

Bolsover District Council

Air Quality Management Area Review

December 2020





Document Control Sheet

Identification		
Client	Bolsover District Council	
Document Title Air Quality Management Area Review		
Bureau Veritas Project No.	AIR10130275/v1.0	

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Configuration					
Version Date Author		Author	Reason for Issue/Summary of Changes	Status	
1.0	11/12/2020	Alexandra Spence	-	Draft for comments	

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Executive Summary

Bureau Veritas have been commissioned by Bolsover District Council (BDC) to undertake a review of South Normanton Air Quality Management Area (AQMA). The AQMA is the last of three AQMAs declared within the borough between 2004 and 2007. Air quality monitoring data, derived from the 2020 Annual Status Report (ASR), within the proximity of the AQMA was reviewed to evaluate the general trends since 2012.

It is possible to revoke AQMAs through analysis of monitoring data and local development information alone, therefore a review of the AQMA has been undertaken; taking into consideration the monitored pollutant level trends, any changes to land use and any potential future development.

South Normanton AQMA comprises a group of twelve properties and was declared on 2nd July 2004 in relation to exceedances of the annual mean NO₂ Air Quality Strategy (AQS) objective. Following a review of local NO₂ monitoring trend data, the known proposed developments in the area and the conversion of the adjacent M1 to smart motorway, it is considered that South Normanton AQMA should be revoked, with diffusion tube monitoring continuing at locations of relevant exposure.



Table of Contents

E.	xecuti	ve Summary	2
1	In	troduction	1
	1.1	Project Background	1
	1.2	Scope of Review	2
2	Ai	r Quality – Legislative Context	3
	2.1	Air Quality Strategy	3
	2.2	Local Air Quality Management	5
3	So	outh Normanton AQMA	7
	3.1	Review of Monitored Pollutant Trends	7
4	Во	olsover District Council	10
	4.1	Overview of Air Quality in the District	10
	4.2	Proposed Local Developments	12
	4.3	M1 Conversion to Smart Motorway	12
5	Co	onclusion	15
L	ist o	f Tables	
Ta	able 1	- Examples of Where the Air Quality Objectives Should Apply	4
Ta	able 2	- Relevant Air Quality Objectives for NO ₂	4
Ta	able 3	- Diffusion Tube Monitoring for NO ₂ within or close to South Normanton AQMA	7
Т	able 4	- Proposed Local Development Planning Applications	12
L	ist o	f Figures	
Fi	gure '	1 – South Normanton AQMA Monitoring Locations	8
Fi	gure 2	2 – South Normanton AQMA 2012-2019	9
Fi	gure 3	B – Trend in Annual Mean NO₂ Concentrations across BDC 2012-2019	11
Fi	gure 4	4 – South Normanton AQMA and Proposed Local Development Sites	14
Fi	gure 1	1 – South Normanton AQMA Monitoring Locations	8
Fi	gure 2	2 – South Normanton AQMA 2012-2019	9
Fi	gure 3	3 – Trend in Annual Mean NO ₂ Concentrations across BDC 2012-2019	11
Fi	gure 4	4 – South Normanton AQMA and Proposed Local Development Sites	14



1 Introduction

1.1 Project Background

Bureau Veritas have been commissioned by Bolsover District Council (BDC) to undertake a review of South Normanton Air Quality Management Area (AQMA). The AQMA is the last of three AQMAs declared within the borough between 2004 and 2007.

All three of BDC's AQMAs had been declared as a result of road traffic emissions in relation to monitored exceedances of the annual mean Air Quality Strategy (AQS) objective for nitrogen dioxide (NO₂). The Council's 2017 Annual Status Report (ASR) noted the intention to assess whether the three AQMAs should be maintained or revoked.

Following appraisal of BDCs 2017 ASR, Defra provided the following response in relation to revocation of the AQMAs:

"We agree with the Council's proposal to consider revoking the three AQMA's...The Council may decide between a screening assessment using the current monitoring, or carry out a further assessment to ratify the recent results if there is reasonable doubt over the monitoring results".

Any decision to revoke an AQMA must be based on evidence in line with Local Air Quality Management (LAQM) requirements. More detail on these is provided in Section 2.2 however in summary, as stated above, an AQMA may be amended or revoked following a screening assessment or on the basis of robust monitoring evidence. Monitoring evidence must demonstrate that the AQS objectives are being, and will continue to be, met within, and close to, an AQMA that is under review and that any reductions in concentration experienced will be sustained.

