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

Information	New Forest District Council Details
Local Authority Officer	Rachel Higgins
Department	Environmental Protection
Address	Appletree Court, Lyndhurst, Hampshire, SO43 7PA
Telephone	02380 285411
E-mail	EandR@nfdc.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in New Forest District 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 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The New Forest District covers 75,100 hectares (290 sq. miles) and has a diverse environment, including the New Forest (and associated New Forest National Park) that covers approximately three quarters of the district comprising of mainly protected heathlands and forests, a coastline of 64 km, areas of industry, towns and villages. Along Southampton Water much of the shoreline is influenced by urban and industrial development. The local landscape is dominated by a refinery, one of the largest in Europe, whilst other industrial processes include a number of energy recovery facilities and chemical installations. Furthermore, there are significant areas of sand and gravel extraction in the district to support local businesses.

The total population of the District is 176,800 although the area also attracts local, national and international visitors throughout the year with over 13 million days visits made annually [6]. With 96% of visitors arriving to the New Forest in cars or coaches, in addition to

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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

the local industry, there is the potential for air quality issues relating to both traffic and industry.

The pollutants of concern in the New Forest district are nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$) and sulphur dioxide (SO_2). Traffic produces both NO_2 and particulate emissions, whilst the local industry may produce NO_2, particulate and SO_2 emissions.

In 2022 there was one Air Quality Management Area (AQMA) within the New Forest.

- **Lyndhurst** (High Street). Traffic related

Further information with regards to the AQMA can be found at:
http://www.newforest.gov.uk/airquality

The Lyndhurst AQMA was declared in 2008 for the likely exceedance of the annual mean air quality objective for NO_2. The AQMA will be revoked by 30 September 2023 as pollutant concentrations for nitrogen dioxide have met the Governments national objective levels for the past 8 years.

In 2017 New Forest District Council was named in the UK Air Quality Plan[7] as having one road which was predicted to persistently exceed nitrogen dioxide EU limit values after 2020. This road is a short stretch (approximately 1km) of the A35 over the Redbridge Causeway into Southampton and is a location where the public has access. Southampton had already been identified in 2015 as an area which also has a number of roads which persistently exceed the EU limit values for nitrogen dioxide and therefore Southampton City Council had already progressed action in understanding the issues and forwarding further measures to improve local air quality.

The area identified in the New Forest was seen as an extension of the Southampton issue therefore Southampton City Council and New Forest District Council worked in partnership to develop a Clean Air Zone (CAZ) within Southampton to ensure compliance with the EU limit value is met in the shortest time possible. Detailed and complex local air quality modelling was undertaken in the New Forest and determined that compliance would be met by 2019 in a business as usual scenario. Furthermore, it was concluded that the

introduction of additional measures would not bring forward compliance, therefore, New Forest District Council's preferred option was to continue with a business as usual scenario.

Monitoring since 2019 has shown that this stretch of road has not exceeded the EU limit values for nitrogen dioxide.

Monitoring - Lyndhurst

New Forest District Council undertakes automatic and non-automatic monitoring of NO_2, PM_{10} and SO_2 at locations throughout the district and compares the results to the UK Air Quality Objectives. Air Quality Objectives are set for different pollutants and may include a number of objectives covering a variety of time periods, for example NO_2 has two objectives: an annual mean and an hourly mean.

2022 was the eighth consecutive year since monitoring began in 2002 (using the current monitoring methods) that there were no monitored exceedances of any of the Air Quality Objectives.

Lyndhurst has monitored significant decreases in nitrogen dioxide concentrations since monitoring began and within part of the High Street designated an air quality management area there has been no exceedances of the nitrogen dioxide annual mean objective (40 µg m^{-3}) since 2014.

Confidence in the continued compliance supported a view to revoke the Lyndhurst AQMA once it could be established that traffic levels were approaching a 'back to normal' scenario post covid. With 2022 data reflecting 'normal' traffic flows, the Council engaged an air quality consultant to model the predicted NO_2 levels under likely and worst case scenarios to ensure no breach of the objective level is likely for the foreseeable future. The results of this modelling did not indicate a breach of the air quality guidelines and subsequently the AQMA will be revoked in summer 2023. Further details on this procedure can be found in Section 2.3.

Monitoring - Totton

A number of monitoring locations were also installed in 2018 along the A35 in Totton to corroborate results of the detailed CAZ air quality modelling work. Nitrogen dioxide

concentrations were shown not to exceed EU Limit Values but were sufficiently close to suggest that monitoring should continue.

The data obtained from these tubes throughout 2022 is presented separately from the main data tables since its use was in conjunction with the Southampton CAZ work and not part of the LAQM process (see Appendix H).

Local Air Quality Management

New Forest District Council has a legal duty to continue to manage local air quality. The Council fulfils this duty by:

• following Local Air Quality Management guidance produced by Defra;

• continuously monitoring pollutants of interest at relevant sites including rural background, roadside and industrial locations;

• identifying new major sources of airborne pollution and assessing the impact on local air quality. It should be noted that no new major sources have been identified during 2022;

• working within other legislative parameters such as the planning regime and / or the permitting of industrial processes to assess the impact of development or industry on local air quality, and if appropriate, taking measures to reduce the determined impact;

• providing training and updates concerning local air quality to colleagues within the local authority, Council Members, Town and Parish Councils and members of the public; and

• working with our partners such as Hampshire County Council, the Environment Agency, local industry, district and National Park colleagues, local Council Members, neighbouring local authorities and Town and Parish Councils.

Working with our partners is vital if air quality is to be recognised as an important local issue that requires consideration and action. Some partners are legal regulators, for example Hampshire County Council regulate roads and transport in our district and the Environment Agency regulate the large industrial processes and therefore their involvement could ensure works are undertaken and / or funding is available for particular schemes.

Ensuring all partners are aware of the local air quality issues is also important, therefore New Forest District Council makes the effort to train and update partners on local air quality by attending relevant meetings and committees. Furthermore, Environmental Protection Officers work with other departments to ensure local air quality is discussed at the planning stages of a development or implementation of a scheme.

Air quality is not just a local issue because airborne pollution is not contained within district boundaries. Therefore, New Forest District Council also works with our five neighbouring local authorities when required to address air quality issues. This was of great importance during our collaborative working with Southampton City Council to progress the work on the Clean Air Zone to improve local air quality within the area as directed by Government, and in more recent years on a 'Burn Better' campaign to inform the public on pollutant issues concerning solid fuel burning.

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[5] 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[6], published in 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] report details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given

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

[6] Defra. Air Quality Strategy: Framework for Local Authority Delivery, April 2023

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

that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

During 2019 New Forest District Council updated the original Air Quality Action Plan (2008) for Lyndhurst[8]. As part of the update, additional monitoring was installed in Emery Down (just outside Lyndhurst) in 2020 to assess whether increases in traffic in the local area has resulted in exceedances of the air quality objective in locations adjacent to Lyndhurst.

Results from Emery Down showed low levels of NO_2 (<10 µg m^{-3}) which are well below the objective level and do not support the continued monitoring of this vicinity. Monitoring at Emery Down will therefore cease in 2023.

Overall monitoring in Lyndhurst has shown significant decreases in the annual mean objective for NO_2, with a 4-11 µg m^{-3} decrease in NO_2 concentrations noted over a 6 year period to date within part of the High Street. There have been no exceedances of the annual mean objective for NO_2 monitored in Lyndhurst during 2022.

Working collaboratively with Southampton City Council on delivering the Southampton Clean Air Zone (CAZ)

As previously stated, New Forest District Council was named in 2017 within the UK Air Quality Plan[9] as having a one road predicted to persistently exceed nitrogen dioxide EU limit values after 2020. Following air quality modelling, it was determined that compliance within NFDC would be met by 2019 in a business as usual scenario. Accordingly, no further action was taken but the Council continue to monitor NO_2 along the A35 to ensure continued compliance.

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8 https://www.newforest.gov.uk/airquality

9 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf

Working with the Environment Centre (tEC) and other Local Authorities to promote the 'Burn Better' scheme

New Forest District Council is currently working with tEC and other Local Authorities to support residents in avoiding air pollution from household burning and improving air quality for their health, their community and the environment. The scheme promotes awareness of the air quality issues surrounding solid fuel burning and has focussed on bonfires and the use of solid fuel appliances such as wood burners and stoves to encourage residents to turn to other means of disposing of waste or heating their homes and to 'burn better' by burning appropriate material and 'ready to burn' fuels where there is no alternative means of heating.

As part of this project the team secured 4 Zephyr sensors which were deployed around the district to monitor pollution levels, specifically PM_{10} and $PM_{2.5}$. The Zephyrs have been in use since October 2022 and the results are currently being assessed. The Council intends to use the data to provide advice and educational resources to residents on the impact of domestic burning.

Production of the air quality supplementary planning guide

A supplementary air quality planning guide has been produced to support applicants submitting planning applications and details the expectations required of them with regard to appropriate mitigation requirements to safeguard air quality during construction and upon completion.

Priorities

New Forest District Council has the following priorities with regards to local air quality:

- to forward the development of a Clean Air / Air Quality Strategy for New Forest;

- to work regionally, pooling expertise and resource to forward local and national air quality issues and strategies; and

- to continue to promote the 'burn better' scheme focussing on woodburning and bonfires in domestic properties.

Conclusions and Priorities

Monitoring of pollutants within the New Forest district has not shown an exceedance of the Air Quality Objectives (AQO) at any monitoring location.

2022 levels showed an overall marginal decrease of 0.4 µg m^{-3} in 2022 compared to 2021 (19.5 to 19.1 µg m^{-3}). On an individual site basis, the largest increase in NO$_2$ concentration in 2022 (2.1 µg m^{-3}) compared to 2021 occurred at Site 13 (16 High Street, Lyndhurst) for which the concentration increased form 24.9 µg m^{-3} to 27.0 µg m^{-3} and remained significantly below the AQO. The largest decrease (3.5 µg m^{-3}) occurred at Site 22 (A35, Baytree Cottage, B'th Road for which the concentration decreased from 21.6 µg m^{-3} to 17.6 µg m^{-3}.

Continued compliance with the objective levels within the Lyndhurst AQMA is observed during 2022 which provides further evidence to support a case for the revocation of the AQMA. The AQMA in Lyndhurst will be revoked by 30 September 2023.

Further monitoring has been and will be installed within the District to assess pollutant levels when circumstances or issues arise. Additional monitoring was installed in the Emery Down area (just outside Lyndhurst) in 2020 to assess nitrogen dioxide concentrations on a known 'rat-run' avoiding Lyndhurst, in Fordingbridge to gather background data ahead of a proposed new housing developments and in Lymington close to a relocated bus depot. Results have demonstrated no exceedance of objectives levels in Emery Down and Lymington over the past 2 years. Given the very low levels of NO$_2$ monitored at these sites, continued monitoring in Emery Down and Lymington will cease in 2023.

It is noted that planning applications are expected to be submitted to the Council for proposed large developments over the forthcoming years. As such the associated work to assess the submitted plans and the impact on local air quality (including the potential impact on the Southampton Clean Air Zone) may be significant for the Department.

Local Engagement and How to get Involved

Everyone can take small steps to improve local air quality and improve their health, for example:

Vehicles

- Find out about your local public transport and car share schemes when travelling to work, school, business trips or weekends away.

- Find out about local bus services. For example, during the summer, bus companies in the New Forest operate hop on / off services throughout the district and to local beaches, often with offers to some local attractions. Details can be found via the following link:

  http://www.thenewforesttour.info/

- Find out about cycle routes in your local area and across the New Forest - you may be surprised how easy it is to cycle to your destination rather than take your car.

- Use **My Journey Planner** website to identify transport options, routes (including fastest and quietest) and public transport details. This is an excellent and informative website giving the user great options to compare different journey options. Details can be found via the following link:

  https://journeyplanner.myjourneyhampshire.com

- Turn off your engine when waiting at traffic lights, closed railway barriers or in traffic jams.

- Turn your vehicles air circulation from pulling in external air to re-circulating internal air to stop drawing the surrounding air pollution into your vehicle for you to breathe.

- Become an eco-driver for example by anticipating traffic flow, maintaining a steady speed at a low revs per minute (RPM) and shifting up through the gears early. This will not only reduce pollution from your vehicle but save on fuel consumption.

- Maintain your vehicle regularly, including checking tyre pressures monthly.

Get Active

- Leave your car at home and try walking to the local shops or school, even if it is just once or twice a week. If you can make it part of your normal routine, not only will you be reducing air pollution you will be more active and healthier.

- The majority of New Forest residents live within walking or cycling distance of open spaces. Explore walking and cycling routes you can take from your doorstep, get active and leave your car at home.

Plan ahead

- Take some time to plan ahead and consider the small steps you can take to reduce pollution, for example planning journeys that you can leave your car at home or car share with work colleagues or on the school run even it is just for one day a week or fortnight.

- When planning a walk, consider the route. It may be possible to take footpaths and streets away from busy high streets or areas of local traffic congestion therefore avoiding areas of higher air pollution.

- If you are buying or leasing a new vehicle (private or business) consider the vehicle emissions and fuel type in addition to the other typical considerations such as miles per gallon, insurance group and safety.

- Be aware of air pollution forecasts for your local area, particularly if you suffer from respiratory issues. The local forecasts can be found via the following link:

  https://uk-air.defra.gov.uk/

Raising concerns

- New Forest District Council residents and businesses can raise concerns about air pollution directly with the Environmental Protection department or their local

Councillor; details and links are listed below. Officers may be able to offer advice or investigate your concerns further.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection Department of New Forest District Council.

Rachel Higgins (Environmental Protection Manager)

Caroline Gill (Environmental Health Technical Officer)

Joanne McClay (Service Manager Environment and Regulation)

This ASR has been approved and signed off by:

Joanne McClay (Service Manager Environment and Regulation)

If you have any comments on this ASR please send them to eandr@nfdc.gov.uk at:

Environmental Protection

Environmental and Regulation

Appletree Court

Lyndhurst

Hampshire

SO43 7PA

023 8028 5411

eandr@nfdc.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in New Forest District Council 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 New Forest District 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.

A summary of AQMAs declared by New Forest District Council can be found in Table 2.1. The table presents a description of the AQMA that was designated within New Forest District Council in. Appendix D: Map(s) of Monitoring Locations and AQMAs provides a map of the AQMA and also the air quality monitoring locations. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=167. The full list of AQMA's in the UK can be found at https://uk-air.defra.gov.uk/aqma/list.

We propose to revoke Lyndhurst AQMA in 2023. See Section 2.3 for further details.

