2016 Air Quality Annual Status Report (ASR)

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

May 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Herefordshire

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 billion[3].

Air quality is generally good within Herefordshire, however, two areas have been identified as Air Quality Management Areas (AQMA's) due to high levels of nitrogen dioxide (from vehicle emissions) exceeding national standards. These two areas are the A49 road corridor through Hereford City and the area of Bargates road junction in central Leominster.

This annual status report considers all new monitoring data and assesses the data against the national Air Quality Objectives (AQO). It also considers any major changes in the County that may have an impact on air quality and reports on progress of measures to improve air quality. The report outlines Herefordshire Council's approach to reducing levels /emissions of fine particulates ($PM_{2.5}$) in line with the updated requirement in Air Quality guidance and includes additional actions to review poultry Farms and $PM_{10's}$.

Recent monitoring has shown that nitrogen dioxide levels have generally fallen over the last 5 years (with the exception of 2013[4]) in both AQMA's. The Hereford AQMA has recorded levels below the national objective level of 40 µg/m^3 at all sites within the AQMA in 2015. However, Leominster AQMA is still exceeding the objective level at Bargates with an NO_2 level of 42.9 µg/m^3.

Monitoring will continue in the two AQMA's to assess whether the downward trend in NO_2 continues. Currently, it is considered too early to make any decisions regarding

[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
[4] 2013 data was omitted from the trend analysis due to collection of only 8 month of data.

revocation of the Hereford AQMA as the Council needs to be confident that no further breach of the Air Quality Objectives is likely.

Details of the AQMA can be found using this link

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=126

Actions to Improve Air Quality

Bargates Air Quality Action Plan

The Bargates Air Quality Action plan was published in 2014. Action 1 was to improve the traffic light sequencing at the Bargates junction. A report was commissioned in 2015 to review the best options for the junction arrangement to improve. The findings of the report were to upgrade the pedestrian crossing and road surfacing and to install a MOVA' (Microprocessor Optimised Vehicle Actuation) traffic management system. The MOVA system which will increase the capacity at the junction and help to disperse queues more effectively. A result of this could be a reduction in emissions created from idling vehicles at the traffic lights. This work commenced in September 2016 and has now been completed. Monitoring data will be reviewed in 2017 to see if there is any improvement in the NO_2 levels.

City Link Road - Hereford

Construction work commenced on the City link road in 2015 and it is anticipated that the work will be completed in November 2017. The road will enable access to brownfield land for new affordable housing and regeneration in the centre of Hereford. The new Link Road will connect Edgar Street to the west and Commercial Road to the east (with a spur linking Blackfriars Street to the south), and assist in reducing traffic within the core of the city along part of the AQMA. Newmarket Street, Blueschool Street and Commercial Square will be re-designed to become safe and attractive routes for pedestrians and cyclists, with improved public transport facilities[5].

[5] Herefordshire Local Plan Core Strategy 2011-2031, Herefordshire Council, Adopted 2015

Southern Link Road and South Wye Transport Package

The Southern Link Road planning application was submitted in May 2015 and given permission in July 2016. This road will aim to reduce congestion on Belmont Road and provide improved access to the Enterprise Zone at Rotherwas[6]. This action was identified in the Hereford Air Quality Action Plan. The Southern Link Road forms part of the South Wye Package along with a range of active travel measures. Funding has been secured for this work.

Destination Hereford

Herefordshire Council was awarded £4.97 million from the Local Sustainable Transport Fund (LSTF) for the very successful Destination Hereford project from 2011 to 2015. The aim of the project was to reduce congestion and help improve journey choices. Below are just some examples of the projects undertaken in 2015:

- Bikeability Cycle training for pupils
- Park and Choose scheme
- Expansion of the Travel for Work scheme
- Junction Improvements
- Cycle Lanes, including a shared use path on Holme Lacy Road. Uphill cycle lanes on Aylestone Hill, a new Ramp and shared use path by Riverside Primary School.
- Safety Improvements.

A further bid was successful in 2016 with £419,000 of funding from the Department of Transport (DfT) Transition Fund to deliver a one year programme of walking and cycling promotions across the county in 2016/17.

Herefordshire Council is a Unitary Authority which enables close working between the sections and teams which are involved with air quality, it' s causes and effects and mitigation measures. These include the Energy and Environmental Management

[6] Local Transport Plan 2016 – 2031 Strategy

team, Transportation team and Public Health. There is also close working with the Environment Agency through various mechanisms including permit consultations and a formal liaison group.

Local Priorities and Challenges

The Core Strategy was adopted in October 2015. The Core strategy is a key document in the Local Plan, which provides the strategic planning framework for the county's future development needs up to 2031. A number of major housing developments were identified to meet Herefordshire's housing need along with the need to ensure appropriate infrastructure such as the Hereford Relief Road and the Leominster Relief Road

The potential impact of these developments on air quality will need to be considered during the planning application stages.

Other Priories for Herefordshire include:

- Continue to monitor and review both the Hereford and Leominster AQMA's
- Identify and review other locations in the County that may benefit from additional monitoring considering identified sites in the core strategy.
- Review the Air Quality Action Plan for Herefordshire
- Review Poultry sites to see if they meet the screening criteria in Technical Guidance LAQM.TG16
- Short Term Operating Reserve (STOR) Planning Applications
- Comment on planning applications for major housing road schemes in relation to air quality
- Continue to inspect Local Authority Permitted installations

How to Get Involved

Herefordshire is sparsely populated with 186,100 (2013) residents scattered across 842 square miles. 95% of the Herefordshire is classified as rural and over half the population lives in these rural areas which presents challenges for sustainable transport. However, over half of all car journeys in Hereford at peak time are less

than 2 miles.[7] Therefore, there is scope to change the way we travel to help improve air quality, our health and reduce congestion in the City. By making short trips and journeys on foot or by bike instead of by car, or using public transport. Car sharing with colleagues, or with other parents on the school run, are some other examples of ways to reduce traffic congestion.

Other examples include:

- Purchasing low-emission electric and/or hybrid vehicles, with government funding and grants available.

- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NOx (and carbon) emissions.

The Choose how you move webpage https://www.herefordshire.gov.uk/info/200136/travel_and_transport/544/choose_how_you_move is a good place to find information on ways to travel sustainably and help to reduce vehicle emissions.

[7] Local Transport Plan 2016 – 2031 Strategy

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1 Local Air Quality Management

This report provides an overview of air quality in Herefordshire 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 Herefordshire 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 Herefordshire 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=126

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA Hereford	• NO_2 annual mean	Hereford	The A49(T) corridor in Hereford, extending from Holmer Road in the north to Belmont Road in the south and extending east along New Market/Blue School Street and west along Eign Street as far as Barton Yard.	Hereford Action Plan http://aqma.defra.gov.uk/action-plans/HC%20AQAP%202008.pdf
AQMA Bargates	NO_2 annual mean	Leominster	An area encompassing the junction between the A44 Bargates and B4361 Dishley Street/Cursneh Road in Leominster	Bargates Action Plan https://www.herefordshire.gov.uk/downloads/file/4823/bargates_air_quality_draft_action_plan

2.2 Progress and Impact of Measures to address Air Quality in Herefordshire

Herefordshire Council has taken forward a number of measures during the current reporting year of 2015 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 their respective Action Plans.

Key completed measures are:

- Bargates Draft Air Quality Action Plan was adopted
- Highways England made changes to the Starting Gate, Edgar Street and Asda roundabouts in 2015 to provide additional capacity for southbound traffic.

Herefordshire Council expects the following measures to be completed over the course of the next reporting year:

- Review of air monitoring locations, considering the proposed development locations in the Core Strategy. To assist in assessing potential air quality impact of any development.
- Review of Hereford Air Quality Action Plan – the Action Plan was published some time ago and a review is required.
- Commence review of Poultry sites now DEFRA has published a screening methodology within Policy Guidance LAQM.PG16 .

Table 2.2 – Progress on Measures to Improve Air Quality

Hereford Air Quality Action Plan

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
1	**Edgar Street Grid Re-development**	Traffic Management	Reduction of speed limits Strategic highways improvements	To re-locate the livestock market (and therefore its traffic) to an out of town location. To downgrade the inner ring road (Newmarket Street and Blue School Street).Construct new A49/Commercial road link road. Enhanced network for pedestrians and cyclists	Herefordshire Council (HC) & Advantage West Midlands formed ESG Herefordshire Ltd		2010 - 2025	Trends in diffusion tube results	Not Specified	Work has been completed on new livestock market site April 2014. Including flood alleviation work. Work has started on the link road 2015.	2025	NO_2 levels at the city centre sites have been gradually reducing since 2007, although this cannot be attributed to the actual re-development, as works have not yet been completed. NO_2 data to be reviewed once action is complete.

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
2	Improvement of A4103 road west of Herefordshire	Transport Planning & infrastructure	Other	Improvement of A4103 road west of Herefordshire between Three Elms and Stretton Sugwas. Widening of Road to 2 lanes with roundabout access at west to A438 Brecon Road (inc. Cycle Lane). Improve current signage to direct through traffic along route and by pass city centre	Herefordshire Council - Highways and Transportation		Jun-08		Not Specified	Road completed 2005 however signage still to be installed to indicate northern east-west bypass	Road completed 2005	Since 2007 NO_2 levels along the Roman Road have been below the objective. Annual Average Daily Flow trends (AADT) along the Roman Road indicate a continuing increase of traffic since the completion of the improved road and an increase in HGVs until 2008 with a slight reduction in 2009. Traffic data to be reviewed in future report.
3	Rotherwas Access Road Link	Transport Planning and Infra-structure	Other	Re-diect HGV's and some other traffic from the A49 and B4339 Holme Lacy	Herefordshire Council - Highways and Transportation		Jun-08	Annual Average Daily Flow trends (AADT) and diffusion tubes	Not Specified	Completed June 2008	Completed	Annual Average Daily Flow trends (AADT) show a reduction in the number of HGVs from 1045 in 2008 to 964 in 2009 however total motor vehicles has increased. Updated traffic data to be reviewed in future reports

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
4	**City Link Road Hereford**	Transport Planning and Infra-structure	Other	Construction of new road	Herefordshire Council – Highways and Transportation Service	2012-2014	2014-2017	Annual Average Daily Flow trends (AADT) and diffusion tubes	Not Specified	Construction work has commenced on the road	Construct by end of 2017	Not applicable until road constructed
5	New Outer Distributer road (3rd Link) Hereford Relief Road	Planning and infra-structure	other	Construction of new road	Herefordshire Council – Highways and Transportation Service	On-going	2016-2031	Annual Average Daily Flow trends (AADT) and diffusion tubes	-	The potential corridor for the road has been proposed in the Councils Draft Core Strategy	Construct by 2031	Not applicable until road constructed
6	Alteration of traffic management at the Belmont Round-about	Traffic man-agement	Other	Alteration of traffic management at the roundabout to improve access to new Asda superstore	Highway Agency		2005 - 2006	Diffusion tube at roundabout	Not Specified	Completed in 2006. New signals are now fully integrated into the Council's SCOOT system and the infrastructure improvements have greatly improved traffic movements	Complete d	The diffusion tube measurements at this roundabout were showing exceedances of the NO_2 objective in 2006 and 2007 although levels were falling. However, a noticeable reduction occurred in 2008 and 2009, to a level well below the objective level.

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
7	"North & South" Park and ride Scheme in Hereford	Alternatives to private car use	Bus based park and ride	Plans for park and ride are currently being developed in an innovative dispersed manner around the radial routes in and our of Hereford city.	Herefordshire Council – Highways and Transportation Service		Timescales are currently undecided	Annual Average Daily Flow trends (AADT) and diffusion tubes	N/A	No longer being taken forward	-	-
8	Parking Strategy in Hereford to reduce commuter parking	Traffic manage-ment	Other	Zonal charging system to deter long stay parking in the central area	Herefordshire Council – Highways and Transportation Service and Planning Services			Annual Average Daily Flow trends (AADT) and diffusion tubes	N/A	No longer being taken forward. Alternative parking strategy in place	-	-
9	Improve and increase number of cycle routes and facilities in Hereford	Transport Planning & Infra-structure	Cycle Network	To encourage motorists to transfer to cycling as their commuter/ shopper/ leisure trip travel mode	Herefordshire Council – Highways and Transportation Service		Ongoing	Diffusion tubes	Not specified.	1.5km of the Great Western Way was completed in 2008 along with a cycle lane along Aylestone Hill. Connect 2 Rotherwas Cycle Link completed.	Rotherwas Cycle Link currently in progress – Completed Dec 2013	NO_2 levels at the city centre sites have been gradually reducing since 2007

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
10	City Centre Pedestrian Enhance-ment in Hereford	Traffic Manage-ment	Strategic Highway improvements	Experimental 10.30 – 4.30pm pedestrianisation of Widemarsh Street and High Street	Herefordshire Council – Highways and Transportation Service		2005	Diffusion tubes at Wide-marsh Street, Broad Street and Edgar Street sites	Not specified	Completed in 2006	Completed in 2006	NO_2 levels at Site 6 (Broad Street) and Site 59 (Elgars, Widemarsh St) have remained at or below 75% of the objective for the last 5 year trend, following the introduction of the scheme. Sites 12, 13 and 14 (Edgar Street) are no longer monitored.
11	Behavioural Change Programme	Promoting Travel Alternatives	Other	Ongoing programme of promotions and initiatives in place and practical measures to support behaviour change	Herefordshire Council – Highways and Transportation Service	On-going	On-going	Diffusion tubes	Not specified	Ongoing programme of promotions and initiatives. Examples include Bike ability Training and the promotion of TwoShare, Destination Herefordshire	Ongoing	NO_2 levels throughout the county have fallen in 2009 and the majority of AADT flows are less in 2009 than in 2008. Recent air quality & traffic data to be reviewed in future reports.

