Herefordshire Council

2017 Air Quality Annual Status Report (ASR)

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

May 2018

Local Authority Officer	Environmental Health Service Manager
Department	Environmental Health & Trading Standards
Address	8 St Owens Street, Hereford HR1 2ZB
Telephone	01432 261761
E-mail	sh_Air&WaterPollutio@herefordshire.gov.uk
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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 (PM2.5) in line with the updated requirement in Air Quality guidance.

2016 monitoring data confirms that nitrogen dioxide levels have generally fallen over the last 6 years (with the exception of 2013) in both AQMA's. Hereford AQMA recorded 2016 levels just below the national objective level of 40µg/m3 (highest reading 39.7µg/m3 at site 10). Leominster AQMA is still exceeding the objective level at Bargates with an NO2 level of 44.2 µg/m3 at site 61.

Monitoring will continue in the two AQMA's to assess whether the downward trend in NO2 continues (see Figures C1 and C2). Currently, it is considered too early to make any decisions regarding revocation of the Hereford AQMA as the Council needs to be

[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

confident that breach of the Air Quality Objectives consistently no longer occur. 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. 2017 monitoring data will be reviewed in the 2018 ASR to evaluate if there are any improvement in NO2 levels.

City Link Road - Hereford

Construction work commenced on the City link road in 2015 and was completed in December 2017. The road has opened up brownfield land for new affordable housing and regeneration in the centre of Hereford. The new Link Road connects Edgar Street to the west and Commercial Road to the east (with a spur linking Blackfriars Street to the south). The completed road includes a shared use path along the north side and a walking and cycling link between Morrisons and Canal Road.

It is anticipated that the road will help ease congestion within the core of the city along part of the AQMA. There are proposals to re-design Newmarket Street, Blueschool Street and Commercial Square with safe and attractive routes for pedestrians and cyclists and improved public transport facilities.

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. 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. 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 and improvements across the county in 2016/17 principally to Holme Lacy Road in the vicinity of Putson Post Office between Oak Crescent and the Co-op.

The Oval redevelopment also included a shared use path along the frontage between Goodrich Grove and Broxash Drive, and a new traffic-free link from Kilvert Drive to Great Western Way.

Other notable projects that are being worked on include:

- St Owen's Street cycle contraflow between Bath Street and High Town https://www.herefordshire.gov.uk/consultations/article/10034/st_owen_street_consultation
- High Town refurbishment including cycle parking https://www.herefordshire.gov.uk/info/200196/roads/252/hereford_2020/2
- South Wye Transport Package, consultation on a range of active travel measures to support the Southern Link Road (between A49 and A465) https://www.herefordshire.gov.uk/south-wye-transport-package. There are a links to series of panels describing the schemes in more detail on that page.

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 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.

Conclusions and Priorities

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
- Comment on planning applications for major housing road schemes in relation to air quality
- Continue to inspect Local Authority Permitted installations

Local Engagement and 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.[4] Therefore, there is scope to change the way we travel to help improve

[4] Local Transport Plan 2016 – 2031 Strategy

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.

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1 Local Air Quality Management

This report provides an overview of air quality in Herefordshire during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by 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 compliance with 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

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

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
AQMA Hereford	23/11/2001	NO2 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.	YES	47 µg/m3	39.71 µg/m3	Hereford Action Plan http://aqma.defra.gov.uk/action-plans/HC%20AQAP%202008.pdf
AQMA Bargates	01/03/2006	NO2 Annual Mean	Leominster	An area encompassing the junction between the A44 Bargates and B4361 Dishley Street/Cursneh Road in Leominster.	NO	61 µg/m3	44.15 µg/m^3	Bargates Action Plan https://www.herefordshire.gov.uk/downloads/file/4823/bargates_air_quality_draft_action_plan

☒ **Herefordshire Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

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

Defra's appraisal of last year's 2016 ASR concluded that the Council's actions, particularly significant traffic management measures are resulting in a positive effect within the AQMA's where pollution concentrations are now mostly achieving objective levels.

On the basis of monitoring data presented in the report, Defra suggested that the Hereford AQMA should be considered for revocation subject to review of 2016 monitoring results indicating no likely further locations of relevant exposure above objective levels. It was however suggested that Herefordshire Council may wish to consider reviewing the current monitoring strategy before making a final decision to revoke the AQMA. Due to significant changes proposed to the A49 corridor and connected infrastructure, additional monitoring sites will be implemented to evaluate these impacts before revocation is considered.

Defra also commented that monitoring results in table A.3 of the 2016 ASR had not been corrected for distance as detailed within the current Technical Guidance LAQM TG(16); where appropriate, these have been corrected for this year's report to provide relevant exposure levels for the nearest receptors.

Herefordshire Council has taken forward a number of direct measures during the current reporting year of 2017 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:

- Review of air monitoring locations, considering the proposed development locations in the Core Strategy and to assist in assessing potential air quality impact of any development
- Review of Poultry sites reference DEFRA Policy Guidance LAQM.PG16

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

Herefordshire Council's priorities for the coming year are:

- 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 Plans for Herefordshire
- 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

Herefordshire Council anticipates a principal air quality challenge will be the potential impact of major housing and infrastructure developments arising from the 2015 Core Strategy; these impacts will need to be considered during the planning application stages. The strategy identified a number of major housing developments required 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.

Herefordshire Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Hereford and Leominster AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Hereford Air Quality Action Plan

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Edgar Street Grid Re-developm ent	Traffic Managem ent	Reduction of speed limits, 20mph zones	Herefordshire Council & Advantage West Midlands formed ESG Herefordshire Ltd	NA	2010 - 2025	Trends in diffusion tube results	Not Specified	"Old Market" retail area development completed 2015.	2025	NO2 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. NO2 data to be reviewed once action is complete.
2	Improvem ent of A4103 road west of Herefords hire	Transport Planning and Infrastruct ure	Other	Herefordshire Council - Highways and Transportation	NA	Jun-08	NA	Not Specified	Road completed 2005 however signage still to be installed to indicate northern east-west bypass	2008	Since 2007 NO2 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.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
3	Rotherwas Access Road Link	Transport Planning and Infrastructure	Other	Herefordshire Council - Highways and Transportation	NA	Jun-08	Annual Average Daily Flow trends (AADT) and diffusion tubes	Not Specified	Completed June 2008	2008	Annual Average Daily Flow trends (AADT) show a reduction in HGVs from 1045 in 2008 to 964 in 2009 however total motor vehicles has increased. Updated traffic data to be reviewed in future reports
4	City Link Road Hereford	Transport Planning and Infrastructure	Other	Herefordshire Council - Highways and Transportation	2012-2014	2014- 2017	Annual Average Daily Flow trends (AADT) and diffusion tubes	Not Specified	Consultation and preparatory work is progressing on the link road 2015.	Construct by Spring 2018	Not applicable until road constructed
5	New Outer Distributer road (3rd Link) Hereford Relief Road	Transport Planning and Infrastructure	Other	Herefordshire Council – Highways and Transportation Service	Ongoing	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 Management	Other	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	Completed	The diffusion tube measurements at this roundabout were showing exceedances of the NO2 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.
7	"North & South" Park and ride Scheme in Hereford	Alternatives to private vehicle use	Bus based Park & Ride	Herefordshire Council – Highways and Transportation Service		Timescales are currently undecided	Annual Average Daily Flow trends (AADT) and diffusion tubes	NA	No longer being taken forward		

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
8	Parking Strategy in Hereford to reduce commuter parking	Traffic Management	Other	Herefordshire Council – Highways and Transportation Service and Planning Services			Annual Average Daily Flow trends (AADT) and diffusion tubes	NA	No longer being taken forward. Alternative parking strategy in place		
9	Improve and increase number of cycle routes and facilities in Hereford	Transport Planning and Infrastructure	Cycle network	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	NO2 levels at the city centre sites have been gradually reducing since 2007
10	City Centre Pedestrian Enhancement in Hereford	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	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	NO2 levels at Site 6 (Broad Street) and Site 59 (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	Herefordshire Council – Highways and Transportation Service	Ongoing	Ongoing	Diffusion tubes	Not Specified	Ongoing programme of promotions and initiatives. Examples include Bike ability Training and the promotion of TwoShare, Destination Herefordshire	Ongoing	NO2 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.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
12	Designation of a Traffic manager for network management Duties along the A49 in Hereford	Traffic Management	Other	Highway Agency and Hereford-shire Council			Diffusion tubes along A49 corridor	Not Specified	Completed 2008	Completed 2008	NO2 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	Traffic Management	Testing Vehicle Emissions	Herefordshire Council Environmental Health and Trading Standards		Annually 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 completed. No plans for further testing.	100% compliance in 2006 and 2007.
14	Information and awareness training	Public Information	Via the Internet	Herefordshire Council Environmental Health and Trading Standards		On-going improvement of web-site material on air quality	Number of hits on the website	Not Specified	Ongoing		Currently investigating whether the hits on the website can be calculated.
15	Southern Link Road A49 Ross Road / Rotherwas Access Road roundabout to the A465 and the B4349 Clehonger Road	Transport Planning and Infrastructure	Other	Herefordshire Council – Highways and Transportation Service	2012-2016	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

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Improvements to the traffic light sequencing at the A44/B4361 junction at Bargates	Transport Planning and Infrastructure	Other	Herefordshire Council	2014-2015	2016	Reduction of NO2 levels at diffusion tubes	Not Specified	Report commissioned reviewing the best options for the junction arrangement.	2016	
2	Improvements to cycle facilities/ routes between Morrisons Store and the Town centre	Transport Planning and Infrastructure	Cycle network	Herefordshire Council	2014-2016	Sep-16	Reduction of NO2 levels at diffusion tubes	Not Specified	Awaiting S106 monies	2014-2016	
3	Improvements to the public transport facilities between Morrisons Store and the Town centre	Transport Planning and Infrastructure	Other	Herefordshire Council	2014-2016	2016	Reduction of NO2 levels at diffusion tubes	Not Specified	Awaiting S106 monies	2016	

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
4	Improve and increase number of pedestrian routes and facilities in Leominster	Transport Planning and Infrastructure	Other	Herefordshire Council	2014-2016		Reduction of NO2 levels at diffusion tubes	Not Specified	Awaiting S106 monies		
5	Behavioural Change Programme	Promoting Travel Alternatives	Promotion of walking	Herefordshire Council	2014-2016		Reduction of NO2 levels at diffusion tubes	Not Specified	Work ongoing. Bid submitted for funding in 2016.	Ongoing	
6	Behavioural Change Programme	Promoting Travel Alternatives	Promotion of cycling	Herefordshire Council	2014-2016		Reduction of NO2 levels at diffusion tubes	Not Specified	Work ongoing. Bid submitted for funding in 2016.	Ongoing	
7	Development of the southern Relief Road	Transport Planning and Infrastructure	Other	Herefordshire Council	For the period up to 2031		Reduction of NO2 levels at diffusion tubes	Not Specified		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.[5]

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 Midlands 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 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.

