



2022 Air Quality Annual Status Report (ASR)

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

Date: June 2022

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Executive Summary: Air Quality in Our Area

Air Quality in New Forest District

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

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

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 64km, 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 176,800⁵ although the area also attracts local, national and international visitors throughout the year with over 13 million days visits made annually⁶. With 96% of visitors arriving into the New Forest in cars or coaches, in addition

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

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

3 Defra. Air quality appraisal: damage cost guidance, July 2021

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

5 Environmental equity, air quality, socioeconomic status and respiratory health, 2010

6 New Forest National Park, Facts and Figures, 2007

to the local industry, it is not surprising the New Forest district has some current or potential air quality issues relating to both traffic and industry.

The pollutants of concern in the New Forest district are nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5}) and sulphur dioxide (SO₂). Traffic produces both NO₂ and particulate emissions, whilst the local industry may produce NO₂, particulate and SO₂ emissions.

As a result of identified local air quality issues, the New Forest currently has one declared Air Quality Management Area (AQMA) for the likely exceedance of the annual mean air quality objective for NO₂:

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

Further information with regards to the AQMA can be found at:

<http://www.newforest.gov.uk/airquality>

In 2017 New Forest District Council was named in the UK Air Quality Plan⁷ 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 modelling⁸ 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.

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf

⁸ <https://democracy.newforest.gov.uk/documents/s10445/Annex%20A%20to%20Air%20Quality%20Plan.pdf>

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

Monitoring

New Forest District Council undertakes automatic and non-automatic monitoring of NO₂, PM₁₀ and SO₂ 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 NO₂ has two objectives: an annual mean and an hourly mean.

2021 was the seventh 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 of between 4-11 µg m⁻³ over the last 8 or 9 years within part of the High Street (the annual mean objective for NO₂ is 40 µg m⁻³), with no exceedances of the nitrogen dioxide annual mean objective being monitored in Lyndhurst over the past seven years.

Confidence in the continued compliance supports a view to revoke the Lyndhurst AQMA if data continues its downward trend. 2020 data had been significantly impacted by Covid 19 and so the Council delayed consideration of revoking the AQMA until more normal circumstances had returned when an analysis of data based on a 'back to normal' scenario could be undertaken. The 2021 data indicates that levels are now approaching pre pandemic levels but, crucially, remain below air quality objectives. Revocation of the Lyndhurst AQMA will be reviewed during 2022.

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 sufficient close to suggest that monitoring should continue.

The data obtained from these tubes throughout 2021 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 I).

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 guidance⁹ 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 2021;
- 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, take 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

⁹ Defra. Technical Guidance LAQM.TG16

Protection officer's 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 and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy¹⁰ sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero¹¹ sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

During 2019 New Forest District Council updated the original Air Quality Action Plan (2008) for Lyndhurst¹². This update outlines those options which have been implemented, those which were removed and outlines a number of 'softer' options to forward to hopefully maintain the improvements monitored in nitrogen dioxide concentrations. 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.

Overall monitoring in Lyndhurst has shown significant decreases in the annual mean objective for NO₂, with a 4-11 µg m⁻³ decrease in NO₂ concentrations noted over a 9- year

10 Defra. Clean Air Strategy, 2019

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

12 <https://www.newforest.gov.uk/airquality>

period to date within part of the High Street. There have been no exceedances of the annual mean objective for NO₂ monitored in Lyndhurst during 2021.

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 Plan¹³ as having a one road 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 seen as an extension of issues identified in Southampton in 2015.

As such New Forest District Council and Southampton City Council have worked in partnership to deliver a Southampton Clean Air Zone to ensure compliance with the EU annual mean limit value for nitrogen dioxide on this road in the shortest possible time, and by 2020 at the latest. This requirement has been placed on the Council's by Government.

Detailed and complex local air quality modelling¹⁴ was undertaken in the New Forest and determined that compliance would be met by 2019 in a business as usual scenario.

Furthermore, it has been concluded that the introduction of additional measures will not bring forward compliance, therefore, New Forest District Council's preferred option was to continue with a business as usual scenario.

NFDC has worked with Hampshire County Council and local schools to promote and improve local air quality. Previous collaborations include:

St. Michael's and All Angels Infant School – Lyndhurst

Promotion of a Clean Walking Route to school avoiding the current AQMA by:

- o working with the school to promote the route, including officers attending school assembly and presenting certificates to children walking the Clean Walking route;

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

14 <https://democracy.newforest.gov.uk/documents/s10445/Annex%20A%20to%20Air%20Quality%20Plan.pdf>



- o promoting anti-idling within Lyndhurst High Street including the use of a banner designed by local school children in 2017



Whilst these schemes have not been progressed through 2021, it is hoped Local Authority involvement will continue in 2022.

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

NFDC 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 campaign 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.

As part of this project the team has secured a number of Zephyr sensors which can be deployed around the district to monitor pollution levels, specifically PM₁₀ and PM_{2.5}. The results will be used to provide advice and educational resources to residents in the impact of domestic burning. This work was commenced during 2021 with the sensors likely to be in place by the summer of 2022 and operational for 2 years.

Production of the air quality supplementary planning guide

A supplementary air quality planning guide has been produced to support applicants submitting planning applications and state expectations regarding appropriate assessment of local air quality in terms of the planning regime and mitigation requirements. This document should be ratified by Council members and available for use in 2022.

Priorities

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

- to complete the development of an air quality supplementary planning guide / document to support applicants submitting planning applications and state expectations regarding appropriate mitigation requirements;
- to forward the development of a Clean Air Strategy for New Forest;
- to forward collaborative work on the updated Air Quality Action Plan for Lyndhurst;
- 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' campaign.

Conclusions and Priorities

Conclusions

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

2021 levels generally show an increase on the preceding years results but crucially are generally lower than the 2019, pre covid, levels. The average NO₂ concentration for all diffusion tube sites not in the CAZ decreased by about 6.2 µg m⁻³ from 2019 to 2020 (23.9 µg m⁻³ to 17.6 µg m⁻³) but have risen by about 1.8 µg m⁻³ to 19.5 µg m⁻³ in 2021.

On an individual site basis, the largest increase in NO₂ concentration in 2021 (7.1 µg m⁻³) compared to 2020 occurred at Site 48 (A35) for which the concentration increased from 29.1 µg m⁻³ to 36.2 µg m⁻³. The next highest increase occurred at Site 28 (93 Commercial Road) for which the concentration increased from 17.6 µg m⁻³ to 23.3 µg m⁻³ and remained significantly below the AQO.

Continued compliance with the objective levels within the Lyndhurst AQMA is observed during 2021, providing evidence to support a case for the revocation of the AQMA which will be considered during 2022.

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 station. Results have demonstrated no exceedance of objectives levels in Emery Down and Lymington over the past 2 years. Given the very low levels of NO₂ monitored at these sites, continued monitoring is likely to cease in 2023.

It is noted that planning applications are expected to be submitted to the Council for proposed large developments (identified Strategic Sites in the Local Plan) 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.

Priorities

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

- to assist in the development of an air quality supplementary planning guide / document to support applicants submitting planning applications and state expectations regarding appropriate mitigation requirements;
- to forward the development of a Clean Air Strategy for New Forest;
- to forward collaborative work on the updated Air Quality Action Plan for Lyndhurst;
- 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' campaign.

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://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 street 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 Team Manager)

Caroline Gill (Environmental Health Technical Officer)

This ASR has been approved 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:

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1 Local Air Quality Management

This report provides an overview of air quality in New Forest District during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

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 is currently designated within New Forest District Council. Appendix D: Map(s) of Monitoring Locations and AQMAs, provides maps of air quality monitoring locations in relation to the Lyndhurst AQMA.

The air quality objectives pertinent to the current AQMA designation are as follows:

- NO₂ 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>.

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 National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	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	26.6	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

- NFDC confirm the information on UK-Air regarding their AQMA(s) is up to date.
- NFDC 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 commented on several aspects of the ASR. These are listed below:

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. *The Council have included a detailed discussion of measures to improve air quality in the District including those that target PM_{2.5} emissions. The Council have also outlined their priorities for the coming year. This is commended and the Council should continue to report in this level of detail in future ASRs.*

This will be updated this year.

2. *Compliance with the annual mean AQO for NO₂ has been reported in the AQMA for the last 6 years but the Council are awaiting the results from 2021 monitoring before making the decision to revoke the AQMA. It is acknowledged that air quality in 2020 was affected by COVID-19. The Council should continue to report their decision and progress on revoking the AQMA in the next report.*

A decision on whether to revoke the AQMA will be taken in 2022.

3. *A detailed discussion of NO₂ trends in the Lyndhurst AQMA is included which supports the idea to revoke AQMA. The Council should include a footnote in Table 3-1 to explain the reason for red and underlined values.*

This formatting has been removed from this year's report.

4. *Robust and accurate QA/QC procedures were applied. The Council have presented calculations for the bias adjustment factor applied and included justification for applying a national factor. Annualisation factors were presented where applicable. Although included in the National bias adjustment factor spreadsheet, the Council should include details of the diffusion tube preparation method used by the lab (e.g. 20% TEA in water or 50% TEA in acetone).*

Details of diffusion tube preparation method and the laboratory used has been provided in this year's report.

5. *Overall, the Council have provided a very thorough and detailed report which contains the required content and more.*

New Forest District Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2-2. Eleven measures are included within Table 2-2, with the type of measure and the progress NFDC have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2-2.

More detail on these measures can be found in the respective Action Plan - The Action Plan for Lyndhurst AQMA – An update 2019 . Key completed measures are:

- Increase of air quality issues at the planning stage – work continuing to produce Air Quality – Supplementary Planning Guidance.
- Continued smarter working leading to fewer car journeys
- Increased awareness of issues through the ‘Burn Better’ project

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

- **To complete and implement an air quality supplementary planning guide / document**

Officers will work with planning colleagues to develop a simple air quality supplementary planning guide to assist applicants in providing the required air quality documentation to support their planning applications. This will include an appropriate air quality assessment and mitigation measures.

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

Local air quality measures have historically focused on the Air Quality Management Area's, however with the reduction of these from 3 to 1 within the New Forest there is a requirement to formally expand the air quality focus throughout the New Forest through the development of a Clean Air Strategy for the New Forest.

- **To forward collaborative work on the updated Air Quality Action Plan for Lyndhurst**

To include all relevant stakeholders, including the public and local businesses. To consider the 'softer' measures to improve air quality in Lyndhurst and to consider the revocation of the Lyndhurst AQMA. Progress on this has been slower than expected due to the constraints of Covid and the need to ensure traffic levels are once again approaching business as usual levels to ensure a revocation is based on robust data

- **To work regionally with colleagues in air quality, public health and transport**

To pool expertise and resource to forward local and national air quality issues and strategies regionally, including the Southampton CAZ work, and include:

- installation of electric charging points
- encourage sustainable travel
- encourage smarter working
- to promote the 'Burn Better' message through collaborative work with tEC and other Local Authorities and to deploy low-cost pollution monitors (Zephyrs) to provide data on PM at various locations within the District.

The principal challenges and barriers to implementation that New Forest District Council anticipates facing are:

- to ensure the Council makes the best use of the resource available to move local air quality forward and to respond appropriately on consultations received for planned development with particular reference to the Local Plan
- to motivate local communities to change their behaviour to improve local air quality, particularly when air quality (outside of the known problem areas) is considered good; and,
- the long-term investment needed from multiple agencies to build a sustainable transport system.

New Forest District Council anticipates that the measures stated above and in Table 2-2 will continue to improve air quality in Lyndhurst which already achieves compliance.