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
12	Desig-nation of a Traffic manager for network management Duties along the A49 in Hereford	Traffic manage-ment	Other	To improve road working liaison and notification procedure between Highway Agency and contractors on A49	Highway Agency and Hereford-shire Council			Diffusion tubes along A49 corridor	Not specified	Completed 2008	Complete d 2008	NO_2 levels at the sites along the A49 have been gradually reducing since 2007. Recent air quality data to be reviewed.
13	Continue to implement Vehicle Emission Testing in Hereford		Testing Vehicle emissions	Random vehicle emission testing in the Hereford AQMA with Vehicle & Operators Services Agency (VOSA)	District Council – Environmenta l Health and Trading Standards		Annua lly from 2000	Review of project dependant upon number of vehicles failing.	Not specified	Commenced in 2000 and was carried out every year until 2007. A dramatic continual improvement in exhaust emissions with the Hereford AQMA noted each year. No failures in 2006 and 2007.	This project has been complete d. No plans for further testing.	100% compliance in 2006 and 2007.
14	Information and awareness training	Public Inform-ation	Via Internet	Improved website information on air quality	Hereford-shire Environmenta l Health and Trading Standards		On-going impro veme nt of web-site materi	Number of hits on the website	Not specified	ongoing		Currently investigating whether the hits on the website can be calculated.

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
							al on air qualit y					
15	Southern Link Road A49 Ross Road/ Rotherwas Access Road roundabout to the A465 and the B4349 Clehonger Road	Transport and Planning	Other	Construction of new road	Herefordshire Council – Highways and Transportatio n Service	201 2- 201 6	2016-2026	Annual Average Daily Flow trends (AADT) and diffusion tubes	Not specified	Scope route was undertaken in 2010. Planning permission has been granted	Construct by 2026	Not applicable until road constructed

Bargates Air Quality Action Plan

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
1	Improvements to the traffic light sequen-cing at the A44/B4361 Junction at Bargates	Transport Planning and Infra-structure	Other	Upgrade signals more efficient flow of traffic less standing of HGV's	HC	2014-2015	2016	Reduction of NO2 levels at diffusion tubes	Not specified	Report commissio ned reviewing the best options for the junction arrange-ment. Work completed 2016.	2016	_
2	Improvements to cycle facilities/ routes between Morrisons Store and the Town centre	Transport Planning and Infra-structure	Cycle network	Reduce car use at Bargates Junction	HC	2014-2016	Sept 2016	Reduction of NO2 levels at diffusion tubes	Not Specified	Awaiting S106 monies	2014-2016	

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
3	Improvements to the public transport facilities between Morrisons Store and the Town centre	Transport Planning and Infra-structure	Other	Reduce car use at Bargates Junction	HC	2014-2016	2016	Reduction of NO2 levels at diffusion tubes	Not Specified	Awaiting S106 monies	2016	
4	Improve and increase number of pedestrian routes and facilities in Leominster	Transport Planning and Infra-structure	Other	Increase walking routes to encourage walking and reduce car use, reducing traffic at the Bargates Junction	HC	2014-2016		Reduction of NO2 levels at diffusion tubes	Not Specified	Awaiting S106 monies	-	

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
5	Behavioural Change Programme	Promoting Travel Alternatives	Promotion of walking & cycling	Ongoing promotion of walking and cycling through press and distribution of publicity materials New Leominster Walking & Cycling Guide showing local infrastructure	HC	2014-2016		Reduction of NO2 levels at diffusion tubes	Not Specified	Work ongoing. Bid submitted for funding in 2016.	On going	
6	Behavioural Change Programme	Promoting Travel Alternatives	Promotion of cycling	Free adult cycle lessons - Free Bikeability sessions for local primary school children	HC	2014-2016		Reduction of NO2 levels at diffusion tubes	Not Specified	Work ongoing. Bid for submitted funding in 2016.	On going	

No.	Measure	EU Category	EU Classification	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments Relating to Emission Reductions
7	Development of the southern Relief Road	Transport Planning and Infra-structure	Other	Development of a Southern Relief Road as an integral part of the development of an urban extension for Leominster as part of the Local Plan – Core Strategy For the period up to 2031	HC	For the period up to 31		Reduction of NO2 levels at diffusion tubes			Not set	

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 many different sources of $PM_{2.5}$, these can be from natural or anthropogenic (manmade) sources.

Anthropogenic sources include industrial sources, road transport, off road transport, residential sources (such as non-smokeless fuels and bonfires) and polluted air traveling from the continent.[8]

Health based objective levels for $PM_{2.5}$'s have not yet been set for local authorities. The EU limit value for $PM_{2.5}$ is 25µg/m^3 as an annual average with an additional requirement to reduce average urban background concentrations by 15% by 2020 (against a 2010 baseline).

PM 2.5's in Herefordshire.

Public health framework indicator 3.01 states that the fraction of mortality in Herefordshire attributable to anthropogenic (man-made) $PM_{2.5}$ particulate air pollution is 4.5% of all deaths. The average for this indicator in the West Midland is 5.2% and in England is 5.1%.

Policy Guidance LAQM.PG(16) acknowledges that many local authorities will consider how to address $PM_{2.5}$ alongside other pollutants such as Nitrogen Dioxide and PM $_{10}$'s when determining appropriate actions and that a few standalone $PM_{2.5}$ measures will be chosen (unless in order to address a very specific local problem).

The AURN is the UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives. $PM_{2.5's}$ are measured at some of the network of ARUN sites. The closest ARUN monitoring site

[8] Fine Particulate Matter (PM2.5) in the United Kingdom, AQEG, 2012

to Herefordshire that measures $PM_{2.5}$ is Chepstow on the A48, this is an urban traffic site. Therefore, it is perhaps difficult to draw direct comparisons to Herefordshire.

It has been recognised that the cost of monitoring for $PM_{2.5s}$ can be prohibitive. Therefore other methods of estimating the likely $PM_{2.5}$ levels in the County have been considered to establish an overview of the possible levels.

Background mapping of $PM_{2.5}$ published by DEFRA has been reviewed http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html and the background levels were found to be between 7.5 and 12.69 /m^3.

Calculations can be undertaken to estimate the PM $_{2.5}$ fraction from PM_{10} monitoring data. Monitoring data for PM_{10}'s at the Victoria Street location is not available for 2015 but it is anticipated that monitoring data will be available from 2017. It should be noted that this estimation would only give an indication of $PM_{2.5}$'s at the roadside location in the Hereford AQMA. (a worst case scenario)

Herefordshire Council is taking the following measures to address $PM_{2.5}$:

Ensure $PM_{2.5}$'s are considered at the planning application stage for relevant development

- Inspection of Local Authority Permitted installations
- Review AQAP's to include additional actions for $PM_{2.5}$
- Consider the need for background monitoring of $PM_{2.5}$

NB It should be noted that actions 1-6 9-11, 13-15 of the Hereford AQAP, and Action points 1-7 of the Leominster AQAP also deal with $PM_{2.5}$ as well as NO_2.

The approach being taken taking in terms of $PM_{2.5}$ assessment and possible monitoring has been considered together with Public Health .Further work is to be undertaken in this area.

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

This section sets out what monitoring has taken place and how it compares with objectives.

Herefordshire Council previously had an automatic monitoring station located on Edgar Street roundabout within Hereford city centre measuring NO_2 and PM_{10}. The monitoring station was removed in preparation for the development work at the Edgar Street Grid in 2011 and relocated at end of 2013 to a new position in Victoria Street. However, since installation there have been continuing issues with access to any recorded data and no monitoring results for 2015 are available at this time. The Nitrogen dioxide and PM_{10} analysers are now in operation as of December 2016. The location of the automatic monitor is shown in Appendix D.

Defra has an AURN site adjacent to the Minster school in Leominster which continuously monitors Nitrogen Dioxide and Ozone. Data is generally available via the UK-AIR website at the following link. https://uk-air.defra.gov.uk/data/
The Leominster monitoring site is classed as a suburban background site. The annual mean at this site was recorded at µg/m^3. This is well below the objective level of 40 µg/m^3.

Maps showing the location of the monitoring site can be found in appendix D

NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/data/

3.1.2 Non-Automatic Monitoring Sites

Herefordshire Council undertook non-automatic (passive) monitoring of NO_2 at 16 sites for the full year and a further 5 (sites 82 to 86) during the year starting in May 2015. Table A.2 in Appendix A shows the details of the sites.

Sites 82 and 83 were located in Ross-on-Wye on Cantilupe Street. This street becomes congested at peak times and also has a number of bus stops along the length of the street.

Sites 84 to 86 were chosen to again information on NO_2 levels in the Kings Acre/Three Elms area as this area has been identified as a potential development site in the Core Strategy.

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.

3.2 Individual Pollutants

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.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares 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 diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Hereford AQMA

The NO_2 data within the AQMA in Hereford shows that there were no exceedances of the annual mean in 2015. This is the first time that all monitoring locations have shown levels below 40 µg/m^3. However, before the AQMA can be revoked, several years of data demonstrating that NO_2 levels are unlikely to breach the national objective will be required. Consideration of national trends in emissions, as well as local factors that may affect the AQMA, including measures introduced as part of the

Air Quality Action Plan, together with information from national monitoring on high and low pollution years will also need to be taken into account.

Trends

All six sites within the AQMA have shown a general downward trend and levels have reduced since 2014 - 2015 by a range of 5.8 to 1.2 µg/m^3.

Two sites are monitored outside the AQMA to determine whether the boundaries of the AQMA need to be extended. These are Site 54 – Holmer Road and Site 65 – 95 Whitecross Road.

Site 54 continues to demonstrate concentrations well below the air quality objective in line with previous year's results. This site will continue to be monitored.

Site 65 is a kerbside monitoring location and the results have been calculated back to position of nearest receptor to compare with air quality objective, see Table C1. The estimation of concentration at the nearest receptor, 37.5 µg/m^3 , is below the air quality objective confirming no extension of the AQMA boundary is required at this time. Site 65 will continue to remain as an indicator of any changes in NO_2 levels along Whitecross Road which is a key traffic route into the town centre.

2 of the 4 sites (6 and 79) in Hereford located further afield from the AQMA have followed the general downward trend seen across the County between 2010 and 2014. The exceptions are site 75 – 22 Barton Road which is an Urban Background monitoring location and site 74 - 140 Whitecross Road .

Site 75 demonstrated a significant increase of 8µg/m^3 between 2012 and 2014 representing a 22% increase (to 36.7 µg/m^3) in measured concentrations, but fell again in 2015 to 30.3 µg/m^3. This latest data is still higher than data for 2011 and 2012, therefore this site does not seem to be following the general trend. The measured concentration of 30.3µg/m^3 in 2015 is below the air quality objective. The Council will continue to closely monitor this location in 2016. Site 74 - 140 Whitecross Road was the only site to increase (marginally at 0.15 µg/m^3). This site is well below the objective level at 19.6 µg/m^3.

Leominster AQMA

Site 46 – Bengry's Lights, was below the air quality objective in 2015 recording concentrations of 32.7 µg/m^3. This continues the general downward trend in measured NO_2 levels at this location in the last 5 years.

By contrast Site 61 – 29 Bargates continues to record the highest concentrations of NO_2 in the County, 42.9µg/m3 in 2015. However it is noted concentrations have reduced by almost 5µg/m3 between 2014 and 2015. This monitoring tube is located on a building façade therefore represents the concentration at the receptor. An NO_2 level of 42.9µg/m3 exceeds the objective level of 40 µg/m^3 and is the only monitoring location to exceed the objective level in the County for 2015.