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	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Lyndhurst	Declared 6 June 2005	NO$_2$ Annual Mean	25m either side of the High Street, Lyndhurst incorporating Lyndhurst Infant School -97 High Street and 8-76 High street	NO	52	26	8yrs (automatic analyser results)	Lyndhurst Action Plan 2008 & Lyndhurst Air Quality Action Plan - An update 2019	https://newforest.gov.uk/media/612/lyndhurst-air-quality-action-plan-update-2019/pdf/lyndhurst-air-quality-action-plan-update_2019.pdf?m=637267183130630000

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

☒ **New Forest District Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in New Forest District Council

Defra's appraisal of last year's ASR concluded:

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports:

1. *All graphs are well-presented, with the chosen-colour scheme allowing for monitoring sites to be easily distinguished. The addition of the AQO on all graphs is useful. Figures highlighting the location of monitoring sites are clear. However, the addition of the CAZ boundary on Figure D.6, and the AQMA boundary on Figure D.5 would be beneficial.*

Response: The CAZ boundary has been added. The AQMA will be revoked by 30 September 2023.

2. *A number of additional appendices have been added. Each of these is relevant to the report and provides extra information. The Council have estimated $PM_{2.5}$ concentrations from monitored PM_{10} concentrations and have presented the fraction of mortality attributable to particulate air pollution to support the discussions in section 2.3.*

3. *Despite revocation of the Totton AQMA in 2016, the Council have continued to discuss monitoring results within this area in detail. This demonstrates that the Council is committed to improving air quality and aims to highlight areas of concern quickly. The Council should continue this discussion in future ASRs.*

4. *A good discussion on QA/QC procedures has been provided. An image of the appropriate national bias adjustment spreadsheet has been provided for completeness. The Council could discuss the reasoning for the chosen bias adjustment in more depth, as the chosen bias adjustment has changed between ASRs.*

Response: Fuller detail on the chosen bias adjustment has been included.

5.   *Overall the report is well-detailed, and provides an excellent amount of information, which is enhanced by the additional appendices provided within the report. The Council should continue the good work in future ASRs.*

In the next reporting year, the Council aims to:

- *Continue development of the "Clear Air Strategy" for the New Forest*

Response: A Clean Air Strategy will start to be developed in 2023 in accordance with updates in Policy following publication of the (National) Air Quality Strategy

- *Begin the process of revocation for the Lyndhurst AQMA*

Response: The Lyndhurst AQMA will be revoked by 30 September 2023.

- *Improve and encourage the use of sustainable transport and increase the number of charging points for electric vehicles.*
- Response: There are now 41 Electric Vehicle Charging Points in our car parks, spread across 15 sites.

In addition, a breakdown of the districts taxi fleet by fuel source shows a general decline in the number of diesel vehicles operating in the fleet (although numbers rose slightly in 2023 when compared to 2022) and an increase in hybrid and electric vehicles. The breakdown per fuel type is shown below:

Breakdown of NFDC licenced taxis by fuel source 2017 to 2023

	Diesel	Hybrid	Petrol	Electric	Bio-fuel	Total vehicles
21 April 2023	353	112	20	5	0	490
30 August 2022	325	77	17	2	0	421
11 March 2020	409	39	20	1	1	470
24 August 2018	424	18	10	1	0	453
11 June 2018	434	15	8	1	0	458
04 December 2017	433	10	16	1	0	460

2.3 Revocation of the Lyndhurst Air Quality Management Area

In line with Defra guidance and their recommendation in the NFDC ASR 2022 to consider revocation of the AQMA, NFDC commissioned Ricardo to carry out a detailed assessment[10] of NO_2 concentrations in and around the Lyndhurst AQMA to determine whether compliance with the Air Quality Objective for annual mean NO_2 concentrations is achieved across the area and to determine whether compliance will be achieved in future years. Modelling was carried out for a 2019 baseline and a 2023 projected year. (Scenario 1).

In addition, to assess model uncertainty in future years, three theoretical worst-case scenarios were tested to quantify the potential impacts of conditions where emissions from road transport would be higher than expected in 2023:

- Scenario 2: Traffic volumes across Lyndhurst growing by 25%;
- Scenario 3: Slower than expected replacement of older road vehicles as a result of economic conditions leading to a 2-year delay in fleet renewal across the area;
- Scenario 4: a combination of scenarios 1 and 2.

The model accurately predicted concentrations at monitoring stations in the Lyndhurst AQMA in 2019, demonstrating that the model is correctly representing real-world conditions, lending confidence to the predictions for future years.

The modelling undertaken through this study showed that:

- No location is predicted to exceed the Air Quality Objective for annual mean NO_2 at any location of relevant exposure in 2019;
- No location is predicted to have an annual mean NO_2 concentration within 10% of the Air Quality Objective for annual mean NO_2 at any location of relevant exposure in 2023 should changes in traffic volumes and fleet composition follow the forecasted national trends.
- Furthermore, no locations of relevant exposure are predicted to exceed the Objective in a number of theoretical scenarios where emissions would be higher than those predicted from forecasted national trends, including a 25% increase in road traffic on all roads in Lyndhurst, a 2-year delay in fleet renewal compared to national fleet projections, and a combination of increased traffic and fleet delay.

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[10] *Lyndhurst Air Quality Management Area – Detailed assessment for New Forest District Council Feb 2023 Ricardo Energy and Environment*

Based on the data available, the modelling suggests that provided the monitoring data for 2022 matches the trends described above, the AQMA could be revoked without risk of future exceedances. Accordingly, NFDC will revoke the Lyndhurst AQMA by 30 September 2023.

Table 2.2 details measures completed or planned to ensure the Lyndhurst AQMA continues to comply with air quality objective levels. The majority of measures have been implemented as far as reasonably practical and Lyndhurst has met the objective level for the last eight years. Any measures which could still be implemented will be included within the Air Quality Strategy – a document which is required by Defra for Local Authorities without an AQMA.

Table 2.2 – 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	Enforcement of loading restrictions	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2012	2032	NFDC enforcement	NO	NO	Not Funded	< £10k	Implementation	< 1 µg m^{-3}	surveys undertaken June 2019	Survey showed no illegal parking during survey period, further surveys required	Ongoing measure
2	Enforcement of HGV restriction in High Street	Traffic Management	Other	2012	2032	NFDC / police	NO	NO	Not Funded	< £10k	Implementation	< 1 µg m^{-3}	Survey undertaken June 2019	Only Police may take enforcement action. Resource intensive.	Resource from police limited
3	Clean walk to school route	Promoting Travel Alternatives	School Travel Plans	2025	2032	NFDC / school / HCC	NO	NO	Not Funded	< £10k	Implementation	5-10µg m^{-3} reduced impact of pollution on clean route	Implementation on-going with new year groups	Location of school means most children already walk	Ongoing measure
4	Anti idling campaign	Public Information	Other	2018	2025	NFDC / regional LA's / HCC	NO	NO	Not Funded	< £10k	Implementation	< 1 µg m^{-3}	Poster/banner campaign in High Street undertaken Feb 2018 and to be reviewed again	Most vehicles now have start stop engines	Use as a regional message using social media platforms
5	Reduce trade vehicle movement	Traffic Management	Other	2018	2025	NFDC / local business	NO	NO	Not Funded	< £10k	Planning	< 1 µg m^{-3}		Project put on hold due to Covid	
6	Improve motorway signage	Traffic Management	UTC, Congestion management, traffic reduction	2012	2022	HCC	NO	NO	Not Funded	< £10k	Completed	< 1µg m^{-3}	NO$_2$ monitoring	System installed and reviewed by HCC	System installed but requires HCC to operate
7	Sustainable travel	Promoting Travel Alternatives	Personalised Travel Planning	2012	2025	All local and regional agencies (Hampshire AQ group)	NO	NO	Not Funded	< £10k	Implementation	< 1 µg m^{-3}	NO$_2$ monitoring	Retro fitting of buses, promotion of cycle network	Requires long term investment from multiple agencies and links to relevant policies
8	Installation of electric charge points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2032	NFDC	NO	NO	Partially Funded	£50k - £100k	Implementation	< 1 µg m^{-3}	Obtaining figures	Charge points in NFDC car parks installed	Charge points in NFDC car parks removes other parking space

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
9	Review Council Fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2019	2032	NFDC	NO	NO	Not Funded	< £10k	Implementation	< 1 µg m-3	Obtaining figures	Electric cars procured 2019	Mileage range of electric vehicles
10	Increase awareness of issues	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2032	NFDC, HCC, PH	NO	NO	Not Funded	< £10k	Implementation	< 1 µg m-3	NO$_2$ monitoring	Publication of 2019 Air Quality Action Plan	Ongoing work
11	Smarter working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2019	2025	NFDC	NO	NO	Not Funded	£50k - £100k	Implementation	< 1µg m-3	NO$_2$ monitoring	forwarded quicker due to Covid - flexi home / office work currently continuing	Not suitable for all employees

2.4 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 2.5 μm 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.

New Forest District Council is taking the following measures to address PM$_{2.5}$:

Collate information with regards to local PM$_{2.5}$ data

Annual mean concentration

New Forest District Council does not currently monitor PM$_{2.5}$ concentrations with continuous analysers. However, by using current guidance, Technical Guidance$_{(Defra, 2022)}$, the PM$_{2.5}$ annual mean concentration can be estimated using monitoring data from local PM$_{10}$ analysers. The estimation of the PM$_{2.5}$ annual mean concentration for 2022 is provided in Appendix F.

Furthermore, it is noted that some private sector businesses in the New Forest area (along Southampton Water) monitor PM$_{2.5}$. Therefore, the Council will determine whether this data could be made available to the Local Authority and the monitoring undertaken is appropriate, in order to provide some monitored local PM$_{2.5}$ concentrations.

Health burden

The Office for Health Improvement & Disparities[11] provide a Public Health Indicator for PM$_{2.5}$ which references the health burden of PM$_{2.5}$ at a local authority level as a fraction of mortality attributable to particulate air pollution. This enables local authorities to assess their local figure, compare it to other regions and take appropriate action by targeting

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[11] The Office for Health Improvement & Disparities (OHID) is the successor organization to Public Health England, since October 2021

resources to reduce the fraction. The figures are provided for the New Forest District and other regions of interest in Appendix G.

Local hot-spots

Background pollutant maps provided electronically by Defra also give a basic local background concentration for $PM_{2.5}$. This information may show areas of higher $PM_{2.5}$ concentrations which New Forest District Council could assess to determine if there are local particulate issues where specific measures could be implemented to reduce particulate emissions.

The above noted methods will be used to establish local $PM_{2.5}$ annual mean concentrations, identify the local health burden of particulate matter and identify any local hot spot areas for particulate matter that have not been identified to date. This will enable New Forest District Council to establish baseline figures for $PM_{2.5}$ with the aim to improve on the established baseline, including the possibility of setting targets for a measured reduction in the near future, and to target resources to assess and improve any identified hot spot areas for $PM_{2.5}$. These data will be updated on an annual basis, and therefore provide some guidance of whether implemented measures are reducing local $PM_{2.5}$ concentrations. In addition, this work could be included within any future Clean Air Strategy for the New Forest.

After seven years of reporting $PM_{2.5}$ concentrations (based on the monitored PM_{10} concentrations), concentrations at both sites (Totton and Fawley) have remained consistent.

See also Regional Partnerships - 'Localised Burning'.

Further current measures include:

Working with Public Health colleagues

NFDC meets with Public Health colleagues and Hampshire County Council at Regional Air Quality meetings.

Working with other partners

Local Tourism

The New Forest district attracts millions of visitors each year including 13.5 million day trips. 96% of visitors will arrive in cars or coaches, however there are alternative methods of transport to arrive and explore the New Forest area. By working with partners such as New Forest National Park Authority, New Forest Tourism and transport companies on current and future schemes, the air quality link of improving not only $PM_{2.5}$ but air quality in general by using alternative transport methods could be forwarded. Transport schemes include:

- Local public transport schemes such as New Forest Bus Tour (3 tourist bus routes operating a hop on / off concession scheme)

- Promotion of cycle and walking routes throughout the New Forest

- The production of tourist maps linking local attractions with available transport routes.

New Forest District Council Public Spaces Protection Order 2022 number 1: relating to fires and BBQs

Despite a series of high-profile campaigns in and around the New Forest, about the dangers of fires on the open forest, including an operational ban on disposable BBQs on Forestry England land in 2020, significant numbers of incidents caused by BBQs and campfires, continue to be recorded by Forestry England, New Forest National Park Authority (NPA) and Hampshire and Isle of White Fire and Rescue Service (HIWFRS).

Such fires can result in serious safety concerns and risk to life; damage biodiversity, habitats and property and place an enormous strain, both operationally and financially, on the emergency services and organisations within the Forest, who have to deal with them.

To help reduce these anti social activities, NFDC has invoked the Public Spaces Protection Order, referred to as The New Forest Public Spaces Protection Order 2022 (Number 1) ('PSPO No 1').

The Public Spaces Protection Order Number 1 prohibits the following activities:

(a) placing, throwing or dropping items likely to cause a fire

(b) lighting fires (of any type) or barbeques (including disposable barbeques and any outdoor temporary cooking facilities or equipment)

(c) using items which either (i) cause a naked flame or (ii) pose a risk of fire

The order applies to any land within a restricted area which principally comprises land managed and controlled by Forestry England.

Whilst this order was convened to protect habitats and bio diversity, restricting burning will also help to keep PM levels low and prevent the spikes associated with bbq's, fire pits etc which can have negative effects on those living near by.

Environment Agency

The Environment Agency permits 20 industrial installations within the New Forest and immediate vicinity including some large chemical, waste, energy generating and oil refining processes. Whilst these installations currently operate under the conditions laid out in their Permit which will include emissions to air, New Forest District Council will continue to work further with the Environment Agency and local industries to discuss local $PM_{2.5}$ emissions and whether these can be reduced further.

Planning authorities

Air quality is a material consideration within the planning regime. To make development acceptable we will expect mitigation measures to be implemented by the applicant to reduce emissions to air from all proposed development.

A Supplementary Planning Document (SPD) was adopted on 1 June 2022 which provides supplementary guidance to the Local Plan for the NFDC area. It aims to prevent pollution hazards and provides guidance on when an Air Quality Assessment will be needed to support a planning application and what the assessment needs to address. It also confirms when an Air Quality Statement is required. Suggested mitigation measures to allow development to take place are also found within the document which is accessible here:

https://newforest.gov.uk/media/2726/Air-Quality-SPD/pdf/Air_Quality_SPD_FINAL_Version_June_2022.pdf?m=637903591614830000:

Regional Partnerships

Localised burning

New Forest District Council has not declared any smoke control areas. The District is primarily rural with a high proportion of domestic open fires and wood burning stoves. Residents with commoner's rights are also able to collect wood from the Forest for their own domestic use, and therefore to some extent wood burning is an accepted form of heating for many residents within the District. In addition, landowners (including the Forestry Commission and National Trust) will periodically burn heathland to effectively manage their land, producing localised smoke episodes with the associated generation of pollution.

