2012 Air Quality Detailed Assessment of Castle Donington Air Quality Management Area

for

North West Leicestershire District Council

In fulfilment of

Part IV of the Environment Act 1995

Local Air Quality Management

Date: October 2012

Local Authority Officer	Gareth Rees
Department	Environmental Health
Address	North West Leicestershire District Council, Council Offices, Whitwick Road, Coalville, Leicestershire, LE67 3FJ
Telephone	01530 454 615
e-mail	Gareth.rees@nwleicestershire.gov.uk
Report Reference number	NWLDC-DA-CDAQMA-NO2-2012
Date	

Executive Summary

This report has been conducted in order to better define the area of Castle Donington where the Annual Mean Air Quality Standard for Nitrogen Dioxide is being exceeded at relevant receptors.

This report includes the analysis or data collected using both automatic monitors and diffusion tubes collected over the last 5 years. Where appropriate corrections have been made to the data to account of distance to relevant receptors and years with incomplete data coverage.

Analysis of the Data has shown that a large proportion of the AQMA to the south of the Moira Arms 2 High Street has not been exceeding the annual mean air quality standard for nitrogen dioxide at relevant receptors. It is therefore proposed that the AQMA be amended to revoked this area.

Table of contents

List of Appendices

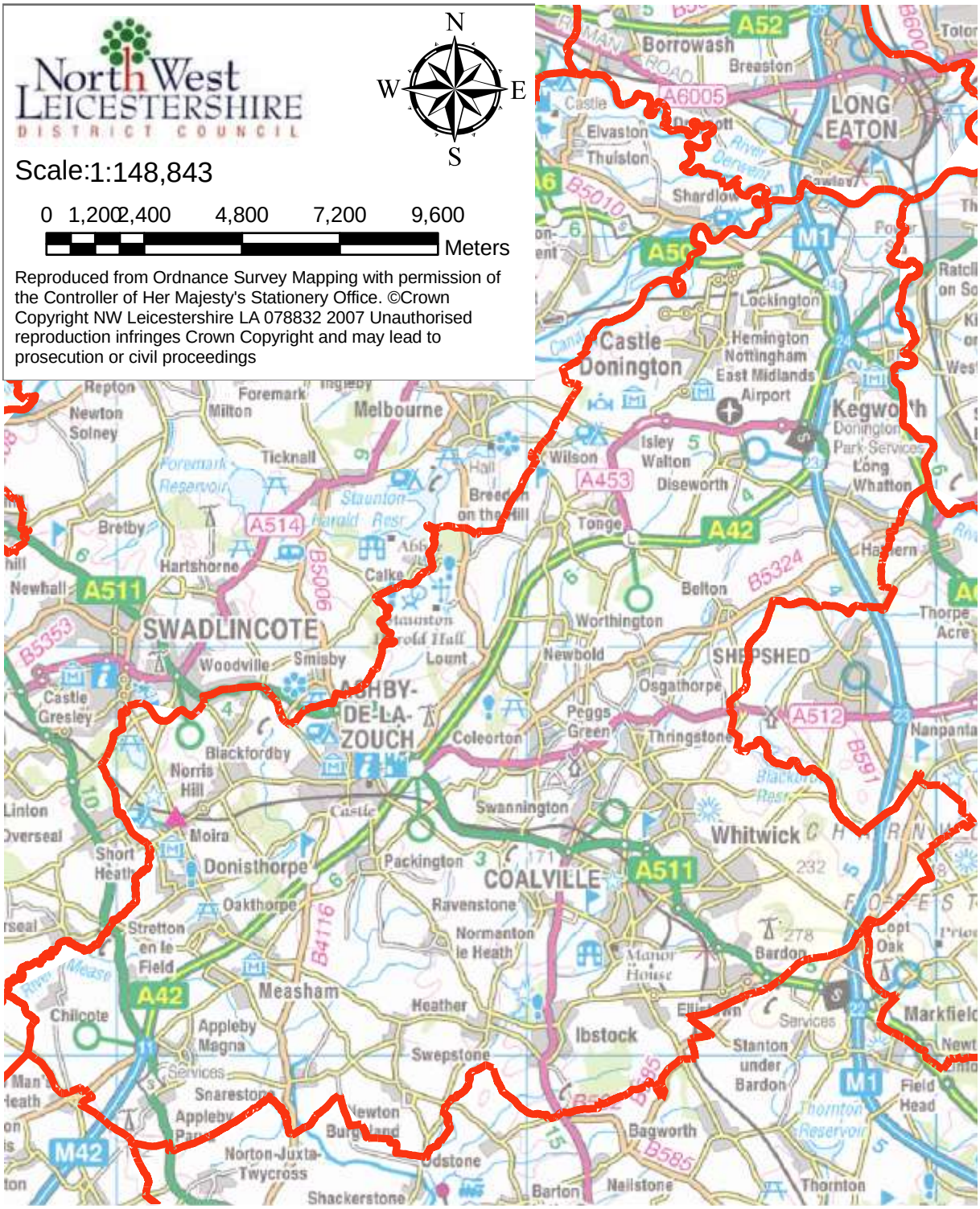
List of Tables

List of Figures

1 Introduction

1.1 Description of Local Authority Area

Figure 1 Map of North West Leicestershire District



North West Leicestershire lies in the East Midlands Region and is both the name and geographical location. The district is situated in the heart of the National Forest and lies between Leicester, Burton-on-Trent, Derby and Nottingham, covering approximately 280Km^2 (approximately 108 square miles). The district is mostly rural with a large extent of industry historically from coal mining, but more recently with Nottingham East Midlands Airport and large quarries.

The Office of National Statistics has estimated the population of the district as 90,800[45] in 2010; the population is mainly distributed in the principle towns of Coalville and Ashby-de-la-Zouch; and the large villages of Castle Donington, Kegworth and Ibstock.

Three established main roads run through the district,

- the M42/A42 between Birmingham and Nottingham,
- the M1,
- and the A511 from Leicester to Burton-on-Trent.

1.2 Purpose of Detailed Assessment Report

This purpose of this report is to determine if the whole area of the currently determined AQMA is exceeding the national air quality standard for NO_2 and if any amendments are needed to the declared area.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) in England are set out in the

- The Air Quality (England) Regulations 2000 (SI 2000/0928)[20],
- The Air Quality (England) (Amendment) Regulations 2002 (SI 2002/3043)[21]
- The Air Quality Standards Regulations 2007 (SI 2007/0717)[22]
- The Air Quality Standards Regulations 2010 (SI 2010/1001)[23]

They are shown in Table 1. Table 1 includes the number of permitted exceedences in any given year (where applicable).

Table 1. Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	**Concentration**	**Measured as**	Date to be achieved by
Benzene	16.25 μgm^{-3}	Running annual mean	31.12.2003
	5.00 μgm^{-3}	Running annual mean	31.12.2010
1,3-Butadiene	2.25 μgm^{-3}	Running annual mean	31.12.2003
Carbon monoxide	10.0 μgm^{-3}	Running 8-hour mean	31.12.2003
Lead	0.5 μgm^{-3}3	Annual mean	31.12.2004
	0.25 μgm^{-3}	Annual mean	31.12.2008
Nitrogen dioxide	200 μgm^{-3} not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 μgm^{-3}	Annual mean	31.12.2005
Particles PM_{10} (gravimetric)	50 μgm^{-3}, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 μgm^{-3}	Annual mean	31.12.2004
Particles $PM_{2.5}$ (gravimetric) (not currently included in regulations)	25 μgm^{-3} (target)	Annual mean	2020
Sulphur dioxide	350 μgm^{-3}, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 μgm^{-3}, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 μgm^{-3}, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Six AQMAs were designated in North West Leicestershire during the first round of review and assessment for the level of nitrogen dioxide concentrations. After Further Assessments it was determined that only two of these locations required AQMA designations and the remaining four were revoked. The Update and Screening Assessment undertaken in 2006 [1] concluded that these two sites should remain AQMAs and identified three additional locations where Detailed Assessments should be undertaken to determine whether new AQMAs were required for nitrogen dioxide concentrations. The two AQMAs designated during the first round are presented in Figure 2 and Figure 3.

The Detailed Assessment [6] undertaken in September 2007 of the three locations identified as possible areas for AQMAs in the USA 2006 [1], the three locations were High Street/Bondgate in Castle Donington, Broom Leys Road, Coalville and Bardon Road, Coalville, found that exceedences of the nitrogen dioxide objective were occurring in Castle Donington at properties located next to the carriageway along High Street and Bondgate due to traffic emissions. Monitoring at both locations in Coalville identified nitrogen dioxide concentrations that exceeded the mean annual objective during 2005, 2006 and 2007. The Detailed Assessment concludes that AQMAs should be designated at all three locations. As a result of these reports, two additional AQMAs were designated; the first in Castle Donington, presented in Figure 4, and the second covering Broom Leys Road and Bardon Road in Coalville, presented in Figure 5.

