



2017 Air Quality
Annual Status Report (ASR)
In fulfilment of
Part IV of the Environment Act 1995
Local Air Quality Management

Date (June, 2017)

Local Authority Officer	Gareth Rees
Department	Regulatory Services
Address	Council Offices The Symington Building Adam and Eve Street Market Harborough Leicestershire LE16 7AG
Telephone	01858 828282
E-mail	airquality@harborough.gov.uk
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1 Executive Summary: Air Quality in Our Area

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

1.1 Air Quality in Harborough District Council

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

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

The authority has 1 AQMA in Lutterworth declared for exceedences of the annual mean Air Quality Objective (AQO) for Nitrogen Dioxide (NO₂).

Copies of the Air quality management orders and a map showing the area covered is available from the council website

http://www.harborough.gov.uk/info/20025/environmental_health/101/air_pollution/3

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

The council has found that an area in Kibworth in the vicinity of the A6 is exceeding the annual mean Air Quality Objective (AQO) for Nitrogen Dioxide (NO₂) and has recommended the declaration of an AQMA.

1.2 Actions to Improve Air Quality

The council has undertaken a study to determine if the implementation of a 20mph zone in the Lutterworth AQMA would positively impact air quality. (attached as Appendix E).

This modelling based study involved collecting real-time second by second data using an instrumented vehicle as part of a drive cycle survey conducted over one day in the existing 30 mph speed limit and to simulate a 20 mph speed limit. The data was used in an instantaneous emissions model (called PHEM) to determine emissions of nitrogen oxides (NO_x), particulates (PM) and carbon dioxide (CO₂) and subsequently modelled to obtain NO₂ and PM₁₀ concentrations.

Data on the local vehicle fleet was obtained specifically for this study from an ANPR camera survey. The survey found that there were more than 15,609 vehicles travelling along the road in a 24 hour period of which 30% were from through traffic. 94% of these vehicles were light duty (i.e. cars and vans) and the majority of these were diesel fuelled (63%). In terms of the contribution to emissions, light duty vehicles were responsible for around 45% of NO_x emissions, 70% of PM₁₀ emissions and 75-80% of CO₂ emissions. The average speed across all drive cycle runs was below the existing 30mph (48km/h) speed limit with the maximum recorded speed being 45km/h.

The simulation of a 20mph (32km/h) speed limit resulted in a reduction of average speed across all runs of around 4km/h to 24.5km/h (15mph). There was also a reduction in the standard deviation from 12-13km/h in the 30mph speed limit to 8km/h in the simulated 20mph limit. This reduction in speed led to a positive effect by dampening acceleration events by up to 30% resulting in a modelled reduction in average NO_x, PM and CO₂ emissions across entire route by around 5%.

Dispersion modelling was run at the façade of 371 properties and found that there was an average reduction in modelled annual mean NO₂ concentrations by 3% (equal to 1.2µgm⁻³) with a maximum reduction of 15% (approximately 6.8µgm⁻³). There were some close to the roadside on Market Street, where the road has a relatively steep gradient of 3.1% where an increase in concentration was modelled. However, the overall net reduction in the population weighted NO₂ concentration was 5% across the modelled area.

1.3 Conclusions and Priorities

The ASR concludes that

- a New AQMA is required in Kibworth
- That a reduction in the speed limit in Lutterworth has the potential to reduce emissions and therefore lower the concentration of Nitrogen Dioxide in Lutterworth

In 2017 the council plans to

- Declare an AQMA in Kibworth
- Draft an action plan for the AQMA in Kibworth
- Negotiate with Leicestershire County Council highways department on the way forward in Lutterworth.

1.4 Local Engagement and How to get Involved

The main contributions that our community can make to improving air quality are around minimising emissions from traffic and other sources and limiting exposure at times of poor air quality. Specifically that means avoiding unnecessary car use for short journeys, utilising public transport where possible, buying and maintaining low emissions vehicles and being linked in to the national alert system for predicted episodes of poor air quality.

The public can get further information on Air Quality from the following websites

- Harborough District Council Air quality website
http://www.harborough.gov.uk/info/20025/environmental_health/101/air_pollution
- DEFRA's UK-AIR: Air information Resource website
<https://uk-air.defra.gov.uk/>
- DEFRA's Local Air Quality Management (LAQM) Support website
<http://laqm.defra.gov.uk/>
- Environmental Protection UK Air Pollution website
<http://www.environmental-protection.org.uk/policy-areas/air-quality/about-air-pollution/>
- Joint Air Quality Initiative (JOAQUIN) website
<http://www.joaquin.eu>

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3 Local Air Quality Management

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

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

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

4 Actions to Improve Air Quality

4.1 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 Harborough District Council can be found in Table 4-1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at http://uk-air.defra.gov.uk/aqma/local-authorities?la_id=1050 or on the Council's website

at: http://www.harborough.gov.uk/directory_record/2269/air_quality_management_area_aqma_order.

Alternatively, see Appendix D Map(s) of Monitoring Locations and AQMAs, which includes maps of air quality monitoring locations and the area of the AQMA.

