2020/2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: October, 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Thurrock

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, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Thurrock currently has 18 Air Quality Management Areas (AQMAs); these are a result of traffic related pollution along busy roads. Many of these roads are the main commuter routes or used for logistical purposes. There is often a large amount of traffic during peak hours and in many of these areas there is relevant public exposure, predominantly in the form of residential dwellings which are in relatively close proximity to these roads. A full list of the AQMAs can be found on the Defra UK Air website via this web-link.

The main pollutant of concern in Thurrock is nitrogen dioxide (NO_2) and to a lesser extent particulate matter (PM_{10}); both of these pollutants arise from road traffic emissions. Thurrock only has AQMAs which are declared for road traffic based emissions, there are no industrial based AQMAs. The AQMAs are all declared for exceedance of the long-term objective for NO_2 (40 µg/m^3). Out of the 18 AQMAs there are currently four that are also declared for PM_{10}, for the short-term objective or 24-hour mean objective of 35 permitted exceedances of >50 µg/m^{-3}.

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[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

The 2016 Air Quality Action Plans (AQAP) along with a new Air Quality & Health Strategy Document (AQHSD) have been devised to provide an approach for the council to manage air quality within its 18 AQMAs, ensure compliance with established regulatory thresholds and also prevent new AQMA's arising in the future. The document can be viewed via the Thurrock Council Website links:

- Thurrock Air Quality
- Thurrock Air Quality and Health Strategy, including AQAP that covers all declared AQMAs

The Council works in collaboration with the Environment Agency (EA) on air quality issues from industrial activities within the borough, consulting as necessary on industrial activities, specifically permitting variations/applications which the EA are responsible for under the Integrated Pollution Prevention & Control Directive (IPPC). The Council also carries out its statutory duties under Local Authority integrated Pollution & Prevention Control Regime (LA-IPPC).

In 2016 the council undertook a detailed modelling assessment to re-determine the extent of NO_2 & PM_{10} exceedances over most of the borough and including all 18 AQMA's. The report found that 8 AQMA's should be revoked for NO_2 and all four for PM_{10} should also be revoked. However, the report was not accepted by Defra as the assessment had not followed the procedures outlined the Defra Local Air Quality Management (LAQM) Technical Guidance (TG16). Following this assessment, the Council set up 12 additional monitoring locations from 2017 using NO_2 diffusion tubes within these locations. The Council planned to monitor at these locations for at least three years and make a determination in 2020 as to whether these AQMAs can be revoked for NO_2 on the basis of the monitoring results. It should be highlighted that owing to the Covid-19 pandemic, the 2020 results are not to be used alone in determining AQMA revocations, therefore the monitoring at the new locations will continue into at least 2021 before making any decisions to revoke AQMAs on monitoring data alone.

Thurrock Council joined the AirTEXT service in 2018 which is provided by Cambridge Environmental Research Consultants (CERC). This service allows members of the public to see air pollution forecasting based on detailed dispersion modelling for the area in which they live. They can also sign up to AirTEXT pollution alerts and receive voice, email or text messages when air pollution is forecast to be moderate or higher. This service is aimed to provide people who suffer with respiratory illnesses, as well as those which suffer with heart

problems, detailed information about air quality on a given day, and alert them when not to go outside. Further information can be found on the Air Text website and the CERC website.

Overall, NO_2 concentrations remained at similar levels during 2018 and 2019, with 39 NO_2 diffusion tube monitoring sites reporting a reduction in annual mean concentrations and 26 sites increasing. Conversely, when comparing 2019 to 2020, all passive monitoring sites reported a decrease in concentration, with an average reduction of 7.2 µg/m^3.

PM_{10} concentrations have remained at similar levels between 2018 and 2020 and have reported below the AQS Objective over the past 5 years.

Thurrock Borough Council currently monitor $PM_{2.5}$ at one location in Stanford-le-Hope (Thurrock 3). When comparing 5-year trends, the concentrations reported at this location declined between 2016 and 2018. However, the annual average concentration increased in 2019, and remained at a similar level in 2020. The annual mean for $PM_{2.5}$ has remained well below the AQS Objective of 25µg/m^3 over the past 5 years.

There is currently one location monitoring SO_2 within the borough located at Thurrock 1, Grays. SO_2 concentrations were well below the air quality objectives in 2019 and 2020, with no exceedances reported in either year.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

[5] Defra. Clean Air Strategy, 2019

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

In 2016, the council, in consultation with stakeholders, produced a strategy that frames its approach to tackling poor air quality and reducing exposure to safe levels across the borough. The Thurrock Air Quality and Health Strategy (2016) sets out the council's overarching objectives for air quality and contains policies and actions that the council will take to improve air quality.

The actions contained in the Air Quality and Health Strategy consists of borough-wide actions and specific actions to improve air quality in prioritised AQMAs in the borough. The creation of the Congestion Task Force (CTF), which brings together stakeholders with a major stake in the strategic road network, such as Highways England, Kent County Council, Essex County Council and Thurrock Council and the Police collaborate together to formulate and implement actions to better manage the road network following incidents at Dartford Crossing. This engagement is on-going and seeking to eliminate other pinch-points which contribute to poor air quality, such as devolving powers to enforce yellow box junctions at Junctions of the M25, which cause significant congestion. Additional measures to be implemented by the Council include investment in new technologies to help dynamically tackle congestion, limiting the impact of traffic on air quality. The Council aims to re-evaluate its Air Quality and Health Strategy to take into consideration new opportunities and develop additional and improved policies and actions. This was planned to be developed over the 2019/20 and 20/21 financial years, however delays associated with Covid-19 have re-directed resources and this will continue to be looked into over 2021/22.

Conclusions and Priorities

During 2019, NO_2 concentrations were monitored across the borough by a network of 67 diffusion tube sites (including one duplicate and one triplicate site) and four automatic monitoring sites. There were nine reported exceedances of the air quality objective across all monitoring sites, of which eight were within AQMAs. The exceedance reported outside an AQMA was at diffusion tube site LT, which is not located near relevant exposure and is associated with a planned future residential development (which will be approximately 45m from the tube location). There were an additional 6 sites which reported within 10% of the AQS Objective, of which only one site was outside an AQMA (Site ERTM reported 37.1µg/m^3 in 2019). This site is located at a residential property located at a traffic-controlled junction of the A1012, just outside AQMA 3.

During 2020, NO_2 concentrations were monitored across the borough by a network of 67 diffusion tube sites (including one duplicate and one triplicate site) and three automatic monitoring sites. There was one reported exceedance of the AQS Objectives in 2020, at the automatic monitoring site TK8, within AQMA 10 in Purfleet. There were six passive sites that were within 10% of the AQS Objectives, of which five were within declared AQMAs and LT is not located at relevant exposure, as discussed above.

There was an average reduction in annual mean NO_2 concentrations of 8.2µg/m^3 recorded at the monitoring sites located within AQMAs when comparing annual mean concentrations at passive monitoring locations between 2019 and 2020. This is likely to be associated with the reductions in traffic across the borough owing to the Covid-19 pandemic.

In relation to the 1-hour AQS Objective, there was one exceedance reported in 2019 at Thurrock 8, there were no exceedances reported in 2020. Additionally, all diffusion tube sites in 2019 and 2020 were below 60µg/m^3, which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

Both 2019 and 2020 monitoring confirms that there are currently no areas breaching the annual mean air quality objectives for PM_{10}. There were some exceedences of the 24-hour mean concentrations across 2019 and 2020 at all three automatic sites, however these remained below the number of permitted exceedances per year. The maximum number of exceedances of the PM_{10} 24-hour mean objective was at Thurrock 8 in 2019, which is located in AQMA 10 (15 exceedences out of the permitted 35 exceedances per year) and at both Thurrock 1 and Thurrock 8 in 2020 (both sites reported 9 exceedences out of the permitted 35 exceedances per year).

Thurrock Council currently has one automatic monitoring station (Thurrock 3; Stanford Le-Hope), that monitors $PM_{2.5}$. All concentrations over the past five years have reported below the $PM_{2.5}$ obligatory standard of 25µg/m^3. Thurrock Borough Council extended its monitoring network in 2020 to include an additional monitoring site for $PM_{2.5}$, which will be located in AQMA 24 in Tilbury. Results will be presented in the 2022 ASR following a full year of data capture.

When considering the current AQMA declarations, the following AQMAs (both declared for exceedance of the annual mean objective for NO_2) have been showing an overall downward trend and reported consistently below 10% of the annual mean AQS Objective for NO_2 for the past five years:

- AQMA 15
- AQMA 16

Both of these AQMAs are declared in relation to individual properties. It is worth highlighting that AQMA 15 is not accessible to the public, therefore the monitoring site is located at the nearest relevant location, considering the same distance from the pollutant source. Thurrock Borough Council therefore propose that the above AQMAs are revoked based on monitoring data showing consistent compliance with the AQS annual mean objective for NO_2, this is regardless of the further declines in concentrations seen in 2020 which are likely to have been impacted by the Covid-19 pandemic.

Thurrock Borough Council are also aiming to conduct a detailed assessment relating to the status of all declared AQMAs across the borough, particularly with regard to the AQMAs that do not currently have monitoring sites associated with them. Progress has been delayed on starting this owing to complications with recruitment during the Covid-19 pandemic.

Local Engagement and How to get Involved

The public can assist in air pollution matters by continuing to address concerns when they think there is an air quality issue in the borough by reporting it via the Thurrock Council website or by contacting our contact centre Tel: 01375 652955. The Environmental Health Team will continue to assist and address any such concerns as necessary.

The public can keep informed on local air quality matters from accessing a wealth of information, firstly from the Council's air quality webpage.

They can find out what air quality is in their region from the London Air Quality Network (LAQN) or from the EssexAir website:

The Public can also keep informed on the latest air quality forecasting from the Defra UK-AIR website.

The public can now access the latest forecasting information for air quality which uses detailed dispersion modelling to predict air quality in near real-time using the newly subscribed AirTEXT service for Thurrock.

The public can also subscribe free to an AirTEXT alert service using a free mobile app.

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1 Local Air Quality Management

This report provides an overview of air quality in Thurrock Borough Council during 2019 and 2020. 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 Thurrock Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

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

A summary of AQMAs declared by Thurrock Borough Council can be found in Table 2.1. The table presents a description of the 18 AQMAs that are currently designated within Thurrock Borough Council. Appendix D: Maps of Monitoring Locations and AQMAs provides maps of AQMAs and the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean;
- PM_{10} 24-hour mean;

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration (Site ID in brackets)	Level of Exceedance: Current Year (Site ID in brackets)	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 1	2001 (Amended 2005)	NO_2 Annual Mean	An area encompassing a number of properties along London Road Grays, Orsett Road & Stanley Road Grays	NO	48.8 µg/m^3 (NAS1) 40.9 µg/m^3 (LRG)	2019: 36.7 2020: 26.4 (LRG)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 2	2001 (Amended 2005)	NO_2 Annual Mean	An area encompassing Residential properties along London Road South Stifford.	NO	48 µg/m^3 (LRSS)	2019: 39.0 2020: 24.3 (LRSS)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 3	2001 (Amended 2005)	NO_2 Annual Mean	An area encompassing Residential properties along Hogg Lane & Elizabeth Road.	NO	49 µg/m^3 (ER)	2019: 48.8 2020: 38.1 (ER)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

AQMA 4	2001 (Amended 2005)	NO_2 Annual Mean	An area encompassing Residential properties along A1306 west of Chafford Hundred Visitor Centre	NO	65.5 µg/m^3 (NAS2) - proxy location, within AQMA 5	No monitoring sites within AQMA. Diffusion tube Site ID: CC located just outside boundary: 2019: 26.0 2020: 20.0	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 5	2001 (Amended 2005)	NO_2 Annual Mean PM_{10} 24 Hour Mean	An area encompassing Residential properties along Warren Terrace A1306 & A13	NO	NO_2 = 65.5 µg/m^3 (NAS2) PM_{10} = No Data. Exceedance was based on modelling only	2019: 49.9 2020: 37.6 (NAS2) No monitoring sites for PM_{10}	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 7	2001 (Amended 2005)	NO_2 Annual Mean PM_{10} 24 Hour Mean	A Hotel (IBIS) near to M25 north of the Dartford Crossing	YES	NO_2 = 52 µg/m^3 (IBIS) PM_{10} = No Data. Exceedance was based on modelling only	2019: 47.0 2020: 37.5 (IBIS) No monitoring sites for PM_{10}	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 8	2001 (Amended 2005)	NO_2 Annual Mean	A Hotel next to Jct 31 of the M25	YES	No Data exceedence was based on	2019: 30.7 2020: 24.1 (PIH)	Air Quality and Health	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

		PM_{10} 24 Hour Mean			modelling only	No monitoring sites for PM_{10}	Strategy (2016)	
AQMA 9	2001 (Amended 2005)	NO_2 Annual Mean	A Hotel next to Jct 31 of the M25	YES	No Data exceedence was based on modelling only	2019: 31.8 2020: 24.4 (THB)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 10	2001 (Amended 2005)	NO_2 Annual Mean PM_{10} 24 Hour Mean	An area encompassing Residential properties along London Road Purfleet near to Jarrah Cottages	NO	69.8 µg/m^3 (TK2) automatic site	2019: 47.7 2020: 41.6 (TK8 automatic site)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 12	2001 (Amended 2005)	NO_2 Annual Mean	An area encompassing Residential properties along A1306 on the Watts Wood Estate	NO	50.5 µg/m^3 (WC)	2019: 39.1 2020: 29.7 (WC)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 13	2001 (Amended 2005)	NO_2 Annual Mean	An area encompassing Residential properties along A1306 London Road Aveley Arterial Road	NO	55.2 µg/m^3 (LRAR)	2019: 50.1 2020: 36.7 (LRAR)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

AQMA 15	2001 (Amended 2005)	NO_2 Annual Mean	1 residential dwelling near the M25 on the edge of Irvine Gardens	YES	40 µg/m^3 (GDSO)	2019: 25.7 2020: 19.2 (GDSO) This site is not located directly within the AQMA but at the closest accessible receptor location, therefore proxy for AQMA concentrations	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 16	2001 (Amended 2005)	NO_2 Annual Mean	1 residential dwelling near the M25 off Dennis Road	YES	42.6 µg/m^3 (KCNO)	2019: 29.3 2020: 21.9 (KCNO)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 21	2005	NO_2 Annual Mean	A former Hotel on Stonehouse Lane	NO	44.6 µg/m^3 (STON)	No monitoring within this AQMA	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 23	2005	NO_2 Annual Mean	An area encompassing Residential properties along London Road West Thurrock	NO	55.1 µg/m^3 (WT)	2019: 35.5 2020: 27.5 (WT)	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

AQMA 24	2014	NO_2 Annual Mean	An area encompassing Residential properties along Calcutta Road, Dock Road & St Chads Road	NO	40.5 µg/m^3 (TL) 39.3 µg/m^3 (TK4)	2019: 41.2 2020: 32.8 (TILB)	Action Plan for AQMA 24 - Tilbury (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 25	2016	NO_2 Annual Mean	An area encompassing Residential properties along Aveley High St & Ship Lane	NO	41 µg/m^3 (AVSL)	2019: 45.0 2020: 32.5 (AVSL)	Action Plan for AQMA 25 - Aveley (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring
AQMA 26	2016	NO_2 Annual Mean	An area encompassing Residential properties along the Purfleet By-pass	NO	37.8 µg/m^3 (PBP)	2019: 31.0 2020: 24.1 (PBP)	Action Plan for AQMA 26 – Purfleet bypass (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

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

☒ **Thurrock Borough Council has not submitted current AQAPs to Defra. As Thurrock Borough Council intend to undertake a detailed assessment to review the current AQMA designations, AQAPs will be submitted accordingly following this update.**

2.2 Progress and Impact of Measures to address Air Quality in Thurrock Borough Council

Defra's appraisal of the 2019 ASR is summarised below, with comments addressed underneath each point:

The report is well structured, detailed and for the most part is clear; using the latest template and providing the information specified in the Guidance. The following commentary is provided to assist with future reports.

1) The Council's decision to conduct a detailed assessment on their AQMAs is strongly supported given that many AQMAs have either not recorded any exceedances within the last 5 years (NO_2) or do not have any monitoring in place (PM_{10}).
    (a) Delays associated with Covid-19 and lack of Air Quality Officer mean that the detailed assessment has not yet taken place, recruitment of a new Air Quality Officer is ongoing.
2) The Council's current AQAP was last updated in 2016 and provides an extensive list of measures to tackle air quality within Thurrock. Should the outcome for the detailed assessments recommend a revocation of AQMAs the AQAP will need to be updated accordingly.
    (a) Detailed assessment not yet completed
3) In Table 2.1 the Council have included the monitoring site at which NO_2 concentrations were recorded within each AQMA. This is extremely useful and should be continued in future reports.
    (a) Included within this report
4) The link to the Council's action plan in Table 2.1 does not appear to be working. It is recommended that the Council address this issue in their next ASR.
    (a) Links to Thurrock page for air quality, with associated AQAP links on the page
5) It appears as though Table 2.3 – Additional Progress on Measures, has not been updated since the last ASR. The text within the table appears to be unchanged. It is strongly recommended that the Council update this table with each new ASR to reflect the progress and changes made within the last reporting year.
    (a) Progress on measures has been reduced owing to Covid-19 and the loss of Air Quality Officer.
6) There appears to be some inconsistencies between Tables A.2 and A.3. There are monitoring locations within A.2 that are not within A.3. These are STON, NAS4, SLHRS and ETRS. All these monitor locations are also present in Figure D.1 though

there are no NO_2 concentrations available for these tubes. If these tubes are no longer active the Council should state this within the ASR and remove the tubes from the data tables and figures, as this can lead to errors in reported concentrations.

(a) Sites that are no longer active have been removed from tables for clarity

7) In Table 2.1 the Council have included within AQMA each monitoring site is (if applicable). This is extremely useful as it limits cross-referencing between the data tables and figures. The Council should continue this practice in future reports.

(a) Included within this report

8) There is an inconsistency in information between Table 2.1 and Table A.2. The former states that site AVSL is within AQMA 25 however in Table A.2, AVSL is stated as not being within an AQMA. The Council will need to provide clarification on this and correct the information within the tables in the next ASR.

(a) All DT sites clarified and corrected within the tables

9) The Council have only presented trend graphs for the automatic monitors. It would beneficial for the Council to present trend graphs for the passive monitors. The Council may wish to consider presenting their graphs with respect to monitoring location. For example, having a trend graph for each AQMA so that it is clear which monitoring location is in which AQMA. This will also help to identify NO_2 trends within each AQMA more easily. In addition to this it is also recommended for the Council to provide a brief discussion of the pollutant trends seen within Thurrock.

(a) Trend graphs presented for passive and automatic monitoring sites, split by AQMAs. Trends are discussed.

10) Appendix C is extremely limited, and far more information must be included within the 2020 ASR. This is particularly in regard to bias adjustment of diffusion tubes. For example, the factor applied appears to have been 0.93, which for Gradko 20% TEA in water was the factor released in March 2019, derived from 30 studies. Given the report was submitted in November, this could have been updated with a later release. A clear discussion of the appropriate factor is also expected, along with examples of the calculations (particularly if locally derived). A discussion around the lack of locally derived factor would also be expected, given the extent of continuous monitoring within the borough. This is potentially pertinent, given the number of declared AQMAs, some of which may be subject to localised effects. If such details are not provided in the 2020 ASR, it is likely that this will be rejected.

(a) Bias adjustment calculations are displayed alongside discussion of which factor to use

11) Monitoring site TILC has a data capture rate of below 75%, meaning the data requires annualisation. The Council has not provided evidence of annualisation. Please include calculation/ screenshots in future reports.

(a) Annualisation calculations have been provided as outputs from the LAQM Diffusion Tube Data Processing Tool

There some outstanding comments from the previous appraisal that the Council have still not addressed. These include:

12) Not referencing the Public Health Outcomes Framework (PHOF) - It would be useful if Section 2.3 could make reference to the PHOF, and the local indicator for $PM_{2.5}$ in the district. The Council may wish to consider comparing the '3.01 - Fraction of mortality attributable to particulate air pollution indicator' value for Thurrock to nearby LAs and National indicator values. This can be found in the link below.https://fingertips.phe.org.uk/profile/public-health-outcomesframework/data#page/0/gid/1000043/pat/6/par/E12000005/ati/101/-are/E07000194.

(a) PHOF has been referenced within the ASR

13) The Council have applied distance correction but have not provided the calculations for these. It would be beneficial in future reports for the Council to use and present the distance correction calculator provided by Defra. https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

(a) Distance-correction has been applied and calculations supplied in the appendix

14) Maps included are good, however their scale makes them difficult to interpret. It is advised that the Council include clearer maps that highlight the sites within each AQMA (instead of cross referring between maps and data tables).

