



Warwick District Council Annual Status Report 2017

Bureau Veritas

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Move Forward with Confidence



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2017 Air Quality Annual Status Report (ASR)

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

September 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Warwick District Council

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

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

Warwick District is situated in the West Midlands, within the county of Warwickshire. To the south lies Stratford-on-Avon, to the east, Rugby, and to the north are Coventry and Solihull. The main towns in the district are Warwick, Leamington Spa and Kenilworth, and there are also a number of villages scattered throughout the rural parts of the district. The main air quality issues identified are for Nitrogen Dioxide (NO₂) emitted from road traffic, particularly at congested town centre locations within Warwick, Leamington Spa and Kenilworth. The M40 also runs through the district, alongside which NO₂ concentrations will be elevated.

There are currently 5 AQMAs declared in the district, located in the Warwick town centre and Coventry Road, Leamington Spa and 2 small AQMAs in Kenilworth. The Action Plan encompassing all these five AQMAs was updated in 2015. Air pollution in 2016 has risen slightly as compared to 2015, but Warwick District Council is actively working to improve air quality in the district, through the implementation of the Action Plan, as well as implementation of the Local Transport Plan and in partnership with Planning and Public Health colleagues.

Actions to Improve Air Quality

Warwick District Council has taken forward a number of measures during the current reporting year in pursuit of improving local air quality. One of the key groups of

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

measures relate to those being implemented on the key corridors, which have been prioritised by Warwickshire County Council. Good progress is being made in relation to these proposals, with many of the detailed measures having some impact on air quality. Detailed proposals are set out for 11 main corridors/areas many of which align with AQMAs in the district. Each of the 11 areas include specific measures for junction/highway improvements, walking and cycling improvements, Park and Ride provision, bus priority measures as well as behavioural change measures. Most work has been undertaken on the A452 Europa Way 'Sustainable Spine' corridor which is the key route from the M40 in Leamington Spa and Warwick. Proposals are being worked on and funding being sought from large scale developments currently coming forward.

The measures being implemented through the planning regime are also successfully moving forward. Planning applications are routinely being checked by the environmental health team and air quality assessments requested where relevant. Mitigation, based on the Low Emissions Strategy Planning Guidance (SPG) is also routinely requested. In addition, an air quality assessment of the impacts of Local Plan development has been undertaken, which goes some way to assessing the potential cumulative impact of development outlined in the Local Plan.

In light of the new funding made available by central government as part of the recently released national strategy for tackling air quality⁴ (and specifically Nitrogen Dioxide), the Council will be looking to access these revenue streams in the coming months and years in order to support the measures proposed.

Conclusions and Priorities

At the majority of monitoring locations, pollutant concentrations in 2016 were higher than 2015 and other recent years. There were fifteen monitored exceedences of the nitrogen dioxide annual mean objective in 2016.

The majority of the diffusion tube locations above the annual mean objective were within the current boundaries of the AQMAs, with the exception of two sites, W67 and W5, which are both on the fringes of the current extent of the Warwick AQMA. Whilst this is cause for concern, WDC do not propose to amend the current AQMA at this time due to factors discussed within the main body of the report, primarily that W67 is

⁴ <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>

the first year of exceedance and W5 is considered a potential anomaly. WDC will however give consideration to expanding the Warwick AQMA if the exceedances are repeated in next year's monitoring data. Given the increase in NO₂ concentrations seen in 2016, it is also not considered prudent to revoke any of the Councils AQMAs at this time.

It is clear that there is still work to do in improving the air quality within Warwick, and the Council will focus on implementing the measures from the 2015 Air Quality Action Plan in 2017/18 in order to address this.

Local Engagement and How to get Involved

Members of the public can help improve air quality in the borough by travelling using sustainable transport options, such as walking, running, cycling and using public transport. Car sharing is also a relatively easy way to reduce private car use (<https://carsharewarwickshire.liftshare.com/>).

Any further enquiries should be directed to the Council's Environmental Protection Division. To contact us, please ring (01926) 456725, or email us on ehpollution@warwickdc.gov.uk.

WDC aim to provide an initial response within 4 working days and to complete your request in no more than 20 working days.

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1 Local Air Quality Management

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

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMA declared by Warwick District Council can be found in Table 2.1, and a copy of the maps submitted with the AQMA declarations is provided in Figure 2.1 to Figure 2.5. Further information related to declared or revoked AQMA, including maps of AQMA boundaries are also available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=296. Alternatively, see Appendix D: Maps of Monitoring Locations and AQMA, which provides for a map of air quality monitoring locations in relation to the AQMA in which they are located.

Whilst there are two identified exceedances just outside the current boundary of Warwick AQMA, WDC do not propose to seek to amend the AQMA at this time for reasons discussed later in the document (see Section 3.2.1), but will consider proceeding to do so if these exceedances are repeated in next year's monitoring data.

The appraisal of the 2016 ASR recommended the Council consider proceeding to the revocation of the two Kenilworth AQMA. However, given that concentrations have increased this year and are now much closer to the annual mean NO₂ AQS objective (see Section 3.2.1), the Council proposes that these AQMA should remain in place at present, and the situation further monitored in future years.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration*	Now	
Warwick Coventry Road	01/03/2011	Nitrogen Dioxide Annual Mean	Warwick	The area covers the east side of Coventry Road from the junction with St. Johns / Coten End, incorporating 2-4 Coventry Road and Montgomery Court, properties fronting on to Coventry Road only.	NO	50.8µg/m ³	44.0µg/m ³	AQAP: WDC, 2015 (Air Quality Consultants, 2015) Available at: http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan
Warwick Road (Kenilworth) AQMA	01/11/2008	Nitrogen Dioxide Annual Mean	Kenilworth	An area encompassing all properties along Warwick Road, Kenilworth between the junctions with Station Road and Waverley Road.	NO	48.1µg/m ³	37.5µg/m ³	AQAP: WDC, 2015 (Air Quality Consultants, 2015) Available at: http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan
New Street Kenilworth AQMA	01/11/2008	Nitrogen Dioxide Annual Mean	Kenilworth	An area encompassing all properties fronting New Street, Kenilworth from the junction with Bridge Street/Fieldgate Lane up to and including No. 17 New Street.	NO	39.8µg/m ³	40.0µg/m ³	AQAP: WDC, 2015 (Air Quality Consultants, 2015) Available at: http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan

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Leamington Spa AQMA	01/12/2004, Amended 2014	Nitrogen Dioxide Annual Mean	Leamington Spa	An area of South Town, Leamington Spa, centred on High Street, Clemens Street and Bath Street.	NO	52.9µg/m³	50.4µg/m³	AQAP: WDC, 2015 (Air Quality Consultants, 2015) Available at: http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan
Warwick AQMA	Declared December 2004, Amended 01/07/2008	Nitrogen Dioxide Annual and 1-Hour Mean	Warwick	An area in the centre of Warwick, encompassing properties along High Street, Jury Street, Bowling Green Street, Theatre Street, Northgate, The Butts, Smith Street, Church St and part of Saltisford, and also including a number of nearby properties. This AQMA is now declared for both annual and hourly mean nitrogen dioxide objectives.	NO	58.3µg/m³	46.6µg/m³	AQAP: WDC, 2015 (Air Quality Consultants, 2015) Available at: http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan

☒ **Warwick District Council confirm the information on UK-Air regarding their AQMA(s) is in the process of being updated, due to identified anomalies with the Leamington Spa boundary**

