



# 2017 Air Quality Annual Status Report (ASR)

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

July 2017

**Richmondshire District Council**

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## Executive Summary

Air pollution is associated with a number of adverse health impacts. Air pollution 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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

## Air Quality in Richmondshire

Richmondshire District Council (RDC) is principally a rural district. Very few areas within the district are of concern in relation to air quality. Nitrogen dioxide levels are the principal focus of monitoring in RDC. Concentrations of nitrogen dioxide tend to reflect local road traffic conditions and can be affected by the layout of the roads, in combination with the surrounding buildings. An area of narrow congested streets, road junctions and properties close to the kerb in Richmond (around the main approaches to the town centre from the northeast) has been identified as an area of concern in relation to air quality and is being monitored. The results of monitoring in 2016 for this area, together with all of the other sites in Richmondshire, indicate that the concentrations of nitrogen dioxide measured lie below the objective set by legislation (see Appendix E). There is no obvious trend displayed by data gathered at the various monitored locations over the five-year period reported (2012 to 2016).

There are currently no Air Quality Management Areas (AQMAs) in the district. If an AQMA were to be declared in the future then RDC and North Yorkshire County Council (NYCC) would work together to develop an Air Quality Action Plan which would include measures to address air pollution.

Locations of AQMAs in other parts of the country can be found at <https://uk-air.defra.gov.uk/aqma/list> .

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Previous reports submitted by Richmondshire District Council can be found at [www.richmondshire.gov.uk](http://www.richmondshire.gov.uk) (search 'Air Quality').

## **Actions to Improve Air Quality**

In light of the air quality in Richmondshire being generally good, air quality has not required particular attention with regard to council policies or actions. Monitoring will continue at the same sites as monitored in 2016. If the results of monitoring indicate an upward trend with exceedance(s) of the air-quality objective then Richmondshire District Council will take the steps required by the Local Air Quality Management (LAQM) Policy Guidance.<sup>4</sup>

## **Conclusions and Priorities**

This report provides the results of the monitoring of nitrogen dioxide (NO<sub>2</sub>) concentrations over the past 5 years. These NO<sub>2</sub> annual mean concentrations are compared to the air quality objective of 40µg/m<sup>3</sup>. In Richmondshire the air-quality objective was not exceeded in 2016. Data over that period has been considered (as appropriate), and no obvious overall trend is shown.

In Richmondshire the priorities with regard to air quality are therefore to focus on continued monitoring of nitrogen dioxide.

North Yorkshire is a two-tier authority with North Yorkshire County Council (NYCC) being responsible for highways. NYCC, RDC and the Local Enterprise Partnership are undertaking major junction improvement works on the A6136 Catterick Road Junction in Catterick Garrison with the aim of reducing congestion (and hence resultant emissions from vehicles) in response to housing and anticipated employment growth in the RDC Local Plan.

The RDC Local Planning Authority and NYCC as the Local Highway Authority will continue to consider planning applications and seek to ensure they do not cause undue traffic congestion on the highway network.

NYCC undertake on-going management of traffic signals, seeking to optimise traffic those signals with the aim of reducing congestion.

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<sup>4</sup> Defra Local Air Quality Management Policy Guidance (PG16), April 2016

## **Local Engagement and How to get Involved**

Richmondshire District Council currently has no schemes to help improve air quality however North Yorkshire County Council work with schools to improve road safety and travel awareness and offer cycle training to primary school pupils. Members of the public can help by reducing the number of car-driver trips, car sharing, increasing use of public transport and increasing active travel (cycling and walking).

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## 1 Local Air Quality Management

This report provides an overview of air quality in Richmondshire 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 it is considered that air quality standards are likely to be exceeded 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. As a two-tier authority Richmondshire District Council and North Yorkshire County Council would work together to develop an AQAP (which would include measures to address air pollution).

This Annual Status Report (ASR) is an annual requirement showing any strategies employed by Richmondshire District Council to improve air quality and any progress that has been made (as appropriate).

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.

Richmondshire District Council currently does not have any AQMAs.

For reference, maps of Richmondshire District Council's monitoring locations are available in Appendix D.

### 2.2 Progress and Impact of Measures to address Air Quality in Richmondshire

Defra's appraisal of last year's ASR concluded that the report was well-structured, detailed and provided information specified in the Guidance. Defra noted that RDC will continue routine monitoring at the existing sites and that the results were below objective levels. This monitoring is ongoing.

Defra also advised that data for some of the sites is not representative of relevant exposure. Data for such sites can be distance corrected using an NO<sub>2</sub> fall-off with distance calculator available on the LAQM website. These corrections have not been undertaken for any data presented in previous reports submitted by RDC to Defra. The data presented in this report has therefore been corrected to nearest exposure (as appropriate) for the 2016 data and also, for comparison purposes, for data for the previous four years (2012-2015).

