West Lothian Council

Proposed revocation of The West Lothian Council (Broxburn) Air Quality Management Area Order 2011

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

January 2023

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Report Reference	057961
Date	January 2023

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1. Introduction

Part IV of the Environment Act 1995 required the UK Government and the devolved administrations, to publish a national Air Quality Strategy (see Ref.1) and establish the system of Local Air Quality Management (LAQM) and Air Quality Objectives for specified pollutants.

The air quality objectives for Scotland are set out in;

- The Air Quality (Scotland) Regulations 2000 (see Ref. 2);
- The Air Quality (Scotland) Amendment Regulations 2002 (see Ref. 3); and
- The Air Quality (Scotland) Amendment Regulations 2016 (see Ref. 4).

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.

West Lothian Council fulfils its LAQM duties by maintaining 3 automatic air quality stations across its area. There is also a network of passive NO_2 diffusion tubes. Results from this monitoring are assessed and an annual progress report is produced each year, in line with statutory guidance.

Due to the potential for the air quality objective to be breached, three AQMAs were declared within West Lothian. One of these AQMA's is in Broxburn town centre – see Map 1 for an outline of the AQMA. Following monitoring, modelling and extensive consultation, this AQMA was declared in 2011 by issuing **The West Lothian Council (Broxburn) Air Quality Management Area Order 2011** (see Ref. 10)**.** The AQMA was declared for Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}).

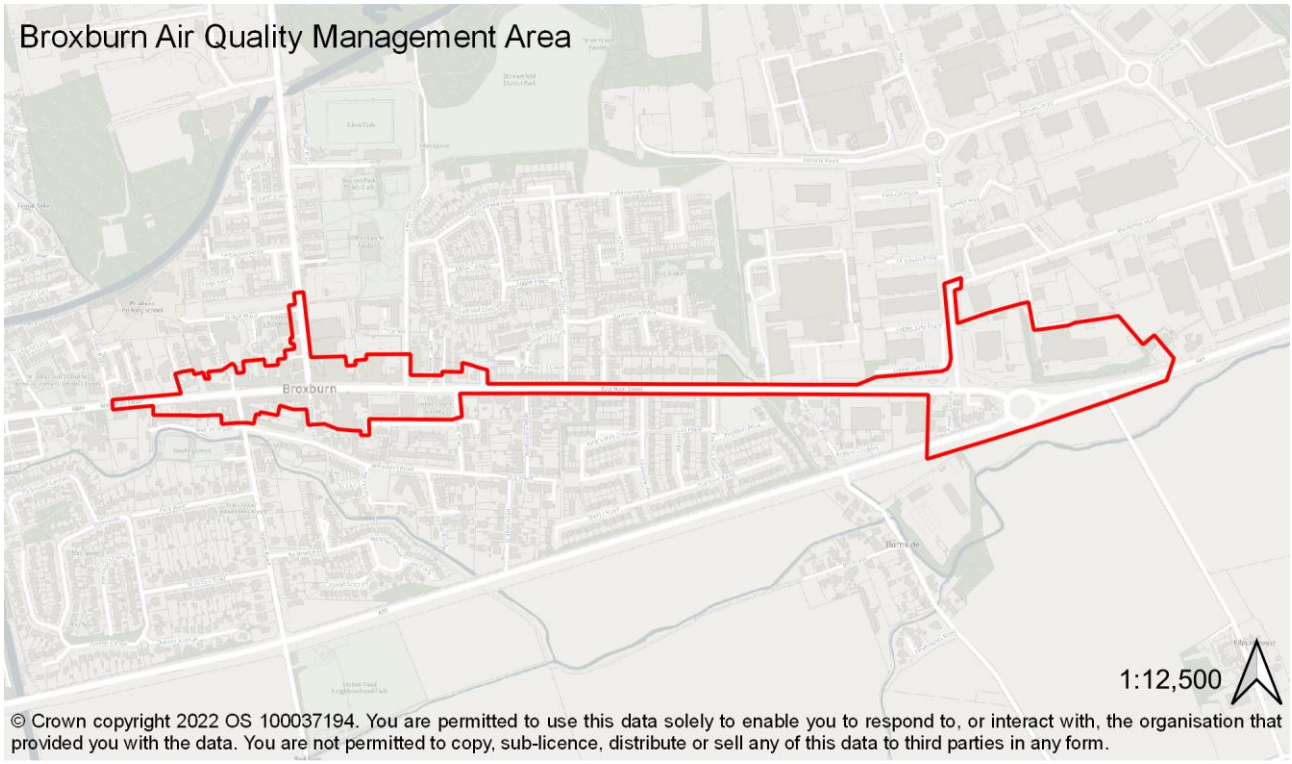
Following completion of the most recent annual progress report (see Ref. 6), and a review of historic monitoring data over previous years, it was noted that the air quality objectives (see Table 1) for both NO_2 and PM_{10} have been met within the Broxburn AQMA for several consecutive years as highlighted in Figures 1 and 2.

