

Worcestershire
Regulatory Services

Supporting and protecting you

2019 Air Quality Annual Status Report (ASR)

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

June 2019

Local Authority Officer	Neil Kirby
Department	Land and Air Quality Team
Address	Wyre Forest House Finepoint Way Kidderminster Worcestershire DY11 7WF
Telephone	01905 822799
E-mail	wrsenquiries@worcsregservices.gov.uk
Report Reference number	RBC/ASR/2019
Date	June 2019

Executive Summary: Air Quality in Our Area

Air Quality in Redditch Borough Council

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

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

Worcestershire Regulatory Services (WRS) have been responsible for managing (monitoring and reporting of) local air quality in the six Worcestershire District Councils since April 2011.

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

Monitoring results within the Redditch Borough area demonstrate that there were no exceedences of the air quality objective of 40µg/m³ in 2018. Monitoring results show a significant increase in concentrations at all monitoring locations in 2018; this is consistent with trends across Worcestershire. This is likely to be have been caused in part by the significant difference in bias adjustment factors between 2017 and 2018; 0.77 in 2017 compared to 0.89 in 2018. There is no discernible upward or downward trend in concentrations over the 5 year period 2014- 2018.

An additional diffusion tube was deployed in Redditch in 2018 (STOR – Lamp-post opposite 18 Washford Lane) to monitor air quality in the area of the newly operational Diesel Power Generation Facility at Park Farm Industrial Estate, Redditch.

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

No annual means greater than $60\mu\text{g}/\text{m}^3$ have been recorded indicating that it is very unlikely that there have been any exceedances of the 1-hour mean objective for NO_2 at any monitoring sites.

Actions to Improve Air Quality

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by Redditch Borough Council on 15th October 2013. WRS have produced two updates to the AQAP, the latest in September 2016. For details of all measures completed, in progress or planned, please refer to the 'Air Quality Action Plan Progress Report for Worcestershire April 2015-2016'. A copy of this, the previous update, and the AQAP is available to view or download at:

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

In 2014, WRS set up the Worcestershire Air Quality Steering Group and sub-groups to facilitate progressing implementation of prioritised actions identified in the AQAP. To date the Redditch Borough area does not form a specific part of the AQAP as there is no current AQMA in the area. However the general actions to improve air quality detailed in the AQAP apply across Worcestershire as a whole, including the Redditch Borough area.

Conclusions and Priorities

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

Over the past five years monitoring results have remained below the objective. Monitoring results within the Redditch Borough Council area demonstrate that there were no exceedances of the air quality objective of $40\mu\text{g}/\text{m}^3$ in 2018. Monitoring results demonstrate a significant increase in concentrations at all monitoring locations in 2018; this is consistent with trends across Worcestershire. This is likely to be have been caused in part by the significant difference in bias adjustment factors between 2017 and 2018; 0.77 in 2017 compared to 0.89 in 2018.

There were no significant residential or commercial/industrial developments or highway infrastructure works within the Borough in 2018. An additional diffusion tube

was deployed in Redditch in 2018 (STOR – Lamp-post opposite 18 Washford Lane), to monitor air quality in the area of the newly operational Diesel Power Generation Facility at Park Farm Industrial Estate, Redditch.

WRS on behalf of Redditch Borough Council will continue to monitor locations in 2019 to assess any improvements or degradation in NO₂ concentrations. The data gathered will assist in further assessment of areas of poor air quality within the Borough. Further update on monitoring and action progress will be provided in the 2020 Annual Status Report.

Local Engagement and 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 District 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.energysavingtrust.org.uk/travel/driving-advice>
 - <http://www.theaa.com/driving-advice/fuels-environment/drive-smart>
 - <http://www.dft.gov.uk/vca/fcb/smarter-driving-tips.asp>