The distance correction data for 2016 for relevant public exposure of the bias adjusted figures is provided in the last column of data presented in Table B.1 of this ASR. Predicted relevant public exposure is lower than the measured (and bias adjusted) figure where the relevant public exposure (e.g. at the face of the building) is further from the source of pollutant than the actual location of the monitoring site.

NB The locations of site references given below are given in Appendix A (Table A.1) and in Appendix D (Figures D.1 and D.2).

The monitoring sites representative of relevant public exposure are: R6; R7; R11; R13; R15; R16 and R19.

The monitoring sites not representative of relevant public exposure are: R2; R3; R4; R8; R10; R12; R17 and R18. Data from these sites has been distance corrected for relevant public exposure.

R4 is an 'Urban Background' site. It is not representative of relevant public exposure and has not been distance corrected for relevant public exposure. The monitoring data from this R4 site has been used as the 'local mean background NO<sub>2</sub> concentration' in the NO<sub>2</sub> fall-off with distance calculations.

Richmondshire District Council has a Local Plan Core Strategy<sup>5</sup>. Core Policy 3 of that Strategy seeks to align development and provision of services to minimise the need for travel. North Yorkshire County Council, as local highway authority, has objectives which relate to transport as detailed in their Local Transport Plan 4<sup>6</sup>. These are summarised in Table 2.1.

Richmondshire District Council's priorities for the coming year are to continue monitoring in the same locations as those monitored during 2016.

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<sup>5</sup> Richmondshire District Council, Richmondshire Local Plan 2012-2028 Core Strategy

<sup>6</sup> North Yorkshire County Council, Local Transport Plan four, 2016-2045

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Plannin g Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimat ed / Actual Completion Date	Comments / Barriers to implementation
1	Local Plan 2012-2028 Core Strategy (including Core Policy CP3 Achieving Sustainable Development)	Policy Guidance and Development Control	Other policy	Richmondshire District Council as Local Planning Authority & in consultation with North Yorkshire County Council as Local Highway Authority	N/A	2012-2028	N/A	N/A	On-going	N/A	The strategy seeks to align development and provision of services to minimise the need for travel.
2	Local Transport Plan 4 (LTP4)	Policy Guidance and Development Control	Other policy	North Yorkshire County Council	N/A	2016-2045	N/A	N/A	On-going	N/A	Two objectives of the plan are - 'Environment and Climate Change' - managing the adverse impact of transport on the environment, and 'Healthier Travel' - promoting healthier travel opportunities.
3	Junction Improvements Catterick Garrison (A6136)	Traffic Management	Strategic highway improvements	North Yorkshire County Council with RDC and Local Enterprise Partnership	Comple t e	2016-2017	N/A	N/A	On-going	Autumn 2017	Aim of reducing congestion in response to housing and anticipated employment growth in the RDC Local Plan
4	Management and optimisation of traffic signals	Traffic Management	Congestion Management	North Yorkshire County Council	Ongoing	Ongoing	N/A	N/A	On-going as part of LTP4	N/A	Aim to reduce congestion
5	Road safety and travel awareness	Promoting Travel Alternatives	School Travel Plans	North Yorkshire County Council	Ongoing	Ongoing	Number of pupils trained	N/A	On-going as part of LTP4	Ongoing	Cycle training to primary school pupils. Promotion of non-car journeys to/from school
6	Countywide Civil Parking Enforcement	Traffic Management	Parking Enforcement on Highway	North Yorkshire County Council	Ongoing	Ongoing	N/A	N/A	On-going as part of LTP4	N/A	To address parking related traffic congestion/disruption

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7	Promotion of cycling	Promoting Travel Alternatives	Promotion of Cycling	North Yorkshire County Council (with partners as appropriate)	Ongoing	Ongoing	N/A	N/A	On-going as part of LTP4	N/A	Very limited resources
8	Provision of cycle routes	Transport Planning and Infrastructure	Cycle Network	North Yorkshire County Council (with partners as appropriate)	Ongoing	Ongoing	N/A	N/A	on-going as part of LTP4	N/A	Very limited resources
9	Information about air quality monitoring and reporting	Public Information	Via the Internet	Richmondshire District Council	N/A	N/A	N/A	N/A	N/A	N/A	Available on RDC website

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7)<sup>7</sup>, local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

No specific targets have been issued and no monitoring is currently undertaken by Richmondshire District Council. Defra has produced national PM<sub>2.5</sub> modelling maps. These models indicate that levels of PM<sub>2.5</sub> are generally low in Richmondshire but with higher levels along the A1 / A1(M) section of the strategic road network (reflecting one of the primary sources of PM<sub>2.5</sub>, i.e. combustion from road traffic exhausts)<sup>8</sup>.

