# 2020 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

June, 2020

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# Executive Summary: Air Quality in Our Area

The 2020 Annual Status Report is designed to provide the public with information relating to local air quality in Uttlesford, to fulfil Uttlesford District Council's statutory duty to review and assess air quality within its area, and to determine whether or not the air quality objectives are likely to be achieved.

In 2019, **no** monitoring locations in Uttlesford exceeded the Air Quality Objectives for nitrogen dioxide or particulate matter.

## Air Quality in Uttlesford

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Uttlesford is considered to be rural in nature and has the principal town of Saffron Walden as its administrative centre. Uttlesford is dissected by the M11 motorway and A120 trunk road which support Stansted International Airport in the south of the district.

Traffic emissions are the most significant source of air pollution within the district. Within Saffron Walden, the historic layout of the town results in problems with traffic flow and congestion particularly at peak times.

Uttlesford District Council has one Air Quality Management Area (AQMA) within Saffron Walden town centre, declared for Nitrogen Dioxide ($NO_2$) annual mean exceedances. However, for the third year running, no exceedances have been measured. This gives the Council grounds to examine whether the AQMA can be revoked.

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[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

# Conclusions and Priorities

Monitoring of NOx and particulates has been extended for 2019, to include further use of diffusion tubes to monitor nitrogen dioxide and automatic analysers to monitor nitrogen dioxide and particulates at locations within the district, to ensure air quality is assessed at pollution hotspots.

Air quality monitoring undertaken by Uttlesford District Council has identified that for the third year running, there were no exceedances of the annual mean objective for Nitrogen Dioxide within the Saffron Walden AQMA.

In 2020, Uttlesford District Council will work to deliver measures contained within the Air Quality Action Plan and examine whether the AQMA can be revoked.

# Local Engagement and How to get Involved

Uttlesford District Council is a member of the Essex Air Quality consortium. The purpose of the Essex Air is to promote improvements in air quality related issues. The Essex Air web site provides a daily forecast of air pollution. Also, the @EssexAir twitter feed provides localised weekly air pollution forecasts.

## Figure i.1 - Essex Air Twitter Air Quality Notifications
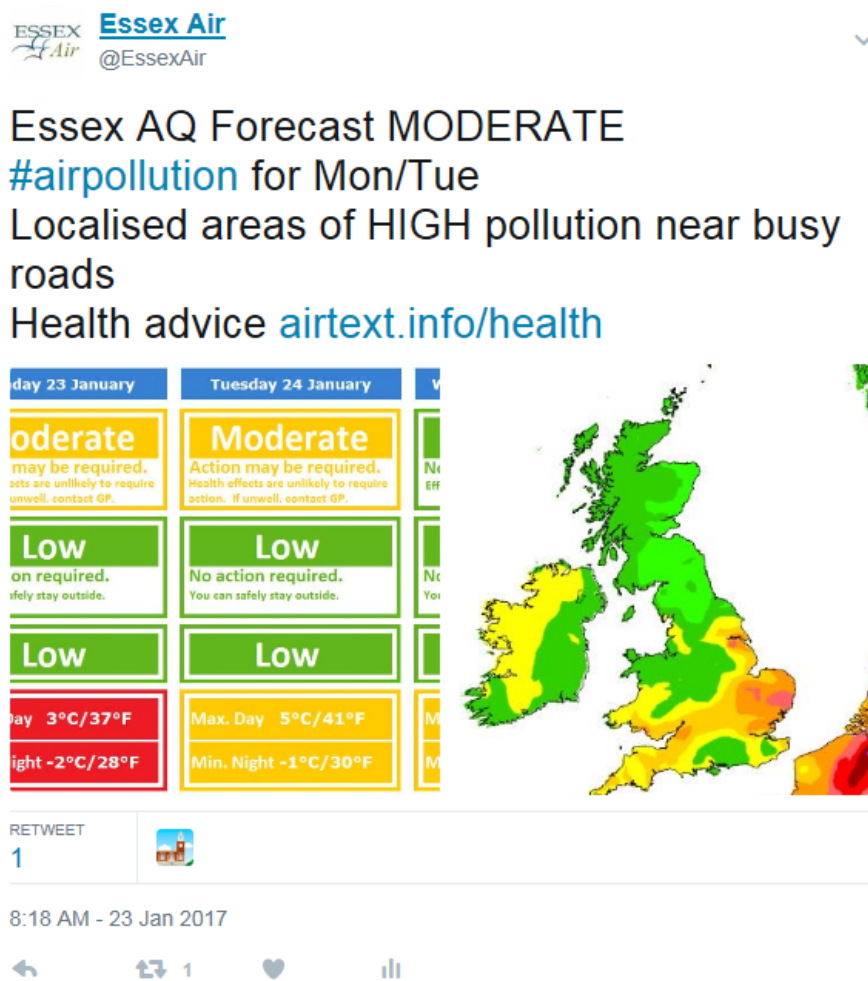


Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

# Table of Contents

## List of Tables

## List of Figures

# 1    Local Air Quality Management

This report provides an overview of air quality in Uttlesford during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Uttlesford District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

# 2 Actions 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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of the AQMA declared by Uttlesford District Council can be found Table 2.1. Further information related to AQMAs in Uttlesford, including the AQMA order and maps of AQMA boundaries are available online at:

https://uk-air.defra.gov.uk/aqma/details?aqma_ref=1520.

Alternatively, see Appendix D: Maps of Monitoring Locations and AQMAs, which provides maps of air quality monitoring locations in relation to the AQMA.

**Table 2.1 – Declared Air Quality Management Areas**

| AQMA Name | Date of Declaration | Pollutants and Air Quality Objectives | City / Town | One Line Description | Is air quality in the AQMA influenced by roads controlled by Highways England? | Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure) | | | Action Plan | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | At Declaration | | Now | Name | Date of Publication | Link |
| Saffron Walden AQMA | Declared 01/08/2007 Amended 12/09/2012 | NO2 Annual Mean | Saffron Walden | Circle of radius 1400m radius centred on Elm Grove in Saffron Walden Town Centre. | NO | 42.9 | µg/m3 | 36.95 (Average of UT044/045/046 Triplicate Diffusion Tubes) | µg/m3 | Air Quality Action Plan 2017-2022 | 01/10/2017 | https://www.uttlesford.gov.uk/CHttpHandler.ashx?id=7346&p=0 |

☒ **Uttlesford District Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

## 2.2 Progress and Impact of Measures to address Air Quality in Uttlesford

In 2017 the Council adopted a new 5-year Air Quality Action Plan which sets out local measures proportionate to the level of previous exceedances at key junctions within Saffron Walden AQMA which Uttlesford will deliver with the aim of maintaining good air quality and preventing further exceedances of the relevant objective at residential properties or other sensitive receptors.

Progress on delivering the measures is set out in Table 2.2 and a priority for the coming year will be to continue to deliver measures set out within the Action Plan.

### Table 2.2 – Progress on Measures to Improve Air Quality

| Measure No. | Measure | EU Category | EU Classification | Organisations involved and Funding Source | Planning Phase | Implementation Phase | Key Performance Indicator | Reduction in Pollutant / Emission from Measure | Progress to Date | Estimated / Actual Completion Date | Comments / Barriers to implementation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | To revise planning policies which will ensure the impact on air quality in the AQMA is given adequate consideration and weight in the decision-making process. | Policy Guidance and Development Control | Air Quality Policies | UDC | 2017 | Concurrent with adoption of Local Plan | Policies contained in the Local Plan once adopted. Use of sec 106 funds to implement action plan | Low, but potential to mitigate against emission increases associated with future growth. | Policies have been included in the submitted Regulation 19 Local Plan. Cost: within existing resources. | 2022/3 | Following the examination of the proposed Local Plan, it was withdrawn in April 2020. Work has started on a new local plan |
| 2 | To produce a planning Technical Guidance document for air quality, to ensure the impacts of new development on the AQMA, new receptors in the AQMA, and the level of mitigation are fully considered in all applications. | Policy Guidance and Development Control | Air Quality Technical Guidance | UDC | Early 2017 | Late 2017 | Publicly available by December 2017 | Low, but potential to mitigate against emission increases associated with future growth. | Technical Guidance document has been completed and included in the Regulation 19 Local Plan. Cost within existing resources | 2022/3 | See above – pending approval of new Local Plan |
| 3 | To work with ECC to facilitate the provision of new cycle/pedestrian routes and cycle storage, and promote the routes available. | Transport Planning and Infrastructure | Cycle Network | ECC & UDC | 2017 | 2017-2022 | Number of new routes provided, increase in no of storage facilities per annum and users of facilities year on year | Low, dependant on reduction in number of vehicles on road network | UDC has held meetings with ECC to review existing provisions and work with ECC on an on-going basis to achieve outcomes. Recently govt funding has been released and UDC will be making bids to support the UDC cycle strategy | | Outcomes dependent on priorities, funding & developer contributions, which the plan cannot timescale. |
| 4 | UDC to increase cycle storage on Council owned sites in Saffron Walden where practical to do so. | Transport Planning and Infrastructure | Cycle Network | UDC | 2017 | 2018 | Increase in no of storage facilities and users of facilities from baseline | Low, dependant on reduction in number of vehicles on road network | To link in with the Travel plan. Engage with property services & apply for funding where appropriate where need has been identified. . | | |
| 5 | To assist ECC in working with local schools and businesses in the review and upgrading of existing travel plans or to assist individual schools or businesses to develop and promote plans | Promoting Travel Alternatives | School and workplace travel planning | ECC & UDC | Engage with ECC and other stakeholders by mid-2017 | 2018-2022 | Number of new or upgraded TPs. Increase in walking or cycling to school or workplace from baseline | Low, dependant on reduction in number of vehicles on road network | Cost within existing resources | | Reliance on joint working with ECC and other stakeholders to develop new travel plans. |
| 6 | To support the extension of phone signal coverage and superfast broadband service to all parts of the district. | Promoting Travel Alternatives | Facilitating home working | ECC & UDC | 2017 | To be confirmed | Number of businesses and homes enabled to access superfast broadband by 2019. Increase in no of people regularly working from home | Low, dependant on reduction in number of vehicles on road network | UDC investment of £500k towards inclusion in Superfast Essex broadband procurement to be implemented by end of 2019. This has been delayed until December 2021 | | |
| 7 | To work with ECC Highways to develop a scheme of measures aimed at improving junction capacity within the AQMA identified to be necessary as part of the Local Plan once adopted. | Traffic Management | Congestion management | ECC | 2019 | To be confirmed | Junction capacity improvements at the four key junctions identified in the action plan. Reduction in queue lengths from identified baseline. | Medium, dependant on reduced congestion | UDC has held meetings with ECC to review existing provisions and work with ECC on an on-going basis to achieve outcomes, regular further meetings to be held. Some funding available from sec 106 agreements. | | Reliant on ECC work programme following approval of the Local Plan and developer contributions once commenced. Timescale beyond control of UDC. Developer contributions have been diverted to pedestrian safety issues & traffic calming on Debden Road |
| 8 | To work with ECC to assess whether changes to junction configurations and signal controls, control of parking measures on main routes through the town and access to the centre by HGVs which will demonstrably reduce congestion can be identified and implemented ahead of adoption of the local plan | Traffic Management | Congestion management | ECC | 2017-18 | To be confirmed | Improvements to junctions carried out, improved parking on main routes, restrictions to HGVs. Reduction in queue lengths | Medium, dependant on reduced congestion | No progress. To engage with ECC and North Essex Parking Partnership (NEEP) | | Reliant on ECC and North Essex Parking Partnership (NEEP) to be in agreement with any changes. No realistic target date can be applied |
| 9 | To support targeted enforcement of parking restrictions where identified to be an issue, on main routes through the town | Traffic Management | Parking enforcement on highway | UDC | 2017 | 2018 | No of parking penalty notices issued on main routes | Low, dependant on reduced congestion | Planned work stream delayed. Cost within existing resources. | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | To provide clear informative signage to Swan Meadow car park, new amenities, leisure centre, food stores, Audley End | Transport Planning and Infrastructure | Other | UDC | 2017 | 2018 | No of new signs provided | Low, dependant on reduced congestion | Appropriate signage on approaches to facilities provided, to be kept under review as new development is delivered | 2019 | Completed |
| 11 | To review UDC travel plan and review opportunities for a shared travel plan with partner organisations using UDC facilities | Promoting Travel Alternatives | Workplace Travel Plans | UDC | 2017 | 2019 | Revised UDC TP by end of 2017. Reduction in car travel to work as measured by survey &occupied car spaces, reduction in business mileage of 5% pa | Low, dependant on reduced congestion | Under review following changes arising from the Covid -19 pandemic. To link in with the Councils Climate Change Strategy. Cost within existing resources | | |
| 12 | To pursue options to install renewable energy technologies at suitable sites within Saffron Walden,to review UDC fleet procurement and implement changes where identified as practicable, and likely emission reductions justify the capital expenditure | Promoting Low Emission Plant and transport | Low emission fuels for stationary sources, company vehicle procurement, prioritising uptake of low emission fuels | UDC | 2017 | 2017-2022 | No kW renewable energy within SW, review of fuel usage and type, no of UDC LEVs | Medium | Meetings held with vehicle procurement to consider options for fleet procurement and conversion of existing fleet to low emission fuel, and cost benefit. Uttlesford Norsk partnership replaced 17 older vehicles with Euro 6 complaint fleet. This included 2x electric vehicles | | Awaiting resources |
| 13 | To encourage ECC to procure bus services with integrated timetables, high quality facilities, and a frequent and reliable service linked to the rail service at Audley End. Information on Public Transport services to be readily available in UDC buildings and via the website. | Transport Planning and Infrastructure | Public transport service improvements | ECC & UDC | Mid 2017 | 2018-19 | No of new or improved services available, information available in UDC buildings. Increase in bus usage of 5% | Low | No progress | | Awaiting resources |
| 14 | To identify opportunities to raise public awareness of air quality issues through education initiatives and publicity campaigns | Public Information | Via leaflets Via the internet | UDC | 2017-2022 | 2017-2022 | No of campaigns, target one per annum. | Low, dependant on behavioural changes | Targeted campaign delivered to schools & the general public, coincided with National Clean Air Day in June 2018 & June 2019 Cost within existing resources. 2020 event delayed due to Covid -19 pandemic | | Ongoing, however limited due to resource |
| 15 | To provide advice and raise awareness of car sharing and associated database software available to employers | Alternatives to private vehicle use | Car and lift sharing schemes | UDC | 2017 | 2018 | No of new car sharing schemes set up, target one per annum. Reduction of 1-5% of private car commuter journeys | Low dependant on reduced congestion | In house promotion linked to Clean Air Day 2018 & 2019. Project suspended due to Covid-19 pandemic. Cost within existing resources | | Scheme uptake outside control of UDC. However, district wide promotion of schemes to take place on an annual basis as part of other awareness linked to measure 14. |
| 16 | To consider the provision of preferential charging for UDC controlled parking spaces for vehicles meeting low emission standards | Traffic Management | Emission based parking or permit schemes | UDC | 2019 | 2020 | Review of charging policy | Low, dependant on raised uptake of LEVs | Project delayed due to resource issues. Feasibility study delayed until Spring 2021 | | |
| 17 | To engage with the Uttlesford licensed operators with the aim of introducing emission controls for licensed taxis operating within the AQMA. | Promoting low emission transport | Taxi licence conditions | UDC | 2017 | 2018 | Review of licensing policy | Low | Upgraded licensed vehicle emissions policy. | 2019 | Completed |
| 18 | To encourage ECC to set emission standards for new and existing buses under contract operating within the AQMA | Vehicle fleet efficiency | Promoting low emission public transport | ECC | 2017-18 | To be confirmed | Review of contractual arrangements | Low | No progress | | Awaiting resources |
| 19 | To work with the operators of fleet vehicles within the town to facilitate the introduction of LEV's | Promoting low emission transport | Company Vehicle Procurement - Prioritising uptake of low emission vehicles | UDC | 2018 | To be confirmed | No of LEV fleet vehicles on town road network. | Potentially medium, dependant on uptake of vehicles. | No progress | | Reliance on engagement with fleet operators to achieve outcome. |
| 20 | Provide electric charging points on UDC owned parking spaces in the town where practical and economically feasible to do so, and encourage the provision of points at suitable privately owned sites | Promoting low emission transport | Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging | UDC | 2018 | 2019-2022 | No of points installed per annum, target 4 | Potentially medium, dependant on uptake of vehicles. | Ongoing. Charging points at the Common Car Park have been delivered. Currently there is a £100K bid, plus £40K match funding for additional car parks in place. 4 post at London Road are planned for August | | |
| 21 | To work with ECC on introducing delivery time restrictions to High Street SW | Freight and delivery management | Off peak hours deliveries | ECC | 2017 | To be confirmed | Restrictions in place, reductions in HGV parking | Low | No progress | | Awaiting resources |
| 22 | To carry out additional monitoring of NO2 within Saffron Walden to inform basis for decision making. | Public Information | Other | UDC | 2017 | 2017-2022 | Provision of localised data for incorporation into air quality modelling | Low, provides evidence base for actions | Permanent Automatic monitoring station at London Road scheduled for 2019. Extension of diffusion tube sites to include co-location. | 2019 | Completed |