Whilst it is acknowledged that these fires and domestic heating sources will give rise to the production of particulate matter, there should be a balance and proportionate response to heathland burning and the use of domestic fires and stoves. Therefore, heathland burning is always controlled with an emphasis not to allow smoke to drift over residential properties, and the Council deals with issues of domestic burning as they arise (typically through a nuisance complaint or planning regime) with advice given regarding burning including stove type, flue design, fuel source, wood type, storage and seasoning.

In 2019 New Forest District Council worked with neighbouring authorities to apply for Government funding for a regional approach to the use of wood burners and bonfires. The bid was successful and New Forest District Council and other authorities are now working with the environmental charity, the Environment Centre (tEC) to promote alternatives to burning and cleaner burning.

In 2021 under the 'Burn Better' campaign the group publicised the burn better message through:

- Production of flyers to promote cleaning burning in urban and rural areas (see Figures 2.1 to 2.4).

- A mailout of the flyers to various postcodes within the district where woodburning is common

- Distribution of the leaflets to all our information offices

- Engagement with tree surgeons, chimney sweeps, and stove and fireplace suppliers

- Posting 'burn better' information on our social media platforms

- Producing social media banners promoting the Ready to Burn regulations which came into effect in May 2021.

These points of action continued through 2022. In addition, flyers relating to bonfires (Figure 2-4) and an updated woodburning leaflet (Figure 2-5) were often sent to residents as part of our nuisance investigation procedure to provide advice and education on the harms of open burning.

Figure 2-1 - Social media banner promoting 'Ready to Burn' fuels

Figure 2-2 - Flyer promoting 'better burning' aimed at residents using solid fuel appliance as their primary heating source

Figure 2-3 - Flyer promoting 'better burning' aimed at users of solid fuel appliances

Figure 2-4 - Flyer promoting alternatives to burning

Figure 2-5 - Updated flyer giving advice on the harms of woodburning

Low cost 'zephyr' sensors

As part of this campaign the group successfully bid for the purchase of low-cost sensors which can be deployed in 'hotspots' around the district to provide localised information on air quality particularly particulate matter. New Forest District Council acquired 4 zephyr sensors from Earthsense which were deployed in the autumn of 2022 in sites across the district each with distinctive characteristics. The locations are shown in Figure 2-6. Breamore represents a background site away from high volumes of traffic and other potential sources of particulate matter. Ashurst represents a typical residential area in the east of the district but where complaints of smoke and odour from wood burners are regularly received, Poulner (Ringwood) is also a typical residential area in the west of the district whilst Hyde is a rural forest village with a nearby campsite with high bbq and fire pit use during the summer months.

Figure 2-6 - Location of zephyr sensors within the New Forest district
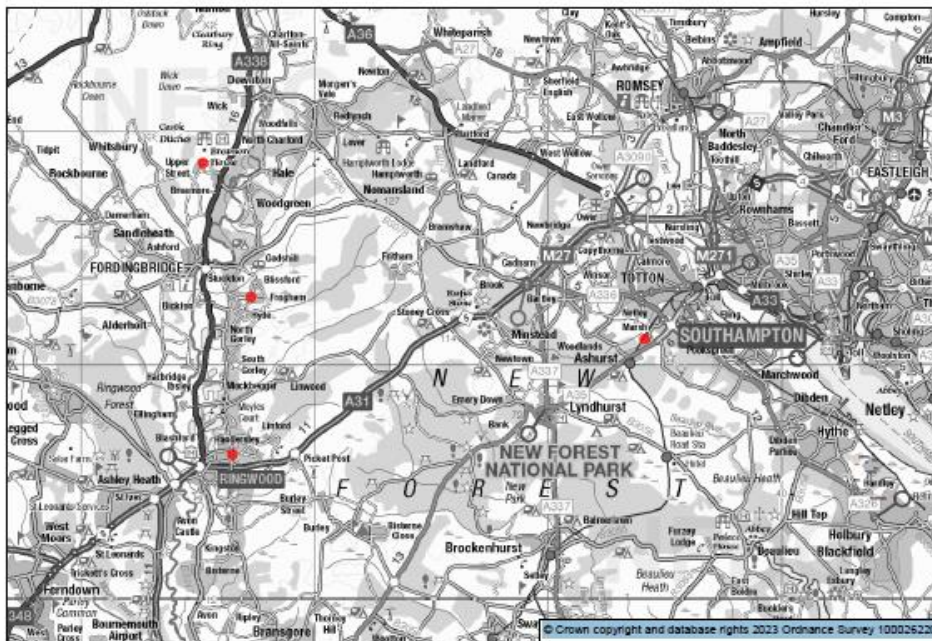
The purpose of this sensor deployment is to gather data on particulate matter (PM) levels around the district under different circumstances ie in an area with little burning, an area where burning is reported to frequently occur etc. and to assess whether or not there is any correlation between reports of wood burning and an increase in particulate matter

concentration. If a correlation can be established, the Council aims to use this information to promote awareness of the harms to health this can cause. Many recent reports in the press indicate that people do not make the link between the use of a wood burner or bonfire with the inhalation of harmful particulate matter. The data from the zephyr sensors aims to address this and encourage people to use alternatives to burning where possible.

The Council does not currently propose to use data from the zephyrs to feed into the LAQM process. Further quality assurance and quality control measures are needed before we can have sufficient confidence in the data to report it to Defra. The Council would like to gather an annual dataset before drawing final conclusions on the association between wood burning and particulate matter levels in each area. However there is sufficient confidence in the data to make general judgments regarding particulate matter levels in the district. An example of the use of the zephyr sensors follows:

Figure 2-7 shows the PM$_{2.5}$ levels at each of the New Forest District Council zephyr sites over the weekend of 4-7 November 2022 – Bonfire night. Peaks at all 4 sites are noted during the afternoons and evenings of 4 and 5 November 2022. Given that all sites are located away from highly trafficked routes and other sources of particulate matter it would be reasonable to assume that the peaks are due to woodburning. Data from this period and others also regularly shows high concentrations of particulate matter in the late evening and early morning.   This is likely to be due to a reduction in temperature which prevents smoke from rising and dispersing and therefore leads to high levels of particulate nearer ground level.

Figure 2-7 - PM2.5 levels at NFDC Zephyr Sites Over 4-7 November 2022
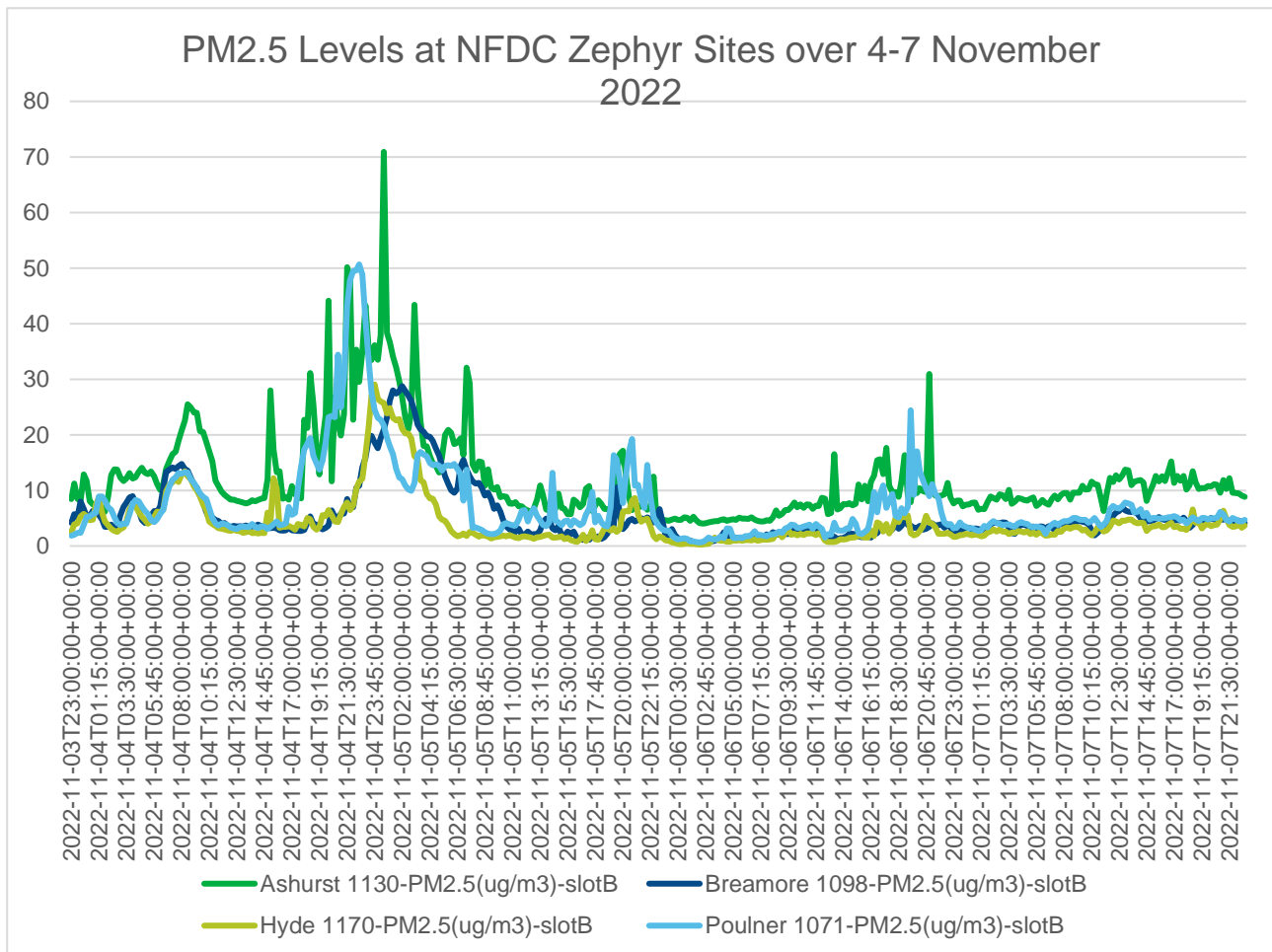
These trends will be further analysed during 2023. The interpreted data will then be used as an educational tool to promote a reduction in burning across the district.

During 2023, the Authority plans to install a further zephyr inside a residential property with a wood burner to compare internal particulate matter levels before, during and after burning. The aim is to demonstrate the rise in particulate matter within the property when a wood burner is used so that owners may be aware of the health effects of using their wood burner and consequently make informed choices over when and how often to use it.

New Measures

Development of a Clean Air Strategy for New Forest

With the revocation of the AQMA in 2023, the Authority will be obliged to produce a Clean Air Strategy for New Forest. This will include the assessment of $PM_{2.5}$ and if required a reduction in the pollutant through working with different authorities, agencies and businesses.

In summary

The following actions will continue to be progressed:

- to continue to determine local concentrations of $PM_{2.5}$ using current monitoring data (including the use of data from non-Council operated monitoring sites) and data from the Office for Health Improvement & Disparities (health indicators) and Defra (background maps).

- to continue to raise awareness of air quality (including particulate emissions) with partners (Public Health, Health and Well-being Board, planning authorities, local tourism, Hampshire County Council and the Environment Agency), local Members and the public through training session and at public events

- to continue to work with partners to identify and forward feasible schemes to reduce particulate emissions for example through our work with the Environment Centre

- to encourage cleaner burning using the data obtained from the zephyr sensors.

- to forward the development of a Clean Air Strategy for New Forest

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

This section sets out the monitoring undertaken within 2022 by New Forest District 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

New Forest District Council undertook automatic (continuous) monitoring at 3 sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. 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. The http://www.airqualityengland.co.uk/local-authority/?la_id=236 page presents automatic monitoring results for New Forest District 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.

Non-Automatic Monitoring Sites

New Forest District Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 54 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

While the vast majority of the sites are in place to fulfil the requirements of LAQM, four are in place to support project work undertaken as part of the Southampton Clean Air Zone.

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 40 µg 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). Figure A.1 present the NO$_2$ concentrations measured by the automatic instruments over the last five years within the Lyndhurst AQMA and in Totton. Figure A.2 presents the NO$_2$ measured by diffusion tube within the Lyndhurst AQMA.

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 200 µg m^{-3}, not to be exceeded more than 18 times per year.

The monitoring undertaken within New Forest District Council throughout 2022 has shown no exceedances of the annual mean objective for nitrogen dioxide at any of the automatic and non-automatic monitoring sites.

Lyndhurst

The results for Lyndhurst showed the concentrations remained significantly below the annual objective, through these was slight increase in levels within those sites with the street canyon. Within the current AQMA in Lyndhurst the monitoring results are presented in Table 3.1.

Table 3.1 - Nitrogen dioxide concentrations measured within Lyndhurst AQMA

Site ID	Location	NO$_2$ Annual Mean Concentration (µg m^{-3})							
		2015	2016	2017	2018	2019	2020	2021	2022
CM2	Lyndhurst	37	38	35	34	31	23	25	26
8	School, High St.	25.19	26.1	21.6	21.6	20.5	15.1	17.2	16.4
9	15, High St.	38.38	39.8	34.0	35.2	31.5	24.4	25.0	25.7
10	14, High St.	37.43	38.5	34.5	34.9	31.6	24.0	24.9	25.8
13	16, High St.	39.22	39.5	37.0	36.9	35.1	26.6	24.9	27.0
14	2a, Romsey Rd	35.76	30.1	26.8	29.1	30.1	23.7	26.6	27.1
16	28, High St.	27.99	22.7	20.0	19.6	20.0	17.0	18	17.5
18	65, High St.	33.33	28.9	30.7	28.8	29.0	20.1	23.7	20.9

Figure 3-1 shows the trend in nitrogen dioxide concentrations within and close by the Lyndhurst AQMA since 2008 - concentrations continue to be below the air quality objective. The impact of Covid-19 on the measured concentrations, particularly during 2020, can be seen at each site.