* Earliest available concentrations are for 2008

In Bold; exceedances of the AQS objective

Figure 2.1 - Coventry Road AQMA, Warwick

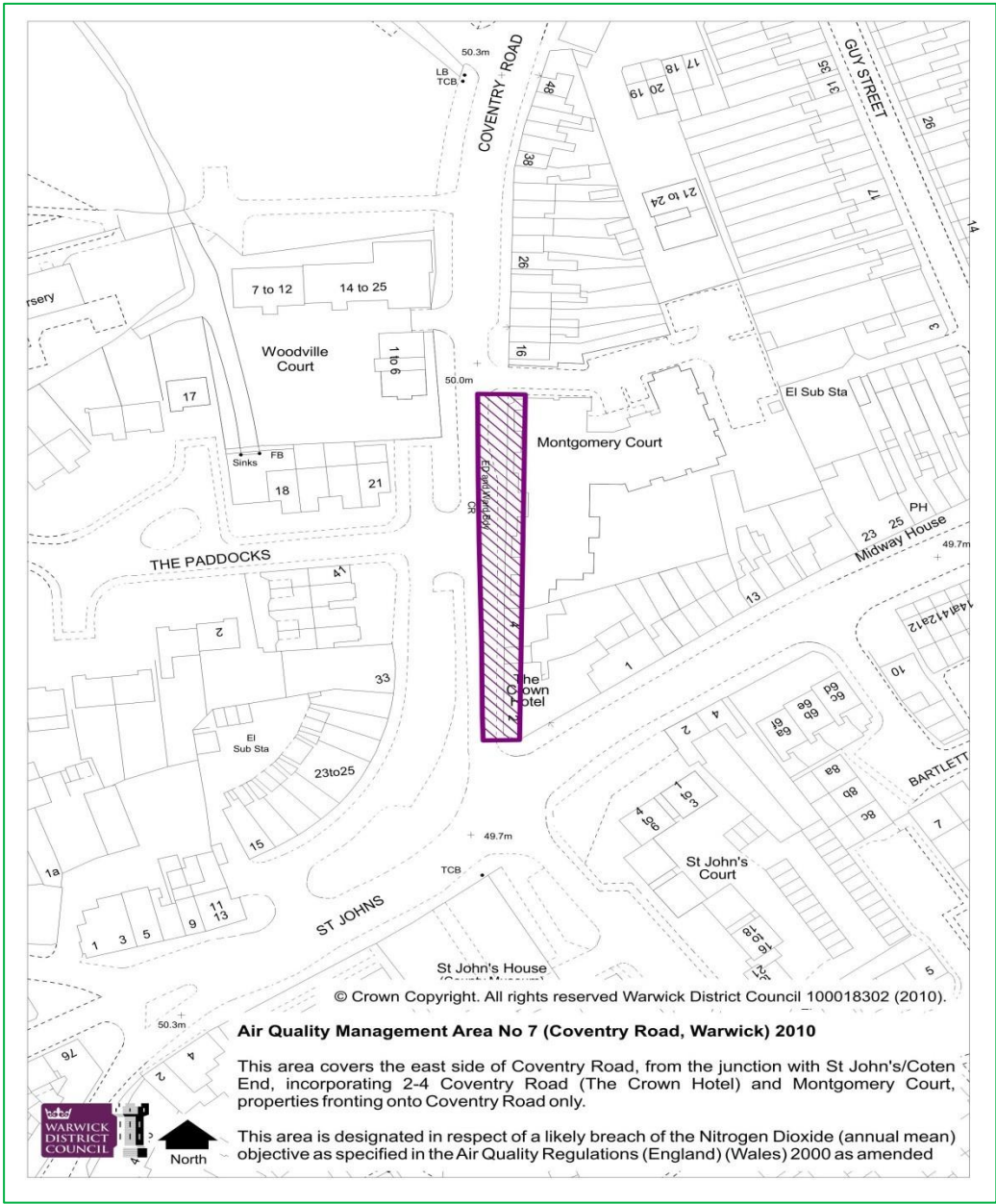


Figure 2.2 - Warwick Road AQMA, Kenilworth

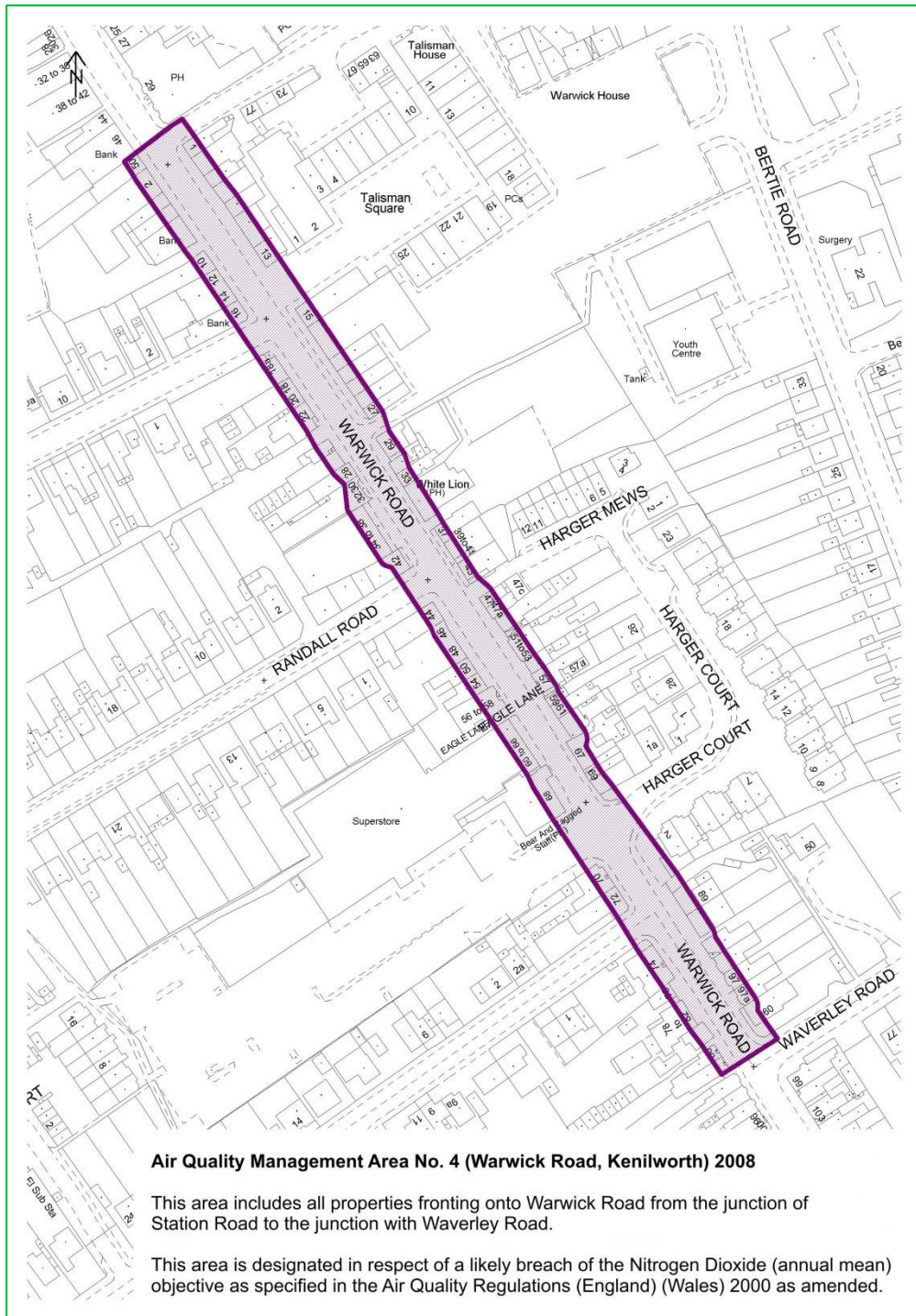


Figure 2.3 - New Street AQMA, Kenilworth

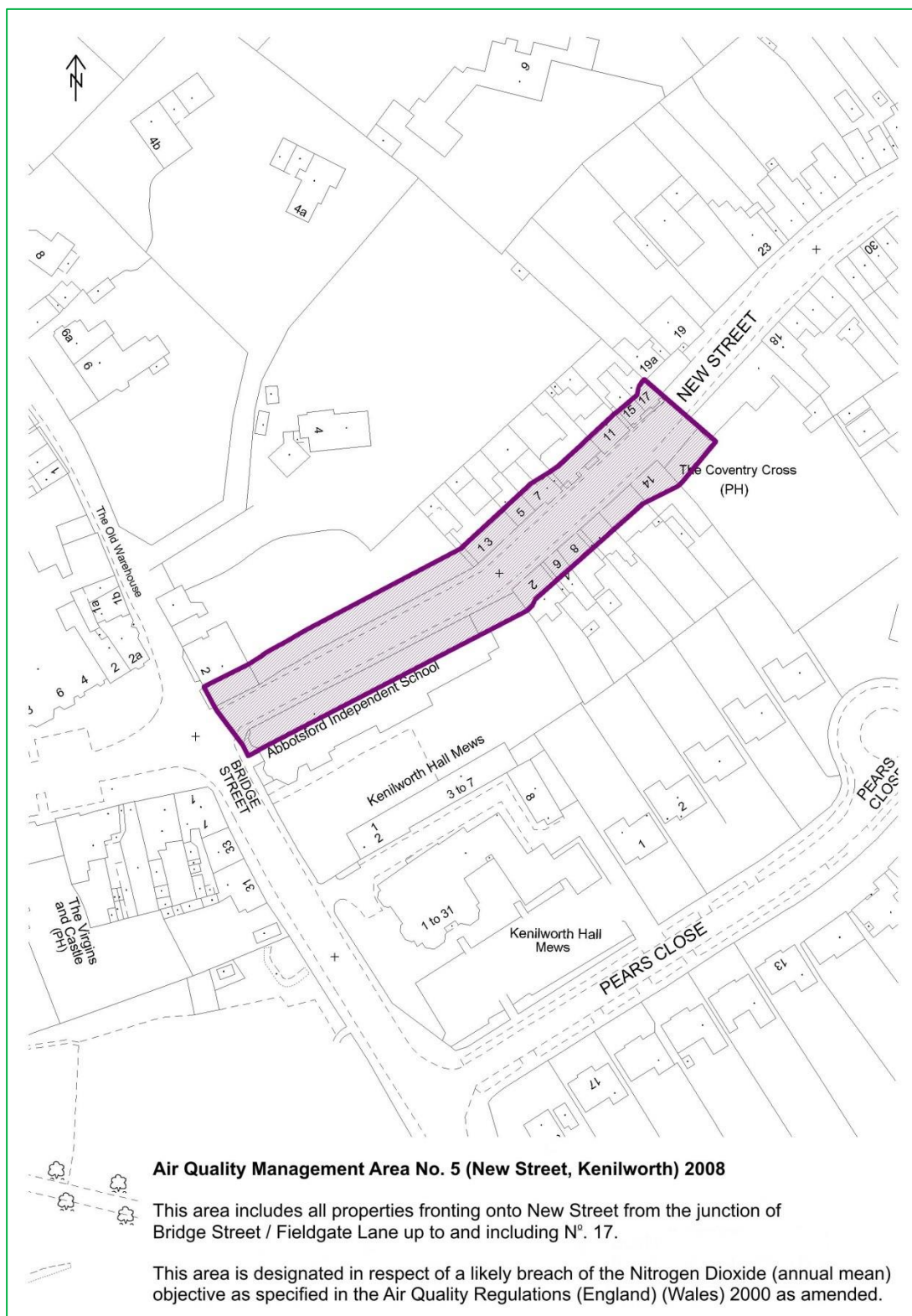


Figure 2.4 - Leamington Spa AQMA

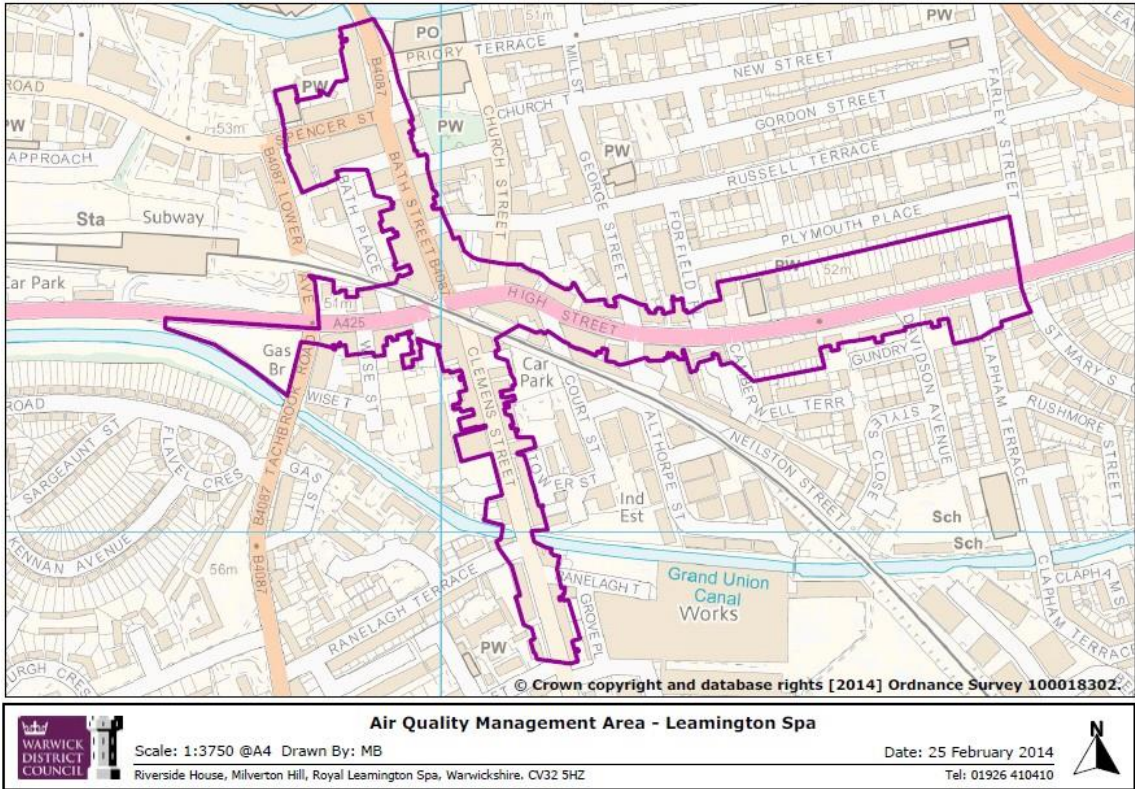
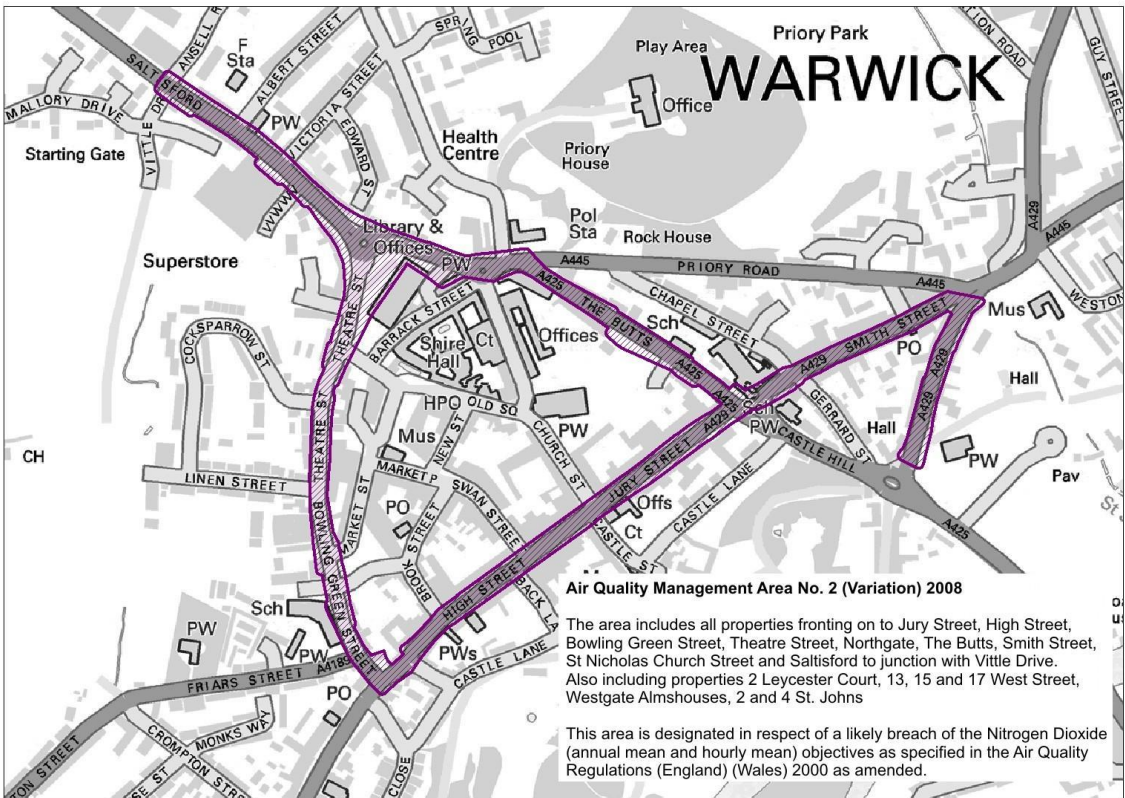


Figure 2.5 - Warwick AQMA (amended 2008)



2.2 Progress and Impact of Measures to address Air Quality in Warwick District Council

Defra's appraisal of last year's ASR concluded the report was well structured, detailed, and provided the information specified in the Guidance. Comments principally centred on the recently published Action Plan, where further progressive development of the Plan to tailor measures to specific AQMAs was recommended. The appraisal also suggested that further assessment of the supporting information for the AQAP should be considered in order to support this. Comments relating to the ASR itself were to include distance correction⁵ where appropriate, and to consider revoking the Kenilworth AQMA, should concentrations continue to remain below the AQS objective. Consideration is given to both these latter points within this year's ASR.

Warwick District Council has taken forward a number of direct measures during the current reporting year in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in Warwick District Council's Air Quality Action Plan (2015)⁶.

One of the key groups of measures relate to those being implemented on the key transport corridors, which have been prioritised by Warwickshire County Council. Good progress is being made relating to these proposals, and many of the detailed measures should have some impact on air quality. Detailed proposals are set out for 11 main corridors, many of which align with AQMAs in the district. Each of the 11 areas include specific measures for junction/highway improvements, walking and cycling improvements, Park and Ride provision, bus priority measures as well as behavioural change measures. Most work has been undertaken on the A452 Europa Way 'Sustainable Spine' corridor which is the key route from the M40 in Leamington Spa and Warwick. Proposals are being worked on and funding being sought from large scale developments currently coming forward.

The measures being implemented through the planning regime are also successfully moving forward. Planning applications are routinely being checked by the

⁵ <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

⁶ https://www.warwickdc.gov.uk/info/20505/air_pollution

environmental health team and air quality assessments requested where relevant. Mitigation, based on the Low Emissions SPG is also routinely requested. In addition, an air quality assessment of the impacts of Local Plan development has been undertaken, which goes some way to assessing the potential cumulative impact of development outlined in the Local Plan.