(a) Maps have been re-drawn

15) The report provides limited discussion of recent developments or planning applications that may impact future air quality. While it may be the case that the Council does not anticipate such developments some reflection on this would provide clarity.

(a) Information on planning applications outlined

Thurrock Borough Council has been unable to provide an update on progress with most measures during the current reporting years of 2019 and 2020, owing to redirection of resources during Covid-19 and changes in staff. Details of all measures completed, in progress or planned are set out in Table 2.2. 41 measures are included within Table 2.2, with the type of measure and the progress Thurrock Borough Council have made during the reporting years of 2019 and 2020 presented.

More detail on these measures can be found in their respective Action Plans:

- Air Quality Action Plan – Tilbury, May 2016
- Air Quality Action Plan – Purfleet by-pass, May 2016
- Air Quality Action Plan – Aveley, May 2016
- Air Quality and Health Strategy – borough-wide to cover all AQMAs, December 2016

Although many measures have been ongoing, specific updates to progress with measures over the course of 2019/20 is minimal. The following action specific to AQMAs were taken during 2017-2020:

AQMA 25 – Aveley High Street: the council introduced westbound width restrictions on Aveley High Street in 2016/17. These restrictions were intended to ameliorate some of the air quality issues that arise from HGVs in the area. Furthermore, the Council is investigating measures to prevent HGV traffic movements along Ship Lane, Aveley from being undertaken. To support this action, the Council consulted with residents to identify what were the problems they perceived with HGV movements within Aveley, and what could be the potential solutions. One outcome has been an improved signage strategy to encourage more sustainable movements of HGV's through the AQMA. These and other bespoke measures are due to be implemented by March 2020. As a result of the success of this strategy, the Council is intending to implement a similar approach elsewhere across the Borough. Within AQMA 25, the Council is also investigating an additional width restriction on northbound HGV movements along Ship Lane.

AQMA 26 – Purfleet Bypass: the council continues to develop plans to deliver cycleway improvements as part of the Cycle Infrastructure Programme. A new cycle path and two new Toucan crossings have been constructed alongside Purfleet Bypass. The toucan crossings have been built across Botony Way and at Meads Roundabout, creating two full segregated routes, one via the Bypass to London Road, and a second via A1306 Arterial Road to J31 of the M25. These were completed in December 2018 with the wider Cycle Infrastructure Programme completed in March 2019.

AQMA 10 – London Road, Purfleet: the council introduced width restrictions to the west of AQMA 10 and east of Botany Way. Further works are proposed once these have been secured from developer contributions. As part of port enhancements at CRo Ports Purfleet, the main port entrance is to be moved away from the AQMA with a new dedicated port entrance preventing HGV's from idling along London Road awaiting entry to

the port. Additionally, the Council is investigating measures to control HGV movements along London Road within the AQMA to control transient movements.

AQMA 3 – Hogg Lane/Elizabeth Road: the council is considering options to widen parts of the A1306 to improve traffic flows. This is the subject of VISSIM modelling work, which is being jointly undertaken with Highways England.

AQMA 24 – Calcutta Road, Tilbury: The council is progressing a scheme as part of the Cycle Infrastructure Programme. Design work has been completed and construction of the route commenced in the summer of 2019. The cycle lane along Calcutta Road and Dock Road has been completed and is now in the process of being enhanced along Brennan Road through to Fort Road. This will come forward by the end of 2022. This will create a full east-west link across Tilbury for cycling. The cycle hub is now funded up to March 2022 when it is hoped that it has become self-sufficient and can carry on into the future. The cycle hub is helping to further encourage cycling and modal shift away from cars, providing an opportunity for those on low incomes to access transport into employment and training opportunities.

HGV parking enforcement activities in the area continue with increased activity in order to address the current issues related to roadside HGV parking.

The Council has now also now been given delegated powers to enforce against idling vehicles within the borough. A £20 fine can be enforced against drivers who chose keep their engine idling when requested to turn them off by an enforcement officer. The Council intends to use a targeted approach where there are Air Quality Management Areas declared, or where there are significant levels of traffic, such as at level crossings.

In addition to the AQMA-specific actions detailed above, the council has taken the following borough-wide actions to address poor air quality:

Variable Message Signing (VMS): the council has acquired ten permanent VMS signs that are deployed throughout the Borough at key locations which are used to inform and hopefully control the traffic around the Borough. The aim is to inform, divert and reduce congestion during incidents and roadworks being undertaken.

Weight Restrictions and HGV Management Schemes: The council continually reviews current HGV routing options and the introduction of measures to minimise air pollution from HGVs, such as weight restrictions and turning bans through dynamic engagement with the local residents and the community. This has recently been undertaken in South Ockendon with a new weight limit, and Little Thurrock parking restrictions. As

implemented in AQMA 25 Aveley, the Council will also be engaging with residents in Horndon on the Hill to identify measures which will help reduce freight vehicles inappropriately moving through the village. This will also include lobbying by the Portfolio Holder for Transport to DfT to create a trial area for enforcement of HGV's in the area, preventing the "rat-running" by large commercial vehicles along inappropriate routes. Parking bans for HGV's and weight limits will also be sought, after the Council has received several representations from residents in the area.

Improvements to Walking and Cycling: Thurrock Council undertook public engagement through an online portal to get thoughts and views from residents about where active travel improvements for walking and cycling are required. This portal will remain open, as it is map based and allows all people to show officers where they feel improvements are necessary to increase walking and cycling. With Active Travel Funding, the Council has implemented four schemes at transport interchanges – Stanford-le-Hope, Okendon, Purfleet, and East Tilbury to make walking and cycling to the trailway station easier, including speed reductions and widened footways. A further consultation took place for five schemes as part of Tranche 2 of the programme, with one scheme likely to include a low traffic neighbourhood (currently in consultation) and another with an enhanced pedestrian and cycle crossing across the busy A128 by the Orsett Cock junction. A third round of funding has been submitted to the DfT for a high quality cycle route linking the east of Thurrock to Basildon Hospital.

Wayfinding has also been progressed with schemes implemented in Stanford le Hope, Tilbury and Grays, with Aveley and South Ockendon due to be completed by December 2021. The cycle Hub in Tilbury which employs three members of staff and sells reconditioned and new cycles and accessories has proved to be popular with sales starting to increase. This has secure funding until March 2022, but the Council are seeking to identify additional funds.

School and Workplace Travel Plans: the council secures travel plans and monitoring provisions as part of development consents. Schools currently monitor their travel plans via Modeshift STARS web-tool which provides a national framework for the implementation of sustainable and active school travel activities. This is the only national accreditation scheme for rewarding sustainable School Travel Plans (STP) and 35 out of 51 schools in the borough are actively working on their School Travel Plans and thirteen schools now have an accredited travel plan. Arthur Bugler has joined the Woodside Academy in achieving Gold accreditation in their STP. St Cleres Secondary School has

also been recognised for the School Travel Plan and the efforts to promote sustainable travel by being awarded the best Secondary School for Sustainable Travel in the East of England Region by Modeshift. This is a great achievement, given the difficulty often experienced in getting secondary schools to participate in school travel planning. To further encourage participation by schools in the Modeshift programme, the Council agreed a five year programme to provide a variety of improvements outside schools to help encourage modal shift, improve safety, and reduce congestion. Priority will be given to schools who have travel plans, or participate in the process and engage with the Council.

Freight Quality Partnership (FQP): the Council re-established its Freight Quality Partnership to work collaboratively with freight and logistics operators to jointly formulate actions aimed at managing and mitigating the air quality impacts of HGVs in Thurrock. The Council is using the meetings to help develop a new Freight and Logistics Strategy for the borough. The Council also hosts a Congestion Task Force and Road User Group meetings, and in the interest of efficiency and engaging with the largest group of people, all three meetings will potentially be condensed into one.

ForwardMotion / South Essex Active Travel (SEAT): the council, along with Southend-on-Sea and Essex County Council was successfully awarded approximately £3.3 million in 2017/18 to deliver this programme, which targets people in a transitional stage of life to encourage sustainable travel options prior to key behavioural decision-making processes, such as commencing new employment or education. The SEAT Project/DfT Access fund came to an end in March 2021, however the SEAT project remains active until December 2021 as the DfT has granted authorities an extension to utilise any underspend from the project created as a result of the Covid pandemic. In the initial years, the programme was called South Essex Active Travel, however it is now publically branded as ForwardMotion when engaging with the public and businesses.

Since the early achievements of the project working with Amazon to help influence travel behaviour of staff at its new Fulfilment Centre in Tilbury, ForwardMotion is continuing to support a range of projects across the borough. As part of the project, the Council has opened a new cycle hub in Tilbury, which will provide opportunities for people to purchased low-cost new and refurbished cycles, to access training and sign-post residents to support programmes to encourage modal shift. The cycle hub also supports a programme of up-skilling local volunteers in cycle repairs, to encourage enterprise and reemployment, as well as offering a community space, cycle recycling and cycle exchange

programme for families (i.e. as a child grows older, a smaller cycle can be exchanged for a more suitable bike). Additionally, the ForwardMotion programme offers a cycle loan opportunity to encourage cycle ownership at a low monthly rate (£10). Similar to the programme implemented at Amazon, ForwardMotion engagement offices continue to work with key business, colleges and sixth forms to provide travel planning advice, as well as hosting road shows at key locations, such as intu Lakeside and Grays town centre.

The ForwardMotion project has also provided a substantial grant to support the delivery of a new bus service linking London Gateway Port and Park development with the local residential community of Stanford le Hope and the nearby station – a link which didn't previously exist.

The programme also includes a range of other measures, including a target to provide adult cycle training to 200 people over the three years to encourage cycling to work. In this past year, a grant scheme within the project has also been offered to local community groups to help promote active and sustainable travel.

The South Essex Active Travel (SEAT) / ForwardMotion programme offers a range of benefits to residents by providing improved travel information and advice on travel to the workplace, not just within Thurrock, but across the south Essex corridor, the promotion of lifelong skills in cycling and cycle confidence, and cycle repairs and maintenance, as well as cycle loans to new job seekers who do not have access to their own transport. The ForwardMotion programme has also engaged with public transport operators to provide free travel tickets to job seekers or new employees to help them commence employment using public transport at a low cost which may otherwise be unaffordable in the first few weeks of employment. The scheme will result in approximately £400,000 worth of investment per annum in Thurrock over three years.

Electric Vehicle Charging: the council has been out to tender on a new contract for electrical charging infrastructure. New EV charging points will be introduced where demand justifies, and will aim to consolidate the market for charging infrastructure in the borough, reducing barriers for residents. An initial tender exercise did not prove fruitful, but the Council is continuing to explore new opportunities, and are engaging with operators to provide a bespoke solution for Thurrock.

Car Club: The Council is exploring the funding of a Car Club to be located in Thurrock for use by all residents and business, all planning applications will be asked to include parking bays for car club vehicles as part of the Travel Plan conditions and this will be applicable

to residential and commercial business. The Council are seeking to undertake procurement in the remainder of 2021/22 financial year.

Impacts of Actions

The strategy sets out the need to monitor and measure air pollution levels in AQMAs where actions are focussed, in order to determine whether the actions being implemented are achieving success in terms of a reducing NO_x levels.

Thurrock Council expects the following measures to be completed over the course of the next reporting year:

South Essex Active Travel (SEAT): The SEAT Project/DfT Access fund came to an end in March 2021, however the SEAT project remains active until December 2021 as the DfT has granted authorities an extension to utilise any underspend from the project created as a result of the Covid pandemic. It is envisioned that a mode shift from car to more sustainable modes of travel will be achieved, and consequently a reduction in vehicle emissions, almost a modest reduction. These will be measured through monitoring and evaluation reports of the scheme, which is a mandatory requirement of the DfT.

Freight Strategy: Thurrock Council are seeing to develop a new freight strategy, which will provide a relevant and up-to-date policy framework to promote the movement of goods and freight within and beyond the borough boundary. This strategy will set out how the council proposes to support and manage freight and industry in Thurrock, whilst promoting measures to address air quality issues arising from these activities. The Freight Strategy is not been progressed at this time but is now being brought forward as part of the development of Thurrock's Local Plan and Transport Strategy. It is not expected to be developed prior to 2022.

Electric Vehicle Charging – The Council will continue to explore and install Electric Vehicle Charging points where demand justifies. When a new contract is approved, further expansion of the network will be expected.

Urban Traffic Management Control: Thurrock Council is engaging with Highways England to implement new technologies on the road network to help improve traffic flows and minimise the impact on air quality through congestion. As part of our collaborative working, the Council is seeking to establish a new suite of Intelligent Transport Systems infrastructure, including a new UTMC which will help this objective to creating better and more reliable journeys. The key objective of this new UTMC is to integrate with the

systems of adjoining highway authorities (incl. Highways England, Kent County Council and Essex County Council) in order to better manage the local road network, particularly in response to incidents at Dartford Crossing, with the aim of minimising traffic congestion and associated air pollution. One specific example the Council is working with Highways England is on Junction 31 of the M25, which regularly sees congestion, due to traffic flows and a lack of adherence to yellow box junction markings. The two authorities will aim to develop plans which will help clear the junction immediately, via dynamic management of traffic signals, rather than relying on manual intervention on site or awaiting for traffic flows to decrease. Plans are also being progressed to enable enforcement of the yellow-box junctions at J31 of the M25.

The Council is also intending to expand its Real Time Passenger Information boards at Public Transport stops, particularly in Tilbury, with an additional sign located in Gravesend to help promote the ferry. This will offer a more visual display of ferry operations, and can potentially attract passengers away from driving across the river. The Council is also exploring replacing existing signs which have come to the end of their life and increasingly out of action. The Real Time Signs in Tilbury should be implemented in summer 2020 ahead of the opening of the Tilbury2 Port development, as instructed by the corresponding Development Consent Order.

In Autumn 2019, the Council received consent from the Secretary of State to enforce idling of vehicles on the highway. The Council has started to promote this measure, and will be looking to act in a targeted fashion at key locations – outside schools, taxi ranks and town centres, and level crossings to help encourage vehicles to switch off their vehicles when waiting. All schools in Thurrock were encouraged to help get the message across to parents to turn off outside schools to pick up children to this end a completion for the children was initiated during the summer. In a select number of schools (three) children were asked to design a poster that would show the way cars idling outside schools can affect the children's health and the Air Quality at schools, a book token for the child that designed the winning poster was given and an outdoor banner to hang on the school gate/railings was also provided with the winning design and school logos. This proved to be very popular way to get the message across to not only the parents of the children that attended that school but also the local residents and passers-by.

Finally, the Council will re-evaluate its Air Quality and Health Strategy to take into consideration new opportunities and develop additional and improved policies and actions. This will be developed over the 21/22 financial years.

Thurrock Council's priorities for the coming year are to ensure delivery of these proposed action measures, and review post implementation whether they have delivered noticeable improvements in air quality, if not then additional measures may need to be required in due course.

The principal challenges and barriers to implementation that Thurrock Council anticipates facing are: - Challenges in identifying funding sources, and lack of resources to plan and implement measures.

Progress on the measures which may have rolled over from previous years has been slower than expected due to challenges in securing identified funding resources from external partners. Additionally, due to the increasing demands on Council resources, there has been the risk of some schemes slipping in previous years. The proposed review of the Air Quality and Health Strategy will help improve the focus on schemes to address air quality, by developing new actions and policies, and set in place a formal process for progressing these actions.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Thurrock Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of AQMA's 1,2,3,4,5,10,13,23,24,25 in particular, the other remaining AQMAs may be revoked due to monitoring data falling below the objectives, if this trend continues, the council will consider revoking them.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Public Awareness Raising & Education	Public Information	via the Internet	Ongoing	Ongoing	Env Protection Team/ Highways & Public Health	Env Protection Team/ Highways & Public Health					N/A	N/A	Effects not quantifiable but may encourage modal shift and lead to long-term improvements	To Inform the Public of the state of Air Quality dissemination of air quality reports and download of AQ data from Thurrock Council website/ LAQN, EssexAir & Defra
2	Smarter Choices-Work Place Travel Planning : Action to road vehicle emissions	Promoting Travel Alternatives	Workplace Travel Planning	2012/13	Ongoing	Strategic Planning	Strategic Planning					<1%	N/A		Encourage modal shift (13 organisations supported since beginning of Local Sustainable Transport Fund (LSTF)
3	Action to road vehicle emissions	Promoting Travel Alternatives	Promotion of cycling	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
4	Action to road vehicle emissions	Promoting Travel Alternatives	School Travel Plans	2004	Complete	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
5	Action to road vehicle emissions	Promoting Travel Alternatives	Promotion of walking	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
6	Action to road vehicle emissions Public Transport (Metrorail)	Promoting Travel Alternatives	Promote use of rail and inland waterways	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
7	Action to road vehicle emissions	Promoting Travel Alternatives	Personalised Travel Planning	2010/11	2015/16	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
8	Action to road vehicle emissions	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2010/11	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
9	Action to road vehicle emissions	Transport Planning and Infrastructure	Cycle network	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
10	Action to road vehicle emissions	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift
11	Action to road vehicle emissions	Transport Planning and Infrastructure	Bus route improvements	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Encourage modal shift

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
12	LAPC Inspections, of local industry	Environmental Permits	Other	1990	Ongoing	Environmental Protection team	Environmental Protection team					Effects not quantifiable, but probably limits local component of background pollution	N/A	LAPC work is ongoing and part of our normal regulatory work	Prevention of Pollution & Nuisance
13	Action to road vehicle emissions (116 drivers trained by SAFED up to March 2013)	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2010/11	2014/15	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Improve HGV driving efficiency to improve vehicle emissions
14	Action to road vehicle emissions (ECO Stars Freight Accreditation Scheme, 42 businesses currently have accreditation from the scheme)	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2010/11	2014/15	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Improve HGV driving efficiency to improve vehicle emissions (funding available until March 2015)
15	Enforcement of local Taxi licencing	Promoting Low Emission Transport	Taxi Licensing conditions	Ongoing	Ongoing	Licencing	Licencing					<1%	N/A	Effects not quantifiable	Ensure that Road vehicles are road worthy and EU compliant vehicles
16	Provision of Electric vehicle car charging points around the borough	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2009	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Alternative fuelled vehicles
17	Council Introduced Home working / flexible working hours	Promoting Travel Alternatives	Encourage / Facilitate home-working	2014	Ongoing	TBC	TBC					N/A	N/A	Thurrock Council has made Home working, wherever possible, a permanent arrangement following the Covid-19 restrictions that will minimise staff commuting. The offices have recently been completely refitted to facilitate agile working where visiting the	To reduce and save money on unnecessary vehicle journeys

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														offices is essential	
18	Introduction of Hybrid Buses into the fleet	Alternatives to private vehicle use	Other	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Switch from Diesel to less polluting alternatives
19	Cycle Parking for AQMA 5	Transport Planning and Infrastructure	Other	2013/2014	Completed	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Increase capacity for cycle network
20	Local Sustainable Transport Fund (LSTF) Improvement of Transport infrastructure (Boroughwide) Initiative	Transport Planning and Infrastructure	Other	2010/2014	Completed	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Improvement of Transport Infrastructure
21	Freight Quality Partnership (FQP) Expansion of FQP (as of 2014 were 45 members in the FQP in Thurrock (AQMA 23)	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2010/11	2015/16	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Partnership with local freight and logistic industry to provide discussion platform around freight issues.
22	Pollution absorbent paint barrier (AQMA 13)	Transport Planning and Infrastructure	Other	2013	Complete	Environmental Protection Team /Highways / Strategic Planning	Environmental Protection Team /Highways / Strategic Planning					1-2%	Monitor NO2 diffusion tube results, see if there is an improvement	No noticeable improvement	Experimental mitigation measure to attempt to reduce NO2 pollution within AQMA 13
23	Public Transport - Eco driver training	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2014	ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Improve driver efficiency in the bus fleet (limited application only 16 drivers trained, Ensign bus fleet operators)
24	Improve traffic signalling at traffic light junction within (AQMA 13)	Traffic Management	Other	2013	2013	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Improve flow of stationary traffic for smoother driving, hence attempt to lower emissions
25	SCOOT/ UTMC (AQMA 1 & AQMA 5)	Traffic Management	UTC, Congestion management, traffic reduction	2014	2014	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
26	HGV weight restriction (AQMAs 1, 2)	Traffic Management	Other	2013	2013 / 2014	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Divert HGVs away from AQMAs along Devonshire road, to alleviate London Road from HGVs & Congestion
27	Improve Bus / Rail interchange (AQMA 5)	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A		Improve accessibility of public transport :Completed scheme, but will make future improvements as part of the Masterplan for Thurrock
28	Road layout review - future bus priority measures (AQMA 23)	Transport Planning and Infrastructure	Other	Unknown	TBC	Highways / Strategic Planning	Highways / Strategic Planning								
29	Air Quality Officer Working Group	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014/15	2015/16	Environmental Protection Team	Environmental Protection Team					n/a	n/a	There is no current activity as we have without an AQ officer, but this will resume when the AQ Officer post situation is resolved	To coordinate action between council departments (Health, Transport & Environment) and determine focus areas/initiatives
30	Air Quality Study	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014/15	2015/16	Highways / Strategic Planning	Highways / Strategic Planning					n/a	n/a		To investigate improvement options in AQMA 3, 4 and 5.

