



Warwick District Council

Annual Status Report 2018

Bureau Veritas

July 2018

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2018 Air Quality Annual Status Report (ASR)

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

July 2018

Warwick District Council

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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. Notably, the NO₂ concentrations have increased at ~90% of monitoring sites within Warwick District Council.

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. A detailed breakdown of the AQMAs, along with maps of the areas, can be found here: https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=296. The Action Plan, which encompasses all five AQMAs, was updated in 2015. Air pollution in 2017 has risen slightly as compared to 2016, 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.

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

Actions to Improve Air Quality

Warwick District Council are in the process of implementing a number of key measures in order to address the air quality issues in the AQMAs and on a higher level across the council jurisdiction. One of these measures is the creation and improvement of key corridors that connect boroughs within Warwick District. Building on progress in 2016; the development of the 'Europa Way', a sustainable 'spine' linking Leamington Spa and Warwick, has been prioritised in 2017 and this will continue throughout 2018. 'Europa Way' has a number of features that will improve local air quality including; park and ride facilities, segregated bicycle lanes, new pedestrian routes as well as general traffic optimisation and junction improvement. Detail around these plans can be found on the Warwick District Council website.⁴

Other measures that have been implemented in 2017 include: 20mph zones in AQMAs which optimise traffic flow, and the on-going support of an Active Travel Campaign which promotes the public to switch to walking, running and cycling. A number of studies are planned to go ahead across the next reporting year which aim to further inform and assess feasibility of measures outlined in the AQAP; examples include, studying the contribution that taxis make to AQMA emissions and a feasibility study into the retrofitting of buses to improve their sustainability and minimise pollution. Warwick District Council are also planning on installing additional non-automatic monitoring sites around the Castle Hill area, located just outside of the existing Warwick AQMA, this will help further analysis of air pollution in this area and inform the decision to expand the AQMA if required.

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.

⁴WDC 2017 https://www.warwickdc.gov.uk/download/downloads/id/2234/in03_-_draft_infrastructure_delivery_plan_appendix_a_-_transport_corridor_strategies.pdf

Conclusions and Priorities

The majority of monitoring locations within Warwick District Council (~90%) reported higher levels of pollutant concentrations than the previous year. There were 18 monitored exceedances of the NO₂ annual mean objective, three more than last year.

15 of the diffusion tubes that exceeded were located in already established AQMAs, 9 in Warwick, 5 in Leamington Spa and 1 in Kenilworth, New Street. This figure fell to 12 exceedances when distance correction was applied to represent relative exposure.

Three monitoring stations that exceeded the NO₂ limit were not within an AQMA. One was located at Castle Hill (W67), an area that Warwick District Council have already made plans to install more monitoring stations in response to previous exceedances. The second diffusion tube (W14) was located on the boundary of the Leamington Spa AQMA, along Tachbrook Road. This monitoring station has increased year on year since 2015, however this is the first year it has exceeded the AQS Objective for NO₂. Warwick District Council will remain vigilant of the concentrations reported at this station and in the event of further exceedances the AQMA will be adjusted accordingly. The third exceedance (W59) was at a site not representative of relevant exposure and concentrations dropped below the annual mean AQS objective for NO₂ when adjusted for relevant exposure.

Warwick District Council do not propose any changes to the existing AQMAs for this reporting year. However, depending on the measurements of the soon-to-be installed non-automatic monitoring stations, Castle Hill may be incorporated into the Warwick AQMA. Similarly, if the monitoring station located on Tachbrook Road, Leamington Spa continues to measure exceedances the Leamington Spa AQMA boundary will be adjusted.

There is no intention to revoke either of the Kenilworth AQMAs seeing as one non-automatic monitoring site within each of these areas exceeded the NO₂ annual mean limit and even after adjusting for receptor distance, the monitoring station within Kenilworth, New Street still exceeded the AQS objective.

Whilst a gradual increase in pollutant levels has been seen, Warwick District Council will continue to implement measures outlined in the Air Quality Action Plan and

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expand their monitoring network in order to identify and tackle this problem. Future ASRs will continue to review the effectiveness of these measures.

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, using public transport or even moving to an electric vehicle. Car sharing is also an 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 2017. 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 are provided below. 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 a map of air quality monitoring locations in relation to the AQMA in which they are located.

15 of the 18 exceedances from 2017 were located in the existing AQMA, one in Kenilworth New Street, 9 in Warwick and 5 in Leamington Spa. After distance correction, this figure dropped down to 12 exceedances within the AQMA. Two of the 3 remaining sites that measured exceedances were located very close to the boundary of an existing AQMA; one is located at Castle Hill, near the boundary of the Warwick AQMA and the other is located on the boundary of the Leamington Spa AQMA. The final exceeding site was located along Charles Street (W59) and was situated at a location not representative of relevant exposure. After distance correction to represent concentrations at the nearest site of relevant exposure, the concentration dropped below the AQS objective at this location.

Castle Hill exceedances have been identified in previous reports and as such the council are planning to install more non-automatic monitoring stations in this area before deciding whether a change to the AQMA boundary is necessary.

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 there were exceedances in these AQMA, the Council proposes that these AQMA should remain in place at present, and the situation further monitored in future years.

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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		
						At Declaration		Now		Name	Date of Publication	Link
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	50.8	µg/m ³	46.4	µg/m ³	Air Quality Action Plan: Warwick District Council	Jun-15	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	48.1	µg/m ³	37.1	µg/m ³	Air Quality Action Plan: Warwick District Council	Jun-15	http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan

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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	39.8	µg/m ³	34.4	µg/m ³	Air Quality Action Plan: Warwick District Council	Jun-15	http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan
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	52.9	µg/m ³	55.4	µg/m ³	Air Quality Action Plan: Warwick District Council	Jun-15	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	NO	58.3	µg/m ³	50.2	µg/m ³	Air Quality Action Plan: Warwick District Council	Jun-15	http://www.warwickdc.gov.uk/download/downloads/id/517/air_quality_action_plan

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				dioxide objectives.									
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☒ **Warwick District Council confirm the information on UK-Air regarding their AQMA 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 objectives