WDC's priorities for the coming year are to continue with the implementation work in the key transport corridors and continue in implementing the planning measures, as well as promoting low emission vehicles and infrastructure.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Warwick District Council anticipates that given current concentrations, further additional measures not yet prescribed may be required in subsequent years to achieve compliance and enable the revocation of Leamington Spa AQMA. The AQAP will be developed and tailored accordingly under its next review.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1 Smarter Travel	Area wide improvements to walking and cycling infrastructure	Promoting Travel Alternatives	Promotion of Cycling and Promotion of Walking	WCC	Mainly as part of key transport corridor proposals. Also a review of cycling infrastructure across the district underway (and how that fits in with new developments)	Ongoing	n/a	n/a	Feasibility work undertaken on some corridors	Ongoing implementation of schemes	Detailed information on specific schemes can be found at http://www.warwickdc.gov.uk/downloads/id/2234/in03_-_draft_infrastructure_delivery_plan_appendix_a_-_transport_corridor_strategies.pdf . Currently focusing on the Europa Way corridor to include a high standard, dedicated cycle route on a section of the highway, fully separated from what will be a new dual carriageway layout by a grass verge. Improvements have also been made to Princes Drive railway arch to improve access for cyclists.
	Smarter Choices and Travel Planning programme	Promoting Travel Alternatives	School Travel Plans and Workplace Travel Planning	WCC	Mainly as part of key transport corridor proposals	Ongoing	n/a	n/a	Feasibility work undertaken on some corridors	Ongoing implementation of schemes	https://www.warwickshire.gov.uk/ltp3
	Targeted bus stop infrastructure upgrades on key public transport corridors	Transport Planning and Infrastructure	Bus Route Improvements	WCC	Bus priority measure implemented as part of key transport corridor proposals	Ongoing	n/a	n/a	Feasibility work undertaken on some corridors	Ongoing implementation of schemes	None
	Improving infrastructure to improve walking and cycling signage	Promoting Travel Alternatives	Promotion of Cycling and Promotion of Walking	WCC	Walking and cycling implemented part of key transport corridor proposals	Ongoing	n/a	n/a	Feasibility work undertaken on some corridors	Ongoing implementation of schemes	Sustrans currently investigating a signage strategy due to be published in September 2017. Section 106 money has been reserved to install new signage ('node points') at railway stations.

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	Hearts and Minds campaign to encourage modal shift away from private car use	Public Information	Other	WCC	Ongoing	Ongoing	n/a	n/a	Mini campaigns undertaken such as 'choose how you move'	Ongoing campaigns	None
	Further consideration of Park and Ride	Alternatives to private vehicle use	Bus based Park and Ride	WCC	Currently in planning phase	Ongoing	n/a	n/a	Park and Ride provision outlined in key transport corridor proposals	Unknown at this time	The Asps development site has now been agreed and review planned looking at park and ride options or workplace parking separate from employer sites with transport in for sites such as National Grid.
	Consideration of a car club	Alternatives to private vehicle use	Car clubs	WDC/ WCC	2015	n/a	n/a	n/a	Decision not to take this forward	n/a	Not being taken forward – population areas not considered large enough to support
	Publicising CarShare Coventry and Warwickshire	Alternatives to private vehicle use	Car and lift sharing schemes	WCC	Ongoing	Ongoing	n/a	n/a	Companies in Tech Park are promoting car share. Workshop for other companies planned	Ongoing	Plans in place for signage advertising the car share website along the main transport corridors, however there is no funding in place for this yet
2. Promote	Supporting future opportunities for funding for Low Emission Vehicles, in particular for vehicle charging infrastructure	Promoting Low Emission Transport	n/a	WDC / WCC	2016	Ongoing (depending on opportunities)	n/a	n/a	WCC currently developing an Electric Vehicle Charging Strategy	Ongoing implementation	WCC currently looking at suppliers for a Warwickshire network of charging points. Expected that suppliers will supply charging infrastructure at no cost to the County and that maintenance/renewal costs would all rest with the supplier. Expecting to go out to tender for a supplier at the end of Summer 2017 and to begin installing by the end of the financial year.
	Use of the planning system to ensure a more widespread infrastructure for low emission vehicles	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WDC	2013	2014 (for adoption of guidance)	n/a	n/a	Implementation of Low Emission Strategy Guidance to install EV infrastructure	Ongoing implementation	Useful policy mechanism for improving infrastructure in long term

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Low Emission Vehicles and Infrastructure	Moving the Warwick DC fleet to electric vehicles where practicable	Promoting Low Emission Transport	Public Vehicle procurement	WDC	2015	2016	n/a	n/a	5 vehicles ordered as pool vehicles	2016 to have vehicles in place. Ongoing commitment where feasible	Very funding dependent. Business case not great without additional funding
	Strive to set up an Ecostars scheme in Warwick District Council whereby fleet operators can join for free and strive to reduce their environmental impacts.	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	WDC	2016	2017 onwards	n/a	n/a	Not taken forward yet – no grant funding available	Subject to grant funding	Dependent on funding being available
	Working with Warwickshire County Council and bus operators to encourage lower emission buses (either retrofitting existing buses, or use of alternative fuels).	Vehicle fleet efficiency	Promoting Low Emission Public Transport	WCC	2016	2016 onwards	n/a	n/a	Not yet taken forward, will potentially bring into discussion regarding work in Warwick	Ongoing implementation	None
	Ensuring that the electric taxi within Warwick District Council is utilised to promote Low Emission Vehicles to commercial operators and the public.	Promoting Low Emission Transport	Taxi emission incentive	WDC	n/a	n/a	n/a	n/a	Not feasible as taxi is privately owned	n/a	Licensing service has to be provided as cost neutral therefore can't incentivise electric taxis
	Promotion of electric vehicles through the Warwickshire Drive Electric Website. http://www.warwickshire.gov.uk/drive-electric	Promoting Low Emission Transport	Other	WCC	2016	Ongoing	n/a	n/a	Promotion could be enhanced.	Ongoing implementation	Investigate including links on Warwick District Council website
	Use the taxi and private hire licensing system to try and reduce emissions from	Promoting Low Emission Transport	Taxi emission incentive	WDC	n/a	n/a	n/a	n/a	Draft proposals in place	To be confirmed	Consideration of implementing a Euro Emission standard through the taxi licensing regime.

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	taxis and private hire vehicles.										
3. Procurement	Investigation with procurement colleagues to produce a sustainable procurement guide to ensure transport emissions are as low as possible	Policy Guidance and Development Control	Sustainable Procurement Guidance	WDC (Procurement)	2016	2016-17	n/a	n/a	No progress made to date	2017	Steering group meeting involved procurement manager. This action still to be taken forward
4. Planning	Ensuring that the Warwick Low Emission Strategy Guidance for Developers is kept up to date, and implemented	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WDC E,S,H and CP and Planning	n/a	Ongoing	n/a	n/a	Good progress in implementing mitigation through development control	Ongoing	None
	Working with planning policy colleagues to ensure that the Local Plan fully addresses air quality issues with appropriate policies included	Policy Guidance and Development Control	Other policy	WDC E,S,H and CP and Planning	n/a	Ongoing	n/a	n/a	Planning policy relevant to air quality included in new Local Plan	n/a	Local Plan is due to be adopted by August/September 2017 and will then be reviewed every five years.
	Working with planning colleagues and developers to ensure that new developments are based around the 'five-minute walkable neighbourhood', thereby encouraging active travel as the preferred methods of transport to access local facilities	Policy Guidance and Development Control	Other policy	WCC Public Health	n/a	Ongoing	n/a	n/a	5 minute walkable neighbourhoods have been investigated within work undertaken by WYG on how developments should look	Ongoing encouragement of active travel	None

	Ensure that green infrastructure is integrated into all residential and commercial developments, in line with the National Planning Policy Framework (NPPF)	Policy Guidance and Development Control	Other policy	WDC E,S,H and CP and Planning	n/a	Ongoing	n/a	n/a	NPPF followed for new development . Green infrastructure included where relevant	Ongoing	None
	Ensuring that planning applications with potential air quality impacts are fully assessed for their impacts, at relevant locations using appropriate methodologies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WDC E,S,H and CP and Planning	n/a	Ongoing	n/a	n/a	Air quality assessments asked for on a regular basis	Ongoing	None
	Ensuring that where possible, cumulative impacts are taken into account. Any committed developments should be included within a given air quality assessment	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WDC E,S,H and CP and Planning	n/a	Ongoing	n/a	n/a	Ongoing work required where large areas of development are allocated in Local Plan	Ongoing	To some extent, work undertaken on air quality impacts of the Local Plan takes cumulative impacts into account at a strategic level
	Ensuring that appropriate mitigation is implemented where any relevant impacts are identified	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WDC E,S,H and CP and Planning	n/a	Ongoing	n/a	n/a	Mitigation asked for on a regular basis	Ongoing	None
5. Traffic Management	Junction improvements on key travel corridors in Warwick and Leamington Spa AQMAs are proposed which include junction/highway	Traffic Management	Strategic Highway Improvements	WCC (Transport)	2014-2016	Possible first corridor in place by 2020	n/a	n/a	Good progress on planning and starting to implement corridor proposals	Ongoing for different corridors, Europa Way target for completion 2020 but dependent on development funding	Europa Way likely to be first improvement implemented

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	modifications, improvements for walking and cycling and bus priority measures										
	An investigation of 20 mph zones as part of the wider transport strategy, where this will smooth traffic flow	Traffic Management	Reduction of Speed Limits, 20 mph zones	WCC (Transport)	2015	n/a	n/a	n/a	Good progress	2022	Statutory consultation completed and proposals to be reviewed by portfolio holder. The 20mph zone and proposals for Northgate will be carried out first and others will follow including the one-way system. Funding is currently being sourced for this and work is expected to be completed within 5 years
	Targeted re-allocation of road space to prioritise and facilitate movement of pedestrians, cyclists, public transport and car share users	Traffic Management	Strategic Highway Improvements	WCC (Transport)	2014-2016	Possible first corridor in place by 2020	n/a	n/a	Good progress on planning and starting to implement corridor proposals	Ongoing for different corridors, Europa Way target for completion 2020 but dependent on development funding	None
	Manage deliveries across Warwick District Council to ensure that no additional congestion is caused by stationary delivery vehicles in busy locations	Traffic Management	Congestion Management	WCC (Transport)	2016	Not being taken forward at present	n/a	n/a	Will review at future Steering Group meetings	n/a	None
6. Public Health	Re-investigate funding for a website to engage with the public on air quality, the health impacts of poor air quality, sustainable transport and strategies to improve air quality	Public Information	Via the internet	WCC Public Health	2016/17	Ongoing	n/a	n/a	Website proposal in place	Jul-17	Proposed website will have a simple user interface with access to info on all active travel options available. There will also be some reference to air quality, alerts for those with chronic health conditions etc. The website is due to be launched in July. Looking at ways to advertise / promote it.

	Working with planners and developers to embed Public Health's Evidence for Planning guidance, thereby encouraging any new developments to support access to active travel	Policy Guidance and Development Control	Other policy	WCC Public Health	n/a	Ongoing	n/a	n/a	The guidance document is used when responding to planning applications, pre-planning applications and local plan consultations on an ad-hoc basis.	Ongoing	The recommendations made always support the inclusion of active travel.
	Investigate implementing a campaign aimed at vulnerable members of the public (i.e. those with existing respiratory or cardio vascular conditions) in order that they could change behaviour to reduce exposure when pollution levels are high	Public Information	Via the internet	WCC Public Health	2015/16	Unlikely to implement a campaign aimed at vulnerable member of population	n/a	n/a	Instead will embed active travel in everything we do, aimed at whole population	Ongoing	None
7. Local Air Quality Management	Continuation of monitoring within Warwick District Council, focussed on AQMAs, but also in other strategic locations	Other	Other	WDC E,S,H and CP.	n/a	Ongoing	n/a	n/a	Monitoring reported in this report	Ongoing	None
	Regular assessment of air quality against air quality objectives as specified by the LAQM process with reports to defra and the public	Other	Other	WDC E,S,H and CP.	n/a	Ongoing	n/a	n/a	Undertaken in this report	Ongoing	None

	Review of measures set out in this Air Quality Action Plan on a regular basis to ensure they are up to date and being implemented	Other	Other	WDC E,S,H and CP	n/a	Ongoing	n/a	n/a	Undertaken in this report	Ongoing	None
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2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16⁷ (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.

Warwick District Council anticipates that the measures within the Action Plan, whilst primarily targeted at NO₂, will also contribute toward a reduction in PM_{2.5}. Proposals focussing on the key transport corridors will also help to reduce overall vehicle trips, reducing PM_{2.5} emissions both through reductions in fuel usage and brake and tire wear. However, sources of PM_{2.5} extend beyond transport. WDC continues to enforce statutory controls on combustion emissions from both industrial and domestic sources, which both contribute to PM_{2.5} concentrations.

Warwick District Council's Environmental and Public Health departments are collaborating to take action on air quality in the local area to help reduce the health burden from air pollution.

The Public Health Outcomes Framework is a Department of Health data tool, intended to focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between communities. The PHOF includes an indicator, based on the effect of particulate matter (PM_{2.5}) on mortality. According to the public health outcomes framework⁸, the fraction of mortality attributable to particulate air pollution (measured as PM_{2.5}) in 2015 in Warwick is 4.7%, equivalent to the average for England, and just below that of the West Midlands region (4.8%). This would suggest that PM_{2.5} concentrations in Warwick are comparable to other areas in the UK.