Table of Contents

Executive Summary: Air Quality in Our Area	1
Air Quality in Redditch Borough Council	1
Actions to Improve Air Quality	2
Conclusions and Priorities	2
Local Engagement and How to get Involved	3
1 Local Air Quality Management	6
2 Actions to Improve Air Quality	7
2.1 Air Quality Management Areas.....	7
2.2 Progress and Impact of Measures to address Air Quality in Redditch Borough Council	8
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations.....	13
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	14
3.1 Summary of Monitoring Undertaken	14
3.1.1 Automatic Monitoring Sites	14
3.1.2 Non-Automatic Monitoring Sites.....	14
3.2 Individual Pollutants	14
3.2.1 Nitrogen Dioxide (NO ₂).....	14
3.2.2 Particulate Matter (PM ₁₀).....	16
3.2.3 Particulate Matter (PM _{2.5})	16
3.2.4 Sulphur Dioxide (SO ₂)	16
Appendix A: Monitoring Results	17
Appendix B: Full Monthly Diffusion Tube Results for 2018	19
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	21
Appendix D: Map(s) of Monitoring Locations and AQMAs	25
Appendix E: Summary of Air Quality Objectives in England	27
Glossary of Terms	28
References	29

List of Tables

Table 2.1 – Progress on Measures to Improve Air Quality	10
Table A.1 – Details of Non-Automatic Monitoring Sites	17
Table A.2 – Annual Mean NO ₂ Monitoring Results.....	18

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018 19
Table E.1 – Air Quality Objectives in England 27

List of Figures

Figure 3.1 – Trends in Annual Mean NO₂ Concentrations 15

1 Local Air Quality Management

This report provides an overview of air quality in Redditch Borough Council during 2018. 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 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.

Redditch Borough Council currently does not have any AQMAs. Concentrations continue to fall below the annual mean objective for nitrogen dioxide.

For reference, a map of Redditch Borough Council's monitoring locations is available in Appendix D.

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

Defra's appraisal of last year's ASR concluded the report was well structured, detailed, and provides the information specified in the Guidance.

1. We note that monitoring results at the four diffusion tube sites continue to show low pollution levels at those sites, with no results above $30\mu\text{g}/\text{m}^3$ after corrections were applied.
2. It is unusual for an urban area the size of Redditch not to have some areas where congested traffic is prevalent, to see higher pollution levels than those recorded here.
3. We repeat our previous comments in relation to reviewing monitoring in Redditch. It may be appropriate for the local authority to review its current monitoring strategy to ensure that sites close to busy traffic with relevant population exposure are being adequately reviewed and monitored where necessary.
4. However, the overall trend from 4 years monitoring at the four monitoring sites shows a distinctive downward trend.

There have been no exceedances of the annual mean objective for nitrogen dioxide at any monitoring location across the Redditch Borough in 2018. Concentrations have remained below the objective. There were significant increases in NO_2 concentrations to well above $30\mu\text{g}/\text{m}^3$ after corrections were applied at three monitoring locations in the Borough in 2018 in part due to the higher bias adjustment factor applied to the 2018 results when compared to 2017. Tubes OR4, OR5 and OR6 (Misty Florist, Other Road) is a triplicate location, after corrections, when averaged the NO_2 concentration for this location is $36.23\mu\text{g}/\text{m}^3$.

Between 1996 and 2018, thirty three diffusion tubes have been deployed at various locations throughout the Borough, results showed concentrations of NO_2 consistently well below the national objective at a majority of these locations. Rationalisation, carried out over the years, has reduced the number to the current figure as the most relevant locations. There have been no significant residential or commercial/industrial

developments or highway infrastructure works within the Borough in 2018 to warrant expanding the network apart from an additional diffusion tube deployed in Redditch in 2018 (STOR – Lamp-post opposite 18 Washford Lane), to monitor air quality in the area of the newly operational Diesel Power Generation Facility at Park Farm Industrial Estate, Redditch.

No specific actions have been progressed to improve air quality in the Redditch Borough area as there is currently no declared AQMA. However the general actions to improve air quality detailed in the AQAP apply across Worcestershire as a whole, including the Redditch Borough Council area.

More detail on these measures can be found in the Air Quality Action Plan for Worcestershire at:

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

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Promote flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working	WCC & RBC	2015 - 2016	2017	Increase in uptake of personal travel planning services. Change in behaviour towards more sustainable modes of transport	<1%	Implementation on-going	On-going	
2	Installing electric vehicle charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	RBC & WCC	2013	2014 onwards	Increase in availability of EV charging points and corresponding increase in use of electric vehicles	1%	Recommendations for installation of EV Charging Points routinely recommended by WRS on relevant planning consents.	On-going	WRS technical guidance note for planning (v.5.1), produced on behalf of Worcestershire local authorities. This document does not form part of any SPD guidance produced by Redditch BC but all applications are reviewed on their behalf with regard to its requirements. http://www.worcsregservices.gov.uk/media/4210767/WRS-technical-guidance-document-for-Planning-V51.pdf .