In addition, Public Health England (PHE) produce figures, as part of the Public Health Outcomes Framework (PHOF), in relation to certain health indicators (found at <http://www.phoutcomes.info/public-health-outcomes-framework#gid/1000049>). The indicator of relevance (within the context of this Annual Status Report report) is 'Fraction of all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, PM<sub>2.5</sub>)'. The values currently available from PHE for this indicator are for 2015. The value for this indicator for Richmondshire is 3.3%, which is the second lowest within the Yorkshire and Humber region. The value for the same indicator for the whole of the Yorkshire and Humber region is 4.3%, with the value for England given as 4.7%.

The Public Health Outcomes Health Profile<sup>9</sup> for Richmondshire is found at <http://fingertipsreports.phe.org.uk/health-profiles/2017/e07000166.pdf>.

It is expected that Local authorities review any existing measures already being implemented and assess whether they are already taking positive action to reduce PM<sub>2.5</sub> emissions. The development of any such measures would form part of an Action Plan to tackle a problem with any Air Quality Management Area (AQMA).

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<sup>7</sup> Defra, Local Air Quality Management Policy Guidance (PG16) April 2016

<sup>8</sup> Defra, Local Air Quality Management Technical Guidance (TG16) April 2016, Table 1.1

<sup>9</sup> Public Health England, Health Profile 2017 Richmondshire District, 4 July 2017

## **Richmondshire District Council**

Richmondshire District Council does not currently have an AQMA (or associated Air Quality Action Plan).

## 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

Richmondshire District Council does not undertake automatic (continuous) monitoring.

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/>.

#### 3.1.2 Non-Automatic Monitoring Sites

Richmondshire District Council undertook non-automatic (passive) monitoring of nitrogen dioxide (NO<sub>2</sub>) at 15 sites during 2016. Table A.1 in Appendix A shows the details for each of those sites.

Maps showing the location of the monitoring sites are provided in Figures D.1 and D.2 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 all adjusted for bias and, where relevant, distance correction. Annualisation was not required for any of the data. Further details on adjustments are provided in Appendix C.

#### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

Table A.2 in Appendix A compares the ratified and bias adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>. Any concentrations above the air-quality objective of 40µg/m<sup>3</sup> are shown in bold.

Monitoring sites not representative of public exposure have included a distance correction to the nearest receptor in accordance with LAQM.TG16. This is discussed in Section 2.2 above.

Figure A.1 shows the change in those concentrations over the period 2012 to 2016. The full 2016 dataset of monthly mean values is provided in Appendix B.

### Monitoring Results Summary

The air-quality objective of  $40\mu\text{g}/\text{m}^3$  was not exceeded in 2016. As there were no annual mean values greater than  $60\mu\text{g}/\text{m}^3$ , this indicates that the 1-hour mean objective (of  $200\mu\text{g}/\text{m}^3$ , not to be exceeded more than 18 times per year) is unlikely to be exceeded at these sites.

### Trends

The majority of the sites have only been monitored for three consecutive years, which is insufficient time over which to detect a trend. The following sites have five years' worth of data, displayed in Figure A.1 and are discussed but there is no obvious overall trend over the period 2012 to 2016.

- Sites **R3** (Darlington Road) shows no overall change from 2012 to 2016.
- Sites **R4** (White Rose Crescent - urban background) and **R7** (Scotch Corner) seem to indicate a very slight overall downward trend from 2012 to 2016.
- Site **R2** (Queens Road roundabout) seems to indicate a very slight overall upward trend from 2012 to 2016.
- Site **R6** (Gatherley Moor Farm on the A66) showed an increase from 2012 to 2014, followed by a slight downward trend.



## Appendix A: Monitoring Results

Table A.1 – 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
R2	Queens Road	Roadside	417180	501125	NO <sub>2</sub>	NO	8	2	NO	3
R3	Darlington Road	Roadside	418066	501490	NO <sub>2</sub>	NO	22	1	NO	3
R4	White Rose Crescent	Urban Background	418504	501455	NO <sub>2</sub>	NO	11	2	NO	3
R6	Gatherley Moor Farm	Roadside	419207	506509	NO <sub>2</sub>	NO	0	8	NO	2
R7	Scotch Corner Hotel	Roadside	421366	505261	NO <sub>2</sub>	NO	0	22	NO	3
R8	15 Queens Road	Roadside	417179	501127	NO <sub>2</sub>	NO	7	2.5	NO	3
R10	Oglethorpe	Roadside	417381	501281	NO <sub>2</sub>	NO	1.7	1.7	NO	3
R11	17 Gallowgate	Roadside	417377	501317	NO <sub>2</sub>	NO	0	3.3	NO	3
R12	1 Anchorage Hill	Roadside	417542	501275	NO <sub>2</sub>	NO	3.5	1.8	NO	3
R13	3 Maison Dieu	Roadside	417536	501258	NO <sub>2</sub>	NO	0	1.4	NO	3
R15	2 Maison Dieu	Roadside	417500	501263	NO <sub>2</sub>	NO	0	1.7	NO	3
R16	74 Frenchgate	Roadside	417451	501269	NO <sub>2</sub>	NO	0	1.5	NO	3
R17	95 Frenchgate	Roadside	417370	501262	NO <sub>2</sub>	NO	2	1.5	NO	3

