

Worcestershire
Regulatory Services

Supporting and protecting you

2017 Air Quality Annual Status Report (ASR)

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

March 2018

Wyre Forest District Council

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Executive Summary: Air Quality in Our Area

Air Quality in Wyre Forest District

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Worcestershire Regulatory Services (WRS) have been responsible for managing (monitoring and reporting of) local air quality of the six Worcestershire District Councils since April 2011.

Two Air Quality Management Areas (AQMA's) were declared by Wyre Forest District Council for exceedences of the annual mean objective for nitrogen dioxide (NO₂):

- Welch Gate, Bewdley AQMA. Declared January 2003
- Horsefair, Kidderminster AQMA. Declared January 2003
Amended in July 2009 to include part of the Kidderminster Ring Road and Coventry Street.

Details can be found at:

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=325

In 2016, there continue to be exceedences of the annual mean objective for NO₂ of 40µg/m³ within the Welch Gate and Horsefair/Coventry Street AQMAs which therefore must remain in place.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Two locations within the Horsefair/Coventry Street AQMA, HF(K) (Peacock Public House, Blackwell Street) and HF(K)(F) (Hudson Florists, Blackwell Street) have recorded means greater than $60\mu\text{g}/\text{m}^3$ indicating that it is likely that there have been exceedances of the 1-hour mean objective for NO_2 . However, members of the public tend to use the road as an access route to walk to and from Kidderminster town centre and as such exposure is expected to be short term.

Monitoring results within the Wyre Forest District Council area demonstrate there has been an increase in NO_2 concentrations between 2015 and 2016 across most of the district.

In Kidderminster, two locations, K3 (53 Coventry Street), within the Horsefair/Coventry Street AQMA and TCH (Top of Comberton Hill), outside of the AQMA, show exceedances of the annual mean objective for nitrogen dioxide (NO_2) of $40.9\mu\text{g}/\text{m}^3$ and $47.6\mu\text{g}/\text{m}^3$ respectively. Renovation work on a residential property adjacent to location TCH has brought the receptor nearer to the road and increased exposure.

In Stourport-on-Severn, three locations, (F)FBS(S) (21 Bridge Street), (F)25YS(S) (22 York Street) and A1 (35 High Street) show exceedances of the annual mean objective for nitrogen dioxide (NO_2) of $41.9\mu\text{g}/\text{m}^3$, $42\mu\text{g}/\text{m}^3$ and $43.2\mu\text{g}/\text{m}^3$ respectively, however, in all cases the receptor is located at the first floor level.

Monitoring at five locations was discontinued in 2016 due to concentrations being consistently under the annual mean objective:

- EXS (Barclays Bank, Exchange Street, Kidderminster)
- MR71(S) (71 Minster Road, Stourport-On Severn)
- (F)MS (7 Mitton Street, Stourport-on-Severn)
- BH(S) (Baldwin House, Lombard Street, Stourport-on-Severn)
- HS(B) (Abacus Hairdressers, High Street, Bewdley)

The triplicate diffusion tubes (A1/2/3) associated with the automatic monitor located outside Bentleys, 36 High Street, Stourport-on-Severn were reduced to one as they were no longer required once the monitor had been removed. The remaining tube was relocated to the façade of 35 High Street (A1),

Two additional monitoring locations were installed prior to the start of 2016 to monitor the effect the newly opened Hoo Brook Link Road at the junction with Stourport Road (A451) had on air quality in the area:

- HLR (Lamppost outside 140 Stourport Road) This was relocated after nine months due to the air flow around the diffusion tube being blocked by additional signage; the tube is now located on the façade of 139 Stourport Road (HLR1)
- SR113 (Signpost outside 113 Stourport Rd, Kidderminster)

Actions to Improve Air Quality

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by Wyre Forest District Council (WFDC) on 24th October 2013. WRS have produced two updates to the AQAP, the latest in September 2016. For details of all measures completed, in progress or planned, please refer to the 'Air Quality Action Plan Progress Report for Worcestershire April 2015-2016'. A copy of this, the previous update, and the AQAP, is available to view or download at:

<http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx>

WRS set up the Worcestershire Air Quality Steering Group to facilitate progressing the implementation of actions identified in the AQAP. At the inaugural Steering Group meeting, on 18th June 2014, it was agreed to establish a number of subgroups. The Welch Gate Sub Group covers the Welch Gate AQMA and the Horsefair Sub Group covers the Horsefair/Coventry Street AQMA. The sub-groups currently comprise representatives of WRS, the Worcestershire County Council Air Quality Liaison Officer, and local County and district Councillors.

The Horsefair/Coventry Street AQMA is intrinsically linked to the Kidderminster Ringway with the vast majority of traffic travelling through the AQMA doing so either from or towards the Kidderminster Ringway. As part of the WFDC Churchfields Masterplan, there is a proposal to build a spur road from the Ringway roundabout at the bottom of

Blackwell Street into Churchfields and creating a one way system which should result in a significant improvement in air quality.

A planning application has been submitted for a large residential development off Cleobury Road (B4190) which leads into Welch Gate, Bewdley. As part of the application a consultation will be carried out to investigate if changing the traffic priorities at the junction of Welch Gate, Dog Lane and High Street will improve traffic flows and reduce waiting times.

Conclusions and Priorities

There are currently two AQMAs declared in the Wyre Forest District, Welch Gate, Bewdley and Horsefair/ Coventry Street, Kidderminster. Monitoring shows that both areas continue to exceed the annual mean objective and therefore the AQMAs will remain in place.

The exceedance at location TCH (Top of Comberton Hill) is giving cause for concern as renovation work on a property adjacent to the diffusion tube has meant that the receptor has moved closer to the road. WRS will continue to monitor the area in 2017 and if necessary expand the monitoring network to locations along Comberton Road and Chester Road North (A449) to identify the extent of additional sites of relevant exposure.

In Stourport-on-Severn, three locations, (F)FBS(S) (21 Bridge Street), (F)25YS(S) (22 York Street) and A1 (35 High Street) show exceedences of the annual mean objective for nitrogen dioxide. However in all cases the receptor is located at the first floor level, therefore one would expect a reduction in NO₂ concentration with height. Consultation with the LAQM Helpdesk Team on 29th November 2017 confirmed this in their reply:

“The fall off with distance calculator, as you note, does not consider height when determining NO₂ concentrations. There is presently not a tool available which takes into account the height of a receptor. It would be expected that the concentrations should be mostly lower, the greater the height. If the location is of concern, it may be advisable placing a diffusion tube directly at the receptor, subject to safe access.”

As the exceedences at these locations are relatively small this option is not being considered at the present time.

The priorities for Wyre Forest District Council are to continue to monitor nitrogen dioxide at key points across the area. To this end tube rationalisation conducted at the end of 2015 led to the decommissioning of a number of tubes where concentrations had been recorded well below the annual mean objective. Two new monitoring locations (HLR1 and SR113) were installed prior to the start of 2016 to target the newly opened Hoo Brook Link Road at the junction with Stourport Road (A451) in Kidderminster. Wyre Forest District Council will continue to review and assess air quality within the area.

Local Engagement and How to get Involved

There are a number of ways members of the public can help to improve local air quality:

- Walk or cycle around the District instead of driving;
- Worcestershire County Council have launched a car sharing website, LiftShare, to help people find others journeying to the same destinations to share journeys and costs, and reduce traffic and emissions. Visit this link for more information: <https://worcestershire.liftshare.com/>
- General travel planning advice is available on Worcestershire County Council's website (including walking, cycling and bus maps and timetables).
- If you have to drive follow fuel efficient driving advice, often known as 'Smarter Driving Tips', to save on fuel and reduce your emissions. A number of websites promote such advice including:
 - <http://www.energysavingtrust.org.uk/travel/driving-advice>
 - <http://www.theaa.com/driving-advice/fuels-environment/drive-smart>
 - <http://www.dft.gov.uk/vca/fcb/smarter-driving-tips.asp>

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1 Local Air Quality Management

This report provides an overview of air quality in Wyre Forest District Council during 2016. 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 Wyre Forest District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Wyre Forest District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at:

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=325.

Alternatively, see, Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMAs

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
The Kidderminster Ring Road (Horsefair/Coventry Street)	Declared 06/01/2003 Amended 30/07/2009	NO ₂ Annual Mean	Kidderminster	An area encompassing residential & commercial properties in The Horsefair & Blackwell Street. The AQMA was amended to include part of the Kidderminster Ring Road and residential properties in Coventry Street.	NO	54 µg/m ³	65 µg/m ³	Air Quality Action Plan for Worcestershire (September 2013) http://www.worcsregservices.gov.uk/media/486190/Final-AQAP-Whole-Doc-v23b-adopted.pdf
Welch Gate	Declared 06/01/2003	NO ₂ Annual Mean	Bewdley	A short section of Welch Gate encompassing a number of residential properties from the junction of Dog Lane running south west to north east to a point level with 84 Welch Gate	NO	47 µg/m ³	46 µg/m ³	

Wyre Forest District Council confirm the information on UK-Air regarding their AQMAs is up to date

2.2 Progress and Impact of Measures to address Air Quality in Wyre Forest District Council

Defra's appraisal of last year's ASR concluded that the report is well structured, detailed, and provides the information specified in the Guidance. The delivery of a co-ordinated Countywide Action Plan is welcomed and the evidence from long term monitoring suggests it is contributing to falling pollution levels in key areas.

1. It is noted that the District Council are continuing to carry out routine monitoring with the use of passive diffusion tubes for nitrogen dioxide at 44 sites across the Borough, with results remaining consistently above objective levels.
2. Pollution levels monitored over the last 5 years within the current AQMA's show little evidence of improvement. There is also a single exceedance location outside of a current AQMA, which suggests that further monitoring may be required to identify the extent of additional sites of relevant exposure.
3. The District Council should consider reviewing the current action plan in light of these results, and consider developing measures in line with the latest Technical Guidance from Defra LAQM TG(16), based upon source apportionment and targeting measures to reduce emissions at hotspot locations.
4. We acknowledge that the Worcestershire approach providing a centralised AQAP, co-ordinated for each district is a cost effective approach to local air quality management, and there is clear evidence of significant progress in developing action plans.
5. However, in order to fulfil the requirements of the annual reports submitted to DEFRA as Annual Status Reports (ASR), we must emphasise that the expectation within ASR's is that the measures table is used to provide a straightforward summary of measures the Council has been delivering and expects to deliver in future to improve air quality in hotspot locations. We fully understand that Worcestershire have produced a Countywide Action Plan, with measures designed for each AQMA that have been updated within the Progress Report. However this

information for each district needs to be presented each year, within the ASR in Table 2.2 in the ASR Template.