Redditch Borough Council

3	Greening Council and Business Fleets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	BDC/RBC & WCC	2015 - 2017	2018 onwards	Increase in number of Council and business fleet vehicles of higher Euro Standard and/or utilising alternative fuels	1%	Proposed Compressed Natural Gas Station in Bromsgrove/Redditch has stalled due to a number of obstacles (financial, strategic, political) plus specific industrial constraints and limitations of the existing highway network. WCC has indicated that development of such a facility would need to be supported by relevant policy before the case would be explored any further.	Unknown	This action has been discontinued due to lack of support and will no longer be reported on in future ASRs
4	Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	WCC	On-going	2017 onwards	Increased uptake of alternative modes of transport	<1%	Personalised travel planning program planned as part of wider health improvement drives from County Council. County Council currently developing a "one-stop-shop" online travel portal	On-going	Initiative taking longer than expected
5	Car Sharing	Alternatives to private vehicle use	Car & lift sharing schemes	WCC	2014 – 2015	Liftshare Scheme launched Autumn 2015	Increase in number of people car sharing	<1%	Liftshare Scheme launched in Autumn 2015	Currently operating	
6	Produce Air Quality Supplementary Planning Document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WRS & District Councils	On-going	Draft completed in August 2017. Start of formal adoption processes by November 2017	Formally adopted and utilised SPD at all six LPAs across County	<1%	SPD drafted by WRS officers	On-going	Draft SPD currently out for consultation

Redditch Borough Council

7	Encourage developers to provide sustainable transport facilities and links serving new developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WRS & District Councils	On-going	Draft completed in August 2017. Start of formal adoption processes by November 2017	Formally adopted and utilised a by all six LPAs across County	<1%	SPD drafted by WRS officers	On-going	Draft SPD currently out for consultation
8	Air Quality Networks	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	RBC & WRS	2014	2014 onwards	Improved cross boundary working between local authorities in Worcestershire	1%	WRS are members of the Midlands Joint Advisory Council (MJAC). Provision of AQ services to Tewkesbury BC	On-going	
9	Forge closer links with local health agencies	Other	Other	WRS & WCC	N/A	2019	Participation of relevant health agencies in the Worcestershire Air Quality Steering Group	<1%	Director of Public Health at Worcestershire County Council set up an air quality group in 2019 to discuss air quality issues in the County.	On-going	

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 the Redditch Borough Council area.

WRS has reviewed the DEFRA national background maps to determine projected PM_{2.5} concentrations within the Redditch Borough area for the 2018 calendar year. The average total PM_{2.5} at 54 locations (centre points of 1km x 1km grids) across Redditch Borough is 9.78µg/m³, with a minimum concentration of 9.06µg/m³ and a maximum concentration of 13.12µg/m³. 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/m³.

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. The DoPH set up an air quality action group in 2019 to discuss air quality issues across the County including PM_{2.5}

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 NO₂ 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 Redditch Borough area during 2018

3.1.2 Non-Automatic Monitoring Sites

Redditch Borough Council undertook non- automatic (passive) monitoring of NO₂ at 5 sites during 2018. 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) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

During 2018, Redditch Borough Council monitored annual mean nitrogen dioxide concentrations using passive diffusion tubes at five locations across the Borough.

Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

NO₂ Five Year Trend for Redditch Borough Council

Figure 3.1 below demonstrates the 2014 – 2018 five year trend for NO₂ concentrations for Redditch Borough Council where available.