Figure 3-1 -Annual mean nitrogen dioxide concentration within Lyndhurst AQMA
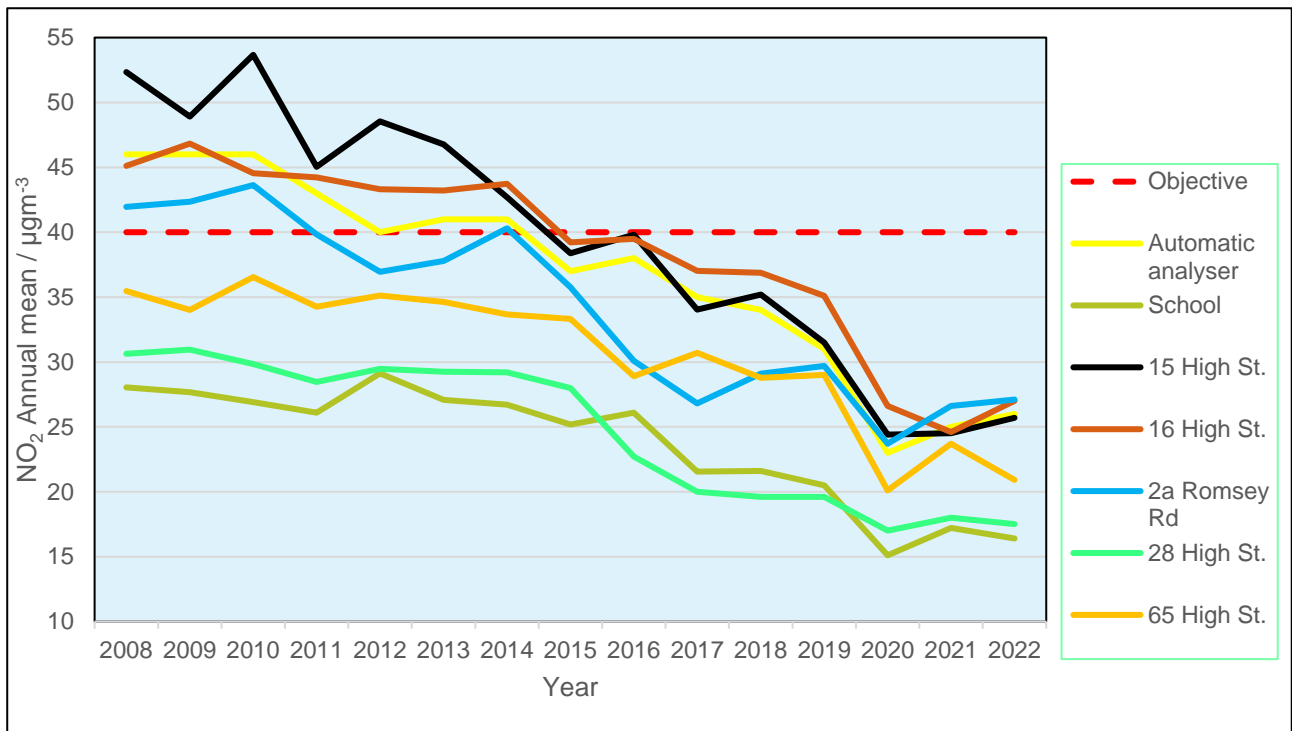
Totton

In July 2016, New Forest District Council revoked the AQMA in Totton. The AQMA was declared in 2005 for the likely exceedance of the nitrogen dioxide annual mean objective. Since the revocation monitoring in Totton using an automatic analyser and diffusion tubes (CM1 and diffusion tube Sites 33-49) has continued to ensure nitrogen dioxide concentrations remain below the air quality objective. The monitoring during 2022 has shown the nitrogen dioxide annual mean concentrations were significantly below the Air Quality Objective of 40 μg m^{-3}. At all sites within Totton there was a decrease in NO_2 concentration in 2022 compared to 2021.

New Forest District Council will continue to monitor nitrogen dioxide thoughout Totton using automatic and non-automatic monitoring.

Other monitoring locations

Monitoring at the remaining locations showed a noted decrease in concentrations during 2020. In terms of changes between 2021 and 2022 at most sites there was no significant

changes, though the largest decrease occurred at Site ID 22 (Site name A35, Baytree Cottage, B'th) for the concentration decreased from 21.1 µg m^{-3} to 17.6 µg m^{-3}.

New monitoring locations since previous ASR

No new monitoring locations have been added during 2022.

Monitoing locations removed since previous ASR

There were no monitoring sites removed in 2022

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 µg 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 µg m^{-3}, not to be exceeded more than 35 times per year.

3.2.3 Sulphur Dioxide (SO$_{2}$)

Table A.8Error! Reference source not found. in Appendix A compares the ratified continuous monitored SO$_{2}$ concentrations for 2022 with the air quality objectives for SO$_{2}$.

There were no exceedances in 2022.

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)
CM1	Totton	Roadside	436188	113237	NO_2, PM_{10}	No	Chemiluminescent; TEOM	5	1.5	1.75
CM2	Lyndhurst	Kerbside	429859	108204	NO_2	No	Chemiluminescent	1	0.6	3
CM3	Fawley	Industrial	445885	103248	SO_2, PM_{10}	No	UV Fluorescence, TEOM	5	n/a	5

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	Lyndhurst Road, Goose Green	Roadside	429991	107583	NO_2	No	0.0	0.4	No	3.0
2	1 Foxlease Terrace, Shrubbs Hill Road	Roadside	429928	107687	NO_2	No	0.0	1.5	No	3.0
3ai, 3aii	Shrubbs Hill Road The Orchards (road)Duplicate Site 3aii	Roadside	429895	107770	NO_2	No	0.0	3.0	No	3.0
5	Shrubbs Hill Road (door)	Roadside	429895	107770	NO_2	No	0.0	5.0	No	3.0
6	Shrubbs Hill Road, Hillmead Lodge	Roadside	429760	107972	NO_2	No	5.0	1.5	No	3.0
7	Queens House, Lyndhurst	Roadside	429710	108128	NO_2	No	0.0	5.0	No	3.0
8	High Street, School, Lyndhurst	Roadside	429767	108205	NO_2	Yes, AQMA 1	0.0	6.0	No	3.0
9	15 High Street, Jewellery shop	Kerbside	429864	108213	NO_2	Yes, AQMA 1	0.0	1.0	No	3.0
10ai, 10aii, 10aiii	14 High Street, Analyser site Triplicate Site	Kerbside	429858	108205	NO_2	Yes, AQMA 1	0.0	0.9	Yes	3.0
13	16a High Street, Bakery	Kerbside	429875	108207	NO_2	Yes, AQMA 1	0.0	1.6	No	3.0
14	2a Romsey Road lights	Roadside	429891	108245	NO_2	Yes, AQMA 1	3.0	2.0	No	3.0
15	22 Romsey Road, Pennyfarthing Hotel	Roadside	429911	108402	NO_2	Yes, AQMA 1	0.0	2.3	No	3.0
16ai, 16aii	28 High Street, Tea Shop Duplicate Site	Roadside	429933	108200	NO_2	Yes, AQMA 1	5.0	4.0	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
18	65 High Street, Card Shop	Roadside	430026	108206	NO$_2$	Yes, AQMA 1	0.0	1.8	No	3.0
19	2 Gosport Lane	Roadside	430079	108147	NO$_2$	No	0.0	2.2	No	3.0
20	2 South View, Gosport Lane	Roadside	430092	108077	NO$_2$	No	5.0	2.0	No	3.0
21	Southampton Road, Lyndhurst Park Hotel	Roadside	430162	108173	NO$_2$	No	5.0	2.0	No	3.0
22	A35, B'th Road, Baytree Cottage	Roadside	429169	108129	NO$_2$	No	0.0	1.5	No	3.0
23	Lyndhurst School Lamp post 1 (1m)	Kerbside	429782	108209	NO$_2$	No	0.0	6.0	No	3.0
24	Lyndhurst School Lamp Post 2 (2m)	Kerbside	429782	108209	NO$_2$	No	0.0	6.0	No	3.0
25	Lyndhurst School Lamp Post 3 (3m)	Kerbside	429782	108209	NO$_2$	No	0.0	6.0	No	3.0
26	Red Lodge, High Street, Lyndhurst	Roadside	429739	108195	NO$_2$	No	0.0	2.0	No	3.0
27	Holbury School, Teachers Way	Industrial	442947	103931	NO$_2$	No	0.0	15.9	No	3.0
28	Fawley, Jubilee Hall	Industrial	442947	103931	NO$_2$	No	0.0	16.4	No	3.0
29	Beaulieu, School field	Rural	445881	103247	NO$_2$	No	10.0	15.7	No	3.0
30	Marchwood School, Twiggs Lane	Roadside	438363	109694	NO$_2$	No	0.0	25.0	No	3.0
31ai, 31aii	Stoney Cross Duplicate Site	Roadside	425877	111778	NO$_2$	No	0.0	20.0	No	3.0
33ai, 33aii, 33aiii	Junction Road, Totton, Triplicate site	Roadside	436189	113235	NO$_2$	No	7.0	2.0	Yes	3.0
36	30 Junction Road, Totton	Roadside	436210	113210	NO$_2$	No	3.0	1.0	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
37	25 Junction Road (downpipe)	Roadside	436232	113156	NO_2	No	0.0	4.0	No	3.0
38	26 Rumbridge Street (downpipe)	Roadside	436205	113019	NO_2	No	2.0	1.5	No	3.0
39	Junction Road BATS Corner	Roadside	436278	113081	NO_2	No	0.0	1.5	No	3.0
40	Elingfield Court, High Street, Totton	Roadside	436383	113135	NO_2	No	0.0	1.5	No	3.0
41	55 High Street, Totton (Eling Wharf entrance)	Roadside	436476	113214	NO_2	No	0.0	4.0	No	3.0
42	93 Commercial Road, Totton	Roadside	436364	113322	NO_2	No	0.0	1.0	No	3.0
43	26 Winsor Road	Roadside	436210	112948	NO_2	No	0.0	2.0	No	3.0
44	A35 Fisher Road	Roadside	436234	112898	NO_2	No	3.0	1.0	No	3.0
49ai, 49aii, 49aiii	A35 triplicate	Roadside	436465	113082	NO_2	No	0.0	2.0	No	3.0
52	131 Christchurch Road, Ringwood	Roadside	438836	102115	NO_2	No	0.0	1.0	No	3.0
53	84 Christchurch Road, Ringwood	Roadside	415118	104608	NO_2	No	0.0	2.0	No	3.0
54	58 Eastfield Lane, Ringwood (A31)	Roadside	415022	104926	NO_2	No	0.0	2.0	No	3.0
55	Emery Down Adj Sunnydale	Roadside	416157	105467	NO_2	No	6.0	3.0	No	3.0
56	Emery Down - Horseshoe Cottage	Roadside	428783	108535	NO_2	No	0.0	3.0	No	3.0
57	Emery Down - Grey Gables, Pikes Hill	Roadside	429621	108873	NO_2	No	0.0	0.0	No	3.0
58	Emery Down - Swan Green	Roadside	429033	108203	NO_2	No	5.0	2.0	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
59	8 Shaftesbury Street Fordingbridge - downpipe	Roadside	414648	114165	NO_2	No	0.0	1.5	No	3.0
60	Co-Op, High Street, Fordingbridge - downpipe	Roadside	414759	114192	NO_2	No	0.0	1.5	No	3.0
61	Timothys, 10 High Street, Fordingbridge - downpipe	Roadside	414835	114234	NO_2	No	0.0	1.5	No	3.0
62	Riverside House, 32 Salisbury Rd, Fordingbridge - downpipe	Roadside	414941	114354	NO_2	No	0.0	1.5	No	3.0
63	Bus depot, Lymington	Roadside	432694	95766	NO_2	No	0.0	2.0	No	3.0

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 NO₂ 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
CM1 Totton	436188	113237	Roadside	86	86	26	21	19	23	22
CM2 Lyndhurst	429859	108204	Kerbside	100	100	34	31	23	25	26

☒ **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 NO₂ annual mean objective of 40 µg 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 NO₂ 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	429991	107583	Roadside	100.0	100.0	17.4	16.7	12.4	13.4	13.5
2	429928	107687	Roadside	100.0	100.0	25	23.2	17.3	18.7	18.3
3ai, 3aii	429895	107770	Roadside	100.0	100.0	32.7	29.8	19.5	24.2	25.0
5	429895	107770	Roadside	100.0	100.0	25.0	24.2	19	20.3	20.4
6	429760	107972	Roadside	84.6	84.6		23.2	18.3	22	23.3
7	429710	108128	Roadside	92.3	92.3	18	16	11.9	13.4	13.8
8	429767	108205	Roadside	100.0	100.0	21.6	20.5	15.1	17.2	16.4
9	429864	108213	Kerbside	90.4	90.4	35.2	31.5	24.4	25	25.7
10ai, 10aii, 10aiii	429858	108205	Kerbside	100	100	34.9	31.6	24	24.9	25.8
13	429875	108207	Kerbside	100	100	36.9	35.1	26.6	24.9	27.0
14	429891	108245	Roadside	100.0	100.0	29.1	30.1	23.7	26.6	27.1
15	429911	108402	Roadside	92.3	92.3	22.5	23.9	15.6	18.4	18.3
16ai, 16aii	429933	108200	Roadside	92.3	92.3	19.6	20	17	18	17.5
18	430026	108206	Roadside	92.3	92.3	28.8	29	20.1	23.7	20.9
19	430079	108147	Roadside	100.0	100.0	39.3	36.4	29	30.5	29.3
20	430092	108077	Roadside	100.0	100.0	22.1	22.6	17.8	21.2	21.0
21	430162	108173	Roadside	100.0	100.0	17.3	17.5	15.7	17.3	16.8
22	429169	108129	Roadside	100.0	100.0	27.2	26.9	19.3	21.1	17.6
23	429782	108209	Kerbside	84.6	84.6			18	18.5	18.8
24	429782	108209	Kerbside	75.0	75.0			16.6	18.5	18.5
25	429782	108209	Kerbside	75.0	75.0			16.3	16.9	17.0
26	429739	108195	Roadside	90.4	90.4	27.9	31.9	23.3	23.6	23.7
27	442947	103931	Industrial	100.0	100.0	12.3	12.2	9.7	10.9	11.1
28	442947	103931	Industrial	73.1	73.1	12.9	12.1	9.7	10.7	10.8

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
29	445881	103247	Rural	100.0	100.0	10.6	8.8	7.7	7.6	7.7
30	438363	109694	Roadside	100.0	100.0	16.7	16	13.5	15.1	14.6
31ai, 31aii	425877	111778	Roadside	92.3	92.3	28.2	29.1	21.9	24.4	22.1
33ai, 33aii, 33aiii	436189	113235	Roadside	100.0	100.0	23.2	22.5	18	22.9	22.2
36	436210	113210	Roadside	100.0	100.0	24.7	24.5	19.5	19.5	18.1
37	436232	113156	Roadside	100.0	100.0	24.3	22.6	17.2	22.1	21.6
38	436205	113019	Roadside	100.0	100.0	25.2	25.6	19.8	18.5	18.0
39	436278	113081	Roadside	90.4	90.4	25	24.8	19.5	24.3	23.1
40	436383	113135	Roadside	92.3	92.3	24.8	25.5	19.2	23.8	21.7
41	436476	113214	Roadside	82.7	82.7	25.4	24.6	18.8	22.5	21.5
42	436364	113322	Roadside	92.3	92.3	27.8	26.6	17.6	23.3	21.5
43	436210	112948	Roadside	100.0	100.0	23.7	24.1	18	19.6	20.3
44	436234	112898	Roadside	92.3	92.3	20.4	18.5	14.9	18.1	17.6
49ai, 49aii, 49aiii	436465	113082	Roadside	100.0	100.0			29.1	36.2	32.9
52	438836	102115	Roadside	90.4	90.4	26.2	25.4	19.2	21.2	21.7
53	415118	104608	Roadside	92.3	92.3	26.3	26.6	23.8	26.7	26.3
54	415022	104926	Roadside	100.0	100.0	27.8	24.3	18.4	22	23.7
55	416157	105467	Roadside	65.4	65.4			6.2	6.9	5.9
56	428783	108535	Roadside	100.0	100.0			8.1	7.8	7.3
57	429621	108873	Roadside	100.0	100.0			7.5	7.2	7.1
58	429033	108203	Roadside	76.9	76.9			8.3	9.4	10.0
59	414648	114165	Roadside	92.3	92.3			19.2	18.8	18.3
60	414759	114192	Roadside	92.3	92.3			24.8	25.9	23.7
61	414835	114234	Roadside	92.3	92.3			22.2	22.7	22.4

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
62	414941	114354	Roadside	92.3	92.3			18.3	16.3	16.9
63	432694	95766	Roadside	82.7	82.7			11.1	11.4	11.5

☒ **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 60 µg m^{-3}, indicating a potential exceedance of the NO$_2$ 1-hour mean objective are shown in **<u>bold and underlined</u>**.

