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Regulatory Services
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2016 Air Quality Annual Status Report (ASR) for Wyre Forest District Council

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

December 2016

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Executive Summary: Air Quality in Our Area

Why air quality matters

Clean air is vital for our health and the environment and essential for making sure our District is a welcoming place for all to live and work now and in the future. Everyone has a part to play in improving air quality, starting with the way we behave. Simple things like walking to work or school will benefit air quality as well as have knock-on benefits for your health and the environment. Think before you make a journey and ask yourself if it is necessary. Local Authorities and the communities who live within them are key to improving the air we breathe. What we do locally can also benefit regional air quality and help meet air quality limit values and objectives as set out in European and UK law.

The Local Air Quality Management (LAQM) system, as set out in Part IV of the Environment Act 1995, 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 exceedences are considered likely, the local authority must declare an Air Quality Management Area (AQMA) and prepare an Action Plan setting out the measures it intends to put in place in pursuit of the objectives.

Air Quality in Wyre Forest

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].

[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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Worcestershire Regulatory Services (WRS) is a shared service formed from the Environmental Health and Licensing departments of the six Worcestershire District Councils. Responsibility for managing (monitoring and reporting of) local air quality transferred from the partnership councils to WRS in April 2011.

Monitoring results within the Wyre Forest District Council area demonstrate there has been a slight reduction in NO_2 concentrations between 2014 and 2015 across the district but there is no discernible upward or downward trend in concentrations over the 5 year period 2011- 2015.

Two Air Quality Management Areas (AQMA's) were declared by Wyre Forest District Council for exceedences of the annual average mean objective for nitrogen dioxide (NO_2):

- Welch Gate, Bewdley AQMA declared January 2003
- Horsefair, Kidderminster AQMA declared January 2003
  extended to include Coventry Street July 2009

In 2015, there continue to be exceedences of the annual mean objective for NO_2 of 40µg/m^3 within the Welch Gate and Horsefair/Coventry Street AQMAs which therefore must remain in place.

One location at the Casper Polish Shop, Comberton Hill, Kidderminster (CAS1) shows a NO_2 concentration of 40.60µg/m^3 and is outside of the existing AQMAs. The diffusion tube at this location was re-located at the beginning of 2015 due to inaccessibility at its previous position on the shop's façade, monitoring will continue to establish whether a detailed assessment will be required.

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by WFDC on 24th October 2013. The AQAP is

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

available to download via the following link: http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx

WRS submitted an update, the 'Air Quality Action Plan Progress Report for Worcestershire April 2013-2015', to Defra in November 2015. A copy of this is also available via 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 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.

More information on the set up of the Steering Group can be found in the 'Air Quality Action Plan Progress Report for Worcestershire April 2013-2015' and the minutes at http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-steering-group.aspx

Actions to Improve Air Quality

Wyre Forest District Council (WFDC) and Worcestershire County Council (WCC) have taken forward a number of measures during the year in pursuit of improving local air quality as detailed in the AQAP, most are on-going. Examples include:

Measure	EU Measure Category	Focus	Progress to date
Loading and unloading restrictions during peak traffic times	Traffic Management	Loading and unloading of vehicles is a frequent issue which results in congestion	Highways to develop an AQMA specific technical discussion paper to set the AQMAs in the context of transport-specific issues and constraints, planned development growth, local demographics and economic profiling as well as current and proposed highway schemes. This document should provide a solid base from which to progress.
HGV or weight restriction on affected roads	Traffic Management	Encourage HGVs to avoid AQMAs and find alternative routes	County wide action plan adopted by WFDC. Measure identified as priority action for Welch Gate following assessment using prioritisation matrix tool. Research carried out regarding implementation feasibility.
Installing electric vehicle charging points	Policy Guidance and Development Control	Increase in availability of EV charging points and corresponding increase in use of electric vehicles	On-going: Installation of EV charging points recommended for inclusion on relevant planning consents.
Travel Planning	Promoting Travel Alternatives	Increase in uptake of personal travel planning services. Change in behaviour towards more sustainable modes of transport	WCC are developing a personal travel planning service for Worcestershire residents and developers
Encourage car sharing	Alternatives to private vehicle use	Increase in number of people car sharing	WCC are launching a new website, Liftshare, which promotes and facilitates car share use.

Local Priorities and Challenges

Blackwell Street in the Horsefair, 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.

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. By improving the efficiency of the Ringway whilst simultaneously encouraging travel to the town centre via alternative modes it is envisaged that levels of congestion within the AQMA will reduce in combination with improvements in flow of traffic. This should result in a significant improvement in air quality.

The Worcestershire County Council technical discussion paper outlined potential proposals for improving air quality within the Welch Gate AQMA. The paper suggested that localised accessibility to the town should be considered holistically as part of a strategic plan for Bewdley. The paper suggests that one potential solution could be the withdrawal of town-centre parking and relocation to a single, large facility within easy access of strategic routes. Investment would then be made to improve the walking route between the car park and the town.

WRS on behalf of Wyre Forest District Council continue to monitor locations in 2016 to assess any improvements or degradation in NO_2 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 2017 Annual Status Report.

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 2015. 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 the objectives.

A summary of AQMAs declared by Wyre Forest District Council can be found in **Error! Reference source not found.**. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at http://www.worcsregservices.gov.uk/environmental-health/pollution/air-quality/air-quality-management-areas.aspx

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Horsefair/ Coventry Street	NO_2 annual mean	Kidderminster	A key corridor into the town centre	Air Quality Action Plan for Worcestershire*
Welch Gate	NO_2 annual mean	Bewdley	A key corridor into the town centre	

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

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

Wyre Forest District Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality. Worcestershire Regulatory Services have produced a document entitled *Air Quality Action Plan Progress Report for Worcestershire April 2015 – March 2016* which includes details of all measures completed, in progress or planned to be undertaken, for the above AQMAs. This report can be accessed via the following link:-

http://www.worcsregservices.gov.uk/media/2294583/WRS-AQAP-Progress-Report-2015-16.pdf

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

Local Authorities are expected under Chapter 7 of Policy Guidance LAQM.PG(16) to work towards reducing emissions and/or concentrations of pollutant $PM_{2.5}$. There is clear evidence that particulate matter ($PM_{2.5}$) 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 2015 calendar year. The average total $PM_{2.5}$ at 196 locations (centre points of 1km x 1km grids) across the Wyre Forest District is 9.78µg/m^3, with a minimum concentration of 8.77µg/m^3 and a maximum concentration of 10.97µg/m^3.

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/m^3.

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 NO_2 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 District during 2015.

3.1.2 Non-Automatic Monitoring Sites

Wyre Forest District Council undertook non- automatic (passive) monitoring of NO_2 at 44 locations during 2015. Tables A.1, A.2 and A.3 in Appendix A show the details of the sites for Kidderminster, Stourport-on-Severn and Bewdley respectively. This was the same number of sites as monitored in 2014.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2 Individual pollutants

3.2.1 Nitrogen Dioxide (NO_2)

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

One location (CAS1- Casper Polish Shop, Comberton Hill) was re-located from the façade of the shop to a lamp-post on the pavement at the front of the shop due to inaccessibility at the previous location.

Table 3.1 below provides a summary of measured exceedences in 2015 (annualised where necessary) or borderline locations, whether representative of relevant exposure and within an existing AQMA or not.

Table 3.1 - Summary of measured exceedences and borderline results in 2015

Site ID	Within AQMA Y/N	Bias Adjusted Measurement (µg/m^3)	Adjusted for distance to relevant exposure (µg/m^3)
Kidderminster			
HF(K)	Y – Horsefair/Coventry Street	**<u>63.55</u>**	**56.40**
HF(K)(F)	Y – Horsefair/Coventry Street	**<u>69.14</u>**	**<u>61.20</u>**
(F)69COV	Y – Horsefair/Coventry Street	**49.18**	**49.18**
CAS1	N	**43.45**	**40.60**
TCH	N	**48.19**	38.50
SR(K)	N	**41.17**	31.90
Stourport-on-Severn			
A1/2/3	N	**40.21**	38.40
(F)25YS(S)	N	39.62	32.70
(F)FBS(S)	N	**41.42**	35.30
Bewdley			
WG(B)	Y – Welch Gate	**44.42**	**44.42**

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence of the NO_2 1-hour mean objective are shown in **<u>bold and underlined.</u>**

Table 3.1 above indicates there have been exceedences of the annual average Air Quality Objective (AQO) for NO_2 concentrations or recorded within 5% of the AQO at 10 of the 44 monitoring locations in 2015. However, when taking into consideration the proximity to relevant exposure only five locations demonstrate exceedences in 2015. Of these, three locations are within the Horsefair/Coventry Street AQMA and

one location is within the Welch Gate AQMA. One location (CAS1- Casper Polish Shop, Comberton Hill) is outside of an existing AQMA. This diffusion tube was re-located at the beginning of 2015, monitoring will continue to establish whether a detailed assessment will be required.

Tables A.4, A.5 and A.6 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3 for Kidderminster, Stourport-on-Severn and Bewdley respectively. For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Kidderminster

Figure 3.1 below demonstrates the five year trend for NO_2 concentrations for Kidderminster where available.

