
# 2022 Air Quality Annual Status Report (ASR)

## In fulfilment of Part IV of the Environment Act 1995

## Local Air Quality Management

Date: July, 2022

| Information | Hartlepool Borough Council Details |
|---|---|
| **Local Authority Officer** | Zoe Craig/Sylvia Tempest |
| **Department** | Neighbourhoods and Regulatory Services |
| **Address** | Hartlepool Borough Council<br>Civic Centre<br>Victoria Road<br>Hartlepool<br>TS24 8AY |
| **Telephone** | 01429 523325/01429 401991 |
| **E-mail** | zoe.craig@hartlepool.gov.uk/<br>sylvia.tempest@hartlepool.gov.uk |
| **Report Reference Number** | HASR22 |
| **Date** | July 2022 |

# Executive Summary: Air Quality in Our Area

## Air Quality in Hartlepool

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

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

The Borough of Hartlepool is situated on the North East coast within the Tees Valley and has an estimated population of 93,836[5]. Hartlepool has a strong industrial heritage and, in the past, this has often made a significant contribution to poor air quality in the area and, early air quality monitoring within Hartlepool and neighbouring councils was specifically targeted to industrial sources of pollution.

Many of the old industrial plants have now closed and regulation has improved significantly over the decades. In 2021 there were 18 permits in place for businesses in Hartlepool regulated by the Environmental Agency and a further 23 permits in place for businesses regulated by the Local Authority under The Environmental Permitting Regulations 2016. The closure of plants and better regulation has resulted in industrial air pollution at ground level being greatly reduced.

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

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

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

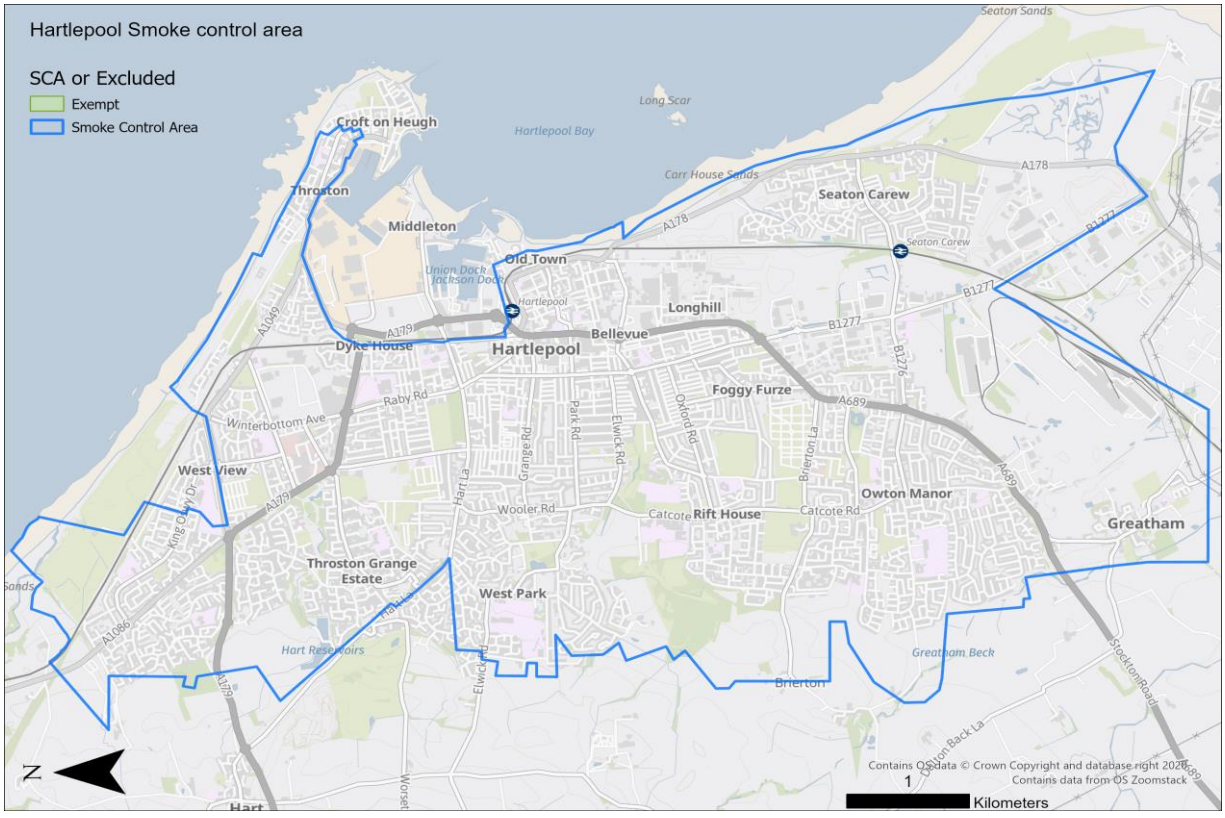
[5] Office for National Statistics (ONS). Population estimates for UK; England, Wales, Scotland and Northern Ireland. 2020

Please see both Public Registers at: https://www.hartlepool.gov.uk/downloads/file/6303/public_register_-_environmental_permits and https://environment.data.gov.uk/public-register/industrial-installations/registration?__details=true&__postcode&address-search&dist=1&easting&local-authority=Hartlepool&name-search&northing&number-search

Another source of air pollution within Hartlepool arises from construction sites and residential properties. Within 2021 there were 7 planning applications approved for residential developments in Hartlepool.

Hartlepool has an extensive coastline and at times of strong north-easterly weather, there can be high levels of natural particulates which may have health effects for some members of the public. Although not frequent events, Hartlepool does experience foam storms. Sea foam can hold algal toxins or surface-active pollutants in its bubbles which, when released into the air can pose a health risk for individuals with pre-existing health conditions and may cause irritation to the eyes.

Most residential properties in the Borough of Hartlepool are included in a smoke control area (see map below) where the solid fuels used are restricted to those approved by DEFRA or fuels burned in a DEFRA approved appliance in order to reduce emissions to the atmosphere.



Notwithstanding this, Officers within the Environmental Protection team regularly receive reports, and investigate cases, where un-authorised fuels and/or appliances are being used within the smoke control areas.

Over recent years there has been an increase in the use of solid fuel stoves as a source of heating for domestic properties potentially further increasing the emission of harmful environmental pollutants. A resident can install a log burner or multi fuel stove provided it is on the DEFRA list of exempted appliances and is installed by a competent person registered under the HETAS scheme.

In 2020 The Air Quality (Domestic Solid Fuel Standards) (England) Regulations 2020 were passed and came into force on 1st May 2021 which tightened the standards relating to the sale of wood and other fuels which can be burnt in a domestic property and ensures that the sale of wood for combustion in domestic properties includes a 'ready to burn' mark.

Although there are several factors which affect air quality, it is pollution from road traffic, with its primary emissions at ground level, which is now of greatest concern to public health, and is the focus for air quality monitoring within Hartlepool.

Whilst road traffic has increased dramatically over recent decades in the United Kingdom, largely due to the increase in car ownership, Hartlepool still has a relatively low level of car ownership. The 2011 Office for National Statistics (ONS) Census[6] revealed that 35.3% of households in the Borough have no car. This compares with a National Figure of 25.6%.

Within Hartlepool through traffic is generally light and is channelled onto the main A689 and A179 through-route leading to the main A19 trunk road which passes well to the west of the town, through rural areas.

[6] Office for National Statistics, Census, 2011

For Hartlepool, the main impact on public health is along commuter roads, and it is in this area that most action needs to be targeted to alleviate air pollution. Fortunately, most housing along these roads is low rise, and set back from kerbside so that there is good dispersion of air pollutants compared with older UK cities and towns.

Provisional estimates show motor vehicles travelled 299.3 billion vehicle miles in Great Britain for the year ending September 2021[7], this was 16.1% lower than pre-pandemic levels (the year ending December 2019), but broadly stable compared to the year ending September 2020 (+0.4%).

Whilst these are national figures it is likely that reductions in vehicle miles would have also occurred at sub-regional levels and resulted in improved air quality across the Borough.

Hartlepool Borough Council reviews and undertakes air quality assessments independently and also in co-operation with neighbouring Councils in the Tees Valley. The Council produces annual reports for the UK Government and, once finalised, these reports are available for the public and published on the Council's website.