Figure 2.1 - Coventry Road AQMA, Warwick

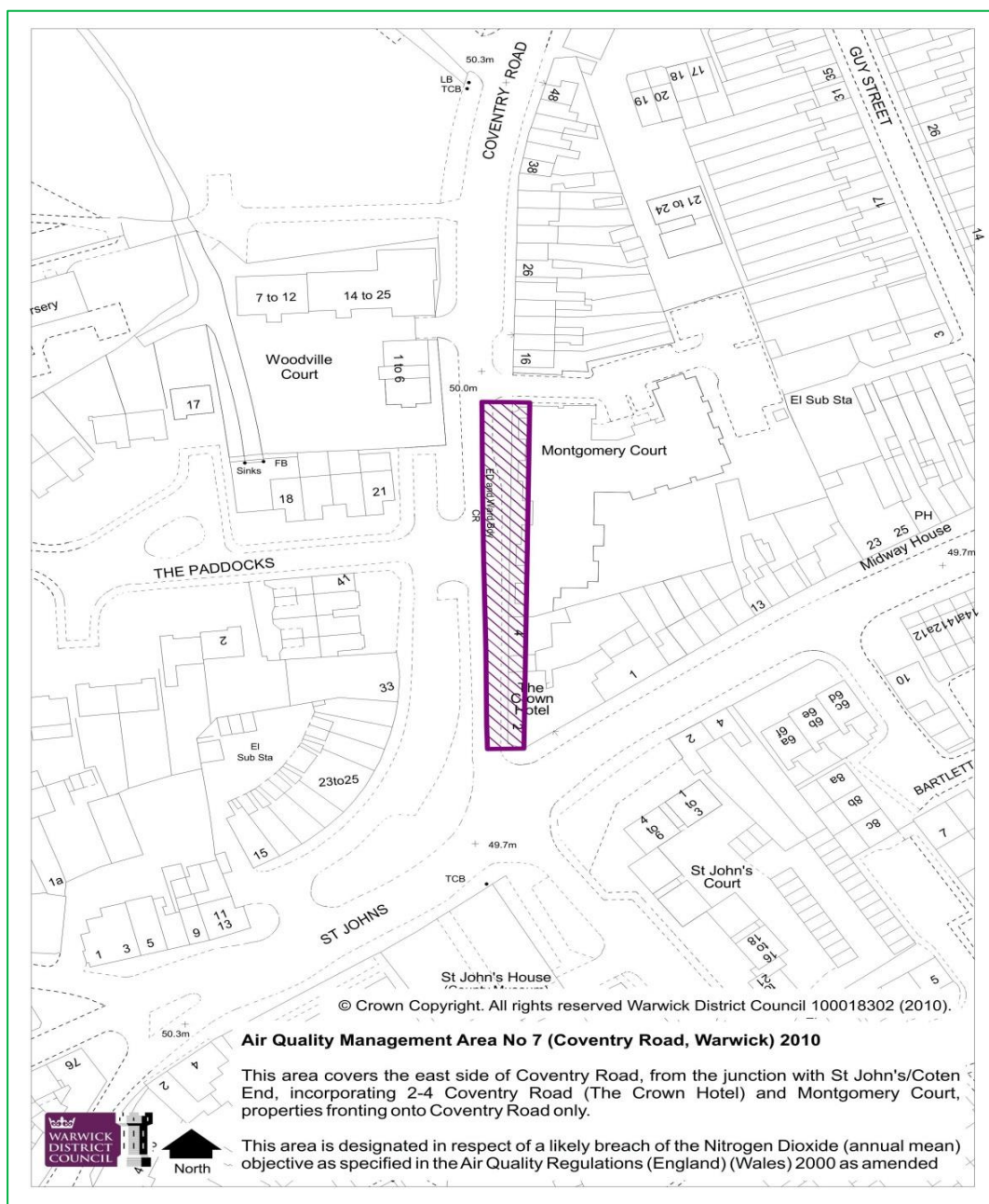


Figure 2.2 - Warwick Road AQMA, Kenilworth

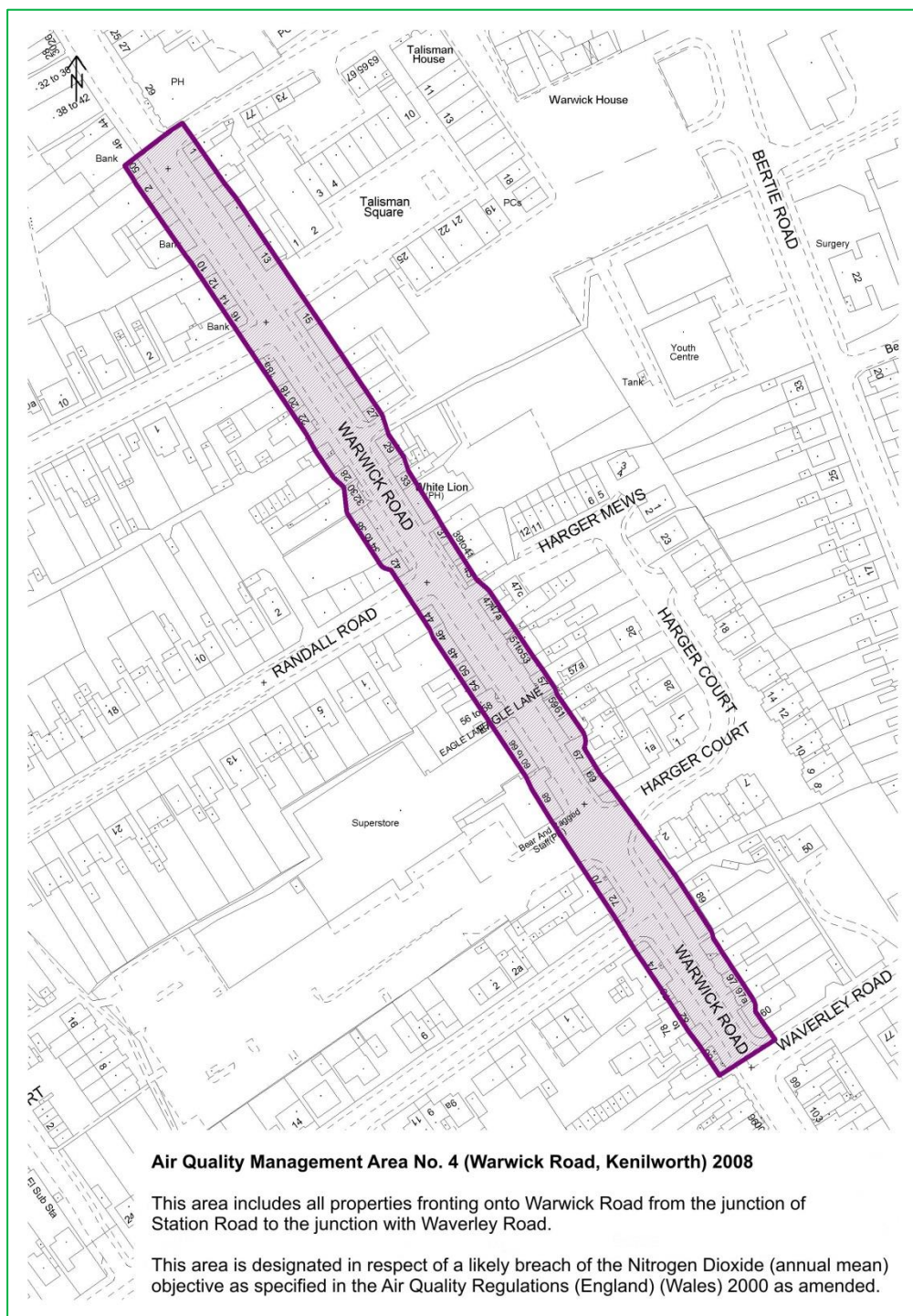


Figure 2.3 - New Street AQMA, Kenilworth

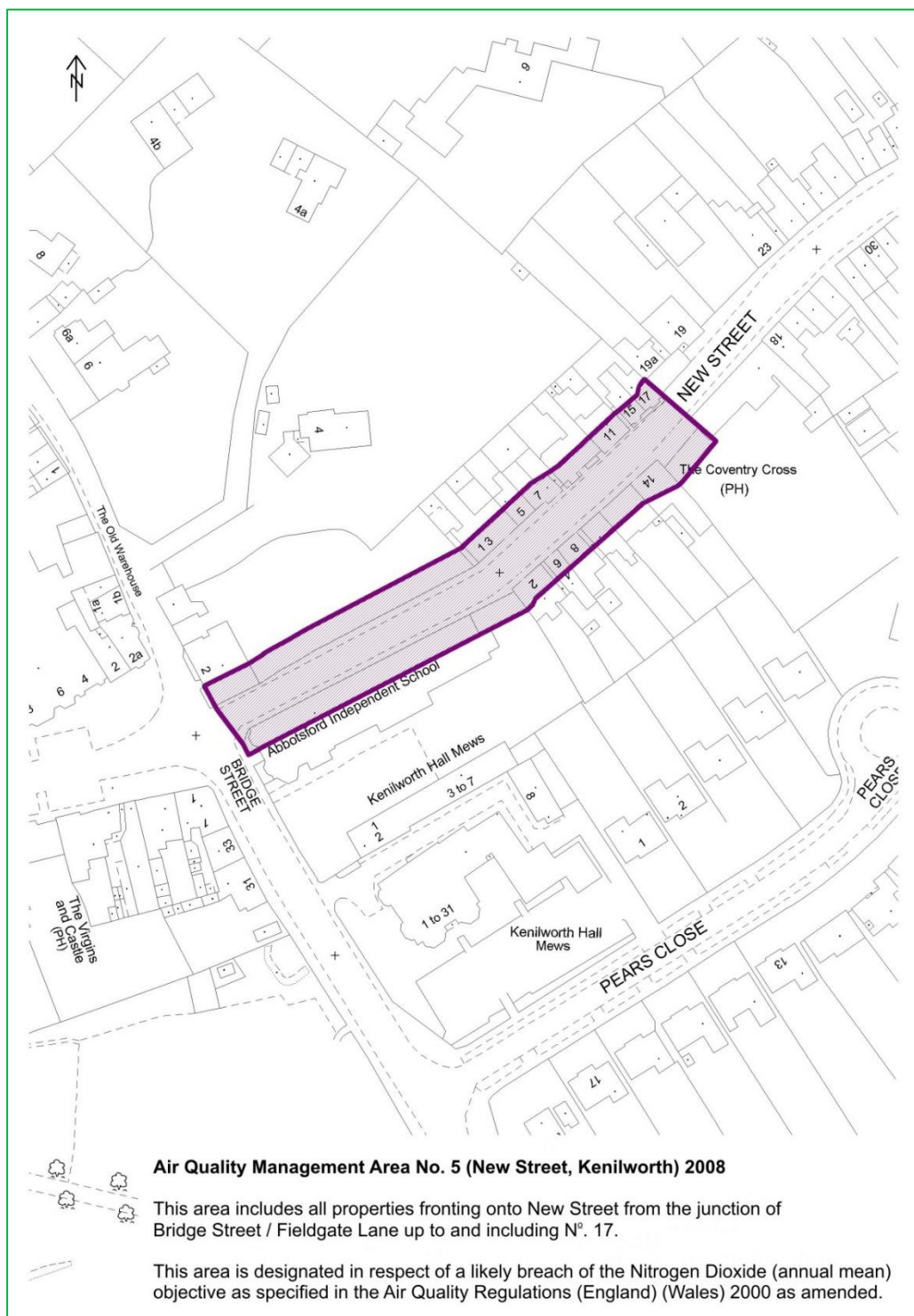
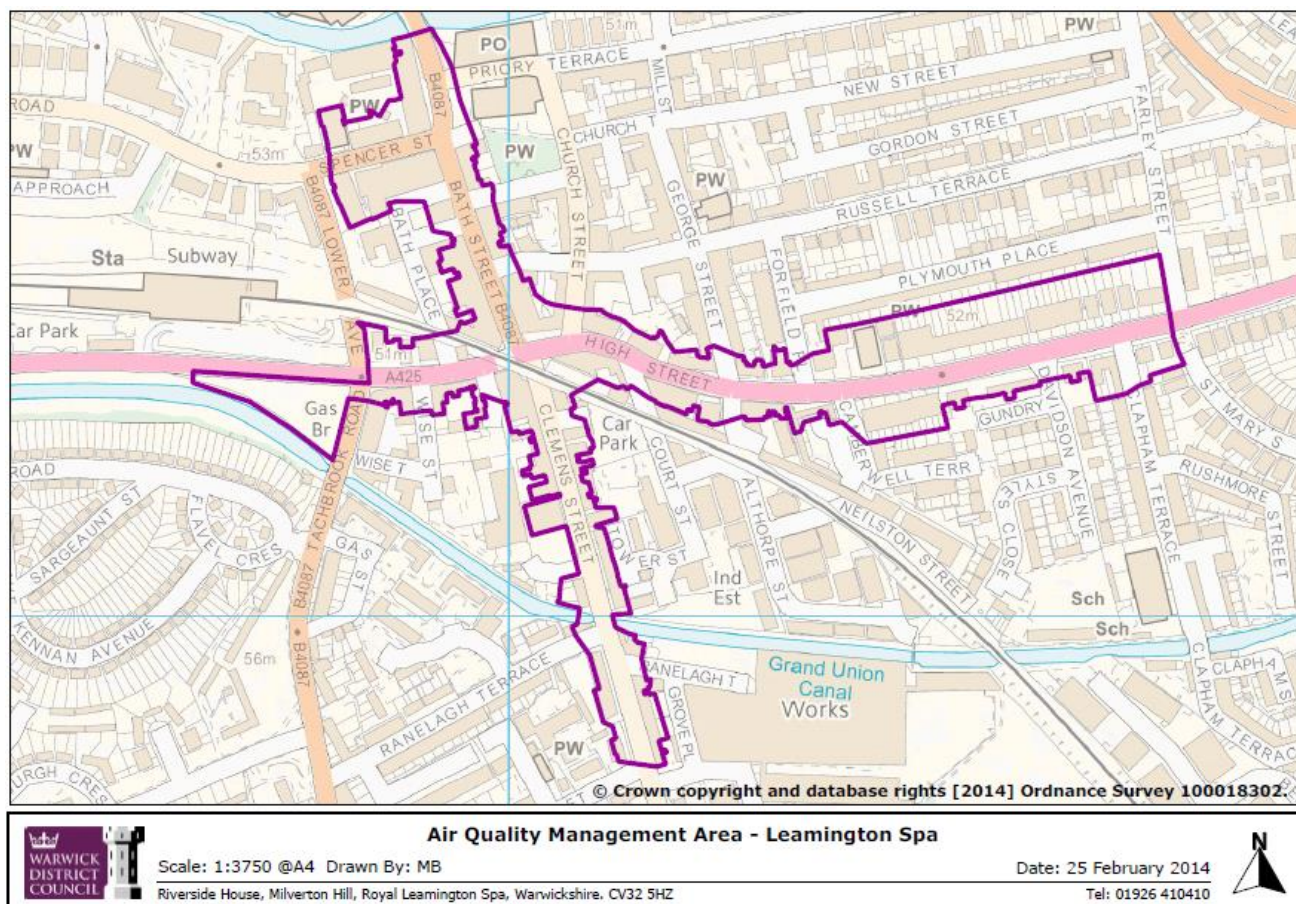
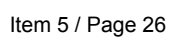


Figure 2.4- Leamington Spa AQMA





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

DEFRA's appraisal of WDC's 2017 ASR noted the report was well structured, sufficiently detailed and contained all information specified within the guidance. There were a number of comments which were offered, with regard to the ASR and the actions taken by WDC to further improve Air Quality within Warwick District.

DEFRA stated that few measures implemented by WDC directly addressed specific hotspots of pollution and suggested that future measures should ensure they target hotspots directly. WDC have acted on this suggestion; beginning improvement in junctions within the Leamington Spa and Warwick AQMAs as well as implementing 20mph speed restrictions as a trial within the Warwick AQMA, the success of these zones will be reviewed in future ASRs, with the hope of continuing this rollout across other AQMAs. WDC have begun discussions with bus providers and identified a number of buses that are eligible for retrofitting and hope to submit a bid for this work. The contribution of Taxis to pollution in AQMAs is also being studied later this year to inform the decision to move to a low emission taxi fleet.

DEFRA also flagged the exceedances in NO₂ located by Castle Hill (W67) and suggested the introduction of new monitoring sites in and around this area. WDC have confirmed plans to install a number of new diffusion tube sites across the Castle Hill area in response to this.

There were a number of minor suggestions to improve the ASR data for future reports, all of which have been noted and taken on board for this report. Examples include; the addition of Benzene monitoring and trending data to the report and ensuring data in Table A.3 has been correctly bias adjusted and annualised.

Previously there has been discussion around the revocation of the Kenilworth AQMA however given the exceedances at stations in both these AQMAs, as well as a general increase in NO₂ concentrations, this will not be carried out before the next reporting year.

Warwick District Council has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

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More detail on these measures can be found in their respective Action Plans. Key **completed** measures are:

- 20mph Zones within AQMAs;
- Creation of active travel campaign website and on-going promotion campaign; and
- Electric Vehicle vehicles incorporated into WDC fleet; 5 in use as pool vehicles for staff.

Warwick District Council expects the following measures **to be completed** over the course of the next reporting year:

- Installation of new diffusion tubes in Castle Hill area;
- Creation of sustainable procurement guide, which is to be used by WDC; and
- 'Europa Way' development commencing in 2018.

Warwick District Council's priorities for the coming year are continuing the on-going implementation of the planning measures and the commencement of the Europa Way corridor which includes a high standard, dedicated cycle route on a section of the highway.

The principal challenge facing Warwick District Council in the implementation of measures is predominantly sourcing funding for some of the schemes and measures outlined in Table 2.2. As a result of this, progress on the below measures has been slower than expected:

- Hearts and Mind campaign; encouraging modal shift from private car use;
- Publicising CarShare Coventry and Warwickshire; and
- Moving more of the WDC fleet to Electric Vehicles.

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	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)	On-going	n/a	n/a	1. Europa Way Corridor Improvements to commence in May 2018. 2. Shared use cycle path created on Priory Road, Warwick. 3. Traffic model being developed for a two way cycle link proposal between Leamington Spa and Warwick along Emscote Road. 4. Pedestrian and cycle improvements at Northgate, Warwick to improve pedestrian routes between Warwick railway station and town centre. 5. Bicycle hire/share scheme to be explored that could serve Leamington Spa railway station, Warwick Technology Park, and Heathcote Industrial Estate.	On-going implementation of schemes	Detailed information on specific schemes can be found at http://www.warwickdc.gov.uk/downloads/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.
2	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	On-going	n/a	n/a	1. Engaging with large employers at Warwick Technology Park in relation to active travel and changes to working patterns/hours being discussed. 2. Active travel website is operational and being maintained.	On-going implementation of schemes	https://www.warwickshire.gov.uk/ltp3
3	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	On-going	n/a	n/a	Feasibility work undertaken on some corridors	On-going implementation of schemes	None
4	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	On-going	n/a	n/a	1. New signage nodes installed in Leamington Spa town centre and railway station in May 2018 showing walking routes/times. Signage nodes at Warwick and Warwick Parkway railway stations proposed for June 2018. 2. Bike hire/share scheme being explored to serve Leamington	On-going implementation of schemes	Sustrans currently investigating a signage strategy due to be published in September 2018. Section 106 money has been reserved to install new signage ('node points') at railway stations.

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									Railway station and large employment sites such as Warwick Technology Park and Heathcote Industrial Estate.		
5	Hearts and Minds campaign to encourage modal shift away from private car use	Public Information	Other	WCC	On-going	On-going	n/a	n/a	1. Mini campaigns undertaken such as 'Choose how you move'. 2. Warwickshire Public Health bid for personal air quality monitors to support health campaign in 2017 was unsuccessful. Alternative funding for 50 personal monitors is being sought to run event/campaign on personal exposure to air pollution.	On-going campaigns	Funding dependent - currently seeking funding to purchase personal air quality monitors
6	Further consideration of Park and Ride	Alternatives to private vehicle use	Bus based Park and Ride	WCC	Currently in planning phase	On-going	n/a	n/a	1. Park and Ride facilities outlined in key transport corridor proposals. 2. 500 space park and ride scheme at Europa Way has been committed and is required to be developed prior to occupation of residential development along this corridor. 3. A park and ride at Blackdown (North of Leamington Spa) is included in local plan and on Community Infrastructure Levy (CIL) list. 4. Warwickshire County Council commissioning works to explore park and ride facilities to the North and South of Leamington Spa.	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.
7	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
8	Publicising CarShare Coventry and Warwickshire	Alternatives to private vehicle use	Car and lift sharing schemes	WCC	On-going	On-going	n/a	n/a	1. Active Travel website publicising car sharing opportunities. 2. Signage in Leamington Spa and Warwick being explored to further promote scheme.	On-going	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
9	Supporting future opportunities for funding for Low Emission Vehicles, in	Promoting Low Emission Transport	n/a	WDC / WCC	2016	On-going (depending on opportunities)	n/a	n/a	WCC currently developing an Electric Vehicle Charging Strategy	On-going 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

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	particular for vehicle charging infrastructure										would all rest with the supplier. Expecting to go out to tender for a supplier at the end of Summer 2018 and to begin installing by the end of the financial year.
10	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. Low emission strategy guidance currently being reviewed/updated and consideration to make this into a Supplementary Planning Guidance document. EV infrastructure is routinely being sought and implemented as part of the planning process.	On-going implementation	Useful policy mechanism for improving infrastructure in long term
11	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	Vehicles in place as of 2016. On-going commitment where feasible	Funding dependent - Business case not strong without additional funding
12	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
13	Working with Warwickshire County Council and bus operators to encourage lower emission buses	Vehicle fleet efficiency	Promoting Low Emission Public Transport	WCC	2016	2017 onwards	n/a	n/a	1. Meetings held with bus providers in the Warwick district. Obtained details on composition of vehicle fleet and have identified eight Euro 4 buses that are eligible for retrofitting. 2. Initial discussions with local bus providers and bus manufacturers on possibility of trialling an electric bus route through the Leamington Spa AQMA. Expression of interest has	Subject to grant funding	Dependent on funding being available. Bid to be submitted for trial of electric bus route in 2018. Exploring funding opportunities for grants to retrofit identified Euro 4 buses that travel through declared AQMAs.

