# London Borough of Ealing Air Quality Annual Status Report for 2021

## Date of publication: May 2022

This report provides a detailed overview of air quality in London Borough of Ealing during 2021. It has been produced to meet the requirements of the London Local Air Quality Management (LLAQM) statutory process[1].

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

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## Abbreviations

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

## Table A. Summary of National Air Quality Standards and Objectives

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

**Notes:**

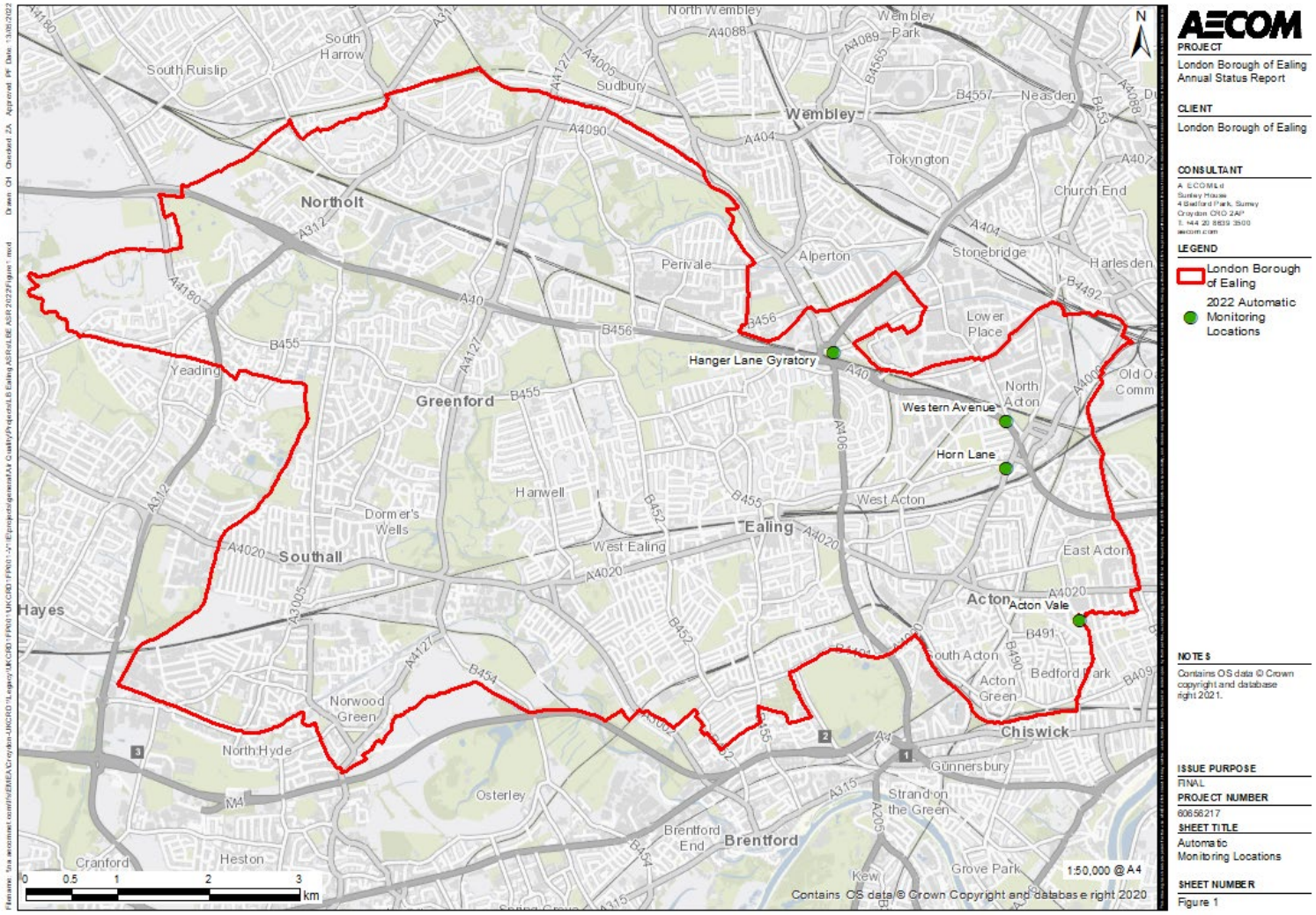
(1) Date by which to be achieved by and maintained thereafter

# 1. Air Quality Monitoring

## 1.1 Locations

In 2021, four automatic monitoring stations were operated in the London Borough of Ealing. The most recent of these to be opened, on 23rd November 2017, was Ealing Acton Vale, which monitors nitrogen dioxide ($NO_2$) and Particulate Matter ($PM_{10}$) and is classified as an urban background site. Of the three remaining monitoring stations, two are roadside sites (Ealing Hanger Lane Gyratory and Ealing Western Avenue) and one is classified as an industrial site (Ealing Horn Lane). All sites are operated as part of the London Air Quality Network. Two different $PM_{10}$ analysers are active at the Horn Lane monitoring station, a TEOM and a TEOM-FDMS. Consistent with the London Air Quality Network classification, data from the two instruments are reported as two separate stations (EA8 Horn Lane and EI8 Horn Lane TEOM). Details of the relevant Quality Assurance/Quality Control (QA/QC) procedures that were followed during the monitoring are provided in Appendix A. Figure 1 and Table B provide details of the automatic monitoring sites located in the Borough. All the currently operational automatic monitoring sites measure $NO_2$ and $PM_{10}$.

## Figure 1. Map of Automatic Monitoring Sites



## Table B. Details of Automatic Monitoring Sites for 2021

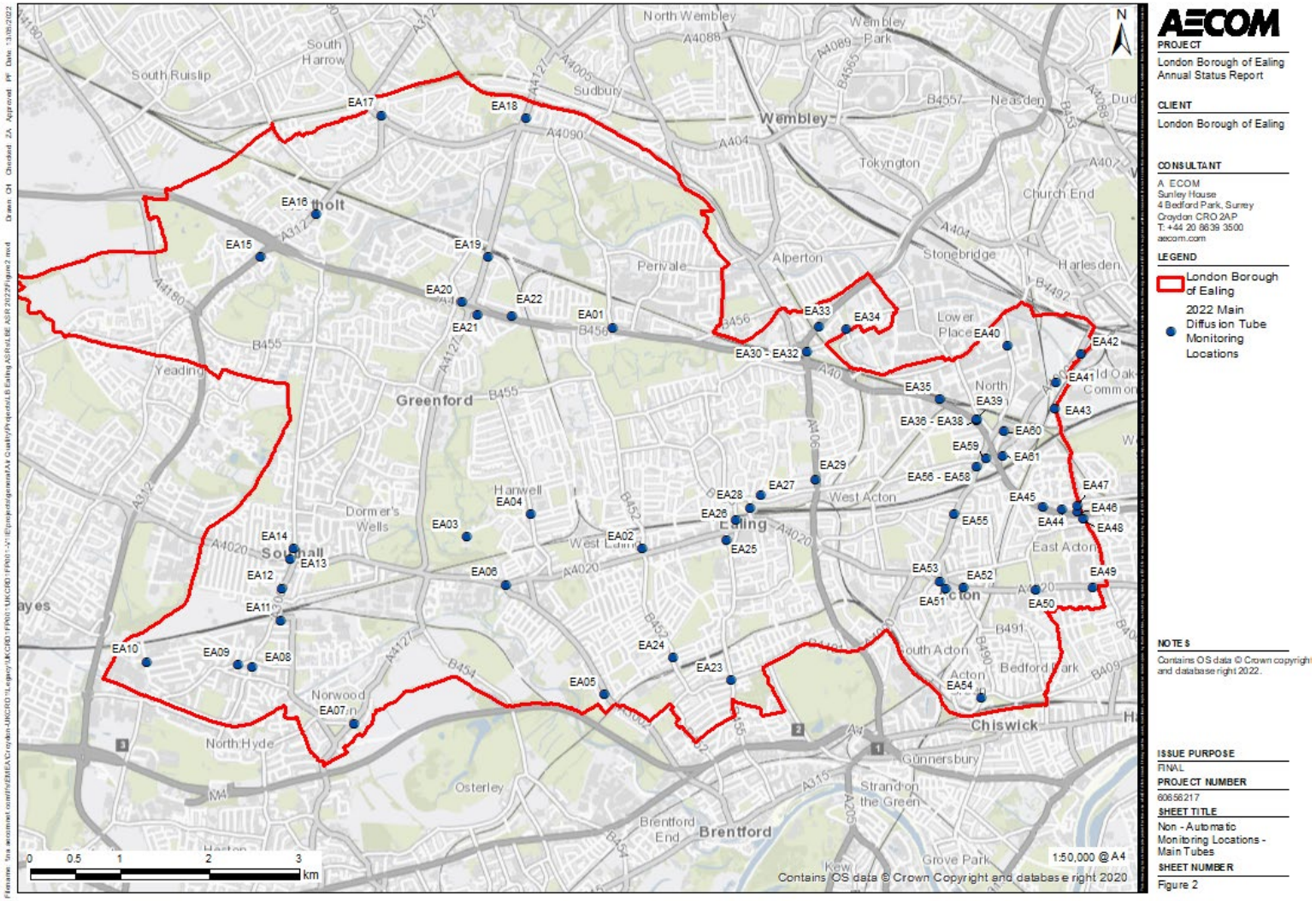
| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? If so, which AQMA? | Distance to Relevant Exposure (m) | Distance to Kerb of Nearest Road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Monitoring technique |
|---|---|---|---|---|---|---|---|---|---|---|
| EA6 Hanger Lane Gyratory | Hanger Lane Gyratory | 518537 | 182708 | Roadside | Y-Ealing | 4 | 3 | 2.0 | $NO_2$, $PM_{10}$ | Chemiluminescence, TEOM |
| EA8 Horn Lane | Horn Lane | 520432 | 181428 | Industrial | Y-Ealing | 8 | 2.5 | 1.8 | $NO_2$, $PM_{10}$ | Chemiluminescence, $PM_{10}$ by FDMS |
| EA8 Horn Lane | Horn Lane | 520432 | 181428 | Industrial | Y-Ealing | 8 | 2.5 | 1.8 | $NO_2$, $PM_{10}$ | TEOM |
| EI1 Western Avenue | Western Avenue | 520430 | 181950 | Roadside | Y-Ealing | 4 | 4 | 2.0 | $NO_2$, $PM_{10}$ | Chemiluminescence, TEOM |
| E13 Acton Vale | Acton Vale | 521134 | 179771 | Urban Background | Y-Ealing | N/A | N/a | 2.55 | $NO_2$, $PM_{10}$ | Chemiluminescence, $PM_{10}$ by FDMS |

During 2021, the London Borough of Ealing monitored annual mean $NO_2$ concentrations using a network of 4 automatic monitors and 61 passive diffusion tubes across 55 locations. There are three triplicate diffusion tube sites, co-located with three automatic air quality monitoring stations. Figure 2 and Table C provide details of the diffusion tube sites operated within the borough during 2021. In recent years, the Council has decommissioned 23 sites to focus on locations of most relevant exposure, by removing sites that had been compliant with the annual mean objective for several years.

Two new temporary diffusion sites located at St Mark's Primary School were added during May 2019 due to concerns expressed by parents about the exposure of their children to pollution from traffic on Lower Boston Road.

The two locations at St Mark's Primary School (NWA1S1 and NWA1S2) only achieved 42.2% data capture in 2021. For some months, the exposure period was outside of the recommended dates in the Defra diffusion tube calendar, i.e. shorter or longer than the recommended 4-5 weeks in LLAQM.TG(19) guidance. However, as the exposure periods were not significantly longer than the recommended period, and due to the overall low data capture, this data was included. Full details of exposure periods are provided in Appendix A.

## Figure 2 Map of Non–Automatic Monitoring Site - Main Tubes



## Table C. Details of Non-Automatic Monitoring Sites for 2021

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? If so, which AQMA? | Distance to Relevant Exposure (m) | Distance to Kerb of Nearest Road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Tube co-located with an automatic monitor. (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| EA01 | 2 Horsenden Lane South, Greenford, UB6 8AB | 516368 | 182978 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA02 | 1 Kirn Road, West Ealing, W13 0UB | 516699 | 180509 | Roadside | Y- Ealing | 0 | 2 | 2 – 2.5 | $NO_2$ | N |
| EA03 | Brent Lodge Park, Church Road, Hanwell, W7 3BP | 514740 | 180643 | Background | Y- Ealing | 0 | 30 | 2 – 2.5 | $NO_2$ | N |
| EA04 | 74a Greenford Avenue, Hanwell, W7 3QS | 515451 | 180894 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA05 | 6 Boston Gardens, Boston Road, Hanwell, W7 2AN | 516277 | 178882 | Roadside | Y- Ealing | 0 | 10 | 2 – 2.5 | $NO_2$ | N |
| EA06 | 200 Uxbridge Road, Hanwell, W7 3TB | 515180 | 180111 | Roadside | Y- Ealing | 0 | 3.3 | 2 – 2.5 | $NO_2$ | N |
| EA07 | 2 St Marys Avenue South, Southall, UB2 4LS | 513476 | 178561 | Roadside | Y- Ealing | 0 | 12 | 2 – 2.5 | $NO_2$ | N |
| EA08 | 55 King Street, Southall, UB2 4DQ | 512341 | 179186 | Roadside | Y- Ealing | 0 | 3.3 | 2 – 2.5 | $NO_2$ | N |
| EA09 | 18 Western Road, Southall, UB2 5DU | 512181 | 179219 | Roadside | Y- Ealing | 0 | 7.5 | 2 – 2.5 | $NO_2$ | N |
| EA10 | 150 Brent Road, Southall, UB2 5LD | 511170 | 179251 | Roadside | Y- Ealing | 0 | 7.7 | 2 – 2.5 | $NO_2$ | N |
| EA11 | 2 Merrick Road, Southall, UB2 4AU | 512657 | 179712 | Roadside | Y- Ealing | 0 | 12 | 2 – 2.5 | $NO_2$ | N |
| EA12 | Hambrough Primary, School, South Road, Southall, UB1 1SF | 512673 | 180069 | Roadside | Y- Ealing | 0 | 10 | 2 – 2.5 | $NO_2$ | N |
| EA13 | 11 The Broadway, Southall, UB1 3PX | 512768 | 180400 | Roadside | Y- Ealing | 0 | 4 | 2 – 2.5 | $NO_2$ | N |

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? If so, which AQMA? | Distance to Relevant Exposure (m) | Distance to Kerb of Nearest Road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Tube co-located with an automatic monitor. (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| EA14 | 25 Lady Margaret Road, Southall, UB1 2RA | 512812 | 180516 | Roadside | Y- Ealing | 0 | 6.3 | 2 – 2.5 | $NO_2$ | N |
| EA15 | 213 Church Road, Northolt, UB5 5BE | 512442 | 183769 | Roadside | Y- Ealing | 0 | 12.4 | 2 – 2.5 | $NO_2$ | N |
| EA16 | 31 Mandeville Road, Northolt, UB5 5HF | 513056 | 184241 | Roadside | Y- Ealing | 0 | 9 | 2 – 2.5 | $NO_2$ | N |
| EA17 | 126 Petts Hill, Northolt, UB5 4NW | 513794 | 185348 | Roadside | Y- Ealing | 0 | 9 | 2 – 2.5 | $NO_2$ | N |
| EA18 | 1504 Greenford Road, Greenford, UB6 0HR | 515402 | 185313 | Roadside | Y- Ealing | 0 | 5.3 | 2 – 2.5 | $NO_2$ | N |
| EA19 | 914 Greenford Road, Greenford, UB6 8QN | 514985 | 183770 | Roadside | Y- Ealing | 0 | 3.3 | 2 – 2.5 | $NO_2$ | N |
| EA20 | 6 Karoline Gardens, Greenford, UB6 9JP | 514691 | 183269 | Roadside | Y- Ealing | 0 | 9.1 | 2 – 2.5 | $NO_2$ | N |
| EA21 | 12 Blenheim Close, Greenford, UB6 8ET | 514863 | 183122 | Roadside | Y- Ealing | 0 | 9.5 | 2 – 2.5 | $NO_2$ | N |
| EA22 | 19 Runnymede Gardens, Greenford, UB6 8SX | 515240 | 183102 | Roadside | Y- Ealing | 0 | 1.2 | 2 – 2.5 | $NO_2$ | N |
| EA23 | 158 South Ealing Road, Ealing, W5 4QL | 517694 | 179045 | Roadside | Y- Ealing | 0 | 3.5 | 2 – 2.5 | $NO_2$ | N |
| EA24 | 213 Northfields Ave, West Ealing, W13 9QU | 517045 | 179292 | Roadside | Y- Ealing | 0 | 5.2 | 2 – 2.5 | $NO_2$ | N |
| EA25 | 12 Bond Street, Ealing W5 5AP | 517644 | 180613 | Roadside | Y- Ealing | 0 | 2.7 | 2 – 2.5 | $NO_2$ | N |
| EA26 | 8 Spring Bridge Road, Ealing, W5 2AA | 517745 | 180826 | Roadside | Y- Ealing | 0 | 3 | 2 – 2.5 | $NO_2$ | N |
| EA27 | 21 Haven Lane, Ealing, W5 2HZ | 518022 | 181114 | Roadside | Y- Ealing | 0 | 2.4 | 2 – 2.5 | $NO_2$ | N |