Figure 3.1 - Long Term Trend Graph of NO_2 Concentrations at Kidderminster Excluding the Horsefair/Coventry Street AQMA

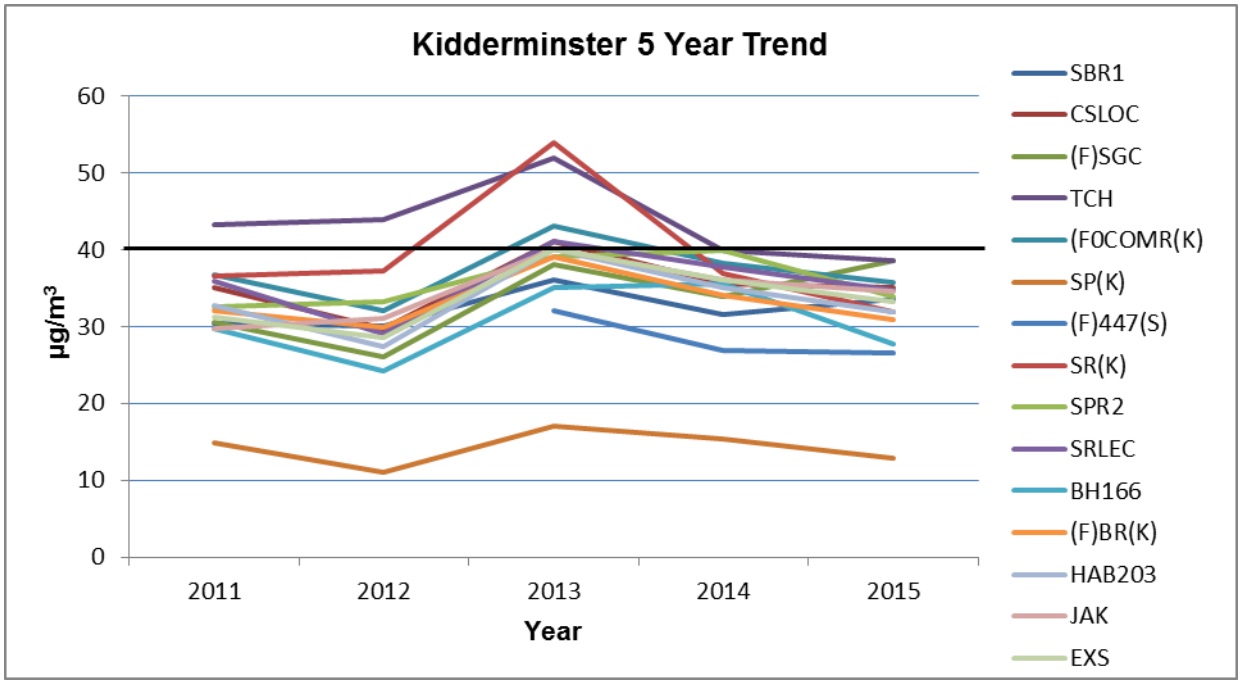


Figure 3.1 demonstrates that there were no exceedences in Kidderminster outside of the Horsefair/Coventry Street AQMA in 2015 and there has been a slight reduction in NO_2 concentrations in 2015 when compared to 2014 across the area and overall the trend has been downwards since 2013.

No annual means greater than 60µg/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 NO_2 concentrations for the Horsefair/Coventry Street AQMA where available.

Figure 3.2 - Long Term Trend Graph of NO_2 Concentrations at the Horsefair/Coventry Street AQMA

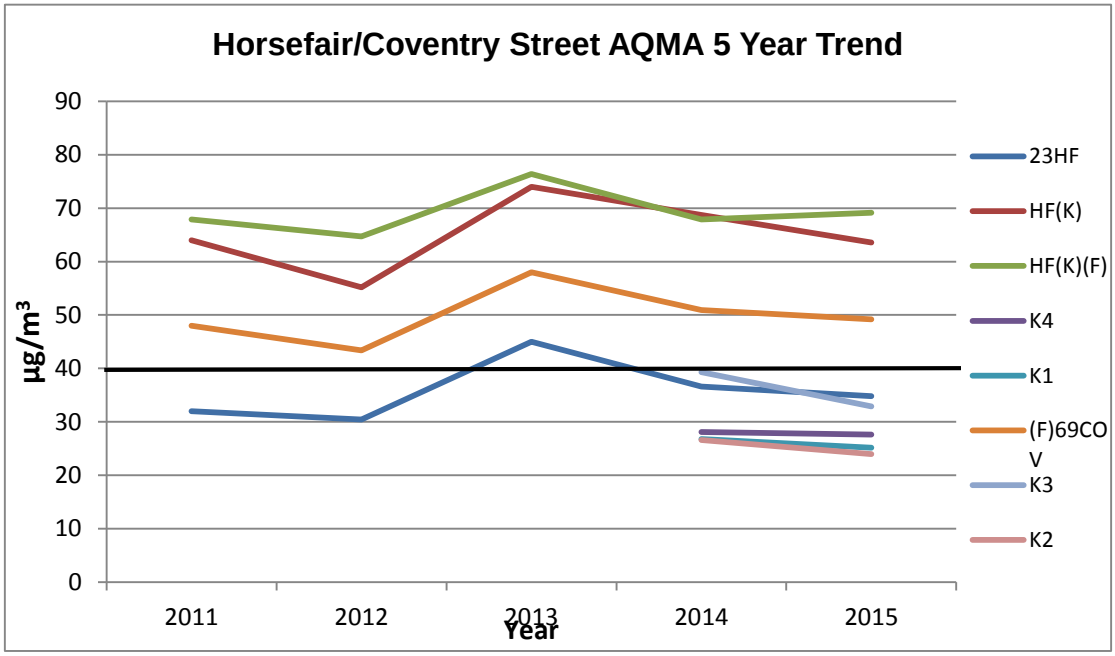


Figure 3.2 demonstrates that there were exceedences at three locations within the Horsefair/Coventry Street AQMA. Diffusion tubes HF(K) – The Peacock Public House and HF(K)(F) - Hudson Florists, both in Blackwell Street, are above the 60µg/m^3 one hour mean objective, however members of the public tend 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.

Apart from HF(K)(F) there has been a slight reduction in NO_2 concentrations in 2015 when compared to 2014 in the AQMA and overall the trend has been downwards since 2013.

Stourport-on-Severn

Figure 3.3 below demonstrates the five year trend for NO_2 concentrations for Stourport-on-Severn where available

Figure 3.3 - Long Term Trend Graph of NO_2 Concentrations at Stourport-on-Severn

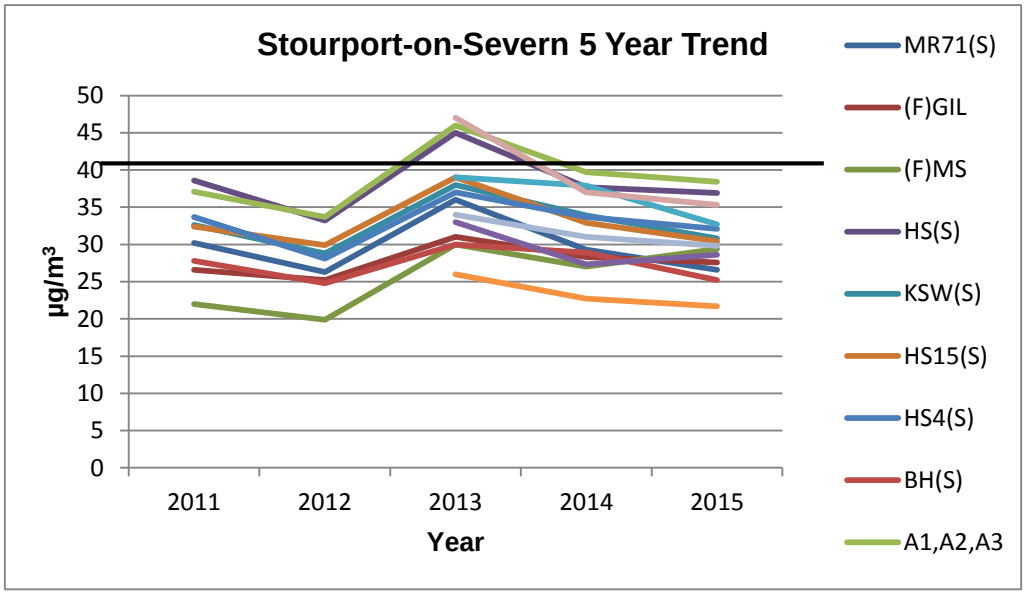


Figure 3.3 demonstrates that there were no exceedences in Stourport-on-Severn in 2015 and there has been a slight reduction in NO_2 concentrations in 2015 when compared to 2014 across the district and overall the trend has been downwards since 2013.

No annual means greater than 60µg/m^3 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 NO_2 concentrations for Bewdley where available

Figure 3.4 - Long Term Trend Graph of NO_2 Concentrations at Bewdley

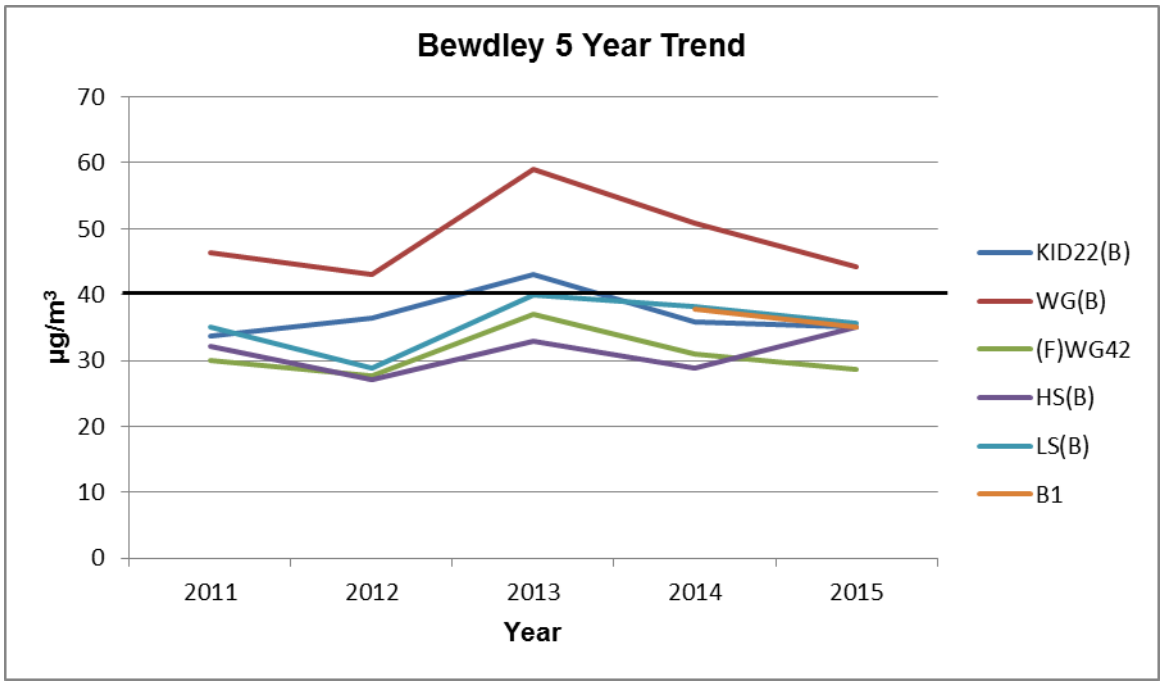


Figure 3.4 demonstrates that there was an exceedence at one location in Bewdley in 2015 at WG(B) – 88 Welch Gate within the AQMA, but there has been a significant reduction in NO_2 concentration at this location since 2013. There has been a slight reduction in NO_2 concentrations in 2015 when compared to 2014 across the Bewdley area apart from HS(B) - Abacus Hairdressers, High Street which has shown an increase of 6.1µg/m^3 over the course of the year, but overall the trend has been downwards since 2013.

