

2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 2021
Local Air Quality Management

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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 ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

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 in Table 2.1 of this report or on the Defra UK Air website via [this web-link](#).

The main pollutants of concern in Thurrock are nitrogen dioxide (NO₂) and particulate matter (PM₁₀ & PM_{2.5}); 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 NO₂ (40 µg/m³). Out of the 18 AQMAs there are currently four that are also declared for PM₁₀, for the short-term objective or 24-hour mean objective of 35 permitted exceedances of >50 µg/m³.

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 an 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 NO₂ & PM₁₀ exceedances over most of the borough and including all 18 AQMA's. The report found that 8 AQMA's should be revoked for NO₂ and all four for PM₁₀ 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 NO₂ 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 NO₂ 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 is ongoing.

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, NO₂ concentrations dropped significantly between 2019 and 2020, with all passive monitoring sites reporting a decrease in annual mean NO₂ concentration and an average reduction of 7.2 µg/m³ across the passive monitoring network. The comparison between 2020 and 2021 is similar. Across the passive NO₂ monitoring network, concentrations reduced by 3.5 µg/m³. However, three sites (LRSS, PIH and WCF) all showed increases, with PIH showing an increase of 7.8 µg/m³. This is likely a result of traffic returning in the latter stages of the COVID-19 pandemic.

PM₁₀ concentrations have reduced slightly between 2019 and 2021 with an average reduction of 8%, although monitoring site “Thurrock 1” saw a reduction of 16.5% during that period. Concentrations have reported below the AQS Objective over the past 5 years.

Thurrock Borough Council currently monitor PM_{2.5} at two locations: Thurrock 3, in Stanford-le-Hope; and Thurrock 9, in Tilbury. 2021 is the first year of monitoring PM_{2.5} at this site and the concentration is compliant with the AQS Target of 25µg/m³ for this pollutant. When comparing 5-year trends at Thurrock 3, levels have remained largely the same between 2017 and 2021.

There is currently one location monitoring SO₂ within the borough located at Thurrock 1, Grays. SO₂ concentrations were well below the air quality objectives in 2020 and 2021, 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 Strategy⁵ sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero⁶ 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

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

Areas (AQMA) are designated due to elevated concentrations heavily influenced by transport emissions.

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 consist 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, in collaboration 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 2022/23.

Conclusions and Priorities

During 2020, NO₂ 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 site LT is not located at relevant exposure.

During 2021, NO₂ concentrations were monitored by a network of 66 diffusion tubes sites and four automatic monitoring stations. The monitoring station within AQMA 10, in

Purfleet, gave the borough's only exceedance of the AQS Objective for NO₂. There were no monitoring sites within 10% of the AQS Objective.

There was an average reduction in annual mean NO₂ concentrations of 3.5µg/m³ recorded at the monitoring sites located within AQMA's when comparing annual mean concentrations at passive monitoring locations between 2020 and 2021. This reduction has occurred despite the fact that traffic has begun to return to the borough's roads in 2021 as a result of the lessening of COVID-19 restrictions.

In relation to the 1-hour AQS Objective, there were no exceedances reported in 2020 or 2021. Additionally, all diffusion tube sites in 2020 and 2021 were below 60µg/m³, which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

Both 2020 and 2021 monitoring confirms that there are currently no areas breaching the annual mean air quality objectives for PM₁₀. There were some exceedances of the 24-hour mean concentrations across 2020 and 2021 at all three automatic sites, however these remained below the number of permitted exceedances per year. The maximum number of exceedances of the PM₁₀ 24-hour mean objective was jointly at Thurrock 1 and 8 in 2020 (9 exceedances out of the permitted 35 exceedances per year) and at Thurrock 8 in 2021 (6 exceedances out of the permitted 35 exceedances per year).

Thurrock Council currently has two automatic monitoring stations (Thurrock 3; Stanford Le-Hope and Thurrock 9; Tilbury), that monitor PM_{2.5}. All concentrations over the past five years have reported below the PM_{2.5} obligatory standard of 25µg/m³.

When considering the current AQMA declarations, the following AQMA's (both declared for exceedance of the annual mean objective for NO₂) have been showing an overall downward trend and reported consistently below 10% of the annual mean AQS Objective for NO₂ for the past five years:

- AQMA 15
- AQMA 16

Both of these AQMA's 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 AQMA's are revoked based on monitoring data showing consistent compliance with the AQS annual mean objective for NO₂, 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. At the time of writing, the tendering process for this work has begun with an expected completion date in Autumn 2023.

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](https://www.thurrock.gov.uk/report)<https://www.thurrock.gov.uk/report> 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 by accessing a wealth of information on 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.

Local Responsibilities and Commitment

This ASR was prepared by the Air Quality Officer of Thurrock Council with the support and agreement of the following officers and departments:

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This ASR has been approved by:

Gavin Dennett, Strategic Lead of Public Protection

A handwritten signature in black ink, appearing to read 'Gavin Dennett', with a long horizontal stroke extending to the right.

If you have any comments on this ASR, please send them to Peter Bond, Air Quality Officer, at:

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1 Local Air Quality Management

This report provides an overview of air quality in Thurrock Borough Council during the 2021 calendar year. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (2021) 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:

- NO₂ annual mean;
- PM₁₀ 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)	21.7 µg/m ³ (NAS1) 25.6 µg/m ³ (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)	26.1 µg/m 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)	30.5 µg/m ³ (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. 29.3 µg/m ³ (NAS2) - proxy location, within AQMA 5	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	NO ₂ = 29.3 µg/m ³ (NAS2)	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	NO ₂ = 28.9 µg/m ³ (IBIS)	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 PM ₁₀ 24 Hour Mean	A Hotel next to Jct 31 of the M25	YES	PM ₁₀ = No Data. Exceedance was based on modelling only	NO ₂ = 31.9 µg/m ³ (PIH) No monitoring sites for PM ₁₀	Air Quality and Health Strategy (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

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	21.0 µg/m ³ (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	NO ₂ = 41.9 µg/m ³ (TK8)	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)	24.8 µg/m ³ (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)	30.8 µg/m ³ (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)	16.8 µg/m ³ (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)	17.7 µg/m ³ (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)	22.6 µg/m ³ (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)	23.8 µg/m ³ (TL)	Action Plan for AQMA 24 - Tilbury (2016)	https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

					39.3 µg/m ³ (TK4)	26.8 µg/m ³ (TILB)		
AQMA 25	2016	NO ₂ Annual Mean	An area encompassing Residential properties along Aveley High St & Ship Lane	NO	41 µg/m ³ (AVSL)	26.8 µg/m ³ (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)	20.3 µg/m ³ (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.

The Council intends re-evaluate its Air Quality and Health Strategy, which contains the overarching Air Quality Action Plan, to take into consideration new opportunities and develop additional and improved policies and actions. This work will be based on the findings of our forthcoming borough-wide modelling assessment, due for completion in Autumn 2023.

Details of all Air Quality Action Plan measures completed, in progress or planned are set out below, in Table 2.2. 30 measures are included within Table 2.2, with the type of measure and the progress Thurrock Borough Council have made during the reporting year of 2021 presented.

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 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 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. 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	The council operates its own website as well as participating in the Essex Air site which is currently being updated to provide more comprehensive and accessible information for the public.	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	This measure is ongoing, with Travel Plans forming an active part of the Development Management process for new developments. The council is undertaking a new process to ensure effective monitoring of travel plans and undertaking any necessary enforcement should these not be complied with and monitored as stated. Additional funding has been received from the DfT to help undertake some workplace challenges.	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	There is ongoing promotion of cycling within the borough. New cycle infrastructure is being built in Tilbury, with the completion of a cycle route along Dock Road and Calcutta Road, and new new dedicated cycle route being built along Brennan Avenue. Consultations have been undertaken in Stanford le Hope for new cycle infrastructure under the Active Travel Fund. A further £616,000 has been awarded to the authority to ide additional routes into Corringham. The FOrwardMotion Cycle Hub Thurrock continues to remain operational in Tilbury providing more people access to low-cost cycles and maintenance.	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
4	Action to road vehicle emissions	Promoting Travel Alternatives	School Travel Plans	2004	Complete	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A	Thurrock Council continues to engage with schools on travel plans. The authority still maintains active use of the Modeshift Stars school travel plan administration system, and have 3 Gold, 6 Silver and 7 bronze accredited schools. The authority has a target to increase the number of schools with accredited travel plans by a further 10 schools.	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	The council implemented a further 3 Wayfinding schemes in the borough - Grays, Tilbury and Aveley, with South Ockendon due to be installed. The active health walks programme has now come to an end.	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	Not progressed	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	Programme has completed and not progressed further	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	The council has a sustainable travel brand - shared with Southend Borough Council and Essex County Council - ForwardMotion which is used to promote active and sustainable travel, and supporting materials are being refreshed including the website.	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	The cycle network is increasing with completion of the Dock Road/Calcutta Road cycle scheme, and commencement of the Brennan Road scheme. Consultations on other cycle schemes are ongoing. Aim is to have a traffic free cycle scheme from North Stifford to Stanford-le-Hope.	Encourage modal shift
10	Action to road vehicle emissions	Transport Planning and Infrastructure	Public transport improvements-interchanges	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A	Enhancement to Grays bus station made, including new rail time	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
			stations and services											information and 7 of the 8 bus shelters replaced.	
11	Action to road vehicle emissions	Transport Planning and Infrastructure	Bus route improvements	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A	Not progressed - issues from the pandemic have hit bus routes and their viabilities.	Encourage modal shift
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	No longer being implemented.	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	No longer being implemented.	Improve HGV driving efficiency to improve vehicle emissions (funding available until March 2015)
15	Enforcement of local Taxi licencing	Promoting Low Emission Transport	Taxi Licencing conditions	Ongoing	Ongoing	Licencing	Licencing					<1%	N/A	Ongoing	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	Thurrock Council has tendered a new contract with supplier to provide more electric charging points across the borough, with reduced costs to the council. Supplier is ConnectedKerb.	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	Ongoing	To reduce and save money on unnecessary vehicle journeys
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

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
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	Except for a very small number of buses, Thurrock has a clean bus fleet. Buses operated by First Essex Buses run hybrid vehicles while nearly all Ensign Buses are Euro 6 compliant. Only buses operated by Nibs and some school operators may not Euro 6.	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	A parking strategy has been adopted where cycle parking is a formal requirement of all new developments for both short and long-term stays.	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	Programme ended in 2015.	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	The Thurrock Freight, Logistics and Transporting Partnership was reformed, but has not met in a number of years.	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	N/A	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	No longer implemented	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	Completed	Improve flow of stationary traffic for smoother driving, hence attempt to lower emissions

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
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	Completed	
26	HGV weight restriction (AQMA 1, 2)	Traffic Management	Other	2013	2013 / 2014	Highways / Strategic Planning	Highways / Strategic Planning					<1%	N/A	Completed	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							Not implemented	
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	A new Air Quality Officer is now in post and the first working group meeting was held on 20/04/22	To coordinate action between council departments (Health, Transport & Environment) and determine focus areas/initiatives

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

2.2 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 NO₂ 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/m³): Introduction of weight restrictions/enforcement to discourage HGVs
- Engine Switch-off Zones (3.0+ µg/m³): Traffic orders and publicity to reduce idling at level crossings e.tc
- Speed limit reduction (5.0+ µg/m³): Localised traffic enforcement and speed reductions
- Clean Air Zone (15.0 µg/m³): Traffic enforcement/management to prevent or charge high polluting vehicles for using certain roads.

Thurrock Council currently undertakes PM_{2.5} monitoring at two sites, Thurrock 3; Stanford-Le-Hope, and Thurrock 9; Tilbury. PM₁₀ 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 2020 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were 12.8µg/m³ and 16.2µg/m³. The estimated concentrations at the same sites in 2021 were 12.0µg/m³ and 15.5µg/m³ respectively. These concentrations are below the PM_{2.5} AQS target of 25µg/m³.

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 etc. can be found on the [UK GOV website](#).

The current Defra background maps for Thurrock Borough Council (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 target for PM_{2.5}. The highest concentration is predicted to be 12.4µg/m³ in 2021 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 NO₂ annual mean and PM₁₀ 24-hour mean.

The [Public Health Outcomes Framework data tool](#) compiled by Public Health England quantifies the mortality burden of PM_{2.5} within England on a county and local authority scale (latest available data: 2021). The 2021 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 by Thurrock Borough Council during the 2021 calendar year and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 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 2021. TK4 was decommissioned in December 2019, but replaced by TK9 in December 2020. 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 NO₂ at 66 sites during 2020 and 2021, including one duplicate and one triplicate site. The location of

the duplicate site, which was associated with the continuous monitor TK4 in 2019, changed in 2020 when it was re-located to the continuous monitor TK9. 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 (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. 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 2021 dataset 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 NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

In 2021, there were no reported exceedances of the air quality objective at passive monitoring sites. Furthermore, there were 0 sites which reported within 10% of the AQS Objective.

Of the four automatic monitoring sites for NO₂ in 2021, three locations reported below 10% of the AQS annual mean objective. The automatic roadside monitoring site Thurrock 8 exceeded the AQS annual mean objective in both 2020 and 2021. 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 2021.

In relation to the 1-hour AQS Objective, there were no exceedances reported in 2020 or 2021. Additionally, all diffusion tube sites in 2020 and 2021 were below $60\mu\text{g}/\text{m}^3$, which indicates that an exceedance of the 1-hour mean objective is unlikely at any sites.

Thurrock Borough Council decommissioned 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, commissioned December 2020, to monitor the level of NO_2 concentrations at the worst-case location within AQMA 24, results from TK9 are presented in this report following its first full year of monitoring.

