

South Staffordshire: Review of Local Air Quality Management

March 2019



Experts in air quality
management & assessment



Document Control

Client	South Staffordshire Council	Principal Contact	John Gerring
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Report Prepared By:	Penny Wilson
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Air Quality Consultants Ltd
23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
119 Marylebone Road, London NW1 5PU Tel: 020 3873 4780
aqc@aqconsultants.co.uk

Registered Office: 23 Coldharbour Road, Bristol BS6 7JT
 Companies House Registration No: 2814570

1 Introduction

- 1.1 This report sets out a review of Local Air Quality Management (LAQM) in South Staffordshire. It has been carried out by Air Quality Consultants Ltd on behalf of South Staffordshire Council.
- 1.2 This review has been carried out to inform future LAQM activities in South Staffordshire, the requirements for which are set out in Part IV of the Environment Act (1995) (HMSO, 1995) and the relevant Policy and Technical Guidance documents.
- 1.3 A review of monitoring sites, Air Quality Management Areas (AQMAs) and emissions sources in the district has been carried out to determine whether there are any additional locations where there is a risk of the objective being exceeded. Following this, recommendations are made about future monitoring and dispersion modelling which may be necessary to determine the extent of any exceedances.

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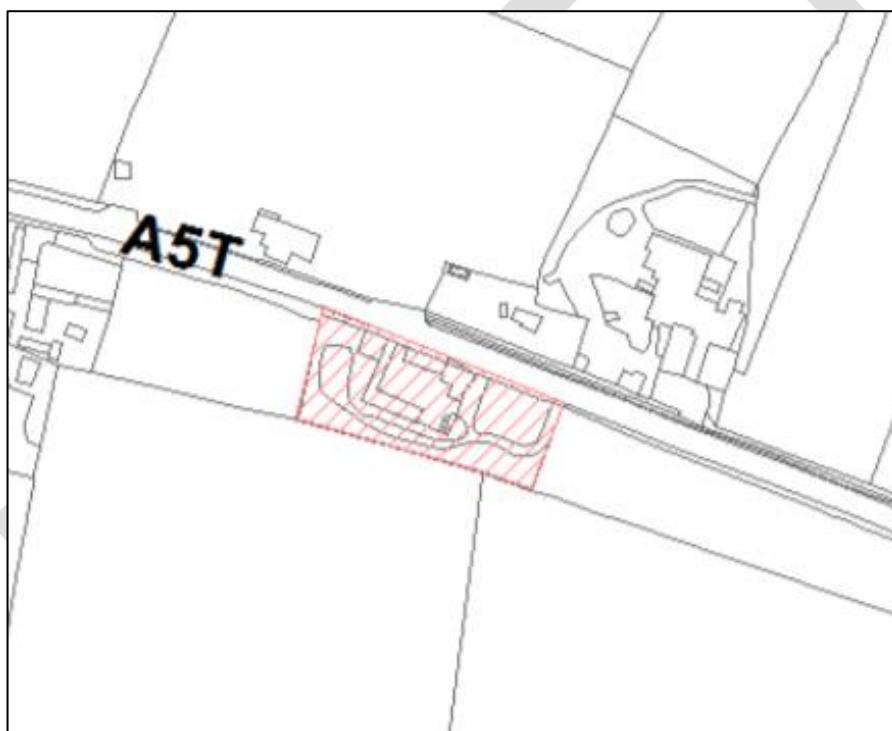
2 Background

- 2.1 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.
- 2.2 The first LAQM report completed by South Staffordshire Council was published in February 1999. Since then regular reports have been published, as required by the relevant policy guidance at the time. Current guidance (Defra, 2016) requires Annual Status Reports (ASRs) to be submitted to Defra every year. The ASR should include information about action to improve air quality, monitoring data and any new sources of emissions. If a risk of an objective is identified at a relevant location, the local authority is required to either declare an AQMA through a fast-track process, or following gathering of additional evidence.
- 2.3 South Staffordshire Council declared five AQMAs as a result of the annual mean nitrogen dioxide objective being exceeded at relevant locations in 2006/7 (as described in Table 1). These were all locations where residential properties are near to major roads, with road traffic being the dominant source of emissions. No exceedances of any of the other regulated pollutants have been identified in the district.
- 2.4 Monitoring carried out following declaration of the Featherstone AQMA (AQMA No.3) identified that the objective was being achieved, and this AQMA was revoked in 2008. In Bursnips Road (AQMA 2) measured concentrations have steadily declined and remained below the objective since 2006. According to recent ASRs this AQMA has been revoked, although this is not registered on the Defra website¹.
- 2.5 Downward trends in measured concentrations have also been recorded in Wedges Mills (AQMA No. 4) and Penkridge (AQMA 1). There have been no measured exceedances of the objective within these AQMAs since 2008 (AQMA 1) and 2010 (AQMA 4). As a result, South Staffordshire Council intends to revoke these AQMAs shortly.
- 2.6 Following revocation of AQMAs 1 and 4, Oak Farm (AQMA 5) will be the only AQMA in South Staffordshire. This encompasses a single residential dwelling (Oak Farm) and some derelict buildings, located alongside the A5 close to the New Hollies Truck Stop, as shown in Figure 1. The dwelling is approximately 2m from the kerb of the A5.

¹ Defra List of Local Authorities with AQMAs <https://uk-air.defra.gov.uk/aqma/list>

Table 1: South Staffordshire AQMAs

Number	Name	Year Declared	Description	Status
AQMA 1	Woodbank	2006	Adjacent to the M6 and Teddesley Road, Nr Penkridge	To be revoked in 2019
AQMA 2	Bursnips	2006	Bursnips Road, Essington	Revoked 2015/16 (not on identified on Defra website)
AQMA 3	Featherstone	2006	Along Cannock Road A460 in Featherstone	Revoked 2008
AQMA 4	Wedges Mills	2006	Along the Wolverhampton Road, Wedges Mills.	To be revoked in 2019
AQMA 5	Oak Farm	2007	The A5 at Hatherton opposite HGV truck stop	Current

**Figure 1: Oak Farm (AQMA 5)**

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3 Existing Air Quality

- 3.1 South Staffordshire Council carries out monitoring of nitrogen dioxide concentrations using a network of diffusion tubes and one automatic analyser. All of the monitoring sites are located in the north east of the district, at roadside sites adjacent to the strategic road network, as shown in Figure 2. They are all in, or near to, existing or former AQMAs. At most relevant locations outside these areas, concentrations are likely to be lower.

