2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Hasting Borough Council

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 29,000 to 343,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The key pollutants of concern in Hastings Borough are nitrogen dioxide (NO_2) and fine particulates ($PM_{2.5}$ and PM_{10}), with road traffic emissions being the principal local emission source.

Hastings has a network of air quality monitoring across the Borough, including one continuous monitoring station, which monitors NO_2 and PM_{10}, and 14 passive NO_2 diffusion tubes. Air quality in the Borough of Hastings is generally good and in 2022, there were no exceedances of the UK Air Quality Standards at any monitored location.

Furthermore, there is a long-term trend showing a decline in measured concentrations of NO_2. For example, in 2022, measured annual mean concentrations of NO_2 were lower than 2018 and 2019 at all sites, and all but two sites in 2021. Air quality is improving across much of the UK, where road traffic is the major source of emissions, due to the replacement of older, “dirtier” vehicles with those with “cleaner” engines, including electric vehicles. As such, these results are in line with national trends.

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

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

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[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

Measured concentrations of PM_{10} have also shown a steady decline over a 5-year period. However, in 2022, measured concentrations of PM_{10} were the highest since 2018 and further measurements will be required to ascertain whether 2022 was an anomalous year or whether the data reflects a new emission source. The elevated concentrations may relate to frequent roadworks and associated vehicle tailbacks that occurred throughout 2022 in the vicinity of the HT1.

The national trend for PM10 and PM2.5 is more complicated than the trend for NO_2, with decreases in PM_{10} and $PM_{2.5}$ emissions from vehicle exhausts and industry somewhat offset by increases in emissions from domestic sources (emissions of $PM_{2.5}$ from domestic wood burning increased by 124% between 2011 and 2021)[5]. Nevertheless, average exposure to $PM_{2.5}$ across the borough, calculated by the Office for Health Improvement and Disparities, was below the government's 2040 target of 10µg.m^{-3} and below the average for the rest of England and the Southeast.

It should be stressed, however, that there are no safe levels of some pollutants and Hastings Borough Council continues to work on reducing pollution levels to improve the health and wellbeing of its residents and visitors.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[6] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, which was published in April 2023, provides more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[7] details the approach to reduce

[5] Defra. Emissions of air pollutants in the UK – Particulate matter (PM10 and PM2.5), February 2023: https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25

[6] Defra. Environmental Improvement Plan 2023, January 2023

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

exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Core actions in 2022 to improve air quality in the borough include the continued maintenance of the air quality monitoring programme. Hastings Borough Council also continued to support the Sussex Air Quality Partnership, which aims to improve air quality across Sussex. Through the Sussex Air Quality Partnership, Hastings Borough Council has supported improving air quality and reducing exposure by:

- Supporting the co-ordination and delivery of strategic work and projects to improve air quality in Sussex, with Sussex Air. In 2022, Hastings Borough Council supported a successful bid to Defra to upgrade Hasting Borough Council's HT1 reference monitor to include $PM_{2.5}$ monitoring. This upgrade was completed in April 2022 and is awaiting commissioning.
- Supporting the co-ordination and delivery of a high standard of air quality evidence base in Sussex.
- Providing information and advice to the public.

Conclusions and Priorities

This ASR confirms that levels of PM_{10} and NO_2 continue to comply with the UK Air Quality Objectives. At monitoring sites in 2022, there were decreases in concentrations at all sites but one when compared to 2021 monitoring data, which follows the long term national and local trends.

Hastings Borough Council's priorities for the coming year are:

- Continue to maintain the air quality monitoring programme.
- Continue to support the Sussex Air Quality Partnership
- Support the delivery of the Sussex Taxi survey, designed to identify the barriers to electric vehicle take up.
- Complete the upgrade to HT1 by commissioning the new PM2.5 monitor at the site.
- Continue working towards the goals set out in the Air Quality Strategy.
- Update the council's website to account for info on wood burning and anti-idling, and for the measures set out in the Air Quality Strategy.

Hastings Borough Council, working with our partners at Sussex Air, did not identify any new major emission sources in 2022, which have the potential to *significantly* impact air quality in the borough. Several major planning applications were granted permission in 2022, which will have a minor influence on air quality.

Local Engagement and How to get Involved

Sussex Air is an overarching body which coordinates the response to air quality in Sussex, including providing bids to Defra. In collaboration with the Sussex Air Quality Partnership, Sustrans are working with community groups in Hastings to promote air quality and active travel. Sustrans continue to arrange Air Quality Workshops and air quality rides across Sussex. They continue to liaise with the Southeast Community Rail Partnership in Hastings and are working with *Active Hastings Youth Link Worker* to plan activities around Air Quality during Sustrans led rides.

Road vehicles are a major source of many pollutants in urban areas, including Hastings. In 2021, they produced over 27% of the emissions of Nitrogen Oxides (NOx) in the UK[8]. As such, before using your car, ask yourself:

- Do I really need to make this journey?
- Could I walk or cycle instead of taking the car?
- Could I take a bus, or train or carpool?
- Are the levels of air pollution already too high today?

If you must drive:

- Drive smoothly. You'll save fuel (and money), and your engine will also pollute less.
- Don't rev your engine unnecessarily.
- Maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and
- Turn off the engine when your car is stationary.

At home:

- Buy water-based or low-solvent paints, varnishes, glues and wood preservatives;

[8] https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-nitrogen-oxides-nox

- Avoid burning solid fuels, if possible;
- Avoid lighting bonfires, but if you must, don't light them when pollution levels are high or while the weather is still and cold;
- Only burn dry material and never burn household waste, especially plastic, rubber, foam or paint;
- Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects;
- However, exposure can be considerably reduced by remaining indoors and keeping windows closed;
- Be aware of internal sources of pollution (e.g. candles, cleaning products and gas stoves) and make sure that your home is sufficiently ventilated when using these products,

Further information on the health effects of air pollution can be found on the Government's website.

Further information on how you can improve air quality is provided by Sussex Air.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health and Licensing Service, Hastings Borough Council with the support and agreement of the following officers and consultants:

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Harley Parfitt – Greenavon Air Quality Consultants

This ASR has been approved by:

Ian Wheeler, Environmental Health and Licensing Manager, Hastings Borough Council

This ASR has been sent to the Director of Public Health, East Sussex County Council for their information.

If you have any comments on this ASR please send them to Scott Thirkettle at:

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1 Local Air Quality Management

This report provides an overview of air quality in Hastings Borough during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Hastings 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 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

Hastings Borough Council currently does not have any declared AQMAs. The Bulverhythe AQMA, which was declared in 2003 due to exceedances of the 24-hour mean Air Quality Objective for PM_{10} (35 exceedances of 50 $\mu g.m^{-3}$ per annum), was revoked in April 2017. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at: Defra UK-Air webpage AQMA list.

Hastings Borough Council has an Air Quality Strategy is in place to improve air quality and ensure continuing compliance with the national air quality objectives. Hastings Borough Council's Air Quality Strategy can be found online, on the Air Quality Management page.

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

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed, and provided the required information. The following comments were provided to help inform future reports:

1. *"Reference to the Public Health Outcomes Framework has been made and this practice should continue going forward.*
2. *Trends have been presented with a robust comparison to the Air Quality Objectives.*
3. *QA/QC procedures are robust, with sufficient supporting evidence provided."*

This report has ensured that the best practice identified last year was repeated this year and has aimed to improve the reporting of results through additional analysis of HT1 data.

