Bath & North East Somerset Council

Improving People's Lives

Provisional 2024 Air Quality Monitoring Report – Jan-Sept 2024

Liveable Neighbourhoods – New Sydney Place and Sydney Road

Monitoring Date: **January-September 2024**

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Background information

This report provides a comparison of the baseline air pollution data (2023) with data from January-September 2024 for the Sydney Place/New Sydney Place Liveable Neighbourhood (LN) scheme.

Air pollution

Air pollution is the leading environmental health risk to the UK public, with an estimated 29,000 to 43,000 deaths annually attributed to it in the UK alone[1].

Long-term exposure to air pollution is linked to premature death associated with lung, heart and circulatory conditions, while short-term exposure exacerbates asthma and increases hospital admissions.

There is evidence to suggest that despite strengthening environmental policies, the poorest in our society are being unfairly exposed to worse air pollution without seeing improvements[2]. Clean air is important for everyone and will alleviate stress on our health system, improve people's lives and make our society more equitable.

Types and causes of air pollution

There are different causes and sources of air pollution. Historically, combustion of fossil fuels for energy, such as coal, produced smoke and sulphur dioxide (SO_2).

Now road traffic is chiefly responsible for the poor air quality in the UK contributing to nitrogen dioxide (NO_2) pollution and particulate matter (PM) pollution.

Particulate matter pollution, referred to as PM_{10} (particulate matter less than 10 µm in diameter) or $PM_{2.5}$ (particulate matter less than 2.5 µm in diameter), is made up of tiny bits of material from all sorts of places including smoke from fires, exhaust fumes, smoking or the dust from brake pads on vehicles. These particles are too small to see, and we can breathe them in without noticing.

Nitrogen dioxide (NO_2) comes from burning fuels or other materials, so levels are especially high around roads. But they are also produced from home gas boilers, bonfires, and other sources as well. You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies. Vehicle exhaust

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.
[2] Air Quality Management Resource Centre, UWE. Emissions vs exposure: Increasing injustice from road traffic-related air pollution in the United Kingdom, 2019 https://www.sciencedirect.com/science/article/pii/S1361920919300392

emissions contribute 35 per cent of all UK nitrogen oxide emissions (NOx) which is the single greatest source[3].

How does air pollution affect our health?

Air pollution particles and gases enter our bodies and can damage our cells in different ways. They usually get into our lungs first and can then move into our blood to reach organs such as our heart and brain.

Any amount of pollution can be damaging to our health, but the more that you are exposed to, the bigger the risk and the larger the effect on you and your family. Some people are more vulnerable to the impacts of air pollution than others. Those more at risk from air pollution include children, pregnant and older people; and people with lung conditions such as asthma, chronic obstructive pulmonary disease (COPD) and lung cancer, and people with heart conditions such as coronary artery disease, heart failure and high blood pressure.

Air pollution in Bath

Historically, nitrogen dioxide (NO_2) levels in Bath have been unacceptably high. Since introducing Bath's clean air zone and through the natural replacement of polluting vehicles with cleaner ones over time, air quality is gradually improving, but there are still areas of concern. For example, annual average nitrogen dioxide (NO_2) levels were below the legal limit of 40 µg/m^3 within the city in 2023. There were 2 sites in Bath with annual average levels between 36-40 µg/m^3. The high concentrations are mainly caused by vehicle emissions.

The problem is exacerbated by Bath's topography. The city sits in the bottom of a valley surrounded by hills, and its central roads are flanked by tall buildings, which means that in certain conditions, vehicle emissions can get trapped in the atmosphere causing high levels of NO_2 in certain locations.

Particulate matter in Bath was not found to exceed legal limits for either PM_{10} or $PM_{2.5}$, except at times when there were meteorological or other events that caused spikes in these pollutants, nationally.

How we monitor air quality

We have measured air quality in Bath and North East Somerset since the mid-1990s. Currently we measure nitrogen dioxide (NO_2) and Particulate Matter ($PM_{2.5}$ and PM_{10}) concentrations in two ways: automatic analysers and diffusion tubes.