No annual means greater than 60µg/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 (PM_{10})

PM_{10} 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 (SO_2)

Sulphur Dioxide is not monitored within the Wyre Forest District.

Appendices

Appendix A: Tables: Monitoring Details

Appendix B: Full Monthly NO_2 Diffusion Tube Results

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

Appendix D: Maps of Monitoring Locations

Appendix E: Summary of Air Quality Objectives in England

Appendix A: Monitoring Results

Table A.1 – Details of Kidderminster 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?
23HF	23 Horsefair	Roadside	383350	277193	NO_2	Y	12	2.5	N
HF(K)	Peacock PH, Horsefair	Roadside	383311	277087	NO_2	Y	0	2.5	N
HF(K)(F)	Hudson Florists on Horsefair	Roadside	383304	277071	NO_2	Y	0	2.5	N
K4	1 Silver Street	Roadside	383337	276998	NO_2	Y	0	18.2	N
K1	50 Radford Avenue	Roadside	383391	277086	NO_2	Y	0	2.1	N
(F)69COV	69 Coventry Street	Roadside	383552	276870	NO_2	Y	0	5.5	N
K3	53 Coventry Street	Roadside	383726	276909	NO_2	Y	0	2.7	N
K2	34 Leswell Lane (10m to Coventry St.)	Roadside	383657	276890	NO_2	Y	0	3	N
SBR121	121 Stourbridge Road	Roadside	383905	277857	NO_2	N	0	2.4	N
CSLOC	Land Oak Court, top of Coventry Street	Roadside	384205	277121	NO_2	N	0	7.9	N
CAS1	Casper Polish Shop, Comberton Hill	Roadside	383628	276378	NO_2	N	1.5	2.7	N

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?
(F)SGC	6/7 St George's Crt.	Roadside	383475	276760	NO_2	N	0	10	N
TCH	Top Comberton Hill on corner with the Firs	Roadside	384086	276228	NO_2	N	5	2	N
(F)COMR(K)	Holmwood, Comberton Road	Roadside	384214	276242	NO_2	N	13.5	3.5	N
SP(K)	Jay Park Crescent, Spennells	Urban Background	384486	274596	NO_2	N	11	1.7	N
(F)447S	447 Stourport Road	Roadside	382447	275506	NO_2	N	0	10.6	N
SR(K)	431 Stourport Road	Roadside	382429	275315	NO_2	N	9	3	N
SPR2	Flat 2, Park House, Sutton Park Road	Roadside	382496	275417	NO_2	N	0	7	N
SRLEC	Lucy Edwards Court, Sutton Road	Roadside	382183	276388	NO_2	N	0	9.5	N
BH166	166 Bewdley Hill	Roadside	382135	276409	NO_2	N	2	5	N
(F)BR(K)	52 Bewdley Road	Roadside	382437	276541	NO_2	N	0	6.5	N
HAB203	203 Habberley Lane	Roadside	381713	278069	NO_2	N	0	3.1	N
JAK	Jacksons PH (on road sign post)	Roadside	382350	277100	NO_2	N	5	1.5	N
EXS	Barclays Bank, Exchange Street	Roadside	383191	276540	NO_2	N	0	4	N

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

Table A.2 – Details of Stourport-on-Severn 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?
MR71(S)	71 Minster Road	Roadside	381405	272258	NO_2	N	0	7.5	N
(F)GIL	10 The Gilgal	Roadside	381483	271534	NO_2	N	0	2	N
(F)MS	7 Mitton Street	Roadside	381333	271360	NO_2	N	0	8	N
HS(S)	High Street, corner of York Street LP	Roadside	380974	271268	NO_2	N	0	4	N
KSW(S)	Kodak Spectacles Warehouse, High Street	Roadside	381072	271347	NO_2	N	0	4	N
HS15(S)	15 High Street	Roadside	381114	271380	NO_2	N	0	2.3	N
HS4(S)	4 High Street	Roadside	381169	271420	NO_2	N	0	4.4	N
BH(S)	Baldwin House, Lombard Street	Roadside	381165	271468	NO_2	N	0	2	N
A1/A2/A3	Outside Bentleys, 36 High St	Roadside	380994	271302	NO_2	N	0	3.6	N
(F)19YS(S)	19 York Street	Roadside	380931	271307	NO_2	N	0	1.7	N
(F)25YS(S)	Stourport Nails Centre, 22 York St	Roadside	380933	271247	NO_2	N	0	1.5	N
(F)14NS(S)	14 New Street	Roadside	380934	271310	NO_2	N	0	2	N
(F)LSNS(S)	Lumsdons Solicitors, New Street	Roadside	380959	271283	NO_2	N	0	1.5	N
(F)FBS(S)	Flamingos, Bridge Street	Roadside	380932	271249	NO_2	N	0	1.9	N

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

Table A.3 – Details of Bewdley 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?
KID22(B)	22 Kidderminster Road	Roadside	378999	275465	NO_2	N	0	3	N
WG(B)	88 Welch Gate	Roadside	378465	275292	NO_2	Y	0	1.7	N
(F)WG42	42 Welch Gate	Roadside	378383	275328	NO_2	Y	0	1	N
HS(B)	Abacus Hairdressers, High Street	Roadside	378587	275279	NO_2	N	0	2	N
LS(B)	The Melting Pot, Load Street	Roadside	378590	275302	NO_2	N	0	3	N
B1	Adam & Eves, Load Street	Roadside	378513	275317	NO_2	N	0	1	N

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

Table A.4 – Annual Mean NO_2 Monitoring Results for Kidderminster

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
23HF	Roadside	Diffusion Tube	100	100	32.0	30.4	**45**	36.6	34.8
HF(K)	Roadside	Diffusion Tube	100	100	**64.0**	**55.2**	**74**	**61**	**56.4**
HF(K)(F)	Roadside	Diffusion Tube	83	83	**67.9**	**64.7**	**76.4**	**60**	**61.2**
K4	Roadside	Diffusion Tube	100	100	-	-	-	28.1	27.6
K1	Roadside	Diffusion Tube	100	100	-	-	-	26.8	25.2
(F)69COV	Roadside	Diffusion Tube	100	100	**48.0**	**43.4**	**58**	**50.4**	**49.2**
K3	Roadside	Diffusion Tube	92	92	-	-	-	39.3	32.9
K2	Roadside	Diffusion Tube	100	100	-	-	-	26.6	24.0
SBR121	Roadside	Diffusion Tube	100	100	30.4	30.1	36	31.5	33.6
CSLOC	Roadside	Diffusion Tube	100	100	35.0	29.8	**41**	35.5	35.0
CAS1	Roadside	Diffusion Tube	92	92	-	-	-	-	**40.6**
(F)SGC	Roadside	Diffusion Tube	92	92	30.5	26.1	38	33.9	30.8
TCH	Roadside	Diffusion Tube	67	67	**43.2**	**43.9**	**52**	39.9	38.5
(F)COMR(K)	Roadside	Diffusion Tube	83	83	36.7	32.0	**43**	38.2	35.7
SP(K)	Urban Background	Diffusion Tube	100	100	14.8	11.0	17	15.3	12.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
(F)447S	Roadside	Diffusion Tube	100	100	-	-	32	26.9	26.6
SR(K)	Roadside	Diffusion Tube	100	100	36.5	37.2	**54**	36.9	31.9
SPR2	Roadside	Diffusion Tube	92	92	32.6	33.3	39	39.9	33.9
SRLEC	Roadside	Diffusion Tube	100	100	35.9	29.0	**41**	37.7	34.8
BH166	Roadside	Diffusion Tube	100	100	29.8	24.3	35	35.6	27.7
(F)BR(K)	Roadside	Diffusion Tube	100	100	32.0	29.9	39	34.1	30.9
HAB203	Roadside	Diffusion Tube	100	100	32.7	27.4	**40**	35.1	31.9
JAK	Roadside	Diffusion Tube	100	100	29.8	31.0	**40**	36.1	34.5
EXS	Roadside	Diffusion Tube	100	100	31.2	28.5	**40**	36.1	33.3

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence of the NO_2 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 LAQM.TG (16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.5 – Annual Mean NO_2 Monitoring Results for Stourport-on-Severn

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
MR71(S)	Roadside	Diffusion Tube	100	100	30.2	26.3	36	29.3	26.6
(F)GIL	Roadside	Diffusion Tube	100	100	26.6	25.2	31	28.3	27.6
(F)MS	Roadside	Diffusion Tube	100	100	22.0	19.9	30	27	29.4
HS(S)	Roadside	Diffusion Tube	75	75	38.6	33.2	**45**	37.7	36.9
KSW(S)	Roadside	Diffusion Tube	92	92	32.6	28.8	38	33.9	30.8
HS15(S)	Roadside	Diffusion Tube	100	100	32.4	29.9	39	32.9	30.4
HS4(S)	Roadside	Diffusion Tube	83	83	33.7	28.1	37	33.7	32.1
BH(S)	Roadside	Diffusion Tube	83	83	27.8	24.8	30	28.9	25.2
A1/A2/A3	Roadside	Diffusion Tube	83	83	37.1	33.7	**46**	39.7	38.4
(F)19YS(S)	Roadside	Diffusion Tube	100	100	-	-	33	27.3	28.6
(F)25YS(S)	Roadside	Diffusion Tube	100	100	-	-	39	37.9	32.7
(F)14NS(S)	Roadside	Diffusion Tube	100	100	-	-	26	22.7	21.7
(F)LSNS(S)	Roadside	Diffusion Tube	83	83	-	-	34	31	29.8
(F)FBS(S)	Roadside	Diffusion Tube	83	83	-	-	**47**	37	35.3