Please see Thurrock's Air Quality and Health Strategy, December 2016, for more information on measures associated with each AQMA.

2.3 $PM_{2.5}$ – 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 $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Thurrock Council is taking the following measures to address $PM_{2.5}$:

The Council has published an integrated Health and Air Quality Strategy to renew its approach to addressing poor air quality and reduce exposure across its area. The focus of the air quality policies and actions are targeted at exceedances of NO_2 in individual AQMAs, however it is acknowledged that many of the interventions proposed will also have beneficial reductions in $PM_{2.5}$ concentrations. The following measures are examples of interventions proposed to also address $PM_{2.5}$ (see Table 2.2 for full list of interventions proposed):

- Land Use Planning (no increase): Policies focusing on avoiding exacerbating existing AQMAs such as car free developments and promoting sustainable transport.
- HGV Traffic Management (10.0+ µg/m^3): Introduction of weight restrictions/enforcement to discourage HGVs
- Engine Switch-off Zones (3.0+ µg/m^3): Traffic orders and publicity to reduce idling at level crossings e.tc
- Speed limit reduction (5.0+ µg/m^3): Localised traffic enforcement and speed reductions
- Clean Air Zone (15.0 µg/m^3): Traffic enforcement/management to prevent or charge high polluting vehicles for using certain roads.

Thurrock Council currently undertakes $PM_{2.5}$ monitoring at one site, Thurrock 3; Stanford-Le-Hope. PM_{10} monitoring is also undertaken in the district and can therefore be used to estimate $PM_{2.5}$ concentrations at these locations, as recommended in box 7.7 of LAQM.TG(16). The estimated $PM_{2.5}$ concentration in 2019 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were 13.5µg/m^3 and 15.3µg/m^3. The estimated $PM_{2.5}$ concentration in 2020 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were

12.8µg/m^3 and 16.2µg/m^3. These concentrations are below the $PM_{2.5}$ obligatory standard of 25µg/m^3.

Thurrock Council has also commissioned a new monitoring site, TK9, in December 2020, to measure $PM_{2.5}$ concentrations within AQMA 24. Results will be presented in the ASR 2022 following a full year of monitoring.

The Council also has a number of Smoke Control Areas, in order to prevent any use of unauthorised domestic heating appliances and fuel substances within residential buildings within these areas. The Council's Environmental Protection Team can provide details on Smoke Control Areas via its email address Air.Quality@thurrock.gov.uk Additional information on Smoke Control Areas i.e. registered appliances & fuels e.tc can be found on the UK GOV website.

The current Defra 2019 and 2020 background maps for Thurrock City Council (using the latest version with 2018 as the base year, these can be found online on the UK Air Website) show that all background concentrations of $PM_{2.5}$ are well below the annual mean AQS objective for $PM_{2.5}$. The highest concentration is predicted to be 12.8µg/m^3 in 2019 and 12.6µg/m^3 in 2020 within the 1 x 1km grid square both with the centroid grid reference of 556500, 177500. This point is located at Purfleet docks, to the West of the railway line. The closest AQMA to this point is AQMA 10 which has been declared for exceedance of the NO_2 annual mean and PM_{10} 24-hour mean.

The Public Health Outcomes Framework data tool compiled by Public Heath England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale (latest available data: 2019). The 2019 fraction of mortality attributable to $PM_{2.5}$ pollution in Thurrock is 6.0%. This is above both the fractions reported for the East of England region which is 5.5% and the fraction across England which is 5.1%.

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

This section sets out the monitoring undertaken within 2019 and 2020 by Thurrock Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Thurrock Borough Council undertook automatic (continuous) monitoring at four sites during 2019, TK4 was decommissioned in December 2019, therefore automatic monitoring was undertaken at 3 sites in 2020. A new site was commissioned in 2020, TK9, to measure NO_2 and $PM_{2.5}$. Monitoring at TK9 started in December 2020, therefore data for this site is not presented within this report and will be discussed following a year of monitoring data in the ASR 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. These pollutants have been screened out in previous reports as the levels were low or non-existent within the borough, and no new sources have been identified since for these pollutants, so they are no longer deemed as being an issue. The LAQN website presents automatic monitoring results for Thurrock Borough Council, with automatic monitoring results also available through the UK-Air website.

In addition, the Council currently operates a Heavy Metals Partisol Monitor on behalf of Defra, as part of Defra's Heavy Metals Monitoring Network. The current monitoring site is located in Chadwell St Mary. Monitoring results from this site can be downloaded via the UK-Air website.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Thurrock Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 69 sites during 2019 and 2020, including one duplicate and one triplicate site, the location of the duplicate site changed in 2020, which was associated with the continuous monitor TK4 in 2019, and was re-located to the continuous monitor TK9 (the continuous site was commissioned in December 2020, but the duplicate diffusion tubes were commissioned in February 2020, therefore the site is not a co-location in 2020). Table A.2 in Appendix A presents the details of the non-automatic sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented 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 and 2020 datasets of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 and Table B.2 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

In 2019, there were eight reported exceedances of the air quality objective at passive monitoring sites, of which seven sites were located within AQMAs. The exceedance reported outside an AQMA was at diffusion tube site LT, which is located on a main roundabout (Lakeside Tesco) and is not located near relevant exposure. The diffusion tube site was placed to measure the air quality associated with traffic, and there are plans for residential developments in this area. The residential development is expected to be approximately 45m from the diffusion tube location. The remaining seven exceedances reported in 2019 were within the following AQMAs:

- AQMA 10 (DT site JC reported 46.6µg/m^3)
- AQMA 7 (DT site IBIS reported 52.0µg/m^3)
- AQMA 5 (DT site NAS2 reported 49.9µg/m^3)
- AQMA 3 (DT site ER reported 48.8µg/m^3)
- AQMA 24 (DT site TILB reported 41.2µg/m^3)
- AQMA 25 (DT site AVSL reported 45.0µg/m^3)
- AQMA 13 (DT site LRAR reported 50.1µg/m^3)

There were an additional 6 sites which reported within 10% of the AQS Objective, of which only one site was outside an AQMA (Site ERTM reported 37.1µg/m^3 in 2019). This site is located at a residential property located at a traffic-controlled junction of the A1012, just outside AQMA 3. Following distance-correction to the nearest receptor, the concentration remained within 10% of the AQS Objective (36.8µg/m^3). The annual mean concentration in 2020 reduced to 26.1µg/m^3. It is possible that this is related to the reduction in traffic associated with the Covid-19 pandemic. Therefore, attention will be paid to this monitoring site in the 2022 ASR to ensure that it remains below the AQS Objective, and if an upward trend is noticed then consideration will be given to extending the AQMA 3 boundary.

Of the four automatic monitoring sites for NO_2 in 2019, three locations reported below 10% of the AQS annual mean objective. Of the three automatic monitoring sites for NO_2 in 2020, two reported below 10% of the AQS annual mean objective. The automatic roadside monitoring site Thurrock 8 exceeded the AQS annual mean objective in both 2019 and 2020. Distance correction was not possible at this site as the nearest receptor is located across the road, therefore is not within the parameters of the LAQM Tool. Thurrock 8 is located within AQMA 10.

There were no further reported exceedances of the AQS Objectives in 2020, there were however six sites that were within 10% of the AQS Objectives (LRAR, JC, IBIS, LT, NAS2

and ER). Following distance correction, where applicable, three of these sites reduced to below the 10% of the AQS Objective (LRAR, NAS2 and ER).

In relation to the 1-hour AQS Objective, there was one exceedance reported in 2019 at Thurrock 8, there were no exceedances reported in 2020. Additionally, all diffusion tube sites in 2019 and 2020 were below 60µg/m^3, which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

Thurrock Borough Council decomissioned site TK4 (within AQMA 24) in December 2019 following years of compliance with the AQS objectives for NO_2. The site has been relocated to TK9, comissioned December 2020, to monitor the level of NO_2 concentrations at the worst-case location within AQMA 24, results from TK9 will be presented in the 2022 ASR.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

Both 2019 and 2020 monitoring confirms that there are currently no areas breaching the annual mean air quality objectives for PM_{10}. There were some exceedences of the 24-hour mean concentrations across 2019 and 2020 at all three automatic sites, however these remained below the number of permitted exceedances per year. The maximum number of exceedances of the PM_{10} 24-hour mean objective was at Thurrock 8 in 2019, which is located in AQMA 10 (15 exceedences out of the permitted 35 exceedances per year) and at both Thurrock 1 and Thurrock 8 in 2020 (both sites reported 9 exceedences out of the permittes 35 exceedances per year). Over the past 5 years, all three sites have remained below the threshold fof 35 permitted exceedances per year, however there was an increase in the number of exceedances reported between 2018 and 2019 at sites Thurrock 1 and 3, which have remained high in 2020. These sites are not located within an AQMA, therefore monitoring will continue at all sites to ensure that any areas of concern are identified at an early stage.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

Thurrock Council currently has one automatic monitoring station (Thurrock 3; Stanford Le-Hope), which is a roadside site that monitors $PM_{2.5}$. The site has seen a decline in concentrations between 2016 – 2018. However, the annual mean concentration increased to 11.6µg/m^3 in 2019, remaining at this level in 2020 (also reporting 11.6µg/m^3). All concentrations over the past five years have reported below the $PM_{2.5}$ obligatory standard of 25µg/m^3.

Thurrock Council has commissioned a new monitoring site, TK9, in December 2020, to measure $PM_{2.5}$ concentrations within AQMA 24. Results will be presented in the ASR 2022 following a full year of monitoring.

In accordance with LAQM.TG(16), the $PM_{2.5}$ concentrations can also be estimated from PM_{10} monitoring using either a local PM_{10} and $PM_{2.5}$ monitoring ratio, or a nationally derived correction ratio of 0.7. As there is local monitoring for $PM_{2.5}$ and PM_{10} at the Thurrock 3 site, a locally derived correction factor of 0.66 in 2019 and 0.69 in 2020 can be applied to PM_{10} concentrations at Thurrock 1 (Grays) and Thurrock 8 (Purfleet), to provide an estimation for $PM_{2.5}$ concentrations at those locations. The locally derived correction ratio of 0.66 was applied to the 2019 PM_{10} concentrations at the automatic monitoring sites Thurrock 1 and Thurrock 8 (20.5µg/m^3 and 23.2µg/m^3) and the correction ratio of 0.69 was applied to the 2020 PM_{10} concentrations at Thurrock 1 and Thurrock 8 (18.6µg/m^3 and 23.5µg/m^3). The estimated $PM_{2.5}$ concentration in 2019 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were 13.5µg/m^3 and 15.3µg/m^3. The estimated $PM_{2.5}$ concentration in 2020 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were 12.8µg/m^3 and 16.2µg/m^3. These concentrations are below the $PM_{2.5}$ obligatory standard of 25µg/m^3.

3.2.4 Sulphur Dioxide (SO_2)

Table A.9 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2019 and 2020 with the air quality objectives for SO_2.

There is currently one location monitoring SO_2 within the borough located at Thurrock 1, Grays. The council has previously monitored for SO_2 at other locations, most recently in Tilbury at the Thurrock 4 site. As of early 2017 monitoring ceased due to there being no

exceedances reported at this location. There have been no pollution incidences regarding this pollutant since monitoring began back in 1996 at Thurrock 1. SO_2 concentrations were well below the air quality objectives in 2019 and 2020, with no exceedances reported in either year.

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? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Thurrock 1 (TK1)	Thurrock, Grays AURN	Urban Background	561066	177894	NO_2 PM_{10} O_3 SO_2	No	Chemiluminescent TEOM FDMS UV absorption UV Fluorescence	38	N/A	3.5
Thurrock 8 (TK8)	Purfleet, London Road	Roadside	556701	177937	NO_2 PM_{10}	AQMA 10	Chemiluminescent BAM	2.6	2	1.5
Thurrock 3 (TK3)	Stanford-le-Hope, Manorway	Roadside	569358	182736	NO_2 PM_{10} $PM_{2.5}$	No	Chemiluminescent TEOM FDMS TEOM FDMS	3	22	2.8
Thurrock 4 (TK4)*	Tilbury, Calcutta Road	Roadside	563900	176282	NO_2	AQMA 24	Chemiluminescent UV Fluorescence	5.5	2	1.5
Thurrock 9 (TK9)**	Dock Road Tilbury	Roadside	563489	176497	NO_2 $PM_{2.5}$	AQMA 24	Chemiluminescent BAMH	5.7	5.5	1.6

Notes:

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

(2) N/A if not applicable

*Site decommissioned December 2019

** Site commissioned December 2020, therefore data is not presented in this year's ASR.

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LRAR	London Road Arterial Road (R)	R	555301	179438	NO_2	13	15.5	0.5	N	1.5
PRS	Purfleet Rail Station (R)	R	555389	178145	NO_2	No	Nearest exposure crosses road source	1.5	N	2.0
WC	Watts Crescent (R)	R	556314	178765	NO_2	12	32.0	2.0	N	2.0
JC	Jarrah Cottages (R)	R	556701	177937	NO_2	10	Nearest exposure crosses road source	2.6	Y (TK8)	1.5
IBIS	Ibis Hotel (UB)	UB	557570	177789	NO_2	7	>50	52.0	N	2.0
GDSO	Gatehope Drive (UB)	UB	557595	181060	NO_2	15	23.0	105.0	N	1.3
LT	Lakeside Tesco Roundabout (R)	R	557981	178700	NO_2	No	>50	1.0	N	2.0
KCNO	Kemps Cottage (UB)	UB	558148	183532	NO_2	16	10.0	57.0	N	2.0
WT	London Road W Thurrock (R)	R	558483	177678	NO_2	23	10.0	4.0	N	1.5
HR	Howard Road (R)	R	559118	179462	NO_2	5	0.0	29.0	N	1.5
NAS2	A1306 (R)	R	559720	179630	NO_2	5	20.0	4.5	N	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LRSS	London Road South Stifford (R)	R	559785	177910	NO_2	2	4.0	3.5	N	2.0
LRG	London Road Grays (R)	R	560624	177811	NO_2	1	4.8	2.5	N	2.0
ER	Elizabeth Road (R)	R	560954	179535	NO_2	3	2.5	0.5	N	2.0
PS	Poison Store - Thurrock AURN Site (Co-located single tube) (UB)	UB	561066	177894	NO_2	No	N/A	38.0	Y (TK1)	3.5
HL	Hogg Lane (R)	R	561108	178922	NO_2	No	27.5	1.2	N	2.0
NAS1	Queensgate Centre Grays (R)	R	561469	178063	NO_2	1	0.0	5.0	N	2.0
CR	Cromwell Road Grays (I)	R	561572	178154	NO_2	1	Nearest exposure crosses road source	0.5	N	2.0
SRG	Stanley Road Grays (R)	R	561685	177833	NO_2	1	2.5	5.0	N	2.0
NAS3	Chestnut Avenue Grays (UB)	UB	561830	179878	NO_2	No	8.0	N/A	N	1.5
WES	William Edwards School (R)	R	561958	180967	NO_2	No	38.0	N/A	N	2.0
B	Bulphan (RB)	RB	563855	184772	NO_2	No	Nearest exposure crosses road source	N/A	N	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TL	Calcutta Road Tilbury (R)	R	563867	176293	NO_2	24	6.0	0.5	N	2.0
PKSL	Park Road (R)	R	567781	182400	NO_2	No	24.0	9.0	N	2.0
SL	Stanford Library (UB)	UB	568501	182459	NO_2	No	7.0	N/A	N	2.0
ML, MM, MR	Manorway Monitoring Station (R) (Co-located triplicate tube site)	R	569357	182737	NO_2	No	22.0	3.0	Y (TK3)	2.8
FRC	Francisco Close (Chafford Hundred) (I)	I	559136	179084	NO_2	No	10.0	17.0	N	2.0
TILA	Dock Road (Tilbury) (R)	R	563498	176483	NO_2	24	14.0	2.5	N	2.0
TILB	Broadway Intersection (Tilbury) (R)	R	563645	176348	NO_2	24	9.0	2.5	N	2.0
TILC	St Andrews Road (Tilbury) (R)	R	563600	176321	NO_2	No	N	2.5	N	1.5
TILD	Calcutta Road East (Tilbury) (R)	R	563995	176291	NO_2	24	6.0	0.5	N	2.0
TILE	Calcutta Road North (Tilbury) (R)	R	563870	176305	NO_2	24	8.0	2.0	N	2.0
TK9 A, TK9 B	Thurrock 9 (R) (co-located duplicate tube site from Dec 2020)	R	563489	176497	NO_2	24	5.7	5.5	Y (TK9 from Dec 2020)	1.5
TK4 A, TK4 B	Thurrock 4 (R) (co-located duplicate	R	563900	176282	NO_2	24	2.0	5.5	Y (TK4)	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
	tube site - CLOSED Dec 2019)									
PBP	Purfleet By-pass (R)	R	556257	178438	NO_2	26	5.5	9.5	N	1.5
PBPA	Purfleet By-pass	R	556221	178461	NO_2	No	3.2	9.5	N	1.5
LYD	Lydden (UB)	UB	560057	179873	NO_2	No	26.0	18.0	N	2.0
AVSL	Aveley Ship Lane (R)	R	556713	180167	NO_2	25	1.0	2.0	N	2.0
AVHS	Aveley High Street (R)	R	556661	180180	NO_2	25	6.5	0.8	N	2.0
SOAA	South Ockendon Arisdale Avenue (R)	R	558785	182323	NO_2	No	6.0	7.0	N	2.0
TSR	Tilbury Sydney Road (UB)	UB	564122	176152	NO_2	No	N	N/A	N	2.0
DR	Devonshire Road (R)	R	560279	178944	NO_2	No	10.5	6.0	N	1.5
LRARN	London Road Art Road (North) (R)	R	555286	179501	NO_2	13	0.5	19.5	N	2.0
LRARS	London Road Art Road (South) (R)	R	555357	179362	NO_2	No	40.0	15.0	N	1.0
LRARMN	London Road Art Road (Mid-North) (R)	R	555299	179453	NO_2	13	Nearest exposure crosses road source	8.0	N	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LRARMS	London Road Art Road (Mid-South) (R)	R	555329	179397	NO_2	13	9.0	7.0	N	2.0
JRP	Joslin Road (UB)	UB	556384	178001	NO_2	No	13.0	N/A	N	2.0
ACHL	Armada Court & Hogg Lane (R)	R	561093	178974	NO_2	3	9.0	8.0	N	1.5
CC	Catherine Close (I)	I	560770	179866	NO_2	No	32.0	20.0	N	1.5
ERFA	Elizabeth Road facade A (R)	R	560962	179527	NO_2	3	32.0	8.2	N	1.5
ERFB	Elizabeth Road facade B (R)	R	560963	179558	NO_2	No	0.5	8.0	N	1.5
ERTM	Elizabeth Road & Treacle Mine Roundabout (R)	R	560965	179796	NO_2	No	0.5	8.5	N	1.5
NC	Nutberry Close (I)	I	561077	179912	NO_2	No	6.6	19.5	N	1.5
HD	Hawkins Drive (R)	R	560003	179694	NO_2	5	8.4	9.0	N	1.5
GRPL	Grifon Road & Pilgrims Lane Roundabout (I)	I	559551	179547	NO_2	5	5.6	19.5	N	1.5
PIH	Premier Inn Hotel (I)	I	557299	178802	NO_2	8	6.6	21.0	N	1.5
WCFA	Watts Cresecent facade (A)	I	556290	178749	NO_2	12	7.5	17.0	N	1.5
THA	Thurrock Hotel A (UB)	UB	557386	179065	NO_2	9	0.0	78.0	N	1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
THB	Thurrock Hotel B (UB)	UB	557437	179099	NO_2	9	0.0	39.0	N	1.5
SCR LTC	Stifford Clays Road LTC site (I)	UB	562383	181157	NO_2	No	29.0	55.5	N	1.5
BSA LTC	Baker Street A LTC site (R)	R	563486	181070	NO_2	No	9.0	1.5	N	1.5
BSB LTC	Baker Street B LTC site (R)	R	563574	180770	NO_2	No	7.2	1.3	N	1.5
HR LTC	Heath Road LTC site (R)	R	563785	180157	NO_2	No	6.5	0.9	N	1.5
SR LTC	Station Road LTC site (R)	I	567351	177555	NO_2	No	Nearest exposure crosses road source	1.5	N	1.5
TTS LTC	Tree Tops School LTC site (I)	I	563828	179597	NO_2	No	>50	38.0	N	1.5
MRS	Manor Road School (R)	R	562413	177747	NO_2	No	0.0	1.5	N	2.0
MTV	Mary The Virgin Church (I)	I	562615	177774	NO_2	No	4.0	56.0	N	2.0

Notes:

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

(2) N/A if not applicable.