Table 2-2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	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	5-10 µg 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	< 1 µg 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	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
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	< 1 µg m ⁻³	NO ₂ monitoring	forwarded quicker due to Covid - flexi home / office work currently continuing	Not suitable for all employees

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5 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. However, by using current guidance, Technical Guidance^(Defra, 2016), the PM_{2.5} annual mean concentration can be estimated using monitoring data from local PM₁₀ analysers. The estimation of the PM_{2.5} annual mean concentration for 2021 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 & Disparities¹⁵ 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 resources to reduce the fraction. The figures are provided for the New Forest District and other regions of interest in Appendix G.

¹⁵ The Office for Health Improvement & Disparities (OHID) is the successor organization to Public Health England, since October 2021

Local hot-spots

Background pollutant maps provided electronically by Defra (Defra,2020)) 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 six years of reporting PM_{2.5} concentrations (based on the monitored PM₁₀ concentrations), concentrations at both sites (Totton and Fawley) have remained consistent.

Further current measures include:

Working with Public Health colleagues

NFDC had previously met with Public Health colleagues and Hampshire County Council. The continuation of these meetings and subsequent implementation of schemes was halted during 2020/21 but are anticipated to resume in 2022.

Working with other partners

Local Tourism

The New Forest district attracts millions of visitors each year including 13.5 million day trips. 96% (NFNP, 2007) 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.

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

In addition to the current measures to review and assess the impact of PM_{2.5} from planning developments (as applicable), it is the intention to work with the local planning authorities (New Forest District Council, New Forest National Park Authority and Hampshire County Council) to provide training to Planning Officers with regards to local air quality and planning, with particular reference to PM_{2.5}. Ideally, this work would be forwarded into formal local planning guidance which would be consistent between the three planning authorities within the New Forest district. This work started at a regional level during 2019. During 2021 NFDC commenced an air quality supplementary planning guidance document. It is anticipated this will be in use in 2022.

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 NFDC 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.

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



In addition, as part of this campaign the group has 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. It is anticipated that the sensors will be deployed during the summer of 2022.

New Measures

Development of a Clean Air Strategy for New Forest

It is acknowledged the assessment and review of PM_{2.5} has not progressed over recent years within the New Forest. Therefore, the development of a Clean Air Strategy for New Forest will include the assessment of PM_{2.5} and if required reduce the pollutant through working with different officers, agencies and businesses.

In summary

The following actions will continue and 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 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 and to deploy low cost sensors in 2022.
- 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 2021 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 2017 and 2021 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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.

New Forest District Council undertook automatic (continuous) monitoring at 3 sites during 2021. 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 .

3.1.2 Non-Automatic Monitoring Sites

New Forest District Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 54 sites during 2021. 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 and List of Local Authorities with AQMAs - Defra, UK. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µgm⁻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 NO₂ concentrations measured by the automatic instruments over the last five years within the Lyndhurst AQMA and in Totton. Figure A.2 presents the NO₂ measured by diffusion tube within the Lyndhurst AQMA.

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant. No distance correction was required for this data set.

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200 µg m⁻³, not to be exceeded more than 18 times per year. There were no exceedances of the objective concentration.

The monitoring undertaken within New Forest District Council throughout 2021 has shown no exceedances of the annual mean objective for nitrogen dioxide at any of the automatic and non-automatic monitoring sites.

Lyndhurst

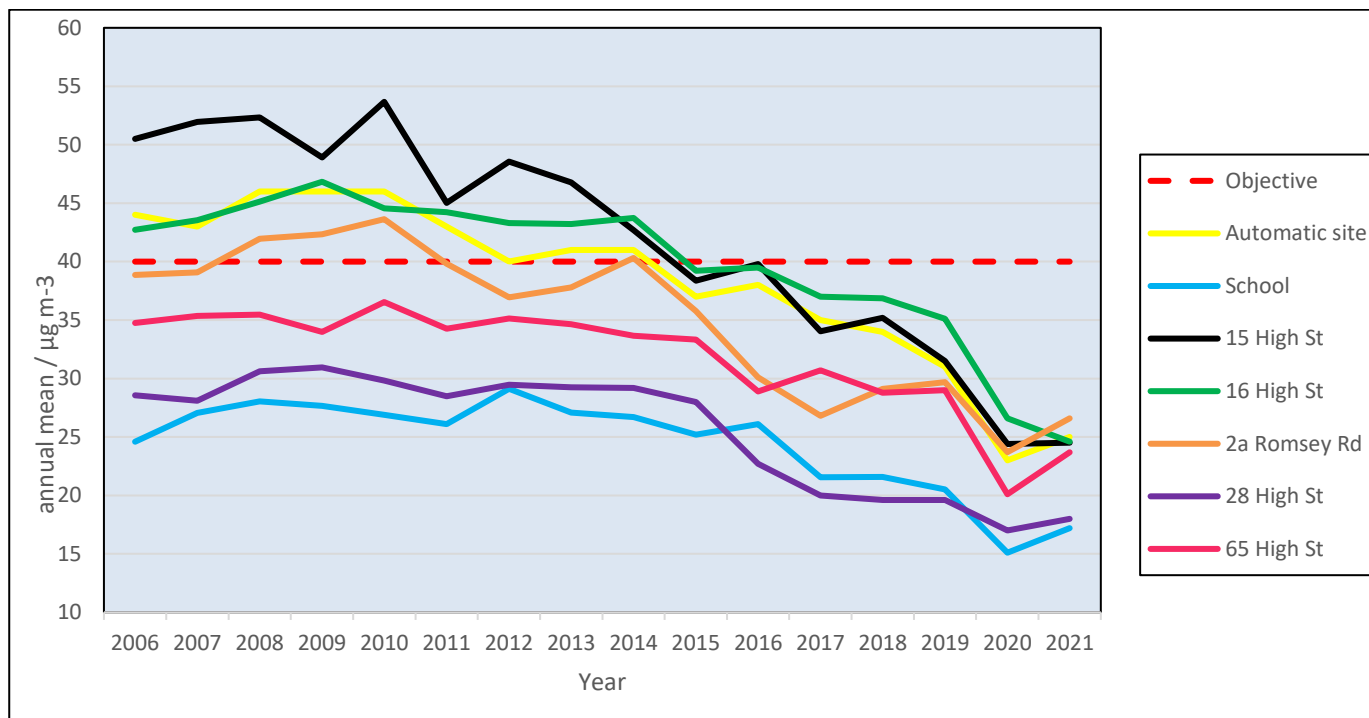
The results for Lyndhurst show an increase in levels in comparison with 2020 which is expected given the lockdowns experienced during 2020, however levels remain lower than those reported in 2019. Within the current AQMA in Lyndhurst the monitoring results are presented in Table 3.1.

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
CM2	Lyndhurst	37	38	35	34	31	23	25
5	School, High St.	25.19	26.1	21.6	21.6	20.5	15.1	17.2
6	15, High St.	38.38	39.8	34.0	35.2	31.5	24.4	24.6
7	14, High St.	37.43	38.5	34.5	34.9	31.6	24.0	24.5
8	16, High St.	39.22	39.5	37.0	36.9	35.1	26.6	24.6
9	2a, Romsey Rd	35.76	30.1	26.8	29.1	30.1	23.7	26.6
11	28, High St.	27.99	22.7	20.0	19.6	20.0	17.0	18
12	65, High St.	33.33	28.9	30.7	28.8	29.0	20.1	23.7

Figure 3.1 shows the trend in nitrogen dioxide concentrations within and closeby the Lyndhurst AQMA since 2006 - 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



The continued compliance with the air quality objective for nitrogen dioxide suggests revocation of the Lyndhurst AQMA should be considered. During 2020 air quality was significantly impacted by Covid-19 and the Council took the decision to delay considering revocation of the AQMA until the 2021 data had been processed when it was expected traffic levels would have returned to pre-pandemic levels. Revocation will therefore be considered during 2022.

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 21-35) has continued to ensure nitrogen dioxide concentrations remain below the air quality objective. The monitoring during 2021 has shown the nitrogen dioxide annual mean concentrations were significantly below the Air Quality Objective of 40 µg m⁻³.

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

Other monitoring locations

Monitoring at the remaining locations showed a noted decrease in concentrations during 2020. Levels have risen during 2021 but no exceedences of the objective have occurred.

New monitoring locations since previous ASR

No new monitoring locations have been added during 2021.

Monitoring locations removed since previous ASR

Rose Road, Totton and Shorefield Road, Marchwood were removed from the diffusion tube network during 2021 since historic results were consistently well below objective levels and the sites are not located in areas likely to experience a deterioration in air quality in the near future.

Ministerial Decision

In 2018 New Forest District Council were issued with a Ministerial Direction to achieve compliance with the EU Ambient Air Quality Directive. As a result, monitoring has been carried out at a number of sites along the A35 in Totton (sites with Site IDs 32 to 35). In 2021, the site measuring the highest mean annual concentration was Site ID 33, measuring ($38.0 \mu\text{g m}^{-3}$ prior to distance correction to 4m) which was within the EU Limit Value.

3.2.2 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of $40 \mu\text{g m}^{-3}$.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of $50 \mu\text{g m}^{-3}$, not to be exceeded more than 35 times per year.

PM₁₀ annual mean concentrations and exceedances remain significantly below air quality objectives.

3.2.3 Sulphur Dioxide (SO₂)

Table A.8 in Appendix A compares the ratified continuous monitored SO₂ concentrations for 2021 with the air quality objectives for SO₂.

There were no exceedances in 2021.