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**. NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence of the NO_2 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 LAQM.TG (16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – Annual Mean NO_2 Monitoring Results for Bewdley

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
KID22(B)	Roadside	Diffusion Tube	100	100	33.7	36.4	**43**	35.9	35.0
WG(B)	Roadside	Diffusion Tube	100	100	**46.4**	**43.1**	**59**	**50.9**	**44.2**
(F)WG42	Roadside	Diffusion Tube	100	100	30.1	27.7	37	31	28.7
HS(B)	Roadside	Diffusion Tube	100	100	32.2	27.1	33	28.9	35.0
LS(B)	Roadside	Diffusion Tube	100	100	35.1	28.8	**40**	38.2	35.7
B1	Roadside	Diffusion Tube	100	100	-	-	-	37.8	35.0

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence of the NO_2 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 LAQM.TG (16) 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 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results for Kidderminster- 2015

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 (1)
23HF	41.47	43.20	43.03	34.76	29.28	36.36	40.27	41.56	43.95	52.79	32.62	40.73	40.0	34.80
HF(K)	88.65	86.84	78.75	60.59	66.43	69.84	81.80	73.03	78.31	81.27	39.27	71.80	73.0	**63.55**
HF(K)(F)	89.74	-	-	72.15	73.92	73.05	87.60	80.01	80.25	94.08	75.00	68.88	79.5	**69.14**
K4	32.35	40.97	34.96	22.38	22.20	24.25	28.38	33.05	28.04	31.71	42.79	39.92	31.7	27.62
K1	37.50	36.46	33.74	23.32	21.82	20.26	22.22	27.41	27.58	30.43	32.34	34.03	28.9	25.17
(F)69COV	60.42	61.62	62.17	53.69	55.95	53.30	55.53	59.88	54.60	43.05	58.64	59.51	56.5	**49.18**
K3	47.56	40.21	37.16	38.54	30.15	28.02	34.47	39.27	45.62	-	40.66	34.23	37.8	32.89
K2	31.73	34.17	31.54	24.88	21.70	20.26	20.69	28.06	28.27	32.54	27.72	29.14	27.6	23.98
SBR121	42.33	44.21	41.80	32.00	30.85	32.48	40.39	39.86	39.50	47.00	38.86	34.43	38.6	33.62
CSLOC	47.32	50.82	43.51	37.77	37.88	31.91	35.18	36.51	36.81	42.98	43.76	37.91	40.2	34.97
CAS1	56.73	-	59.09	41.95	-	44.74	44.17	47.72	46.52	55.47	47.64	55.43	49.9	**43.45**

(1) See Appendix C for details on bias adjustment

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 (1)
(F)SGC	39.29	42.31	43.09	31.65	30.91	31.03	27.25	35.62	34.30	-	35.21	38.16	35.3	30.75
TCH	70.32	-	47.91	52.38	49.40	43.55	41.75	-	-	-	52.82	44.76	50.4	**43.81**
(F)COMR(K)	-	50.62	49.87	36.95	38.12	36.20	35.48	-	37.50	47.25	39.92	38.36	41.0	35.69
SP(K)	21.20	20.04	18.78	14.45	8.24	9.03	7.91	13.68	15.05	20.30	13.99	14.14	14.7	12.82
(F)447S	39.21	35.45	35.70	28.41	24.77	24.76	22.28	29.47	29.55	41.07	29.25	26.68	30.6	26.58
SR(K)	43.89	54.93	59.15	54.20	36.11	41.43	36.54	42.03	46.61	65.62	44.64	42.74	47.3	**41.17**
SPR2	42.25	48.39	45.71	36.60	32.51	30.61	34.47	38.80	35.76	-	40.34	43.29	39.0	33.91
SRLEC	47.17	45.98	50.97	38.30	38.29	33.61	37.07	38.45	34.34	42.66	37.56	35.69	40.0	34.81
BH166	34.92	37.74	35.82	32.89	25.78	24.45	23.41	33.64	27.23	38.91	32.53	34.83	31.8	27.70
(F)BR(K)	41.94	47.13	41.07	32.65	28.27	29.47	30.57	38.10	22.68	43.49	35.12	35.69	35.5	30.90
HAB203	48.80	45.16	48.71	38.24	30.34	36.82	24.12	38.39	37.47	22.50	35.76	33.83	36.7	31.91
JAK	60.03	44.08	46.63	35.71	28.61	29.89	30.92	38.68	40.31	48.77	37.29	35.24	39.7	34.52
EXS	47.48	46.50	44.25	35.77	32.21	28.73	29.44	36.04	29.98	42.35	44.45	42.99	38.4	33.36

(1) See Appendix C for details on bias adjustment

Table B.2 – NO_2 Monthly Diffusion Tube Results for Stourport-on-Severn - 2015

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 (1)
MR71(S)	36.24	38.88	34.95	23.64	24.18	25.18	27.47	28.18	28.38	34.32	40.48	24.91	30.6	26.59
(F)GIL	42.80	38.94	34.53	27.53	22.94	21.56	25.63	29.59	32.50	42.28	36.13	26.68	31.8	27.63
(F)MS	41.08	37.10	36.24	34.12	30.26	32.06	27.47	32.76	33.30	41.65	31.33	28.54	33.8	29.43
HS(S)	39.91	43.83	44.56	36.83	-	-	35.53	-	40.62	48.91	45.24	45.81	42.4	36.85
KSW(S)	30.15	39.77	39.18	34.95	28.27	-	31.81	35.16	37.89	43.56	31.19	37.10	35.4	30.77
HS15(S)	39.60	39.77	38.44	30.29	30.51	27.77	32.58	34.11	38.04	42.28	34.14	31.36	34.9	30.37
HS4(S)	40.38	41.86	35.63	31.12	32.34	-	34.94	35.87	-	40.18	39.27	36.95	36.9	32.06
BH(S)	30.69	33.28	31.77	23.70	22.20	-	22.61	25.71	31.22	36.93	-	31.11	28.9	25.16
A1	49.36	47.52	51.53	46.49	41.13	47.90	40.86	45.44	43.67	48.46	-	-	46.2	**40.22**
A2	47.72	46.06	50.74	44.96	43.02	48.57	41.75	43.97	42.44	48.72	-	-	45.8	39.84
A3	48.74	48.47	49.45	43.37	40.95	47.54	44.06	50.48	43.43	49.93	-	-	46.6	**40.58**
(F)19YS(S)	38.90	38.88	37.22	30.06	27.67	28.23	32.45	30.11	32.55	40.75	33.45	23.81	32.8	28.57
(F)25YS(S)	49.60	44.91	41.32	34.65	32.63	33.46	45.19	41.21	40.40	79.04	30.08	74.06	45.5	39.62
(F)14NS(S)	57.80	54.12	55.63	41.72	45.49	-	46.66	43.20	49.73	61.71	20.05	-	47.6	**41.42**

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 (1)
(F)LSNS(S)	32.27	36.59	36.25	30.75	26.51	-	32.16	-	31.45	39.42	42.93	34.08	34.2	29.79
(F)FBS(S)	57.80	54.12	55.63	41.72	45.49	-	46.66	43.20	49.73	61.71	20.05	-	47.6	**41.42**

(1) See Appendix C for details on bias adjustment

Table B.3 – NO_2 Monthly Diffusion Tube Results for Bewdley - 2015

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 (1)
KID22(B)	41.32	43.13	44.19	38.30	35.70	37.39	31.97	44.44	37.94	42.99	42.65	42.34	40.2	34.97
(F)WG42	25.85	39.19	38.81	28.76	30.68	29.32	27.79	35.34	37.18	39.16	32.94	30.81	33.0	28.70
WG(B)	34.99	50.82	53.49	50.20	46.39	45.00	46.66	61.05	52.66	59.90	50.78	58.30	50.9	**44.24**
HS(B)	42.72	42.31	41.50	37.89	34.04	32.99	34.77	44.20	40.45	46.69	39.09	45.86	40.2	34.98
LS(B)	40.69	44.59	45.84	40.89	36.23	37.70	35.89	38.22	43.57	52.50	39.09	36.40	41.0	35.64
B1	41.32	43.13	44.19	38.30	35.70	37.39	31.97	44.44	37.94	42.99	42.65	42.34	40.2	34.97

(1) See Appendix C for details on bias adjustment

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

QA/QC Data

Factor from Local Co-location Studies (if available)

No local co-location studies for nitrogen dioxide have been undertaken in 2015.

Diffusion Tube Bias Adjustment Factors

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.

The bias adjustment factor applied to the results in 2015 was 0.87 (Spreadsheet Version No. 03/15) which were derived from the national studies.

QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2015.

QA/QC of Diffusion Tube Monitoring

Under the WASP Scheme Somerset Scientific Services performed 100% satisfactory for all periods in 2015. Tube precision was generally ‘Good’ throughout 2015

Short-term to Long-term Data Adjustment

Only 8 months of data was recorded for TCH – Top of Comberton Hill and this data has been annualised in accordance with Technical Guidance LAQM TG(16) as shown in Table C.1 below.