R18	26 Darlington Road	Roadside	417661	501297	NO <sub>2</sub>	NO	3.5	1.7	NO	3
R19	43 Frenchgate	Roadside	417312	501037	NO <sub>2</sub>	NO	0	2	NO	3

**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.2 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2016 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2012	2013	2014	2015	2016
R2	Roadside	Diffusion Tube	100	100	19.9	19	22.3	19.2	21.1
R3	Roadside	Diffusion Tube	100	100	12.3	12.1	13	11.5	12.3
R4	Urban Background	Diffusion Tube	100	100	9.4	9.1	9.4	7.8	8.8
R6	Roadside	Diffusion Tube	100	100	18.3	24.5	26.5	23.8	22.9
R7	Roadside	Diffusion Tube	100	100	19.1	19.7	20.3	18.1	18.1
R8	Roadside	Diffusion Tube	100	100			25.5	24.5	24.1
R10	Roadside	Diffusion Tube	100	100			32.9	31.3	32
R11	Roadside	Diffusion Tube	100	100			38	37.1	36.7
R12	Roadside	Diffusion Tube	100	100			22.7	22.2	22.1
R13	Roadside	Diffusion Tube	100	100			28.2	25.9	27.4
R15	Roadside	Diffusion Tube	100	100			28.7	28.6	27.6
R16	Roadside	Diffusion Tube	100	100			<b>40.2</b>	38.9	37.8
R17	Roadside	Diffusion Tube	92	92			28.4	24.3	26
R18	Roadside	Diffusion Tube	100	100			22.9	23.5	24.1
R19	Roadside	Diffusion Tube	100	100				25.9	29.3

- Diffusion tube data in the above table has been bias corrected
- Annualisation has been conducted where data capture is <75%
- If applicable, data in the above table has been distance corrected for relevant exposure

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

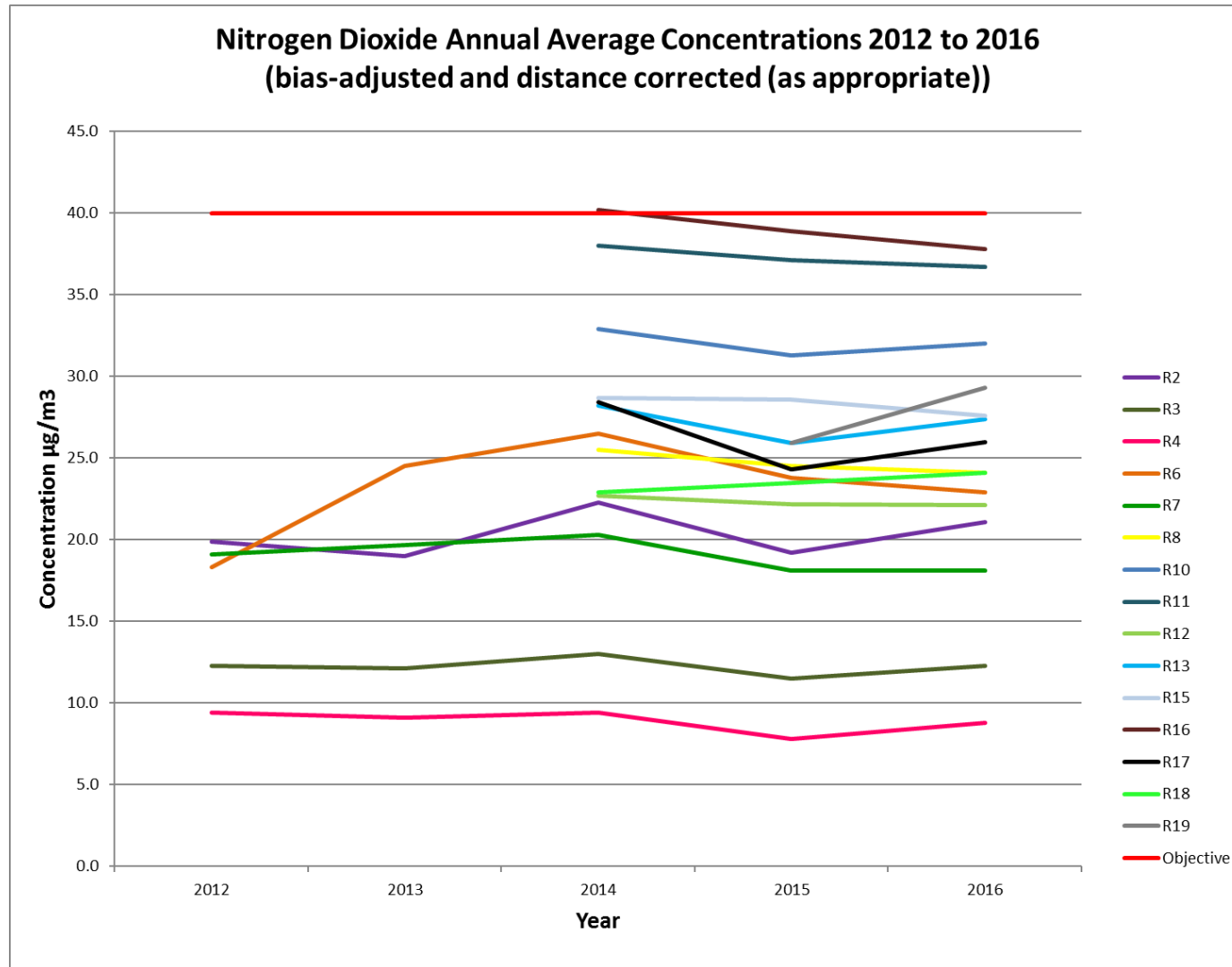
NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

