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2016 Air Quality Annual Status Report (ASR) for Redditch Borough Council

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

December 2016

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Executive Summary: Air Quality in Our Area

Why air quality matters

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2]. The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Air Quality in Redditch

Worcestershire Regulatory Services (WRS) is a shared service formed from the Environmental Health and Licensing departments of the six Worcestershire District Councils. Responsibility for managing (monitoring and reporting of) local air quality transferred from the partnership councils to WRS in April 2011.

Monitoring results within the Redditch Borough Council area demonstrate that there were no exceedences of the air quality objective of 40µg/m^3 in 2015. There has been slight increases at two diffusion tube locations and slight reductions at four diffusion tube locations and no change at one diffusion tube location in NO_2 concentrations between 2014 and 2015 across the Borough but there is no discernible upward or downward trend in concentrations over the 5 year period 2011- 2015.

There are currently no Air Quality Management Areas (AQMAs) in the Redditch Borough area.

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by Redditch Borough Council on 15th October

[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

2013. The AQAP is available to download via the following link: http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx

Actions to Improve Air Quality

Whilst there are currently no AQMAs in the Redditch Borough area and therefore does not form a specific part of the AQAP, Redditch Borough Council will continue to pursue measures set out in the Air Quality Action Plan to improve air quality across the Borough. Examples include:

Measure	EU Measure Category	Focus	Progress to date
Promote flexible working arrangements	Promoting travel alternatives	Encourage/facilitate home-working	To date the main promotion of flexible working arrangements is a continued push by WCC to get the entire County connected to high speed broadband to enable successful working from home
Produce Air Quality Supplementary Planning Document (SPD)	Policy Guidance and Development Control	Air quality planning and policy guidance	SPD currently being drafted by WRS officers. Progress delayed by approx. 15 months due to conflicting priorities
Installing electric vehicle charging points	Policy Guidance and Development Control	Increase in availability of EV charging points and corresponding increase in use of electric vehicles	On-going: Installation of EV charging points recommended for inclusion on relevant planning consents.
Travel Planning	Promoting Travel Alternatives	Increase in uptake of personal travel planning services. Change in behaviour towards more sustainable modes of transport	WCC are developing a personal travel planning service for Worcestershire residents and developers
Encourage car sharing	Alternatives to private vehicle use	Increase in number of people car sharing	WCC are launching a new website, Liftshare, which promotes and facilitates car share use.

Local Priorities and Challenges

Other Road, Redditch has previously been subject to a detailed assessment which concluded that an AQMA was not required at the time. Over the past five years results have remained below the objective, and below 5% of the objective, with the exception of 2013. The Council maintains a watching brief on the area due to levels exceeding or being close to the Air Quality Objective in 2010 and 2013. Following discussions between WRS and Worcestershire County Council Highways representative and the RBC Strategic Planning officer it is anticipated that access to the specific area of Other Road will be restricted as part of the future redevelopment of Redditch Town Centre highways network with the resulting reduction in traffic volume likely to improve air quality in the area.

WRS on behalf of Redditch Borough Council continue to monitor locations in 2016 to assess any improvements or degradation in NO_2 concentrations. The data gathered will assist in further assessment of areas of poor air quality outside the current AQMAs. Further update on monitoring and action progress will be provided in the 2017 Annual Status Report.

How to Get Involved

There are a number of ways members of the public can help to improve local air quality:

- Walk or cycle around the Borough instead of driving;
- Worcestershire County Council have launched a car sharing website, LiftShare, to help people find others journeying to the same destinations to share journeys and costs, and reduce traffic and emissions. Visit this link for more information: https://worcestershire.liftshare.com/
- General travel planning advice is available on Worcestershire County Council's website (including walking, cycling and bus maps and timetables).
- If you have to drive follow fuel efficient driving advice, often known as ‘Smarter Driving Tips’, to save on fuel and reduce your emissions. A number of websites promote such advice including:

  http://www.theaa.com/driving-advice/fuels-environment/drive-smart

  http://www.dft.gov.uk/vca/fcb/smarter-driving-tips.asp

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1 Local Air Quality Management

This report provides an overview of air quality in Redditch Borough Council during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

The statutory air quality objectives applicable to LAQM **in England** can be found in Table E.2 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Redditch Borough Council currently does not have any AQMAs.

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

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by Redditch Borough Council on 15th October 2013 and includes measures in progress and planned in pursuit of improving local air quality across the Borough. The AQAP is available to download via the following link:

http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

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

There are currently no automatic $PM_{2.5}$ monitoring stations in Worcestershire. The nearest AURN $PM_{2.5}$ monitoring station is the Birmingham Acocks Green site approximately 22 kilometres to the north east of Redditch Borough.