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	(either retrofitting existing buses, or use of alternative fuels).								been submitted for funding. Full bid to be submitted in 2018.		
14	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
15	Promotion of electric vehicles through the Warwickshire Drive Electric Website. http://www.warwickshire.gov.uk/drive-electric	Promoting Low Emission Transport	Other	WCC	2016	On-going	n/a	n/a	Website is updated and maintained.	On-going implementation	Investigate including links on Warwick District Council website
16	Use the taxi and private hire licensing system to try and reduce emissions from taxis and private hire vehicles.	Promoting Low Emission Transport	Taxi emission incentive	WDC	n/a	n/a	n/a	n/a	Preliminary review of WDC licensed taxi fleet completed in November 2017. Explored possibility of a county-wide taxi euro emission licensing policy through the Coventry and Warwickshire Air Quality Alliance, however, limited interest from neighbouring local authorities.	To be confirmed	Further information needed on taxi vehicle emissions contribution to air pollution in declared AQMAs before policy can be progressed. Potential for study to be undertaken in 2018 to explore this and inform a taxi emission policy.

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17	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	2018	Steering group meeting involved procurement manager. This action still to be taken forward
18	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	On-going	n/a	n/a	1. Good progress in implementing mitigation through development control. 2. Existing Low Emission Strategy currently being revised and exploring possibility of making the strategy a Supplementary Planning Document.	On-going	
19	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	On-going	n/a	n/a	Planning policy relevant to air quality included in new Local Plan	n/a	Local Plan adopted in September 2017 and will be reviewed every five years.
20	Working with planning colleagues and developers to ensure that new developments are based around the	Policy Guidance and Development Control	Other policy	WCC Public Health	n/a	On-going	n/a	n/a	5 minute walkable neighbourhoods have been investigated within work undertaken by WYG on how developments should look	On-going encouragement of active travel	Warwickshire County Council Public Health continues to recommend the inclusion of five minute walkable neighbourhoods within their planning guidance however for many developments it can be a difficult target to implement due to existing infrastructure. This is an easier target for larger

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	'five-minute walkable neighbourhood', thereby encouraging active travel as the preferred methods of transport to access local facilities										strategic sites.
21	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	On-going	n/a	n/a	NPPF followed for new development. Green infrastructure included where relevant	On-going	
22	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	On-going	n/a	n/a	Air quality assessments asked for on a regular basis and mitigation sought where necessary	On-going	

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23	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	On-going	n/a	n/a	On-going work required where large areas of development are allocated in Local Plan. Potential cumulative impacts raised at pre-application and outline planning application stages as necessary.	On-going	To some extent, work undertaken on air quality impacts of the Local Plan takes cumulative impacts into account at a strategic level.
24	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	On-going	n/a	n/a	Mitigation asked for on a regular basis as part of the Low Emission Strategy	On-going	
25	Junction improvements on key travel corridors in Warwick and Leamington Spa AQMAs are proposed which include junction/highway modifications, improvements for walking and cycling and bus priority measures	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	On-going for different corridors, Europa Way to commence in May 2018.	1. Europa Way likely to be first improvement implemented to ensure that vehicles use the strategic road networks rather than roads travelling through local AQMAs. 2. 20 MPH restrictions introduced in Warwick town centre to align with Warwick AQMA. 3. Further improvements to be explored for Leamington Spa AQMA.

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26	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	20mph zone has been implemented in Warwick town centre. WCC transport colleagues to review its implementation in Autumn 2018.
27	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	On-going	n/a	n/a	Good progress on planning and starting to implement corridor proposals	On-going for different corridors, Europa Way to commence in May 2018 but dependent on development funding. Shared use cycle link completed on Priory Road, Warwick which is to be expanded to Northgate, Eastgate, Westgate, St. Johns, and Emscote Road	
28	Manage deliveries across Warwick District	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	

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	Council to ensure that no additional congestion is caused by stationary delivery vehicles in busy locations										
29	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	On-going	n/a	n/a	Air quality information incorporated into Active Travel website. Further information about air quality and local AQMAs to be included. https://www.warwickshire.gov.uk/active-travel	On-going implementation	Active Travel Campaign social media presence continues to grow and there have been 2,241 website visits to date, increased from 1,323 visits in December 2017. More than 12,500 people have also been reached through a targeted digital radio advertisement. Currently exploring further ways to advertise / promote it.
30	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	On-going	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.	On-going	The responses always support the inclusion of active travel and make recommendations for any further opportunities for encouraging active travel in design such as the inclusion of way finding signage / measured miles and cycle parking.

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31	Investigate implementing a campaign aimed at vulnerable members of the public (i.e. those with existing respiratory or cardiovascular 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	On-going	Warwickshire Public Health bid for personal air quality monitor campaign in 2017 was unsuccessful. Alternative funding for 50 personal monitors has been sought to run an event/campaign on personal exposure to air pollution.
32	Continuation of monitoring within Warwick District Council, focussed on AQMAs, but also in other strategic locations	n/a	n/a	WDC E,S, H and CP.	n/a	On-going	n/a	n/a	Monitoring reported in this report	On-going	Three additional diffusion tube monitoring points to be installed as of June 2018 around Castle Hill, Warwick following feedback from DEFRA on ASR 2017. Two additional diffusion tube monitors to be routinely deployed to investigate any temporary air quality concerns.
33	Regular assessment of air quality against air quality objectives as specified by the LAQM process with reports to defra and	n/a	n/a	WDC E,S, H and CP.	n/a	On-going	n/a	n/a	Undertaken in this report	On-going	

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	the public										
34	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	n/a	n/a	WDC E,S, H and CP	n/a	On-going	n/a	n/a	Undertaken in this report	On-going	

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

As detailed in Policy Guidance LAQM.PG16⁵ (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 tyre 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 framework⁶, the fraction of mortality attributable to particulate air pollution (measured as PM_{2.5}) in 2016 in Warwick is 5.5%, just above the average for England (5.3%), and equivalent to 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).

⁵ <https://laqm.defra.gov.uk/supporting-guidance.html>

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

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Warwick District Council also uses the two monitoring stations in the Automatic Urban and Rural Network (AURN) measuring PM_{2.5} to monitor progress against this pollutant. The trend in the last 5 years is broadly consistent; whilst 2016 saw a marginal reduction in concentrations at both sites (~10µg/m³), the 2017 levels have risen to ~11µg/m³. 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 the sources go beyond 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 2017. Two of which are part of the Automatic Urban and Rural Network (AURN), the remainder is a council run Automatic Monitoring site. Table A.1 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: Maps of Monitoring Locations and AQMAs. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC.

3.1.2 Non-Automatic Monitoring Sites

Warwick District Council undertook non- automatic (passive) monitoring of NO₂ at 53 sites during 2017, two of which were triplicate co-located sites. Appendix A: Monitoring Results shows the details of all of these locations.

Maps showing the location of the monitoring sites are provided in Appendix D: Maps of Monitoring Locations and AQMAs. 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: Supporting Technical Information / Air Quality Monitoring Data QA/QC.

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 non-automatic monitoring or diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B: Full Monthly Diffusion Tube Results for 2017.

Figure A.6 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.

The majority of sites, both automatic and non-automatic, have increased in their mean annual NO₂ concentrations from 2016.

Concentrations exceeding the 40µg/m³ limit were seen at 18 sites; after having distance corrected to nearest exposure, 14 sites still exceeded the NO₂ annual mean objective. Of the 14 sites in exceedance, 12 were situated within existing AQMAs. Of the 12 exceedances within AQMAs;

- 6 located in the Warwick AQMA;
- 5 located in the Leamington Spa AQMA; and
- 1 located in the New Street, Kenilworth AQMA

Figure A.2 to Figure A.5 show the changes in concentrations over a 5 year period for the monitoring sites located in AQMAs.

It can be seen that the Leamington Spa annual mean concentrations are rising at a greater rate, when compared to the Warwick. Monitoring sites in the Leamington Spa AQMA measured similar changes in NO₂ concentrations since last year; the sites within this AQMA increased by 10% on average. The highest increase was at W2, which rose from 40.4µg/m³ in 2016 to 48.8µg/m³ in 2017. The DFT have estimated traffic increases year on year since 2012 for Old Warwick Road, and W2 is located on a key junction from this road. This station will be monitored closely in the next reporting year.

The remaining 2 non-AQMA sites still exceeding the $40\mu\text{g}/\text{m}^3$ after distance correction are:

- W14 - located on Tachbrook Road, near the border of the Leamington Spa AQMA; and
- W67 - located on Castle Hill, on boundary of Warwick AQMA.

Both these sites have reported NO_2 levels $>35\mu\text{g}/\text{m}^3$ since 2013, however only W67 has exceeded $40\mu\text{g}/\text{m}^3$ prior to this year. Castle Hill has been identified as a potential problem area by both the council and DEFRA. Plans are in place to install more monitoring sites around this location in response, this will inform the response to the exceedances in NO_2 concentration. If future NO_2 concentrations, from W67 and also the new diffusion tubes, remain high at this site the AQMA boundary will be amended to incorporate this area.

W14's concentration of NO_2 has steadily increased since 2014 however this is the first year measured values have exceeded $40\mu\text{g}/\text{m}^3$; W14 is located on the border of the Leamington Spa AQMA, meaning measures implemented to improve Air Quality in this area will likely also improve this location. In the event W14 continues to exceed the AQS Objective for NO_2 next year, the AQMA will be adjusted to incorporate this area. This is an area WDC will remain vigilant of in future ASRs.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified, continuously monitored, PM_{10} 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, continuously monitored, PM_{10} 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.

Shown in Figure A.8, no exceedances of either the annual or daily PM_{10} objectives were measured in 2017. PM_{10} concentrations have remained relatively stable over the last 5 years; however since 2016, PM_{10} concentrations have decreased marginally at AURN1 and increased marginally at AURN2. Whilst both monitoring stations are still measuring considerably below the limit for PM_{10} ($13.9\mu\text{g}/\text{m}^3$ and

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17.3µg/m³ respectively in 2017), AURN2 PM₁₀ concentrations have marginally increased year on year since 2014.

Also shown in Figure A.8, in line with the minor changes in annual mean concentrations at the two monitoring sites, daily exceedances of 50µg/m³ have changed accordingly. AURN1 measured 2 exceedances, falling from 4 last year, and AURN2 measured 4 exceedances, rising from 2 last year.

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 from the two automatic stations.

No exceedances of the UK PM_{2.5} annual mean target value were measured in 2017.

Concentrations measured at both stations have increased marginally since 2016, however the concentration of PM_{2.5} has been broadly consistent over the last 5 years and remains well below the target value (25 µg/m³) at ~11 µg/m³ across both sites.

3.2.4 Benzene (C₆H₆)

Table A.8 in Appendix A presents the ratified and adjusted monitored Benzene annual mean concentrations for the past 5 years measured at AURN1, Figure A.10 graphically shows this data.

No exceedances of the UK annual mean objective for Benzene (5µg/m³) were measured in 2017 and over the 5 year period Benzene has been decreasing in concentration.

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)
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 (1)	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(3.6)	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/Saltisford Junction	Roadside	427867	265275	NO ₂	Y	Y	2.7	N	2.5
W46	The Butts	Roadside	428240	265088	NO ₂	Y	N(1.4)	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(1.5)	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
W1	Bath Street	Kerbside	431978	265280	NO ₂	Y	N (1m)	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

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W11	Clemens Street	Roadside	432051	265060	NO ₂	Y	N	3.2	N	1.5
W12	Spencer Street	Roadside	426836	260855	NO ₂	Y	N(0.2)	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(0.6)	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(6.3)	7.5	N	1.5
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(1.3)	1.4	N	4.5
W32	Warwick Road	Roadside	428906	271497	NO ₂	Y	Y	1.3	N	1.5
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 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
CM1	Roadside	Automatic	93.1	93.1	39.7	40.1	37.2	31.7	37.1
AURN1	Urban Centre	Automatic	98.5	98.5	20.7	19.6	19.3	21.4	23.5
AURN2	Roadside	Automatic	99.3	99.3	21.2	21.1	20.2	20.4	17.3
W5	Roadside	DT	83.3	83.3	32.7	33.8	34.5	40.4	35.3
W17	Kerbside	DT	91.7	91.7	29.1	29.1	27.7	29.4	31.2
W18	Roadside	DT	91.7	91.7	25	24.7	24.7	27.2	28.5
W19	Roadside	DT	100	100	31.4	31	28.4	33.3	35.0
W33-35	Roadside	DT	66.7	66.7	40.8	41.3	41.2	44.2	44.3
W36	Roadside	DT	100	100	41.1	43.6	42.2	46.3	49.5
W37	Roadside	DT	100	100	38.3	34.6	37.5	41	42.7
W38	Kerbside	DT	91.7	91.7	32.6	34.5	34	37.4	39.6
W39	Roadside	DT	100	100	26.8	27.3	27.6	30.7	31.5
W40	Kerbside	DT	100	100	39.8	40	40.7	42.9	47.6
W41	Roadside	DT	91.7	91.7	24.8	25.4	22.6	26.7	27.6
W42	Roadside	DT	100	100	32	29.4	26.4	33.4	32.1
W43	Roadside	DT	100	100	44.3	45.4	43.4	46.6	50.2
W44	Roadside	DT	100	100	29.9	31.9	28.6	32.5	34.8
W45	Roadside	DT	100	100	26.4	27.8	27.2	29.6	31.2
W46	Roadside	DT	100	100	35.4	34.3	34.2	39.2	40.0
W48	Roadside	DT	91.7	91.7	33.5	33.8	32.7	36	39.7
W49	Roadside	DT	100.0	100.0	22.9	23.3	22.1	25.3	26.1