Figure 3.1 - Long Term Trend Graph of NO₂ Concentrations in Redditch

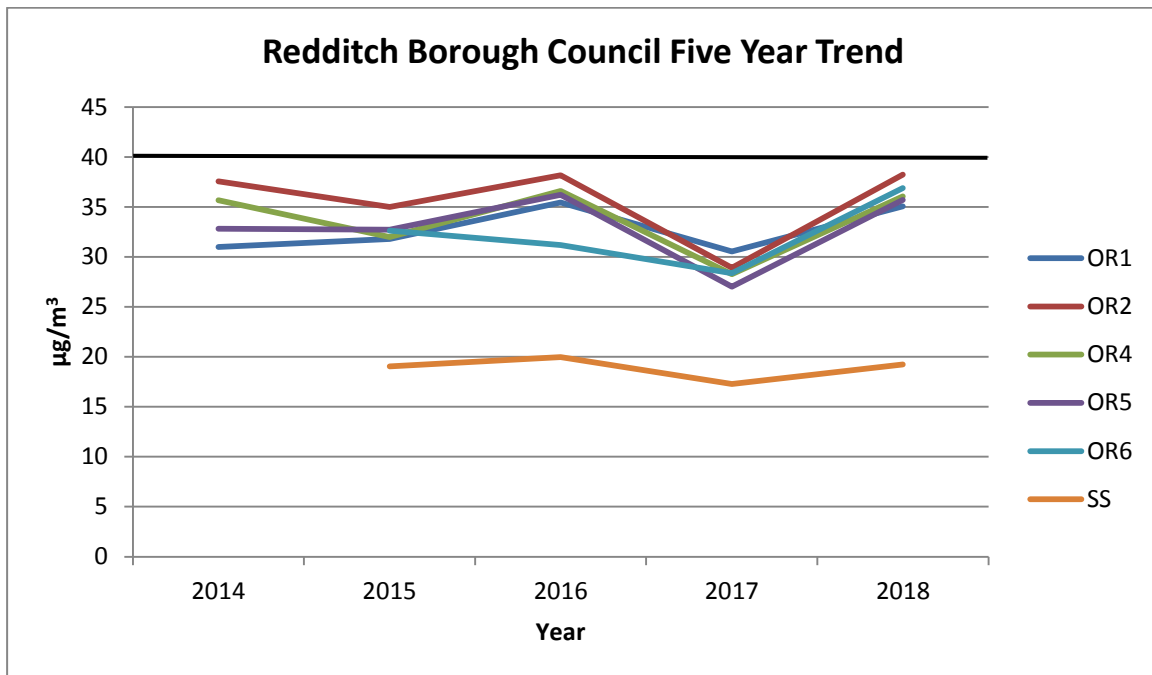


Table 3.1 above indicates there have been no exceedences of the annual average Air Quality Objective (AQO) for NO₂ concentrations recorded in 2018. Monitoring results demonstrate a significant increase in concentrations at all monitoring locations in 2018; this is consistent with trends across Worcestershire. . This is likely to be have been caused in part by the significant difference in bias adjustment factors between 2017 and 2018; 0.77 in 2017 compared to 0.89 in 2018.

It should be noted that diffusion tubes OR4, OR5 and OR6 is a triplicate location (Misty Florist, Other Road), when averaged and bias adjusted the NO₂ concentration for this location is 36.23µg/m³. Overall there is no discernible trend in NO₂ concentrations.

3.2.2 Particulate Matter (PM₁₀)

PM₁₀ is not monitored within Redditch Borough Council.

3.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} is not monitored within Redditch Borough Council.

3.2.4 Sulphur Dioxide (SO₂)

SO₂ is not monitored within Redditch Borough Council.

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)
OR1	Other Road Street Lamp 2237	Roadside	404599	267542	NO ₂	No	3m	1.5m	No	2.44m
OR2(26N)	14 Other Road	Roadside	404620	267495	NO ₂	No	0m	3m	No	2.06m
OR4 (28N)	Other Road Misty Florist	Roadside	404629	267467	NO ₂	No	0m	4m	No	2.01m
OR5 (29N)	Other Road Misty Florist	Roadside	404629	267467	NO ₂	No	0m	4m	No	2.01m
OR6	Other Road Misty Florist	Roadside	404629	267467	NO ₂	No	0m	4m	No	2.01m
SS	7 Summer Street	Suburban	404376	267242	NO ₂	No	0m	2.63m	No	1.97m
STOR	Lamp-post opposite 18 Washford Lane	Urban Background	406603	265783	NO ₂	No	14.6	0.8m	No	2.2m