Wyre Forest District Council has taken forward a number of direct measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in the 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – April 2016'. Key completed measures are:

- Loading and unloading restrictions during peak traffic times:
A meeting was held between WRS and the WFDC Parking Enforcement Manager; parking enforcement officers now prioritise the areas around both Wyre Forest District AQMAs.
- HGV or weight restriction on affected roads:
A 7.5 tonne weight limit and access only restriction is currently in operation on the B4190 Cleobury Road leading into Welch Gate.
- Freight Quality Partnership:
On-going work with satellite navigation companies to route HGVs around AQMAs.
- Installing electric vehicle charging points:
Recommendations for the installation of EV Charging Points are routinely included by WRS on relevant planning consents
- Measures linked to walking and cycling initiatives:
WFDC has a web page dedicated to the promotion of walking and cycling:
<http://www.wyreforestdc.gov.uk/things-to-see-do-and-visit/cycling-walking-and-running.aspx>
- Car Sharing:
A Liftshare scheme is currently operating for Worcestershire:
<https://liftshare.com/uk/community/worcestershire>

Wyre Forest District Council expects the following measures to be completed over the course of the next reporting year:

- **Greening Council and Business Fleets:**
It is anticipated that the Local Transport Plan 2017 will be developed to incorporate policy on alternative fuels and associated infrastructure.
- **Travel Planning:**
Personalised travel planning program planned as part of wider health improvement drives from the County Council who are currently developing a “one-stop-shop” online travel portal due to be rolled out in 2017.
- **Produce Air Quality Supplementary Planning Document (SPD):**
WRS officers will draft the SPD and send it out for consultation. WRS estimate formal adoption by the Worcestershire District Councils in early 2018.

WRS on behalf of Wyre Forest District Council will continue to monitor locations in 2017 to assess any improvements or degradation in NO₂ concentrations. The data gathered will assist in further assessment of areas of poor air quality outside the current AQMAs. Further update on monitoring and action progress will be provided in the 2018 Annual Status Report.

The principal challenges and barriers to implementation that Wyre Forest District Council anticipates facing are that Blackwell Street in the Horsefair/Coventry Street AQMA, Kidderminster and Welch Gate, Bewdley are described as ‘street canyons’, in that they are narrow streets with continuous buildings on either side and both streets are major routes for traffic in and out of Kidderminster and Bewdley respectively. As a consequence solving the problem of poor air quality at these locations is proving to be difficult. Two solutions are being considered:

- **Horsefair/Coventry Street AQMA:** As part of the WFDC Churchfields Masterplan, there is a proposal to build a spur road from the Ringway roundabout at the bottom of Blackwell Street into Churchfields to create a one way system which should result in a significant improvement in air quality.

- Welch Gate AQMA: A planning application has been submitted for a large residential development off Cleobury Road (B4190) which leads into Welch Gate, Bewdley. As part of the application a consultation will be carried out to see if changing the traffic priorities at the junction of Welch Gate, Dog Lane and High Street will improve traffic flows and reduce waiting times.

Progress on the following measure has been slower than expected:

- HGV or weight restriction on affected roads:
The B4190 Cleobury Road/Welch Gate is the main access route for traffic from the B456 Bewdley By-pass to the B4194 Dowles Road which leads to towns in Shropshire. Enforcement of the 7.5 tonne weight limit and access only restriction is proving problematic as alternative routes in the area for HGVs are not considered viable.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Wyre Forest District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Horsefair/Coventry Street and Welch Gate AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Loading and unloading restrictions during peak traffic times	Traffic Management	UTC, Congestion management, traffic reduction	Wyre Forest District Council (WFDC)	2015	2016	Decrease in illegally parked vehicles	2 - 5%	WFDC parking enforcement to target AQMA areas.	Currently in operation	
2	HGV or weight restriction on affected roads	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	WCC	2015 - 2016	2016	Less HGV's travelling through Welch Gate AQMA	2%	A 7.5 tonne weight limit and access only restriction is currently in operation on the B4190 Cleobury Road leading into Welch Gate.	Unknown – currently on-going	HGVs use the B4190 for access to the B4194 (Dowles Road)
3	Promote flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working	WCC & WFDC	2015 - 2016	2017	Increase in uptake of personal travel planning services. Change in behaviour towards more sustainable modes of transport	<1%	Implementation on-going	On-going	

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Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
4	Freight Quality Partnership – work with satellite navigation companies to route HGVs around AQMAs	Traffic Management	UTC, Congestion management, traffic reduction	WCC		On-going	Fewer HGVs travelling through AQMAs	5 - 10%	Implementation on-going	On-going	It can take some time for the information to filter down to users.
5	Alteration to phasing of traffic light systems	Traffic Management	UTC, Congestion management, traffic reduction	WCC	2015 - 2017	2018 onwards	Improved flow through Horsefair/Covenry Street AQMA, reduction in congestion	10-40%	Action linked to the implementation of the WFDC Churchfields Masterplan	Unknown – currently on-going	
6	Introduction of traffic signals at roundabouts	Traffic Management	UTC, Congestion management, traffic reduction	WCC	2015 - 2017	2018 onwards	Improved flow around ring road, significant reduction in stationary idling traffic at peak times.	10-40%	Action linked to the implementation of the WFDC Churchfields Masterplan	Unknown – currently on-going	
7	Installing electric vehicle charging points	Promoting Low Emission Transport	alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	WFDC & WCC	2013	2014 onwards	Increase in availability of EV charging points and corresponding increase in use of electric vehicles	1%	Recommendations for installation of EV Charging Points routinely recommended by WRS on relevant planning consents. To be formalised in SPD drafted by WRS officers.	Estimate formal adoption by District Councils in 2018.	Draft SPD currently out for consultation

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Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
8	Greening Council and Business Fleets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Bromsgrove District Council & WCC	2015 - 2017	2018 onwards	Increase in number of Council and business fleet vehicles of higher Euro Standard and/or utilising alternative fuels	1%	Proposed Compressed Natural Gas Station in Bromsgrove/Redditch has stalled due to a number of obstacles (financial, strategic, political) plus specific industrial constraints and limitations of the existing highway network. WCC has indicated that development of such a facility would need to be supported by relevant policy before the case would be explored any further.	Unknown	It is anticipated that the Local Transport Plan 2017 will be developed to incorporate policy on alternative fuels and associated infrastructure.
9	Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	WCC	Currently taking place	2017 onwards	Increased uptake of alternative modes of transport	<1%	Personalised travel planning program planned as part of wider health improvement drives from County Council who are currently preparing a bid for the DfT's Access Fund to move project forward. County Council currently developing a "one-stop-shop" online travel portal due to be rolled out in 2017.	Estimated end 2017	

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Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
10	Measures linked to walking and cycling initiatives	Promoting Travel Alternatives	Promotion of cycling	WFDC & WCC	2014 - 2015	Easter 2015 onwards	Increased uptake of walking and cycling in Wyre Forest	<1%	WFDC has a web page dedicated to the promotion of walking and cycling.	On-going	
11	Car Sharing	Alternatives to private vehicle use	Car & lift sharing schemes	WCC	2014 – 2015	Liftshare Scheme launched Autumn 2015	Increase in number of people car sharing	<1%	Liftshare Scheme launched in Autumn 2015	Liftshare website scheme launched Autumn 2015. Currently operating	
12	Produce Air Quality Supplementary Planning Document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WRS & District Councils	On-going	Draft completed in August 2017. Start of formal adoption processes by November 2017	Formally adopted and utilised SPD at all six LPAs across County	<1%	SPD drafted by WRS officers	Estimate formal adoption by District Councils in 2018.	Draft SPD currently out for consultation
13	Encourage developers to provide sustainable transport facilities and links serving new developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WRS & District Councils	On-going	Draft completed in August 2017. Start of formal adoption processes by November 2017	Formally adopted and utilised a by all six LPAs across County	<1%	SPD drafted by WRS officers	Estimate formal adoption by District Councils in 2018.	Draft SPD currently out for consultation
14	Air Quality Policy in Local Development Plans	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WFDC	On-going	Due to come into effect on 13th August 2015	Formal adoption of revised LDO	<1%	WRS consulted on revised South Kidderminster Enterprise Park Revised Development Order. WRS recommended air quality condition updated to reflect current policies	13th August 2015	Action to be re-prioritised

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Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
15	Air Quality Networks	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	WFDC & WRS	2014	2014 onwards	Improved cross boundary working between local authorities in Worcestershire	1%	WRS hold position of Air Quality technical coordinator for the Midlands Joint Advisory Council (MJAC). Provision of AQ services to Tewkesbury DC & Herefordshire Council 2015-16	On-going	
16	Forge closer links with local health agencies	Other	Other	WRS & WCC	N/A	On-going	Participation of relevant health agencies in the Worcestershire Air Quality Steering Group	<1%	WRS officers have met with the Director of Public Health at Worcestershire County Council to highlight the air quality agenda in relation to NO2 and PM2.5. Discussions are on-going as role of DoPH is considered	On-going	
17	Normal length buses block road in narrow bends	Transport Planning and Infrastructure	Bus route improvements	WFDC (WCC no longer manages any bus fleet other than school buses, all operators are private companies)	2015 - 2016	N/A	More shorter length buses seen in Welch Gate AQMA area	2%	WCC has no control over commercial bus companies and any commitment to using shorter length buses would be purely on a voluntary basis on the part of the bus companies.	WCC advised they have no influence over bus networks	Action to be re-prioritised
18	Alteration to phasing of traffic light systems	Traffic Management	UTC, Congestion management, traffic reduction	Worcestershire County Council (WCC)	2014 - 2015	N/A	Improved flow through Welch Gate AQMA, reduction in congestion	3%	Not be possible because of very high costs and technological limitations due to the layout of the site.	Action not progressed further	Action will not be reported on in the future.

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.

There are currently no automatic PM_{2.5} monitoring stations in Worcestershire. The nearest AURN PM_{2.5} monitoring station is the Walsall Woodlands site approximately 23 kilometres to the north east of the Wyre Forest District.