WRS has reviewed the DEFRA national background maps to determine projected $PM_{2.5}$ concentrations within Redditch Borough for the 2015 calendar year. The average total $PM_{2.5}$ at 64 locations (centre points of 1km x 1km grids) across Redditch Borough is 10.10µg/m^3, with a minimum concentration of 9.36µg/m^3 and a maximum concentration of 13.38µg/m^3.

This indicates that $PM_{2.5}$ concentrations within Redditch Borough are well below the annual average EU limit value for $PM_{2.5}$ of 25µg/m^3.

As outlined in Policy Guidance LAQM.PG16 WRS have discussed the role of the DoPH, and the details of $PM_{2.5}$ levels across the County, with the Director of Public Health for Worcestershire County Council. The DoPH has not confirmed to WRS that they are advocating or supporting any specific actions to reduce $PM_{2.5}$ concentrations across the County at this time.

In light of the above no additional actions are currently planned by Redditch Borough Council in relation to the reduction of $PM_{2.5}$ levels. However it is anticipated that any actions taken to improve NO_2 levels across the Borough will likely result in a linked improvement in $PM_{2.5}$ levels.

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

No automatic (continuous) monitoring was undertaken within the Borough during 2015.

3.1.2 Non-Automatic Monitoring Sites

Redditch Borough Council undertook non- automatic (passive) monitoring of NO_2 at six sites during 2015. Table A.1 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) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

During 2015, Redditch Borough Council monitored annual mean nitrogen dioxide concentrations using nine passive diffusion tubes at six locations across the Borough.

Two monitoring locations were decommissioned as part of the 2015 rationalisation of monitoring sites. 17N(OR3) – Other Road (road-sign) was moved to a more appropriate location at Misty Flowers, Other Road (see below) and 31N, the diffusion tube was located on a sign post outside 34 Oakly Road. The sign post was subsequently removed by Worcestershire County Councils Highways Authority.

Two new locations were established; OR6 – Misty Flowers, Other Road to create a triplicate location and SS - 7 Summer Street as an urban background location.

There were no exceedences of the air quality objective of 40µg/m^3 in the Redditch Borough area.

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Figure 3.1 below demonstrates the five year trend for NO_2 concentrations for Redditch where available.