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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
OR1	Roadside	Diffusion Tube		92	31	31.8	35.44	30.55	35.06
OR2 (26N)	Roadside	Diffusion Tube		100	37.56	35	38.18	28.92	38.23
OR4 (28N)	Roadside	Diffusion Tube		75	35.69	31.99	36.61	28.27	36.07
OR5 (29N)	Roadside	Diffusion Tube		75	32.81	32.72	36.23	27.03	35.72
OR6	Roadside	Diffusion Tube		92		32.62	31.19	28.63	36.89
SS	Suburban	Diffusion Tube		100		19.04	19.98	17.28	19.23
STOR	Urban Background	Diffusion Tube		67					12.92

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

Notes:

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

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

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (f0.89) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
OR1	42.36	45.18		41.18	38.98	33.02	37.67	34.36	37.53	39.60	43.48	39.91	39.39	35.06	29.8
OR2 (26N)	41.37	52.69	47.14	41.99	49.35	45.52	42.66	33.55	35.67	41.86	44.63	39.06	42.96	38.23	
OR4 (28N)	36.04	46.65			45.73	49.94	41.16		32.91	38.71	37.24	36.41	40.53	36.07	
OR5 (29N)	39.33	46.52			46.28	48.69	40.11		31.25	38.12	36.39	34.57	40.14	35.72	
OR6	39.70	48.17	43.90	42.92	49.41	49.94	41.39		30.28	38.71	36.01	35.51	41.45	36.89	
SS	25.95	28.57	26.48	22.10	19.69	15.73	16.84	16.90	15.83	23.07	24.58	23.49	21.60	19.23	
STOR	14.14	21.89	19.15			9.02	10.91	10.28	10.61			17.94	14.24	12.92	12.9

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%
- Where applicable, data has been distance corrected for relevant exposure

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

Sources of pollution

Redditch Borough Council has not identified any new or significant changes to sources as described in Chapter 7, section 1 of Technical Guidance LAQM.TG(16)

QA/QC Data

Factor from Local Co-location Studies (if available)

No local co-location studies for nitrogen dioxide have been undertaken in 2018.

Diffusion Tube Bias Adjustment Factors

The following UKAS accredited company provides Redditch Borough Council with nitrogen dioxide diffusion tubes and analysis:

Somerset Scientific Services,
Unit 2A,
Westpark 26
Chelston
Wellington
Somerset
TA21 9AD

01823 355906

sssmailbox@somerset.gov.uk

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used. The bias adjustment factor applied to the results in 2018 was 0.89 (Spreadsheet Version No. 03/19) which were derived from the national studies.

QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2018.

QA/QC of Diffusion Tube Monitoring

Under the AIR NO₂ PT (formerly WASP) Scheme Somerset Scientific Services performed 100% satisfactory for the period January to October 2018. Tube precision was 'Good' throughout 2018.

Data Annualisation

Short-term to Long-term Data Adjustment

Only 8 months of data was recorded for STOR - Lamp-post opposite 18 Washford Lane, Redditch. The 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 STOR



Site	Site Type	Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	Urban Background	17.8	17.3	1.03
Birmingham A4540	Roadside	32.3	32	1.01
Walsall Woodlands	Urban Background	18.9	15.5	1.03
			Average	1.02
			STOR Result	12.67
			STOR Annualised	12.92

Distance Correction

Estimate of concentration 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 results are presented below.


Figure C.1 - OR1 - Other Road Street Lamp 2237


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)?	4.5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	13.12	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in g/m ³)?	35.06	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	29.8	µg/m ³

Figure C.2 STOR - Lamp-post opposite 18 Washford Lane



**BUREAU
VERITAS**



Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.8	metres
Step 2	How far from the KERB is your receptor (in metres)?	13.8	metres
Step 3	What is the local annual mean background NO ₂ concentration (in g/m ³)?	12.91	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in g/m ³)?	12.92	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	12.9	µg/m ³