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W50	Roadside	DT	100.0	100.0	29.4	28.7	27.9	30.5	32.5
W51	Urban Background	DT	91.7	91.7	19.3	18.2	17.4	20.2	21.4
W52	Kerbside	DT	100.0	100.0	41.4	39.4	38.1	41.4	44.3
W53	Roadside	DT	100.0	100.0	42.7	41	38.5	44	46.4
W54	Roadside	DT	83.3	83.3	34	32.9	31	34.8	37.3
W55	Roadside	DT	91.7	91.7	29.9	28.5	27.3	31	32.4
W56	Roadside	DT	100.0	100.0	22.5	22.7	21.3	23.7	26.3
W57	Roadside	DT	100.0	100.0	31.4	31.3	30	31.8	33.5
W58	Roadside	DT	91.7	91.7	35	31.3	29.9	31	34.4
W59	Roadside	DT	100	100	36.3	36.7	34	38.1	41.6
W60	Roadside	DT	100	100	31.2	28.9	27.8	31.6	32.3
W61	Roadside	DT	100	100	27.8	26.4	26.2	29.5	31.2
W62	Roadside	DT	100	100	43.8	44	42.5	41.5	47.9
W65	Roadside	DT	91.7	91.7	24.3	23.2	23.0*	26.4	27.5
W67	Roadside	DT	83.3	83.3	-	41	41.8	48	50.0
W1	Kerbside	DT	58.3	58.3	36.3	40	43.4	47.3	52.4
W2	Roadside	DT	75	75	33.5	32.6	38.2	40.4	48.8
W6-8	Urban Background	DT	100	100	19.8	19.2	19.7	21.8	22.9
W10	Roadside	DT	100	100	24.1	24	24.3	26.5	28.9
W11	Roadside	DT	83.3	83.3	32.9	23.7	23.2	25.6	23.8
W12	Roadside	DT	100	100	38	33.7	33.3	36.6	41.3
W13	Roadside	DT	100	100	42.8	47	48.6	50.4	55.4
W14	Roadside	DT	100	100	39.6	34.5	38.1	39.6	45.4
W15	Roadside	DT	100	100	35.9	41	43.9	45	52.0
W16	Roadside	DT	91.7	91.7	30.6	28.5	30.7	32.6	37.6

Warwick District Council

W23	Roadside	DT	100	100	30.7	31.1	30.6	33.6	35.8
W24	Roadside	DT	100	100	30.2	29.7	28.2	30.4	30.7
W25	Roadside	DT	75	75	34.6	34.5	31.3	34.6	30.7
W26	Roadside	DT	100.0	100.0	27.1	25.7	24.4	29	30.3
W27	Kerbside	DT	91.7	91.7	23.1	22.5	21.6	26.1	26.5
W28	Roadside	DT	66.7	66.7	37.7	37.8	33.2	40	37.1
W30	Roadside	DT	100	100	25	26.1	24	27.3	29.0
W31	Kerbside	DT	100	100	37.4	37.6	35.2	37.1	41.4
W32	Roadside	DT	100	100	36	35.8	34	37.5	37.2
W68	Roadside	DT	100	100	-	23.3	23.6	24.7	25.1

☒ 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 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 submitted data, as error identified in reported figure

Figure A.1 –Trends in Annual Mean NO₂ Concentrations located in Warwick AQMA – Automatic Stations

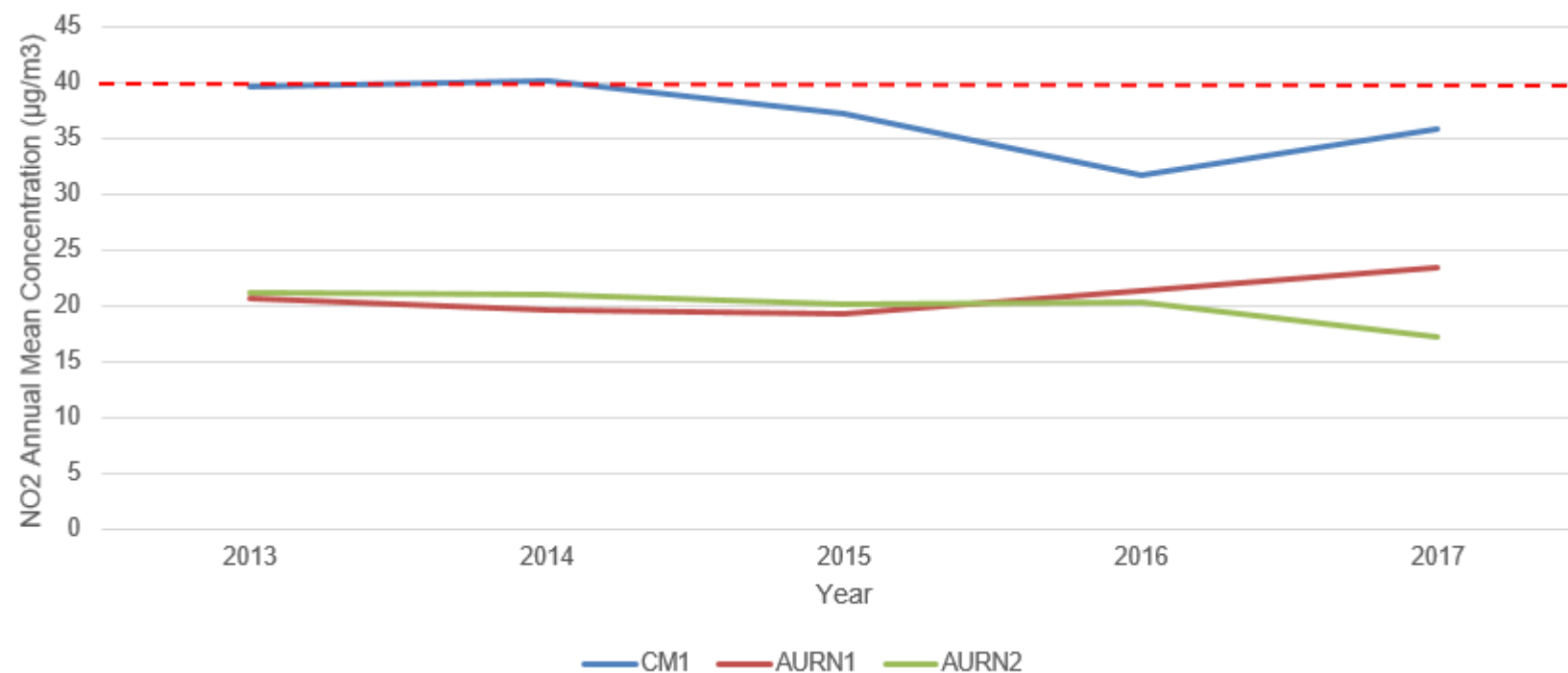


Figure A.2 –Trends in Annual Mean NO₂ Concentrations located in Warwick AQMA – Non Automatic Sites

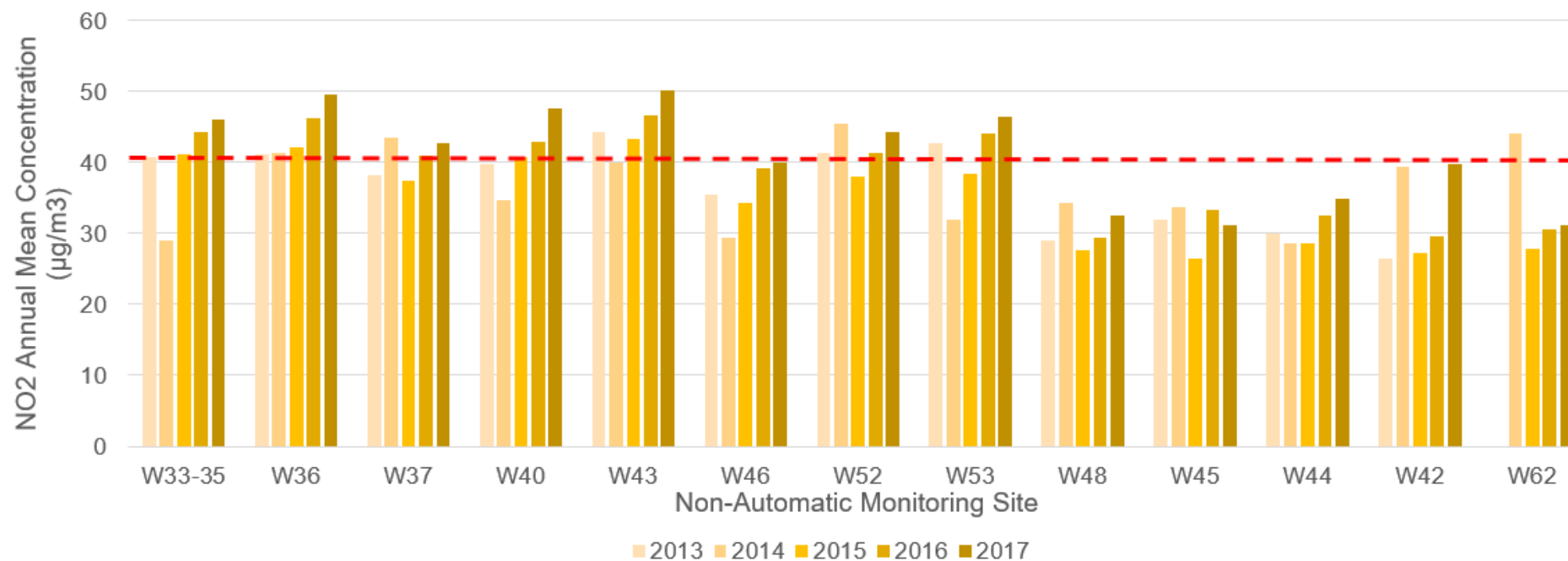


Figure A.3 –Trends in Annual Mean NO₂ Concentrations located in Leamington Spa AQMA – Non Automatic Sites

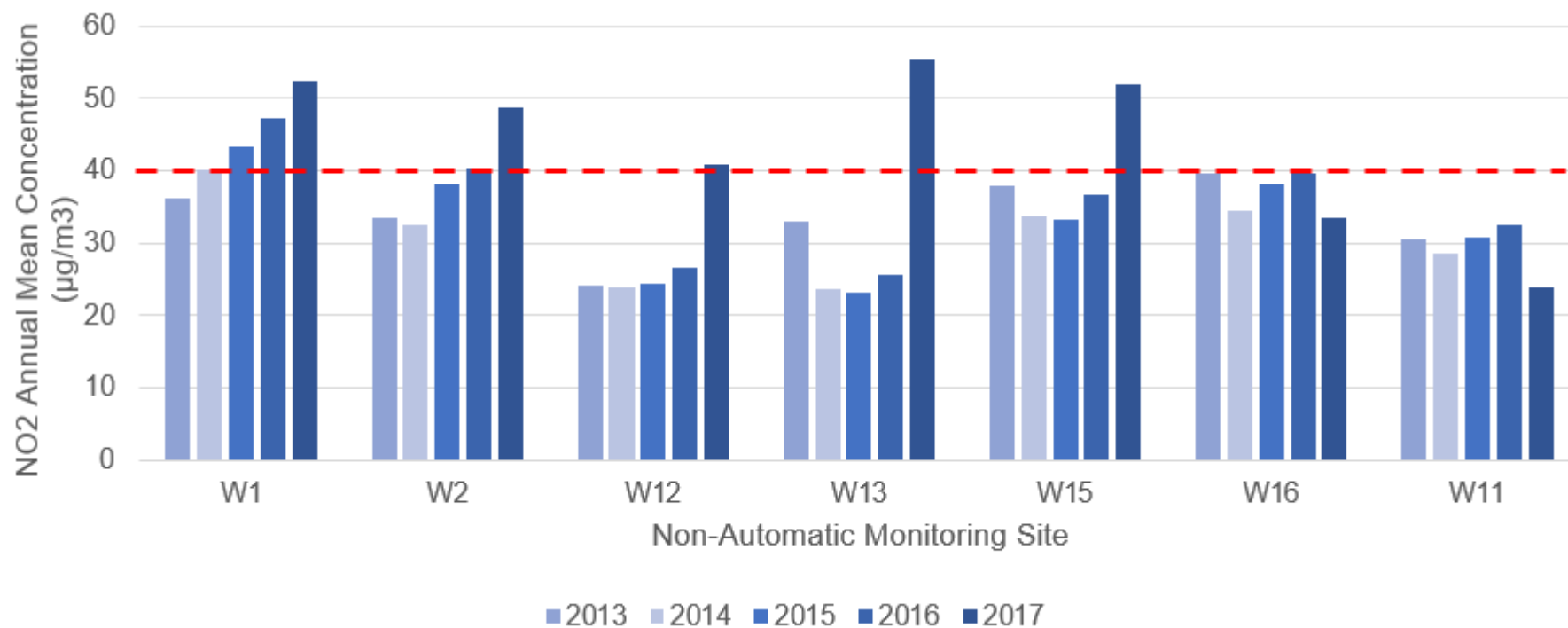


Figure A.4 –Trends in Annual Mean NO₂ Concentrations located in Kenilworth, New Street – Non Automatic Sites