## 2.3 PM2.5 – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM2.5 (particulate matter with an aerodynamic diameter of 2.5μm or less). There is clear evidence that PM2.5 has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Uttlesford District Council monitors PM2.5 concentrations within Saffron Walden town centre. Since monitoring started in 2014, monitored concentrations have been below 20μg/m³ and are likely to be representative of the local area.

Uttlesford District Council notes the Public Health Outcomes Framework indicator D01 – Fraction of mortality attributable to particulate (PM2.5) air pollution which for 2018 gave a value of 5.3% down from 5.5% in 2011.

**Figure 2.1 - Public Health Framework Indicator 3.01 Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution**
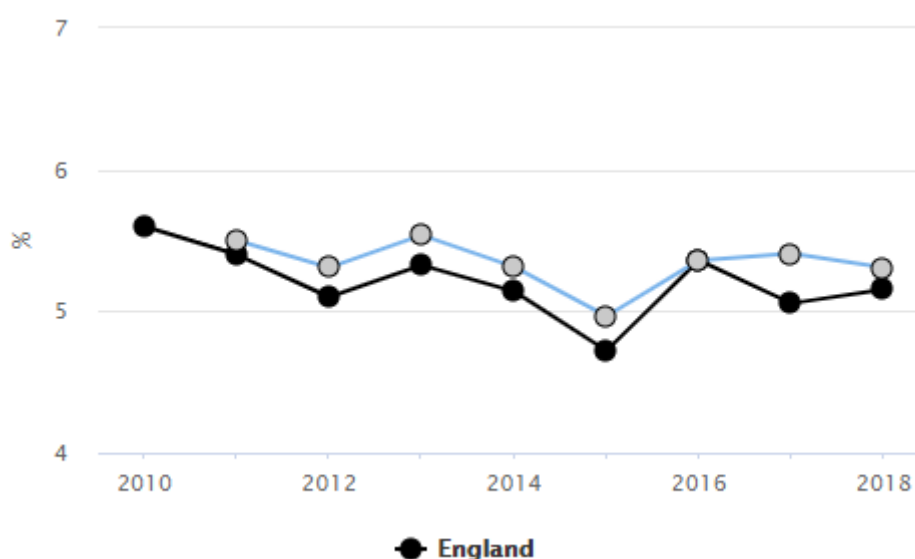


Uttlesford District Council is taking the following measures to address PM2.5:

- Use of Essex Air twitter to encourage the reporting of smoky vehicles through the DVSA reporting service. It is possible to report either heavy goods vehicles or public service vehicles (buses).

- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of PM2.5

# 3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

## 3.1 Summary of Monitoring Undertaken

### 3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Uttlesford District Council undertook automatic (continuous) monitoring with reference analysers at three sites during 2018.

- Site UTT2 Thaxted Road, Saffron Walden measuring $NO_2$

- Site UTT3 London Road, Saffron Walden measuring $NO_2$, $PM_{2.5}$ and $PM_{10}$

Table A.1 in Appendix A provides detail of the sites.

Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Maps showing the location of the monitoring sites are provided in Appendix D.

### 3.1.2 Non-Automatic Monitoring Sites

Uttlesford District Council undertook non-automatic (passive) monitoring of $NO_2$ at 31 sites using 33 diffusion tubes during 2019.

Table A.2 in Appendix A provides detail of the sites.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

Maps showing the location of the monitoring sites are provided in <Appendix D.

## 3.2  Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4]. For diffusion tubes, no "annualisation" (where the data capture falls below 75%) has been necessary. It should be noted that UTT3 automatic analyser recorded only 74.33% valid data capture however has not been annualised as the majority of the data gaps are small intraday issues which means that annualisation would not be possible in the same way as adjusting short term seasonal studies

Distance correction[5] has been applied in Appendix B. Further details on adjustments are provided in Appendix C.

### 3.2.1      Nitrogen Dioxide (NO$_2$)

Table A. in Appendix A compares the ratified and adjusted monitored NO$_2$ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m$^3$. Note that the concentration data presented in Table A. represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B. includes distance corrected values, only where relevant.

Figure A.1 in Appendix A compares the diffusion tube monitoring locations outside of the AQMA for the past 5 years with the air quality objective of 40µg/m$^3$.

Figure A.2 in Appendix A compares the diffusion tube monitoring locations inside of the AQMA for the past 5 years with the air quality objective of 40µg/m$^3$.

In 2019, Uttlesford District Council did **not** measure any exceedances of the annual mean or 1-Hr mean Air Quality Objective for Nitrogen Dioxide (NO$_2$).

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[4] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[5] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

LAQM Annual Status Report 2020

### 3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored $PM_{10}$ annual mean concentrations for the past five years with the air quality objective of $40\mu g/m^3$. Figure A.5 in Appendix A presents this data in graphical format.

Figure A.6 in Appendix A presents the ratified and adjusted $PM_{10}$ monitored from the UTT3 site in 2019.

Table A.6 in Appendix A compares the ratified continuous monitored $PM_{10}$ daily mean concentrations for the past 5 years with the air quality objective of $50\mu g/m^3$, not to be exceeded more than 35 times per year.

Figure A.7 presents five year trend data for $PM_{10}$ measured at UTT3.

The reported data has been fully ratified and the Met One $PM_{10}$ measurements are corrected for slope by dividing the data by 1.2.

In 2019, Uttlesford District Council did not measure any exceedances of the annual mean or 24-Hr mean Air Quality Objective for Particulate Matter ($PM_{10}$).

### 3.2.3 Particulate Matter (PM₂.₅)

$PM_{2.5}$ has been monitored in Saffron Walden for five years. From 2015 to 2018 this was at the UTT1 monitoring site. For 2019 this has been moved to the UTT3 monitoring site.

Details of the monitoring site can be found in Table A.1 in Appendix A. The location can be seen on Figure D.1.

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years in a tabular format.

Figure A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years in graphical format.

Figure A.9 in Appendix A presents the ratified and adjusted $PM_{2.5}$ monitored from the UTT3 site in 2019.

Figure A.10 in Appendix A presents a comparison between $PM_{2.5}$ and $PM_{10}$ monitored from the UTT3 site in 2019.

The reported data has been fully ratified and the Met One $PM_{2.5}$ measurements are not adjusted due to the presence of the smart heater.

# Appendix A: Monitoring Results

## Table A.1 - Details of Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Pollutants Monitored | In AQMA? | Monitoring Technique | Distance to Relevant Exposure (m) [1] | Distance to kerb of nearest road (m) [2] | Inlet Height (m) |
|---------|-----------|-----------|-------------------------|--------------------------|----------------------|----------|----------------------|----------------------------------------|-------------------------------------------|------------------|
| UTT1 | Hill St, Saffron Walden | Roadside | 553825 | 238409 | $PM_{2.5}$ | Y | BAM (with Smart Heater) | 4.1 | 2 | 1 |
| UTT2 | Junction Thaxted Rd & Radwinter Rd, Saffron Walden | Roadside | 554357 | 238444 | $NOx$, $NO$, $NO_2$ | NO | Chemiluminescent | 0 | 2 | 1 |
| UTT3 | London Road, Saffron Walden | Roadside | 553570 | 237908 | $NOx$, $NO$, $NO_2$; $PM_{10}$; $PM_{2.5}$ | NO | Chemiluminescent, BAM, BAM (with Smart Heater) | 6 | 3 | 2.8 |

**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

UTT1 was not operation in 2019 but is kept due to reporting historical $PM_{2.5}$ data.

## Table A.2 – Details of Non-Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) [1] | Distance to kerb of nearest road (m) [2] | Tube collocated with a Continuous Analyser? | Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| UT001 | High Street, Saffron Walden | Urban Centre | 553709 | 238417 | NO2 | Yes | 15 | 1.5 | NO | 2 |
| UT003 | Gibson Gardens, Saffron Walden | Urban Background | 553554 | 238218 | NO2 | Yes | 5.1 | 1.5 | NO | 2 |
| UT004 | YHA, Saffron Walden | Kerbside | 553598 | 238595 | NO2 | Yes | 0.8 | 0.4 | NO | 2 |
| UT005 | Thaxted Road, Saffron Walden | Kerbside | 554336 | 238454 | NO2 | Yes | 2.4 | 0.5 | NO | 2 |
| UT009 | Burton End | Roadside | 552403 | 223965 | NO2 | No | 17 | 27 | NO | 2 |
| UT010 | Newport M11 | Kerbside | 551246 | 233649 | NO2 | No | 40 | 0.1 | NO | 2 |
| UT011 | 33 High Street, Saffron Walden | Urban Centre | 553697 | 238452 | NO2 | Yes | 0 | 2.7 | NO | 2 |
| UT012 | Town Hall, Saffron Walden | Urban Background | 553879 | 238510 | NO2 | Yes | 20 | 0.1 | NO | 2 |
| UT015 | 57 High Street, Saffron Walden | Roadside | 553739 | 238317 | NO2 | Yes | 0 | 4 | NO | 2 |
| UT016 | Radwinter Road, Saffron Walden | Roadside | 554413 | 238474 | NO2 | Yes | 8 | 1.6 | NO | 2 |
| UT017 | Stortford Rd, Lt Canfield | Roadside | 560023 | 221444 | NO2 | No | 14 | 2.5 | NO | 2 |