A40 corridor

The two roadside locations along this corridor, Sites 32 – Weir End House and 33 – Apple Tree Cottage, continue to follow the general downward trend seen across the County measuring 34.3µg/m^3 and 33.9µg/m^3 in 2015 respectively. Both these sites will continue to be monitored closely in 2016.

Other Market Towns and Villages

Monitoring is no longer undertaken in Bromyard, Kington, Ledbury, Pembridge, and Weobley. However, monitoring re-commenced in Cantilupe Street, Ross-on-Wye in May 2015 due to concerns regarding vehicle and bus emissions. Monitoring to date has indicated that there is unlikely to be a breach in the air quality objectives in this location.

Please note that the 2013 data was omitted from the trend analysis. This is because the 2013 results were noticeably higher at every monitoring location than in the other years shown in the five year trend. It is considered this is due to only 8 months data being collected and the requirement to annualise that data. Although the data has been annualised in line with Defra guidance (Box3.2 of TG(09)), there is only data from two appropriate automatic Defra monitors within a 50 mile radius to include in the annualisation process (see Appendix A). The Council consider the annualised 2013 results should be regarded with caution. It is, therefore, considered more

appropriate to review the long term trend of monitoring results between 2011-12 and 2014-15.

3.2.2 Particulate Matter (PM_{10})

PM_{10} was previously measured by the Council at the automatic monitoring station at Edgar Street. The site, which was not relevant to public exposure, was decommissioned in 2011 due to redevelopment of the site where it was located. The monitor was repositioned in Victoria Street in 2013, but as discussed above in section 2.1.1 no data is available for the monitoring period in 2015.

The automatic monitoring station has been operational since December 2016.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ monitoring is not currently undertaken by Herefordshire Council.

3.2.4 Sulphur Dioxide (SO_2)

Sulphur Dioxide has not been monitored by Herefordshire County Council since January 2011. Results of monitoring previously undertaken by the Council are presented in previous annual reports submitted to Defra.

4.0 Additional Information

4.1 Poultry Farms and PM_{10}'s

Herefordshire has a number of intensive poultry rearing units and this industry is currently expanding within the County.

In previous air quality review and assessment reports a poultry site was identified as meeting the screening criteria in the previous LAQM Guidance TG9 and which triggered the need to undertake a Detailed Assessment for PM_{10}. However, at the time Defra advised no further action should be taken until further advice was provided by them.

In 2016, DEFRA published the new Technical Guidance LAQM.TG16 which contained a screening criteria and calculation to assess the need to move to detailed assessment. Since 2009 there have been a number of new poultry units built in Herefordshire, therefore, the intention is to rescreen the County to determine if any further assessment is required in relation to PM_{10}'s and poultry units.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
HRD1	Victoria Street	Roadside	350721	239791	NO_2; PM_{10}	Y	Chemiluminescent and PM10	10m	5m	1.9m

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

(2) N/A if not applicable.

Table A.2 – 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)
6	Broad Street, Hereford	Urban background	350890	240000	NO_2	N	1	0.3	N	2.8
9	Victoria St, Hereford (duplicate 1)	Roadside	350688	239864	NO_2	Y	1	2.9	N	2.9
10	Victoria St, Hereford (house façade)	Roadside	350677	240015	NO_2	Y	1	2.9	N	2.5
22	Edgar/ Moor St, Hfd façade (duplicate 1)	Roadside	350860	240615	NO_2	Y	1	2.3	N	2.3
32	Weir End house façade	Roadside	357717	223736	NO_2	N	2	4.5	N	2.0
33	Wilton house façade	Roadside	358506	224214	NO_2	N	2	2.9	N	1.9
46	Bengry's Lights, Leominster	Roadside	349409	259010	NO_2	Y	1	3.40	N	2.1
53	Cross St, Belmont, Hfd house façade	Roadside	350723	239163	NO_2	Y	1	5.3	N	2.1
54	Holmer Rd, Hereford house façade	Urban Background	350602	241097	NO_2	N	1	9.5	N	1.7
57	Eign St, Hereford shop flat façade	Urban Background	350499	240108	NO_2	Y	1	.50	N	2.2
59	Elgars Rest, Widemarsh St, Hfd façade	Urban Centre	350987	240139	NO_2	Y	5	4.3	N	2.4
61	29 Bargates, Leominster	Roadside	349363	259013	NO2	Y	1	2.0	N	2.2

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)
65	96 Whitecross Road, Hereford façade	Urban Background	350086	240296	NO_2	N	3	1.3	N	2.2
74	140 Whitecross Road, Hereford	Roadside	349985	240334	NO_2	N	2	8.2	N	2.1
75	22 Barton Road, Hereford	Roadside	350511	239740	NO_2	N	1	2.4	N	2.4
79	76 Belmont Road	Roadside	350472	238999	NO_2	N	7	1	N	2.3
82	Cantilupe Road 1 Ross-on-wye	Urban Background	360204	224177	NO_2	N	1.5	1.7	N	2.3
83	Cantilupe Road 2 Ross-on-wye	Urban Background	360165	224130	NO_2	N	1.5	1.5	N	2.3
84	Kings Acre Road	Urban Background	347864	241236	NO_2	N	10.5	6.2	N	2.55
85	Huntington Lane, Hereford	Rural	348752	241941	NO_2	N	n/a	1.2	N	2.1
86	Three Elms Road, Hereford	Urban Background	349067	241933	NO_2	N	n/a	1.5	N	1.7

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)
					NO_2					
					NO_2					

(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.3 – Annual Mean NO_2 Monitoring Results

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
6	Broad Street, Hereford	Urban background	-	100	30.5	30.4	37.17**a**	28.93	25.53
9	Victoria St, Hereford (duplicate 1)	Roadside	-	91.7	**42.3**	**44.7**	**54.38a**	**40.25**	35.94
10	Victoria St, Hereford (house façade)	Roadside	-	100	**45.9**	**46.9**	**50.40a**	**43.71**	38.54
22	Edgar/ Moor St, Hfd façade (duplicate 1)	Roadside	-	91.7	35.0	35.7	**42.58a**	30.59	24.68
32	Weir End house façade	Roadside	-	100	**41.7**	37.3	**48.75a**	36.07	34.25
33	Wilton house façade	Roadside	-	100	**41.1a**	38.7	**50.11a**	36.27	33.93
46	Bengry's Lights, Leominster	Roadside	-	100	39.1	**40.3**	**49.33a**	38.43	32.70

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
53	Cross St, Belmont, Hfd house façade	Roadside	-	100	35.1	34.1	**41.71a**	33.73	31.39
54	Holmer Rd, Hereford house façade	Urban Background	-	100	26.7	27.9	31.59**a**	25.58	22.42
57	Eign St, Hereford shop flat façade	Urban Background	-	91.7	37.9	38.3	**43.94a**	34.05	28.27
59	Elgars Rest, Widemarsh St, Hfd façade	Urban Centre	-	100	26.6a	28.1	37.11**a**	24.61	23.42
61	29 Bargates, Leominster	Roadside	-	91.7	**50.2**	**54.4**	**60.02a**	**47.63**	**42.90**
65	96 Whitecross Road, Hereford façade	Urban Background	-	100	**42.0**	39.5	**51.87a**	**40.18**	36.35
74	140 Whitecross Road, Hereford	Roadside	-	91.7	20.0	21.9	25.65**a**	19.44	19.59
75	22 Barton Road, Hereford	Roadside	-	100	27.1	28.7	**48.38a**	36.70	30.33
79	76 Belmont Road	Roadside	-	100	38.6	38.5	**47.50a**	35.33	32.76
82	Cantilupe Road 1 Ross-on-wye	Urban Background	100	66.7	-	-	-	-	
83	Cantilupe Road 2 Ross-on-wye	Urban Background	87.5	58.3	-	-	-	-	
84	Kings Acre Road	Urban Background	100	66.7	-	-	-	-	

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
85	Huntington Lane, Hereford	Rural	100	66.7	-	-	-	-	
86	Three Elms Road, Hereford	Urban Background	100	66.7	-	-	-	-	

Notes: Exceedances of the NO_2 annual mean objective of 40$\mu g/m^3$ are shown in **bold**.

NO_2 annual means exceeding 60$\mu g/m^3$, indicating a potential exceedance 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 Technical Guidance 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 2015

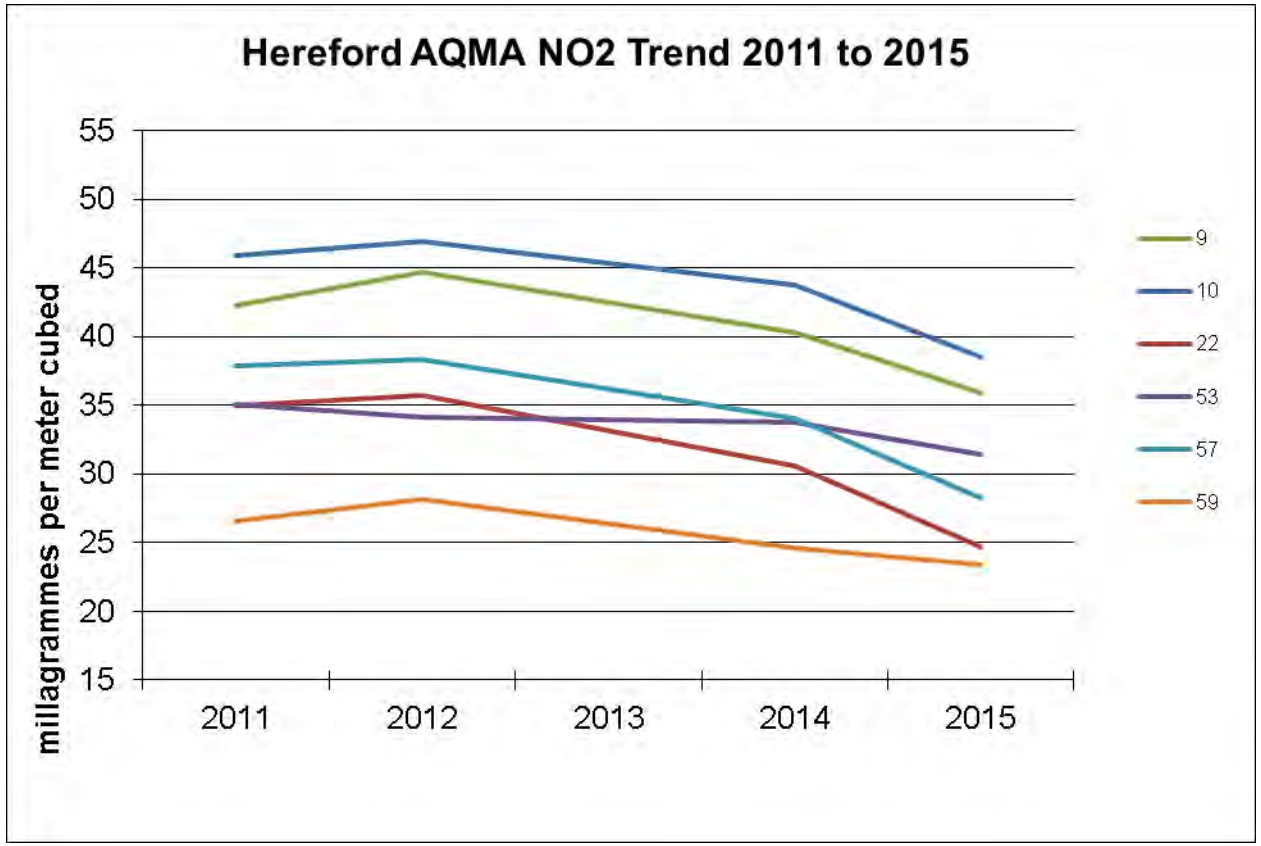
Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
6	32.2	29.9	24.9	23.9	22.5	19.6	23.0	24.3	26.3	30.7	22.3	26.9	**28.1**	**25.5**
9	30.9	42.5	36.1	34.9	24.1	0.0	29.2	33.9	30.9	50.1	34.4	48.3	**39.5**	**35.9**
10	44.8	46.0	36.8	32.8	32.0	37.6	36.8	36.3	38.9	48.3	36.7	35.5	**42.3**	**38.5**
22	31.2	35.8	21.0	22.5	15.1	17.3	21.9	0.0	24.7	34.9	21.4	25.7	**27.1**	**24.7**
32	40.6	41.7	30.5	32.4	28.4	32.2	35.0	35.0	32.9	41.5	32.0	28.8	**37.6**	**34.3**
33	40.7	36.9	27.1	33.6	28.5	30.7	36.6	36.8	33.4	40.3	34.5	28.2	**37.3**	**33.9**
46	41.2	37.9	26.9	32.3	27.6	26.5	35.5	34.6	33.2	39.6	27.0	30.0	**35.9**	**32.7**
53	39.8	34.6	32.5	31.8	29.2	27.5	29.1	29.9	30.8	40.5	25.7	25.2	**37.6**	**31.4**
54	24.3	28.3	21.1	23.7	19.1	19.4	20.0	21.1	22.7	30.9	17.9	20.5	**24.6**	**22.4**
57	36.2	0.0	26.6	18.5	26.9	26.0	25.4	30.7	26.4	40.0	26.2	28.1	**31.1**	**28.3**
59	29.4	29.3	24.3	25.0	18.8	18.3	18.0	19.0	23.5	31.3	22.1	22.0	**25.7**	**23.4**
61	47.9	44.6	43.8	35.9	35.5	41.1	46.1	44.7	0.0	45.4	44.6	42.3	**47.1**	**42.9**
65	43.1	42.0	39.1	41.7	29.3	35.1	30.2	34.5	35.1	53.6	24.7	27.9	**39.9**	**36.4**
74	30.4	25.3	21.2	17.5	15.8	15.9	13.6	16.7	18.1	24.2	18.8	17.7	**21.5**	**19.6**