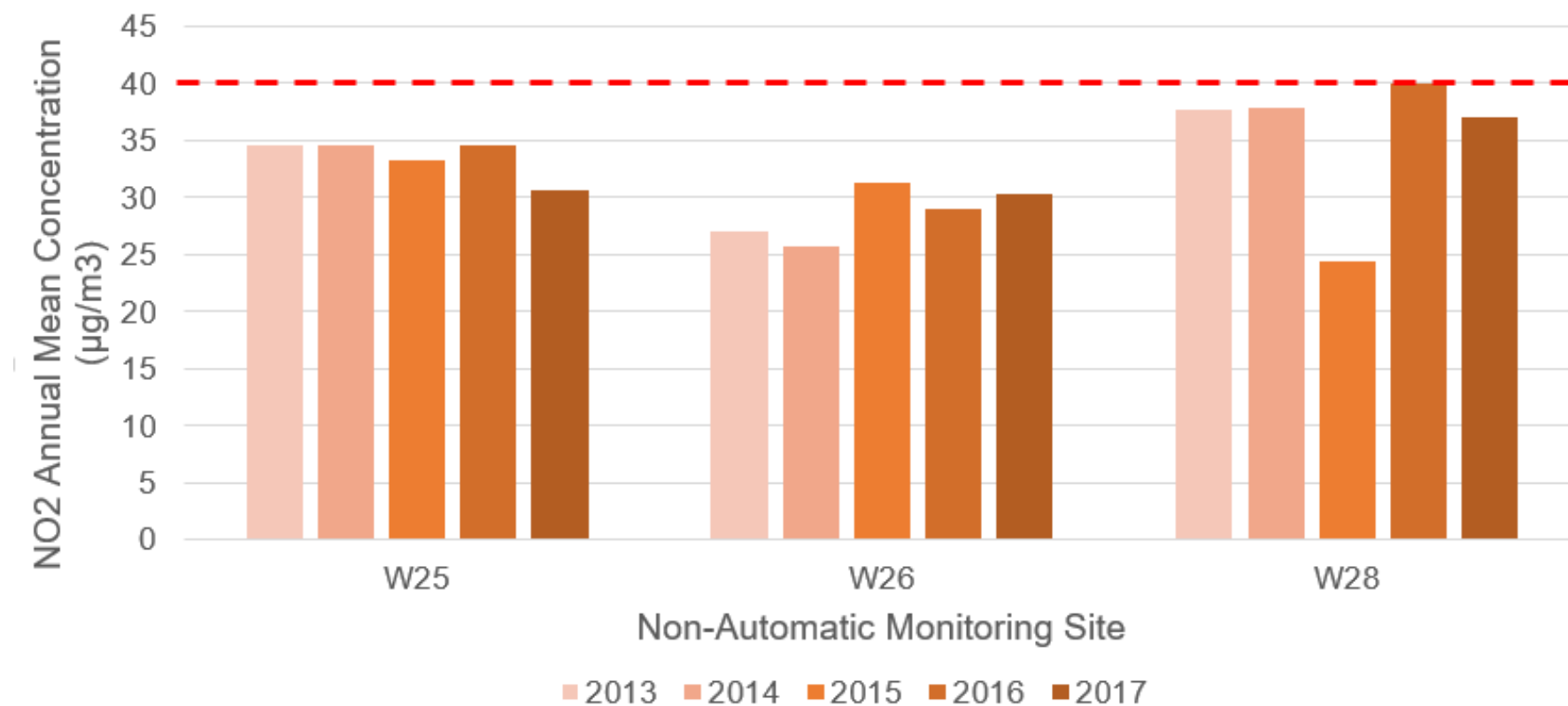


Figure A.5 – Trends in Annual Mean NO₂ Concentrations located in Kenilworth, Warwick Rd – Non Automatic Sites

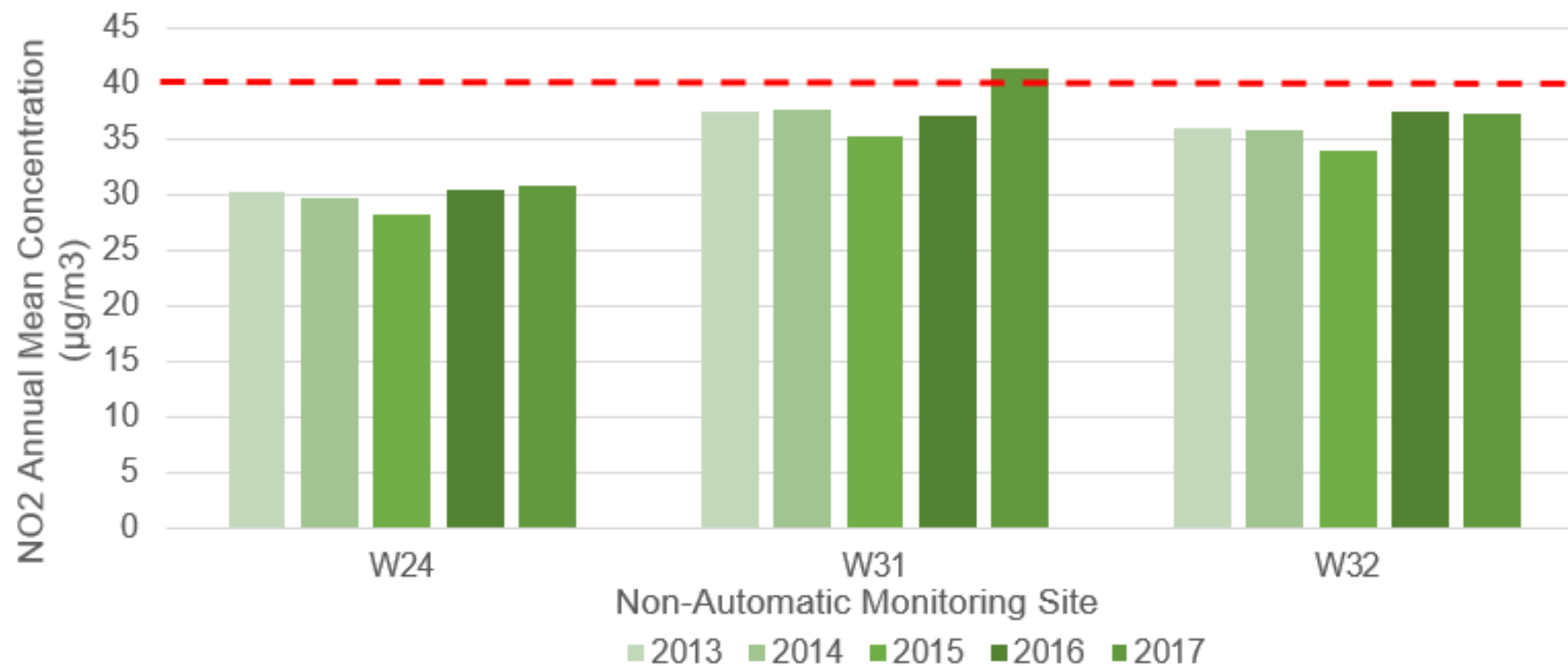


Figure A.6 –Trends in Annual Mean NO₂ Concentrations located outside of AQMAs

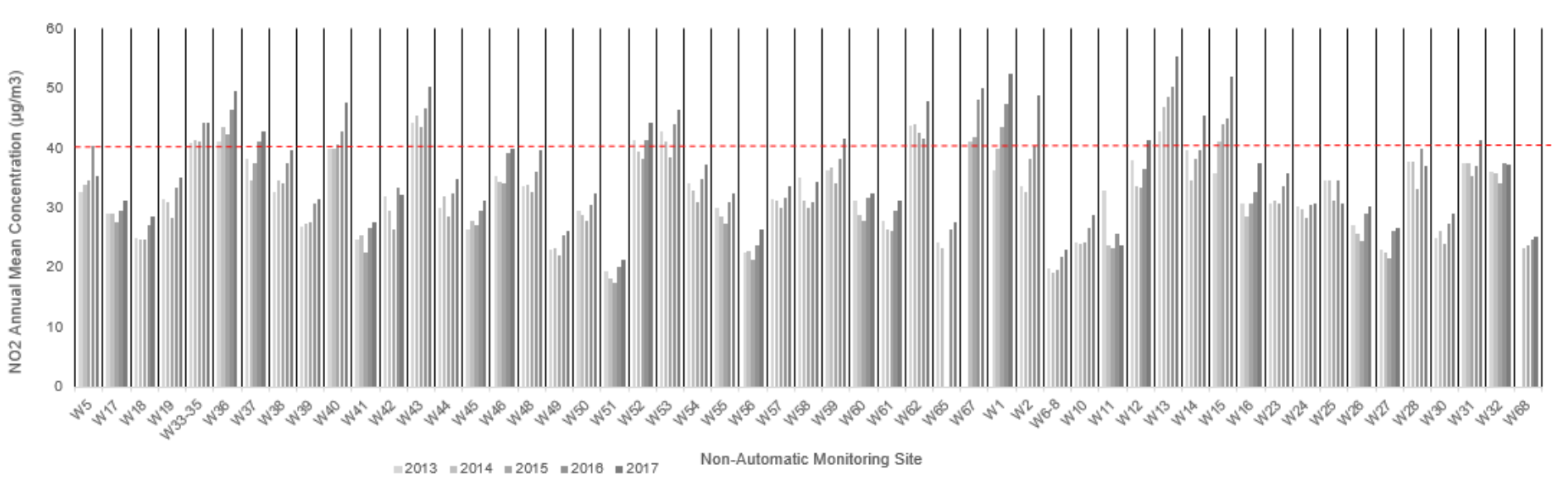


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200 µg/m ³ ⁽³⁾				
					2013	2014	2015	2016	2017
AURN1	UB	Automatic	98.5	98.5	0 (77)	0(74)	0	0	0
CM1	RS	Automatic	93.1	93.1	4	0	0	0	0
AURN2	RS	Automatic	99.3	99.3	1	0	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.

Figure A.7 –Trends in Number of NO₂ 1-Hour Means > 200µg/m³

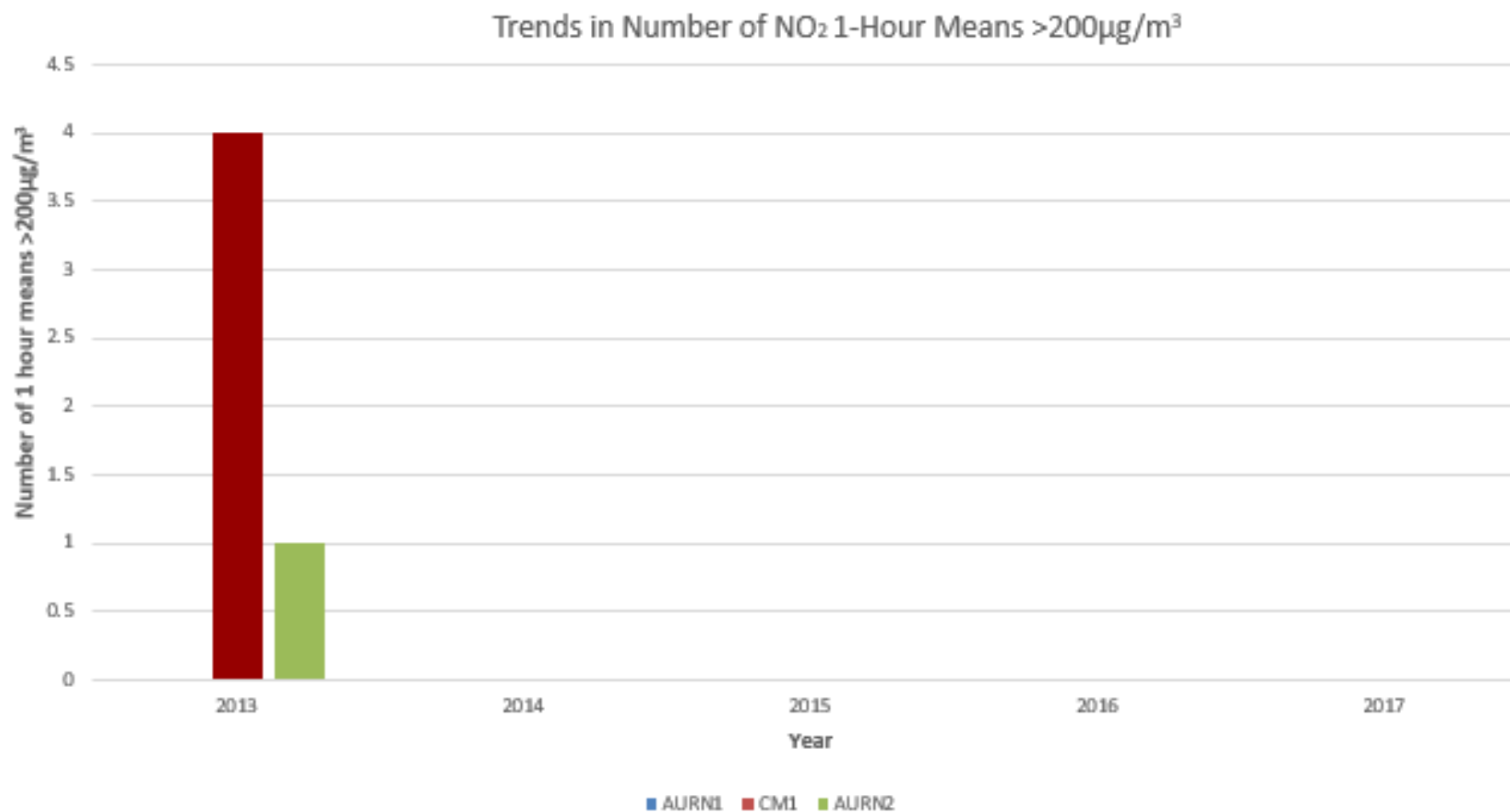


Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
AURN1	UB	96.7	96.7	17.9	15.9	15.3	15.4	13.9
AURN2	RS	96.3	96.3	15.8	14.7	15.3	15.7	17.3

☒ **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, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.8 – Trends in Annual Mean PM₁₀ Concentrations