WRS has reviewed the DEFRA national background maps to determine projected PM_{2.5} concentrations with the Wyre Forest District for the 2016 calendar year. The average total PM_{2.5} at 197 locations (centre points of 1km x 1km grids) across the Wyre Forest District is 8.55µg/m³, with a minimum concentration of 7.44µg/m³ and a maximum concentration of 11.56µg/m³.

This indicates that PM_{2.5} concentrations within the Wyre Forest District are well below the annual average EU limit value for PM_{2.5} of 25µg/m³.

As outlined in Policy Guidance LAQM.PG16 WRS have discussed the role of the DoPH, and the details of PM_{2.5} levels across the County, with the Director of Public Health for Worcestershire County Council. The DoPH has not confirmed to WRS that they are advocating or supporting any specific actions to reduce PM_{2.5} concentrations across the County at this time.

In light of the above no additional actions are currently planned by Wyre Forest District Council in relation to the reduction of PM_{2.5} levels. However it is anticipated that any actions taken to improve NO₂ levels across the District will likely result in a linked improvement in PM_{2.5} levels.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

No automatic (continuous) monitoring was undertaken within the Wyre Forest District during 2016.

3.1.2 Non-Automatic Monitoring Sites

Wyre Forest District Council undertook non- automatic (passive) monitoring of NO₂ at 41 sites during 2016. Table A.1 in Appendix A shows the details of the 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 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” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

During 2016, Wyre Forest District Council monitored annual mean nitrogen dioxide concentrations using passive diffusion tubes at forty one locations across the District compared to forty four locations in 2015.

Monitoring at five locations was discontinued in 2016 due to concentrations being consistently under the annual mean objective:

- EXS (Barclays Bank, Exchange Street, Kidderminster)
- MR71(S) (71 Minster Road, Stourport-On Severn)
- (F)MS (7 Mitton Street, Stourport-on-Severn)
- BH(S) (Baldwin House, Lombard Street, Stourport-on-Severn)

- HS(B) (Abacus Hairdressers, High Street, Bewdley)

The triplicate diffusion tubes (A1/2/3) associated with the automatic monitor located outside Bentleys, 36 High Street, Stourport-on-Severn were reduced to one as they were no longer required once the monitor had been removed. The remaining tube was relocated to the façade of 35 High Street (A1).

Two additional monitoring locations were installed prior to the start of 2016 to monitor the effect the newly opened Hoo Brook Link Road at the junction with Stourport Road (A451) had on air quality in the area:

- HLR (Lamppost outside 140 Stourport Road) This was relocated after nine months due to the air flow around the diffusion tube being reduced because of additional signage; the tube is now located on the façade of 139 Stourport Road (HLR1)
- SR113 (Signpost outside 113 Stourport Rd, Kidderminster)

Table 3.1 below provides a summary of measured exceedences in 2016 (annualised where necessary) or borderline locations (within 5% of annual mean objective), whether representative of relevant exposure and within an existing AQMA or not.

Table 3.1 - Summary of measured exceedences and borderline results in 2016

Site ID	Within AQMA Y/N	Bias Adjusted Measurement ($\mu\text{g}/\text{m}^3$)	Adjusted for distance to relevant exposure ($\mu\text{g}/\text{m}^3$)
Kidderminster			
HF(K) ¹	Y – Horsefair/Coventry Street	<u>65.3</u>	<u>65.3</u>
HF(K)(F) ¹	Y – Horsefair/Coventry Street	<u>73.6</u>	<u>73.6</u>
(F)69COV	Y – Horsefair/Coventry Street	53.5	53.5
K3	Y – Horsefair/Coventry Street	40.9	40.9
CAS1	N	43.8	37.1
TCH	N	51.3	47.6
SR(K)	N	47.6	35.1

Site ID	Within AQMA Y/N	Bias Adjusted Measurement ($\mu\text{g}/\text{m}^3$)	Adjusted for distance to relevant exposure ($\mu\text{g}/\text{m}^3$)
SR113	N	38.6	31.9
Stourport-on-Severn			
A1 ¹	N	43.2	43.2
(F)25YS(S) ¹	N	42.0	42.0
(F)FBS(S) ¹	N	41.8	41.8
Bewdley			
WG(B)	Y – Welch Gate	45.8	45.8

Notes: Exceedences of the NO₂ annual mean objective of 40 $\mu\text{g}/\text{m}^3$ are shown in **bold**.
 NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedence of the NO₂ 1-hour mean objective are shown in **bold and underlined**.
 1. First Floor Receptor

Table 3.1 above indicates there have been exceedences of the annual average Air Quality Objective (AQO) for NO₂ concentrations or recorded within 5% of the AQO at 12 of the 41 monitoring locations in 2016. Of these, four locations are within the Horsefair/Coventry Street AQMA and one location is within the Welch Gate AQMA. One location (TCH - Top of Comberton Hill) is outside of an existing AQMA. However, when taking into consideration the proximity to relevant exposure (including the assumption that there is a fall off of NO₂ concentrations with height) only six locations demonstrate exceedences in 2016.

Table A. 2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40 $\mu\text{g}/\text{m}^3$.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

NO₂ Five Year Trends for Kidderminster, Stourport-on-Severn and Bewdley

Kidderminster

Figure 3.1 below demonstrates the five year trend for NO₂ concentrations for Kidderminster excluding the Horsefair/Coventry Street AQMA where available.

Figure 3.1 - Long Term Trend Graph of NO₂ Concentrations in Kidderminster. Excluding the Horsefair/Coventry Street AQMA

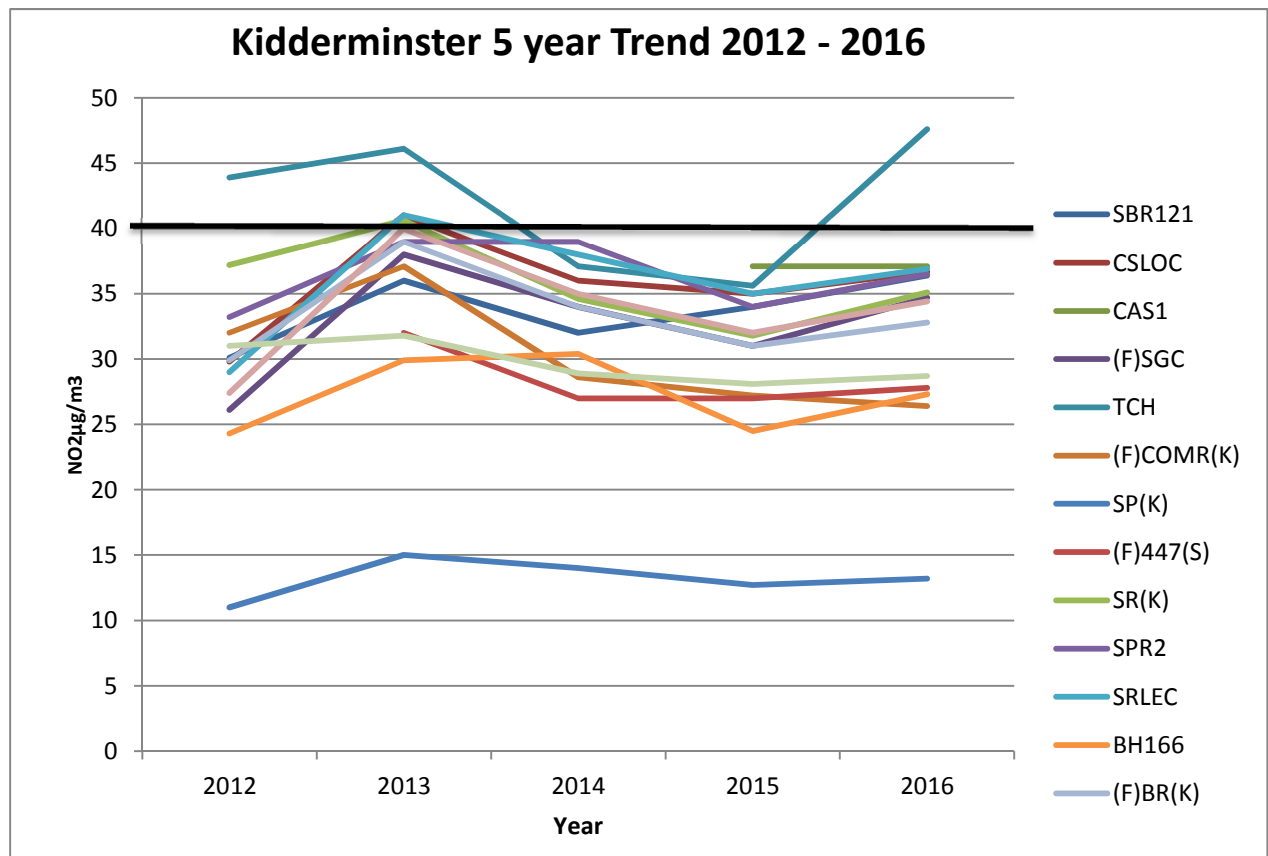


Figure 3.1 shows that there was one exceedence in Kidderminster outside of the Horsefair/Coventry Street AQMA in 2016. Location TCH (Top of Comberton Hill) shows an exceedence of the annual mean objective for NO₂ of 47.6µg/m³.

Renovation work on a residential property adjacent to location TCH has brought the receptor to three metres from the road, previously the receptor was located seven metres from the road. WRS will continue to monitor the area in 2017 and if necessary expand the monitoring network to locations along Comberton Road and Chester Road North (A449) to identify the extent of additional sites of relevant exposure.

There has been an increase in NO₂ concentrations at all locations in 2016 when compared to 2015 apart from location (F)COMR((K) (Holmwood, Comberton Road)

which shows a slight decrease. This is a reverse of the overall the downward trend that has occurred since 2013.

No annual means greater than $60\mu\text{g}/\text{m}^3$ have been recorded indicating it is unlikely there have been any exceedences of the 1-hour mean objective at these sites.

Horsefair/Coventry Street AQMA

Figure 3.2 below demonstrates the five year trend for NO₂ concentrations for the Horsefair/Coventry Street AQMA where available.