The Air Quality Progress Report conducted in April 2008 [7] recommended that a detailed assessment of the village of Copt Oak and the area surrounding East midlands airport be undertaken to determine if AQMA's should be determined at these locations.

The Detailed Assessment of Copt Oak published in January 2009 [9] found that an AQMA should be declared and that the area should cross the district boundary to include an area within the borough of Hinckley and Bosworth as shown in Figure 6.

The Detailed assessment of East midlands airport published in March 2009 [8] concluded that the Air quality objective for NO_2 would not be exceeded within 1000m of the airport as a result of air traffic emissions.

The further assessment of Bardon Road, Coalville published in February 2009 [10] supported the original declaration of the AQMA comprising the four residential properties at Broom Leys Junction and the one hundred and seventy two residential properties on Bardon Road.

The further assessment of High street castle Donington published in April 2009 [11] supported the original declaration of the AQMA comprising ninety one residential properties on High Street and Bondgate, Castle Donington.

The update and screening assessment published October 2009 [12] found that a detailed assessment for SO_2 was required in some areas of the district in relation to the burning of solid fuel, to which this report relates. The report also recommended that the M1 AQMA is expanded to include an exceedence of the 1-hour mean objective for NO_2 as the yearly mean has exceeded 60μgm^{-3}.

The Progress Report published in April 2010 [13] found no significant change in the district.

A Detailed Assessment for SO_2 was conducted in 2010 [14]. This found that solid fuel usage within off-gas areas of the district was insufficient to warrant further investigation.

A Detailed assessment of the M1 AQMA conducted in 2011 [16] found that most of the declared area could be revoked as there is either no relevant receptor or the annual mean air quality standard for NO_2 is not being exceeded.

A Detailed Assessment of the Coalville AQMA conducted in 2011 [15] found that the declared area could be reduced to the declared area of Stephenson Way as the annual mean air quality standard for NO_2 is not being exceeded along Bardon Road.

The 2011 progress report [17] found that Broomleys junction in the Coalville AQMA exceeded the 1-hour mean air quality standard for NO_2 and recommended that a detailed assessment be undertaken.

The progress report also found that the current air quality action plan is insufficient needs to be updated.

The 2011 detailed assessment of of 1-hour Mean Air Quality Standard at Broomleys junction Coalville[18] found that the 1-hour mean air quality standard was being exceeded and the AQMA should be amended.

A Further Assessment for the AQMA declared at Copt Oak is currently being undertaken.

Figure 2 Kegworth AQMA (highlighted in blue).

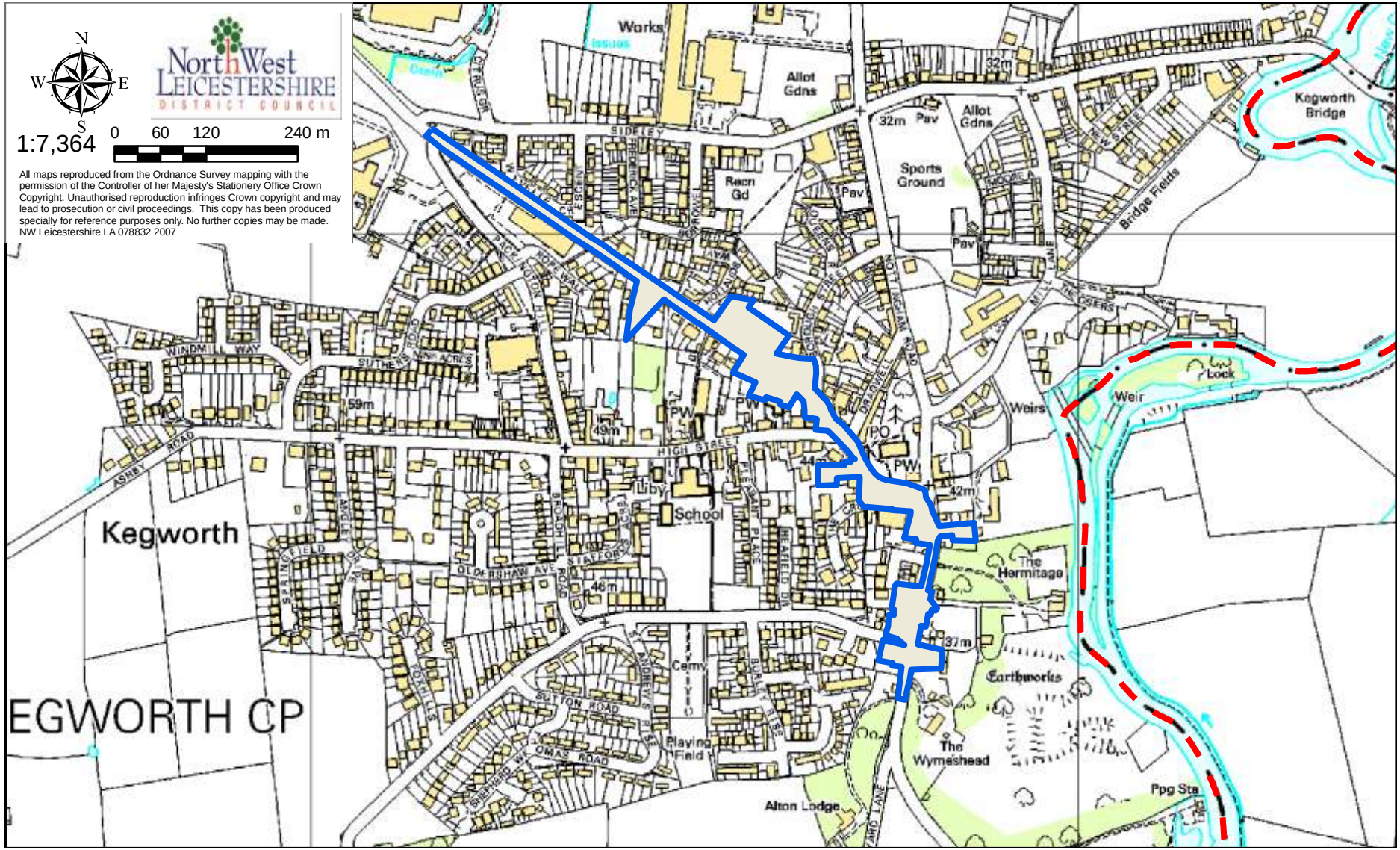


Figure 3 M1 AQMA (Outlined in Dark Blue)