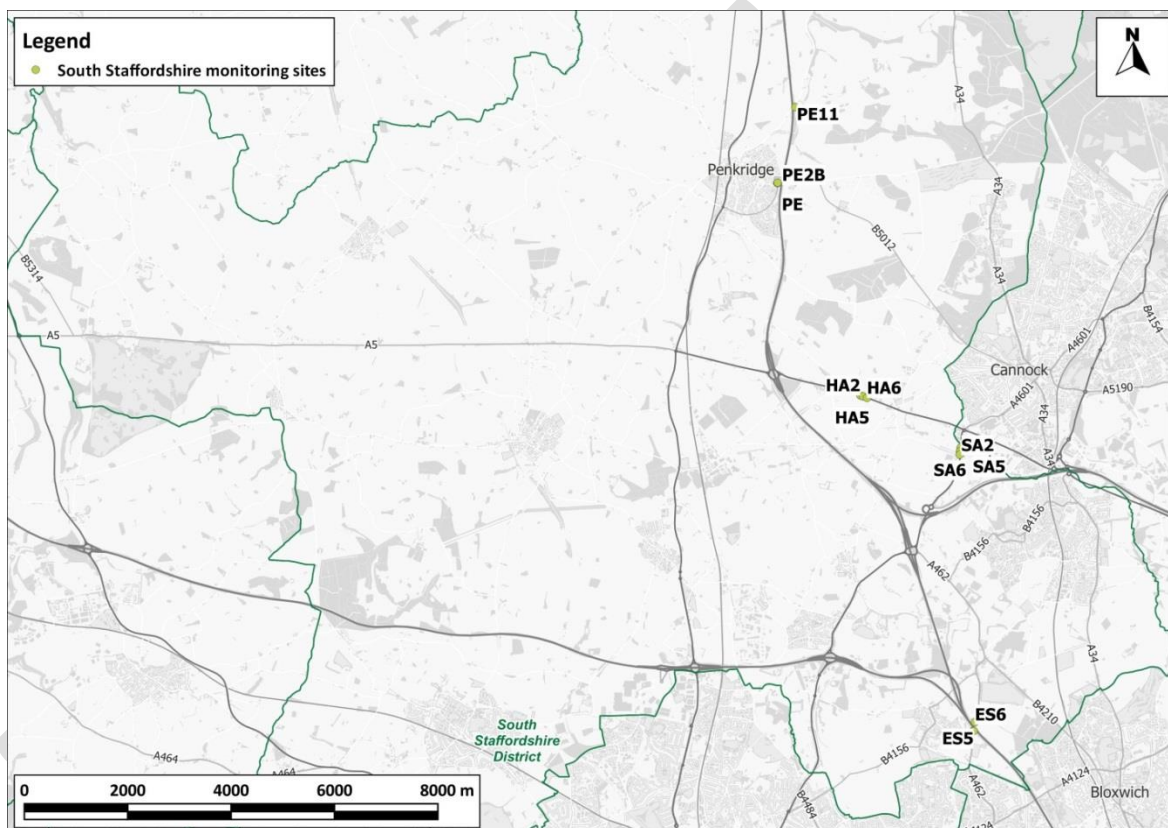


Figure 2: Monitoring Locations in South Staffordshire

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- 3.2 Monitoring has been maintained at the same sites for over 10 years. The data from these sites provides valuable information about trends in concentrations over this period. Data for each of the areas of concern are presented in the following sections.

Woodbank (AQMA 1, soon to be revoked)

3.3 Monitoring is carried out using a single diffusion tube (PE11). This is located near to Woodbank House, which is the only relevant location within the AQMA. As shown in Figure 3, concentrations have been below the objective since 2009. As a result, this AQMA is to be revoked shortly.

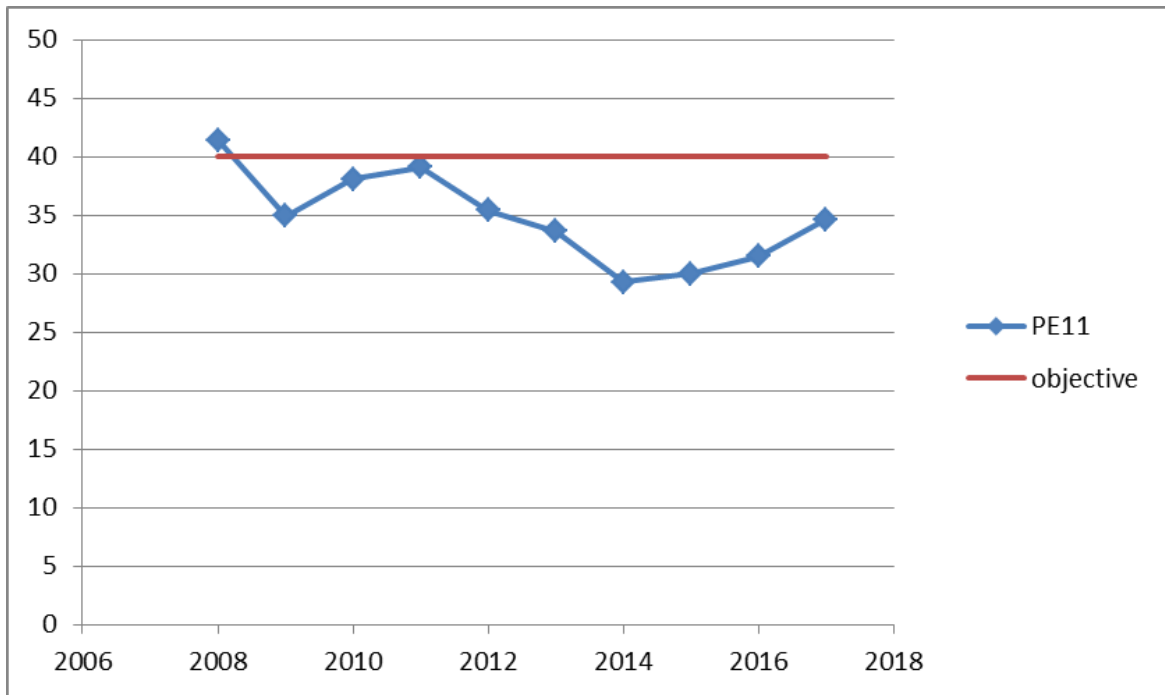


Figure 3: Annual Mean Nitrogen Dioxide Concentrations at Woodbank (µg/m³)

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Bursnips, Essington (AQMA 2, revoked)

3.4 Monitoring is carried out using diffusion tubes at three locations (ES4, ES5 and ES6). These are all located near to residential properties alongside Bursnips Road, close to where it crosses the M6. As shown in Figure 3, concentrations have been below the objective since 2008. As a result, this AQMA was revoked in 2015/16.