The approach used in partnership with Public Health colleagues utilises this tool further, and includes the encouragement of active travel, which will also have wider public health benefits captured in other indicators such as increased physical activity (indicator 2.13) and reducing excess weight at various ages (indicators 2.6 & 2.12).

⁷ <https://laqm.defra.gov.uk/supporting-guidance.html>

⁸ <http://www.phoutcomes.info/public-health-outcomes-framework#page/0/gid/1000043/pat/6/par/E12000005/ati/101/are/E07000222>

Warwick District Council also uses the two monitoring stations in the AURN measuring PM_{2.5} to monitor progress against this pollutant. The trend in the last 5 years is broadly consistent, though 2016 saw a marginal reduction in concentrations at both sites. However, there is little difference in concentrations between the background site, AURN1 (Hamilton Terrace), and the roadside site, AURN2 (Rugby Road, Leamington), thus illustrating that sources of PM_{2.5} can be trans-boundary and regionally influenced, and are much wider than just transport.

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

This section sets out what monitoring has taken place and how it compares with relevant objectives.

Warwick District Council undertook automatic (continuous) monitoring at three sites during 2016. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available online at <https://uk-air.defra.gov.uk/data/>.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Warwick District Council undertook non- automatic (passive) monitoring of NO₂ at 53 sites during 2016, two of which were triplicate or co-located sites. Table A.2 in Appendix A shows the details of all of these locations.

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)

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

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

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

At the majority of locations, concentrations in 2016 were higher than 2015 and other recent years.

Concentrations above 40µg/m³ were measured at sixteen diffusion tube monitoring sites. Once corrected for relevant exposure, there were fifteen exceedences of the nitrogen dioxide annual mean objective. One further site, W28, returned a concentration of 39.96µg/m³, which when rounded is equal to 40µg/m³, though not technically in exceedance in the absolute concentration.

The majority of the above were within the current boundaries of the AQMA, with the following two exceptions.

Diffusion tube W67 is located on Castle Hill, to the west of the Warwick AQMA which currently encompasses each road link feeding Castle Hill, but not that road itself. The site has recorded annual mean concentrations above 40µg/m³ since installation in 2014. However, the monitoring location is not representative of exposure, and under distance correction⁵ to the nearest receptor in the preceding two years, was marginally below the annual mean AQS objective. In 2016 however, there was a 6.2µg/m³ increase in the monitored concentration at this site, which means that even after distance correction, there was an exceedance of the NO₂ annual mean AQS objective. Accordingly, the Council will proceed to amend the AQMA to include this location should this exceedance be repeated in 2017.

One further location, site W5, was in exceedance of the annual mean AQS objective in 2016, and lies just beyond the southern extent of the Warwick AQMA on Hampton Street. Whilst this is cause for concern, it is possible that this is to some extent an anomaly given that this site has historically been well below the objective. It is likely the exceedance has been caused by a combination of a slightly reduced data capture and one very high monitored concentration in April 2016. By way of comparison, if the high April concentration is removed, the annual mean concentration falls to 37.8µg/m³, which whilst still an increase as compared to 2015, is more comparable with preceding concentrations at that site. Additionally, the monitored concentration at W65 (just north of W5 on the same road and closer to the current AQMA) is only 26.4µg/m³. WDC will continue to monitor the situation at this

location and will give consideration to amending the AQMA if the exceedance is repeated in next year's monitoring data, but do not propose to amend the current AQMA at this time.

All measured exceedences were below $60 \mu\text{g}/\text{m}^3$, which based on the relationship stated in TG(16)⁹, indicates that an exceedence of the 1-hour mean objective at these sites is not likely. No exceedences of the annual mean or the 1-hour mean objectives were measured by the automatic monitoring stations.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of $40 \mu\text{g}/\text{m}^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of $50 \mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

No exceedences of either the annual mean objective or the 24-hour mean PM₁₀ objective were measured in 2016.

PM₁₀ concentrations have generally remained relatively stable over the last 5 years, and indeed are very similar to 2015.

3.2.3 Particulate Matter (PM_{2.5})

Table A.7 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past 5 years.

No exceedences of the UK PM_{2.5} annual mean objective were measured in 2015.

The trend in the last 5 years is broadly consistent, though 2016 saw a marginal reduction in concentrations at both sites.

3.2.4 Ozone (O₃)

Annual reporting is not required for ozone, unless local circumstances indicate that there is a problem. An analysis of monitored ozone concentrations has been included for information.

⁹ <https://laqm.defra.gov.uk/technical-guidance/>

Table A.8 in Appendix A presents the number of daily maximum O₃ concentrations greater than 100µg/m³ for 2016, not to be exceeded more than 10 times in a year.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
AURN1	Hamilton Terrace, Leamington Spa	Urban Background	431943	265730	NO ₂ , O ₃ , C ₆ H ₆ , PM ₁₀ , PM _{2.5}	NO	Chemiluminescence, Ultra-violet fluorescence (UVF), FDMS	9	50	4
CM1	Pageant House, Warwick	Roadside	428263	264877	NO ₂	YES	Chemiluminescence	13	2.8	N/a
AURN2	Rugby Road, Leamington Spa	Roadside	431271	266404	NO ₂ , PM ₁₀ , PM _{2.5}	NO	Chemiluminescence, FDMS	23	8	3.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
Warwick										
W5	Hampton Street (3)	Roadside	427615	264563	NO ₂	N	Y	2	N	1.5
W17	Coventry Road (Woodville Road)	Kerbside	428704	265236	NO ₂	N	N	1	N	1.5
W18	Coventry Road (Coachouse Mews)	Roadside	428735	265362	NO ₂	N	N	1.5	N	1.5
W19	West Street Torry's	Roadside	427937	264586	NO ₂	N	N	3.2	N	1.5
W33-35	Pageant House	Roadside	428263	264877	NO ₂	Y	Y	2.8	Y	1.5
W36	Jury Street	Roadside	428391	264966	NO ₂	Y	N (1m)	2.1	N	1.5
W37	High Street	Roadside	428132	264799	NO ₂	Y	Y	2.9	N	1.5
W38	West Street	Kerbside	427959	264624	NO ₂	N	N	0.6	N	1.5
W39	Crompton Street/ West Street	Roadside	427910	264541	NO ₂	N	Y	4.1	N	1.5
W40	Bowling Green Street	Kerbside	427992	264695	NO ₂	Y	Y	0.9	N	1.5
W41	Friars Street	Roadside	427905	264682	NO ₂	N	N	1	N	1.5
W42	Theatre Street	Roadside	427938	264947	NO ₂	Y	Y	2.3	N	4.5
W43	Saltisford/northgate	Roadside	428026	265158	NO ₂	Y	Y	1.5	N	2.5
W44	West Rock	Roadside	427930	265200	NO ₂	Y	N	2.3	N	2.6
W45	Albert Street/satilsford Junction	Roadside	427867	265275	NO ₂	Y	Y	2.7	N	2.5
W46	The Butts	Roadside	428240	265088	NO ₂	Y	N	1.6	N	2.5
W48	Smith Street	Roadside	428522	265039	NO ₂	Y	Y	2	N	3

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W49	Gerrard Street	Roadside	428501	264967	NO ₂	N	Y	1.8	N	2.6
W50	St Nicholas' Church St 1.	Roadside	428600	264983	NO ₂	N	Y	1.7	N	2.6
W51	St Mary's Churchyard	Urban Background	428270	264982	NO ₂	N	N	n/a	N	n/a
W52	Coventry Road/crown Hotel	Kerbside	428710	265165	NO ₂	Y	N (2m)	1	N	2.5
W53	Coventry Road No 1 (Mongomery Court)	Roadside	428715	265202	NO ₂	Y	Y	1.8	N	2.4
W54	Coventry Road No 2 (28 Coventry Road)	Roadside	428715	265285	NO ₂	N	Y	1.9	N	2.4
W55	Coventry Road No 3 (Great Western Arms)	Roadside	428710	265341	NO ₂	N	N	1.2	N	2.5
W56	St Johns	Roadside	428619	265113	NO ₂	N	N	1.1	N	2.5
W57	Coten End	Roadside	428748	265166	NO ₂	N	Y	3	N	2.5
W58	Emscote Road	Roadside	429514	265469	NO ₂	N	N	3.8	N	n/a
W59	Charles Street	Roadside	429501	265494	NO ₂	N	N	2	N	n/a
W60	Bridge Street	Roadside	430015	265718	NO ₂	N	N	2.4	N	n/a
W61	Greville Road	Roadside	429974	265733	NO ₂	N	N	5.4	N	n/a
W62	St Nicholas' Church St. 2	Roadside	428608	265042	NO ₂	Y	Y	2.1	N	3
W65	Hampton Street (2)	Roadside	427680	264607	NO ₂	N	Y	4.3	N	n/a
W67	Castle Hill	Roadside	428477	264939	NO ₂	N	N (1.2m)	3.2	N	2.5
Leamington Spa										
W1	Bath Street	Kerbside	431978	265280	NO ₂	Y	Y	0.7	N	1.5
W2	High Street	Roadside	432075	265234	NO ₂	Y	Y	2.2	N	1.5
W6-8	Hamilton Terrace	Urban Background	431943	285730	NO ₂	N	N	n/a	N	1.5
W10	Farley Street	Roadside	432560	265254	NO ₂	N	N	0.1	N	4.5
W11	Clemens Street	Roadside	432051	265060	NO ₂	Y	N	3.2	N	1.5

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W12	Spencer Street	Roadside	426836	260855	NO ₂	Y	N	5	N	1.5
W13	Wise Street	Roadside	431900	265189	NO ₂	Y	Y	1	N	1.5
W14	Tachbrook Road	Roadside	431862	265169	NO ₂	N	N	5.22	N	1.5
W15	Old Warwick Road	Roadside	431849	265193	NO ₂	Y	Y	2	N	1.5
W16	Parade	Roadside	431951	265397	NO ₂	N	N	7.5	N	1.5
Kenilworth										
W23	Moorlands Road Jcn	Roadside	429078	271207	NO ₂	N	N	4.2	N	1.5
W24	Waverley Road	Roadside	428974	271402	NO ₂	Y	N	2.8	N	4.5
W25	New Street No 1	Roadside	428707	272556	NO ₂	Y	Y	0.4	N	1.5
W26	New Street No 2	Roadside	428733	272578	NO ₂	Y	Y	1.7	N	1.5
W27	New Street No 3	Kerbside	428750	272612	NO ₂	N	N	1.1	N	4.5
W28	Fieldgate Lane Jcn	Roadside	428652	272524	NO ₂	Y	Y	0.7	N	4.5
W30	The Square	Roadside	428714	271769	NO ₂	N	Y	3.4	N	4.5
W31	Barrow Road	Kerbside	428816	271618	NO ₂	Y	N	1.4	N	4.5
W32	Warwick Road	Roadside	428906	271497	NO ₂	Y	Y	1.3	N	1.5
Stoneleigh										
W68	Birmingham Road	Roadside	432931	272790	NO ₂	N	Y	3.2	N	n/a

Notes:

- (1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
 (2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
Warwick									
CM1	Roadside	Automatic	94.1	94.1	60.4	39.7	40.1	37.2	31.7
W5	Roadside	DT	91.7	91.7	36.0	32.7	33.8	34.5	40.4
W17	Kerbside	DT	100	100	27.8	29.1	29.1	27.7	29.4
W18	Roadside	DT	100	100	27.9	25.0	24.7	24.7	27.2
W19	Roadside	DT	100	100	32.9	31.4	31	28.4	33.3
W33-35	Roadside	DT	100	100	46.1	40.8	41.3	41.2	44.2
W36	Roadside	DT	100	100	44.6	41.1	43.6	42.2	46.3
W37	Roadside	DT	100	100	36.6	38.3	34.6	37.5	41.0
W38	Kerbside	DT	100	100	36.9	32.6	34.5	34	37.4
W39	Roadside	DT	100	100	27.5	26.8	27.3	27.6	30.7
W40	Kerbside	DT	100	100	42.2	39.8	40	40.7	42.9
W41	Roadside	DT	100	100	26.1	24.8	25.4	22.6	26.7
W42	Roadside	DT	100	100	34.7	32.0	29.4	26.4	33.4
W43	Roadside	DT	100	100	32.5	44.3	45.4	43.4	46.6
W44	Roadside	DT	100	100	31.6	29.9	31.9	28.6	32.5
W45	Roadside	DT	100	100	28.6	26.4	27.8	27.2	29.6
W46	Roadside	DT	100	100	36.4	35.4	34.3	34.2	39.2
W48	Roadside	DT	100	100	36.0	33.5	33.8	32.7	36.0
W49	Roadside	DT	83.3	83.3	24.7	22.9	23.3	22.1	25.3
W50	Roadside	DT	100	100	30.0	29.4	28.7	27.9	30.5
W51	Urban Background	DT	91.7	91.7	19.6	19.3	18.2	17.4	20.2