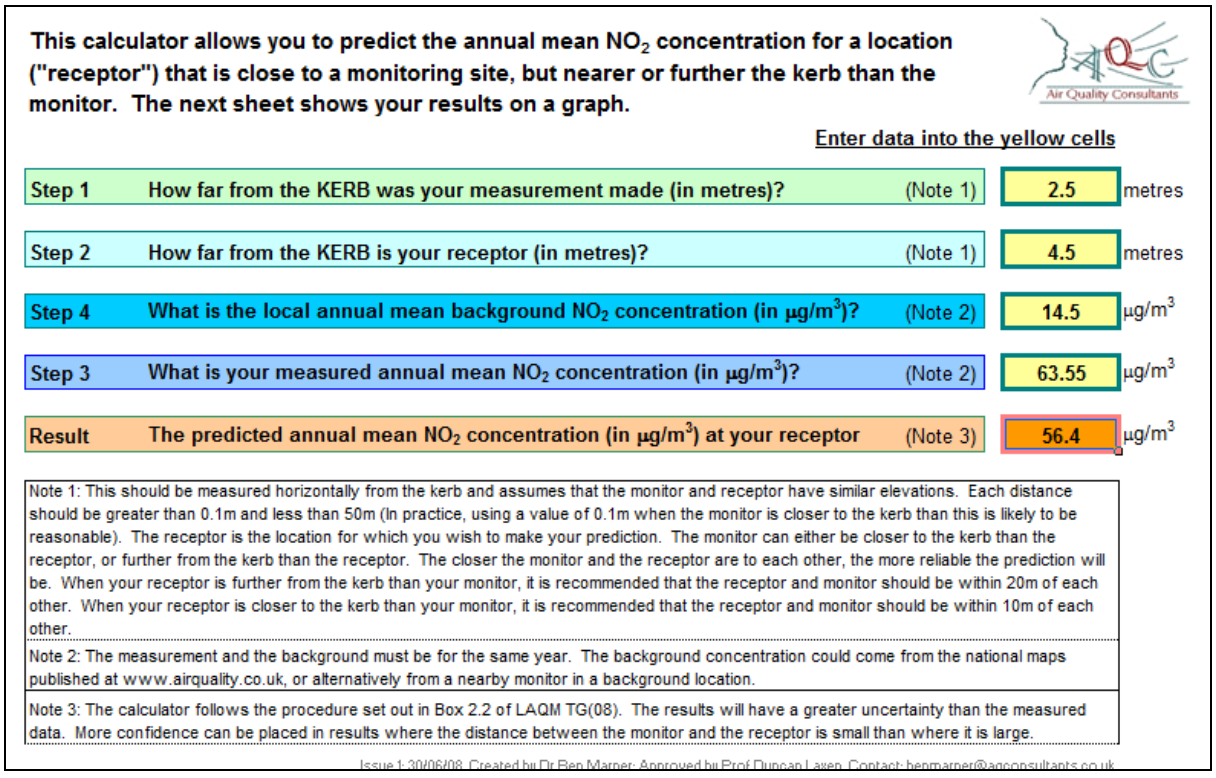
Table C.1 - Annualisation calculation for TCH - Top of Comberton Hill

Site	Site Type	Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	Background Urban	19	16.9	1.12
Birmingham Tyburn	Background Urban	30	27.9	1.07
Leominster	Suburban Background	8	7.1	1.12
Leamington Spa Rugby Road	Urban Traffic	20	18.4	1.08
			Average	1.10
			TCH Result	43.81
			TCH Annualised	**48.19**

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.1 to C.8 below.

Figure C.1 – HF(K) - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 4	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	14.5	µg/m^3
Step 3	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	63.55	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	56.4	µg/m^3

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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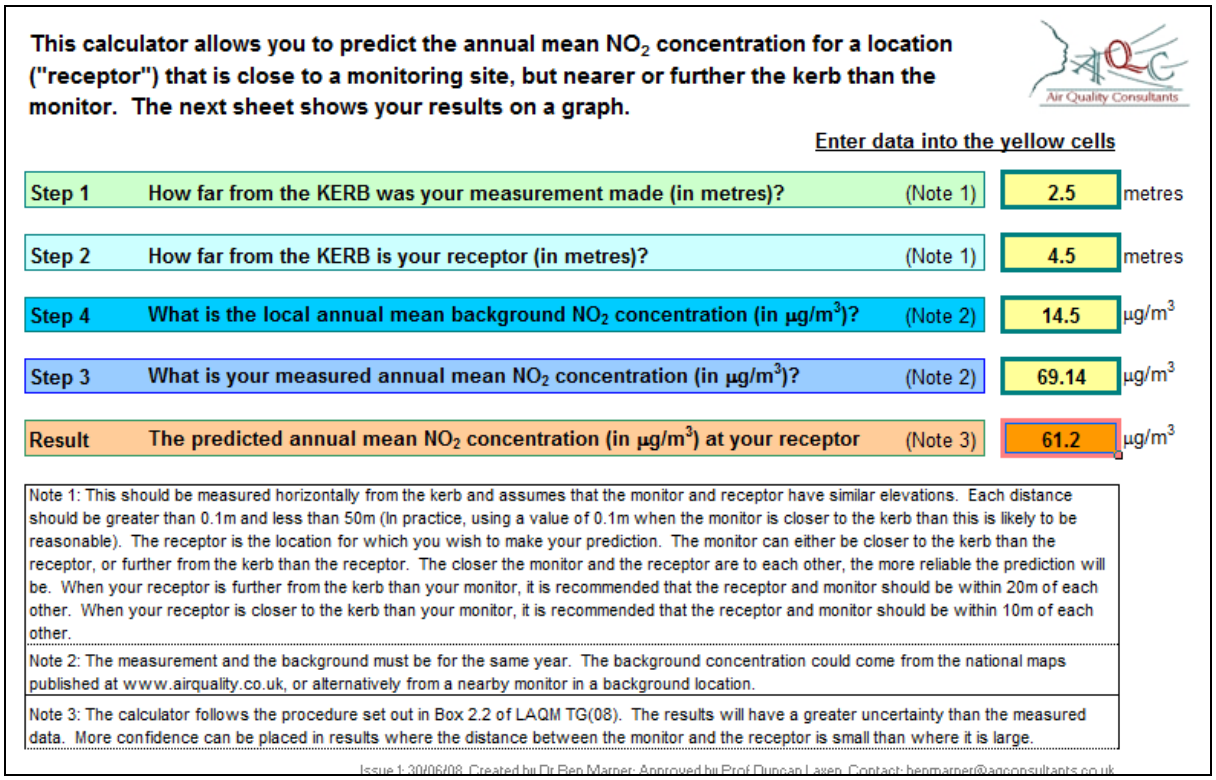
Figure C.2 – HF(K)(F) - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 4	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	14.5	$\mu g/m^3$
Step 3	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	69.14	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	61.2	$\mu g/m^3$

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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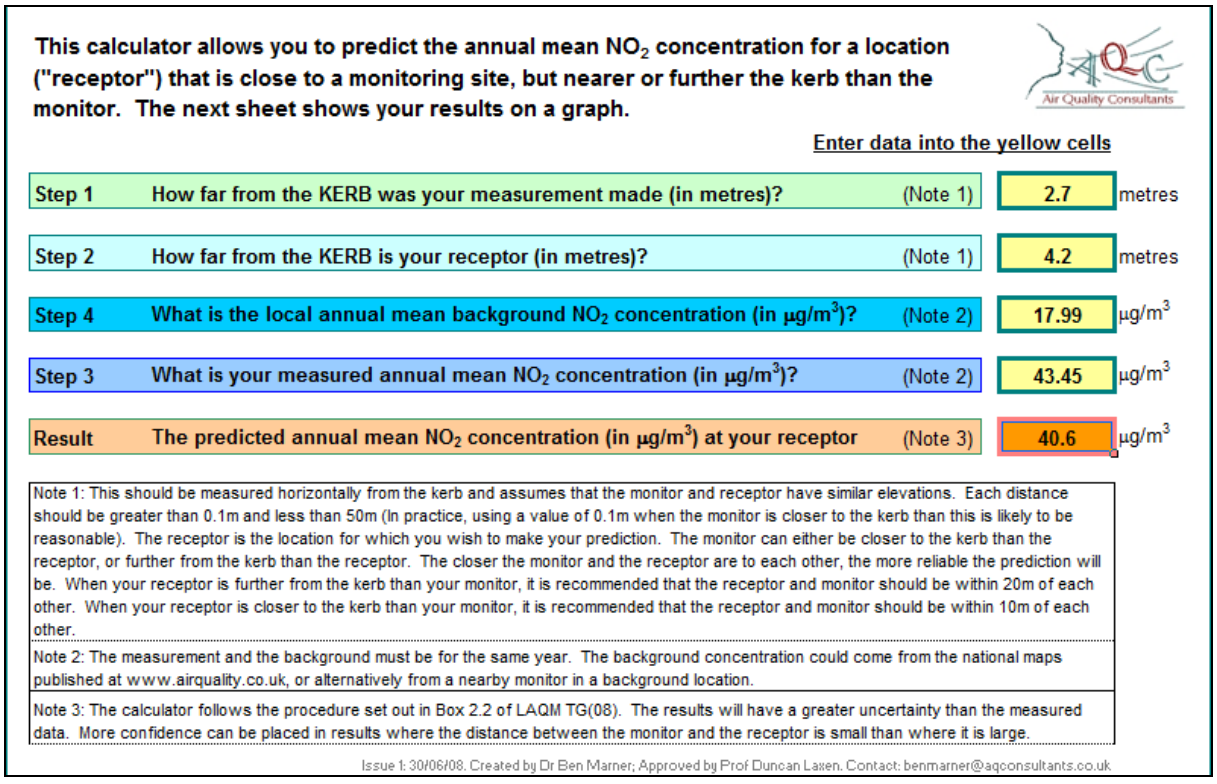
Figure C.3 – CAS1 - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2.7	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.2	metres
Step 4	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	17.99	$\mu g/m^3$
Step 3	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	43.45	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	40.6	$\mu g/m^3$