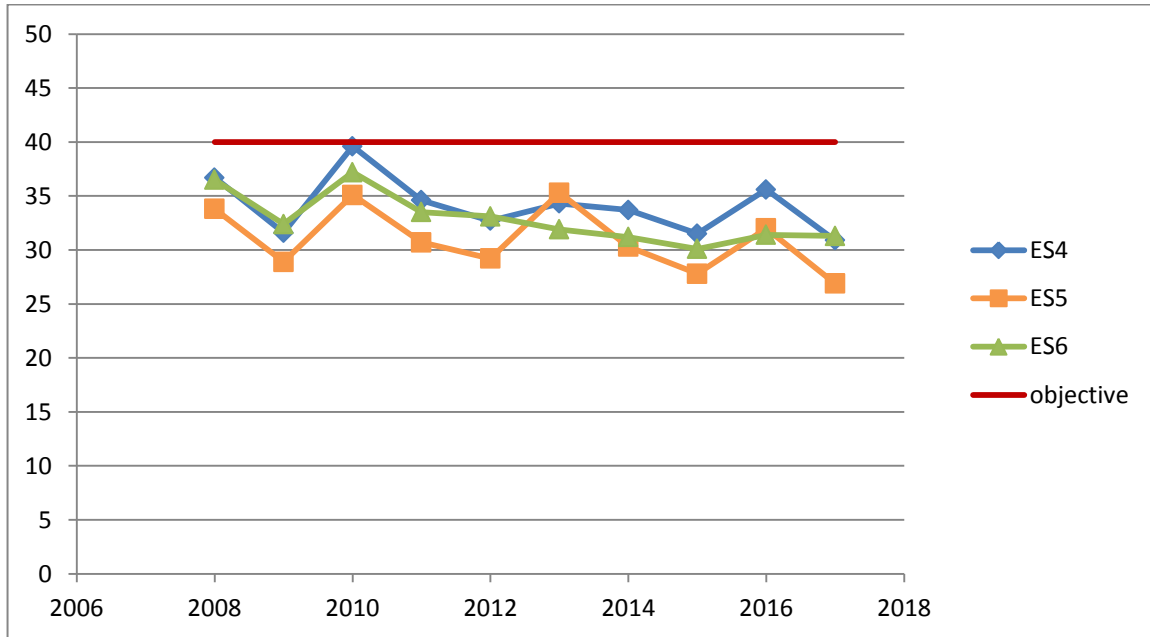


Figure 4: Annual Mean Nitrogen Dioxide Concentrations in Essington (µg/m³)

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Wedges Mills (AQMA 4, to be revoked)

3.5 Monitoring is carried out using diffusion tubes at three locations (SA2, SA5 and SA6). These are all at residential properties adjacent to Wolverhampton Road, Wedges Mills. As shown in Figure 5, concentrations have been below the objective since 2011. As a result, this AQMA is to be revoked.

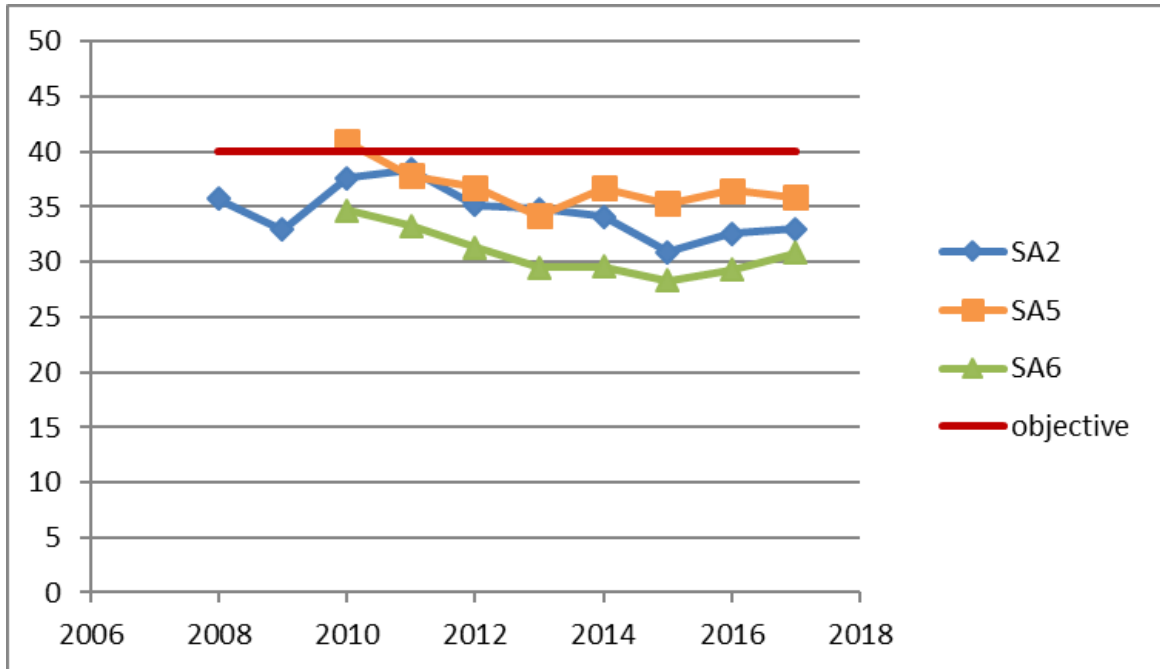


Figure 5: Annual Mean Nitrogen Dioxide Concentrations in Wedges Mills (µg/m³)

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Oak Farm (AQMA 5, to be retained)

3.6 Monitoring is carried out using diffusion tubes at one location within the AQMA (HA2), adjacent to Oak Farm, opposite the truck stop on the A5. As shown in Figure 6, concentrations at HA2 have reduced, and have been just below the objective for the last three years. However, concentrations remain within 5% of the objective, and therefore this AQMA is to be retained.