Air quality monitoring is carried out via the use of three automatic sites at Stockton Road, the Headland and St Abbs Walk (Automatic Urban and Rural Network AURN) as well as diffusion tubes situated across the Borough. The pollutants measured are Particulate Matter 10 ($PM_{10}$) and Nitrogen Dioxide ($NO_2$).

Particulate Matter 2.5 ($PM_{2.5}$) is not measured in Hartlepool but information is available from neighbouring Councils through monitoring stations in Redcar and Cleveland, Stockton and Middlesbrough. Levels have also been estimated using $PM_{10}$ recorded data for Hartlepool and applying a nationally derived correction ratio of 0.7. (There is currently no objective for the $PM_{2.5}$ annual mean in the UK).

Hartlepool's annual report has consistently concluded that air quality in the Borough is generally good in areas where the public are regularly exposed to air pollution. As the results are below objective levels set by Government, there has been no need to declare any Air Quality Management areas in the Borough. Notwithstanding this, Hartlepool Borough Council has, through partnership-working, introduced a range of initiatives and

[7] Department of Transport, (DfT) Provisional road traffic estimates, Great Britain: October 2020 to September 2021

actions as part of its commitment to improving air quality. The majority of these actions and initiatives are to reduce the environmental impact of traffic on the roads and encourage healthier, alternative methods of transport.

## Actions to Improve Air Quality

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

The 2019 Clean Air Strategy[8] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[9] 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.

Hartlepool Borough Council works jointly with neighbouring authorities in the Tees Valley and other external agencies to implement actions to improve air quality. The Tees Valley Combined Authority has developed a joint strategic transport plan in collaboration with the five constituent Local Authorities, Darlington, Middlesbrough, Redcar & Cleveland, Stockton-on-Tees and Hartlepool. The plan covers the period 2020-2030 and has the vision “To provide a high quality, quick, affordable, reliable, low carbon and safe transport network for people and freight to move within, to and from Tees Valley”.

Within the Council, Environmental Health professionals work closely with officers from various disciplines, including Public Health, Traffic and Transportation and Planning to improve air quality in the area.

[8] Defra. Clean Air Strategy, 2019

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

## Conclusions and Priorities

The data collected from our automatic air quality monitoring stations and diffusion tube sites all indicate that the levels of $NO_2$ have fallen compared to 2019 (pre-pandemic) figures, however the levels had increased slightly from those recorded in 2020 at the Stockton Road station and diffusion tube sites. All levels are all below the national objective levels.

The data shows that annual levels of $PM_{10}$ at the Stockton Road and Headland stations and the number of exceedances (>50 µg/m³) at both sites have decreased during 2021. The Stockton Road station recorded 0 exceedances and at the Headland station, exceedances in the year have decreased to 5 from 20 in 2020 (13 in 2019) which is well below the national objective of 35 exceedances in the year.

Although $PM_{2.5}$ is not measured in Hartlepool at the current time, $PM_{2.5}$ is calculated based on $PM_{10}$ levels and using a nationally derived figure of 0.7. Monitoring of $PM_{2.5}$ is carried out within Redcar and Cleveland, Stockton and Middlesbrough AURN stations and can be used as an indicator of likely levels in all Tees Valley Council areas, including Hartlepool and national objectives at those sites are easily met and this is expected to continue.

Although the impact of the Coronavirus pandemic (COVID-19) was reduced, there were still implications on air quality measurements and reporting in Hartlepool during 2021. This included the breakdown of monitoring equipment which resulted in substantial loss of data during the year. A comprehensive review of monitoring equipment is currently being undertaken within the department. Despite the challenges, officers within the Local Authority continue to monitor and work to improve air quality within the Borough.

## Local Engagement and How to get Involved

There are many ways in which residents of Hartlepool can contribute to reducing the levels of air pollution within the Borough for example:

- Reducing the level of traffic on the roads by using alternative methods of transport such as walking or cycling which has benefits for health and wellbeing as well as the environment.

  Hartlepool is part of the “Let’s Go Tees Valley” organisation which aims to change and improve the way members of the public travel around the region, making small

changes to their everyday journeys. The organisation developed a Commuter Challenge during August 2018 to change the way you commute to work, encouraging car sharing, alternative modes of transport and health benefits of walking and cycling in the daily commute. Further information is available from:-

https://www.letsgoteesvalley.co.uk/in-your-area/Hartlepool

- If you need to travel by car, consider joining a car sharing scheme. For information on car sharing please use the following link: www.liftshare.com
- Use public transport instead of private vehicles.
- If you intend to replace your existing vehicle then consider purchasing 'greener' vehicles such as hybrid and electric vehicles which will become more readily available in future years.
- Ensure that your vehicle is well maintained and keep tyre pressures properly inflated to manufacturer's recommendation. Drive more smoothly and avoid excessive speed, excessive braking and prolonged idling.
- After months of home working over the last two years, many residents may now have the opportunity to work from home either full time or on a hybrid basis which would lead to reduced traffic on our roads.
- Support local garden initiatives and plant more trees and greenery – and don't burn garden waste/rubbish in the garden – take it to the waste recycling centre.

## Local Responsibilities and Commitment

This ASR was prepared by the Neighbourhoods and Regulatory Services Department (Environmental Protection Team) of Hartlepool Borough Council with the support and agreement of the following officers and departments:

Kate Ainger (Strategy and Performance Officer), Resources and Development

Tony Davison (Sustainable Travel Officer), Neighbourhoods and Regulatory Services

Peter Frost (Highways, Traffic & Transport Team Leader), Neighbourhoods and Regulatory Services

Angela Hall (Planning Technician), Neighbourhoods and Regulatory Services

Julian Heward (Senior Communications and Marketing Officer), Resources and Development

Peter Nixon (Traffic and Transport Engineer), Neighbourhoods and Regulatory Services

Jane Tindall (Senior Planning Officer), Neighbourhoods and Regulatory Services

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Zoe Craig or Sylvia Tempest at:

Hartlepool Borough Council

Civic Centre

Victoria Road

Hartlepool

TS24 8AY

Telephone: 01429 523325/01429 401991

Email: zoe.craig@hartlepool.gov.uk/sylvia.tempest@hartlepool.gov.uk

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## Figures



## Tables

# 1 Local Air Quality Management

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

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

# 2 Actions to Improve Air Quality

## 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Hartlepool Borough Council currently does not have any declared AQMAs.

## 2.2 Progress and Impact of Measures to address Air Quality in Hartlepool.

Defra's appraisal of last year's ASR concluded that the report is well structured, detailed, and provided the information specified in the Guidance. The data was also deemed to be up to date and accurate.

Specific comments included:

- The Council is commended for their approach to further improving air quality in the absence of a formal AQAP. Continued collaboration with the neighbouring Tees Valley Councils is highly encouraged. The council should continually try to identify additional means to address further air quality concerns.
- Trend graphs have been provided for all monitoring data including diffusion tubes, which is commended.
- It is encouraging to see the council considered the comments made during the previous appraisal and actively made an effort to address all of these actions for this year's ASR.
- The Council have included a detailed discussion of the opportunities and challenges presented as a result of the COVID-19 restrictions and we welcome the information provided by the council surrounding the impact of the pandemic on air quality.
- The Council is recommended to consider reviewing their current monitoring regime, specifically the addition of several new non-automatic monitoring sites (diffusion tubes) across the region.

Following Defras recommendation to consider reviewing our monitoring regime; it has been agreed that we will double the number of diffusion tubes in the Borough as a minimum during 2022.

Although there have been no exceedance or likely exceedance of an air quality objective in Hartlepool and therefore no requirement for Hartlepool Borough Council to declare any AQMAs; various measures and initiatives have been implemented within various departments of the Council in order to sustain and continuously improve air quality in the Borough and the Authority remains committed to monitoring and improving air quality within the Borough.

A summary of the actions which are being undertaken in the Borough is presented below. The actions help to reduce congestion, reduce vehicle numbers, reduce emissions per vehicle and improve health and wellbeing and air quality.

**Motor Vehicles**

- Taxi Licensing Strategy approved - new vehicle age policy takes effect on 1st April 2023. On this date, all vehicles that are not Euro 6 will no longer remain licensed in Hartlepool.