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%).
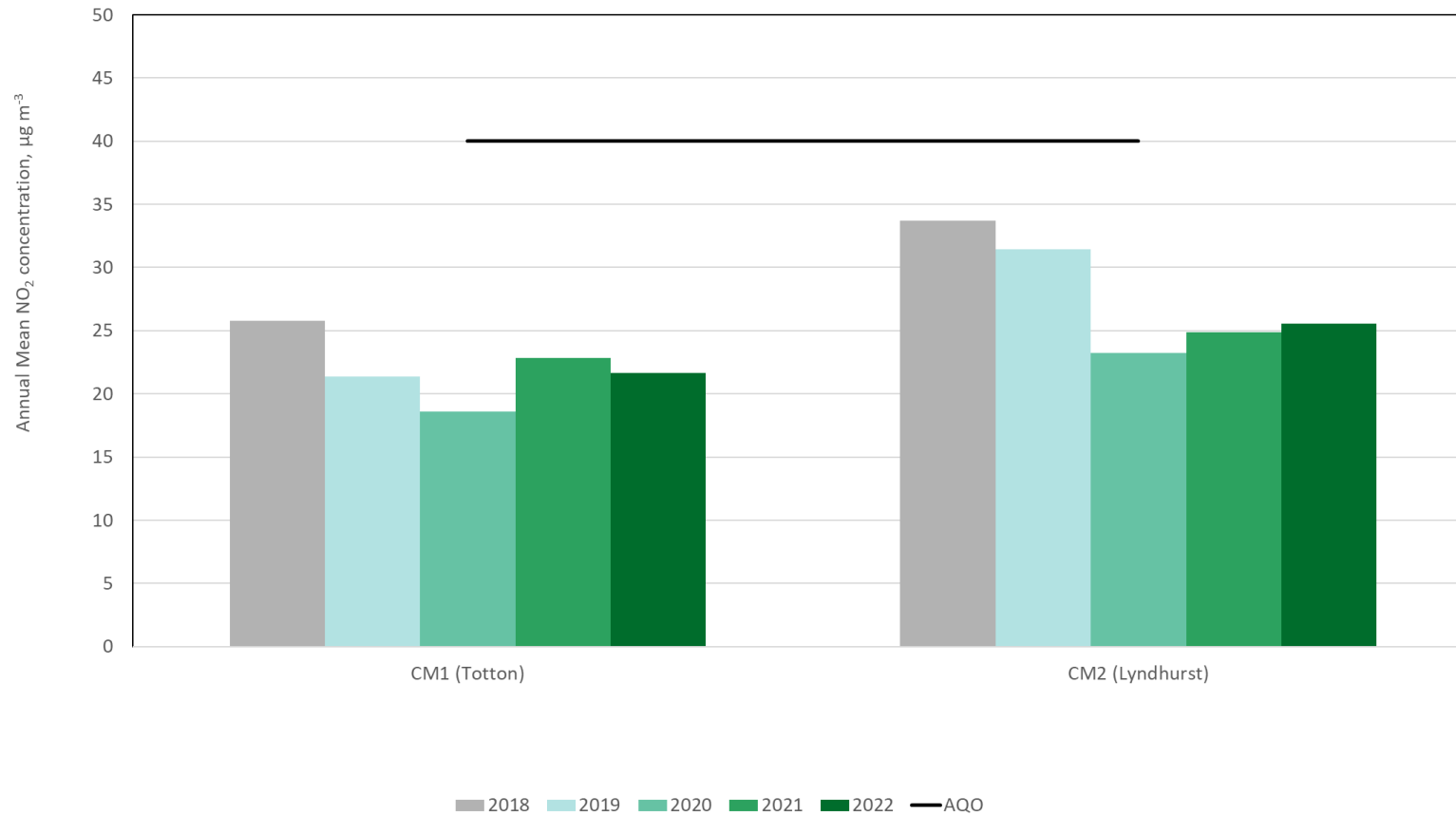
Figure A.1 – Trends in Annual Mean NO₂ Concentrations

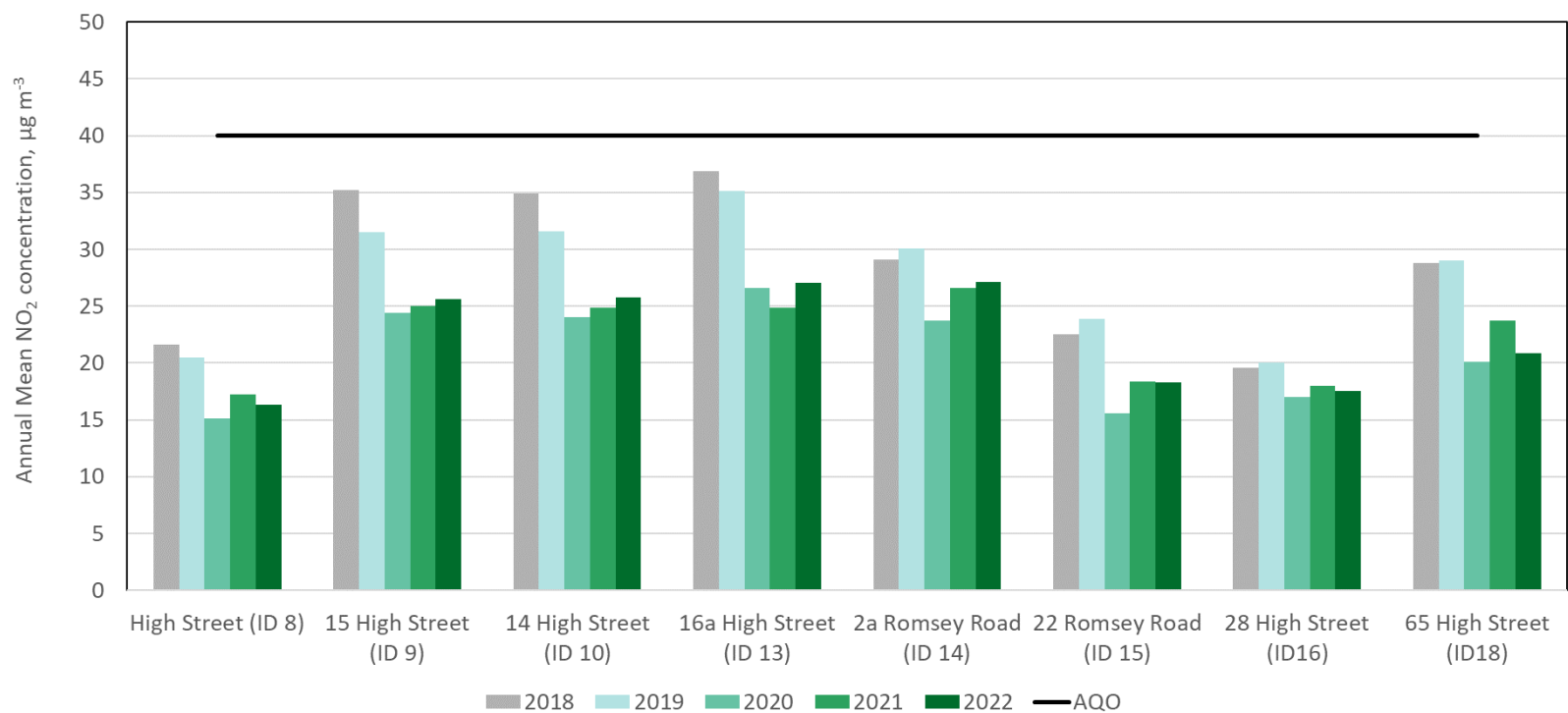**Figure A.2 – Trends in Annual Mean NO₂ Concentrations in Lyndhurst AQMA (Diffusion Tubes)**

Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200 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
CM1 Totton	436188	113237	Roadside	86	86	0	0	0	0	0
CM2 Lyndhurst	429859	108204	Kerbside	100	100	0	0	0	0	0

Notes:

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

Exceedances of the NO₂ 1-hour mean objective (200 µg 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 (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
CM1 Totton	436188	113237	Roadside	96	96	18	19	21	18	19
CM3 Fawley	445885	103248	Industrial	96	96	16	17	19	15	17

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

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the PM$_{10}$ 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.

(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%).
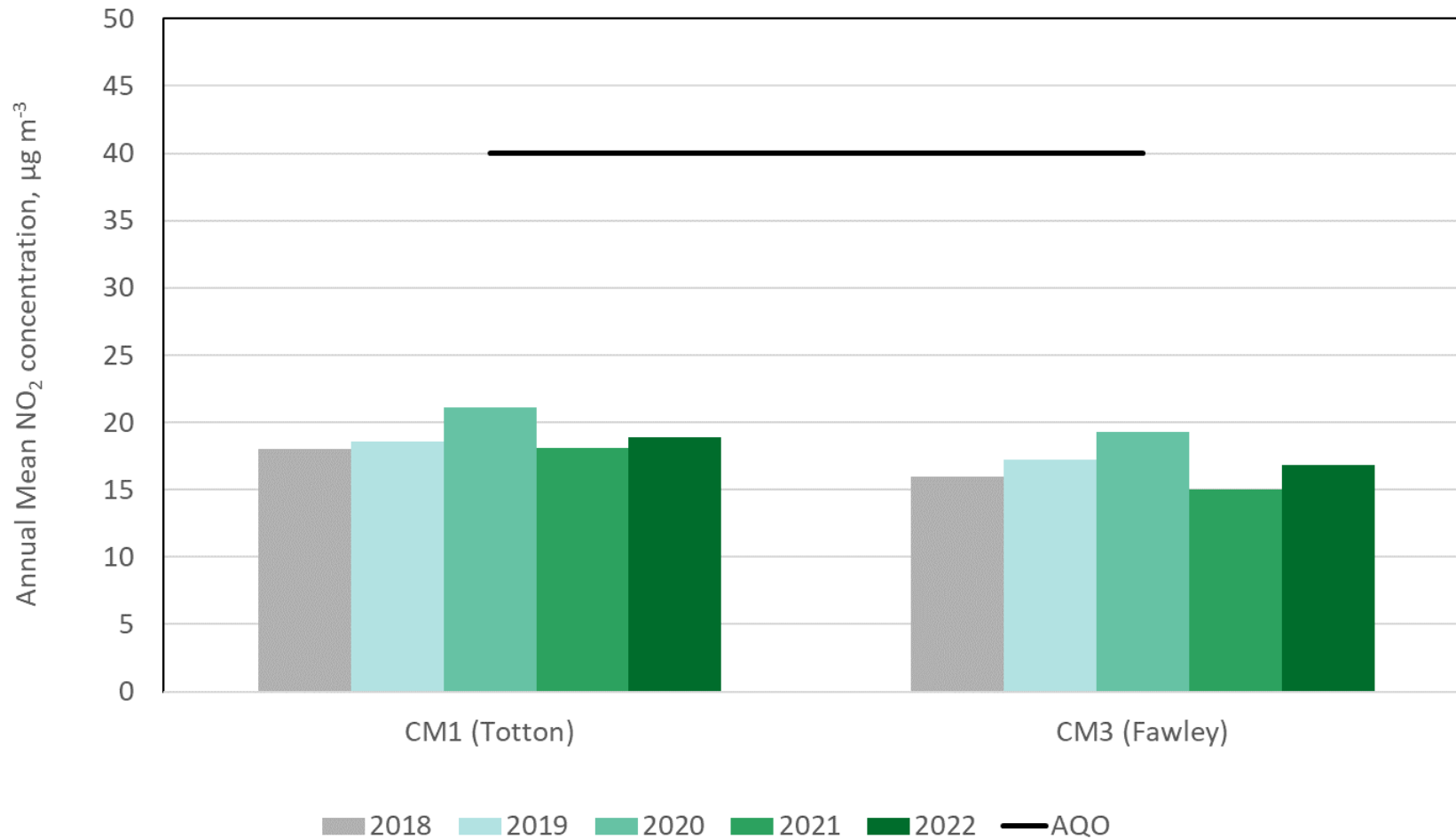
Figure A.3 – Trends in Annual Mean PM$_{10}$ Concentrations

Table A.7 – 24-Hour Mean PM$_{10}$ Monitoring Results, Number of PM$_{10}$ 24-Hour Means > 50 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
CM1 Totton	436188	113237	Roadside	96	96	0	5	0	2	0
CM3 Fawley	445885	103248	Industrial	96	96	0	2	0	0	3

Notes:

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

Exceedances of the PM$_{10}$ 24-hour mean objective (50 µg 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%).