(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.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations



## Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2016

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (factor 0.77) <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
R2	36.1	39.8	38.4	37.7	34.2	35.2	28.7	37.7	35.3	37.8	43	42.3	37.2	28.6	21.1
R3	29.5	26.4	23.6	20.8	33.7	18.3	17.3	18.6	19.7	20.2	25.2	32.2	23.8	18.3	12.3
R4	17.3	14.3	13.2	10.2	7.7	6.9	4.2	7.7	10	9.8	15.5	20.3	11.4	8.8	8.8
R6	27.3	30.1	32	31.9	28.7	34.6	17.4	27.7	27.9	29.8	35.5	33.9	29.7	22.9	22.9
R7	23.2	22.5	26.2	25.5	22.4	24.2	18.8	21	19.9	25	23.2	29.8	23.5	18.1	18.1
R8	41.7	50.7	45	42.4	43.6	36.4	28.6	39.9	37.3	41.4	38.6	46.4	41.0	31.6	24.1
R10	45.6	54.6	50	50.5	49.2	44.9	33.8	45	40.4	46.2	54.1	52.1	47.2	36.3	32.0
R11	46.8	56.4	45	49.2	46.5	40.3	35.7	45.2	45.1	49.8	60.3	51.5	47.7	36.7	36.7
R12	40.7	40.9	33.1	24.6	34.5	27.5	23.1	34.6	30.3	34.6	44.2	43.5	34.3	26.4	22.1
R13	33.3	31.4	41.7	37.7	35.2	33.5	21.8	32	32.4	39.8	45.8	42.2	35.6	27.4	27.4
R15	33.5	43.2	40.2	38.2	33.6	26.3	20.2	32.2	30.9	39.3	46.5	45.5	35.8	27.6	27.6
R16	55.7	53.7	50.8	48.7	49.2	38	33	49.1	46.6	49	56.7	59.1	49.1	37.8	37.8
R17	36.5	41.9	40	41	39.2	29.6	25.2	-	35.2	42.6	47.3	48.1	38.8	29.9	26.0
R18	40	42.7	38.2	34.6	38.5	35.8	21	32.1	34	39.1	51.9	47.4	37.9	29.2	24.1
R19	37.4	39.5	38.6	36.7	52.6	28.5	30.3	34.5	28.7	33.4	51	45.6	38.1	29.3	29.3

Local bias adjustment factor used

National bias adjustment factor used

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold** (bias adjusted figures).

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

(2) Distance corrected to nearest relevant public exposure (as appropriate).

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

### Diffusion Tube Bias Adjustment Factor

Richmondshire has made use of the National bias adjustment factor. The factor used takes into account the following aspects:

(i) Supplier

The diffusion tubes used in Richmondshire are supplied and analysed by Environmental Scientifics Group (ESG), Didcot, Oxfordshire.

(ii) Tube Type

The tubes used contain a mesh which is doped with 50% v/v triethanolamine (TEA) and acetone.

(iii) Results from other local authorities using the same supplier and tube type

There are systematic differences in the performance of different laboratories and preparation methods of diffusion tubes. A spreadsheet provided by the LAQM Helpdesk (viewed at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>) shows those figures for different local authorities using the same supplier and tube type and where diffusion tubes are co-located with automatic (continuous) monitors.