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W52	Kerbside	DT	100	100	42.0	41.4	39.4	38.1	41.4
W53	Roadside	DT	100	100	41.0	42.7	41	38.5	44.0
W54	Roadside	DT	100	100	32.5	34.0	32.9	31	34.8
W55	Roadside	DT	100	100	29.4	29.9	28.5	27.3	31.0
W56	Roadside	DT	91.7	91.7	24.7	22.5	22.7	21.3	23.7
W57	Roadside	DT	100	100	31.9	31.4	31.3	30	31.8
W58	Roadside	DT	100	100	33.8	35.0	31.3	29.9	31.0
W59	Roadside	DT	83.3	83.3	40.1	36.3	36.7	34	38.1
W60	Roadside	DT	100	100	31.1	31.2	28.9	27.8	31.6
W61	Roadside	DT	100	100	29.8	27.8	26.4	26.2	29.5
W62	Roadside	DT	66.7	66.7	45.6	43.8	44	42.5	41.5
W65	Roadside	DT	100	100	25.9	24.3	23.2	23.0*	26.4
W67	Roadside	DT	100	100	-	-	41	41.8	48.0
Leamington Spa									
AURN1	Urban Background	Automatic	97.5	97.5	20.7	20.7	19.6	19.3	21.4
AURN2	Roadside	Automatic	95.9	95.9	19.5	21.2	21.1	20.2	20.4
W1	Kerbside	DT	83.3	83.3	44.0	36.3	40	43.4	47.3
W2	Roadside	DT	100	100	39.3	33.5	32.6	38.2	40.4
W6-8	Urban Background	DT	100	100	20.7	19.8	19.2	19.7	21.8
W10	Roadside	DT	100	100	25.4	24.1	24	24.3	26.5
W11	Roadside	DT	100	100	25.5	32.9	23.7	23.2	25.6
W12	Roadside	DT	100	100	35.1	38.0	33.7	33.3	36.6
W13	Roadside	DT	100	100	49.6	42.8	47	48.6	50.4
W14	Roadside	DT	100	100	40.6	39.6	34.5	38.1	39.6
W15	Roadside	DT	100	100	45.2	35.9	41	43.9	45.0
W16	Roadside	DT	100	100	31.6	30.6	28.5	30.7	32.6

Kenilworth									
W23	Roadside	DT	91.7	91.7	33.0	30.7	31.1	30.6	33.6
W24	Roadside	DT	100	100	30.9	30.2	29.7	28.2	30.4
W25	Roadside	DT	75	75	27.0	34.6	34.5	31.3	34.6
W26	Roadside	DT	100	100	23.3	27.1	25.7	24.4	29.0
W27	Kerbside	DT	75	75	39.8	23.1	22.5	21.6	26.1
W28	Roadside	DT	100	100	39.3	37.7	37.8	33.2	40.0
W30	Roadside	DT	100	100	28.1	25.0	26.1	24	27.3
W31	Kerbside	DT	100	100	37.0	37.4	37.6	35.2	37.1
W32	Roadside	DT	100	100	37.2	36.0	35.8	34	37.5
Stoneleigh									
W68	Roadside	DT	100	100	-	-	23.3	23.6	24.7

☒ Diffusion tube data has been bias corrected

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

☐ If applicable, all data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 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.

* Differs from 2016 ASR as an error was identified in previously submitted data

Figure A.1 – Trends in Annual Mean NO₂ Concentrations - Warwick

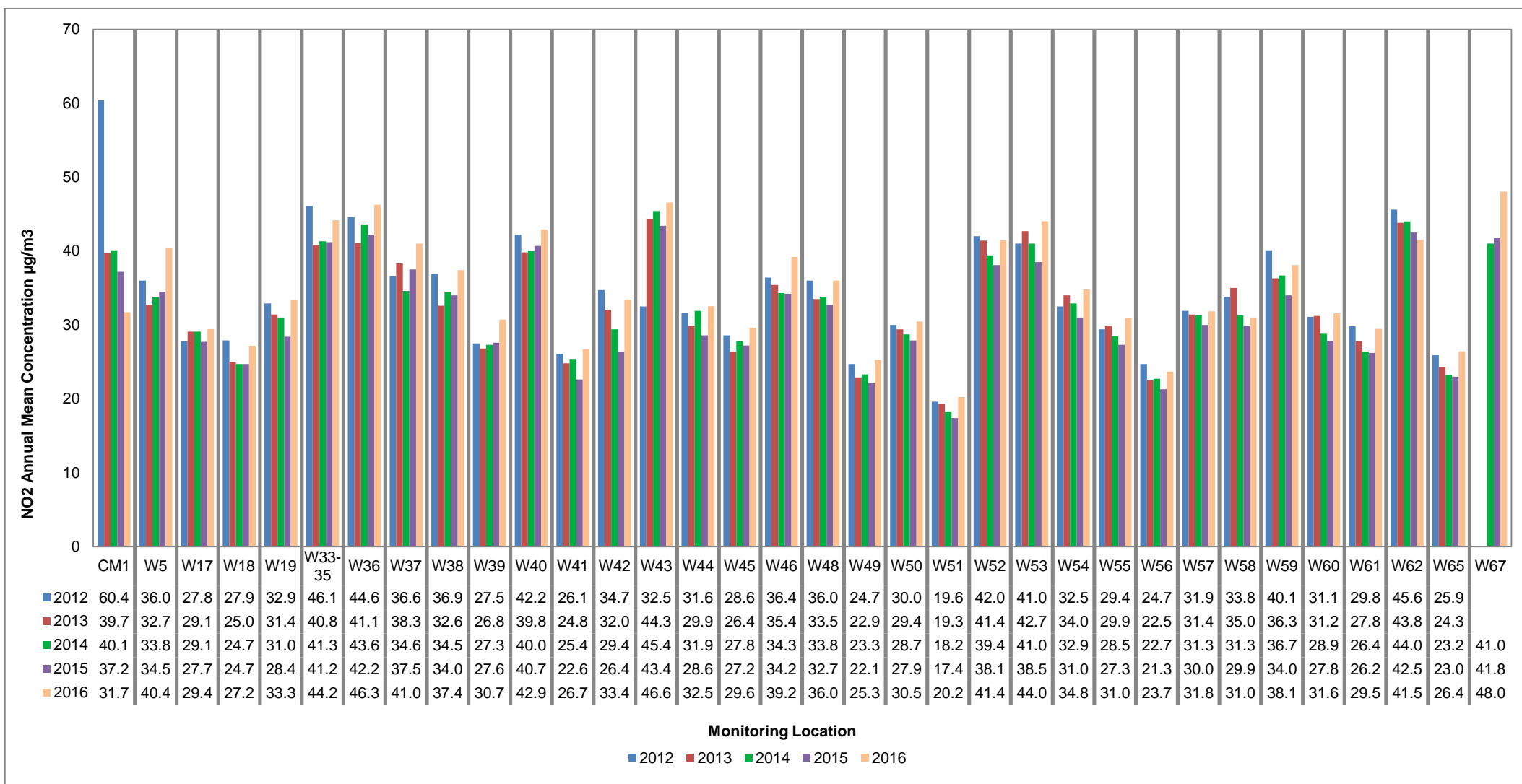


Figure A.2 - Trends in Annual Mean NO₂ Concentrations - Leamington, Kenilworth and Stoneleigh

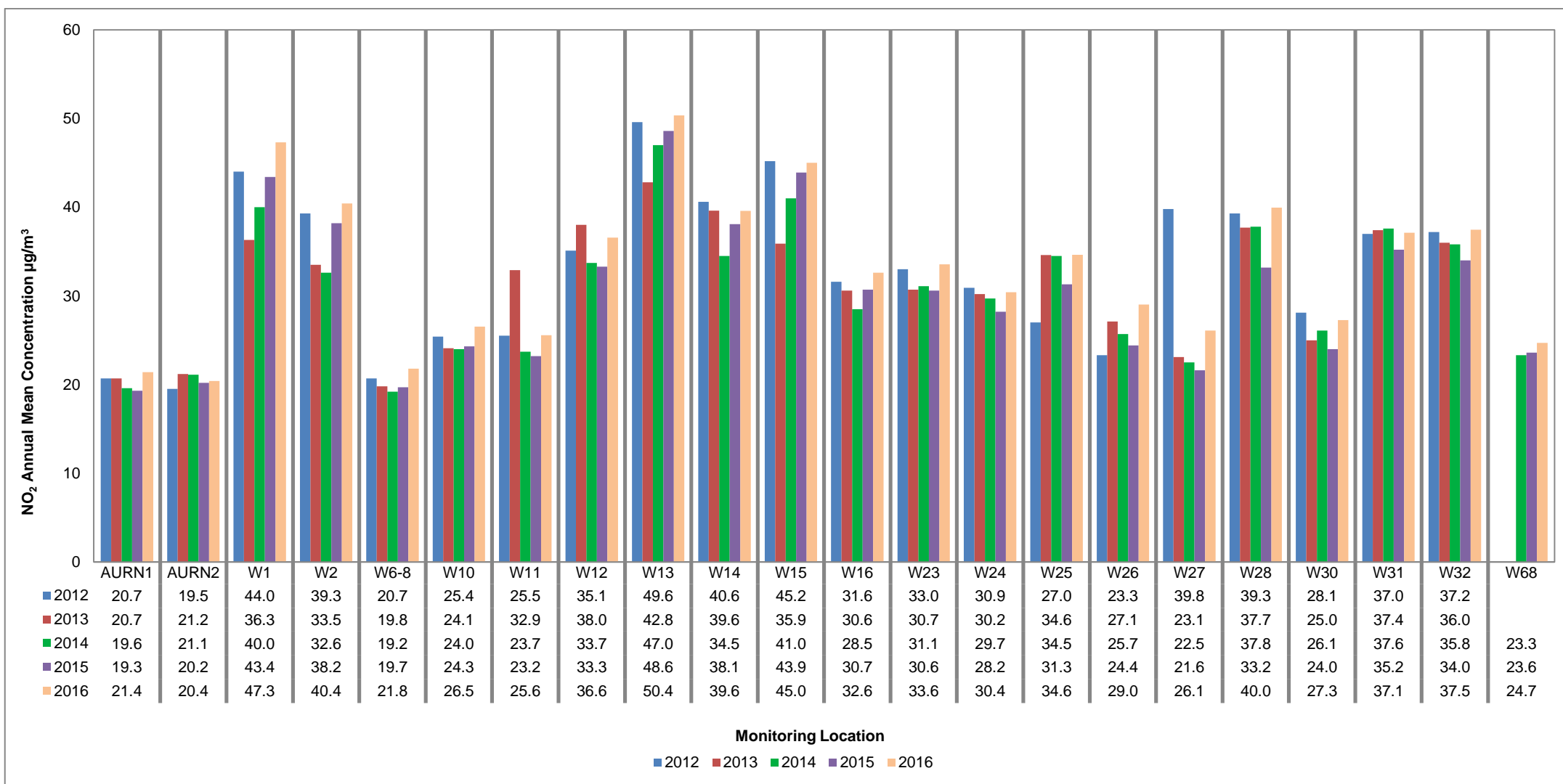


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2012	2013	2014	2015	2016
AURN1	UB	Automatic	97.5	97.5	0	0 (77)	0(74)	0	0
CM1	RS	Automatic	94.1	94.1	379 ⁽⁴⁾	4	0	0	0
AURN2	RS	Automatic	95.9	95.9	0 (82)	1	0	0	0

Notes:

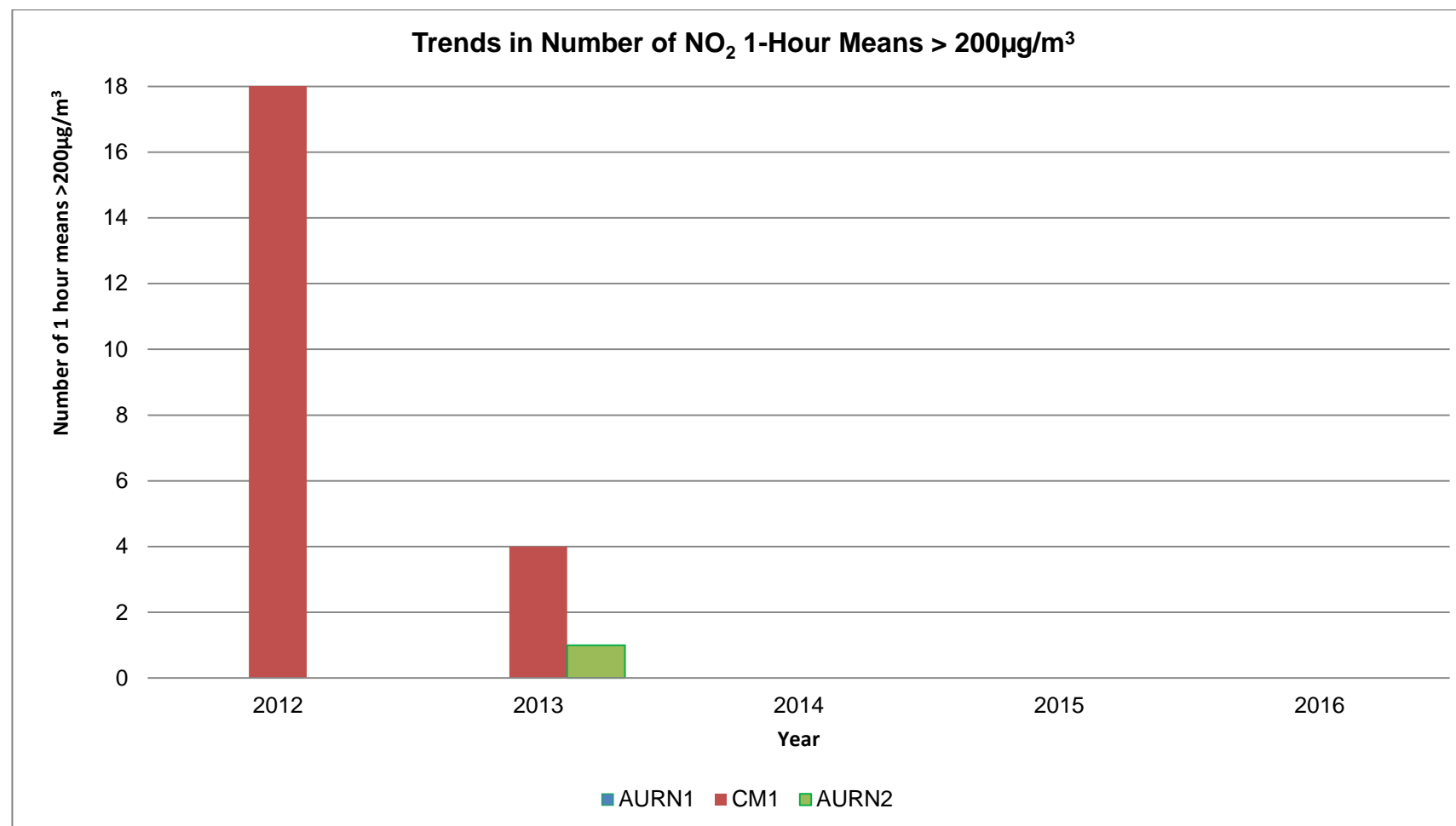
Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

(4) All 379 exceedances occurred during the period 1 January to 4 April 2012, during which time the data was considered anomalous. After this period there were no more exceedances.