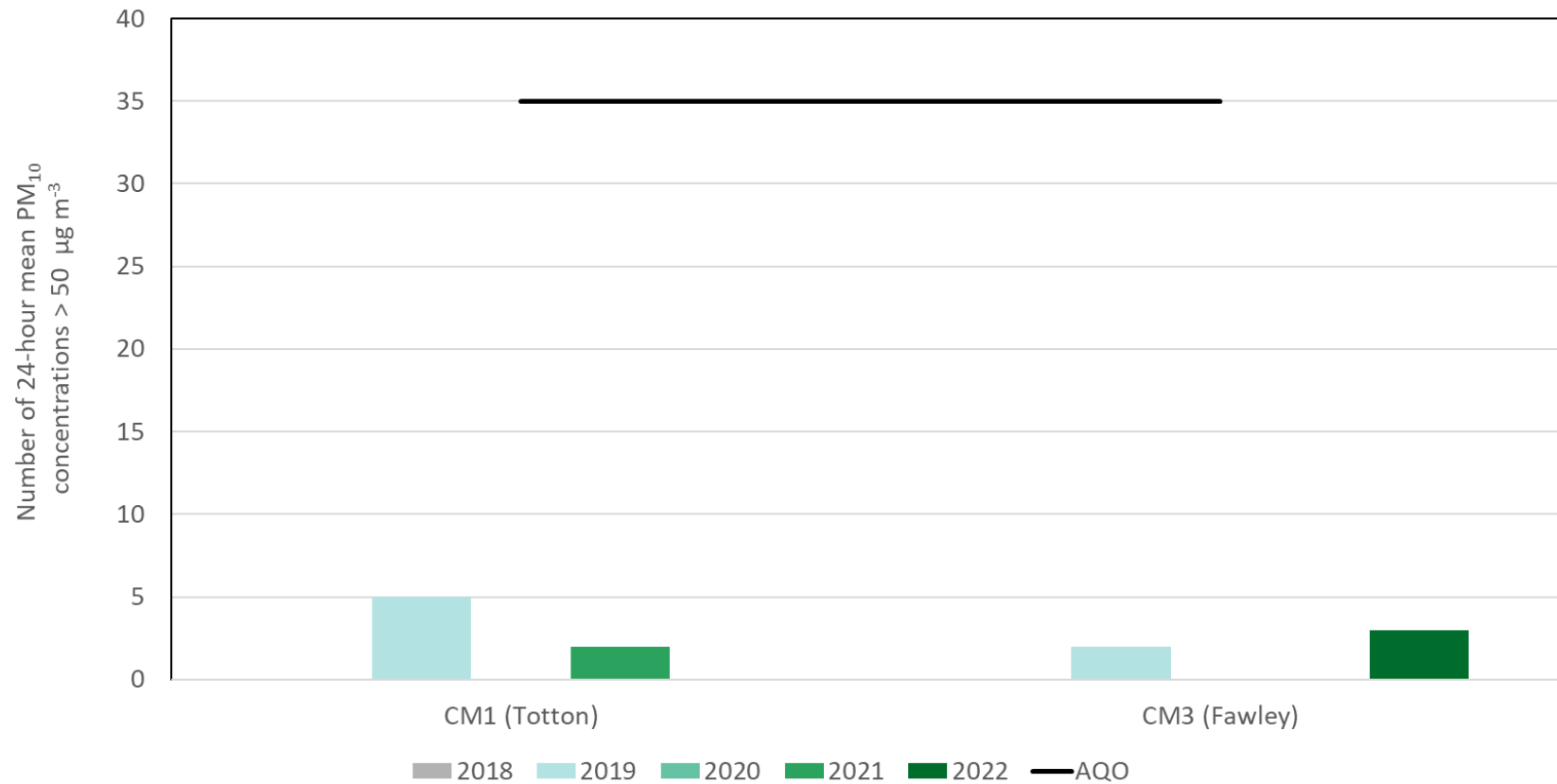**Figure A.4 – Trends in Number of 24-Hour Mean PM$_{10}$ Results > 50 µg m^{-3}**

Table A.8 – SO₂ 2022 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 2022 (%) [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
CM3 Fawley	445885	103248	Industrial	99	99	1	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 2022

Table B.1 – NO₂ 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 0.69 0.76	Annual Mean: Distance Corrected to Nearest Exposure	Comment
9	429864	108213	37.4	29.1	40.9	41.3	34.9	35.4	37.4	50.8	36.2		32.4	33.2	37.2	25.7	-	
10ai	429858	108205	42.0	31.8	44.0	33.7	32.1	36.3	42.1	47.1	36.8	38.4	36.3	33.7	-	-	-	Triplicate Site with 10ai, 10aii and 10aiii - Annual data provided for 10aiii only
10aii	429858	108205	44.2	34.0	44.4	34.5	36.0	32.9	29.9	45.8	36.2	38.4	33.6	38.2	-	-	-	Triplicate Site with 10ai, 10aii and 10aiii - Annual data provided for 10aiii only
10aiii	429858	108205	40.7		43.1	35.4	37.2	35.8	32.8	45.1	38.5	38.5	35.7	26.3	37.3	25.8	-	Triplicate Site with 10ai, 10aii and 10aiii - Annual data provided for 10aiii only
13	429875	108207	42.1	35.3	43.5	36.5	37.8	37.8	32.4	47.6	39.5	40.2	38.8	38.8	39.2	27.0	-	
1	429991	107583	20.6	14.0	26.4	20.5	14.6	14.6	12.0	22.3	17.5	17.1	16.5	17.7	17.8	13.5	-	
2	429928	107687	28.4	19.0	36.2	28.1	23.0	18.3	17.5	30.7	27.7	20.1	16.1	24.2	24.1	18.3	-	
3ai	429895	107770	35.6	24.4	45.6	41.1	31.1	30.5	28.3	41.2	33.9	31.0	29.6	24.6	-	-	-	Duplicate Site with 3ai and 3aii - Annual data provided for 3aii only
3aii	429895	107770	43.0	21.6	47.6	35.4	31.1	30.8	32.6	40.6	31.4	28.6	24.8	25.5	32.9	25.0	-	Duplicate Site with 3ai and 3aii - Annual data provided for 3aii only
5	429895	107770	33.4	25.9	34.4	24.3	25.4	26.1	24.6	27.1	24.6	26.9	21.2	28.3	26.9	20.4	-	
6	429760	107972	48.7		40.4	28.1	25.3	26.2	26.8		29.8	28.1	27.3	26.4	30.7	23.3	-	
7	429710	108128	22.0		25.4	18.4	15.3	14.1	16.3	20.2	16.1	16.3	15.4	19.6	18.1	13.8	-	
8	429767	108205	30.3	21.9	27.1	18.9	20.7	17.2	14.9	23.0	19.8	22.7	23.0	18.9	21.5	16.4	-	
14	429891	108245	42.6	33.3	44.3	35.1	30.8	34.3	28.9	45.2	32.3	33.0	35.8	32.4	35.7	27.1	-	
15	429911	108402	24.7		31.1	25.7	21.3	20.0	19.6	34.5	21.9	22.9	21.4	21.6	24.1	18.3	-	
16ai	429933	108200	30.6		27.2	22.3	21.8	20.7	18.0	22.0	20.1	25.3	25.5	22.9	-	-	-	Duplicate Site with 16ai and 16aii - Annual data provided for 16aii only
16aii	429933	108200	31.0		28.7	18.8	20.2	20.8	16.2	25.7	20.5	21.8	24.8		23.1	17.5	-	Duplicate Site with 16ai and 16aii - Annual data provided for 16aii only
18	430026	108206	38.2	26.8	37.7	3.5	27.1	25.3	23.8	38.6		27.8	25.6	27.7	27.5	20.9	-	
19	430079	108147	43.9	37.6	39.6	37.4	40.4	38.9	28.4	46.1	41.4	43.6	30.1	35.0	38.5	29.3	-	
20	430092	108077	34.2	21.8	35.4	29.2	24.6	22.6	20.6	37.2	29.2	25.8	24.2	27.5	27.7	21.0	-	
21	430162	108173	27.1	23.2	23.6	19.2	19.8	18.6	20.2	24.3	20.6	21.2	25.2	22.3	22.1	16.8	-	
22	429169	108129	23.6	12.8	19.4	23.0	24.2	28.2	15.5	28.2	27.2	27.9	25.0	23.1	23.2	17.6	-	
23	429782	108209	29.6			22.1	21.8	20.2	20.2	29.8	22.6	27.3	28.2	25.0	24.7	18.8	-	

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 0.69 0.76	Annual Mean: Distance Corrected to Nearest Exposure	Comment
24	429782	108209	37.5		31.4	21.5	21.8	20.1	17.5	26.9	19.7			23.0	24.4	18.5	-	
25	429782	108209	29.7		31.4	20.6	19.6	19.4	16.5	24.3	18.9			21.0	22.4	17.0	-	
26	429739	108195	43.2	33.1	34.8	29.4		28.4	24.9	31.8	28.0	32.0	27.4	29.5	31.1	23.7	-	
27	442947	103931	22.0	10.9	24.7	15.2	10.4	10.2	11.3	14.3	11.3	16.5	12.3	15.7	14.6	11.1	-	
28	442947	103931	21.0		18.0	15.0		12.2	11.3	14.3	12.4	12.3	11.5		14.2	10.8	-	
29	445881	103247	13.7	8.8	13.0	10.0	8.0	12.3	4.3	11.4	8.5	8.8	9.1	14.1	10.2	7.7	-	
30	438363	109694	24.7	17.0	24.0	19.6	15.1	16.4	13.1	21.9	17.3	20.3	20.6	20.7	19.2	14.6	-	
31ai	425877	111778	37.6		28.1	1.3		30.2	28.0	33.9	28.0	30.5	29.0	27.1	-	-	-	Duplicate Site with 31ai and 31aii - Annual data provided for 31aii only
31aii	425877	111778	38.9		28.8	31.9	30.5	33.3	23.3	35.3	29.9	30.3	25.4	28.2	29.1	22.1	-	Duplicate Site with 31ai and 31aii - Annual data provided for 31aii only
33ai	436189	113235	37.3	28.0	37.2	28.3	21.9	23.1	19.7	28.4	28.1	31.3	33.3	29.6	-	-	-	Triplicate Site with 33ai, 33aii and 33aiii - Annual data provided for 33aiii only
33aii	436189	113235	35.9	28.6	39.5	26.2	22.0	25.5	19.6	28.6	27.8	33.4	33.2	33.1	-	-	-	Triplicate Site with 33ai, 33aii and 33aiii - Annual data provided for 33aiii only
33aiii	436189	113235	40.0	29.1	37.3	28.7	22.2	25.6	15.9	30.1	25.7	33.6	31.9	29.9	29.2	22.2	-	Triplicate Site with 33ai, 33aii and 33aiii - Annual data provided for 33aiii only
36	436210	113210	35.8	17.7	31.0	25.5	19.3	17.5	14.9	25.1	23.3	24.5	25.9	25.4	23.8	18.1	-	
37	436232	113156	36.8	27.7	33.4	29.3	24.5	24.6	23.0	29.4	28.4	29.4	30.7	23.1	28.4	21.6	-	
38	436205	113019	30.9	20.5	31.5	25.8	18.7	18.6	18.2	21.9	21.4	25.9	24.9	26.4	23.7	18.0	-	
39	436278	113081	42.8	31.0	41.4		23.9	23.7	15.0	30.7	27.5	30.7	33.9	34.4	30.5	23.1	-	
40	436383	113135	37.9		37.2	27.9	24.7	22.4	15.2	29.5	24.3	32.4	32.3	31.0	28.6	21.7	-	
41	436476	113214	37.9	30.7			22.6	22.6	16.1	29.7	30.2	30.2	32.1	31.0	28.3	21.5	-	
42	436364	113322	44.4		40.9	31.2	16.3	21.2	16.8	31.9	25.0	27.9	27.1	29.0	28.3	21.5	-	
43	436210	112948	33.4	24.3	34.7	25.2	21.1	23.3	19.5	25.9	24.0	30.7	30.9	27.6	26.7	20.3	-	
44	436234	112898	36.5		28.6	26.2	14.3	15.4	13.4	23.5	26.0	19.6	22.6	28.1	23.1	17.6	-	
49ai	436465	113082	55.2	40.4	42.0	46.0	41.5	37.3	31.2	45.2	42.9	43.0	48.4	46.3	-	-	-	Triplicate Site with 49ai, 49aii and 49aiii - Annual data provided for 49aiii only
49aii	436465	113082	57.0	46.9	41.2	44.8	42.0	39.1	25.6	43.0	45.3	42.6	45.3	50.4	-	-	-	Triplicate Site with 49ai, 49aii and 49aiii - Annual data provided for 49aiii only
49aiii	436465	113082	58.1	30.9	41.8	45.8		40.0	30.4	43.4	45.4	42.0	50.6	47.1	43.3	32.9	-	Triplicate Site with 49ai, 49aii and 49aiii - Annual data provided for 49aiii only
52	438836	102115	38.1	19.8	38.4	26.0		25.0	29.1	30.5	27.6	29.0	23.8	26.8	28.6	21.7	-	
53	415118	104608	44.5		37.3	30.0	29.6	28.8	28.8	38.0	31.8	35.8	37.8	37.8	34.6	26.3	-	
54	415022	104926	46.7	34.6	29.0	33.1	27.8	27.4	27.0	35.4	30.8	26.8	27.7	27.4	31.1	23.7	-	

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 0.69 0.76	Annual Mean: Distance Corrected to Nearest Exposure	Comment
55	416157	105467	13.2	8.7	12.1	10.1			6.9	9.0	7.2			9.5	9.6	5.9	-	
56	428783	108535	11.7	6.3	10.8	9.8	10.9	7.9	4.9	11.6	8.4	9.5	9.4	13.4	9.6	7.3	-	
57	429621	108873	12.5	7.9	18.9	8.9	6.2	6.7	7.0	8.5	7.2	8.6	8.5	11.3	9.4	7.1	-	
58	429033	108203	17.6		16.8	12.7	12.1		8.5	15.1	12.2	12.0		11.7	13.2	10.0	-	
59	414648	114165	38.0		27.4	26.7	19.5	19.1	12.6	25.7	21.6	22.5	22.8	28.6	24.0	18.3	-	
60	414759	114192	47.5		33.6	30.5	30.2	28.1	19.7	32.0	30.9	30.0	32.0	28.6	31.2	23.7	-	
61	414835	114234	40.6	30.4	33.6	29.3	28.0	24.4	23.5	30.2		25.8	26.6	31.9	29.5	22.4	-	
62	414941	114354	27.4		27.8	22.7	18.7	19.7	14.4	19.0	19.2	25.1	26.7	23.9	22.2	16.9	-	
63	432694	95766	25.9	16.2	16.2	14.5			7.7	13.7	12.7	11.2	15.8	16.8	15.1	11.5	-	

☒ **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.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.**

☒ **New Forest District Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO₂ annual mean objective of 40 µg m^{-3} are shown in **bold**.

NO₂ annual means exceeding 60 µg m^{-3}, 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 New Forest District Council During 2022

Additional Air Quality Works Undertaken by New Forest District Council During 2022

QA/QC of Diffusion Tube Monitoring

This section provides detail regarding aspects of non-automatic monitoring using diffusion tubes.

Diffusion tube supplier

New Forest District Council's diffusion tubes are supplied and analysed by SOCOTEC Didcot utilising the 20% triethanolamine (TEA) in water preparation method.