We propose to declare a new AQMA in Kibworth area (see monitoring section).

Table 4-1 – 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	
Lutterworth	Declared 18/07/2001, Amended 04/04/2011, Amended 16/04/2013	NO2 Annual Mean	Lutterworth	An area encompassing properties adjacent to Rugby Road, High street and Market Street..	NO		45 µg/m3	2013 Lutterworth Air Quality Management Area Action Plan Framework for Harborough District Council http://www.harborough.gov.uk/download/downloads/id/145/lutterworth_air_quality_action_plan.pdf

☒ Harborough District Council confirm the information on UK-Air regarding their AQMA(s) is up to date

4.2 Progress and Impact of Measures to address Air Quality in Harborough District Council

Harborough District Council has taken forward a number of direct measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 4-2.

The modelling undertaken to determine if the implementation of a 20mph speed limit in Lutterworth will have a positive effect on air quality is attached as Appendix E.

The results found that there were more than 15,609 vehicles travelling along the road in a 24 hour period of which 30 % were from through traffic. 94 % of these vehicles were light duty (i.e. cars and vans) and the majority of these were diesel fuelled (63 %). In terms of the contribution to emissions, light duty vehicles were responsible for around 45 % of NO_x emissions, 70 % of PM₁₀ emissions and 75-80 % of CO₂ emissions. The average speed across all drive cycle runs was below the existing 30 mph (48 km/h) speed limit with the maximum recorded speed being 45 km/h.

The simulation of a 20 mph (32 km/h) speed limit resulted in a reduction of average speed across all runs of around 4 km/h to 24.5 km/h (15 mph). There was also a reduction in the standard deviation from 12-13 km/h in the 30 mph speed limit to 8 km/h in the simulated 20 mph limit. This reduction in speed led to a positive effect by dampening acceleration events by up to 30 % resulting in a modelled reduction in average NO_x, PM and CO₂ emissions across entire route by around 5 %.

Dispersion modelling was run at the façade of 371 properties and found that there was an average reduction in modelled annual mean NO₂ concentrations by 3 % (equal to 1.2 µg/m³) with a maximum reduction of 15 % (approximately 6.8 µg/m³). There were some locations close to the roadside on Market Street, where the road has a relatively steep gradient of 3.1% where an increase in concentration was modelled. However, the

overall net reduction in the population weighted NO₂ concentration was 5 % across the modelled area.

Because of elevated levels of NO₂ detected at receptors in Kibworth along the A6, in 2015, the councils increased the number of monitoring locations within the area in order to better inform the area of any possible AQMA. Following completion of the year of monitoring the council will undertake a detailed assessment of the A6 to include the use of dispersion modelling (ADMS Roads) and will use the 2016 diffusion tube data for verification.

Harborough District Council's priorities for the coming year are

- Undertake a detailed assessment of A6 in Kibworth to inform the area of a potential AQMA
- Declare an AQMA in Kibworth
- Draft an action plan for the AQMA in Kibworth
- Negotiate with Leicestershire County Council highways department on the way forward in Lutterworth and Kibworth.

The principal challenges and barriers to implementation that Harborough District Council anticipates facing are:

- Resources to implement schemes
- Resources for research and modelling to show schemes have the desired impact

Whilst the measures stated above and in Table 4-2 will help to contribute towards compliance, Harborough District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Lutterworth.

Table 4-2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	20mph zone	Traffic Management	Reduction of speed limits, 20mph zones	LA, Funding: Defra AQ grant	Apr-18	Apr-20	Determine reduction in traffic emissions		Complete	Complete	Lengthy Timescale
							Determine impact on air quality		Complete	Nov-16	
							Determine exact area of the speed reduction (likely required to be larger than AQMA by Highway authority) and costs		none	Apr-18	First phase successful, second phase complete. LCC Highways require further evidence of likely reduction before they would be willing to consider implementation

							of implemen tation and undertak e cost benefit analysis				
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4.3 **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.

The Public Health Outcomes Framework (PHOF)

(<http://www.phoutcomes.info/>) is a Department of Health data tool for England, intended to focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between communities. The tool uses indicators to assess improvements. Recognising the significant impact that poor air quality can have on health, the PHOF includes an indicator relating to fine particulate matter (PM_{2.5}).

The indicator in the PHOF reports the estimates fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution (measured as fine particulate matter).

Based on the latest available figures the position in Harborough District can be compared to the situation across the rest of England Harborough District Council has

- the lowest fraction of attributable deaths to particulate air pollution in Leicestershire;
- the 3rd lowest in the east midlands region; and
- is slightly below the national average

Harborough District Council not currently taking any specific measures to address PM_{2.5}. However the following measures and activities undertaken by Harborough District Council will improve PM_{2.5} concentrations:

- The council is looking to implement a 20mph zone in the Lutterworth AQMA which will reduce traffic sourced PM_{2.5}
- The council also controls dust and combustion emissions from permitted processes within the district
- Promoting the use of green waste collection and Leicestershire County Council run waste bring sites over bonfires to dispose of garden waste

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

5.1 Summary of Monitoring Undertaken

5.1.1 Automatic Monitoring Sites

The council does not currently operate any automatic monitoring stations.