As such, West Lothian Council propose to revoke the Broxburn AQMA Order 2011 for both NO_2 and PM_{10}. This report brings together all the relevant monitoring information to support the revocation.

Table 1 – Summary of Air Quality Objectives for NO2 and PM10 in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO_2)	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM_{10})	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2021

Map 1 – Broxburn Air Quality Management Area



2. Monitoring Equipment in Broxburn

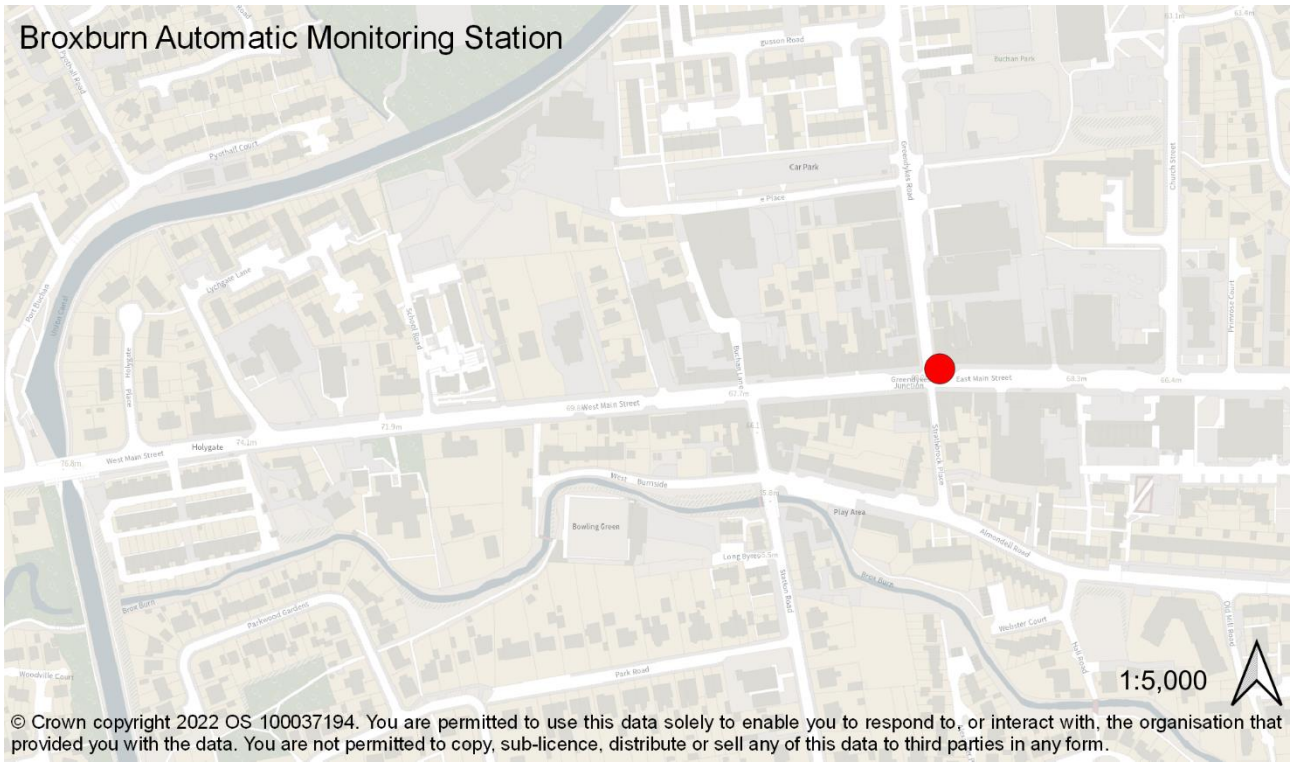
The following monitoring equipment is currently installed at our Broxburn automatic air quality monitoring site;