| UT018 | 17 Cambridge Road, Stansted | Roadside | 551035 | 225199 | NO2 | No | 3 | 1.5 | NO | 2 |
|---|---|---|---|---|---|---|---|---|---|---|
| UT019 | Silver Street, Stansted | Roadside | 550950 | 225039 | NO2 | No | 3.5 | 2 | NO | 2 |
| UT020 | Grove Hill, Stansted | Roadside | 551535 | 225065 | NO2 | No | 0 | 3.3 | NO | 2 |
| UT021 | 41 East Street, Saffron Walden | Roadside | 554212 | 238436 | NO2 | Yes | 0 | 2 | NO | 2 |
| UT024 | Takeley Hill, Hatfield Forest | Rural | 554671 | 221010 | NO2 | No | N/A | 118 | NO | 2 |
| UT028 | London Rd, Saffron Walden | Roadside | 553755 | 238092 | NO2 | Yes | 0.8 | 2 | NO | 2 |
| UT029 | Debden Road, Saffron Walden | Roadside | 553770 | 238076 | NO2 | Yes | 0.5 | 0.5 | NO | 2 |
| UT030 | Friends School, Saffron Walden | Kerbside | 553875 | 237764 | NO2 | Yes | 10 | 0.5 | NO | 2 |
| UT031 | Mount Pleasant Road, Saffron Walden | Roadside | 554178 | 237767 | NO2 | Yes | 2 | 1.5 | NO | 2 |
| UT032 | Borough Lane, Saffron Walden | Roadside | 553625 | 237856 | NO2 | Yes | 0 | 7 | NO | 2 |
| UT033 | Chapel Hill, Stansted | Roadside | 551377 | 224913 | NO2 | No | 0 | 3 | NO | 2 |
| UT034 | Four Ashes, Takeley | Roadside | 556101 | 221243 | NO2 | No | 8 | 1.5 | NO | 2 |
| UT036 | Church Street, Saffron Walden | Urban Centre | 553718 | 238530 | NO2 | Yes | 0 | 1 | NO | 2 |
| UT037 | Castle Street, Saffron Walden | Kerbside | 553923 | 238770 | NO2 | Yes | 1 | 1 | NO | 2 |
| UT039 | Newport High Street | Roadside | 552156 | 234034 | NO2 | No | 0 | 1.2 | NO | 2 |

| UT040 | Wawel Cottage, Newport | Roadside | 552113 | 234505 | NO2 | No | 0 | 6 | NO | 2 |
| UT041 | Rose Cottage, Newport | Roadside | 552091 | 233630 | NO2 | No | 0 | 3 | NO | 2 |
| UT042 | Debden Road, Newport | Roadside | 552152 | 233878 | NO2 | No | 0.5 | 0.5 | NO | 2 |
| UT043 | Gaces Acre, Newport | Roadside | 552135 | 234344 | NO2 | No | 1 | 2 | NO | 2 |
| UT044 | Thaxted Road Co-located 1 | Roadside | 554357 | 238443 | NO2 | Yes | 0 | 2 | YES | 1 |
| UT045 | Thaxted Road Co-located 2 | Roadside | 554357 | 238443 | NO2 | Yes | 0 | 2 | YES | 1 |
| UT046 | Thaxted Road Co-located 3 | Roadside | 554357 | 238443 | NO2 | Yes | 0 | 2 | YES | 1 |

**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.

LAQM Annual Status Report 2020

## Table A.3 – Annual Mean NO₂ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2019 (%) [2] | NO₂ Annual Mean Concentration (µg/m³) [3] [4] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| UTT2 | 554358.00 | 238444.00 | Roadside | Automatic | 88.15 | 88.15 | N/A | N/A | N/A | 35.31 | 32.70 |
| UTT3 | 553570.00 | 237908.00 | Roadside | Automatic | 74.33 | 74.33 | N/A | 23.95 | 18.34 | 21.17 | 19.57 |
| UT001 | 553709.00 | 238417.00 | Urban Centre | Diffusion Tube | 91.67 | 91.67 | 36.35 | 40.04 | 33.96 | 19.16 | 29.97 |
| UT003 | 553554.00 | 238218.00 | Urban Background | Diffusion Tube | 91.67 | 91.67 | 12.26 | 16.22 | 13.43 | 11.20 | 11.11 |
| UT004 | 553598.00 | 238595.00 | Kerbside | Diffusion Tube | 100.00 | 100.00 | 42.17 | 46.90 | 38.00 | 30.61 | 35.13 |
| UT005 | 554336.00 | 238454.00 | Kerbside | Diffusion Tube | 100.00 | 100.00 | 41.17 | 47.52 | 37.98 | 28.46 | 33.86 |
| UT009 | 552403.00 | 223965.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | 35.51 | 43.04 | 36.82 | 28.11 | 30.14 |
| UT010 | 551246.00 | 233649.00 | Kerbside | Diffusion Tube | 91.67 | 91.67 | 25.10 | 31.02 | 25.02 | 14.78 | 21.45 |
| UT011 | 553697.00 | 238452.00 | Urban Centre | Diffusion Tube | 100.00 | 100.00 | 32.90 | 38.57 | 30.97 | 29.02 | 26.31 |
| UT012 | 553879.00 | 238510.00 | Urban Background | Diffusion Tube | 100.00 | 100.00 | 18.52 | 20.48 | 16.20 | 11.14 | 15.54 |
| UT015 | 553739.00 | 238317.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | 25.76 | 24.87 |
| UT016 | 554413.00 | 238474.00 | Roadside | Diffusion Tube | 83.33 | 83.33 | N/A | N/A | N/A | 32.12 | 30.68 |
| UT017 | 560023.00 | 221444.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 14.87 | 14.64 |
| UT018 | 551035.00 | 225199.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 26.72 | 24.39 |
| UT019 | 550950.00 | 225039.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 35.02 | 31.89 |
| UT020 | 551535.00 | 225065.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | 35.65 | 30.68 |
| UT021 | 554212.00 | 238436.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | 27.05 | 23.96 |
| UT024 | 554671.00 | 221010.00 | Rural | Diffusion Tube | 83.33 | 83.33 | 14.73 | 17.01 | 15.49 | 13.06 | 11.39 |
| UT028 | 553755.00 | 238092.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | 37.96 | 44.76 | 37.44 | 33.36 | 31.23 |
| UT029 | 553770.00 | 238076.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | 21.58 | 26.50 | 21.41 | 20.46 | 20.06 |
| UT030 | 553875.00 | 237764.00 | Kerbside | Diffusion Tube | 100.00 | 100.00 | 29.01 | 35.27 | 26.10 | 27.16 | 24.98 |
| UT031 | 554178.00 | 237767.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | 22.00 | 26.22 | 21.38 | 19.83 | 20.65 |
| UT032 | 553625.00 | 237856.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | 16.79 | 19.71 | 17.36 | 15.21 | 15.00 |
| UT033 | 551377.00 | 224913.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | 27.61 | 36.18 | 26.99 | 26.92 | 23.80 |
| UT034 | 556101.00 | 221243.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | 26.08 | 35.15 | 29.79 | 26.23 | 24.61 |
| UT036 | 553718.00 | 238530.00 | Urban Centre | Diffusion Tube | 100.00 | 100.00 | 21.63 | 27.09 | 20.87 | 19.16 | 18.39 |
| UT037 | 553923.00 | 238770.00 | Kerbside | Diffusion Tube | 91.67 | 91.67 | 24.19 | 29.08 | 23.97 | 22.01 | 22.43 |
| UT039 | 552156.00 | 234034.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | 31.35 | 30.11 | 27.10 |
| UT040 | 552113.00 | 234505.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 19.80 | 20.51 |
| UT041 | 552091.00 | 233630.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | 18.65 | 19.16 |
| UT042 | 552152.00 | 233878.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | N/A | 24.06 |
| UT043 | 552135.00 | 234344.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | N/A | 22.93 |
| UT044 | 554357.00 | 238443.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | N/A | 36.57 |
| UT045 | 554357.00 | 238443.00 | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | N/A | 37.04 |
| UT046 | 554357.00 | 238443.00 | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | N/A | 37.25 |

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted for diffusion tubes where data capture is <75%. It should be noted that UTT3 automatic analyser recorded only 74.33% valid data capture however has not been annualised as the majority of the data gaps are small intraday issues which means that annualisation would not be possible in the same way as adjusting short term seasonal studies**

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

**Notes:**

Exceedances of the NO$_2$ annual mean objective of 40µg/m$^3$ are shown in **bold**.

NO$_2$ annual means exceeding 60µg/m$^3$, indicating a potential exceedance of the NO$_2$ 1-hour mean objective are shown in **bold and underlined.**

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

**Figure A.1 – Trends in Diffusion Tube Annual Mean NO$_2$ Concentrations outside the AQMA**

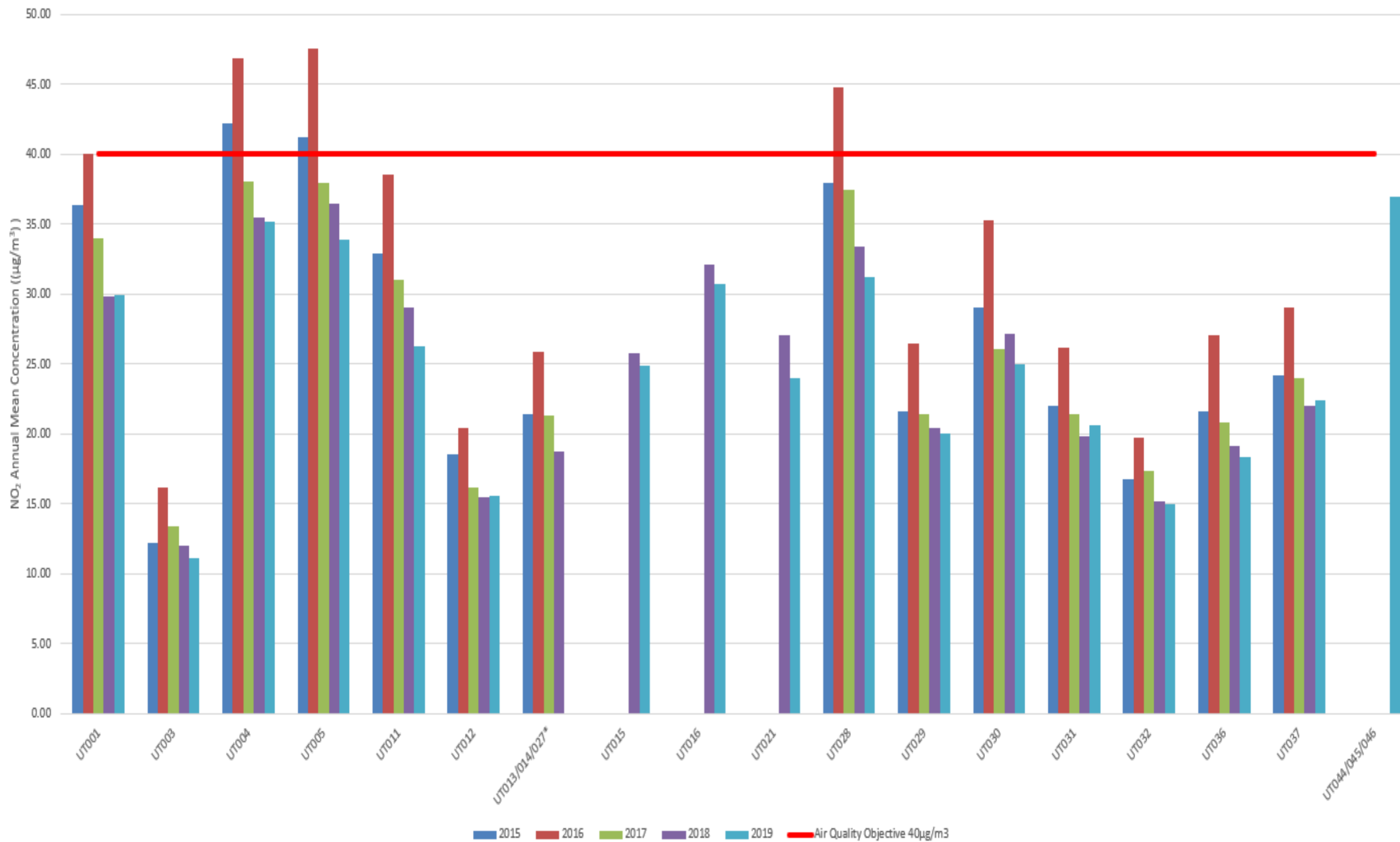**Figure A.2 – Trends in Annual Mean NO₂ Concentrations inside of the AQMA**