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)
75	34.4	32.5	30.6	32.5	26.6	28.5	28.7	29.9	28.9	41.9	22.8	26.7	**33.3**	**30.3**
79	38.4	38.1	35.1	34.7	28.2	30.4	0.0	30.1	29.0	42.1	28.6	25.8	**36.0**	**32.8**
82	-	-	-	--	18.3	16.3	18.5	21.8	23.7	32.6	20.1	22.2	**23.8**	**25.2(3)**
83	-	-	-	-	16.5	16.1	17.7	19.0	19.7	24.5	15.4	0.0	**20.2**	**21.2(3)**
84	-	-	-	-	11.9	8.6	9.0	11.6	13.5	18.9	7.2	8.3	**12.2**	**12.9(3)**
85	-	-	-	-	4.9	4.1	17.7	6.4	0.6	11.8	7.1	8.0	**8.3**	**10.5(3)**
86	-		-	-	11.7	8.5	11.5	14.0	13.1	24.4	11.8	21.7	**16.0**	**16.9(3)**

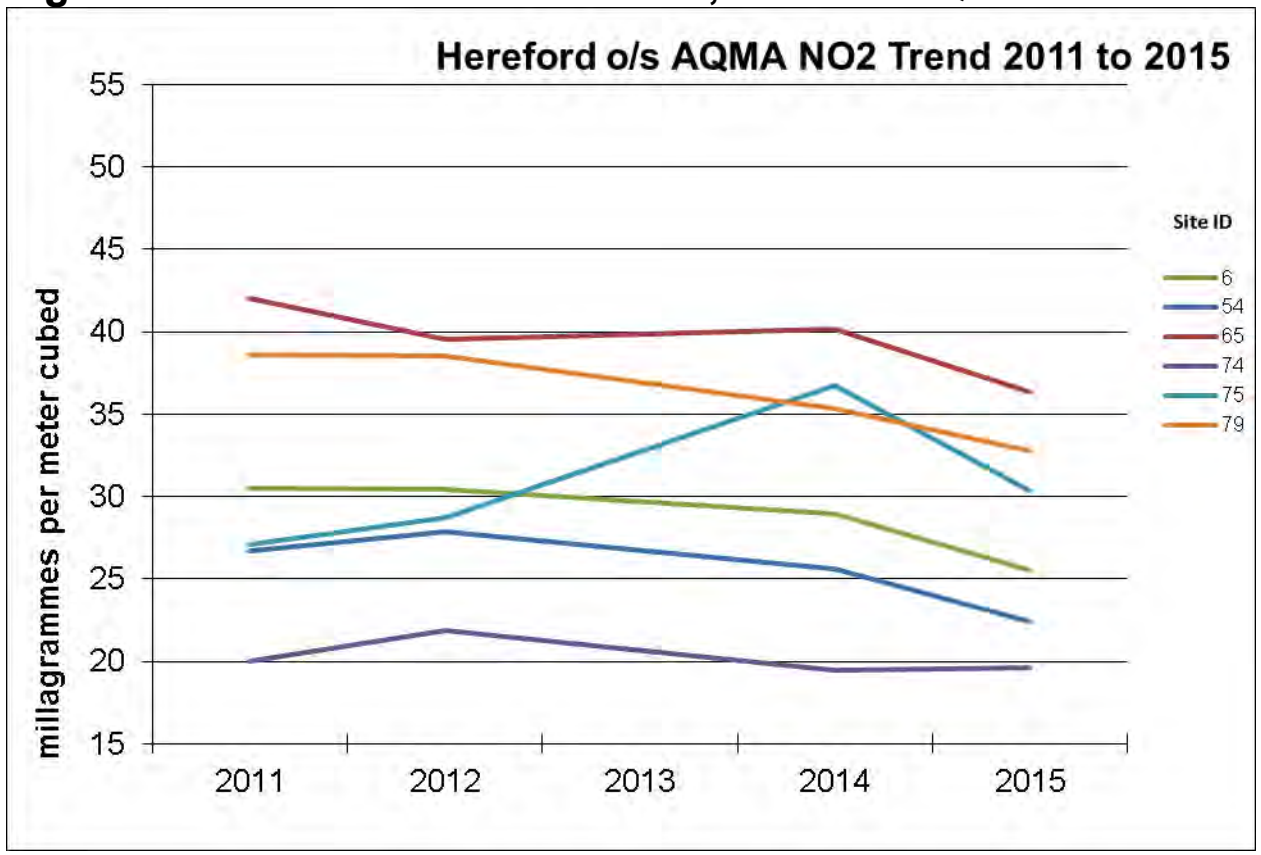
(1) See Appendix C for details on bias adjustment

Figure A1 – Trend in NO2 Hereford AQMA 2011-2015



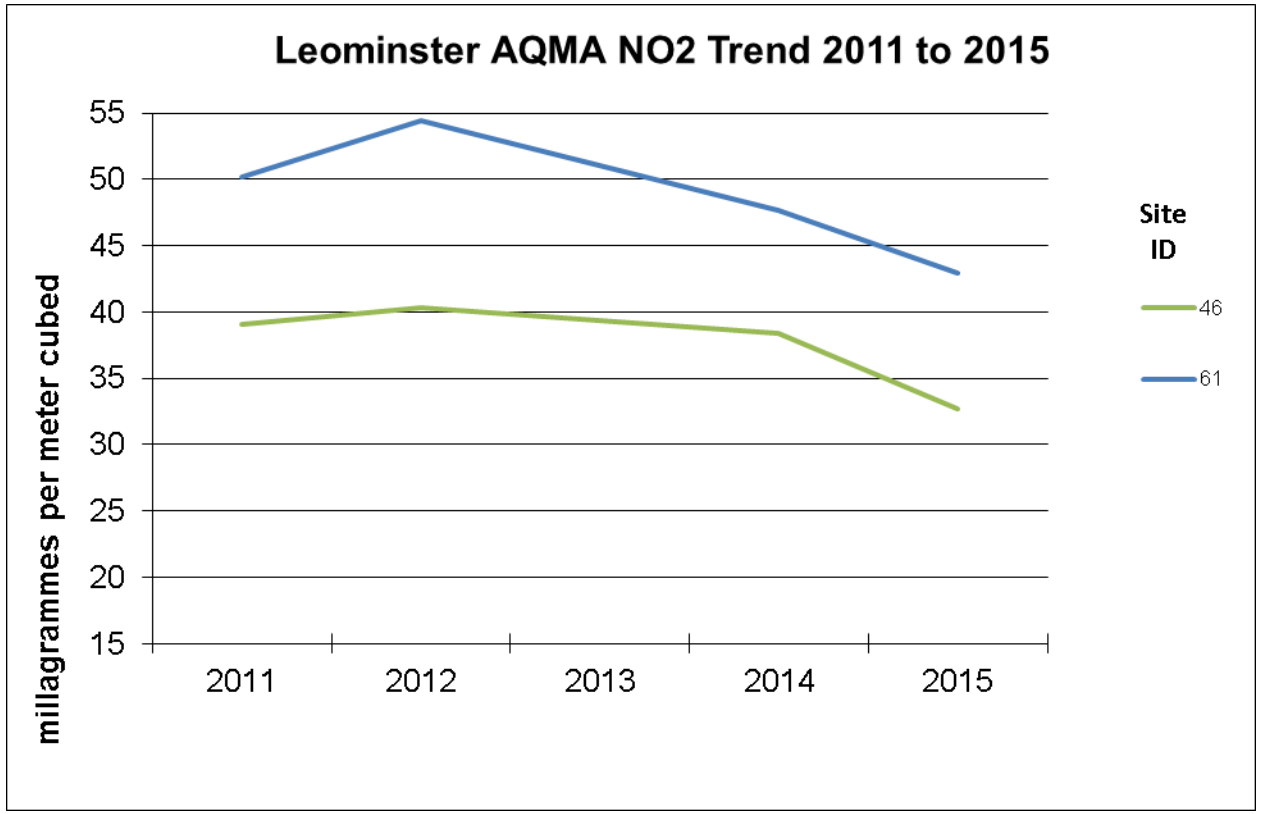
Please note that the objective level for NO2 is 40ug/m3 (annual average)

Figure A2 – Trend in NO2 Hereford, Outside AQMA 2011-2015



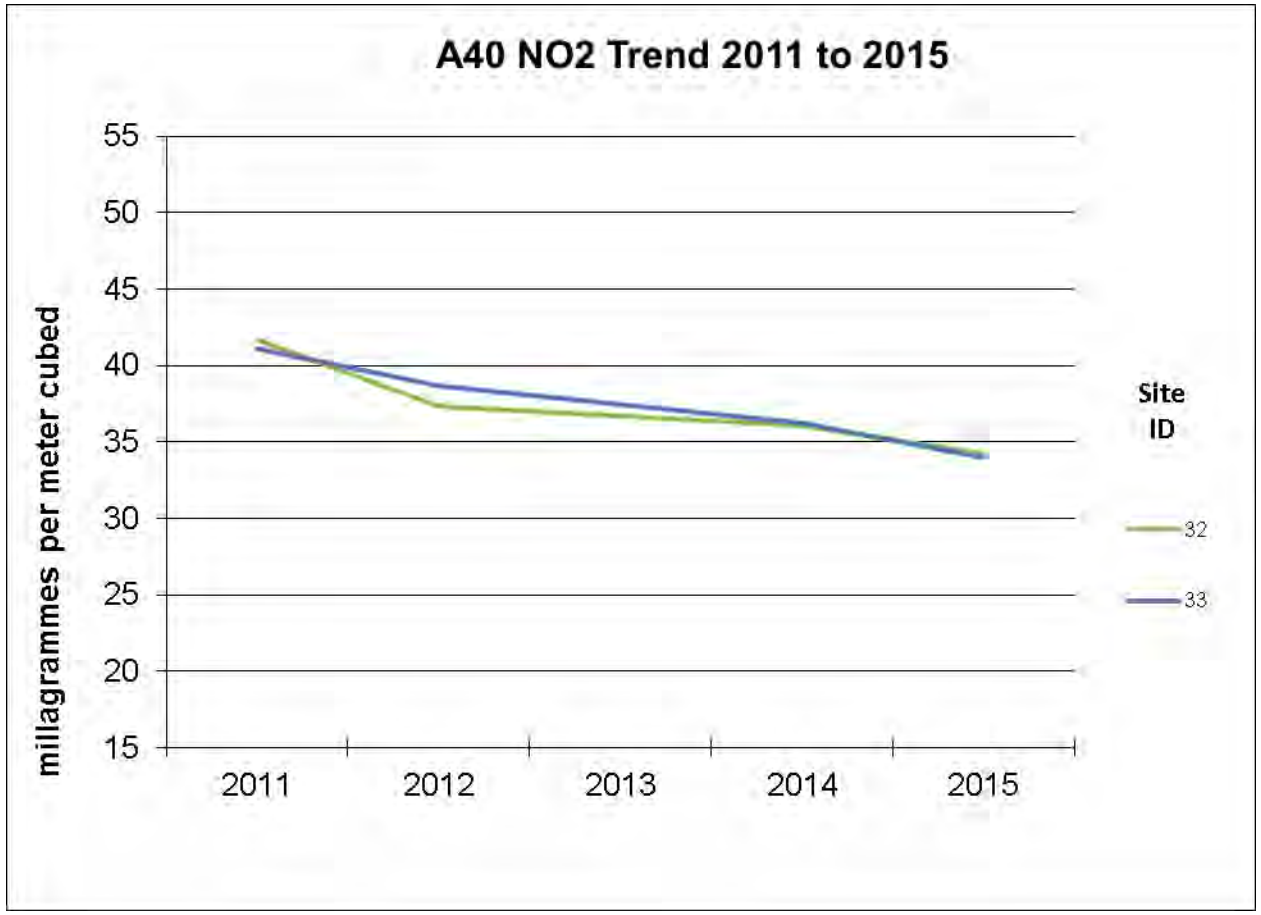
Please note that the objective level for NO2 is 40ug/m3 (annual average)

Figure A3 – Trend in NO2, Leominster AQMA 2011-2015



Please note that the objective level for NO2 is 40ug/m3 (annual average)

Figure A4 – Trend in NO2, A40 2011-2015



Please note that the objective level for NO2 is 40ug/m3 (annual average)

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

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 Herefordshire Council with nitrogen dioxide diffusion tubes and analysis:

Gradko Environmental,
St Martins House,
77 Wales Street,
Winchester,
Hampshire, SO23 0RH
Tel 01962 860331
diffusion@gradko.co.uk

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

The bias adjustment factor applied to the results in 2015 was 0.91 which were derived from the national studies. All sites are shown in Appendix B.