Hastings Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. Seven measures are included within Table 2.1, with the type of measure and the progress Hastings Borough Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1. More detail on these measures can be found in Hastings Borough Council's Air Quality Strategy.

In 2022, we have continued to maintain the air quality monitoring programme and support the Sussex Air Quality Partnership and their associated projects, including a bid to Defra which included the upgrade of automatic monitor HT1.

Hastings Borough Council's priorities for the coming year are to

- Continue to maintain the air quality monitoring programme.
- Continue to support the Sussex Air Quality Partnership and associated projects.
- Support the delivery of the Sussex Taxi survey, designed to identify the barriers to electric vehicle take up.
- Complete the upgrade to HT1 by commissioning the new PM2.5 monitor at the site.
- Continue working towards the goals set out in the Air Quality Strategy.
- Update to the website to include further information on wood burning, anti-idling and the commitments set out in the Air Quality Strategy.

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

- Commission the HT1, by Autumn 2023. This will allow monitoring of PM2.5, an important pollutant from a public health perspective.
- Update to the website to include further information on wood burning, anti-idling and the commitments set out in the Air Quality Strategy.
- The Sussex Taxi Survey and associated reporting.

Hastings Borough Council worked to implement these measures in partnership with the following stakeholders during 2022:

- East Sussex County Council
- Sussex Air Quality Partnership
- Sustrans

East Sussex County Council are also heavily involved in projects that could help to improve air quality in Hastings. For example, they were involved in a Strategic Outline Business Case for proposed upgrades to the Kent and East Sussex rail network. The following two proposed improvements relate to rail in Hastings:

- partial line speed improvements between Rye and Ore and between Bexhill and Hampden Park; use of bi-mode diesel or battery trains; and
- full scale line speed improvements; Marshlink third rail electrification; electric trains; diversion of A259 at Star/Guldeford level crossings.

As these projects are not on a national priority list of rail projects, local MPs and local authorities in East Sussex and Kent are working collaboratively to explore opportunities to lever private sector finance/investment to fund the delivery of the rail schemes identified in the study.

Regarding the implementation of measures which the Sussex Air Quality Partnership and Hastings Borough Council have direct control over, Hastings Borough Council anticipates facing no significant challenges or barriers to implementation in 2023.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	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	Inform and promote Clean Burn Sussex	Environmental Permit	Other	2018	-	Sussex-Air	Defra	Yes	Funded	-	Ongoing	-	-	Promoting use of smokeless fuels and reduction of solid fuels.	Timescale
2	Sussex Air Quality Alert	Health Protection	Other	2010	-	Sussex Air	Sussex-air	No	Funded	-	Ongoing	-	-	Promoting public involvement in alert system.	Funding
3	The implementation of Active Travel Initiatives to manage demand to travel by car	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2015	-	ESCC.	DFT	No	Funded	-	Ongoing	-	-	Support of this project which included walking enhancements and a school streets trial.	First phase successful, second phase on-going
4	Promote use of electric vehicles and charging network	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV, recharging, Gas fuel recharging	2015	-	Sussex-air	-	No	Funded	-	Ongoing	-	-	Encouraging electric vehicles including Taxi's. Support of project to improve charging infrastructure and promotion of electric vehicles	
5	Households and building trade to avoid fires and dispose of waste in the revoked AQMA	Environmental Permit	Other	2005	-	HBC Env-protection	HBC	No	Funded	-	Ongoing	-	-	Discourage burning of waste through bonfires.	
6	Sussex Taxi survey	Promoting Low Emission Transport	Taxi emission incentives	2023	2023	Sussex-Air	Sussex-air	Yes	Funded	< £10k	Ongoing	-	-	Beginning in 2023	
7	Hastings Borough Council EV fleet Upgrade,	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2022	-	HBC	HBC	No	Funded	-	Ongoing	-	-	7 out of 26 HBC vehicles are electric vehicles.	
8	Commission HT1 Pm2.5 monitoring	Air Quality Monitoring	Other	2023	2023	HBC	Defra	Yes	Funded	-	Ongoing	-	-	Pm2.5 installed	

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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.

Hastings Borough Council does not yet monitor PM2.5. However, a new PM2.5 monitor has been installed at HT1 - Hastings-Bulverhythe air quality monitoring station (AQMS) and will start monitoring in Autumn 2023. PM_{10} concentrations are measured at 1 location in the borough (HT1 - Hastings-Bulverhythe AQMS). An estimate of annual mean $PM_{2.5}$ concentrations at HT1 can be derived using the measured annual mean concentration for PM_{10} at this site. Using the correction factor outlined in LAQM TG.22, annual mean $PM_{2.5}$ concentrations were estimated to be 17.8µg.m^{-3}, in 2022.

A regional estimate of exposure to $PM_{2.5}$ can be derived from work carried out by Public Health England. Public Health England estimates that average $PM_{2.5}$ concentrations across the borough were 7.8 µg.m^{-3} in 2020, with 4.9% of mortality associated with particulate air pollution in 2021. This information is available from Public Health England's Public Health Data webpage.

The mortality calculated for Hastings Borough Council is slightly lower than that calculated for South East England (5.4%) and England (5.5%) as a whole.

Hastings Borough Council continues to work with Sussex Air and the East Sussex County Council Public Health team to address $PM_{2.5}$. Several of the existing measures in Table 2.2 directly address $PM_{2.5}$ concentrations, including investigating smoke complaints and the promotion of clean burning. In addition, Hastings Borough Council continues to investigate smoke nuisance in line with the requirements of the Environmental Protection Act (1990) and will plan to update their website to include information on the adverse effects of wood burning in 2023.

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

This section sets out the monitoring undertaken within 2022 by Hastings Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Hastings Borough Council undertook automatic (continuous) monitoring at one site during 2022. The automatic monitoring site is situated at Bulverhythe known as Hastings 1 (HT1) and forms part of the Sussex Air Quality Network. Table A.1 in Appendix A shows the details of the automatic monitoring site, with Appendix F showing various analytical plots.

The Sussex Air 'Air quality monitoring page' presents automatic monitoring results for Hastings Borough Council, with automatic monitoring results also available through 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

Hastings Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 14 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites. Maps showing the location of the monitoring sites are provided in Appendix D.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment). The 5-year trend in monitoring data is indicative of a decline in NO_2 concentrations in Hastings.

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

No exceedances of the annual or 1-hour mean air quality objectives were measured in Hastings Borough, in 2022.

Appendix F shows that measured concentrations of NO_2 at HT1 are likely influenced by road traffic emissions, with peaks in pollution occurring during rush hour, and when the wind is from the east, blowing parallel to the A259.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. A decreasing trend in values can be observed from 2018. Measured concentration in 2022 were, however, the highest since 2018. It is unknown at this point whether this is an anomaly, reflective of a new emission source or concentrations of frequent roadworks and associated vehicle tailbacks along the A259 by the HT1.

Regardless, the annual mean PM_{10} concentration (µg.m-3) was well below the objective value during 2022.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year. No exceedances were recorded during 2022. Concentrations above 50 µg.m^{-3} were recorded only 4 times throughout the year.

Appendix F shows that measured concentrations of PM_{10} at HT1 are highly influenced by emissions from the business park/ industrial estate and rail depot to the southeast and another rail depot to the southwest.