Figure 3.1 - Long Term Trend Graph of NO_2 Concentrations at Redditch

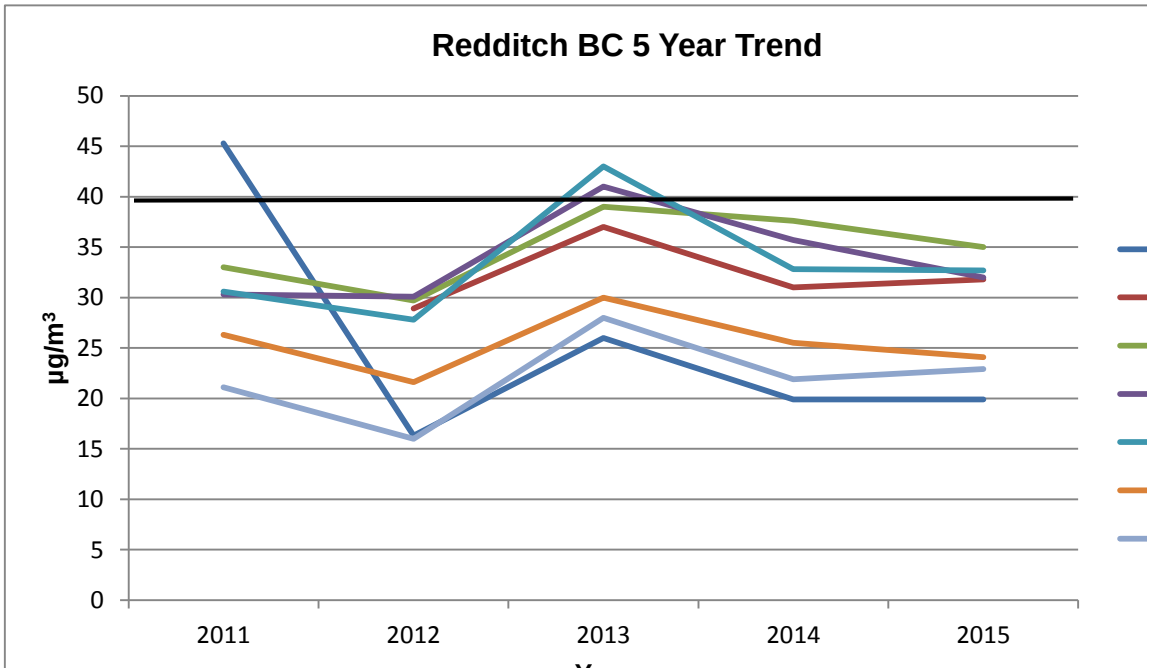

Table 3.1 above indicates there have been no exceedences of the annual average Air Quality Objective (AQO) for NO_2 concentrations recorded. There has been a reduction in NO_2 concentrations at four locations (OR2, OR4, OR5 and 25N), an increase at two locations (OR1and 30N) and no change at one location (12N) in 2015 when compared to 2014 across the Borough. Overall there is no discernible trend in concentrations. The exceedence at 12N in 2011 is considered to be an anomaly.

3.2.2 Particulate Matter (PM_{10})

PM_{10} is not monitored within the Redditch Borough.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ is not monitored within the Redditch Borough.

3.2.4 Sulphur Dioxide (SO_2)

Sulphur Dioxide is not monitored within the Redditch Borough.

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) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
12N	287 Birmingham Road	Roadside	403983	268815	NO2	N	0	16	N	1.8
OR1	Other Road Street Lamp 2237	Roadside	404599	267542	NO_2	N	3	1.5	N	2.44
OR2 (26N)	14 Other Road	Roadside	404620	267495	NO_2	N	0	3	N	2.06
28N (OR4)	Other Road Misty Florist	Roadside	404629	267467	NO_2	N	0	4	N	2.01
29N OR5	Other Road Misty Florist	Roadside	404629	267467	NO_2	N	0	4	N	2.01
OR6	Other Road Misty Florist	Roadside	404629	267467	NO_2	N	0	4	N	2.01
SS	7 Summer Street - (Rain water pipe FOP)	Urban Background	404376	267242	NO_2	N	0	2.6	N	1.97
25N	41 The Slough	Roadside	404415	264384	NO2	N	0	2	N	2.03
30N	34 Oakly Road	Other	403883	267414	NO2	N	0	18	N	2.01

(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_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
12N	Roadside	Diffusion Tube	92	92	**45.3**	16.3	26	19.93	19.93
OR1	Roadside	Diffusion Tube	92	92	–	28.9(4)	37(4)	31(4)	31.8(4)
OR2 (26N)	Roadside	Diffusion Tube	100	100	33	29.7	39	37.56	35
28N (OR4)	Roadside	Diffusion Tube	100	100	30.33	30.06	**41**	35.69	31.99
29N OR5	Roadside	Diffusion Tube	100	100	30.62	27.79	**43**	32.81	32.72
OR6	Roadside	Diffusion Tube	83	83	–	–	–	–	32.62
SS	Roadside	Urban Background	92	92	–	–	–	–	19.04
25N	Roadside	Diffusion Tube	67	67	26.3	21.6	30	25.5	24.13
30N	Roadside	Diffusion Tube	100	100	21.1	16	28	21.96	22.94

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

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

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) **B**ias adjusted concentration figures after adjustment back to relevant receptor

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.2 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
12N	26.93	27.93	25.09	23.36	17.81	17.29	18.48	19.88	22.76	30.89	21.61	-	22.91	19.93
OR1	38.95	46.06	40.83	39.49	31.32	-	34.27	40.98	38.28	49.27	33.48	37.97	39.17	34.08
OR2 (26N)	38.71	45.51	38.77	42.60	33.89	32.75	36.55	39.09	45.40	56.44	37.03	35.98	40.23	35.00
28N (OR4)	35.02	39.69	37.88	42.05	31.69	32.16	31.78	36.04	41.06	55.67	32.82	25.42	36.77	31.99
29N OR5	36.74	42.14	39.00	41.19	32.07	31.04	34.17	36.89	42.90	54.20	33.62	27.42	37.62	32.72
OR6	34.34	40.37	40.83	41.44	30.56	-	-	36.34	42.47	53.09	30.83	24.61	37.49	32.62
SS	24.20	26.11	25.15	20.76	15.58	14.85	17.53	21.10	22.39	31.92	21.12	-	21.88	19.04
25N	34.71	32.46	32.80	26.54	22.56	19.39	22.61	28.50	28.28	38.32	26.47	20.20	27.74	24.13
30N	-	-	-	-	19.55	16.66	18.15	20.37	27.57	33.95	22.37	23.29	22.74	19.78

(1) See Appendix C for details on bias adjustment

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

QA/QC Data

Factor from Local Co-location Studies (if available)

No local co-location studies for nitrogen dioxide have been undertaken in 2015.

