

East Cambridgeshire District Council - Environmental Services

Review of supplementary nitrogen dioxide monitoring in Wilburton, Haddenham and Sutton - October 2016 – April 2017

Introduction and summary

This report sets out the findings of a survey of nitrogen dioxide (NO₂) levels from ten diffusion tube locations in Wilburton, Haddenham, and Sutton between October 2016 and April 2017. This survey was in addition to the ongoing monitoring at the locations which make up the district NO₂ diffusion tube network for the purposes of Local Air Quality Management (LAQM) under the Environment Act 1995. The purpose of the survey was to try to establish the extent to which air quality is affected by the heavy traffic volumes passing through these villages. The survey found that air quality was impacted but that annual mean NO₂ concentrations at all locations were within the national air quality objective of 40 µg/m³ set out under LAQM.

HCV Action Group

In March 2016 the Cambridgeshire Joint Parishes HCV Action Group contacted Environmental Services (ES) to enquire if diffusion tubes could be deployed at a number of extra locations and what the costs might be. The Group proposed that the extra tubes would be funded by the parish councils. The Group is working towards applying for a weight restriction to prevent heavy vehicles rat-running through local villages including Wilburton, Haddenham, and Sutton. The Group is seeking to refresh parts of its evidence base which includes air quality measurements.

Potential tube locations suggested by the Group were:

- High Street, Wilburton: several locations, (the Post Office, the Old School, bottom of the hill near the church)
- Just west of The Green, Haddenham
- Porch House, Haddenham
- A10, Stretham: south of junction with A1123
- The America, Sutton: several locations
- The Brook, Sutton: corner near school
- Junction of Ely Road and Church Lane, Sutton

ES agreed to this proposal and informed the Group of the costs. The Group did not proceed with this. However, in July 2016 ES made a successful bid to the Cambridgeshire County Council Local Transport Planning budget to fund the tubes for a seven month period from October 2016 to April 2017.

Monitoring locations

ES considered that it would be useful to collect data on the state of air quality in Wilburton as no monitoring had previously been undertaken there and the village experiences high traffic volumes at peak times. Coverage in Haddenham was already good with four existing monitoring points. Sutton had only one monitoring point, an urban background location at Tamar Drive. Therefore, extra diffusion tubes were deployed at all locations suggested by the HCV Group with the exception of the A10/A1123 junction at Stretham where there is an existing monitoring point (NAS13) in the district network. With regard to the request for a monitoring point just west of the Green, Haddenham, a new tube XT5 was deployed at this location near to Mill View. A monitoring point at this location known as NAS17, West End already exists as part of the district network. However, in January 2015 this tube was moved approximately 120m southeast from its original location outside 6 West End into The Green due to building work and since the move it has recorded higher levels of NO₂. Tube XT4 was installed in Hill Row, Haddenham as close to Porch House as possible. Details of the tube locations including NAS13 on the A10 at Stretham are set out in Table 1 below.

Site ID	Site Name	Site Type	OS Grid Ref x	OS Grid Ref y	Distance to kerb of nearest road	height
XT1	Old School, Wilburton	Roadside	548456	274867	1.5	2.5
XT2	Post Office, Wilburton	Roadside	548320	274896	1.5	2.5
XT3	St Peter's Church, Wilburton	Roadside	548036	274989	1.5	2.5
XT4	Hill Row, Haddenham	Roadside	544984	275713	1.5	2.25
XT5	Mill View, Haddenham	Roadside	546090	275754	1.5	2.25
XT6	Ely, Road, Sutton	Roadside	544822	279194	2	2.5
XT7	The Brook, Sutton	Roadside	544238	278971	2	2.5
XT8	The America East, Sutton	Roadside	543255	278569	1.5	2.25
XT9	The America West, Sutton	Roadside	543652	278695	1.5	2.25
NAS13	A10, Stretham	Roadside	546185	275594	1.5	2.25

Table 1. Details of supplementary diffusion tube locations

Monitoring results

Monitoring was carried out between October 2016 and May 2017. The full results are included in Table 2. The table includes the monthly raw data, the annualized mean of the raw data, and a bias adjusted annual mean figure for each location. Three tubes were lost. XT2 near Wilburton Post Office was lost in October when building work was carried out on the roof of the adjacent property. XT4 at Hill Row, Haddenham was lost in December when the road sign to which the tube was attached was demolished in a road accident. XT5, Mill View, Haddenham went missing in April. The reason is not known.