Figure 3.2 - Long Term Trend Graph of NO₂ Concentrations in the Horsefair/Coventry Street AQMA

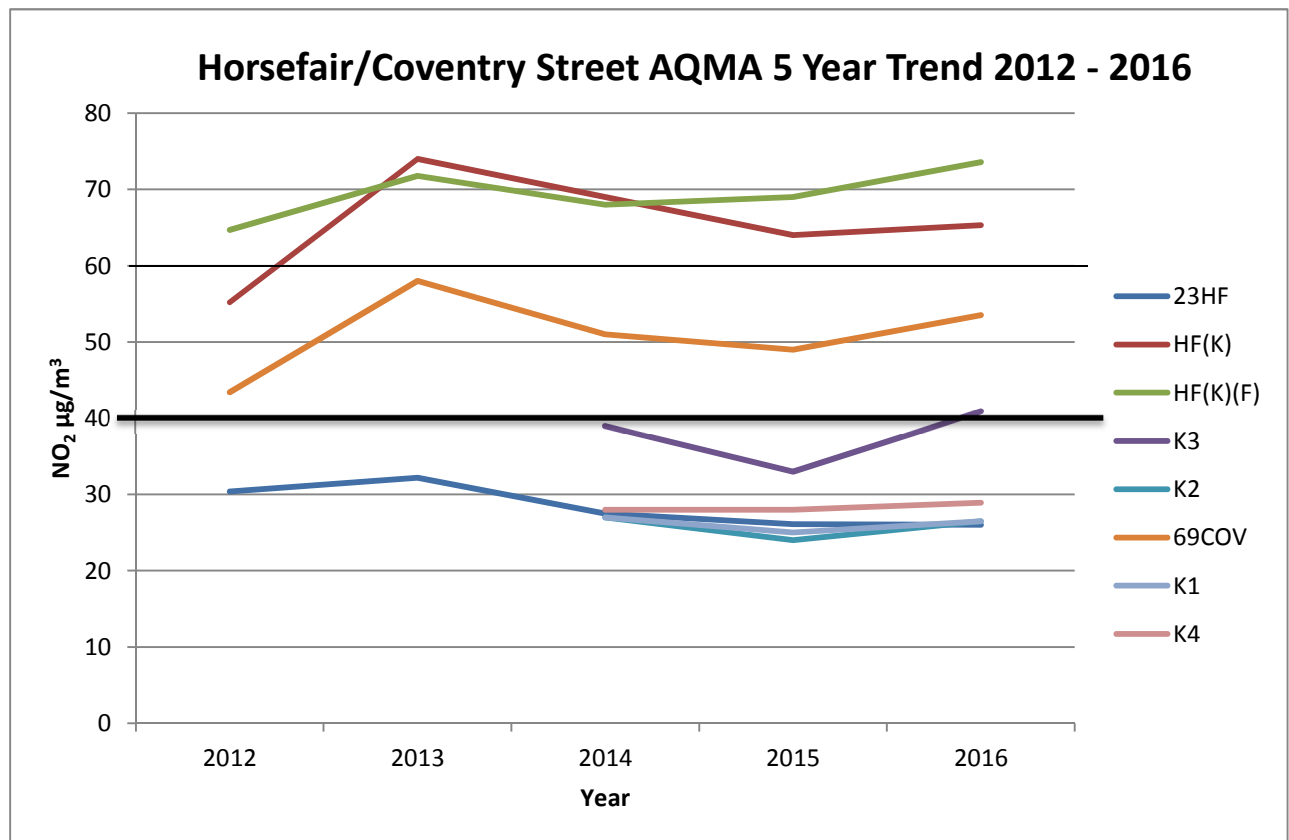


Figure 3.2 shows that there were exceedences at four locations within the Horsefair/Coventry Street AQMA. Locations HF(K) (The Peacock Public House) and HF(K)(F) (Hudson Florists), both in Blackwell Street, are above the $60\mu\text{g}/\text{m}^3$ one hour mean objective, however members of the public tend to use the road as an access

route to walk to and from Kidderminster town centre and as such exposure is expected to be short term.

There has been an increase in NO₂ concentrations at all locations within the AQMA in 2016 when compared to 2015. This is a reverse of the overall the downward trend that has occurred since 2013.

Stourport-on-Severn

Figure 3.3 below demonstrates the five year trend for NO₂ concentrations for Stourport-on-Severn where available

Figure 3.3 - Long Term Trend Graph of NO₂ Concentrations at Stourport-on-Severn

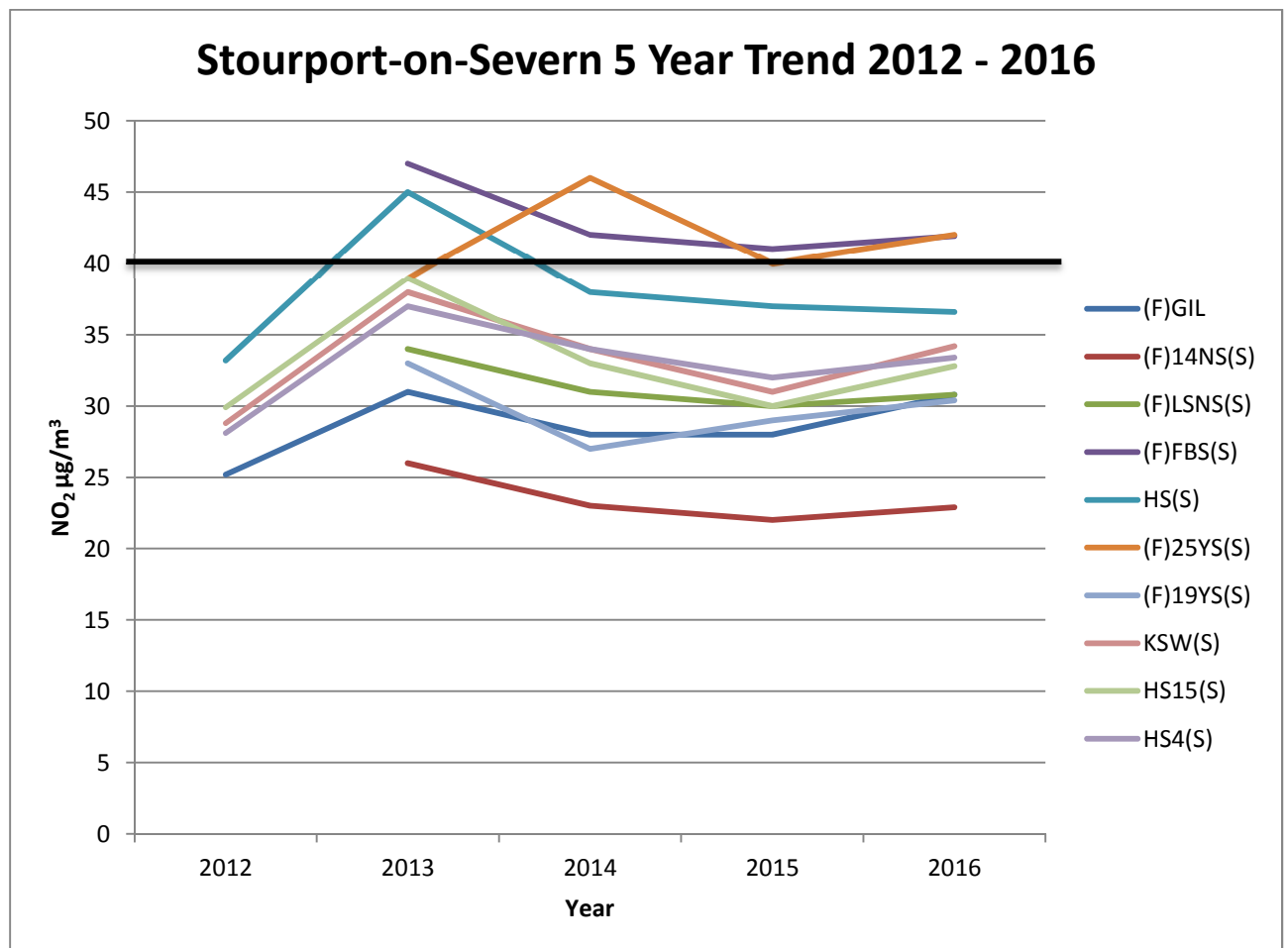


Figure 3.3 shows that there were two exceedences in Stourport-on-Severn in 2016 at locations (F)FBS(S) (21 Bridge Street) and (F)25YS(S) (25 York Street). The receptors at both of these locations are at the first floor level, assuming that there is a

fall off of NO₂ concentration with height; it is likely that the concentrations are below the AQO.

There has been an increase in NO₂ concentrations at all locations in Stourport-on-Severn in 2016 when compared to 2015, apart from HS(S) (High Street, corner of York Street) which shows a decrease. This is a reverse of the overall the downward trend that has occurred since 2013.

No annual means greater than 60µg/m³ have been recorded indicating it is unlikely there have been any exceedences of the 1-hour mean objective at these sites.

Bewdley

Figure 3.4 below demonstrates the five year trend for NO₂ concentrations for Bewdley where available