Sites associated with Lower Thames Crossing, sited to monitor infrastructure emissions

Sites associated with Tilbury Green Power to monitor industrial emissions

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Thurrock 1	561066	177894	Urban Background	98.9	98.9	27.9	28.2	24.8	23.4	19.3
Thurrock 3	569358	182736	Roadside	98.7	98.7	26.9	28.3	27.6	25.3	21.2
Thurrock 4	563900	176282	Roadside	0	0	33.5	33.8	30.0	32.2	N/A
Thurrock 8	556701	177932	Roadside	93.3	93.3	**55.0**	**52.1**	**51.6**	**47.7**	**41.6**
Thurrock 9	563489	176497	Roadside	100	5.9	N/A	N/A	N/A	N/A	N/A(3)

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

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

Notes:

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

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

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

(3) Site was commissioned December 2020, data capture too low to provide annual mean (<25%)

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
LRAR	555301	179438	R	100	100.0	**62.5**	**58.2**	**51.2**	**50.1**	36.7
PRS	555389	178145	R	100	100.0	35.0	31.5	34.4	32.0	22.6
WC	556314	178765	R	100	100.0	**50.2**	**40.1**	**41.1**	39.1	29.7
JC	556701	177937	R	100	100.0	**48.6**	**46.7**	**49.5**	**46.6**	37.4
IBIS	557570	177789	UB	75	75.0	**49.1**	**46.4**	**45.3**	**47.0**	37.4
GDSO	557595	181060	UB	90.4	90.4	28.9	27.5	25.3	25.7	19.2
LT	557981	178700	R	100	100.0	**53.7**	**56.0**	**54.7**	**52.0**	39.9
KCNO	558148	183532	UB	100	100.0	32.8	33.5	29.4	29.3	21.9
WT	558483	177678	R	92.3	92.3	**41.1**	39.1	38.2	35.5	27.5
HR	559118	179462	R	100	100.0	31.5	32.1	30.3	27.7	22.2
NAS2	559720	179630	R	100	100.0	**56.0**	**52.8**	**51.3**	**49.9**	37.6
LRSS	559785	177910	R	100	100.0	39.6	**41.9**	39.2	39.0	24.3
LRG	560624	177811	R	100	100.0	38.9	38.3	36.2	36.7	26.4
ER	560954	179535	R	90.4	90.4	**51.8**	**49.7**	**49.8**	**48.8**	38.1
PS	561066	177894	UB	100	100.0	25.7	26.1	25.4	24.9	18.8
HL	561108	178922	R	100	100.0	33.9	34.3	33.7	31.8	24.6
NAS1	561469	178063	R	100	100.0	33.5	32.9	32.9	31.0	23.6
CR	561572	178154	R	100	100.0	32.6	31.8	30.9	33.0	24.0
SRG	561685	177833	R	100	100.0	30.9	28.7	29.6	30.6	23.0
NAS3	561830	179878	UB	92.3	92.3	22.0	23.2	23.9	24.8	18.8
WES	561958	180967	R	100	100.0	31.8	30.0	29.5	26.6	20.3
B	563855	184772	RB	100	100.0	17.2	16.3	15.2	14.6	11.9
TL	563867	176293	R	63.5	63.5	35.7	35.0	32.9	34.8	28.0
PKSL	567781	182400	R	100	100.0	29.0	27.8	29.4	26.0	20.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
SL	568501	182459	UB	100	100.0	27.0	25.9	26.2	25.5	19.5
ML, MM, MR	569357	182737	R	100	100.0	27.0	27.8	28.5	26.5	21.6
FRC	559136	179084	I	100	100.0	33.2	31.8	30.6	31.0	23.9
TILA	563498	176483	R	100	100.0	**40.8**	**40.9**	38.0	39.8	31.1
TILB	563645	176348	R	92.35	92.3	39.7	37.6	**42.4**	**41.2**	32.8
TILC	563600	176321	R	90.4	90.4	39.0	**40.2**	37.8	33.3	28.2
TILD	563995	176291	R	75	75.0	36.9	36.3	35.0	35.1	31.3
TILE	563870	176305	R	100	100.0	34.9	35.4	33.4	35.2	31.7
TK9 A, TK9 B	563489	176497	R	92.3	92.3	-	-	-	-	29.4
PBP	556257	178438	R	92.3	92.3	37.8	36.8	33.1	31.0	24.1
PBPA	556221	178461	R	100	100.0	34.7	33.3	33.1	30.7	23.8
LYD	560057	179873	UB	100	100.0	30.8	31.4	29.9	26.7	22.1
AVSL	556713	180167	R	100	100.0	**41.0**	**42.1**	**40.7**	**45.0**	32.5
AVHS	556661	180180	R	100	100.0	37.3	35.2	35.6	35.1	26.5
SOAA	558785	182323	R	92.3	92.3	30.3	28.1	32.5	29.2	21.0
TSR	564122	176152	UB	92.3	92.3	28.1	28.4	26.8	28.5	24.2
DR	560279	178944	R	100	100.0	30.1	28.0	26.5	27.9	21.0
LRARN	555286	179501	R	100	100.0	32.0	33.2	31.4	33.0	24.1
LRARS	555357	179362	R	100	100.0	31.1	30.7	25.8	26.4	19.8
LRARMN	555299	179453	R	100	100.0	**45.6**	**40.9**	39.6	36.7	26.6
LRARMS	555329	179397	R	100	100.0	**43.6**	39.2	37.5	34.3	25.4
JRP	556384	178001	UB	100	100.0	27.6	25.3	26.4	24.1	18.1
ACHL	561093	178974	R	92.3	92.3	**No Data**	35.8	32.7	35.3	27.7
CC	560770	179866	I	100	100.0	**No Data**	22.8	25.6	26.0	20.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
ERFA	560962	179527	R	100	100.0	No Data	33.8	32.5	32.5	23.8
ERFB	560963	179558	R	100	100.0	No Data	34.5	31.4	32.2	25.8
ERTM	560965	179796	R	100	100.0	No Data	35.5	37.5	37.1	26.1
NC	561077	179912	I	100	100.0	No Data	36.5	33.8	34.5	28.7
HD	560003	179694	R	100	100.0	No Data	34.9	32.7	31.5	25.5
GRPL	559551	179547	I	100	100.0	No Data	33.0	32.5	31.0	24.4
PIH	557299	178802	I	82.7	82.7	No Data	32.0	35.1	30.7	24.1
WCFA	556290	178749	I	100	100.0	No Data	31.0	32.7	32.6	24.4
THA	557386	179065	UB	100	100.0	No Data	30.8	34.3	29.7	24.0
THB	557437	179099	UB	100	100.0	No Data	30.2	35.7	31.8	24.4
SCR LTC	562383	181157	UB	100	100.0	No Data	No Data	32.4	30.1	22.3
BSA LTC	563486	181070	R	100	100.0	No Data	No Data	24.0	25.9	18.9
BSB LTC	563574	180770	R	100	100.0	No Data	No Data	30.2	28.3	23.5
HR LTC	563785	180157	R	100	100.0	No Data	No Data	27.3	29.0	22.1
SR LTC	567351	177555	I	100	100.0	No Data	No Data	18.7	17.1	15.4
TTS LTC	563828	179597	I	100	100.0	No Data	No Data	23.7	21.5	19.2
MRS	562413	177747	R	100	100.0				23.5	19.5
MTV	562615	177774	I	100	100.0				21.5	17.5

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

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

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

Notes:

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

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**.

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

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

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

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

Sites associated with Lower Thames Crossing, sited to monitor infrastructure emissions

Sites associated with Tilbury Green Power to monitor industrial emissions

Figure A.1 – Trends in Annual Mean NO_2 Concentrations – Automatic Monitoring Sites

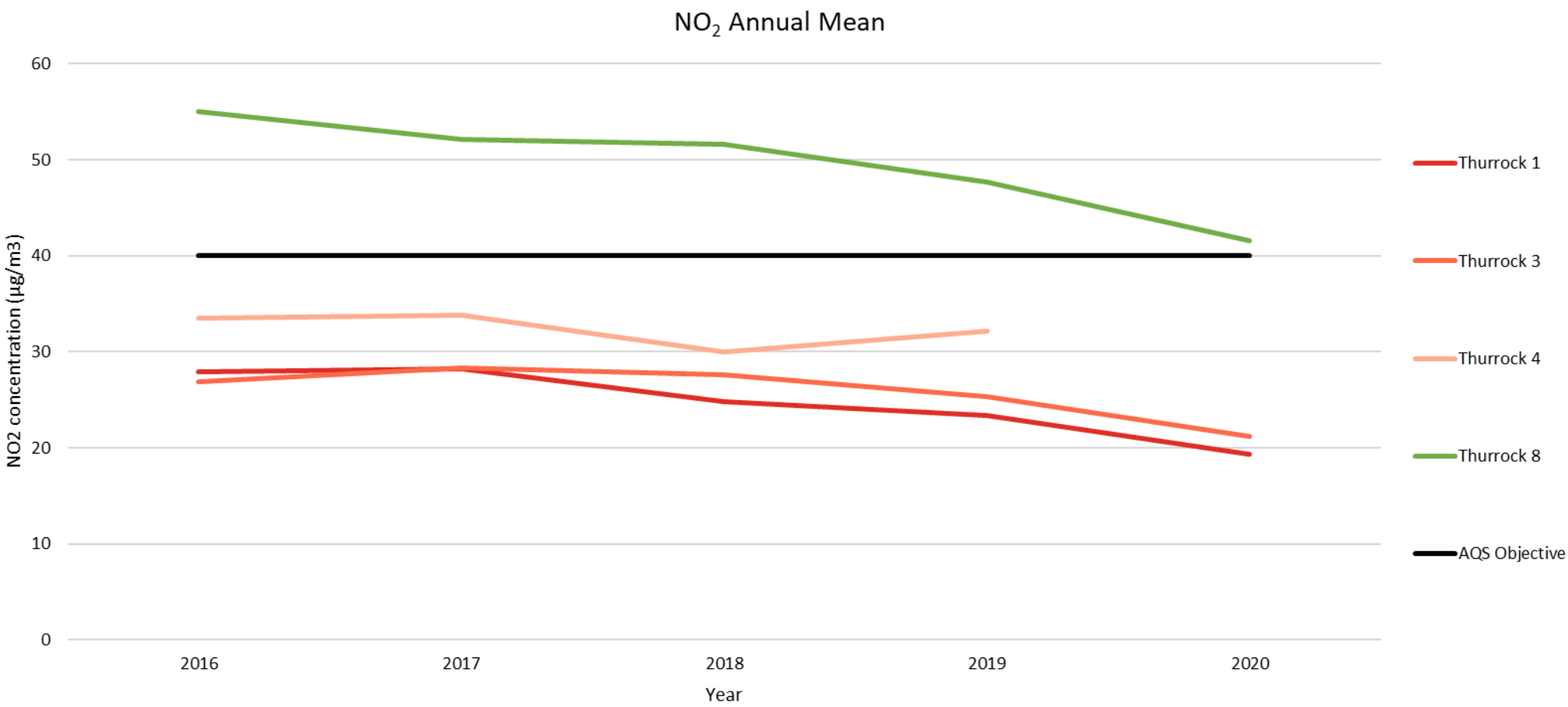


Figure A. 2 – Trends in Annual Mean NO_2 Concentrations – Passive Monitoring Sites in AQMA 1, 2, 3 and 5

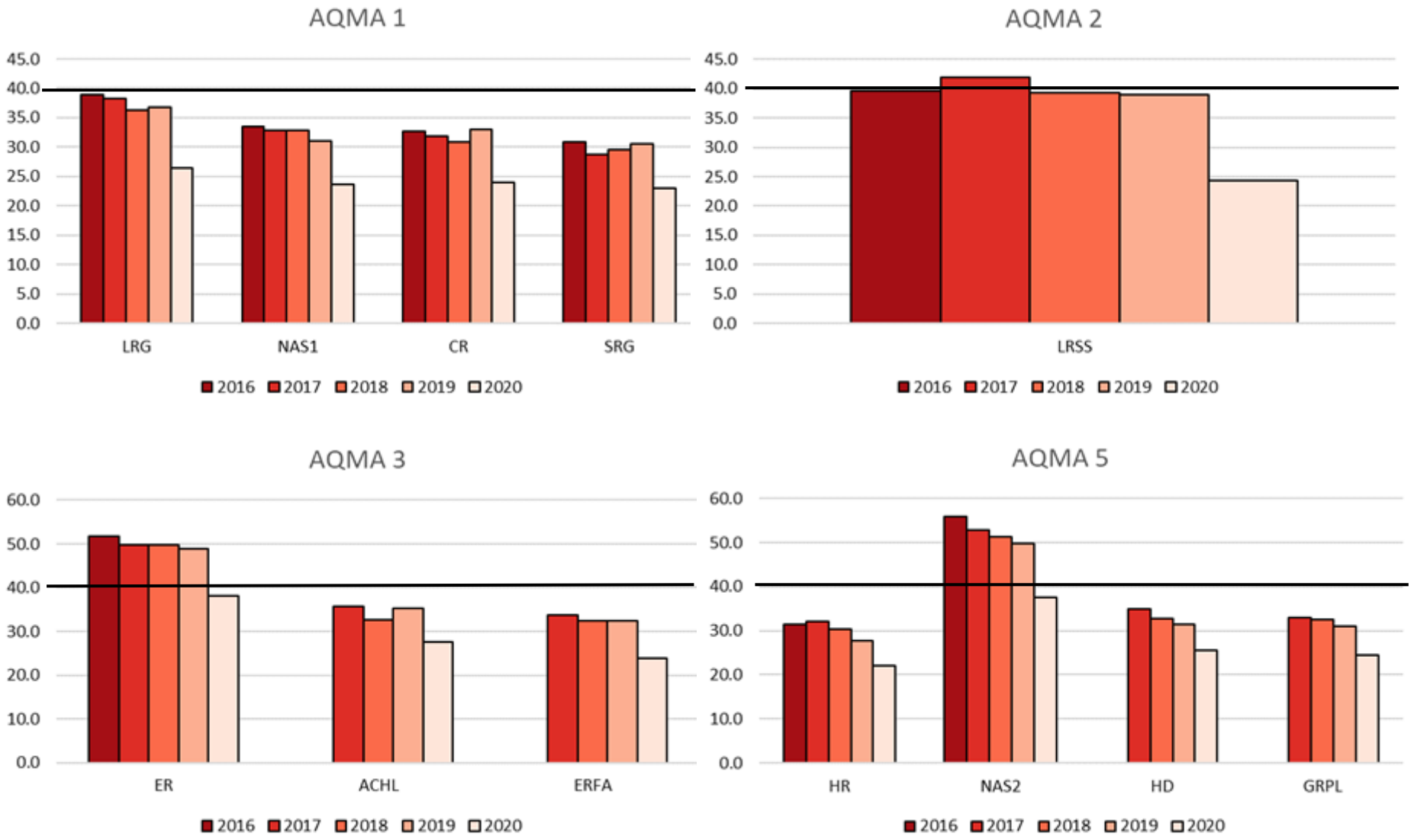


Figure A. 3 - Trends in Annual Mean NO_2 Concentrations – Passive Monitoring Sites in AQMA 7, 8, 9 and 10

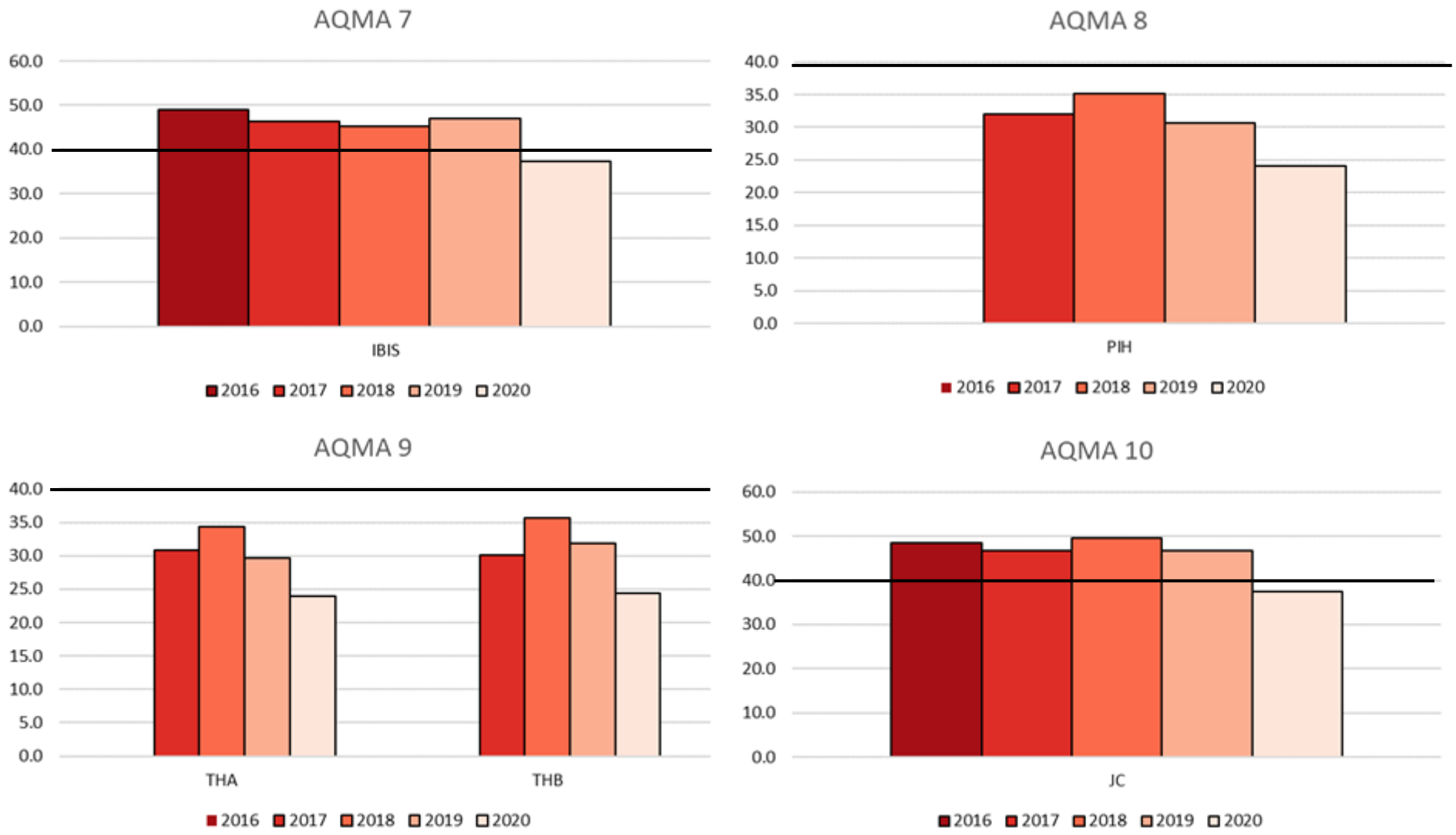


Figure A. 4 - Trends in Annual Mean NO_2 Concentrations – Passive Monitoring Sites in AQMA 12, 13, 15 and 16