This AQMA review leads on from a previous review¹ undertaken by Bureau Veritas in 2018 on behalf of the Council. The 2018 review concluded that there was sufficient evidence to support the revocation of Barlborough AQMAs No. 1 and No. 2, with no exceedances of the annual mean nitrogen dioxide (NO₂) AQS objective recorded in either of these AQMAs since 2012. The revocation of both Barlborough AQMAs was completed in June 2020.

South Normanton AQMA is located approximately six meters, at its closet point, to the east of the southbound M1 exit slip road at Junction 28 (South Normanton). No exceedance of the annual mean NO₂ AQS objective, along with an overall decrease in monitored annual mean NO₂ concentrations

Project Number: AIR10130275

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¹ Bolsover District Council Air Quality Management Area Review – Detailed Assessment - February 2018. Bureau Veritas



between 2012 and 2016, meant that revocation of this AQMA was also considered in 2017. However, an increase in concentrations was observed at the majority of diffusion tube sites located within the AQMA in 2017, including one exceedance of the annual mean NO2 AQS objective. This observation was based on indicative monitoring data for the year 2017 which was bias adjusted using the 2016 adjustment factor. The M1 motorway, a major traffic source at the AQMA, was also subjected to extensive road works involving 50mph speed limits and lane closures for at least 18 months prior to April 2016, during its conversion to a 4-lane Smart Motorway. The 2018 review therefore recommended that the South Normanton AQMA should remain declared to monitor any effect of the Smart Motorway Project with monitoring to continue within, and close to the AQMA.

1.2 Scope of Review

Since completion of the 2018 AQMA review, three additional years of monitoring have been undertaken and so two more years of monitoring data is now available, for 2018 and 2019. The 2017 monitoring data has also since been updated. The 2018 review discussed 2017 monitoring data that had been adjusted by BDC using the relevant bias adjustment factor for 2016 from Defra's most recent National Diffusion Tube Bias Adjustment Factors Spreadsheet² that was available at that time. The 2017 data has therefore since been updated with the relevant 2017 National Bias Adjustment Factor. The most up-to-date data is provided in BDC's 2020 ASR3.

As a result of the above, this report has been commissioned to revisit the recommendations provided in the 2018 review¹, and has completed a review of South Normanton AQMA based on the following scope:

- Summarise the history of South Normanton AQMA;
- Assess the monitored pollutant trend data within the AQMA since 2012;
- Assess the AQMA in the context of average monitored pollutant trend data across the district:
- Review the location of the AQMA in the wider context of the district, to include detail on any land use changes within and surrounding the AQMA; and,
- Provide conclusions and recommendations on the designation of the AQMA.

² Defra National Bias Adjustment Factors https://lagm.defra.gov.uk/bias-adjustment-factors/national-bias.html

³ Bolsover District Council, 2020 Annual Status Report (ASR), [June 2020]



2 Air Quality - Legislative Context

2.1 Air Quality Strategy

The importance of existing and future pollutant concentrations can be assessed in relation to the national air quality standards and objectives established by Government. The Air Quality Strategy⁴ (AQS) provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards and objectives established by the UK Government and Devolved Administrations to protect human health. The air quality objectives incorporated in the AQS and the UK Legislation are derived from Limit Values prescribed in the EU Directives transposed into national legislation by Member States.

The CAFE (Clean Air for Europe) programme was initiated in the late 1990s to draw together previous directives into a single EU Directive on air quality. The CAFE Directive⁵ has been adopted and replaces all previous air quality Directives, except the 4th Daughter Directive⁶. The Directive introduces new obligatory standards for PM_{2.5} for Government but places no statutory duty on local government to work towards achievement of these standards.

The Air Quality Standards (England) Regulations 2010 came into force on 11 June 2010 in order to align and bring together in one statutory instrument the Government's obligations to fulfil the requirements of the new CAFE Directive.

The objectives for ten pollutants – benzene (C₆H₆), 1,3-butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), particulate matter - PM₁₀ and PM_{2.5}, ozone (O₃) and Polycyclic Aromatic Hydrocarbons (PAHs), have been prescribed within the AQS⁵.

The EU Limit Values are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites).