Figure 3.4 - Long Term Trend Graph of NO₂ Concentrations at Bewdley

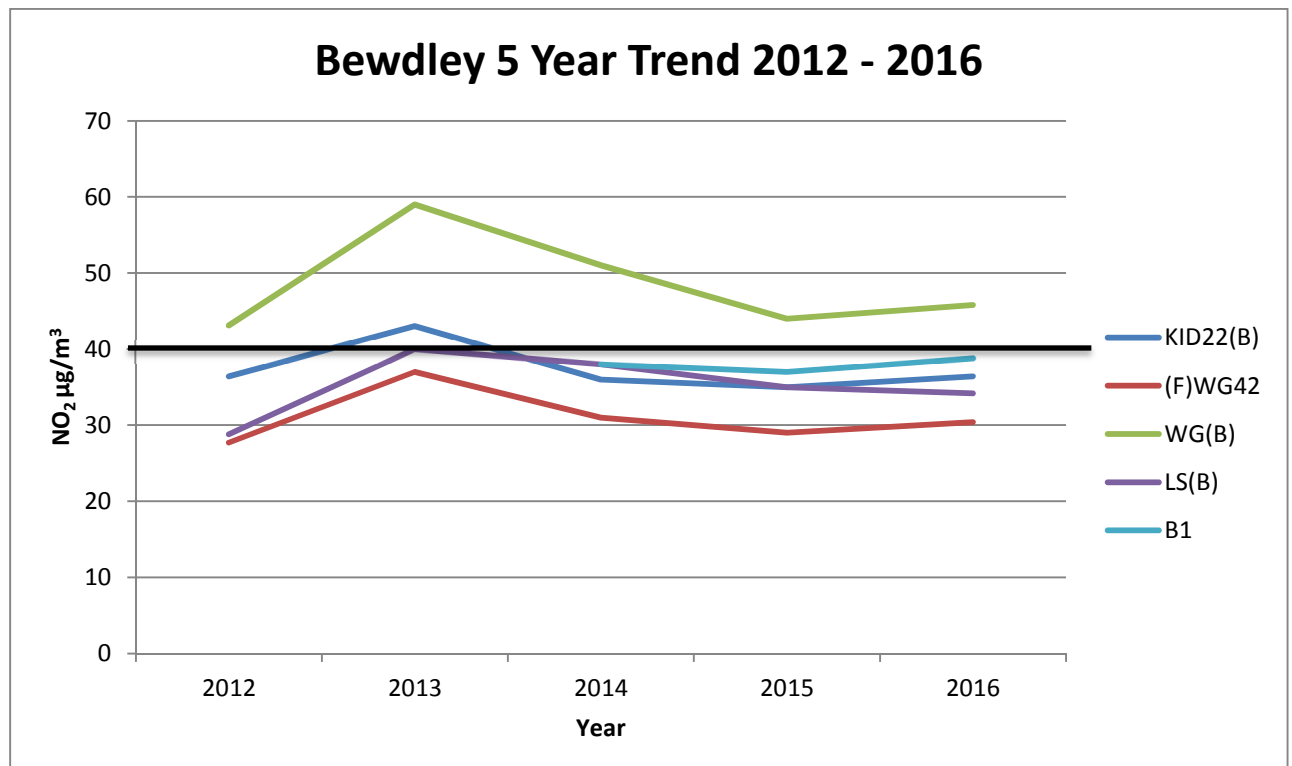


Figure 3.4 shows that there was an exceedence at one location in Bewdley in 2016 at WG(B) (88 Welch Gate) within the AQMA. There has been a slight increase in NO₂ concentrations at all locations in 2016 when compared to 2015 across the Bewdley

area. This is a reverse of the overall the downward trend that has occurred since 2013.

No annual means greater than $60\mu\text{g}/\text{m}^3$ have been recorded indicating it is unlikely there have been any exceedences of the 1-hour mean objective at these sites.

3.2.2 Particulate Matter (PM₁₀)

PM₁₀ is not monitored within the Wyre Forest District.

3.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} is not monitored within the Wyre Forest District.

3.2.4 Sulphur Dioxide (SO₂)

Sulphur Dioxide is not monitored within the Wyre Forest District.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
KIDDERMINSTER										
HLR (Relocated)	Lamppost o/s 140 Stourport Rd, junc. With Hoobrook Link Rd (Relocated)	Roadside	382149	274584	NO ₂	NO	13.2	5.4	NO	2.5
HLR1	139 Stourport Road, Kidderminster	Roadside	382136	274589	NO ₂	NO	0m	18.6	NO	1.7m
SR113	Sign Post O/S 113 Stourport Road	Roadside	382342	275054	NO ₂	NO	2.6m	2.4m	NO	2.3m
23HF	23 Horsefair	Roadside	383350	277193	NO ₂	YES	12m	2.5m	NO	2.34m
HF(K)	Horsefair (lamppost @ peacock PH, Blackwell Street)	Roadside	383311	277087	NO ₂	YES	0m	2.5m	NO	2.51m
HF(K)(F)	Hudson Florists on Horsefair	Roadside	383304	277071	NO ₂	YES	0m	2.5m	NO	2.49m
SBR121	121 Stourbridge Road	Roadside	383905	277857	NO ₂	NO	0m	2.44m	NO	2.69m
CSLOC	Flats at top of Coventry Street - Land Oak Court	Roadside	384205	277121	NO ₂	NO	0m	7.92m	NO	1.93m
K3	53 Coventry Street, 6m to kerb	Roadside	383726	276909	NO ₂	YES	0m	2.72m	NO	1.27m
K2	34 Leswell Lane, 3m to kerb, 10m to Coventry Street	Roadside	383657	276890	NO ₂	YES	0m	3.07m	NO	1.80m

Wyre Forest District Council

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
(F)69COV	69 Coventry Street	Roadside	383552	276870	NO ₂	YES	0m	5.5m	NO	1.83m
K1	50 Radford Avenue	Roadside	383391	277086	NO ₂	YES	0m	2.12m	NO	2.49m
K4	1 Silver Street – façade 20 m to kerb of ring road, 14 m to kerb of Silver Street.	Roadside	383337	276998	NO ₂	YES	0m	18.2m	NO	2.39m
CAS1	Casper Polish Shop, 99 Comberton Hill (On lamppost on side of building)	Roadside	383636	276377	NO ₂	NO	4.2m	2.7m	NO	2.5m
(F)SGC	6/7 St George's Court	Roadside	383475	276760	NO ₂	YES	0m	10m	NO	1.79m
TCH	Top Comberton Hill (lamppost) on corner with the Firs (white building)	Roadside	384086	276228	NO ₂	NO	1m	2m	NO	2m
(F)COMR(K)	Holmwood, Comberton Road	Roadside	384214	276242	NO ₂	NO	13.5m	3.5m	NO	2.18m
SP(K)	Spennells (located at Jay Park Crescent)	Urban Background	384486	274596	NO ₂	NO	11m	1.70m	NO	2.34m
(F) 447 (S)	447 Stourport Road	Roadside	382447	275506	NO ₂	NO	0m	10.62m	NO	1.65m
SR(K)	431 Stourport Road	Roadside	382429	275315	NO ₂	NO	9m	3m	NO	2.34m
SPR2	Flat 2, Park House, Sutton Park Road (façade)	Roadside	382496	275417	NO ₂	NO	0m	7m	NO	1.73m
SRLEC	Flats at crossroads - Lucy Edwards Court Sutton Road	Roadside	382183	276388	NO ₂	NO	0m	9.5m	NO	1.98m

Wyre Forest District Council

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BH166	166 Bewdley Hill (lamppost against garden wall)	Roadside	382135	276409	NO ₂	NO	5m	2m	NO	2.21m
(F)BR(K)	52 Bewdley Road	Roadside	382437	276542	NO ₂	NO	0m	6.53m	NO	1.70m
HAB203	203 Habberley Lane (Façade)	Roadside	381713	278069	NO ₂	NO	0m	3.10m	NO	1.52m
JAK	Spar Shop, Franche Road (on road sign post)	Roadside	382350	277100	NO ₂	NO	5m	1.5m	NO	2.29m
STOURPORT-ON-SEVERN										
(F)GIL	10 The Gilgal	Roadside	381482	271534	NO ₂	NO	0m	2m	NO	2.29m
(F)14NS(S)	14 New Street	Roadside	380931	271307	NO ₂	NO	0m	2m	NO	2.4m
(F)LSNS(S)	Lumsdons Solicitors, New Street,	Roadside	380957	271284	NO ₂	NO	0m	1.47m	NO	2.32m
(F)FBS(S)	21 Bridge Street	Roadside	380933	271247	NO ₂	NO	0m	1.86m	NO	2.4m
HS(S)	High Street corner of York Street	Roadside	380974	271268	NO ₂	NO	0m	2.3m	NO	2.82m
(F)25YS(S)	ChutimasThai Massage Centre, 22 York Street	Roadside	380990	271268	NO ₂	NO	0m	1.46m	NO	2.45m
(F)19YS(S)	19 York Street	Roadside	381086	271268	NO ₂	NO	0m	1.66m	NO	2.34m
KSW(S)	Kodak Spectacles Warehouse, High Street	Roadside	381072	271347	NO ₂	NO	0m	2.2m	NO	2.25m
HS15(S)	15 High Street	Roadside	381114	271380	NO ₂	NO	0m	2.2m	NO	2.34m
HS4(S)	4 High Street	Roadside	381169	271420	NO ₂	NO	0m	3.5m	NO	2.36m
A1	35 High Street	Roadside	380989	271298	NO ₂	NO	0m	3.2m	NO	2.4m

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BEWDLEY										
KID22(B)	22 Kidderminster Road	Roadside	373996	275464	NO ₂	NO	0m	2m	NO	2.4m
(F)WG42	42 Welch Gate	Roadside	378383	275328	NO ₂	NO	0m	1.69m	NO	2.5m
WG(B)	88 Welch Gate	Roadside	378465	275292	NO ₂	YES	0m	0.93m	NO	2.53m
LS(B)	Load Street, (by estate agents)	Roadside	378590	275302	NO ₂	NO	0m	3m	NO	2.5m
B1	Adam & Eve, Load Street, on Lamppost,	Roadside	378513	275317	NO ₂	NO	0m	1.1m	NO	2.31m

Notes:

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
KIDDERMINSTER									
HLR*	Roadside	Diffusion Tube		75					20.0
HLR1	Roadside	Diffusion Tube	25						22.3
SR113	Roadside	Diffusion Tube		100					32.0
23HF	Roadside	Diffusion Tube		83	30.4	32.2	27.5	26.1	26.0
HF(K)	Roadside	Diffusion Tube		92	55.2	74	69	64	65.3
HF(K)(F)	Roadside	Diffusion Tube		100	64.7	71.8	68	69	73.6
SBR121	Roadside	Diffusion Tube		92	30.1	36	32	34	36.4
CSLOC	Roadside	Diffusion Tube		100	29.8	41	36	35	36.7
K3	Roadside	Diffusion Tube		100			39	33	40.9
K2	Roadside	Diffusion Tube		100			27	24	26.5
(F)69COV	Roadside	Diffusion Tube		100	43.4	58	51	49	53.5
K1	Roadside	Diffusion Tube		100			27	25	26.6
K4	Roadside	Diffusion Tube		100			28	28	28.9
CAS1	Roadside	Diffusion Tube		83				37.1	37.1
(F)SGC	Roadside	Diffusion Tube		100	26.1	38	34	31	34.7
TCH	Roadside	Diffusion Tube		83	43.9	46.1	37.1	35.6	47.6
(F)COMR(K)	Roadside	Diffusion Tube		92	32	37.1	28.6	27.2	26.4
SP(K)	Urban Background	Diffusion Tube		100	11	15	14	12.7	13.2
(F) 447 (S)	Roadside	Diffusion Tube		100		32	27	27	27.8