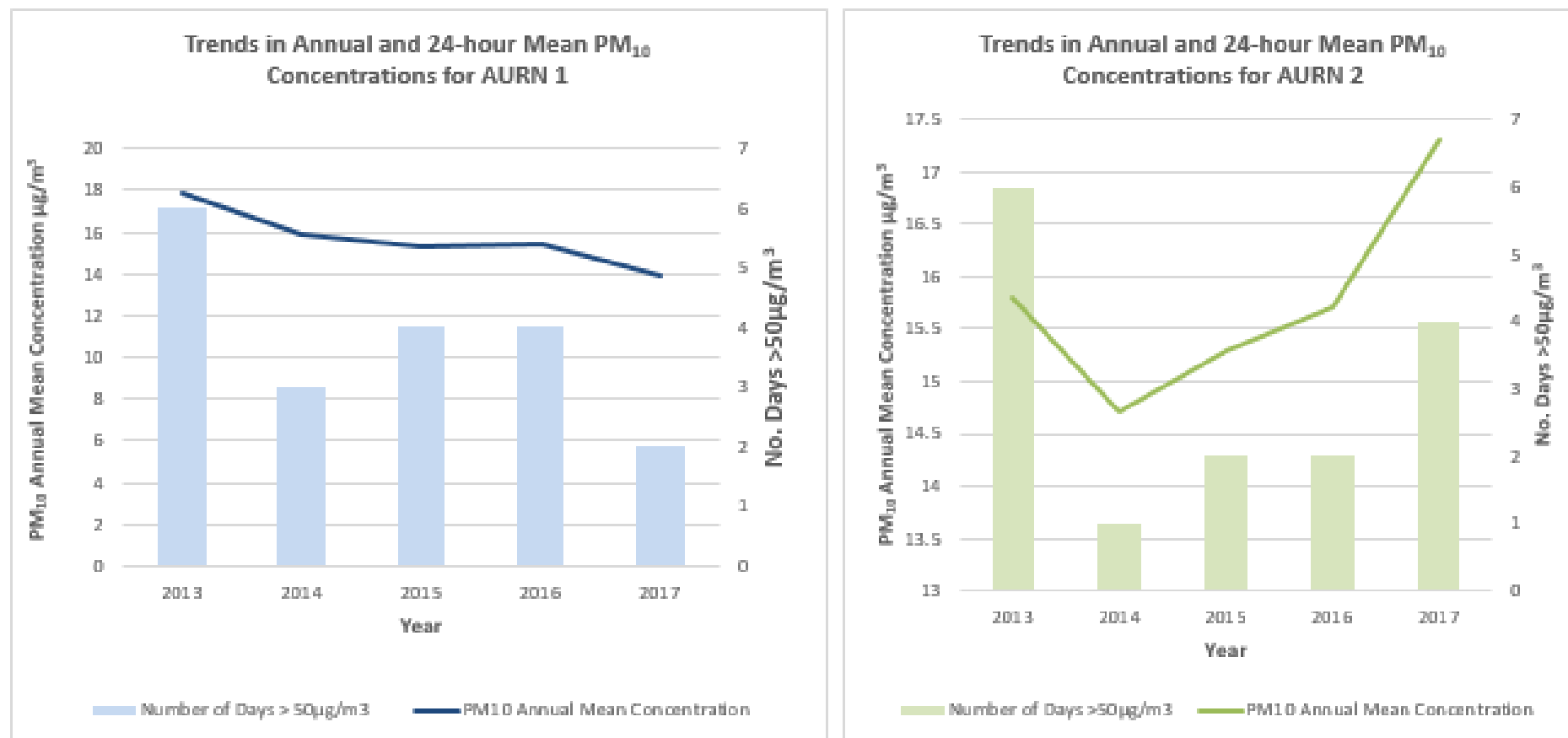


Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2013	2014	2015	2016	2017
AURN1	UB	96.7	96.7	6 (39)	3	4	4	2
AURN2	RS	96.3	96.3	6 (29)	1 (30)	2	2	4

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.

Table A.7 – PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
AURN1	UB	95.5	95.5	13	12.9	12.3	10.5	10.7
AURN2	RS	97.5	97.5	12.1	11.2	12.9	9.7	11

☒ 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, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.9 – Trends in Annual Mean PM_{2.5} Concentrations

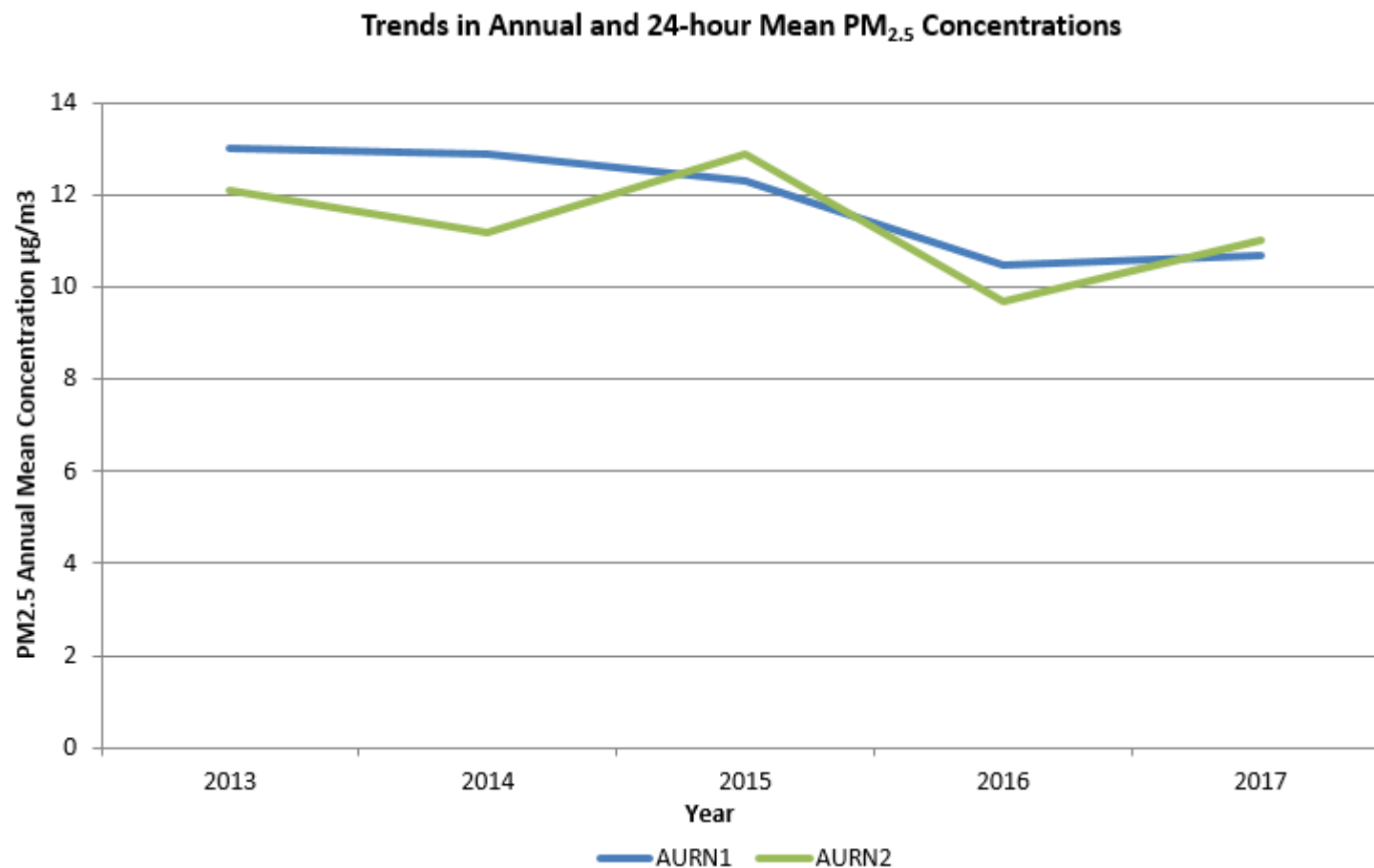


Table A.8 – Benzene (C₆H₆) Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	C ₆ H ₆ Annual Mean Concentration (µg/m ³)				
				2013	2014	2015	2016	2017
AURN1	UB	100	100	0.68	0.67	0.60	0.53	0.52

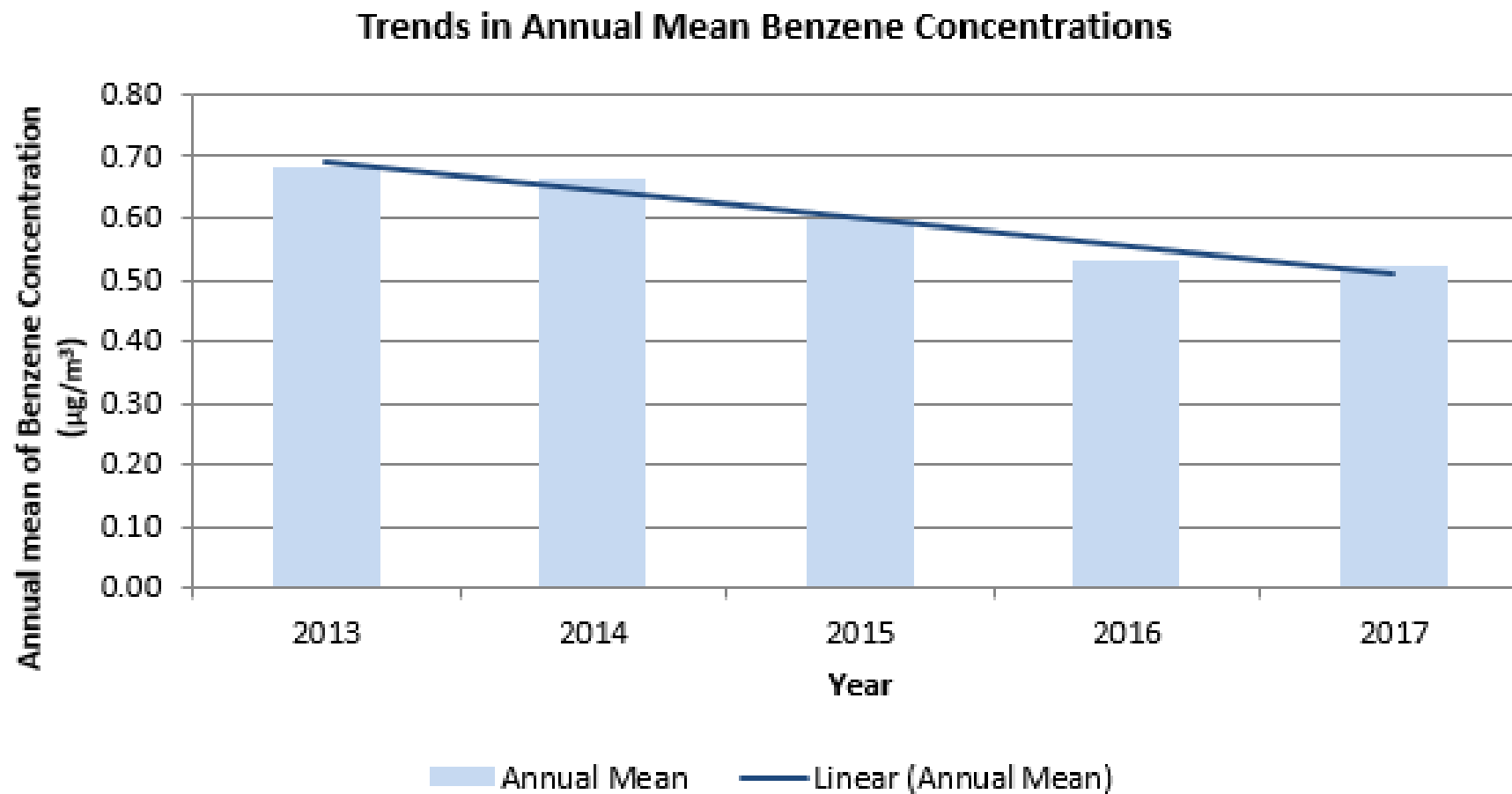
☒ Annualisation has been conducted where data capture is <75%

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%).

Figure A.10 – Trends in Benzene (C₆H₆) Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

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 (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
W1	-	-	55	-	-	-	45.4	50.3	57.8	59.7	68.8	59.3	56.6	52.4	
W10	47.2	32.8	30.1	14.3	22.7	22	18.9	21.7	24.9	27.9	36.4	34.8	27.8	28.9	
W11	37.8	28	24.5	15.2	20.8	17.2	18.6	20.3	25	21.3	-	-	22.9	23.8	
W12	62.1	46.6	41	22.1	38	38.4	29.3	33.6	37.3	42.6	43	43.1	39.8	41.3	40.9
W13	73.8	60.1	65.1	44.6	51.4	55.1	5.2	48.5	60.9	56.8	60.7	56.7	53.2	55.4	
W14	51.9	43.8	47.4	26.6	37.7	40.5	47	42	44.1	44.3	51.9	47.1	43.7	45.4	44.5
W15	63.3	48.5	58.4	34.2	43.8	49.2	41.2	44	49.1	52.2	58.6	57.1	50.0	52.0	
W16	49.8	42.4	38	20	-	30.6	28.6	30.1	36.4	37.1	44	40.6	36.1	37.6	33.5
W17	43.8	36.1	31.8	19.1	26.8	22.5	22.9	24.9	-	27.8	38.2	36.5	30.0	31.2	
W18	43.3	30.3	-	16	26.1	23.5	21.5	24.1	28.3	25	33.8	29.4	27.4	28.5	
W19	44.8	37.1	32.3	20.4	28.5	29.2	29	30	34.2	34.7	43.2	40.1	33.6	35.0	
W2	59	45.3	47.5	-	-	-	40.8	40.3	49.5	36.2	54.8	49.3	47.0	48.8	
W23	51	40	38.3	23.3	29.6	29.9	27.2	28	34.9	33.4	39.7	37.3	34.4	35.8	
W24	51.1	35.5	29.4	22	25.2	21.2	23.8	21.6	28.5	27.6	38.2	30.6	29.6	30.7	
W25	53.2	33.6	31.7	21	26.9	24.3	25.5	20.5	28.6	-	-	-	29.5	30.7	