3.2.3 Particulate Matter ($PM_{2.5}$)

Hastings Borough Council does not monitor $PM_{2.5}$. However, $PM_{2.5}$ has been estimated using monitored PM_{10} from the continuous monitoring station (HT1) and the national derived correction factor set out in Technical Guidance LAQM.TG.22. The calculation is set out below:

23.5µg.m^{-3} (annual mean PM_{10})- 5.7 µg.m^{-3} (correction factor) = 17.8 µg.m^{-3}

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)
HT1	Hastings-Bulverhythe	Roadside	577633	108726	NO_2/PM_{10}	No	Chemiluminescent/ TEOM	5	3	1.7

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)
1	St Luke's Church, Alma Terrace	Roadside	580037	110902	NO_2	No	1.0	1.0	No	2.0
2	Carlise Parade	Roadside	581496	109288	NO_2	No	5.0	1.0	No	2.5
3	Manor Road	Roadside	582223	110361	NO_2	No	0.0	10.0	No	2.5
4	Ore Church	Roadside	583610	111325	NO_2	No	0.0	2.0	No	2.5
5	Harley Shute Road	Roadside	578382	109601	NO_2	No	10.0	1.0	No	2.0
6	The Boat, Bexhill Road	Roadside	576770	108101	NO_2	No	15.0	1.5	No	2.5
7	81 Bexhill Road	Roadside	578500	108771	NO_2	No	0.2	1.5	No	2.5
8	47 Bexhill Road	Roadside	578637	108798	NO_2	No	1.5	2.8	No	2.0
9	71 Bexhill Road	Roadside	578532	108776	NO_2	No	0.5	0.5	No	2.5
10	138 Bexhill Road	Roadside	578290	108819	NO_2	No	1.5	2.0	No	2.0
11	Railway Bridge	Roadside	578447	108794	NO_2	No	10.0	3.0	No	2.5
12	Grosvenor Gardens	Roadside	578946	108746	NO_2	No	10.0	0.5	No	2.5
13	104 Bohemia Road	Roadside	580252	110058	NO_2	No	0.5	1.5	No	2.0
14	116 Bohemia Road	Roadside	580246	110064	NO_2	No	0.5	1.5	No	2.0

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
HT1	Roadside	577633	108726	99.3	99.3	16.4	14.9	10.7	11.0	12.8

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

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

Notes:

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

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

All means have been "annualised" as per LAQM.TG22 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%).

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
1	580037	110902	Roadside	92.3	92.3	21.9	21.0	14.4	18.1	16.6
2	581496	109288	Roadside	84.6	84.6	24.6	23.7	15.8	19.3	19.1
3	582223	110361	Roadside	84.6	84.6	15.3	14.4	10.0	12.5	10.9
4	583610	111325	Roadside	92.3	92.3	25.9	24.9	17.4	20.7	20.0
5	578382	109601	Roadside	92.3	92.3	27.3	24.9	20.6	23.6	24.1
6	576770	108101	Roadside	92.3	92.3	37.4	28.0	15.4	19.4	18.8
7	578500	108771	Roadside	92.3	92.3	36.0	33.7	26.5	27.4	27.3
8	578637	108798	Roadside	92.3	92.3	30.2	28.8	19.4	22.9	21.9
9	578532	108776	Roadside	92.3	92.3	36.6	33.9	23.3	26.1	26.5
10	578290	108819	Roadside	76.9	76.9	25.7	24.1	15.8	18.8	18.5
11	578447	108794	Roadside	92.3	92.3	27.7	24.0	17.4	20.4	19.1
12	578946	108746	Roadside	92.3	92.3	23.2	21.6	14.9	17.3	16.4
13	580252	110058	Roadside	92.3	92.3	35.6	33.0	21.2	25.3	24.2
14	580246	110064	Roadside	92.3	92.3	30.6	30.2	20.5	24.1	23.8

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

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

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

Notes:

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

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 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%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations (Diffusion Tubes)

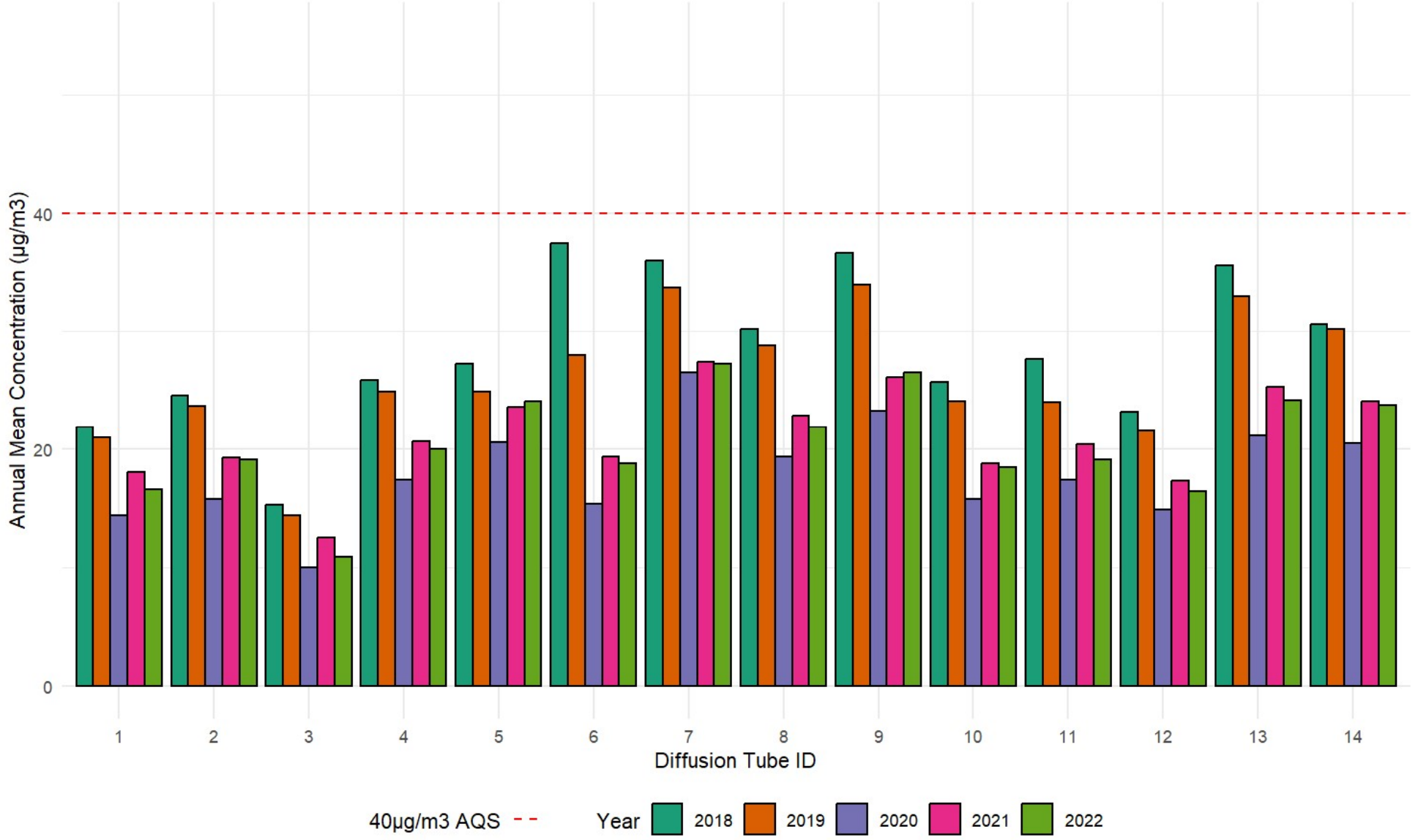


Figure A.2 – Trends in Annual Mean NO_2 Concentrations (HT1)