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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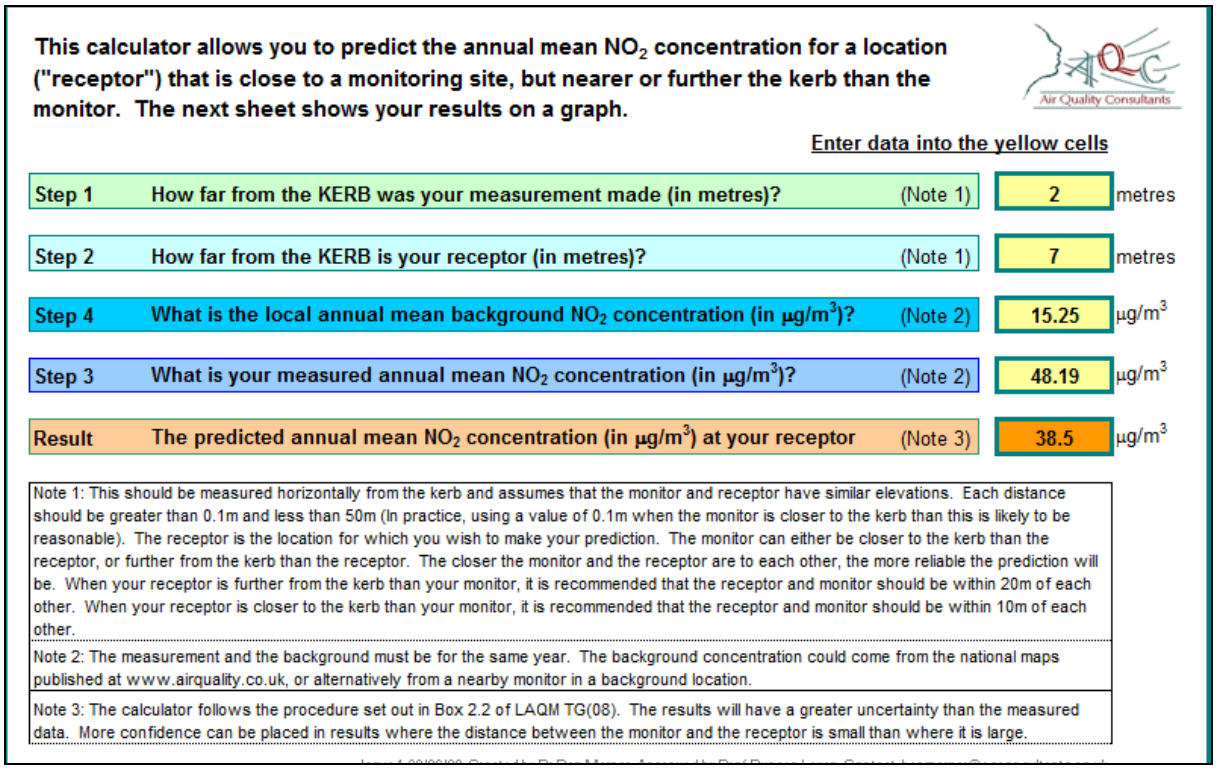
Figure C.4 – TCH - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

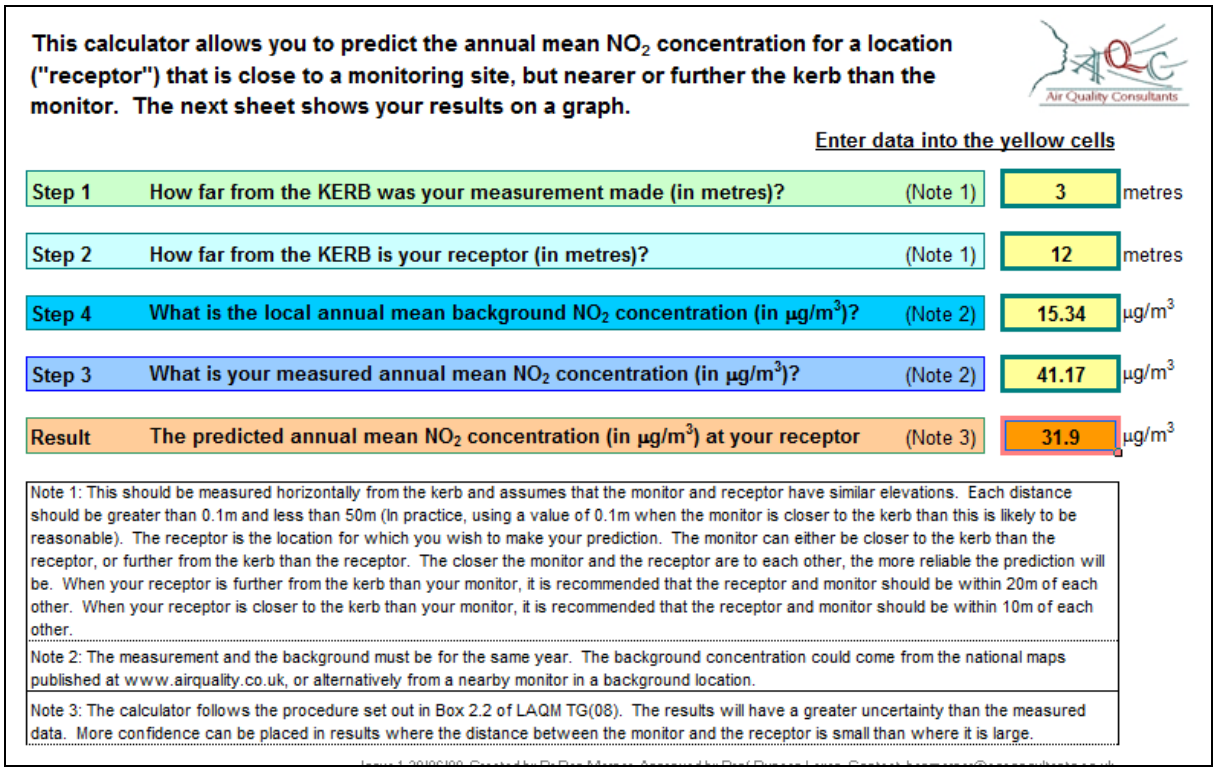
Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	7	metres
Step 4	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	15.25	µg/m^3
Step 3	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	48.19	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	38.5	µg/m^3

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Figure C.5 – SR(K) - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

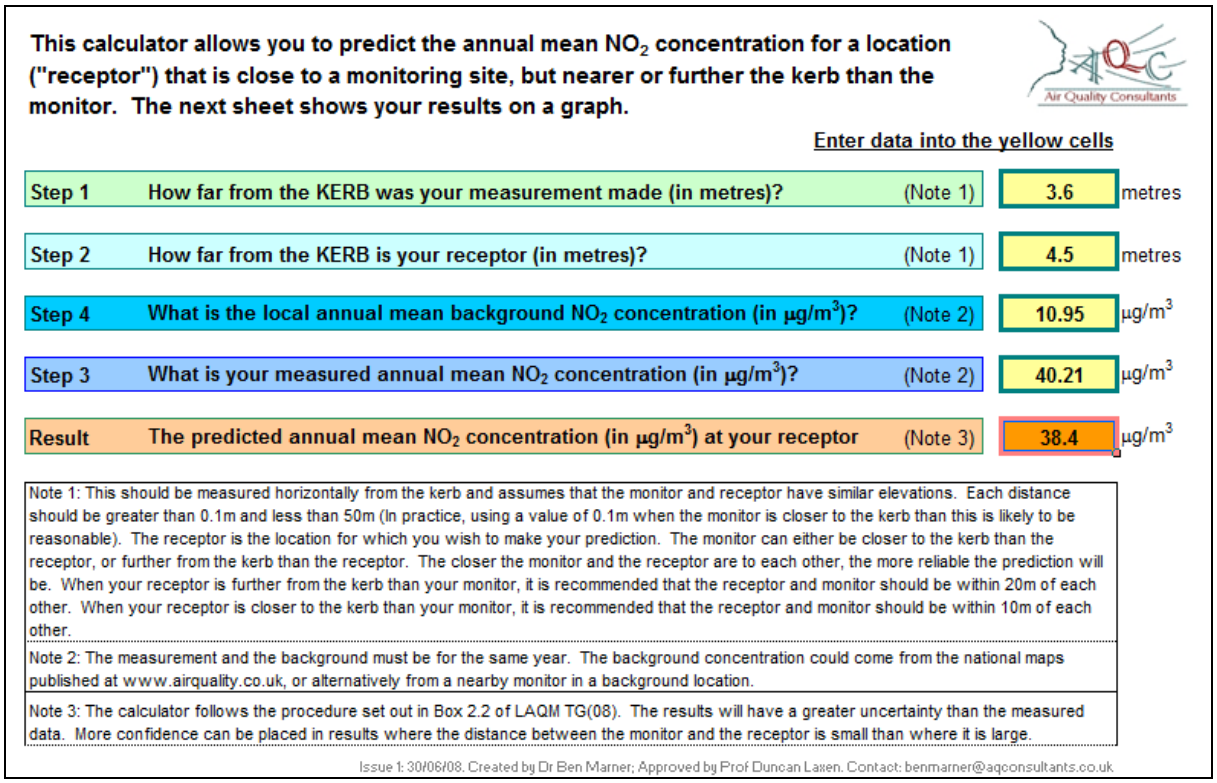
Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	12	metres
Step 4	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	15.34	µg/m^3
Step 3	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	41.17	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	31.9	µg/m^3

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Figure C.6 – A1/2/3 - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	3.6	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 4	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	10.95	µg/m^3
Step 3	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	40.21	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	38.4	µg/m^3