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

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 2016 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

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 2016 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 8µg/m^3. This is well below the objective level of 40 µg/m^3 (although it is noted that the data capture rate at this site is low at 62%). 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 21 sites for the full year. Table A.2 – Details of Non-Automatic Monitoring Sites in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 – Annual Mean NO2 Monitoring Results 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 2016 dataset of monthly mean values is provided in Appendix B.

Note: 2013 data was omitted from the trend analysis in figures A1 to A4. 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 2014-16.

Hereford AQMA

The NO_2 data within the AQMA in Hereford (figure A1) shows that there were no exceedances of the air quality objective of 40µg/m3 in 2016, although the adjusted annual mean for site ID10 was only just below the objective (39.71 µg/m^3). There were also no exceedances in 2015 (38.54 µg/m^3 at site ID10). However, the marginal increase in 2016 demonstrates the need to acquire several years of data before revocation of the Hereford AQMA.

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.

All six sites within the AQMA have shown a general downward trend and levels have reduced since 2011 - 2016 by a range of 2.7 to 6.8 µg/m^3. However, all but one of the 2016 monitoring points are marginally elevated from those recorded in 2015.

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 (see figure A2).

Site 54 continues to demonstrate declining concentrations well below the air quality objective in line with previous year's results, although again there appears to be a marginal increase in annual values. This site will continue to be monitored.

Site 65 is a kerbside monitoring location that has now been consecutively below the air quality objective for two years (without nearest receptor calculation), 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 City.

3 of the 4 sites (6, 74 and 79) in Hereford located further afield from the AQMA have followed the general downward trend seen across the County between 2011 and 2016. The exception is site 75 – 22 Barton Road which is an Urban Background monitoring location. 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. The latest data for 2016 of 29.6µg/m^3 is still higher than data for 2011 and 2012 demonstrating that this site does not seem to be following the linear trend in reducing concentration. However, the measured concentration in 2016 is substantially below the air quality objective. The Council will continue to closely monitor this location, particularly with potential impacts on local road use from the proposed Herford Transport Package.

Leominster AQMA

2011 to 2016 trend data for sites in the Leominster AQMA can be found in the graph of figure A3. Site 46 – Bengry's Lights, was below the air quality objective in 2016 recording concentrations of 32.8 µg/m^3. While this continues the linear downward trend in measured NO_2 levels since 2011 at this location, it is still marginally increased by 0.1µg/m^3 from 2015 levels.

Site 61 (29 Bargates) continues to record the highest concentrations of NO_2 in the County; 42.9µg/m3 in 2015, and 44.2µg/m3 in 2016. However, with reference to the graph in figure A3, it is noted concentrations continue the linear downward trend at a similar rate as site 46, and have reduced by over 10µg/m3 since 2012. This monitoring tube is located on a building façade therefore represents the concentration at the receptor. An NO_2 level of 44.2µg/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 2016. An additional monitoring site in the Leominster AQMA is planned in 2017 to provide information about receptor impacts further away from the main traffic light junction.

A40 corridor

With reference to figure A4, the two roadside locations along this corridor, Sites 32 – Weir End House and 33 – Apple Tree Cottage, continue to follow the linear downward trend seen across the County since 2011, measuring 33.7µg/m^3 and 33.6µg/m^3 in 2016 respectively. Both these sites will continue to be monitored in 2017 to confirm the linear downward trend seen so far.

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 at sites 82 and 83 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. Annual mean concentrations for 2016 suggest urban background levels of between 21-23µg/m^3. However, trend data for Ross on Wye town centre will be published in the ASR once sufficient trend data is gathered.

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 2016.

The automatic monitoring station has been operational since December 2016 and data is expected for the 2018 ASR.

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.

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	NO2; PM10	Y	Chemiluminescent and PM10	10m	5m	1.9m

Notes:

(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	NO2	N	1	0.3	N	2.8
9	Victoria St, Hereford (duplicate 1)	Roadside	350688	239864	NO2	Y	NA	2.9	N	2.9
10	Victoria St, Hereford (house façade)	Roadside	350677	240015	NO2	Y	0	2.9	N	2.5
22	Edgar/ Moor St, Hfd façade (duplicate 1)	Roadside	350860	240615	NO2	Y	0	2.3	N	2.3
32	Weir End house façade	Roadside	357717	223736	NO2	N	0	4.5	N	2
33	Wilton house façade	Roadside	358506	224214	NO2	N	0	2.9	N	1.9
46	Bengry's Lights, Leominster	Roadside	349409	259010	NO2	Y	0	3.4	N	2.1
53	Cross St, Belmont, Hfd house façade	Roadside	350723	239163	NO2	Y	0	5.3	N	2.1

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)
54	Holmer Rd, Hereford house façade	Urban Background	350602	241097	NO2	N	0	9.5	N	1.7
57	Eign St, Hereford shop flat façade	Roadside	350499	240108	NO2	Y	1	0.5	N	2.2
59	Elgars Rest, Widemarsh St, Hfd façade	Urban Centre	350987	240139	NO2	Y	0	3	N	2.4
61	29 Bargates, Leominster	Roadside	349363	259013	NO2	Y	0	2.85	N	2.2
65	96 Whitecross Road, Hereford façade	Urban Background	350086	240296	NO2	N	4	1.3	N	2.2
74	140 Whitecross Road, Hereford	Roadside	349985	240334	NO2	N	0	8.2	N	2.1
75	22 Barton Road, Hereford	Roadside	350511	239740	NO2	N	15	1.4	N	2.4

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)
79	76 Belmont Road	Roadside	350472	238999	NO2	N	7	1	N	2.3
82	Cantilupe Road 1 Ross-on-wye	Urban Background	360204	224177	NO2	N	1.5	1.7	N	2.3
83	Cantilupe Road 2 Ross-on-wye	Urban Background	360165	224130	NO2	N	1.5	1.5	N	2.3
84	Kings Acre Road	Suburban	347864	241236	NO2	N	NA	6.2	N	2.55
85	Huntington Lane, Hereford	Rural	348752	241941	NO2	N	NA	1.2	N	2.1
86	Three Elms Road, Hereford	Roadside	349067	241933	NO2	N	NA	1.5	N	1.7

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2012	2013	2014	2015	2016
6 - Broad St, Hereford	Urban Background	Diffusion Tube	–	100	30.4	37.17a	28.93	25.53	25.92
9 - Victoria St (duplicate 2), Hereford	Roadside	Diffusion Tube	–	100	**44.7**	**54.38a**	**40.25**	35.94	37.96
10 - Victoria St (house façade), Hereford	Roadside	Diffusion Tube	–	91.7	**46.9**	**50.40a**	**43.71**	38.54	39.71
22 - Façade Edgar/Moor St(Duplicate 2),Hfd	Roadside	Diffusion Tube	–	83.3	35.7	**42.58a**	30.59	24.68	28.82
32- House facade, Weir End	Roadside	Diffusion Tube	–	100	37.3	**48.75a**	36.07	34.25	33.74
33 - House façade, Wilton	Roadside	Diffusion Tube	–	100	38.7	**50.11a**	36.27	33.93	33.63
46 - Bengry's Lights, Leominster	Roadside	Diffusion Tube	–	100	**40.3**	**49.33a**	38.43	32.7	32.81
53 - House façade, Cross St, Belmont, Hfd	Roadside	Diffusion Tube	–	100	34.1	**41.71a**	33.73	31.39	31.20
54 - House façade, Holmer Rd, Hereford	Urban Background	Diffusion Tube	–	100	27.9	31.59a	25.58	22.42	24.42

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
57 - Shop flat façade, Eign Street, Hereford	Urban Background	Diffusion Tube	–	100	38.3	**43.94a**	34.05	28.27	31.07
59 - Elgars Restaurant (façade), Widemarsh St, Hfd	Urban Centre	Diffusion Tube	–	91.7	28.1	37.11a	24.61	23.42	23.92
61 - 29 Bargates, Leominster	Roadside	Diffusion Tube	100	33.3	–	–	–	–	**44.15**
65 - 96 Whitecross Road (façade), Hereford	Urban Background	Diffusion Tube	–	100	39.5	**51.87a**	**40.18**	36.35	36.04
74 - 140 Whitecross	Roadside	Diffusion Tube	–	100	21.9	25.65a	19.44	19.59	18.82
75 - 22 Barton Road, Hereford	Roadside	Diffusion Tube	–	100	28.7	**48.38a**	36.7	30.33	29.60
79 - 76 Belmont Road	Roadside	Diffusion Tube	–	91.7	38.5	**47.50a**	35.33	32.76	31.46
82 - Cantilupe Road 1 (Flats)	Urban Background	Diffusion Tube	–	100	–	–	–	–	22.30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
83 - Cantilupe Road 2 (Bus Stop)	Urban Background	Diffusion Tube	–	91.7	–	–	–	–	21.58
84 - Kings Acrre Rd, Hereford	Urban Background	Diffusion Tube	–	100	–	–	–	–	12.60
85 - Huntington Lane, Hereford	Rural	Diffusion Tube	–	100	–	–	–	–	8.80
86 - Three Elms Rd, Hereford	Urban Background	Diffusion Tube	–	91.7	–	–	–	–	16.80

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

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

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/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 Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

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

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.94) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
6 - Broad St, Hereford	27.79	29.73	30.42	27.04	24.55	25.32	20.62	17.92	19.32	24.65	29.83	33.87	27.58	25.92	25.0
9 - Victoria St (duplicate 2), Hereford	49.93	40.66	43.86	40.51	34.39	37.89	31.72	24.12	27.87	32.98	41.48	50.14	40.39	37.96	NA
10 - Victoria St (house façade), Hereford	36.67	36.11	47.56	48.94	42.06	41.50	0.00	31.43	31.84	35.96	45.76	39.03	42.25	39.71	NA
22 - Façade Edgar/Moor St(Duplicate 2),Hfd	26.59	0.00	33.60	31.36	23.82	32.43	0.00	24.14	20.36	28.86	35.68	31.34	30.66	28.82	NA
32- House facade, Weir End	29.76	32.54	31.82	38.47	33.15	34.94	29.78	30.32	30.49	29.73	43.55	40.30	35.89	33.74	NA
33 - House façade, Wilton	29.12	32.80	35.29	33.80	30.29	35.08	34.15	30.65	32.14	33.34	39.47	37.40	35.77	33.63	NA