- Introduction of '20's Plenty' speed restriction zones to various areas and streets across the Borough
- Introduction of Hybrid working at Hartlepool Borough Council to reduce volume of traffic

**Alternative Vehicles**

- Wheels 2 Work scheme - providing electric motorbikes to working age people for up to a six-month period.
- Encouragement of low emission/ zero emission vehicles.
- E-scooter initiative. Whilst the e-scooters have prompted a lot of debate they have on the whole established well in Hartlepool and enjoy a fair amount of use. The scheme has recently been extended to run until 30th November 2022. Currently there are over 50 defined 'parking spaces' where you can either pick up or leave a scooter.

**Cycling and Walking Initiatives**

- Introduction of Summerhill Cycle Clinic. Free bike services have been offered with free parts up to a value of £30 and the services are carried out at the Cycle Clinic's base at the Summerhill Visitor Centre.



- In 2021 two video cycle trails were created that can be freely enjoyed by the public. The trails have been established supported by video footage filmed from a webcam. Both are linked to the coast, one travelling south from the town centre, the other north. The trails aim to appeal to all levels of cyclist and also highlight key local

attractions. They are to feature on the Council's 'Explore Hartlepool' tourism website. A local company, Wheel Education, were appointed to deliver the project.

- Following their successful bid to British Cycling's 'Places to Ride' initiative the Team are focusing on establishing 'cycle hubs' and developing cycling activity generally within the town. The key focus will be at the Summerhill site, establishing more facilities for cycling – including a cycle track - in a traffic-free environment. A junior cycling area and improvements to the site's BMX track are also planned.
- Bikeability training including balance bike training. Bikeability saw an external delivery partner appointed in early 2021. They are Middlesbrough Environment City (MEC) who also delivery the Child Pedestrian Training programme. The current programme has now been extended until March 2023 thanks to further funding from the Bikeability Trust.
- Let's Go Tees Valley encourages people who live and work in the Tees Valley to leave their cars at home and use greener, more active ways to travel on their day-to-day journeys.
- Pool Bike scheme and cycle allowance within Hartlepool Borough Council
- Installation of cycle shelters in schools.
- The Child Pedestrian Training (CPT) programme. Sessions throughout the year ensured that the target for the core programme of involving 1,000 Year 3 pupils was met.
- Work with Living Streets and the 'Let's Go team' to further promote the Living Streets 'Walk Once a Week' (WOW) initiative. WOW has operated in Hartlepool for a number of years and in the past was supported by a Living Streets Project Officer based with the Council. Living Streets also devised a 'lockdown' version of WOW, encouraging participants to walk, cycle or scoot once a day.
- Walking Bus Initiatives. During 2021 a new walking bus project was developed for Barnard Grove School. The Council's Walking Bus procedures were revised in 2021 to hopefully aid other schools in the future.
- Promotion of 'Travel Tracker' – a web based programme allowing for easy logging of active travel by school pupils.
- The Active Travel Hub has continued to offer adult cycle training to any level from 'learn to ride' to Bikeability level 3. Bikeability Level 3 training has also been given to the Police aiding officers patrolling on bikes.
- The School Crossing Patrol service remains a very high profile and important service in encouraging walking and scooting to school and as such is a key

intervention to help support Active Travel in the future. At the present time Hartlepool manages 28 school crossing patrol sites.

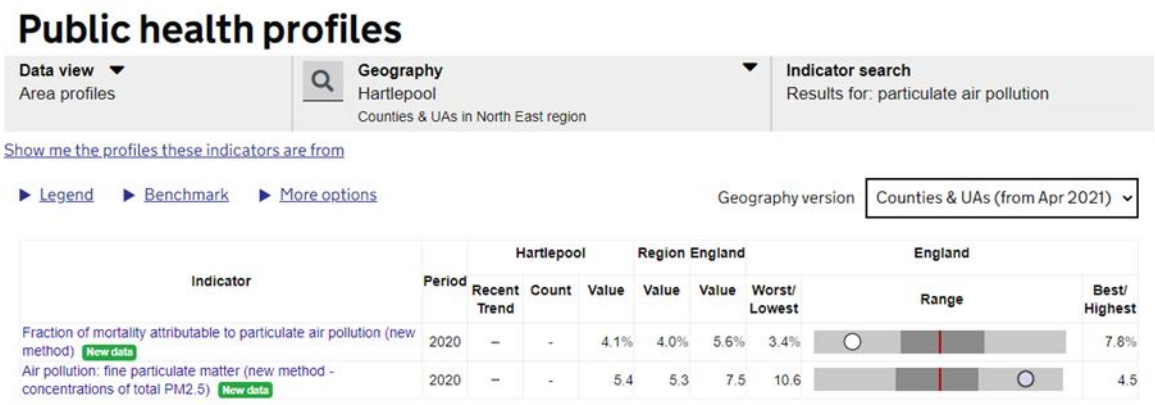
**General Air Quality Initiatives and policies**

- Committee proposal approved to develop a Net Zero and Climate Change Plan by September 2022
- The Borough Council has developed a Tree Strategy which includes objectives to: retain and protect existing trees; increase the number of trees by planting more, and encouraging others to plant more.
- The Hartlepool Local Plan 2018 specifies that where appropriate, an ecosystems services approach will be used to assess the impact of development proposals on the natural environment and improve air quality.
- Crucial Crew is an annual educational interactive event for Primary School (year 6) children, delivered successfully in Hartlepool since 1995 and which incorporates a scenario about air quality. Unfortunately the event had to be cancelled in both 2020 and 2021 but is expected to re-start in September 2022.

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The latest data available on the Public Health England website as displayed below states that the fraction of mortality attributed to particulate air pollution within Hartlepool is 4.1% which is lower than the overall value for England which is 5.6% although it is a slighter higher rate than for the North East Region (4%).



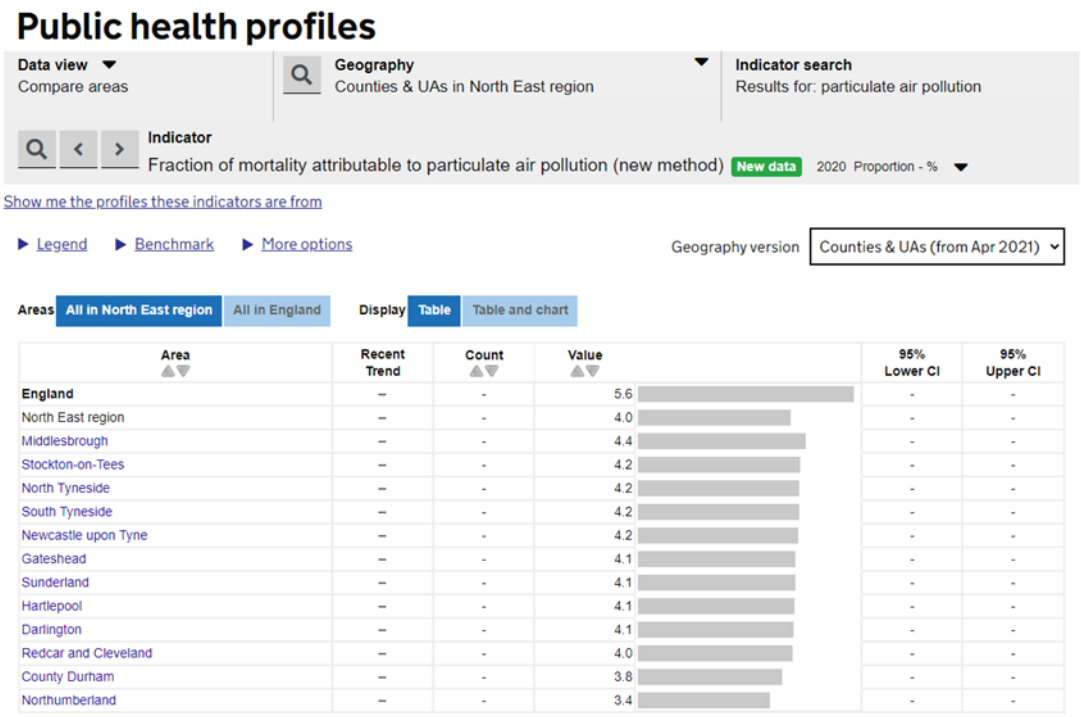
Public health profiles

Data view: Area profiles | Geography: Hartlepool, Counties & UAs in North East region | Indicator search: Results for: particulate air pollution