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 $40\mu\text{g}/\text{m}^3$.

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 $50\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

Both 2020 and 2021 monitoring confirms that there are currently no areas breaching the annual mean air quality objectives for PM_{10} . There were some exceedances of the 24-hour mean concentrations across 2020 and 2021 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 in 2021 was at Thurrock 8, which is located in AQMA 10 (6 exceedances out of the permitted 35 exceedances per year). Over the past 5 years, all three sites have remained below the threshold for 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. 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 two automatic PM_{2.5} monitoring stations (Thurrock 3; Stanford Le-Hope and Thurrock 9; Tilbury), which are both roadside sites. 2021 is the first complete year of monitoring at Thurrock 9 and shows that the site is comfortably compliant with the AQS target concentration for this pollutant. Thurrock 3 has seen a decline in concentrations between 2016 – 2018. However, the annual mean concentration increased to 11.6µg/m³ in 2019, remaining at roughly this level through 2021 (reporting 11.8µg/m³). All concentrations over the past five years have reported below the PM_{2.5} target of 25µg/m³.

In accordance with LAQM.TG(16), the PM_{2.5} concentrations can also be estimated from PM₁₀ monitoring using either a local PM₁₀ 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 PM₁₀ at the Thurrock 3 site, a locally derived correction factor of 0.69 in 2020 and 0.7 in 2021 can be applied to PM₁₀ 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 0.69 was applied to the 2020 PM₁₀ concentrations at the automatic monitoring sites Thurrock 1 and Thurrock 8 (18.6µg/m³ and 23.5µg/m³) and the correction ratio of 0.7 was applied to the 2021 PM₁₀ concentrations at Thurrock 1 and Thurrock 8 (17.1µg/m³ and 22.1µg/m³). The estimated PM_{2.5} concentration in 2020 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were 12.8µg/m³ and 16.2µg/m³. The estimated PM_{2.5} concentration in 2021 at the automatic monitoring sites Thurrock 1 and Thurrock 8 were 12µg/m³ and 15.5µg/m³. These concentrations are below the PM_{2.5} AQS target of 25µg/m³.

3.2.4 Sulphur Dioxide (SO₂)

Table A.9 and A.10 in Appendix A compare the ratified continuous monitored SO₂ concentrations for 2020 and 2021 with the air quality objectives for SO₂.

There is currently one location monitoring SO₂ within the borough located at Thurrock 1, Grays. The council has previously monitored for SO₂ 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. SO₂ concentrations were

well below the air quality objectives in 2020 and 2021, 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 , PM _{2.5} , O ₃ , SO ₂	No	Chemiluminescent, BAM 1020, 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 1020	2.6	2	1.5
Thurrock 3 (TK3)	Stanford-le-Hope, Manorway	Roadside	569358	182736	NO ₂ , PM ₁₀ , PM _{2.5}	No	Chemiluminescent, BAM 1020, BAM 1020	3	22	2.8
Thurrock 9 (TK9)	Dock Road Tilbury	Roadside	563489	176497	NO ₂ , PM _{2.5}	AQMA 24	Chemiluminescent, BAM 1020	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

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
WC	Watts Crescent (R)	R	556314	178765	NO ₂	12	32	2	N	2
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	N	2
GDSO	Gatehope Drive (UB)	UB	557595	181060	NO ₂	15	23	105	N	1.3
LT	Lakeside Tesco Roundabout (R)	R	557981	178700	NO ₂	No	>50	1	N	2
KCNO	Kemps Cottage (UB)	UB	558148	183532	NO ₂	16	10	57	N	2
WT	London Road W Thurrock (R)	R	558483	177678	NO ₂	23	10	4	N	1.5
HR	Howard Road (R)	R	559118	179462	NO ₂	5	0	29	N	1.5
NAS2	A1306 (R)	R	559720	179630	NO ₂	5	20	4.5	N	2
LRSS	London Road South Stifford (R)	R	559785	177910	NO ₂	2	4	3.5	N	2

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)
LRG	London Road Grays (R)	R	560624	177811	NO ₂	1	4.8	2.5	N	2
ER	Elizabeth Road (R)	R	560954	179535	NO ₂	3	2.5	0.5	N	2
PS	Poison Store - Thurrock AURN Site (Co-located single tube) (UB)	UB	561066	177894	NO ₂	No	N/A	38	Y (TK1)	3.5
HL	Hogg Lane (R)	R	561108	178922	NO ₂	No	27.5	1.2	N	2
NAS1	Queensgate Centre Grays (R)	R	561469	178063	NO ₂	1	0	5	N	2
CR	Cromwell Road Grays (I)	R	561572	178154	NO ₂	1	Nearest exposure crosses road source	0.5	N	2
SRG	Stanley Road Grays (R)	R	561685	177833	NO ₂	1	2.5	5	N	2
NAS3	Chestnut Avenue Grays (UB)	UB	561830	179878	NO ₂	No	8	N/A	N	1.5
WES	William Edwards School (R)	R	561958	180967	NO ₂	No	38	N/A	N	2
B	Bulphan (RB)	RB	563855	184772	NO ₂	No	Nearest exposure crosses road source	N/A	N	2
TL	Calcutta Road Tilbury (R)	R	563867	176293	NO ₂	24	6	0.5	N	2
PKSL	Park Road (R)	R	567781	182400	NO ₂	No	24	9	N	2

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)
SL	Stanford Library (UB)	UB	568501	182459	NO ₂	No	7	N/A	N	2
ML, MM, MR	Manorway Monitoring Station (R) (Co-located triplicate tube site)	R	569357	182737	NO ₂	No	22	3	Y (TK3)	2.8
FRC	Francisco Close (Chafford Hundred) (I)	I	559136	179084	NO ₂	No	10	17	N	2
TILA	Dock Road (Tilbury) (R)	R	563498	176483	NO ₂	24	14	2.5	N	2
TILB	Broadway Intersection (Tilbury) (R)	R	563645	176348	NO ₂	24	9	2.5	N	2
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	0.5	N	2
TILE	Calcutta Road North (Tilbury) (R)	R	563870	176305	NO ₂	24	8	2	N	2
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)	1.5
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	18	N	2

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)
AVSL	Aveley Ship Lane (R)	R	556713	180167	NO ₂	25	1	2	N	2
AVHS	Aveley High Street (R)	R	556661	180180	NO ₂	25	6.5	0.8	N	2
SOAA	South Ockendon Arisdale Avenue (R)	R	558785	182323	NO ₂	No	6	7	N	2
TSR	Tilbury Sydney Road (UB)	UB	564122	176152	NO ₂	No	N	N/A	N	2
DR	Devonshire Road (R)	R	560279	178944	NO ₂	No	10.5	6	N	1.5
LRARN	London Road Art Road (North) (R)	R	555286	179501	NO ₂	13	0.5	19.5	N	2
LRARS	London Road Art Road (South) (R)	R	555357	179362	NO ₂	No	40	15	N	1
LRARMN	London Road Art Road (Mid-North) (R)	R	555299	179453	NO ₂	13	Nearest exposure crosses road source	8	N	2
LRARMS	London Road Art Road (Mid-South) (R)	R	555329	179397	NO ₂	13	9	7	N	2
JRP	Joslin Road (UB)	UB	556384	178001	NO ₂	No	13	N/A	N	2
ACHL	Armada Court & Hogg Lane (R)	R	561093	178974	NO ₂	3	9	8	N	1.5
CC	Catherine Close (I)	I	560770	179866	NO ₂	No	32	20	N	1.5
ERFA	Elizabeth Road facade A (R)	R	560962	179527	NO ₂	3	32	8.2	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)
ERFB	Elizabeth Road facade B (R)	R	560963	179558	NO ₂	No	0.5	8	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	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	N	1.5
WCF	Watts Cresecent facade (A)	I	556290	178749	NO ₂	12	7.5	17	N	1.5
THA	Thurrock Hotel A (UB)	UB	557386	179065	NO ₂	9	0	78	N	1.5
THB	Thurrock Hotel B (UB)	UB	557437	179099	NO ₂	9	0	39	N	1.5
SCR LTC	Stifford Clays Road LTC site (I)	UB	562383	181157	NO ₂	No	29	55.5	N	1.5
BSA LTC	Baker Street A LTC site (R)	R	563486	181070	NO ₂	No	9	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

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)
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	N	1.5
MRS	Manor Road School (R)	R	562413	177747	NO ₂	No	0	1.5	N	2
MTV	Mary The Virgin Church (I)	I	562615	177774	NO ₂	No	4	56	N	2

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 NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
Thurrock 1	561066	177894	Urban Background	97.6	97.6	28.2	24.8	23.4	19.3	20.6
Thurrock 3	569358	182736	Roadside	99.1	99.1	28.3	27.6	25.3	21.2	22.1
Thurrock 8	556701	177932	Roadside	87.9	87.9	52.1	51.6	47.7	41.6	41.9
Thurrock 9	563489	176497	Roadside	94.2	94.2	N/A	N/A	N/A	N/A ⁽³⁾	29.1

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/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ 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 NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
LRAR	555301	179438	R	100.0	100.0	58.2	51.2	50.1	36.7	30.8
PRS	555389	178145	R	100.0	100.0	31.5	34.4	32	22.6	19.4
WC	556314	178765	R	100.0	100.0	40.1	41.1	39.1	29.7	24.8
JC	556701	177937	R	100.0	100.0	46.7	49.5	46.6	37.4	32.1
IBIS	557570	177789	UB	100.0	100.0	46.4	45.3	47	37.4	28.9
GDSO	557595	181060	UB	100.0	100.0	27.5	25.3	25.7	19.2	16.8
LT	557981	178700	R	100.0	100.0	56	54.7	52	39.9	34.1
KCNO	558148	183532	UB	100.0	100.0	33.5	29.4	29.3	21.9	17.7
WT	558483	177678	R	91.7	91.7	39.1	38.2	35.5	27.5	22.6
HR	559118	179462	R	100.0	100.0	32.1	30.3	27.7	22.2	20.7
NAS2	559720	179630	R	100.0	100.0	52.8	51.3	49.9	37.6	29.3
LRSS	559785	177910	R	100.0	100.0	41.9	39.2	39	24.3	26.1
LRG	560624	177811	R	91.7	91.7	38.3	36.2	36.7	26.4	25.6
ER	560954	179535	R	100.0	100.0	49.7	49.8	48.8	38.1	30.5
PS	561066	177894	UB	91.7	91.7	26.1	25.4	24.9	18.8	18.0
HL	561108	178922	R	100.0	100.0	34.3	33.7	31.8	24.6	22.0
NAS1	561469	178063	R	100.0	100.0	32.9	32.9	31	23.6	21.7
CR	561572	178154	R	83.3	83.3	31.8	30.9	33	24	22.2
SRG	561685	177833	R	100.0	100.0	28.7	29.6	30.6	23	21.4
NAS3	561830	179878	UB	100.0	100.0	23.2	23.9	24.8	18.8	15.8
WES	561958	180967	R	100.0	100.0	30	29.5	26.6	20.3	16.8
B	563855	184772	RB	100.0	100.0	16.3	15.2	14.6	11.9	9.5
TL	563867	176293	R	83.3	83.3	35	32.9	34.8	28	23.8
PKSL	567781	182400	R	100.0	100.0	27.8	29.4	26	20.7	18.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
SL	568501	182459	UB	83.3	83.3	25.9	26.2	25.5	19.5	17.8
ML, MM, MR	569357	182737	R	100.0	100.0	27.8	28.5	26.5	21.6	18.9
FRC	559136	179084	I	100.0	100.0	31.8	30.6	31	23.9	20.6
TILA	563498	176483	R	75.0	75.0	40.9	38	39.8	31.1	23.4
TILB	563645	176348	R	100.0	100.0	37.6	42.4	41.2	32.8	26.8
TILC	563600	176321	R	100.0	100.0	40.2	37.8	33.3	28.2	22.5
TILD	563995	176291	R	66.7	66.7	36.3	35	35.1	31.3	25.3
TILE	563870	176305	R	91.7	91.7	35.4	33.4	35.2	31.7	22.8
TK9 A, TK9 B	563489	176497	R	100.0	100.0	-	-	-	29.4	23.1
PBP	556257	178438	R	91.7	91.7	36.8	33.1	31	24.1	20.3
PBPA	556221	178461	R	100.0	100.0	33.3	33.1	30.7	23.8	21.6
LYD	560057	179873	UB	100.0	100.0	31.4	29.9	26.7	22.1	18.3
AVSL	556713	180167	R	100.0	100.0	42.1	40.7	45	32.5	26.8
AVHS	556661	180180	R	100.0	100.0	35.2	35.6	35.1	26.5	23.5
SOAA	558785	182323	R	91.7	91.7	28.1	32.5	29.2	21	19.8
TSR	564122	176152	UB	100.0	100.0	28.4	26.8	28.5	24.2	20.3
DR	560279	178944	R	100.0	100.0	28	26.5	27.9	21	17.3
LRARN	555286	179501	R	100.0	100.0	33.2	31.4	33	24.1	22.0
LRARS	555357	179362	R	91.7	91.7	30.7	25.8	26.4	19.8	17.7
LRARMN	555299	179453	R	100.0	100.0	40.9	39.6	36.7	26.6	23.9
LRARMS	555329	179397	R	100.0	100.0	39.2	37.5	34.3	25.4	23.7
JRP	556384	178001	UB	100.0	100.0	25.3	26.4	24.1	18.1	16.3
ACHL	561093	178974	R	100.0	100.0	35.8	32.7	35.3	27.7	22.1
CC	560770	179866	I	91.7	91.7	22.8	25.6	26	20	18.2