[3] DEFRA. Air quality: explaining air pollution – at a glance, 2019. https://www.gov.uk/government/publications/air-quality-explaining-air-pollution/air-quality-explainingair-pollution-at-a-glance

Automatic analysers measure NO_2 and PM in three permanent roadside locations in Bath. They take hourly readings of air pollution concentrations and provide more accurate readings than diffusion tubes. One of these monitoring stations is linked to the UK Automatic Urban and Rural Network (AURN) which provides national coverage of a range of pollutants.

Diffusion tubes are light, mobile and can be placed in many locations around the area (typically using street furniture), usually 1 to 15 metres from the road or at the kerbside (less than 1 metre from the road) and around 2-3 metres above ground level. The ambient air reacts with a chemical reagent in the tube so that NO_2 concentrations can be measured. The tubes are exposed to the air for one month before they are collected and sent to a laboratory for analysis. There are currently over 150 diffusion tube locations across Bath & North East Somerset including 24 key sites with higher levels of pollution where three diffusion tubes are located at each location to improve data confidence.

To find out more information about air quality across B&NES go to: https://www.bathnes.gov.uk/air-quality

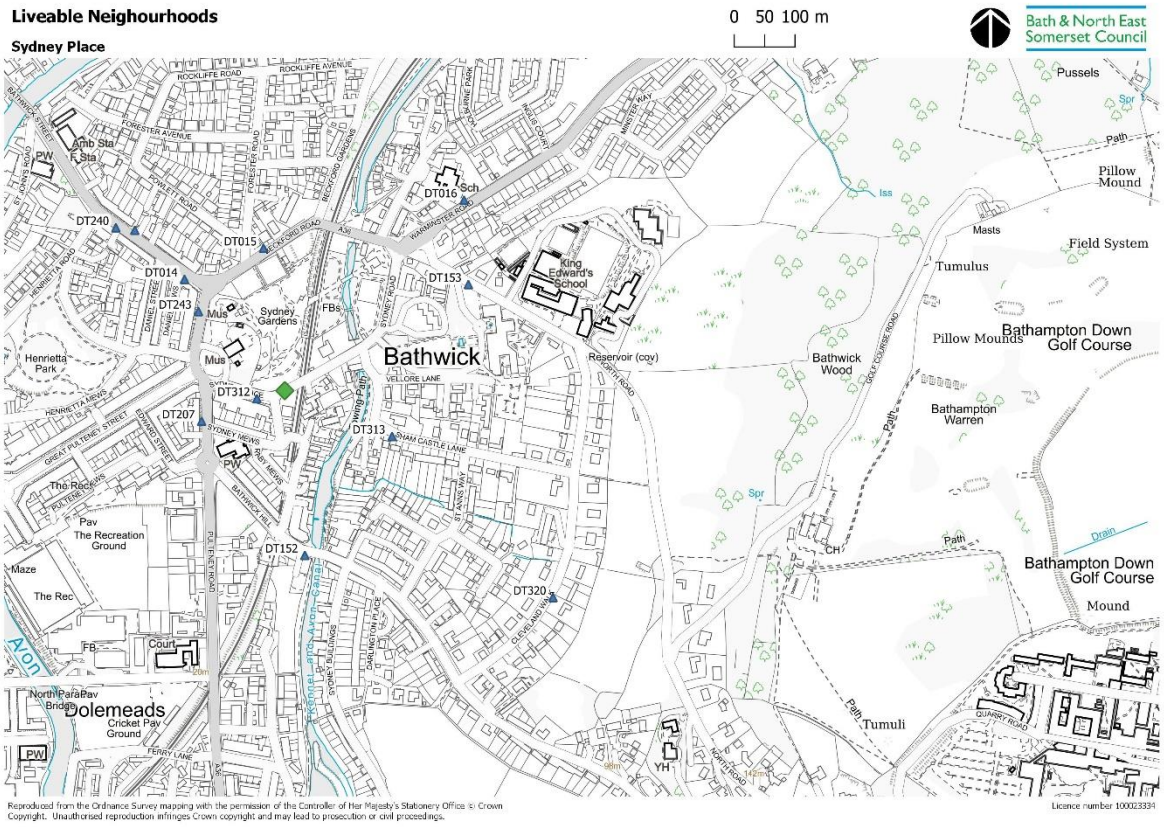
As part of our obligations under the Local Air Quality Management (LAQM) legislation (part IV of Environment Act 1995) as amended by the Environment Act (2021) we have issued an Annual Status Reports (ASR) alongside this report. These set out and comment on air quality data from across the wider authority. These are found at: https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports.