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.94) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
46 - Bengry's Lights, Leominster	30.94	39.39	32.98	35.93	31.44	31.32	29.11	30.10	31.26	30.61	30.13	40.48	34.90	32.81	NA
53 - House façade, Cross St, Belmont, Hfd	26.02	27.51	29.63	34.40	32.67	36.72	29.52	25.28	27.47	31.36	39.88	33.95	33.19	31.20	NA
54 - House façade, Holmer Rd, Hereford	21.15	21.35	25.00	25.78	29.56	26.06	23.14	17.78	19.83	22.56	30.91	29.92	25.98	24.42	NA
57 - Shop flat façade, Eign Street, Hereford	29.01	28.39	35.93	33.27	32.09	34.51	27.84	25.20	22.88	26.99	40.48	36.30	33.06	31.07	29.3
59 - Elgars Restaurant (façade), Widemarsh St, Hfd	22.75	25.57	29.30	29.07	21.66	25.46	20.73	0.00	14.18	19.31	27.14	27.91	25.44	23.92	NA
61 - 29 Bargates, Leominster	43.71	52.46	43.93	44.20	43.21	44.69	38.39	43.96	41.83	40.70	44.43	48.36	46.97	**44.15**	NA

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 (0.94) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
65 - 96 Whitecross Road (façade), Hereford	28.84	31.01	40.92	41.55	43.40	42.73	37.13	28.20	23.16	29.89	46.27	39.43	38.34	36.04	33.9
74 - 140 Whitecross	18.25	21.42	18.95	19.85	18.75	17.81	16.00	14.51	15.06	17.36	22.67	25.22	20.02	18.82	NA
75 - 22 Barton Road, Hereford	27.58	30.15	34.56	34.67	34.97	36.01	29.29	22.52	19.86	24.86	34.05	26.74	31.49	29.60	28.8
79 - 76 Belmont Road	26.64	28.69	37.77	31.46	34.64	34.67	28.84	26.29	27.78	29.13	40.13	0.00	33.47	31.46	30.5
82 - Cantilupe Road 1 (Flats)	22.97	25.25	27.05	25.13	20.29	24.21	22.56	15.53	17.72	21.09	16.89	28.90	23.72	22.30	22.2
83 - Cantilupe Road 2 (Bus Stop)	0.00	23.41	24.35	23.09	20.70	20.29	18.69	16.79	14.91	19.15	31.40	24.57	22.95	21.58	21.6

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 (0.94) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
84 - Kings Acrre Rd, Hereford	8.61	9.79	15.68	14.86	11.82	13.34	12.25	8.22	9.09	11.19	18.68	17.63	13.40	12.60	NA
85 - Huntington Lane, Hereford	8.25	12.53	10.45	10.52	6.95	7.66	6.58	4.03	4.94	6.37	13.15	14.17	9.36	8.80	NA
86 - Three Elms Rd, Hereford	22.38	19.78	20.22	17.79	15.44	16.31	0.00	7.21	9.14	13.67	20.49	22.37	17.87	16.80	NA

☒ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

(2) Distance corrected to nearest relevant public exposure.