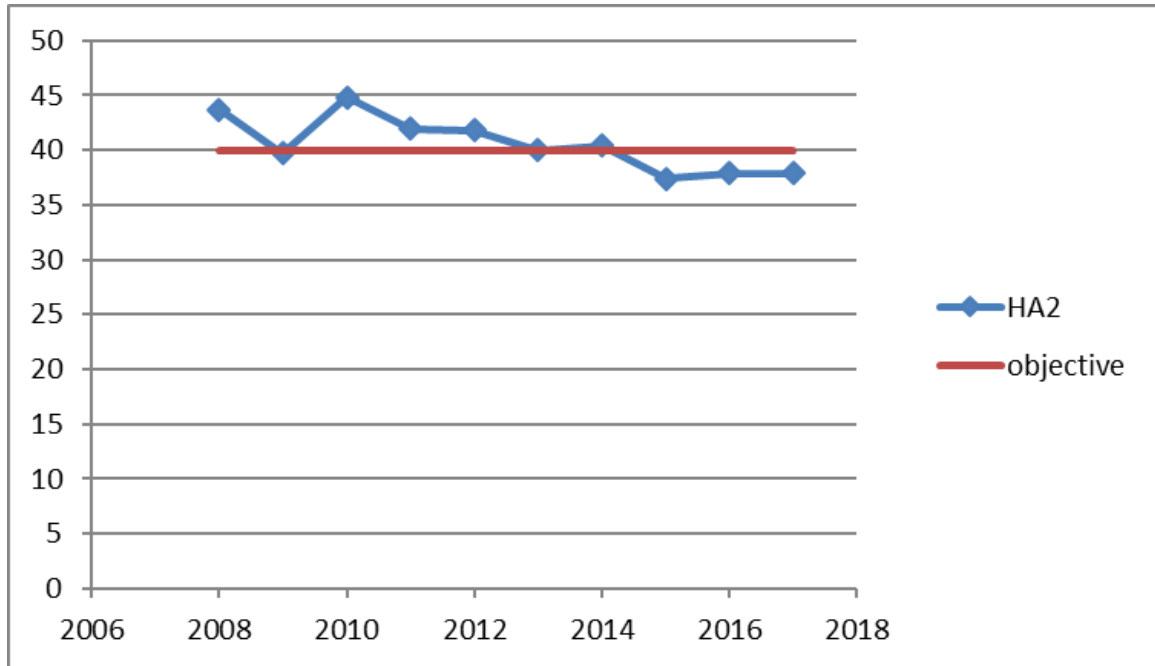


Figure 6: Annual Mean Nitrogen Dioxide Concentrations at Oak Farm (µg/m³)

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3.7 Two further sites, HA5 and HA6, are at roadside locations outside the AQMA, which are not representative of relevant exposure. As shown in Figure 7, concentrations have also reduced at these sites. As there is no relevant exposure near to sites HA5 and HA6 it is not essential that monitoring continues.

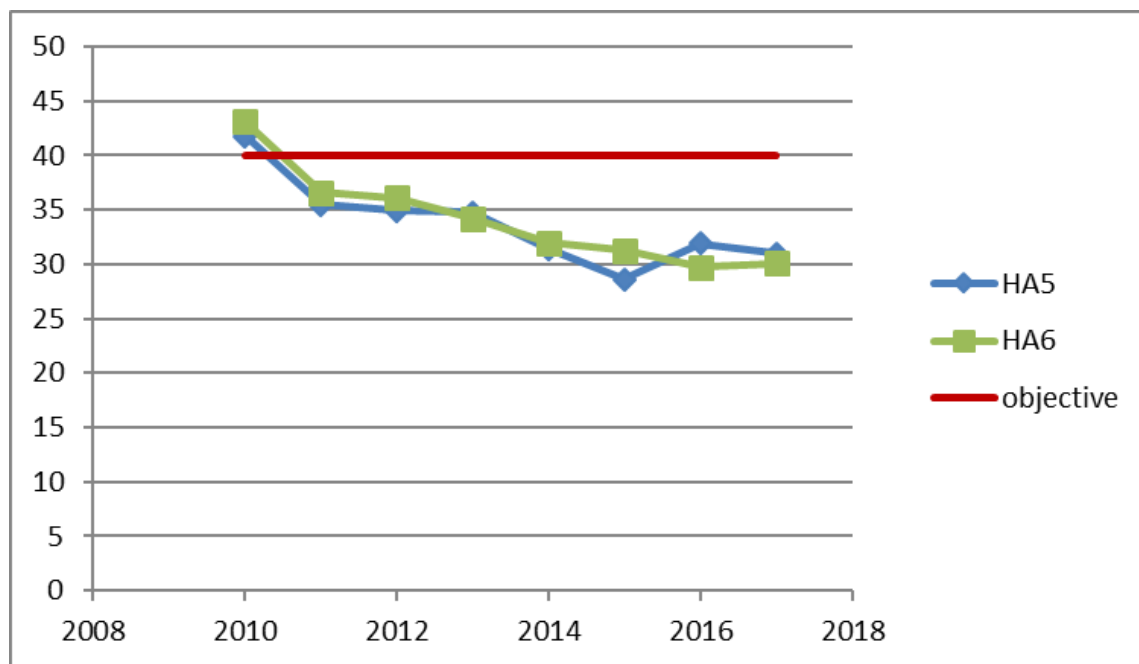


Figure 7: Annual Mean Nitrogen Dioxide Concentrations at Alongside A5, near to Oak Farm (µg/m³)

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Penkridge

- 3.8 Monitoring is carried out using both an automatic analyser (PE) and a triplicate set of diffusion tubes (PE2) at a site on Wolgarston Way, near to the M6. These are representative of the residential properties closest to the M6 in Penkridge. As shown in Figure 9 although the diffusion tubes are located immediately adjacent to the inlet for the automatic analyser, in recent years the measured results have been quite different, whereas a prior to 2012 there was good agreement.
- 3.9 Some of the discrepancy between the monitoring sites in 2013 and 2014 is due to a period of poor data capture, when the automatic monitor was switched off due to breakdown. However, there continues to be poor agreement between the monitors in subsequent years.
- 3.10 A number of local authorities use diffusion tubes supplied and analysed by the same laboratory (Staffordshire Scientific Services) and carry out their own collocation studies with automatic analysers. The results are reported to Defra, who collate the information and derive national bias adjustment factors for each laboratory. Nineteen of these studies were provided to Defra for Staffordshire Scientific Services using monitoring carried out in 2017, including the one carried out by South Staffordshire. As shown in Figure 8, the majority of studies indicated that the diffusion tubes were over-predicting concentrations by around 10-20%, with an overall bias adjustment factor of 0.88. However, the South Staffordshire study was the only one which suggested that the

diffusion tubes were under-estimating concentrations (by 30%). This provides further evidence that the automatic analyser is performing poorly.