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? If so, which AQMA? | Distance to Relevant Exposure (m) | Distance to Kerb of Nearest Road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Tube co-located with an automatic monitor. (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| EA28 | 41-42 Haven Green, Ealing, W5 2NX | 517909 | 180971 | Roadside | Y- Ealing | 0 | 3 | 2 – 2.5 | $NO_2$ | N |
| EA29 | 64 Hanger Lane, Ealing, W5 2JH | 518635 | 181288 | Roadside | Y- Ealing | 0 | 0.7 | 2 – 2.5 | $NO_2$ | N |
| EA30, EA31,EA32 | Fernlea House, Hanger Lane, Ealing, W5 1EF, (AQMS) (Tri) | 518541 | 182707 | Roadside | Y- Ealing | 0 | 4 | 2 – 2.5 | $NO_2$ | Y |
| EA33 | 25 Waverley Gardens, Park Royal, NW10 7EX | 518673 | 182982 | Roadside | Y- Ealing | 0 | 1.8 | 2 – 2.5 | $NO_2$ | N |
| EA34 | 3 Iveagh Terrace, Park Royal, NW10 7SY | 518976 | 182963 | Roadside | Y- Ealing | 0 | 33 | 2 – 2.5 | $NO_2$ | N |
| EA35 | Wendover Court, Western Avenue, Acton,W3 0TG | 520020 | 182180 | Roadside | Y- Ealing | 0 | 11 | 2 – 2.5 | $NO_2$ | N |
| EA36,EA37, EA38 | 322 & 324 Western Avenue, Acton, W3 OPL, (AQMS) (Tri) | 520430 | 181950 | Roadside | Y- Ealing | 3.5 | 5 | 2 – 2.5 | $NO_2$ | Y |
| EA39 | 326 Western Avenue, Acton, W3 0PL | 520426 | 181958 | Roadside | Y- Ealing | 0 | 11.4 | 2 – 2.5 | $NO_2$ | N |
| EA40 | 94 North Acton Road, Park Royal, NW10 7AY | 520780 | 182775 | Roadside | Y- Ealing | 0 | 6 | 2 – 2.5 | $NO_2$ | N |
| EA41 | 1 Shaftesbury Gardens, Park Royal, NW10 6LJ | 521312 | 182366 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA42 | 39 Old Oak Lane, Park Royal, NW10 6EJ | 521587 | 182685 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA43 | 165 Wells House Road, Park Royal, NW10 6EA | 521301 | 182076 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA44 | 4 St Andrews Road, Acton, W3 7NE | 521389 | 180953 | Roadside | Y- Ealing | 0 | 8.6 | 2 – 2.5 | $NO_2$ | N |

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? If so, which AQMA? | Distance to Relevant Exposure (m) | Distance to Kerb of Nearest Road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Tube co-located with an automatic monitor. (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| EA45 | 98 Western Avenue, Acton, W3 7TZ | 521173 | 180981 | Roadside | Y- Ealing | 0 | 10 | 2 – 2.5 | $NO_2$ | N |
| EA46 | 6 Western Avenue, Acton, W3 7UD | 521549 | 180923 | Roadside | Y- Ealing | 0 | 4.6 | 2 – 2.5 | $NO_2$ | N |
| EA47 | 71 Old Oak Common Lane (PO), Acton,W37DD | 521557 | 180996 | Roadside | Y- Ealing | 0 | 11 | 2 – 2.5 | $NO_2$ | N |
| EA48 | 205 Old Oak Road, Acton, W3 7HH | 521614 | 180852 | Roadside | Y- Ealing | 0 | 4.7 | 2 – 2.5 | $NO_2$ | N |
| EA49 | 17 The Vale, Acton, W3 7SH | 521720 | 180084 | Roadside | Y- Ealing | 0 | 19.4 | 2 – 2.5 | $NO_2$ | N |
| EA50 | Warple Way, Acton, W3 0RH | 521088 | 180046 | Roadside | Y- Ealing | 0 | 2.2 | 2 – 2.5 | $NO_2$ | N |
| EA51 | 88 High Street, Acton, W3 6QX | 520285 | 180075 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA52 | 15a Church Road, Acton, W3 8QE | 520092 | 180063 | Roadside | Y- Ealing | 0 | 10 | 2 – 2.5 | $NO_2$ | N |
| EA53 | 182 High Street, Acton, W3 9NN | 520026 | 180141 | Roadside | Y- Ealing | 0 | 4 | 2 – 2.5 | $NO_2$ | N |
| EA54 | 44 Acton Lane, Chiswick, W4 5ED | 520484 | 178847 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| EA55 | 156 Horn Lane, Acton, W3 6PH | 520180 | 180896 | Roadside | Y- Ealing | 0 | 6 | 2 – 2.5 | $NO_2$ | N |
| EA56, EA57,EA58 | 317 Horn Lane, Acton, W3 0BU (AQMS) (Tri) | 520432 | 181428 | Roadside | Y- Ealing | 10 | 3 | 2 – 2.5 | $NO_2$ | Y |
| EA59 | 5 Leamington Park, Acton, W3 6TJ | 520532 | 181517 | Roadside | Y- Ealing | 0 | 11 | 2 – 2.5 | $NO_2$ | N |
| EA60 | Lyra Court, Portal Way, Acton, W3 6DB | 520739 | 181824 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? If so, which AQMA? | Distance to Relevant Exposure (m) | Distance to Kerb of Nearest Road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Tube co-located with an automatic monitor. (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| EA61 | 36 Wales Farm Road, Acton, W3 6UE | 520724 | 181552 | Roadside | Y- Ealing | 0 | 5 | 2 – 2.5 | $NO_2$ | N |
| NWA1 S1 | St Mark's Primary School, Fit for sport | 515231 | 179900 | Background | Y- Ealing | 0 | N/A | 2-2.5 | $NO_2$ | N |
| NWA1 S2 | St Mark's Primary School, o/s Early Years Building | 515210 | 179901 | Background | Y- Ealing | 0 | N/A | 2-2.5 | $NO_2$ | N |

## 1.2 Comparison of Monitoring Results with AQOs

The results presented are after adjustments for “annualisation” and for distance to a location of relevant public exposure (if required), the details of which are described in Appendix A.

The annual mean $NO_2$ concentration results from automatic monitoring stations and diffusion tube monitoring locations since 2015 are presented in Table D.

Data capture was good at Hanger Lane Gyratory, Horn Lane and Western Avenue (EA6, EA8, EI1) automatic monitors in 2021, with all three achieving a data capture rate above 95%. Data capture at Acton Vale (EI3) was 69% and thus the results required annualisation. Data capture at most diffusion tubes sites was good in 2021, with at least 9 months of valid data (i.e. 75% data capture or greater).

There have been exceedances of the $NO_2$ annual mean objective of 40 µg $m^{-3}$ observed at automatic Hanger Lane Gyratory monitoring station since 2014, a trend which continued into 2021 (49.4 µg $m^3$). Both Horn Lane and Western Avenue remained below the objective for the second year in a row. The $NO_2$ annual mean was 21.0 µg $m^{-3}$ at Acton Vale monitoring station. None of the automatic sites exceeded the 1 hour mean $NO_2$ objective (200 µg $m^{-3}$ not to be exceeded more than 18 times a year) in 2021.

Amongst the diffusion tubes, there were four exceedances of the $NO_2$ annual mean objective in 2021 (at sites EA26, EA30-32, EA33, EA46). As there were no diffusion tube locations which saw annual mean concentrations above 60 µg $m^{-3}$ in 2021, it is unlikely that the 1 hour mean $NO_2$ objective was exceeded, with the maximum $NO_2$ concentration recorded at diffusion tube sites in 2021 being 50.3 µg $m^{-3}$ at triplicate site EA30-32 at Fernlea House, Hanger Lane. This location has historically seen high concentrations in excess of 70 µg $m^{-3}$, but has shown a decreasing trend since 2015. It is likely that lower concentrations noted in 2020 versus 2021 were impacted by the COVID-19 pandemic.

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

| Site ID | Site type | Valid data capture for monitoring period %[(a)] | Valid data capture 2021 %[(b)] | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| EA6 Hanger Lane Gyratory | Automatic | 99.5 | 99.5 | **85.0** | **76.0** | **72.3** | **67.9** | **64.5** | **51.0** | **49.4** |
| EA8 Horn Lane | Automatic | 99.5 | 99.5 | **48.0** | **48.0** | **44.2** | **43.9** | **41.8** | 33.2 | 32.0 |
| EI1 Western Avenue | Automatic | 99.6 | 99.6 | **60.3** | **60.1** | **51.2** | **47.7** | **48.6** | 35.2 | 35.9 |
| EI3 Acton Vale | Automatic | 68.8 | 68.8 | - | - | - | 29.0 | 26.5 | 19.7 | 21.0 |
| EA01 | Diffusion Tube | 92.3 | 92.3 | **64.3** | **61.0** | **54.0** | **49.4** | **50.3** | 36.1 | 34.6 |
| EA02 | Diffusion Tube | 90.4 | 90.4 | **50.1** | **47.9** | **40.1** | **42.0** | 38.7 | 27.7 | 29.8 |
| EA03 | Diffusion Tube | 100.0 | 100.0 | 24.7 | 23.8 | 20.2 | 21.0 | 20.5 | 15.2 | 14.9 |
| EA04 | Diffusion Tube | 100.0 | 100.0 | 36.4 | 36.2 | 32.4 | 30.1 | 34.4 | 24.4 | 25.9 |
| EA05 | Diffusion Tube | 100.0 | 100.0 | 33.5 | 34.2 | 29.7 | 30.7 | 29.8 | 21.2 | 21.1 |
| EA06 | Diffusion Tube | 90.4 | 90.4 | **49.5** | **49.8** | **42.8** | **42.8** | **43.0** | 33.5 | 33.5 |
| EA07 | Diffusion Tube | 100.0 | 100.0 | 25.6 | 31.9 | 29.4 | 30.5 | 28.9 | 21.0 | 22.0 |
| EA08 | Diffusion Tube | 90.4 | 90.4 | **48.6** | **48.9** | **50.6** | **41.1** | **40.5** | 27.0 | 29.4 |
| EA09 | Diffusion Tube | 100.0 | 100.0 | 36.7 | 36.6 | 31.9 | 30.9 | 31.5 | 22.4 | 22.9 |
| EA10 | Diffusion Tube | 100.0 | 100.0 | **40.3** | 38.5 | 34.6 | 35.0 | 33.2 | 23.4 | 24.3 |
| EA11 | Diffusion Tube | 100.0 | 100.0 | 31.9 | 33.4 | 28.6 | 28.6 | 27.5 | 17.6 | 20.8 |

| Site ID | Site type | Valid data capture for monitoring period %[a] | Valid data capture 2021 %[b] | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| EA12 | Diffusion Tube | 100.0 | 100.0 | 37.1 | 39.3 | 31.4 | 34.4 | 32.5 | 24.0 | 22.6 |
| EA13 | Diffusion Tube | 100.0 | 100.0 | **53.5** | **52.7** | **45.1** | **46.0** | **44.3** | 35.2 | 32.9 |
| EA14 | Diffusion Tube | 100.0 | 100.0 | - | **48.0** | **44.1** | **40.2** | **41.2** | 29.6 | 31.6 |
| EA15 | Diffusion Tube | 100.0 | 100.0 | **42.5** | **42.5** | 36.2 | 37.2 | 35.2 | 24.3 | 27.3 |
| EA16 | Diffusion Tube | 100.0 | 100.0 | **42.5** | **40.0** | 37.1 | 33.9 | 34.6 | 28.3 | 25.9 |
| EA17 | Diffusion Tube | 100.0 | 100.0 | 37.5 | 37.3 | 33.4 | 33.4 | 32.8 | 24.8 | 23.6 |
| EA18 | Diffusion Tube | 100.0 | 100.0 | 34.5 | 33.9 | 31.5 | 31.8 | 31.7 | 24.1 | 25.3 |
| EA19 | Diffusion Tube | 92.3 | 92.3 | **40.6** | 39.3 | 34.7 | 35.0 | 34.3 | 24.4 | 26.7 |
| EA20 | Diffusion Tube | 100.0 | 100.0 | **48.8** | **42.2** | **41.0** | **41.6** | 39.1 | 28.7 | 27.9 |
| EA21 | Diffusion Tube | 92.3 | 92.3 | 39.4 | 39.0 | 34.2 | 34.4 | 30.0 | 20.2 | 22.6 |
| EA22 | Diffusion Tube | 100.0 | 100.0 | **41.9** | 39.1 | 37.9 | 33.1 | 33.1 | 24.6 | 23.5 |
| EA23 | Diffusion Tube | 100.0 | 100.0 | **62.4** | **62.1** | **53.5** | **50.6** | **52.0** | 35.2 | 31.4 |
| EA24 | Diffusion Tube | 100.0 | 100.0 | 35.4 | 36.6 | 36.1 | 33.5 | 32.7 | 24.3 | 25.6 |
| EA25 | Diffusion Tube | 100.0 | 100.0 | **49.0** | **48.6** | **44.3** | **52.5** | **42.2** | 30.9 | 30.7 |
| EA26 | Diffusion Tube | 100.0 | 100.0 | **62.3** | **61.9** | **54.4** | **60.4** | **56.2** | **42.5** | **44.3** |
| EA27 | Diffusion Tube | 100.0 | 100.0 | 35.2 | 35.4 | 31.2 | 31.2 | 30.2 | 22.6 | 22.5 |