*Tube relocated after nine months

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
SR(K)	Roadside	Diffusion Tube		100	37.2	40.6	34.6	31.8	35.1
SPR2	Roadside	Diffusion Tube		100	33.3	39	39	34	36.5
SRLEC	Roadside	Diffusion Tube		100	29	41	38	35	36.9
BH166	Roadside	Diffusion Tube		100	24.3	29.9	30.4	24.5	27.3
(F)BR(K)	Roadside	Diffusion Tube		100	29.9	39	34	31	32.8
HAB203	Roadside	Diffusion Tube		92	27.4	40	35	32	34.4
JAK	Roadside	Diffusion Tube		75	31	31.8	28.9	28.1	28.7
STOURPORT-ON-SEVERN									
(F)GIL	Roadside	Diffusion Tube		100	25.2	31	28	28	30.8
(F)14NS(S)	Roadside	Diffusion Tube		100		26	23	22	22.9
(F)LSNS(S)	Roadside	Diffusion Tube		100		34	31	30	30.8
(F)FBS(S)	Roadside	Diffusion Tube		100		47	42	41	41.9
HS(S)	Roadside	Diffusion Tube	58		33.2	45	38	37	36.6
(F)25YS(S)	Roadside	Diffusion Tube		92		39	46	40	42
(F)19YS(S)	Roadside	Diffusion Tube		100		33	27	29	30.4
KSW(S)	Roadside	Diffusion Tube		100	28.8	38	34	31	34.2
HS15(S)	Roadside	Diffusion Tube		100	29.9	39	33	30	32.8
HS4(S)	Roadside	Diffusion Tube		100	28.1	37	34	32	33.4
A1	Roadside	Diffusion Tube		100					43.2

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
BEWDLEY									
KID22(B)	Roadside	Diffusion Tube		92	36.4	43	36	35	36.4
(F)WG42	Roadside	Diffusion Tube		100	27.7	37	31	29	30.4
WG(B)	Roadside	Diffusion Tube		100	43.1	59	51	44	45.8
LS(B)	Roadside	Diffusion Tube		100	28.8	40	38	35	30
B1	Roadside	Diffusion Tube		92			38	36	37.8

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

If applicable, all data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.89) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
KIDDERMINSTER															
HLR	34.81	35.56	37.72	31.27	27.80	26.38	15.62	18.32	28.43				28.43	25.31	20.0
HLR1										28.14	31.98	33.82	31.31	22.29	22.3
SR113	49.14	50.58	49.84	39.68	42.91	38.96	32.65	36.06	38.03	37.34	48.26	56.24	43.31	38.55	31.9
23HF	47.54	47.25	45.84	45.33	41.72	42.83			31.14	37.22	27.81	44.90	41.16	36.63	26.0
HF(K)	<u>75.27</u>	<u>81.11</u>	-	<u>70.92</u>	<u>47.15</u>	<u>74.18</u>	<u>72.70</u>	<u>69.72</u>	<u>64.50</u>	<u>71.96</u>	<u>82.76</u>	<u>96.44</u>	<u>73.34</u>	<u>65.27</u>	<u>65.3</u>
HF(K)(F)	<u>79.85</u>	<u>82.89</u>	<u>88.27</u>	<u>82.71</u>	<u>87.05</u>	<u>79.12</u>	<u>79.39</u>	<u>73.97</u>	<u>73.09</u>	<u>82.69</u>	<u>83.17</u>	<u>99.80</u>	<u>82.67</u>	<u>73.58</u>	<u>73.6</u>
SBR121	42.00	42.27	43.07		41.78	37.22	31.54	33.52	36.95	40.58	47.94	52.62	40.86	36.37	36.4
CSLOC	48.91	48.69	45.13	40.17	42.90	37.70	35.61	32.45	35.25	33.50	46.90	48.11	41.28	36.74	36.7
K3	46.05	48.57	55.73	47.76	44.44	44.04	35.04	36.36	39.73	49.49	50.66	54.01	45.99	40.93	40.9
K2	35.16	33.85	31.24	28.31	29.74	25.08	18.91	21.59	24.02	31.20	37.20	41.26	29.80	26.52	26.5
(F)69COV	<u>62.89</u>	<u>53.78</u>	<u>59.96</u>	<u>53.70</u>	<u>64.39</u>	<u>64.46</u>	<u>56.54</u>	<u>58.29</u>	<u>57.75</u>	<u>58.98</u>	<u>61.32</u>	<u>68.96</u>	<u>60.09</u>	<u>53.48</u>	<u>53.5</u>
K1	36.35	35.62	29.36	24.27	26.85	24.54	23.41	23.52	26.90	27.31	36.97	43.41	29.88	26.59	26.6
K4	44.50	36.83	32.72	27.04	26.34	27.20	26.79	27.38	30.96	26.66	40.10	42.89	32.45	28.88	28.9
CAS1	56.58	56.48	53.90		34.23		46.48	46.17	39.83	45.24	53.84	59.91	49.26	43.84	37.1

Wyre Forest District Council

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.89) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
(F)SGC	37.30	38.66	45.66	38.47	43.02	31.94	31.56	30.56	44.83	37.22	44.77	43.66	38.97	34.68	34.7
TCH	62.53	67.94	64.14	56.21		57.59	46.73	46.46	46.15	59.57		68.97	57.63	51.29	47.6
(F)COMR(K)	49.44	47.08	40.54	40.83	41.13	31.85	37.74	37.30	33.60	38.52		52.57	40.96	36.45	26.4
SP(K)	17.72	19.24	20.00	15.49	13.10	12.93	8.89	9.62	14.35	19.23	24.14	41.40	18.01	16.03	13.2
(F) 447 (S)	30.69	34.08	37.01	30.99	31.04	26.04	24.67	23.77	28.17	32.56	37.79	38.23	31.25	27.81	27.8
SR(K)	51.70	54.59	60.49	53.66	60.61	52.46	38.03	41.14	44.87	60.16	59.10	64.37	53.43	47.55	35.1
SPR2	46.64	41.70	43.96	36.64	42.55	40.22	34.21	34.37	36.52	34.45	45.09	55.83	41.01	36.50	36.5
SRLEC	43.91	47.14	46.49	42.29	40.84	36.54	39.42	37.84	32.65	40.94	41.82	47.87	41.48	36.92	39.9
BH166	41.94	35.74	36.07	33.78	34.82	48.20	25.99	27.54	29.82	37.81	40.46	50.94	36.93	32.87	27.3
(F)BR(K)	41.70	33.67	43.07	29.59	39.24	37.85	26.81	29.60	32.70	38.58	40.92	48.93	36.89	32.83	32.8
HAB203	40.93	38.03	39.48	39.38	34.17	37.17	34.90	37.07	34.02	39.52	44.72	43.94	38.61	34.36	34.4
JAK	41.82	46.51	45.90	41.02	40.31	38.96	30.76			40.70	48.76		41.64	37.1	28.7
STORPORT-ON-SEVERN															
(F)GIL	39.03	35.34	40.60	31.83	32.69	32.34	23.95	26.76	30.25	31.91	45.22	44.91	34.57	30.76	30.8
(F)14NS(S)	27.46	26.51	31.44	25.83	27.77	27.03	11.76	15.91	18.31	32.97	32.44	31.42	25.74	22.91	22.9
(F)LSNS(S)	37.89	35.34	38.49	34.83	37.50	33.65	23.62	28.82	27.83	36.16	40.69	40.44	34.60	30.79	30.8
(F)FBS(S)	46.24	49.72	30.89	54.18	54.08	51.33	38.93	40.92	42.05	53.14	51.52	51.48	47.04	41.86	41.9
HS(S)	50.65	37.17		45.55		46.55				44.24	43.59	51.96	45.67	36.59	36.6
(F)25YS(S)	75.62	41.07	45.19	38.08	39.31	39.16	33.87	44.00	58.01	36.98	67.76		47.19	41.99	42.0
(F)19YS(S)	32.47	37.68	39.84	34.71	34.80	29.98	28.03	28.70	30.00	35.46	39.69	38.76	34.18	30.42	30.4

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.89) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
KSW(S)	42.42	46.05	42.60	36.18	38.67	36.89	24.11	30.53	32.22	40.40	44.09	47.26	38.45	34.22	34.2
HS15(S)	40.63	38.89	42.49	37.10	37.03	35.48	26.19	28.30	31.37	39.11	40.01	45.10	36.81	32.76	32.8
HS4(S)	41.95	37.28	39.72	35.81	37.44	35.29	29.44	34.64	33.17	39.23	37.42	48.94	37.53	33.40	33.4
A1	48.25	44.73	57.73	51.18	51.15	46.51	39.06	44.35	39.97	49.96	53.52	55.76	48.51	43.17	43.2
BEWDLEY															
KID22(B)	41.65	42.96	47.62	38.93	43.75	37.54	29.13		28.78	45.42	45.18	48.56	40.86	36.36	36.4
(F)WG42	38.61	34.42	42.07	31.40	34.62	31.71	18.69	23.28	25.80	38.34	43.55	47.64	34.18	30.42	30.4
WG(B)	55.47	54.93	58.93	52.28	55.67	54.55	34.58	37.38	39.40	51.30	<u>61.27</u>	<u>61.47</u>	51.44	45.78	45.8
LS(B)	46.83	41.41	45.43	40.16	39.02	35.51		25.16	28.87	38.64	39.83	41.45	38.39	34.17	34.2
B1	41.89	40.95	53.92	41.81	43.86	42.98	27.51	29.27		47.41	45.63	52.49	42.52	37.84	37.8