Table 2 – Broxburn Air Quality Station - Automatic Monitoring Equipment (Current and Historical)

Site ID	Site Type	Grid Ref	Pollutants Measured	Equipment	Distance to relative exposure (m)	Distance to kerb of nearest road (m)	Inlet height (m)	Date of Installation
CM2 Broxburn CNC Roadside	Roadside	308314, 672231	NO_2	ET Chemilumi-nescent NOx analyser	3.5	2.2	2.36	7.9.21
CM2 Broxburn CNC Roadside	Roadside	308314, 672231	PM_{10}, $PM_{2.5}$	PALAS FIDAS 200	3.5	2.2	2.36	13.9.17*
CM2 Broxburn CNC Roadside	Roadside	308314, 672231	NO_2	Thermo 42(i) NOx analyser	3.5	2.2	2.36	Installed between 2010 & 6.9.21
CM2 Broxburn CNC Roadside	Roadside	308314, 672231	PM_{10}	TEOM FDMS	3.5	2.2	2.36	Installed between 2010 & 12.9.17
* A hot spare PALAS FIDAS was installed on 8.7.22 due to a fault with the Councils own FIDAS monitor								

There are also 3 diffusion tubes co-located at the automatic monitoring site. The location of the Broxburn automatic monitoring station is shown in Map 2 below;

Map 2 – Location of Broxburn Automatic Monitoring Station



3. Air Quality Management Area – NO_2 (annual mean objective)

The Council's Detailed Assessment of NO_2 in Broxburn (see Ref. 9), completed in 2011, found exceedances of the Air Quality Objective at the continuous monitoring site, and also at one of the diffusion tube monitoring sites within Broxburn. NO_2 monitoring results from 2010 are shown in Table 3 below;

Table 3 – NO_2 monitoring results 2010

Site	Site Type	Data Capture (%)	Annual Mean (μgm^{-3})
East main Street (Automatic Monitor)	R	99.7	46
Diffusion Tube at Automatic Monitor	R	58%	42.4*
R = Roadside site (1-5m from the kerb) * = Period adjusted mean as diffusion tubes were not present for whole year			

Annual Mean NO_2 values for the year were then modelled for the Broxburn study area and the findings compared to the results of NO_2 monitoring. The modelling exercise found that NO_2 concentrations at various residential receptors within the study area, had been estimated to exceed the annual mean objective of 40 μgm^{-3} for the 2010 calendar year. As such, West Lothian Council declared an AQMA for NO_2 in the Broxburn study area.

3.1 More Recent NO_2 monitoring results

Over a number of years, within the Councils Annual Progress report, it has been noted that NO_2 levels are consistently below the Air Quality Objective annual mean level of 40 μgm^{-3} at both at the automatic monitoring site and diffusion tube sites within Broxburn. The results of a number of years of monitoring are shown in Table 4 below;