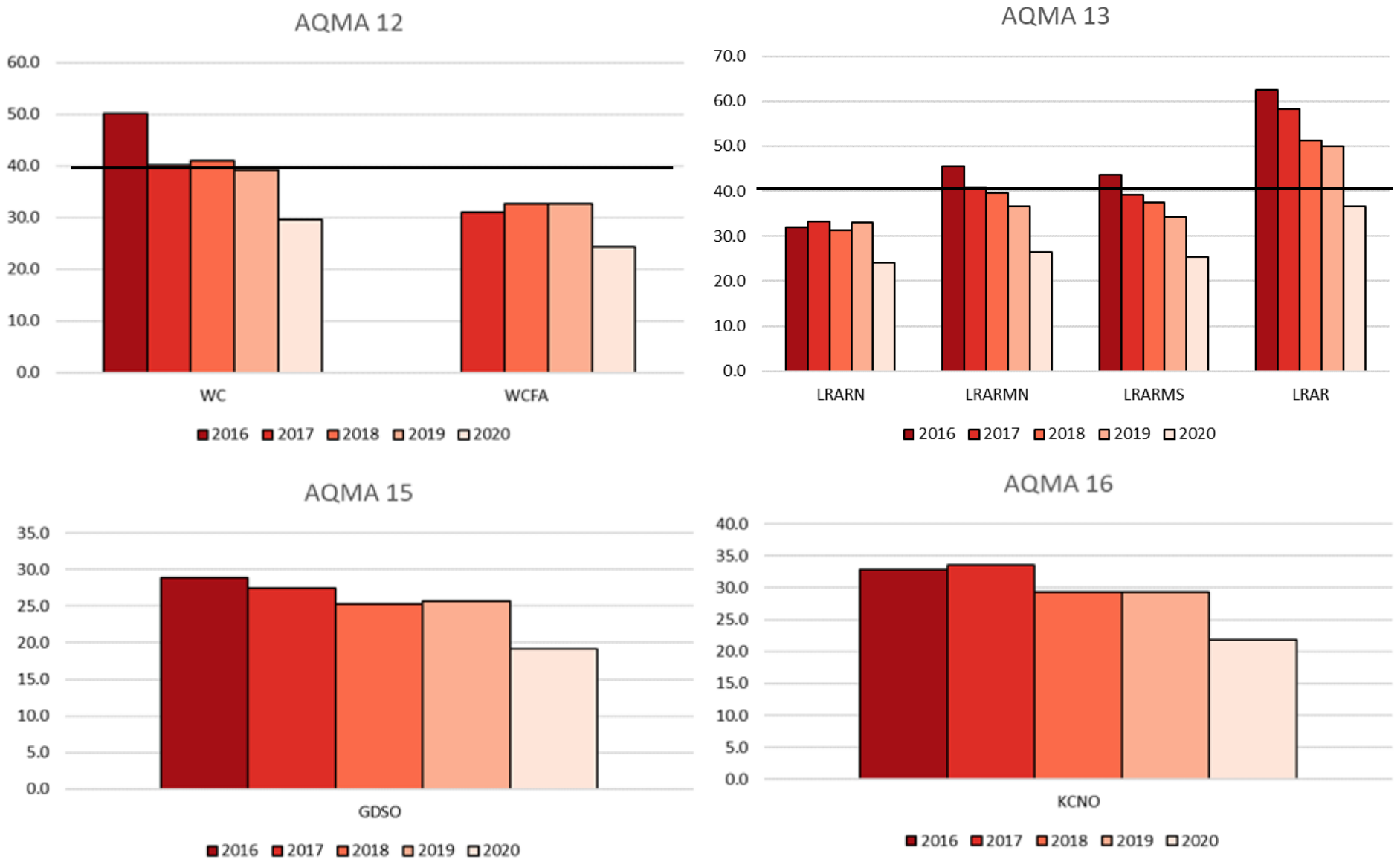


Figure A. 5 - Trends in Annual Mean NO_2 Concentrations – Passive Monitoring Sites in AQMA 23, 24, 25 and 26

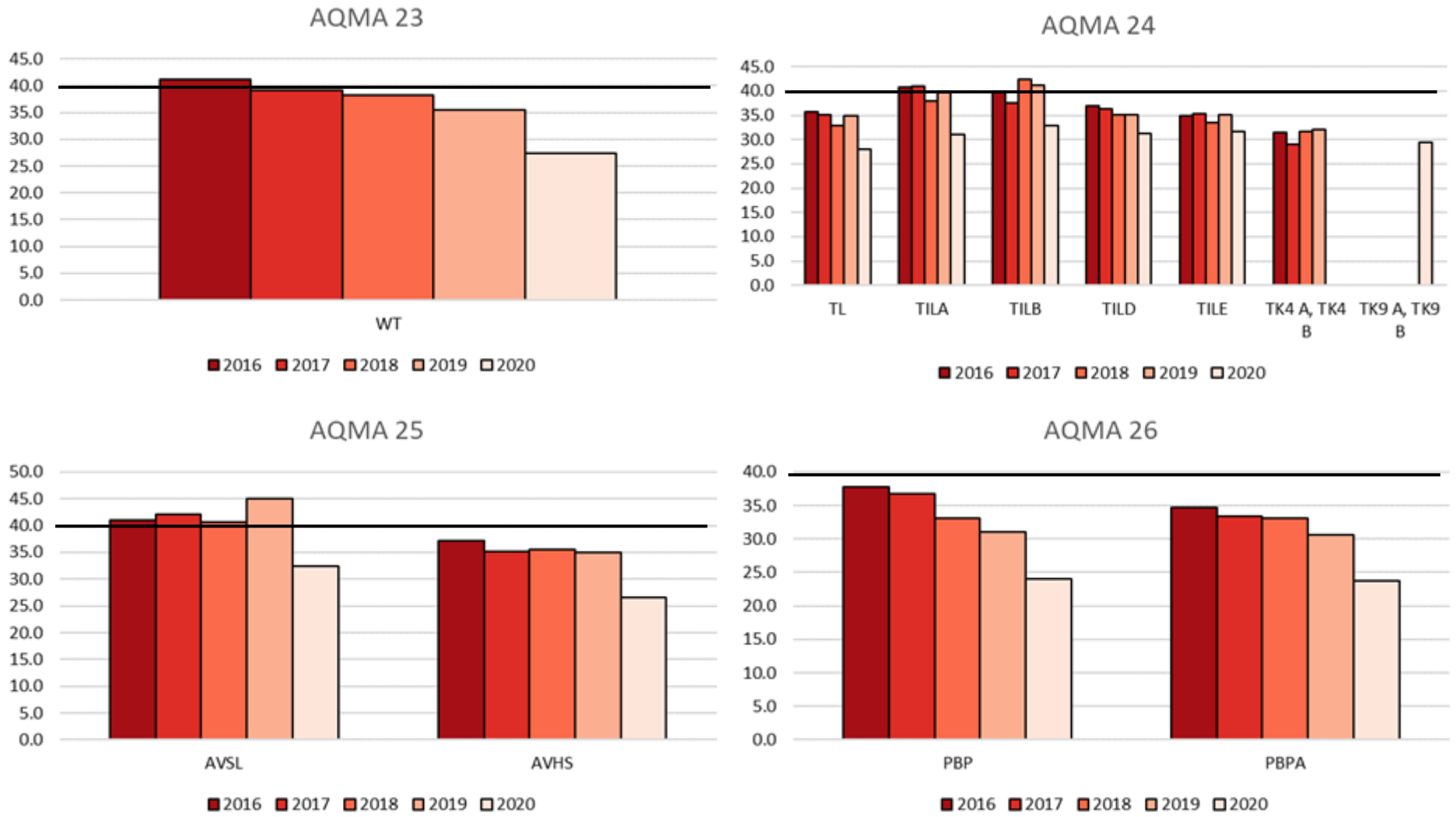


Figure A. 6 - Trends in Annual Mean NO_2 Concentrations – Passive Monitoring Sites outside AQMAs

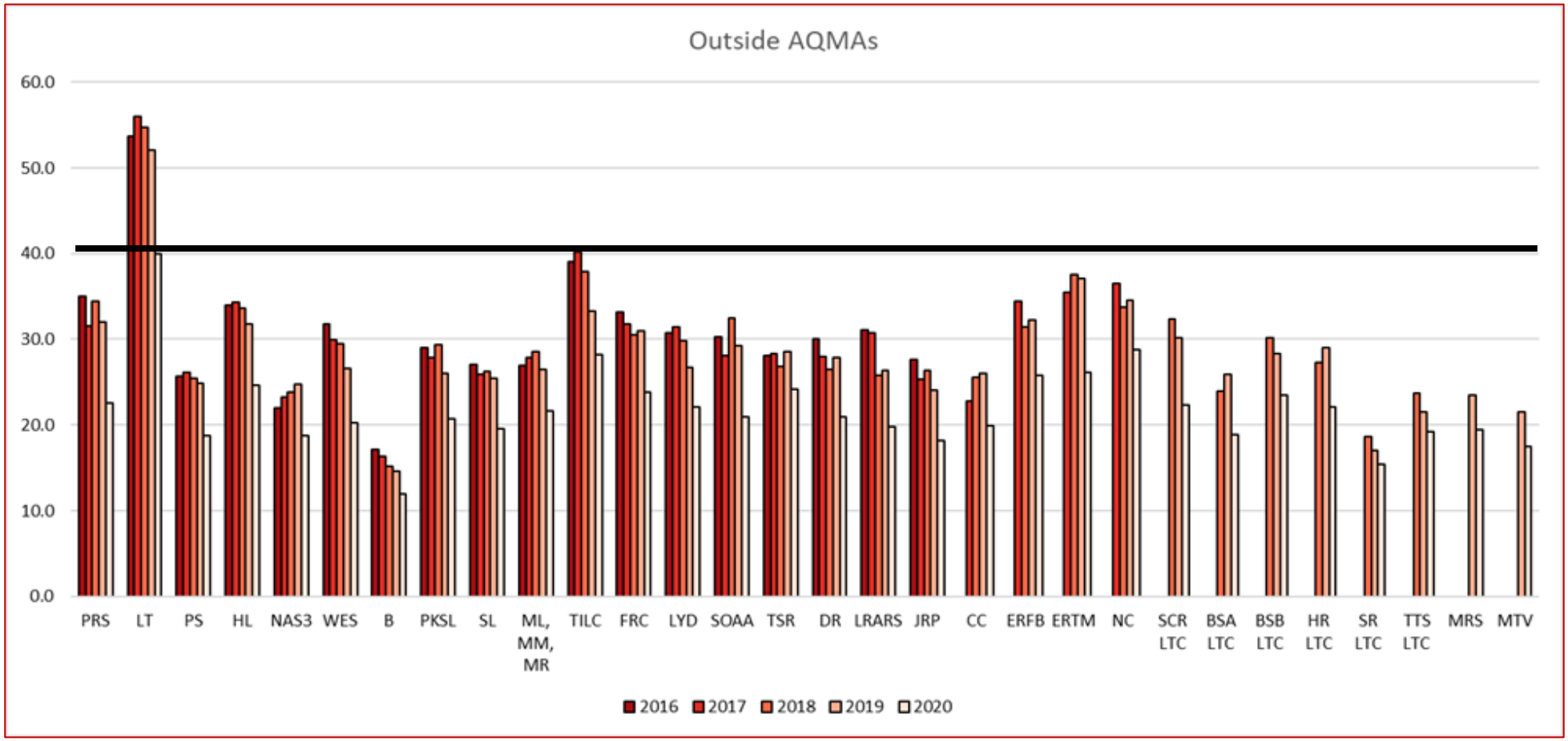


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Thurrock 1	561066	177894	Urban Background	98.9	98.9	0	0	0	0	0
Thurrock 3	569358	182736	Roadside	98.7	98.7	0	0	0	0	0
Thurrock 4	563900	176282	Roadside	0	0	0	0	0	0 [111.9]	N/A
Thurrock 8	556701	177932	Roadside	93.3	93.3	1	2	0	1	0
Thurrock 9	563489	176497	Roadside	100.0	5.9	N/A	N/A	N/A	N/A	N/A

Notes:

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

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**.

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

(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%).

Figure A.7 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3

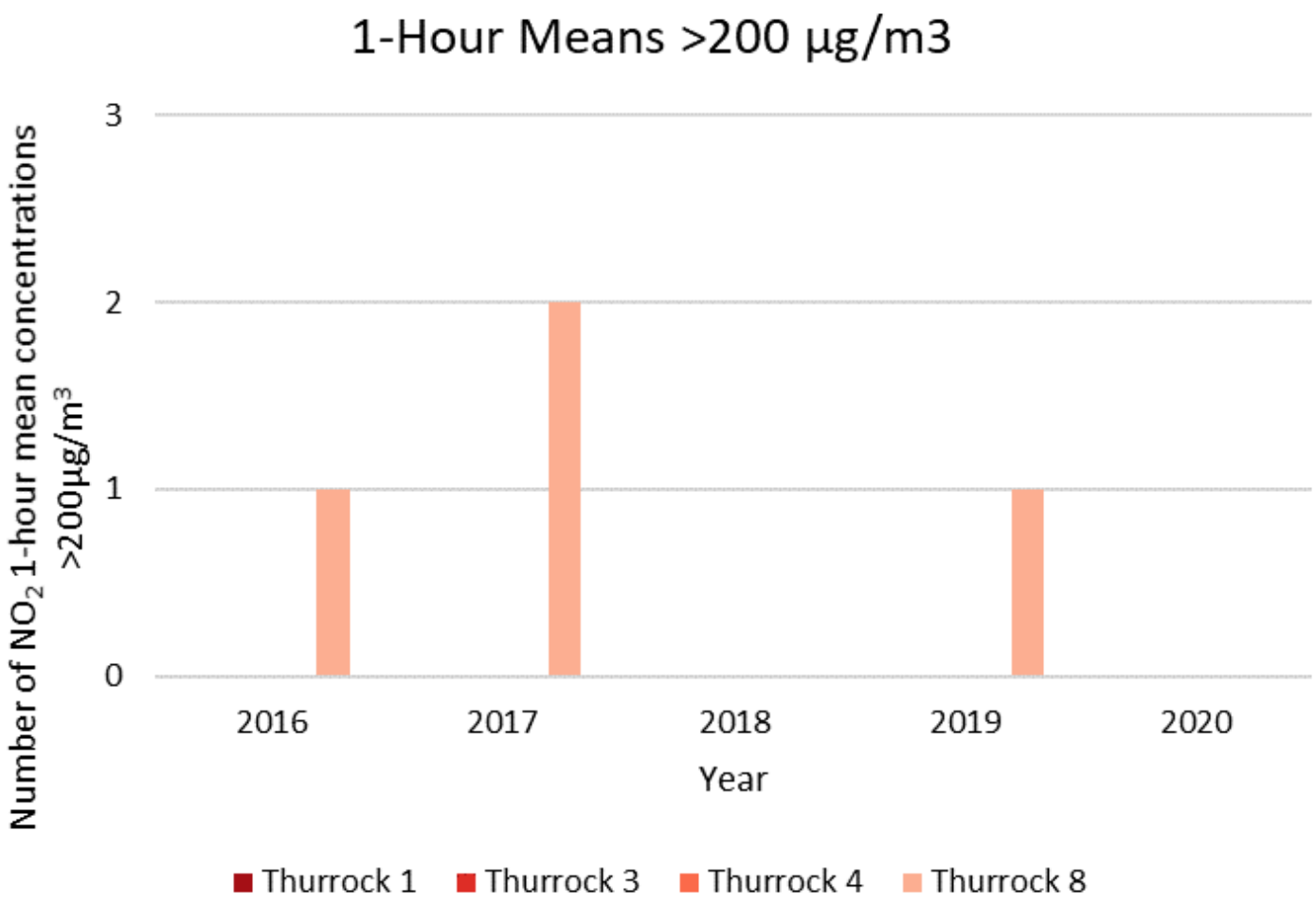


Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Thurrock 1	561066	177894	Urban Background	94.0	94.0	17.3	18.1	18.9	20.5	18.6
Thurrock 3	569358	182736	Roadside	81.7	81.7	19.5	18.6	18.4	17.4	16.7
Thurrock 8	556701	177932	Roadside	91.7	91.7	24.8	24.9	26.7	23.2	23.5

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

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

Exceedances of the PM_{10} annual mean objective of $40\mu g/m^3$ are shown in **bold**.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Figure A.8 – Trends in Annual Mean PM_{10} Concentrations

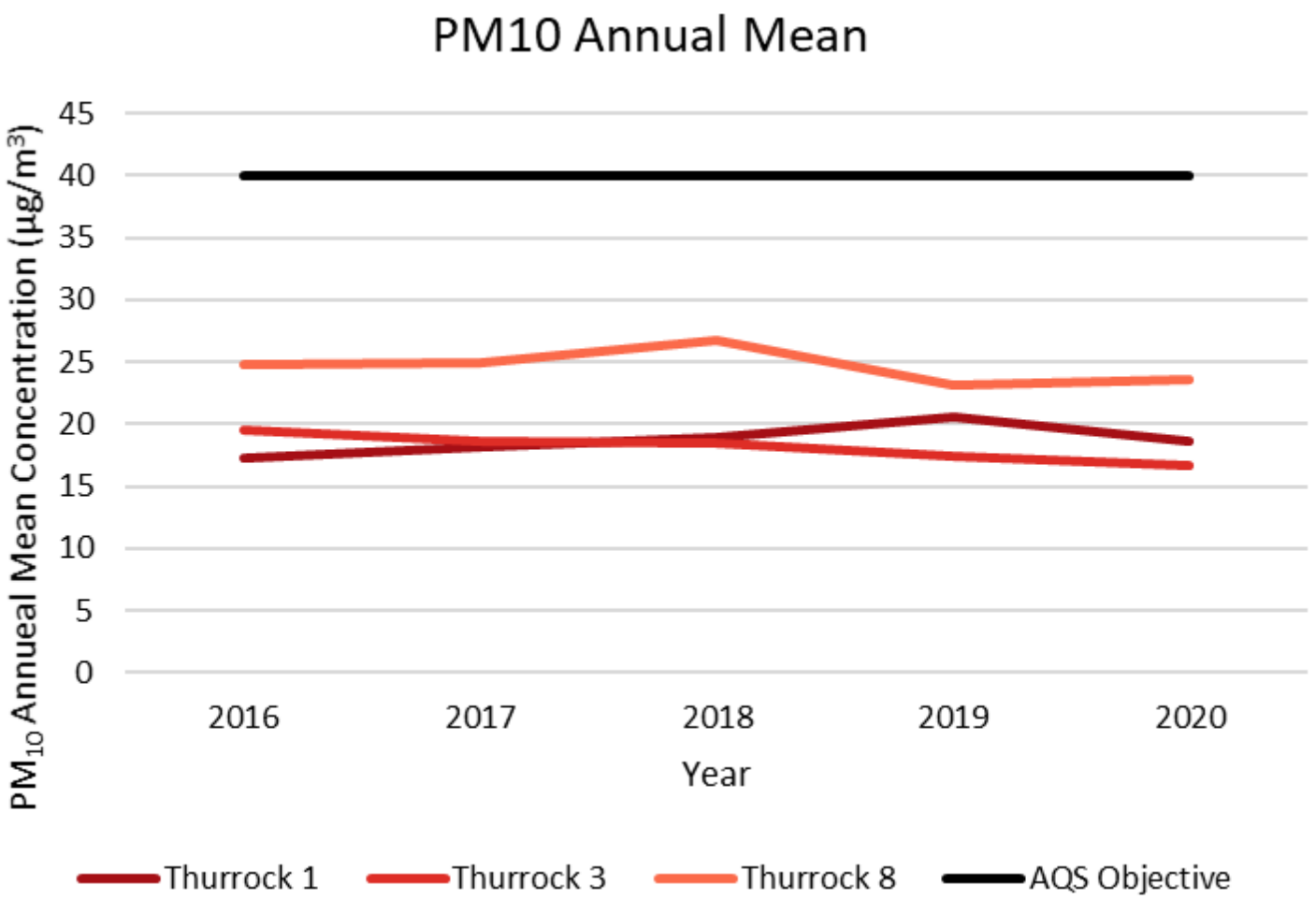


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Thurrock 1	561066	177894	Urban Background	94.0	94.0	4	5	4	14	9
Thurrock 3	569358	182736	Roadside	81.7	81.7	4 (36)	5 (35)	3 (34)	10	5 (30.4)
Thurrock 8	556701	177932	Roadside	91.7	91.7	11	12	16	15	9

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

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**.

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

(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%).