Figure A1 Trend in NO2 Hereford AQMA 2011-2016

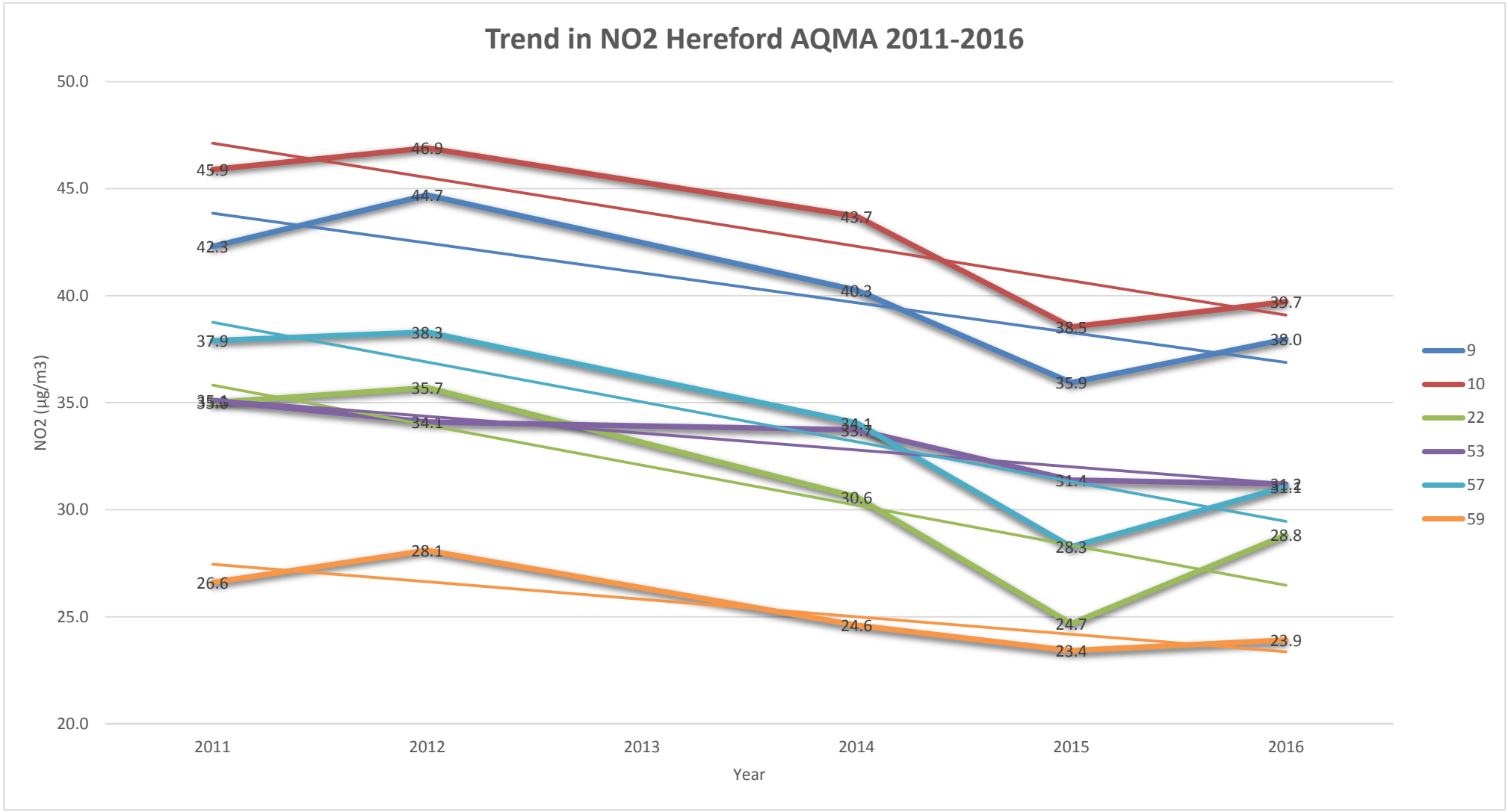


Figure A2 Trend in NO2 Hereford, Outside AQMA 2011-2016

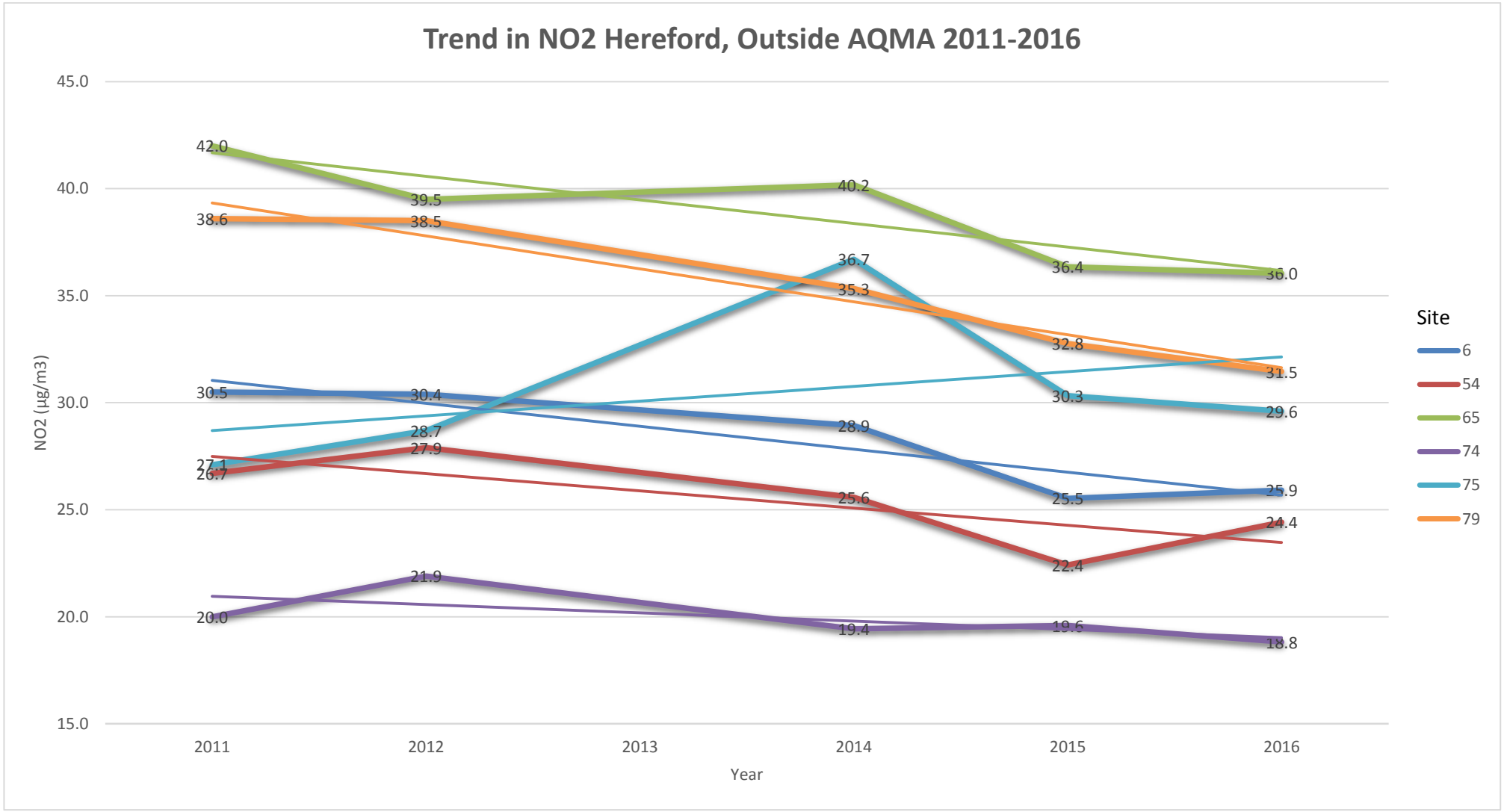


Figure A3 Trend in NO2, Leominster AQMA 2011-2016

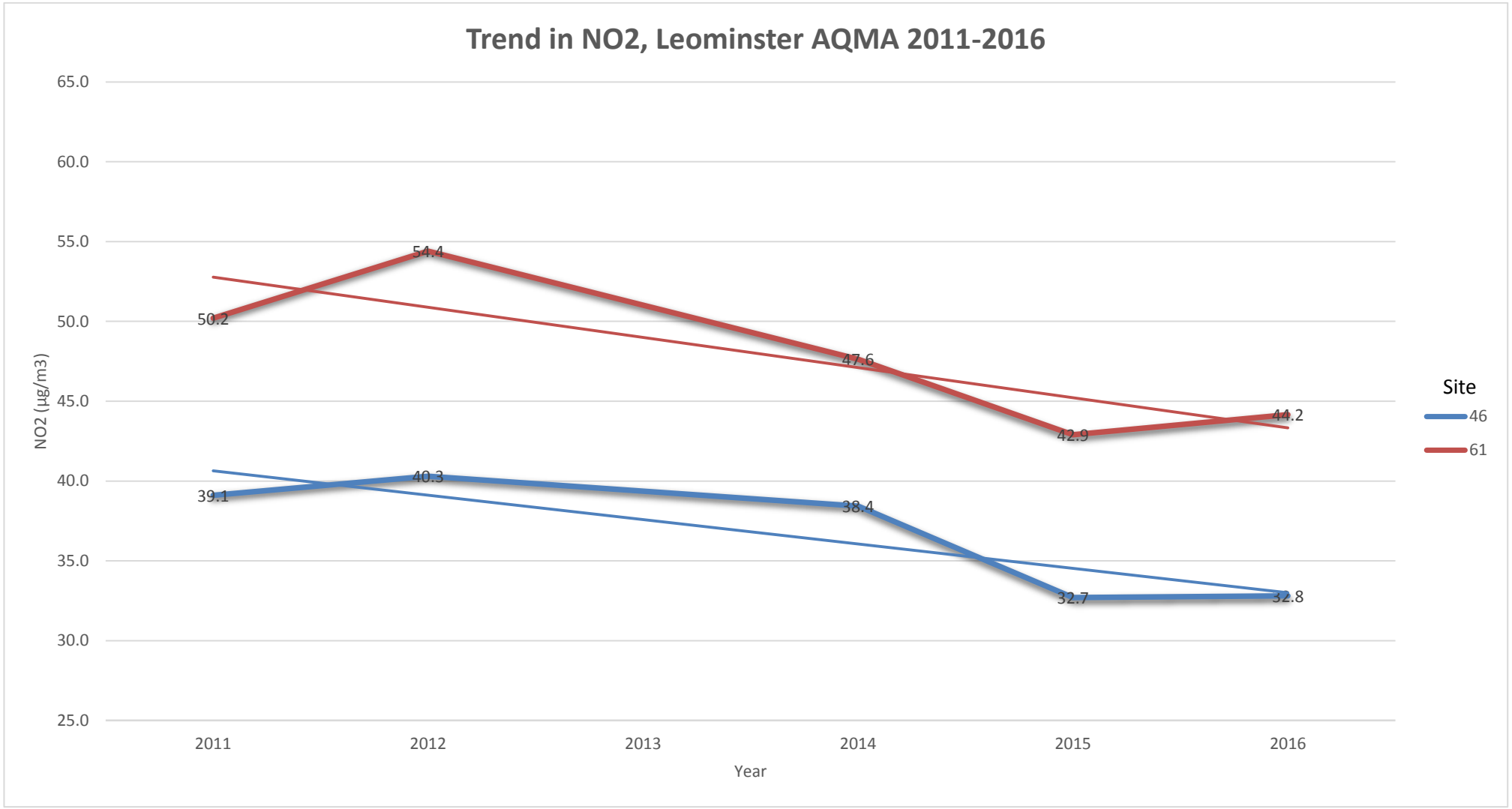
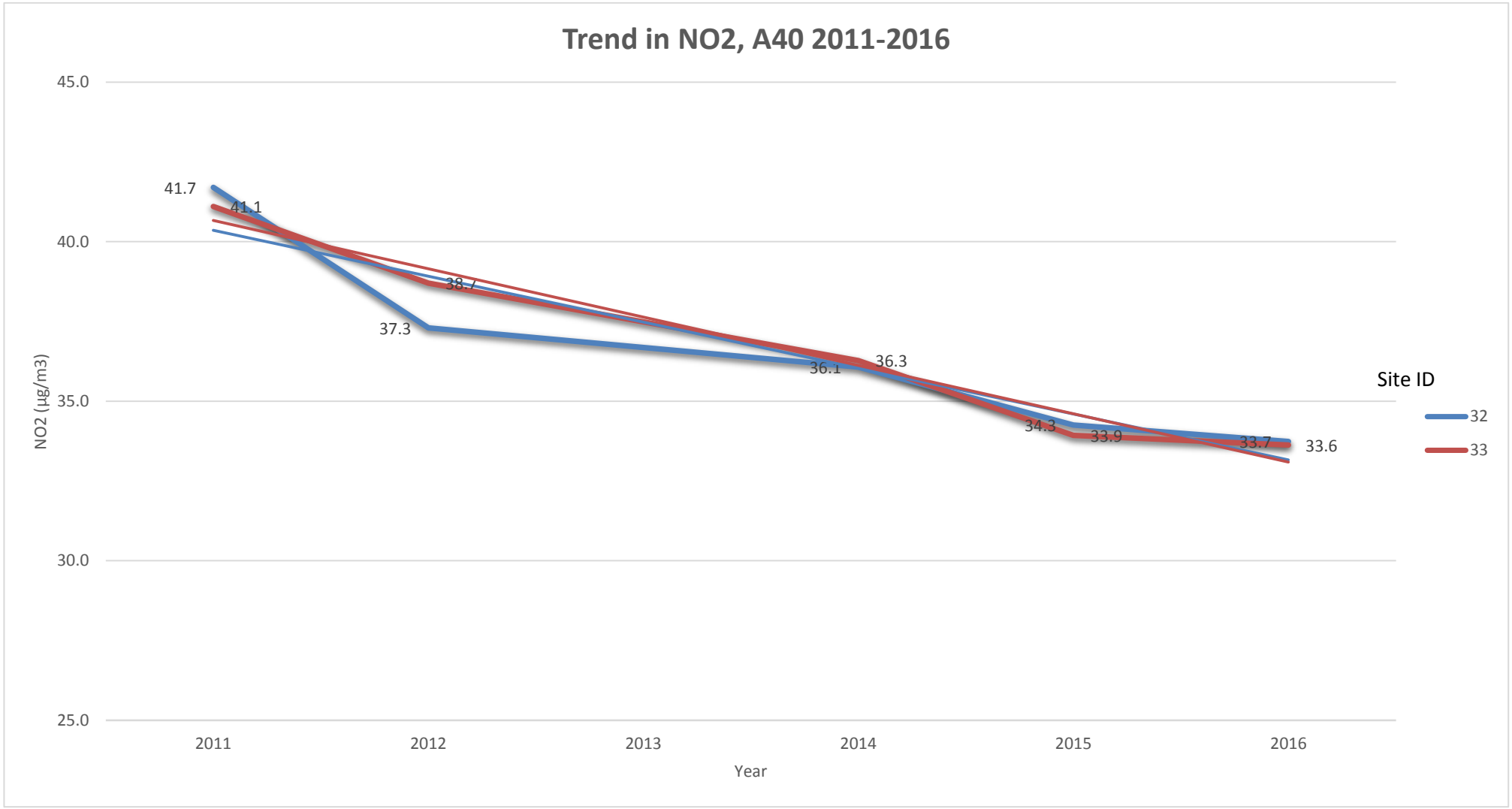


Figure A4 Trend in NO2, A40 2011-2016



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 2016.

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

Table C.1 – 2016 National Diffusion Tube Bias Adjustment Factor (03/17 V2)

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/17 V2

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2017

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2016	R	Gateshead Council	12	29	26	10.5%	G	**0.90**
Gradko	20% TEA in water	2016	R	Gateshead Council	11	35	37	-6.0%	G	**1.06**
Gradko	20% TEA in water	2016	R	Gateshead Council	12	37	31	19.0%	G	**0.84**
Gradko	20% TEA in water	2016	R	Wokingham Borough Council	11	45	41	9.0%	G	**0.92**
Gradko	20% TEA in water	2016	R	Wokingham Borough Council	11	37	34	9.5%	G	**0.91**
Gradko	20% TEA in water	2016	R	Cheshire West and Chester	12	37	39	-5.3%	G	**1.06**
Gradko	20% TEA in water	2016	R	Thurrock Borough Council	12	29	26	11.0%	G	**0.90**
Gradko	20% TEA in water	2016	R	Borough Council of King's Lynn & West Norfolk	11	30	25	18.2%	G	**0.85**
Gradko	20% TEA in water	2016	UB	Eastleigh Borough Council	11	29	30	-4.7%	G	**1.05**
Gradko	20% TEA in water	2016	R	Eastleigh Borough Council	12	44	42	2.9%	G	**0.97**
Gradko	20% TEA in water	2016	R	Brighton & Hove City Council	12	52	48	8.8%	G	**0.92**
Gradko	20% TEA in water	2016	R	Eastleigh Borough Council	11	29	37	-22.0%	G	**1.28**
Gradko	20% TEA in water	2016	KS	Marylebone Road Intercomparison	12	99	79	25.2%	G	**0.80**
Gradko	20% TEA in water	2016	R	Monmouthshire County Council	11	39	34	16.6%	G	**0.86**
Gradko	20% TEA in Water	2016	R	Preston City Council	10	30	27	10.0%	G	**0.91**
Gradko	20% TEA in water	2016	R	Dudley MBC	12	37	34	11.0%	G	**0.90**
Gradko	20% TEA in water	2016	UB	Dudley MBC	12	26	22	18.6%	G	**0.84**
Gradko	20% TEA in water	2016	R	Dudley MBC	11	43	38	12.4%	G	**0.89**
Gradko	20% TEA in water	2016	R	Dudley MBC	12	51	54	-5.6%	G	**1.06**
Gradko	20% TEA in water	2016	B	LB Waltham Forest	12	31	30	2.3%	G	**0.98**
Gradko	20% TEA in water	2016	R	NOTTINGHAM CITY COUNCIL	12	37	39	-5.4%	G	**1.06**
Gradko	20% TEA in water	2016		**Overall Factor[3] (21 studies)**				Use		**0.94**

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

The bias adjustment factor applied to the results in 2016 was 0.94 (spreadsheet 03/17 v2) 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 2016. Tube precision was generally 'Good' throughout 2016