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W26	45.3	35	33.1	18.2	21.9	24.9	23.7	24	28.1	26.3	33.7	35.4	29.1	30.3	
W27	42.5	30.3	26.9	-	19.9	18.4	19.5	19.1	22.5	19.6	31.2	30.1	25.5	26.5	
W28	61.4	-	48.1	23.2	43	40.6	33.7	31.9	-	-	-	38.8	40.1	37.1	
W30	44.8	33.6	25.8	19.9	20.7	23.4	22.8	23.1	28.2	28	34.1	30.1	27.9	29.0	
W31	53.4	46.2	39.3	26.1	34.3	35	35.2	34.4	42.9	40.7	45.4	45.2	39.8	41.4	37.3
W32	53	40.5	37.3	23.9	36.8	28.9	32.4	30.6	36.1	32.2	41.8	36.3	35.8	37.2	
W33-35	60.8	54.4	-	-	-	-	39.1	39.1	42.2	46.4	50.6	50.2	47.8	44.3	
W36	72.4	52.2	55.8	26.8	42.9	44.2	38.3	36.7	43.3	48.8	58.2	51.4	47.6	49.5	46.0
W37	53	47.2	44.1	35.3	36.3	36.2	35.9	32.7	39.2	38.8	50.8	43.1	41.1	42.7	
W38	51.2	44.2	39.2	30.8	29.4	32.1	33.6	36	39.8	37.1	45.4	-	38.1	39.6	29.7
W39	46.1	35.2	30.7	19.4	25.8	23.4	25.2	26.2	31.4	28.1	36.8	35.1	30.3	31.5	
W40	58.3	49.9	47.6	34.9	36.6	41	40.3	43.4	47.5	48.3	55.4	46.5	45.8	47.6	
W41	45.5	30.5	28.8	18.1	-	16.6	20.7	19.5	25.6	24.2	33.2	29.3	26.5	27.6	
W42	49.6	34.9	29.5	17.8	27.1	22.8	26.8	27.7	33.2	29.7	37.6	33.5	30.9	32.1	
W43	65.9	49.2	45.3	34	45.7	44.8	45.8	47.2	50.1	47.3	54.9	48.6	48.2	50.2	
W44	61.1	38.7	33.2	16.3	27.6	28.6	28.9	29.1	34	32	36.9	35.7	33.5	34.8	
W45	48	32	30.4	18.8	28	24.9	24.8	24.3	27.5	31.1	37.3	32.8	30.0	31.2	
W46	61.5	43.7	37.9	27.1	36.4	32.2	33.6	30.1	40.5	37.9	45.4	34.9	38.4	40.0	36.5
W48	61.1	42.9	39.4	19	30.9	-	29.4	32.5	36.9	38.6	49.2	40.5	38.2	39.7	
W49	42.6	29.9	26.8	13.7	18.5	19.4	18.3	18.4	23.1	25.3	34.2	30.9	25.1	26.1	
W5	50.6	42	-	21.7	27.4	27.5	29	30.6	35.5	33	41.8	-	33.9	35.3	
W50	55.4	35.4	35.3	21.8	28.9	25.7	24	23.8	28.4	28.7	35.4	32.6	31.3	32.5	
W51	34.8	35.2	20.2	13.1	16.6	11.7	14.5	14.7	19.2	19.9	26.7	-	20.6	21.4	
W52	56.9	49.1	43.3	28.2	45.5	41.7	37.9	37.5	41.3	39.8	47.5	42	42.6	44.3	37.8
W53	63.4	49.7	47.1	33.5	48.5	42.5	37.8	37	42.3	43.2	47.7	43.2	44.7	46.4	
W54	48.2	40.4	40.2	20.5	34.4	30.1	-	-	34.7	31.6	39.4	39.5	35.9	37.3	
W55	49.8	36.5	29.8	22.6	30.6	27.8	28.4	-	32.2	17.2	33.9	34	31.2	32.4	

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W56	41.4	31.6	25.2	16	19.2	17.1	18.4	19.9	24.4	24.5	33.6	31.6	25.2	26.3	
W57	48.5	38.3	33.5	19.4	31	25.2	27.4	29.4	33.1	28.7	37.8	34.6	32.2	33.5	
W58	47	40	36.4	24.3	26.7	28.8	26.9	26.2	-	31.5	38.7	37.2	33.1	34.4	
W59	52	43.8	39.9	26.9	31	36.5	33.1	37.2	40.8	40.9	50.5	47.4	40.0	41.6	36.7
W60	45.3	35.8	31.8	21.5	28.9	26.1	28.9	26.4	30.2	27.9	36.7	32.7	31.0	32.3	
W61	44	36.1	30.2	20.7	27.1	22.8	24.8	24.7	31.1	28.9	35.8	33.8	30.0	31.2	
W62	60.8	51	47	29.4	39.2	43	41.5	44.9	46.6	44.2	52.4	52.6	46.1	47.9	
W65	42	31.7	29.1	16.8	22.3	19.2	-	20.4	24	24.8	30.1	30	26.4	27.5	
W67	48.3	50.3	53	-	53.4	43.6	44.5	43.6	45.1	46.4	52.9	-	48.1	50.0	46.8
W68	35.8	27.1	25.3	15.5	19.7	18.5	19.1	20.1	24.2	24.8	33	26.6	24.1	25.1	
W6	36.3	26.1	24	9.3	14.8	14.6	14.4	15.9	21.8	23.7	31.6	32.9	22.1	23.0	
W7	36	26.9	20.1	14.3	13.4	14.4	13.9	16.2	21.8	22.5	31.3	31	21.8	22.7	
W8	36.6	27.5	22.9	14.1	15.4	14.6	13.9	16.3	22.1	22.1	30.3	31.3	22.3	23.1	

☒ 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

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 2017 is covered by rounds 18-22 of AIR PT. In all five of these rounds SSS scored 100%, this means the round rolling average is 100%, higher than the 95% recommended. This means the laboratory has no systematic bias that we are aware of.

Diffusion Tube Bias Adjustment

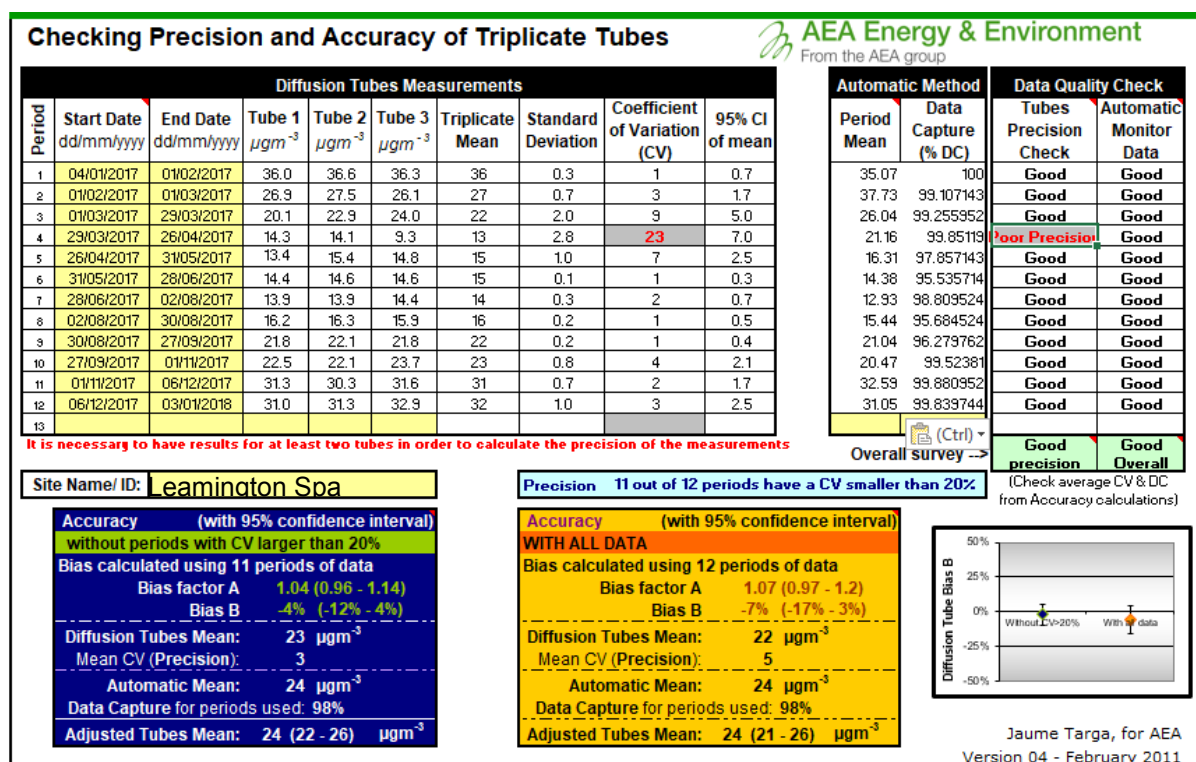
The bias adjustment factor for SSS in 2017, obtained from the national bias adjustment spreadsheet (v03/18) is 0.89 (based on 12 studies).

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 C.2.

The Jury Street/Pageant House Warwick Local Bias Adjustment factor has not been used due to low data capture for the 3 co-located diffusion tubes; this leads to a high level of uncertainty and poor overall precision.

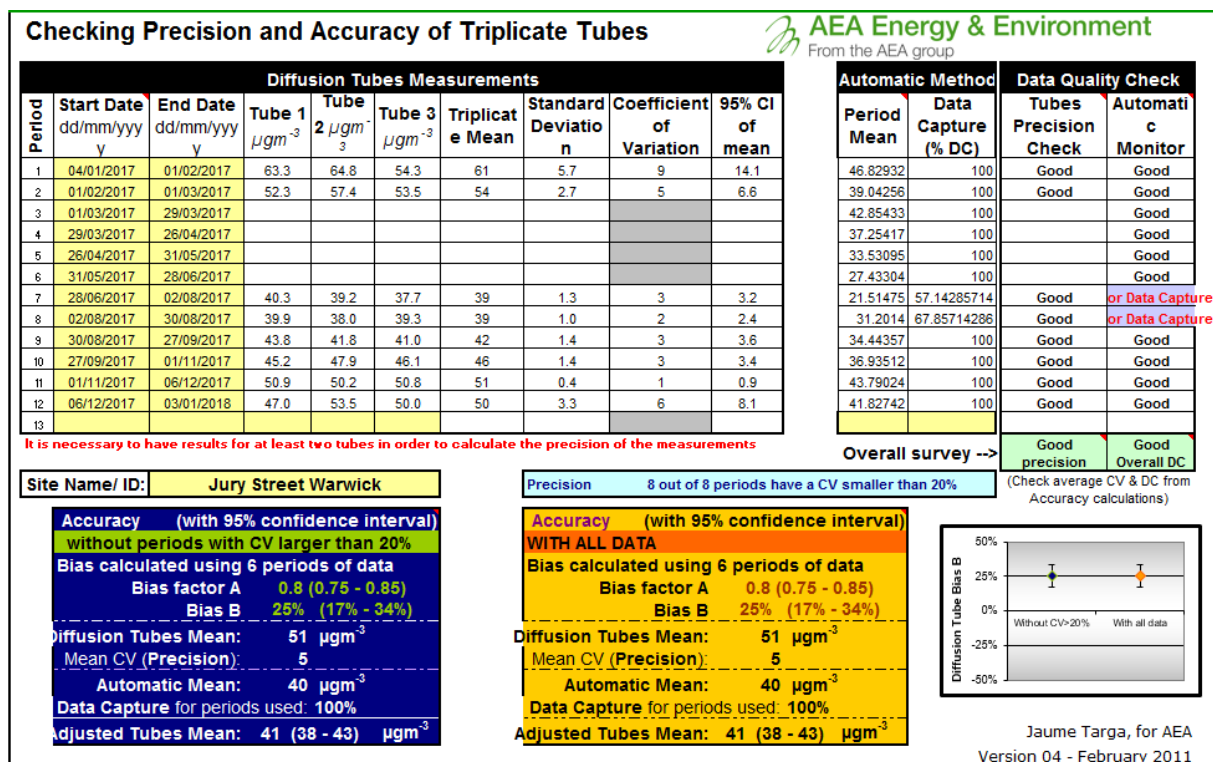
The local bias adjustment factor (1.04) calculated from Leamington Spa Hamilton Terrace has been used to adjust the data accordingly because it is a far more conservative figure than the national adjustment figure (0.89) in this instance.