**Figure A.3 – UTT2 Thaxted Road NO$_2$ Hourly Chart**
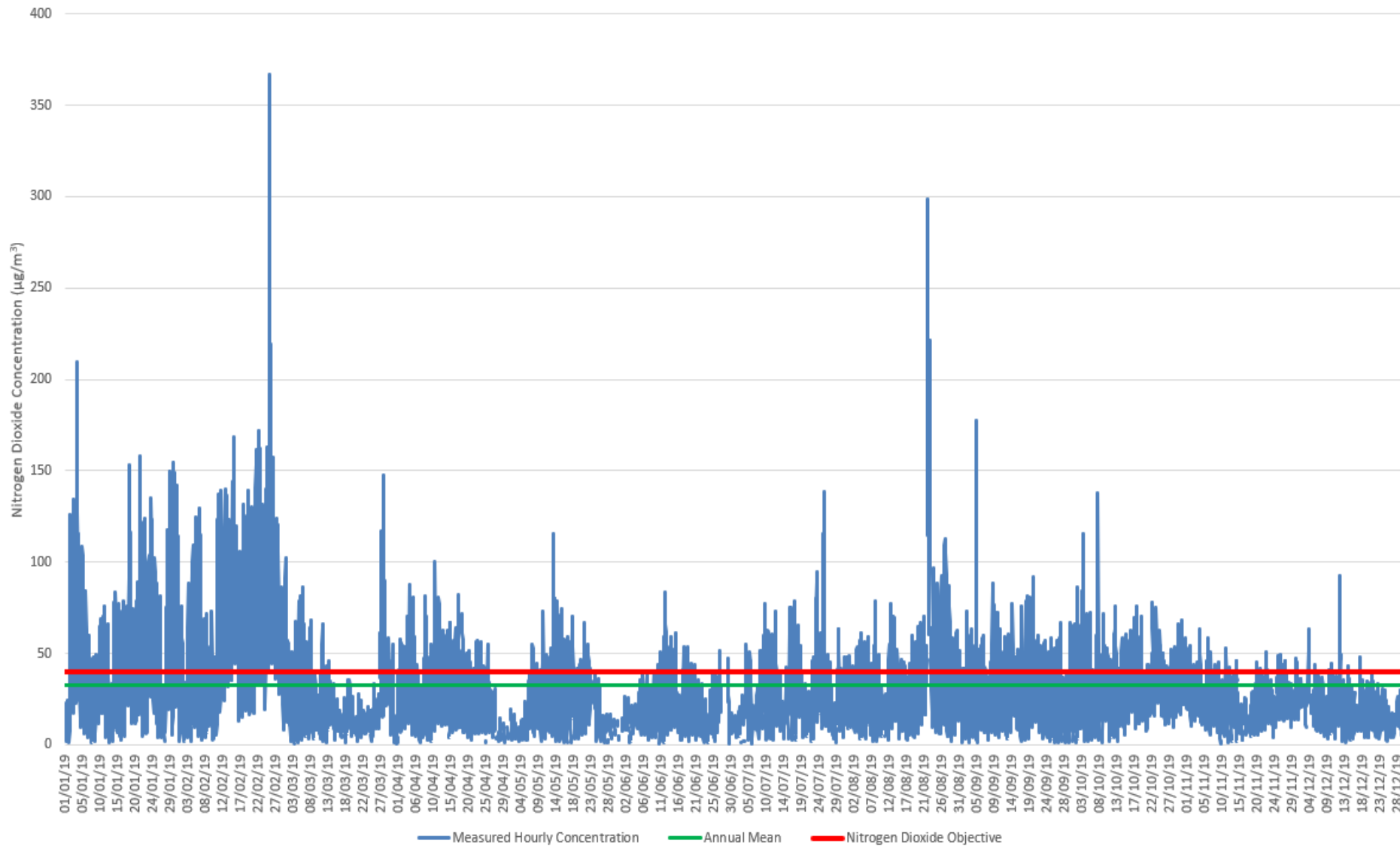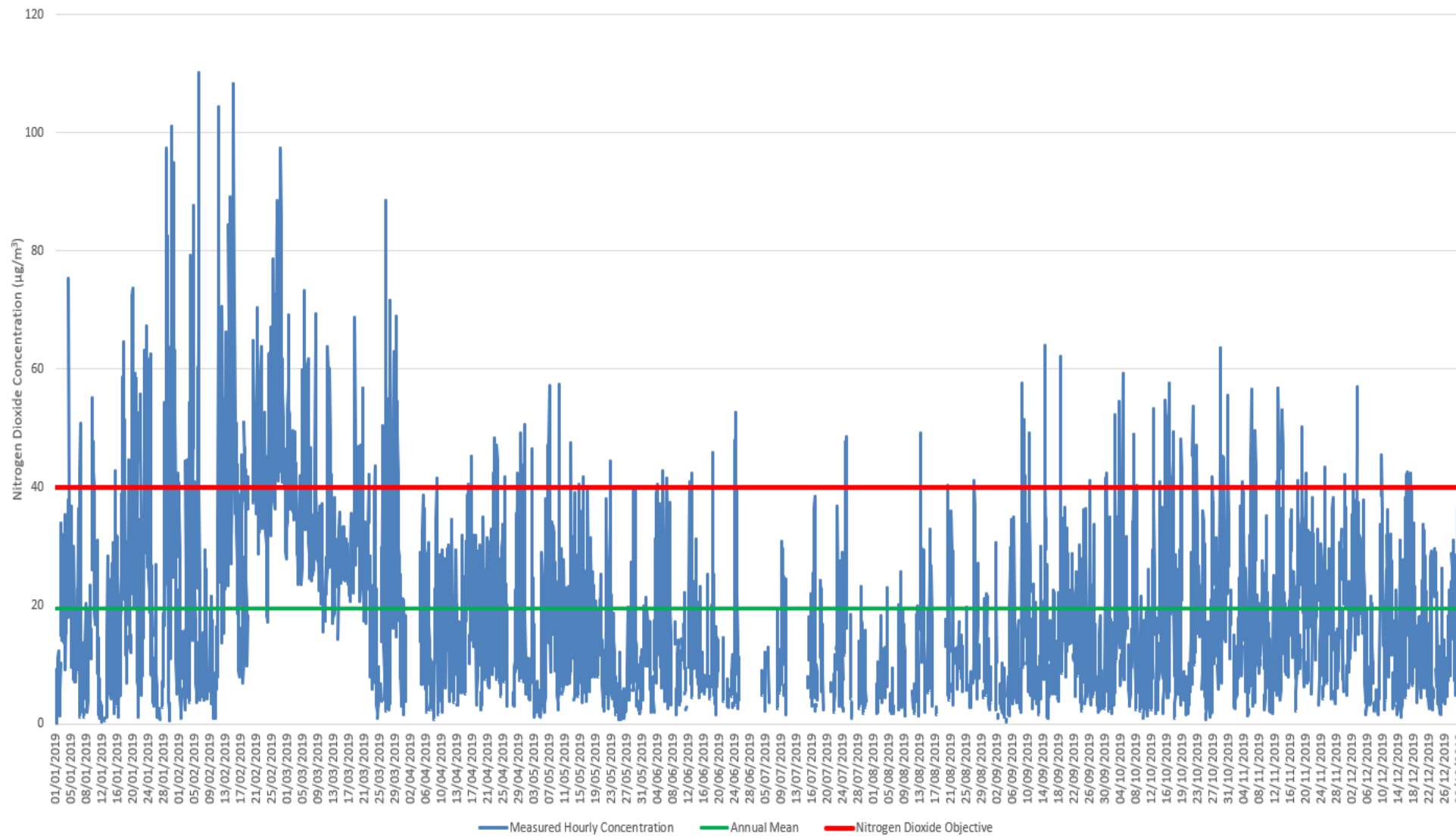
**Figure A.4 – UTT3 London Road NO₂ Hourly Chart**

## Table A.4 – 1-Hour Mean NO$_2$ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2019 (%) [2] | NO$_2$ 1-Hour Means > 200µg/m$^3$ [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| UTT2 | 554357 | 238444 | Roadside | Automatic | 88.15 | 88.15 | N/A | N/A | N/A | 0 (139.31) | 8 |
| UTT3 | 553570 | 237908 | Roadside | Automatic | 74.33 | 74.33 | N/A | 0 (133.57) | 1 | 0 (102.71) | 0 (89.07) |

**Notes:**

Exceedances of the NO$_2$ 1-hour mean objective (200µg/m$^3$ not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

## Table A.5 – Annual Mean PM$_{10}$ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2019 (%) [2] | PM$_{10}$ Annual Mean Concentration (µg/m$^3$) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| UTT3 | 553570 | 237908 | Roadside | 94.79 | 94.79 | N/A | 24.5 | 24.18 | 25.52 | 24.67 |

☒ **Annualisation has been conducted where data capture is <75%**

**Notes:**

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

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

## Figure A.5 – Trends in Annual Mean PM$_{10}$ Concentrations
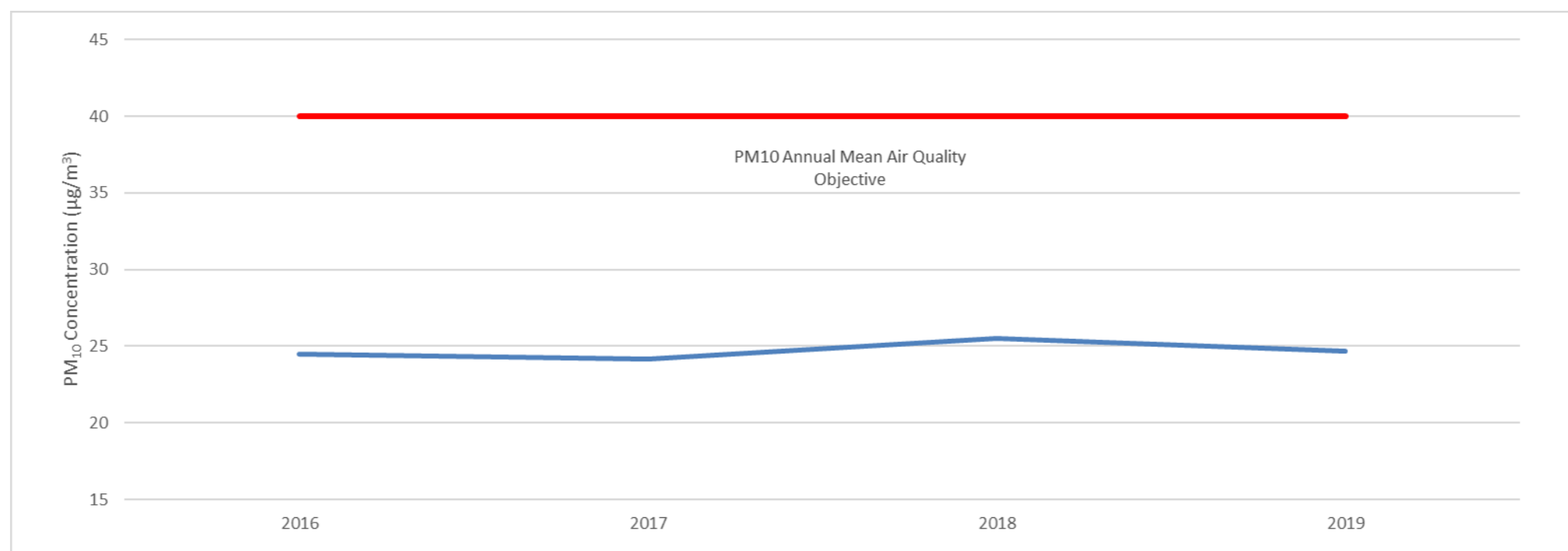
**Figure A.6 – UTT3 London Road PM$_{10}$ Chart**
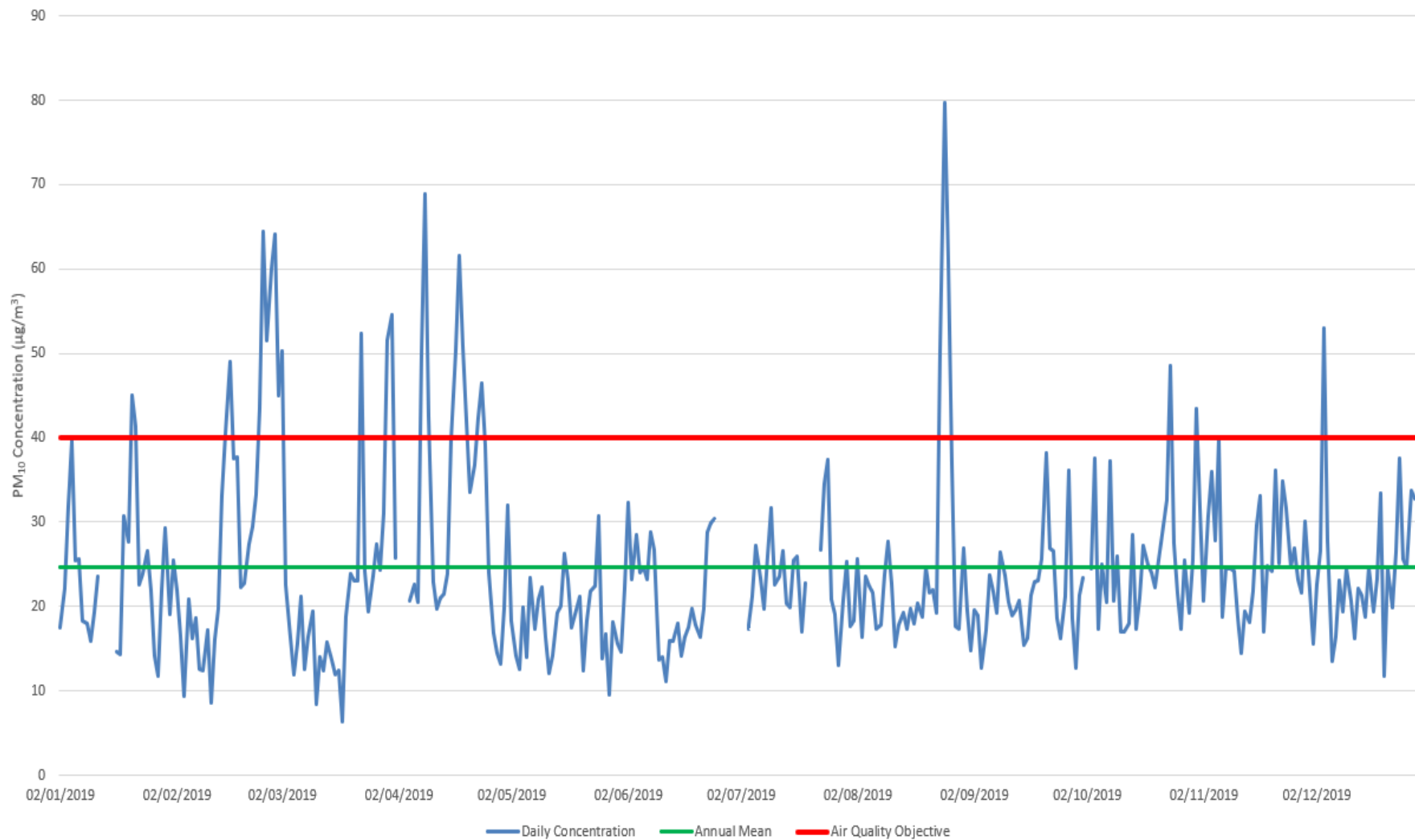
## Table A.1 – 24-Hour Mean PM$_{10}$ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2019 (%) [2] | PM$_{10}$ 24-Hour Means > 50µg/m$^3$ [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| UTT3 | 553570 | 237908 | Roadside | 94.79 | 94.79 | N/A | 6 (43.47) | 19 | 8 (38.63) | 16 |