Bureau Veritas currently operate an AURN network **site on behalf of DEFRA** during 2016. Table A-1 in Appendix A shows the details of the site.

Maps showing the location of the monitoring sites are provided in Appendix D or https://uk-air.defra.gov.uk/networks/site-info?site_id=MKTH&view=View . Further details on how the monitors are calibrated and how the data has been adjusted are available from the AURN Network <https://uk-air.defra.gov.uk/networks/network-info?view=aurn> .

5.1.2 Non-Automatic Monitoring Sites

Harborough District Council undertook non- automatic (passive) monitoring of NO₂ at 23 sites during 2016. Table A-2 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.

5.2 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.

5.2.1 Nitrogen Dioxide (NO₂)

Table A-3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

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

Figure A-4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

5.2.1.1 Lutterworth

The council has 10 monitoring locations in Lutterworth.

- Former Lutterworth Service Shop (01n)
- Day Nursery (11n)
- Jazz Hair (18n)
- 77 Leicester Load Lutterworth (22n)
- 6 The Terrace Rugby Road (23n)
- Regent Court (24n)
- 26 Market Street Lutterworth (25n)

- 24 Rugby Road Lutterworth (26n)
- 17 Rugby Road Lutterworth (27n)
- 40 Regent Street Lutterworth (30n)

The monitoring location at the former Lutterworth service shop exceeded the air quality standard.

All other locations, after façade correction to the nearest receptor, were significantly below the air quality standard.

5.2.1.2 Kibworth

The council has 3 monitoring locations which have data for the full year

- A6 Kibworth (12n),
- 69 Leicester Road Kibworth (31n), and
- Sign outside 64 Leicester Road (34n)

The council also started monitoring at 2 additional locations in September

- Lamppost outside 78 Leicester Road (35n), and
- Signpost north of 11 Leicester Road (36n)

Monitoring at A6 Kibworth (12n) and 69 Leicester road Kibworth (31n) did not recorded exceedences of the air quality standards

Monitoring at signpost outside 64 Leicester Road (34n) recorded an exceedence of the air quality standard when façade corrected to the nearest receptor.

Monitoring at lamppost outside 78 Leicester Road (35n) when annualised did not record an exceedence of the air quality standard.

Monitoring at signpost north of 11 Leicester Road (36n) when annualised did record an exceedence of the air quality standard.

As monitoring recorded exceedences of air quality standards along the A6/Leicester Road in Kibworth the council has commissioned a detailed assessment to include dispersion modelling using ADMA(roads) and traffic counts to be undertaken in 2017 to determine all locations along the stretch of road that are likely to be exceeding the air quality standard.

5.2.1.3 Market Harborough

The council has historically had 2 monitoring points in Market Harborough,

- Rockingham Road (13n), and
- The Square (17n).

Monitoring on Rockingham Road was discontinued in September as the location has not exceeded air quality standards at relevant receptors for 11 years.

Monitoring at The Square (17n) was discontinued in November, so that the tube could be relocated to a new location on St Mary's Road (37n), monitoring at the Square has not exceeded the air quality standard in 12 years.

Monitoring at St Mary's Road (37n) recorded a bias adjusted mean of $50.44\mu\text{gm}^{-3}$ however as there is only 1 month of data available there is insufficient data to draw a conclusion on air quality in the vicinity

5.2.1.4 Theddingworth

The council has 2 monitoring points in Theddingworth.

- Spencerdene, Main Street Theddingworth (28n), and
- Homeside, Main Street Theddingworth (29n)

No exceedences of air quality standards were recorded.

5.2.1.5 A5

The council has 2 monitoring points along the A5.

- Alma House, Watling Street Claybrooke Parva Leicestershire LE17 5BE (32n), and
- sign post outside White House Farm Watling street (33n)

No exceedences of air quality standards were recorded.

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)
1A	Market Harborough AURN site	Rural	483335	295896	NO; NO ₂ ;	N	Unknown	N/A	N/A	unknown