| Site ID | Site type | Valid data capture for monitoring period %[a] | Valid data capture 2021 %[b] | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| EA28 | Diffusion Tube | 100.0 | 100.0 | **49.4** | **48.0** | **39.8** | **42.3** | **42.1** | 33.3 | 36.8 |
| EA29 | Diffusion Tube | 100.0 | 100.0 | 38.4 | 39.5 | 35.6 | 36.4 | 35.1 | 27.1 | 25.6 |
| EA30, EA31,EA32 | Diffusion Tube | 92.3 | 92.3 | **79.7** | **73.2** | **71.9** | **69.4** | **66.2** | **50.2** | **50.3** |
| EA33 | Diffusion Tube | 100.0 | 100.0 | **52.6** | **49.8** | **43.3** | **54.5** | **56.0** | **44.5** | **40.3** |
| EA34 | Diffusion Tube | 92.3 | 92.3 | **41.1** | 39.6 | 34.6 | 35.2 | 33.9 | 28.1 | 25.1 |
| EA35 | Diffusion Tube | 100.0 | 100.0 | **56.4** | **55.7** | **47.3** | **49.7** | **46.6** | 35.7 | 33.7 |
| EA36,EA37,EA38 | Diffusion Tube | 100.0 | 100.0 | **68.9** | **60.2** | **56.0** | **54.4** | **49.4** | 36.5 | 35.8 |
| EA39 | Diffusion Tube | 100.0 | 100.0 | **58.1** | **52.1** | **45.0** | **48.3** | **41.4** | 31.2 | 28.4 |
| EA40 | Diffusion Tube | 100.0 | 100.0 | 38 | 38.1 | 33.4 | 33.1 | 30.6 | 22.0 | 25.9 |
| EA41 | Diffusion Tube | 100.0 | 100.0 | **40.2** | 37.7 | 32.6 | 32.6 | 30.0 | 25.2 | 24.2 |
| EA42 | Diffusion Tube | 100.0 | 100.0 | **54.4** | **49.6** | **45.3** | **44.4** | **45.9** | 32.0 | 35.4 |
| EA43 | Diffusion Tube | 100.0 | 100.0 | **45.7** | **40.5** | 36.9 | 36.6 | 33.2 | 24.9 | 24.4 |
| EA44 | Diffusion Tube | 100.0 | 100.0 | **40.0** | 38.1 | 34.7 | 32 | 31.4 | 22.6 | 21.0 |
| EA45 | Diffusion Tube | 100.0 | 100.0 | **49.8** | **49.9** | **43.9** | **46.7** | 39.6 | 29.3 | 29.4 |
| EA46 | Diffusion Tube | 100.0 | 100.0 | **82.5** | **75.3** | **67.9** | **67.6** | **59.6** | **46.1** | **45.3** |
| EA47 | Diffusion Tube | 100.0 | 100.0 | **49.4** | **49.2** | **43.7** | **43.0** | **41.4** | 32.9 | 30.5 |

| Site ID | Site type | Valid data capture for monitoring period %[a] | Valid data capture 2021 %[b] | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| EA48 | Diffusion Tube | 100.0 | 100.0 | **60.7** | **58.9** | **50.9** | **52.6** | **47.1** | 37.8 | 36.4 |
| EA49 | Diffusion Tube | 92.3 | 92.3 | **41.4** | **40.9** | 34.6 | 37.5 | 35.3 | 26.7 | 25.4 |
| EA50 | Diffusion Tube | 100.0 | 100.0 | 38.2 | 39.4 | 32.6 | 36.2 | 34.3 | 25.7 | 24.3 |
| EA51 | Diffusion Tube | 100.0 | 100.0 | **55.5** | **56.0** | **49.0** | **48.1** | **48.8** | 39.0 | 39.4 |
| EA52 | Diffusion Tube | 100.0 | 100.0 | 33.7 | 35.1 | 28.6 | 29.6 | 27.5 | 22.5 | 22.2 |
| EA53 | Diffusion Tube | 100.0 | 100.0 | **55.8** | **54.7** | **44.4** | **47.7** | **47.5** | 36.2 | 34.5 |
| EA54 | Diffusion Tube | 100.0 | 100.0 | **41.1** | 37.8 | 37.6 | **44.3** | 39.3 | 28.2 | 28.9 |
| EA55 | Diffusion Tube | 100.0 | 100.0 | **42.2** | **43.1** | 36.5 | **40.5** | 34.9 | 27.6 | 28.2 |
| EA56,EA57,EA58 | Diffusion Tube | 100.0 | 100.0 | **52** | **50.8** | **44.1** | **44.3** | **41.2** | 31.3 | 31.1 |
| EA59 | Diffusion Tube | 100.0 | 100.0 | **43.7** | **43.7** | 36.4 | 38.4 | 34.1 | 26.6 | 26.0 |
| EA60 | Diffusion Tube | 100.0 | 100.0 | **47.8** | **47.5** | **40.0** | 39.2 | 39.8 | 29.7 | 26.5 |
| EA61 | Diffusion Tube | 100.0 | 100.0 | **45.6** | **43.9** | 38.9 | 37.6 | 37.1 | 28.6 | 26.3 |

**Notes:**

The annual mean concentrations are presented as µg/m$^3$.

Exceedances of the $NO_2$ annual mean AQO of 40 µg/m$^3$ are shown in **bold**.

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

Means for diffusion tubes have been corrected for bias.

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

Results have been distance corrected where applicable.

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

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

The two new temporary background sites at St Mark's Primary School show a decrease between 2019 and 2020, and an increase between 2020 and 2021. Concentrations at the background sites have continually been within the annual mean objective of 40 µg $m^3$, suggesting that background concentrations are not the cause of exceedances at other locations. As these sites are additional to the core of the monitoring network, these are presented in the additional Table D.B below.

**Table D.B Annual Mean $NO_2$ Ratified and Bias-adjusted Monitoring Results – St Marks School**

| Site ID | Site type | Valid data capture for monitoring period %[(a)] | Valid data capture 2021 %[(b)] | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| NWA1 S1 | St Mark's Primary School, Fit for sport | 48.7 | 48.7 | - | - | - | - | 23.8 | 14.3 | 23.4 |
| NWA1 S2 | St Mark's Primary School, o/s Early Years Building | 48.7 | 48.7 | - | - | - | - | 24.5 | 9.4 | 20.7 |

**Notes:**

The annual mean concentrations are presented as µg/$m^3$.

Exceedances of the $NO_2$ annual mean AQO of 40 µg/$m^3$ are shown in **bold**.

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

Means for diffusion tubes have been corrected for bias.

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

Results have been distance corrected where applicable.

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

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

Figure 3 shows the trends in $NO_2$ concentrations at automatic monitoring sites in the borough for the 2015 – 2021 period, whilst Figure 4 to Figure 10 show the trends in $NO_2$ concentrations for the same period at diffusion tube monitoring sites grouped by monitoring site type: urban background and roadside sites. At automatic monitoring sites (Figure 3), a decreasing trend in $NO_2$ concentrations can be seen since 2015, albeit with some natural variations. Since 2020, the decreasing trend has largely levelled out. At the urban background diffusion tube site Brent Lodge Park (EA3) (Figure 4), there is evidence of a slight decrease in $NO_2$ concentrations between 2015 and 2021. The majority of near-road and roadside sites show an overall decreasing trend in concentrations, with a stabilisation between 2017 and 2019 and a stabilisation or slight increase between 2020 and 2021. Figure 11 shows $NO_2$ concentrations at the two sites at St Mark's Primary School. The majority of monitoring locations show a decrease in $NO_2$ concentrations between 2019 and 2020. However, between 2020 and 2021 in some instances the trend stabilizes or an increase in concentrations can be seen. The decrease in 2020 is likely to be the impact of COVID-19 and resulting lockdowns leading to a decrease in road traffic emissions.