Table C.2 – Estimation of NO2 concentrations at the nearest receptor

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration (µg/m^3)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
6 H	1.0	1.3	8.8	25.9	25.0
9 H	NA				
10 H	NA				
22 H	NA				
32 R	NA				
33 R	NA				
46 L	NA				
53 H	NA				
54 H	NA				
57 H	1.0	1.5	8.8	31.1	29.3
59 H	NA				
61 L	NA				
65 H	4.0	5.3	8.8	36.0	33.9
74 H	NA				
75 H	15.0	16.4	8.8	29.6	28.8
79 H	7	8.0	8.8	31.5	30.5
82 R	1.5	3.2	21.5	22.3	22.2
83 R	1.5	3	21.5	21.6	21.6
84 H	NA				
85 H	NA				
86 H	NA				

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

Figure D5 Map of Herefordshire Transport Network and Major Settlements

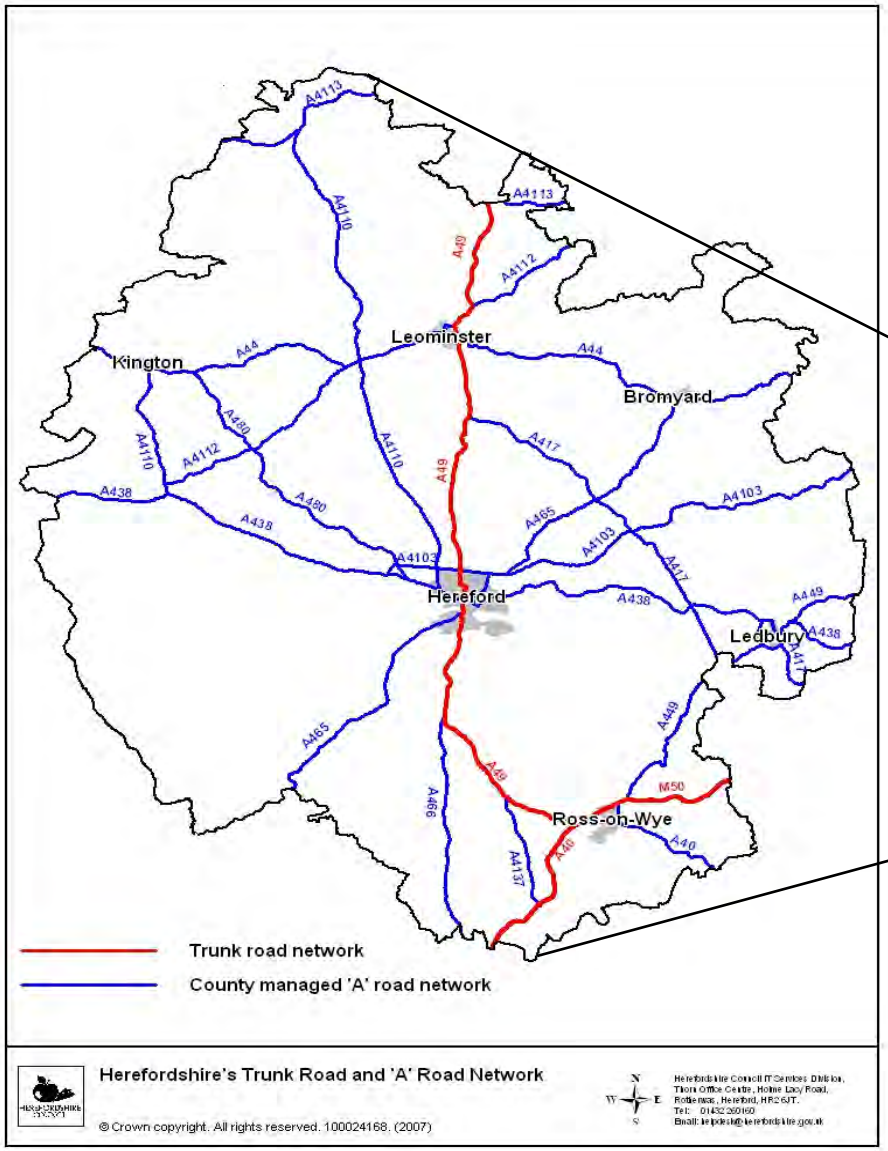


Figure D6 Location of Herefordshire

Figure D7 Hereford AQMA Boundary

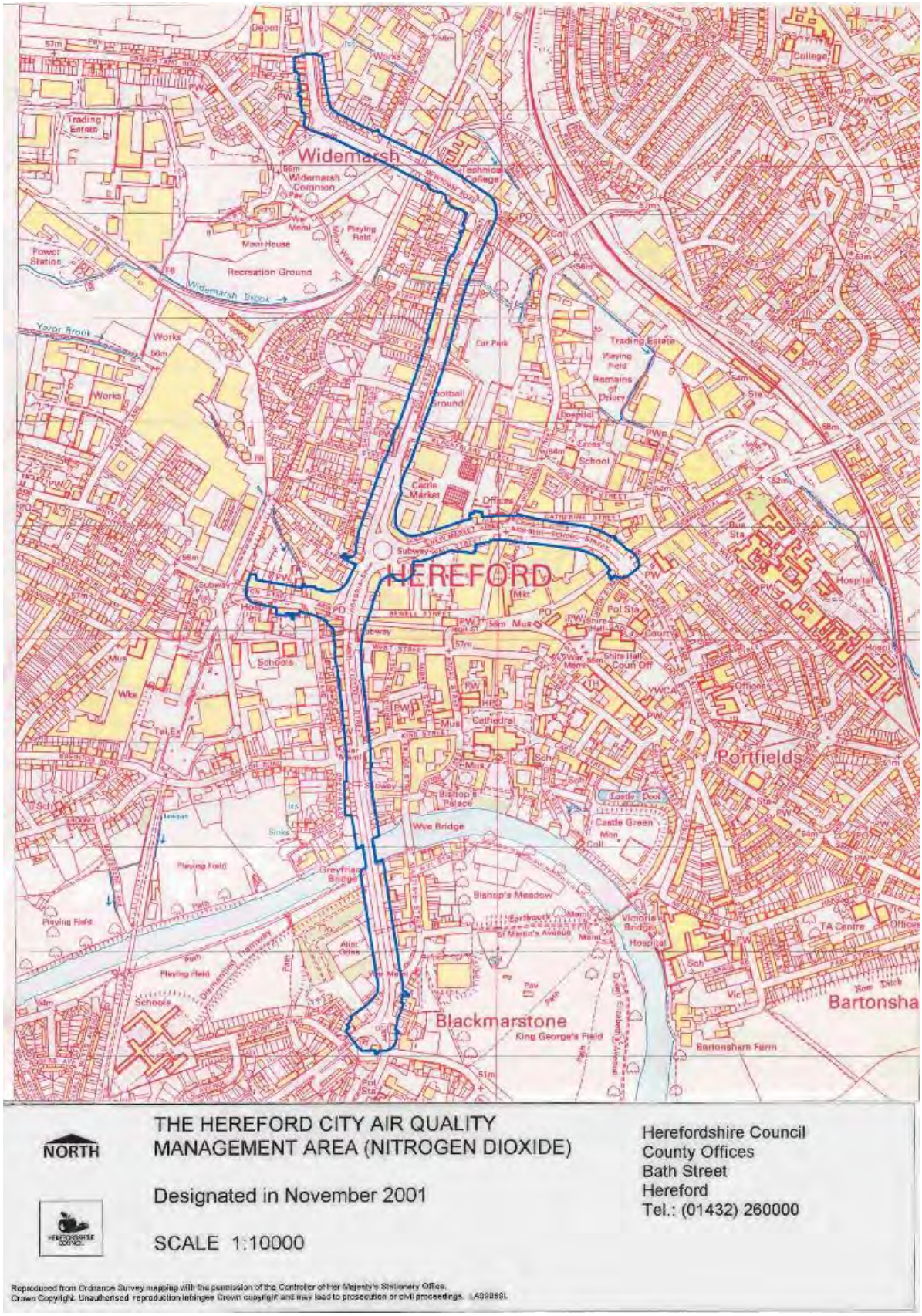


Figure D8 Hereford City (North) Monitoring Locations

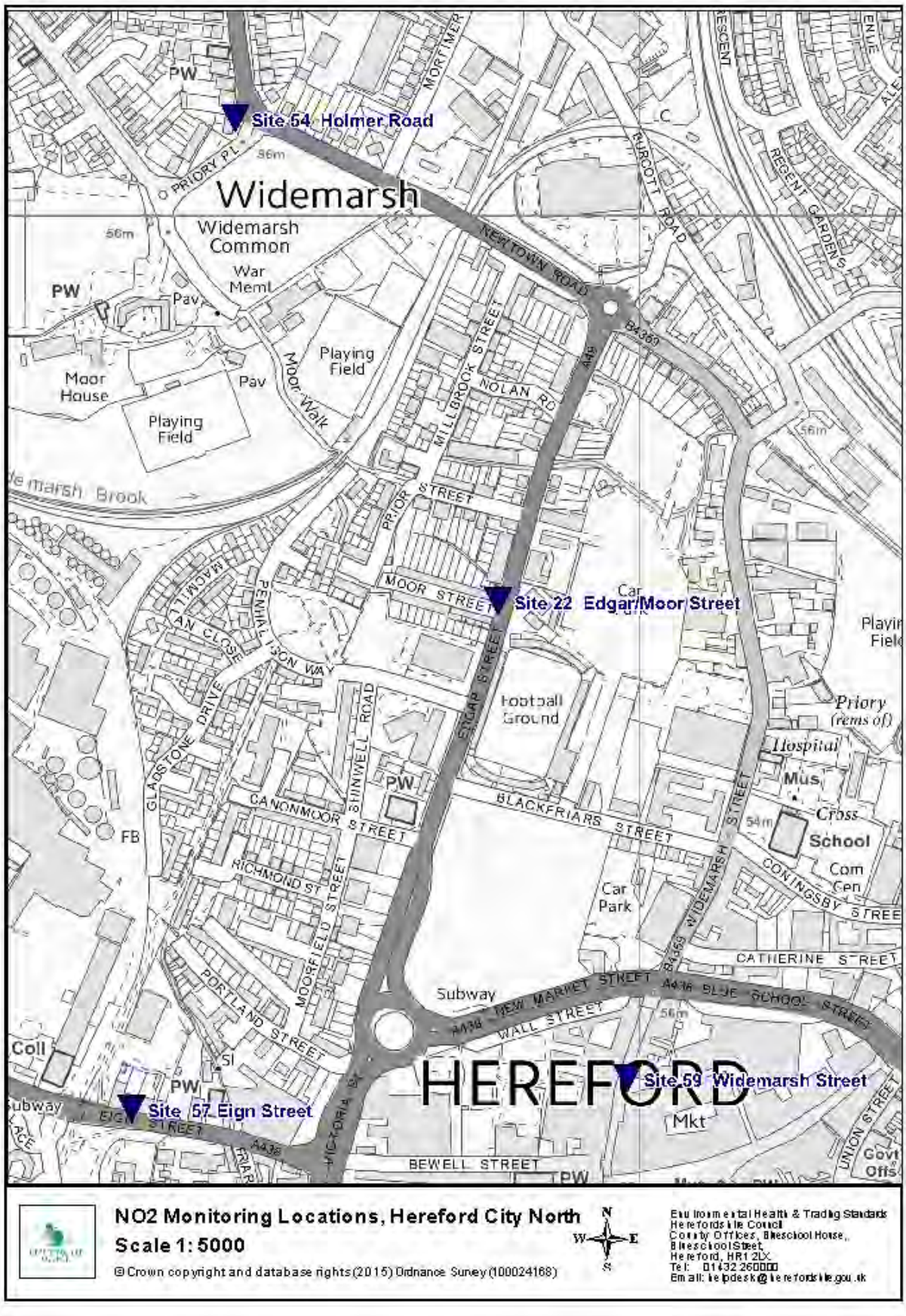


Figure D9 Hereford City (South) Monitoring Locations

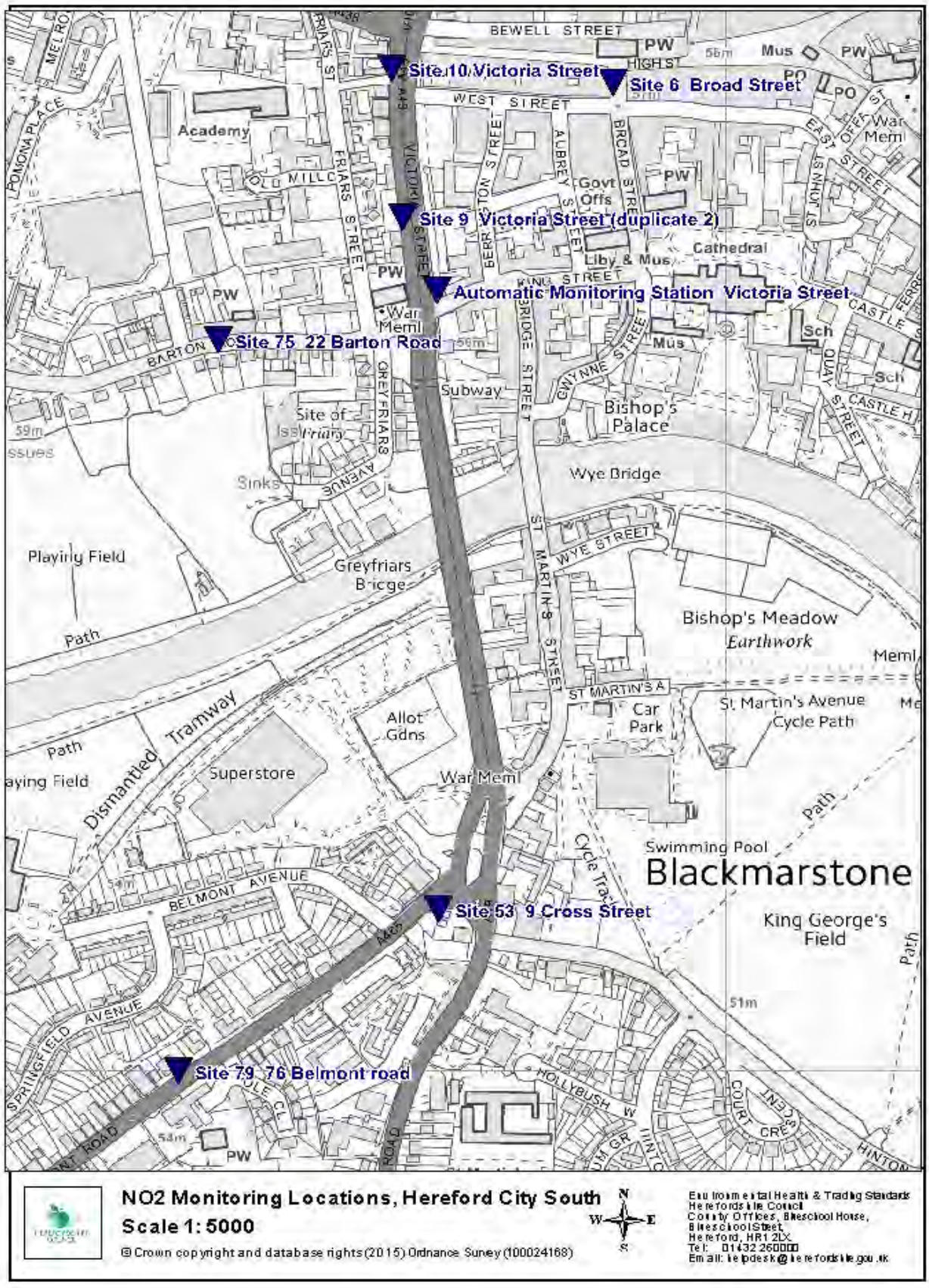


Figure D10 Whitecross Road, Hereford Monitoring Locations

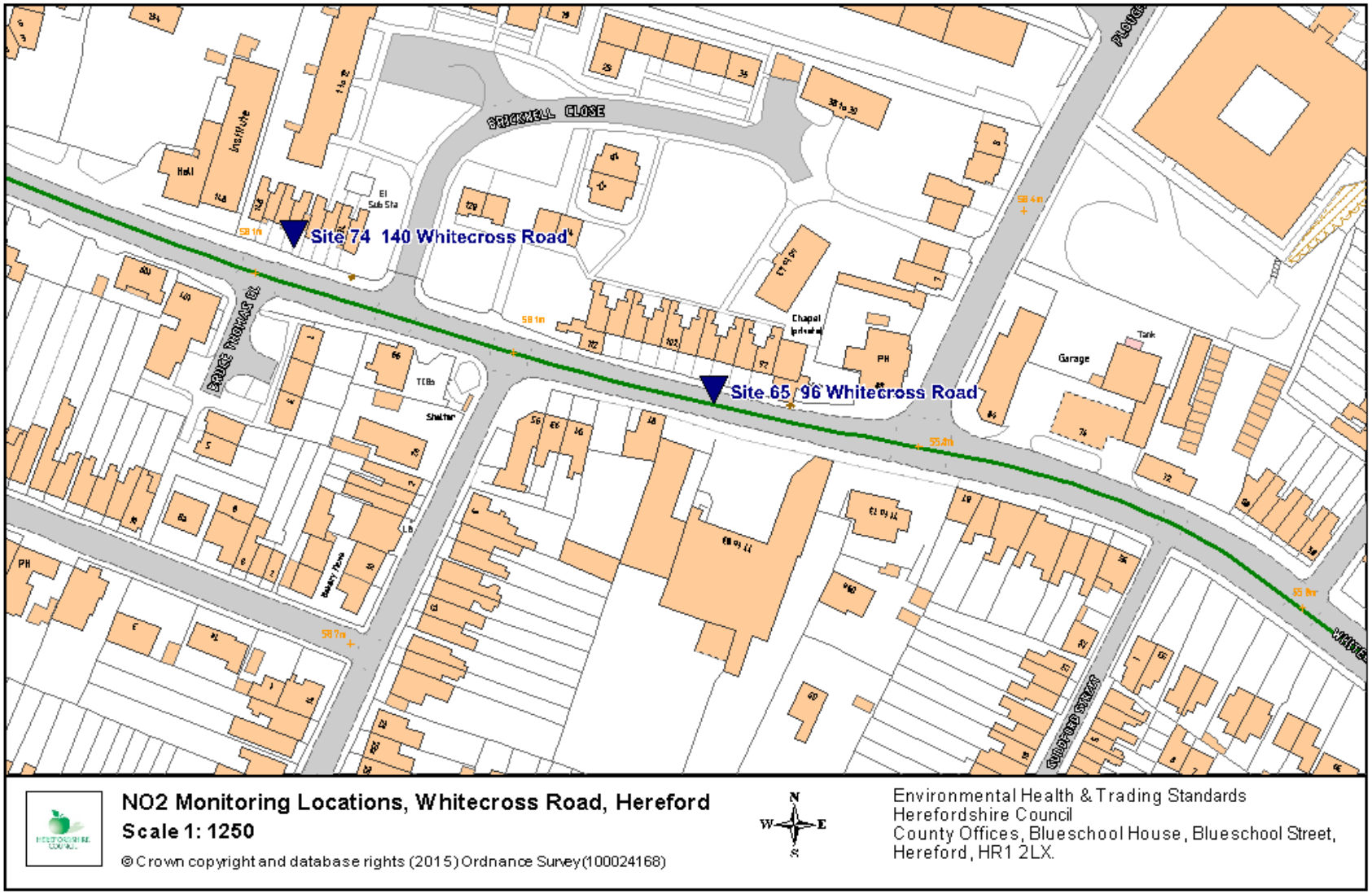


Figure D11 Leominster AQMA Boundary