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	Yes, AQMA 1	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)
6	15 High Street, Lyndhurst	Kerbside	429864	108213	NO ₂	yes Lyndhurst	0.0	1.0		3.0
7a , 7b, 7c	14 High Street, Analyser site (triplicate) 7c	Kerbside	429858	108205	NO ₂	yes Lyndhurst	0.0	0.9	Yes	3.0
8	16 High St, Lyndhurst	Kerbside	429875	108207	NO ₂	yes Lyndhurst	0.0	1.6		3.0
21a, 21b, 21c	Junction Road, Totton analyser triplicate	Roadside	436189	113235	NO ₂	no	7.0	2.0	Yes	3.0
22	30 Junction Road, Totton	Roadside	436210	113210	NO ₂	no	3.0	1.0		3.0
23	25 Junction Road, Totton	Roadside	436232	113156	NO ₂	no	0.0	4.0		3.0
24	26 Rumbridge St, Totton	Roadside	436205	113019	NO ₂	no	2.0	1.5		3.0
25	Junction Rd - BATS corner, Totton	Roadside	436278	113081	NO ₂	no	0.0	1.5		3.0
26	Elingfield Court, High St, Totton	Roadside	436383	113135	NO ₂	no	0.0	1.5		3.0
27	55 High St, Totton	Roadside	436476	113214	NO ₂	no	0.0	4.0		3.0
28	93 Commercial Road, Totton	Roadside	436364	113322	NO ₂	no	0.0	1.0		3.0
30	26 Winsor Road, Totton	Roadside	436210	112948	NO ₂	no	0.0	2.0		3.0
31	A35 (Fisher Rd)	Roadside	436234	112898	NO ₂	no	3.0	1.0		3.0
48a, 48b, 48c	A35 Triplicate	Roadside	436465	113082	NO ₂	no	0.0	2.0		3.0
1	Lyndhurst Road, Goose Green	Roadside	429991	107583	NO ₂	no	0.0	0.4		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)
2	1 Foxlease Terrace, Shrubbs Hill Rd	Roadside	429928	107687	NO ₂	no	0.0	1.5		3.0
3ai (duplicate), 3aii (duplicate)	Shrubbs Hill Rd The Orchards - façade 3aii	Roadside	429895	107770	NO ₂	no	0.0	3.0		3.0
3b	Shrubbs Hill Rd, The Orchards door	Roadside	429895	107770	NO ₂	no	0.0	5.0		3.0
47	Shrubbs Hill Road, Hillmead Lodge	Roadside	429760	107972	NO ₂	no	5.0	1.5		3.0
4	Queens House, Lyndhurst	Roadside	429710	108128	NO ₂	no	0.0	5.0		3.0
5	High St, School, Lyndhurst	Roadside	429767	108205	NO ₂	yes Lyndhurst	0.0	6.0		3.0
9	2a Romsey Rd, Lyndhurst	Roadside	429891	108245	NO ₂	yes Lyndhurst	3.0	2.0		3.0
10	22 Romsey Rd, Lyndhurst	Roadside	429911	108402	NO ₂	yes Lyndhurst	0.0	2.3	Yes	3.0
11a, 11b	28 High Street 11b	Roadside	429933	108200	NO ₂	yes Lyndhurst	5.0	4.0		3.0
12	65 High St, Lyndhurst	Roadside	430026	108206	NO ₂	yes Lyndhurst	0.0	1.8		3.0
13	2 Gosport Lane, Lyndhurst	Roadside	430079	108147	NO ₂	no	0.0	2.2		3.0
14	South View, Gosport Lane, Lyndhurst	Roadside	430092	108077	NO ₂	no	5.0	2.0		3.0
15	Southampton Rd, Lyndhurst Park Hotel	Roadside	430162	108173	NO ₂	no	5.0	2.0		3.0
16	A35, Baytree Cottage, B'th Road	Roadside	429169	108129	NO ₂	no	0.0	1.5		3.0
17	Lyndhurst School lamp post 1m	Kerbside	429782	108209	NO ₂	no	0.0	6.0		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	Lyndhurst School lamp post 2m	Kerbside	429782	108209	NO ₂	no	0.0	6.0		3.0
19	Lyndhurst School lamp post 3m	Kerbside	429782	108209	NO ₂	no	0.0	6.0		1.0
20	Red Lodge, High St, Lyndhurst	Roadside	429739	108195	NO ₂	no	0.0	2.0		2.0
37a, 37b	Stoney Cross 37b	Roadside	425877	111778	NO ₂	no	0.0	20.0		3.0
39	Marchwood School, Twiggs Lane	Roadside	438363	109694	NO ₂	no	0.0	25.0		3.0
41	Teachers Way, Holbury School	Industrial	442947	103931	NO ₂	no	0.0	15.9		3.0
42	Jubilee Hall, The Square, Fawley	Industrial	442947	103931	NO ₂	no	0.0	16.4		3.0
43	Beaulieu school field	Rural	445881	103247	NO ₂	no	10.0	15.7		3.0
44	131 Christchurch Road, Ringwood	Roadside	438836	102115	NO ₂	no	0.0	1.0		3.0
45	St Catherine's, Christchurch Road	Roadside	415118	104608	NO ₂	no	0.0	2.0		3.0
46	58 Eastfield Lane, Ringwood (A31)	Roadside	415022	104926	NO ₂	no	0.0	2.0		3.0
49	Emery Down Adj Sunnydale	Roadside	416157	105467	NO ₂	no	6.0	3.0		3.0
50	Emery Down - Horseshoe Cottage	Roadside	428783	108535	NO ₂	no	0.0	3.0		3.0
51	Emery Down - Grey Gables, Pikes Hill	Roadside	429621	108873	NO ₂	no	0.0	0.0		3.0
52	Emery Down - Swan Green	Roadside	429033	108203	NO ₂	no	5.0	2.0		3.0
53	Bus depot, Lymington	Roadside	432694	95766	NO ₂	no	0.0	2.0		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)
54	8 Shaftesbury Street, Fordingbridge	Roadside	414648	114165	NO ₂	no	0.0	1.5		3.0
55	Co-Op, High Street, Fordingbridge	Roadside	414759	114192	NO ₂	no	0.0	1.5		3.0
56	10 High Street, Fordingbridge	Roadside	414835	114234	NO ₂	no	0.0	1.5		3.0
57	32 Salisbury Rd, Fordingbridge	Roadside	414941	114354	NO ₂	no	0.0	1.5		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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
CM1 (Totton)	436188	113237	Roadside	100	100	26	26	21	19	23
CM2 (Lyndhurst)	429859	108204	Kerbside	100	100	35	34	31	23	25

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

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

Notes:

The annual mean concentrations are presented as µg m⁻³.

Exceedances of the NO₂ annual mean objective of 40µg m⁻³ are shown in **bold**.

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

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

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

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

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
6	429864	108213	Kerbside	100	100.0	34.0	35.2	31.5	24.4	25.0
7a , 7b, 7c	429858	108205	Kerbside	100	100.0	34.5	34.9	31.6	24.0	24.9
8	429875	108207	Kerbside	100	100.0	37.0	36.9	35.1	26.6	24.9
21a, 21b, 21c	436189	113235	Roadside	100	100.0	23.2	23.2	22.5	18.0	22.9
22	436210	113210	Roadside	100	100.0	23.8	24.7	24.5	19.5	19.5
23	436232	113156	Roadside	92	93.1	24.2	24.3	22.6	17.2	22.1
24	436205	113019	Roadside	100	100.0	24.7	25.2	25.6	19.8	18.5
25	436278	113081	Roadside	92	92.0	25.2	25.0	24.8	19.5	24.3
26	436383	113135	Roadside	92	93.1	25.8	24.8	25.5	19.2	23.8
27	436476	113214	Roadside	83	85.4	23.7	25.4	24.6	18.8	22.5
28	436364	113322	Roadside	92	93.1	26.7	27.8	26.6	17.6	23.3
30	436210	112948	Roadside	92	93.1	24.6	23.7	24.1	18.0	19.6
31	436234	112898	Roadside	92	92.3	20.1	20.4	18.5	14.9	18.1
48a, 48b, 48c	436465	113082	Roadside	100	100.0				29.1	36.2
1	429991	107583	Roadside	100	100.0	20.4	17.4	16.7	12.4	13.4
2	429928	107687	Roadside	100	100.0	25.3	25.0	23.2	17.3	18.7
3ai (duplicate), 3aii (duplicate)	429895	107770	Roadside	100	100.0	32.6	32.7	29.8	19.5	24.2
3b	429895	107770	Roadside	100	100.0	25.3	25.0	24.2	19.0	20.3
47	429760	107972	Roadside	92	90.4			23.2	18.3	22.0
4	429710	108128	Roadside	100	100.0	17.9	18.0	16.0	11.9	13.4
5	429767	108205	Roadside	100	100.0	21.6	21.6	20.5	15.1	17.2
9	429891	108245	Roadside	100	100.0	26.8	29.1	30.1	23.7	26.6
10	429911	108402	Roadside	100	100.0	23.2	22.5	23.9	15.6	18.4
11a, 11b	429933	108200	Roadside	83	84.6	20.0	19.6	20.0	17.0	18.0
12	430026	108206	Roadside	92	90.4	30.7	28.8	29.0	20.1	23.7
13	430079	108147	Roadside	92	80.8	38.6	39.3	36.4	29.0	30.5
14	430092	108077	Roadside	83	73.1	20.2	22.1	22.6	17.8	21.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
15	430162	108173	Roadside	100	90.4	17.3	17.3	17.5	15.7	17.3
16	429169	108129	Roadside	100	90.4	26.8	27.2	26.9	19.3	21.1
17	429782	108209	Kerbside	83	75.0				18.0	18.5
18	429782	108209	Kerbside	92	82.7				16.6	18.5
19	429782	108209	Kerbside	83	75.0				16.3	16.9
20	429739	108195	Roadside	92	82.7		27.9	31.9	23.3	23.6
37a, 37b	425877	111778	Roadside	92	92.3	33.1	28.2	29.1	21.9	24.4
39	438363	109694	Roadside	92	92.3	16.9	16.7	16.0	13.5	15.1
41	442947	103931	Industrial	100	90.4	9.5	12.3	12.2	9.7	10.9
42	442947	103931	Industrial	100	90.4	12.4	12.9	12.1	9.7	10.7
43	445881	103247	Rural	67	57.7	9.0	10.6	8.8	7.7	7.6
44	438836	102115	Roadside	100	100.0		26.2	25.4	19.2	21.2
45	415118	104608	Roadside	100	100.0		26.3	26.6	23.8	26.7
46	415022	104926	Roadside	100	100.0		27.8	24.3	18.4	22.0
49	416157	105467	Roadside	100	100.0				6.2	6.9
50	428783	108535	Roadside	100	100.0				8.1	7.8
51	429621	108873	Roadside	92	90.4				7.5	7.2
52	429033	108203	Roadside	92	92.3				8.3	9.4
53	432694	95766	Roadside	92	92.3				11.1	11.4
54	414648	114165	Roadside	100	92.3				19.2	18.8
55	414759	114192	Roadside	100	100.0				24.8	25.9
56	414835	114234	Roadside	100	100.0				22.2	22.7
57	414941	114354	Roadside	83	84.6				18.3	16.3

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

Diffusion tube data has been bias adjusted.

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

Notes:

The annual mean concentrations are presented as $\mu\text{g m}^{-3}$.

Exceedances of the NO₂ annual mean objective of 40 $\mu\text{g m}^{-3}$ 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**.

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

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

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 - Trends in Annual Mean NO₂ Concentrations (Automatic monitoring)