Annualisation of monitoring results

Data was collected over a period of seven months from October 2016 to April 2017. For the purposes of LAQM short term data for periods of less than twelve months is adjusted or “annualised” to take account of seasonal highs and lows and an annual mean concentration is derived. An adjustment factor of 0.78 was derived and applied to the results in Table 2 to obtain the annualised mean concentration for the raw data.

Bias Adjustment

Diffusion tubes tend to overestimate true NO₂ concentrations. This bias must be corrected by applying a bias adjustment factor to the raw data. The bias adjustment factor is obtained by comparing results from sites across the country where diffusion tubes have been co-located with chemiluminescent analysers which give more reliable measurements of true NO₂ values. The information is collated and published by DEFRA. A bias adjustment figure of 0.77 was obtained from the DEFRA web site and applied to the annualised mean figures to give the final adjusted annual mean values in Table 2.

Discussion of results

The survey has found annual mean NO₂ concentrations at all locations to be within the national air quality objective of 40 µg/m³. However, there are some elevated monthly results at some locations. The average mean value for the ten sites in this survey is 18.8 µg/m³. This compares favourably with the average mean value in 2016 for the seventeen sites in the district air quality network of 20.2 µg/m³.

Wilburton

On an individual monthly basis XT2 near Wilburton Post Office recorded raw values of $53.6 \mu\text{g}/\text{m}^3$ in December 2016, and $71.4 \mu\text{g}/\text{m}^3$ in January 2017. This results in values of $41.3 \mu\text{g}/\text{m}^3$ and $55 \mu\text{g}/\text{m}^3$ when bias adjustment is applied. These figures exceed the national air quality objective mean figure of $40 \mu\text{g}/\text{m}^3$. These concentrations are most likely due to the fact that the location is close to the junction of the A1123 and B1049 and that adverse weather conditions in the winter months often prevent NO_2 from breaking down and dispersing. This road junction experiences high traffic flows with queuing traffic at peak times.

Haddenham

The monitoring results for the two extra sites in Haddenham showed air quality to be relatively good at these locations with estimated annual mean values of $11.8 \mu\text{g}/\text{m}^3$ and $13.5 \mu\text{g}/\text{m}^3$ for XT4 and XT5 respectively. These concentrations are lower than the figures obtained for the four existing monitoring points in the village.

Sutton

NO_2 concentrations obtained from the four roadside locations in Sutton were higher than the existing monitoring site NAS10 at Tramar Drive. XT6 at Ely Road and XT7 at The Brook are affected particularly during the winter months. NO_2 concentrations at the two sites at The America were elevated but not excessive.

Conclusions

If we compare the results from this survey with readings from sites in the district such as NAS2 at Abbot Thurston Avenue, Ely; and NAS8 at Burrough Green where the effect of road traffic emissions is much less, and which recorded annual means in 2016 of $12.5 \mu\text{g}/\text{m}^3$ and $10.5 \mu\text{g}/\text{m}^3$ respectively, we can conclude that air quality in Wilburton, Haddenham and Sutton is negatively impacted by road traffic emissions, especially in the winter months. However, the survey has found annual mean NO_2 concentrations at all locations to be within the national air quality objective. The impact of traffic emissions on air quality is not so great that air quality objectives are being or are likely to be exceeded, and there are no grounds on which to declare an Air Quality Management Area under LAQM or introduce control measures. However, as the results demonstrate that air quality is being negatively impacted by vehicle

emissions the council will support any appropriate measures which reduce road traffic emissions and improve air quality in order to protect human health.

Recommendations

Although the survey shows that NO₂ concentrations at all locations meet the national air quality objectives it is recommended that monitoring is continued at two sites and that these sites are added to the district network. These sites are:

1. XT2 - Post Office, Wilburton
2. XT7 - The Brook, Sutton

XT2 at Wilburton has now been added to the district monitoring network because there is clearly an adverse impact on air quality and the 40 µg/m³ objective has been exceeded on occasion for individual months during winter time.

XT7 at The Brook, Sutton has also been added to the network. The existing monitoring point NAS10 at Tramar Drive is an urban background location. A roadside location is required to adequately monitor NO₂ levels in the village. Although XT6 at Ely Road recorded higher NO₂ levels, XT7 has been selected for inclusion in the network because of its proximity to the village school.

Peter Ord

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