You can also view an interactive map of historical NO_2 data collected from monitoring locations around the area, here: https://www.bathnes.gov.uk/nitrogen-dioxide-monitoring-data

How we monitor air quality (specifically NO_2 concentrations) for the Liveable Neighbourhoods programme

As part of the Liveable Neighbourhoods (LN) project additional monitoring has been carried out at around the Sydney Road/New Sydney Place Experimental Traffic Regulation Order (ETRO) trial. Additional monitoring sites were placed on Sydney Road and Sham Castle Lane in October 2023 and Cleveland Walk in April 2024 to supplement the existing monitoring in the area (Figure 1). Full details of site locations can be found in the Air Quality Annual Status Report (https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports).

Figure 1: Air quality monitor locations near Sydney Road/New Sydney Place LN



Blue triangles are monitoring locations, and the green diamond represents the through traffic restriction location.

Data Analysis – Provisional Data

The data shown below is provisional, final results will be available when the Annual Status Report has been peer reviewed.

To determine how air quality may have changed with the introduction of the trial, we compare the latest data collected since the start of the trial with baseline data from similar periods before its launch.

And because we need to consider seasonal effects on air quality, we compare like-for-like data from previous years, breaking the year into quarters:

- Quarter 1 (Q1) – January, February, March
- Quarter 2 (Q2) – April, May, June
- Quarter 3 (Q3) – July, August, September
- Quarter 4 (Q4) – October, November, December

The primary focus of this report is the second and third quarters (Q2 & Q3) of 2024 as this covers the first 6 months of the trial.

When reading the report please note the following:

- All 2024 air quality data is provisional.
- We use data from 2023 to compare to 2024 air quality monitoring results.
- Air pollution is affected by the seasons, therefore baseline air quality data for this report is from April to September 2023 i.e., the second and third quarters (Q2 & Q3)
- Quarterly results are not comparable to annual air quality objectives
- The data has not been corrected for bias as this is only carried out at the end of the year, this process is detailed in the Annual Status Report (https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports).
- The A36 closed completely at Limpley Stoke from 12 August 2024 and apart from re-opening temporarily for 3 weeks in November 2024, it has remained shut since this date. This closure will have impacted traffic flows on the A36, however, the impact on air quality in the area will be only understood following longer-term monitoring.

The results for the monitoring in quarters 2 & 3 are shown in the Table 1 and 2 and Figure 2. Full quarterly data is available in Appendix 1.

Although the results are not directly comparable with the annual average objective (as bias correction has not been applied and the data is not for the full year), all the quarterly results show that the NO_2 concentrations at all locations are below 40 µg/m^3.

The results show that when comparing Q2 in 2024 with Q2 in 2023, there has been a decrease at all but one site located in Bathwick Street. This site has a small (<1µg/m^3) increase which is within expected normal variability. There are also 2 other monitoring sites on the same road which show a decrease, so it is very unlikely that the small increase is due to the effect of the trial. The results show that when comparing Q3 in 2024 with Q3 in 2023, there has been a decrease at all the monitoring sites indicate that the slight increase seen in Q2 was not due to the effect of the trial.