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
ERFA	560962	179527	R	100.0	100.0	33.8	32.5	32.5	23.8	19.2
ERFB	560963	179558	R	100.0	100.0	34.5	31.4	32.2	25.8	20.3
ERTM	560965	179796	R	100.0	100.0	35.5	37.5	37.1	26.1	24.4
NC	561077	179912	I	100.0	100.0	36.5	33.8	34.5	28.7	22.8
HD	560003	179694	R	100.0	100.0	34.9	32.7	31.5	25.5	21.8
GRPL	559551	179547	I	91.7	91.7	33	32.5	31	24.4	22.0
PIH	557299	178802	I	83.3	83.3	32	35.1	30.7	24.1	31.9
WCF	556290	178749	I	100.0	100.0	31	32.7	32.6	24.4	24.8
THA	557386	179065	UB	83.3	83.3	30.8	34.3	29.7	24	19.8
THB	557437	179099	UB	100.0	100.0	30.2	35.7	31.8	24.4	21.0
SCR LTC	562383	181157	UB	100.0	100.0		32.4	30.1	22.3	17.6
BSA LTC	563486	181070	R	100.0	100.0		24	25.9	18.9	17.0
BSB LTC	563574	180770	R	100.0	100.0		30.2	28.3	23.5	20.1
HR LTC	563785	180157	R	100.0	100.0		27.3	29	22.1	17.7
SR LTC	567351	177555	I	75.0	75.0		18.7	17.1	15.4	13.1
TTS LTC	563828	179597	I	91.7	91.7		23.7	21.5	19.2	16.0
MRS	562413	177747	R	91.7	91.7			23.5	19.5	17.0
MTV	562615	177774	I	100.0	100.0			21.5	17.5	14.8

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 $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 NO₂ Concentrations – Automatic Monitoring Sites

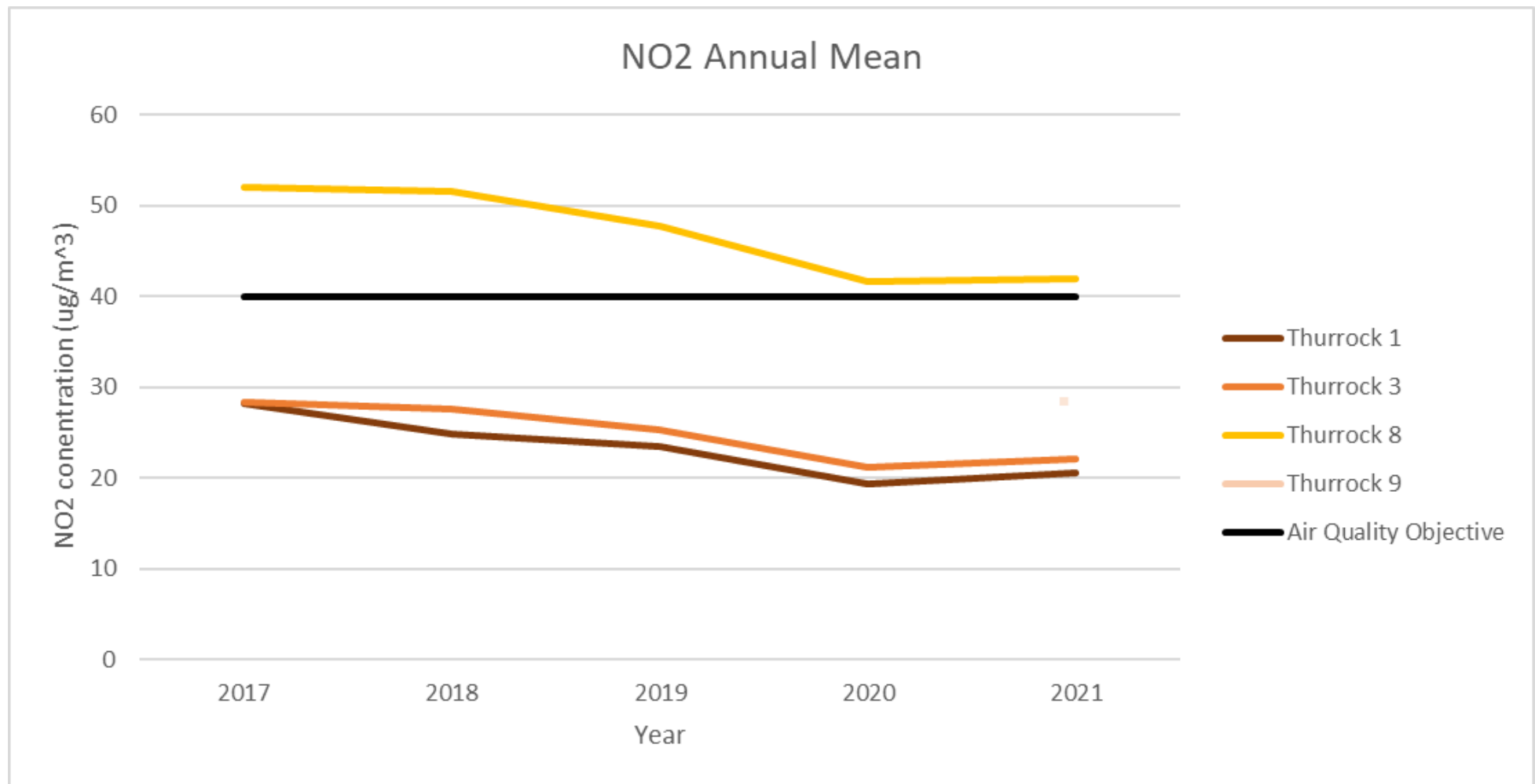


Figure A. 2 – Trends in Annual Mean NO₂ Concentrations – Passive Monitoring Sites in AQMA 1, 2, 3 and 5

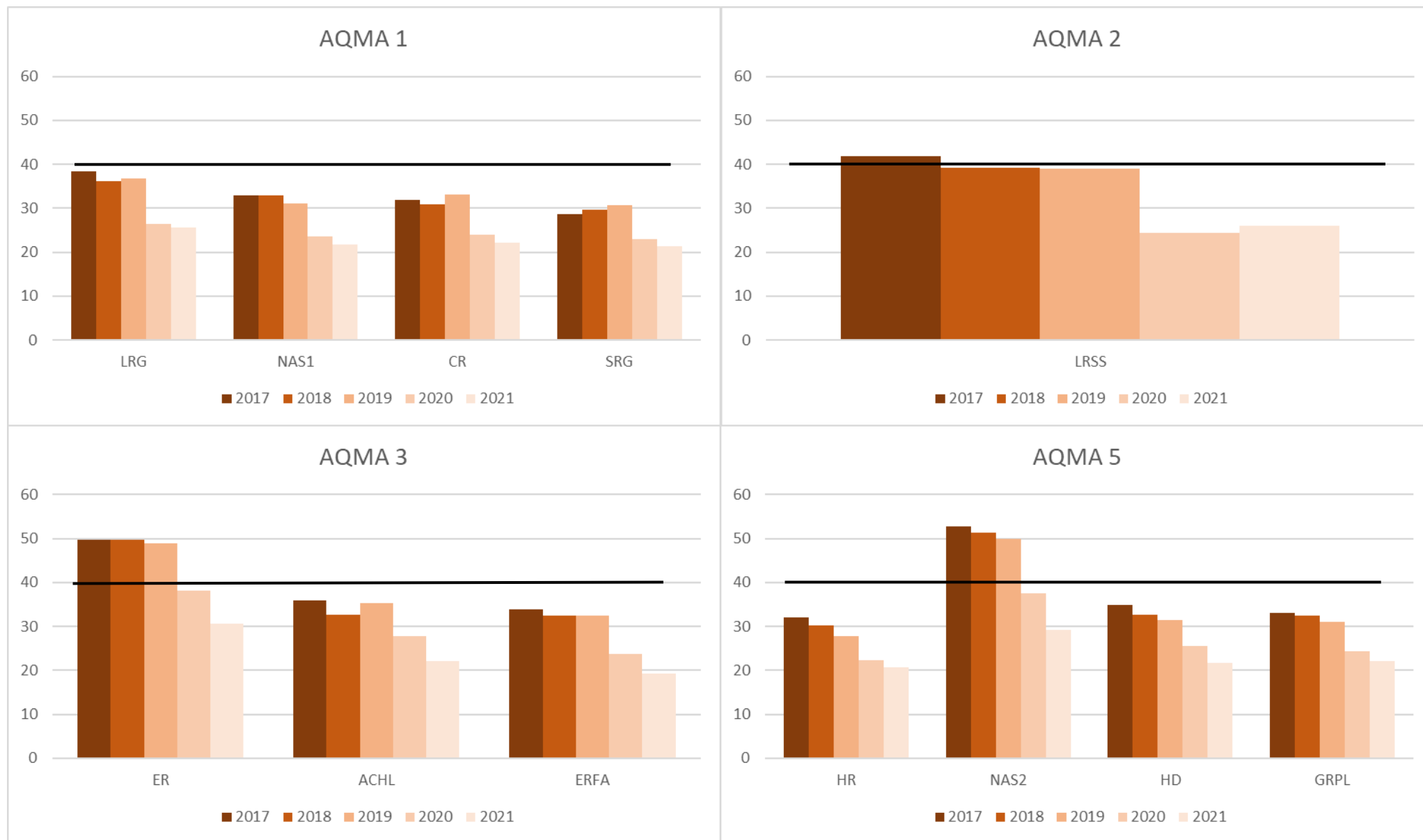


Figure A. 3 - Trends in Annual Mean NO₂ Concentrations – Passive Monitoring Sites in AQMA 7, 8, 9 and 10

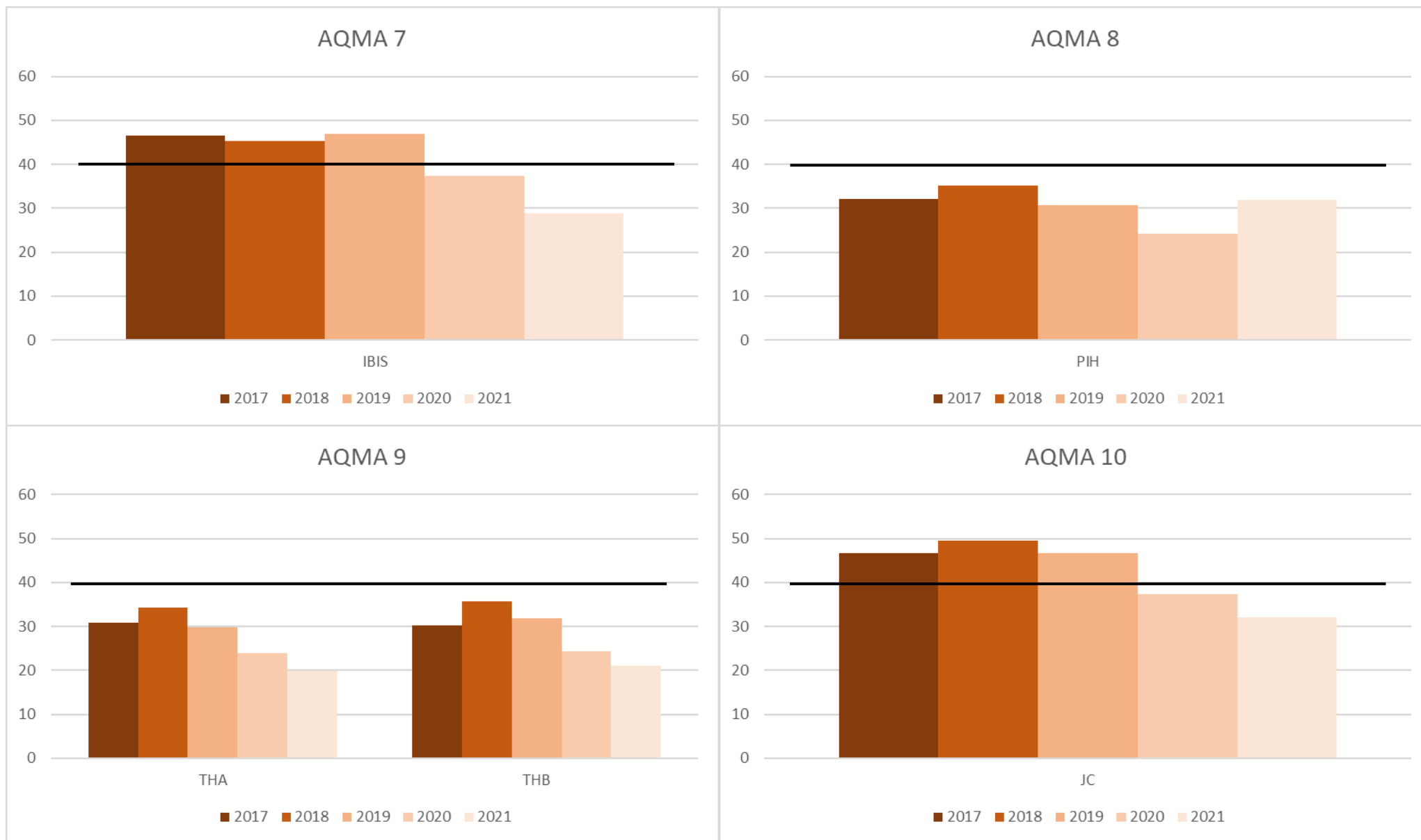


Figure A. 4 - Trends in Annual Mean NO₂ Concentrations – Passive Monitoring Sites in AQMA 12, 13, 15 and 16