Show me the profiles these indicators are from

▶ Legend ▶ Benchmark ▶ More options Geography version: Counties & UAs (from Apr 2021)

| Indicator | Period | Hartlepool Recent Trend | Hartlepool Count | Hartlepool Value | Region Value | England Value | England Worst/ Lowest | England Range | England Best/ Highest |
|---|---|---|---|---|---|---|---|---|---|
| Fraction of mortality attributable to particulate air pollution (new method) New data | 2020 | – | - | 4.1% | 4.0% | 5.6% | 3.4% | | 7.8% |
| Air pollution: fine particulate matter (new method - concentrations of total PM2.5) New data | 2020 | – | - | 5.4 | 5.3 | 7.5 | 10.6 | | 4.5 |



Public health profiles

Data view: Compare areas | Geography: Counties & UAs in North East region | Indicator search: Results for: particulate air pollution

Indicator: Fraction of mortality attributable to particulate air pollution (new method) New data 2020 Proportion - %

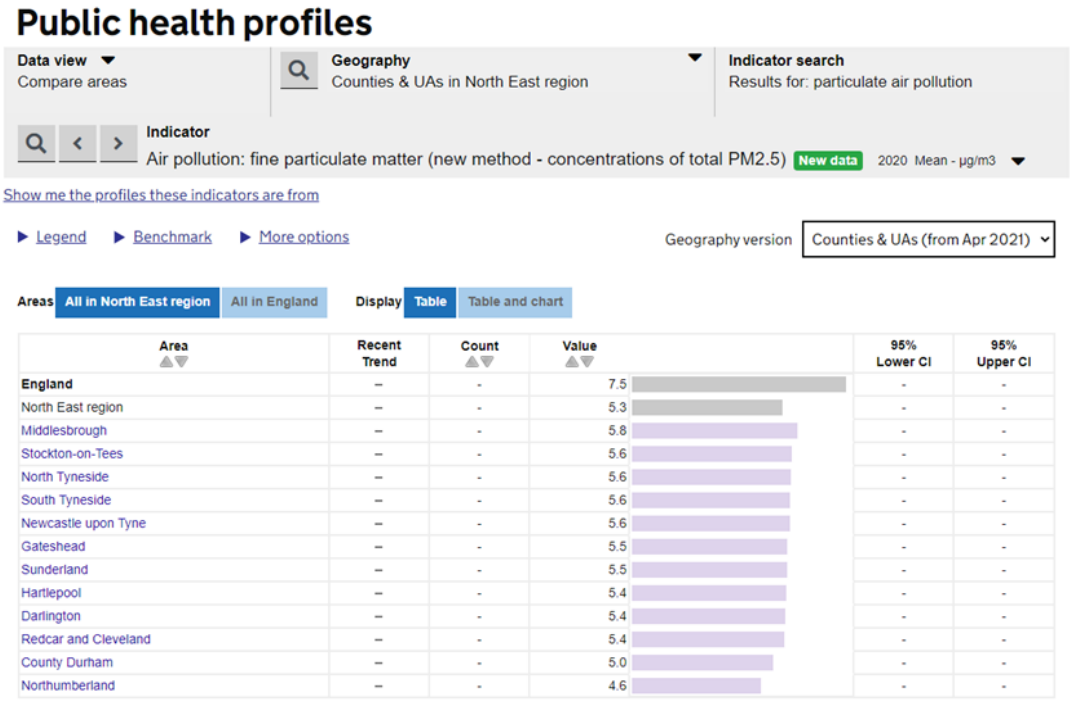
Show me the profiles these indicators are from

▶ Legend ▶ Benchmark ▶ More options Geography version: Counties & UAs (from Apr 2021)

Areas: All in North East region | All in England Display: Table | Table and chart

| Area | Recent Trend | Count | Value | 95% Lower CI | 95% Upper CI |
|---|---|---|---|---|---|
| England | – | - | 5.6 | - | - |
| North East region | – | - | 4.0 | - | - |
| Middlesbrough | – | - | 4.4 | - | - |
| Stockton-on-Tees | – | - | 4.2 | - | - |
| North Tyneside | – | - | 4.2 | - | - |
| South Tyneside | – | - | 4.2 | - | - |
| Newcastle upon Tyne | – | - | 4.2 | - | - |
| Gateshead | – | - | 4.1 | - | - |
| Sunderland | – | - | 4.1 | - | - |
| Hartlepool | – | - | 4.1 | - | - |
| Darlington | – | - | 4.1 | - | - |
| Redcar and Cleveland | – | - | 4.0 | - | - |
| County Durham | – | - | 3.8 | - | - |
| Northumberland | – | - | 3.4 | - | - |

A new measure for 2021 (based on 2020 data) is fine particulate matter – concentrations of total $PM_{2.5}$. Results shows that for this measure, levels within Hartlepool were 5.4µg/$m^3$ which is lower than the overall value for England (7.5µg/$m^3$) and slighter higher than the rate for the North East Region (5.3µg/$m^3$).



Public health profiles

Data view: Compare areas | Geography: Counties & UAs in North East region | Indicator search: Results for: particulate air pollution

Indicator: Air pollution: fine particulate matter (new method - concentrations of total PM2.5) New data 2020 Mean - µg/m3

Show me the profiles these indicators are from

Legend | Benchmark | More options | Geography version: Counties & UAs (from Apr 2021)

Areas: All in North East region | All in England | Display: Table | Table and chart

| Area | Recent Trend | Count | Value | 95% Lower CI | 95% Upper CI |
|---|---|---|---|---|---|
| England | – | - | 7.5 | - | - |
| North East region | – | - | 5.3 | - | - |
| Middlesbrough | – | - | 5.8 | - | - |
| Stockton-on-Tees | – | - | 5.6 | - | - |
| North Tyneside | – | - | 5.6 | - | - |
| South Tyneside | – | - | 5.6 | - | - |
| Newcastle upon Tyne | – | - | 5.6 | - | - |
| Gateshead | – | - | 5.5 | - | - |
| Sunderland | – | - | 5.5 | - | - |
| Hartlepool | – | - | 5.4 | - | - |
| Darlington | – | - | 5.4 | - | - |
| Redcar and Cleveland | – | - | 5.4 | - | - |
| County Durham | – | - | 5.0 | - | - |
| Northumberland | – | - | 4.6 | - | - |

Further information on this data can be found on Public Health England's Website using the link below:

https://fingertips.phe.org.uk/search/particulate%20air%20pollution#page/3/gid/1/pat/6/par/E12000001/ati/102/are/E06000047/iid/30101/age/230/sex/4/cid/4/tbm/1

Monitoring of particulate $PM_{2.5}$ is carried out within neighbouring Redcar and Cleveland, Stockton and Middlesbrough Councils through the national network and it is also possible to determine likely levels in all Tees Valley Council areas, including Hartlepool. Government objectives are easily met where relevant public exposure exists and this is expected to continue. Even so, Hartlepool council will continue to co-operate with the four other Tees Valley councils in trying to identify in more detail sources of fine particles, and see if any local action can cost effectively reduce emissions / concentrations.

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

This section sets out the monitoring undertaken within 2021 by Hartlepool Borough 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

Hartlepool Borough Council has two continuous monitoring stations, one alongside the busy main A689 Stockton Road (Barra Grove) leading into Hartlepool and measuring nitrogen dioxide and particulate $PM_{10}$, the other alongside the working port area on the Headland (Town Wall) measuring particulate $PM_{10}$ only. The Headland station is a site specific location for port activity. Hartlepool Borough Council undertook automatic (continuous) monitoring at these 2 sites during 2021. Additionally, a monitor was installed by DEFRA in October 2017 at St Abbs Walk and measures continuous urban background $NO_2$ in the Borough as part of the Automatic Urban Rural Network (AURN). 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 Data Selector - Defra, UK  page presents automatic monitoring results for Hartlepool Borough Council, with automatic monitoring results also available through the UK Air Website:

https://uk-air.defra.gov.uk/networks/network-info?view=aurn

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

### 3.1.2 Non-Automatic Monitoring Sites

Hartlepool Borough Council undertook non- automatic (i.e. passive) monitoring of $NO_2$ at 3 sites during 2021. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide ($NO_2$)

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

For diffusion tubes, the full 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.