Figure A.3 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

* Vertical axis scale only goes to maximum number of allowed exceedances as 2012 value for CM1 considered erroneous

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
AURN1	UB	95.4	95.4	26.3	17.9	15.9	15.3	15.4
AURN2	RS	94.6	94.6	11.6	15.8	14.7	15.3	15.7

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

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

(3) 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.

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2012	2013	2014	2015	2016
AURN1	UB	95.4	95.4	4	6 (39)	3	4	4
AURN2	RS	94.6	94.6	0 (20)	6 (29)	1 (30)	2	2

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure A.4 – Trends in Annual Mean PM₁₀ Concentrations

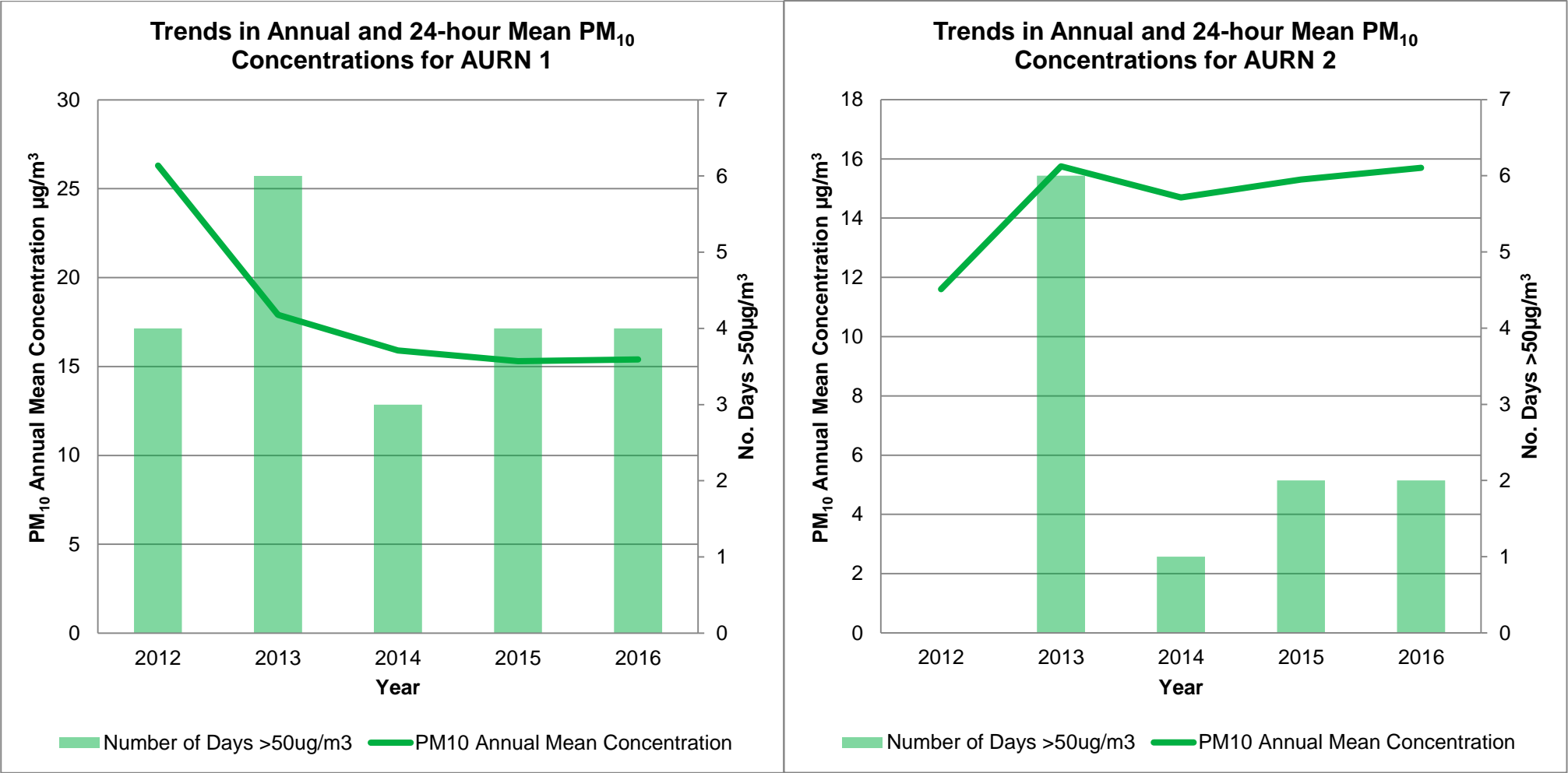


Table A.7 – PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
AURN1	UB	96.3	96.3	11.4	13.0	12.9	12.3	10.5
AURN2	RS	95.8	95.8	11.7	12.1	11.2	12.9	9.7

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

Notes:

(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) 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.

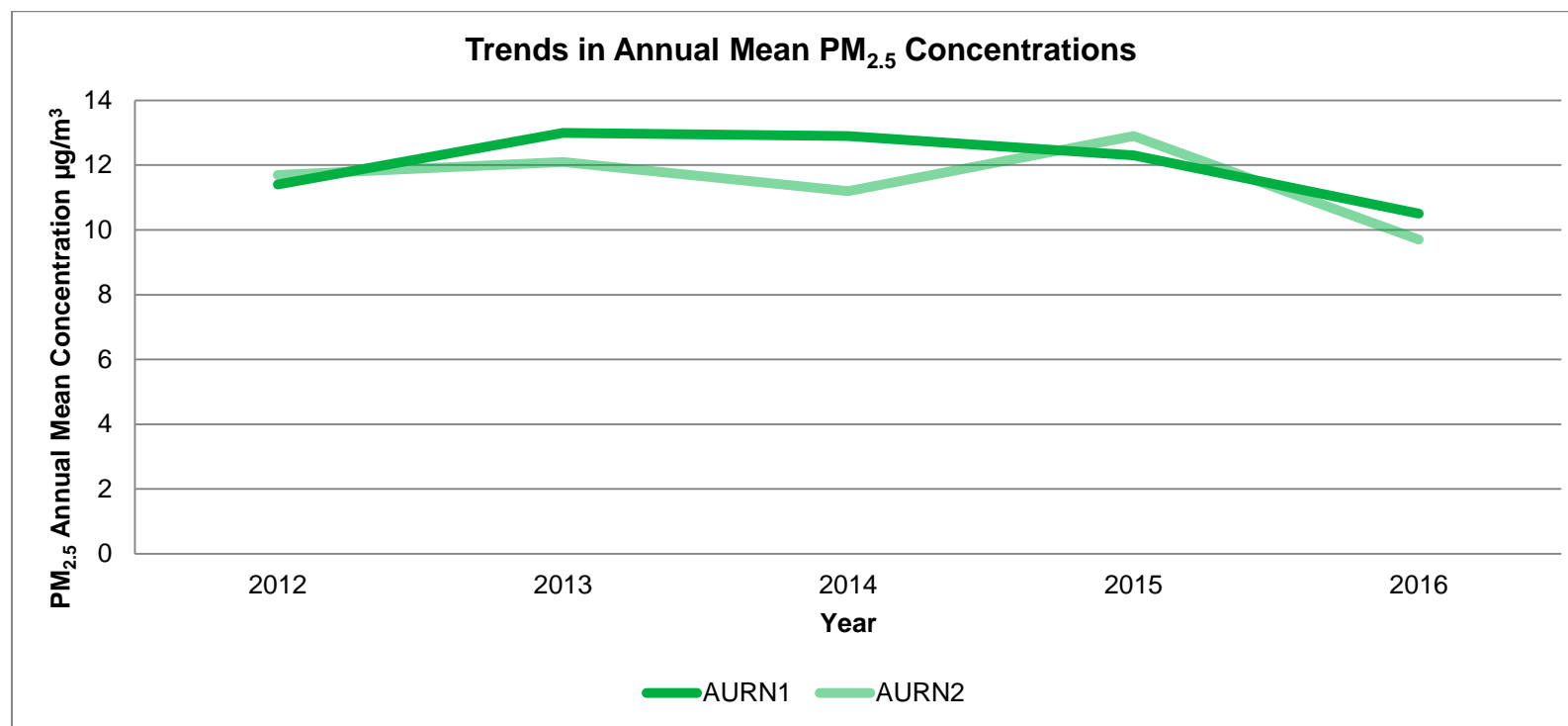
Table A.8 - O₃ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	Ozone Daily maximum 8-Hour Means >100 µg/m ³				
				2012	2013	2014	2015	2016
AURN1	UB	96.6	96.6	12	30	10	8*	10

(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%).

*Revision from 2016 ASR due to release of ratified data

Figure A.5 – Trends in Annual Mean PM_{2.5} Concentrations

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.91) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
W5	45.0	38.1	-	72.5	36.9	37.2	36.7	29.8	39.1	47.4	54.6	50.8	44.4	40.4	-
W17	35.8	34.8	36.4	29.7	28.2	27.8	27.3	23.7	29.5	31.3	41.0	42.6	32.3	29.4	-
W18	32.0	28.2	29.9	25.1	25.5	25.0	28.2	23.2	30.6	33.1	39.2	38.5	29.9	27.2	-
W19	40.6	35.7	35.9	34.6	30.4	33.5	34.3	30.8	36.1	38.6	47.3	41.9	36.6	33.3	-
W33	55.6	51.0	44.2	43.4	45.2	42.9	43.5	40.7	42.6	52.1	55.9	60.5	48.1	43.8	-
W34	59.2	54.4	45.7	36.5	42.9	42.7	48.5	43.4	45.0	52.7	53.0	64.6	49.1	44.6	-
W35	56.7	50.8	46.1	38.5	41.9	41.0	51.1	41.9	46.1	49.7	54.0	63.2	48.4	44.1	-
W36	51.4	57.1	47.2	41.8	45.0	47.3	52.0	37.1	42.8	52.6	68.4	67.2	50.8	46.3	43.5
W37	45.1	42.3	48.3	44.1	43.7	39.2	35.8	35.2	41.5	49.6	65.7	50.3	45.1	41.0	-
W38	44.0	43.1	42.8	37.5	38.6	36.8	36.4	31.9	40.8	43.4	49.0	48.9	41.1	37.4	-
W39	37.2	36.0	37.7	35.4	26.8	26.3	35.8	24.4	31.0	36.7	41.8	36.1	33.8	30.7	-
W40	56.2	51.3	43.8	43.8	40.1	39.1	52.0	39.8	44.8	46.1	52.9	55.9	47.2	42.9	-
W41	26.3	32.4	33.7	25.2	24.9	26.2	25.2	19.5	28.4	32.5	38.9	38.9	29.3	26.7	-
W42	31.0	39.3	38.8	33.6	30.6	33.5	38.8	26.0	34.3	42.2	47.5	45.3	36.7	33.4	-
W43	42.5	56.5	53.0	48.8	44.6	47.9	45.1	46.8	52.1	60.5	61.8	54.5	51.2	46.6	-

