.9		27.9	24.4	22.1	18.5		22.8	24.4	22.5	20.4	25.4	20.6	-
11	519664	166505	27.9	26.1	17.7	18.3	15.0	15.4	9.9	14.2		19.0	19.1	12.2	17.7	14.3	-
12	519714	165886		20.3	32.5	33.8	30.2	28.1	23.3	26.1	31.5	31.3	21.9		27.9	22.6	-
13	519808	165873	51.7	51.7	42.8	50.2		46.4	35.4	35.8	49.4	46.9	35.6	33.7	43.6	35.3	-
14	519872	165692	38.8	42.2	27.9	38.2	34.0	27.5		30.8	40.2	38.6	29.8	29.2	34.3	27.8	-
15	520192	165264	41.8	40.4	32.5	31.7	25.8	26.8	23.5	24.6	27.8	29.4	24.0	22.5	29.2	23.7	-
16	518087	165096	36.2	35.2	25.3	25.2	23.6	20.7	18.2	21.1	23.4	25.2	20.5	16.1	24.2	19.6	-
17	518026	164785	37.2	34.6	27.1	22.0	20.2	19.1	16.4	19.5	20.3	22.3	20.9	15.0	22.9	18.5	-

18	517991	164532	37.5	37.4	27.9	28.7	25.8	23.0	17.9	22.2	24.1	25.7	22.6	18.2	25.9	21.0	-
19	518155	163395	30.0	28.4	18.2	17.6	14.1	13.7	11.8	15.3	15.5		18.4	18.0	18.3	14.8	-
20	517256	161578	32.1	31.7	23.6	25.0	23.0	20.3	18.5	21.2	23.1	23.2	17.7	18.0	23.1	18.7	-
21	517683	163465	34.5	29.9	24.9	21.6	25.0	20.9	17.6	20.3	20.5	20.7	20.2	15.6	22.7	18.3	-
22	518601	165270	50.5	45.2	31.4	30.9	23.9	23.9	27.2	25.2	29.8	33.0	26.1	27.7	31.2	25.3	-
23	518147	169455	32.8	32.1	22.8	26.3		20.5	12.6	19.2	19.7	25.2	19.6	17.1	22.5	18.3	-
24	518467	169509	67.8	60.2	56.1	53.1	44.0	38.9	44.6	40.6	51.7	44.8	38.4	41.9	48.5	39.3	36.2
25	518533	169348	36.2	36.4	27.4	31.3	23.1	23.7	18.5	21.4	24.4	29.0	25.9	19.2	26.4	21.4	-
26	518199	170056	32.5	30.1	23.5	23.2	18.8	17.2	12.6	17.5	18.5	23.1	21.0	15.3	21.1	17.1	-
27	517800	171423	24.8	20.5	13.6		10.8	10.2	8.4	11.8	12.0	13.7	14.6	11.7	13.8	11.2	-
28	519353	169895	49.3	56.9	37.2	43.5	42.5	31.4	27.8	28.2	36.8	36.9	25.8	26.6	36.9	29.9	-
29	521107	172055	33.7	31.9	25.5	26.0	22.7	21.6	16.5	19.5	22.7	24.4	19.1	17.7	23.4	19.0	-
30	520611	169889	43.4	38.6	30.0	29.1	24.2	24.8	25.8	22.8	28.5	29.3	24.7	31.7	29.4	23.8	-
31	521651	167397	42.3	43.3	30.3	35.6	31.0	26.1	19.6	24.4	26.4	29.1	22.9	21.4	29.4	23.8	-
32	521252	166877	28.5	26.4	17.0	16.9	12.7	10.9	9.5	12.4	14.3	17.3	19.9	11.7	16.5	13.3	-
33	521873	168117	38.7	39.2	28.7	32.1	23.6	25.2	23.8	27.5	26.0	36.4	27.1	26.0	29.5	23.9	-
34	521416	168373	35.5	34.8	26.4	29.7	24.1	21.2	15.0	19.5	23.2	23.1	21.6	17.3	24.3	19.7	-
35	520708	169258	38.1	35.2	23.8	23.6	17.5	16.7	12.2	15.7	16.6	20.1	19.0	16.5	21.3	17.2	-
36	520047	169651	40.8	36.8	24.6	28.6	22.0	21.3	17.7	21.5	23.3	23.0	21.8	19.3	25.1	20.3	-
37	520764	169525	28.1	27.1	17.6	17.7	13.0	12.7	11.1	15.0	16.3	20.4	18.0	15.9	17.7	14.4	-
38	520503	168388	41.7	43.0	32.9	35.8	30.4	27.2	23.7	28.2	33.4	36.1	28.9	26.9	32.4	26.2	-
39	519372	169098	45.0	46.6	36.0	37.1	34.1	28.8	27.5	29.9	37.4	36.4	36.6	28.2	35.3	28.6	-

40	519064	169244	39.9	40.0	31.9	34.9	27.2	25.3	25.2	24.5	31.8	33.5	28.3	28.5	30.9	25.0	-

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation

Appendix C Maps of Monitoring Locations and AQMAs

Figure A. Map of Non-Automatic Monitoring Sites

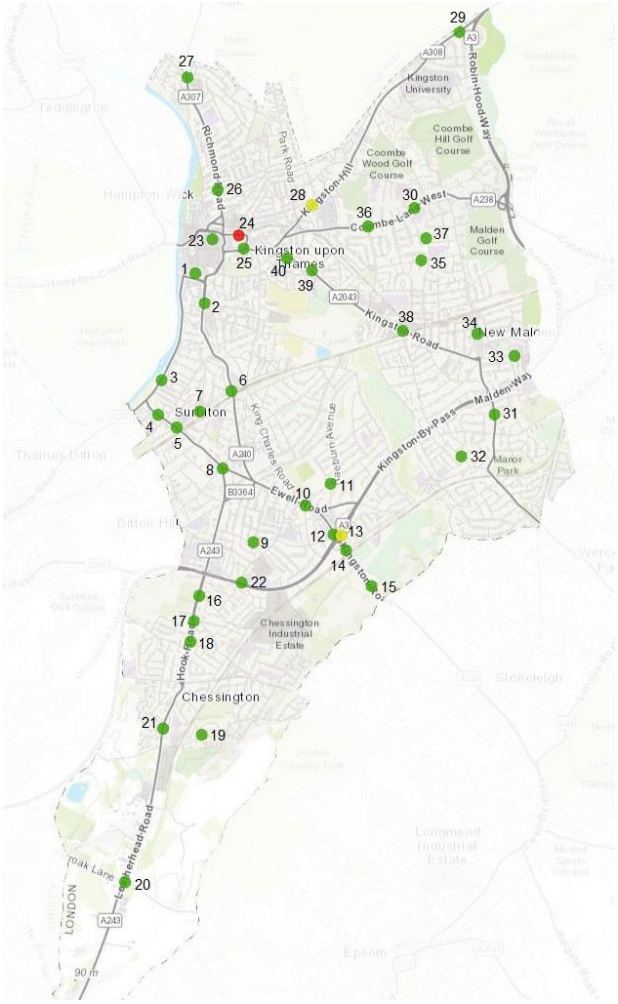

Figure B. Map of Automatic Monitoring Sites