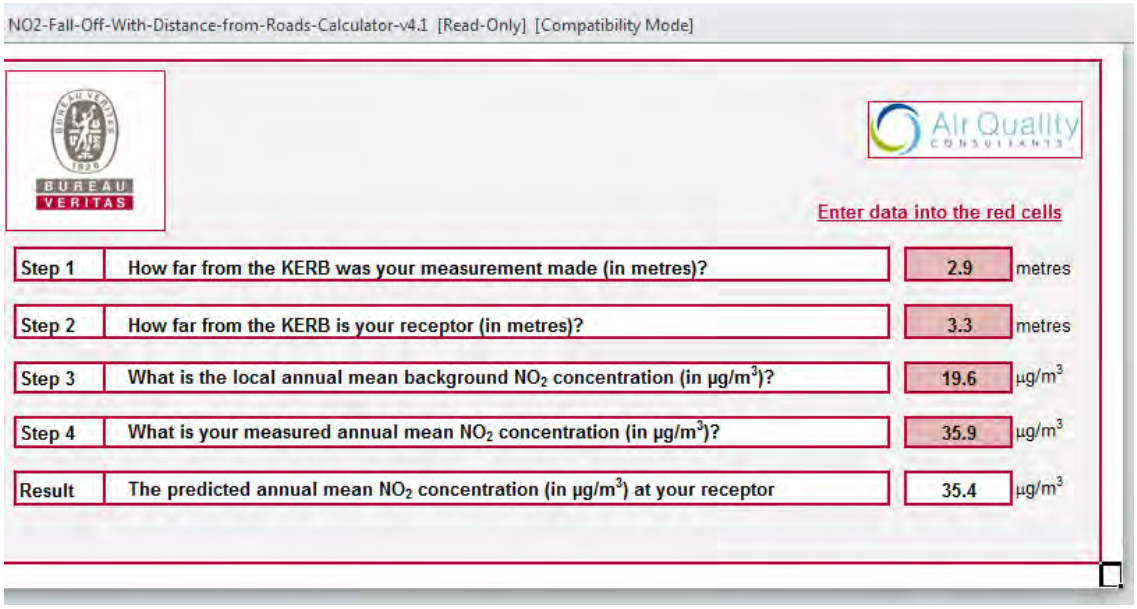
QA/QC of Diffusion Tube Monitoring

Under the WASP Scheme Gradko performed 100% satisfactory for all periods during 2015. Tube precision was generally ‘Good’ throughout 2015.

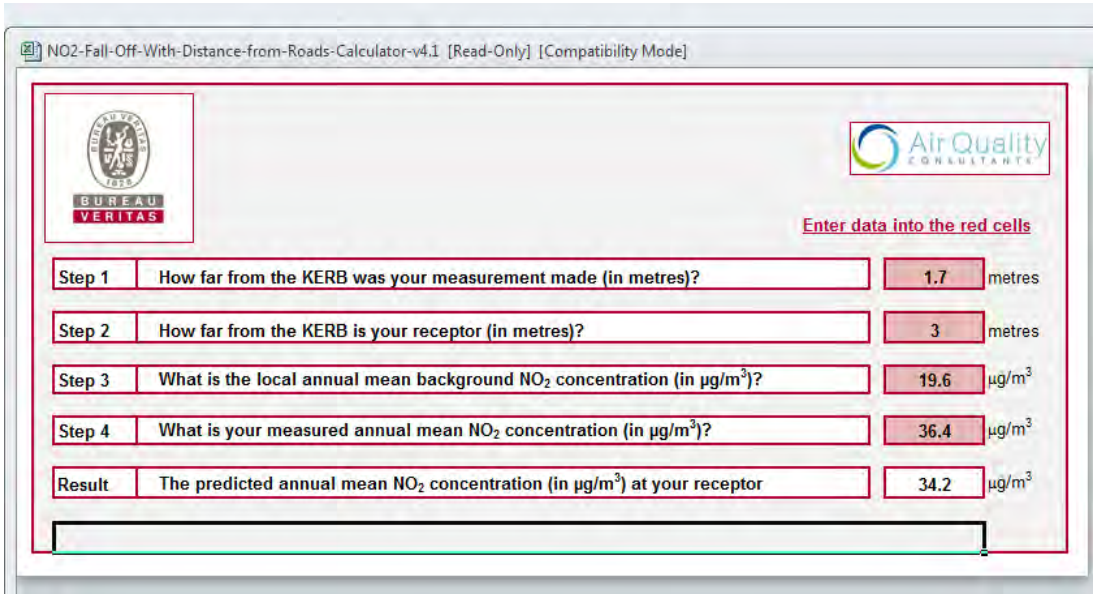
Table C 1 Estimation of Concentrations at the nearest Receptor.

Site ID	Location	In AQMA	Tube distance from kerb (m)	Receptor distance from kerb (m)	Local annual mean background N02 (µg/m$^{3)}$	Measured annual mean concentration at tube location	Estimation of concentration at nearest receptor
9	Victoria St, Hereford	Y	2.3	3.3	19.6	**40.25**	38.4
65	96 Whitecross Road, Hereford	N	1.7	3.0	19.6	**40.18**	37.5

Site 9 Victoria Street, Hereford



Site 65 – Whitecross Road, Hereford



Appendix D: Map(s) of Monitoring Locations

Figure D.1 – Map of Herefordshire Transport Network and Major Settlements

Figure D.2 – Location of Herefordshire

Figure D.3 – Hereford AQMA Boundary

Figure D.4 – Hereford City (North) Monitoring Locations

Figure D.5 – Hereford City (South) Monitoring Locations

Figure D.6 – Whitecross Road, Hereford Monitoring Locations

Figure D.7 – Leominster AQMA Boundary

Figure D.8 – Leominster Monitoring Locations

Figure D.9 – A40 Corridor, Ross-on-Wye Monitoring Locations

Figure D.10 – Ross-on-Wye Monitoring Locations

Figure D11 – Kings Acre Road, Huntington Lane and Three Elms Road Monitoring Locations