Figure A.9 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3

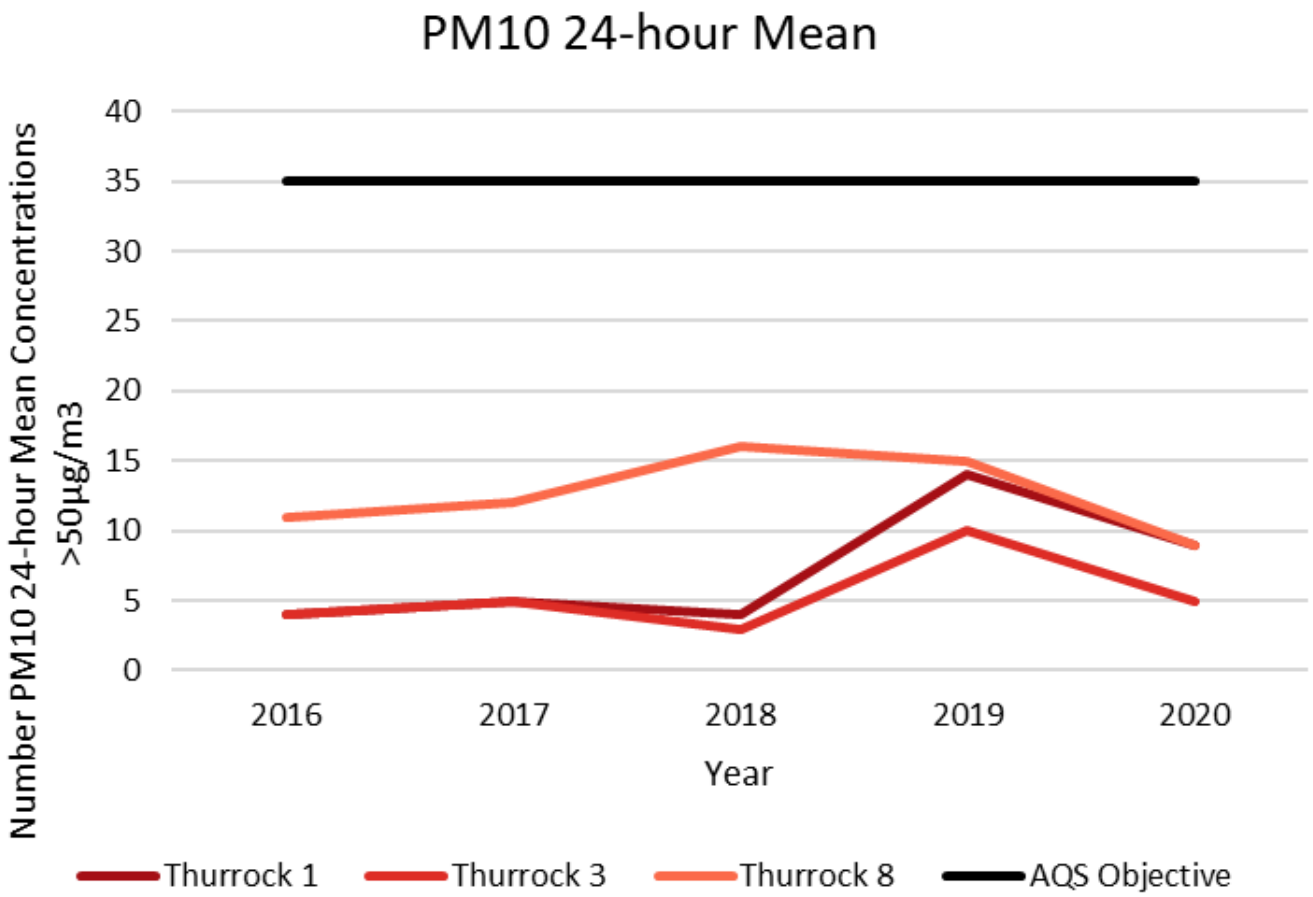


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Thurrock 3	569358	182736	Roadside	96.6	96.6	13.4	11.1	10.1	11.6	11.6

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

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

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Figure A.10 – Trends in Annual Mean $PM_{2.5}$ Concentrations

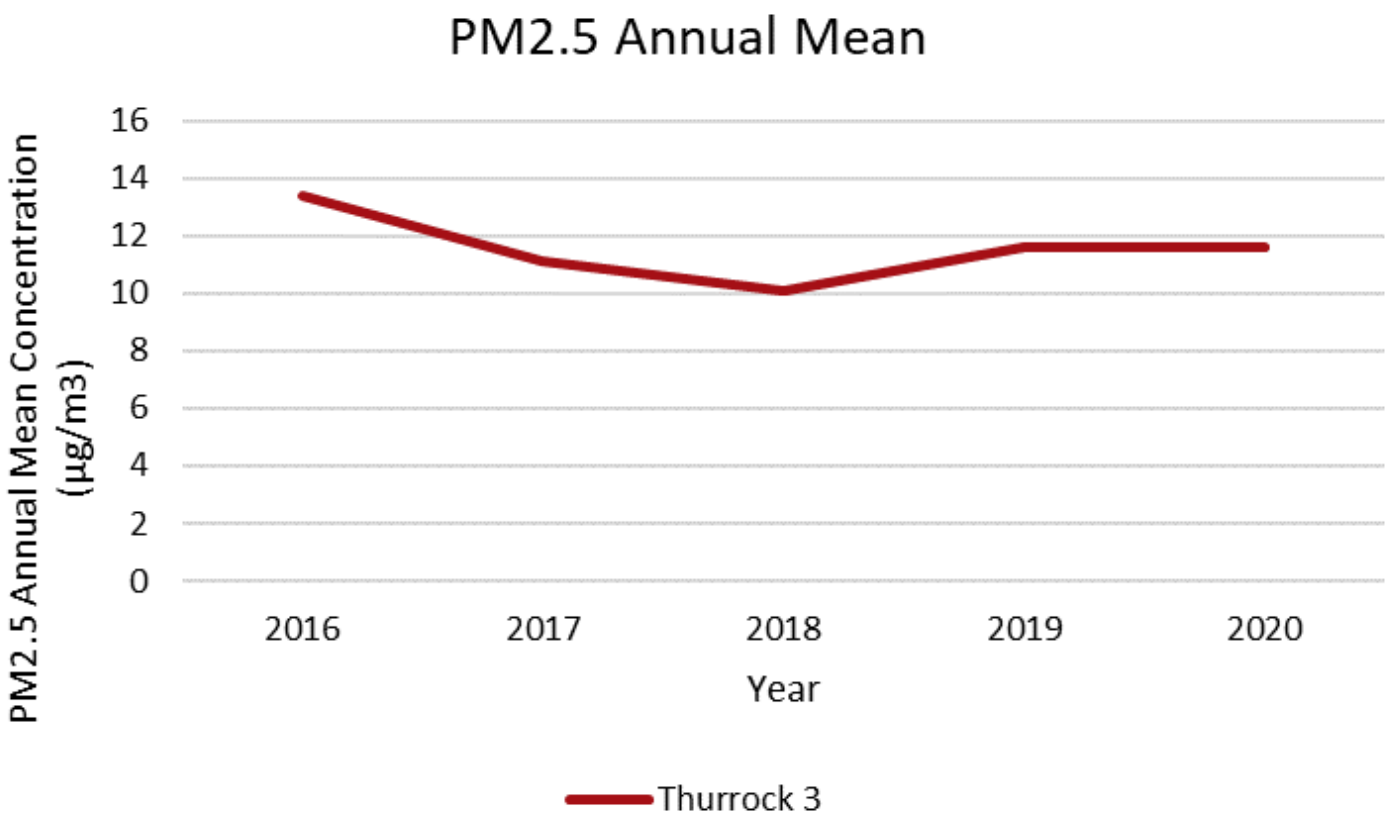


Table A.9 – SO_2 2019 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Number of 15-minute Means > 266µg/m³	Number of 1-hour Means > 350µg/m³	Number of 24-hour Means > 125µg/m³
Thurrock 1	561066	177894	Urban Background	95.4	95.4	0	0	0

Table A.10 - SO_2 2020 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	Number of 15-minute Means > 266µg/m³	Number of 1-hour Means > 350µg/m³	Number of 24-hour Means > 125µg/m³
Thurrock 1	561066	177894	Urban Background	97.4	97.4	0	0	0

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

(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%).

Appendix B: Full Monthly Diffusion Tube Results for 2019 and 2020

Table B.1 – NO_2 2019 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.91)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LRAR	555301	179438	72.5	65.8	68.4	44.3	46.9	42.2	54.9	46.7	38.6	56.5	70.5	53.1	55.0	**50.1**	33.3	
PRS	555389	178145	44.9	40.5	46.0	33.1	27.4	26.8	BAD DATA	29.1	29.5	31.9	45.5	32.7	35.2	32.0	-	
WC	556314	178765	53.3	50.9	59.0	37.4	35.3	28.7	33.9	34.6	36.4	46.8	56.2	43.8	43.0	39.1	27.4	
JC	556701	177937	60.2	61.6	64.4	40.6	43.5	46.2	48.2	50.6	45.1	51.1	61.0	42.4	51.3	**46.6**	-	
IBIS	557570	177789	57.1	66.8	69.0	29.4	40.9	42.0	45.9	54.5	MISSING	50.6	55.4	56.9	51.7	**47.0**	-	
GDSO	557595	181060	38.0	37.8	38.2	17.4	21.7	21.9	22.5	27.1	25.4	23.6	33.9	32.0	28.3	25.7	-	
LT	557981	178700	65.7	73.3	81.9	35.1	47.2	43.5	56.7	61.1	54.5	50.9	59.8	56.5	57.2	**52.0**	-	
KCNO	558148	183532	43.7	43.8	45.9	16.6	25.6	23.7	29.0	30.8	28.3	29.3	36.1	33.4	32.2	29.3	-	
WT	558483	177678	56.6	44.7	57.8	28.6	30.4	27.9	34.9	27.3	32.6	35.9	47.4	44.7	39.1	35.5	-	
HR	559118	179462	42.8	41.9	40.0	18.4	22.7	21.4	24.2	MISSING	21.7	31.6	37.8	32.9	30.5	27.7	-	
NAS2	559720	179630	65.4	71.2	82.9	42.2	40.1	40.9	49.9	53.4	46.2	47.9	61.6	56.4	54.8	**49.9**	36.8	
LRSS	559785	177910	56.6	40.3	62.7	35.6	32.3	35.4	40.3	39.8	40.9	42.0	50.5	38.5	42.9	39.0	35.8	
LRG	560624	177811	48.3	49.9	52.8	34.5	29.4	33.4	34.4	37.0	38.2	39.4	48.0	39.3	40.4	36.7	33.5	
ER	560954	179535	65.7	67.5	66.6	37.4	47.2	47.6	45.1	50.3	47.0	55.1	63.7	50.7	53.7	**48.8**	**40.4**	
PS	561066	177894	37.9	31.3	41.7	22.5	20.8	18.5	21.6	22.4	24.0	20.5	37.7	29.0	27.3	24.9	-	
HL	561108	178922	53.7	47.8	51.9	21.9	26.9	25.0	25.0	28.9	32.9	24.0	44.9	36.6	35.0	31.8	-	
NAS1	561469	178063	42.4	42.8	45.5	29.0	26.3	27.0	31.7	26.3	29.3	32.3	41.5	34.9	34.1	31.0	-	
CR	561572	178154	48.5	46.0	49.0	25.0	24.9	29.5	29.7	31.0	30.2	36.6	46.6	37.9	36.2	33.0	-	
SRG	561685	177833	44.2	39.3	41.8	26.3	27.7	25.0	27.0	28.0	29.8	31.4	47.8	35.6	33.6	30.6	-	
NAS3	561830	179878	40.3	38.5	36.1	18.2	18.6	17.3	17.9	23.3	22.6	26.3	37.6	30.0	27.2	24.8	-	
WES	561958	180967	42.3	35.1	43.8	21.6	27.6	22.8	25.2	23.9	25.1	25.6	30.1	27.6	29.2	26.6	-	
B	563855	184772	23.9	23.1	18.4	11.6	10.1	10.6	11.0	13.3	13.1	15.4	23.1	19.5	16.1	14.6	-	
TL	563867	176293	50.5	40.8	59.6	26.6	30.7	27.9	36.1	33.3	35.7	37.2	43.6	37.5	38.3	34.8	-	
PKSL	567781	182400	39.4	33.7	38.7	20.4	21.6	22.9	21.4	26.0	26.3	25.4	35.2	31.5	28.5	26.0	-	
SL	568501	182459	38.7	37.6	38.7	17.9	19.5	18.4	21.5	22.6	24.0	26.8	37.0	33.2	28.0	25.5	-	
ML	569357	182737	39.9	32.7	37.5	22.4	21.8	22.7	23.2	23.4	24.3	30.5	36.8	28.9	-	-	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
MM	569357	182737	42.7	37.3	43.2	23.8	24.9	22.0	21.5	24.9	24.6	25.8	37.1	29.0	-	-	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
MR	569357	182737	37.9	35.9	39.5	23.3	21.9	23.8	24.1	24.2	21.7	28.5	37.6	27.0	29.1	26.5	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
FRC	559136	179084	42.0	44.1	40.5	24.4	24.2	24.3	27.3	MISSING	29.5	33.6	48.2	36.6	34.1	31.0		
TILA	563498	176483	61.4	52.9	64.5	29.2	35.1	MISSING	37.1	34.3	34.7	38.9	45.3	47.8	43.7	39.8	32.3	
TILB	563645	176348	60.4	53.6	62.0	31.2	38.1	33.8	42.8	41.0	40.0	34.9	51.9	53.3	45.3	**41.2**	34.6	
TILC	563600	176321	BAD DATA	46.1	54.6	28.9	BAD DATA	31.7	33.9	33.2	29.5	27.8	41.5	39.2	36.6	33.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.91)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TILD	563995	176291	55.0	44.5	55.7	25.9	30.8	30.1	34.4	35.6	31.8	34.8	41.6	42.0	38.5	35.1	-	
TILE	563870	176305	55.5	45.7	63.1	27.2	30.0	28.0	32.1	31.0	30.1	33.4	46.6	41.6	38.7	35.2	-	
TK4 A	563900	176282	46.2	43.2	49.6	28.2	30.8	27.8	32.4	38.2	29.9	24.1	END	END	-	-	-	Duplicate Site with TK4 A and TK4 B - Annual data provided for TK4 B only
TK4 B	563900	176282	47.9	40.1	53.4	26.7	28.5	25.8	31.1	37.4	32.0	30.2	END	END	35.2	32.0	-	Duplicate Site with TK4 A and TK4 B - Annual data provided for TK4 B only
PBP	556257	178438	46.1	48.2	43.3	26.5	21.2	27.3	30.1	29.6	27.8	32.5	38.3	38.5	34.1	31.0	-	
PBPA	556221	178461	47.0	39.2	48.8	28.2	25.4	24.8	30.0	28.0	27.4	28.0	46.4	31.5	33.7	30.7	-	
LYD	560057	179873	39.6	37.7	43.1	12.8	23.7	24.6	25.9	30.4	25.1	25.0	35.1	MISSING	29.4	26.7	-	
AVSL	556713	180167	62.3	66.6	59.8	35.9	30.3	36.5	42.1	49.4	42.0	52.1	63.6	53.4	49.5	**45.0**	**42.7**	
AVHS	556661	180180	MISSING	49.8	39.2	34.1	38.1	29.6	33.6	32.2	33.2	40.3	57.3	36.6	38.5	35.1	-	
SOAA	558785	182323	44.4	47.3	36.8	22.3	25.1	MISSING	26.9	29.5	26.7	28.4	43.0	23.1	32.1	29.2	-	
TSR	564122	176152	44.5	37.3	45.6	19.8	23.0	MISSING	24.8	26.2	26.0	27.6	36.5	33.5	31.3	28.5	-	
DR	560279	178944	43.8	38.7	42.0	21.5	20.8	18.1	25.1	25.9	24.8	MISSING	43.5	32.9	30.6	27.9	-	
LRARN	555286	179501	50.7	48.2	46.7	25.5	30.1	30.2	27.5	32.6	35.1	24.5	45.5	38.6	36.2	33.0	-	
LRARS	555357	179362	37.2	36.1	37.1	20.3	24.8	24.4	28.0	25.2	22.0	28.8	36.5	27.3	29.0	26.4	-	
LRARMN	555299	179453	52.9	48.5	53.0	30.8	30.2	33.2	34.6	32.0	37.4	34.2	54.7	42.7	40.4	36.7	-	
LRARMS	555329	179397	50.1	45.7	47.7	28.4	31.6	30.7	33.8	27.4	31.9	33.3	52.8	39.0	37.7	34.3	-	
JRP	556384	178001	34.2	35.7	30.3	23.8	20.4	20.1	21.6	22.7	21.0	20.4	41.4	26.5	26.5	24.1	-	
ACHL	561093	178974	52.7	49.9	59.3	25.1	26.5	26.0	29.0	31.2	33.7	37.6	53.0	41.4	38.8	35.3	-	
CC	560770	179866	39.6	37.4	39.2	24.8	11.1	MISSING	23.0	24.2	24.4	27.4	38.0	25.8	28.6	26.0	-	
ERFA	560962	179527	MISSING	50.9	MISSING	MISSING	MISSING	25.2	28.1	31.4	31.8	30.3	42.3	33.0	34.1	32.5	-	
ERFB	560963	179558	46.8	43.9	41.6	22.2	26.7	24.9	33.6	38.8	34.9	33.2	43.9	34.3	35.4	32.2	-	
ERTM	560965	179796	50.9	48.6	53.5	33.4	32.7	35.7	36.2	33.0	37.2	35.8	56.9	34.9	40.7	37.1	36.8	
NC	561077	179912	50.9	51.9	57.3	19.9	29.0	25.1	32.9	30.5	38.6	34.3	41.0	44.0	37.9	34.5	-	
HD	560003	179694	42.8	41.6	48.3	27.4	25.2	27.5	28.7	28.6	31.0	35.0	44.6	34.9	34.6	31.5	-	
GRPL	559551	179547	43.0	50.0	41.7	24.3	20.4	25.6	28.8	33.0	31.9	28.4	43.9	37.7	34.1	31.0	-	
PIH	557299	178802	40.2	41.6	40.4	32.4	28.2	29.6	32.8	28.1	27.6	32.3	41.1	30.2	33.7	30.7	-	
WCFA	556290	178749	50.5	42.1	50.6	35.1	28.2	24.2	27.7	24.1	30.6	34.3	45.8	36.6	35.8	32.6	-	
THA	557386	179065	39.7	40.9	39.3	33.3	14.5	26.9	31.9	26.7	29.2	30.7	43.6	34.7	32.6	29.7	-	
THB	557437	179099	39.0	42.0	41.7	36.6	28.8	28.5	31.5	28.4	31.4	33.9	40.6	37.7	35.0	31.8	-	
SCR LTC	562383	181157	45.2	40.2	44.3	21.9	25.9	25.3	29.0	30.2	24.9	35.9	37.3	37.5	33.1	30.1	-	
BSA LTC	563486	181070	45.5	37.7	35.3	19.9	17.9	20.6	21.5	25.2	22.5	28.3	37.3	30.1	28.5	25.9	-	
BSB LTC	563574	180770	38.1	42.7	43.1	23.9	20.6	26.5	17.6	30.3	28.9	31.8	36.2	34.0	31.1	28.3	-	
HR LTC	563785	180157	44.9	47.6	42.8	20.7	22.2	21.9	25.4	26.1	27.0	30.3	38.4	35.3	31.9	29.0	-	
SR LTC	567351	177555	29.9	15.2	26.7	12.9	14.3	11.4	9.9	13.6	17.4	18.0	27.0	28.7	18.7	17.1	-	
TTS LTC	563828	179597	35.1	35.2	38.3	19.9	17.7	18.1	15.4	17.4	22.3	15.1	29.8	19.7	23.7	21.5	-	
MRS	562413	177747	37.6	29.6	37.2	22.8	18.4	17.9	18.1	20.1	21.4	21.8	35.7	29.1	25.8	23.5	-	
MTV	562615	177774	31.8	30.7	34.2	19.8	15.9	17.0	17.6	17.1	19.9	23.1	32.0	24.7	23.7	21.5	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used**

☒ **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**.

See Appendix C for details on bias adjustment and annualisation.