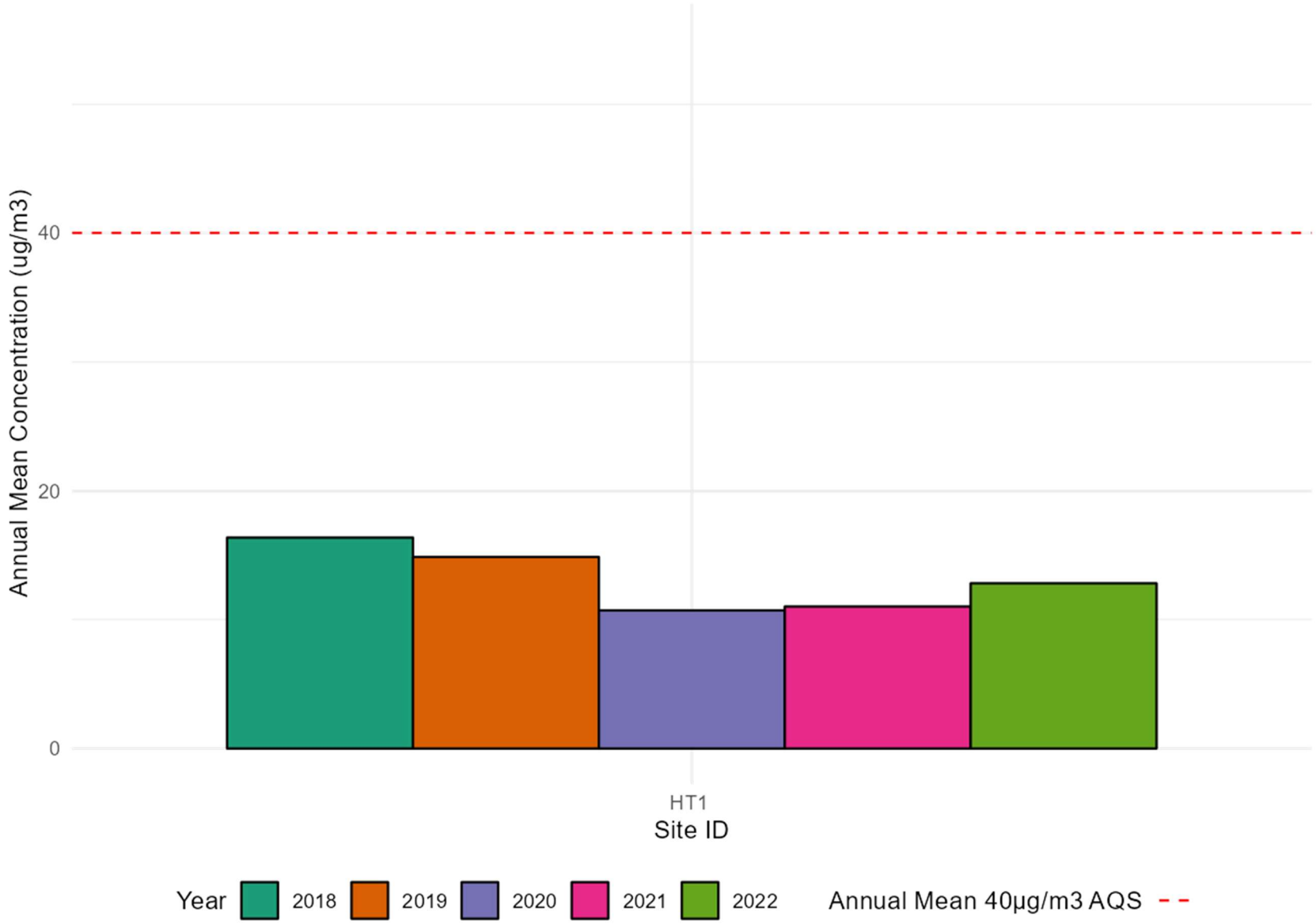


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
HT1	Roadside	577633	108726	99.3	99.3	0	0	0	0	0

Notes:

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

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
HT1	577633	108726	Roadside	97.4	97.4	22.9	21.8	21.3	19.5	23.5

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

Notes:

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

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

All means have been "annualised" as per LAQM.TG22 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.3 – Trends in Annual Mean PM_{10} Concentrations

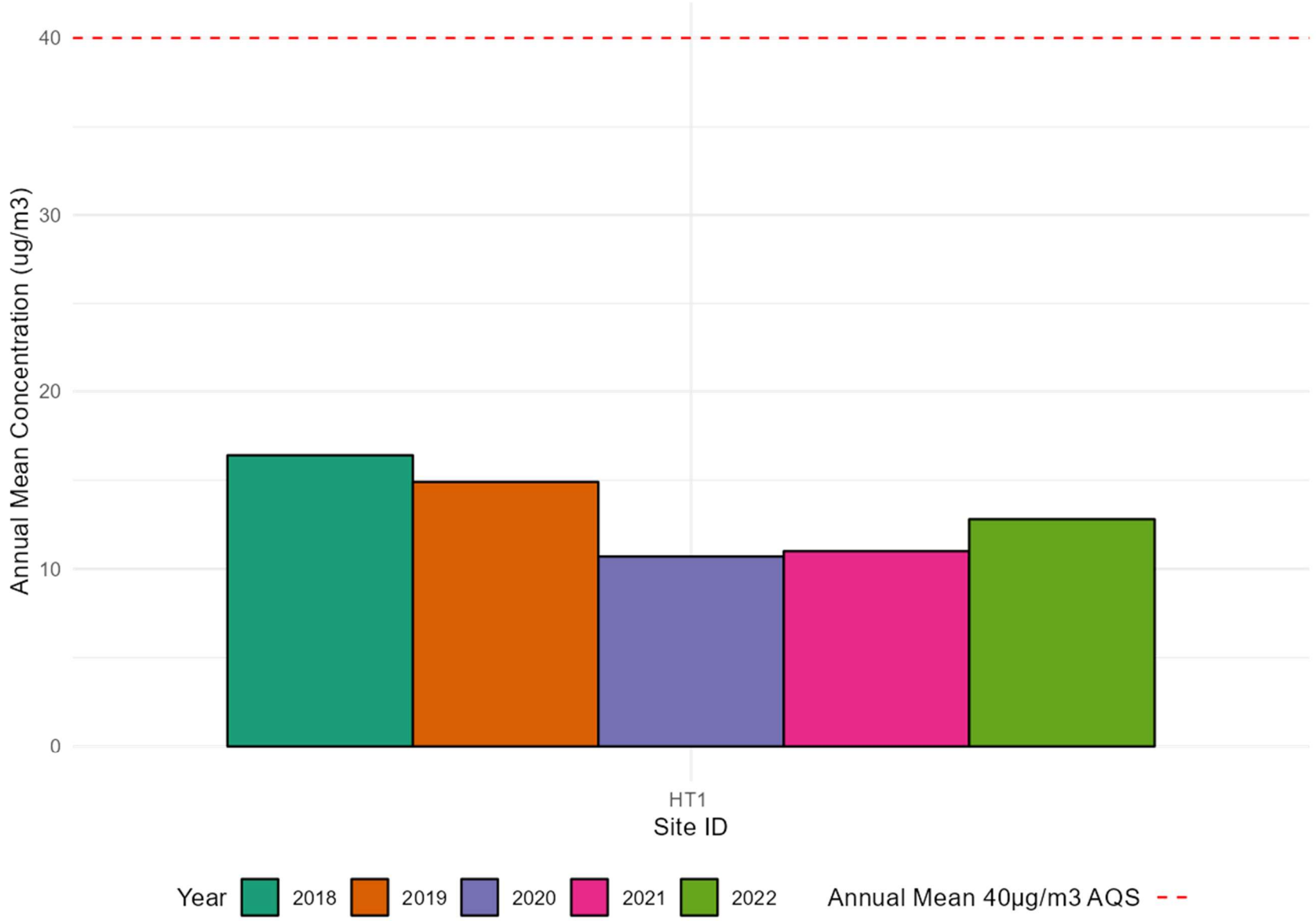


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
HT1	577633	108726	Roadside	100	100	4	4	1	3	5