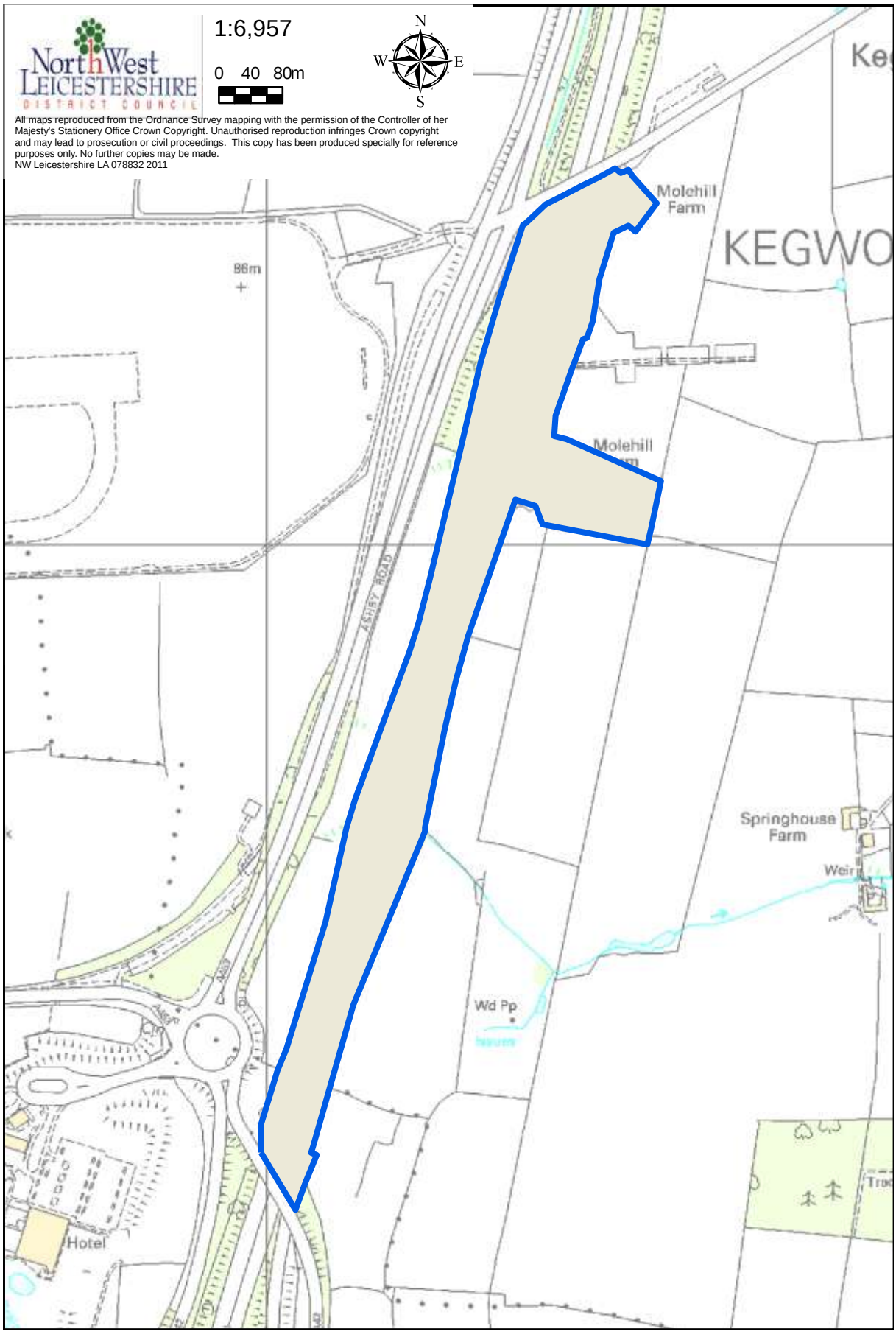


Figure 4 Castle Donington Air Quality Management Area

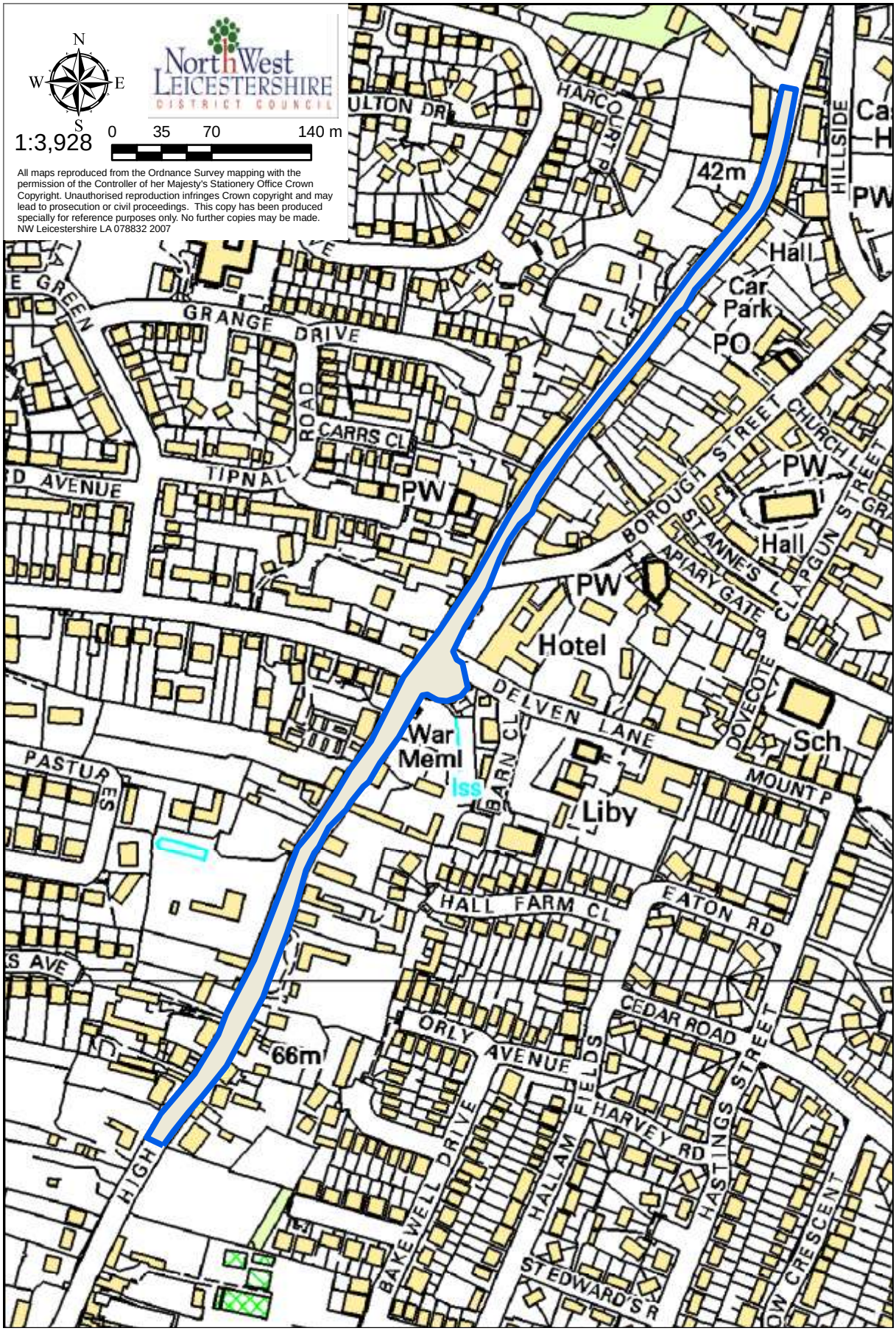


Figure 5 Coalville Air Quality Management Area (Broom Leys Junction)