Figure D12 – Location of Automatic Monitoring Station, Hereford

Figure D.1 – Map of Herefordshire Transport Network and Major Settlements

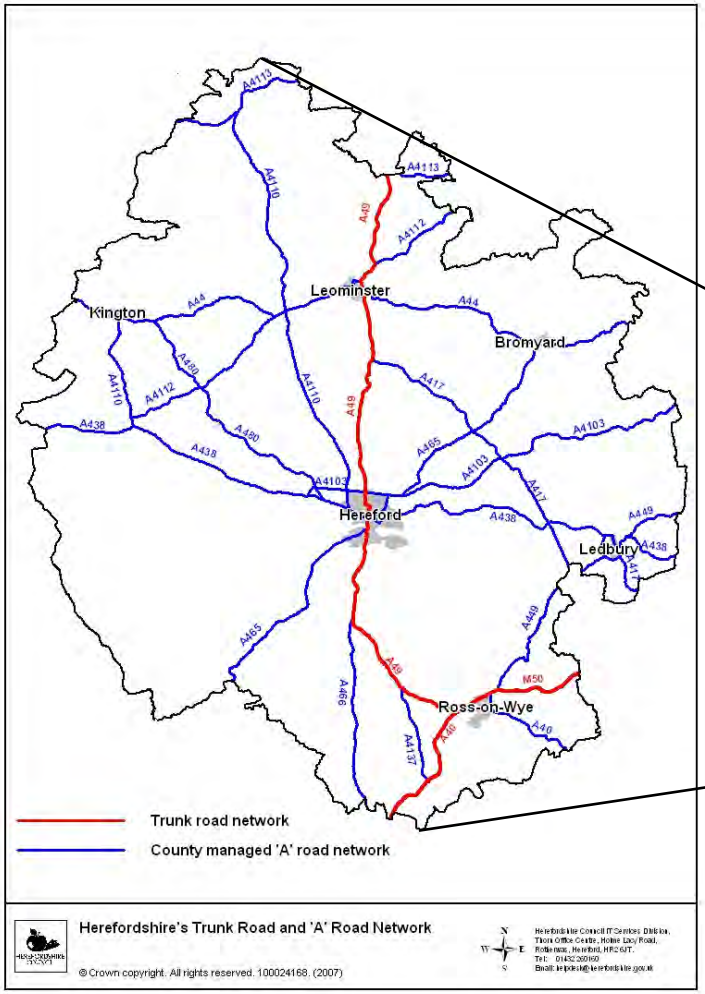


Figure D.2 – Location of Herefordshire

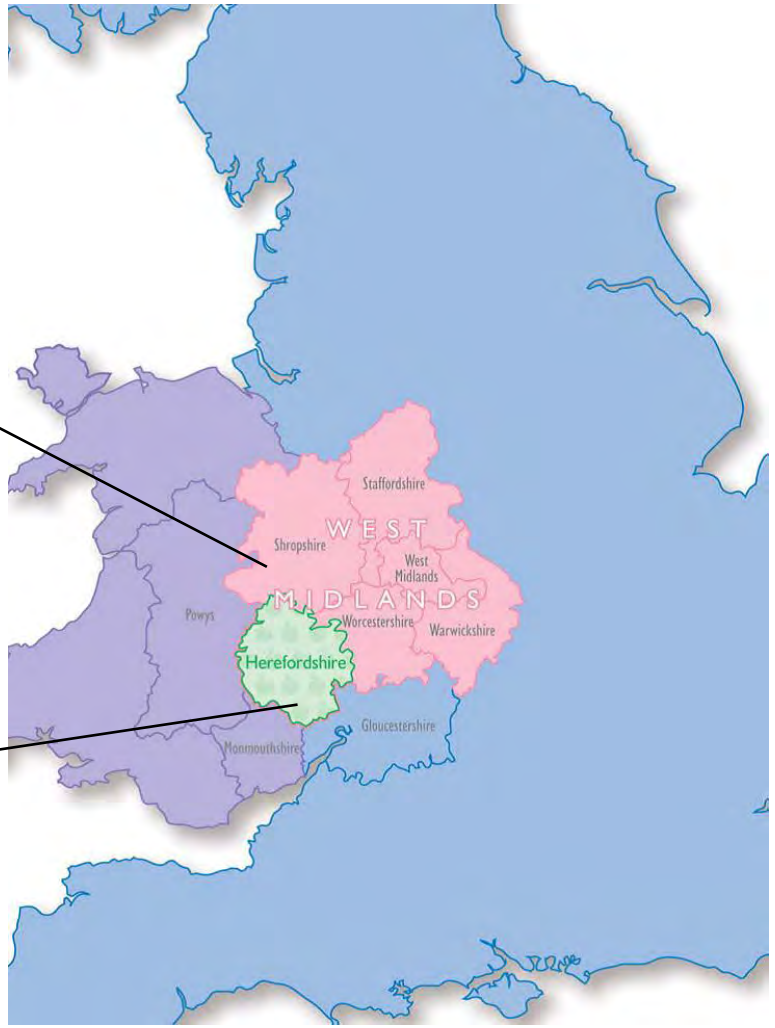


Figure D.3 – Hereford AQMA Boundary

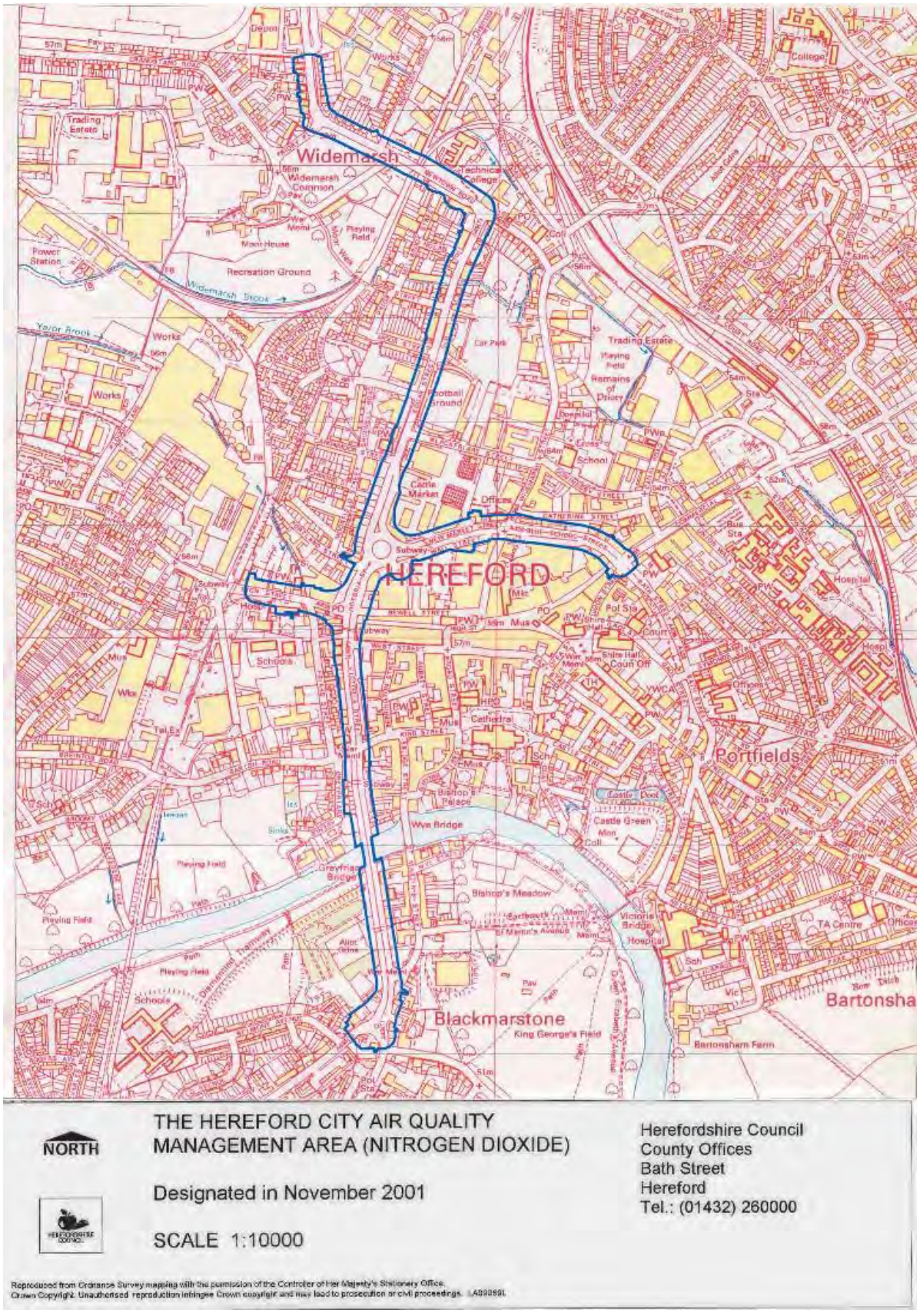


Figure D.4 – Hereford City (North) Monitoring Locations

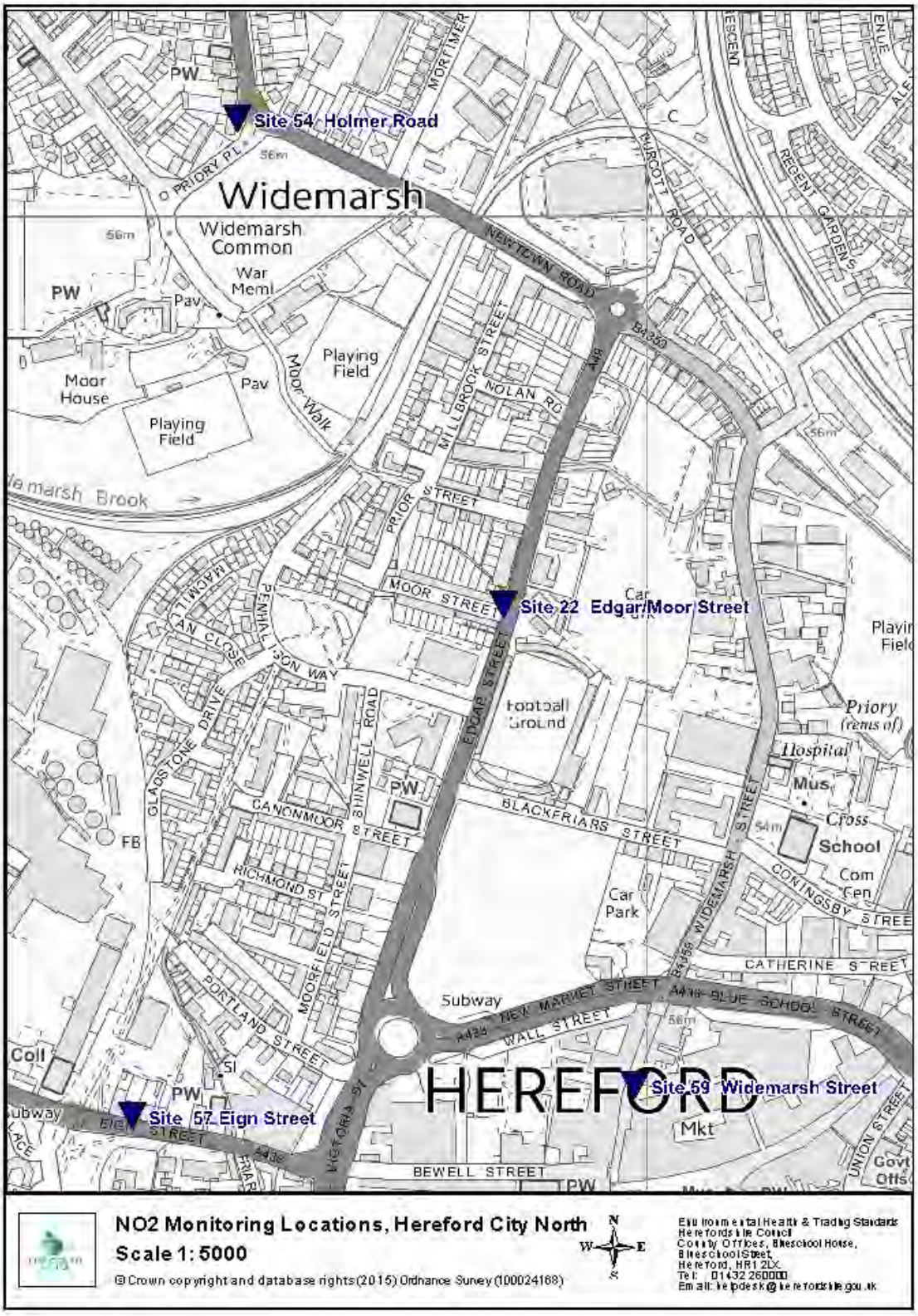


Figure D.5 – Hereford City (South) Monitoring Locations

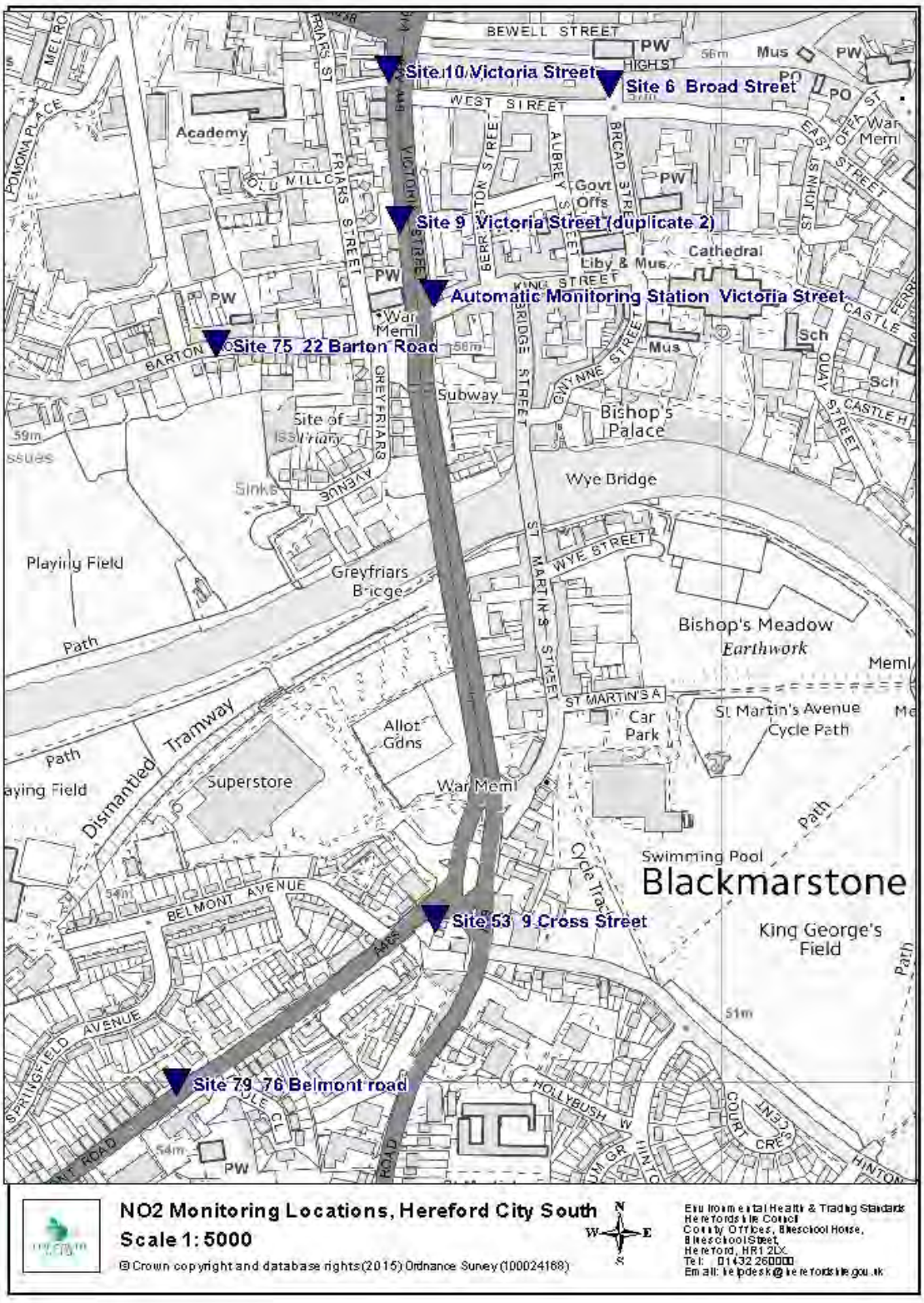


Figure D.6 – Whitecross Road, Hereford Monitoring Locations