Notes:

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

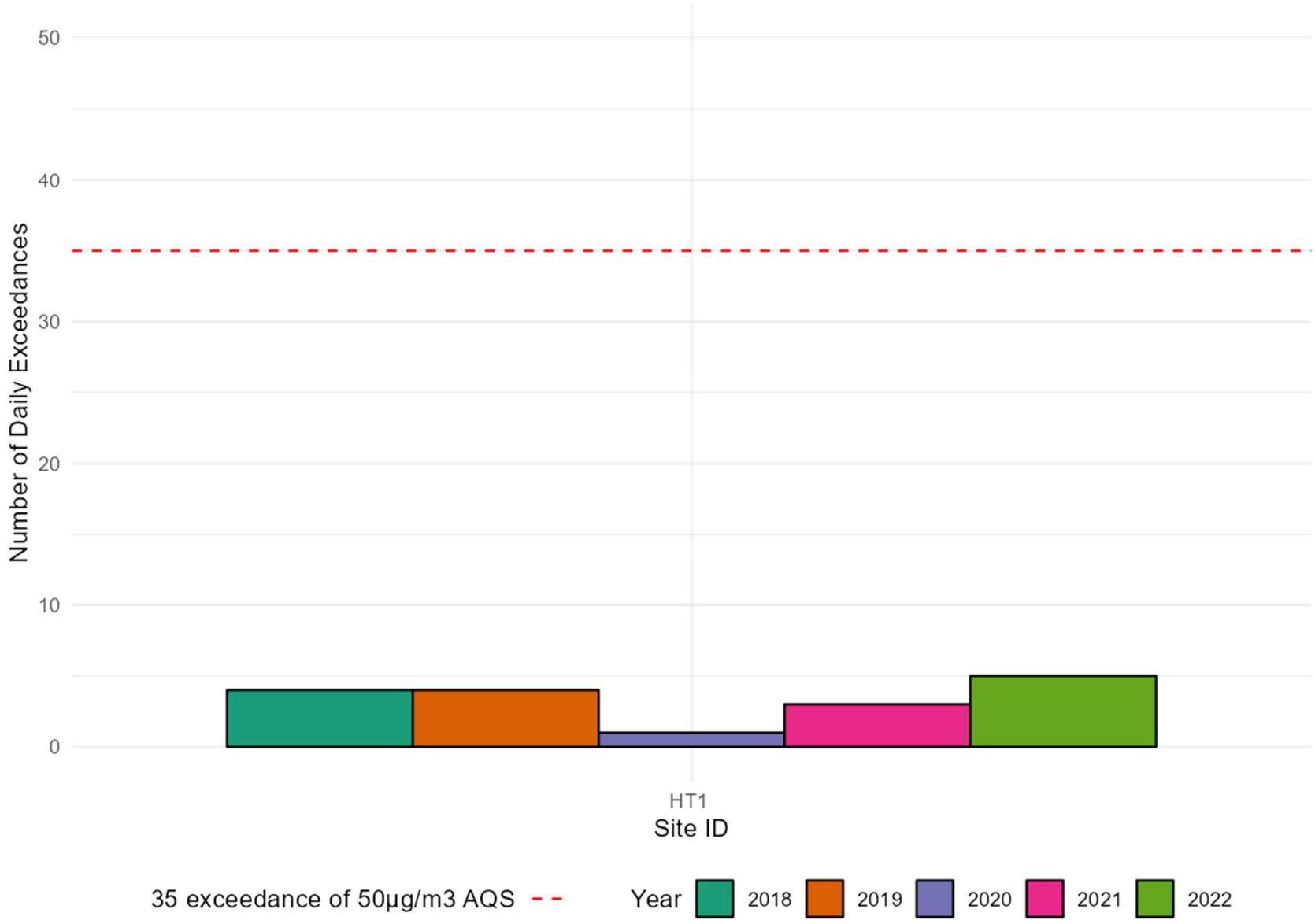
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	580037	110902	N/A	25.9	21.4	17.5	16.8	17.5	17.4	16.6	19.4	20.9	21.5	26.0	20.1	16.6	-	
2	581496	109288	N/A	Missing	30.3	23.4	22.0	20.9	24.5	24.0	24.0	19.2	17.7	23.8	23.0	19.1	-	
3	582223	110361	N/A	Missing	16.5	12.6	12.5	8.7	12.5	11.6	13.6	13.3	12.8	17.5	13.2	10.9	-	
4	583610	111325	N/A	27.6	27.7	23.7	22.6	23.4	21.8	24.0	22.5	23.4	22.3	25.4	24.0	20.0	-	
5	578382	109601	N/A	25.5	32.6	28.5	29.1	31.8	32.0	31.7	26.4	26.1	25.7	29.8	29.0	24.1	-	
6	576770	108101	N/A	27.7	22.5	20.4	20.9	22.1	22.6	21.3	22.4	21.9	21.4	25.4	22.6	18.8	-	
7	578500	108771	N/A	36.0	39.6	30.2	29.5	31.8	37.7	33.7	35.0	25.5	29.7	33.7	32.9	27.3	-	
8	578637	108798	N/A	28.7	31.5	24.3	25.4	13.6	29.7	27.3	26.5	28.6	25.7	28.8	26.4	21.9	-	
9	578532	108776	N/A	34.3	35.8	30.6	31.0	31.4	34.0	30.5	32.2	27.8	30.1	33.3	31.9	26.5	-	
10	578290	108819	N/A	Missing	26.7	20.0	21.4	21.1	24.0	20.8	22.6	19.5	Missing	24.0	22.2	18.5	-	
11	578447	108794	N/A	27.6	29.7	23.3	19.7	18.6	20.8	19.7	22.0	19.7	25.5	26.6	23.0	19.1	-	
12	578946	108746	N/A	18.3	27.5	19.7	17.4	18.1	20.4	15.8	19.1	17.4	19.4	24.6	19.8	16.4	-	
13	580252	110058	N/A	34.8	36.9	23.4	27.3	24.9	28.7	28.7	33.7	27.1	25.6	29.7	29.2	24.2	-	
14	580246	110064	N/A	34.3	36.6	23.3	25.6	23.2	25.7	28.5	34.1	25.8	29.5	29.5	28.7	23.8	-	

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

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

☒ **Hastings Borough Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

February results are representative of exposure in January *and* February. Tubes for January were only collected at beginning of March.

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

New or Changed Sources Identified Within Hastings Borough Council During 2022

Hastings Borough Council has not identified any major new emission sources in 2022.

Two major developments of over 100 dwellings were, however, granted planning permission in 2022. The links to these planning applications are as follows:

1. HS/DS/21/01044: Approval of Reserved Matters relating to appearance, landscaping, layout and scale pursuant to Outline Planning Permission HS/OA/17/00901 (Outline application, (seeking approval of Access) for the erection of 140 residential units.
2. HS/FA/21/00003 | Erection of a total of 151 no. dwellings (C3) and a 188 sq.m community centre (Use Class F2(b)).