A copy of the relevant section of the table used to obtain the bias adjustment figure for this report provided by the LAQM Helpdesk is shown in Table C.1 below.



Table C.1 National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/17 V2

National Diffusion Tube Bias Adjustment Factor Spreadsheet								Spreadsheet Version Number: 03/17 V2			
Follow the steps below <b>in the correct order</b> to show the results of <b>relevant</b> 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 <a href="#">LAQM Helpdesk Website</a>			
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:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyzes Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	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 <sup>2</sup> shown in blue at the foot of the final column.  If you have your own co-location study then see footnote <sup>4</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at <a href="mailto:LAQMHelpdesk@uk.bureauveritas.com">LAQMHelpdesk@uk.bureauveritas.com</a> or 0800 0327953								
If a laboratory is not chosen, we have no data for this laboratory.	If a preparation method is not chosen, we have no data for this method at this laboratory.	If a year is not chosen, we have no data.									
Analysed By <sup>1</sup>	Method <sup>2</sup> <small>To make your selection, choose (all) from the pop-up list</small>	Year <sup>3</sup> <small>To make your selection, choose (all)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ( $\mu\text{g}/\text{m}^3$ )	Automatic Monitor Mean Conc. (Cm) ( $\mu\text{g}/\text{m}^3$ )	Bias (B)	Tube Precision <sup>4</sup>	Bias Adjustment Factor (A) (Cm/Dm)	
ESG Didcot	50% TEA in acetone	2016	R	Tunbridge Wells	12	57	44	30.6%	G	<b>0.77</b>	
ESG Didcot	50% TEA in acetone	2016	R	Cambridge City Council	10	49	37	32.6%	G	<b>0.75</b>	
ESG Didcot	50% TEA in acetone	2016	R	City of Wolverhampton Council	12	44	39	13.5%	G	<b>0.88</b>	
ESG Didcot	50% TEA in acetone	2016	R	City of Wolverhampton Council	11	53	43	22.7%	G	<b>0.81</b>	
ESG Didcot	50% TEA in acetone	2016	B	Gravesham Borough Council	12	31	23	33.5%	G	<b>0.75</b>	
ESG Didcot	50% TEA in acetone	2016	B	Gravesham Borough Council	12	40	30	36.1%	G	<b>0.73</b>	
ESG Didcot	50% TEA in acetone	2016	R	Horsham District Council	12	35	27	30.3%	G	<b>0.77</b>	
ESG Didcot	50% TEA in acetone	2016	R	Horsham District Council	11	33	29	12.2%	G	<b>0.89</b>	
ESG Didcot	50% TEA in acetone	2016	R	Horsham District Council	10	34	25	34.0%	G	<b>0.75</b>	
ESG Didcot	50% TEA in acetone	2016	B	Maidstone Borough Council	11	15	12	25.3%	G	<b>0.80</b>	
ESG Didcot	50% TEA in acetone	2016	R	Medway Council	12	35	26	36.6%	G	<b>0.73</b>	
ESG Didcot	50% TEA in acetone	2016	B	Medway Council	9	21	11	88.1%	G	<b>0.53</b>	
ESG Didcot	50% TEA in acetone	2016	KS	Suffolk Coastal DC	12	43	37	17.3%	G	<b>0.85</b>	
ESG Didcot	50% TEA in acetone	2016	UB	City of York Council	9	22	16	38.6%	G	<b>0.72</b>	
ESG Didcot	50% TEA in acetone	2016	R	City of York Council	12	39	29	34.1%	G	<b>0.75</b>	
ESG Didcot	50% TEA in acetone	2016	R	City of York Council	12	33	25	33.4%	G	<b>0.75</b>	
ESG Didcot	50% TEA in acetone	2016	R	City of York Council	12	41	27	51.2%	G	<b>0.66</b>	
ESG Didcot	50% TEA in acetone	2016	KS	Leeds City Council	9	66	55	20.1%	S	<b>0.83</b>	
ESG Didcot	50% TEA in acetone	2016	R	Leeds City Council	12	57	44	27.6%	S	<b>0.78</b>	
ESG Didcot	50% TEA in acetone	2016		<b>Overall Factor<sup>2</sup> (30 studies)</b>				<b>Use</b>		<b>0.77</b>	

## Distance Correction

Distance correction is undertaken where monitoring sites are not representative of public exposure (e.g. if monitoring sites are located at roadside or kerbside, but the façades of the nearest properties are set further back from the road).

Data for such sites can be distance corrected using an NO<sub>2</sub> fall-off with distance calculator available on the LAQM website (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>), following guidance in LAQM TG(16).

The data presented in this report has been corrected to nearest exposure (as appropriate) for the 2016 data, and also for comparison purposes, for data for the previous four years (2012-2015).