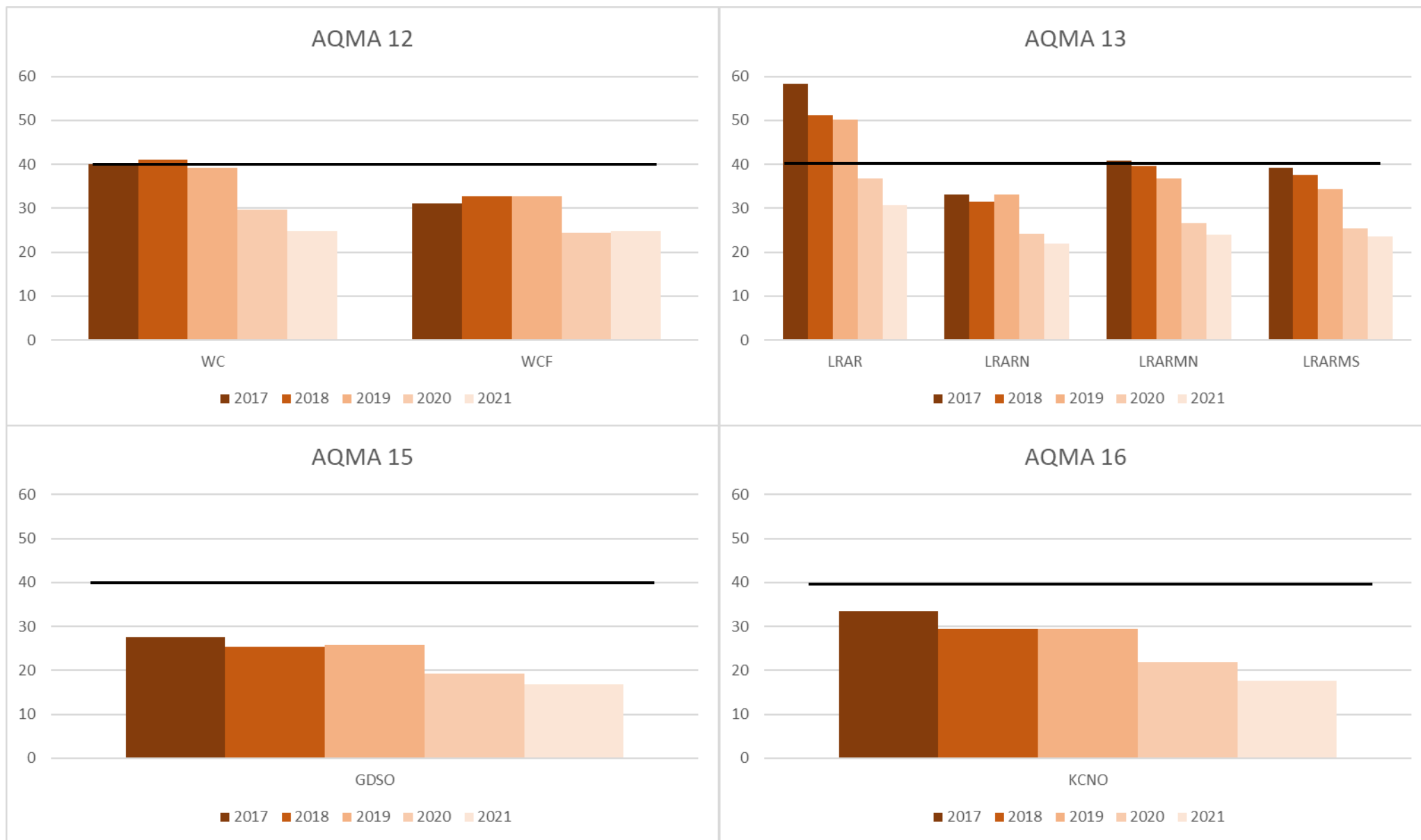


Figure A. 5 - Trends in Annual Mean NO₂ Concentrations – Passive Monitoring Sites in AQMA 23, 24, 25 and 26

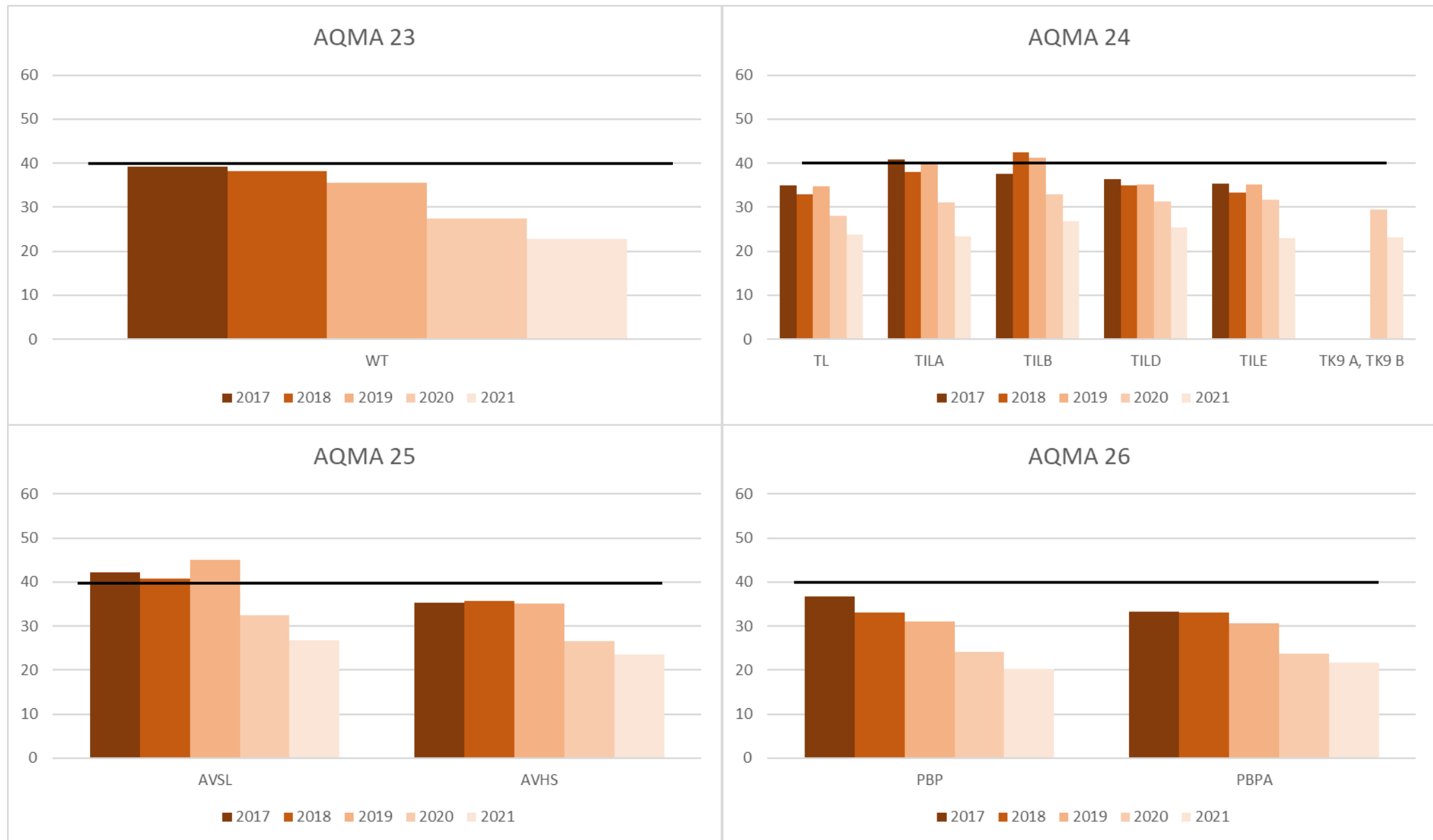


Figure A. 6 - Trends in Annual Mean NO₂ Concentrations – Passive Monitoring Sites outside AQMAs

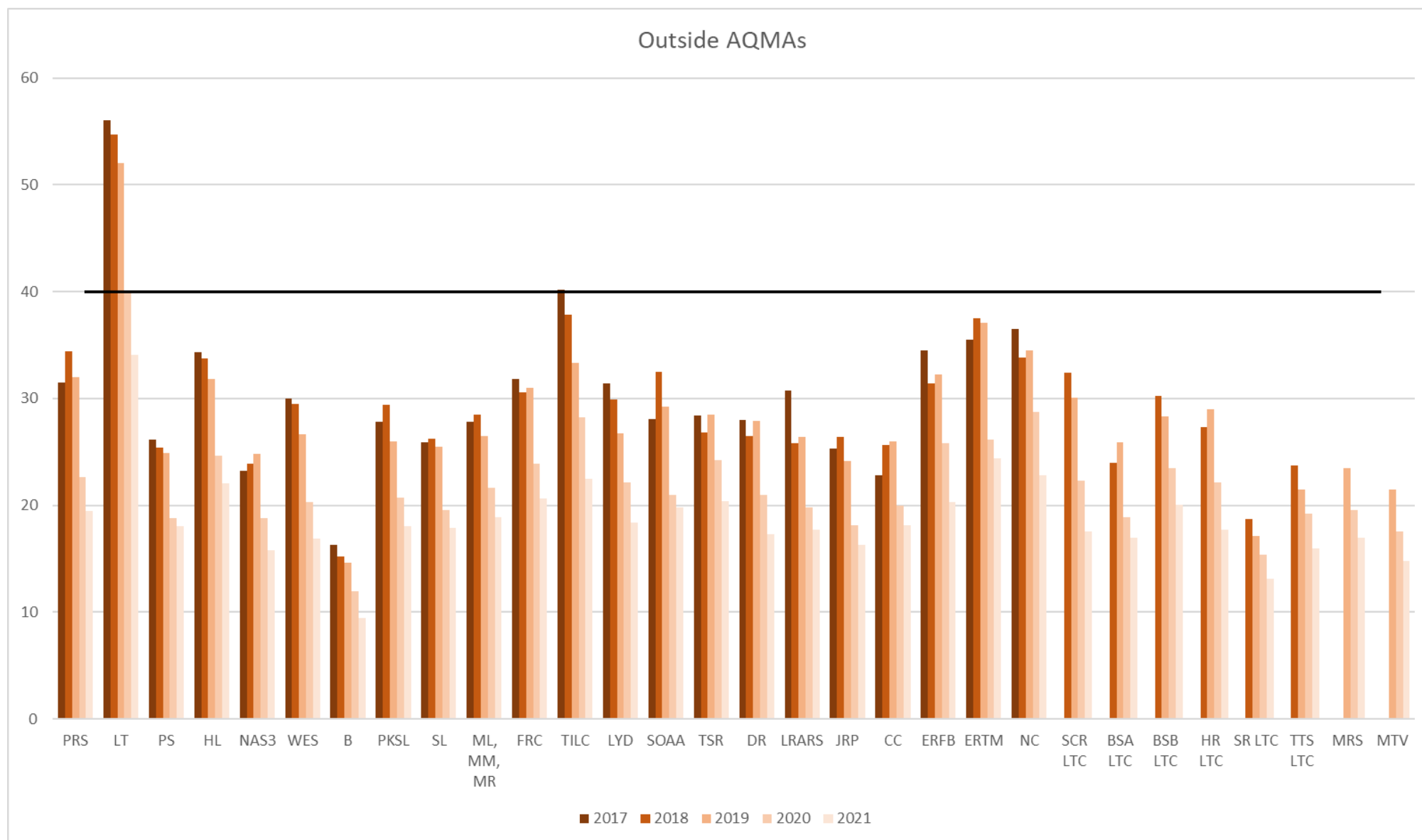


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
Thurrock 1	561066	177894	Urban Background	97.6	97.6	0	0	0	0	0
Thurrock 3	569358	182736	Roadside	99.1	99.1	0	0	0	0	0
Thurrock 8	556701	177932	Roadside	87.9	87.9	2	0	1	0	0
Thurrock 9	563489	176497	Roadside	94.2	94.2	N/A	N/A	N/A	N/A	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ 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%).