**Figure 3 Annual Mean $NO_2$ Concentrations at Automatic Monitoring Sites**

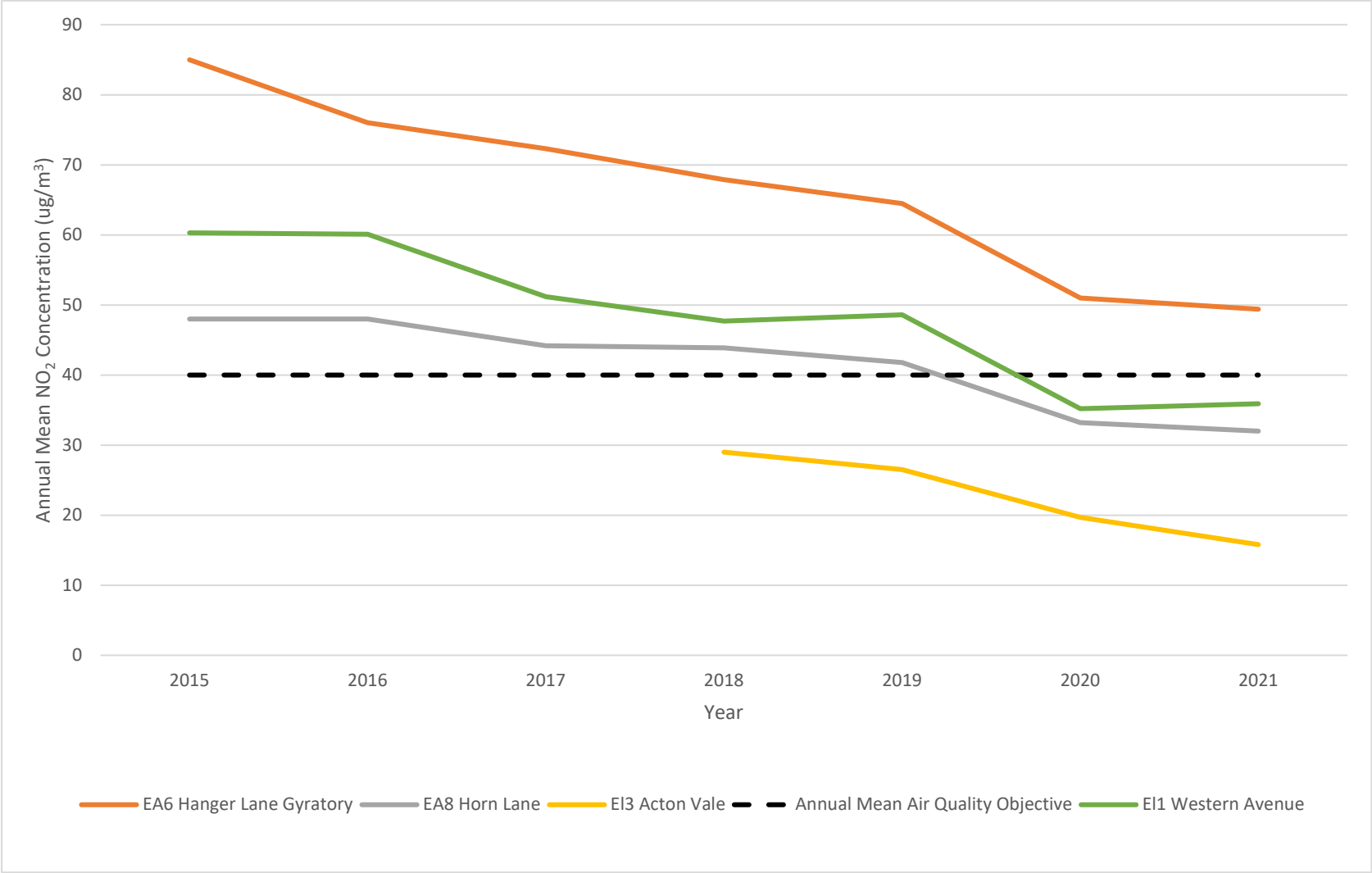


**Figure 4. Annual Mean $NO_2$ Concentrations at Urban Background Sites**

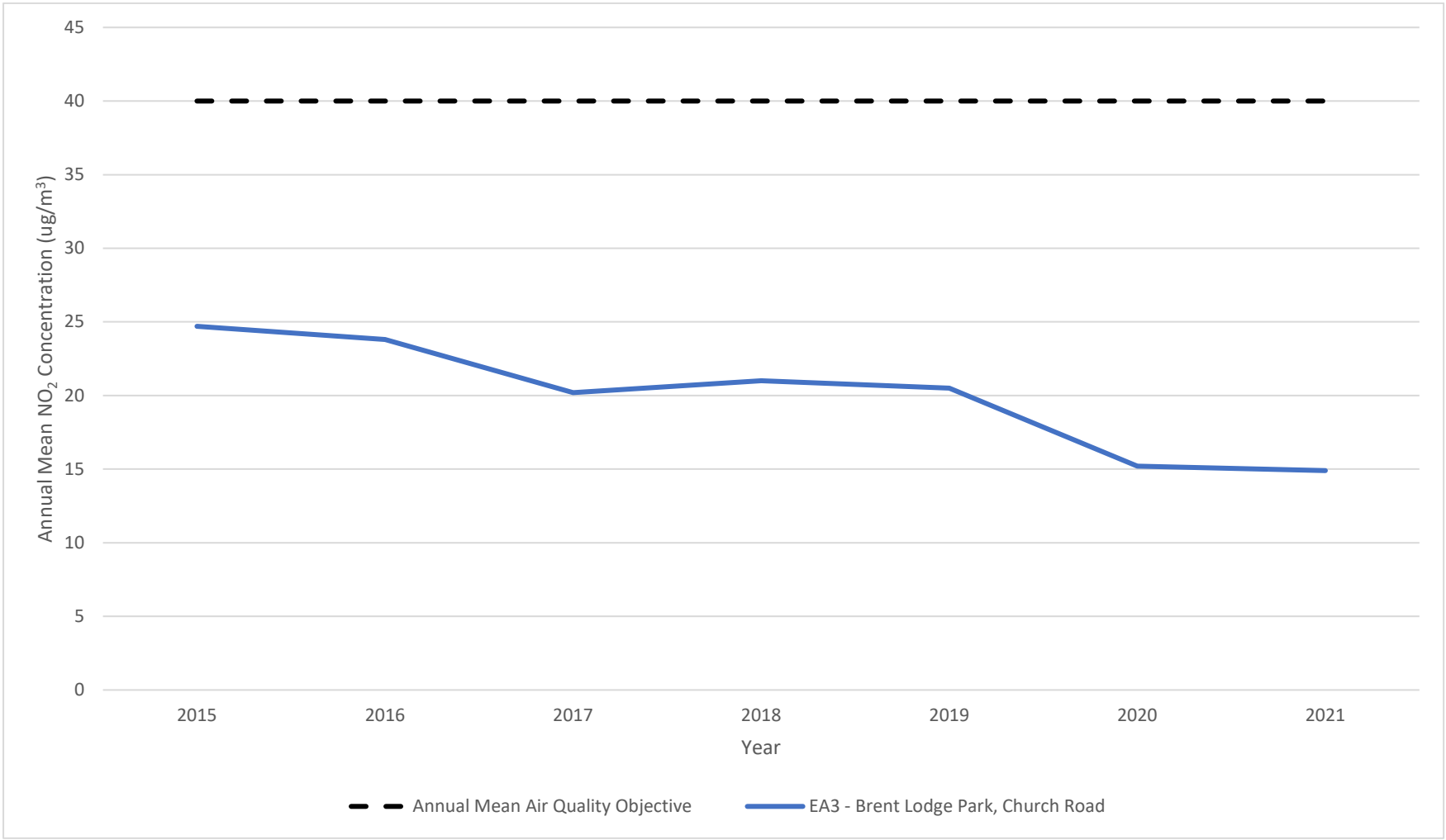


**Figure 5. Annual Mean $NO_2$ Concentrations at Roadside Sites (1)**

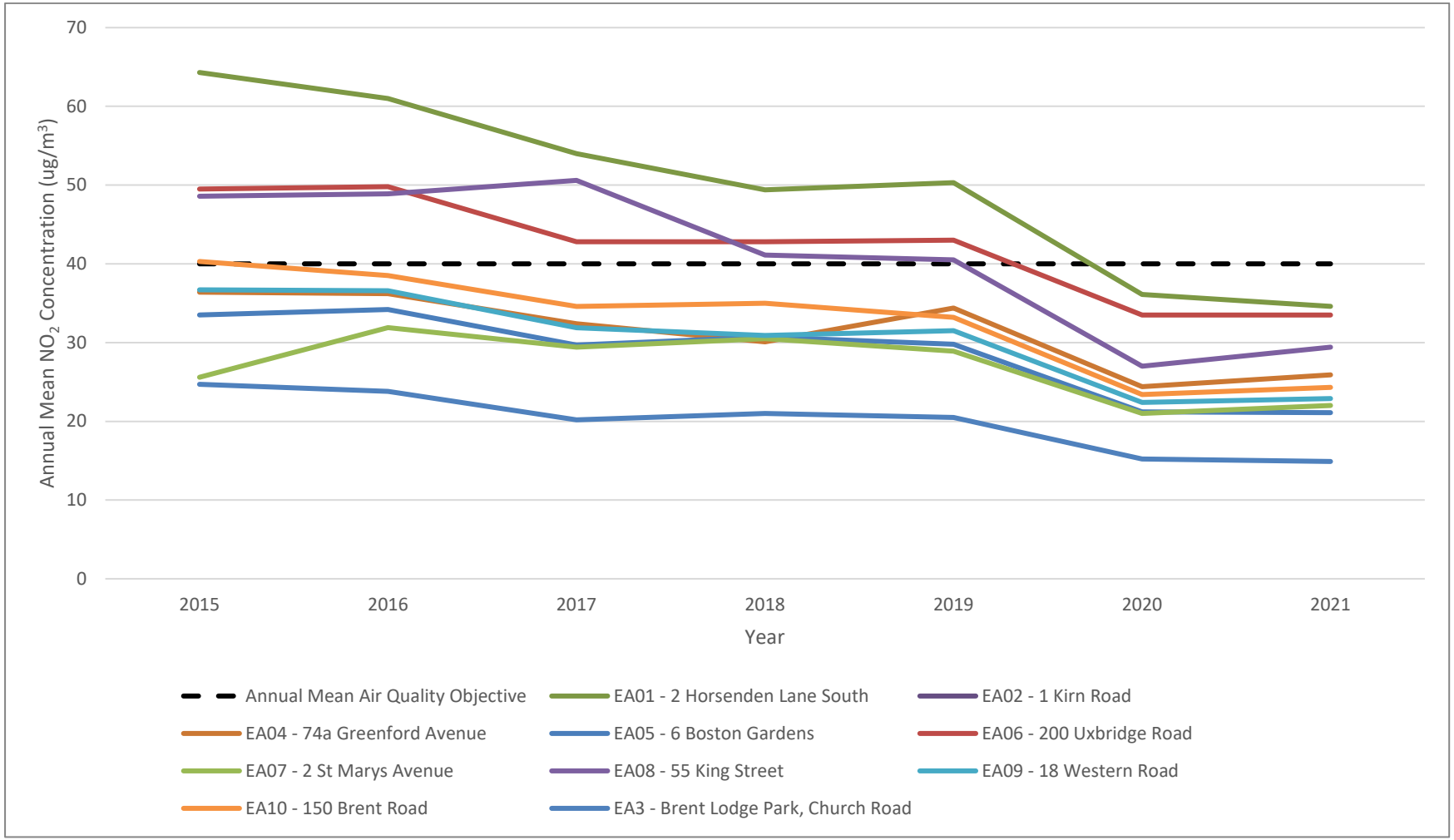


**Figure 6. Annual Mean $NO_2$ Concentrations at Roadside Sites (2)**

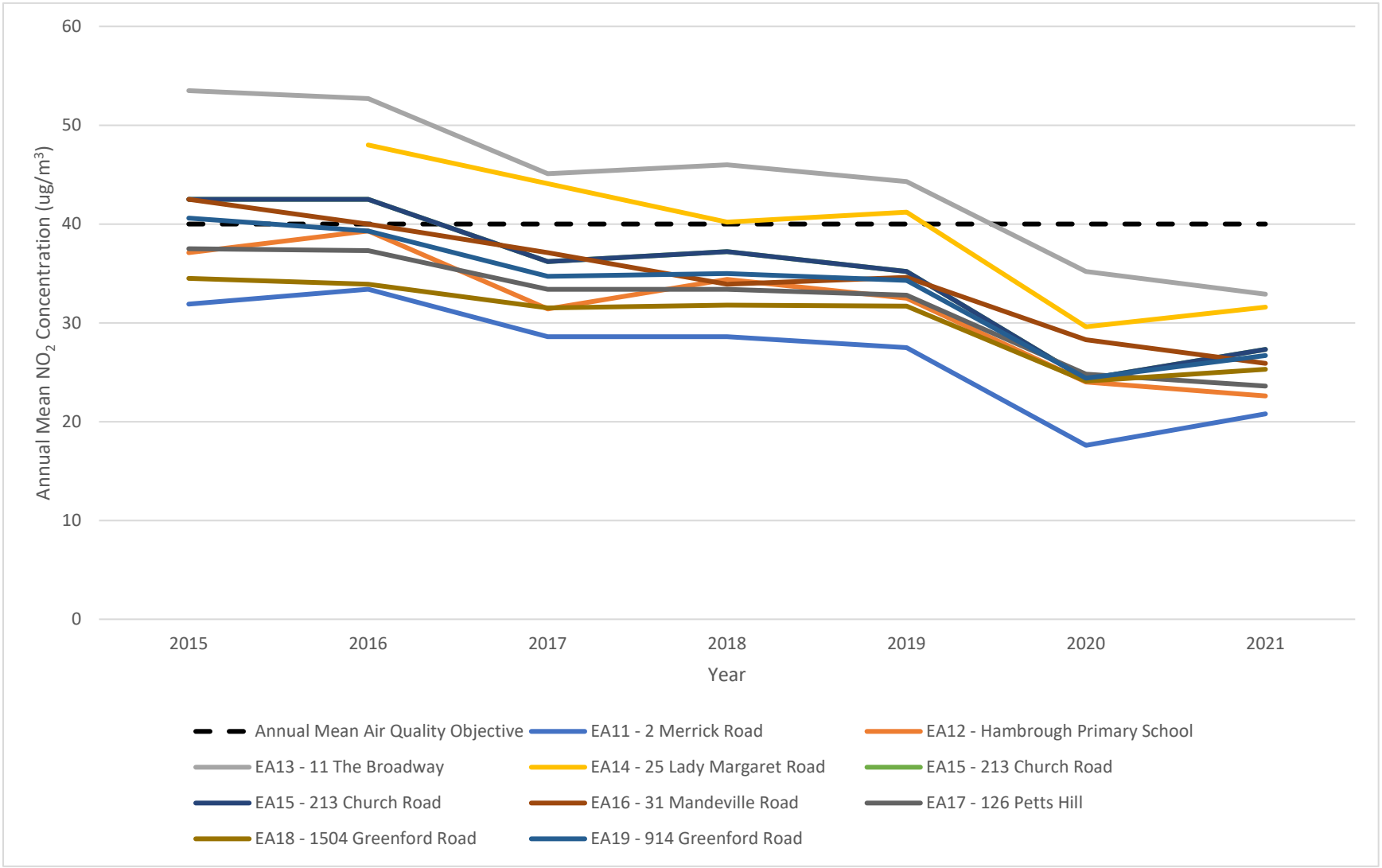


**Figure 7. Annual Mean $NO_2$ Concentrations at Roadside Sites (3)**

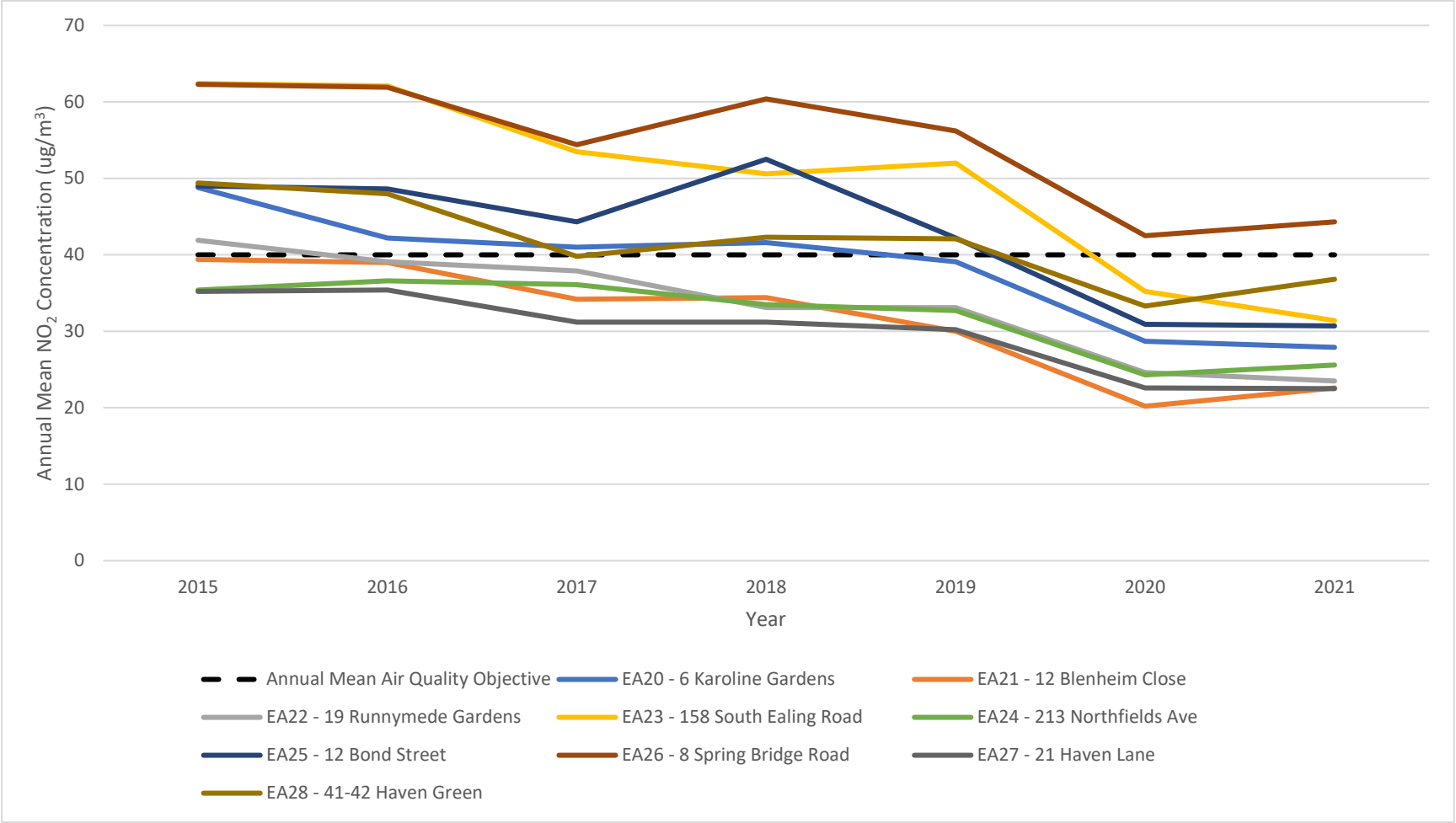


**Figure 8. Annual Mean $NO_2$ Concentrations at Roadside Sites (4)**

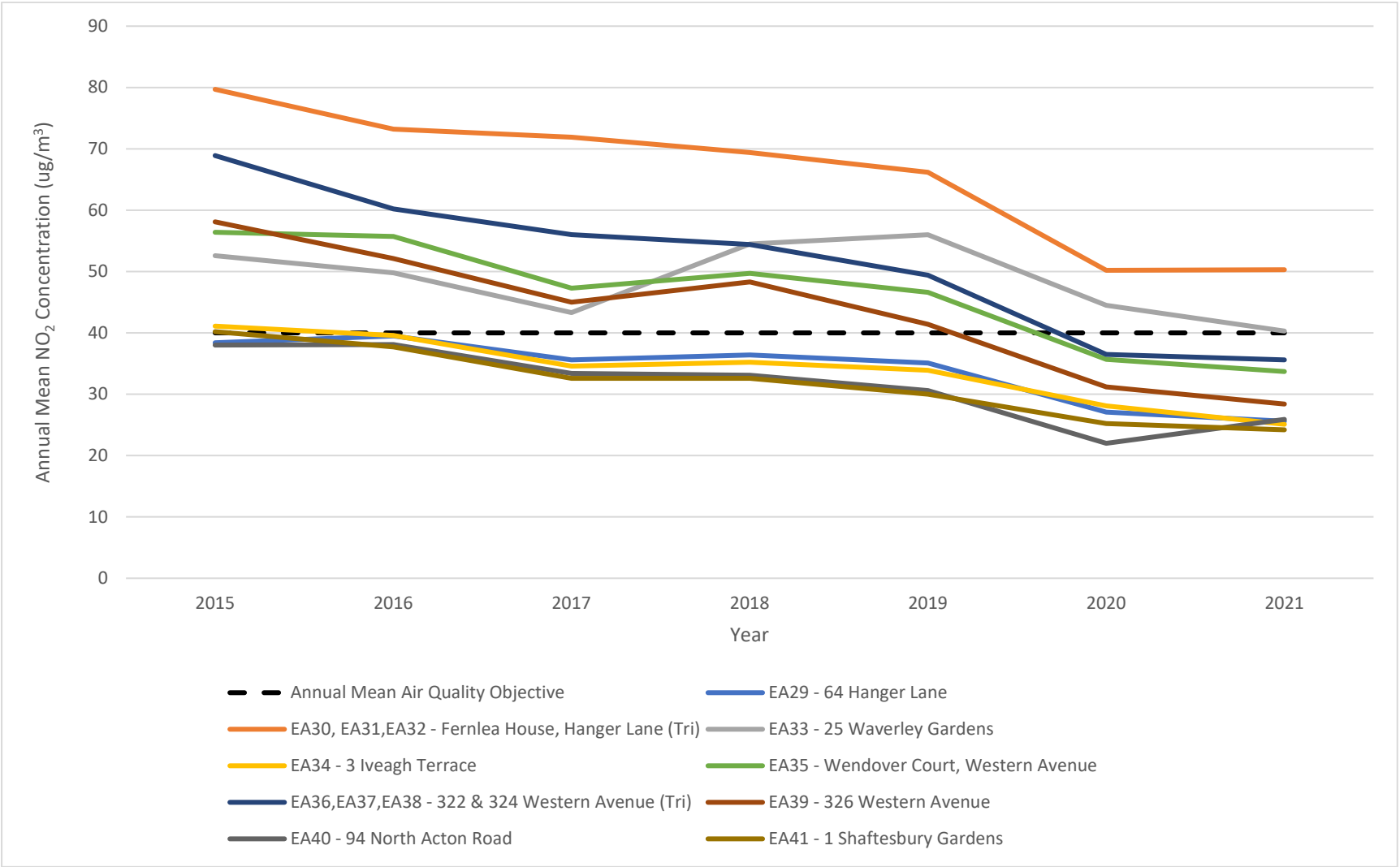


**Figure 9. Annual Mean $NO_2$ Concentrations at Roadside Sites (5)**

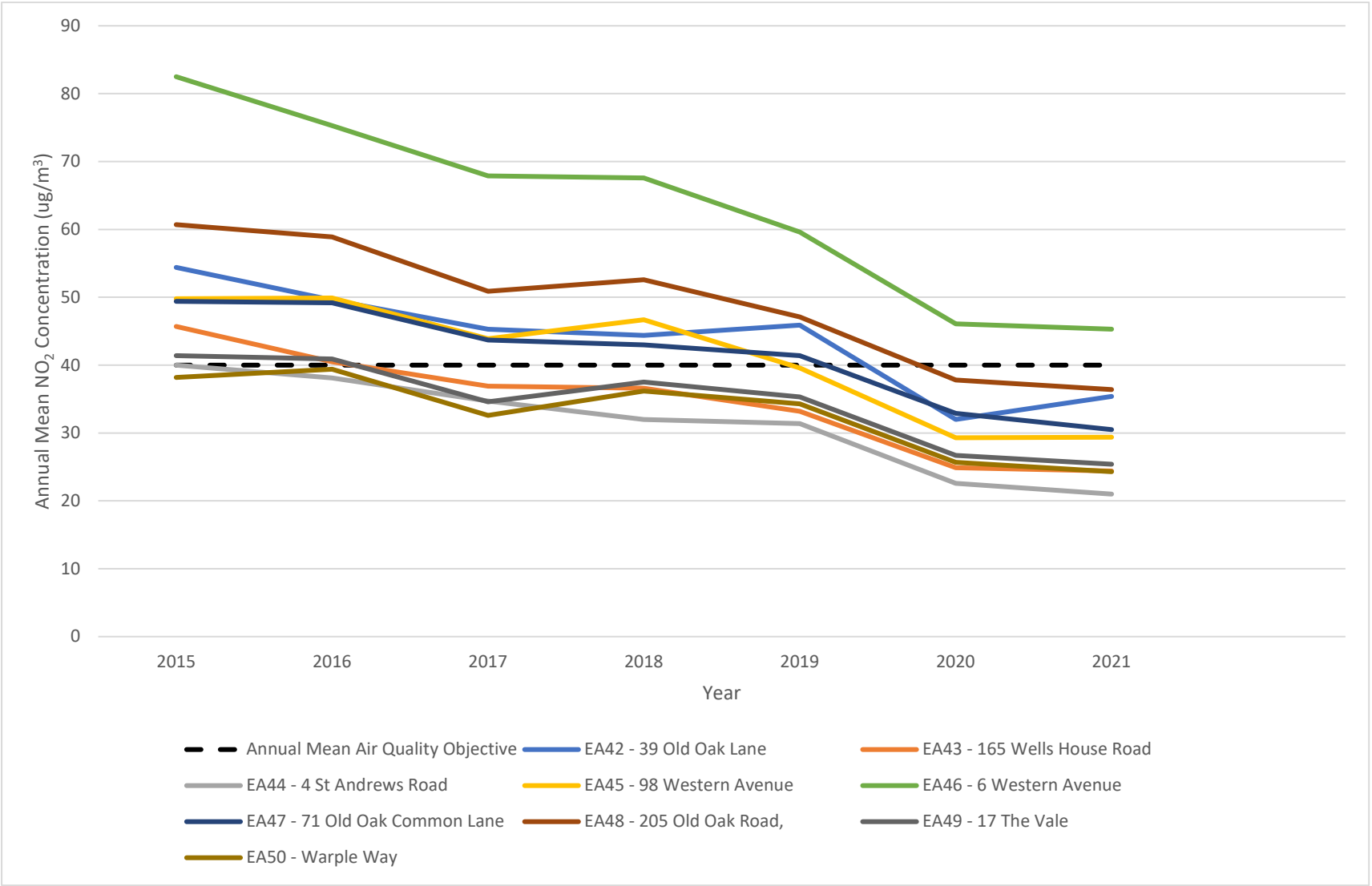


**Figure 10. Annual Mean $NO_2$ Concentrations at Roadside Sites (6)**

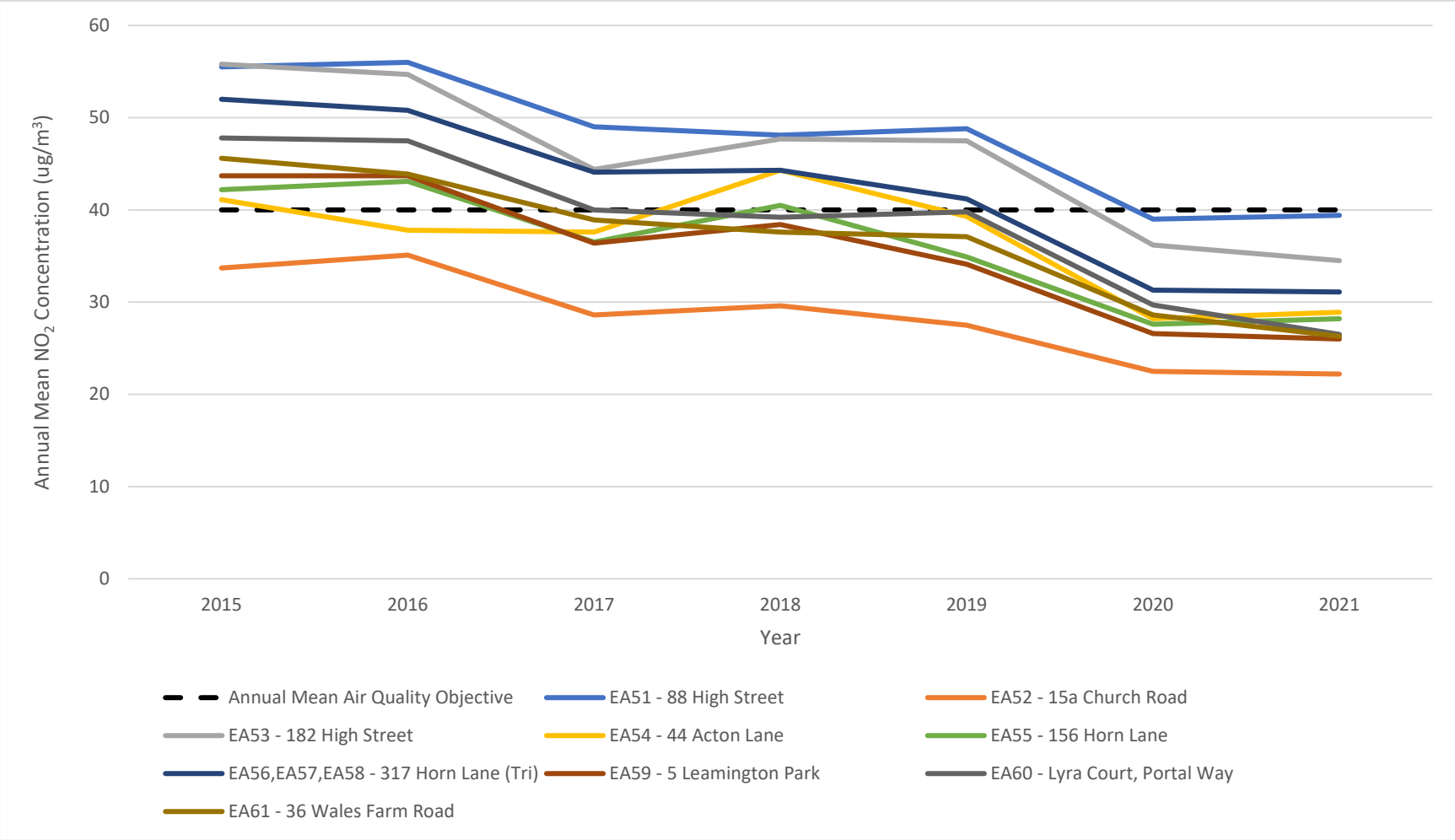


**Figure 11. Annual Mean $NO_2$ Concentrations at St Marks Primary School Sites**

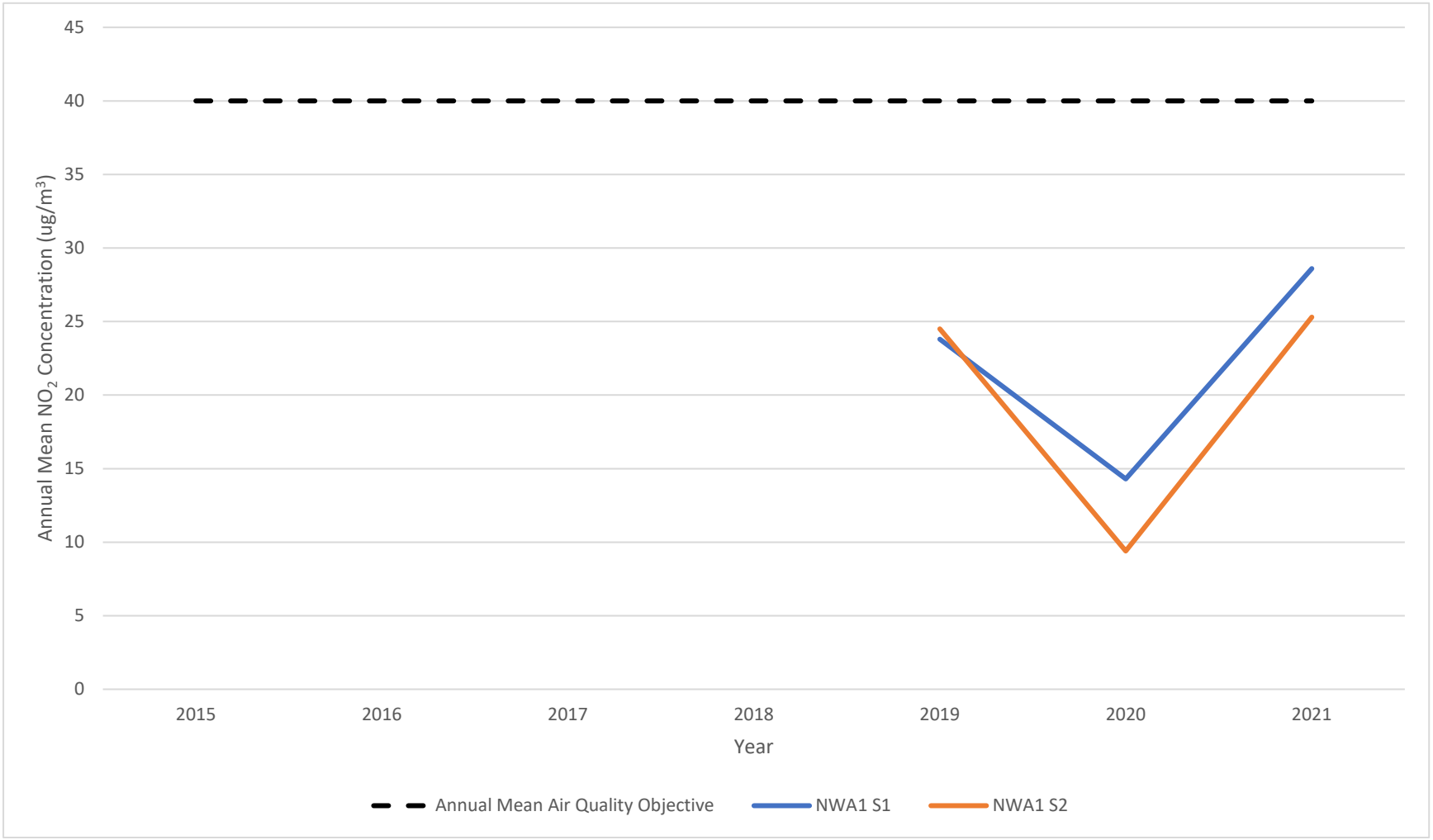


Table E presents the 1-hour mean $NO_2$ monitoring results at automatic monitoring stations between 2015 to 2021. None of the automatic sites exceeded the 1 hour mean $NO_2$ objective (200 µg $m^3$ not to be exceeded more than 18 times a year) in 2021. Whilst there were some hourly mean concentrations over the 200 µg $m^3$ threshold in 2019, all monitoring sites have been compliant with the objective since 2017.

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

| Site ID | Valid data capture for monitoring period %([a]) | Valid data capture 2021 %([b]) | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| EA6 Hanger Lane Gyratory | 99.5 | 99.5 | **98** | **45** | 9 | 0 | 3 | 0 | 0 |
| EA8 Horn Lane | 99.5 | 99.5 | 3 | 1 | 2 | 0 | 2 | 0 | 0 |
| EI1 Western Avenue | 99.6 | 99.6 | 2 (179) | **22** | 0 | 0 | 0 | 0 | 0 |
| E13 Acton Vale | 68.8 | 68.8 | - | - | - | 0 | 0 | 0 (82) | 0 (81) |

**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%)

PM concentrations are currently measured using TEOMs at all automatic monitoring locations in the London Borough of Ealing. The Horn Lane station is equipped with both TEOM and TEOM-FDMS analysers for $PM_{10}$ monitoring and results from these are presented separately. The annual mean $PM_{10}$ results are shown in Table F and the 24-hour mean $PM_{10}$ results are presented in Table G. Data capture in 2021 was good (i.e. >85%) at all locations, with the exception of Acton Vale (EI3), which