The results also show increases of 1 µg/m^3 in Cleveland Walk and Sydney Place 2 between Q2 and Q3 in 2024. As these monitoring locations were not added until Q2 in 2024, they cannot be used for comparison purposes yet. It should be noted that there are a number of factors which can affect nitrogen dioxide concentrations these include but are not limited to weather, local pollution sources and seasonality, hence small fluctuations between quarterly results are not unexpected. Further information

is needed to see the ongoing trend at this site. Monitoring will continue in the area with the through traffic restriction trial to ensure there are no ongoing adverse effects on air quality until a decision is made to either make the scheme permanent or remove it.

Figure 2: Quarter 2 & 3 Provisional NO_2 Diffusion Tube Monitoring Results ($\mu g/m^3$)

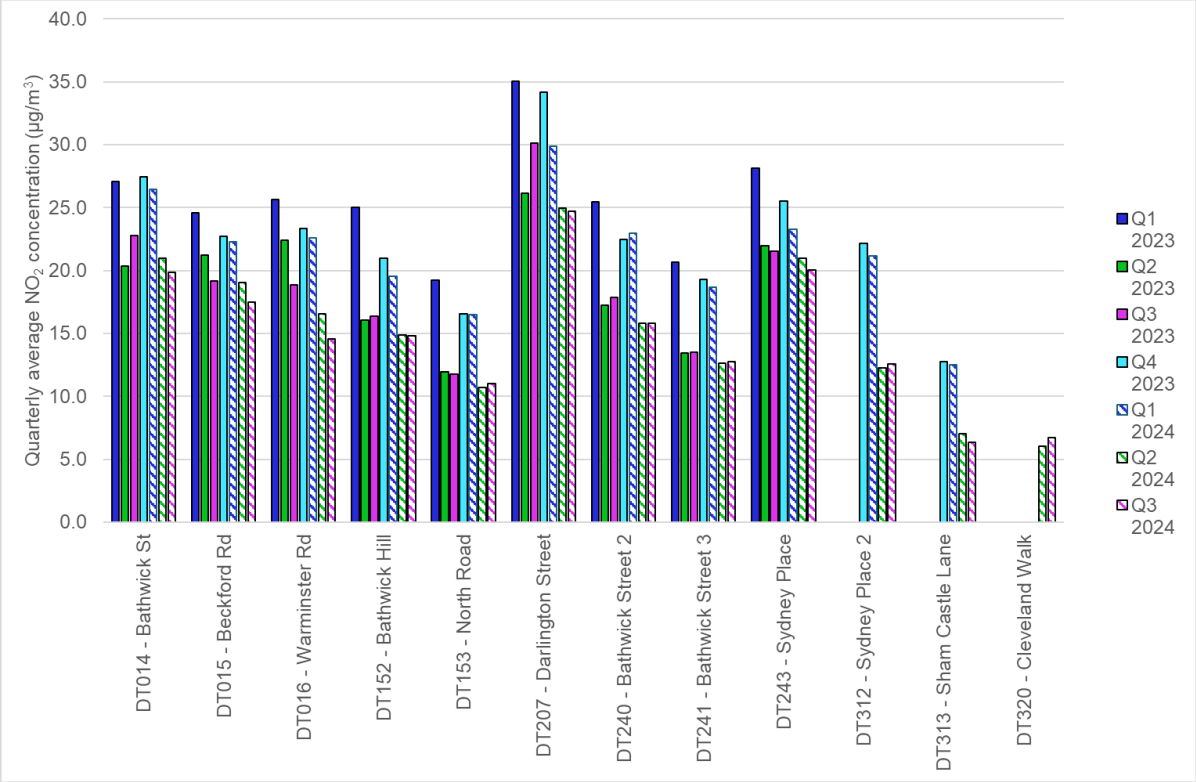


Table 1 – Quarter 2 Provisional NO_2 Diffusion Tube Monitoring Results: Sydney Road LN (µg/m^3)