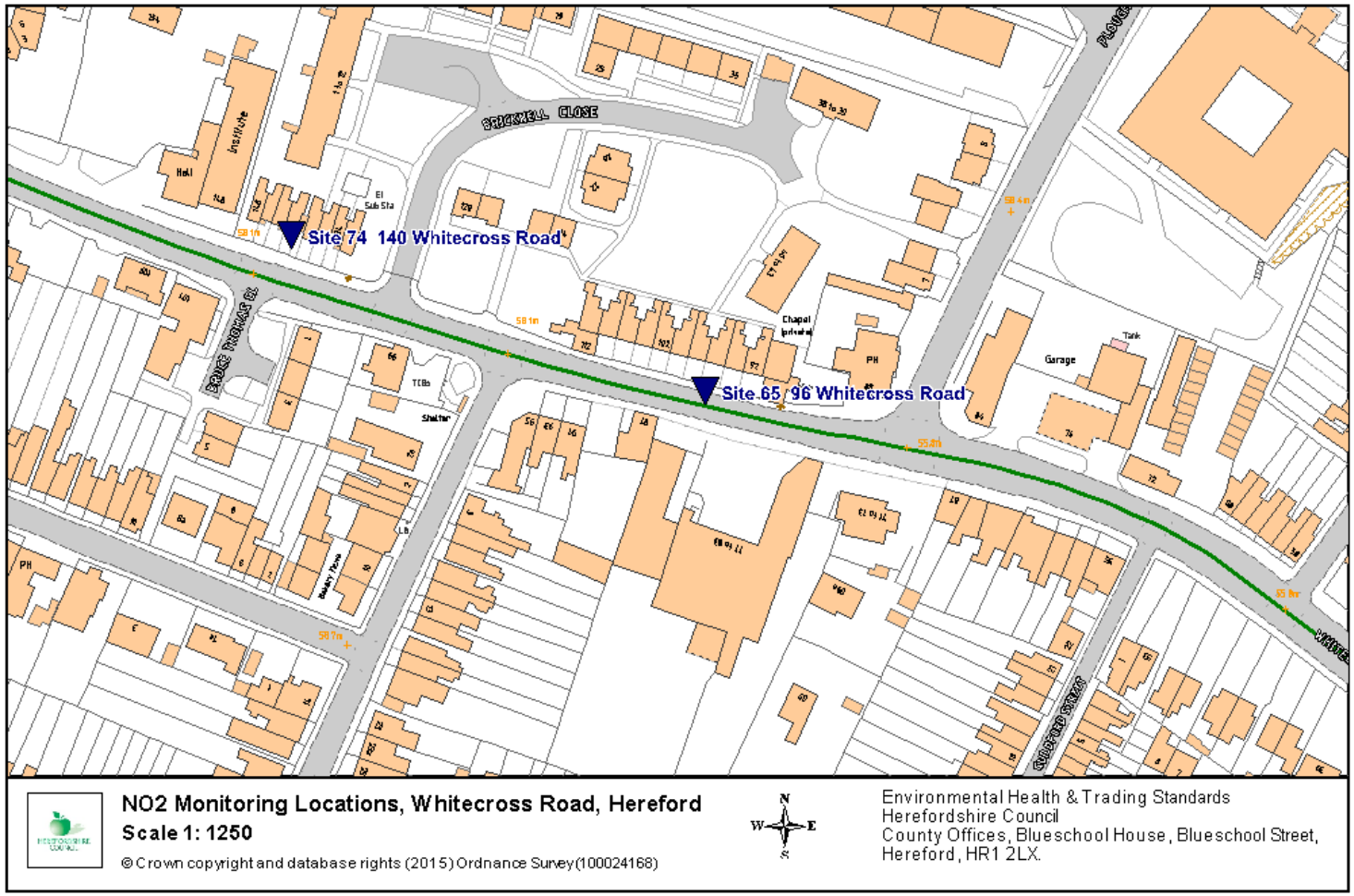


Figure D.7 – Leominster AQMA Boundary

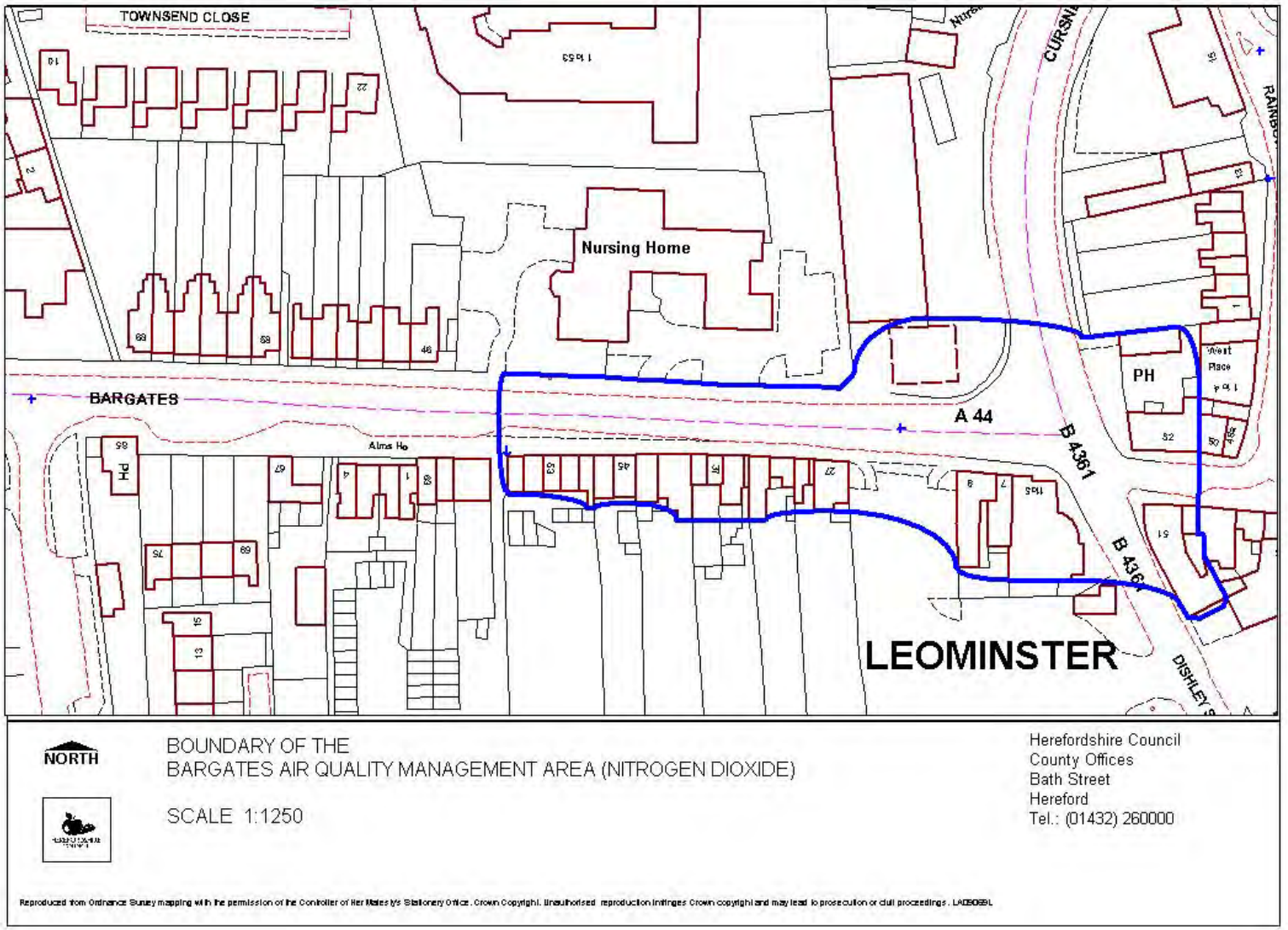


Figure D.8 – Leominster Monitoring Locations

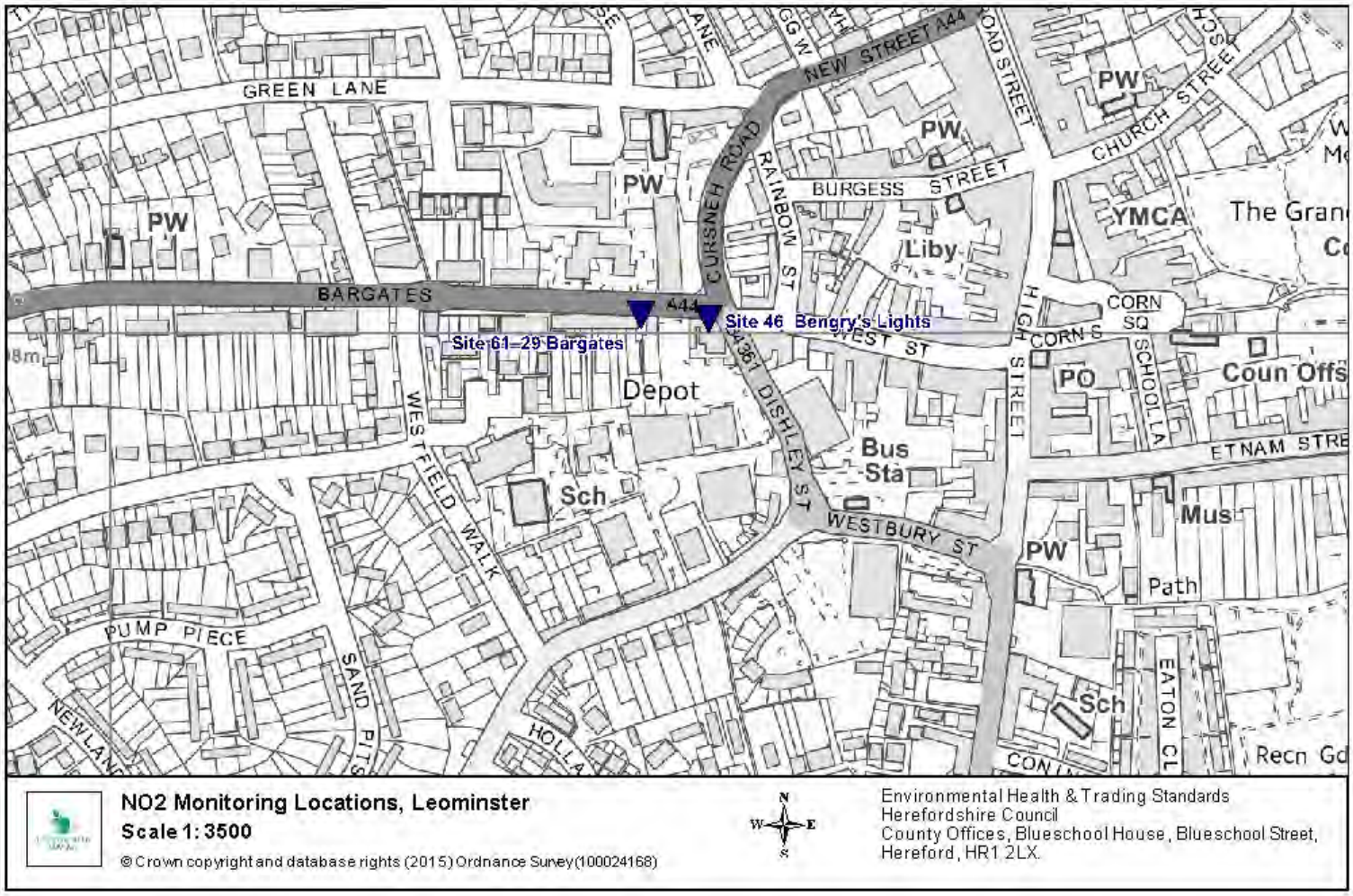


Figure D.9 – A40 Corridor, Ross-on-Wye Monitoring Locations

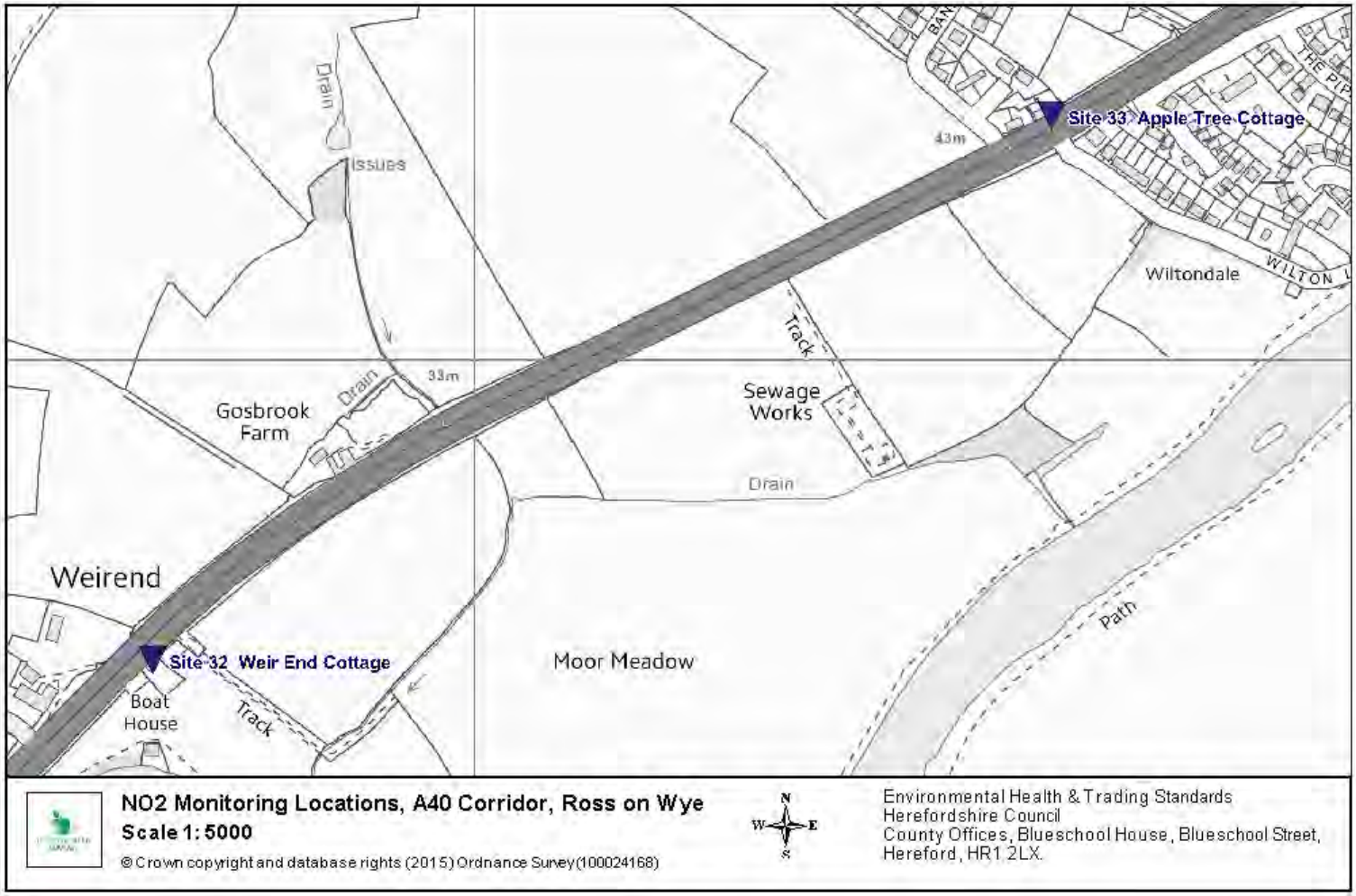


Figure D.10 – Ross-on-Wye Monitoring Locations

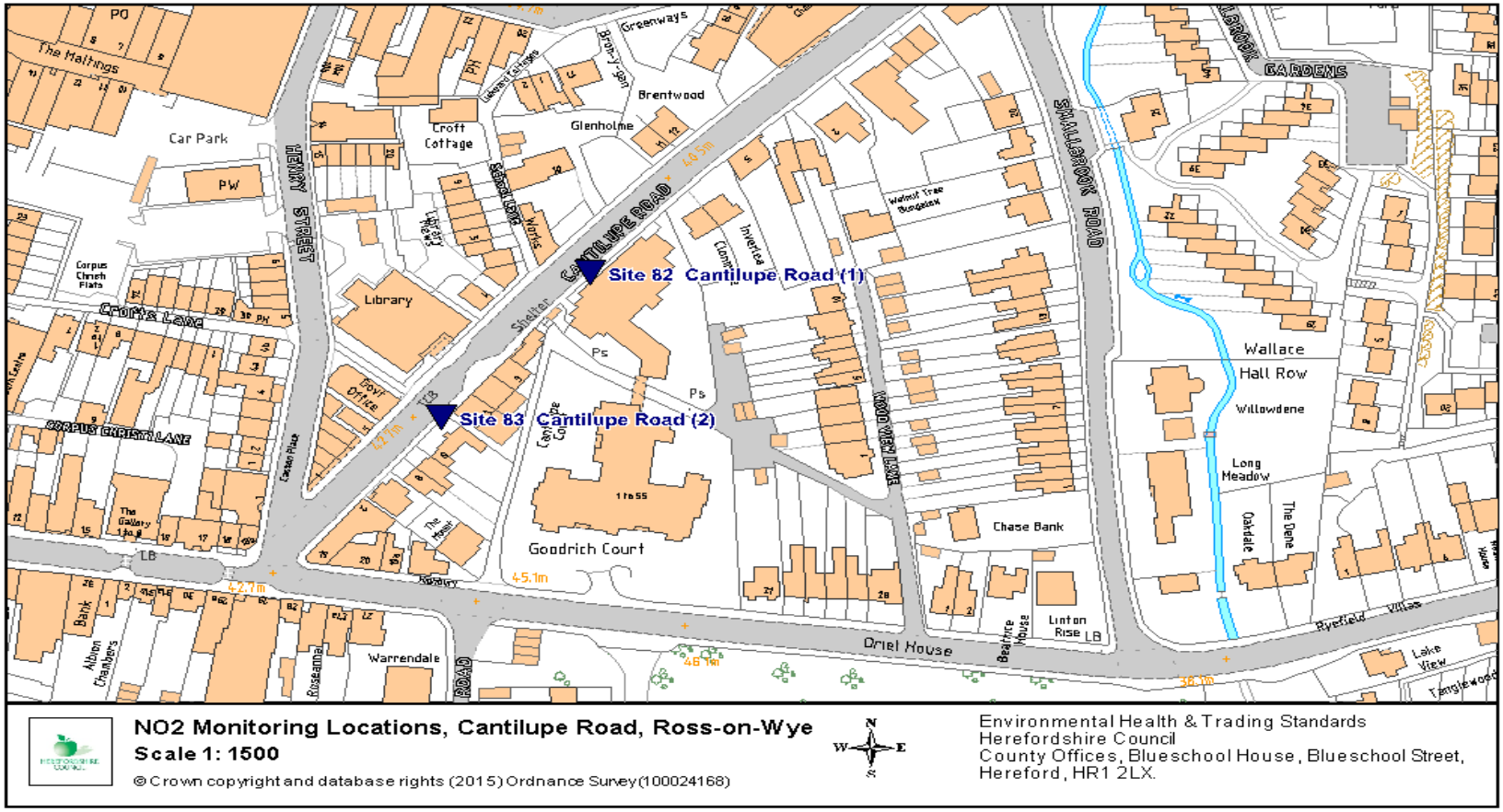


Figure D11 – Kings Acre Road, Huntington Lane and Three Elms Road Monitoring Locations

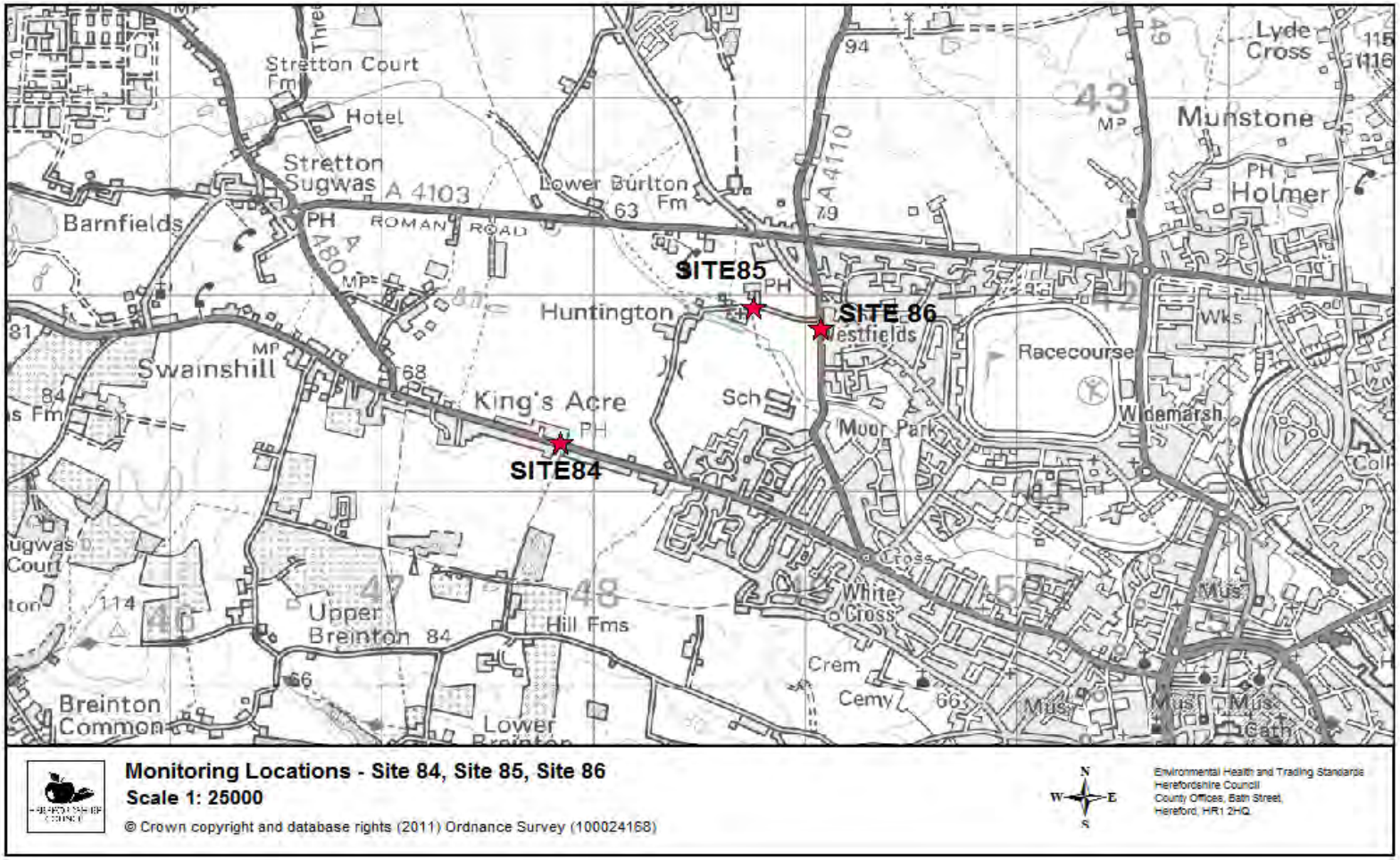
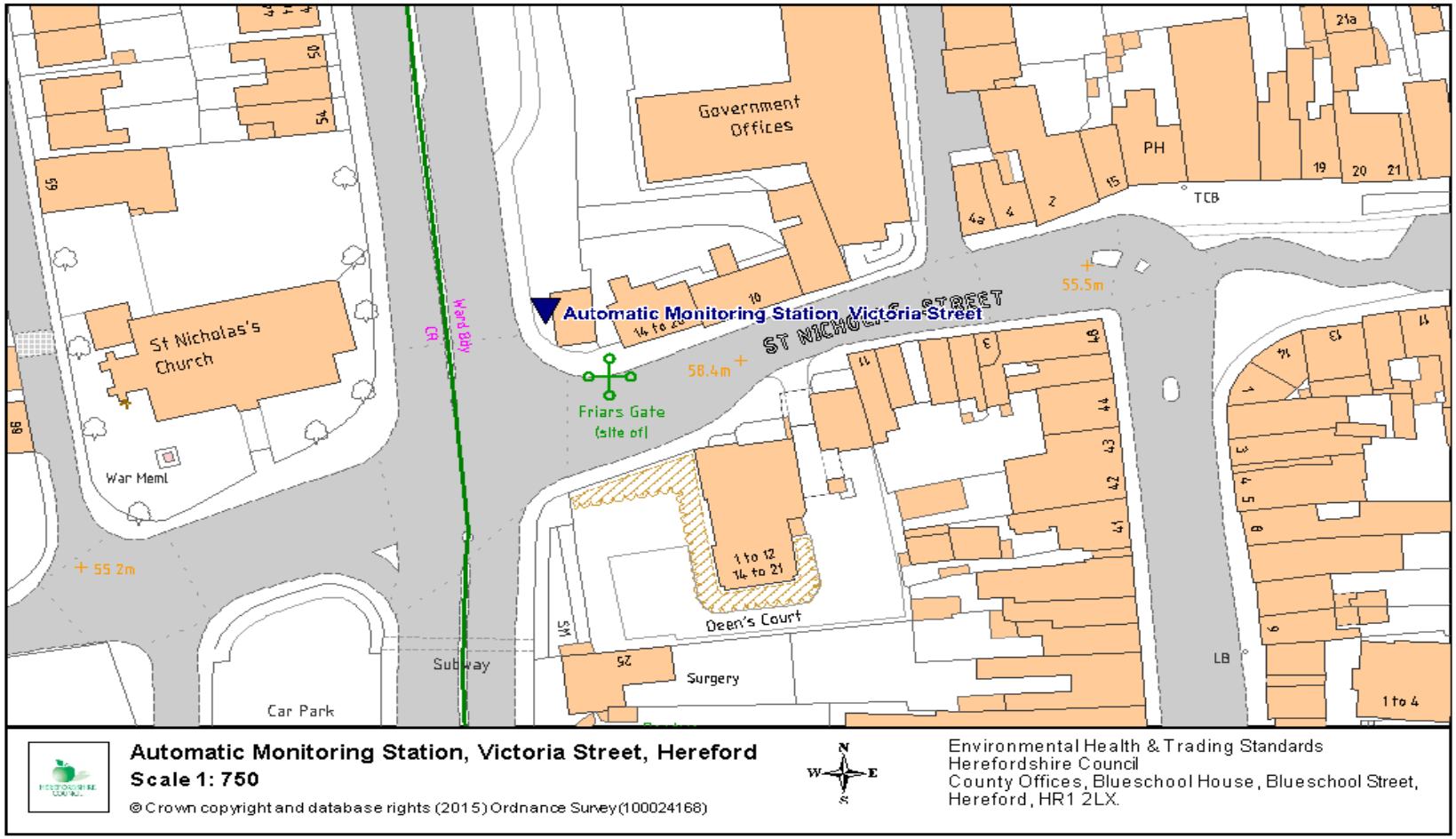


Figure D12 – Location of Automatic Monitoring Station, Hereford



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[9]	
	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

[9] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

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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
…	…

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

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

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Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom, AQEG, 2012