had a lower data capture rate of 68.8%. The annual mean $PM_{10}$ objective of 40 µg $m^3$ was achieved at all sites during 2021, and it has been at all automatic monitoring locations in the borough since 2015. Figure 12 shows a slight downward trend in annual values since 2015. The highest annual mean $PM_{10}$ concentration in 2021 was recorded at EA8 Horn Lane (26.3 µg/$m^3$). The number of exceedances of the 24-hour mean objective (50 µg/$m^3$) was within the permitted 35 days per year.

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

| Site ID | Valid data capture for monitoring period %([a]) | Valid data capture 2021 %([b]) | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| EA6 Hanger Lane Gyratory | 99.5 | 99.5 | 25 | 24 | 26 | 28 | 25 | 22.6 | 20.2 |
| EA8 Horn Lane | 99.5 | 99.5 | 31 | 28 | 27 | 25 | 28 | 24.4 | 26.3 |
| EI8 Horn Lane TEOM | 98.3 | 98.3 | 27 | 26 | 26 | 26 | 25 | 21.3 | 23.3 |
| EI1 Western Avenue | 99.6 | 99.6 | 29 | 30 | 26 | 28 | 26 | 22.8 | 25.0 |
| EI3 Acton Vale | 68.8 | 68.8 | - | - | - | 19 | 18 | 16.0 | 16.1 |

**Notes**

The annual mean concentrations are presented as µg/m$^3$.

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

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

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

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

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

| Site ID | Valid data capture for monitoring period %[(a)] | Valid data capture 2021 %[(b)] | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|
| EA6 Hanger Lane Gyratory | 99.5 | 99.5 | 6 | 12 | 10 | 12 | 13 | 7 | 4 |
| EA8 Horn Lane | 99.5 | 99.5 | 11 (46) | 19 | 16 | 7 | 15 | 9 | 13 |
| EI8 Horn Lane TEOM | 98.3 | 98.3 | 17 | 17 | 10 | 7 | 16 | 5 | 9 |
| EI1 Western Avenue | 99.6 | 99.6 | 22 (43) | 24 | 9 | 14 | 21 | 11 | 11 |
| EI3 Acton Vale | 68.8 | 68.8 | - | - | - | 2 | 9 | 3 (30) | 1 |

**Notes**

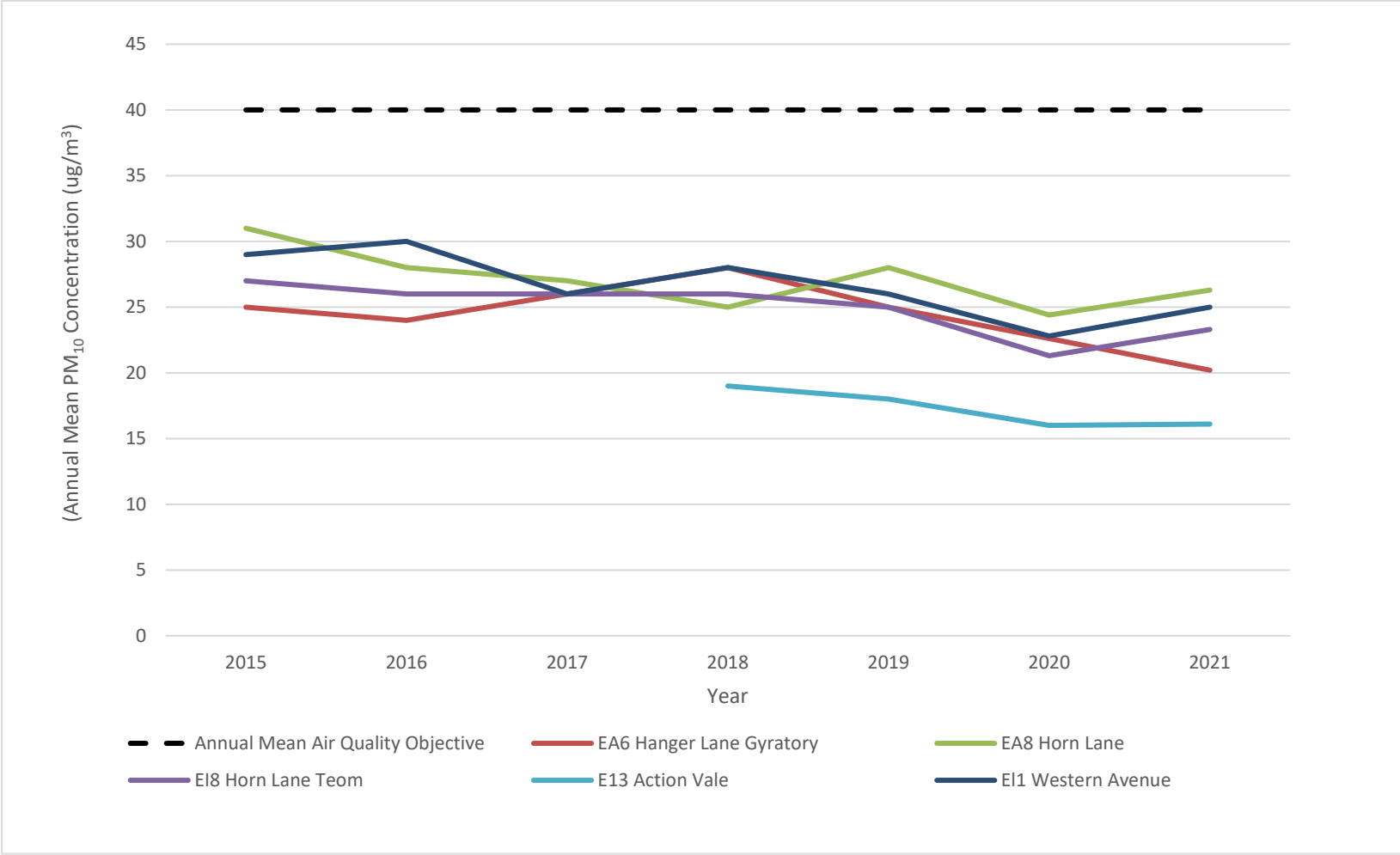
Exceedances of the $PM_{10}$ 24-hour mean objective (50 µg/m$^3$ over the permitted 35 days per year) are shown in **bold.**

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%). Annual Mean $PM_{10}$ Concentration (ug/m$^3$)

**Figure 12. Annual Mean $PM_{10}$ Concentrations at Automatic Monitoring Sites**



# 2. Action to Improve Air Quality

## 2.1 Air Quality Action Plan Progress

Table H provides a brief summary of London Borough of Ealing progress against the Air Quality Action Plan, showing progress made this year.