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. Typically, these include residential properties and schools/care homes for long-term (i.e. annual mean) pollutant objectives and high streets for short-term (i.e. 1-hour) pollutant objectives. Table 1, taken from LAQM.TG(16)4, provides an indication of those locations that may or may not be relevant for each averaging period.

⁴ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007), Published by Defra in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland

⁵ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for

⁶ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic hydrocarbons in ambient air.

⁷ The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.



This assessment focuses on the NO₂ annual mean data, as this is the pollutant of most concern within the Council's administrative area. Moreover, as a result of traffic pollution, the UK has failed to meet the EU Limit Values for NO₂ by the 2010 target date. As a result, the Government has had to submit time extension applications for compliance with the EU Limit Values. Continued failure to achieve these limits may lead to EU fines. The AQS objectives for these pollutants are presented in Table 2.

Table 1 - Examples of Where the Air Quality Objectives Should Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
	All locations where members of	Building facades of offices or other places of work where members of the public do not have regular access.
Annual mean	the public might be regularly exposed	Hotels, unless people live there as their permanent residence.
Annualmean	Building facades of residential	Gardens of residential properties.
	properties, schools, hospitals, care homes etc.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens or residential properties ¹ .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
	All locations where the annual mean and 24 and 8-hour mean objectives would apply.	
	Kerbside sites (e.g. pavements of busy shopping streets).	
1-hour mean	Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more.	Kerbside sites where the public would not be expected to have regular access.
	Any outdoor locations at which the public may be expected to spend one hour or longer.	
15-minute mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

¹ For gardens and playgrounds, such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

Table 2 - Relevant Air Quality Objectives for NO₂

Pollutant	AQS Objective Concentration Measured as:		Date for Achievement	
Nitrogen Dioxide (NO₂)	200µg/m³ not to be exceeded more than 18 times per year	1-hour mean	31 st December 2005	
(1402)	40µg/m³	Annual mean	31 st December 2005	



2.2 Local Air Quality Management

Part IV of the Environment Act 1995⁸ places a statutory duty on local authorities to periodically Review and Assess the current, and future air quality conditions experienced within their jurisdiction. This is completed by determining whether the AQS objectives set down by Government for a number of pollutants are to be met, a process known as Local Air Quality Management (LAQM). The AQS objectives that apply to LAQM are defined for seven pollutants: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulate matter.

Where the results of the Review and Assessment process highlight that problems in the attainment of health-based objectives for air quality will arise, the authority is required to declare an AQMA; a geographic area defined by high concentrations of pollution and exceedances of health-based standards.

The LAQM Policy Guidance (PG16)⁹ is designed to maximise the public health benefits of local authority action and sets out the requirements for revocation of an AQMA. When assessing the current status of an AQMA, PG16 requires local authorities to undertake a robust review that demonstrates:

"air quality objectives are being met and will continue to do so ..."

"...they should have confidence that the improvements will be sustained".

The LAQM Technical Guidance (TG16)¹⁰ is designed to support local authorities in this process of carrying out their duties under the Environment Act 1995 and provides further information on the revocation process. In particular, TG16 states:

"an AQMA may be amended or revoked following a screening assessment or on the basis of robust monitoring evidence".

This guidance also sets out that the following must be considered before an AQMA can be revoked on the basis of monitored concentrations:

- The impact of meteorological conditions (i.e. that any future exceedances that might occur in more adverse conditions are unlikely);
- National trends in emissions;
- Local factors, including measures introduced as part of the local Air Quality Action Plan (AQAP); and
- Trends and information from national monitoring on high and low pollution years.

⁸ Environment Act, Part IV 1995 (http://www.legislation.gov.uk/ukpga/1995/25/part/IV)

⁹ LAQM Policy Guidance LAQM.PG(16) – April 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

¹⁰ LAQM Technical Guidance LAQM.TG(16) – February 2018. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland



Basing the decision of whether or not to revoke an AQMA on monitored data therefore requires consistent measurements carried out at locations within, and close to, the designated AQMA over a period of several years.

In the case of South Normanton AQMA, this review will be based on the results from four diffusion tube monitoring sites (one being a triplicate site) that are located within the AQMA, each of which has recorded more than five years of monitoring data. This will be considered in the context of the trend in air quality across the district as a whole.