**Notes:**

Exceedances of the PM$_{10}$ 24-hour mean objective (50µg/m$^3$ not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

## Figure A.7 – Trends in Number of UTT3 24-Hour Mean PM$_{10}$ Results >50µg/m$^3$
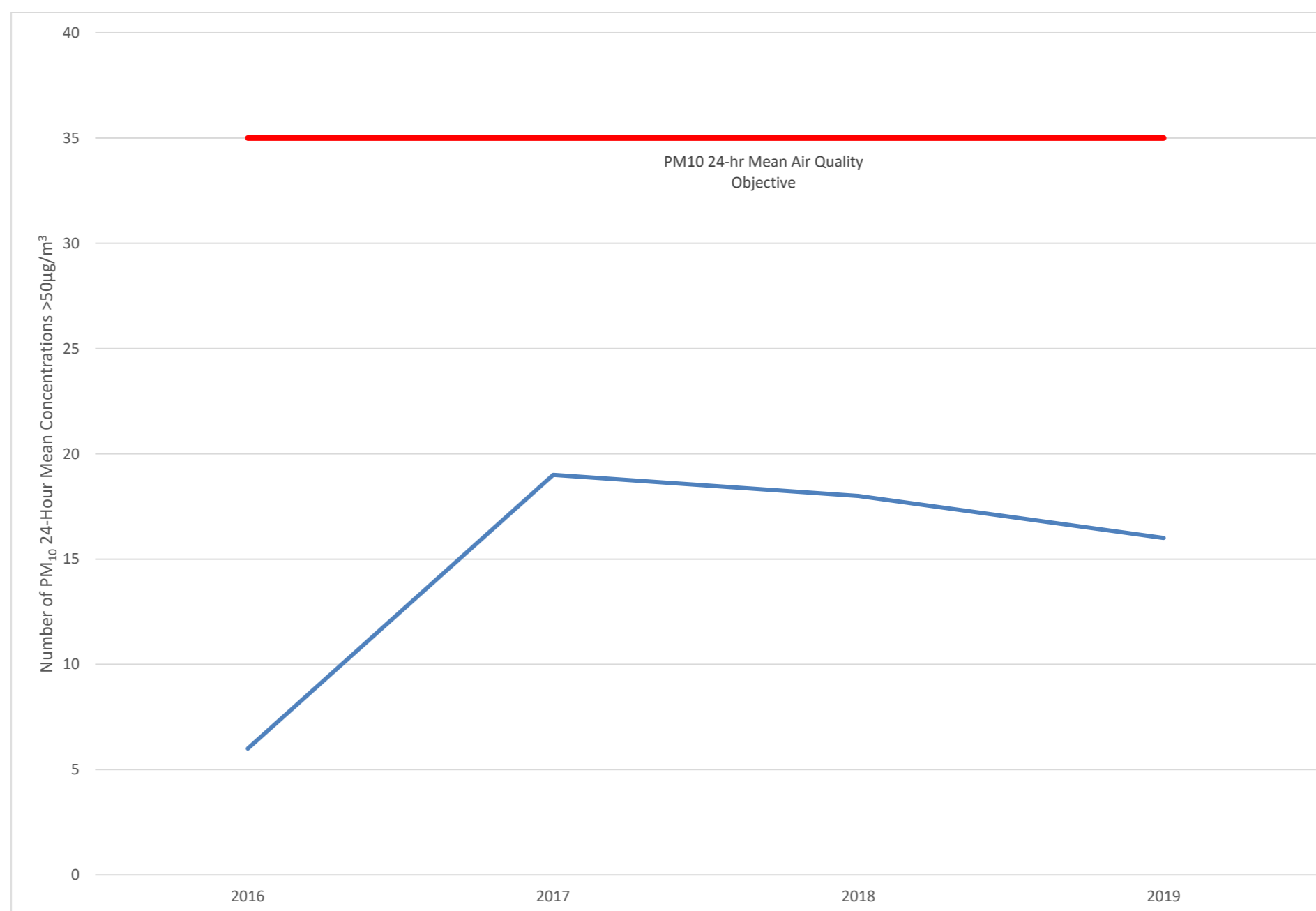
### Table A.7 – PM~2.5~ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2019 (%) [2] | PM2.5 Annual Mean Concentration (µg/m³) [3] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| UTT1 | 553825 | 238409 | Roadside | N/A | N/A | 19.3 | 17.27 | 18.45 | 17.52 | N/A |
| UTT3 | 553570 | 237908 | Roadside | 92.6 | 92.6 | N/A | N/A | N/A | N/A | 13.75 |