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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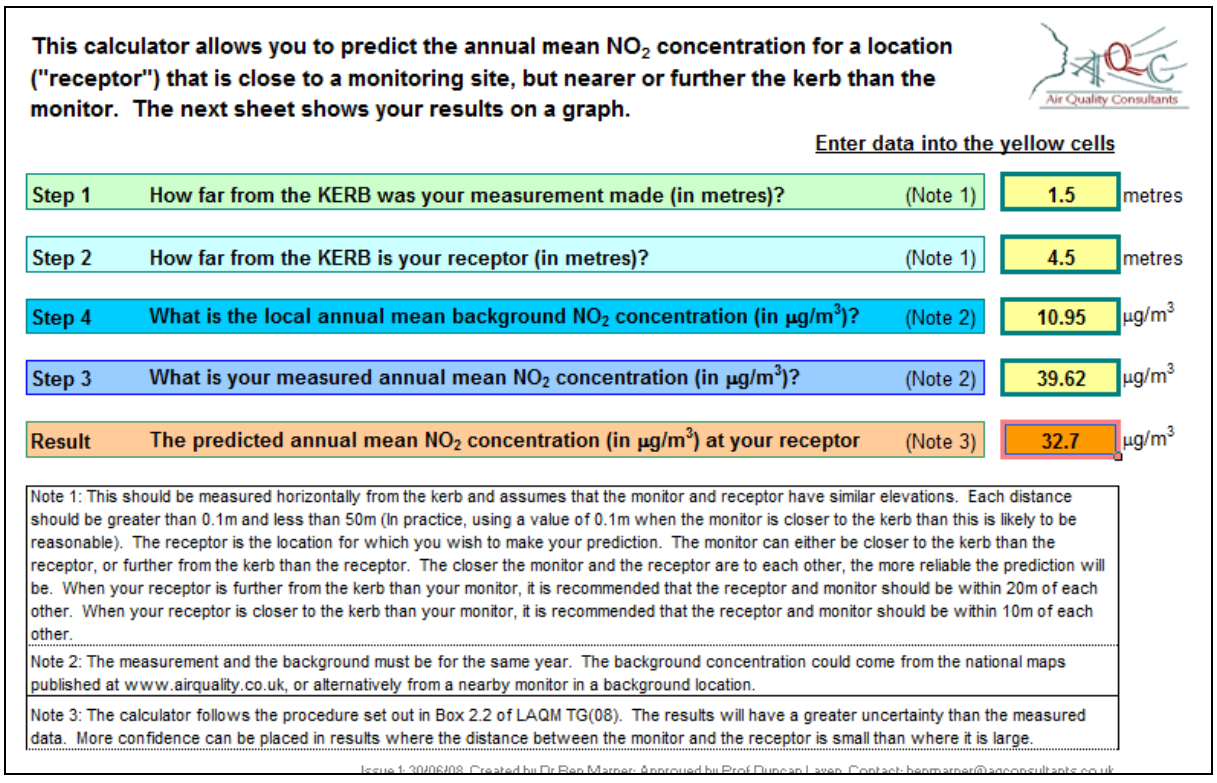
Figure C.7 – F)25YS(S) - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 4	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	10.95	µg/m^3
Step 3	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	39.62	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	32.7	µg/m^3

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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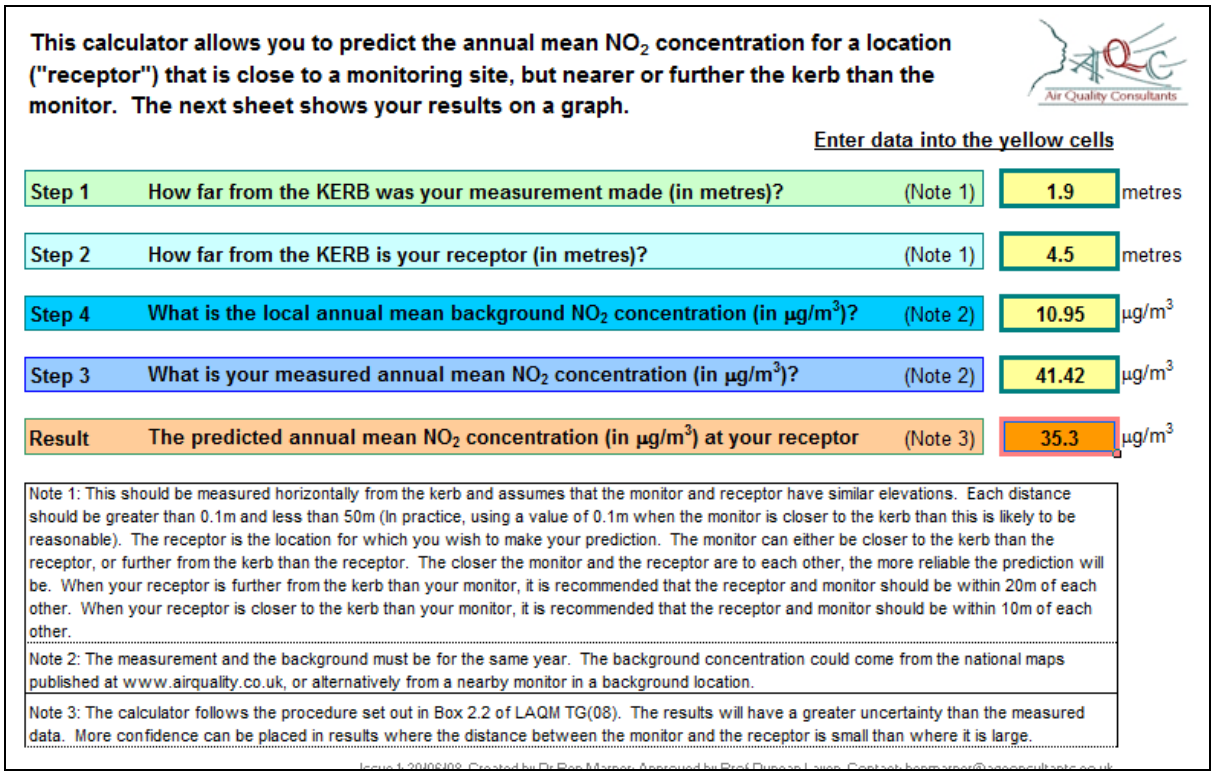
Figure C.8 – (F)FBS(S) - Distance from road to relevant exposure calculation



This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality Consultants

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.9	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 4	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	10.95	µg/m^3
Step 3	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	41.42	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	35.3	µg/m^3

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.2 of LAQM TG(08). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Appendix D: Maps of Monitoring Locations