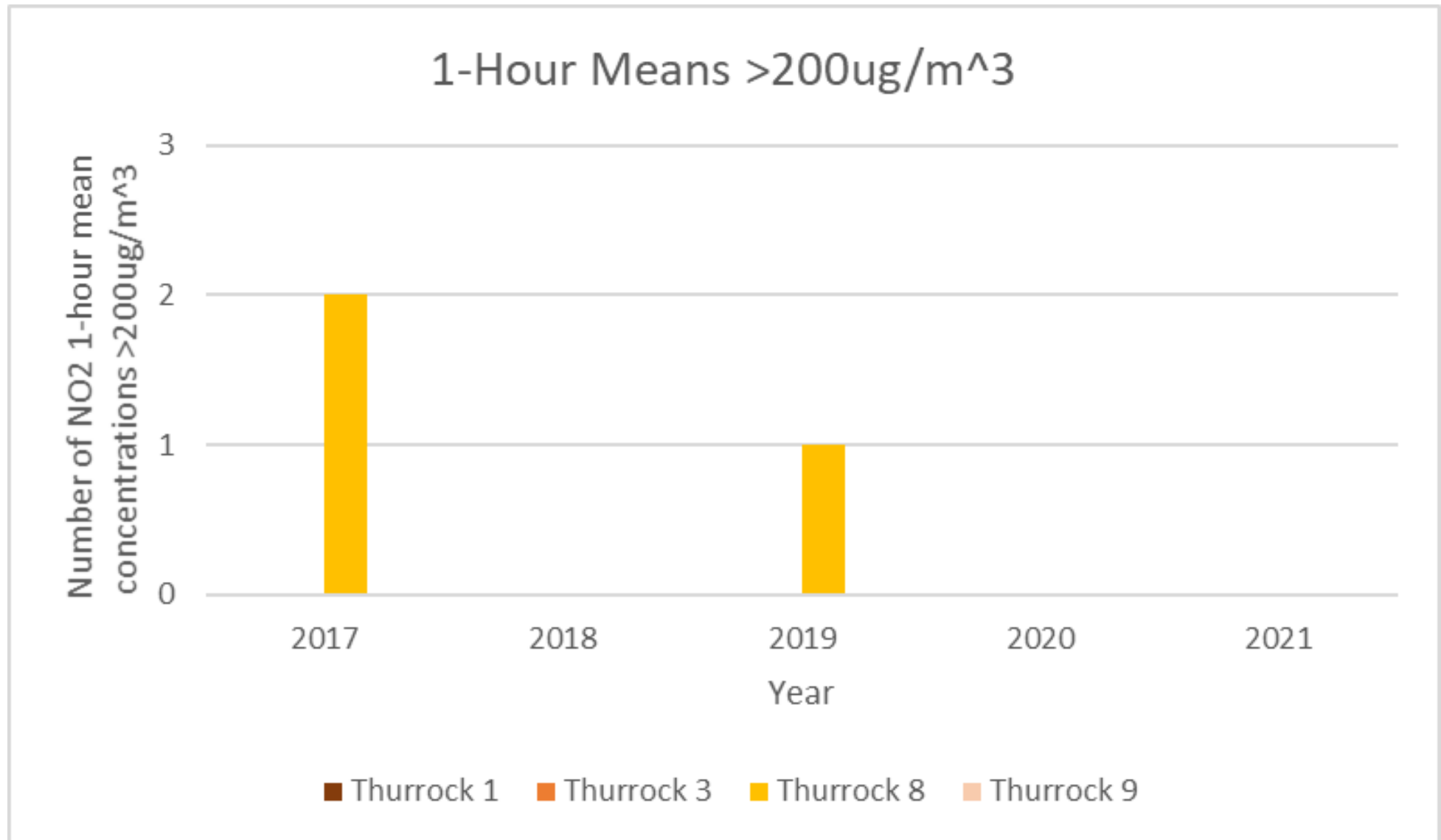
Figure A.7 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
Thurrock 1	561066	177894	Urban Background	88.5	88.5	18.1	18.9	20.5	18.6	17.1
Thurrock 3	569358	182736	Roadside	86.0	86.0	18.6	18.4	17.4	16.7	16.8
Thurrock 8	556701	177932	Roadside	89.9	89.9	24.9	26.7	23.2	23.5	22.1

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/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ 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 PM₁₀ Concentrations

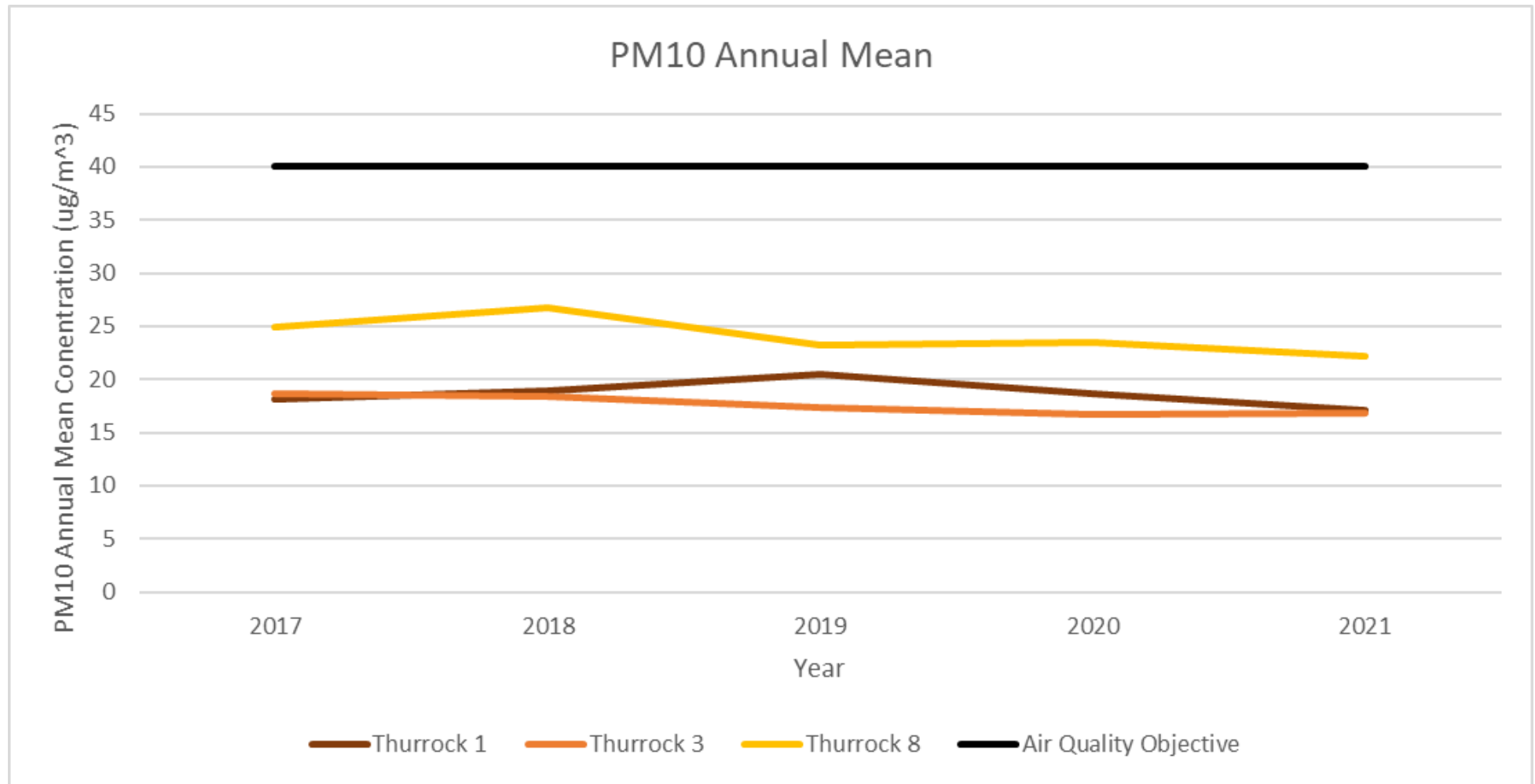


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
Thurrock 1	561066	177894	Urban Background	88.5	88.5	5	4	14	9	1
Thurrock 3	569358	182736	Roadside	86.0	86.0	5 (35)	3 (34)	10	5 (30.4)	2
Thurrock 8	556701	177932	Roadside	89.9	89.9	12	16	15	9	6

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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 PM₁₀ Results > 50µg/m³

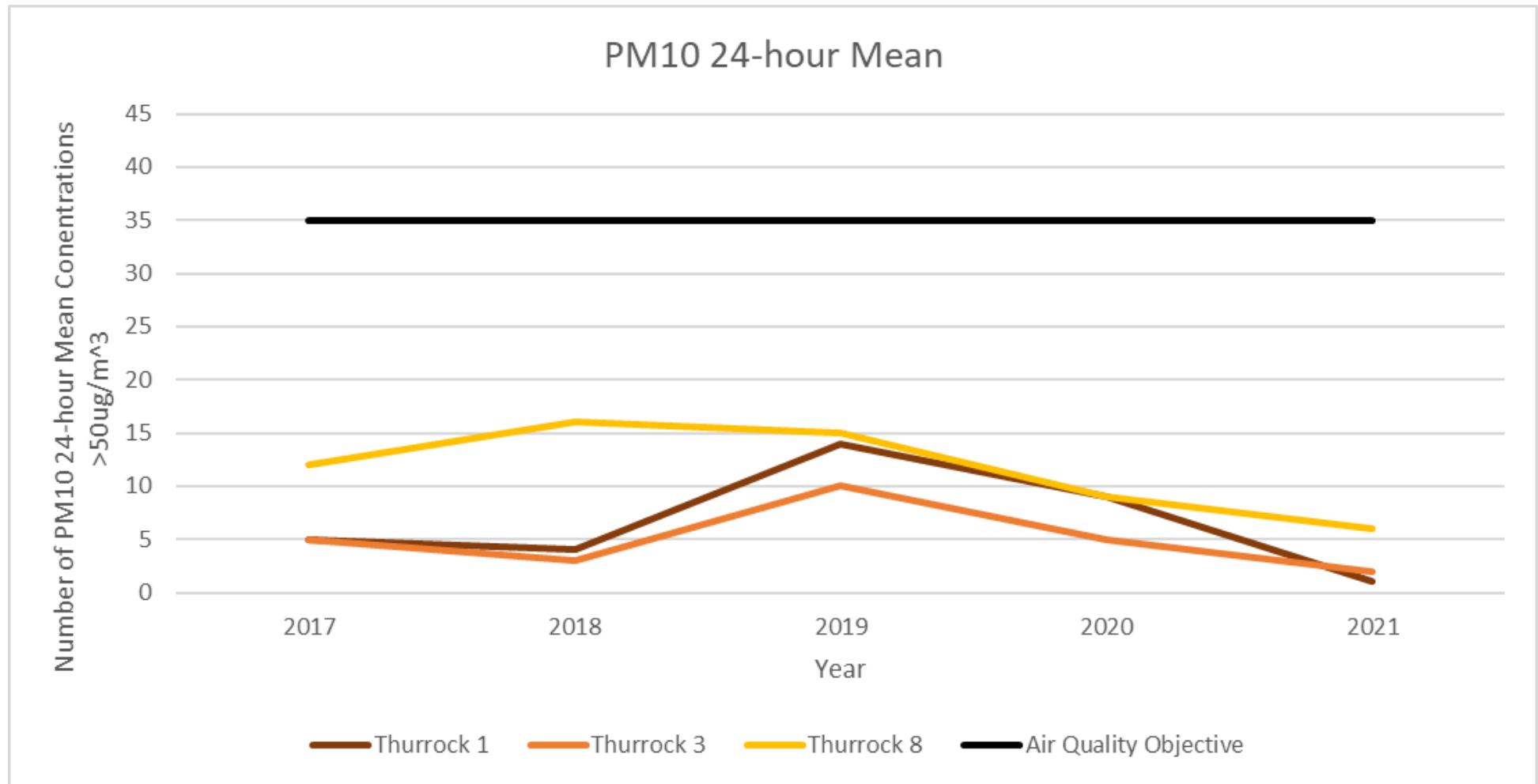


Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
Thurrock 3	569358	182736	Roadside	96.2	96.2	11.1	10.1	11.6	11.6	11.8
Thurrock 9	563489	176497	Roadside	96.9	96.9	N/A	N/A	N/A	N/A	10.8

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/m³.

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

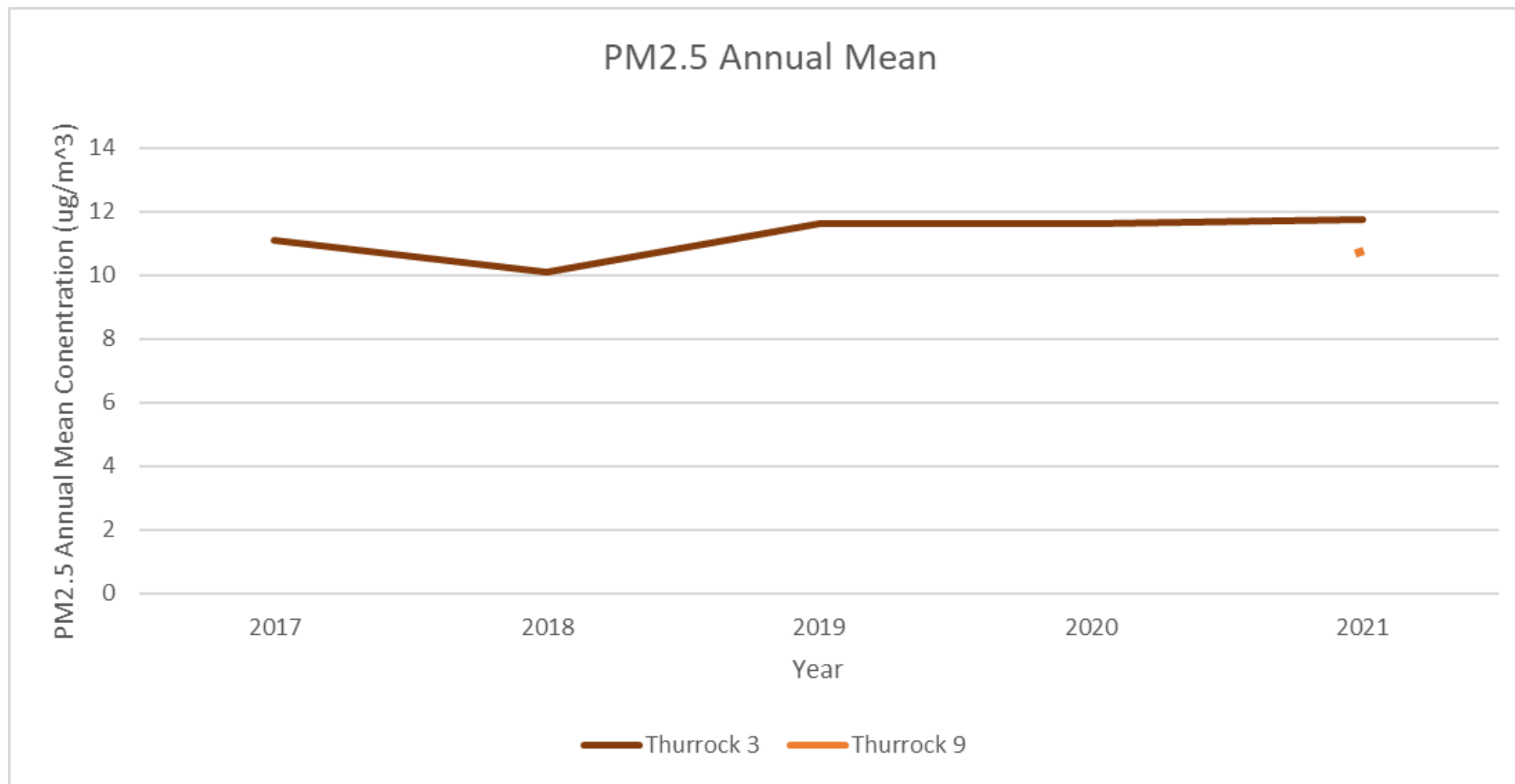


Table A.9 – SO₂ 2020 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	Number of 15-minute Means > 266µg/m ³	Number of 1-hour Means > 350µg/m ³	Number of 24-hour Means > 125µg/m ³
Thurrock 1	561066	177894	Urban Background	97.4	97.4	0	0	0