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

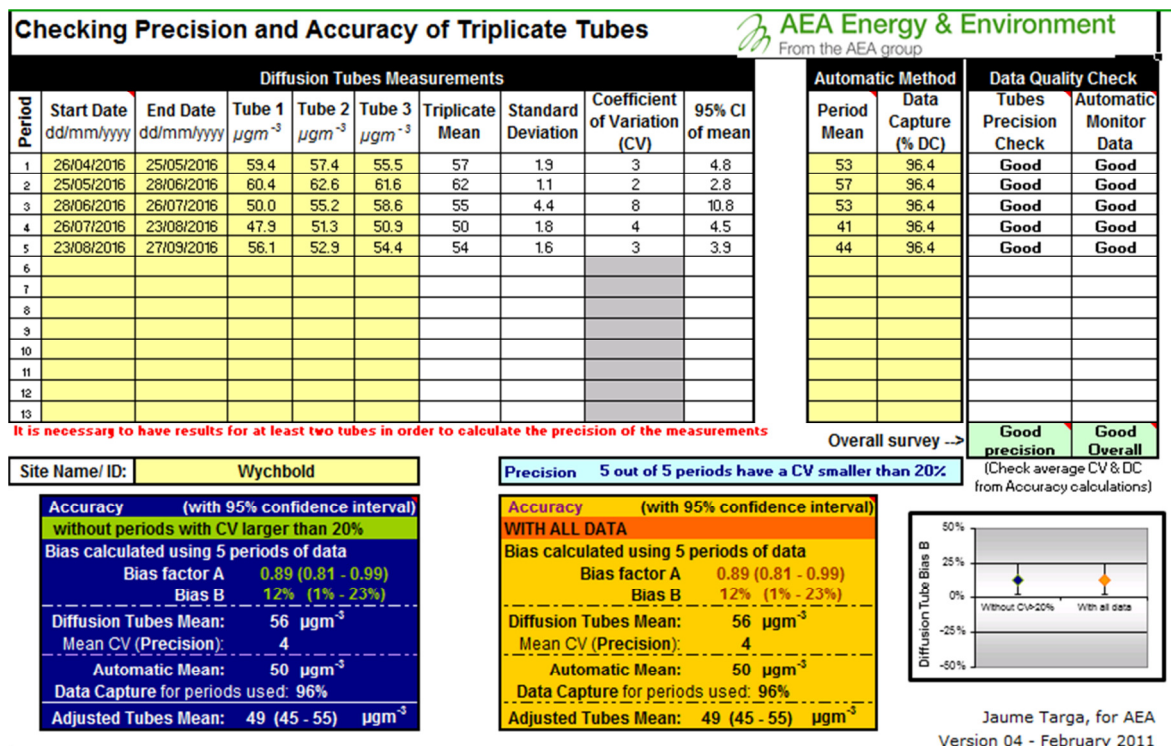
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

QA/QC Data

Factor from Local Co-location Studies

The bias adjustment factor applied to the results in 2016 is 0.89 which has been derived from local co-location study at Worcester Road, Wychbold. The co-location study was undertaken in accordance with LAQM.TG16 and the local bias-adjustment factor calculated using the AEA Environment & Technology spreadsheet tool provided by DEFRA, see figure C.1 below. .

Figure C.1 - Local bias-adjustment factor calculation



Diffusion Tube Bias Adjustment Factors

The national bias-adjustment factor published by DEFRA in April 2017 (spreadsheet version number 03/17 V2) is 0.88 indicating good agreement between the national bias-adjustment figure and that calculated following the local co-location study at Worcester Road, Wychbold. The local bias-adjustment factor of 0.89 is considered to be more conservative than the national figure and has therefore been adopted for use across Worcestershire for bias-adjustment of 2016 diffusion tube data.

QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2016.

QA/QC of Diffusion Tube Monitoring

The following UKAS accredited company provides Bromsgrove District Council with nitrogen dioxide diffusion tubes and analysis:

Somerset Scientific Services,
The Crescent
County Hall Taunton
TA1 4DY

0300 123 2224

somersetscientific@somerset.gov.uk

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used

Under the WASP scheme Somerset Scientific Services performed 100% satisfactory for all periods between January 2016 and February 2017. Tube precision was "Good" throughout 2016.

Data Annualisation

Short-term to Long-term Data Adjustment

Only 3 months of data was recorded for HLR1 – 139 Stourport Road, Kidderminster due to the tube being relocated. The data has been annualised in accordance with Technical Guidance LAQM TG(16) as shown in Table C.1 below.

Table C.1 - Annualisation calculation for HLR1 – 139 Stourport Road

Site	Site Type	Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	Urban Background	21.00	29.7	0.7
Birmingham Tyburn	Urban Background	29.00	38	0.8
Coventry Allesley	Urban Background	22.00	29.3	0.8
Leamington Spa	Urban Background	21.00	29.6	0.7
			Average	0.8
			HLR1 Result	27.87
			HLR1 Annualised	22.29

Only 7 months of data was recorded for HS(S) – High Street/York Street, Stourport-on-Severn. The data has been annualised in accordance with Technical Guidance LAQM TG(16) as shown in Table C.2 below.

Table C.2 - Annualisation calculation for HS(S) – High Street/York Street

Site	Site Type	Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	Urban Background	21.00	24.7	0.9
Birmingham Tyburn	Urban Background	29.00	33.3	0.9
Coventry Allesley	Urban Background	22.00	25.7	0.9
Leamington Spa	Urban Background	21.00	24.6	0.9
			Average	0.9
			HS(S) Result	40.65
			HS(S) Annualised	36.59

Distance Correction

Estimates of concentrations at the nearest receptor

If an exceedance is measured at a monitoring site (or close to the air quality objective) which is not representative of public exposure, the procedure specified in Technical Guidance LAQM.TG(16) has been used to estimate the concentration at the nearest receptor where applicable. The results are presented in Figures C.2 to C.10 below.

Figure C.2 – HLR – Lamp-post outside 140 Stourport Road

BUREAU VERITAS logo on the left and **Air Quality CONSULTANTS** logo on the right.

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	5.4	metres
Step 2	How far from the KERB is your receptor (in metres)?	18.6	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	11.16	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	25.3	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	20.0	µg/m ³



Figure C.3– SR113 – Signpost outside 113 Stourport Road

BUREAU VERITAS logo on the left and **Air Quality CONSULTANTS** logo on the right.

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	3.6	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.9	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	38.55	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	31.9	µg/m ³



Figure C.4 – 23HF – 23 Horsefair

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	14.5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.1	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	36.63	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	26.0	µg/m ³



Figure C.5 – CAS1 – Lamp-post outside 99 Comberton Hill

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2.7	metres
Step 2	How far from the KERB is your receptor (in metres)?	6.9	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	43.83	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	37.1	µg/m ³



Figure C.6 – TCH – Lamp-post outside The Firs top of Comberton Hill

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	3	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.9	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	51.29	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	47.6	µg/m ³



Figure C.7 – (F)COMR(K) – Lamp-post outside Holmwood, Comberton Road

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	17	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.9	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	36.45	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	26.4	µg/m ³



Figure C.8 – SP(K) – Spennells, lamp-post in Jay Park Crescent

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.7	metres
Step 2	How far from the KERB is your receptor (in metres)?	12.7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	9.7	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	16.03	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	13.2	µg/m ³


Figure C.9 – SR(K) – Lamp-post outside 431 Stourport Road


Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	12	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.8	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	47.55	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	35.1	µg/m ³

Figure C.10 – BH166 – Lamp-post outside 166 Bewdley Hill



**BUREAU
VERITAS**



Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	13.9	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	32.87	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	27.3	µg/m ³

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Horsefair/Coventry Street AQMA and Monitoring Locations