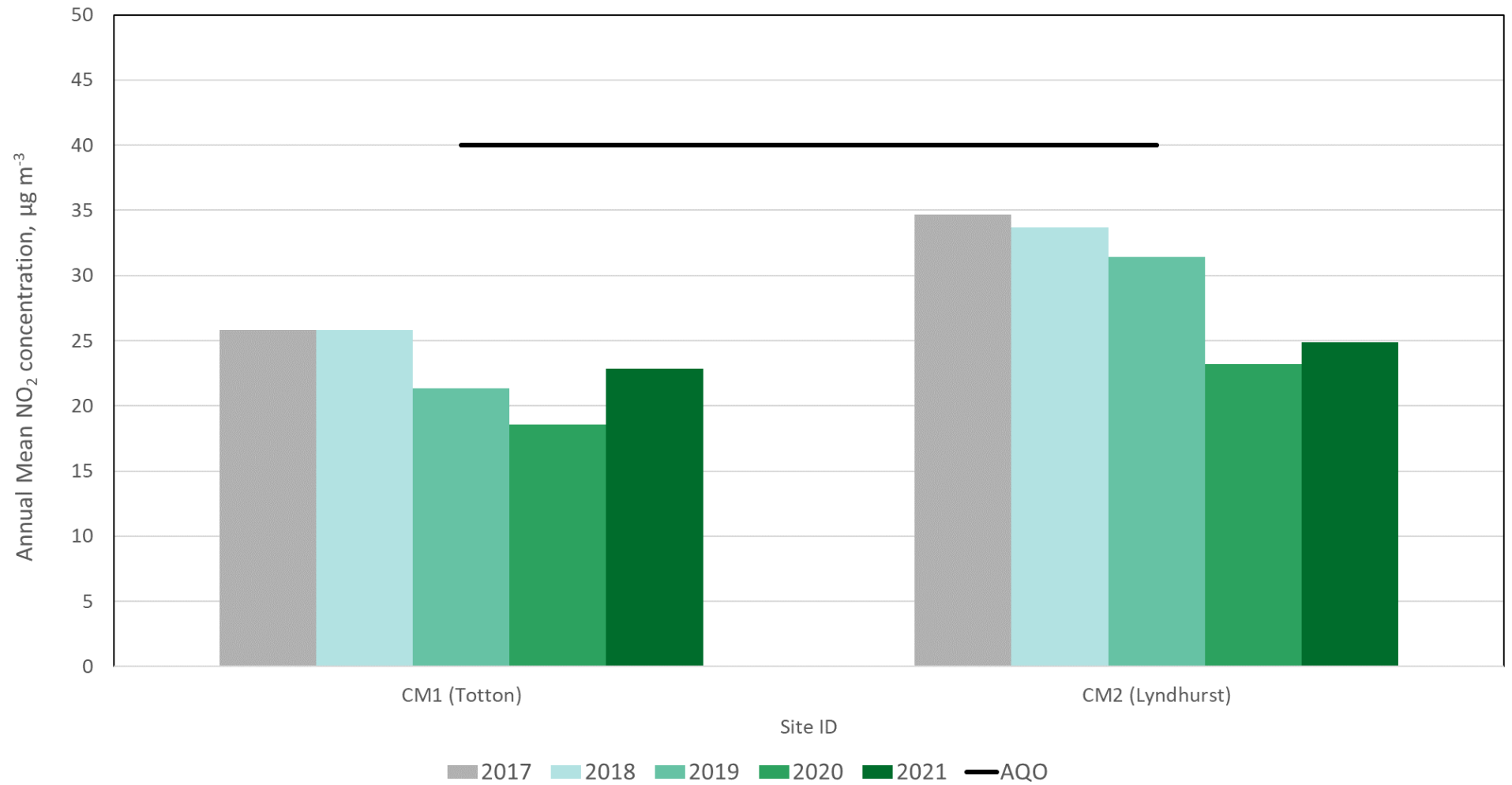


Figure A.2 - Trends in Annual Mean NO₂ Concentrations in Lyndhurst AQMA (Diffusion Tubes)

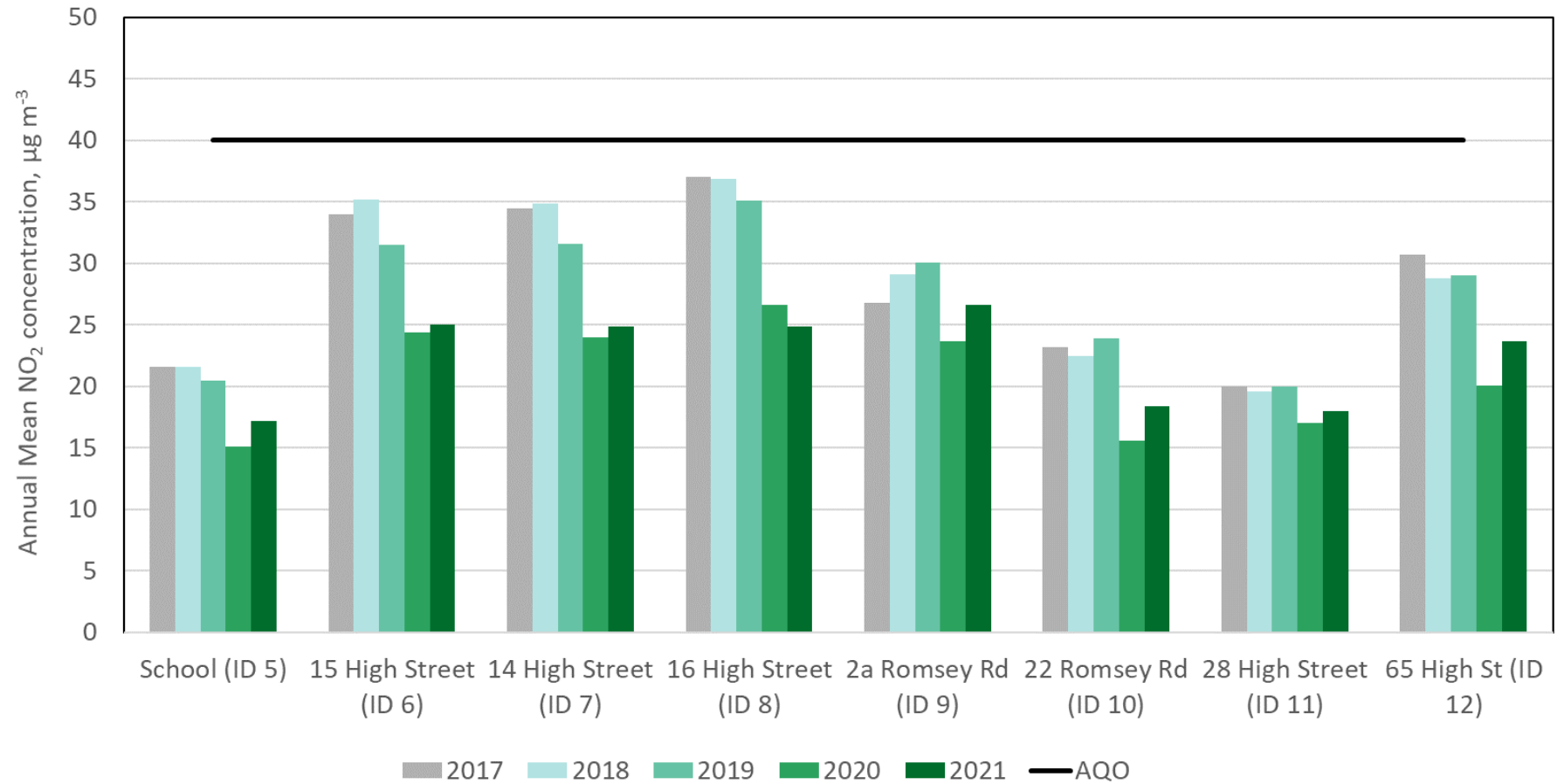


Table A.5 - 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200 µg m⁻³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
CM1 (Totton)	436188	113237	Roadside	100	100	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 PM₁₀ 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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
CM1 (Totton)	436188	113237	Roadside	98	98	20	18	19	21	18
CM3 (Fawley)	445885	103248	Industrial	99	99	15	16	17	19	15

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

Notes:

The annual mean concentrations are presented as µg m⁻³.

Exceedances of the PM₁₀ annual mean objective of 40µg m⁻³ are shown in **bold**.

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

(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 PM₁₀ Concentrations

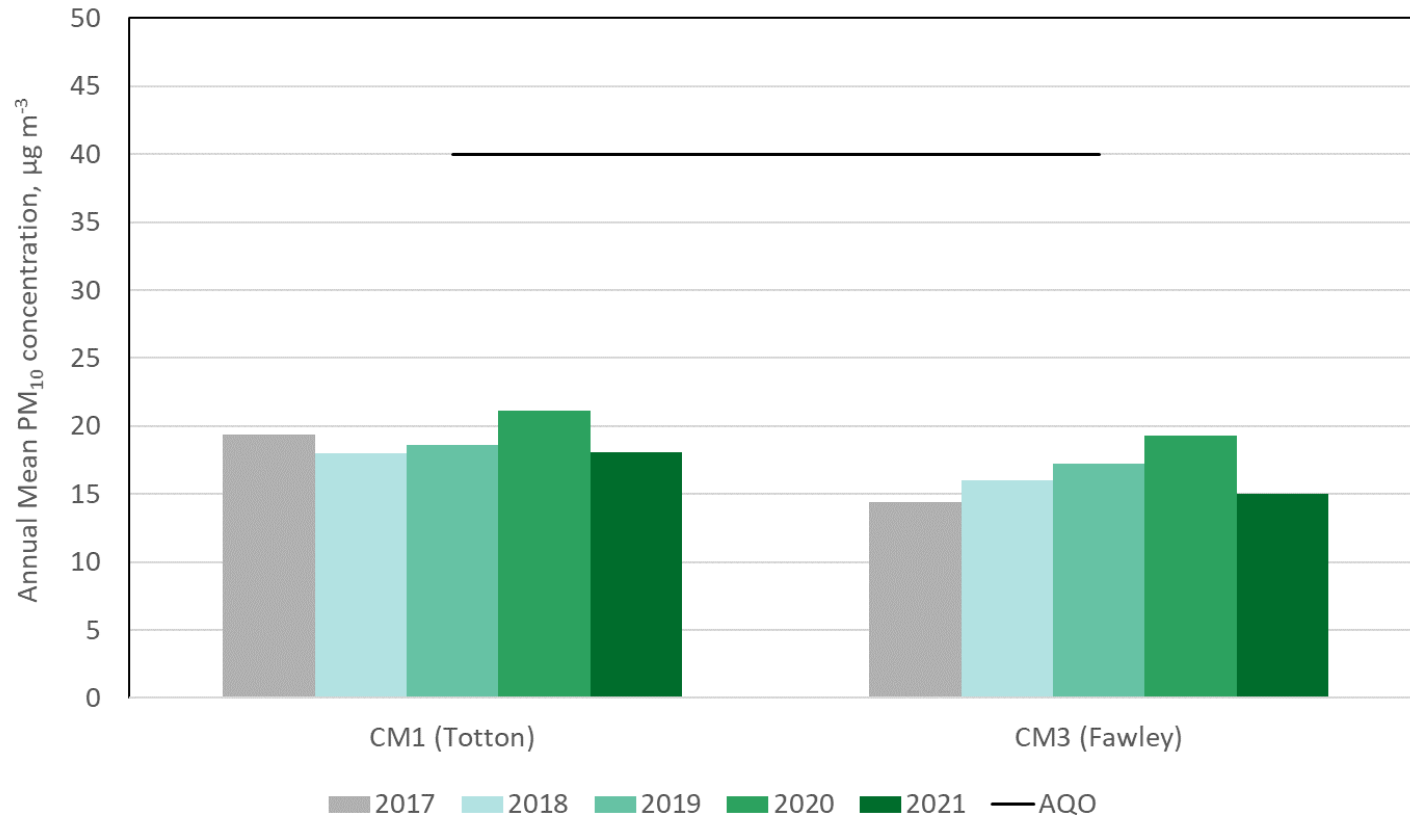


Table A.7 - 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50 µg m⁻³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
CM1 (Totton)	436188	113237	Roadside	98	98	4	0	5	0	2
CM3 (Fawley)	445885	103248	Industrial	99	99	0	0	2	0	0

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 PM₁₀ 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 PM₁₀ Results > 50 µg m⁻³