Table A.10 - SO₂ 2021 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 2021 (%) ⁽²⁾	Number of 15-minute Means > 266µg/m ³	Number of 1-hour Means > 350µg/m ³	Number of 24-hour Means > 125µg/m ³
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 SO₂ 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 2020 and 2021

Table B.1 – NO₂ 2020 Diffusion Tube Results (µg/m³)

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	45	53.2	48	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	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	51.8	48	43.6	46.2	37.4	-	
GDSO	557595	181060	33.8	29.5	22.1	18.1	15.7	17.9	19.6	21	25.8	27.2	30.4	MISSING	23.7	19.2	-	
LT	557981	178700	60.8	65.6	48.2	30.3	30	40.6	45.8	53.5	55.4	61.3	57.8	42.1	49.3	39.9	-	
KCNO	558148	183532	43	34.3	24.5	16.8	15.7	20.9	26.2	24.6	29.5	27.2	32.2	29	27	21.9	-	
WT	558483	177678	43	43.2	31.7	29.2	23.5	27.7	27.7	30	MISSING	40.1	41.1	36	33.9	27.5	-	
HR	559118	179462	32.4	31.9	26.8	24.8	19.8	19.8	24.5	25	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	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	48.7	42.1	38.6	38.9	41.3	47	47	54.2	MISSING	48.8	48.8	47	38.1	32.7	
PS	561066	177894	31.6	26.6	22.8	21.2	16	17.5	17.8	20.2	25.3	26	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	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	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	29.6	24	-	
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	-	
NAS3	561830	179878	31.3	28.4	MISSING	21.2	14	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	22.3	16.7	20.4	21.7	20	29.8	27.5	32.1	26.2	25	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	-	
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	24.8	27	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	23	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	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	32.1	38.2	34.9	38	44.7	52.3	45.2	41	40.5	32.8	-	
TILC	563600	176321	41	36.3	31.1	29.4	27	36.7	30.9	33.8	36.6	BAD DATA	41.1	38.7	34.8	28.2	-	
TILD	563995	176291	38.7	38	35.4	33.8	31.8	36.1	MISSING	MISSING	MISSING	46.5	48	39.6	38.7	31.3	-	

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
TILE	563870	176305	45.9	37.8	32	32.9	30.9	37.8	38.3	34.4	45	48.5	48.2	38.4	39.2	31.7	-	
TK9 A	563489	176497		35.5	32.8	31.9	31.3	39.2	37.9	34.9	38.4	43.8	43	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	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	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	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	24	27.7	28.8	34	29.4	27.3	22.1	-	
AVSL	556713	180167	53.8	44.2	35.1	27.8	29.2	38.6	29	40.2	45	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	22.8	19.4	14.8	21.4	22.2	23.3	27.9	29.7	35.9	33.2	25.9	21	-	
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	32.7	29.6	25.9	21	-	
LRARN	555286	179501	41	37.6	31.6	24	22	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	18.1	19.8	18.9	24	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	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	23	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	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	18.8	21.4	26.2	26.7	29.8	25.2	24.6	20	-	
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	26.8	26.3	24.2	28.8	31.9	31.5	35.9	38	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	38.2	32.2	26.1	-	
NC	561077	179912	47	46.4	30.3	25.2	22.6	27.8	33.4	31.8	39.4	43	40.9	38	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	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	32	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	-	
THB	557437	179099	36.4	32	29.5	30.9	25.3	28.1	19.2	29.2	29.9	31.3	33.8	36	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	21.9	25	23.9	26.5	31.6	31	36.5	29.9	29	23.5	-	
HR LTC	563785	180157	39.8	33.1	22.8	20.3	18	24.1	21.4	23.4	28.7	30	36.5	29.9	27.3	22.1	-	
SR LTC	567351	177555	21	34.2	17.5	17.6	13.6	14	15.5	15.1	18.7	21	24.1	16.5	19.1	15.4	-	
TTS LTC	563828	179597	30.6	29	19.6	20.7	17	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	26.6	33	29.9	24	19.5	-	
MTV	562615	177774	27.1	22.4	20	20.5	14.8	18.5	15.2	17.8	21.8	25	29.5	26.3	21.6	17.5	-	

All erroneous data has been removed from the NO₂ 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**
- Thurrock Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

Table B.2 – NO₂ 2021 Diffusion Tube Results (µg/m³)

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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LRAR	555301	179438	44.7	42.3	28.7	35.7	29.7	33.8	34.7	28.4	42.4	39.8	44.4	34.7	36.6	30.8		
PRS	555389	178145	29.2	29.3	22.1	24.5	19.4	19.9	21.0	16.6	25.7	21.4	26.6	21.8	23.1	19.4		
WC	556314	178765	39.6	35.0	30.6	29.8	26.3	27.3	20.5	22.4	26.4	30.8	37.5	28.2	29.5	24.8		
JC	556701	177937	45.0	41.2	37.0	35.7	37.2	38.6	34.0	32.6	39.4	38.5	45.1	33.8	38.2	32.1		
IBIS	557570	177789	43.4	37.6	26.8	28.9	29.6	30.7	28.2	31.8	34.7	40.5	45.3	34.8	34.4	28.9		
GDSO	557595	181060	27.9	20.1	29.3	16.6	15.7	14.2	15.1	14.6	16.9	22.0	27.3	20.2	20.0	16.8		
LT	557981	178700	54.2	38.8	26.3	38.1	34.1	39.0	35.9	42.0	42.0	44.0	51.5	41.4	40.6	34.1		
KCNO	558148	183532	30.3	21.8	20.8	16.0	18.1	15.7	16.3	18.2	17.3	23.3	31.2	23.0	21.0	17.7		
WT	558483	177678	39.0	30.2	BAD DATA	27.8	23.9	24.3	MISSING	23.4	30.5	32.1	35.3	30.0	27.0	22.6		
HR	559118	179462	29.4	22.6	41.1	21.8	18.8	18.9	16.8	20.0	22.4	26.1	32.8	25.5	24.7	20.7		
NAS2	559720	179630	46.5	38.0	26.5	31.1	33.0	21.1	28.5	32.3	37.0	39.5	47.3	37.6	34.9	29.3		
LRSS	559785	177910	39.1	35.2	25.8	28.9	26.9	31.1	25.1	29.0	32.4	30.7	38.8	29.7	31.1	26.1		
LRG	560624	177811	41.5	29.3	23.3	MISSING	48.6	25.5	24.5	21.0	29.6	29.9	34.8	27.5	30.5	25.6		
ER	560954	179535	45.0	40.9	32.3	37.1	31.3	35.7	31.6	29.7	36.9	34.8	44.6	36.3	36.3	30.5		
PS	561066	177894	26.3	20.9	25.2	17.5	15.9	14.8	MISSING	30.6	19.9	18.6	26.0	20.1	21.4	18.0		
HL	561108	178922	37.7	30.0	39.8	21.4	18.5	21.8	20.2	17.8	24.7	25.5	30.6	26.9	26.2	22.0		
NAS1	561469	178063	33.5	30.1	32.1	25.2	22.1	23.2	22.5	17.0	27.5	23.9	26.9	26.0	25.8	21.7		
CR	561572	178154	35.1	28.9	27.7	21.2	22.5	MISSING	MISSING	19.8	25.7	25.0	31.8	26.1	26.4	22.2		
SRG	561685	177833	33.5	27.3	32.8	22.7	20.0	21.3	21.3	17.3	27.4	25.5	32.7	23.8	25.5	21.4		
NAS3	561830	179878	27.7	22.6	25.2	15.9	15.1	13.1	12.4	10.4	18.0	20.3	25.4	19.8	18.8	15.8		
WES	561958	180967	28.3	21.9	BAD DATA	13.2	18.4	18.4	15.6	14.9	20.5	21.2	27.6	20.4	18.4	15.4		
B	563855	184772	18.7	13.5	12.1	8.6	10.3	8.7	7.7	6.7	10.7	10.6	14.4	13.0	11.3	9.5		
TL	563867	176293	40.4	34.7	30.0	23.4	29.1	23.4	24.4	21.7	29.9	MISSING	MISSING	26.3	28.3	23.8		
PKSL	567781	182400	27.8	23.9	24.0	18.7	19.1	20.2	16.8	16.6	21.6	21.1	27.2	20.9	21.5	18.1		
SL	568501	182459	28.1	22.8	26.1	14.2	16.7	MISSING	MISSING	15.2	20.6	20.9	26.6	21.0	21.2	17.8		
ML	569357	182737	28.5	24.8	18.8	21.0	21.0	19.5	18.3	14.2	21.3	22.4	29.0	22.5	21.8	18.3		Triplicate Site with ML, MM and MR - Annual data provided for MR only
MM	569357	182737	29.9	24.3	19.2	21.9	21.2	19.3	18.1	15.6	23.0	21.2	28.8	22.2	22.1	18.5		Triplicate Site with ML, MM and MR - Annual data provided for MR only
MR	569357	182737	30.4	24.5	43.9	22.8	17.0	18.5	18.0	15.2	22.9	20.6	27.4	22.4	23.6	19.8		Triplicate Site with ML, MM and MR - Annual data provided for MR only
FRC	559136	179084	30.0	27.0	28.4	22.1	19.5	20.3	17.0	17.8	24.6	27.5	32.9	27.2	24.5	20.6		
TILA	563498	176483	42.0	31.4	34.3	21.8	MISSING	21.7	21.6	21.3	27.2	MISSING	MISSING	29.0	27.8	23.4		
TILB	563645	176348	42.1	36.1	35.1	24.1	30.8	25.8	30.5	21.8	32.8	34.0	35.5	33.7	31.8	26.8		
TILC	563600	176321	34.0	32.9	31.3	20.8	25.6	20.1	22.7	17.4	26.4	30.1	33.3	26.4	26.7	22.5		
TILD	563995	176291	39.8	MISSING	31.5	MISSING	29.7	25.2	24.4	19.5	28.5	MISSING	MISSING	30.6	28.6	24.1		
TILE	563870	176305	MISSING	17.4	32.6	24.3	29.8	23.8	25.4	17.8	30.5	27.2	38.5	31.7	27.2	22.8		