☒ **Annualisation has been conducted where data capture is <75%**

**Notes:**

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

### Figure A.8 – Trends in Annual Mean PM~2.5~ Concentrations

**Figure A.9 – UTT3 London Road PM2.5 Chart**

### Figure A.10 – UTT3 London Road PM2.5 / PM10 Comparison Chart

# Appendix B: Full Monthly Diffusion Tube Results for 2019

## Table B.1 - NO₂ Monthly Diffusion Tube Results - 2019

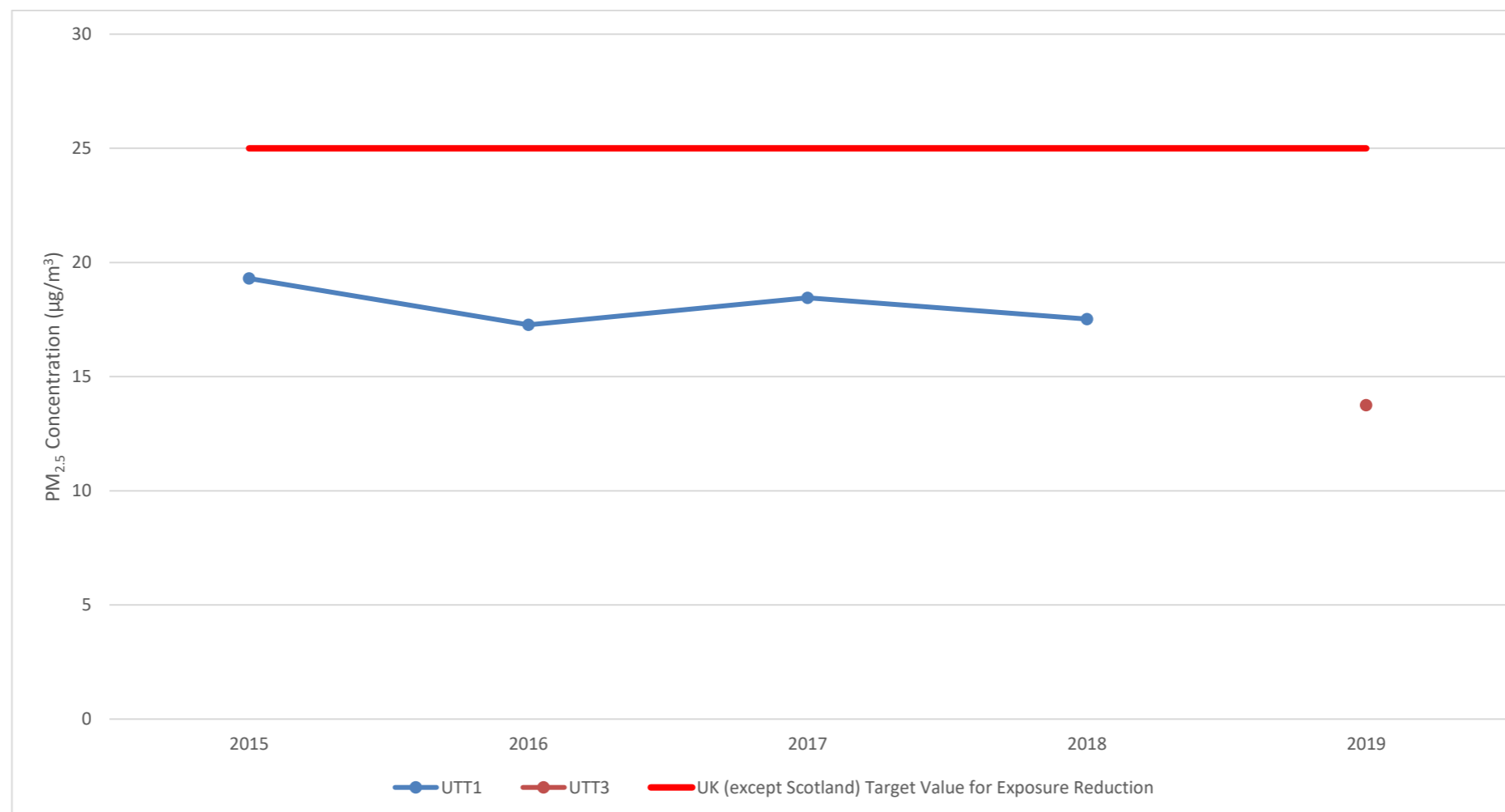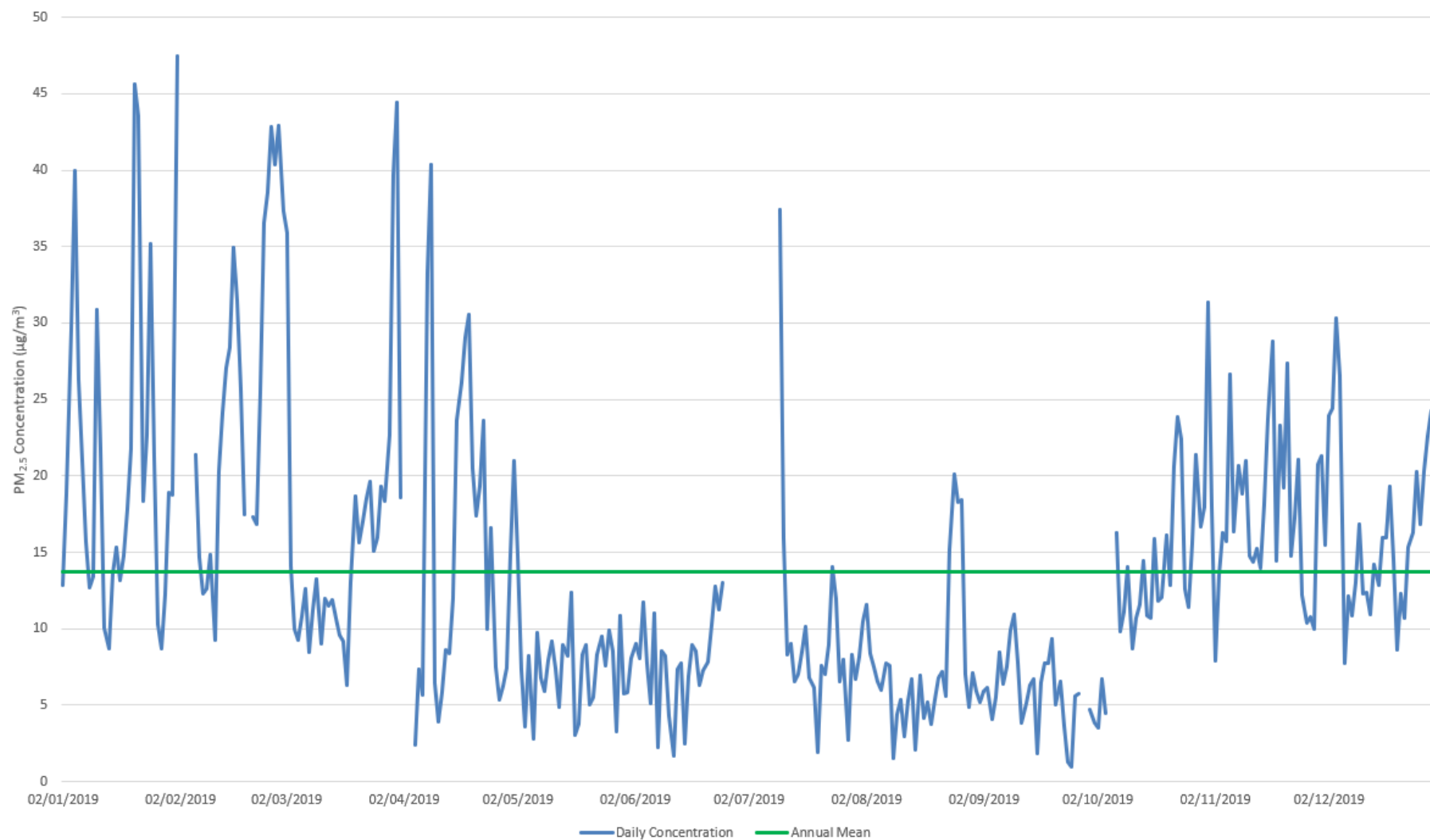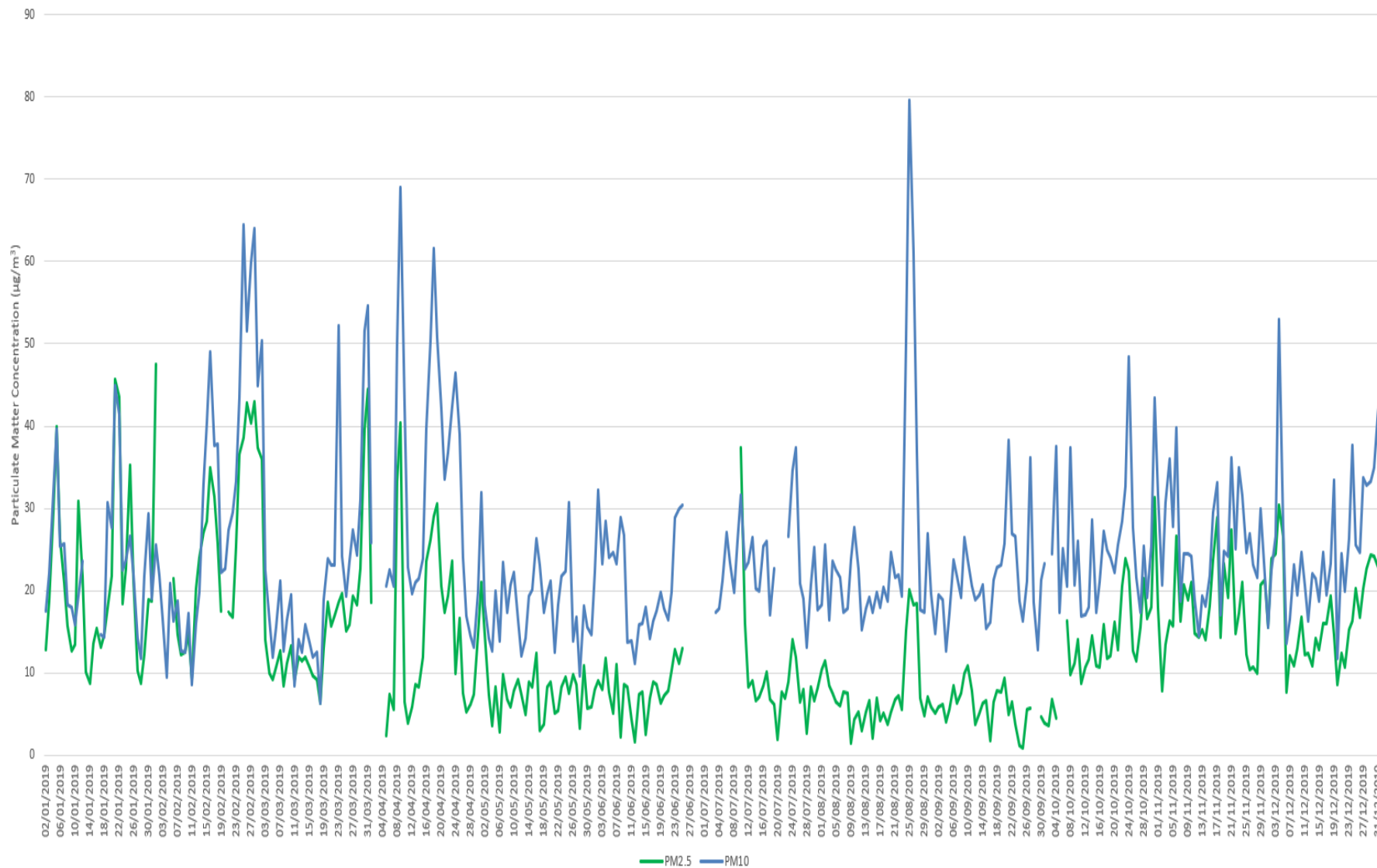| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | NO₂ Mean Concentrations (µg/m³) | | | | | | | | | | | | Annual Mean | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Raw Data | Bias Adjusted (0.75) and Annualised [1] | Distance Corrected to Nearest Exposure [2] |
| UT001 | 553709.00 | 238417.00 | 46.80 | 51.10 | 42.40 | 31.70 | 34.70 | 33.20 | 35.80 | 36.10 | 37.60 | 39.50 | 50.70 | Missing | 39.96 | 29.97 | 19.82 |
| UT003 | 553554.00 | 238218.00 | Missing | 22.80 | 18.20 | 13.80 | 9.50 | 10.10 | 9.10 | 5.40 | 12.10 | 16.90 | 26.10 | 19.00 | 14.82 | 11.11 | 10.98 |
| UT004 | 553598.00 | 238595.00 | 56.40 | 56.40 | 55.80 | 40.30 | 39.80 | 38.00 | 39.20 | 45.00 | 44.30 | 46.30 | 51.10 | 49.50 | 46.84 | 35.13 | 30.56 |
| UT005 | 554336.00 | 238454.00 | 55.40 | 48.80 | 49.00 | 42.60 | 39.60 | 38.40 | 45.40 | 40.20 | 41.80 | 43.50 | 57.50 | 39.50 | 45.14 | 33.86 | 27.10 |
| UT009 | 552403.00 | 223965.00 | Missing | 35.90 | 49.20 | 32.00 | 39.90 | 32.60 | 39.20 | 38.00 | 41.80 | 43.80 | 48.70 | 40.90 | 40.18 | 30.14 | 25.83 |
| UT010 | 551246.00 | 233649.00 | Missing | 34.80 | 33.30 | 20.80 | 23.20 | 22.40 | 25.00 | 30.10 | 27.70 | 28.10 | 34.30 | 34.90 | 28.60 | 21.45 | 15.08 |
| UT011 | 553697.00 | 238452.00 | 42.50 | 39.20 | 42.90 | 28.90 | 31.60 | 29.70 | 32.80 | 31.90 | 31.80 | 33.60 | 41.90 | 34.10 | 35.08 | 26.31 | 26.31 |
| UT012 | 553879.00 | 238510.00 | 25.30 | 29.80 | 21.90 | 18.10 | 13.80 | 14.50 | 14.40 | 16.50 | 17.20 | 23.10 | 29.60 | 24.40 | 20.72 | 15.54 | 12.00 |
| UT015 | 553739.00 | 238317.00 | 41.00 | 38.60 | 39.40 | 25.20 | 27.60 | 28.80 | 30.40 | Damaged | 33.20 | 25.20 | 39.50 | 35.80 | 33.15 | 24.87 | 24.87 |
| UT016 | 554413.00 | 238474.00 | 48.60 | Missing | Missing | 38.00 | 31.90 | 36.40 | 33.70 | 40.60 | 36.40 | 41.90 | 52.60 | 48.90 | 40.90 | 30.68 | 23.27 |
| UT017 | 560023.00 | 221444.00 | 25.50 | 26.20 | 23.60 | 18.70 | 15.80 | 12.70 | 14.20 | 12.70 | 17.50 | 16.20 | 28.30 | 22.90 | 19.53 | 14.64 | 13.58 |
| UT018 | 551035.00 | 225199.00 | 35.40 | 42.10 | 34.00 | 29.30 | 24.10 | 26.70 | 26.10 | 27.60 | 30.20 | 35.60 | 41.90 | 37.30 | 32.53 | 24.39 | 21.12 |
| UT019 | 550950.00 | 225039.00 | 52.80 | 52.90 | 47.00 | 31.40 | 36.10 | 35.80 | 38.60 | 38.20 | 38.70 | 38.80 | 55.90 | 44.10 | 42.53 | 31.89 | 26.59 |
| UT020 | 551535.00 | 225065.00 | 40.40 | 44.00 | 38.20 | 14.20 | 38.20 | 44.70 | 45.60 | 50.20 | 44.00 | 42.60 | 47.90 | Missing | 40.91 | 30.68 | 30.68 |
| UT021 | 554212.00 | 238436.00 | 39.70 | Missing | 34.10 | 33.10 | 27.20 | 27.70 | 26.10 | 24.10 | 28.80 | 32.60 | 45.40 | 32.60 | 31.95 | 23.96 | 23.96 |
| UT024 | 554671.00 | 221010.00 | Missing | 18.50 | 16.60 | 12.30 | Missing | 10.90 | 10.90 | 11.00 | 14.40 | 15.30 | 23.70 | 18.20 | 15.18 | 11.39 | N/A |
| UT028 | 553755.00 | 238092.00 | 52.50 | 42.90 | 52.70 | 31.60 | 33.00 | 34.30 | 37.90 | 33.00 | 40.60 | 41.00 | 53.90 | 46.20 | 41.63 | 31.23 | 29.61 |
| UT029 | 553770.00 | 238076.00 | 31.60 | 33.80 | 25.10 | 22.90 | 19.00 | 20.90 | 20.60 | 23.10 | 25.70 | 28.60 | 40.20 | 29.40 | 26.74 | 20.06 | 18.91 |
| UT030 | 553875.00 | 237764.00 | 30.70 | 38.40 | 33.80 | 36.20 | 29.80 | 31.40 | 29.10 | 24.90 | 30.50 | 35.00 | 49.50 | 30.40 | 33.31 | 24.98 | 17.26 |
| UT031 | 554178.00 | 237767.00 | 34.20 | 39.60 | 27.40 | 22.70 | 21.60 | 21.90 | 20.20 | 19.80 | 23.00 | 29.70 | 42.80 | Missing | 27.54 | 20.65 | 18.71 |
| UT032 | 553625.00 | 237856.00 | 25.30 | 28.20 | 23.40 | 15.30 | 14.90 | 14.50 | 13.20 | 13.30 | 17.20 | 20.30 | 29.50 | 24.90 | 20.00 | 15.00 | 15.00 |
| UT033 | 551377.00 | 224913.00 | 34.20 | 33.60 | 41.90 | 29.90 | 29.90 | 30.90 | 26.60 | 22.30 | 30.80 | 32.30 | 36.70 | 31.70 | 31.73 | 23.80 | 23.80 |
| UT034 | 556101.00 | 221243.00 | 41.10 | 39.90 | 33.80 | 25.20 | 28.20 | 28.50 | 27.60 | 24.00 | 29.10 | 34.90 | 47.40 | 34.10 | 32.82 | 24.61 | 19.25 |
| UT036 | 553718.00 | 238530.00 | 31.40 | 29.90 | 28.90 | 17.10 | 19.00 | 18.60 | 18.50 | 18.30 | 21.80 | 25.80 | 33.80 | 31.20 | 24.53 | 18.39 | 18.39 |
| UT037 | 553923.00 | 238770.00 | 33.70 | 39.90 | Missing | 28.40 | 21.10 | 25.50 | 21.70 | 21.50 | 24.40 | 31.40 | 43.60 | 37.70 | 29.90 | 22.43 | 20.79 |
| UT039 | 552156.00 | 234034.00 | 45.10 | 43.10 | 39.60 | 34.80 | 32.90 | 30.40 | 27.70 | 27.90 | 34.00 | 35.50 | 50.10 | 32.50 | 36.13 | 27.10 | 27.10 |
| UT040 | 552113.00 | 234505.00 | 35.30 | 30.60 | 28.60 | 23.30 | 23.10 | 26.00 | 22.80 | 22.60 | 26.00 | 27.80 | 34.40 | 27.70 | 27.35 | 20.51 | 20.51 |
| UT041 | 552091.00 | 233630.00 | Damaged | 35.10 | 24.90 | 24.20 | 19.90 | 20.00 | 19.50 | 16.90 | 21.90 | 29.00 | 38.80 | 30.80 | 25.55 | 19.16 | 19.16 |
| UT042 | 552152.00 | 233878.00 | 34.30 | 45.60 | 33.40 | 27.90 | 22.10 | 25.20 | 25.70 | 28.20 | 30.00 | 33.80 | 40.20 | 38.50 | 32.08 | 24.06 | 22.33 |
| UT043 | 552135.00 | 234344.00 | 36.90 | 38.30 | 31.70 | 30.90 | 23.50 | 27.80 | 22.10 | 22.50 | 26.80 | 28.00 | 45.40 | 32.90 | 30.57 | 22.93 | 21.65 |
| UT044 | 554357.00 | 238443.00 | Damaged | 52.30 | 49.80 | 46.40 | 46.00 | 47.40 | 48.20 | 49.70 | 47.20 | 41.70 | 56.90 | 50.70 | 48.75 | 36.57 | 36.57 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UT045 | 554357.00 | 238443.00 | Damaged | 53.10 | 50.10 | 47.50 | 46.70 | 46.40 | 51.50 | 48.40 | 46.20 | 49.80 | 54.70 | 48.90 | 49.39 | 37.04 | 37.04 |
| UT046 | 554357.00 | 238443.00 | 46.50 | 52.80 | 50.20 | 50.60 | 49.10 | 47.40 | 50.60 | 51.00 | 47.70 | 48.00 | 54.00 | 48.10 | 49.67 | 37.25 | 37.25 |

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

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

**Notes:**

Exceedances of the NO$_2$ annual mean objective of 40µg/m$^3$ are shown in **bold**.

NO$_2$ annual means exceeding 60µg/m$^3$, indicating a potential exceedance of the NO$_2$ 1-hour mean objective are shown in **bold and underlined.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

# Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

In 2019, Uttlesford District Council operated two automatic monitoring stations and monitored for $NO_2$, $PM_{2.5}$ and $PM_{10}$

The following reference analysers are located within the monitoring network

- two API chemiluminescence ($NO/NO_2/NO_x$) gas analysers
- one Met One Smart Heated BAM $PM_{2.5}$ analyser
- one Met One BAM $PM_{10}$ analyser

Analysers are serviced in-line with manufacturer guidelines biannually. $NO_2$ analysers have an LSO calibration fortnightly to check against a certified calibration gas bottle.

Data has been ratified according to LAQM TG16 procedures to identify erroneous data and to account for instrument drift.

For nitrogen dioxide, the ratification process corrected the raw dataset for any drift in the zero baseline and upper range of the instrument using zero and span check information measured during calibration visits.

The Met One $PM_{10}$ measurements are corrected for slope by dividing the data by 1.2.

The Met One $PM_{2.5}$ measurements are not adjusted due to the presence of the smart heater.

## Diffusion Tubes QA/QC

In 2019, Uttlesford District Council undertook monitoring with 33 nitrogen dioxide diffusion tubes at 31 sites.