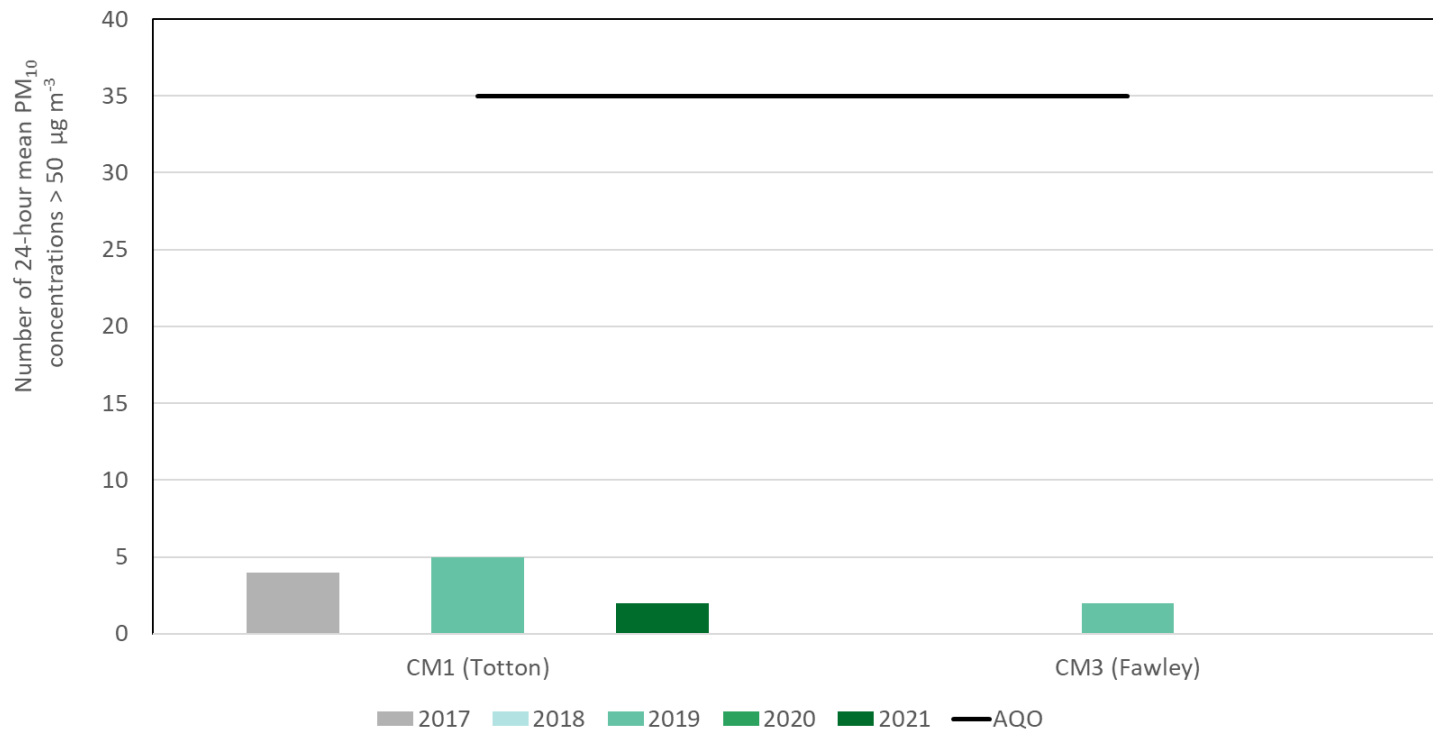


Table A.8 - SO₂ 2021 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	Number of 15-minute Means > 266 µg m ⁻³	Number of 1-hour Means > 350 µg m ⁻³	Number of 24-hour Means > 125 µg m ⁻³
CM3(Fawley)	445885	103248	Industrial	99	99	0	0	0

Notes:

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

Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 - NO₂ 2021 Diffusion Tube Results (µg m⁻³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.67 0.79 0.76	Annual Mean: Distance Corrected to Nearest Exposure	Comment
6	429864	108213	24.7	31.0	32.0	45.3	34.1	39.3	38.1	38.4	43.9	37.8	45.5	36.9	37.3	25.0	-	
7a	429858	108205	25.6	29.5	29.4	35.8	38.2	44.6	46.7	31.3	48.7	45.5	45.5	36.3	-	-	-	Triplicate Site with 7a , 7b and 7c - Annual data provided for 7c only
7b	429858	108205	29.0	28.9	31.1	34.8	35.9	44.9	42.3	31.1	45.0	39.5	42.7	39.0	-	-	-	Triplicate Site with 7a , 7b and 7c - Annual data provided for 7c only
7c	429858	108205	25.2	27.6	31.1	34.7	38.0	44.2	45.0	28.9	48.5	36.8	41.3	36.1	37.2	24.9	-	Triplicate Site with 7a , 7b and 7c - Annual data provided for 7c only
8	429875	108207	27.0	33.0	30.1	40.2	39.7	32.9	43.1	31.5	47.7	40.7	42.7	38.1	37.2	24.9	-	
21a	436189	113235	31.1	33.0	30.2	28.8	28.8	26.6	21.5	19.7	33.1	32.7	37.5	30.1	-	-	-	Triplicate Site with 21a, 21b and 21c - Annual data provided for 21c only
21b	436189	113235	31.4	30.9	26.9	28.0	23.6	26.8	25.7	20.0	32.6	32.1	40.8	33.9	-	-	-	Triplicate Site with 21a, 21b and 21c - Annual data provided for 21c only
21c	436189	113235	31.3	30.0	26.9	26.1	24.5	26.5	22.4	19.8	32.8	33.4	34.8	31.3	29.0	22.9	-	Triplicate Site with 21a, 21b and 21c - Annual data provided for 21c only
22	436210	113210	33.3	27.7	25.5	28.0	20.1	21.0	19.9	18.3	21.0	24.0	29.3	27.5	24.6	19.5	-	
23	436232	113156		28.8	26.1	28.0	25.1	26.7	25.0	21.3	33.3	33.2	31.5	28.8	28.0	22.1	-	
24	436205	113019	25.3	27.4	26.2	29.0	18.7	20.8	17.6	16.1	25.6	22.7	25.5	25.5	23.4	18.5	-	
25	436278	113081	35.1	34.6	35.0	33.6	23.4	26.8	19.5	23.3		32.1	40.8	34.6	30.8	24.3	-	
26	436383	113135		35.9	32.1	31.7	24.9	26.6	24.5	21.5	32.7	32.7	35.4	33.7	30.2	23.8	-	
27	436476	113214		35.7		30.1	20.1	27.7	22.9	21.5	32.0	29.9	34.2	30.9	28.5	22.5	-	
28	436364	113322		36.1	30.7	37.0	24.4	27.5	21.7	21.6	31.2	28.3	35.2	30.6	29.5	23.3	-	
30	436210	112948		26.2	23.3	24.3	24.2	24.9	21.0	17.5	27.3	26.8	28.5	28.7	24.8	19.6	-	
31	436234	112898	27.0	26.5	26.2	26.7	18.2	22.8	19.6	15.7	25.8	21.5		22.1	22.9	18.1	-	
48a	436465	113082	50.9	30.2	46.9	46.4	36.5	42.0	40.7	41.3	52.5	43.7	72.7	46.3	-	-	-	Triplicate Site with 48a, 48b and 48c - Annual data provided for 48c only
48b	436465	113082	50.3	40.9	47.6	46.2	36.6	45.5	40.7	39.5	50.8	48.5	59.5	47.8	-	-	-	Triplicate Site with 48a, 48b and 48c - Annual data provided for 48c only
48c	436465	113082		42.4	46.8	46.1	26.2	43.0	40.6	40.3	51.3	49.9	65.6	41.3	45.8	36.2	-	Triplicate Site with 48a, 48b and 48c - Annual data provided for 48c only
1	429991	107583	15.8	16.8	17.5	19.9	15.3	18.1	16.1	16.3	20.9	14.7	23.1	17.7	17.7	13.4	-	
2	429928	107687	20.5	24.5	25.3	24.1	18.8	28.4	24.9	22.2	31.0	18.4	33.0	24.0	24.6	18.7	-	
3ai (duplicate)	429895	107770	25.0	27.4	27.8	35.2	29.5	38.0	35.5	28.8	39.7	30.2	35.2	28.1	-	-	-	Duplicate Site with 3ai (duplicate) and 3aii (duplicate) - Annual data provided for 3aii (duplicate) only
3aii (duplicate)	429895	107770	24.0	28.6	27.9	34.8	27.5	36.4	37.3	28.5	41.0	30.3	37.7	30.4	31.9	24.2	-	Duplicate Site with 3ai (duplicate) and 3aii (duplicate) - Annual data provided for 3aii (duplicate) only
3b	429895	107770	24.0	27.7	23.0	26.6	25.9	25.7	27.6	20.6	31.7	29.5	30.2	28.8	26.8	20.3	-	
47	429760	107972	25.7	24.7	24.7	26.8	23.9	29.9		25.4	36.4	36.4	35.6	29.2	29.0	22.0	-	
4	429710	108128	16.3	20.2	17.5	21.0	15.0	16.6	16.5	14.4	20.7	13.7	21.8	18.4	17.7	13.4	-	
5	429767	108205	20.4	21.5	20.3	21.4	20.6	21.1	20.4	17.2	28.1	26.1	29.8	24.5	22.6	17.2	-	
9	429891	108245	27.9	35.0	32.2	36.4	37.4	35.9	34.3	33.4	42.6	32.7	36.0	36.6	35.0	26.6	-	
10	429911	108402	16.8	21.9	20.8	26.9	23.1	25.6	26.9	22.1	31.6	23.8	27.1	24.1	24.2	18.4	-	
11a	429933	108200	19.4				22.2	22.9	22.1	18.0	25.9	24.8	30.3	25.6	-	-	-	Duplicate Site with 11a and 11b - Annual data provided for 11b only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.67 0.79 0.76	Annual Mean: Distance Corrected to Nearest Exposure	Comment
11b	429933	108200	24.1			22.8	20.8	23.7	23.0	18.8	26.1	24.1	31.3	24.6	23.7	18.0	-	Duplicate Site with 11a and 11b - Annual data provided for 11b only
12	430026	108206	27.6	27.4	28.9	34.6	28.5	32.9	31.3	28.0	36.1	30.0	38.1		31.2	23.7	-	
13	430079	108147	44.3	25.0	34.2	40.8	37.4	45.0		35.1	50.6	40.2	48.1		40.1	30.5	-	
14	430092	108077	26.2	29.5	29.1	31.1	13.2	31.6	21.8		32.7		36.3		27.9	21.2	-	
15	430162	108173	22.9	20.5	22.8	19.8	19.1	21.2	21.3	24.9	26.5	21.6	29.8		22.8	17.3	-	
16	429169	108129	22.9	27.5	25.6	22.0	27.9	29.4	30.2	22.5	33.9	29.3	34.8		27.8	21.1	-	
17	429782	108209	22.4		18.1	24.0		22.0	23.5	19.0	33.0	29.4	28.1		24.4	18.5	-	
18	429782	108209	24.1		20.7	22.7	19.9	23.6	23.7	18.6	28.7	29.9	30.9		24.3	18.5	-	
19	429782	108209			19.3	23.3	20.3	22.9	18.7	17.8	25.5	25.2	26.9		22.2	16.9	-	
20	429739	108195	30.8		31.4	29.6	33.8	30.1	32.9	18.6	36.1	31.0	36.6		31.1	23.6	-	
37a	425877	111778	27.1	26.1		25.8	28.8	33.1	30.8	32.5	38.0	34.9	38.6	34.7	-	-	-	Duplicate Site with 37a and 37b - Annual data provided for 37b only
37b	425877	111778	26.2	24.7		31.1	30.5	35.6	32.8	38.3	37.6	33.9	36.5	28.5	32.1	24.4	-	Duplicate Site with 37a and 37b - Annual data provided for 37b only
39	438363	109694		20.6	20.7	21.0	13.4	20.2	15.8	17.7	22.8	18.5	29.6	18.6	19.9	15.1	-	
41	442947	103931	20.5	16.0	18.9	10.2	11.5	12.0	7.7	15.0	11.9	21.3	13.1		14.4	10.9	-	
42	442947	103931	17.2	15.4	17.6	10.1	14.2	12.8	8.1	16.1	13.4	18.5	11.6		14.1	10.7	-	
43	445881	103247			10.1		8.1		8.0	9.6	8.1	15.3	13.0		10.3	7.6	-	
44	438836	102115	26.1	27.5	26.5	28.7	24.4	27.3	28.6	21.1	31.8	29.0	32.3	31.1	27.9	21.2	-	
45	415118	104608	38.0	34.5	32.6	35.2	22.6	35.1	33.2	29.0	37.1	42.1	42.7	39.1	35.1	26.7	-	
46	415022	104926	31.3	28.7	31.0	23.4	23.3	32.1	13.5	24.9	32.2	32.1	42.6	32.9	29.0	22.0	-	
49	416157	105467	11.0	11.1	9.9	8.8	6.4	8.0	7.6	7.4	9.0	6.5	12.6	10.7	9.1	6.9	-	
50	428783	108535	10.2	12.5	10.5	10.4	7.0	10.6	10.6	8.4	11.9	8.4	12.5	10.7	10.3	7.8	-	
51	429621	108873	13.6	13.5	11.2	10.8	3.0	8.6	7.3	5.8	9.2		12.5	9.3	9.5	7.2	-	
52	429033	108203	10.9	14.6		13.5	11.9	13.9	12.5	10.1	14.7	12.0	13.0	9.5	12.4	9.4	-	
53	432694	95766		19.7	15.4	16.2	8.2	13.2	12.6	10.4	14.1	14.1	22.6	19.0	15.0	11.4	-	
54	414648	114165	30.9	26.1	26.8	29.3	20.5	19.6	20.1	19.7	27.9?	23.1	29.0	27.7	24.8	18.8	-	
55	414759	114192	36.1	30.4	37.3	35.0	32.6	31.9	30.6	29.0	35.2	32.6	42.1	36.5	34.1	25.9	-	
56	414835	114234	32.3	20.2	36.6	33.3	28.0	30.5	26.3	23.8	34.5	27.9	36.1	29.3	29.9	22.7	-	
57	414941	114354	21.5	25.2		22.8	21.0	20.3	19.8	17.8	23.5	16.7		25.4	21.4	16.3	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.