**Table H. Delivery of Air Quality Action Plan Measures**

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| 1 | Emissions from Development and Buildings | Further actions to mitigate $PM_{10}$ and $PM_{2.5}$ emissions from industrial sources and resuspension in Horn Lane, Acton | **ONGOING**<br>Indicative monitoring continued in Acton Goods Yard in 2020/21 and is ongoing. Data is online at Welcome to Centre for Low Emission Construction \| Centre for Low Emission Construction (clec.uk) | Contact air quality officer for updates |
| 2 | Localised Solutions | Ealing Broadway Station -Forecourt improvements at Ealing Broadway Station | **ONGOING**<br>Works to improve pedestrian and cycle access to Ealing Broadway Station have commenced using Council funding with the aim to recover cost from TfL. This resulted in the scheme to be scaled down, once TfL funding has been restored, the full scheme to be completed. | https://www.ealing.gov.uk/downloads/download/3256/ealing_broadway_station_forecourt_improvement_plans |
| 3 | Cleaner Transport | Cycling | **COMPLETE**<br>• 1,676 Children received cycle training in 2021/22.<br>• 1,304 Adults received cycle training in 2021/22.<br>• 98 Dr Bike sessions held with 1,600 bikes serviced in 2021/22.<br>**ONGOING** | http://www.westtrans.org/WLA/wt2.nsf/Files/WTA201/$file/Ealing+Cycling+Plan.pdf |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | | | • Work on Ealing - Greenford Quietway to restart in 2022/23. Feasibility on other routes including Southall to Heathrow (subject to available funding) to be undertaken in 2022/23 (subject to available funding).<br>• Implemented experimental closures of Chiswick and Church Road, Northolt to all traffic except buses and cyclists (and emergency vehicles). These schemes will be reviewed at the end of the year prior to a decision on whether to make them permanent. The Fishers Lane closure to vehicles is now permanent after the successful experimental closure. | |
| 4 | Cleaner Transport | West London Student Cycling Champion project | **COMPLETE**<br>• A programme of events to promote cycling and active travel at NHS sites across West London Including Ealing Hospital. 76 staff bikes repaired and 11 staff took cycle training.<br>Outcomes: NHS phases of the programme (August 2020 to October 2021) included:<br>• 43 x 'London By Cycle' events delivered<br>• 12 x hospitals across 5 NHS Trusts engaged<br>• 1074 x staff interactions about cycling<br>• 513 x NHS and hospital staff bikes fixed<br>• 53 x cycle training refreshers delivered<br>• 283 x cycle surveys completed | shovlare@ealing.gov.uk |
| 5 | Cleaner Transport | Electric Bike Trial to encourage more sustainable journeys | **COMPLETE**<br>• Trialled a cargo bike delivery service for businesses for several months helping to deliver over 400 parcels to residents, travelling a distance of | shovlare@ealing.gov.uk |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | | | 450km helping to save approximately 125kg of $CO_2$ emissions should these journeys have been made by car.<br><br>**ONGOING**<br>• Two e-bikes remain on trial within the NHS, further review is being conducted on how to best deploy for 2022/23. | |
| 6 | Cleaner Transport | Improved access to public transport | **COMPLETE**<br>• All new Crossrail stations open and accessible. | For details of access improvements at these stations, see<br>http://www.crossrail.co.uk/route/western-section/ |
| 7 | Emissions from Developments and Buildings | Control of emissions from developments and buildings | **ONGOING**<br>During 2021, planning conditions were imposed to:<br>• Ensure that particulate emissions from construction and demolition are minimised<br>• Control emissions from NRMM<br>• Control emissions from CHP and biomass boilers and to ensure that smaller developments use ultra-low $NO_x$ gas boilers<br>• Enforce Air Quality Neutral policies | |
| 8 | Emissions from Developments and Buildings | Ensuring adequate, appropriate, and well-located green space and infrastructure is included in new developments | **ONGOING**<br>The London Borough of Ealing's Development (Core) Strategy DPD includes a chapter "Protecting and Enhancing Ealing's Green and Open Spaces". | The focus is on larger developments to implement on-site green space |
| 9 | Emissions from | Investigate the potential for larger | **COMPLETE**<br>• Independent air quality monitoring station installed October 2021. | |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | Developments and Buildings | development areas to proactively assess air quality impacts cumulatively | **ONGOING**<br>• A draft Low Emission Strategy (LES) for the Southall Waterside development has been prepared and under review prior to publication<br>Monitoring of the air quality project is expected to continue till the conclusion of the project. | |
| 10 | 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. | **COMPLETE**<br>• In 2020/21 the council was successful in bidding for £2.995m to retrofit 30 corporate buildings to reduce carbon emissions and decarbonise heating systems. Work will be completed in summer 2021<br>• The council was successful in bidding for £2.04m to complete whole house retrofits on 40 of its own council houses, with the aim of making them carbon neutral<br>• Finally, the council led a West London partnership to secure £4.8m to deliver a home retrofit programme for low income homes across West London. It is estimated that Ealing will see 50-100 homes retrofitted under the scheme, by June 2021. A further top up of £10m has been bid, extending delivery to December 2021 if successful<br>**ONGOING**<br>• In 2020/21/22 Public Sector Decarbonisation Scheme, Phase 1 has been underway. A £2.955m programme has retrofit 15 corporate buildings and two schools. Phase 3 of this programme will begin in April 2022, £7.222m will be invested in a further eight schools and four sheltered accommodation blocks to improve energy efficiency and decarbonise heating.<br>In 2020/21 Green Homes Grant Local Authority Delivery scheme Phase 1 was delivered in full - £4.8m of home retrofits across West London led by Ealing. | |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | | | Phases 2 and 3 began in February 2022 and will run through March 2023, adding £34.879m to expand the programme. | |
| 11 | Public Health and Awareness Raising | Ensure that Directors of Public Health (DsPH) have been fully briefed on the scale of the problem in your local authority area; what is being done, and what is needed. A briefing should be provided. | **ONGOING**<br>Public Health (led by the DPH) has led a Joint Strategic Needs Assessment in this area to inform local decision making. | |
| 12 | Public Health and Awareness Raising | Public Health through the health protection forum that there is engagement with wider stakeholders in this agenda). | **ONGOING**<br>• The Council are working with Ealing's Clinical Commission Group, through the JSNA and its recommendations.<br><br>Health Protection Forum (HPF) meetings were stopped during COVID and have only restarted in Sept 2021. Air quality has been added to HPF forward plan, as a future focus topic. | |
| 13 | Public Health and Awareness Raising | Encourage schools to join the TfL STARS accredited travel planning programme by providing information on the benefits to schools and supporting the implementation of such a programme | **ONGOING**<br><br>STARS Accreditation to August 2021 Update:<br><br>• Gold: **21** schools<br>• Silver: **6** schools<br>• Bronze: **20** schools<br>• Engaged (registered on STARS only): **6** schools<br><br>**16** STARS Surgeries and **7** STARS training workshop were held online between September 2020 and July 2021, to support schools in progression towards accreditation. | For information on the London-wide STARS scheme, see https://stars.tfl.gov.uk |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | | | School Streets<br><br>• 10 of our 2020 School Streets were made permanent in November 2021.<br>• 4 additional School Streets were implemented in October 2021.<br>• 1 2020 School Street is being redesigned and will be made permanent in 2022. | |
| 14 | Public Health and Awareness Raising | Air quality at schools | **COMPLETE**<br><br>• The School Travel Team promoted Go Green for Clean Air Day, to all schools in the Borough, on 17th June 2021.<br>• The team produced resources to raise awareness of COP26 and invited schools to take part in a Great Walk to School on 12th November 2021. It also produced a poster of an Active Travel Tree and asked pupils to add a leaf for their mode of travel (green = active; yellow = public transport; red = car). | Focus on minimising further exposure by siting new schools away from busy roads.<br><br>See Ealing Council's *Sustainable Modes of Travel to School Strategy* https://www.ealing.gov.uk downloads/201182/transport_ strategies_and_plans<br><br>See *Climate change, COP26 and air quality* page on Ealing Grid for Learning https://www.egfl.org.uk/services-children/school- |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | | | | travel-plans-stp/climate-change-cop26-and-air-quality |
| 15 | Emissions from Development and Buildings | Update Procurement policies to ensure sustainable logistical measures are implemented (and include requirements for preferentially scoring bidders based on their sustainability criteria) | **ONGOING**<br>• The new Greener Ealing London waste service provider procured a new fleet that significantly improves performance related to impacts on local air quality. They have also made commitments in the climate strategy that all heavy vehicles will run on alternative fuels or electric by 2030 and all light vehicles to be electric by 2026.<br>• The parks team made similar commitments, with 29% of their current vehicle fleet electric/hybrid and a commitment to increase to 50% by 2026. Further they have committed that 100% of their maintenance equipment will have zero carbon output by 2025, current baseline is 60%.<br>• The contract for waste handling includes sustainable logistics.<br>• A new West London Low Carbon Procurement toolkit has now been shared with colleagues and supply chain training will take place in April.<br>In 2022, the following teams will be getting electric vehicles<br>• ICT and PS: 21 electric vans and 1 electric car.<br>• Hostels: 1 electric van.<br>• Pollution control: 1 electric car. | Most significant measure identified as reducing trip distance (and hence emissions) http://www.westtrans.org/wla/wt2.nsf/pages/WT-211 |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| 16 | Delivery Servicing and Freight | Re-organisation of freight to support consolidation (or micro-consolidation) of deliveries, by setting up or participating in new logistics facilities, and/or requiring that council suppliers participate in these | **COMPLETE**<br>• Ealing Council Facilities acquired 6 electric vans to replace diesel vans in their fleet in 2021.<br>**ONGOING**<br>• Ealing Broadway Business Improvement District Air Quality Exemplar project undertaken with MAQF funding project has continued and is now fully funded by Ealing BID. This project has saved around 9,000 diesel vehicle trips each year.<br>• Greener Ealing LATCo established (in 2019) will provide a borough-based waste collection service and this should reduce numbers of vehicle trips and contractors used for waste collection services. Investigations currently underway into possible use of EVs. | See https://www.london.gov.uk/sites/default/files/mayors_air_quality_fund_report_2016.pdf |
| 17 | Emissions from Development and Buildings | Green Infrastructure | **ONGOING**<br>• Planning policies encourage green roofs, green walls, Sustainable Urban Drainage Systems etc.<br>• West Ealing Liveable Neighbourhood initial prototype phase implemented (includes parklets, decorative pedestrian crossing points and street art) to promote walking and cycling journeys. | |
| 18 | Public Health and Awareness Raising | Discouraging unnecessary idling by taxis, coaches and other vehicles (e.g. through anti-idling campaigns or enforcement activity) | **ONGOING**<br>• Ongoing community engagement with parents and residents re anti-idling measures.<br>• Delivering activities and events as a participating council of the anti-idling Mayor's Air Quality Fund. In 2022, 3 anti-idling workshops and events was held at 3 primary schools. | |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| 19 | Cleaner Transport | Increasing the proportion of electric, hydrogen and ultra-low emission vehicles in Car Clubs | **ONGOING**<br>• Work undertaken within WestTrans Partnership to increase EV fleet within car clubs.<br>• The Council and partners Source London and Siemens/Ubitricity have installed 215 on-street and car park EVCPs since 2019. There are also around 85 additional EVCPs on private land open to the public see Map of charging points for electric car drivers in UK: Zap-Map (zap-map.com)<br>• We also plan to instal 200 further EVCPs on-street this summer and autumn with more likely to follow later<br>• Zipcar Flex floating car club launched in July 2021, with 25% of the fleet as EVs | https://www.ealing.gov.uk/info/201173/transport_and_parking/1316/electric_vehicles_and_charging_points/1 |
| 20 | Cleaner Transport | Very Important Pedestrian Days (e.g. no vehicles on certain roads on a Sunday) and similar initiatives | **COMPLETE**<br>• 2 permanent LTNs now in place.<br><br>**ONGOING**<br>• Playstreets initiative: there are 53 registered, resident-led Playstreets currently. | |
| 21 | Cleaner Transport | Railway emissions | **ONGOING**<br>• Successfully secured the trial replacement of the diesel train operating on the Greenford Line by a battery electric train scheduled to enter service in winter 2022. | GWR fast-charging trial brings regular battery-only rail services a step closer<br>Ealing's trains leading the charge towards net zero \| Ealing Council |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| 22 | Public Health and Awareness Raising | Ensure that the Head of Transport has been fully briefed on the Public Health duties and the fact that all directors (not just Director of Public Health) are responsible for delivering them, as well as on air quality opportunities and risks related to transport in the borough. Provide a briefing which can be disseminated amongst the Transport team | **ONGOING**<br>• Transport staff are closely involved in air quality initiatives and projects and have been involved in JSNA development. Recommendations of the JSNA are shared across Council services and the Council aims to incorporate them in all relevant strategies.<br>• The Healthy Weight, Healthy Lives Strategy work has been led during this past year by the Healthy Weight, Healthy Lives group (incl. leads from the active travel / transport team).<br>The strategy will be updated, timescale to be confirmed and will be informed by an upcoming CYP Healthy Weight JSNA (in development).<br>• Let's Go Southall: initiative to encourage residents of Southall to be more physically active - delivered by providing the necessary facilities and services for a healthier and more active lifestyle.<br><br>Healthy Weight Strategy group is now superseded by the following groups:<br>• CYP: Giving Children the best Start in Life.<br>• CYP: Supporting Children and Young people to achieve healthy lifestyles / weight.<br><br>Once the JSNA is complete a new updated strategy will be produced.<br><br>Separately the successful Let's Go Southall bid and work has included active travel as a key component in a bid to encourage more people in Southall to use active travel as an alternative method than using cars. | |
| 23 | Monitoring and Other Core Statutory Duties | $PM_{2.5}$ Monitoring | **ONGOING**<br>• The Council is currently evaluating resources required to monitor for $PM_{2.5}$ at Horn Lane, including installation of a new $PM_{2.5}$ monitor at the site | |

| Measure | LLAQM Action Matrix Theme | Action | Progress<br>• Emissions/Concentration data<br>• Benefits<br>• Negative impacts / Complaints | Further Information |
|---|---|---|---|---|
| | | | Although there are no specific measures targeting the reduction of $PM_{2.5}$ currently, it is expected that the combination of actions and that are currently in force or coming into force will help to bring about a reduction of $PM_{2.5}$. However, discussions are being held with Public Health to devise policies that will specifically target the reduction of $PM_{2.5}$. | |

## 3. Planning Update and Other New Sources of Emissions

Table I gives a summary of planning requirements relating to air quality in the London Borough of Ealing in 2021. All planning applications, including those for the discharge of conditions relating to air quality, are logged and validated by the Planning Support Team. A consultation request for each application is sent to the Planning Enforcement and Environment Team, where air quality officers will identify matters needing their input and will recommend appropriate conditions to the planning case officer. The air quality officer will, if necessary, request further details and will liaise as required with the applicant and/or their air quality consultant to ensure that any recommendations to the case officer are soundly based and provide the necessary coverage of all air quality matters.