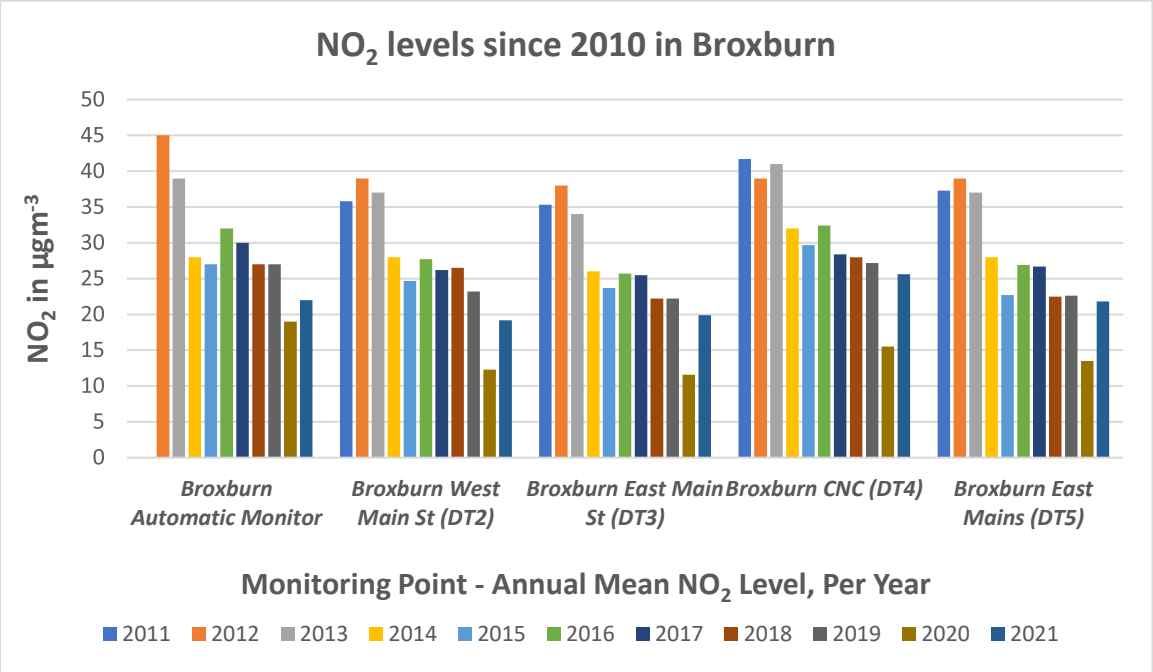
Table 4 – NO_2 monitoring results since 2010 in Broxburn (annual mean μgm^{-3})

Site	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Broxburn Automatic Monitor	**43**	**45**	39	28	27	32	30	27	27	19	22
Broxburn West Main St (DT2)	35.8 34.4*	39	37	28	24.7	27.7	26.2	26.5	23.2	12.3	19.2
Broxburn East Main St (DT3)	35.3 36*	38	34	26	23.7	25.7	25.5	22.2	22.2	11.6	19.9
Broxburn CNC (DT4)	**41.7** **41.6***	39	**41**	32	29.7	32.4	28.4	28	27.2	15.5	25.6

Broxburn East Mains (DT5)	37.3	39	37	28	22.7	26.9	26.7	22.5	22.6	13.5	21.8
Numbers in bold indicate an exceedance of the Air Quality Objective (40µgm^{-3}) * = 2 results as the 2 tubes were placed at the same location											

It is evident that measured levels have been significantly below the Annual Air Quality Objective for many years. Measured results for 2020 are lower due to the Coronavirus pandemic, however, several years of data before this have remained below the objective level. As the pandemic eased and traffic levels increased in 2021, it is notable that the measured NO_2 level, also returned to its pre-pandemic level.

Figure 1 – NO_2 levels Since 2010 in Broxburn



4. Air Quality Management Area – PM_{10} (Annual Mean)

Following exceedances of the air quality objective noted in the 2010 annual progress report (see Table 5), the 2011 detailed assessment considered whether an air quality management area should be declared for PM_{10} as well as NO_2. The detailed assessment utilised modelling to determine PM_{10} levels at different receptors throughout the Broxburn study area. The modelling exercise found that PM_{10} concentrations at various residential receptors within the study area, had been estimated to exceed the annual mean objective of 18 µgm^{-3} for the 2010 calendar year. As such, West Lothian Council declared an AQMA for PM_{10} in the Broxburn study area in 2011.