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

There have been no exceedances of the annual mean or 1 hour mean objectives at any monitoring location.

### 3.2.2 Particulate Matter ($PM_{10}$)

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

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

There have been no exceedances of the annual mean objective.

### 3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years using the nationally derived factor of 0.7 applied to the particulate $PM_{10}$ results at the Stockton Road and Headland site.

Derived annual means have fallen from 16.6 µg/$m^3$ in 2020 (18.9 µg/ $m^3$ in 2019) to 16 µg/$m^3$ in 2021 at Stockton Road and have fallen from 20.8 µg/$m^3$ in 2020 (22.2 µg/ $m^3$ in 2019) to 18.4 µg/ $m^3$ in 2021 at the Headland station.

The actual monitored levels at Redcar and Cleveland, Stockton and Middlesbrough sites range from 6.6 µg/$m^3$ to 8.2 µg/$m^3$ over the same period.

### 3.2.4 Sulphur Dioxide ($SO_2$)

Hartlepool Borough Council no longer monitors sulphur dioxide concentrations, and there is no requirement to do so in the absence of industrial sources or significant domestic coal burning. Hartlepool did monitor sulphur dioxide concentrations at the Stockton Road station until 2007 and results were significantly and consistently below the air quality objective. Sulphur dioxide monitoring results from other Tees Valley Councils with significant emissions from the chemical and steel industries, consistently show the objectives being met, and this will also be the case within the Hartlepool area.

# 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 Stockton Road | Stockton Road (Barra Grove) | Roadside | 450300 | 529700 | $NO_2$; $PM_{10}$ | NO | Chemiluminescent; Beta Attenuated | 10 | 12 | 2 |
| A2 Headland | Headland (Town Wall) | Other | 452400 | 533600 | $PM_{10}$ | NO | Beta Attenuated | 10 | 5 | 2 |
| A3 St Abbs Walk | St Abbs Walk (AURN) | Urban Background | 451429 | 532312 | $NO_2$ | NO | Chemiluminescent | 6.5 | 6 | 2 |

**Notes:**

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

(2) N/A if not applicable

## 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1 | Powlett Road | Roadside | 450400 | 533900 | $NO_2$ | NO | 0 | 5 | NO | 2.5 |
| S2 | King Oswy Drive | Roadside | 449600 | 535950 | $NO_2$ | NO | 0 | 5 | NO | 2.5 |
| S3 | Fens Crescent | Roadside | 449600 | 529100 | $NO_2$ | NO | 0 | 5 | NO | 2.5 |

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

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 Stockton Road | 450300 | 529700 | Roadside | 33 | 33 | 18.5 | 17.9 | 13.9 | 7.6 | 12.1 |
| A3 St Abbs Walk | 451429 | 532312 | Urban Background | 99 | 99 | - | 13 | 12.3 | 9.9 | 10.3 |

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

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

**Notes:**

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

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

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

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

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

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

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

| Diffusion Tube ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| S1 | 450400 | 533900 | Roadside | N/A | 83% | 9.5 | 7.5 | 13.4 | 9.7 | 11.6 |
| S2 | 449600 | 535950 | Roadside | N/A | 83% | 11.2 | 6.9 | 13.1 | 8.6 | 9.2 |
| S3 | 449600 | 529100 | Roadside | N/A | 83% | 9 | 7.8 | 14.2 | 10.7 | 11.9 |

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

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

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

**Notes:**

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

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

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

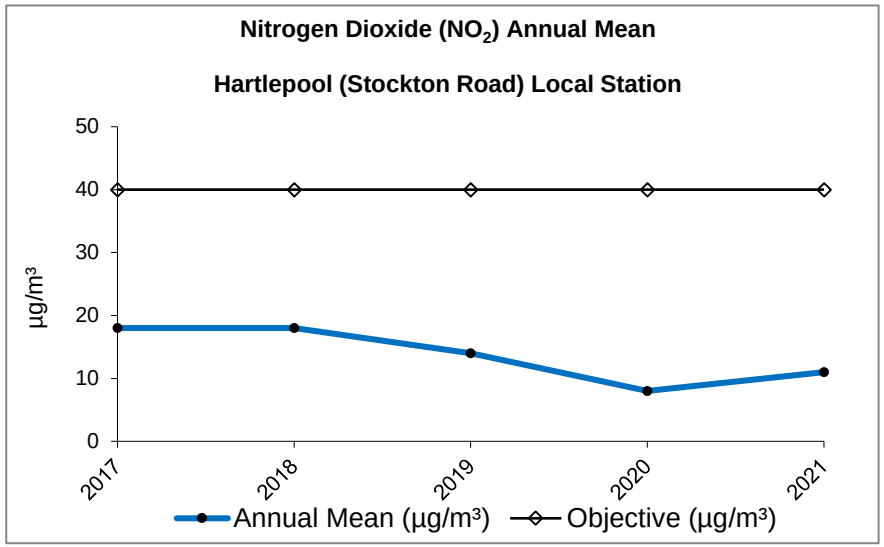
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

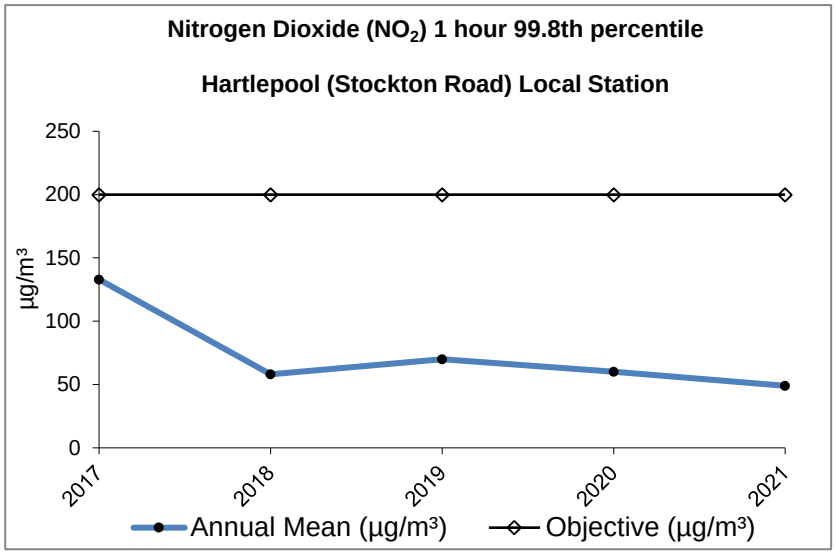
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

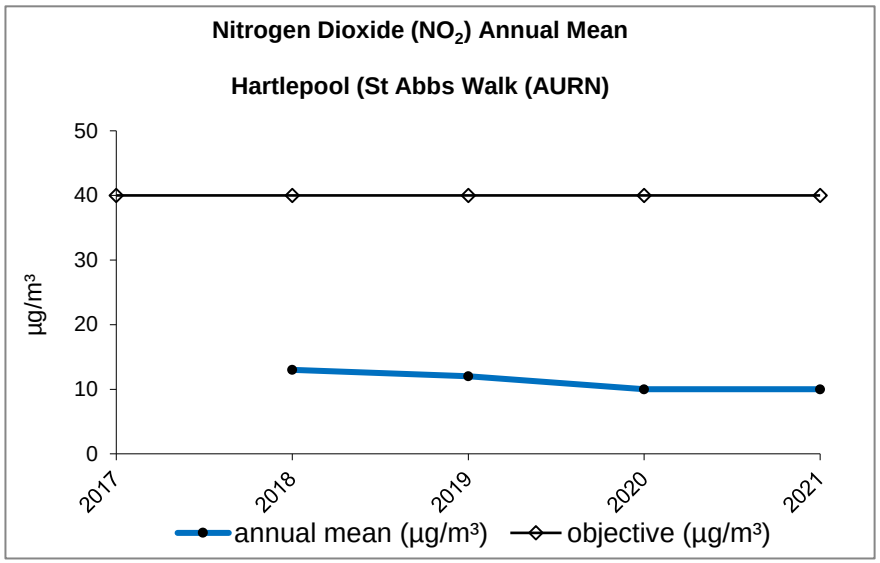
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