Currently planning conditions relating to air quality will be investigated and enforced in response to complaint, for example where there is a dust issue at a construction site and a construction management plan is in place that was required by a planning condition.

**Table I. Planning requirements met by planning applications in London Borough of Ealing in 2021**

| Condition | Number |
|---|---|
| Number of planning applications where an air quality impact assessment was reviewed for air quality impacts | 293 (See Note 1) |
| Number of planning applications required to monitor for construction dust | 178 (See Note 2) |
| Number of CHPs/Biomass boilers refused on air quality grounds | 0 |
| Number of CHPs/Biomass boilers subject to GLA emissions limits and/or other restrictions to reduce emissions | 0 |
| Number of developments required to install Ultra-Low $NO_x$ boilers | 4 |
| Number of developments where an AQ Neutral building and/or transport assessments undertaken | 52 |
| Number of developments where the AQ Neutral building and/or transport assessments not meeting the benchmark and so required to include additional mitigation | 0 |
| Number of planning applications with S106 agreements including other requirements to improve air quality | 33 |
| Number of planning applications with CIL payments that include a contribution to improve air quality | 0 |
| **NRMM: Central Activity Zone and Canary Wharf** Number of conditions related to NRMM included. | N/A |

| Condition | Number |
|---|---|
| Number of developments registered and compliant.<br>Please include confirmation that you have checked that the development has been registered with the GLA through the relevant NRMM website and that all NRMM used on-site is compliant with Stage IIIB of the Directive and/or exemptions to the policy. | |
| **NRMM: Greater London (excluding Central Activity Zone and Canary Wharf)**<br>Number of conditions related to NRMM included.<br>Number of developments registered and compliant.<br>Please include confirmation that you have checked that the development has been registered at www.nrmm.london and that all NRMM used on-site is compliant with Stage IIIA of the Directive and/or exemptions to the policy. | 87 conditions included.<br>22 sites were audited, 0 were self-compliant, 1 was non-compliant, 5 were not required to be registered on NRMM website and finally 4 sites were completed |

Note 1. This is the number of full planning applications initially reviewed by officers for air quality impacts. It does not include condition discharge applications where an air quality condition has been set and details are submitted in compliance with the condition.

Note 2. Monitoring is taken to include visual monitoring.

## 3.1 New or significantly changed industrial or other sources

No new sources identified.

# 4. Additional Activities to Improve Air Quality

## 4.1 London Borough of London Borough of Ealing's Fleet

London Borough of Ealing Council has within its fleet 8 zero emission/ zero emission capable cars and vans. These represent 10% of the total Council car and van fleet.

## 4.2 NRMM Enforcement Project

Ealing Council continues to collaborate with Merton Council to enforce the council's NRMM policies. The Air quality team sets NRMM conditions on developments and requests developers to register their site details on NRMM website for officers to Merton Council to audit.

## 4.3 Air Quality Alerts

Ealing Council has subscribed to airTEXT and advertises its services on Ealing Air website and on social media to raise awareness for residents to subscribe.

Available at: https://ealingair.org.uk/AirQuality/Default.aspx

# Appendix A Details of Monitoring Site Quality QA/QC

## A.1 Automatic Monitoring Sites

The four active automatic monitoring sites in the borough were operated as part of the London Air Quality Network (LAQN). Data have traceability to national standards and operational procedures defined for the LAQN. The Horn Lane site is also part of the national Automatic Urban and Rural Network (AURN), operated by the Environment Agency to monitor compliance with the EU Directives. AURN QA/QC procedures involve 4-weekly calibration of NOx and maintenance of particulate samplers.

$PM_{10}$ Monitoring Adjustment

Monitoring is conducted using TEOMs at two of the four automatic monitoring stations. There is therefore a need to eliminate the effect of changing humidity on the mass measurement; the TEOM is required to maintain the sample filter at an elevated temperature, which may lead to losses of semi-volatile species such as ammonium nitrate. The Volatile Correction Model (VCM) uses local FDMS monitoring sites to correct TEOM measurements for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. This adjustment to $PM_{10}$ data is provided by the London Air Quality Network.

## A.2 Diffusion Tubes

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme.

AIR $NO_2$ PT forms an integral part of the UK $NO_2$ Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme. The results for Socotec (formerly Environmental Scientifics Group (ESG) Didcot) were overall satisfactory. The laboratory scored

100% satisfactory results between September 2020 and October 2020 (AR040) and 100% satisfactory results between January 2021 and March 2021 (AR042).

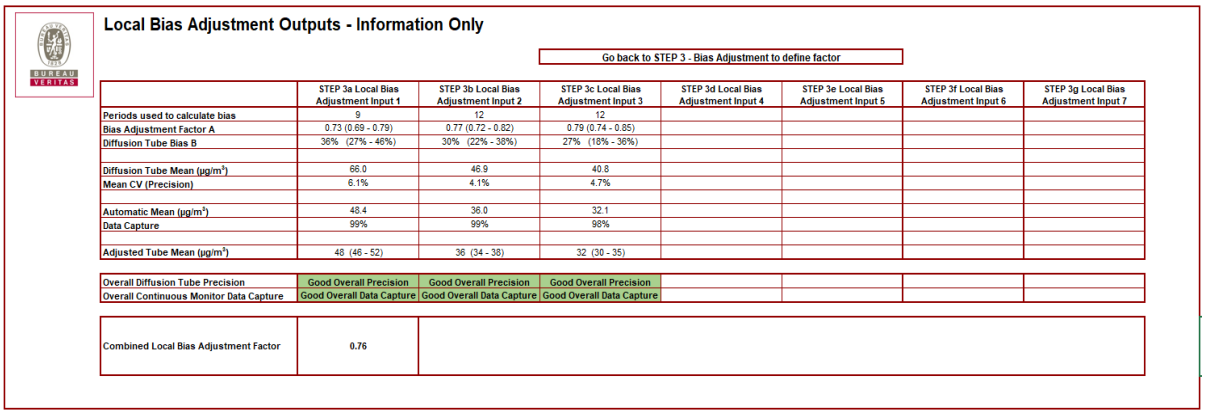
Factor from Local Co-location Studies

Bias adjustment is a calculated factor, which shows whether diffusion tubes are over or under reading ambient concentrations and therefore allows for a correction to be made.

Ealing carries out studies at three sites where triplicate diffusion tubes are co-located with automatic monitors for the purpose of deriving a local bias adjustment factor. In 2021, the local bias adjustment factor, derived from these studies, was 0.76.

The automatic monitor at Hanger Lane and Western Avenue had very good data capture (11 out of 12 months had a data capture of 100%). At Horn Lane, 11 of the 12 months had a data capture >90%. Figure 13 shows the details of the calculation of the local bias adjustment factors. The calculation of local bias adjustment factors takes into account both data capture from diffusion tubes and automatic monitors, and also the coefficient of variation (CV) of the triplicate diffusion tubes. If the CV is too high for a particular period, that period is not taken into account when calculating the local bias adjustment factor. Periods where automatic monitoring data capture rates are less than 90% are also excluded.

**Figure 13 Local bias adjustment factor calculation**



**Local Bias Adjustment Outputs - Information Only**

Go back to STEP 3 - Bias Adjustment to define factor

| | STEP 3a Local Bias Adjustment Input 1 | STEP 3b Local Bias Adjustment Input 2 | STEP 3c Local Bias Adjustment Input 3 | STEP 3d Local Bias Adjustment Input 4 | STEP 3e Local Bias Adjustment Input 5 | STEP 3f Local Bias Adjustment Input 6 | STEP 3g Local Bias Adjustment Input 7 |
|---|---|---|---|---|---|---|---|
| Periods used to calculate bias | 9 | 12 | 12 | | | | |
| Bias Adjustment Factor A | 0.73 (0.69 - 0.79) | 0.77 (0.72 - 0.82) | 0.79 (0.74 - 0.85) | | | | |
| Diffusion Tube Bias B | 36% (27% - 46%) | 30% (22% - 38%) | 27% (18% - 36%) | | | | |
| | | | | | | | |
| Diffusion Tube Mean (µg/m³) | 66.0 | 46.9 | 40.8 | | | | |
| Mean CV (Precision) | 6.1% | 4.1% | 4.7% | | | | |
| | | | | | | | |
| Automatic Mean (µg/m³) | 48.4 | 36.0 | 32.1 | | | | |
| Data Capture | 99% | 99% | 98% | | | | |
| | | | | | | | |
| Adjusted Tube Mean (µg/m³) | 48 (46 - 52) | 36 (34 - 38) | 32 (30 - 35) | | | | |

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

| | | |
|---|---|---|
| Combined Local Bias Adjustment Factor | 0.76 | |

The national bias adjustment factor for co-location diffusion tube studies in 2021 analysed by Socotec (formerly Environmental Scientifics Group (ESG) Didcot) using a preparation method of 20% TEA/water was calculated to be 0.76. This has been taken from the national bias adjustment spreadsheet 03/22, as shown in Figure 14.

**Figure 14 2021 National bias adjustment factor.**

**National Diffusion Tube Bias Adjustment Factor Spreadsheet** — Spreadsheet Version Number: 03/22

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 June 2022
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: | Step 2: | Step 3: | Step 4: |
|---|---|---|---|
| Select the Laboratory that Analyses Your Tubes from the Drop-Down List | Select a Preparation Method from the Drop-Down List | Select a Year from the Drop-Down List | 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[2] shown in blue at the foot of the final column. |
| If a laboratory is not shown, we have no data for this laboratory. | If a preparation method is not shown, we have no data for this method at this laboratory. | If a year is not shown, we have no data[2] | 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[2] (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) |
|---|---|---|---|---|---|---|---|---|---|---|
| Socotec Didcot | 20% TEA in water | 2021 | KS | Marylebone Road Intercomparison | 10 | 57 | 42 | 35.7% | P | **0.74** |
| Socotec Didcot | 20% TEA in water | 2021 | KS | New Forest District Council | 12 | 37 | 25 | 50.0% | G | **0.67** |
| Socotec Didcot | 20% TEA in water | 2021 | R | New Forest District Council | 12 | 29 | 23 | 27.2% | G | **0.79** |
| Socotec Didcot | 20% TEA in water | 2021 | R | South Oxfordshire Distric Council | 11 | 25 | 18 | 38.5% | G | **0.72** |
| Socotec Didcot | 20% TEA in water | 2021 | R | South Oxfordshire DistricT Council | 11 | 37 | 33 | 12.9% | G | **0.89** |
| SOCOTEC Didcot | 20% TEA in water | 2021 | | **Overall Factor[3] (5 studies)** | | | | **Use** | | **0.76** |

## Discussion of Choice of Factor to Use

The local bias adjustment factor was applied to the 2021 monitoring data. This was chosen on the basis that:

- it is locally-derived from co-location sites, and therefore considered most representative of local conditions; and
- it was the same as the national bias adjustment factor (0.76)

Table J. presents the bias adjustment factors used for LAQM purposes in the borough since 2014.

**Table J. Bias Adjustment Factor**

| Year | Local or National | If National, Version of National Spreadsheet | Adjustment Factor |
|---|---|---|---|
| 2021 | Local | 03/22 | 0.76 |
| 2020 | Local | 03/20 | 0.80 |
| 2019 | Local | 03/19 | 0.79 |
| 2018 | Local | 03/18 | 0.84 |
| 2017 | Local | 03/17 | 0.72 |
| 2016 | Local | 03/16 | 0.81 |
| 2015 | Local | 03/15 | 0.83 |

## A.3 Adjustments to the Ratified Monitoring Data

Short-term to Long-term Data Adjustment

Where data capture is less than 75% and greater than 25% of a full calendar year (between 3 and 9 months), the mean should be “annualised” – i.e. adjusted using the methodology outlined in LLAQM.TG(19) before being compared to annual mean objectives.

There was a total of 3 monitoring locations that required annualisation: the two St Mark’s Primary School diffusion tubes (NWA1S1 and NWA1S2), and the automatic monitor at Acton Vale (EI3). Acton Vale was annualised for both $NO_2$ and $PM_{10}$ annual means.

The three continuous monitoring sites chosen for annualisation were London Hillingdon, London North Kensington and London Westminster.

Table K. outlines the calculations for the annualisation factor applied to the monitoring data.