HS/FA/21/00003 included an air quality assessment which concluded that the proposal would result in negligible changes in air quality. HS/DS/21/01044 and the associated outline application (HS/OA/17/00901): included no such assessment. Whilst the risk of significant changes in air pollution is considered low, Hastings Borough Council will consider relocating a diffusion tube in the vicinity of Harrow Lane to manage any residual risk once the final stage of the Queensway Gateway is complete. Queensway Gateway is a new road which will connect Queensway with Sedlescombe Road North (the A21) in northern Hastings/St Leonards is complete.

Additional Air Quality Works Undertaken by Hastings Borough Council During 2022

Hastings Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Hastings Borough Council's diffusion tubes are prepared and analysed by Gradko International Ltd. using the 20% TEA in water method. This laboratory takes part in the QA/QC Field Intercomparison, operated on behalf of Defra. Gradko International Ltd are a UKAS accredited laboratory.

Monitoring was completed in adherence with the 2022 Diffusion Tube Monitoring Calendar, with the exception of January where the tubes were over-exposed for one additional month. As such, one measurement represents January and February.

Having taken advice from the tube provider Gradko, who stated that over-exposure would likely lead to underpredictions of monitored concentrations, it was decided to keep the data. This decision was taken as measured concentrations in January/ February were higher than the 2022 average, and therefore, omitting this data would have likely led to an even greater underprediction of measured concentrations in Hastings Borough, with potential ramifications for Public Health.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Hastings Borough Council recorded data capture of 75% therefore it was not required to annualise any monitoring data.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Hastings Borough Council have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data. A summary of bias adjustment factors used by Hastings Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/22	0.83
2021	National	03/22	0.84
2020	National	02/21	0.81
2019	National	03/20	0.93
2018	National	06/19	0.93

NO_2 Fall-off with Distance from the Road

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

No diffusion tube NO_2 monitoring locations within Hastings Borough Council required distance correction during 2022.

QA/QC of Automatic Monitoring

The automatic monitoring site at Bulverhythe (HT1) is part of the Sussex Air Quality Network; hence the standards of QA/QC are similar to those of the government's Automatic Urban and Rural Network (AURN) sites.

The Local Site Operations (LSO) duties are carried out by trained officers from the Council. Servicing of the instrumentation, gases and associated on-site equipment and station is undertaken by Enviro Technology Services Ltd. Bureau Veritas UK carry out ratification-type process and the data presented in this report has been verified.

Air Quality data is live and uploaded to the Sussex-Air website (www.sussex-air.net).

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

The TEOM PM_{10} monitor utilised by Hastings Borough Council requires correction by a Volatile Correction Model (VCM). Results are presented on the Sussex Air website only as the reference gravimetric equivalent.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within Hastings Borough Council required distance correction during 2022.

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Map of Monitoring Sites (Bluverhythe)

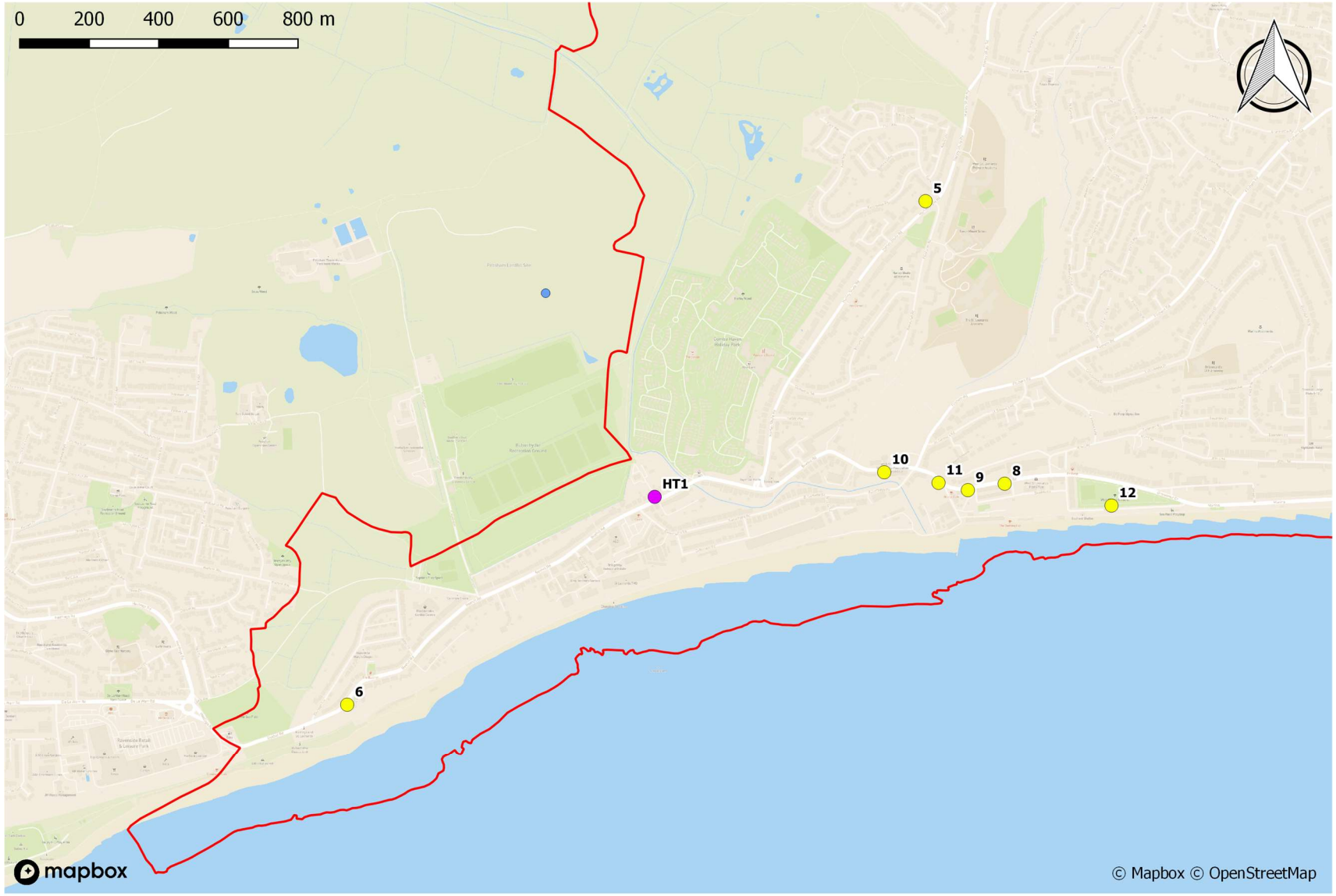
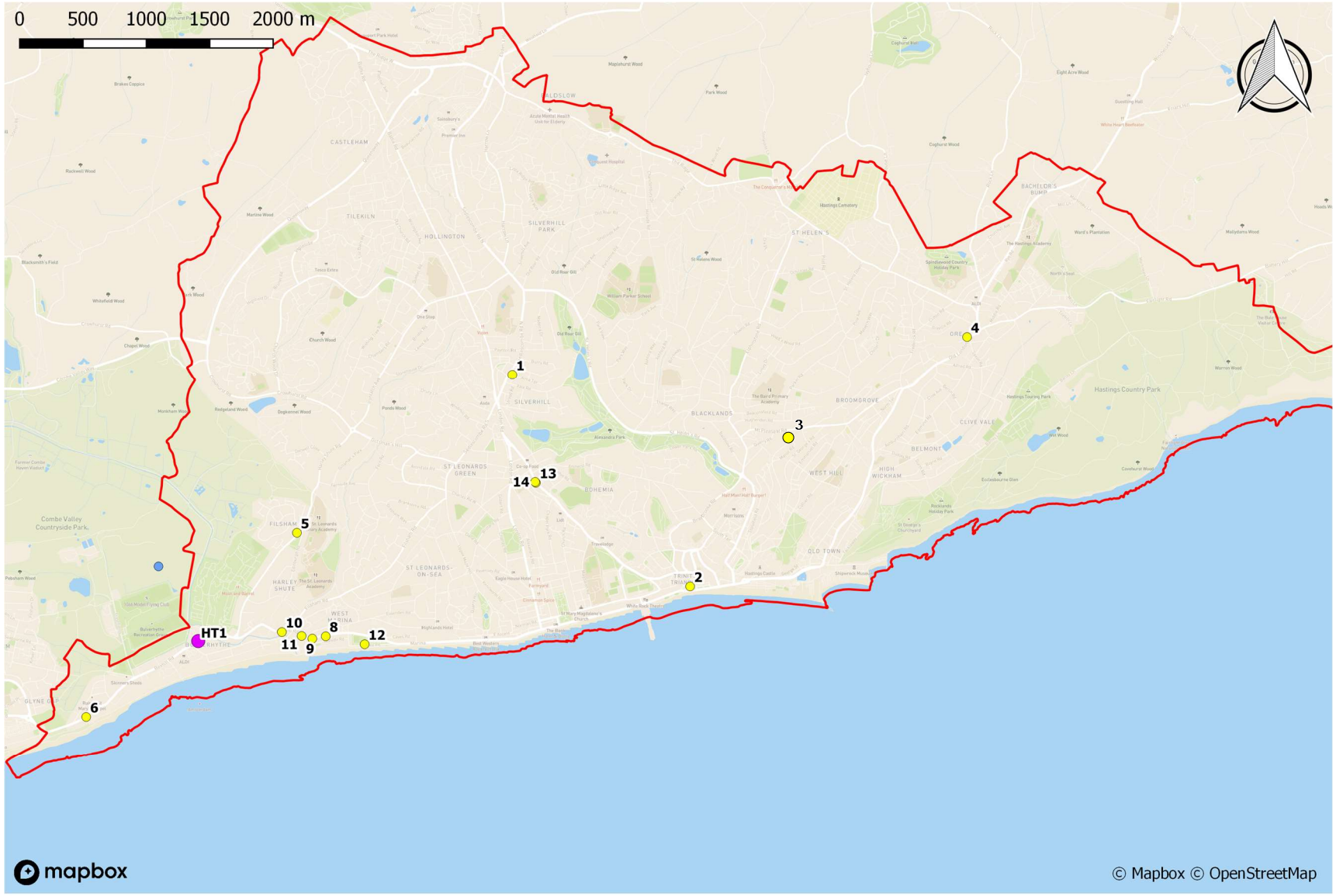