The diffusion tubes were supplied by Socotec (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.

The AIR $NO_2$ proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2018:

### Table C.1 – AIR PT Results

| AIR PT Round | AIR PT AR030 | AIR PT AR031 | AIR PT AR033 | AIR PT AR034 |
|---|---|---|---|---|
| Round conducted in the period | January – February 2019 | April – May 2019 | July – August 2019 | September – October 2019 |
| SOCOTEC | 87.5% | 100% | 100% | 100% |

LAQM Annual Status Report 2020

## Diffusion Tube Bias Adjustment Factors

In past years, Uttlesford District Council has utilised both local bias adjustment factors derived from co-location study and the national bias adjustment factor.

For calculating the 2019 data, Uttlesford District Council has considered both methods of adjustment for calculating the diffusion tubes results.

The locally calculated factor (0.62) estimates concentrations to be significantly lower than from the factor derived from national studies and considered not representative of local air quality. For this reason, the national bias adjustment factor has been used to present monitoring data.

The Diffusion Tube Bias Adjustment Factors Spreadsheet 03/20 identified that for Socotec 50% TEA in acetone diffusion tubes in 2019, a bias adjustment factor of 0.75 should be used. This was derived from orthogonal regression analysis of 24 studies.

## Point Sources

No significant new point sources of emissions have been identified.

## $NO_2$ Fall Off Estimation

Diffusion tube monitoring shown in Table B.1 in Appendix B has been adjusted for $NO_2$ falloff between the monitoring location and the point of relevant exposure.

Using the equation taken from the $NO_2$ Fall Off With Distance Calculator, a custom Excel spreadsheet has been developed to derive the $NO_2$ concentrations at relevant exposure. This calculator uses background concentrations taken from the 2017 $NO_2$ background maps, measured annual mean concentrations and distances between the kerb, monitor and relevant exposure.

Estimated Annual Mean at Relevant Exposure:

$$Cz = ((Cy-Cb) / (-0.5476 \times Ln(Dy) + 2.7171)) \times (-0.5476*Ln(Dz)+2.7171) + Cb$$

Where:

Cz is the total predicted concentration (µg/m3) at distance Dz;

Cy is the total measured concentration (µg/m3) at distance Dy;

Cb is the background concentration (µg/m3);

Dy is the distance from the kerb at which concentrations were measured;

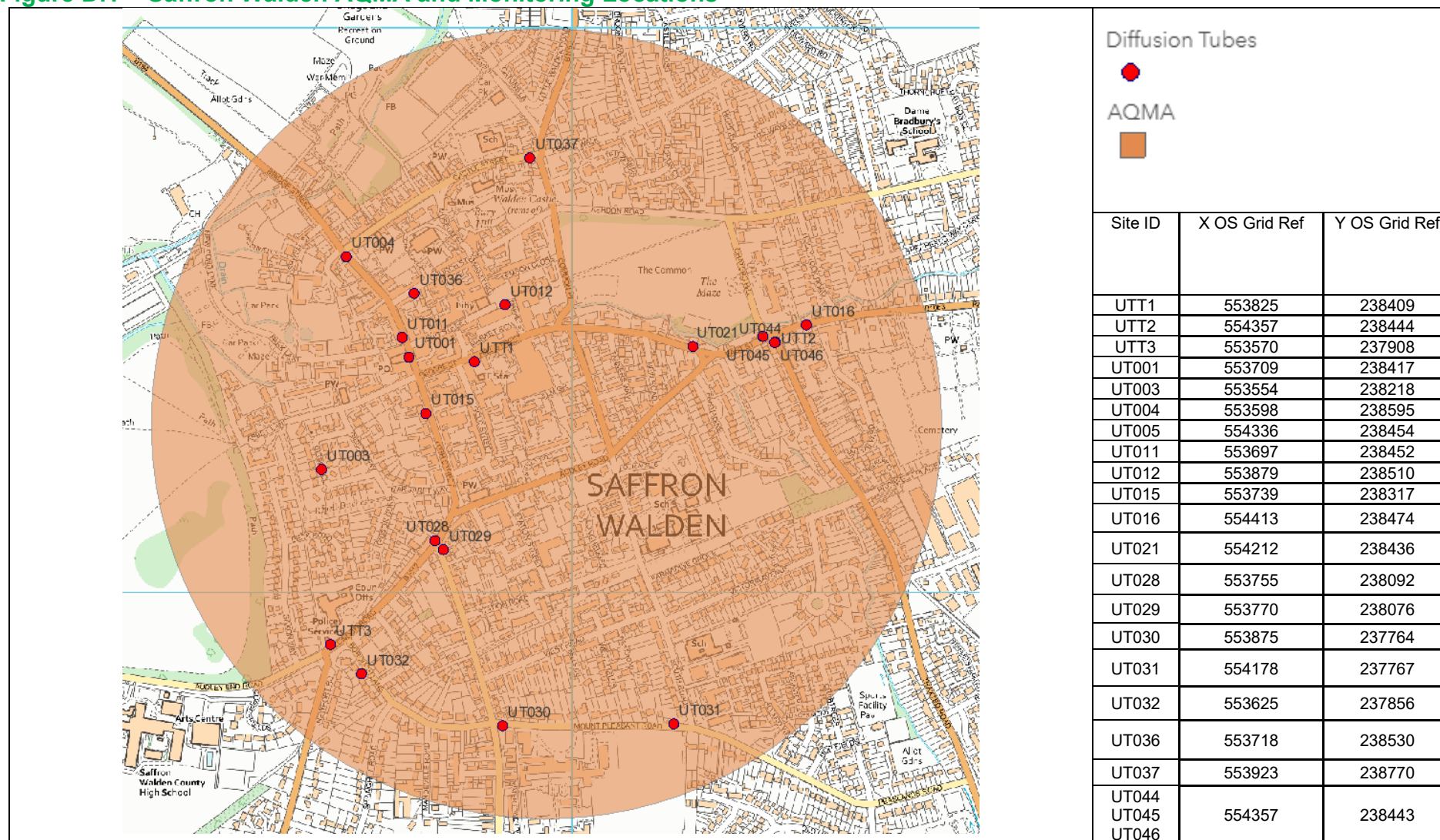Dz is the distance from the kerb (m) at which concentrations are to be predicted; and

Ln(D) is the natural log of the number D

LAQM Annual Status Report 2020

## Table C.2 – NO$_2$ Fall-Off Calculator

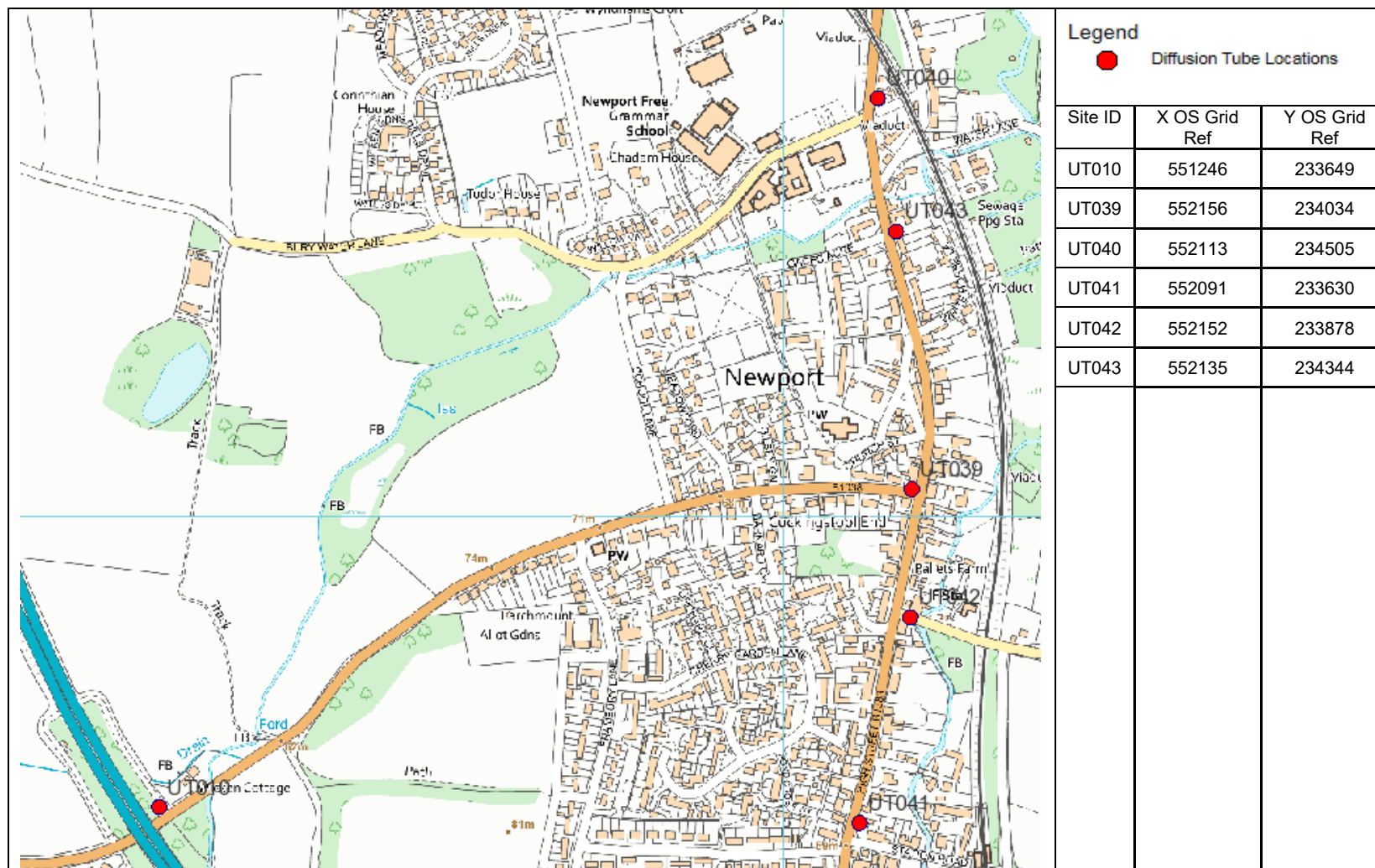| Site ID | Site Name | Bias Adjusted Mean | Annual Mean Background | Distance to kerb of nearest road (m) [2] | Distance to Relevant Exposure (m) [1] | Distance Corrected to Nearest Exposure [2] |
|---------|-----------|--------------------|------------------------|----------------------------|-----------------------------|------------------------------|
| UT001 | High Street, Saffron Walden | 29.97 | 10.68945 | 15.0 | 1.5 | 19.82 |
| UT003 | Gibson Gardens, Saffron Walden | 11.11 | 10.68945 | 5.1 | 1.5 | 10.98 |
| UT004 | YHA, Saffron Walden | 35.13 | 10.68945 | 0.8 | 0.4 | 30.56 |
| UT005 | Thaxted Road, Saffron Walden | 33.86 | 12.11689 | 2.4 | 0.5 | 27.10 |
| UT009 | Burton End | 30.14 | 15.44956 | 17.0 | 27.0 | 25.83 |
| UT010 | Newport M11 | 21.45 | 13.72788 | 40.0 | 0.1 | 15.08 |
| UT011 | 33 High Street, Saffron Walden | 26.31 | 10.68945 | 0.0 | 2.7 | 26.31 |
| UT012 | Town Hall, Saffron Walden | 15.54 | 10.68945 | 20.0 | 0.1 | 12.00 |
| UT015 | 57 High Street, Saffron Walden | 24.87 | 10.68945 | 0.0 | 4.0 | 24.87 |
| UT016 | Radwinter Road, Saffron Walden | 30.68 | 12.11689 | 8.0 | 1.6 | 23.27 |
| UT017 | Stortford Rd,  Lt Canfield | 14.64 | 12.35704 | 14.0 | 2.5 | 13.58 |
| UT018 | 17 Cambridge Road, Stansted | 24.39 | 10.80773 | 3.0 | 1.5 | 21.12 |
| UT019 | Silver Street, Stansted | 31.89 | 9.502014 | 3.5 | 2.0 | 26.59 |
| UT020 | Grove Hill, Stansted | 30.68 | 10.80773 | 0.0 | 3.3 | 30.68 |
| UT021 | 41 East Street, Saffron Walden | 23.96 | 12.11689 | 0.0 | 2.0 | 23.96 |
| UT024 | Takeley Hill, Hatfield Forest | 11.39 | 15.12564 | N/A | 118.0 | N/A |
| UT028 | London Rd, Saffron Walden | 31.23 | 10.68945 | 0.8 | 2.0 | 29.61 |
| UT029 | Debden Road, Saffron Walden | 20.06 | 10.68945 | 0.5 | 0.5 | 18.91 |
| UT030 | Friends School, Saffron Walden | 24.98 | 10.64617 | 10.0 | 0.5 | 17.26 |
| UT031 | Mount Pleasant Road, Saffron Walden | 20.65 | 10.19253 | 2.0 | 1.5 | 18.71 |
| UT032 | Borough Lane, Saffron Walden | 15.00 | 10.64617 | 0.0 | 7.0 | 15.00 |
| UT033 | Chapel Hill, Stansted | 23.80 | 11.34405 | 0.0 | 3.0 | 23.80 |
| UT034 | Four Ashes, Takeley | 24.61 | 11.36557 | 8.0 | 1.5 | 19.25 |
| UT036 | Church Street, Saffron Walden | 18.39 | 10.68945 | 0.0 | 1.0 | 18.39 |
| UT037 | Castle Street, Saffron Walden | 22.43 | 10.68945 | 1.0 | 1.0 | 20.79 |
| UT039 | Newport High Street | 27.10 | 9.47132 | 0.0 | 1.2 | 27.10 |
| UT040 | Wawel Cottage, Newport | 20.51 | 9.47132 | 0.0 | 6.0 | 20.51 |
| UT041 | Rose Cottage, Newport | 19.16 | 10.00572 | 0.0 | 3.0 | 19.16 |
| UT042 | Debden Road, Newport | 24.06 | 10.00572 | 0.5 | 0.5 | 22.33 |
| UT043 | Gaces Acre, Newport | 22.93 | 9.47132 | 1.0 | 2.0 | 21.65 |
| UT044 | Thaxted Road Co-located 1 | 36.57 | 12.11689 | 0.0 | 2.0 | 36.57 |
| UT045 | Thaxted Road Co-located 2 | 37.04 | 12.11689 | 0.0 | 2.0 | 37.04 |
| UT046 | Thaxted Road Co-located 3 | 37.25 | 12.11689 | 0.0 | 2.0 | 37.25 |