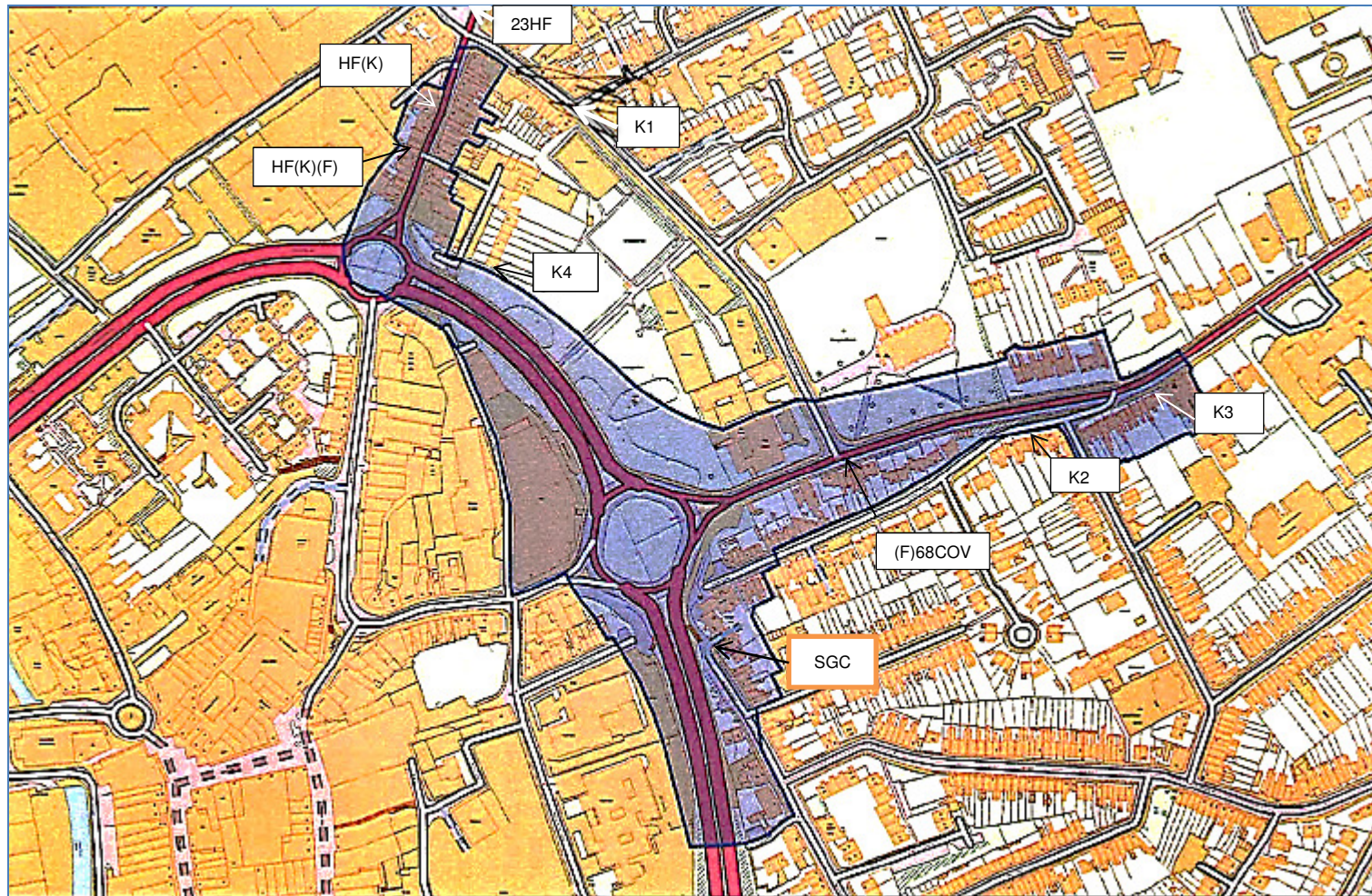


Figure D. 2 - Welch Gate AQMA and Monitoring Locations

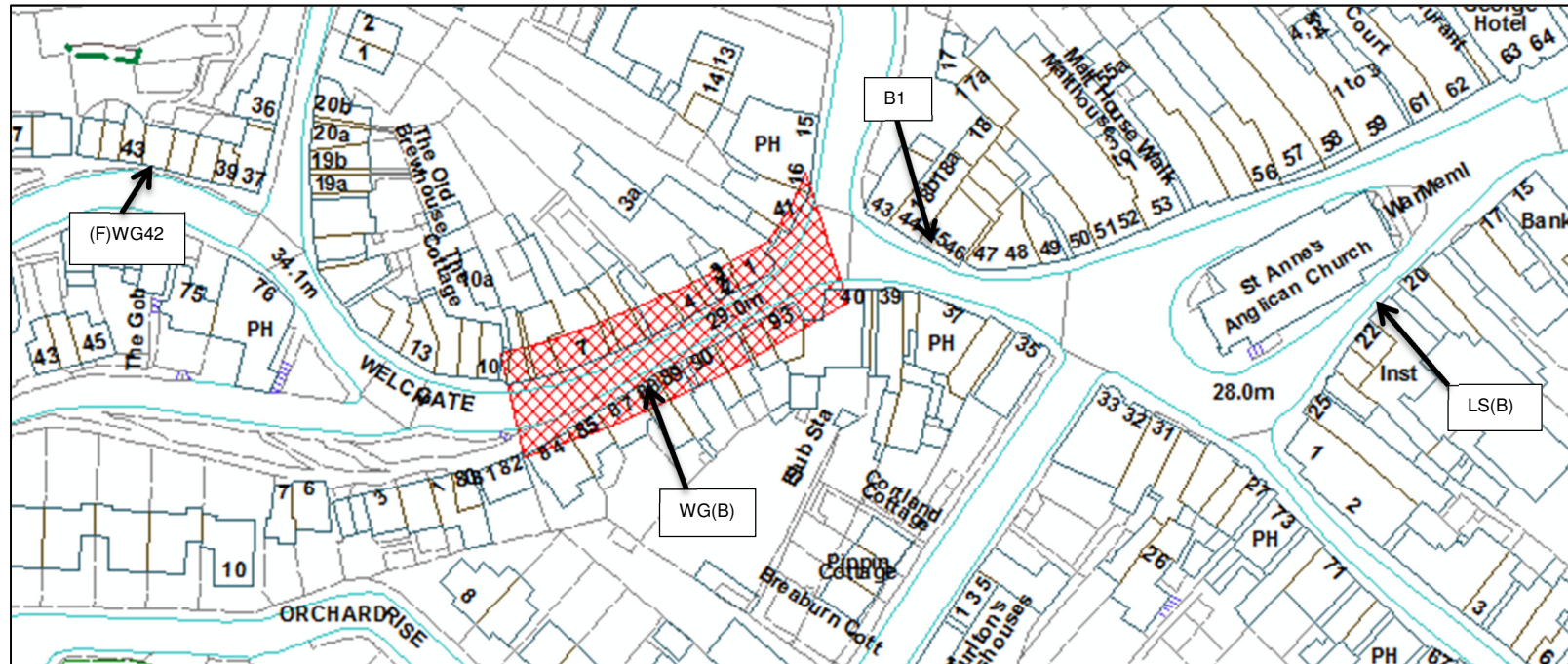


Figure D.3 - East of Kidderminster Town Centre

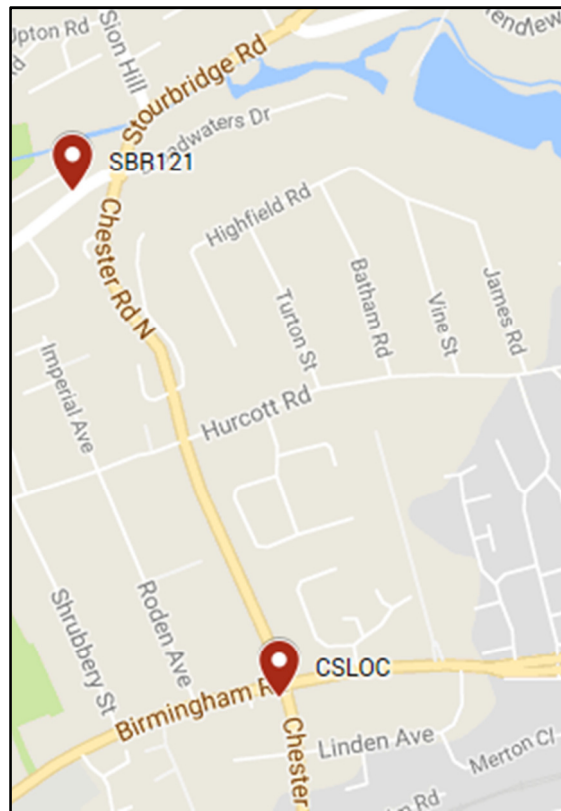


Figure D.4 - West of Kidderminster Town Centre

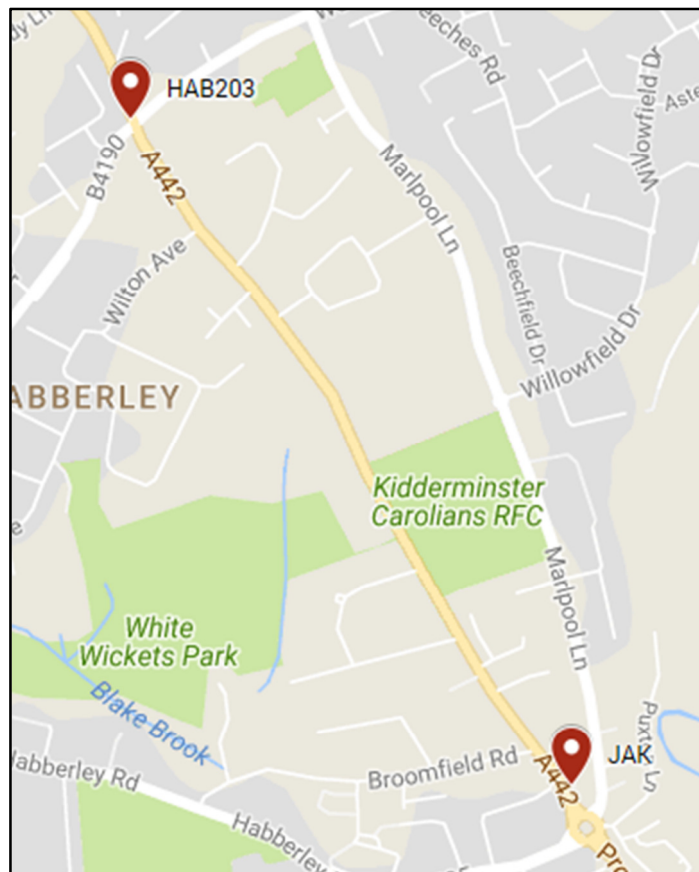


Figure D.5 South of Kidderminster Town Centre



Figure D.6 Stourport-on-Severn

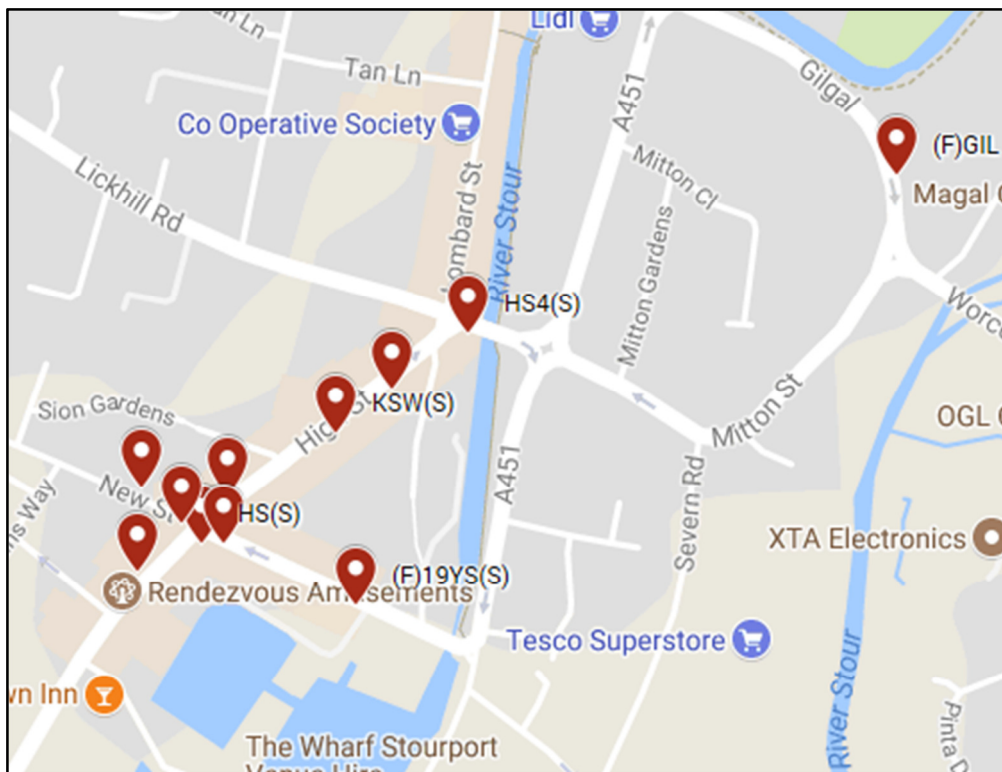


Figure D.7 East of Bewdley Town Centre



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁴	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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 (micrometres or microns) 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
WFDC	Wyre Forest District Council
WRS	Worcestershire Regulatory Services

References

1. DEFRA (2016) Local Air Quality Management Policy Guidance LAQM PG.(16)
2. DEFRA (2016) 'Local Air Quality Management Technical Guidance LAQM TG.(16)
3. DEFRA (2017) 'National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/17 V2
4. Worcestershire Regulatory Services (2013) 'Air Quality Action Plan for Worcestershire'
5. Worcestershire Regulatory Services (2015) 'Air Quality Action Plan Progress Report for Worcestershire April 2013-April 2015'
6. Worcestershire Regulatory Services (2016) 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – April 2016'
7. Worcestershire Regulatory Services (2016) Air Quality Annual Status Report for Wyre Forest District Council
8. Wyre Forest District Council (2011) Churchfields Masterplan Supplementary Planning Document