3 South Normanton AQMA

3.1 Review of Monitored Pollutant Trends

The South Normanton AQMA, comprising of twelve properties, was declared on 2nd July 2004 in relation to exceedances of the annual mean NO₂ AQS objective. The boundary of the AQMA is presented in Figure 1 with the relevant diffusion tube monitoring locations also identified.

Table 3 presents data from BDC's 2020 ASR³, recorded at the diffusion tubes located either within the boundary, or close to, the AQMA at South Normanton. The foremost observation from the table shows that no exceedances have been recorded at any of the monitoring sites between 2013 and 2019. Prior to this an annual mean NO_2 concentration of $41.1\mu g/m^3$ was recorded at the triplicate site 5/26/27 and $41.0\mu g/m^3$ at sites 15 and 20 in 2012. A reduction in annual mean concentration is apparent between 2017 and 2019 at each of the four monitoring locations, with all results significantly below the AQS objective of $40\mu g/m^3$ during 2018 and 2019.

The triplicate site 5/26/27, site 15 and site 21 are located at points of relevant exposure (the residential properties), whilst site 20 is located 7m from the closest point of relevant exposure. Due to these three monitoring sites being located at points of relevant exposure, and site 20 consistently being below 36µg/m³ (within 10% of the AQS objective), distance correction has not been completed.

Table 3 – Diffusion Tube Monitoring for NO₂ within or close to South Normanton AQMA

Site ID	Sito Tuno	NO₂ Annual Mean Concentration (μg/m³)							
Site ID Site Type	2012	2013	2014	2015	2016	2017*	2018	2019	
5, 26, 27	Roadside (Triplicate)	41.1	39.2	37.6	37.0	36.0	37.3 (39.0)	33.9	32.2
15	Roadside	41.0	39.4	36.9	37.6	36.0	39.8 (41.5)	34.8	32.6
20	Roadside	41.0	36.1	36.2	36.0	35.5	36.0 (37.5)	33.8	30.9
21	Suburban	33.0	30.4	29.8	26.2	28.3	27.5 (28.7)	26.6	25.8
* Indicative data for 2017 using 2016 National Bias Adjustment Factor									

Figure 2 illustrates the NO₂ concentration trend for the monitoring undertaken in the South Normanton AQMA, demonstrating both the decline in NO₂ concentrations at all monitoring sites between 2012 and 2019 and no exceedances of the annual mean NO₂ AQS objective since 2012. Aside from a slight increase in concentration reported at most sites in 2017, there has been a continual trend of reduction across the monitoring locations.

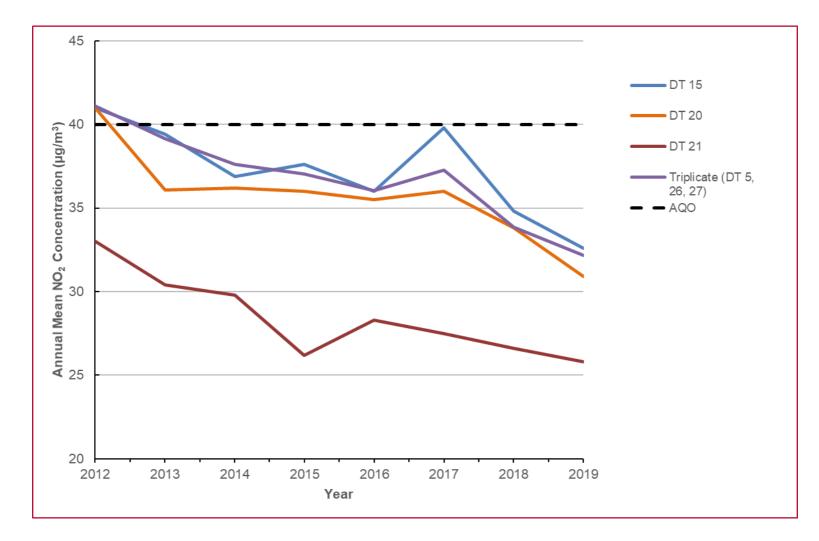
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Figure 1 – South Normanton AQMA Monitoring Locations