Figure D.2 – Map of Monitoring Sites (Hastings Borough)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[9]

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

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

Appendix F: Openair Plots for HT1

Figure F. 1: Polar Plots for PM_{10} (left) and NO_2 (right)

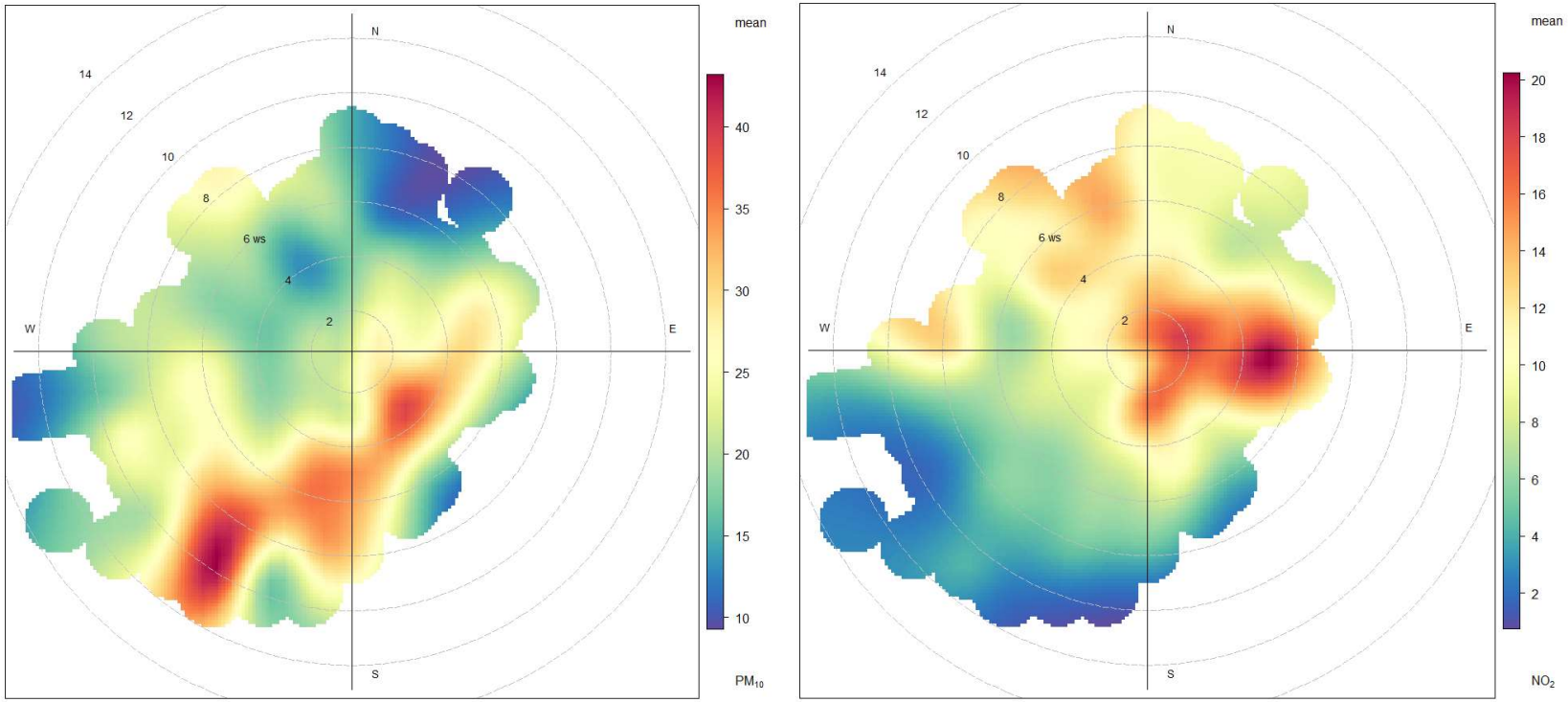


Figure F. 2: Time Variation Plots for NO_2 and PM_{10} at HT1