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)
01n	Lutterworth Service Shop	Roadside	454475	284560	NO ₂	Y	0	4.2	N	2
11n	Day Nursery	Roadside	454539	284932	NO ₂	N	9	1.3	N	2
12n	A6 Kibworth	Roadside	468425	294314	NO ₂	N	10.7	1.3	N	2
13n	Rockingham Road	Roadside	474731	287585	NO ₂	N	9	2.8	N	2
16n	Walcote	Roadside	456810	283652	NO ₂	N	12.5	3	N	2
17n	The Square	Roadside	473373	287231	NO ₂	N	2.5	3	N	2
18n	Jazz Hair	Roadside	454443	284348	NO ₂	N	0	3	N	2
22n	77 Leicester road Lutterworth	Roadside	454533	284872	NO ₂	N	0	13.5	N	2
23n	6 The Terrace Rugby Road	Roadside	454428	284274	NO ₂	N	0	2.5	N	2
24n	4-9 regent court	Roadside	454410	284326	NO ₂	N	0	16.25	N	2
25n	26 Market Street Lutterworth	Roadside	454497	284618	NO ₂	Y	1.6	4.8	N	2
26n	24 Rugby Road Lutterworth	Roadside	454432	284229	NO ₂	N	0	2	N	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)
27n	17 Rugby road Lutterworth	Roadside	454476	284178	NO ₂	N	3.7	5.2	N	2
28n	Spencerdene main street theddingworth	Roadside	466535	285545	NO ₂	N	1.2	0.2	N	2
29n	Homeside main street Theddingworth	Roadside	466651	285607	NO ₂	N	0.2	1.4	N	2
30n	40 regent Street Lutterworth	Roadside	454318	284288	NO ₂	N	0	2.5	N	2
31n	lampost outside 69 leicester road kibworth	Roadside	467933	294660	NO ₂	N	3.5	4	N	2
32n	Alma House, Watling Street Claybrooke Parva	Roadside	448065	287719	NO ₂	N	0	7	N	2
33n	signpost outside White House Farm Watling street	Roadside	448948	286554	NO ₂	N	14	1	N	2
34n	sign outside 64 Leicester	Roadside	468143	294351	NO ₂	N	0.5	2.3	N	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)
	Road Kibworth									
35n	lamppost outside 78 leicester road kibworth	Roadside	468022	294450	NO ₂	NO2	N	3.1	6.4	Y
36n	signpost just north of 11 Leicester road Kibworth	Roadside	468309	294352	NO ₂	NO2	N	0	1.4	Y
37n	pizza Express st marys road	Roadside	473479	287214	NO ₂	NO2	N	0	1	Y

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 (µgm ⁻³) ⁽³⁾				
					2012	2013	2014	2015	2016
A1	Rural	Automatic	94.94	94.94	15.31	13.12	14.29	9.02	10.66
01n	Roadside	Diffusion Tube	100%	100%	48.72	45.51	39.8	43.52	42.27
11n	Roadside	Diffusion Tube	100%	100%	34.8	36.24	35.8	36.11	26.59
12n	Roadside	Diffusion Tube	100%	100%	32.19	30.43	28.2	29.72	21.74
13n	Roadside	Diffusion Tube	88%	58%	26.5	22.31	25.73	24.85	22.40
16n	Roadside	Diffusion Tube	100%	67%	24.51	23.79	21.44	22.41	19.00
17n	Roadside	Diffusion Tube	67%	67%	29	26.49	25	24.48	19.59
18n	Roadside	Diffusion Tube	92%	92%	43.34	42.15	39.2	37.52	34.10
22n	Roadside	Diffusion Tube	100%	100%	22.26	20.96	19.93	19.45	19.12
23n	Roadside	Diffusion Tube	100%	100%	31.47	34.18	27.6	28.87	28.49
24n	Roadside	Diffusion Tube	100%	100%	51.4	47.45	38.84	47.8	38.06
25n	Roadside	Diffusion Tube	83%	83%	31.06	37.8	34.87	34.38	28.18

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µgm ⁻³) ⁽³⁾				
					2012	2013	2014	2015	2016
26n	Roadside	Diffusion Tube	100%	100%	41.83	41.02	40.67	40.63	38.96
27n	Roadside	Diffusion Tube	100%	100%	33.85	32.85	29.8	32.32	27.05
28n	Roadside	Diffusion Tube	100%	100%	23.33	19.3	21.13	19.43	16.89
29n	Roadside	Diffusion Tube	92%	92%	31.08	30.36	27.53	28.15	26.77
30n	Roadside	Diffusion Tube	100%	100%			20.89	21	20.30
31n	Roadside	Diffusion Tube	100%	100%				33.12	30.48
32n	Roadside	Diffusion Tube	100%	100%				25.27	29.93
33n	Roadside	Diffusion Tube	100%	100%				26.5	18.13
34n	Roadside	Diffusion Tube	100%	100%				55	52.87
35n	Roadside	Diffusion Tube	75%	25%					33.36
36n	Roadside	Diffusion Tube	125%	42%					42.67
37n	Roadside	Diffusion Tube	40%	17%					50.44

- ☒ Diffusion tube data has been bias corrected
- ☒ Annualisation has been conducted where data capture is <75%
- ☒ If applicable, all data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µgm⁻³ are shown in **bold**.