Figure 2 – South Normanton AQMA 2012-2019





4 Bolsover District Council

4.1 Overview of Air Quality in the District

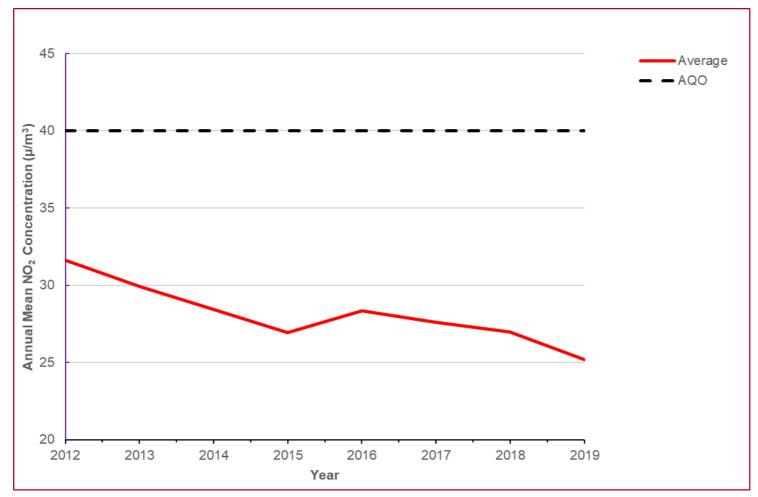
The Council has completed all the rounds of LAQM Review and Assessment as required by Part IV of the Environment Act 1995, up to the 2020 Annual Status Report which was completed in June 2020.

Monitoring of NO₂ has, and continues to be, completed across the district to ascertain whether concentrations comply with the annual mean AQS objective. In 2019, non-automatic monitoring using passive diffusion tubes was completed at 34 separate monitoring sites located across the district. The total number of monitoring sites has varied from year to year based upon the declaration of AQMAs and through local knowledge in terms of possible hot-spot areas where concentrations potentially may be elevated.

Figure 3 illustrates the trend in average NO₂ concentration for all monitoring undertaken across BDC for each year. Aside from a slight increase in concentrations reported on average across the district between 2015 and 2016, it can be seen that there has been a continual trend of reduction across the district with the lowest average concentration presented in 2019.



Figure 3 – Trend in Annual Mean NO₂ Concentrations across BDC 2012-2019





4.2 Proposed Local Developments

Relevant land use changes and future developments anticipated in the surrounding area of the South Normanton AQMA since the previous review undertaken in 2018 are described in Table 4. There are two significant planning proposals that Bureau Veritas are aware of; both of which have had Air Quality Assessments (AQA) completed and following peer review it was concluded that neither would lead to any significant adverse impact upon existing conditions within the AQMA.

Table 4 – Proposed Local Development Planning Applications

Planning Application Reference	Description
19/00699/FUL / 19/00648/FUL	Retail development at Castlewood, Sutton-in-Ashfield, consisting of three retail units and associated infrastructure. The predicted change of traffic flow upon the A38 at the closest point to the South Normanton AQMA, based upon an opening year of 2024 for the proposed development was 1.6% (685 vehicles per day). Within the completed AQA a negligible impact due to the proposed
	scheme has been predicted at the receptor location closest to the AQMA for the proposed opening year of the scheme (2024).
20/00295OUT / 20/00296/FUL	Mixed-use development located at 'Park 38', Cartwright Lane, Bolsover, consisting of hotel/restaurant, two warehouse units and an access road. An increase of 58 vehicles per day was predicted on the southbound M1 exit slip road at Junction 28, the closest road link to the South Normanton AQMA.
	Within the completed AQA a negligible impact due to the proposed scheme has been predicted at a receptor location within the AQMA for the proposed opening year of the scheme (2025).

Although the two identified developments are likely to increase the amount of road traffic in the local area, particularly on the A38. Due to the location of the A38 in comparison to the South Normanton AQMA, this is not likely to impact as largely on NO₂ concentrations in the vicinity of the AQMA when considered in the context of the existing traffic on the adjacent M1 motorway. It is likely that the overall increase in monitored concentrations reported for South Normanton AQMA in 2017 arise mostly from the nearby motorway traffic. The location of the two developments relative to the AQMA are presented in Figure 4.

4.3 M1 Conversion to Smart Motorway

In 2015 Highways England began the conversion of sections of the M1 motorway, including the stretch between Junction 28 and Junction 31 close to the South Normanton AQMA, into a 4-lane smart motorway. The works between Junction 28 and Junction 31 were completed in April 2016, therefore the review completed by Bureau Veritas in 2018 recommended the monitoring at South Normanton AQMA be maintained to monitor the effect of the changes made to the M1 on the NO₂ concentrations.