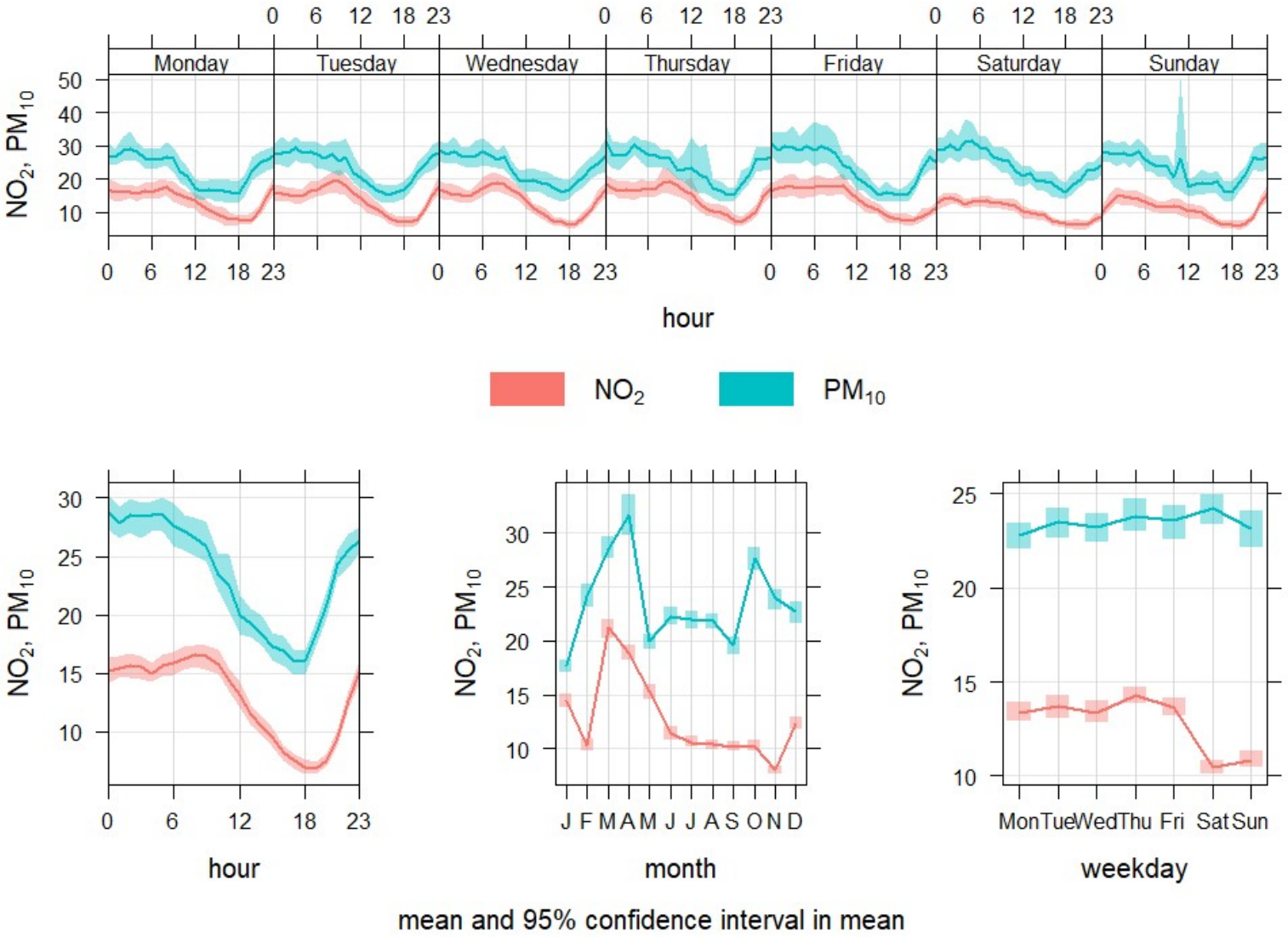
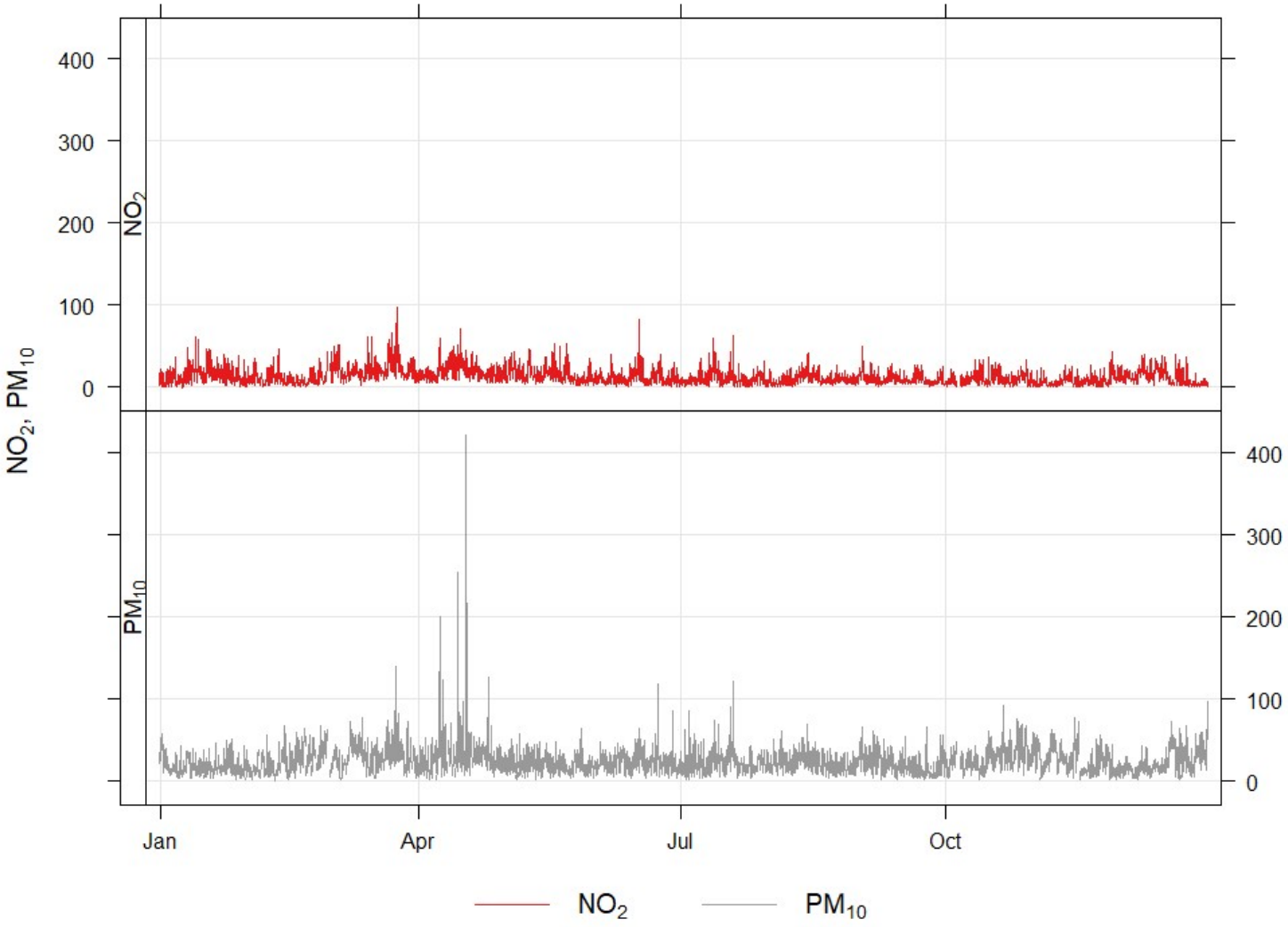


Figure F. 3: Line Plots for NO_2 and PM_{10} at HT1



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 National Highways
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

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. 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.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.