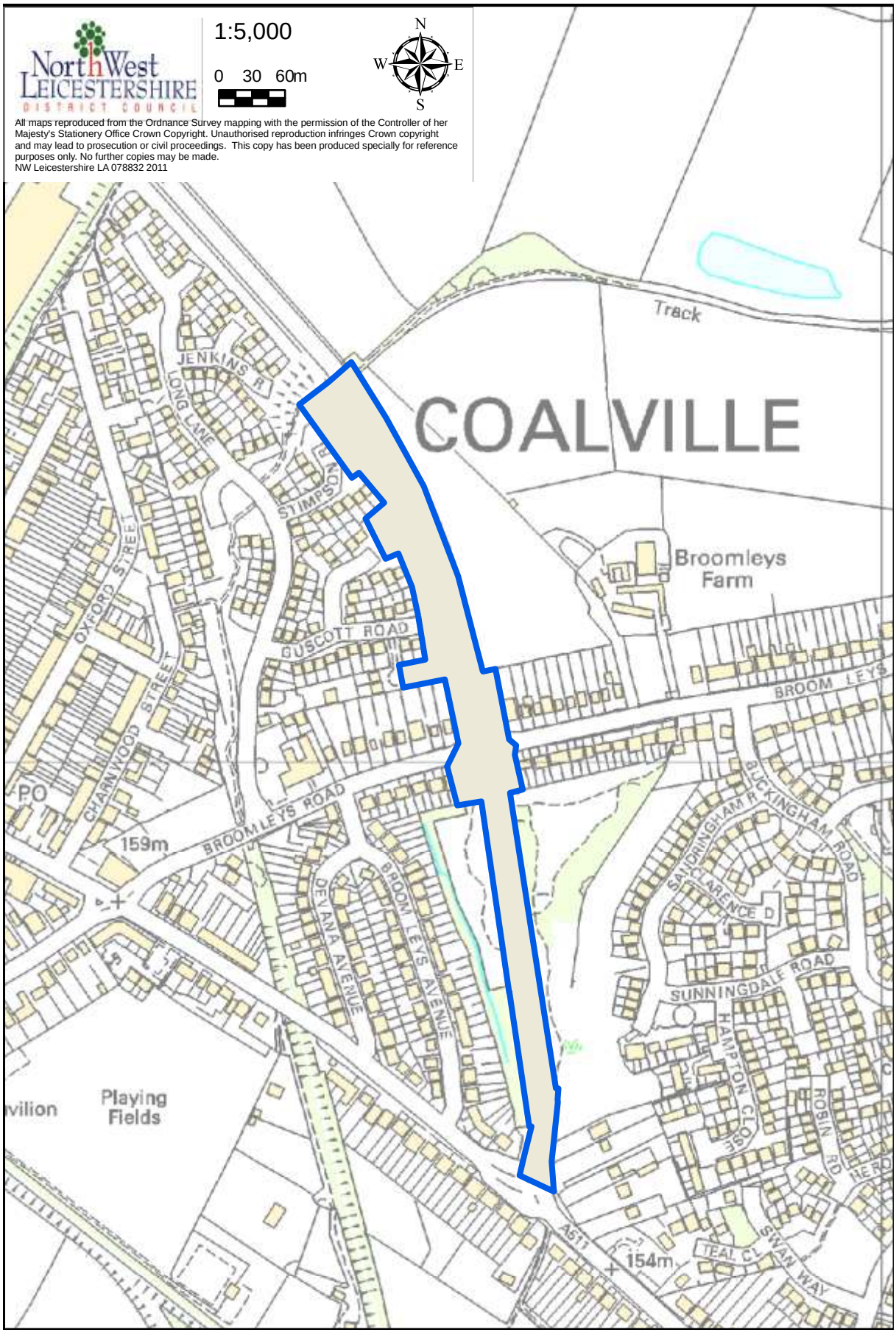
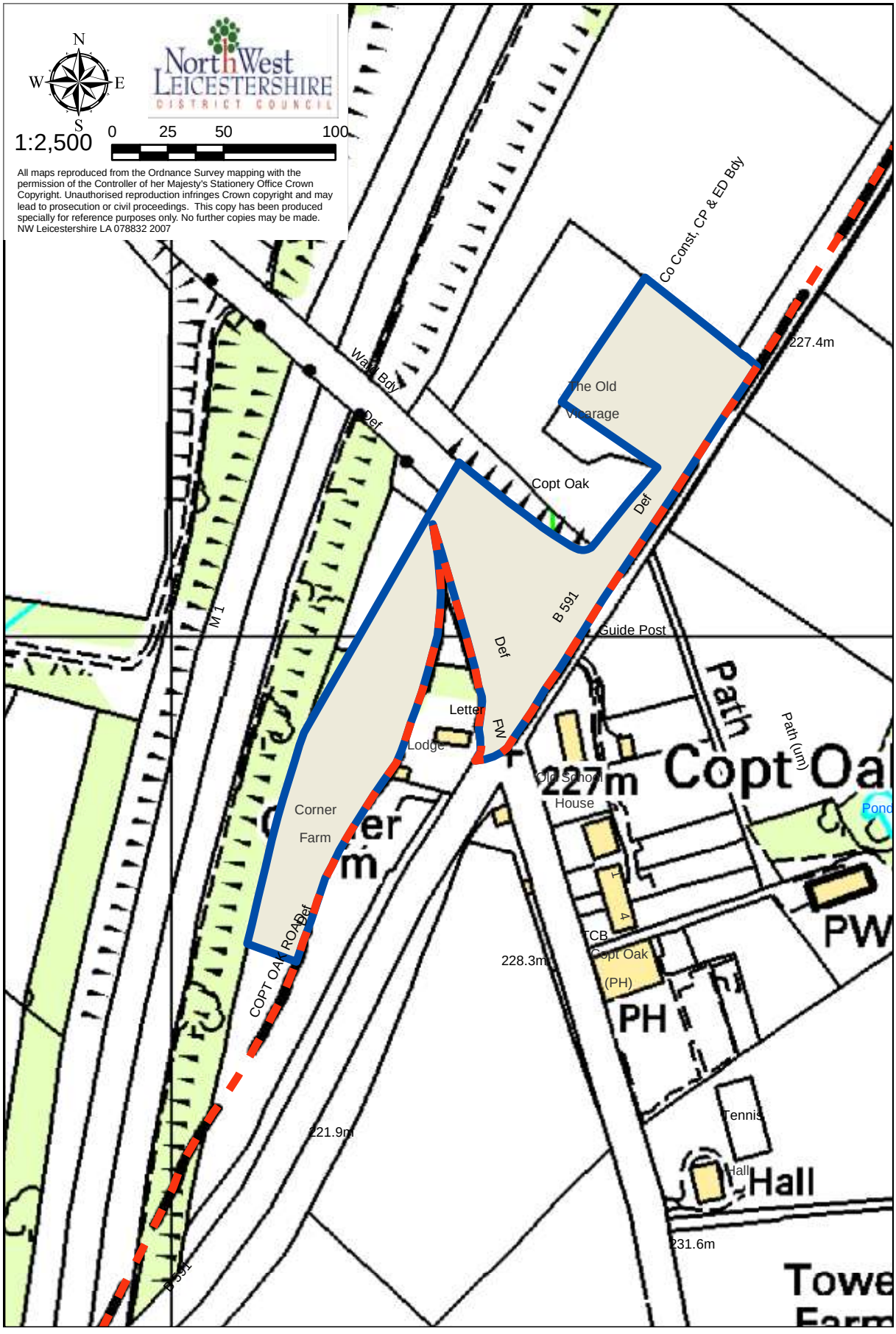


Figure 6 Copt Oak AQMA



2 Methodology

This report will look at monitoring data collected in and around the AQMA. The data looked at will be spread over several years in order to show that areas of the AQMA which are not exceeding the annual mean Air Quality Objective for NO_2 have not exceeded for several years and are unlikely to in the future.

Where appropriate the measured values will be projected forward to 2020 to show that exceedences are unlikely in future years.

2.1 Projecting measured annual mean roadside nitrogen dioxide concentrations to future years

The technical guidance LAQM.TG(09) [34] defines a method for projecting the NO_2 concentration to future years in paragraph 2.13 page 2-3 and box 2.1 on page 2-4. A correction to box 2.1 was published in an Errata published in 2010 [35]. The corrected version of Box 2.1 is reproduced in Table 2 for reference.

As North West Leicestershire District council has data for 2008, 2009, 2010 and 2011 for the locations to be assessed the projection will be conducted using each measured year.

As Castle Donington is not located in Central, Inner or Outer London the adjustment factors for the Rest of the UK will be used.

Table 2. Box 2.1 from *Errata to LAQM.TG(09): Is the example in box 2.1 of TG(09) correct?*

Box 2.1: Projecting measured annual mean roadside nitrogen dioxide concentrations to future years

Year	Adjustment factor to be applied			
	Central London	Inner London	Outer London	Rest of UK
2008	1.000	1.000	1.000	1.000
2009	0.940	0.926	0.916	0.916
2010	0.881	0.853	0.832	0.832
2011	0.824	0.799	0.780	0.783
2012	0.766	0.746	0.729	0.735
2013	0.709	0.692	0.678	0.687
2014	0.652	0.639	0.626	0.639
2015	0.595	0.585	0.575	0.591
2016	0.554	0.549	0.542	0.557
2017	0.513	0.513	0.508	0.523
2018	0.472	0.477	0.475	0.489
2019	0.430	0.441	0.442	0.454
2020	0.389	0.405	0.408	0.420

Example:

The measured NO_2 concentration at a roadside site in Outer London in 2009 is 45.8 µgm^{-3}. The projected concentration for 2010 would be

$$45.8 \times \left(\frac{0.832}{0.916} \right) = 41.6\,\mu gm^{-3}$$

Roadside locations are typically within 1 to 5 metres of the kerbside, but may extend up to 15 metres depending upon the road configuration and traffic flow.

Modified from Box 2.1 in *Errata to TG(09): Is the example in Box 2.1 of TG(09) correct?* [35]

From the example given in Box 2.1 it is believed the projection factors should be used as follows

$$Y_p = Y_m \times \frac{AF_p}{AF_m}$$

Where:

Y_p = NO_2 concentration for the Projected Year

Y_m = Measured NO_2 Concentration

AF_p = Adjustment factor for the year to be projected

AF_m = Adjustment factor for the year NO_2 was measured

2.2 Façade Correction

Some diffusion tubes required a façade correction; the corrections were undertaken using the procedure outlined in Box 2.3: Predicting nitrogen dioxide concentrations at different distances from road of the technical guidance (reproduced in Table 3)

Table 3. Box 2.3: Predicting nitrogen dioxide concentrations at different distances from roads?

Box 2.3: Predicting nitrogen dioxide concentrations at different distances from roads

A method has been developed to allow NO_2 measurements made at one distance from a road to be used to predict concentrations at a different distance from the same road. It is appropriate for distances between 0.1 m and 140 m of the kerb.

Step 1: Identify the local background concentration in μgm^{-3}, either from local monitoring or from the national maps published at www.airquality.co.uk. (Note that the background concentration must be less than the measured concentration).

Step 2: apply the following calculation

$$C_z = \left(\frac{C_y - C_b}{-0.5476 \times Ln(D_y) + 2.7171} \right) \times (-0.5476 \times Ln(D_z) + 2.7171) + C_b$$

Where:

- C_z is the total predicted concentration (μgm^{-3}) at distance D_z;
- C_y is the total measured concentration (μgm^{-3}) at distance D_y;
- C_b is the background concentration (μgm^{-3});
- D_y is the distance from the kerb at which concentrations were measured;
- D_z is the distance from the kerb (m) at which concentrations are to be predicted.
- *Ln(D)* is the natural log of the number D.

Results derived in this way will have a greater uncertainty than the measured data. Further assistance with this procedure and interpretation of the results can be obtained from the Review and Assessment helpdesk (http://laqm.defra.gov.uk/helpdesks.html).