Figure D.1 North East of Kidderminster Town Centre

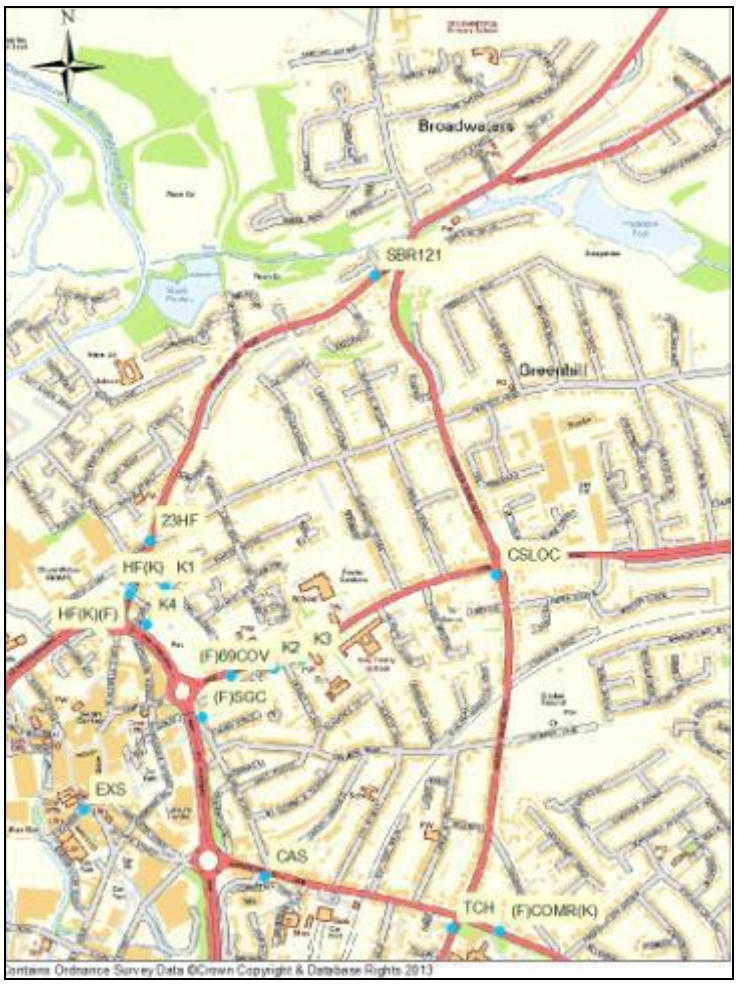


Figure D.2 Blakebrook and Foley Park Areas of Kidderminster

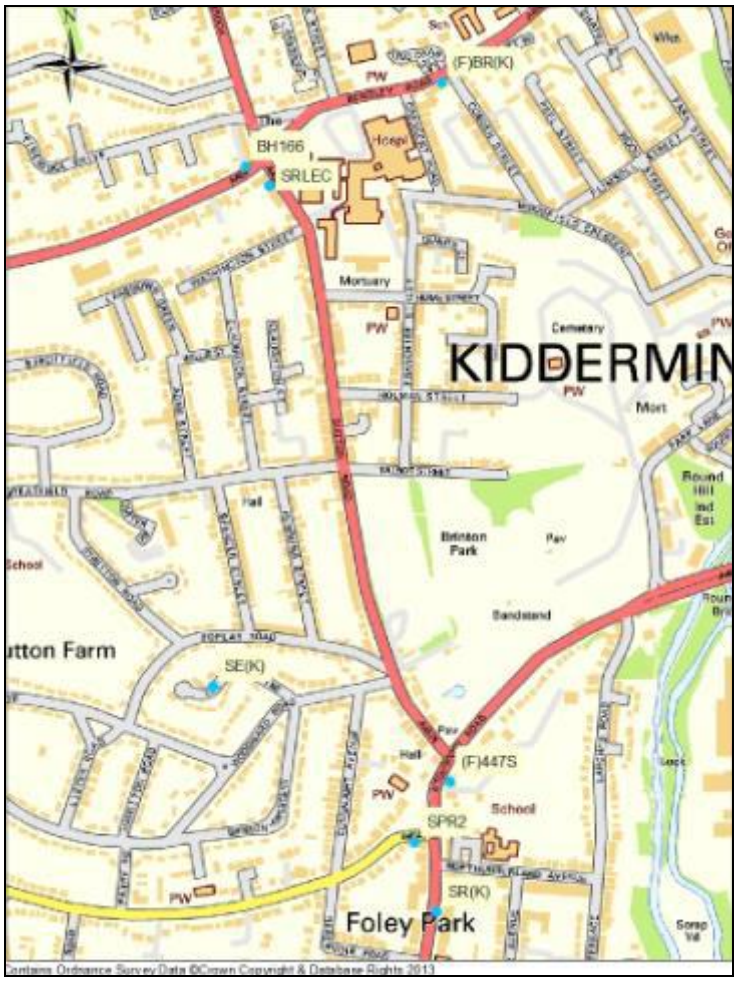


Figure D.3 Franche Area of Kidderminster

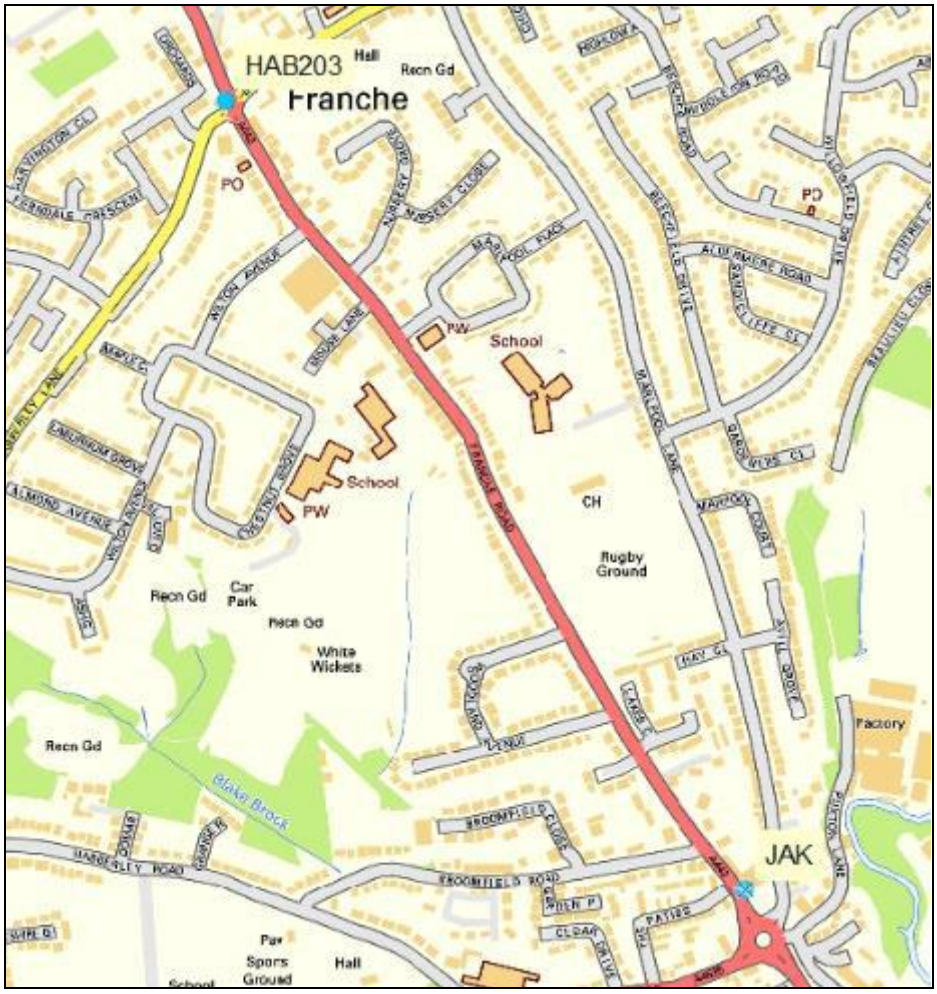


Figure D.4 Spennells Area of Kidderminster (Urban Background)

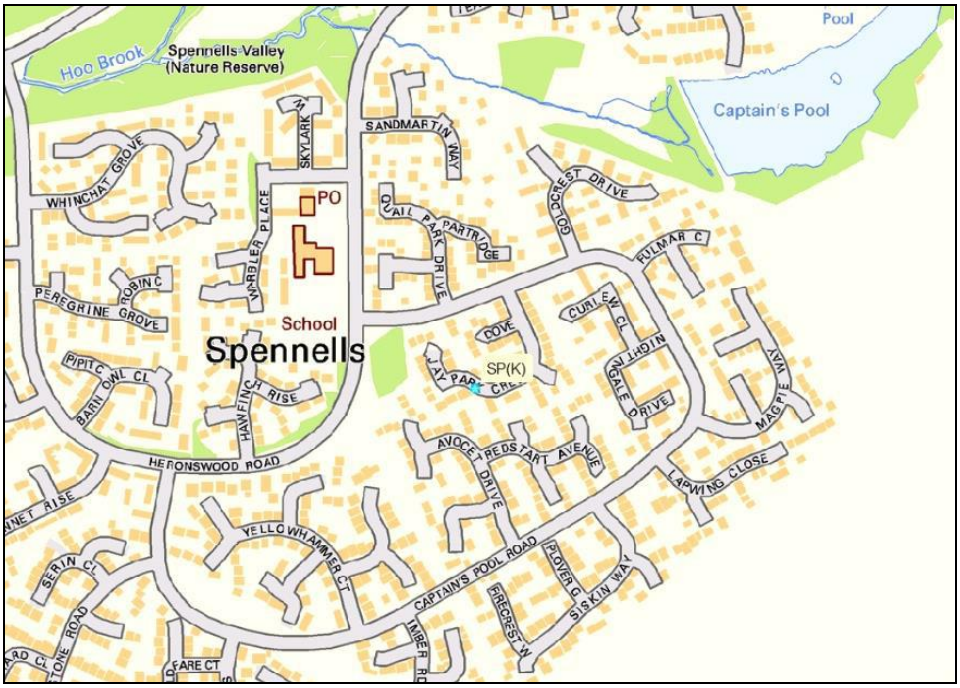


Figure D.5 Stourport-on-Severn

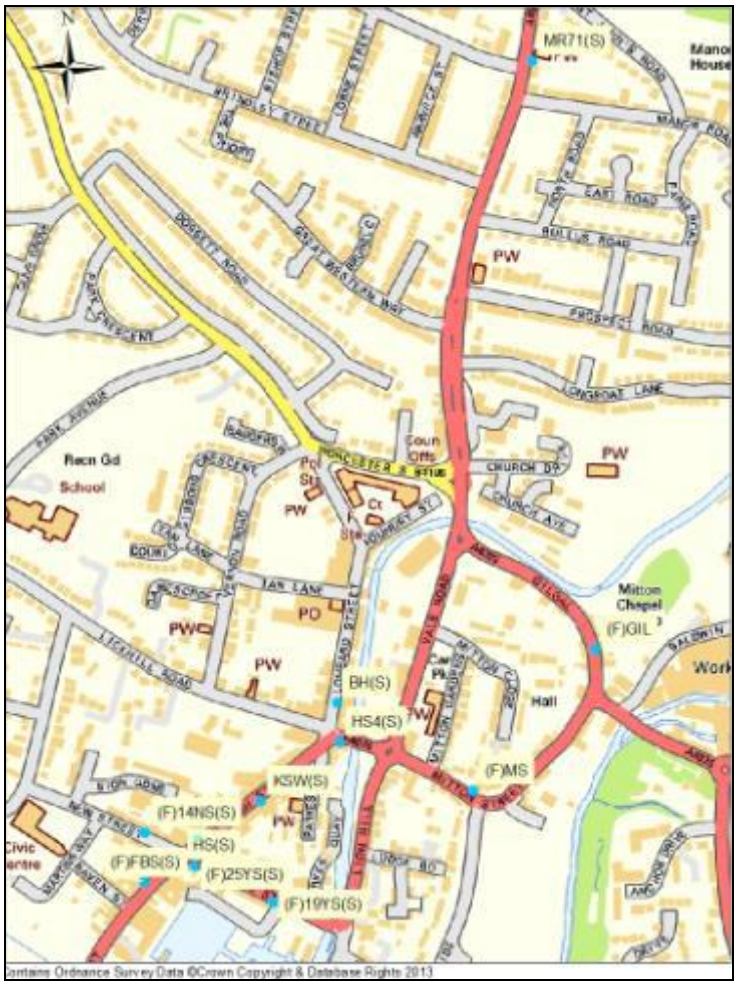
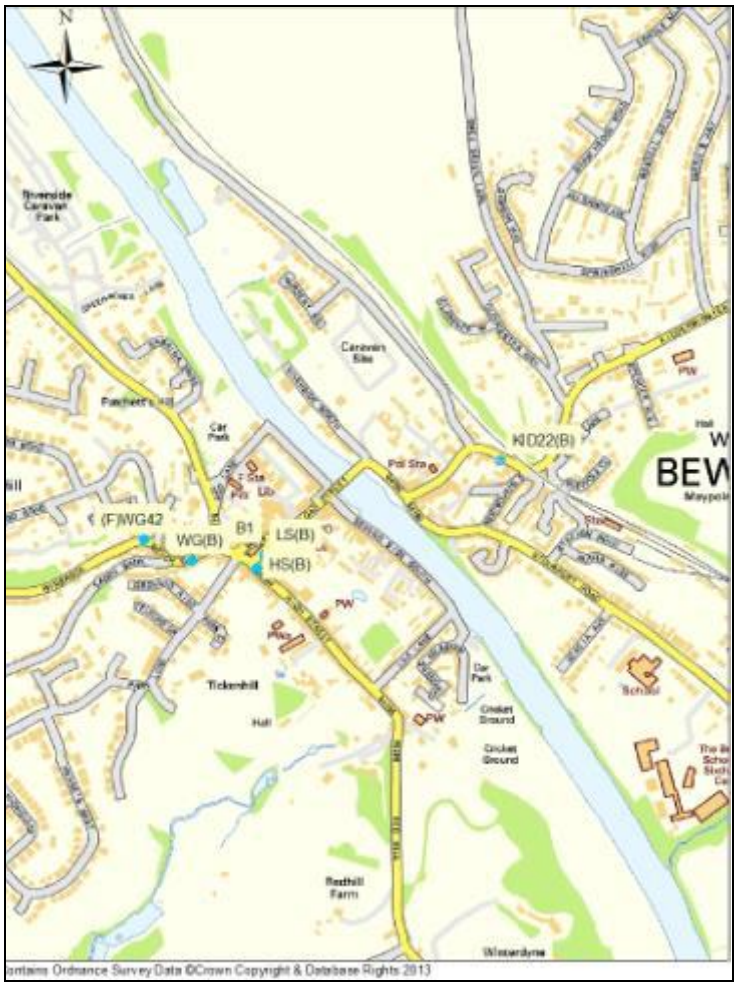


Figure D.6 Bewdley



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/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	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 (2015) 'National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/15'

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 (2015) Air Quality Updating and Screening Assessment for Wyre Forest District Council

8. Wyre Forest District Council (2011) Churchfields Masterplan Supplementary Planning Document