SOCOTEC participate in the AIR-PT analysis scheme[12]. This is an independent analytical proficiency-testing scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR NO_2 PT scheme. For those reporting periods in 2022

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[12]

https://laqm.defra.gov.uk/wp-content/uploads/2022/07/LAQM-NO2-Performance-data_Up-to-June-2022_V2.1.pdf

for which SOCOTEC reported results, all results were considered satisfactory (based on z-scores less than or equal to 2). The laboratory performance for SOCOTEC is summarised below:

AIR PT Round	AIR PT AR049	AIR PT AR50
Round conducted in the period	January – February 2022	May – June 2022
SOCOTEC	100	100

The determination of nitrogen dioxide diffusion tube precision is obtained from duplicate and triplicate co-located sites. The results from triplicate diffusion tube sites operated by New Forest District Council at Totton and Lyndhurst can be seen in the spreadsheet calculation used to determine local bias correction and shown in Appendix B. Overall the triplicate diffusion tube sites showed good precision during 2022 for both sites.

Diffusion Tube Calendar

The diffusion tube calendar provided by DEFRA is provided below.

NFDC sampling periods did not deviate significantly from these dates.

Month	Tube on	Tube off
Jan	05/01/2022	02/02/2022
Feb	02/02/2022	02/03/2022
Mar	02/03/2022	30/03/2022
Apr	30/03/2022	04/05/2022
May	04/05/2022	08/06/2022
Jun	08/06/2022	06/07/2022
Jul	06/07/2022	03/08/2022
Aug	03/08/2022	31/08/2022
Sep	31/08/2022	28/09/2022
Oct	28/09/2022	02/11/2022
Nov	02/11/2022	30/11/2022
Dec	30/11/2022	04/01/2023

Diffusion Tube Annualisation

One site (Tube 55 – Emery Down Adj Sunnydale) required annualization because the data capture was below 75%. The automatic data for the annualization was obtained from UK-AIR and included the following background sites:

- Chilbolton

- Bournemouth

Details of annualisation factors and annualised means for this site is provided in Table C-1.

Table C-1 – Annualisation Summary (concentrations presented in µg m^{-3})

Site ID	Annualisation Factor Chilbolton	Annualisation Factor Bournmouth	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
55	0.8459	0.7655	0.8057	9.6	7.7

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 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.

As in previous years co-location of diffusion tubes with automatic analysers takes place within the street canyon at Lyndhurst (using tubes 9, 10ai, 10aii, 10aiii and 13) and Totton (using tubes 33ai, 33aii and 33aiii). The respective local basis adjustment factors for 2022 data are presented in Table C-2.

Table C-2 – Local Bias Adjustment Calculation

	Local Bias Adjustment Lyndhurst Canyon	Local Bias Totton
Periods used to calculate bias	12	9
Bias Factor A	0.69 (0.64 - 0.74)	0.75 (0.69 - 0.82)
Bias Factor B	45% (35% - 55%)	34% (22% - 46%)
Diffusion Tube Mean (µg m^{-3})	37.3	27.3
Mean CV (Precision)	6.0%	4.8%
Automatic Mean (µg m^{-3})	25.8	20.4
Data Capture	99%	99%
Adjusted Tube Mean (µg m^{-3})	26 (24 - 28)	20 (19 - 22)

National bias adjustment

The national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method. A bias adjustment of 0.76 for the year 2022 (based on 5 studies) has been derived from the national bias adjustment spreadsheet (v03_23). A screenshot of the spreadsheet for SOCOTEC is shown in Figure C-1.

Figure C-1 - National bias adjustment factor

Selection of appropriate bias adjustment factor

New Forest District Council have applied the Lyndhurst bias correction factor (0.69) to the tubes within the Lyndhurst canyon (9,10i,10ii, 10iii,13). Street canyons will typically have lower wind speeds than elsewhere hence the pollution concentration will tend to be higher. Using a bias correction obtained from co located data in the immediate vicinity will therefore yield more accurate results.

In previous years, the Totton bias adjustment factor has been used to adjust the Totton tubes. However, in 2022 the Totton bias correction figure was disregarded as data capture from the continuous analyser was poor over periods 1-3 (although the analyser did capture >75% data across the year) Therefore, Totton and all sites, apart from the Lyndhurst canyon, were corrected using the national factor.

A summary of bias adjustment factors used by New Forest District Council over the past five years is presented in Table C-3.

Table C-3 – Bias Adjustment Factors since 2018

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Lyndhurst		0.69
	Totton	V03 2023	(0.75 not used)
	National		0.76
2021	Lyndhurst		0.67
	Totton		0.79
	National	V03 2022	0.76
2020	National	V03 2021	0.74
2019	Lyndhurst		0.68
	National	V03 2020	0.76
2018	Lyndhurst		0.69
	Totton		0.72
	National	V03 2019	0.74

NO₂ 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 New Forest District Council required distance correction during 2022.

QA/QC of Automatic Monitoring

PM₁₀ and PM₂.₅ Monitoring Adjustment

New Forest District Council uses TEOM analysers to monitor PM_{10}. It is noted that this monitoring equipment does not meet the equivalence criteria, however guidance states that it is not necessary to immediately replace the monitoring equipment particularly considering the monitored PM_{10} concentrations are below the objectives. When the equipment is due for replacement the Council will consider other equipment which meets the equivalence criteria.

PM_{10} data has been adjusted using the Volatile Correction Model (VCM) to correct for the use of a TEOM particulate monitor

Automatic Monitoring Annualisation

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

All of the automatic monitoring sites undertake a daily internal calibration using permeation tubes and scrubbers. The sites are also manually calibrated using a reference span gas once a fortnight. The gas is obtained from Air Liquide and BOC, and each cylinder is certified. In addition, the sites are serviced and calibrated every 6 months by engineers

from ESU1 Ltd. who hold current the service contract until the end of 2024. Engineers are also available for call outs if the site appears to be malfunctioning.

Ricardo Energy & Environment validated and ratified the data from the sites during 2022 which was downloaded twice a day. During the validation process any potential problems are identified and if necessary, report back to the Council and ESU1 Ltd. The data is ratified every 1-3 months during which the manual calibrations and servicing are taken into account. Full ratification of the data occurs annually when all servicing and auditing reports, calibrations and breakdown information can be applied to the data.

Ricardo Energy & Environment externally audit the automatic monitoring sites biannually. This process ensures quality assurance and control of the sites.

The data provided in the Annual Status Report 2022 has been fully ratified.

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 diffusion tube NO$_2$ monitoring locations within New Forest District Council required distance correction during 2022. (With the exception of the CAZ sites but these are not required to be formally reported).

As all bias adjusted concentrations were less than 36 µg m^{-3}, it was not necessary to distance correct.

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

Figure D-1 – Map of Automatic Monitoring Site: Totton (CM1)

The Totton site is located in a roadside location to monitor for emissions from a road. This site is located between the road and residential properties, some 5m from the building façade. Therefore, the site is not representative of relevant public exposure.

Figure D-2 – Map of Automatic Monitoring Site: Lyndhurst (CM2) with AQMA Shown
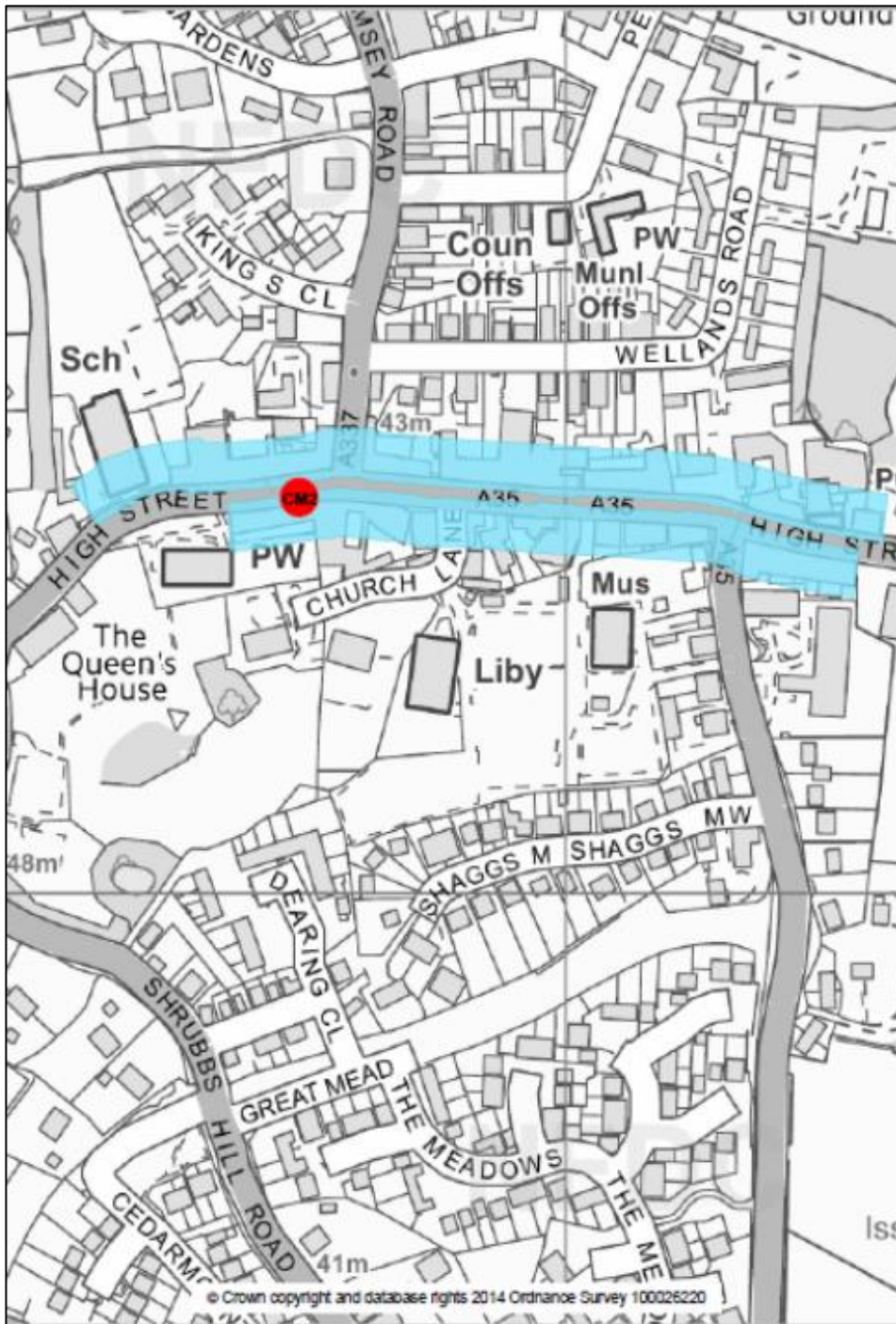
The extent of the Air Quality Management Area within the High Street in Lyndhurst is shown in the blue shading The Lyndhurst site is located on the first floor of an office. The

office is situated within a street canyon and is representative of relevant public exposure because the adjacent properties are residential flats

Figure D-3 – Map of Automatic Monitoring Site: Fawley (CM3)

The Fawley site is located within a village hall, which includes a children's nursery and pre-school, at the centre of the village of Fawley. This site is representative of relevant public exposure.

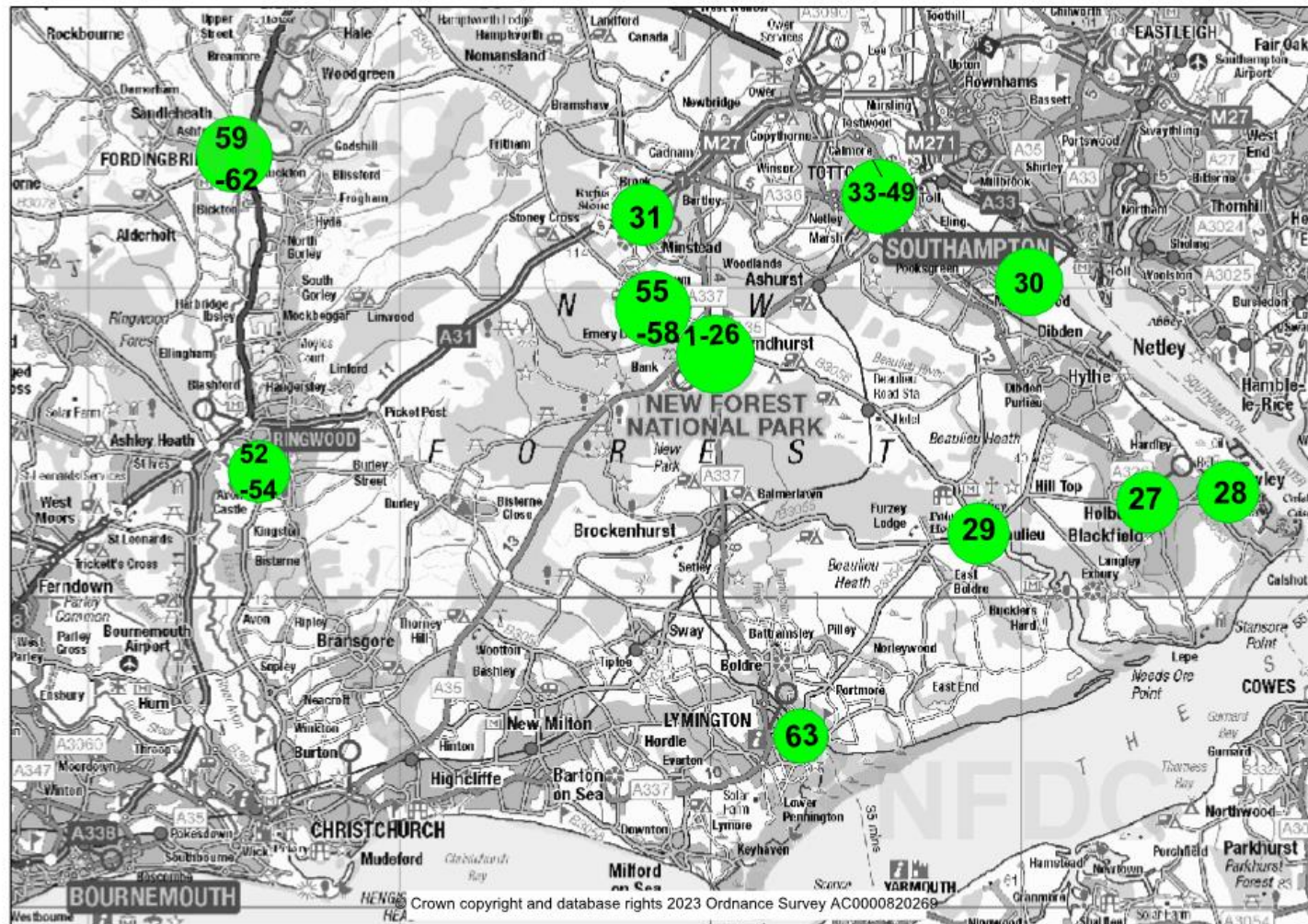**Figure D-4 – Overview of diffusion tubes locations throughout NFDC**