Site ID	Site Name	Q2 2023	Q2 2024	Change (%)
DT014	Bathwick Street	20	21	3
DT015	Beckford Road	21	19	-10
DT016	Warminster Road	22	17	-26
DT152	Bathwick Hill	16	15	-8
DT153	North Road	12	11	-11
DT207	Darlington Street	26	25	-5
DT240	Bathwick Street 2	17	16	-8
DT241	Bathwick Street 3	14	13	-6
DT243	Sydney Place	22	21	-5
DT312	Sydney Place 2*	-	12	-
DT313	Sham Castle Lane*	-	7	-
DT320	Cleveland Walk*	-	6	-

*Data not available for Q2 2023

Table 2 – Quarter 3 Provisional NO_2 Diffusion Tube Monitoring Results: Sydney Road LN (µg/m^3)

Site ID	Site Name	Q3 2023	Q3 2024	Change (%)
DT014	Bathwick Street	23	20	-13
DT015	Beckford Road	19	18	-8
DT016	Warminster Road	19	15	-23
DT152	Bathwick Hill	16	15	-9
DT153	North Road	12	11	-6
DT207	Darlington Street	30	25	-18
DT240	Bathwick Street 2	18	16	-12
DT241	Bathwick Street 3	14	13	-6
DT243	Sydney Place	22	20	-7
DT312	Sydney Place 2*	-	13	-
DT313	Sham Castle Lane*	-	6	-
DT320	Cleveland Walk*	-	7	-

*Data not available for Q3 2023

Conclusion

Baseline NO_2 monitoring has been carried out in the Sydney Road/New Sydney Place Liveable Neighbourhood area as part of monitoring of the ETRO trial which was launched in April 2024. The results of the baseline monitoring show that the NO_2 concentrations at all locations are below 40 µg/m^3 and that the annual average air quality objective had not been exceeded.[4]

In the LN area, only one site on Bathwick Street saw a small increase in NO_2 levels from 20 to 21 µg/m^3 (as a quarterly average) in Q2 2024. Although quarterly results are not directly comparable to the annual average objective, this concentration is well below the annual average legal limit of 40 µg/m^3.

All other sites are showing a decrease in concentration when compared to 2023 Q2 baseline results.

All sites are showing a decrease in concentration when compared to 2023 Q3 baseline results.

The results show similar trends to other locations across Bath. Monitoring will continue to determine the impact, if any of the through traffic restriction until a decision is made to either make the scheme permanent or remove it.

Further information

- As part of our obligations under the Local Air Quality Management (LAQM) legislation (part IV of Environment Act 1995) as amended by the Environment Act (2021) we have issued an Annual Status Reports (ASR) alongside this report. These set out and comment on air quality data from across the wider authority. These are found at https://www.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports
- You can also view an interactive map of historical NO_2 data collected from monitoring locations around the area, here: https://www.bathnes.gov.uk/nitrogen-dioxide-monitoring-data

[4] Air Quality Annual Status Report 2024 - https://beta.bathnes.gov.uk/document-and-policy-library/annual-air-quality-reports

Appendix 1

Table 3 – Quarterly NO_2 Monitoring Results: Diffusion Tube – Sydney Road LN (µg/m^3)

Site ID	Site Name	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024
DT014	Bathwick Street	27	20	23	28	27	21	20
DT015	Beckford Road	25	21	19	23	22	19	18
DT016	Warminster Road	26	22	19	23	23	17	15
DT152	Bathwick Hill	25	16	16	21	20	15	15
DT153	North Road	19	12	12	17	17	11	11
DT207	Darlington Street	35	26	30	34	30	25	25
DT240	Bathwick Street 2	26	17	18	23	23	16	16
DT241	Bathwick Street 3	21	14	14	19	19	13	13
DT243	Sydney Place	28	22	22	26	24	21	20
DT312	Sydney Place 2	-	-	-	22	21	12	13
DT313	Sham Castle Lane	-	-	-	13	13	7	6
DT320	Cleveland Walk	-	-	-	-	-	6	7

The results are averaged across 3 months data and have not been bias adjusted. The 2024 results are also provisional and may be subject change following end of year QA/QC checks. As such the quarterly results should not be compared to annual average objectives. Shaded squares have one or two months missing data.