Calculator

The equation above is available as a simple calculator (available at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html). This is set up to work from 0.1 to 50 m from the kerb, as this is the range that is likely to be relevant for Local Air Quality Management (LAQM) work. Kerbside sites should be treated as being at 0.1 m from the kerb. The calculator works for receptors either closer to or further from the kerb than the monitor. The greater the distance between the receptor and monitor, the greater the uncertainty in the derived receptor concentration. It is therefore recommended that if the receptor is further from the kerb than the monitor it should be no more than 20m away. If the receptor is closer to the kerb, then it should be no more than 10 m from the monitor.

Modified from Box 2.3 page 2-6 of the technical Guidance 2009 [34] (modification are improved layout of equation and insertion of updated hyperlinks where footnotes are present in the original.

2.3 Annualisation

Where only short-term periods of monitoring data are available, the results may be adjusted to estimate an annual mean concentration using the approach set out in Box 3.2: Estimation of annual mean concentrations from short-term monitoring data of the technical guidance LAQM.TG(09) [34] (reproduced in Table 4).

Table 4. Box 3.2: Estimation of annual mean concentrations from short-term monitoring data

Box 3.2: Estimation of annual mean concentrations from short-term monitoring data

Example

It has only been possible to carry out a monitoring survey (automatic or diffusion tube) at site **S** for six months between July and December 2008. The measured mean concentration **M** for this period is 30.2µgm^{-3}. How can this be used to estimate the annual mean for this location?

Adjustment to estimate annual mean

The adjustment is based on the fact that patterns in pollutant concentrations usually affect a wide region. Thus if a six month period is above average at one place it will almost certainly be above average at other locations in the region. The adjustment procedure is as follows:

1. Identify two to four nearby, long-term, continuous monitoring sites, ideally those forming part of the national network. These should be background sites to avoid any very local effects that may occur at roadside sites, and should, wherever possible lie within a radius of about 50 miles.
2. Obtain the annual means, **Am**, for the calendar year for these sites, 2008 in this example.
3. Work out the period means, **Pm**, for the period of interest, in this case July to December 2008. [It may be necessary to use unratified automatic data.]
4. Calculate the ratio, **R**, of the annual mean to the period mean $\left(\frac{Am}{Pm}\right)$ for each of the sites.
5. Calculate the average of these ratios, $\mathbf{R_a}$. This is then the adjustment factor.
6. Multiply the measured period mean concentration **M** by this adjustment factor $\mathbf{R_a}$ to give the estimate of the annual mean for 2008.

Long term site	Annual mean 2008 (Am)	Period Mean 2008 (Pm)	Ratio $\left(\frac{Am}{Pm}\right)$
A	28.6	29.7	0.963
B	22.0	22.8	0.965
C	26.9	28.9	0.931
D	23.7	25.9	0.915
		Average (R_a)	0.944

For this example the best estimate of the annual mean for site **S** in 2008 will be **M** × $\mathbf{R_a}$ = 30.2 x 0.944 = 28.5µgm^{-3}.

Notes

Monitoring data for the long-term sites must have adequate data capture rates: above 90% is preferable; sites with data capture below 75% should not be used.

It may be appropriate to use diffusion tube results from a long-term survey to adjust short-term diffusion tube results. To allow for the greater uncertainty of diffusion tubes results from four or more sites should be used. Ensure that the tubes are from the same supplier using the same method of preparation.

If the short-term period covers, for instance, February to June 2009, and the work is being carried out in August 2009, then an annual mean for 2009 will not be available. The calculation can then be carried out using the ratio to the 2008 annual mean, but the result is then an estimate of the 2008 annual mean at the short-term site.

Modified from Box 3.2 page 3-4 of the technical Guidance 2009 [34].

2.4 Summary of Monitoring Undertaken

2.4.1 Automatic monitoring locations

North West Leicestershire district council has procured 1 automatic monitor located within the AQMA at Castle Donington and is shown in Table 5. Full Data is available from North West Leicestershire District Council Website [47]

Table 5. Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
			X	Y						
2	Castle Donington	Roadside	444534	327365	NO NO_2 NO_x	Chemiluminescence	Y	0	1.5	Y

2.4.2 Diffusion tube Monitoring Locations

The council undertakes extensive diffusion tube monitoring within its AQMAs. Details of the tubes currently and historically present within the Castle Donington AQMA as shown in Table 6. Full Data is available from North West Leicestershire District Council Website [46]