Warwick District Council

W44	39.1	38.7	38.1	34.9	27.6	31.7	29.6	25.9	35.7	37.7	44.6	45.2	35.7	32.5	-
W45	37.1	35.7	28.6	30.8	27.6	31.8	28.8	23.5	32.9	31.4	42.3	40.2	32.6	29.6	-
W46	42.7	47.7	48.2	39.6	37.1	38.0	34.2	29.5	37.9	47.8	61.7	52.4	43.1	39.2	-
W48	43.5	48.8	38.3	31.2	28.7	34.8	34.9	31.9	38.7	38.9	52.0	52.9	39.6	36.0	-
W49	32.3	28.4	28.5	20.2	21.6	21.9	21.4	-	-	28.7	35.9	38.8	27.8	25.3	-
W50	37.2	34.1	35.6	32.9	31.4	30.8	26.6	23.9	31.2	38.3	41.1	38.7	33.5	30.5	-
W51	24.7	23.8	23.9	19.0	15.4	16.0	-	13.2	19.4	26.5	31.9	30.8	22.2	20.2	-
W52	41.3	40.5	50.1	43.4	43.8	44.4	40.7	37.6	44.6	52.2	54.1	53.6	45.5	41.4	38.1
W53	48.9	47.9	45.2	43.5	48.7	52.2	42.1	41.9	49.7	54.0	55.2	51.2	48.4	44.0	-
W54	38.3	39.5	40.3	32.8	36.2	37.3	32.8	30.9	36.5	41.0	46.8	46.7	38.3	34.8	-
W55	31.1	35.1	31.6	27.7	30.2	34.3	32.7	28.4	37.2	37.3	41.7	41.1	34.0	31.0	-
W56	30.7	27.0	27.8	23.3	21.7	22.7	20.5	18.2	25.1	30.8	-	38.5	26.0	23.7	-
W57	38.3	38.3	33.0	33.2	32.4	18.9	34.4	30.2	35.7	38.9	44.7	41.7	35.0	31.8	-
W58	40.6	40.1	35.8	30.5	31.0	14.5	32.0	28.5	35.9	35.8	38.7	45.2	34.1	31.0	-
W59	47.3	43.5	43.3	-	-	37.6	40.4	34.1	39.7	39.8	52.3	40.5	41.9	38.1	-
W60	31.4	35.8	36.1	33.2	32.9	33.7	27.5	26.6	32.9	42.8	42.4	41.0	34.7	31.6	-
W61	35.6	30.8	33.5	29.3	26.9	28.9	29.9	22.2	31.6	35.8	42.5	41.5	32.4	29.5	-
W62	47.5	49.9	49.6	46.8	-	50.2	-	-	-	53.0	62.9	59.1	52.4	41.5	-
W65	32.0	32.3	30.1	25.3	23.2	23.8	29.0	18.6	26.3	30.9	36.9	40.3	29.1	26.4	-
W67	49.5	54.8	64.1	48.5	52.7	51.5	41.5	43.3	51.6	60.4	55.2	60.5	52.8	48.0	45.3
W1	61.7	60.9	-	-	43.0	45.3	55.2	40.1	47.8	45.4	61.5	59.1	52.0	47.3	-
W2	48.2	44.4	40.0	44.8	43.0	39.8	40.3	38.0	42.9	46.6	51.3	53.6	44.4	40.4	-
W6	29.2	28.2	23.9	18.8	15.8	15.7	19.4	14.0	22.7	24.9	33.6	31.7	23.2	21.1	-
W7	29.4	28.6	25.2	19.3	15.5	17.1	19.4	26.8	21.2	24.6	32.2	33.2	24.4	22.2	-
W8	29.2	28.3	24	17.4	13.4	16.3	22.4	26.8	22.3	24.7	33.3	33.7	24.3	22.1	-
W10	35.8	31.1	29.7	24.7	22.3	24	25.6	20.1	26.1	31	38.9	40.5	29.2	26.5	-
W11	27.5	29.8	34.5	24.2	23.0	23.7	27.9	17.6	27.7	30.8	37.6	32.9	28.1	25.6	-

Warwick District Council

W12	42.5	47.9	36.4	35.2	32.5	36.2	39.8	31.1	38.3	42.1	49.8	50.3	40.2	36.6	-
W13	68.4	61.6	47.2	45.6	50.4	50.5	55.4	47.8	52.3	53.8	65.0	66.0	55.3	50.4	-
W14	38.5	44.7	38.6	43.4	40.7	41.3	48.0	38.8	39.8	47.8	50.9	49.3	43.5	39.6	-
W15	56.6	62.7	39.7	36.7	41.8	42.3	52.9	44.7	46.9	54.2	56.4	58.4	49.4	45.0	-
W16	43.2	39.0	33.9	28.6	30.0	31.1	35.7	27.7	33.7	36.2	46.0	44.9	35.8	32.6	-
W23	41.7	36.8	39.2	29.6	32.9	30.4	32.8	-	34.4	36.6	45.3	46.0	36.9	33.6	-
W24	35.8	36.1	36.7	32.9	28.6	30.3	24.8	22.3	30.2	39.4	41.6	42.4	33.4	30.4	-
W25	40.0	42.2	-	38.4	33.9	-	31.5	29.2	-	45.5	40.4	41.3	38.0	34.6	-
W26	38.4	37.5	32.1	26.0	24.2	24.3	35.8	23.1	29.4	31.6	39.7	40.5	31.9	29.0	-
W27	31.0	29.2	26.9	24.6	-	-	26.3	18.2	-	30.2	35.7	35.8	28.7	26.1	-
W28	40.9	51.5	40.1	39.0	38.1	43.7	37.1	34.1	43.1	48.5	54.2	56.6	43.9	40.0	-
W30	34.9	35.1	30.4	26.3	21.5	25.8	28.2	20.7	30.3	30.6	35.5	40.2	30.0	27.3	-
W31	47.6	47.3	40.3	32.9	34.8	36.4	38.8	33.6	40.3	41.5	49.2	46.9	40.8	37.1	-
W32	39.7	40.2	44.6	38.8	37.6	43.2	32.2	32.2	38.2	47.6	50.3	49.4	41.2	37.5	-
W68	33.5	32.3	27.9	23.8	20.6	23.4	22.4	20.2	25.4	27.6	35.4	33.1	27.1	24.7	-

☐ Local bias adjustment factor used

☒ National bias adjustment factor used

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

Notes:

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

NO₂ annual means exceeding 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

QA/QC of automatic monitoring

All automatic monitoring sites in Warwick, other than Rugby Road, are calibrated by the Council's Local Site Operator (LSO). The QA/QC of the two Leamington Spa sites is undertaken through its status as part of the AURN and therefore conforms to AURN standards (undertaken by Ricardo-Energy and Environment). WeCare4Air is responsible for the servicing and call out contract for Hamilton Terrace and Jury Street and provides data management for Jury Street. The service contract for Rugby Road is arranged by Bureau Veritas and Defra and is provided by Enviro Technology Services.

QA/QC of diffusion tube monitoring

Warwick District Council uses Staffordshire Scientific Services (SSS) for its diffusion tube analysis. These tubes are prepared using the 20% TEA in water method.

Staffordshire Scientific Services was assessed as part of the AIR scheme. AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme. Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London. A laboratory is assessed and given a 'z' score. A score of 2 or less indicates satisfactory laboratory performance.

SSS's performance for 2016 is covered by rounds 12-16 of AIR PT. In rounds 12 and 13, 75% of samples had a Z score below 2. For round 15, 100% of samples submitted had a Z score below 2, and for round 16 no results were reported. The 5 round rolling average of rounds 10-16 for SSS (when samples are returned) is

81.3%, below the 95% recommended, indicating the laboratory may have some element of systematic bias in their assay.

Diffusion Tube Bias Adjustment

The bias adjustment factor for SSS in 2016, obtained from the national bias adjustment spreadsheet (v06/17) is 0.91 (based on 12 studies).

Bias adjustment factors are also available for two co-location studies at the automatic monitoring sites Hamilton Terrace in Leamington Spa and Pageant House in Warwick, as shown in Figure C.1 and Figure C.2.

The bias adjustment factor obtained from the national bias adjustment spreadsheet has been applied to all 2016 concentrations as this is based on a larger number of studies. The national factor is equal to the local factor for Hamilton Terrace (AURN 1), but provides a much more conservative adjustment factor than that derived from Pageant House (CM1).

Figure C.1 - Leamington Spa Hamilton Terrace Local Bias Adjustment

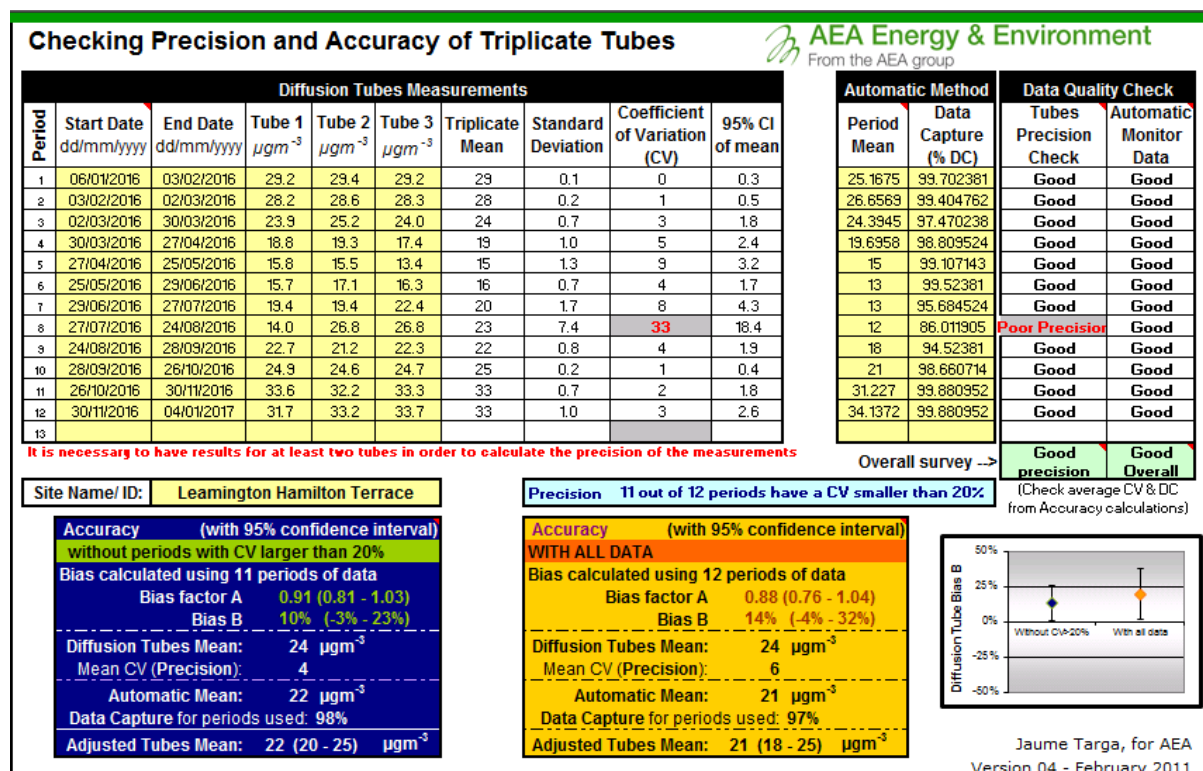
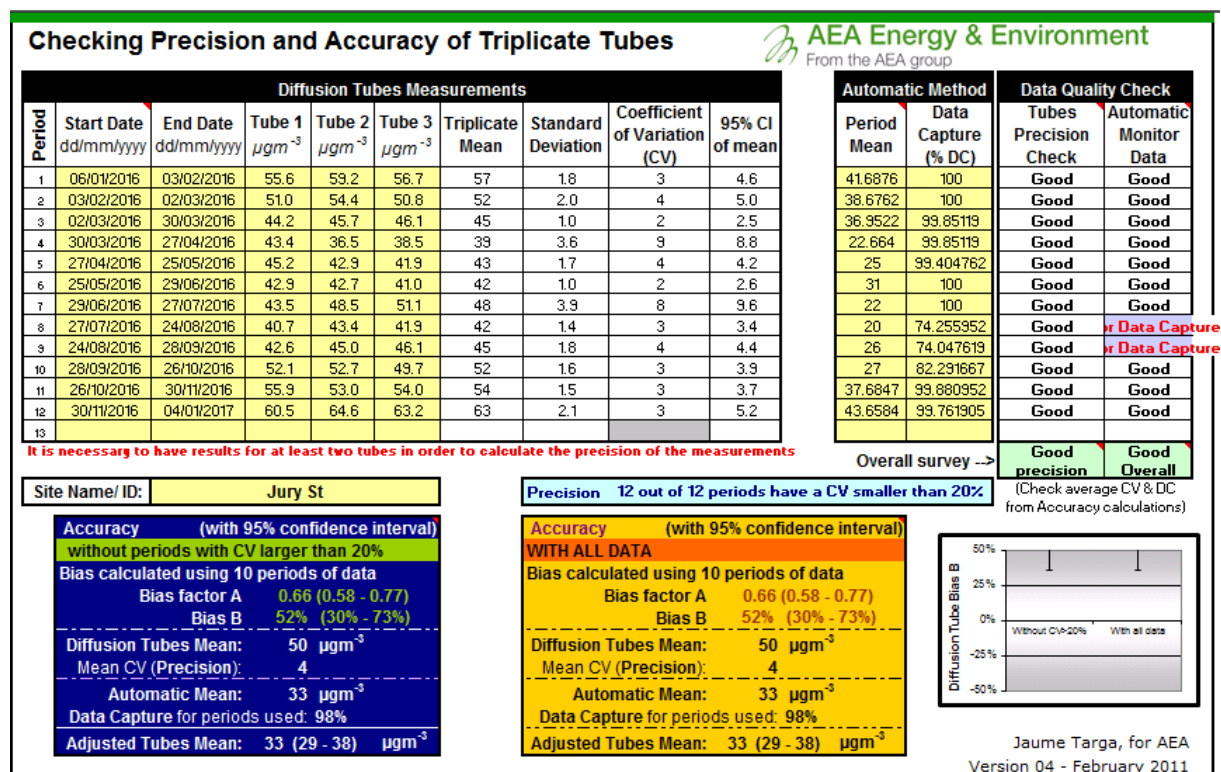


Figure C.2 - Jury St/Pageant House Warwick Local Bias Adjustment



Short to Long term data adjustment; Annualisation

In 2016, only one monitoring location, W62, fell below 75% data capture. In accordance with the methodology in Box 7.10 of LAQM.TG(16)⁹, this site has therefore been annualised for comparison with the NO₂ annual mean AQS objective.