Table B.2 – NO_2 2020 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LRAR	555301	179438	60.3	47.3	43.7	32.1	37.4	38.8	35.0	45.0	53.2	48.0	47.7	55.3	45.3	36.7	27.5	
PRS	555389	178145	29.4	26.3	27.3	29.6	24.6	26.4	22.4	25.9	32.6	25.4	33.8	31.3	27.9	22.6	-	
WC	556314	178765	39.3	36.8	36.8	33.8	30.2	38.5	29.8	36.8	38.9	41.5	41.0	35.9	36.6	29.7	-	
JC	556701	177937	56.1	44.8	44.4	45.4	37.8	40.3	37.6	46.8	50.2	52.4	49.2	49.7	46.2	37.4	-	
IBIS	557570	177789	58.3	53.6	MISSING	MISSING	MISSING	38.9	37.6	43.3	41.0	51.8	48.0	43.6	46.2	37.4	-	
GDSO	557595	181060	33.8	29.5	22.1	18.1	15.7	17.9	19.6	21.0	25.8	27.2	30.4	MISSING	23.7	19.2	-	
LT	557981	178700	60.8	65.6	48.2	30.3	30.0	40.6	45.8	53.5	55.4	61.3	57.8	42.1	49.3	39.9	-	
KCNO	558148	183532	43.0	34.3	24.5	16.8	15.7	20.9	26.2	24.6	29.5	27.2	32.2	29.0	27.0	21.9	-	
WT	558483	177678	43.0	43.2	31.7	29.2	23.5	27.7	27.7	30.0	MISSING	40.1	41.1	36.0	33.9	27.5	-	
HR	559118	179462	32.4	31.9	26.8	24.8	19.8	19.8	24.5	25.0	32.3	29.5	32.6	28.7	27.4	22.2	-	
NAS2	559720	179630	46.6	60.1	47.6	37.1	38.9	44.5	39.2	47.1	44.7	52.5	54.6	44.5	46.4	37.6	30.1	
LRSS	559785	177910	44.5	41.4	26.5	24.7	17.1	21.2	20.4	23.7	28.2	32.9	41.9	37.8	30.0	24.3	-	
LRG	560624	177811	42.1	35.2	35.2	30.7	24.2	27.5	24.9	27.2	30.9	32.8	41.5	38.3	32.6	26.4	-	
ER	560954	179535	62.0	48.7	42.1	38.6	38.9	41.3	47.0	47.0	54.2	MISSING	48.8	48.8	47.0	38.1	32.7	
PS	561066	177894	31.6	26.6	22.8	21.2	16.0	17.5	17.8	20.2	25.3	26.0	28.6	24.4	23.2	18.8	-	
HL	561108	178922	37.6	33.4	27.4	23.4	23.1	25.3	25.8	28.1	31.9	34.7	37.3	36.0	30.3	24.6	-	
NAS1	561469	178063	34.2	27.9	24.4	30.9	25.1	27.5	21.9	27.7	31.8	29.0	36.9	32.4	29.1	23.6	-	
CR	561572	178154	41.3	32.3	27.6	20.9	20.4	24.8	22.7	27.5	30.5	33.7	40.8	33.0	29.6	24.0	-	
SRG	561685	177833	37.6	33.7	29.7	23.8	19.5	22.1	19.8	25.4	29.8	29.7	36.6	32.7	28.4	23.0	-	
NAS3	561830	179878	31.3	28.4	MISSING	21.2	14.0	18.1	17.3	16.4	22.4	25.1	30.3	30.4	23.2	18.8	-	
WES	561958	180967	30.5	29.7	23.0	22.3	16.7	20.4	21.7	20.0	29.8	27.5	32.1	26.2	25.0	20.3	-	
B	563855	184772	22.3	17.5	13.1	11.3	8.2	11.7	10.8	11.8	14.5	15.9	22.1	17.2	14.7	11.9	-	
TL	563867	176293	MISSING	30.6	26.9	27.6	MISSING	33.7	33.1	30.7	41.5	MISSING	46.5	MISSING	33.8	28.0	-	
PKSL	567781	182400	29.1	30.9	22.7	21.3	18.4	22.4	23.6	22.7	26.7	30.3	33.5	24.8	25.5	20.7	-	
SL	568501	182459	33.4	26.3	22.4	21.2	16.9	20.3	21.6	20.0	24.8	27.0	30.3	25.2	24.1	19.5	-	
ML	569357	182737	33.1	29.4	26.1	26.9	23.4	22.2	22.7	22.6	28.7	28.3	31.9	26.9	-	-	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
MM	569357	182737	30.2	27.6	26.5	26.8	22.9	22.8	22.1	24.6	30.3	27.7	33.4	26.9	-	-	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
MR	569357	182737	29.6	25.7	26.7	27.0	23.0	22.6	22.6	24.3	29.2	27.9	31.8	26.7	26.7	21.6	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
FRC	559136	179084	39.7	33.6	29.4	22.4	21.8	23.6	21.1	27.5	32.4	32.0	38.9	31.5	29.5	23.9	-	
TILA	563498	176483	48.8	48.4	29.3	29.2	30.4	37.7	33.1	32.9	37.4	47.8	46.7	38.8	38.4	31.1	-	
TILB	563645	176348	MISSING	46.7	34.8	38.0	32.1	38.2	34.9	38.0	44.7	52.3	45.2	41.0	40.5	32.8	-	
TILC	563600	176321	41.0	36.3	31.1	29.4	27.0	36.7	30.9	33.8	36.6	BAD DATA	41.1	38.7	34.8	28.2	-	
TILD	563995	176291	38.7	38.0	35.4	33.8	31.8	36.1	MISSING	MISSING	MISSING	46.5	48.0	39.6	38.7	31.3	-	
TILE	563870	176305	45.9	37.8	32.0	32.9	30.9	37.8	38.3	34.4	45.0	48.5	48.2	38.4	39.2	31.7	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TK9 A	563489	176497		35.5	32.8	31.9	31.3	39.2	37.9	34.9	38.4	43.8	43.0	32.2	-	-	-	Duplicate Site with TK9 A and TK9 B - Annual data provided for TK9 B only
TK9 B	563489	176497		34.6	28.5	32.0	30.9	38.8	38.5	35.1	38.3	48.7	41.9	31.5	36.4	29.4	-	Duplicate Site with TK9 A and TK9 B - Annual data provided for TK9 B only
PBP	556257	178438	40.5	37.7	28.1	25.4	20.3	25.9	24.0	26.1	31.3	32.8	MISSING	34.5	29.7	24.1	-	
PBPA	556221	178461	34.1	31.4	27.4	29.2	21.8	24.7	24.0	26.8	32.8	29.7	36.5	34.6	29.4	23.8	-	
LYD	560057	179873	35.2	32.4	27.1	25.4	19.6	23.4	21.0	24.0	27.7	28.8	34.0	29.4	27.3	22.1	-	
AVSL	556713	180167	53.8	44.2	35.1	27.8	29.2	38.6	29.0	40.2	45.0	45.5	50.4	42.2	40.1	32.5	-	
AVHS	556661	180180	40.5	31.6	28.7	29.6	25.9	31.3	22.8	34.3	36.3	32.8	40.9	38.3	32.7	26.5	-	
SOAA	558785	182323	MISSING	34.0	22.8	19.4	14.8	21.4	22.2	23.3	27.9	29.7	35.9	33.2	25.9	21.0	-	
TSR	564122	176152	33.2	30.7	22.8	27.2	23.1	30.3	27.3	25.2	MISSING	38.1	40.5	29.6	29.8	24.2	-	
DR	560279	178944	34.9	31.3	25.1	22.9	18.6	19.8	19.7	21.6	25.3	29.0	32.7	29.6	25.9	21.0	-	
LRARN	555286	179501	41.0	37.6	31.6	24.0	22.0	25.6	20.4	29.1	32.8	22.4	34.8	35.5	29.7	24.1	-	
LRARS	555357	179362	32.7	26.2	22.4	19.0	18.1	19.8	18.9	24.0	25.9	25.1	32.3	28.4	24.4	19.8	-	
LRARMN	555299	179453	39.8	37.9	32.9	28.9	25.7	27.9	27.2	32.6	35.5	33.3	41.8	29.9	32.8	26.6	-	
LRARMS	555329	179397	41.7	32.0	29.8	26.3	24.3	27.5	24.7	31.7	34.2	29.2	38.9	36.2	31.4	25.4	-	
JRP	556384	178001	29.2	23.3	22.0	23.0	16.5	19.5	14.9	21.3	22.1	20.7	30.6	25.5	22.4	18.1	-	
ACHL	561093	178974	52.2	39.4	MISSING	31.4	23.9	26.4	27.3	28.0	33.9	33.3	42.3	37.9	34.2	27.7	-	
CC	560770	179866	34.8	25.4	25.1	23.5	19.7	19.0	18.8	21.4	26.2	26.7	29.8	25.2	24.6	20.0	-	
ERFA	560962	179527	40.1	28.8	26.5	23.9	21.7	25.3	26.8	27.6	31.9	31.8	37.9	30.2	29.4	23.8	-	
ERFB	560963	179558	40.6	31.0	26.8	26.3	24.2	28.8	31.9	31.5	35.9	38.0	36.5	31.3	31.9	25.8	-	
ERTM	560965	179796	19.4	36.7	32.7	24.1	29.8	30.1	27.3	33.6	37.9	35.1	42.0	38.2	32.2	26.1	-	
NC	561077	179912	47.0	46.4	30.3	25.2	22.6	27.8	33.4	31.8	39.4	43.0	40.9	38.0	35.5	28.7	-	
HD	560003	179694	39.5	32.5	31.7	29.6	24.9	25.1	26.9	29.5	36.6	35.7	34.1	32.2	31.5	25.5	-	
GRPL	559551	179547	38.0	37.4	32.8	26.3	21.8	22.9	27.8	26.1	33.8	31.1	34.9	28.7	30.1	24.4	-	
PIH	557299	178802	29.1	26.9	28.8	30.3	26.2	26.6	20.3	29.0	32.0	MISSING	MISSING	47.9	29.7	24.1	-	
WCFA	556290	178749	34.7	27.9	28.4	31.6	24.3	30.2	23.1	25.9	32.1	30.4	37.5	35.5	30.1	24.4	-	
THA	557386	179065	35.4	28.3	32.8	33.2	26.4	31.5	19.7	29.6	27.4	23.1	34.5	33.6	29.6	24.0	-	
THB	557437	179099	36.4	32.0	29.5	30.9	25.3	28.1	19.2	29.2	29.9	31.3	33.8	36.0	30.1	24.4	-	
SCR LTC	562383	181157	36.4	34.2	24.2	21.3	16.4	24.6	22.7	25.9	27.1	32.7	33.7	31.1	27.5	22.3	-	
BSA LTC	563486	181070	33.3	26.8	19.9	18.9	14.1	20.3	17.8	20.3	23.6	25.8	32.5	26.3	23.3	18.9	-	
BSB LTC	563574	180770	40.2	29.5	26.7	26.0	21.9	25.0	23.9	26.5	31.6	31.0	36.5	29.9	29.0	23.5	-	
HR LTC	563785	180157	39.8	33.1	22.8	20.3	18.0	24.1	21.4	23.4	28.7	30.0	36.5	29.9	27.3	22.1	-	
SR LTC	567351	177555	21.0	34.2	17.5	17.6	13.6	14.0	15.5	15.1	18.7	21.0	24.1	16.5	19.1	15.4	-	
TTS LTC	563828	179597	30.6	29.0	19.6	20.7	17.0	20.4	16.1	19.7	23.6	27.7	33.5	26.2	23.7	19.2	-	
MRS	562413	177747	30.2	25.5	21.6	25.3	17.3	20.3	15.6	19.1	24.0	26.6	33.0	29.9	24.0	19.5	-	
MTV	562615	177774	27.1	22.4	20.0	20.5	14.8	18.5	15.2	17.8	21.8	25.0	29.5	26.3	21.6	17.5	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used**

☒ **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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Thurrock Borough Council During 2019 and 2020

Thurrock Borough Council has not identified any new sources relating to air quality within the reporting years of 2019 and 2020.

There have been five recent developments in 2019/2020 that have required Air Quality Assessments:

- Thames Enterprise Park – impact on air quality deemed **not significant**
- Thurrock Flexible Generation Plant – impact on air quality deemed **not significant** for construction phase and **negligible to moderate adverse** for operational phase
- Tilbury Green Power Phase 2 – impact on air quality deemed **not significant**
- Kemps Farm, South Ockendon – impact on air quality deemed **not significant**
- Northlake, Lakeside Basin – impact on air quality deemed **not significant** for construction phase, with mitigation measures in place. The magnitude of the effects of changes in traffic flow on air quality is determined to be **negligible**

Additional Air Quality Works Undertaken by Thurrock Borough Council During 2019 and 2020

Thurrock Borough Council has not completed any additional works within the reporting years of 2019 and 2020.

QA/QC of Diffusion Tube Monitoring

All diffusion tubes, between 2019 and 2020, were from Gradko and used a mixture of 20% TEA in water method. Gradko International Ltd is a UKAS accredited laboratory. Gradko participates in the AIR Proficiency Testing (PT) scheme for diffusion tubes, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL), which provides a Quality Assurance / Quality Control (QA/QC) framework for local authorities carrying out

diffusion tube monitoring as a part of their local air quality management process. The percentage of results submitted by Gradko International Ltd that were subsequently determined to be satisfactory was 100% for tests in AIR-PT rounds 31, 33 and 34 (April 2019 – November 2019). For AIR-PT Rounds 30 (January-February 2019), 36 (January-February 2020) and 40 (September-October 2020), 75% of results were submitted which were subsequently determined to be satisfactory. No results were reported for AIR-PT Rounds 37 (May-June 2020) and 39 (July-August 2020) as these rounds were cancelled due to the pandemic.

The lockdown restrictions did not prevent the Council from adhering with the 2020 Diffusion Tube Monitoring Calendar, and no monitoring periods were missed during 2020.

Diffusion Tube Annualisation

In 2019, data capture for the majority of diffusion tube sites was greater than 75%, with the exception of Site ERFA.

In 2020, data capture for the majority of diffusion tube sites was greater than 75%, with the exception of Site TL.

The data for these sites were therefore subsequently annualised using DEFRA's 'Diffusion Tube Data Processing Tool V1.1', in accordance with the methodology stipulated in LAQM.TG16.

The AURN background sites used for annualisation were Thurrock London Road - Grays (Urban Background), London Bexley (Suburban Background), Rochester Stoke (Rural Background) and London Eltham (Suburban Background), all sites had annual data capture of >85% and were within 50 miles radius of Thurrock.

An annualisation summary is presented in Table C.2.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020/21 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from

NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Thurrock Borough Council have applied a national bias adjustment factor of 0.91 to the 2019 monitoring data and 0.81 to the 2020 monitoring data. A summary of bias adjustment factors used by Thurrock Borough Council over the past five years is presented in Table C.1.

Thurrock Borough Council undertook two co-location studies in 2019, a triplicate site at Manorway Monitoring Station (diffusion tubes ML/MM/MR) and a duplicate site at Thurrock 4 (diffusion tubes TK4 A and TK4 B). Local bias adjustment factors were calculated for both sites. The overall data capture at the automatic monitoring site TK4 was “Poor”, therefore this factor was not included in calculating the local bias adjustment factor. The local bias adjustment factor derived from the Manorway Monitoring Station was 0.87. This was lower than the national bias adjustment factor for 2019, 0.91 – 31 studies. The national bias adjustment factor therefore provides the most conservative approach, and also is in line with previous factors used by Thurrock Borough Council (0.93 used on 2018 monitoring data, 0.89 used on 2017 monitoring data).

Thurrock Borough Council undertook one co-location study in 2020, a triplicate site at Manorway Monitoring Station (diffusion tubes ML/MM/MR). The local bias adjustment factor derived from the Manorway Monitoring Station was 0.79. This was lower than the national bias adjustment factor for 2020, 0.81 – 27 studies. The national bias adjustment factor therefore provides the most conservative approach, and also is closer to previous factors used by Thurrock Borough Council (0.93 used on 2018 monitoring data, 0.89 used on 2017 monitoring data).

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	06/21	0.81
2019	National	06/21	0.91
2018	National	03/19	0.93
2017	National	03/18	0.89
2016	National	03/17	0.91

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

Fall-off-with-distance calculations were required at 14 non-automatic monitoring sites in 2019. Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36µg/m^3 and the monitoring site is not located at a point of relevant exposure. Taking the limitations of the calculator into account, 4 sites could not be processed due to being located >50m from relevant exposure, or the relevant exposure being located on the other side of the road. Outputs from the Diffusion Tube Data Processing Tool are presented in Table C.6.

Fall-off-with-distance calculations were required at 6 non-automatic monitoring sites in 2020. Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36µg/m^3 and the monitoring site is not located at a point of relevant exposure. Taking the limitations of the calculator into account, 3 sites could not be processed due to being located >50m from relevant exposure, or the relevant exposure being located on the other side of the road. Outputs from the Diffusion Tube Data Processing Tool are presented in Table C.7.

QA/QC of Automatic Monitoring

There are a number of different organisations responsible for carrying out QA/QC at various stations and equipment at Thurrock's automatic monitoring sites.

For Thurrock 1, Grays AURN site, the QA/QC is managed by Bureau Veritas (BV) and by Ricardo AEA, the site Audits are conducted by Ricardo AEA. Service contracts do vary, all the gas analysers are maintained by Enviro Technology, and the PM_{10} FDMS is maintained by Air Quality Monitors.

For Thurrock 3, Stanford-le-Hope site, this is an affiliated site on the AURN network and is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL), the site Audits are conducted by Ricardo AEA. The Service contracts are managed by Enviro Technology.

For Thurrock 4, Tilbury site, this is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL). The site Audits are conducted by Ricardo AEA. The Service contracts are managed by Enviro Technology.

For Thurrock 8, Purfleet site, this is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL). The site Audits are conducted by the National Physical Laboratory (NPL). The Service contracts are managed by Enviro Technology.

Calibrations for all sites are done every fortnight by Thurrock Council Environmental Health Officers & the Air Quality Officer.

All data can be viewed online via the LAQN website.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

PM10 monitoring conducted at the London Road, Purfleet site was measured using a Beta Attenuation Monitor (BAM).

TK1 and TK3 PM_{10} monitoring was measured using TEOM-FDMS. TEOMs collect particles on a small oscillating filter. The change in oscillation frequency of the filter is proportional to the change in PM_{10} concentrations. TEOM-FDMS is a modification of the TEOM. The instrument operates at 30ºC rather than 50ºC. The monitoring results have been corrected using the Volatile Correction Model. The monitoring results are downloaded as gravimetric equivalent from the LAQN Website. The website managers of the LAQN website are responsible for the PM_{10} adjustment.

Automatic Monitoring Annualisation

All automatic monitoring locations within Thurrock Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-

automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

Distance correction was not conducted at any sites for 2019 and 2020. The Thurrock 8 site reported an annual mean in exceedance of the NO_2 annual mean objective of 40µg/m^3 in both 2019 and 2020, however the nearest exposure crosses a road source, therefore is outside of the parameters of the NO_2 fall-off with distance calculator.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3) - 2019

Site ID	Annualisation Factor Thurrock London Road (Grays) - Urban Background	Annualisation Factor London Bexley - Suburban Background	Annualisation Factor Rochester Stoke - Rural Background	Annualisation Factor London Eltham - Suburban Background	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
ERFA	1.0426	1.0601	1.0290	1.0541	1.0464	34.1	35.7	

Table C.3 – Annualisation Summary (concentrations presented in µg/m^3) - 2020

Site ID	Annualisation Factor Thurrock London Road (Grays) - Urban Background	Annualisation Factor London Bexley - Suburban Background	Annualisation Factor Rochester Stoke - Rural Background	Annualisation Factor London Eltham - Suburban Background	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
TL	1.0227	1.0202	1.0262	1.0230	1.0230	33.8	34.6	

Table C.4 – Local Bias Adjustment Calculation - 2019

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2
Periods used to calculate bias	12	8
Bias Factor A	0.87 (0.8 - 0.96)	0.9 (0.8 - 1.03)
Bias Factor B	15% (4% - 25%)	11% (-3% - 24%)
Diffusion Tube Mean (µg/m^3)	29.1	35.3
Mean CV (Precision)	5.3%	6.0%
Automatic Mean (µg/m^3)	25.3	31.8
Data Capture	99%	98%
Adjusted Tube Mean (µg/m^3)	25 (23 - 28)	32 (28 - 36)

Notes:

The Local Bias Adjustment Input 2 had a Poor Overall Data Capture for the continuous monitor data capture. Therefore only the Local Bias Input 1 was used to calculate the local factor. The diffusion tube data was corrected using the National Bias Adjustment Factor of 0.91 to provide the most conservative approach.

Table C.5 - Local Bias Adjustment Calculation - 2020

	Local Bias Adjustment Input 1
Periods used to calculate bias	12
Bias Factor A	0.79 (0.75 - 0.84)
Bias Factor B	26% (19% - 33%)
Diffusion Tube Mean (µg/m^3)	26.7
Mean CV (Precision)	2.4%
Automatic Mean (µg/m^3)	21.2
Data Capture	99%
Adjusted Tube Mean (µg/m^3)	21 (20 - 22)

Notes:

The diffusion tube data was corrected using the National Bias Adjustment Factor of 0.81 to provide the most conservative approach, and in line with previous ASRs.