Diffusion Tube Bias Adjustment Factors

The following UKAS accredited company provides Bromsgrove District Council with nitrogen dioxide diffusion tubes and analysis:

Somerset Scientific Services,
The Crescent
County Hall
Taunton
TA1 4DY

0300 123 2224

somersetscientific@somerset.gov.uk

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

The bias adjustment factor applied to the results in 2015 was 0.87 (Spreadsheet Version No. 03/15) which were derived from the national studies.

QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2015.

QA/QC of Diffusion Tube Monitoring

Under the WASP Scheme Somerset Scientific Services performed 100% satisfactory for all periods in 2015. Tube precision was generally ‘Good’ throughout 2015.

Short-term to Long-term Data Adjustment

Only 8 months of data was recorded for 30N – 34 Oakly Road and this data has been annualised in accordance with Technical Guidance LAQM TG(16) as shown in Table C.1 below.

Table C.1 - Annualisation calculation for 30N - 34 Oakly Road

Site	Site Type	Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	Background Urban	19	16.1	1.18
Birmingham Tyburn	Background Urban	30	27	1.11
Leominster	Suburban Background	8	7	1.19
Leamington Spa Rugby Road	Urban Traffic	20	16.8	1.16
			Average	1.16
			30N Result	19.78
			30N Annualised	**22.94**

Estimates of concentrations at the nearest receptor

If an exceedance is measured at a monitoring site (or close to the air quality objective) which is not representative of public exposure, the procedure specified in Technical Guidance LAQM.TG(16) has been used to estimate the concentration at the nearest receptor where applicable. The result is presented in Figure C.1 below.

Figure C.1 – OR1 - Distance from road to relevant exposure calculation

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Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	3	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	19.04	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	34.08	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	31.8	µg/m^3