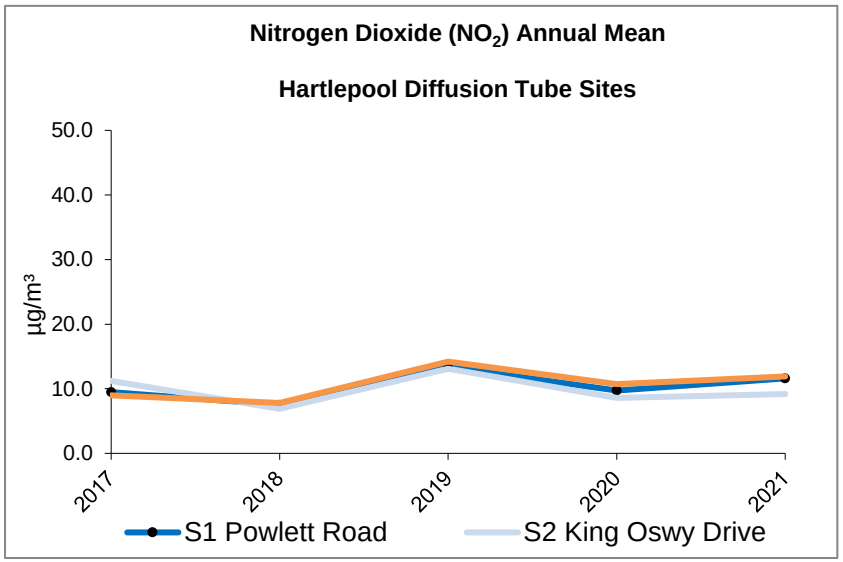
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

## Figure A.1 – Trends in Annual Mean $NO_2$ Concentrations



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

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 Stockton Road | 450300 | 529700 | Roadside | 33 | 33 | 0 | 0 | 0 | 0 (60) | 0 (49) |
| A3 St Abbs Walk | 451429 | 532312 | Urban Background | 99 | 99 | 0 | 0 | 0 | 0 | 0 |

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

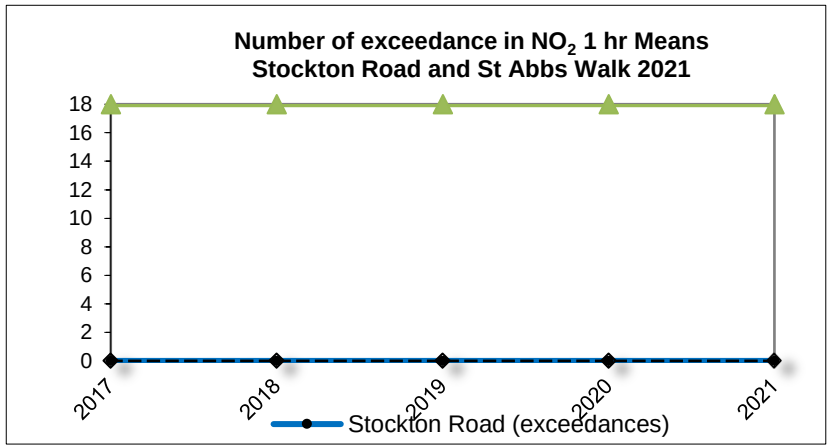
Exceedances of the $NO_2$ 1-hour mean objective (200µg/m$^3$ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

## Figure A.2 – Trends in Number of $NO_2$ 1-Hour Means > 200µg/m$^3$



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

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 Stockton Road | 450300 | 529700 | Roadside | 53 | 53 | 22.5 | 26.6 | 25.3 | 23.7 | 22.9 |
| A2 Headland | 452400 | 533600 | Other | 51 | 51 | 26.8 | 27.3 | 29.7 | 29.7 | 26.3 |

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

**Notes:**

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

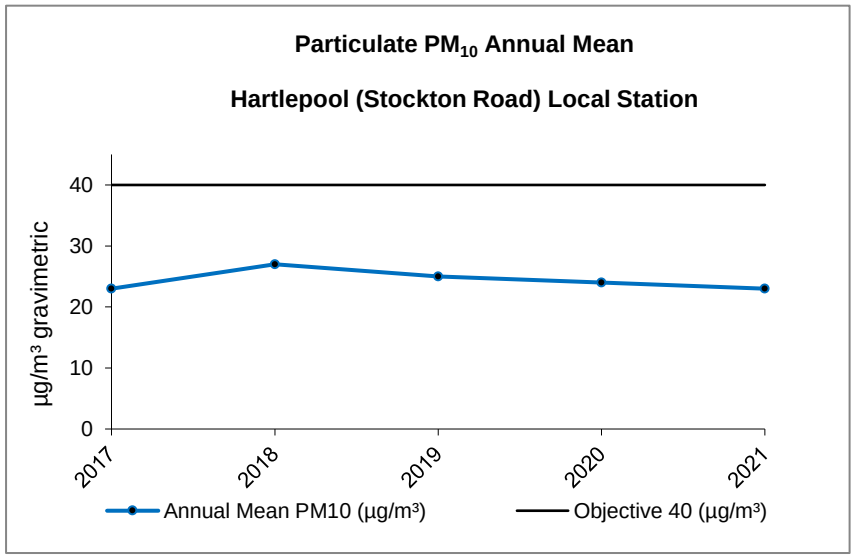
Exceedances of the $PM_{10}$ annual mean objective of $40\mu g/m^3$ are shown in **bold**.

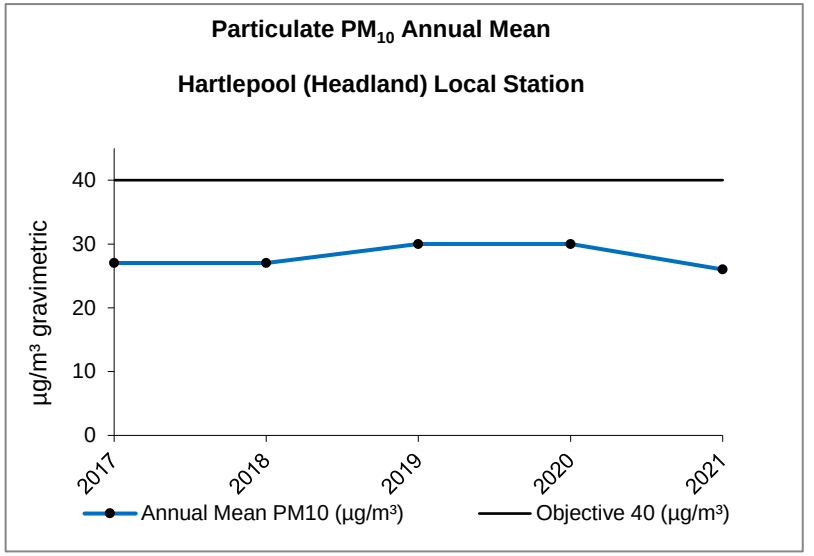
All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

## Figure A.3 – Trends in Annual Mean $PM_{10}$ Concentrations



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

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 Stockton Road | 450300 | 529700 | Roadside | 53 | 53 | 3(34) | 9(38) | 5(38) | 1(33) | 0(34) |
| A2 Headland | 452400 | 533600 | Other | 51 | 51 | 7 | 12 | 13(46) | 20 | 5(41) |

**Notes:**

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

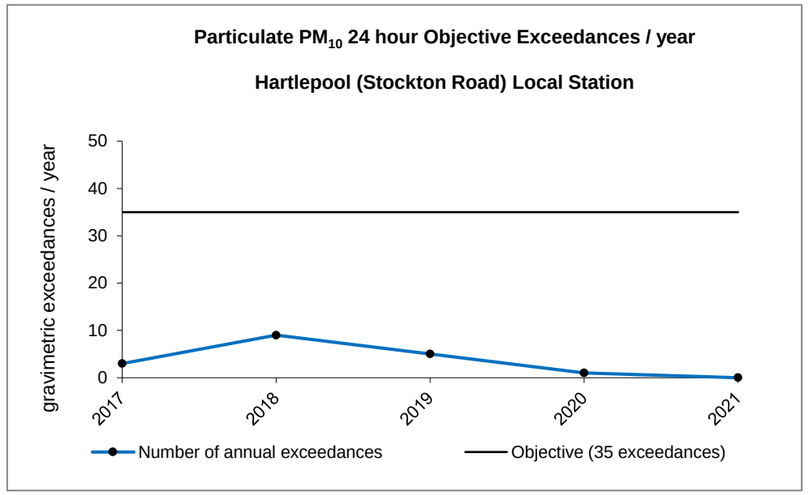
Exceedances of the $PM_{10}$ 24-hour mean objective (50µg/m$^3$ not to be exceeded more than 35 times/year) are shown in **bold**.