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

Local bias adjustment factor used

National bias adjustment factor used.

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

New Forest District Council confirm that all 2021 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 2021

New Forest District Council has not identified any new sources relating to air quality within the reporting year of 2021.

New Forest District Council is currently working on a number of planning applications concerning strategic sites identified within the Local Plan. Air quality impacts are being assessed with submitted applications which consider the impact of the proposed development in isolation and in combination with other local development sites and strategic sites. The work is complex but to date no significant impact has been predicted from the proposed developments.

Areas of current interest in 2021 include Fawley (development of the redundant power station ~1200 residential, marina, commercial), Fordingbridge ~1000 residential over 3 strategic sites – hence the start of diffusion tube monitoring in the town centre in 2021, Ringwood ~800 residential and commercial over 2 strategic sites, Lymington ~250 residential homes over 2 strategic sites and Bransgore ~100 residential. This work continues.

Additional Air Quality Works Undertaken by New Forest District Council During 2021

In 2020 the New Forest District Council started a survey in Lyndhurst (at the school) to see if pollutant concentrations changed significantly over height. Therefore Sites 17, 18 and 19 are diffusion tubes set up 1m apart up a lamppost. The results were inconclusive and so the study was continued through 2021. Once again however, the results do not show a clear trend.

In addition, monitoring of the Southampton Clean Air Zone along part of the A35 within the New Forest District has continued through 2021. This comprises of 4 tubes (Sites 32-35).

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 scheme¹⁶. 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 NO₂ PT scheme. For those reporting periods in 2020 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 AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040
Round conducted in the period	January – February 2020	May – June 2020	July - August 2020	September – October 2020
SOCOTEC	100 %	No results reported		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 2021 for both sites.

¹⁶

https://laqm.defra.gov.uk/documents/LAQM%20NO2%20Performance%20data_Up%20to%20March%202021_v2.pdf

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	06/01/2021	03/02/2021
Feb	03/02/2021	03/03/2021
Mar	03/03/2021	31/03/2021
Apr	31/03/2021	05/05/2021
May	05/05/2021	02/06/2021
Jun	02/06/2021	30/06/2021
Jul	30/06/2021	04/08/2021
Aug	04/08/2021	01/09/2021
Sep	01/09/2021	29/09/2021
Oct	29/09/2021	03/11/2021
Nov	03/11/2021	01/12/2021
Dec	01/12/2021	05/01/2022

Diffusion Tube Annualisation

One site (tube 43 – Beaulieu School) 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:

- Southampton
- Chilbolton
- Bournemouth

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

Table C.1 - Annualisation Summary for diffusion tubes

Site ID	Annualisation Factor Southampton Centre	Annualisation Factor Chilbolton	Annualisation Factor Bournemouth	Average Annualisation Factor	Raw Data Annual Mean, $\mu\text{g m}^{-3}$	Annualised Annual Mean, $\mu\text{g m}^{-3}$
43	0.8022	1.1079	1.0018	0.9706	10.3	10.0

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under

or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Local bias adjustment

Local bias adjustment factors were derived for the Lyndhurst street canyon and Totton, respectively, using Defra’s NO₂ processing tool. The bias adjustment factors are presented in Table C.2.

Table C.2 - Local Bias Adjustment factors

	Local Bias Adjustment Input 1 Lyndhurst Canyon	Local Bias Adjustment Input 2 Totton
Periods used to calculate bias	12	12
Bias Factor A	0.67 (0.63 - 0.7)	0.79 (0.73 - 0.85)
Bias Factor B	50% (42% - 58%)	27% (17% - 37%)
Diffusion Tube Mean (µg m⁻³)	37.2	29.0
Mean CV (Precision)	4.5%	4.6%
Automatic Mean (µg m⁻³)	24.8	22.8
Data Capture	100%	99%
Adjusted Tube Mean (µg m⁻³)	25 (23 - 26)	23 (21 - 25)

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 2021 (based on 5 studies) has been derived from the national bias adjustment spreadsheet (v03_22). A screenshot of the spreadsheet for SOCOTEC is shown in .

Figure C.1 - National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/22				
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of June 2022				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods						LAQM Helpdesk Website				
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet										
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data	If you have your own co-location study then see footnote ² . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@bureauveritas.com or 0800 0327953							
Analysed By ¹	Method ²	Year ³	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)
Socotec Didcot	20% TEA in water	2021	KS	Marylebone Road Intercomparison	10	57	42	35.7%	P	0.74
Socotec Didcot	20% TEA in water	2021	KS	New Forest District Council	12	37	25	50.0%	G	0.67
Socotec Didcot	20% TEA in water	2021	R	New Forest District Council	12	29	23	27.2%	G	0.79
Socotec Didcot	20% TEA in water	2021	R	South Oxfordshire District Council	11	25	18	38.5%	G	0.72
Socotec Didcot	20% TEA in water	2021	R	South Oxfordshire District Council	11	37	33	12.9%	G	0.89
Overall Factor³ (5 studies)								Use		0.76

Selection of appropriate bias adjustment factor

New Forest District Council have applied the Lyndhurst bias correction factor (0.67) to the tubes within the street canyon (6,7a,7b,7c,8). Street canyons will typically have lower wind speeds than elsewhere and hence the pollutant concentration will tend to be higher. As diffusion tubes and automatic analysers are collocated in the street canyon, the calculated bias is the most appropriate to use.

The Totton bias correction factor (0.79) has been applied to the tubes (21a,21b,21c,22,23,24,25,26,27,28,30,31,48a,48b,48c) within Totton. Using this factor provides consistency with previous reports before the 2021 ASR report.

The national bias correction of 0.76 has been applied to all other tubes (1,2,3ai,3aii,3b,4,5,9,10,11a,11b,12,13,14,15,16,17,18,19,20,37a,37b,39,41,42,43,44,45,46,49,50,51,52,53,54,55,56,57) within the district.

A summary of bias adjustment factors used by NFDC over the past 5 years is presented in Table C.3. For the 2021 ASR, we had applied the factor derived from the national bias adjustment spreadsheet (0.74) to all diffusion tube data.

Table C.3 - Bias Adjustment Factors

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	Lyndhurst	V03 2022	0.67
	Totton		0.79
	National		0.76
2020	National	V03 2021	0.74
2019	Lyndhurst	V03 2020	0.68
	National		0.76
2018	Lyndhurst	V03 2019	0.69
	Totton		0.72
	National		0.74
2017	Lyndhurst	V03 2018	0.65
	Totton		0.72
	National		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 NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within New Forest District Council required distance correction during 2021.

QA/QC of Automatic Monitoring

PM₁₀ Monitoring Adjustment

New Forest District Council uses TEOM analysers to monitor PM₁₀. 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 PM₁₀ concentrations are below the objectives. When the

equipment is due for replacement the Council will consider other equipment which meets the equivalence criteria.

PM₁₀ 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 2021 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 2021 has been fully ratified.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

New Forest District Council

No diffusion tube NO₂ monitoring locations within New Forest District Council required distance correction during 2021. (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

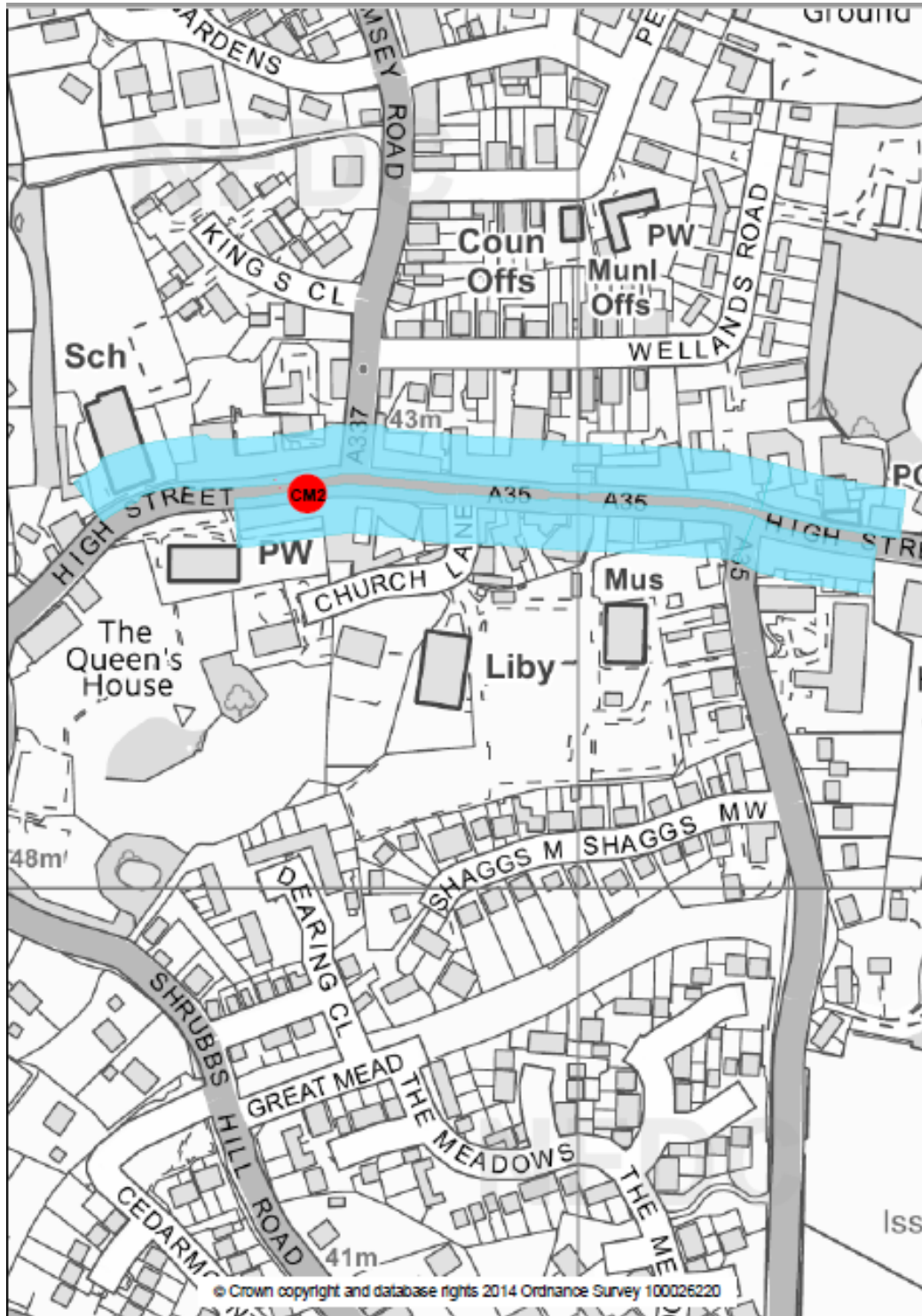
Automatic Monitoring Sites

Figure D.1 - Automatic monitor: 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.