Figure 7 Map of Castle Donington Monitoring Sites

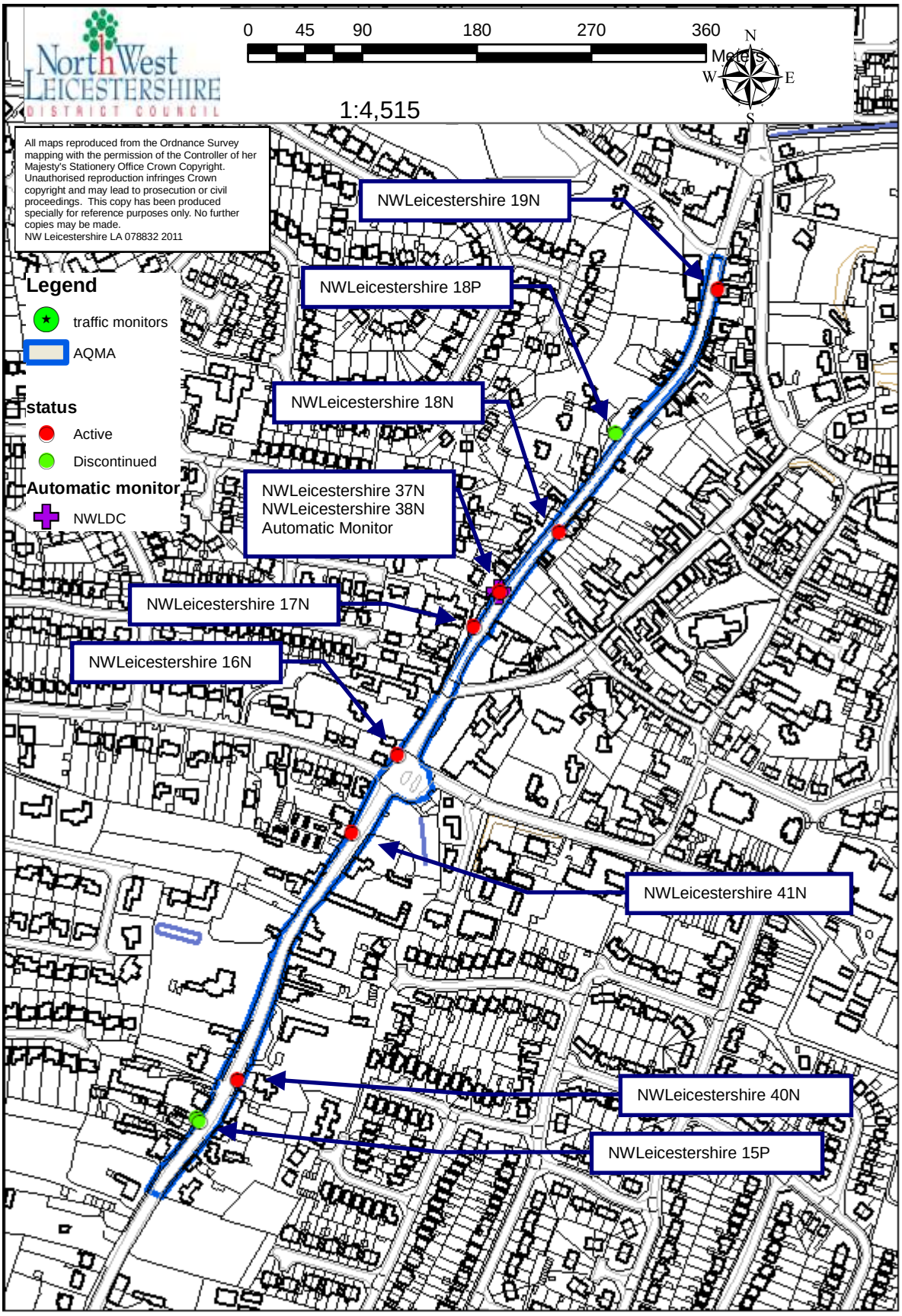


Table 6. Diffusion tube monitoring locations

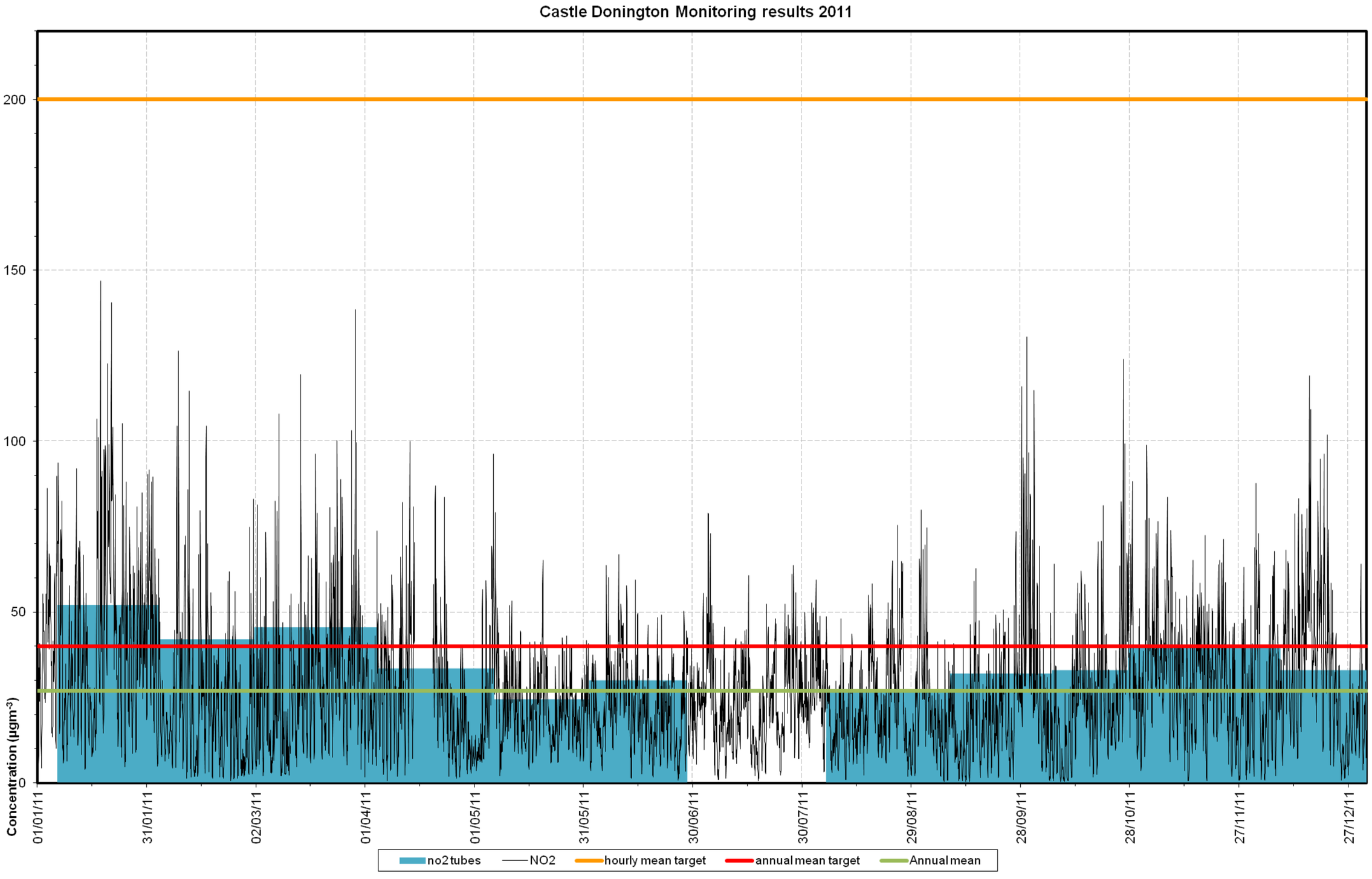
Site details	location	Location Type	Grid Reference		Our Tube No.	Pollutant monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?	Monitoring Period	
			X	Y							Start	End
NWLeicestershire 16N	Crossroads CD	Roadside	444450	327233	16	NO_2	Y	7.53	1	Y	2007	
NWLeicestershire 17N	13 Bondgate CD	Roadside	444512	327335	17	NO_2	Y	2	2.5	Y	2004	
NWLeicestershire 18N	34 Bondgate CD	Roadside	444580	327411	18	NO_2	Y	0	2.3	Y	2007	
NWLeicestershire 19N	94 Bondgate CD	Roadside	444707	327603	19	NO_2	Y	0.8	1.4	Y	2008	
NWLeicestershire 37N	monitoring station CD (1)	Roadside	444534	327365	24	NO_2	Y	0	1.5	Y	2010	
NWLeicestershire 38N	monitoring station CD (2)	Roadside	444534	327365	25	NO_2	Y	0	1.5	Y	2010	
NWLeicestershire 40N	35 high street Castle Donington	Roadside	444323	326975	13	NO_2	Y	3	0.9	Y	2011	
NWLeicestershire 41N	18 high street Castle Donington	Roadside	444474	327171	15	NO_2	Y	4	1	Y	2011	
NWLeicestershire 15P	High St CD (44)	Roadside	444291	326945	34	NO_2	Y	9	4.5		2008	2009
NWLeicestershire 18P	Bondgate CD (61-79)	Roadside	444624	327489	40	NO_2	Y	N	8.5		2008	2009

3 Results

Table 7. NO_2 Diffusion Tube Result

Site details	location	NO_2 concentration Year measured µgm^{-3}							
	YEAR	2004	2005	2006	2007	2008	2009	2010	2011
	BAF	0.98	1.1	1.01	0.99	0.94	0.9	1.06	1.06
NWLeicestershire 16N	Crossroads CD				39.04	34.01	33.46	**42.10**	33.44
NWLeicestershire 17N	13 Bondgate CD	36.59	**40.64**	35.91	38.38	34.01	33.61	**44.69**	36.13
NWLeicestershire 18N	34 Bondgate CD				**42.25**	**47.83**	**43.94**	**57.88**	**59.07**
NWLeicestershire 19N	94 Bondgate CD					35.12	29.78	**41.14**	35.95
NWLeicestershire 37N	monitoring station CD (1)							**42.57**	38.16
NWLeicestershire 38N	monitoring station CD (2)							**43.44**	35.51
NWLeicestershire 40N	35 high street Castle Donington								27.52
NWLeicestershire 41N	18 high street Castle Donington								37.67
NWLeicestershire 15P	High St CD (44)					29.03	23.74		
NWLeicestershire 18P	Bondgate CD (61-79)					32.66	30.88		

Figure 8 Graph of automatic monitoring compared with NO_2 tubes



4 Analysis of Results

The findings of each monitoring location is as follows

4.1 NWLeicestershire 16N

The Location at Park Lane | High Street | Delven lane | Bondgate Crossroads has been monitored by diffusion tubes since 2007 the tube exceeded 36µgm^{-3} in 2007 and exceeded 40µgm^{-3} in 2010. The site has never exceeded 60µgm^{-3} .

If a façade correction is applied to the monitoring location (see Table 8) it is unlikely that an exceedence of the annual mean air quality standard for NO_2 is occurring at the nearest relevant receptor.

4.2 NWLeicestershire 17N

The location outside 13 Bondgate has been monitored using diffusion tubes since 2004. The site exceeded 36µgm^{-3} in 2004, 2007 and 2011. ths site exceeded 40µgm^{-3} in 2005 and 2010. The site has never exceeded 60µgm^{-3}

If a façade correction is applied to the monitoring location (see Table 8) it is possible that in 2010 the annual mean air quality standard for NO_2 may have been exceeded at the nearest relevant receptor.

4.3 NWLeicestershire 18N

The location is adjacent to the façade of 34 Bondgate has been monitored since 2008. The site has exceeded 40µgm^{-3} in 2007, 2008, 2009, 2010, 2011.

4.4 NWLeicestershire 19N

The location is a road sign outside of 94 Bondgate has been monitored since 2007. The site has exceeded 40µgm^{-3} 2010.

If a façade correction is applied to the monitoring location (see Table 8) it is unlikely that an exceedence of the annual mean air quality standard for NO_2 is occurring at the nearest relevant receptor.

4.5 NWLeicestershire 37N, NWLeicestershire 38N and Automatic Monitor

the location is on the pavement outside 17 Bondgate and has been monitored since November 2010. Annualisation of 2010 Tube data indicates that the Annual mean air quality standard for NO_2 may have been exceeded. Annualisation of 2010 Automatic monitor data indicates that the Annual mean air quality standard for NO_2 may have been exceeded.

In 2011 Tube data NWLeicestershire 37N exceeded 36µgm^{-3}. The Automatic monitor recorded an annual mean of 26.9µgm^{-3} no exceedence of 200µgm^{-3} hourly mean were detected.

4.6 NWLeicestershire 40N

The location on lamppost outside 35 High Street has been monitored since February 2011. Annualisation of the tube data does not exceed 36µgm^{-3}

If a façade correction is applied to the monitoring location (see Table 8) it is unlikely that an exceedence of the annual mean air quality standard for NO_2 is occurring at the nearest relevant receptor.