# Appendix D: Maps of Monitoring Locations and AQMAs

## Figure D.1 – Saffron Walden AQMA and Monitoring Locations



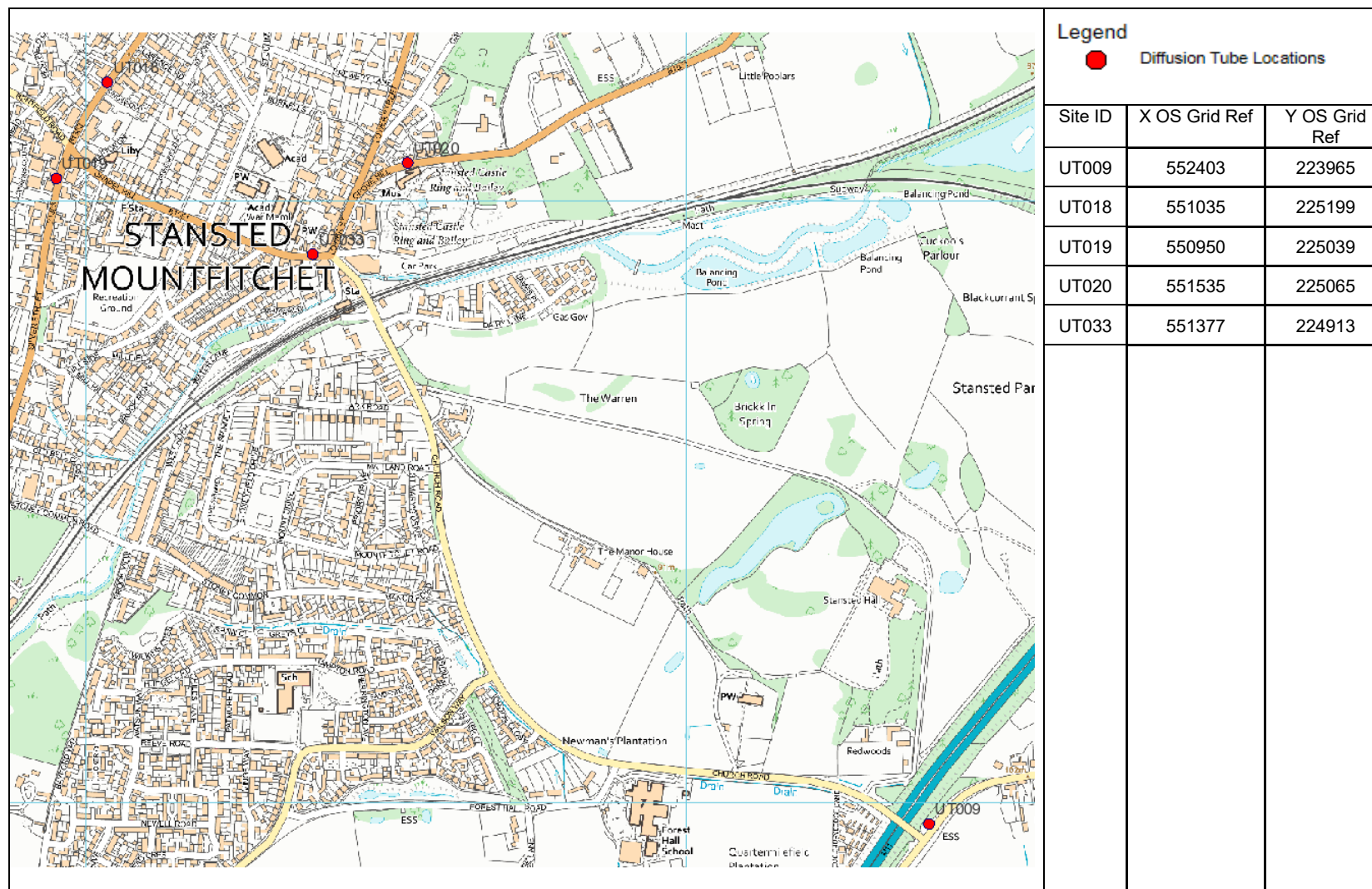| Site ID | X OS Grid Ref | Y OS Grid Ref |
|---------|---------------|---------------|
| UTT1 | 553825 | 238409 |
| UTT2 | 554357 | 238444 |
| UTT3 | 553570 | 237908 |
| UT001 | 553709 | 238417 |
| UT003 | 553554 | 238218 |
| UT004 | 553598 | 238595 |
| UT005 | 554336 | 238454 |
| UT011 | 553697 | 238452 |
| UT012 | 553879 | 238510 |
| UT015 | 553739 | 238317 |
| UT016 | 554413 | 238474 |
| UT021 | 554212 | 238436 |
| UT028 | 553755 | 238092 |
| UT029 | 553770 | 238076 |
| UT030 | 553875 | 237764 |
| UT031 | 554178 | 237767 |
| UT032 | 553625 | 237856 |
| UT036 | 553718 | 238530 |
| UT037 | 553923 | 238770 |
| UT044 UT045 UT046 | 554357 | 238443 |

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## Figure D.2 – Newport Monitoring Locations



| Site ID | X OS Grid Ref | Y OS Grid Ref |
|---------|---------------|---------------|
| UT010 | 551246 | 233649 |
| UT039 | 552156 | 234034 |
| UT040 | 552113 | 234505 |
| UT041 | 552091 | 233630 |
| UT042 | 552152 | 233878 |
| UT043 | 552135 | 234344 |

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## Figure D.3 – Stansted Mountfitchet Monitoring Locations



| Site ID | X OS Grid Ref | Y OS Grid Ref |
|---------|---------------|---------------|
| UT009 | 552403 | 223965 |
| UT018 | 551035 | 225199 |
| UT019 | 550950 | 225039 |
| UT020 | 551535 | 225065 |
| UT033 | 551377 | 224913 |

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## Figure D.4 – Takeley Monitoring Locations



| Legend | | |
|--------|--|--|
| 🔴 | Diffusion Tube Locations | |

| Site ID | X OS Grid Ref | Y OS Grid Ref |
|---------|---------------|---------------|
| UT017 | 560023 | 221444 |
| UT024 | 554671 | 221010 |
| UT034 | 556101 | 221243 |
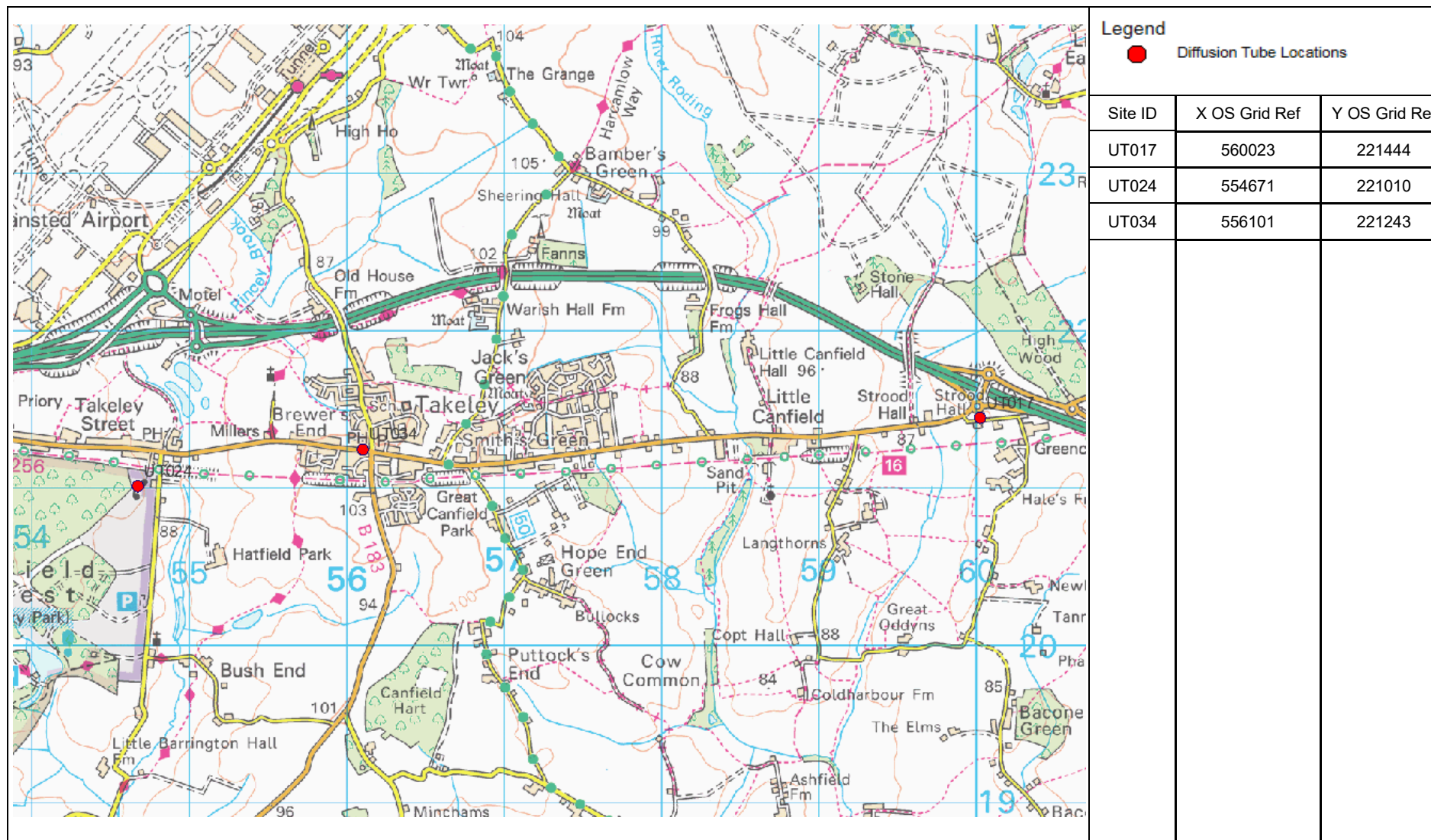
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# Appendix E: Summary of Air Quality Objectives in England

### Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective[6] | |
| | Concentration | Measured as |
|---|---|---|
| Nitrogen Dioxide (NO$_2$) | 200 µg/m$^3$ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 µg/m$^3$ | Annual mean |
| Particulate Matter (PM$_{10}$) | 50 µg/m$^3$, not to be exceeded more than 35 times a year | 24-hour mean |
| | 40 µg/m$^3$ | Annual mean |
| Sulphur Dioxide (SO$_2$) | 350 µg/m$^3$, not to be exceeded more than 24 times a year | 1-hour mean |
| | 125 µg/m$^3$, not to be exceeded more than 3 times a year | 24-hour mean |
| | 266 µg/m$^3$, not to be exceeded more than 35 times a year | 15-minute mean |

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[6] The units are in microgrammes of pollutant per cubic metre of air (µg/m$^3$).

LAQM Annual Status Report 2020

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| µg/m$^3$ | Micrograms per cubic metre |
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Air Quality Annual Status Report |
| BAM | Beta Attenuation Monitors |
| Defra | Department for Environment, Food and Rural Affairs |
| EU | European Union |
| LAQM | Local Air Quality Management |
| NO$_2$ | Nitrogen Dioxide |
| NO$_x$ | Nitrogen Oxides |
| PM$_{10}$ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| PM$_{2.5}$ | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |

# References

Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at;

https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Defra LAQM Summary of Laboratory Performance in AIR $NO_2$ PT Scheme available at;

https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html

Defra LAQM Policy Guidance LAQM.PG16 available at;

https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

Defra LAQM Technical Guidance LAQM.TG16 available at;

http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Defra $NO_2$ Background Maps available at; https://uk-air.defra.gov.uk/data/laqm-background-home

Defra Nitrogen Dioxide Fall-Off with Distance Calculator available at;

http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

DVSA Smoky Vehicle Reporting Service available at; https://www.gov.uk/report-smoky-vehicle

Essex Air Twitter Feed available at; https://twitter.com/essexair

EssexCarShare.com available at; https://essex.liftshare.com/

Essex County Council Local Transport Plan available at;

http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Local-Transport-Plan.aspx

Essex County Council Major Schemes available at; http://www.essexhighways.org/highway-schemes-and-developments/major-schemes.aspx

National Air Quality Objectives and European Directive Limit and Target Values for the Protection of Human Health available at; https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

Public Health Outcomes Framework Indicator D01 available at;

https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

Uttlesford District Council 2019 Air Quality Annual Status Report available at;

http://www.essexair.org.uk/Reports/Uttlesford_2019_ASR.pdf

Uttlesford District Council Air Quality Technical Planning Guidance available at;

http://www.uttlesford.gov.uk/CHttpHandler.ashx?id=8250&p=0