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

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
- (3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A-4– Trends in Annual Mean NO₂ Concentrations

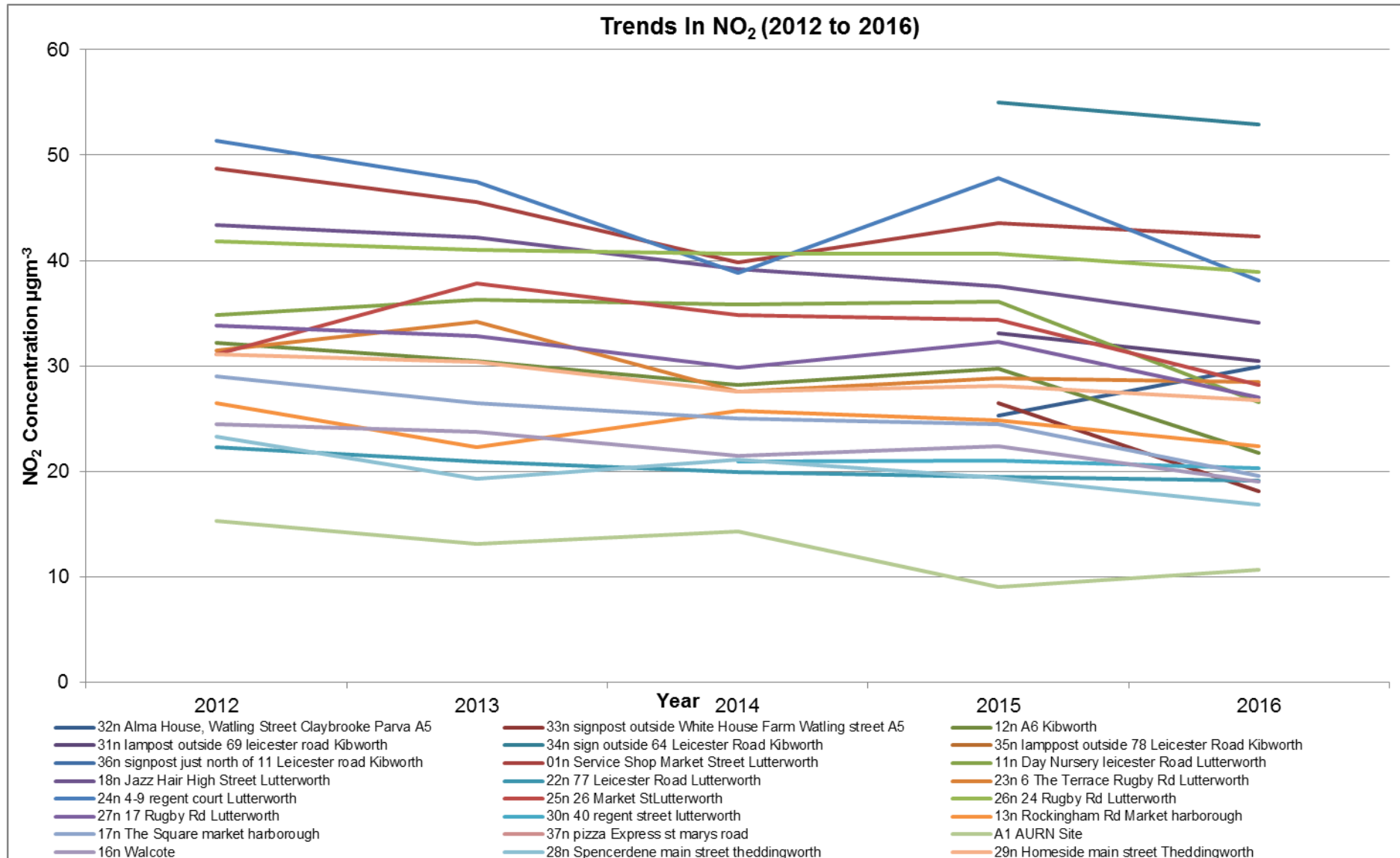


Table A-5– 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2012	2013	2014	2015	2016
A1	Rural		94.94	94.94	0	0	0	0	0

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

(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) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

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)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
01n	65.1	28.9	60.9	26.4	49.8	58.7	55.4	53.4	59.3	54.3	79.2	67.3	54.9	42.3	
11n	69.8	26.7	50.8	24.1	44.1	38.1	36.6	43.6	49.6	44.1	82.3	68.9	48.2	37.1	26.6
12n	48.3	24.5	41.2	19.5	33.6	38.6	38	31	40.4	37.8	58.4	57.9	39.1	30.1	21.7
13n	46.6	19.8	37.7		17.8	30	26.5	31.4					30.0	26.1	20.5
16n	43	19.8	32.5	12.6	19.3	23.5	23	24.9					24.8	21.6	17.5
17n	33.3		36.1	14.8	32.7	21.3	22.4	27.8	28.8				27.2	20.9	19.6
18n	47.8	29.5	55.1	24.9	54.7	41.2	34.1	42.1	47.3	53.8		56.6	44.3	34.1	
22n	29.5	15.9	29.6	12.1	22.8	18.6	16.3	21.7	26.9	27.9	45.7	31	24.8	19.1	
23n	42	21.9	46	18.4	45.5	30.1	26.2	32.7	38.8	46.8	55.9	39.7	37.0	28.5	
24n	72.7	30.9	76.2	30.4	65.6	59.2	50.1	52.9	59.3	71.9	78.7	58	58.8	45.3	38.1
25n	52.4	27.6	53.2	22.3	10.5	40.5	31.9	39.9	47.7			58	38.4	29.6	28.2
26n	57.8	34.4	60	27.7	48.3	51.3	50.9	43.8	50.5	47.6	72.3	62.6	50.6	39.0	
27n	47.3	26.6	40.9	19.5	40.1	32.4	32.1	37.1	43	44.3	50.2	51.6	38.8	29.8	27.1
28n	31.7	16.4	25.3	11.2	21.8	24.4	23	23.6	28	31.5	40.7	30.7	25.7	19.8	16.9
29n	49.8	25.3	38.9	18.1	31.1	31.3	30.9	31.7	38.1	35.5	58.9		35.4	27.3	26.8
30n	28.5	16	29.7	13.5	24.2	20.8	17.9	22.4	27	31.2	51.2	38.7	26.8	20.6	20.3
31n	40.3	27.8	54.3	28.7	48.6	36.9	41.5	42.8	40	45.7	76.8	51.4	44.6	34.3	30.5