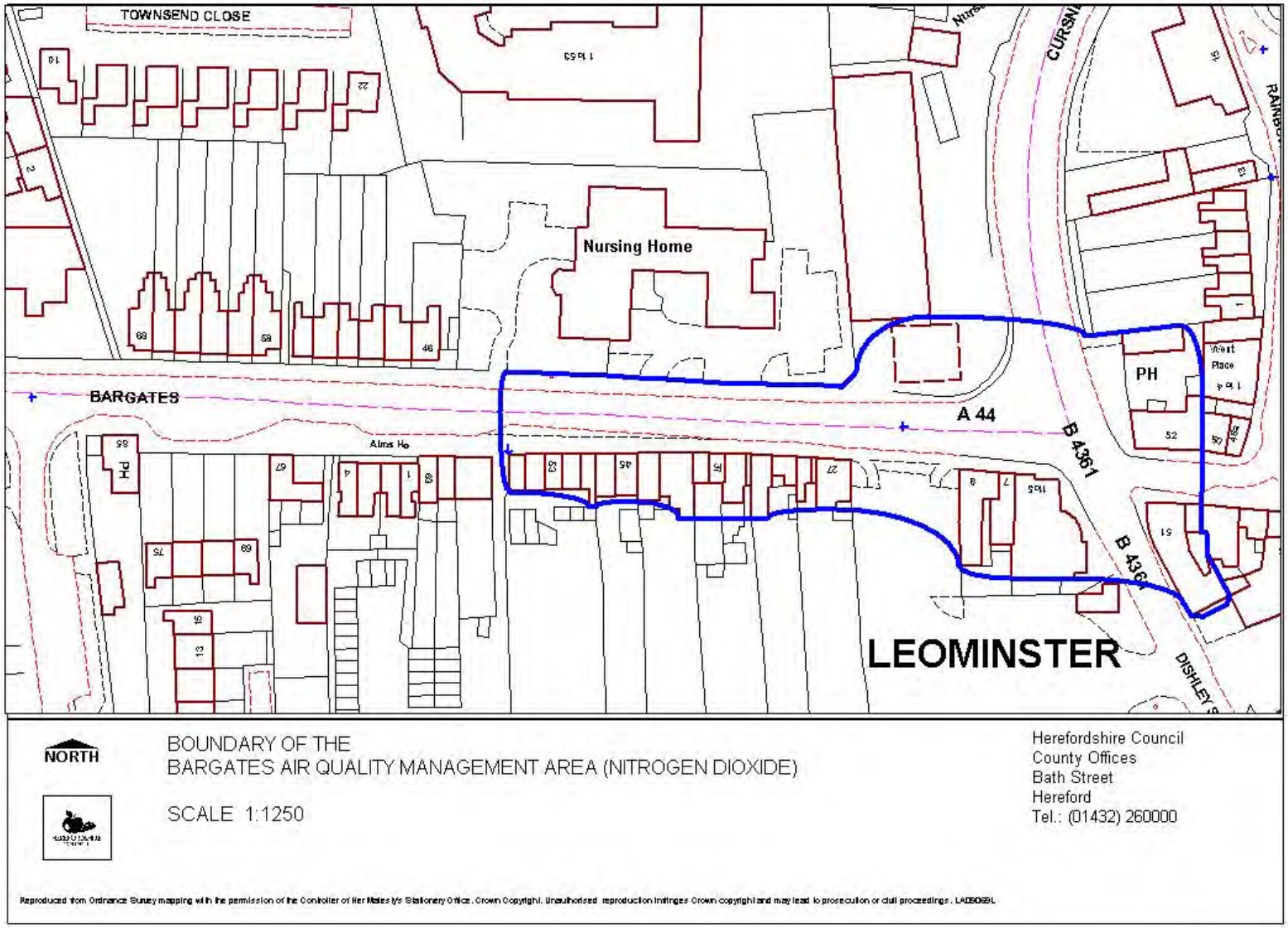


Figure D12 Leominster Monitoring Locations

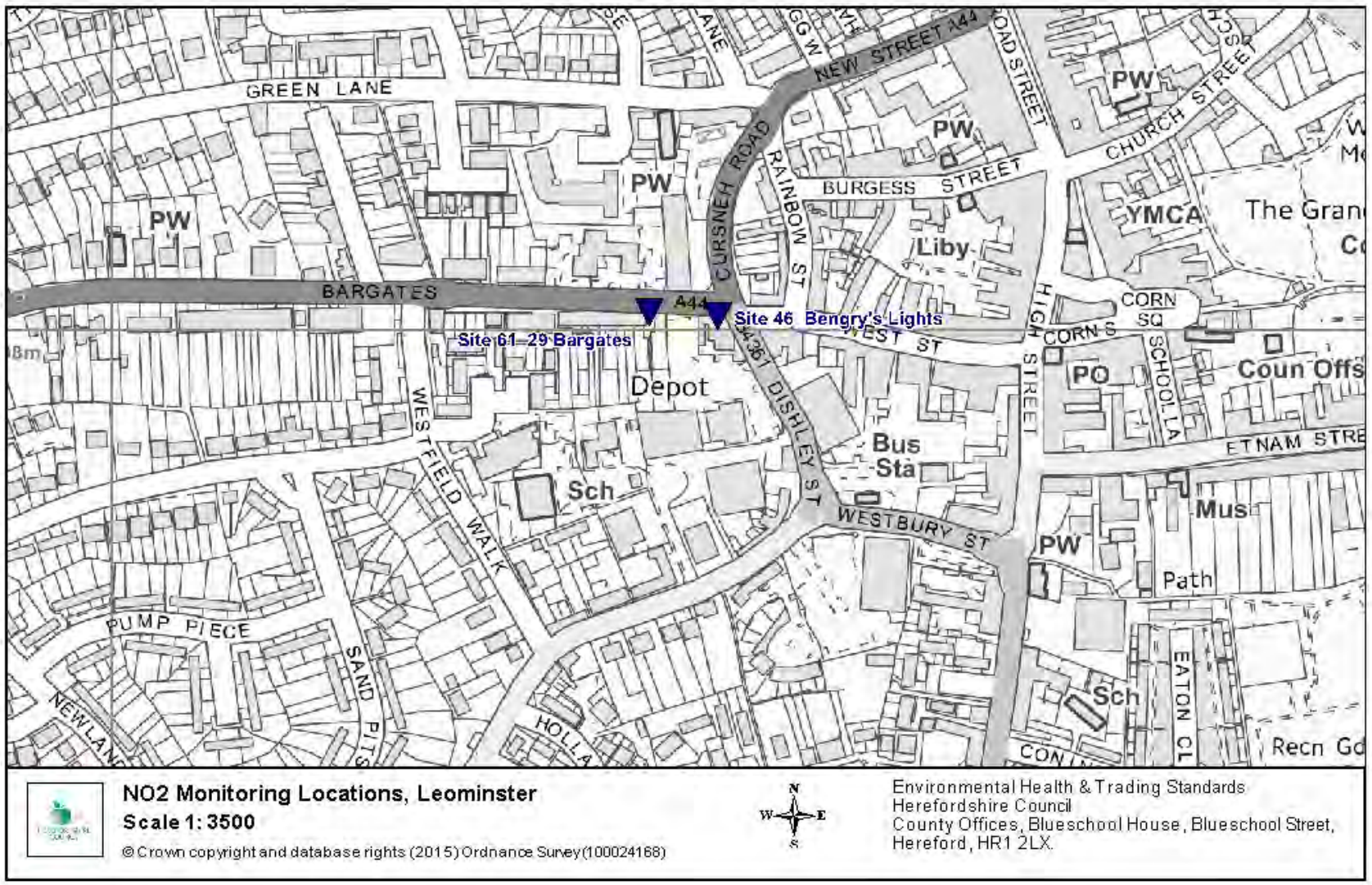


Figure D13 A40 Corridor, Ross-on-Wye Monitoring Locations

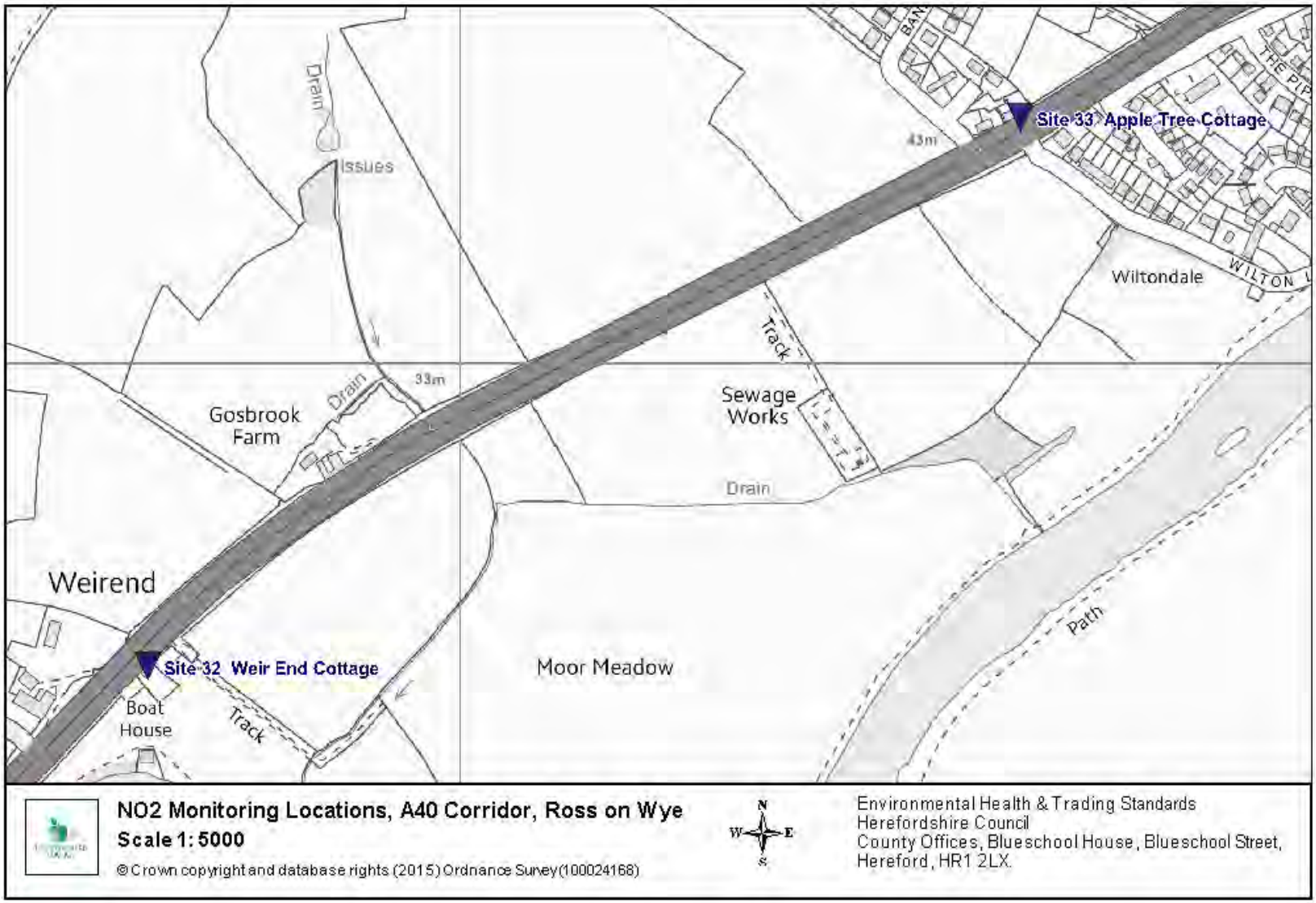


Figure D14 Ross-on-Wye Monitoring Locations

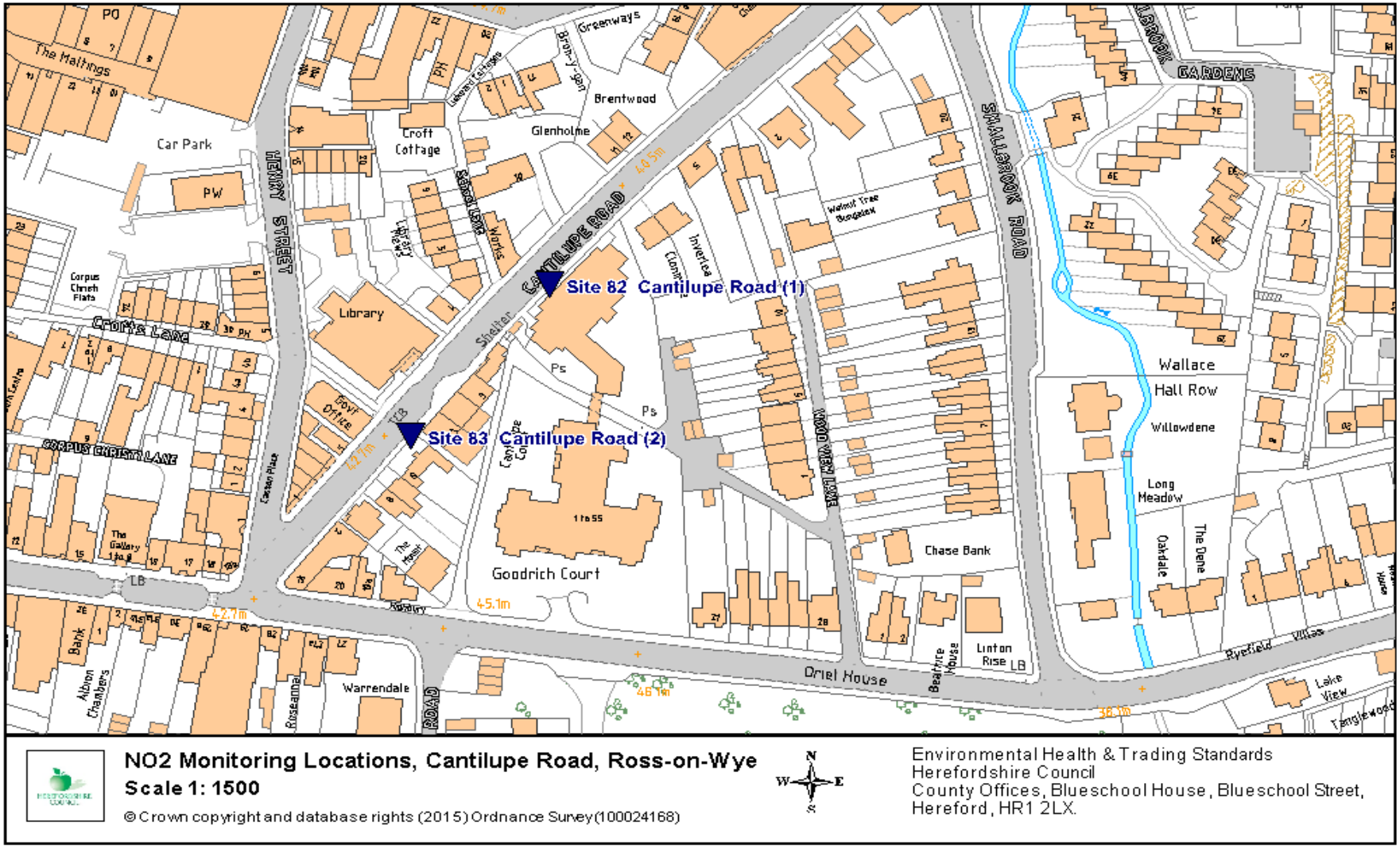


Figure D15 Kings Acre Road, Huntington Lane and Three Elms Road Monitoring Locations

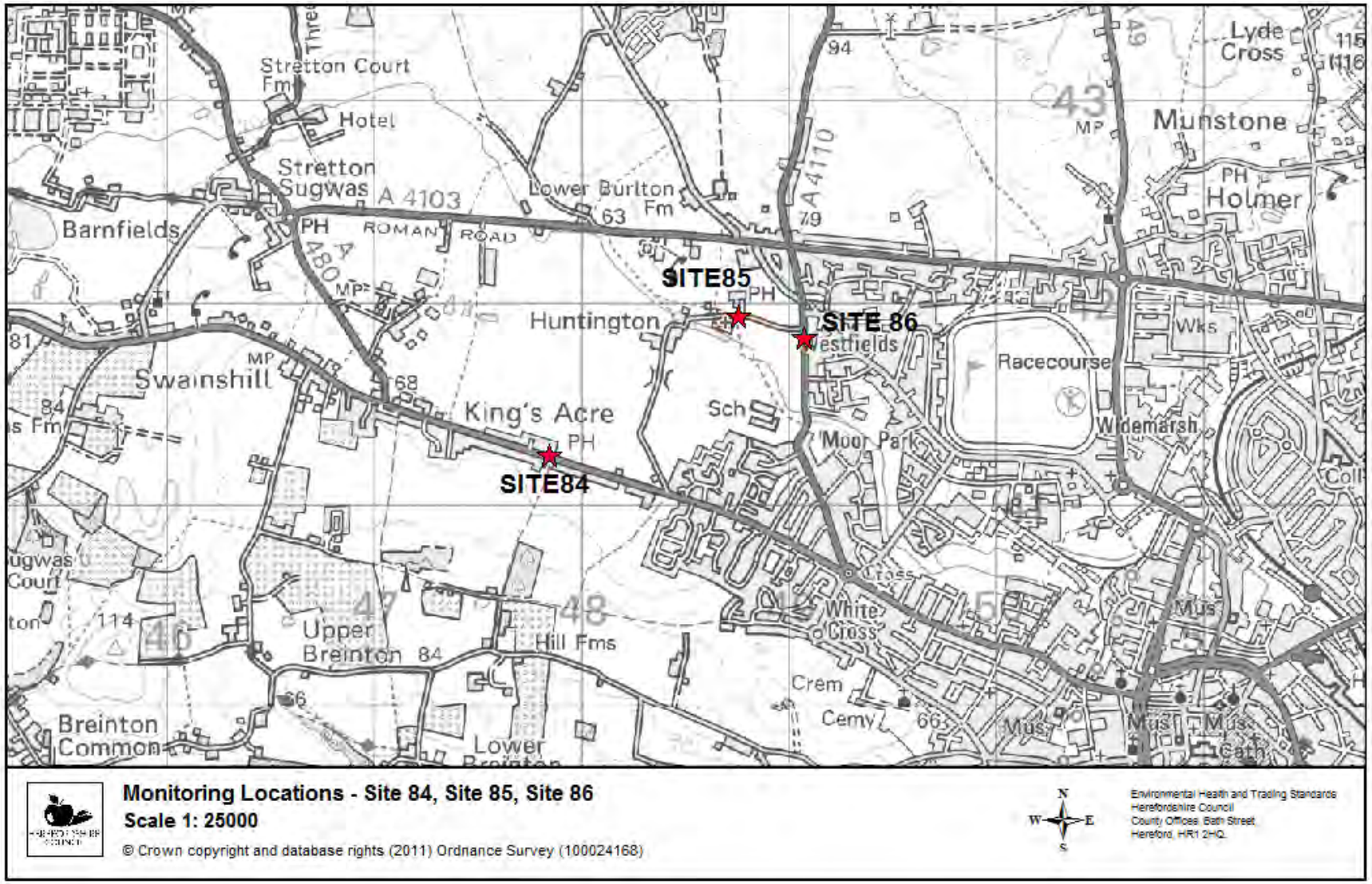
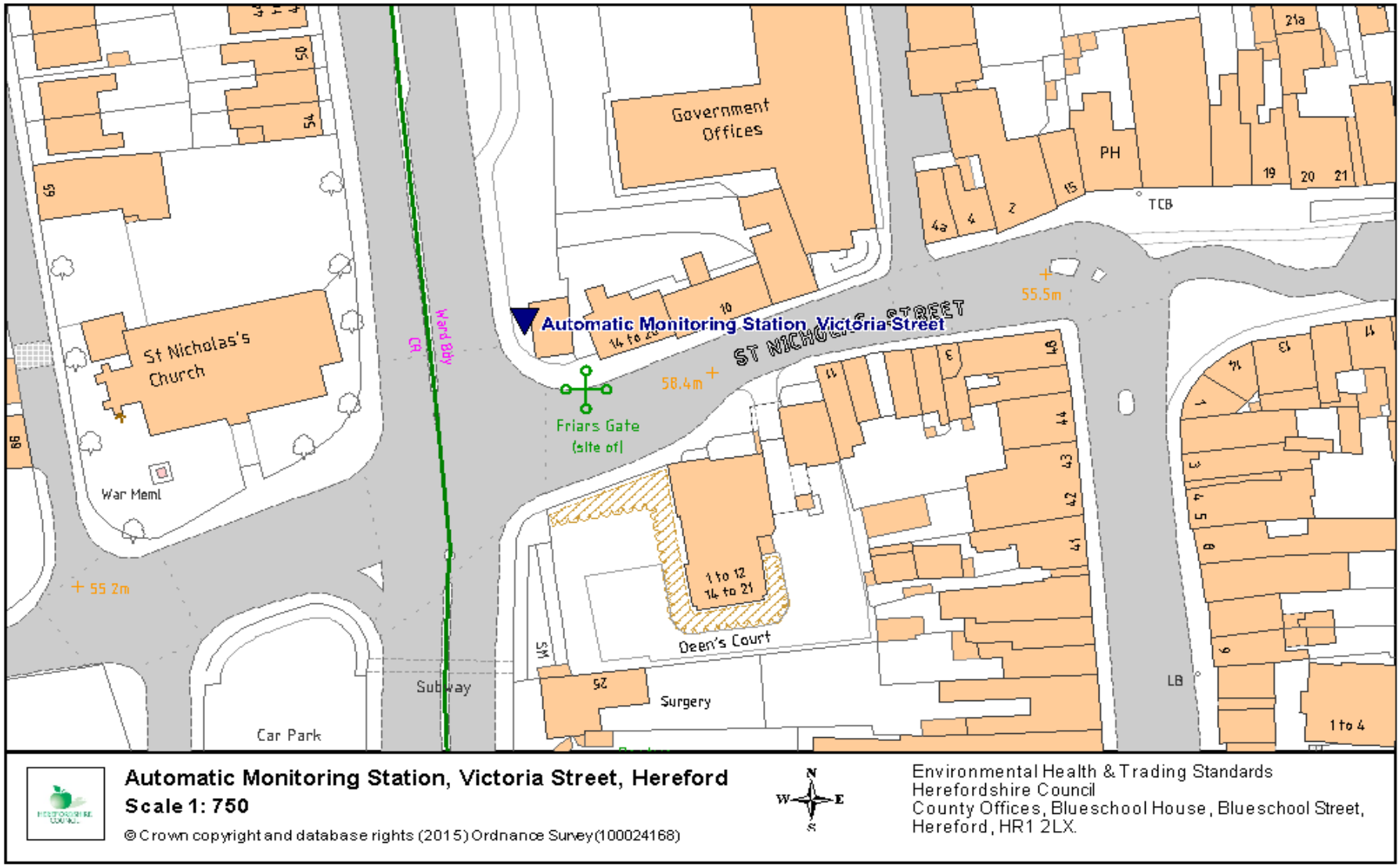


Figure D16 Location of Automatic Monitoring Station, Hereford



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	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

[6] 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

References

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

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

Herefordshire Local Plan Core Strategy 2011-2031, Herefordshire Council, Adopted 2015:https://www.herefordshire.gov.uk/info/200185/local_plan/137/adopted_core_strategy/2

Local Transport Plan 2016 – 2031 Strategy: https://www.herefordshire.gov.uk/directory_record/2093/local_transport_plan_2016-2031

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