National Diffusion Tube Bias Adjustment Factor Spreadsheet					Spreadsheet Version Number: 09/18					
Follow the steps below in the correct order to show the results of relevant co-location studies								This spreadsheet will be updated at the end of March 2019		
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods								LAQM Helpdesk Website		
When presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet								Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.		
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.										
Step 1:		Step 2:	Step 3:	Step 4:						
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.						
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data	If you have your own co-location study then see footnote 4. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953						
Analysed By ¹	Method <small>To do your selection, choose (M) from the pop-up list</small>	Year <small>To do your selection, choose (All)</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ²	Bias Adjustment Factor (A) (Cm/Dm)
Staffordshire Scientific Services	20% TEA in water	2017	R	East Staffordshire Borough Council	12	50	47	6.4%	G	0.94
Staffordshire Scientific Services	20% TEA in water	2017	Q	South Staffordshire Council	11	29	41	-30.4%	G	1.44
Staffordshire Scientific Services	20% TEA in water	2017	UB	Wigan Council	11	26	18	46.7%	G	0.68
Staffordshire Scientific Services	20% TEA in water	2017	R	Stoke-on-Trent City Council	12	55	52	5.7%	G	0.95
Staffordshire Scientific Services	20% TEA in water	2017	UB	Stoke-on-Trent City Council	12	30	26	17.3%	G	0.85
Staffordshire Scientific Services	20% TEA in water	2017	R	Salford City Council	12	46	44	4.8%	G	0.95
Staffordshire Scientific Services	20% TEA in water	2017	UB	Salford City Council	12	32	26	21.4%	G	0.82
Staffordshire Scientific Services	20% TEA in water	2017	R	Cannock Chase Council	10	26	22	20.3%	G	0.83
Staffordshire Scientific Services	20% TEA in water	2017	KS	Manchester City Council	11	64	65	-1.4%	G	1.01
Staffordshire Scientific Services	20% TEA in water	2017	UC	Manchester City Council	11	40	35	13.3%	G	0.88
Staffordshire Scientific Services	20% TEA in water	2017	SI	Manchester City Council	12	25	24	6.3%	G	0.94
Staffordshire Scientific Services	20% TEA in water	2017	R	Stockport MBC	9	49	44	11.5%	G	0.90
Staffordshire Scientific Services	20% TEA in water	2017	R	Stockport MBC	12	29	20	41.0%	G	0.71
Staffordshire Scientific Services	20% TEA in water	2017	KS	Manylebone Road Intercomparison	12	89	79	13.1%	G	0.88
Staffordshire Scientific Services	20% TEA in water	2017	R	Bury Council	10	34	29	18.4%	G	0.84
Staffordshire Scientific Services	20% TEA in water	2017	R	Cannock Chase Council	11	27	22	19.5%	G	0.84
Staffordshire Scientific Services	20% TEA in water	2017	R	Cannock Chase Council	9	24	20	20.4%	G	0.83
Staffordshire Scientific Services	20% TEA in water	2017	B	Trafford	12	17	14	16.0%	G	0.86
Staffordshire Scientific Services	20% TEA in water	2017	UB	Trafford	10	22	19	19.6%	G	0.84
Staffordshire Scientific Services	20% TEA in water	2017	Overall Factor³ (19 studies)						Use	0.88

Figure 8: Staffordshire Scientific Services Diffusion Tube Bias Adjustment Factors 2017

- 3.11 No 1-hour mean nitrogen dioxide concentrations greater than 200 µg/m³ have been measured since 2012. The objective allows for 18 exceedances in a year, and therefore there is no risk of it being exceeded at this location.
- 3.12 The automatic monitor was installed in 2003. It is now 16 years old and coming to the end of its useful life. It is performing poorly, and there is no risk of the 1-hour mean objective being exceeded. Consideration could, therefore, be given to decommissioning the automatic monitor, as the data are no longer reliable. There would be cost savings associated with this, which could be used to measure other pollutants, or at other locations.

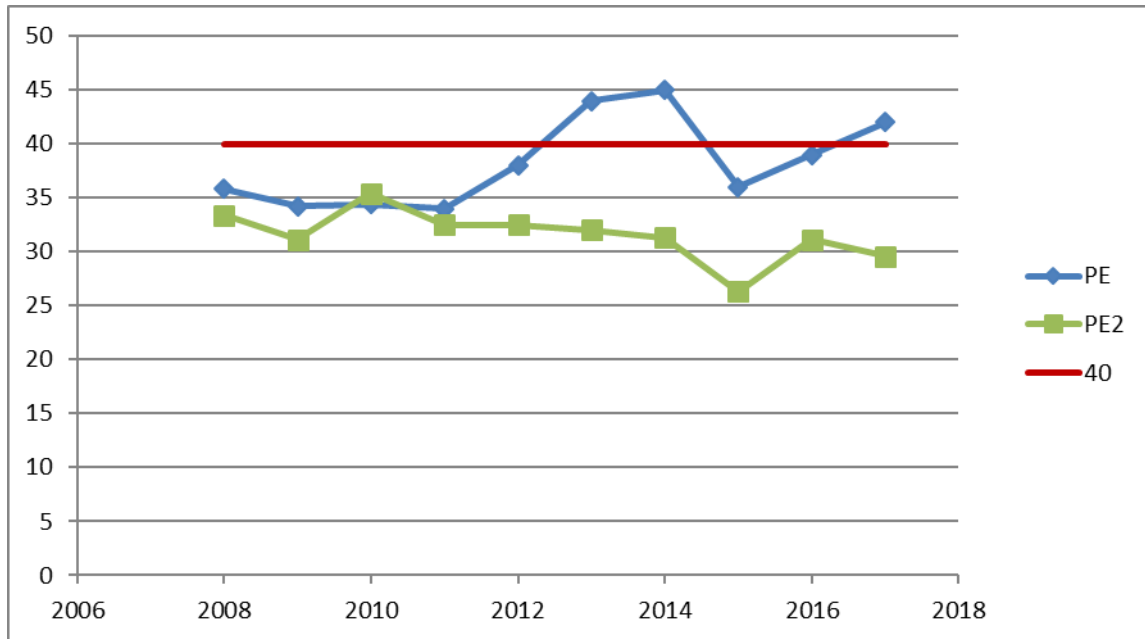


Figure 9: Annual Mean Nitrogen Dioxide Concentrations in Penkridge (µg/m³)