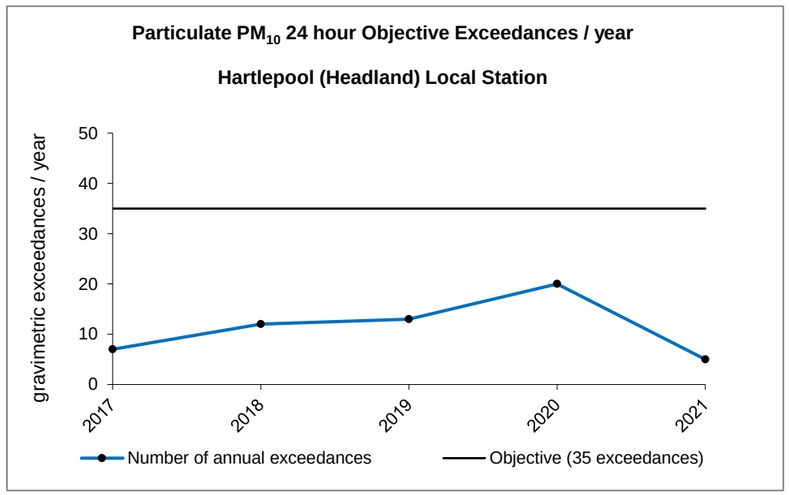
If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

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

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

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



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

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2021 (%) (2) | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| A1 Stockton Road | 450300 | 529700 | Roadside | 53 | 53 | 15.7 | 18.6 | 18.9 | 16.6 | 16 |
| A2 Headland | 452400 | 533600 | Other | 51 | 51 | 18.7 | 19.1 | 22.2 | 20.8 | 18.4 |

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

**Notes:**

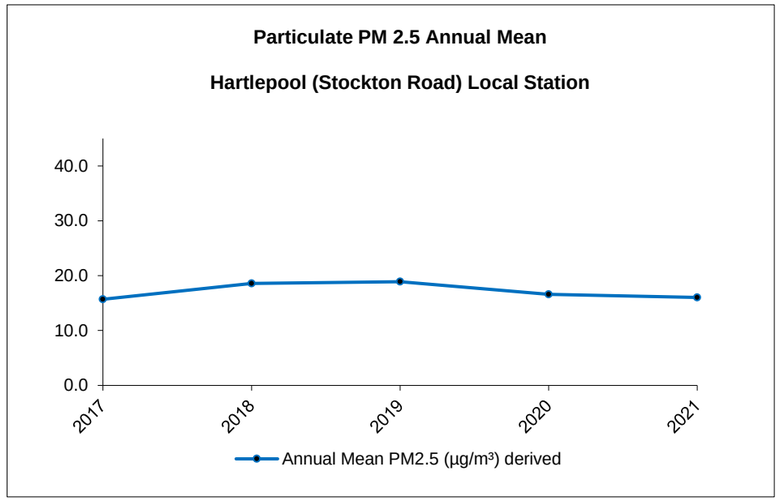
The annual mean concentrations are presented as µg/m$^3$.

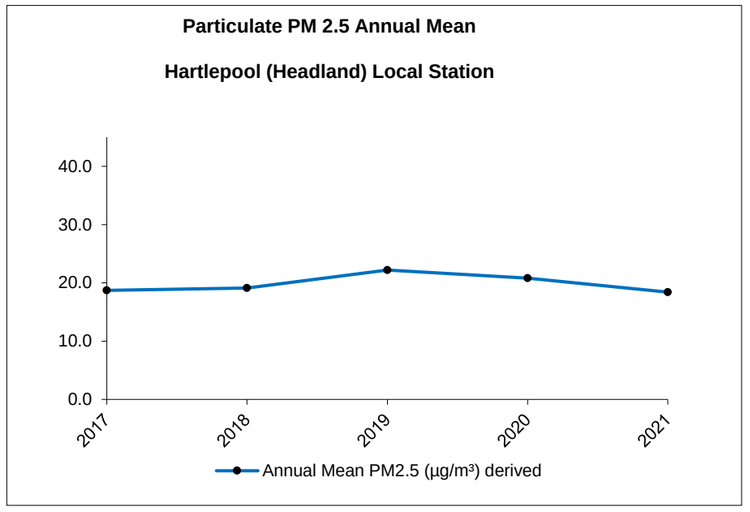
All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

## Figure A.5 – Trends in Annual Mean $PM_{2.5}$ Concentrations



# Appendix B: Full Monthly Diffusion Tube Results for 2021

## Table B.1 – $NO_2$ 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 (0.78) | Annual Mean: Distance Corrected to Nearest Exposure | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 | 450400 | 533900 | | 17.5 | 13.3 | 15.7 | 11.9 | 12.3 | 11.3 | 13.4 | 16.2 | 16.0 | | 20.8 | 14.8 | 11.6 | - | Some data missing due to Covid 19 restrictions and staff absence |
| S2 | 449600 | 535950 | | 14.6 | 10.1 | 10.5 | 10.1 | 8.7 | 8.1 | 10.5 | 14.3 | 14.2 | | 17.2 | 11.8 | 9.2 | - | Some data missing due to Covid 19 restrictions and staff absence |
| S3 | 449600 | 529100 | | 19.7 | 14.3 | 14.5 | 11.8 | 10.3 | 7.7 | 12.6 | 19.0 | 19.4 | | 23.0 | 15.2 | 11.9 | - | Some data missing due to Covid 19 restrictions and staff absence |

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

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **Hartlepool Borough Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

**Notes:**

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

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

See Appendix C for details on bias adjustment and annualisation.

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

## New or Changed Sources Identified Within Hartlepool Borough Council During 2021

Hartlepool Borough Council have identified the following planning approvals for residential dwellings within the reporting year of 2021 which may affect air quality.

| | |
|---|---|
| **H/2019/0226** | **LAND TO THE NORTH OF HARTLEPOOL ROAD (A689) WYNYARD PARK**<br>Residential development comprising 243 houses including associated access, link road connection, infrastructure and open space |
| **H/2019/0473** | **LAND AT WYNYARD PARK**<br>Residential development comprising erection of 186 dwellings and associated works including access and landscaping. |
| **H/2020/0261** | **LAND TO SOUTH OF A179, MIDDLE WARREN**<br>Erection of 570 dwellings and provision of a new roundabout and associated infrastructure |
| **H/2020/0372** | **LAND AT HILL VIEW, GREATHAM**<br>Residential development comprising the erection of 18 residential dwellings with associated access, infrastructure and landscaping. |
| **H/2015/0354** | **LAND AT HART RESERVOIR (Outline Approval)**<br>Residential development (up to 52 dwellings) with associated access and highway works and creation of wildlife ponds, park, footpaths, public car park, landscaping and open space areas. |
| **H/2020/0303** | **LAND AT RODNEY STREET**<br>Development of 12 bungalows with associated hard and soft landscaping works. |

| | |
|---|---|
| **H/2021/0315** | **LAND AT LYNN STREET, WHITBY STREET, SURTEES STREET HARTLEPOOL**<br>Demolition of existing buildings (incl. former Market Hotel, Lynn Street Council depot and former Drug Rehabilitation Centre) and<br>erection of 48 dwellings with associated access, infrastructure, and hard and soft landscaping |

## Additional Air Quality Works Undertaken by Hartlepool Borough Council During 2021

Hartlepool Borough Council has not completed any additional works within the reporting year of 2021.