## Table K. Short-Term to Long-Term Monitoring Data Adjustment

| Site ID | Annualisation Factor London Hillingon | Annualisation Factor London N. Kensington | Annualisation Factor London Westminster | Annualisation Factor Wandsworth Putney | Annualisation Factor Horn Lane | Average Annualisation Factor | Raw Data Annual Mean (µg $m^{-3}$) | Annualised Annual Mean (µg $m^{-3}$) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| NWA1S1 | 0.9470 | 0.9402 | 0.9190 | - | - | 0.9354 | 33.0 | 30.8 | |
| NWA1S2 | 0.9470 | 0.9402 | 0.9190 | - | - | 0.9354 | 29.1 | 27.2 | |
| E13 ($NO_2$) | - | 0.9578 | - | 1.0099 | 0.9950 | 0.9876 | 21.3 | 21.0 | |
| E13 ($PM_{10}$) | - | 0.9950 | - | 0.8616 | 1.0020 | 0.9529 | 16.9 | 16.1 | |

## Table L. St. Marks Primary School Diffusion Tube Exposure Periods and Exclusions

| Month | Date On | Date Off | Exposure Period (Days) | Comments |
|---|---|---|---|---|
| January | 11th December 2020 | 29th January 2021 | 49 | Included, although exposure period longer than recommended |
| April - June | 06th April 2021 | 05th June 2021 | 61 | Included, although exposure period longer than recommended |
| July | 22nd July 2021 | 17th August 2021 | 26 | Appropriate length |
| November | 8th November 2021 | 10th December 2021 | 26 | Appropriate length |
| December | 10th December 2021 | 28th January 2022 | 49 | Included, although exposure period longer than recommended |

# Appendix B Full Monthly Diffusion Tube Results for 2021

**Table M. $NO_2$ Diffusion Tube Results**

| Site ID | Valid data capture for monitoring period %[a] | Valid data capture 2021 %[b] | Jan | Feb | Mar | Apr | May | June | Jul | Aug | Sept | Oct | Nov | Dec | Annual mean – raw data | Annual mean – bias adjusted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EA1 | 92.3 | 92.3 | | 44.4 | 43.8 | 43.7 | 47.0 | 37.9 | 42.2 | 37.5 | 53.9 | 48.9 | 53.4 | 46.6 | 45.4 | 34.6 |
| EA2 | 90.4 | 90.4 | 46.8 | 44.2 | 34.0 | 40.7 | 37.6 | 35.5 | 31.6 | 25.7 | 45.7 | 42.4 | 45.8 | | 39.1 | 29.8 |
| EA3 | 92.3 | 92.3 | 32.6 | | 15.8 | 16.6 | 26.2 | 12.1 | 14.5 | 11.4 | 21.3 | 19.0 | 23.5 | 21.4 | 19.5 | 14.9 |
| EA4 | 100.0 | 100.0 | 36.2 | 34.1 | 25.8 | 37.3 | 30.6 | 30.5 | 29.4 | 22.4 | 39.9 | 40.6 | 44.0 | 36.4 | 33.9 | 25.9 |
| EA5 | 84.6 | 84.6 | | | 27.0 | 31.1 | 27.1 | 20.4 | 22.8 | 17.6 | 30.7 | 26.6 | 39.5 | 34.1 | 27.7 | 21.1 |
| EA6 | 90.4 | 90.4 | 48.4 | 48.6 | 29.8 | 47.4 | 50.1 | 35.3 | 39.5 | 30.7 | 57.5 | | 47.0 | 48.0 | 43.8 | 33.5 |
| EA7 | 100.0 | 100.0 | 30.9 | 30.6 | 22.2 | 27.4 | 29.0 | 23.6 | 25.6 | 22.4 | 36.7 | 31.3 | 37.2 | 29.3 | 28.9 | 22.0 |
| EA8 | 90.4 | 90.4 | 40.8 | 40.4 | 33.2 | | 35.7 | 33.9 | 33.6 | 28.8 | 47.7 | 44.0 | 44.2 | 41.7 | 38.5 | 29.4 |
| EA9 | 100.0 | 100.0 | 34.9 | 31.2 | 24.9 | 29.3 | 25.5 | 23.3 | 25.7 | 21.1 | 34.0 | 32.1 | 43.7 | 33.8 | 30.0 | 22.9 |
| EA10 | 100.0 | 100.0 | 38.7 | 35.6 | 28.0 | 31.3 | 32.5 | 23.0 | 20.4 | 24.0 | 35.9 | 36.2 | 42.0 | 34.5 | 31.8 | 24.3 |
| EA11 | 100.0 | 100.0 | 33.9 | 30.3 | 24.7 | 29.7 | 24.7 | 24.2 | 22.3 | 17.0 | 30.4 | 27.0 | 33.9 | 29.6 | 27.3 | 20.8 |
| EA12 | 100.0 | 100.0 | 30.4 | 35.9 | 24.0 | 31.9 | 25.1 | 24.2 | 26.9 | 28.0 | 36.5 | 26.5 | 33.0 | 33.5 | 29.7 | 22.6 |
| EA13 | 100.0 | 100.0 | 47.1 | 49.3 | 31.7 | 41.9 | 45.2 | 31.9 | 44.0 | 31.8 | 51.5 | 48.6 | 45.8 | 47.7 | 43.0 | 32.9 |
| EA14 | 100.0 | 100.0 | 40.5 | 39.8 | 39.6 | 36.6 | 36.9 | 33.4 | 37.8 | 35.1 | 52.0 | 49.4 | 50.6 | 44.4 | 41.3 | 31.6 |
| EA15 | 92.3 | 92.3 | 40.7 | 38.8 | | 34.8 | 29.4 | 30.7 | 27.8 | 27.5 | 36.8 | 32.7 | 57.6 | 36.3 | 35.7 | 27.3 |
| EA16 | 92.3 | 92.3 | 37.3 | | 34.3 | 32.4 | 30.0 | 30.9 | 28.1 | 17.5 | 40.4 | 40.9 | 44.8 | 36.0 | 33.9 | 25.9 |
| EA17 | 100.0 | 100.0 | 38.0 | 31.5 | 28.2 | 29.3 | 28.1 | 24.2 | 19.6 | 19.7 | 39.1 | 34.9 | 42.2 | 36.5 | 30.9 | 23.6 |
| EA18 | 100.0 | 100.0 | 36.0 | 36.9 | 30.1 | 31.7 | 30.6 | 25.4 | 27.2 | 26.1 | 41.9 | 33.7 | 41.0 | 36.7 | 33.1 | 25.3 |
| EA19 | 92.3 | 92.3 | 38.7 | 32.2 | 32.5 | 34.0 | 29.5 | 27.7 | 29.1 | | 40.3 | 35.2 | 47.4 | 38.6 | 35.0 | 26.7 |
| EA20 | 100.0 | 100.0 | 41.2 | 35.3 | 32.3 | 35.6 | 37.4 | 30.0 | 32.6 | 25.7 | 45.8 | 40.7 | 42.2 | 39.6 | 36.5 | 27.9 |
| EA21 | 84.6 | 84.6 | | | 27.8 | 34.6 | 26.3 | 23.9 | 23.5 | 22.4 | 31.6 | 30.4 | 44.2 | 31.2 | 29.6 | 22.6 |
| EA22 | 100.0 | 100.0 | 39.9 | 32.5 | 29.5 | 28.6 | 30.7 | 18.9 | 22.7 | 20.4 | 37.3 | 31.9 | 40.9 | 36.1 | 30.8 | 23.5 |
| EA23 | 100.0 | 100.0 | 50.1 | 32.4 | | 41.1 | 45.3 | 34.6 | 28.0 | 35.3 | 56.4 | 52.2 | 58.2 | 48.0 | 41.0 | 31.4 |
| EA24 | 100.0 | 100.0 | 40.4 | 38.2 | 26.5 | 34.7 | 31.8 | 21.3 | 29.6 | 22.0 | 40.9 | 36.6 | 41.9 | 38.4 | 33.5 | 25.6 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EA25 | 100.0 | 100.0 | 43.0 | 37.8 | 42.4 | 40.4 | 40.7 | 33.1 | 33.7 | 24.3 | 51.6 | 48.9 | 44.9 | 42.2 | 40.3 | 30.7 |
| EA26 | 100.0 | 100.0 | 52.8 | 49.8 | 54.8 | 54.0 | 57.8 | 55.7 | 54.7 | 51.4 | 71.8 | 66.8 | 66.8 | 60.7 | 58.1 | 44.3 |
| EA27 | 100.0 | 100.0 | 37.8 | 32.2 | 29.5 | 27.9 | 24.9 | 19.2 | 19.6 | 19.1 | 35.8 | 32.3 | 40.7 | 34.4 | 29.5 | 22.5 |
| EA28 | 100.0 | 100.0 | 58.1 | 44.8 | 40.1 | 38.3 | 44.8 | 40.3 | 42.9 | 36.5 | 62.5 | 61.5 | 59.8 | 49.0 | 48.2 | 36.8 |
| EA29 | 100.0 | 100.0 | 41.8 | 38.6 | 35.7 | 36.7 | 31.8 | 21.6 | 29.8 | 23.6 | 38.0 | 33.1 | 38.6 | 33.2 | 33.5 | 25.6 |
| EA30 | 84.6 | 84.6 | | | 65.7 | 56.9 | 77.4 | 56.8 | 60.3 | 46.1 | 72.6 | 61.6 | 75.4 | 62.6 | 63.5 | 48.5 |
| EA31 | 100.0 | 100.0 | 73.3 | 74.0 | 69.8 | 57.6 | 70.0 | 60.7 | 64.8 | 52.4 | 79.5 | 68.8 | 75.0 | 64.0 | 67.5 | 51.5 |
| EA32 | 84.6 | 84.6 | | | 44.9 | 58.7 | 71.7 | 58.7 | 67.0 | 46.4 | 85.4 | 82.9 | 81.1 | 67.8 | 66.5 | 50.7 |
| EA33 | 100.0 | 100.0 | 49.9 | 53.0 | 55.8 | 58.0 | 54.1 | 48.4 | 46.8 | 47.9 | 59.8 | 51.1 | 58.2 | 50.1 | 52.8 | 40.3 |
| EA34 | 100.0 | 100.0 | 37.4 | 38.0 | 29.3 | 36.6 | 30.6 | 24.6 | 29.3 | 24.9 | 40.1 | 31.6 | 39.5 | 32.8 | 32.9 | 25.1 |
| EA35 | 100.0 | 100.0 | 50.5 | 54.2 | 39.6 | 50.9 | 43.5 | 40.6 | 37.5 | 36.3 | 54.1 | 36.7 | 47.5 | 38.4 | 44.2 | 33.7 |
| EA36 | 100.0 | 100.0 | 58.2 | 51.8 | 40.5 | 40.7 | 47.1 | 35.7 | 39.5 | 32.0 | 57.4 | 50.5 | 55.4 | 42.7 | 46.0 | 35.1 |
| EA37 | 100.0 | 100.0 | 57.0 | 53.7 | 45.1 | 38.6 | 47.4 | 38.4 | 39.6 | 34.0 | 57.9 | 50.2 | 55.2 | 46.8 | 47.0 | 35.9 |
| EA38 | 100.0 | 100.0 | 55.0 | 50.5 | 43.7 | 42.6 | 46.2 | 38.4 | 42.1 | 34.6 | 61.2 | 57.1 | 58.8 | 43.9 | 47.8 | 35.7 |
| EA39 | 100.0 | 100.0 | 48.5 | 43.6 | 37.4 | 35.8 | 36.9 | 30.7 | 32.5 | 28.3 | 38.1 | 36.8 | 41.6 | 36.3 | 37.2 | 28.4 |
| EA40 | 100.0 | 100.0 | 47.7 | 33.1 | 30.1 | 30.8 | 27.8 | 22.6 | 26.3 | 20.5 | 39.1 | 35.7 | 58.9 | 34.7 | 33.9 | 25.9 |
| EA41 | 100.0 | 100.0 | 38.3 | 37.5 | 27.6 | 30.5 | 27.8 | 25.5 | 27.5 | 24.7 | 34.6 | 35.7 | 38.9 | 32.3 | 31.7 | 24.2 |
| EA42 | 100.0 | 100.0 | 47.6 | 39.7 | 48.7 | 49.7 | 46.1 | 37.2 | 42.8 | 35.8 | 61.4 | 52.2 | 51.8 | 43.8 | 46.4 | 35.4 |
| EA43 | 100.0 | 100.0 | 35.0 | 31.5 | 30.2 | 34.6 | 33.1 | 21.0 | 30.0 | 23.9 | 44.1 | 32.5 | 38.4 | 28.9 | 31.9 | 24.4 |
| EA44 | 100.0 | 100.0 | 29.1 | 30.8 | 27.0 | 22.0 | 26.7 | 22.1 | 21.2 | 20.2 | 32.5 | 32.5 | 37.2 | 29.0 | 27.5 | 21.0 |
| EA45 | 92.3 | 92.3 | 44.2 | 43.2 | 36.8 | 43.2 | 38.5 | 32.6 | 30.6 | 31.6 | 47.5 | 38.7 | | 36.3 | 38.5 | 29.4 |
| EA46 | 100.0 | 100.0 | 58.9 | 62.9 | 55.7 | 69.0 | 61.7 | 63.2 | 55.6 | 46.0 | 68.7 | 58.3 | 62.0 | 50.7 | 59.4 | 45.3 |
| EA47 | 100.0 | 100.0 | 45.5 | 42.6 | 39.7 | 36.6 | 40.1 | 32.1 | 34.1 | 30.2 | 48.6 | 42.7 | 48.2 | 38.6 | 39.9 | 30.5 |
| EA48 | 100.0 | 100.0 | 50.4 | 47.3 | 43.8 | 52.4 | 51.9 | 48.4 | 41.7 | 40.2 | 58.7 | 45.8 | 50.9 | 41.4 | 47.7 | 36.4 |
| EA49 | 100.0 | 100.0 | 39.8 | 37.2 | 29.2 | 35.0 | 31.9 | 26.1 | 29.1 | 21.6 | 41.5 | 35.1 | 37.3 | 34.8 | 33.2 | 25.4 |
| EA50 | 100.0 | 100.0 | 37.6 | 37.7 | 29.7 | 33.5 | 28.3 | 27.9 | 27.9 | 24.9 | 38.0 | 29.6 | 36.2 | 30.8 | 31.8 | 24.3 |
| EA51 | 100.0 | 100.0 | 56.9 | 47.8 | 49.6 | 53.1 | 52.2 | 45.7 | 37.5 | 40.8 | 66.3 | 54.1 | 61.6 | 54.5 | 51.7 | 39.4 |
| EA52 | 100.0 | 100.0 | 34.3 | 32.0 | 26.6 | 32.0 | 26.1 | 22.6 | 21.9 | 20.3 | 34.9 | 28.9 | 39.8 | 29.6 | 29.1 | 22.2 |
| EA53 | 100.0 | 100.0 | 49.0 | 48.7 | 36.9 | 53.7 | 47.8 | 44.5 | 34.5 | 40.5 | 52.7 | 42.5 | 47.4 | 43.5 | 45.1 | 34.5 |
| EA54 | 100.0 | 100.0 | 44.3 | 39.5 | 36.9 | 38.8 | 39.0 | 30.9 | 33.9 | 25.3 | 43.6 | 39.5 | 43.8 | 38.2 | 37.8 | 28.9 |
| EA55 | 100.0 | 100.0 | 42.9 | 43.1 | 33.3 | 38.3 | 35.6 | 29.7 | 33.6 | 28.3 | 43.9 | 37.9 | 40.3 | 36.9 | 37.0 | 28.2 |
| EA56 | 100.0 | 100.0 | 45.5 | 43.3 | 39.2 | 40.6 | 41.3 | 31.3 | 31.9 | 30.0 | 46.0 | 41.2 | 54.2 | 42.9 | 40.6 | 31.0 |
| EA57 | 100.0 | 100.0 | 50.9 | 43.5 | 40.0 | 39.8 | 36.8 | 32.3 | 32.6 | 29.9 | 50.5 | 42.2 | 51.0 | 40.7 | 40.9 | 31.2 |
| EA58 | 100.0 | 100.0 | 49.7 | 42.0 | 39.1 | 35.3 | 38.6 | 34.1 | 36.5 | 33.3 | 45.4 | 43.1 | 55.0 | 39.3 | 41.0 | 31.3 |
| EA59 | 100.0 | 100.0 | 19.8 | 38.0 | 33.6 | 34.7 | 40.3 | 26.8 | 31.8 | 23.0 | 45.5 | 36.9 | 41.4 | 36.8 | 34.1 | 26.0 |
| EA60 | 100.0 | 100.0 | 41.7 | 37.9 | 29.9 | 33.3 | 34.8 | 25.6 | 27.5 | 22.2 | 45.2 | 39.0 | 43.2 | 36.5 | 34.7 | 26.5 |
| EA61 | 100.0 | 100.0 | 41.7 | 37.7 | 34.8 | 35.5 | 33.7 | 30.8 | 29.4 | 16.2 | 44.6 | 34.8 | 38.2 | 36.4 | 34.5 | 26.3 |

**Notes**

Concentrations are presented as µg/m$^3$.

Exceedances of the $NO_2$ annual mean AQO of 40 µg/m$^3$ are shown in **bold**.

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

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

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

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

**Table N. $NO_2$ Diffusion Tube Results (Schools Results Only)**

| Site ID | Valid data capture for monitoring period %[(a)] | Valid data capture 2021 %[(b)] | Jan | Feb | Mar | Apr | May | June | Jul | Aug | Sept | Oct | Nov | Dec | Annual mean – raw data | Annual mean – bias adjusted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NWA1S1 | 48.7 | 48.7 | 37.2 | | | | 37.7 | | | 16.4 | | | 31.0 | 34.6 | 33.0 | 28.6 |
| NWA1S2 | 48.7 | 48.7 | 45.1 | | | | 28.2 | | | 14.0 | | | 25.1 | 28.5 | 29.1 | 25.3 |

**Notes**

Concentrations are presented as µg/m$^3$.

Exceedances of the $NO_2$ annual mean AQO of 40 µg/m$^3$ are shown in **bold**.

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

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

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

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