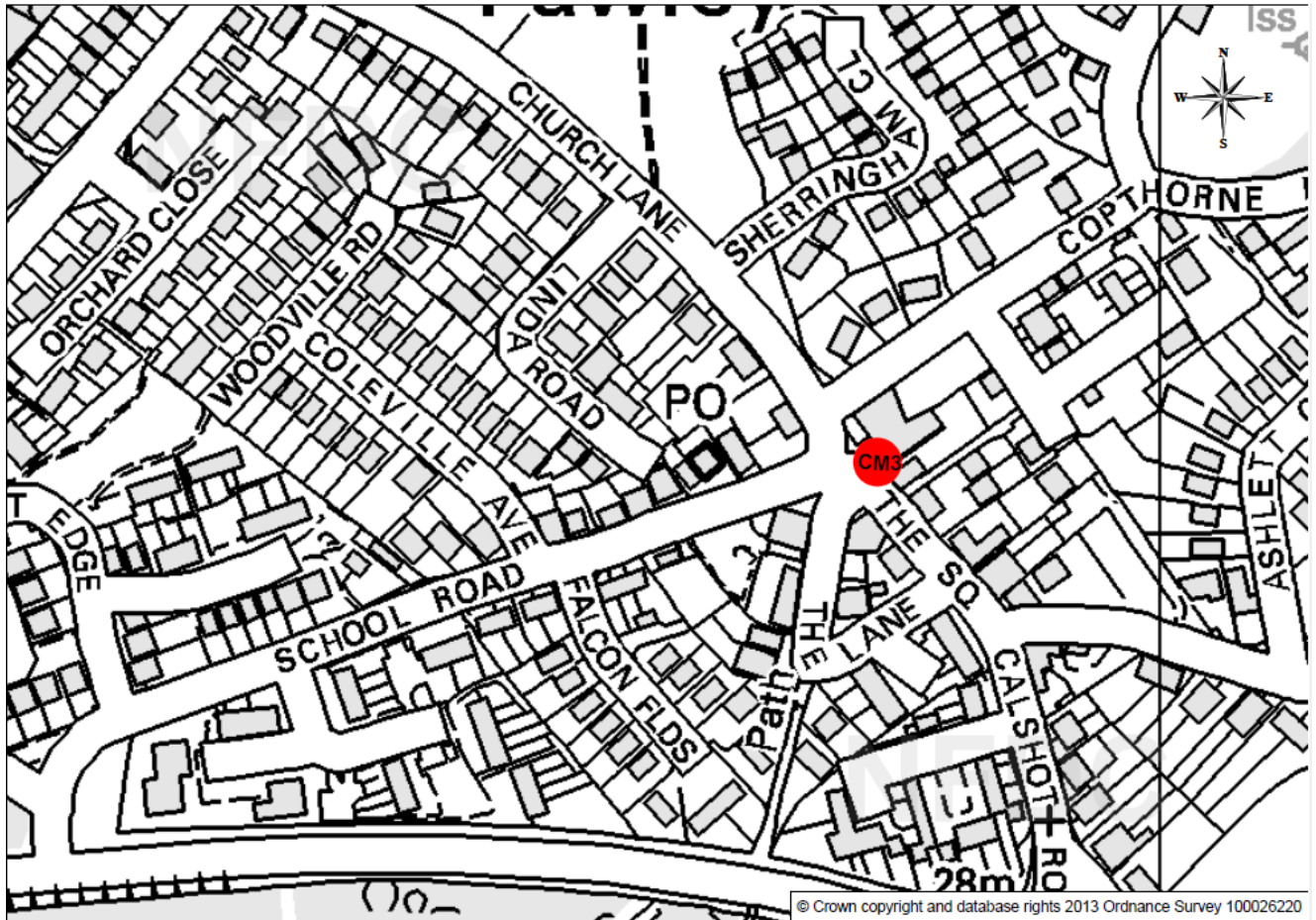
Figure D.2 - Automatic monitor: Lyndhurst (CM2)



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.

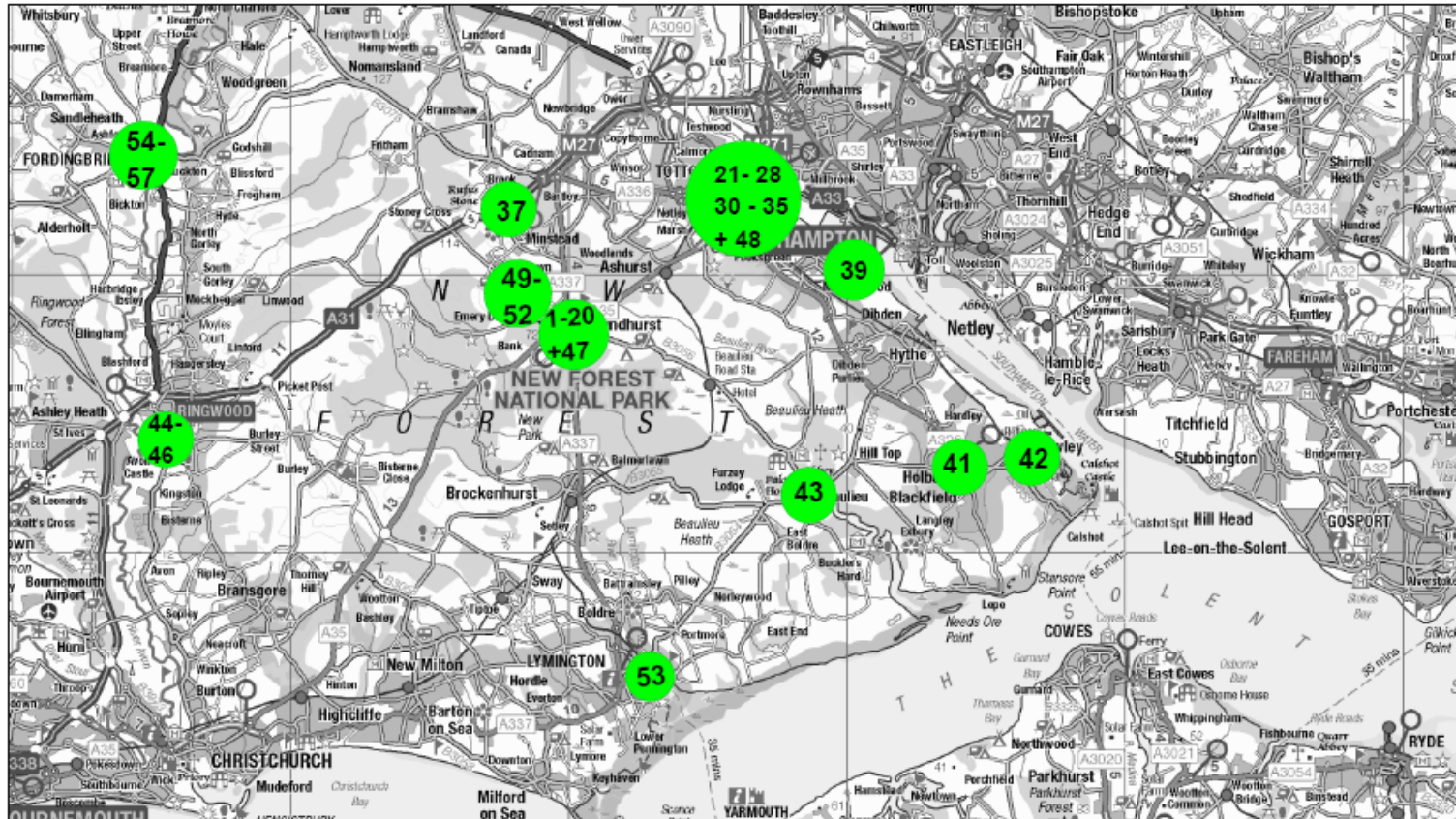
Figure D.3 - Automatic monitor: Fawley (CM3)



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.

Non-Automatic Monitoring Sites

Figure D.4 - Overview of diffusion tubes locations throughout NFDC



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Figure D.5 - NO₂ diffusion sites in Lyndhurst