Table 5 – PM_{10} monitoring results 2010

Site	Site Type	Data Capture (%)	Annual Mean (μgm^{-3})
East Main Street (Automatic Monitor)	R	95	21
R = Roadside site (1-5m from the kerb)			

4.1 More recent PM_{10} monitoring results

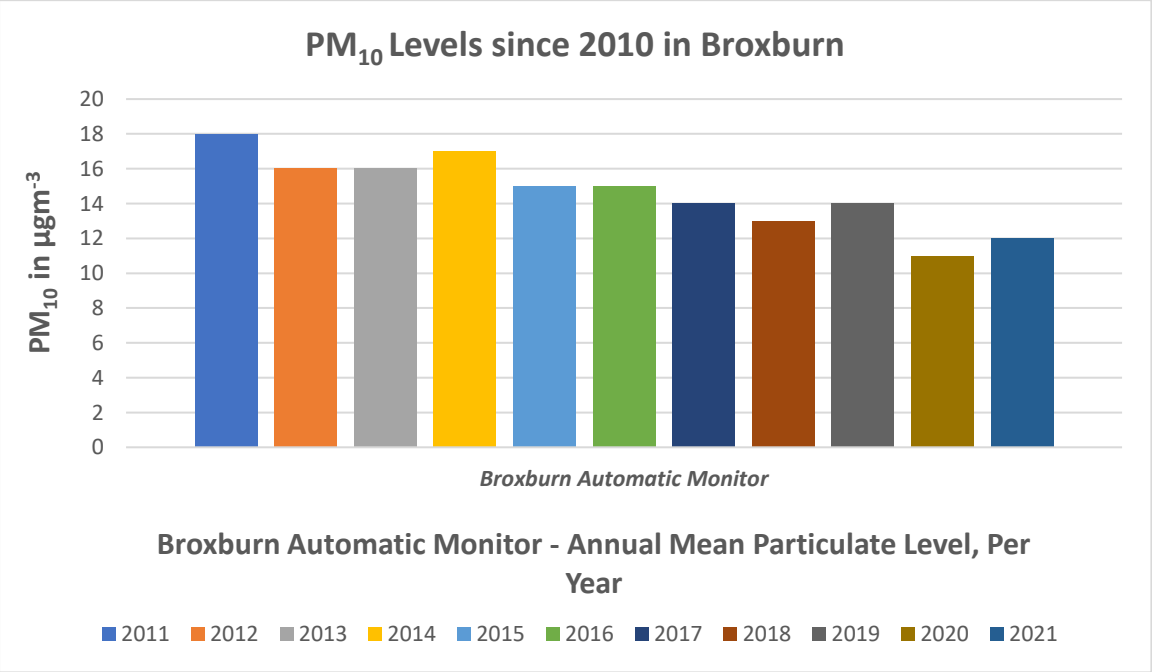
Over a number of years, within the Councils Annual Progress reports, it has been noted that PM_{10} levels are consistently below the Air Quality Objective annual mean level of 18 µgm-3 at the Broxburn automatic monitoring site. The results of a number of years of monitoring are shown in Table 6 below;

Table 6 – PM_{10} monitoring results since 2010 (annual mean μgm^{-3})

Site	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Broxburn Automatic Monitor	18	16	16	17	15	15	14	13	14	11	12
Numbers in bold indicate an exceedance of the Air Quality Objective ($18\mu gm^{-3}$)											

It is clear that measured levels over a number of recent years have been significantly below the Annual Air Quality Objective. Measured results for 2020 are lower due to the Coronavirus pandemic, As the pandemic eased and traffic levels increased in 2021, it is notable that the measured PM_{10} also increased to pre-pandemic levels.

Figure 2 – PM_{10} Levels Since 2010 in Broxburn



5. Air Quality Action Plan 2017

During 2017, an air quality action plan was developed for Broxburn (see Ref. 8). The development of an action plan is a statutory requirement, following the declaration of an AQMA. A steering group across West Lothian Council was established and a number of strategic measures were outlined. These measures were also the subject of a public consultation exercise. Many of the measures set out in the action plan have been actioned since 2017. For example;

- Supplementary guidance on air quality and planning has been produced (see Ref. 12);
- The ECO stars scheme has expanded in its membership across West Lothian;
- Electric vehicle charging points have continued to be installed, both by the Council and via planning conditions for residential and commercial developments;
- Developers have been encouraged to include active travel measures into their plans – included in air quality and planning guidance and general planning condition requirements;
- Environmental Health have continued to deal with environmental nuisance (including dust and smoke) complaints across the Councils area

In addition to this, much of the previously planned residential development in and around Broxburn has not progressed and is unlikely to do so.