The distance correction data, for 2016 for relevant public exposure of the bias adjusted figures, is given in the last column of data presented in Table B.1 of this ASR. The data shows that the predicted relevant public exposure is lower than the measured (and bias adjusted) figure where the relevant public exposure is further from the source of pollutant than the actual location of the monitoring site.

The NO<sub>2</sub> fall-off with distance calculation requires the use of a 'local mean background NO<sub>2</sub> concentration'. The figure used in the calculation in Richmondshire is that obtained from monitoring data from the R4 'Urban Background' site in Richmond.

## Annualisation

Data capture for all monitoring sites in this report was greater than 75%, therefore annualisation of the data was not necessary.

# Appendix D: Maps of Monitoring Locations

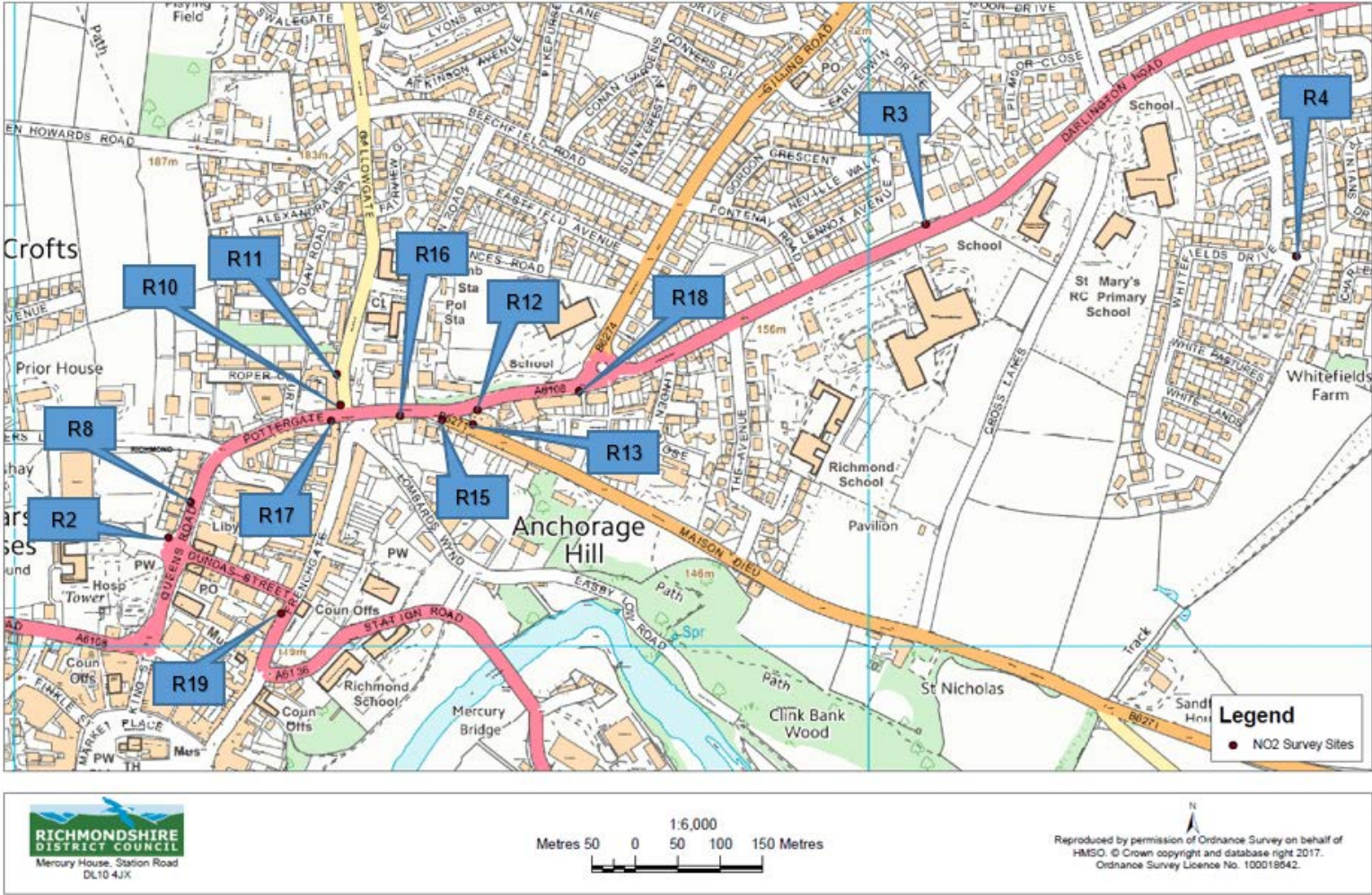


Figure D.1 Location of Diffusion Tubes in Richmond

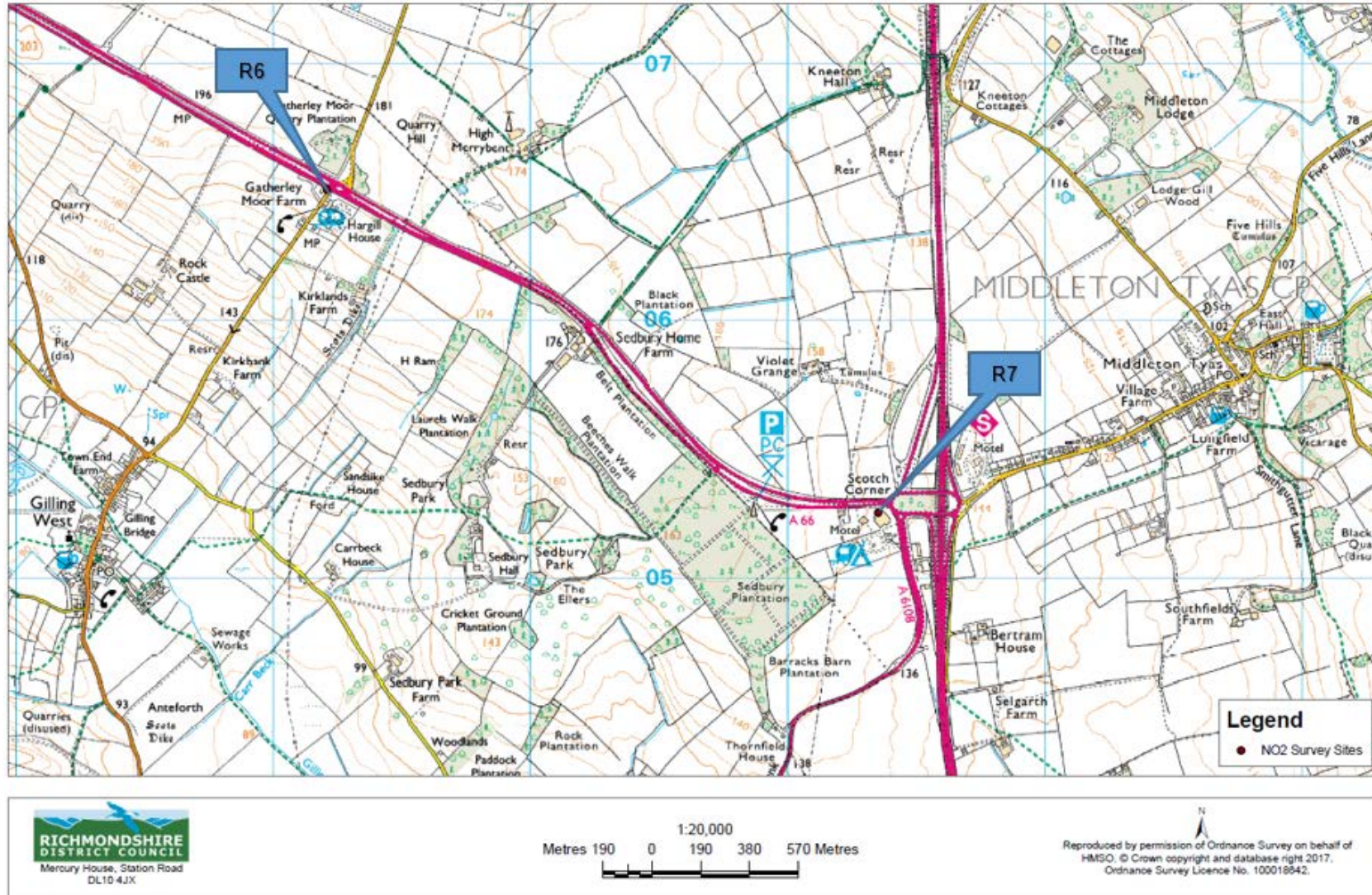


Figure D.2 Location of Diffusion Tubes on the A66 Road

## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

<sup>10</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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
ESG	Environmental Scientifics Group
EU	European Union
LAQM	Local Air Quality Management
LEP	Local Enterprise Partnership
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
NYCC	North Yorkshire County Council
PHOF	Public Health Outcomes Framework
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RDC	Richmondshire District Council
TEA	Triethanolamine

## References

- AEA Energy and Environment, Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users, February 2008
- Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
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- Defra Local Air Quality Management Policy Guidance (PG16), April 2016
- Defra Local Air Quality Management Technical Guidance (TG16), April 2016
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- North Yorkshire County Council, Local Transport Plan four, 2016-2045
- Public Health England, Health Profile 2017 Richmondshire District, July 2017
- Richmondshire District Council, Richmondshire Local Plan 2012-2028 Core Strategy, adopted 9 December