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Other locations and pollutants

- 3.13 In the future, as nitrogen dioxide concentrations decrease, greater emphasis is likely to be placed on PM₁₀ and PM_{2.5} concentrations. This also aligns with Public Health objectives. It would therefore be prudent to give consideration to installing a PM monitor at a suitable location.
- 3.14 Officers are often contacted by residents with concerns about air quality in their area. It is not possible to monitor at every location of potential concern, and it is often difficult to communicate the spatial variation in pollutants and relative contributions of various sources. Therefore, consideration could be given to modelling pollutant concentrations in these areas of concern. However, some monitoring will still be necessary to appropriately verify the model.
- 3.15 The review of relevant sources has identified some additional locations where it may be appropriate to carry out monitoring of nitrogen dioxide, and PM₁₀ and/or PM_{2.5} concentrations, as discussed in the next section.

4 Review of Sources

- 4.1 Defra has provided Technical Guidance to local authorities on how to review and assess air quality in their area. The guidance has evolved over the period of 15 years or so, and acknowledges that most of the areas of concern have now been identified. It provides a list of the types of processes or locations where there is a risk that exceedances of the objectives may occur, based on experience throughout the UK. A full review of this list has been carried out to consider whether there are any sources in South Staffordshire that require further consideration.
- 4.2 The full list and review is set out in Table 2 to Table 5. Any sources that may require further investigation are highlighted and discussed further in the recommendations section.

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Table 2: Road Traffic Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in South Staffordshire?
Narrow congested streets with residential properties close to the kerb.	NO ₂	Long and Short-Term	5,000 vehicles/day - exposure within 2m from kerb - slow moving traffic with frequent stop/start	<p>The strategic road network in South Staffordshire has largely been built around, rather than through, settlements. There are no historic towns or villages characterised by narrow streets with tall buildings either side that form a typical 'canyon'. There are a small number of older buildings close to busy roads, such as at Wedges Mills and Oak Farm. Monitoring has been carried out at these locations and AQMAs declared, although the Wedges Mills AQMA will be revoked shortly.</p> <p>There are, however, <u>some sections of the A34</u>, such as in Huntingdon near to the Limepit Lane roundabout and Cheslyn Hay near to the junction with Love Lane, where there are properties within a few metres of the kerb. Traffic flows on the A34 are around 12,000 vehicles/day. This is the type of location, where exceedances of the annual mean NO₂ objective can occur. <u>Therefore consideration could be given to carrying out monitoring at the façades of these properties.</u></p> <p>There is a section of <u>Station Street in Cheslyn Hay</u>, which is fairly narrow and has properties close to the kerb on either side. It is also on a gradient, which can further increase emissions. <u>If traffic flows exceed 5,000 vehicles per day, consideration could be given to monitoring at this location</u></p>
Busy streets where people may spend 1 hour or more close to traffic	NO ₂	Short-Term	10,000 vehicles/day - exposure within 5m from kerb >= 1-hour	<p>Traffic flows on the <u>A449 through Penkridge</u> are in the region of 12,000 vehicles per day. There are a number of shops and businesses in the centre of the village, where people could potentially spend an hour or more. Based on experience elsewhere, it is unlikely that the short-term NO₂ objective would be exceeded. However, due to the location of residential properties close to the kerb, it is <u>recommended that some monitoring is carried out in the village to identify whether the annual mean objective is being achieved.</u></p>
Roads with a high flow of HDVs	NO ₂ / PM ₁₀	Long and Short-Term	2,500 HDVs/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	<p>The previously declared AQMAs were alongside the M6 and A5, which carry high volumes of HGVs. The proposed <u>West Midlands Interchange would increase HDV movements on a number of roads in the district, to the extent that additional roads are likely to fall into this category, and this should be reviewed as part of the DCO application process.</u> It is recommended that there is liaison with Staffordshire County Council highways department to identify if there are any roads that have not been previously considered.</p>

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in South Staffordshire?
Junctions	NO ₂ / PM ₁₀	Long and Short-Term	10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	<p>There is a <u>single property</u> within 10m of the kerb where the A449 Stafford Road meets the M54. Consideration could be given to monitoring at this location, if it has not been considered in previous rounds of LAQM.</p> <p>There are a small number of properties within a few metres of the kerb, near to the roundabout in Gailey. Six months monitoring has recently been carried out as part of the application for the West Midlands Interchange. This indicated that annual mean NO₂ concentrations are in the region of 33 µg/m³ and therefore further investigation is not considered necessary.</p>
New roads constructed or proposed since the last round of Review and Assessment	NO ₂ / PM ₁₀	Long and Short-Term	if no air quality assessment available from planning application - 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	There is a new link road planned between the M54 and the M6. This would reduce traffic on the A460 through Featherstone and potentially lead to air quality benefits. Whilst a preferred option has been selected, a DCO application has not yet been made.
Roads with significantly changed traffic flows	NO ₂ / PM ₁₀	Long and Short-Term	25% traffic increase on roads > 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants) - Roads previously identified at risk of exceeding (within 10% of objective)	The proposed <u>West Midlands Interchange</u> has the potential to lead to significant changes in traffic flows. Assistance should be sought from the applicant to identify which roads will be affected.
Bus and coach stations	NO ₂	Long and Short-Term	2,500 bus/coach movements/day ⁽⁵⁾ - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)	There are no bus or coach stations which meet the criteria in the district.