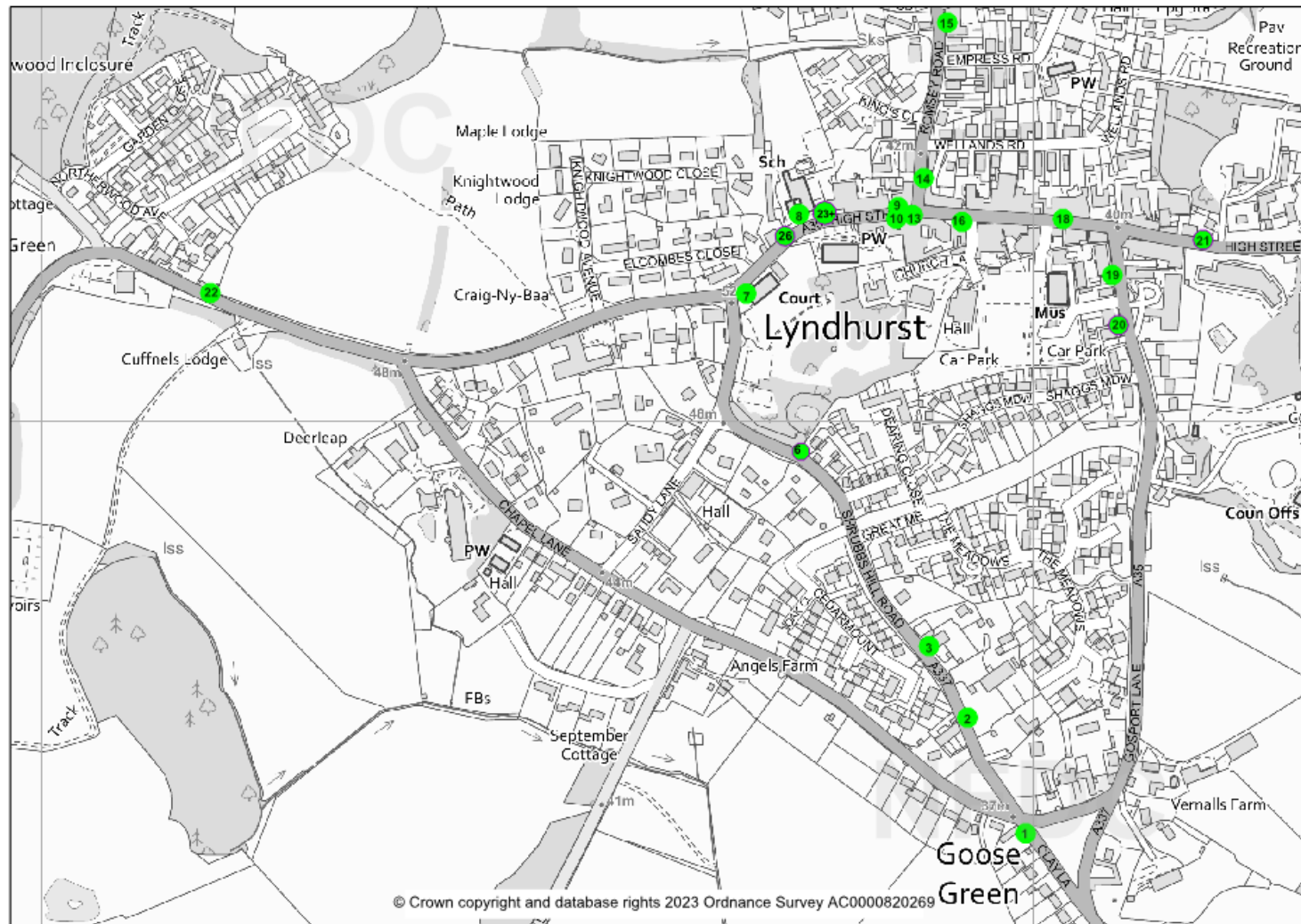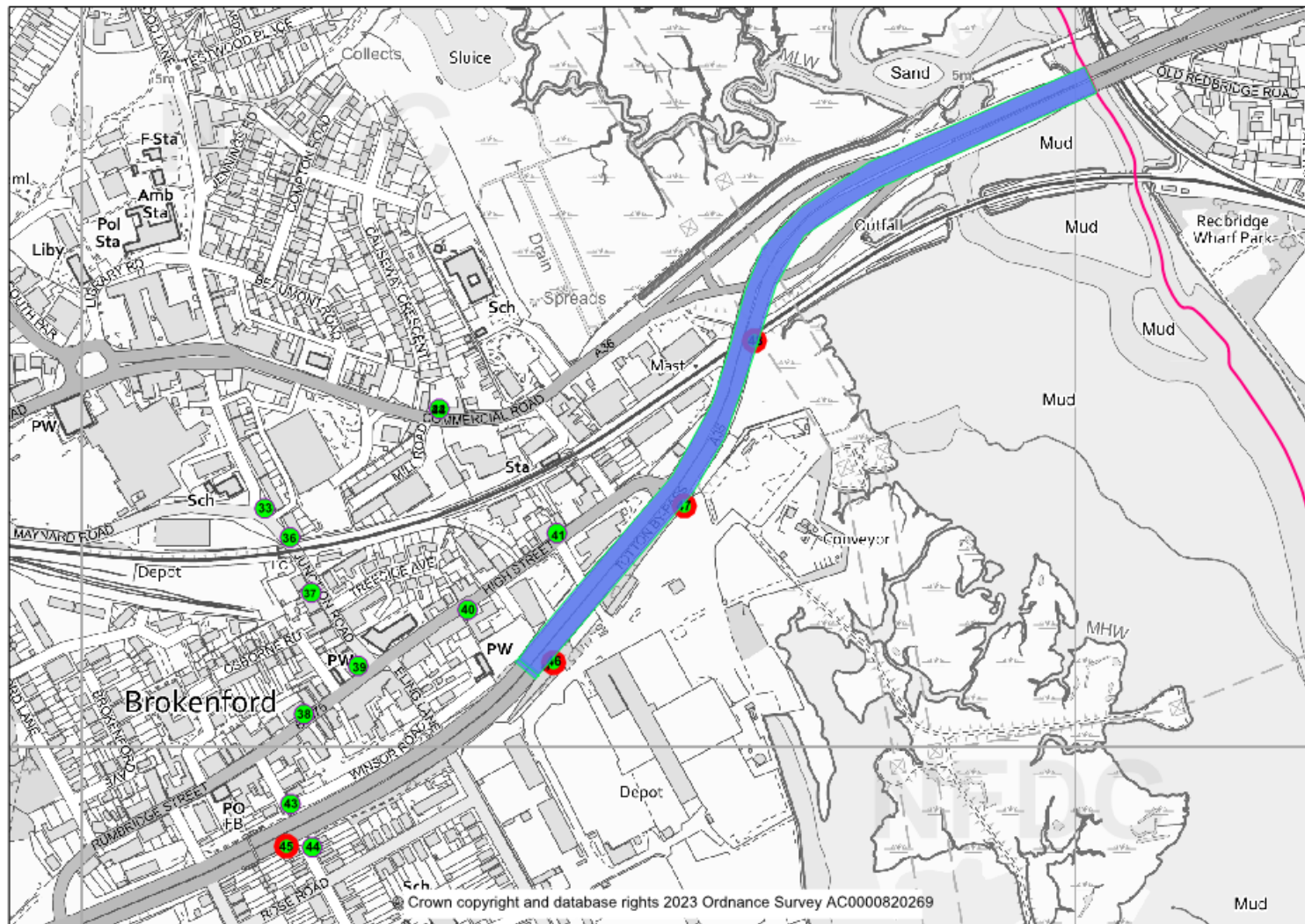**Figure D-5 – NO₂ diffusion tubes in Lyndhurst**

Figure D-6 – NO₂ diffusion tubes in Totton. Note: red circled sites denote CAZ monitoring site. CAZ road shown in blue.

Appendix E: Summary of Air Quality Objectives in England

Table E.1– Air Quality Objectives in England[13]

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

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[13] The units are in microgrammes of pollutant per cubic metre of air (µg m^{-3}).

Appendix F: Estimating $PM_{2.5}$ Concentrations from PM_{10} Monitoring Data

In accordance with the Technical Guidance (Defra, 2022, Box 7.7) nationally derived PM_{Coarse} concentrations of 5.7 μg m^{-3} and 6.4 μg m^{-3} were subtracted from the measured PM_{10} concentrations measured respectively for 2021 and 2022 at Totton. These factors are obtained from the LAQM Support Website[14]

Whilst New Forest District Council monitors PM_{10} at both Totton (roadside) and Fawley (industrial) the new guidance does not recommend applying these correction factors to industrial sites, hence the $PM_{2.5}$ concentration estimates for Fawley have not been presented. For years before 2021 TG22 recommends using the 0.7 factor (0.7 x PM_{10}) presented in TG16.

The $PM_{2.5}$ concentration estimates are presented in Table F.1 and Figure F.1.

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[14] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/estimating-pm2-5-from-pm10-measurements/

Table F.1 – PM₂.₅ Estimates for New Forest District Council

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2021 (%)	2018	2019	2020	2021	2022
CM1 (Totton)	436188	113237	Roadside	96	96	13	13	15	12.4	12.5

Figure F.1 – Trends in Annual Mean PM$_{2.5}$ Concentrations
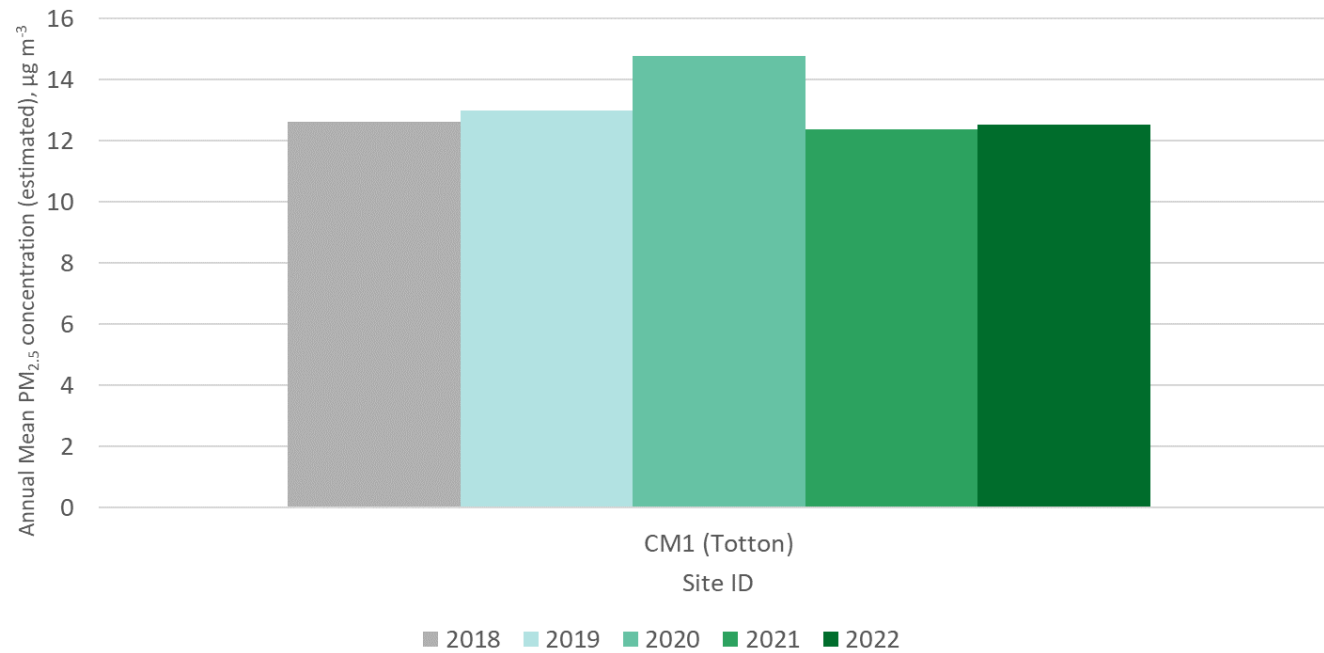
Appendix G: Health Burden of PM$_{2.5}$ As Reported by Office for Health Improvement & Disparities

Table G.1 – Fraction of Mortality Attributable to Particulate Air Pollution - 2021[15]

Region	Fraction of Mortality Attributable to Particulate Air Pollution, %
England	5.5
South East Region	5.4
New Forest DC	5.1

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[15] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/1/gid/1000043/pat/15/par/E92000001/ati/501/are/E07000091/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/tre-do-0_car-do-0

Appendix H: CAZ Monitoring Results

Monitoring of nitrogen dioxide at the CAZ monitoring sites began in 2018. The results are presented here. Concentrations in 2022 increased at two sites compared to 2021 results (CAZ 47 and 48) and decreased at the remaining 2 (CAZ 45 and 46).

Table H.1 - Details of CAZ 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)
45 CAZ	A35 1	Roadside	436210	112902	NO$_2$	NO	1.4	2.6	No	3.0
46 CAZ	A35 2	Roadside	436470	113088	NO$_2$	NO	1.4	2.6	No	3.0
47 CAZ	A35 3	Roadside	436608	113254	NO$_2$	NO	1.6	2.4	No	3.0
48 CAZ	A35 4	Roadside	436675	113400	NO$_2$	NO	0.8	3.2	No	3.0

Table H.2 - Annual Mean NO$_2$ Monitoring Results: Non-Automatic Monitoring at CAZ sites (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
45 CAZ	436210	112902	Roadside	100	100	28.7 (29.9*)	29.3 (31.1*)	22.3	26.3	24.6
46 CAZ	436470	113088	Roadside	92.3	92.3	39.8 (42.4)	39.7 (42.4)	33.5	35.6 (38.0)	34.6
47 CAZ	436608	113254	Roadside	100	100	34.0 (36.3)	33.4 (35.7*)	32.2	33.7 (36.3)	34.2
48 CAZ	436675	113400	Roadside	100	100	38.0 (39.3)	37.5 (38.8)	34.3	35.4 (36.6)	35.99 (37.2).

Notes:

Results in brackets () advise of the bias corrected result prior to distance correction to 4m (as advised for comparison to EU limit value)

* distance corrected but not currently required for bias corrected results less than 36µg m^{-3}

** 2020 no distance corrections undertaken due to bias corrected results less than 36µg m^{-3}

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.

- Defra, 2020 Background Concentration Maps, User Guide, August 2020, Available from UK-AIR 2018-based-background-maps-user-guide-v1.0.pdf (defra.gov.uk)

- New Forest National Park (2007). *Tourism and Recreation, Facts and Figures.* 2007. New Forest National Park Authority.