4.7 NWLeicestershire 41N

The location on lamppost outside 18 High Street has been monitored since February 2011. Annualisation of the tube data exceeds 36µgm^{-3}

If a façade correction is applied to the monitoring location (see Table 8) it is unlikely that an exceedence of the annual mean air quality standard for NO_2 is occurring at the nearest relevant receptor.

4.8 NWLeicestershire 15P

The location on lamppost outside 44 High Street was monitored in 2008 and 2009. In 2008 the tube did not exceed 36µgm^{-3}, annualisation of the 2009 tube data does not exceed 36µgm^{-3}

4.9 NWLeicestershire 18P

The location on lamppost between 61 and 79 Bondgate was monitored in 2008 and 2009. In 2008 the tube did not exceed 36µgm^{-3}, annualisation of the 2009 tube data does not exceed 36µgm^{-3}

Table 8. Façade Correction data

Site details	location	Location Type	Grid Reference		Our Tube No.	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?	2009		2010		2011	
			X	Y					relevant background concentration	receptor correction for roadside tubes (Bias adjusted mean used)	relevant background concentration	receptor correction for roadside tubes (Bias adjusted mean used)	relevant background concentration	receptor correction for roadside tubes (Bias adjusted mean used)
NWLeicestershire 16N	Crossroads CD	Roadside	444450	327233	16	7.53	1	Y	12.84	24.56	11.93	29.06	11.49	23.96
NWLeicestershire 17N	13 Bondgate CD	Roadside	444512	327335	17	2	2.5	Y	12.84	30.59	11.93	39.93	11.49	32.55
NWLeicestershire 19N	94 Bondgate CD	Roadside	444707	327603	19	0.8	1.4	Y	16.21	28.45	15.16	38.60	14.60	33.87
NWLeicestershire 40N	35 high street CD	Roadside	444323	326975	13	3	0.9	Y					11.49	21.70
NWLeicestershire 41N	18 high street CD	Roadside	444474	327171	15	4	1	Y					11.49	27.65
NWLeicestershire 15P	High St CD (44)	Roadside	444291	326945	34	9	4.5		12.84	23.05				

5 Conclusions and Proposed Actions

Diffusion tube data shows that there has not been an exceedence of the annual mean air quality standard for NO2 at relevant receptors south of location NWleicestershire 16N.

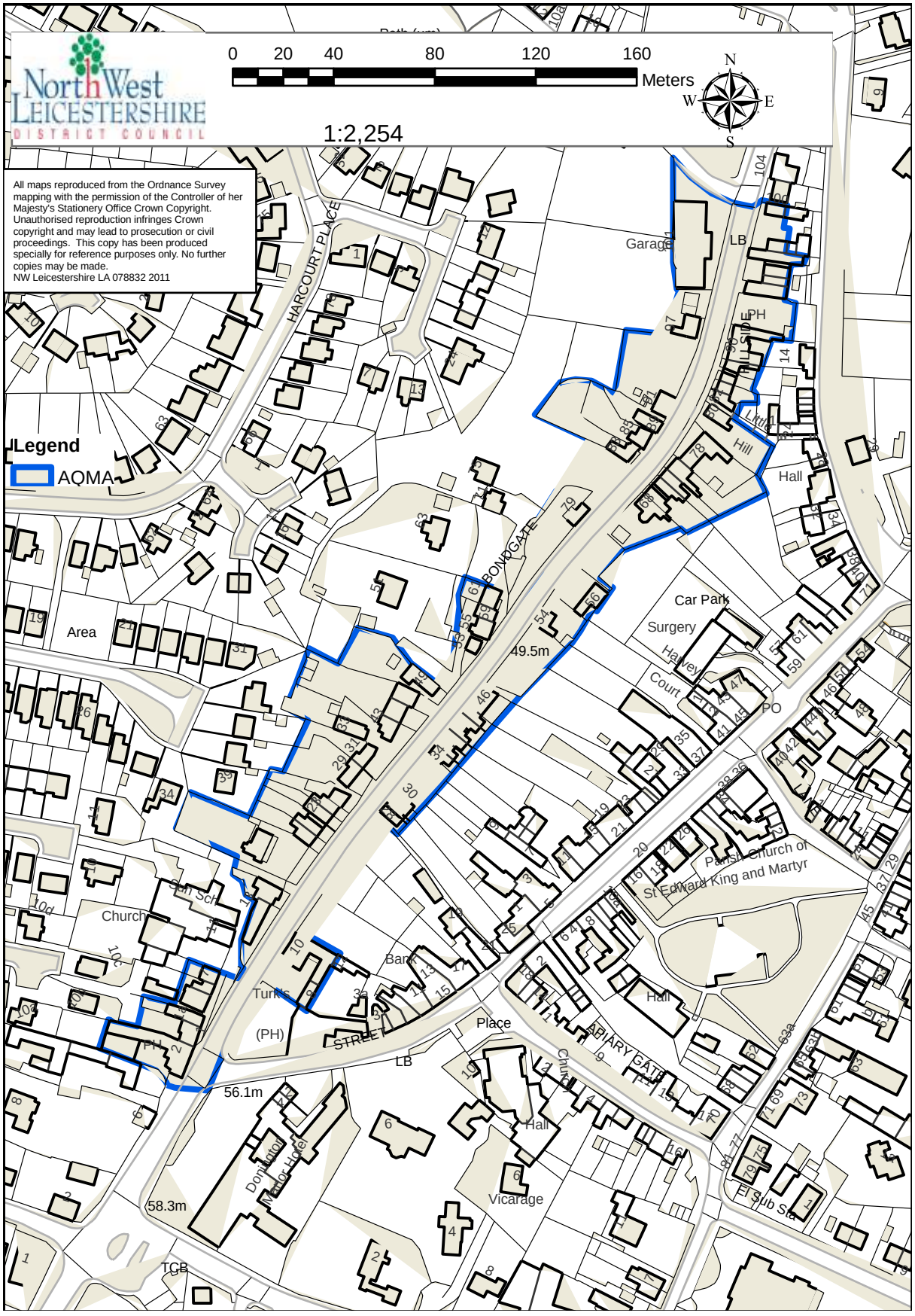
Diffusion Tubes have recorded exceedences of the annual mean air quality standard for NO_2 north of location NWLeicestershire 16N.

5.1 Proposed Actions

The Castle Donington AQMA should be amended to cover the extent shown in Figure 9. An Example amendment order is shown in Appendix A.

Publish an Action Plan outlining how the AQMA will be addressed.

Figure 9 Proposed AQMA Extent



6 References

6.1 Previous Review and Assessment Reports

[1] North West Leicestershire District Council , 2003a, *Air Quality Stage 4 Review and Assessment*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[2] North West Leicestershire District Council , 2003b, *Air Quality Updating and Screening Assessment 2003*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[3] North West Leicestershire District Council , 2005a, *Air Quality Detailed Assessment*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[4] North West Leicestershire District Council , 2005b, *Air Quality Progress Report 2005*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[5] North West Leicestershire District Council , 2006, *Air Quality Updating and Screening Assessment 2006*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[6] North West Leicestershire District Council, 2007, *Air Quality Detailed Assessment for Coalville and Castle Donington*. Coalville: North West Leicestershire District Council. Available at:

https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[7] Conestoga-Rovers & Associates (Europe) Ltd, 2008, *Air Quality Progress Report 2008 Report No. 933628*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[8] Conestoga-Rovers & Associates (Europe) Ltd, 2009a, *Air Quality Detailed Assessment For East Midlands Airport Report No.933690-1*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[9] Conestoga-Rovers & Associates (Europe) Ltd, 2009b, *Air Quality Detailed Assessment For Copt Oak Report No. 933690-2-RPT2*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[10] Conestoga-Rovers & Associates (Europe) Ltd, 2009c, *Air Quality Further Assessment Of Bardon Road AQMA, Coalville Report No. 933690-2-RPT3*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[11] *Conestoga-Rovers & Associates (Europe) Ltd, 2009d, Air Quality Further Assessment of Castle Donington AQMA Report No.933690-4*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[12] North West Leicestershire District Council, 2009e, *Air Quality Update and Screening Assessment 2009*. Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[13] North West Leicestershire District Council, 2010a, *Air Quality Progress Report 2010*, Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[14] North West Leicestershire District Council, 2010b, *Air Quality Detailed Assessment for SO_2*, Coalville: North West Leicestershire District Council Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[15] North West Leicestershire District Council, 2011a, *Air Quality Detailed Assessment of Coalville AQMA*, Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[16] North West Leicestershire District Council, 2011b, *Air Quality Detailed Assessment of M1 AQMA*, Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[17] North West Leicestershire District Council, 2011c, *Air Quality Progress Report 2011*, Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