Table 3: Non-Road Transport Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in South Staffordshire?
Airports	NO ₂	Long-term	Determine relevant exposure within 1km of the airport boundary; If exposure has been identified, determine whether the airport total equivalent passenger throughput is more than 10 million passengers per annum (mppa). Freight should also be considered, and converted to equivalent mppa using 100,000 tonnes = 1 mppa; and Identify whether the background annual mean NO _x concentration is above 25µg/m ³ in these areas.	There are no airports in South Staffordshire
Railway Stationary diesel or steam locomotives:	NO ₂ , SO ₂	Short-term	Identify locations where diesel or steam locomotives are regularly (at least 3 times a day) stationary for periods of 15 minutes or more; and Determine relevant exposure within 15m of the locomotives.	There are no locations where diesel or steam trains are stationary for 15-minutes or more within 15 m of relevant exposure. It does not appear that there would be relevant exposure near to areas where there would be stationary locomotives as a result of the <u>West Midlands Interchange</u> . However, this should be checked with the <u>applicant</u> .
Railway - Moving diesel locomotives:	NO ₂	Long-term and short-term	Determine relevant exposure within 30m of the relevant railway tracks (Table 7.2 provides information on which lines should be considered); and Identify whether the background annual mean NO ₂ concentration is above 25µg/m ³ in these areas.	None of the railway lines that travel through the district are listed by Defra as have heavy traffic of diesel passenger trains.
Ports	NO ₂ , PM ₁₀ , SO ₂	Short-term	Is there more than 5,000 large ship movements ⁴³ per year, with relevant exposure within 250m of the berths and main areas of manoeuvring; or Is there more than 15,000 large ship movements per year, with relevant exposure within 1km of these areas?	There are no ports in South Staffordshire
Non-Road Mobile Machinery (NRMM)	NO ₂ , PM ₁₀	Short-term	Where there is considered to be an elevated risk of local air quality issues arising from NRMM activities, please contact the LAQM Helpdesk	It is possible that the proposed West Midlands Interchange would require the use of NRMM in both the construction and operation phases. However, there is no relevant exposure sufficiently close to the site that this would lead to exceedances of the objectives.

Table 4: Industrial Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in South Staffordshire?
Industrial Installations	All Pollutants	Long and Short-Term	If no air quality assessment available from planning application - New source or existing source with significant increase (30%) in emissions - with population exposure nearby	A new energy from waste plant opened at Four Ashes in 2014. The planning and permit applications demonstrated that the impact on local air quality would be not significant. Monitoring data shows that it is operating within its emissions limits ² and therefore the conclusions of these assessments remain valid.
				South Staffordshire Council are not aware of any other installations or applications.
Major Petrol Storage Depots	Benzene	Long-Term	-	There are no major petrol storage depots in the district
Petrol Stations	Benzene	Long-Term	Petrol throughput > 2,000m ³ or 2 million litres per year - Near busy road (>30,000 vehicles/day) - Exposure within 10m from the pumps	There are no petrol stations that meet the criteria.
Poultry Farms	PM ₁₀	Long and Short-Term	Poultry farms housing in excess of 400,000 birds (if mechanically ventilated) / 200,000 birds (if naturally ventilated) / 100,000 birds (if turkey unit) - Exposure within 100m from the poultry units	There are two poultry farms in the district that meet the criteria in Pilaton and Hatherton. The procedure set out in the Technical Guidance should be followed, to determine whether any further investigation is necessary.

² <https://www.veolia.co.uk/staffordshire/our-facility/four-ashes-emissions-air-data>

Table 5: Domestic and Fugitive or Uncontrolled Sources

Source Category	Pollutant of Concern	Objectives of Concern	Criteria	Any in South Staffordshire?
Commercial and Domestic Gas-Fired CHP Combustion - Individual Installations	NO ₂	Long-Term (NO ₂)	Screen using the CHP Screening Tool (see paras 7.43-7.47)	No CHP have been identified that meet the relevant criteria.
Commercial and Domestic Biomass Combustion - Individual Installations	NO ₂ / PM ₁₀	Long and Short-Term (NO ₂) / Short-Term (PM ₁₀)	Screen against Target Emission Rate from Biomass Calculator (see paras 7.48-7.53)	There is a biomass boiler at one of the poultry farms. The procedure set out in the Technical Guidance should be followed, to determine whether any further investigation is necessary.
Commercial and Domestic Biomass Combustion - Combined Installations	PM ₁₀	Long-Term (Scotland) / Short-Term (not Scotland)	Screen against Threshold Emissions Density from Biomass Calculator (see paras 7.54-7.62)	There are no areas with high densities of biomass combustion in South Staffordshire
Domestic Other Solid-Fuel Combustion	SO ₂	Long and Short-Term	Density of coal burning premises = 100 per 500m × 500m area	There are no areas with high densities of solid fuel combustion in South Staffordshire
Fugitive or uncontrolled Sources	PM ₁₀	Long- and short-term	Outside Scotland: exposure within 200m of the source of emission (up to 1km if background PM ₁₀ > 28µg/m ³)	<p>There are a number of mineral extraction sites in the district, some of which have relevant exposure within 200m. These are:</p> <ul style="list-style-type: none"> • <u>Calf Heath Quarry</u> • <u>Two near to Cheslyn Hay</u> • <u>Redhurst Quarry</u> • <u>Seisdon Quarry</u> <p>If these have not been considered in previous rounds of LAQM it is recommended that a review of the permits and associated information is carried out to determine whether there is a risk of the objectives being exceeded.</p>

5 Recommendations

5.1 There are a number of recommendations as a result of the review, as set out below.

Monitoring

- 5.2 Retain all of the existing nitrogen dioxide diffusion tubes, with the exception of HA5 and HA6 which are not representative of relevant exposure.
- 5.3 Decommission the automatic nitrogen dioxide monitor in Penkridge. The diffusion tube monitoring site should be retained in this area.
- 5.4 Consider installation of a PM monitor at a suitable location. If a specific risk of the PM₁₀ objectives as a result of quarrying activities is identified, then a PM₁₀ monitoring should be installed. Consideration could also be given to PM_{2.5} monitoring which is the most relevant component for health impacts. Defra guidance (Defra, 2016) notes that *“an increase in PM_{2.5} monitoring is desirable given the links to the Public Health Outcomes Framework”*.