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

Figure D.1 Redditch Borough Council Monitoring Locations

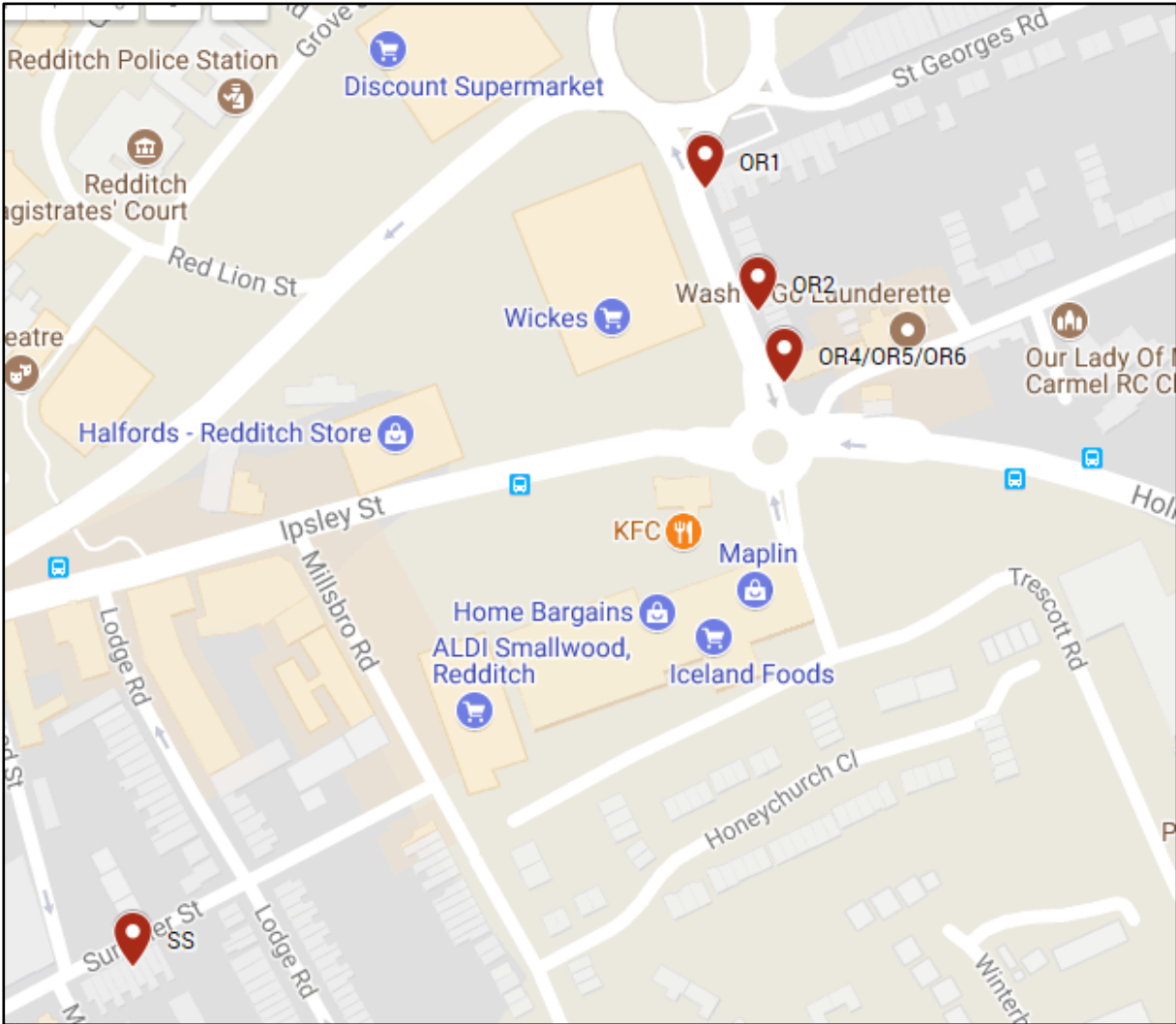


Figure D.2 STOR - Lamp-post opposite 18 Washford Lane



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – 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/m³).

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
DoPH	Director of Public Health
EU	European Union
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RBC	Redditch Borough Council
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 (2019) National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/19
4. DEFRA (2017) Background Mapping for Local Authorities
5. Worcestershire Regulatory Services (2013) 'Air Quality Action Plan for Worcestershire'
6. Worcestershire Regulatory Services (2015) 'Air Quality Action Plan Progress Report for Worcestershire April 2013-April 2015'
7. Worcestershire Regulatory Services (2016) 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – April 2016'
8. Worcestershire Regulatory Services (2018) Air Quality Annual Status Report for Redditch Borough Council