[18] North West Leicestershire District Council, 2011d, 2011 *Air Quality Detailed Assessment of 1-hour Mean Air Quality Standard at Broomleys junction Coalville*, Coalville: North West Leicestershire District Council. Available at: https://www.nwleics.gov.uk/pages/local_air_quality_review_and_assessment [Accessed 11/12/2012]

6.2 Acts and Statutory Instruments and orders

[19] Environment Act 1996 (c. 25), London: Her Majesty's Stationary Office Available at: http://www.legislation.gov.uk/ukpga/1995/25/contents [Accessed 11/12/2012]

[20] *Air Quality (England) Regulations 2000* SI 2000/0928, London: HMSO Available at: http://www.legislation.gov.uk/uksi/2000/928/contents/made [Accessed 11/12/2012]]

[21] *Air Quality (England) (Amendment) Regulations 2002* SI 2002/3043, London: HMSO. Available at: http://www.legislation.gov.uk/uksi/2002/3043/contents/made [Accessed 11/12/2012]

[22] *The Air Quality Standards Regulations 2007* SI 2007/0717, London: HMSO Available at http://www.legislation.gov.uk/uksi/2007/64/contents/made [Accessed 11/12/2012]

[23] The Air Quality Standards Regulations 2010 SI 2010/1001, London: HMSO. Available at http://www.legislation.gov.uk/uksi/2010/1001/contents/made [Accessed 11/12/2012]

[24] *North West Leicestershire District Council Air Quality Management Order 2009 (No. 1),* 2009 Coalville: North West Leicestershire District Council. Available at http://www.nwleics.gov.uk/pages/air_quality_managment_area_copt_oak [Accessed 11/12/2012]

[25] *North West Leicestershire District Council Air Quality Management Order 2008 (No. 1)*, 2008, Coalville: North West Leicestershire District Council. Available at http://www.nwleics.gov.uk/pages/air_quality_managment_area_castle_donington [Accessed 11/12/2012]

[26] *North West Leicestershire District Council Air Quality Management Order 2008 (No. 2),* 2008, Coalville: North West Leicestershire District Council.

Available at http://www.nwleics.gov.uk/pages/air_quality_managment_area_coalville [Accessed 11/12/2012]

[27] *The North West Leicestershire District Council (Kegworth Air Quality Management Area) Order 2001*, 2001, Coalville: North West Leicestershire District Council Available at http://www.nwleics.gov.uk/pages/air_quality_managment_area_high_street_kegworth [Accessed 11/12/2012]

[28] *North West Leicestershire District Council (M1 Air Quality Management Area) Order 2001*, 2001, Coalville: North West Leicestershire District Council Available at http://www.nwleics.gov.uk/pages/m1_mole_hill_farm_kegworth [Accessed 11/12/2012]

[29] *M1 Air Quality Management Area (nitrogen dioxide) Revocation Order 2004*, 2004, Coalville: North West Leicestershire District Council Available at http://www.nwleics.gov.uk/pages/m1_mole_hill_farm_kegworth [Accessed 11/12/2012]

[30] Air Quality Management Area (Nitrogen Dioxide) Amendment Order 2011 (No.1), 2011, Coalville: North West Leicestershire District Council Available at http://www.nwleics.gov.uk/pages/m1_mole_hill_farm_kegworth [Accessed 11/12/2012]

[31] *Air Quality Management Area (Nitrogen Dioxide) Amendment Order 2011 (No.)2,* 2011, Coalville: North West Leicestershire District Council Available at http://www.nwleics.gov.uk/pages/air_quality_managment_area_coalville [Accessed 11/12/2012].

6.3 British Standards

[32] British Standards Institution, 2007. *BS EN 15259:2007 Air quality. Measurement of stationary source emissions. Requirements for Progress*

Report 32 measurement sections and sites and for the measurement objective, plan and report. Milton Keynes: BSI

[33] British Standards Institution 2007. *BS ISO 4226:2007 - Air quality. General aspects. Units of measurement*. Milton Keynes: BSI

6.4 Technical guidance

[34] Department for Food and Rural Affairs, 2009, *Local Air Quality Management Technical Guidance LAQM.TG(09)*. Department for Food and Rural Affairs

[35] Department For Environment Food and Rural Affairs. 2010. *Errata to LAQM.TG(09): Is the example in Box 2.1 of TG(09) correct?* London: Department for Environment Food and Rural Affairs.[Online] Available at http://laqm2.defra.gov.uk/supportguidance/ [accessed 15/02/2011]

[36] Department for Food and Rural Affairs, 2009. *Local Air Quality Management Policy Guidance LAQM.PG(09).* London: Department for Food and Rural Affairs

[37] Department for Food and Rural Affairs, 2003. *Local Air Quality Management Technical Guidance LAQM.TG(03)*. London: Department for Food and Rural Affairs

6.5 Other Documents

[38] AEA, 2007a, National Atmospheric Emissions Inventory. www.naei.org.uk Department for Food and Rural Affairs

[39] AEA, 2010, Quality assurance/quality control (QA/QC) framework. [Online] London: Department for Environment, Food and Rural Affairs. Available at: http://laqm1.defra.gov.uk/review/tools/no2/qa-qc.php [Accessed 21/03/2011]

[40] Bureau Veritas, 2011, *National Diffusion Tube Bias Adjustment Factor Spreadsheet*. [online] London: Department for Environment Food and Rural Affairs. Available at: http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html [Accessed 11/12/2012]

[41] Department for Food and Rural Affairs, 2007, *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. CM 7169 NIA 61/06-07*, London: Her Majesty's Stationary Office.

[42] Department for Transport, 2008. *Annual Average Daily Traffic Flows.* London: Department for Transport http://www.dft.gov.uk/matrix

[43] Highways Agency, 1992 (updated June 2010). *Design Manual for Roads and Bridges Volume 11, Section 3 Environmental Assessment Progress Report 34 Techniques*. Birmingham: Highways Agency. Available at: http://www.standardsforhighways.co.uk/dmrb/index.htm [accessed 25/10/2010].

[44] Laxen & Marner. 2003. A*nalysis of the Relationship between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites.* Available from DEFRA,.

[45] Office for National Statistics, updated 28 September 2011, *Resident Population Estimates, All Persons, 2010*. [online] Available at: http://neighbourhood.statistics.gov.uk/dissemination/LeadTrendView.do?a=3&b=277034&c=north+west+leicestershire&d=13&e=13&f=26982&g=466548&i=1001x1003x1004x1005&l=1818&o=322&m=0&r=1&s=1297168244107&enc=1&adminCompId=26982&variableFamilyIds=6766&xW=779

[46] North West Leicestershire District Council, updated 30th April 2012, Diffusion Tube Data [Online]. Available at: http://www.nwleics.gov.uk/pages/air_quality_monitoring_no2_diffusion_tubes

[47] North West Leicestershire District Council, updated 30th April 2012, Automatic Monitoring Data [Online]. Available at: http://www.nwleics.gov.uk/pages/air_quality_realtime_monitoring

7 Appendices

Appendix A Example Amendment Order

ENVIRONMENT ACT 1995 PART IV Section 83(2) (b)

THE NORTH WEST LEICESTERSHIRE DISTRICT COUNCIL

AIR QUALITY MANAGEMENT AREA (nitrogen dioxide) AMENDMENT ORDER 2012 (No.2) Order

By an Order dated 9th January 2008 – North West Leicestershire Council ("the Council") made the North West Leicestershire District Council Air Quality management Area Order 2008 (No. 1) ("the 2008 Order")

The Council is satisfied that as a result of it's 2012 Air Quality Detailed Assessment of Annual Mean Air Quality Standard at Castle Donington, it appears that the Annual Mean Air Quality Standard is being exceeded at relevant receptors north of the Turks Head Public House.

In using it's authority conferred under Section 83(2) of the Environment Act 1995, the Council make the following Order varying the North West Leicestershire District Council Air Quality management Area Order 2008 (No. 1) as follows;

1. The Order Known as the North West Leicestershire District Council Air Quality management Area Order 2008 (No. 1) shall be amended as follows.
    a. Paragraph 2 be amended to read as follows:
    The area comprises the Bondgate area of Castle Donington. The northern extent of the AQMA shall extend to the junction of Bondgate with The Spittal and the southern extent shall extend to The Moira Arms 2 High Street as shown outlined in blue on the attached Map 01 is declared to be an Air Quality Management Area ("the designated area")

for exceedences of the annual mean air quality standard for nitrogen dioxide (NO_2).

b. The Plan Numbered AQMA 01 be renamed Map 01 and be replaced with the attached Map 01

2. This order shall come into force on 01 December 2012.

Signed: _____

Steve Bambrick

Director of Services

Date:

Map 01 AQMA Extent