The data have been adjusted to an annual mean, based on the ratio of concentrations during the monitoring period for that site to those over the 2016 calendar year at the nearest background automatic monitoring sites. Four AURN urban background monitoring sites were considered for Annualisation; Leamington Spa, Birmingham Acocks Green, Coventry Allesley and Northampton Kingsthorpe. However Northampton Kingsthorpe did not have sufficient data capture to provide an annualisation factor and therefore was not included. The resultant factor was 0.872, which was applied to the bias corrected concentrations for W62 to give the final annual mean concentration. The annualisation calculations are summarised below in Table C.1.



Table C.1 - Annualisation Factor Calculation

W62				
Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio Annual Mean / Period Mean
Leamington Spa Hamilton	Urban Background	21.5	24.6	0.873
Birmingham Acocks Green	Urban Background	21.3	24.7	0.863
Coventry Allesley	Urban Background	22.5	25.6	0.879
Northampton Kingsthorpe	Urban Background	16.0	20.3	Insufficient Data
Average Ratio				0.872

NO₂ Fall-off with distance from the road



Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated, using the NO₂ fall-off with distance calculator⁵ available on the LAQM Support website.

This has been done for three locations (W36, W52 and W67) where the monitoring site is not strictly representative of exposure, and the concentrations are greater than $40\mu\text{g}/\text{m}^3$, to identify whether elevated monitored concentrations constitute an exceedance of the annual mean NO₂ AQS objective. The summaries of the adjustments undertaken using the tool are presented in Figure C.3, Figure C.4 and Figure C.5. Background concentrations are taken from the Defra 2013-based background maps, also available on the LAQM website.

Figure C.3 - W36 NO₂ fall-off with distance from the road





Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2.1	metres
Step 2	How far from the KERB is your receptor (in metres)?	3.1	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.6	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	46.3	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	43.5	µg/m ³

Figure C.4 - W52 NO₂ fall-off with distance from the road



Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	2	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.9	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	41.4	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	38.1	µg/m ³

Figure C.5 - W67 NO₂ fall-off with distance from the road



Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3.2	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.4	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.6	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	48	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	45.3	µg/m ³

PM Monitoring Adjustment

PM₁₀ and PM_{2.5} have been measured using an FDMS monitor and therefore no adjustment is required.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 - Air Quality Monitoring Locations - Leamington Spa Centre

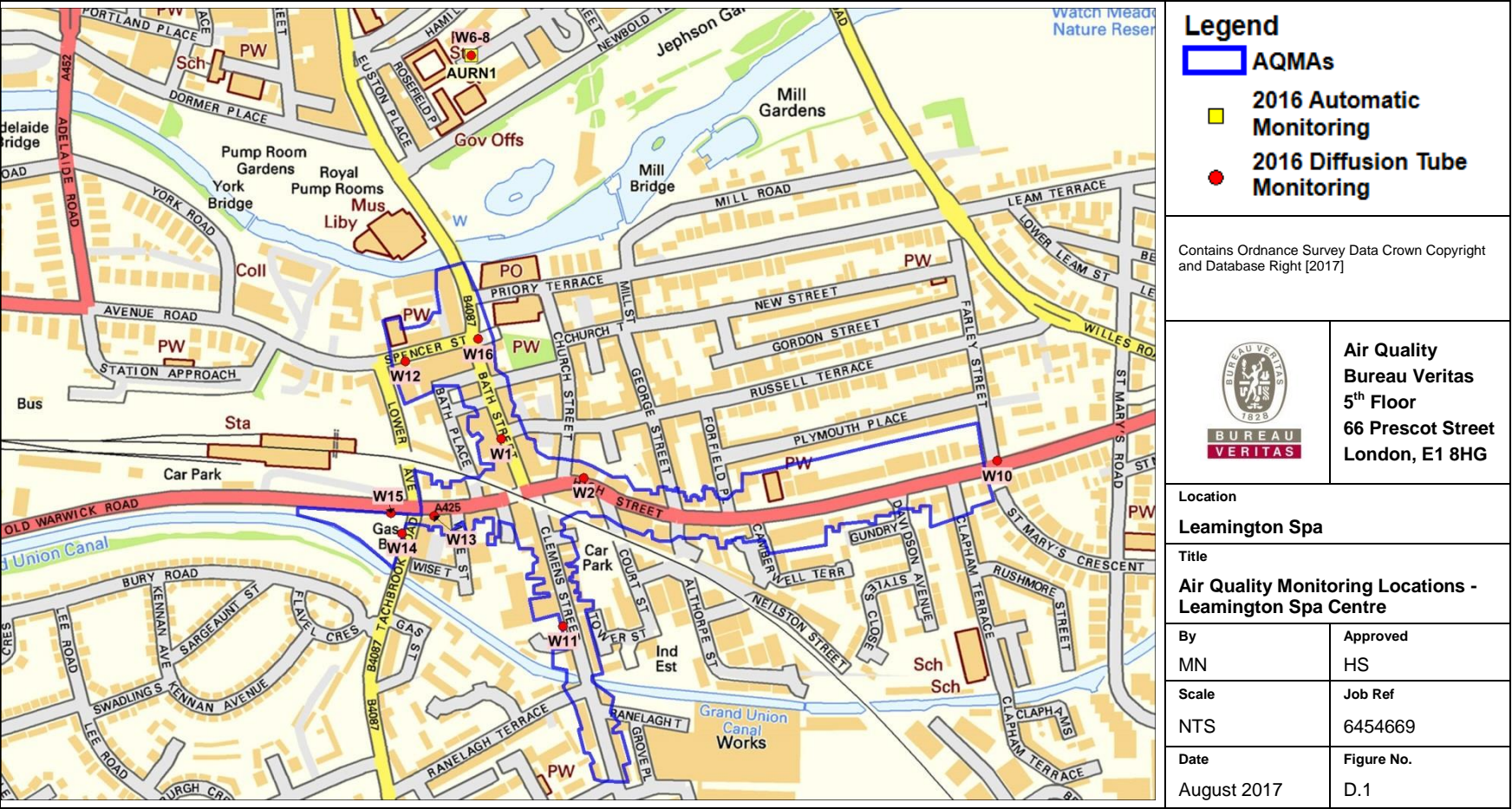


Figure D.2 - Air Quality Monitoring Locations - Leamington Spa Rugby Road



Figure D.3 - Air Quality Monitoring Locations - Warwick

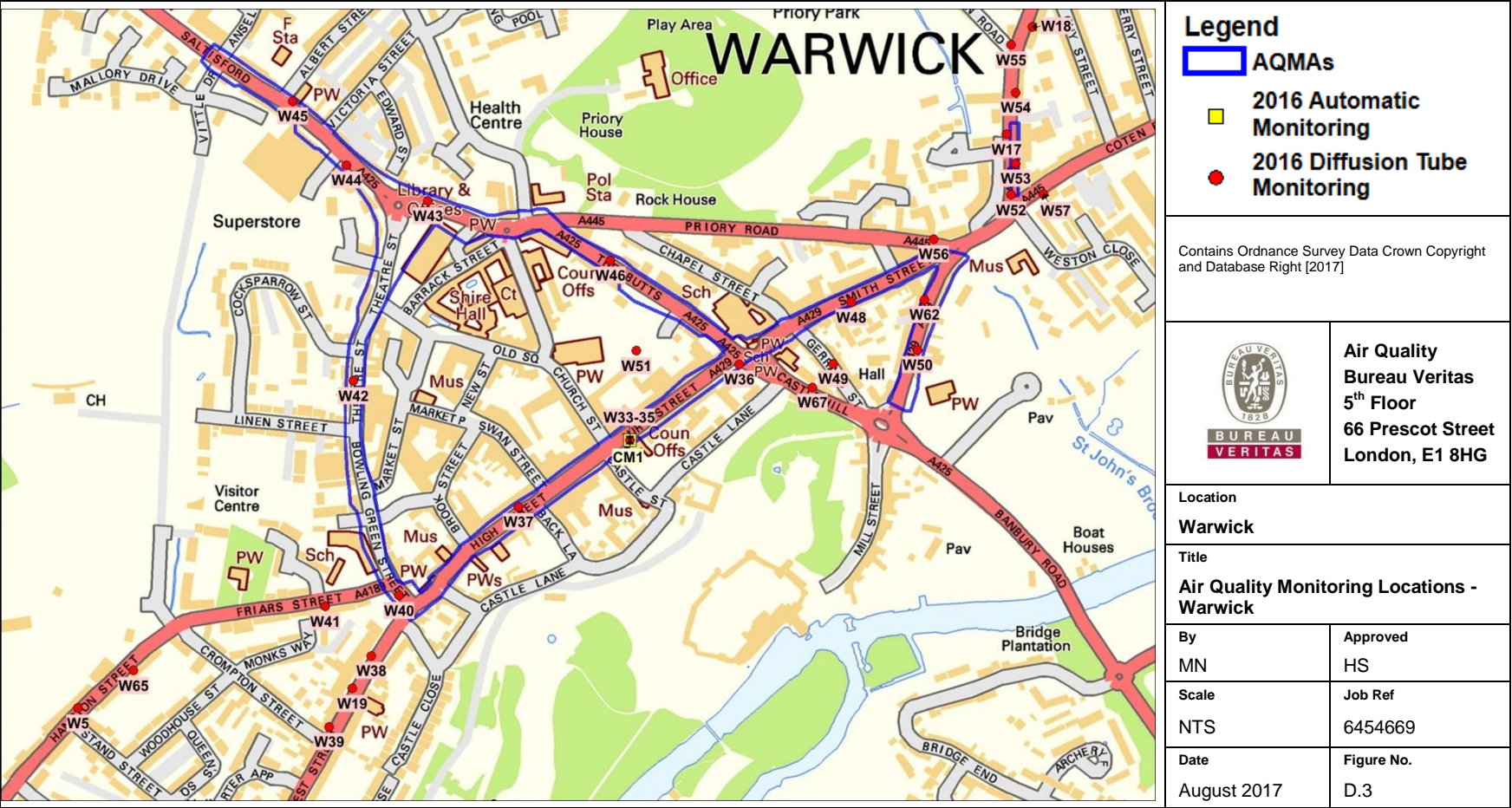


Figure D.4 - Air Quality Monitoring Locations - Kenilworth



Figure D.5 Air Quality Monitoring Locations - Stoneleigh



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ¹⁰	
	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
Ozone (O ₃)	Number of days with daily maximum of running 8-hour mean exceeding 100 µg/m ³ , not to be exceeded more than 10 times a year	Running 8-hour mean

¹⁰ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: New Developments/Emissions Sources

The following developments have been granted planning consent:

Table F.1 - Planning Applications

ID	Location	Description	Status	Within AQMA?	Air Quality Considerations
W/16/0801	Former North Leamington School, Cloister Way, Leamington Spa	Demolition of existing buildings and erection of 44 dwellings	GRANTED 09/11/2016	No	The proposed development represents a less intensive use and would have a negligible impact on the adjacent highway network.
W/16/1987	Land on the west side of Southam Road, Radford Semele, Leamington Spa	Approval of reserved matters under planning permission no. W/15/1761 for a residential development of 25 no. dwelling	GRANTED 26/05/2017	No	Air quality impacts not significant-
W/16/1139	Talisman Square, Warwick Road, Kenilworth	Mixed use development comprising 1533sqm of retail floor space at ground floor and 65 residential units (mix of cluster flats and studio rooms) above	GRANTED 06/12/2016	No, just outside Warwick Road Kenilworth	Removal of existing car park to reduce traffic numbers and the proposals are therefore not considered to have a detrimental impact on air quality
W/15/0795	Lord Leycester Hotel, 17-19 Jury Street, Warwick CV34 4EJ	Demolition of existing extensions to rear, renovation and change of use of remaining building to form 11 no. self-contained flats and one commercial unit to ground floor and the erection of 10 no. dwellings to the rear.	GRANTED 19/08/2015	Yes, Warwick AQMA	Specific consideration given to ventilation strategy for new residents

In relation to the new developments listed, all are examined through the planning system and air quality assessments requested where relevant. These assessments investigate both the impacts of traffic generated by the development, and the impacts of existing sources of pollution on new residents. Where necessary, mitigation is requested. Monitoring within and around the current AQMAs should track any adverse impacts from these developments and allow WDC to respond accordingly, if necessary.

The Council is also aware of one application (W/17/0992) for which retrospective planning permission is being sought for the erection of a rear extension to house two Kostrzewa Maxi Bio 199kW output biomass boilers. Further information is required to

screen this installation, which is to be requested of the applicant and considered within the next ASR.

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
O ₃	Ozone
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide
SPG	Strategy Planning Guidance
SSS	Staffordshire Scientific Services
WDC	Warwick District Council

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