Table C.6 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3) for passive monitoring in 2019

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
LRAR	0.5	16.0	50.1	22.7	33.3	
WC	2.0	34.0	39.1	21.4	27.4	*Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.*
JC	2.6		46.6	29.7	-	*Nearest exposure crosses road source – not within the parameters of the tool.*
IBIS	52.0	>50	47.0	31.7	-	*Monitoring Site to Kerb is > 50m – not within the parameters of the tool.*
LT	1.0	>50	52.0	25.6	-	*Monitoring Site to Kerb is > 50m – not within the parameters of the tool.*
NAS2	4.5	24.5	49.9	23.2	*36.8*	*Predicted concentration at Receptor within 10% the AQS objective. Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.*
LRSS	3.5	7.5	39.0	23.3	35.8	
LRG	2.5	7.3	36.7	24.4	33.5	
ER	0.5	3.0	48.8	22.1	**40.4**	*Predicted concentration at Receptor above AQS objective.*
TILA	2.5	16.5	39.8	23.6	32.3	
TILB	2.5	11.5	41.2	23.6	34.6	
AVSL	2.0	3.0	45.0	20.2	**42.7**	*Predicted concentration at Receptor above AQS objective.*
LRARMN	8.0		36.7	22.7	-	*Nearest exposure crosses road source – not within the parameters of the tool.*
ERTM	8.5	9.0	37.1	22.1	*36.8*	*Predicted concentration at Receptor within 10% the AQS objective.*

Table C.7 - NO_2 Fall off With Distance Calculations (concentrations presented in µg/m3) for passive monitoring in 2020

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
LRAR	0.5	16.0	36.7	21.7	27.5	
JC	2.6		37.4	28.8	-	*Nearest exposure crosses road source – not within the parameters of the tool.*

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
IBIS	52.0	>50	37.4	30.4	-	*Monitoring Site to Kerb is > 50m – not within the parameters of the tool.*
LT	1.0	>50	39.9	24.5	-	*Monitoring Site to Kerb is > 50m – not within the parameters of the tool.*
NAS2	4.5	24.5	37.6	22.2	30.1	*Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.*
ER	0.5	3.0	38.1	21.2	32.7	

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Monitoring Sites in West Thurrock, AQMAs 7, 8, 9, 10, 12, 13, 23 and 25

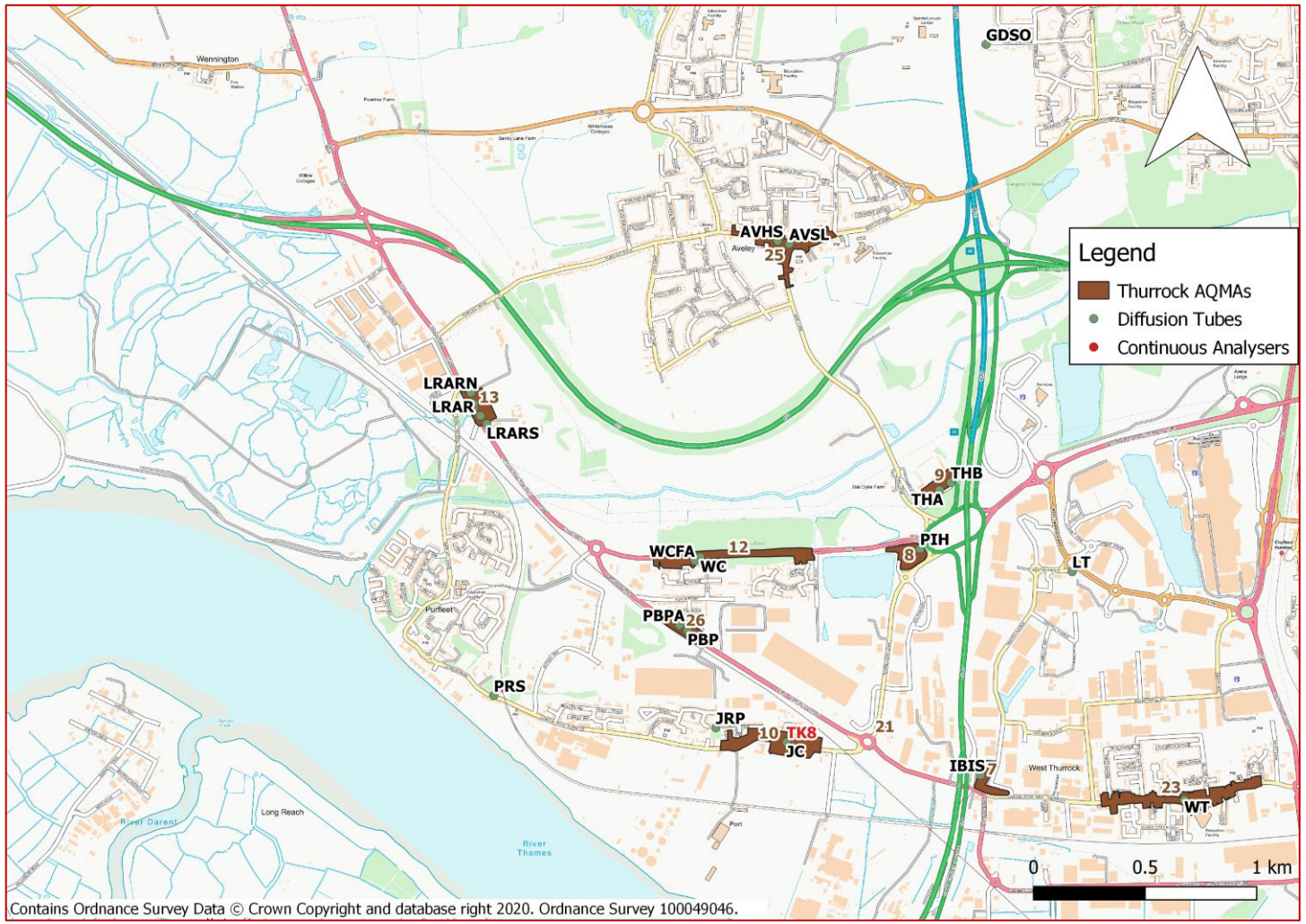


Figure D.2 - Map of Monitoring Sites in North Thurrock, AQMAs 15 and 16

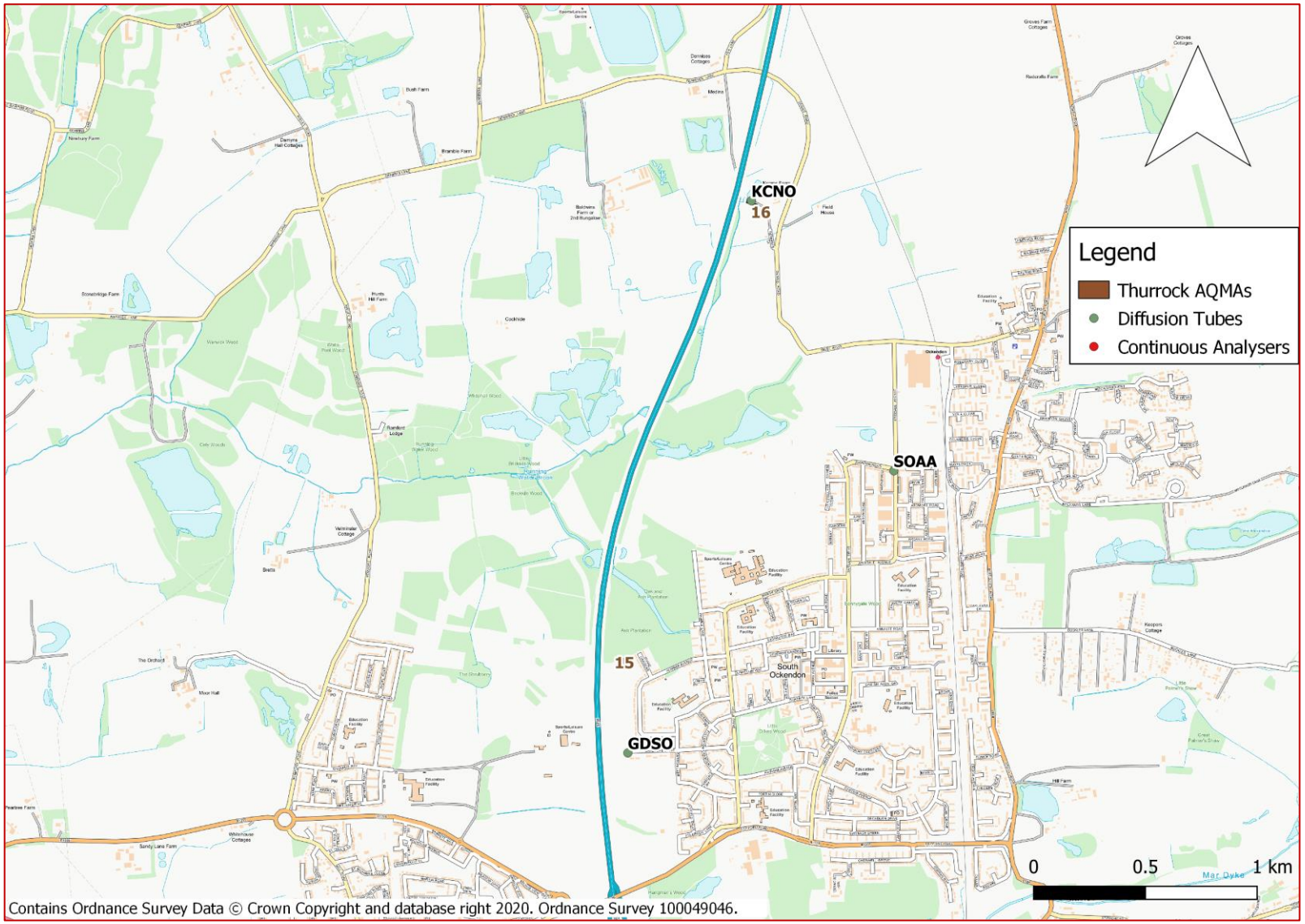


Figure D. 3 - Map of Monitoring Sites in Central Thurrock, AQMAs 1, 2, 3, 4, 5 and 23

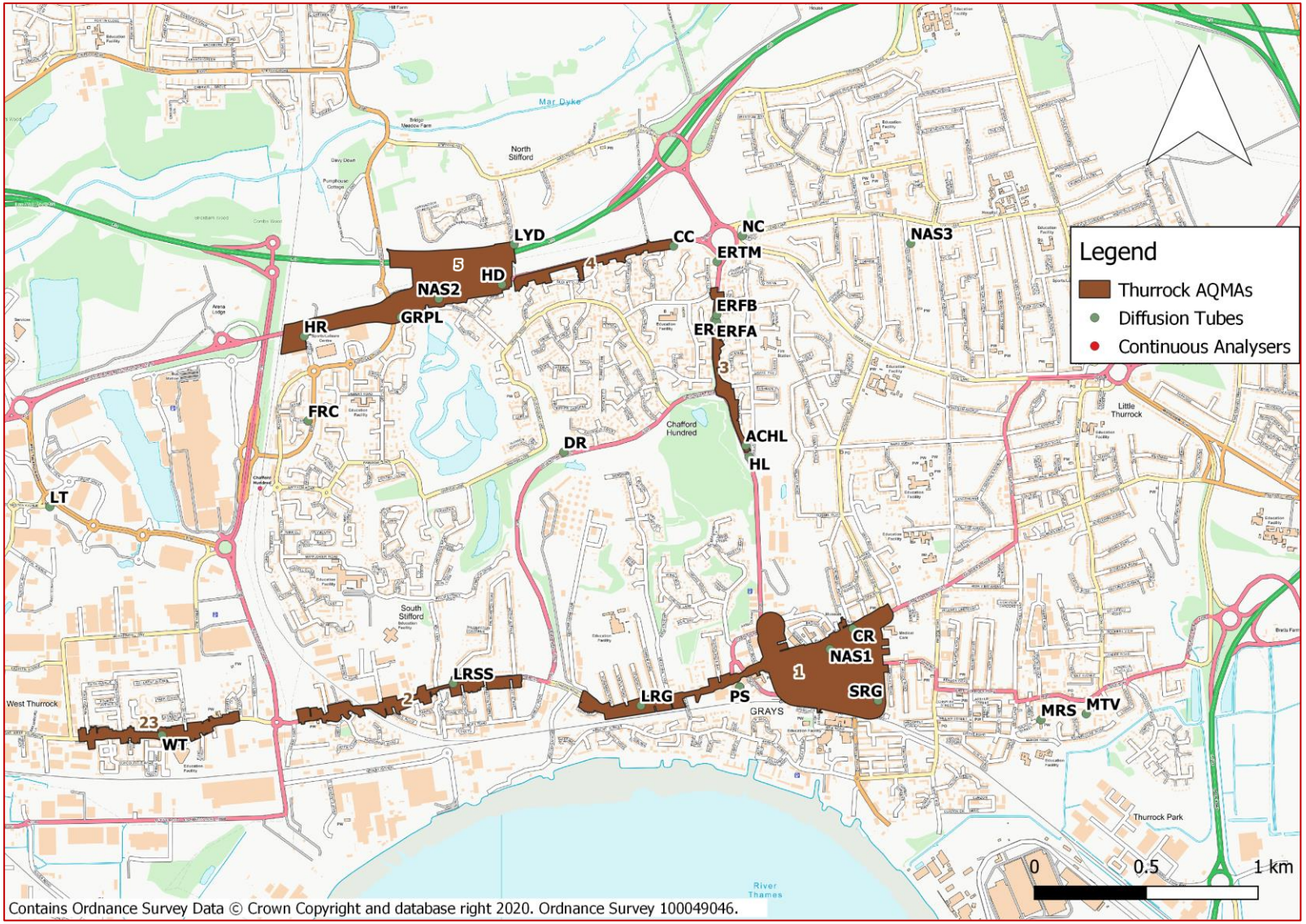


Figure D. 1 – Map of Monitoring Sites in East Thurrock, AQMA 3 and 4, monitoring sites outside AQMAs

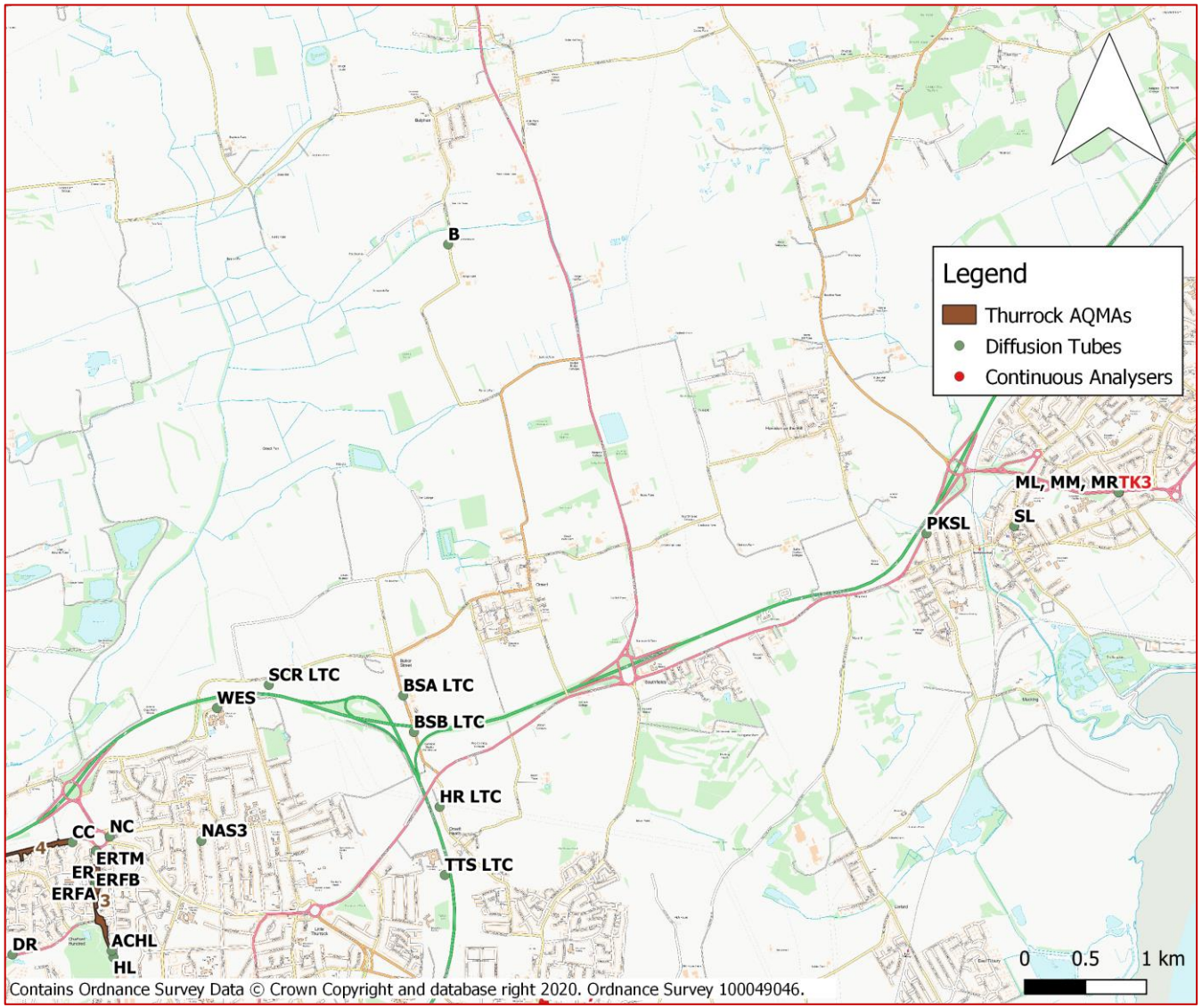
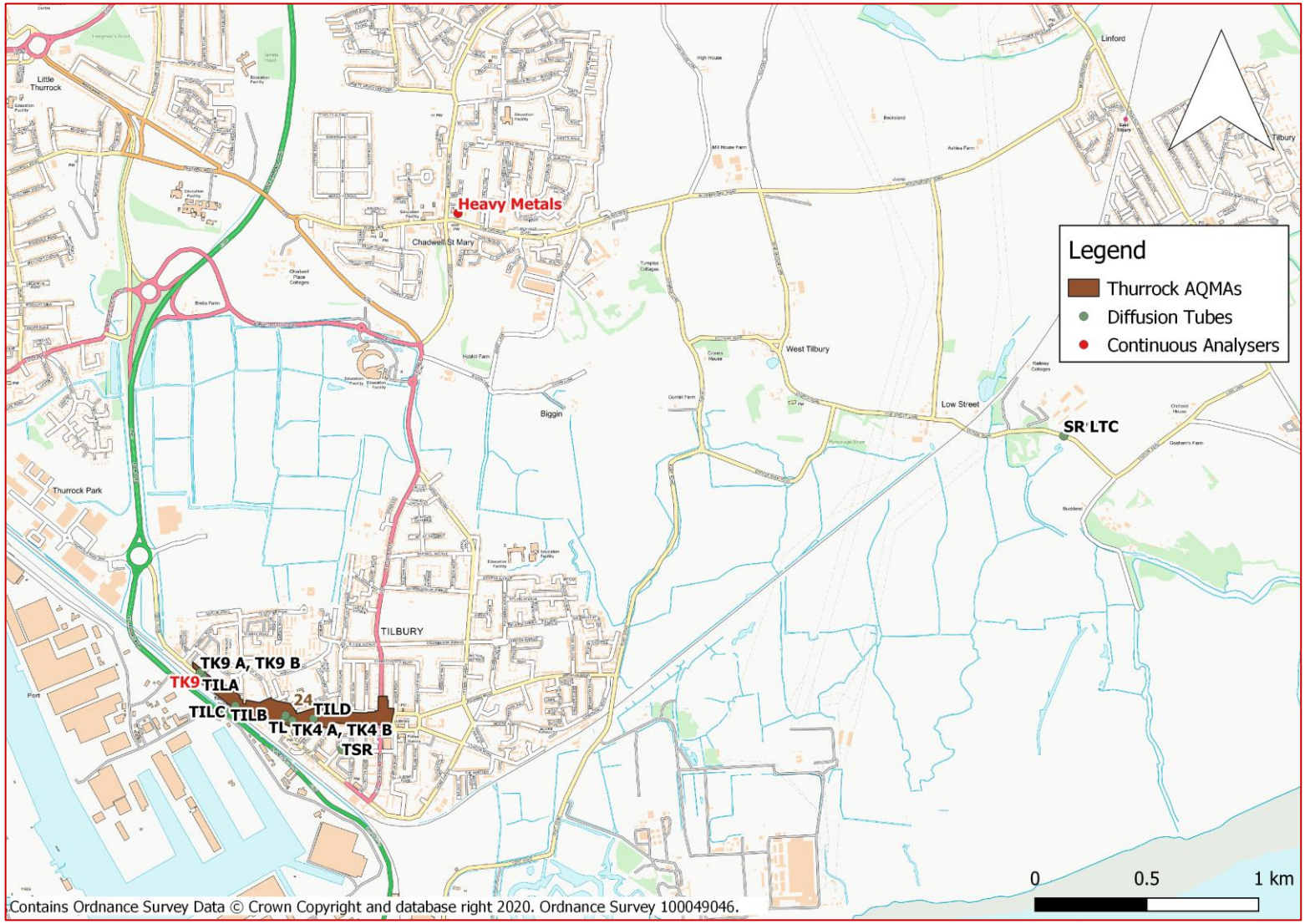


Figure D. 2 - Map of Monitoring Sites in Tilbury, AQMA 24



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[8] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[9] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[8] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[9] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Thurrock Borough Council

- There was an average reduction of 8.2µg/m^3 recorded at the monitoring sites located within AQMAs when comparing annual mean concentrations at passive monitoring locations between 2019 and 2020
- There were no reported exceedances within AQMAs in 2020 at passive monitoring sites, when compared with 6 reported exceedances in 2019.
- When comparing automatic monitoring sites between 2019 and 2020, reductions of NO_2 concentrations of between 13% and 18% were experienced.

Opportunities Presented by COVID-19 upon LAQM within Thurrock Borough Council

No LAQM related opportunities have arisen as a consequence of COVID-19 within Thurrock Borough Council.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Thurrock Borough Council

Thurrock Borough Council's monitoring regime was not affected by lab closures or any similar circumstances associated with Covid-19. Monitoring continued as normal, adhering to the Defra Diffusion Tube Calendar. This impact rating is therefore classified as "None" as per the LAQM Impact Matrix provided within Table F 1.

Covid-19 has led to the difficulties in recruiting a new Air Quality Officer, which has impacted upon progress with measures to address air quality within the borough, not least the progress with undertaking a detailed assessment to address the status of the AQMAs across the borough. This impact rating is therefore classified as “Large” as per the LAQM Impact Matrix provided within Table F 1.

The impacts as presented above are aligned with the criteria as defined in Table F 1, with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Glossary of Terms

Abbreviation	Description
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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
TEOM	Tapered Element Oscillating Microbalance

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
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