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



If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

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



Short to Long term data adjustment; Annualisation

In 2017, three monitoring locations, W1, W28 and W33-35, fell below 75% data capture. In accordance with the methodology in Box 7.10 of LAQM.TG (16) the sites have 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 2017 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 annualisation calculations are summarised below in Table C.1

Table C.1- Annualisation Factor Calculation for W1, W28 and W33-35

W1				
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	1.033
Birmingham Acocks Green	Urban Background	21.3	24.7	1.057
Coventry Allesley	Urban Background	22.5	25.6	1.027
Average Ratio				1.039
W28				
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	1.109
Birmingham Acocks Green	Urban Background	21.3	24.7	1.011
Coventry Allesley	Urban Background	22.5	25.6	1.045
Average Ratio				1.055
W33-35				
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	0.919
Birmingham Acocks Green	Urban Background	21.3	24.7	0.925
Coventry Allesley	Urban Background	22.5	25.6	0.932
Average Ratio				0.925

NO₂ Fall-off with distance from the road

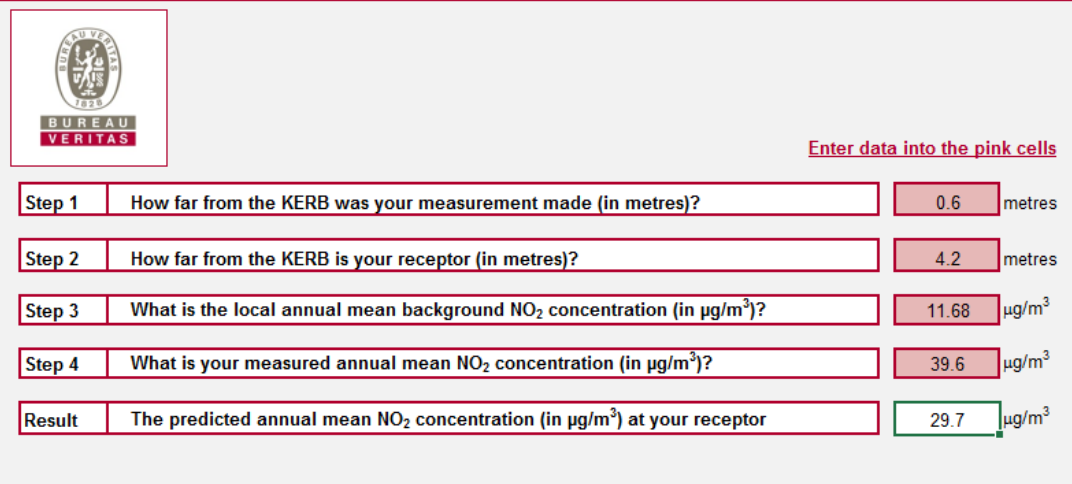
Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated, using the NO₂ fall-off with distance calculator available on the LAQM Support website.⁷

⁷ DEFRA 2017- Nitrogen Dioxide fall off with distance. <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

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This has been done for ten locations where the monitoring site is not strictly representative of exposure, and the concentrations are greater than $36\mu\text{g}/\text{m}^3$, to identify whether elevated monitored concentrations constitute an exceedance of the annual mean NO_2 AQS objective. The summaries of the adjustments undertaken using the tool are presented below. Background concentrations are taken from the Defra 2013-based background maps, also available on the LAQM website.

Figure C.3- W38 NO_2 fall-off with distance from the road

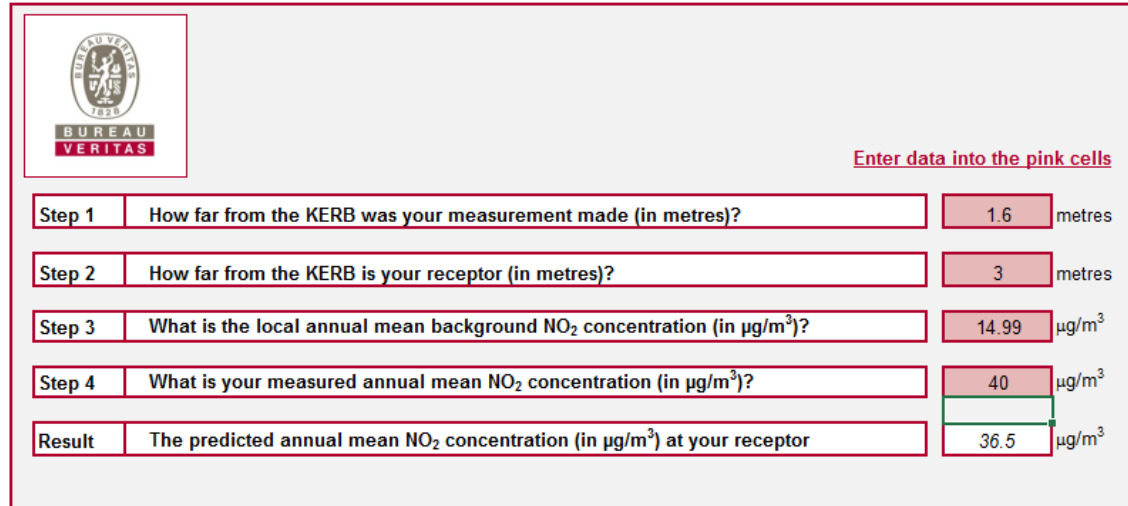


BUREAU VERITAS

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.6	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.2	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu\text{g}/\text{m}^3$)?	11.68	$\mu\text{g}/\text{m}^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu\text{g}/\text{m}^3$)?	39.6	$\mu\text{g}/\text{m}^3$
Result	The predicted annual mean NO_2 concentration (in $\mu\text{g}/\text{m}^3$) at your receptor	29.7	$\mu\text{g}/\text{m}^3$

Figure C.4– W46 NO_2 fall-off with distance from the road




BUREAU VERITAS

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.6	metres
Step 2	How far from the KERB is your receptor (in metres)?	3	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu\text{g}/\text{m}^3$)?	14.99	$\mu\text{g}/\text{m}^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu\text{g}/\text{m}^3$)?	40	$\mu\text{g}/\text{m}^3$
Result	The predicted annual mean NO_2 concentration (in $\mu\text{g}/\text{m}^3$) at your receptor	36.5	$\mu\text{g}/\text{m}^3$


Figure C.5– W59 NO₂ fall-off with distance from the road



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	3.5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.1	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	41.6	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	36.7	µg/m ³


Figure C.6- W36 NO₂ fall-off with distance from the road



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	5	metres
Step 2	How far from the KERB is your receptor (in metres)?	5.2	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	7.98	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	41.3	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	40.9	µg/m ³


Figure C.7 – W14 NO₂ fall-off with distance from the road



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	5.22	metres
Step 2	How far from the KERB is your receptor (in metres)?	5.82	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.517	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	45.4	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	44.5	µg/m ³


Figure C.8- W16 NO₂ fall-off with distance from the road



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	7.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	13.78	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.51	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	37.6	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	33.5	µg/m ³


Figure C.9- W31 NO₂ fall-off with distance from the road



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.4	metres
Step 2	How far from the KERB is your receptor (in metres)?	2.7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	12.63	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	37.3	µg/m ³


Figure C.10- W36 NO₂ fall-off with distance from the road



Enter data into the pink 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)?	12.10776	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	49.5	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	46.0	µg/m ³


Figure C.11– W52 NO₂ fall-off with distance from the road



Enter data into the pink 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)?	3	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	14.99	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	44.3	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	37.8	µg/m ³

Figure C.12- W67 NO₂ fall-off with distance from the road



Enter data into the pink 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)?	12.11	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	50	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	46.8	µg/m ³

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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

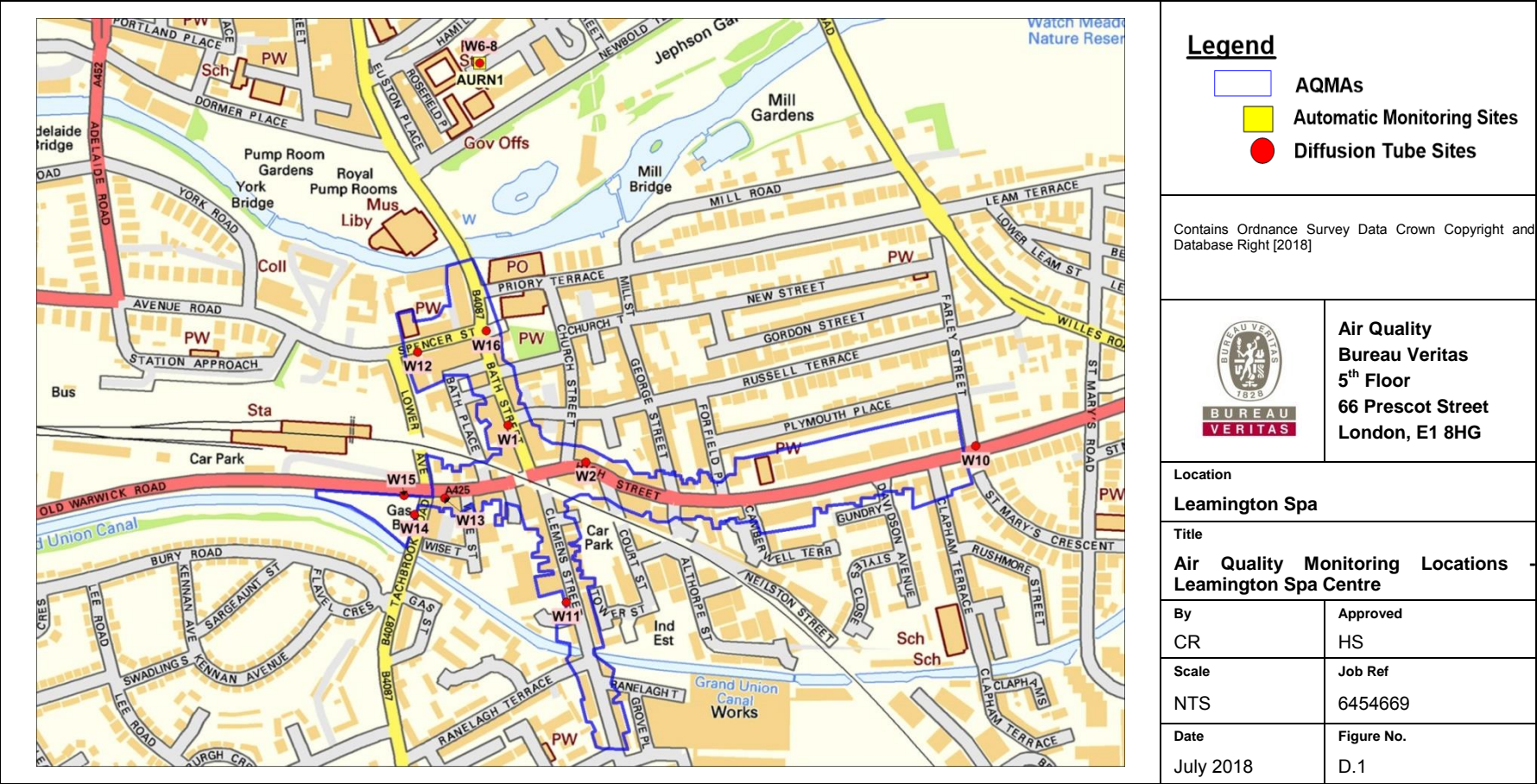


Figure D.2 - Air Quality Monitoring Locations - Leamington Spa Rugby Road



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Figure D.1 - Air Quality Monitoring Locations - Warwick

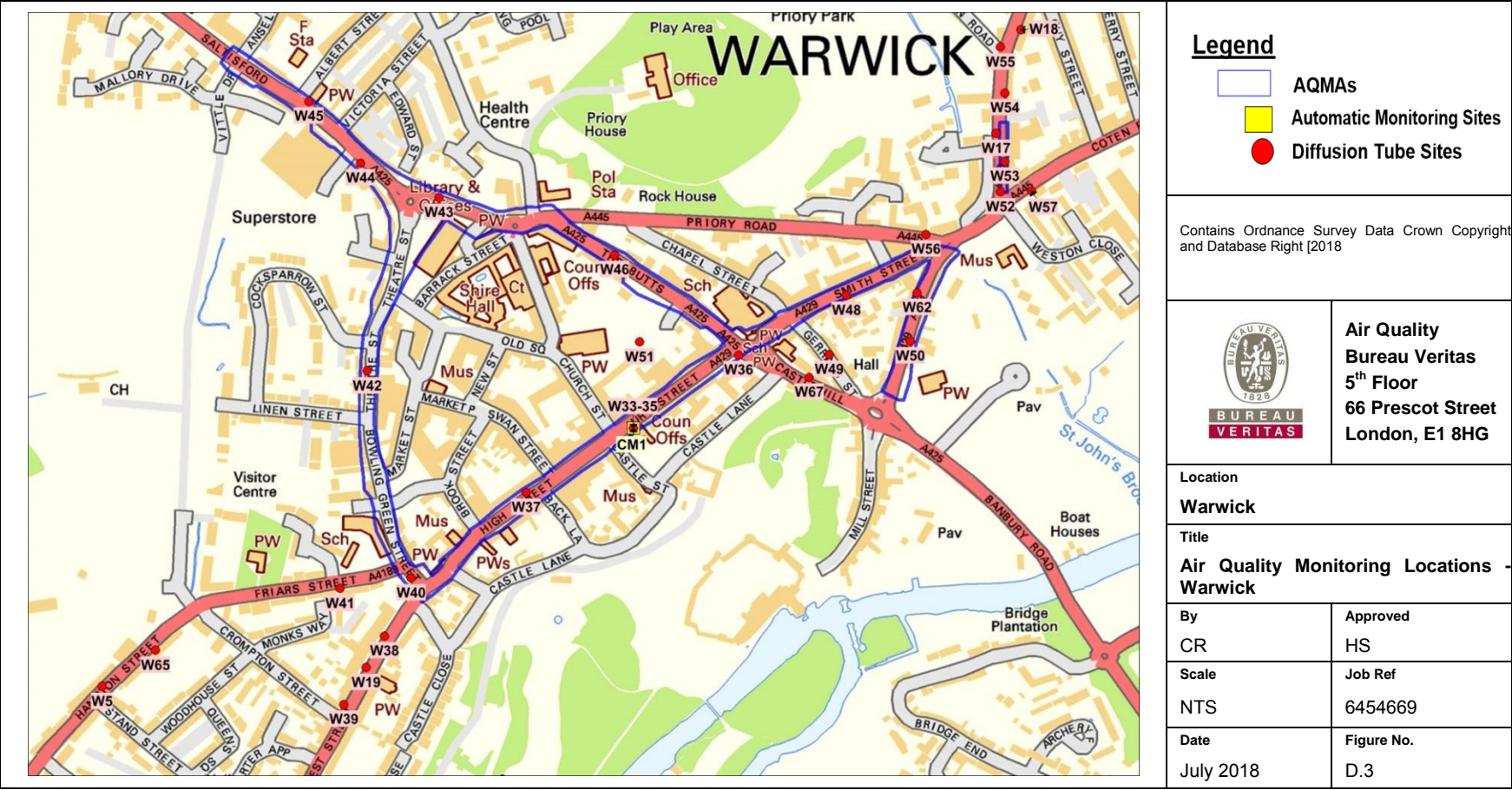


Figure D.2 - Air Quality Monitoring Locations - Kenilworth



Figure D.3 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 ⁸	
	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

⁸ The units are in micrograms 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
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide
WDC	Warwick District Council