Appendix D: Maps of Monitoring Locations

Figure D.1 – 12N – 287 Birmingham Road

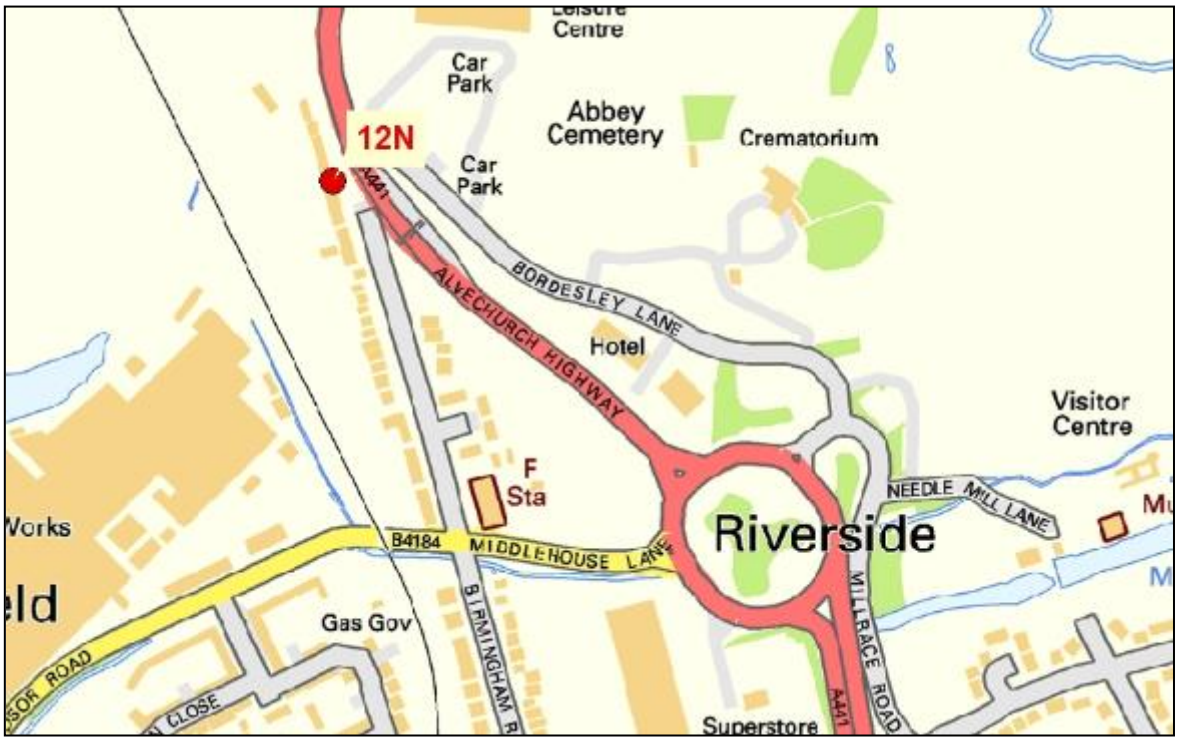

Figure D.2 – 25N - 41The Slough

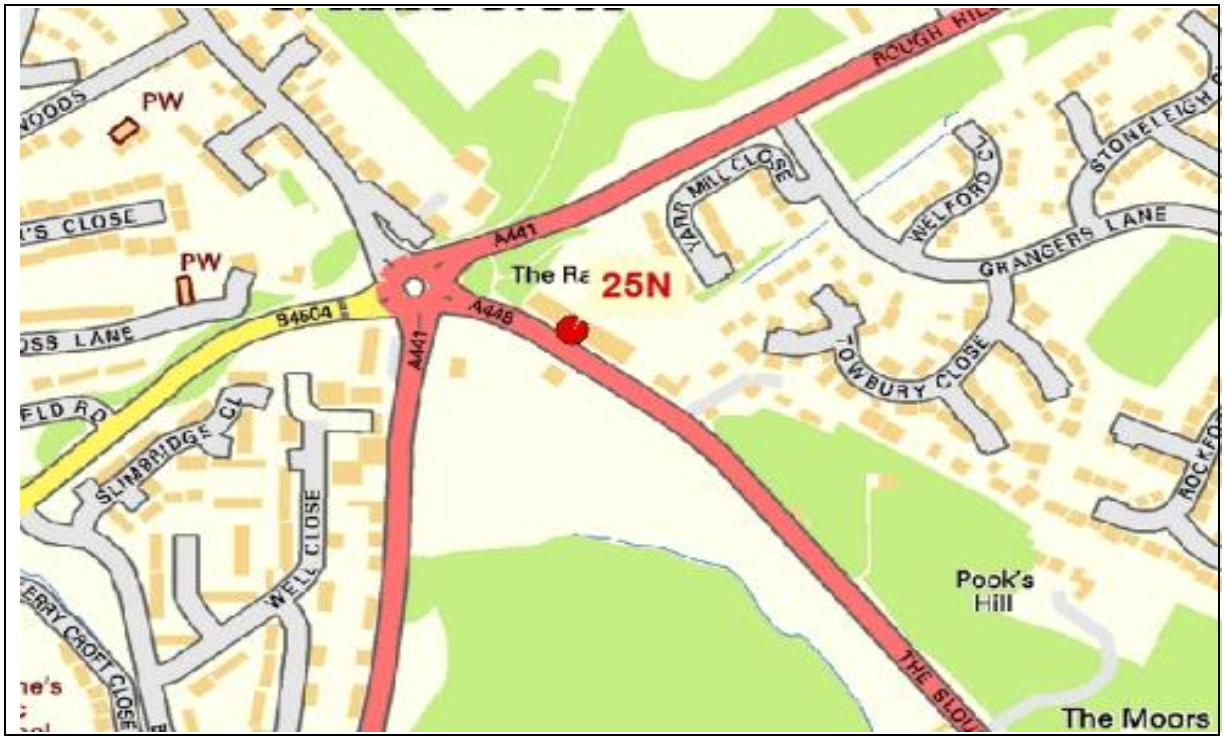

Figure D.3 – 30N - 34 Oakly Road

Figure D.4 – OR1, OR2, OR4, OR5, OR6 – Other Road, SS – 7 Summer Street

Appendix E: Summary of Air Quality Objectives in England

Table E.2 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
RBC	Redditch Borough Council
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
WRS	Worcestershire Regulatory Services

References

1. DEFRA (2016) Local Air Quality Management Policy Guidance LAQM PG (16)

2. DEFRA (2016) 'Local Air Quality Management Technical Guidance LAQM TG (16)

3. DEFRA (2015) 'National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/15'

4. Worcestershire Regulatory Services (2013) 'Air Quality Action Plan for Worcestershire'

5. Worcestershire Regulatory Services (2015) 'Air Quality Action Plan Progress Report for Worcestershire April 2013-April 2015'

6. Worcestershire Regulatory Services (2016) 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – March 2016'

7. Worcestershire Regulatory Services (2015) Air Quality Updating and Screening Assessment for Redditch Borough Council