## QA/QC of Diffusion Tube Monitoring

Hartlepool Borough Council nitrogen dioxide diffusion tube programme is operated through an approved laboratory (SOCOTEC, Didcot) with formal accreditation to BS standards and one that participates in the AIR-PT programme. Particular attention is paid to correct installation of the tubes at site and reliable exposure duration.

Tube precision for this laboratory is consistently shown as good for tube preparation 50% TEA in acetone. As can be seen from the table below SOCOTEC are considered to be satisfactory as they have 100% across their most recent six tube rounds where data was available - this indicates that diffusion tube results should be accurate to within +/- 2%.

### Diffusion Tube Annualisation

All diffusion tube monitoring locations within Hartlepool Borough Council recorded data capture of over 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.

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

Hartlepool Borough Council have applied a National bias adjustment factor of 0.78 to the 2021 monitoring data. The national bias adjustment factor was derived using the 'National Diffusion Tube Bias Adjustment Factor Spreadsheet 03/22 which produced a bias adjustment factor of 0.78 following 23 studies.

**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
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2022
LAQM Helpdesk Website

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:** Select the Laboratory that Analyses Your Tubes from the Drop-Down List
If a laboratory is not shown, we have no data for this laboratory.

**Step 2:** Select a Preparation Method from the Drop-Down List
If a preparation method is not shown, we have no data for this method at this laboratory.

**Step 3:** Select a Year from the Drop-Down List
If a year is not shown, we have no data[2]

**Step 4:** 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 you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

| Analysed By[1] | Method (To select your co-location, choose (All) from the pop-up list) | Year[2] (To select your co-location, choose (All)) | Site Type | Local Authority | Length of Study (months) | Diffusion Tube Mean Conc. (Dm) (µg/m³) | Automatic Monitor Mean Conc. (Cm) (µg/m³) | Bias (B) | Tube Precision[4] | Bias Adjustment Factor (A) (Cm/Dm) |
|---|---|---|---|---|---|---|---|---|---|---|
| SOCOTEC Didcot | 50% TEA in acetone | 2021 | R | City of York Council | 12 | 22 | 17 | 29.0% | G | **0.77** |
| SOCOTEC Didcot | 50% TEA in acetone | 2021 | R | City of York Council | 12 | 37 | 25 | 45.5% | G | **0.69** |
| SOCOTEC Didcot | 50% TEA in acetone | 2021 | UI | North Lincolnshire Council | 12 | 17 | 14 | 19.9% | G | **0.83** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | Bridgend Borough County Council / Shared R | 12 | 36 | 25 | 42.9% | G | **0.70** |
| Socotec Didcot | 50% TEA in acetone | 2021 | UB | Derry City and Strabane District Council | 12 | 11 | 9 | 28.4% | G | **0.78** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | Derry City and Strabane District Council | 12 | 30 | 30 | 2.4% | G | **0.98** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | East Suffolk Council | 11 | 30 | 25 | 22.3% | P | **0.82** |
| Socotec Didcot | 50% TEA in acetone | 2021 | KS | Marylebone Road Intercomparison | 10 | 56 | 42 | 32.9% | P | **0.75** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | North East Lincolnshire Council | 10 | 27 | 29 | -7.6% | G | **1.08** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | North East Lincolnshire Council | 9 | 45 | 33 | 34.5% | P | **0.74** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | Leeds City Council | 13 | 40 | 29 | 35.5% | G | **0.74** |
| Socotec Didcot | 50% TEA in acetone | 2021 | KS | Leeds City Council | 12 | 34 | 25 | 37.9% | G | **0.73** |
| Socotec Didcot | 50% TEA in acetone | 2021 | R | Leeds City Council | 9 | 43 | 31 | 40.8% | G | **0.71** |
| Socotec Didcot | 50% TEA in acetone | 2021 | UC | Leeds City Council | 12 | 31 | 23 | 37.4% | G | **0.73** |
| SOCOTEC Didcot | 50% TEA in acetone | 2021 | | **Overall Factor[3] (23 studies)** | | | | **Use** | | **0.78** |

## Discussion on use of bias correction factor

Hartlepool Borough Council has chosen to use a national bias adjustment factor for the 2021 data; which factor has been used for the previous 5 years. The national bias adjustment factor has been selected on the basis that it includes 23 sites which reflects a larger sample size than would be possible for a local bias-adjustment factor in the Borough.

A summary of bias adjustment factors used by Hartlepool Borough Council over the past five years is presented in Table C.1.

### Table C.1 – Bias Adjustment Factor

| Monitoring Year | Local or National | If National, Version of National Spreadsheet | Adjustment Factor |
|---|---|---|---|
| **2021** | National | 03/22 | 0.78 |
| **2020** | National | 09/21 | 0.76 |
| **2019** | National | - | 0.75 |
| **2018** | National | - | 0.77 |
| **2017** | National | - | 0.77 |

### $NO_2$ Fall-off with Distance from the Road

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

No diffusion tube $NO_2$ monitoring locations within Hartlepool Borough Council required distance correction during 2021.

## QA/QC of Automatic Monitoring

The two Hartlepool fixed continuous Local monitoring stations (one $NO_2$ and $PM_{10}$, the other $PM_{10}$), are modern installations, and have been operated under a comprehensive service contract. Operators of the site have received supplier training.

The Council is committed to achieving accuracy, precision, data capture, traceability and long term consistency to ensure that data is representative of ambient air quality. In common with other Tees Valley Councils, Hartlepool has a documented quality assurance and control programme, which includes an established schedule of regular site calibrations, validation of data, and documentation of all procedures.

Details are summarised as follows:

Calibration gas obtained from approved gas standard suppliers. Equipment has a comprehensive service agreement with the supplier.

Data capture site operators are experienced and trained personnel, monitoring data capture on a daily basis where possible to ensure that faults are detected and corrected quickly.

Ratification data is screened, where possible on a daily basis, to check for unusual measurements. Suspicious data is investigated fully, and if found to be faulty, is deleted from the records. Particular attention is paid to possible environmental changes in the vicinity of the analyser.

Data is recorded monthly and compared with earlier results.

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

The Stockton Road and Headland $PM_{10}$ monitors are BAM units adjusted to full gravimetric equivalence by dividing the raw data by 1.21.

### Automatic Monitoring Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%.

The data from the Stockton Road and Headland stations required annualisation due to; the impact on collection and analysis during the COVID 19 pandemic and breakdown of monitoring equipment.

The data has been annualised using the results at three Tees Valley continuous monitoring sites, in accordance with LAQM.TG16. Details of the sites and the data are displayed in Table C.2.

### $NO_2$ Fall-off with Distance from the Road

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

No automatic $NO_2$ monitoring locations within Hartlepool Borough Council required distance correction during 2021.

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

| Site ID | Annualisation Factor Redcar and Cleveland (Dormanstown) | Annualisation Factor Stockton –on-tees Eaglescliffe | Annualisation Factor Middlesbrough | Average Annualisation Factor | Raw Data Annual Mean (µg/m3) | Annualised Annual Mean (µg/m$^3$) | Comments |
|---|---|---|---|---|---|---|---|
| A1 Stockton Road ($NO_2$) | 1.11 | 1.01 | 1.10 | 1.08 | 11.2 | 12.1 | |
| A1 Stockton Road ($PM_{10}$) | 0.89 | 0.90 | 0.93 | 0.91 | 25.1 | 22.9 | |
| A2 Headland ($PM_{10}$) | 0.89 | 0.90 | 0.93 | 0.91 | 28.9 | 26.3 | |

# Appendix D: Map of Monitoring Locations


Automatic Monitoring Sites: **A1** - Stockton Road, **A2** - Headland, **A3** - St Abbs Walk, and

Diffusion Tubes: **S1** - Powlett Road, **S2** - King Oswy Drive, **S3** - Fens Crescent

# Appendix E: Summary of Air Quality Objectives in England

### Table E.1 – Air Quality Objectives in England[10]

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

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

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Annual Status Report |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways |
| EU | European Union |
| FDMS | Filter Dynamics Measurement System |
| LAQM | Local Air Quality Management |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| $PM_{10}$ | Airborne particulate matter with an aerodynamic diameter of 10µm or less |
| $PM_{2.5}$ | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| $SO_2$ | Sulphur Dioxide |
| | |

# References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