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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TK9A	563489	176497	39.4	31.3	23.2	19.8	27.6	20.3	23.3	21.4	27.5	30.8	32.2	29.3	27.2	22.8		Duplicate Site with TK9 A and TK9 B - Annual data provided for TK9 B only
TK9B	563489	176497	39.5	31.7	33.3	22.0	26.8	21.0	24.1	21.2	28.8	26.6	31.5	26.9	27.8	23.3		Duplicate Site with TK9 A and TK9 B - Annual data provided for TK9 B only
PBP	556257	178438	36.0	MISSING	23.5	24.5	21.1	18.0	19.5	16.1	24.7	26.5	32.5	23.8	24.2	20.3		
PBPA	556221	178461	32.2	28.1	26.4	20.2	22.4	18.9	38.2	15.8	25.3	28.6	31.6	21.6	25.8	21.6		
LYD	560057	179873	28.9	24.1	24.2	19.1	18.3	17.8	16.9	15.4	22.2	24.4	27.7	22.9	21.8	18.3		
AVSL	556713	180167	40.4	35.5	27.0	26.7	29.6	32.1	22.0	25.1	35.3	34.4	42.4	32.8	31.9	26.8		
AVHS	556661	180180	33.4	34.0	24.9	25.4	24.9	25.9	29.4	21.3	30.6	30.7	29.6	25.2	27.9	23.5		
SOAA	558785	182323	29.9	28.4	27.5	16.0	19.0	MISSING	17.0	16.4	22.9	28.6	29.8	24.0	23.6	19.8		
TSR	564122	176152	34.5	26.8	26.9	19.6	27.3	20.8	18.0	14.6	24.3	23.9	31.3	22.7	24.2	20.3		
DR	560279	178944	29.3	24.3	26.6	18.0	17.5	15.3	14.5	13.5	17.9	21.7	26.2	21.9	20.6	17.3		
LRARN	555286	179501	31.3	29.8	28.5	20.0	22.0	21.5	22.3	21.2	26.0	28.4	32.6	31.1	26.2	22.0		
LRARS	555357	179362	25.4	21.4	29.5	17.3	17.9	17.2	MISSING	14.1	20.4	21.6	26.8	20.1	21.1	17.7		
LRARMN	555299	179453	35.8	30.2	36.1	26.9	24.8	25.2	23.6	19.8	29.8	29.5	32.4	27.5	28.5	23.9		
LRARMS	555329	179397	31.4	27.7	47.7	22.6	22.8	26.0	23.2	19.3	29.0	27.4	35.0	25.8	28.2	23.7		
JRP	556384	178001	24.3	25.9	26.5	20.2	14.5	14.6	15.5	12.0	20.8	19.9	19.8	19.2	19.4	16.3		
ACHL	561093	178974	37.5	32.6	20.6	22.8	23.7	21.7	20.2	19.1	27.4	26.5	34.7	29.3	26.3	22.1		
CC	560770	179866	27.8	23.6	41.4	21.1	15.0	18.7	15.7	15.6	18.9	19.6	MISSING	20.5	21.6	18.2		
ERFA	560962	179527	30.3	25.1	27.1	18.9	19.7	17.9	18.5	17.5	21.8	24.5	29.7	23.8	22.9	19.2		
ERFB	560963	179558	30.7	25.8	23.9	20.9	23.9	22.8	15.8	21.5	22.5	26.7	31.4	23.5	24.1	20.3		
ERTM	560965	179796	34.0	33.0	30.8	26.9	26.0	27.9	23.8	23.6	30.9	29.0	34.7	28.0	29.0	24.4		
NC	561077	179912	36.5	28.9	22.8	20.5	24.8	22.8	27.1	21.8	26.7	29.3	36.4	28.2	27.2	22.8		
HD	560003	179694	33.8	26.4	24.0	25.1	22.8	26.1	20.2	20.4	25.8	26.7	32.9	26.6	25.9	21.8		
GRPL	559551	179547	31.5	26.0	24.5	21.5	MISSING	42.7	17.5	18.7	19.4	26.4	32.9	27.1	26.2	22.0		
PIH	557299	178802	23.1	31.8	21.5	26.5	MISSING	45.4	38.3	45.3	45.0	24.1	78.8	MISSING	38.0	31.9		
WCF	556290	178749	39.6	35.0	30.6	29.8	26.3	27.3	20.5	22.4	26.4	30.8	37.5	28.2	29.5	24.8		
THA	557386	179065	MISSING	33.2	31.6	24.9	21.9	19.1	20.9	15.8	MISSING	25.0	23.4	20.0	23.6	19.8		
THB	557437	179099	28.7	33.5	31.6	24.6	22.6	22.3	20.8	17.1	27.4	25.6	24.0	22.5	25.0	21.0		
SCR LTC	562383	181157	30.6	24.0	16.6	16.6	19.6	17.6	17.9	16.3	14.1	25.2	28.6	23.8	20.9	17.6		
BSA LTC	563486	181070	26.8	22.9	27.5	15.4	16.4	15.3	19.8	12.3	19.6	21.7	24.4	20.6	20.2	17.0		
BSB LTC	563574	180770	30.8	25.9	23.3	23.5	22.7	20.6	21.2	17.1	24.9	23.8	29.6	23.1	23.9	20.1		
HR LTC	563785	180157	31.0	25.5	22.0	15.4	18.3	16.2	15.6	14.9	21.0	23.7	27.5	22.3	21.1	17.7		
SR LTC	567351	177555	21.0	MISSING	23.7	11.5	9.2	11.1	MISSING	8.3	23.3	13.3	18.8	MISSING	15.6	13.1		
TTS LTC	563828	179597	27.1	MISSING	23.8	15.9	14.5	13.9	17.3	11.9	18.7	20.1	24.0	21.8	19.0	16.0		
MRS	562413	177747	28.6	24.4	25.7	16.3	15.8	13.7	11.6	MISSING	18.9	20.0	25.8	21.4	20.2	17.0		
MTV	562615	177774	24.6	22.4	19.8	14.9	15.4	13.0	12.1	10.7	16.5	18.9	24.5	18.7	17.6	14.8		

All erroneous data has been removed from the NO₂ 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 NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 2021

Thurrock Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

There have been a number of developments over the 2021 reporting year that have required Air Quality Assessments. All have been found to have a “negligible” or “not significant” after mitigation where necessary.

Additional Air Quality Works Undertaken by Thurrock Borough Council During 2021

Thurrock Borough Council has not completed any additional works within the reporting years of 2021.

QA/QC of Diffusion Tube Monitoring

All diffusion tubes during the 2021 reporting year 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 43, 45 and 46. For AIR-PT Round 42 (January-February 2021), 25% of results were submitted which were subsequently determined to be satisfactory.

Diffusion Tube Annualisation

In 2021, data capture for the majority of diffusion tube sites was greater than 75%, with the exception of Site TILD.

The data for this site was therefore 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), and London Eltham (Suburban Background). Both 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 2021 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/NO₂ 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 0.84 to the 2021 monitoring data, in keeping with previous years. A summary of bias adjustment factors used by Thurrock Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	Jun-21	0.84
2020	National	Jun-21	0.81
2019	National	Jun-21	0.91
2018	National	Mar-19	0.93
2017	National	Mar-18	0.89

NO₂ 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 NO₂ concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

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/m³ 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.6.

Fall-off-with-distance calculations were required at 0 non-automatic monitoring sites in 2021. 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 TK1 & 3, the QA/QC is managed by Bureau Veritas (BV). For TK8 & 9, QA/QC is managed by the Environmental Research Group (ERG) at Imperial College London.

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](#).

PM₁₀ and PM_{2.5} Monitoring Adjustment

PM₁₀ monitoring conducted at the all sites was measured using Beta Attenuation Monitors (BAMs).

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.

NO₂ 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 NO₂ concentration at the nearest location relevant for exposure should be estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

Distance correction was not conducted at any sites for 2020 and 2021. The Thurrock 8 site reported an annual mean in exceedance of the NO₂ annual mean objective of 40µg/m³ in both 2020 and 2021, however the nearest exposure crosses a road source, therefore is outside of the parameters of the NO₂ fall-off with distance calculator.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$) - 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	1.023	1.023	33.8	34.6	

Table C.3 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$) - 2021

Site ID	Annualisation Factor Thurrock London Road (Grays) - Urban Background	Annualisation Factor Greenwich GR4 - Suburban Background	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments	Site ID	Annualisation Factor Thurrock London Road (Grays) - Urban Background
TILD	1.0417	1.0649	1.0533	28.6	30.2		TILD	1.0417

Table C.4 – 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 ($\mu\text{g}/\text{m}^3$)	26.7
Mean CV (Precision)	2.40%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	21.2
Data Capture	99%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	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.5 - Local Bias Adjustment Calculation - 2021

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2
Periods used to calculate bias	11	10
Bias Factor A	0.98 (0.91 - 1.05)	1.05 (0.93 - 1.21)
Bias Factor B	2% (-5% - 10%)	-5% (-17% - 8%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	22.05423916	27.33073038
Mean CV (Precision)	0.037081073	0.031050553
Automatic Mean ($\mu\text{g}/\text{m}^3$)	21.56840874	28.70621676
Data Capture	0.990665584	0.979613095
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	22 (20 - 23)	29 (25 - 33)

Notes:

The diffusion tube data was corrected using the National Bias Adjustment Factor of 0.84, in line with previous ASRs.

Table C.6 – NO₂ 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	-	<i>Nearest exposure crosses road source – not within the parameters of the tool.</i>
IBIS	52.0	>50	37.4	30.4	-	<i>Monitoring Site to Kerb is > 50m – not within the parameters of the tool.</i>
LT	1.0	>50	39.9	24.5	-	<i>Monitoring Site to Kerb is > 50m – not within the parameters of the tool.</i>
NAS2	4.5	24.5	37.6	22.2	30.1	<i>Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.</i>
ER	0.5	3.0	38.1	21.2	32.7	

Table C.7 - NO₂ Fall off With Distance Calculations (concentrations presented in µg/m³) for passive monitoring in 2021

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
N/A	N/A	N/A	N/A	N/A	N/A	

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

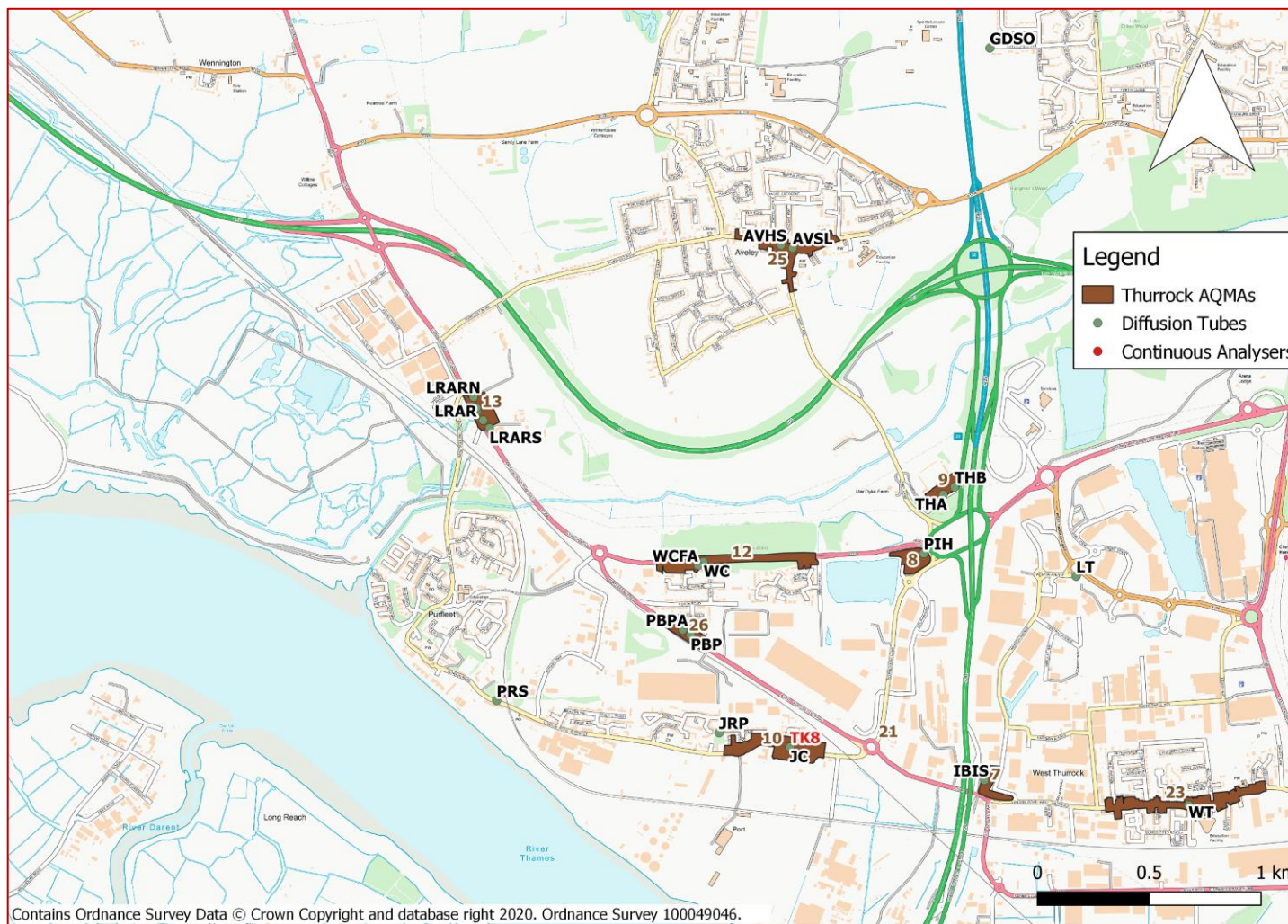


Figure D.2 - Map of Monitoring Sites in North Thurrock, AQMAs 15 and 16

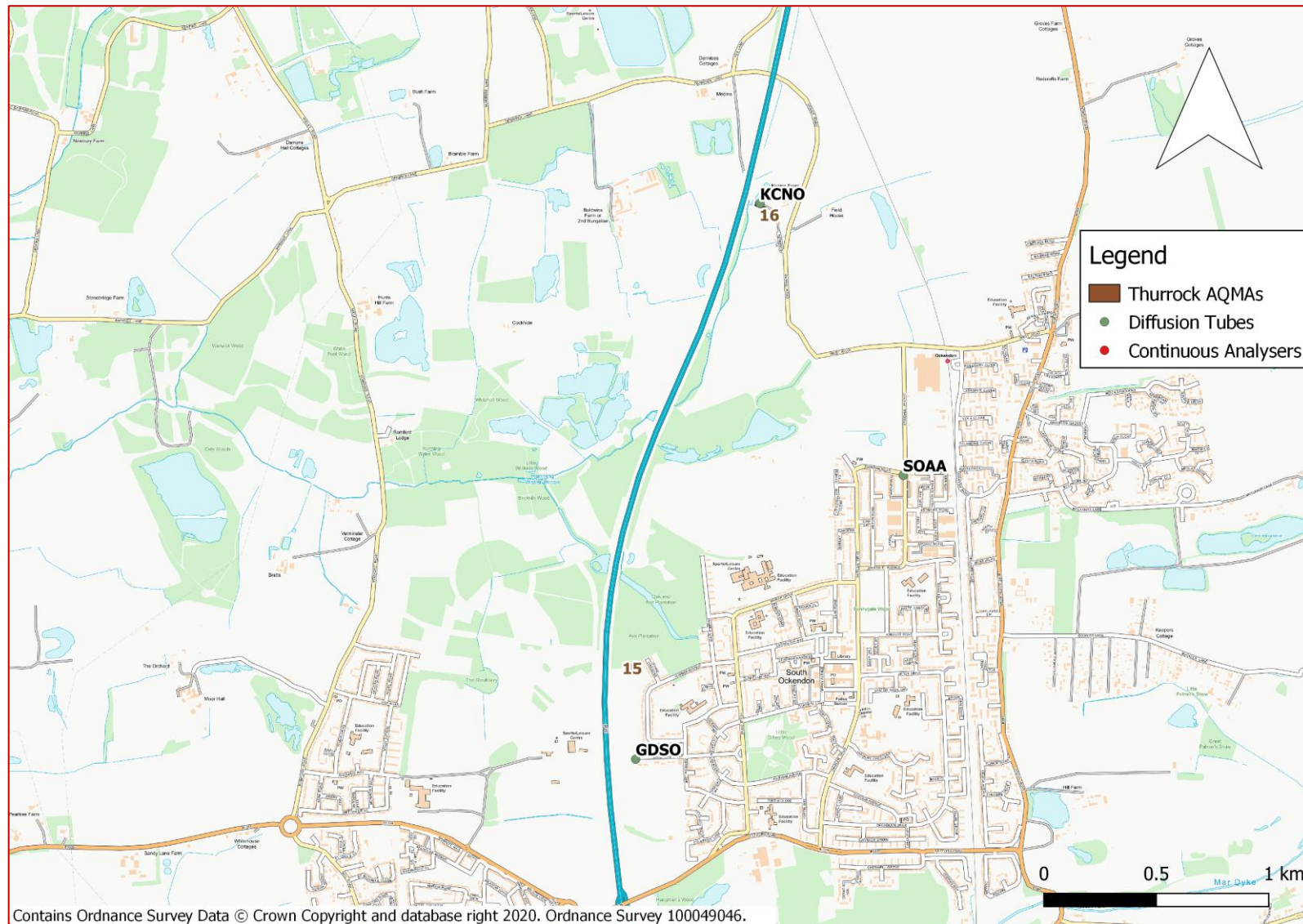


Figure D. 3 - Map of Monitoring Sites in Central Thurrock, AQMAs 1, 2, 3, 4, 5 and 23