Harborough District Council

32n	29.3	24.5	23.5	36.4	39.3	34.3	37.2	36.3	42.2	46.3	69.1	48.1	38.9	29.9	
33n	49.4	22.9	18	14.5	26.2	33.5	31.3	28.3	34	28.4	64.6	46.8	33.2	25.5	18.1
34n	93.9	44	76.1	39.4	66.3	73.5	67.9	70.2	67.1	69.4	105.4	82.3	71.3	54.9	52.9
35n									49.6		61.3	65.5	58.8	36.4	33.36
36n									62.8	66.4	89.9	56.5	68.9	42.7	
37n												65.5	65.5	50.4	

☐ Local bias adjustment factor used

☒ National bias adjustment factor used

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

Notes:

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

NO₂ annual means exceeding 60µgm⁻³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

(2) Distance corrected to nearest relevant public exposure.

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

Harborough District Councils Diffusion Tubes are provided by Environmental Scientifics Group and are undertaken using the 50% TEA in Acetone method. see Figure C-2

The bias adjustment factor used in 0.77 taken from the National Diffusion Tube Bias Spreadsheet for 2016

Table C-1 – Details of Annualisation and Façade Correction undertaken

Site ID	location	Measurement Period (μgm^{-3})												BIAS =		annualisation (in line with Boxes 7.9 and 7.10 in LAQM.TG16)						Façade Correction (See Box 2.3 pg 2-6 LAQM.TG(09))				
		(01)	(02)	(03)	(04)	(05)	(06)	(07)	(08)	(09)	(10)	(11)	(12)	0.77		period means		annual/period mean ratio		annualised bias adjusted mean		find relevant background concentration			Façade Corrected Bias Adjusted Mean (μgm^{-3})	Façade Corrected Annualised Bias Adjusted Mean (μgm^{-3})
		Environmental scientific group												arithmetic mean (μgm^{-3})	Bias adjusted arithmetic Mean (μgm^{-3})	Jan - aug	sept - dec	jan - aug	sept - dec	Jan - Oct	Nov - Dec	X	Y	background NO ₂ (μgm^{-3})		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec													
01n	Lut. Service Shop	65	29	61	26	50	59	55	53	59	54	79	67	54.89	42.27	49.83	65.03	1.10	0.84			453500	284500	13.18		
11n	Day Nursery	70	27	51	24	44	38	37	44	50	44	82	69	48.23	37.13	41.73	61.23	1.16	0.79			453500	284500	13.18	26.59	
12n	A6 Kibworth	48	25	41	20	34	39	38	31	40	38	58	58	39.10	30.11	34.34	48.63	1.14	0.80			467500	293500	12.42	21.74	
13n	Rockingham Road	47	20	38		18	30	27	31					29.97	23.08					26.12		473500	287500	15.95	20.47	22.40
16n	Walcote	43	20	33	13	19	24	23	25					24.83	19.12					21.63		455500	283500	15.43	17.55	19.00
17n	The Square	33		36	15	33	21	22	28	29				27.15	20.91							472500	286500	12.50	19.59	
18n	Jazz Hair	48	30	55	25	55	41	34	42	47	54		57	44.28	34.10	41.18	52.57	1.08	0.84			453500	283500	12.64		
22n	77 leicester road	30	16	30	12	23	19	16	22	27	28	46	31	24.83	19.12	20.81	32.88	1.19	0.76			453500	284500	13.18		
23n	6 The Terrace Rugby Road	42	22	46	18	46	30	26	33	39	47	56	40	37.00	28.49	32.85	45.30					453500	283500	12.64		
24n	regent court	73	31	76	30	66	59	50	53	59	72	79	58	58.83	45.30	54.75	66.98	1.07	0.88			453500	283500	12.64	38.06	
25n	26 Market Street Lutterworth	52	28	53	22	11	41	32	40	48			58	38.40	29.57	34.79	52.85	1.10	0.73			453500	284500	13.18	28.18	
26n	24 Rugby Road Lutterworth	58	34	60	28	48	51	51	44	51	48	72	63	50.60	38.96	46.78	58.25	1.08	0.87			453500	283500	12.64		
27n	17 Rugby road Lutterworth	47	27	41	20	40	32	32	37	43	44	50	52	38.76	29.84	34.50	47.28	1.12	0.82			453500	283500	12.64	27.05	
28n	Spencerdene main street theddingworth	32	16	25	11	22	24	23	24	28	32	41	31	25.69	19.78	22.18	32.73	1.16	0.79			465500	285500	10.01	16.89	
29n	Homeside main street Theddingworth	50	25	39	18	31	31	31	32	38	36	59		35.42	27.27	32.14	44.17	1.10	0.80			465500	285500	10.01	26.77	
30n	40 regent street lutterworth	29	16	30	14	24	21	18	22	27	31	51	39	26.76	20.60	21.63	37.03	1.24	0.72			465500	285500	10.01	20.30	
31n	69 leicester road Kibworth	40	28	54	29	49	37	42	43	40	46	77	51	44.57	34.32	40.11	53.48	1.11	0.83			466500	294500	12.51	30.48	
32n	Alma House, Watling Street Claybrooke Parva Leicestershire LE17 5BE	29	25	24	36	39	34	37	36	42	46	69	48	38.88	29.93	32.60	51.43	1.19	0.76			447500	287500	12.25		
33n	sign post outside White House Farm Watling street	49	23	18	15	26	34	31	28	34	28	65	47	33.16	25.53	28.01	43.45	1.18	0.76			447500	286500	11.97	18.13	
34n	sign outside 64 Leicester Road Kibworth	94	44	76	39	66	74	68	70	67	69	105	82	71.29	54.89	66.41	81.05	1.07	0.88			467500	293500	12.42	52.87	
35n	lamppost outside 78 leicester road kibworth									50		61	66	58.80	45.28						36.42	467500	293500	12.42	41.10	33.36
36n	signpost just north of 11 Leicester road Kibworth									63	66	90	57	68.90	53.05						42.67	467500	293500	12.42		
37n	pizza Express st marys road												66	65.50	50.44							472500	286500	12.50		