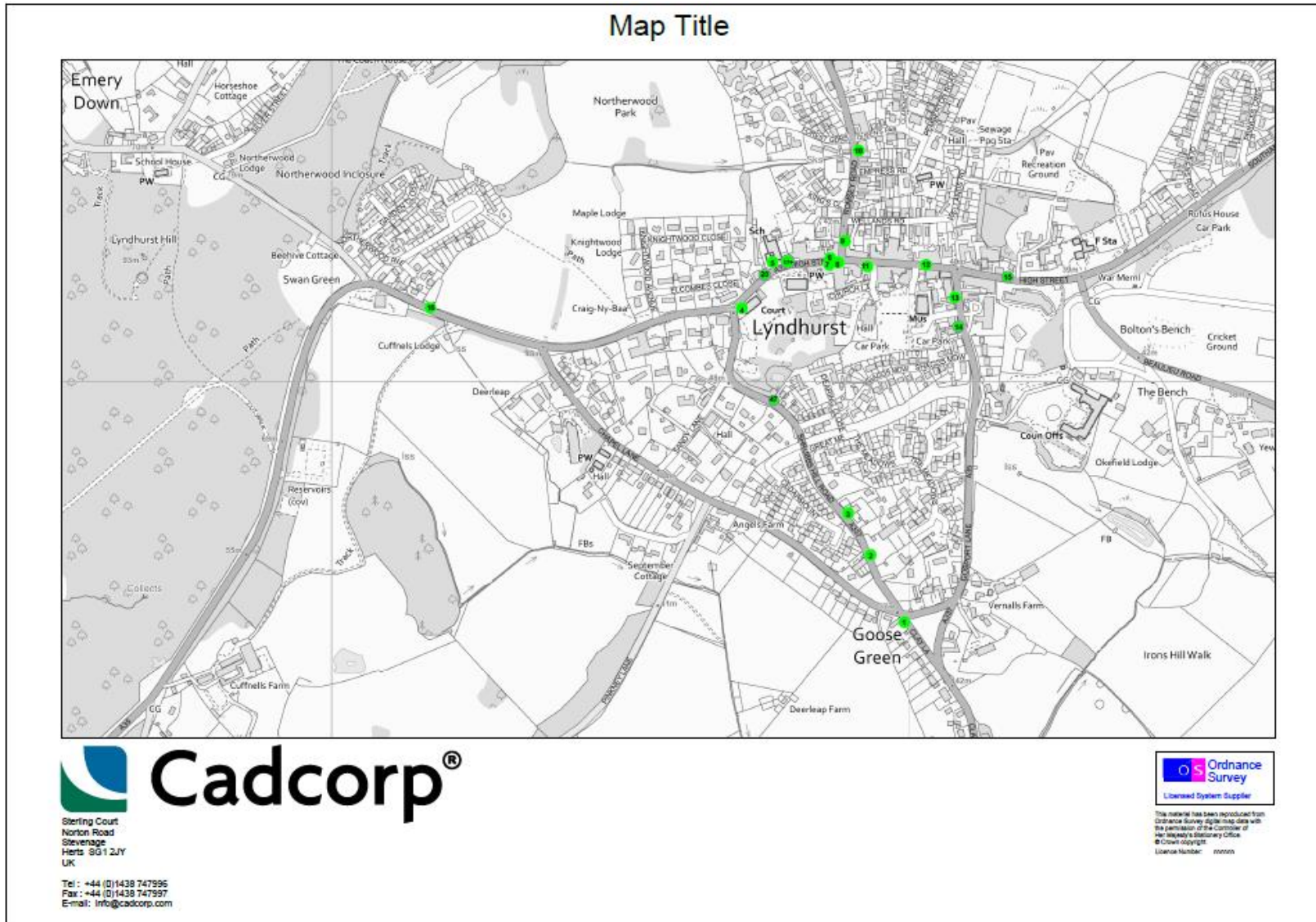
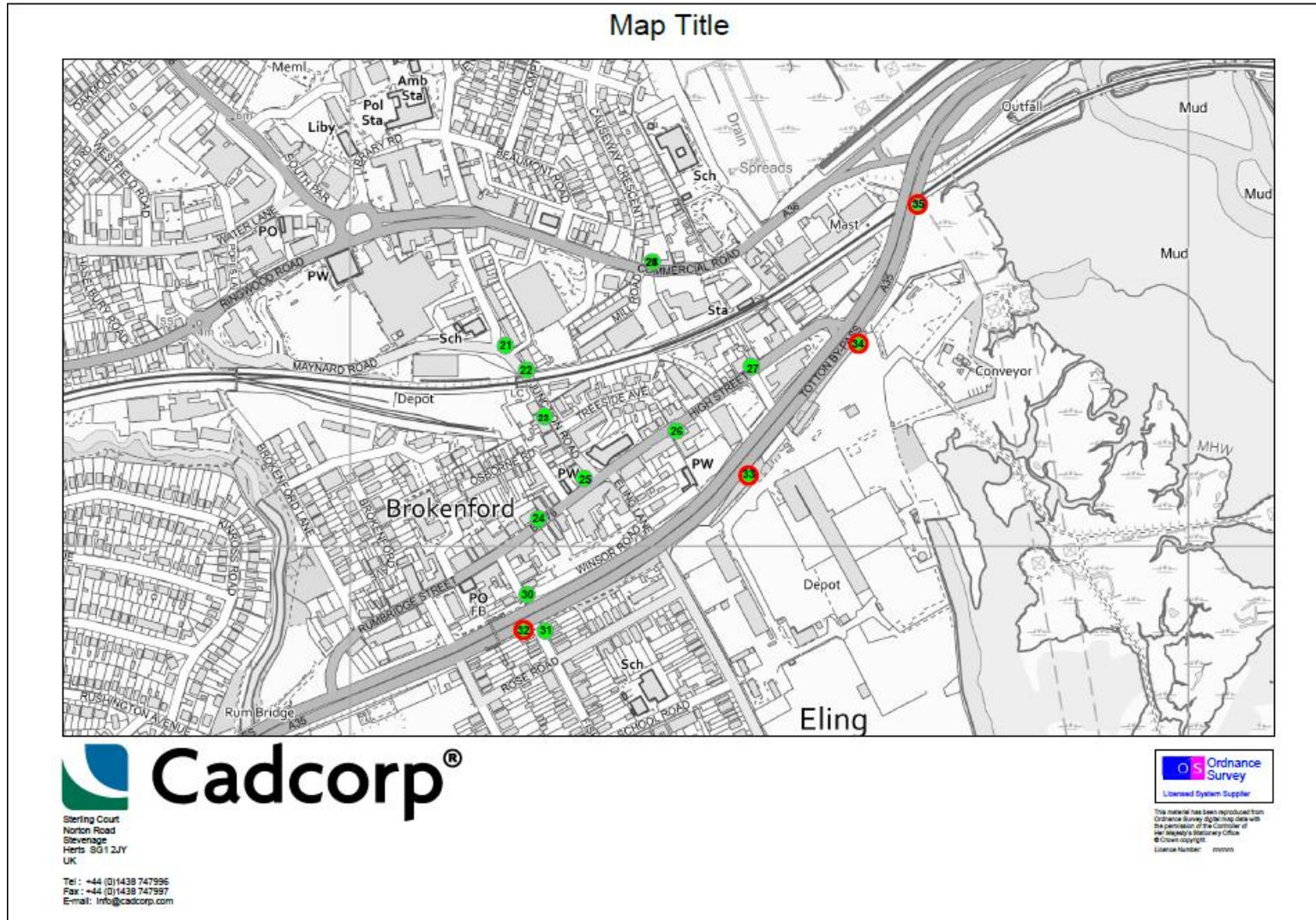


Figure D.6 - NO₂ diffusion tube sites in Totton. Note: the red sites denote the tubes within the Southampton CAZ



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England¹⁷

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

¹⁷ The units are in microgrammes of pollutant per cubic metre of air (µg m⁻³).

Appendix F: Estimating PM_{2.5} Concentrations from PM₁₀ Monitoring Data

Technical Guidance (Defra, 2016) Box 7.7 provides methods to estimate PM_{2.5} concentrations from monitored PM₁₀ concentrations.

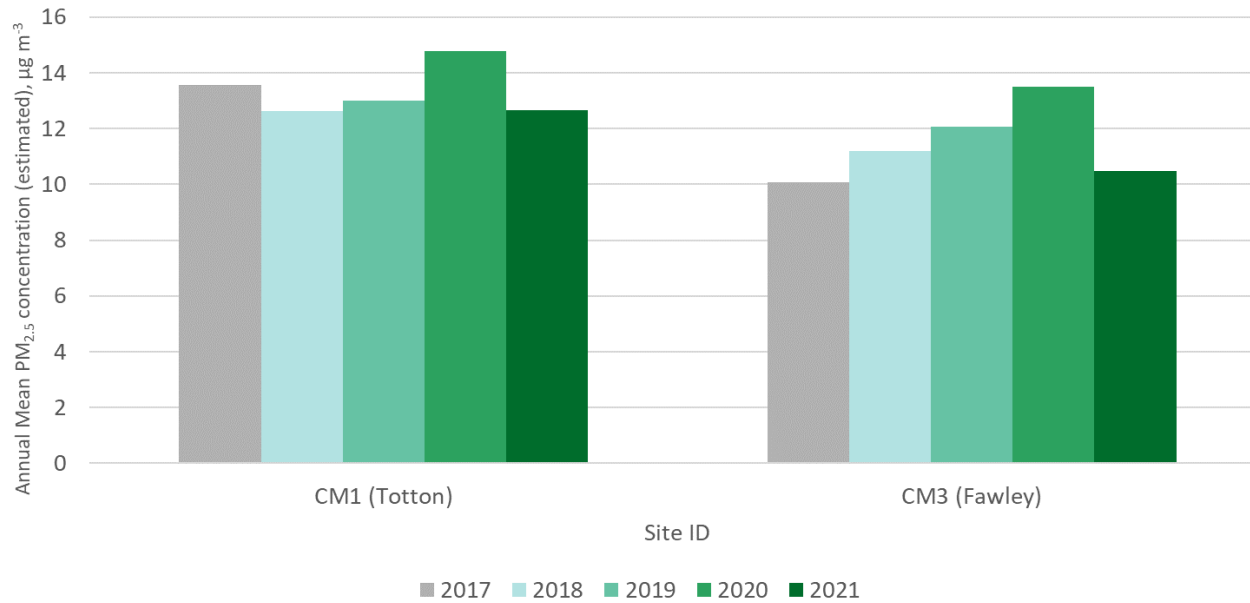
New Forest District Council monitors PM₁₀ at 2 locations: Totton (roadside) and Fawley (industrial). Whilst it is possible to use data from other local automatic monitoring sites that monitor PM_{2.5} such as Southampton AURN, Bournemouth AURN and Portsmouth AURN, these sites are classified as urban background sites and therefore are not comparable with the automatic monitoring sites in the New Forest district monitoring PM₁₀.

Therefore, in accordance with the Technical Guidance(Defra, 2016) a nationally derived correction ratio of 0.7 can be used to correct locally obtained PM₁₀ data to estimate local PM_{2.5} concentrations.

Table F.1 – PM_{2.5} 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 (%)	2017	2018	2019	2020	2021
CM1 (Totton)	436188	113237	Roadside	98	98	14	13	13	15	13
CM3 (Fawley)	445885	103248	Industrial	99	99	10	11	12	13	10

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 - 2020¹⁸

Region	Fraction of Mortality Attributable to Particulate Air Pollution, %
England	5.6
South East Region	6.0
New Forest DC	5.5

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Public Health Outcomes Framework

Data view ▼

Area profiles

Geography

New Forest

Districts & UAs in South East region

Topic ▼

D. Health protection

▶ [Legend](#) ▶ [Benchmark](#) ▶ [More options](#)

Geography version Districts & UAs (from Apr 2021) ▼

CIPFA nearest neighbours to New Forest

Indicator	Period	New Forest			Region England			South East	
		Recent Trend	Count	Value	Value	Value	Worst/Lowest	Range	Best/Highest
D01 - Fraction of mortality attributable to particulate air pollution (old method)	2019	-	-	4.1%	5.2%	5.1%	4.1%		6.3%
D01 - Fraction of mortality attributable to particulate air pollution (new method) New data	2020	-	-	5.5%	6.0%	5.6%	5.4%		7.1%

¹⁸ https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/1/gid/1000043/pat/6/ati/401/are/E07000091/iid/30101/age/230/sex/4/cid/1/tbm/1/page-options/map-ao-4_cin-ci-4_car-ao-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 2021 have increased at all four sites compared to 2020 results. This would be expected due to the decreases in vehicle numbers due to the Covid pandemic.

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)
32 CAZ	A35 1	Roadside	436210	112902	NO ₂	NO	1.4	2.6	No	3.0
33 CAZ	A35 2	Roadside	436470	113088	NO ₂	NO	1.4	2.6	No	3.0
34 CAZ	A35 3	Roadside	436608	113254	NO ₂	NO	1.6	2.4	No	3.0
35 CAZ	A35 4	Roadside	436675	113400	NO ₂	NO	0.8	3.2	No	3.0

Table H.2 - Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring at CAZ sites (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2018	2019	2020**	2021
32 CAZ	436210	112902	Roadside	84.6	84.6	28.7 (29.9*)	29.3 (31.1*)	22.3	26.3
33 CAZ	436470	113088	Roadside	84.6	84.6	39.8 (42.4)	39.7 (42.4)	33.5	35.6 (38.0)
34 CAZ	436608	113254	Roadside	76.9	76.9	34.0 (36.3)	33.4 (35.7*)	32.2	33.7 (36.3)
35 CAZ	436675	113400	Roadside	84.6	84.6	38.0 (39.3)	37.5 (38.8)	34.3	35.4 (36.6)

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 36µgm⁻³

** 2020 no distance corrections undertaken due to bias corrected results less than 36µgm⁻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

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