Sources

- 5.5 The following roadside locations have been identified where there may be a risk of exceedance of the annual mean nitrogen dioxide objective. Consideration should therefore be given to monitoring (possibly in conjunction with modelling) at the following locations:
- A34, where houses are very close to the road in Huntingdon and Cheslyn Hay;
 - Station Street, Cheslyn Hay (if traffic flows exceed 5,000 AADT);
 - A449 in Penkridge village centre; and
 - At the façade of the single property closest to the A449 Stafford Road, where it meets the M54 (if this has not been considered in previous rounds of review and assessment).
- 5.6 The impacts of the West Midlands Interchange on traffic and HGV flows, as well as stationary locomotives should be considered in relation to the LAQM criteria, to determine whether any of the potential impacts require further investigation.
- 5.7 Further investigation of the risk of two poultry farms, at Pilaton and Hatherton, is required to determine whether there is a risk of the PM₁₀ objective being exceeded. The first stage will be to consider the number of birds and distance between the nearest property and the shed, using the equation provided in the Defra Technical Guidance (Defra, 2016). This investigation should also consider the risk of exceedances of the nitrogen dioxide and PM₁₀ objectives due to the biomass installation at one of the farms.

5.8 Review the permits and associated information associated with quarries which have relevant exposure within 200m, if they have not been considered in previous rounds of review and assessment. Consideration could then be given to monitoring PM₁₀ at a suitable location. A laser-based monitor, such as an Osiris would be suitable to identify if there is a risk of exceedance of the objective. From a review of aerial photography, the quarries to review are:

- Calf Heath Quarry;
- Two near to Cheslyn Hay;
- Redhurst Quarry; and
- Seisdon Quarry.

Other

5.9 To assist with responding to queries raised by members of the public, consideration could be given to modelling road traffic sources in some areas of concern. Suitable monitoring would be necessary to verify the model results.

6 Summary and Conclusions

- 6.1 Air quality across most of the district is good. Monitoring has demonstrated that even within AQMAs annual mean nitrogen dioxide concentrations are well below the objective. As a result, all but one of the AQMAs has been, or will be, revoked. The remaining AQMA covers a single property very close to the A5, next to the truck stop. If measured concentrations continue to decline at this location, this AQMA could also be revoked.
- 6.2 A review of the district has been carried out to ascertain whether there are any sources of emissions to air that require further investigation. There are a small number of properties very close to roads that warrant further investigation. In addition, the potential for exceedances of the PM₁₀ objectives near to some poultry farms and quarries, and the impact of the proposed West Midlands Interchange should be reviewed.
- 6.3 The monitoring strategy in the district has also been reviewed. The locations of the diffusion tubes are appropriate and most should be retained. The automatic NO₂ monitor at Penkridge is coming to the end of its useful life and monitoring should be discontinued.
- 6.4 Health concerns are primarily focused on PM concentrations; this aligns with public health objectives. There are also public concerns about dust sources. Therefore consideration could be given to monitoring PM₁₀ and/or PM_{2.5}.
- 6.5 Although the current monitoring sites are in appropriate locations it is not possible to determine concentrations throughout the entire district. Modelling of key areas across the district could therefore be carried out to identify concentrations in areas of concern, and to provide reassurance to the public about air quality in their area.

7 References

Defra, 2016. *Local Air Quality Management Policy Guidance (PG16)*, s.l.: s.n.

Defra, 2016. *Local Air Quality Management Technical Guidance LAQM.TG16*, s.l.: s.n.

HMSO, 1995. *Environment Act*. s.l.:s.n.

South Staffordshire Council, 2018. *LAQM Annual Status Report 2017*, s.l.: s.n.

8 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
EU	European Union
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
kph	Kilometres Per hour
LAQM	Local Air Quality Management
µg/m³	Microgrammes per cubic metre
NO₂	Nitrogen dioxide
NRMM	Non-road Mobile Machinery
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PM_{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide

9 Appendices

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A1 Professional Experience

Stephen Moorcroft, BSc (Hons) MSc DIC MEnvSc MIAQM CEnv

Mr Moorcroft is a Director of Air Quality Consultants, and has worked for the company since 2004. He has over thirty-five years' postgraduate experience in environmental sciences. Prior to joining Air Quality Consultants, he was the Managing Director of Casella Stanger, with responsibility for a business employing over 100 staff and a turnover of £12 million. He also acted as the Business Director for Air Quality services, with direct responsibility for a number of major Government projects. He has considerable project management experience associated with Environmental Assessments in relation to a variety of development projects, including power stations, incinerators, road developments and airports, with particular experience related to air quality assessment, monitoring and analysis. He has contributed to the development of air quality management in the UK, and has been closely involved with the LAQM process since its inception. He has given expert evidence to numerous public inquiries, and is frequently invited to present to conferences and seminars. He is a Member of the Institute of Air Quality Management.

Penny Wilson, BSc (Hons) CSci MEnvSc MIAQM

Ms Wilson is an Associate Director with AQC, with more than seventeen years' relevant experience in the field of air quality. She has been responsible for air quality assessments of a wide range of development projects, covering retail, housing, roads, ports, railways and airports. She has also prepared air quality review and assessment reports and air quality action plans for local authorities and appraised local authority assessments and air quality grant applications on behalf of the UK governments. Ms Wilson has arranged air quality and dust monitoring programmes and carried out dust and odour assessments. She has provided expert witness services for planning appeals and is Member of the Institute of Air Quality Management and a Chartered Scientist.

Dr Clare Beattie, BSc (Hons) MSc PhD CSci MEnvSc MIAQM

Dr Beattie is an Associate Director with AQC, with more than 20 years' relevant experience. She has been involved in air quality management and assessment, and policy formulation in both an academic and consultancy environment. She has prepared air quality review and assessment reports, strategies and action plans for local authorities and has developed guidance documents on air quality management on behalf of central government, local government and NGOs. Dr Beattie has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has also provided support to the integration of air quality considerations into Local Transport Plans and planning policy processes. She has carried out numerous assessments for new residential and commercial

developments, including the negotiation of mitigation measures where relevant. She has carried out BREEAM assessments covering air quality for new developments. Clare has worked closely with Defra and has recently managed the Defra Air Quality Grant Appraisal contract over a 4-year period. She is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Full CVs are available at www.aqconsultants.co.uk.