Figure C-2– Laboratory Diffusion tube Qa/QC procedure

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

FigureD-1– Map of Automatic Monitoring Locations

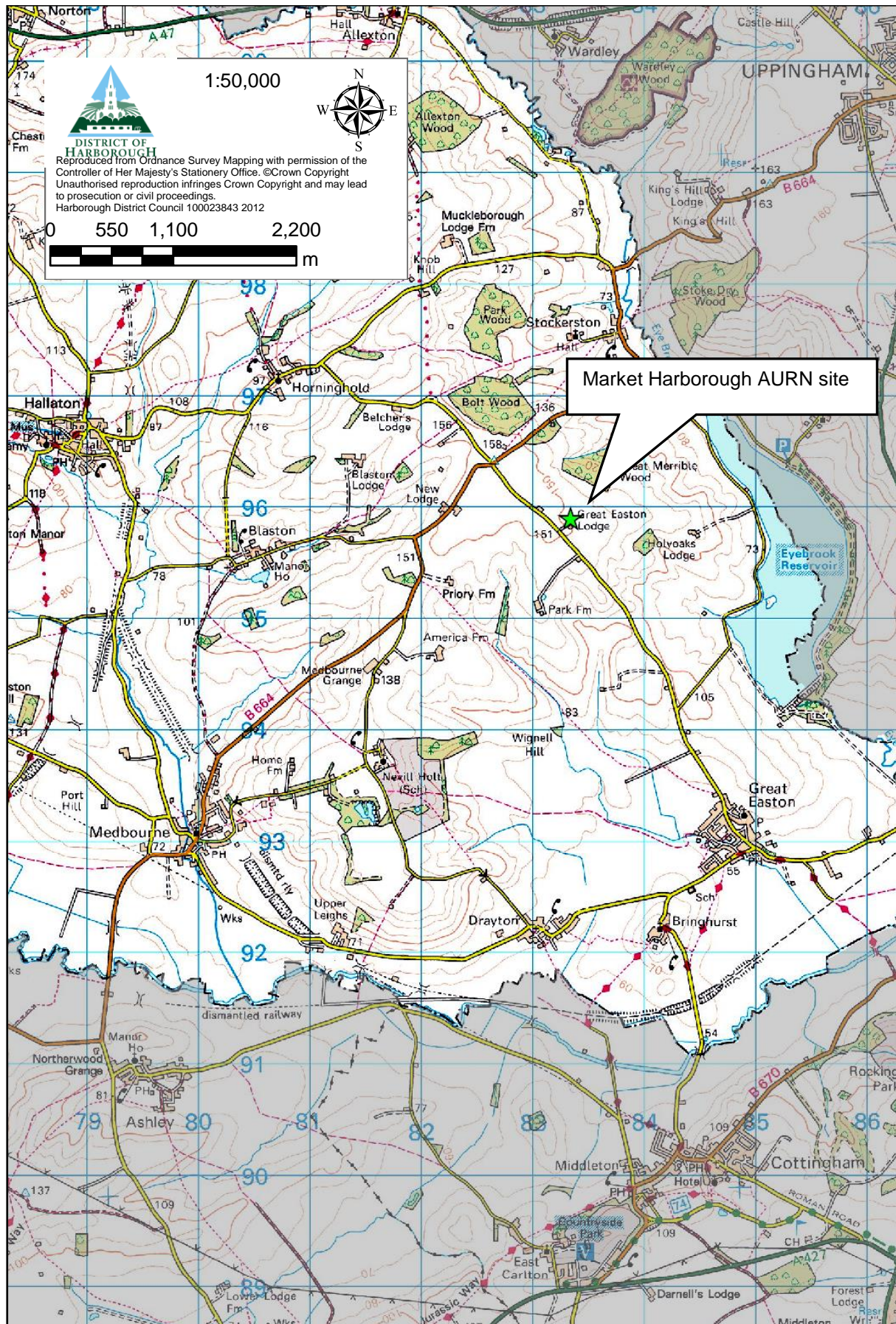
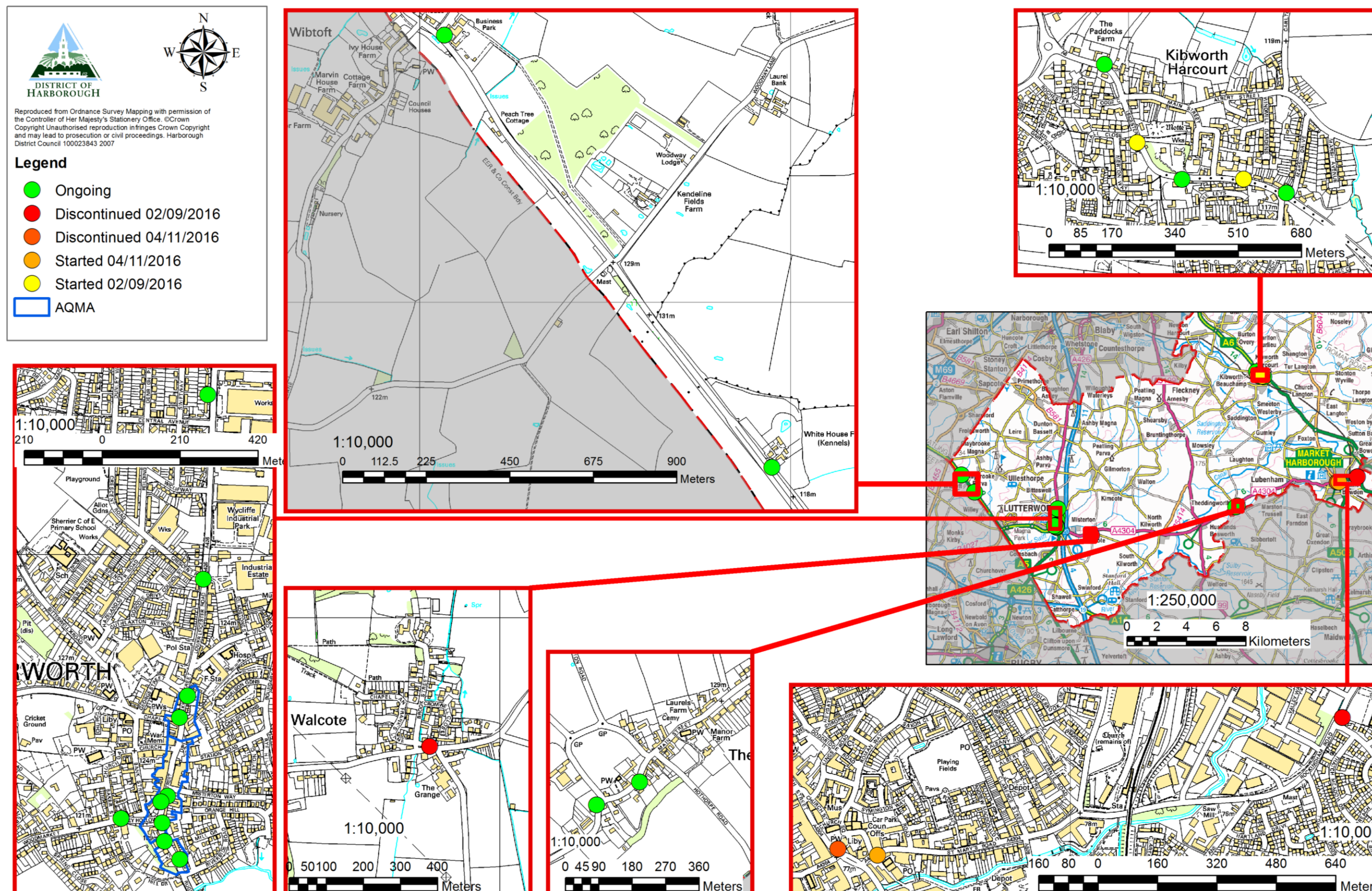


Figure D-2 – Map of Diffusion Tube Monitoring Locations and AQMA



Appendix E. Emissions and air quality assessment of a 20 mph speed limit in the Lutterworth AQMA

Appendix F. Summary of Air Quality Objectives in England

Table F-1– Air Quality Objectives in England

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

6 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
...	...