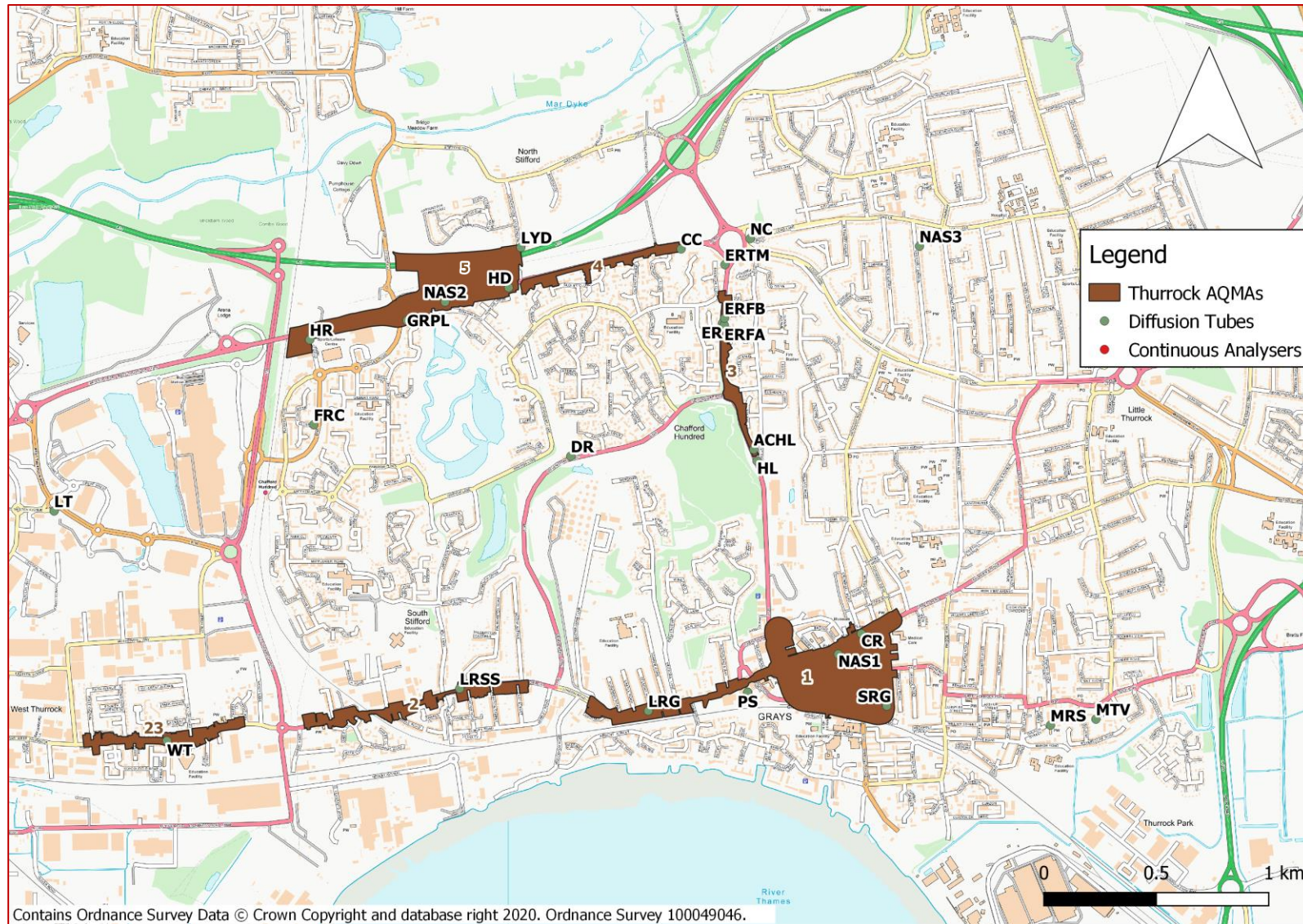


Figure D.1 – Map of Monitoring Sites in East Thurrock, AQMA 3 and 4, monitoring sites outside AQMAs

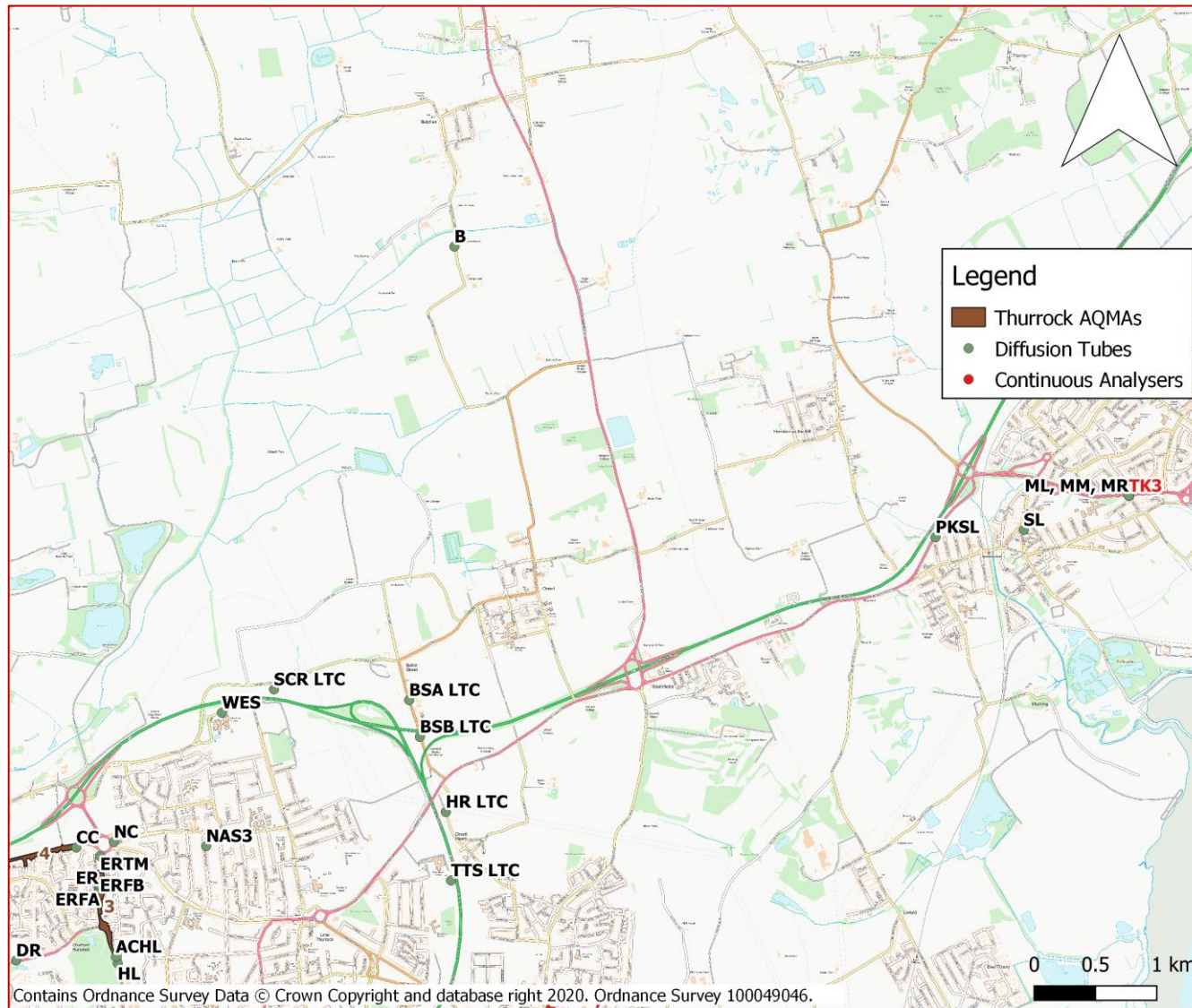
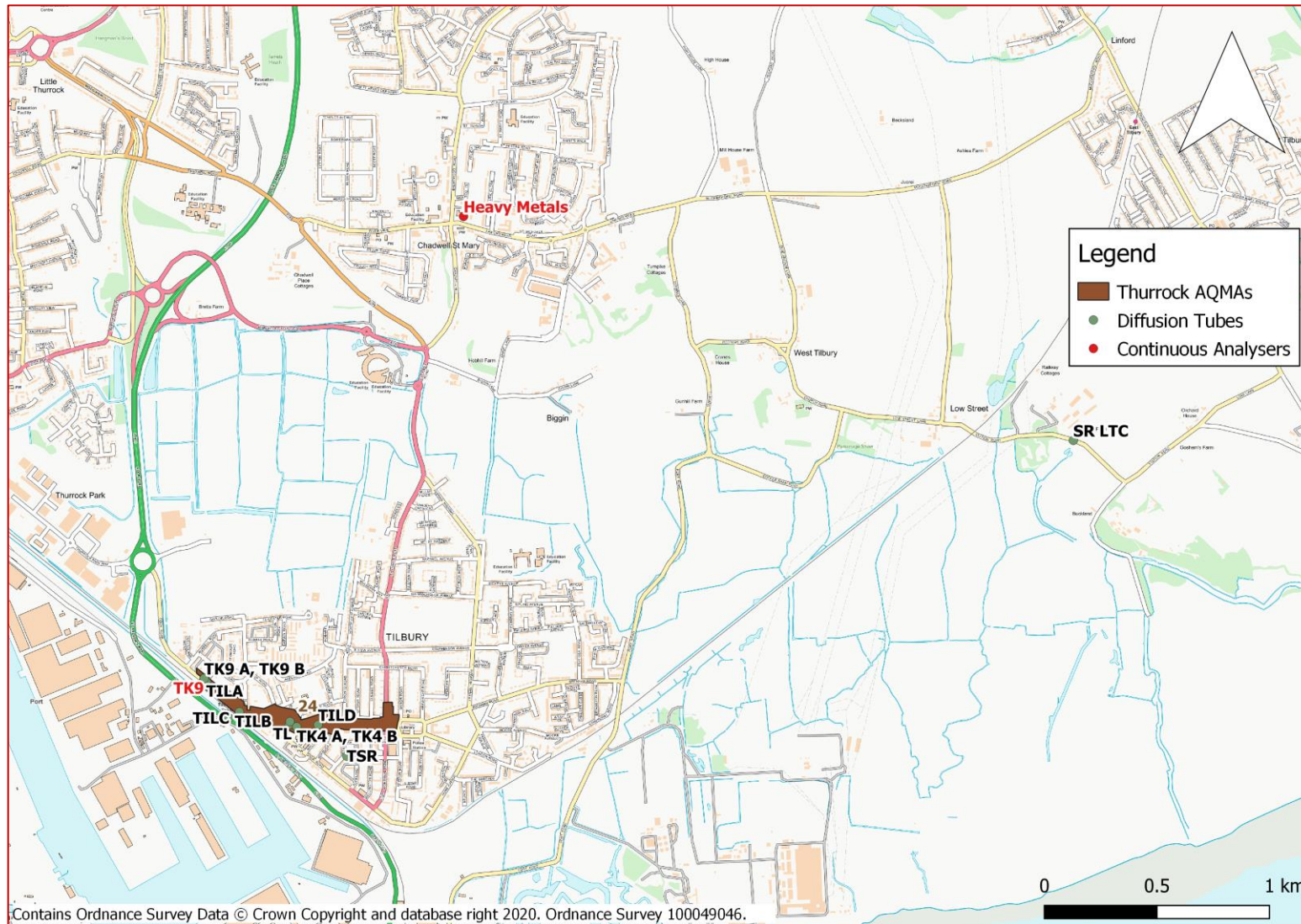


Figure D. 2 - Map of Monitoring Sites in Tilbury, AQMA 24



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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/m³).

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.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Thurrock Council – Air Quality and health strategy. December 2016.
- Public Health Outcomes Framework