

Wooburn and Bourne End Parish Council Air Quality statement at year end 2022

Air pollution causes both short term and long-term effects on health, and in particular worsens symptoms for those suffering with lung and heart conditions. It is estimated that 40,000 people die prematurely each year in the UK due to poor air quality.

Previous studies by Wycombe District Council have shown that nitrogen dioxide (NO₂) and particulates are the key pollutants in this area, and that the primary source of these pollutants is from motor vehicle exhausts. Vehicles can emit both gases such as NO₂ but also particulates (e.g. soot), which are particularly linked to diesel vehicles and commercial vehicles (e.g. buses, lorries, etc..). High levels of NO₂ and particulates tend to be found where there are high volumes of traffic, and also where traffic is stationary with engines running or slow moving, for example at junctions, traffic lights, bus stops, etc. Other sources of emissions include gas boilers and combustion of solid fuels in homes and other locations (e.g. coal and log fires, wood burners, etc.) as well as industrial sources.

Given the potential for development in the parish, Wooburn and Bourne End Parish Council (WBPC) has been monitoring air quality since 2019 to understand the level of pollution and to guide future actions. Buckinghamshire Council is required to create an Air Quality Management Area (AQMA) where national air quality objectives (see below) are not likely to be achieved. Based on NO₂ monitoring since the 1990s, Buckinghamshire Council created an AQMA covering the A40, which includes part of the parish close to the motorway, and monitors NO₂ at one site in the parish (Knaves Hollow, close to Tesco Loudwater) as part of this. As such, the findings of this project are also beneficial to Buckinghamshire Council. We have regular contact with the Buckinghamshire Council Air Quality Officer for the Wycombe area in both planning and delivering this project and share the monthly monitoring data.

1. National air quality objectives

The National Air Quality Objective (AQO) limit for nitrogen dioxide is 40 µg NO₂/m³ air as an annual mean value. This is intended to represent the risk to human health of being exposed to poor air quality for two hours or more in a given location. Separate National AQOs exist for other pollutants such as particulates (PM_{2.5} and PM₁₀), and for different time periods.

These objectives have been in place for many years, and new Environment Bill includes a provision to review and potentially amend the UK air quality objective limits, but with no commitment as to what or by when.

2. What has been measured and where?

Nitrogen dioxide is being monitored in the parish using diffusion tubes conducted in line with DEFRA guidelines; a simple but standard (and highly cost-effective) approach used by local authorities throughout the UK. This approach gives an indication of the average air quality (mean NO₂ concentrations) at each location. Monitoring particulates, for example PM_{2.5} and PM₁₀, requires highly sophisticated and very expensive equipment and could not be included in the scope of this project.

Diffusion tubes (Figure 1) can be installed individually or in duplicate or triplicate in line with DEFRA guidance where increased confidence in the results is required (i.e. all tubes at that site giving the same/broadly the same reading).

Figure 1: Diffusion tubes installed in triplicate at a site in the Parish



The diffusion tubes contain a chemical that reacts to NO₂. The tubes are changed each month and analysed by a specialist laboratory (Socotec) to determine the average NO₂ level at each location over the month. This simple method cannot reveal the peak concentration (NO₂ levels tend to peak at rush hour) and to do this would require more sophisticated (and much more expensive) monitoring. But they do give an affordable indication of air quality that can be used to target further actions.

An annual average is calculated from 12 months of raw data and this value is “bias adjusted” using the DEFRA approved approach (see Section 3). This bias-adjusted annual mean is then compared with the National Air Quality Objective. Further analysis can include applying distance factors to determine the expected concentration where someone might be exposed for two hours or more (“Predicted value at receptor” – see Section 5) but this is only done where levels exceed the national objectives.

15 sites were monitored in 2019/2021, with four additional sites added for 2020/2021. The monitoring locations were chosen to cover the village centres, schools and potential development sites as shown

Figure 2: Air quality monitoring locations in the parish in 2019/20

Table 1: Air quality monitoring locations in the parish

Site Ref	Site Name	Rationale	2019/20	2020/21	2021/22
1	Town Lane	School, potential development	✓	✓	✓
2	Stratford Drive (St Pauls School)	School, potential development	✓	✓	✓
3	Cores End Roundabout	Potential development site	✓	✓	✓
4	Furlong Road North	Main route	✓	✓	✓
5	Furlong Road South	Main route	✓	✓	
6	Ferry Lane/Hedsor Road	Potential development site	✓	✓	✓
7	Hedsor Lane/Garibaldi Public House	Potential development site	✓	✓	
8	Ferry Lane/Cookham Bridge	Main route	✓	✓	✓
9	Bourne End Railway Station	Main route, pedestrians	✓	✓	✓
10	The Parade (Bourne End)	Main route, pedestrians	✓	✓	✓
11	Wendover Road (Claytons School)	School	✓	✓	
12	Highfield Road (Westfield School)	School	✓	✓	
13	New Road (Bourne End Academy)	School	✓	✓	
14	The Green (Wooburn Green)	Main route, pedestrians	✓	✓	✓
15	School Road/ Mayfield Road (Wooburn Green School)	School	✓	✓	
16	Marlow Road (Blind Lane)	Main route		✓	
17	Wycombe Lane (Wooburn Green)	Main route		✓	
18	Watery Lane (Wooburn Moor)	Main route		✓	
19	Holtspur Lane (Wooburn Green)	Main route		✓	

3. Data analysis

Before reviewing the detailed results, it is important to understand several important elements of data analysis that are undertaken when following DEFRA guidance. Raw monthly values are interesting and indicative, but it is bias adjusted annual mean that is key for analysis and driving actions. To determine the bias adjusted annual mean, the raw annual mean (calculated from the raw monthly data) is multiplied by the Defra provided “bias adjustment” factor. This corrects for the inherent limitations of the simple

diffusion tube approach and allows for wider regional and national comparison. For 2020 the relevant factor is 0.77, and for 2021 the factor is 0.78.

Air pollution concentrations quality generally reduce significantly as distance from the source increases, due to mixing in the air and the effect of wind. A “Predicted value at receptor” for NO₂ concentrations can be calculated to reflect this. A “receptor” is essentially a person – so if the diffusion tube is 2m from the road, but the nearest anyone would be for at least two hours (e.g. a restaurant table) is 4m away, this calculation will determine the value 4 m from source. In accordance with Defra guidelines this is only done where the bias adjusted mean exceeds the national air quality objective.

4. Results

Overall the results show that the majority of locations have average monthly readings **significantly** less than 20 µg NO₂/m³– both on an adjusted basis and an unadjusted basis – that is half that of the National Air Quality Objective (AQO) limit for nitrogen dioxide of 40 µg NO₂/m³ air as an annual mean value

Unsurprisingly, the locations with the highest readings are **The Parade, The Railway Station and Cookham Bridge**. However, their readings are still significantly below National Guidelines/limits, each being below 30 µg NO₂/m³

5. Conclusion

An aim of the monitoring is to have a base line understanding of Air Quality in Wooburn and Bourne Parish ahead of the new housing developments of Slate Meadow and Hollands Farm so that we can act quickly to discuss possible reduction measures with Buckinghamshire Council if there is a significant change in air quality.

At this time the results do not indicate that any interventions are required.

Wooburn and Bourne End Parish Council intend to continue monitoring Air Quality until the data collection is no longer considered to be informative or of value.