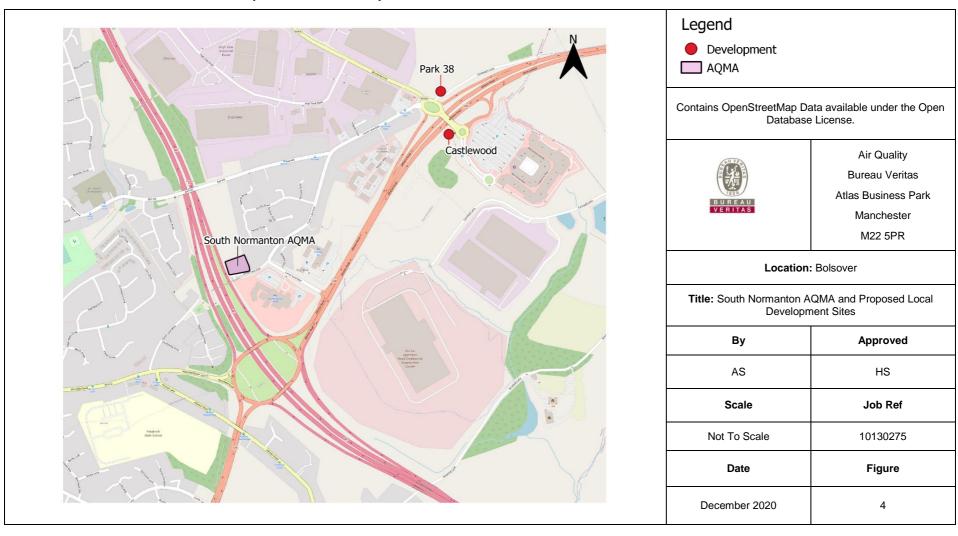
Bolsover District Council Air Quality Management Area Review



Following a slight increase experienced in monitored concentrations in 2017, all monitoring sites located within South Normanton AQMA have since significantly declined when compared to pre 2017 concentrations. This may be due to the 4-lane smart motorway conversion or simply due to longer-term trends observed across the district. Based upon the monitoring completed within and close to the South Normanton AQMA, it is unlikely that the conversion of the M1 motorway to a smart motorway has contributed to a worsening of NO₂ concentrations both within, and close to the South Normanton AQMA.



Figure 4 – South Normanton AQMA and Proposed Local Development Sites





5 Conclusion

Bureau Veritas was appointed by Bolsover District Council (BDC) to undertake analysis of monitoring data and local development information surrounding South Normanton AQMA, the last of three long-standing AQMAs declared within the borough, with a view to informing the proposed revocation of the AQMA. Defra has further supported the recommendation to consider revocation within the appraisal of the 2020 ASR.

This review has been undertaken in line with the 2016 LAQM technical and policy guidance, which states that it is possible to apply for revocation of an AQMA through analysis of existing monitoring data and local development information.

Two proposed local developments were identified which could impact road traffic in proximity to the AQMA, however, the air quality assessments completed for each concluded that neither would lead to any significant adverse impact upon existing local air quality. These developments are therefore not likely to cause a significant change in traffic figures at or near to the AQMA, particularly when considered in the context of traffic flows on the adjacent M1 motorway.

Diffusion tube monitoring undertaken within the AQMA shows a long-term trend of reductions in annual mean NO_2 concentrations between 2012 and 2016. An increase is observed in the 2017 data, however, there has now been two years of monitoring undertaken since conversion of the adjacent M1 motorway to smart motorway in 2016. There have been no monitored exceedances of the annual mean NO_2 AQS objective since 2012 and a long-term trend of reduction is apparent for all monitoring locations within, and close to the AQMA. The rate of reduction is in line with the overall trend across the district when assessing the average of all monitored NO_2 concentrations for each year, which has been shown to be improving year on year.

On the above basis, it is therefore recommended that the South Normanton AQMA should be revoked. Air quality monitoring should continue at the locations of relevant exposure and it is expected that Bolsover District Council will continue to review air quality in the area and across the district as a whole whilst they continue working to improve air quality across the district.