6. Detailed Assessment 2022

In considering whether the revocation of the Broxburn AQMA is appropriate, a detailed assessment of air quality in Broxburn was also undertaken and subsequently published in October 2022 (see Ref. 11). The detailed assessment considered;

- A review of measured NO_2, PM_{10} and $PM_{2.5}$ concentrations within the AQMA over recent years;
- Detailed dispersion modelling of NO_2, PM_{10} and $PM_{2.5}$ concentrations for a baseline year of 2017;
- A sensitivity analysis of potential fluctuations in annual mean pollutant concentrations attributable to meteorological conditions;
- Detailed dispersion modelling of NO_2, PM_{10} and $PM_{2.5}$ concentrations in a future year of 2025 reflecting anticipated changes in traffic levels associated with projected growth or planned local developments.

The detailed assessment concluded that West Lothian Council may wish to:

1. Consider revocation of the Broxburn Air Quality Management Area for exceedances of the NO_2 annual mean objective;
2. Delay revoking the AQMA for exceedances of the PM_{10} annual mean objective until Scottish Government guidance regarding AQMA revocation and the use of FIDAS analysers for particulate measurements is updated.

7. Conclusion

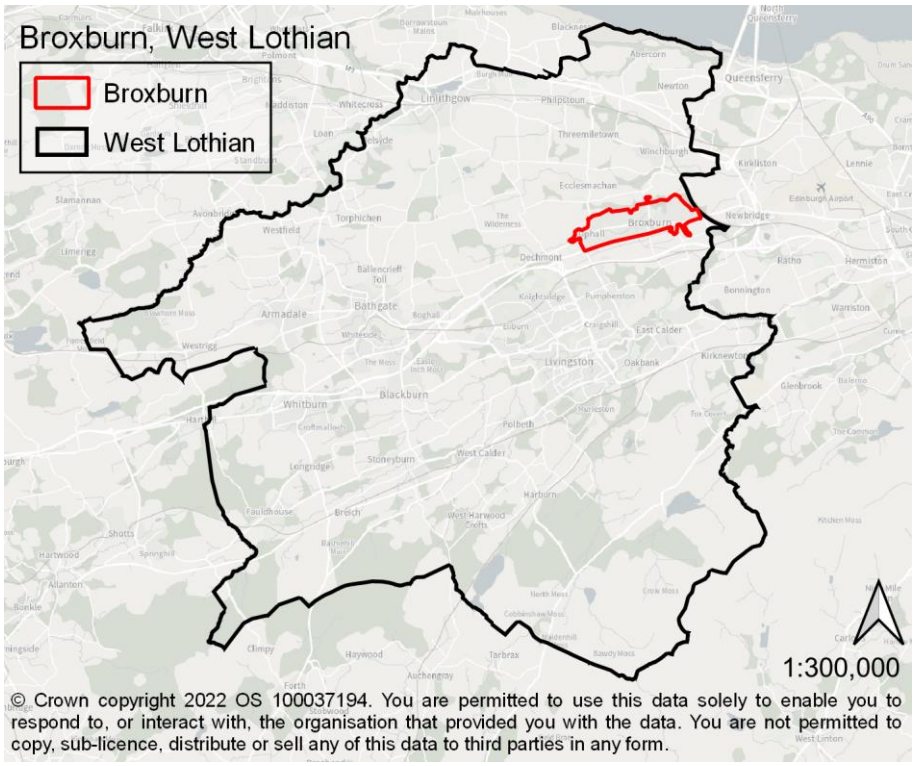
The Broxburn AQMA was declared on the 29th March 2011 after monitoring and modelling found exceedances of NO_2 and PM_{10} air quality objective levels, at various residential receptors in the Broxburn study area. Since the AQMA was declared, measured concentrations of both NO_2 and PM_{10} have consistently been below the air quality objectives for several consecutive years – (9 years for NO_2 and 10 years for PM_{10}).

As stated within the Air Quality in Scotland (LAQM) website in relation to AQMA Revocation: 'Where a local authority feels that it has sufficient evidence to justify the need to amend/revoke an AQMA at any time, it should submit that evidence to the Scottish Government for appraisal. For those authorities that have continuous monitoring, the Scottish Government would expect them to keep the AQMA under regular review, and to take action where necessary, rather than await the next round of reviews and assessments.'

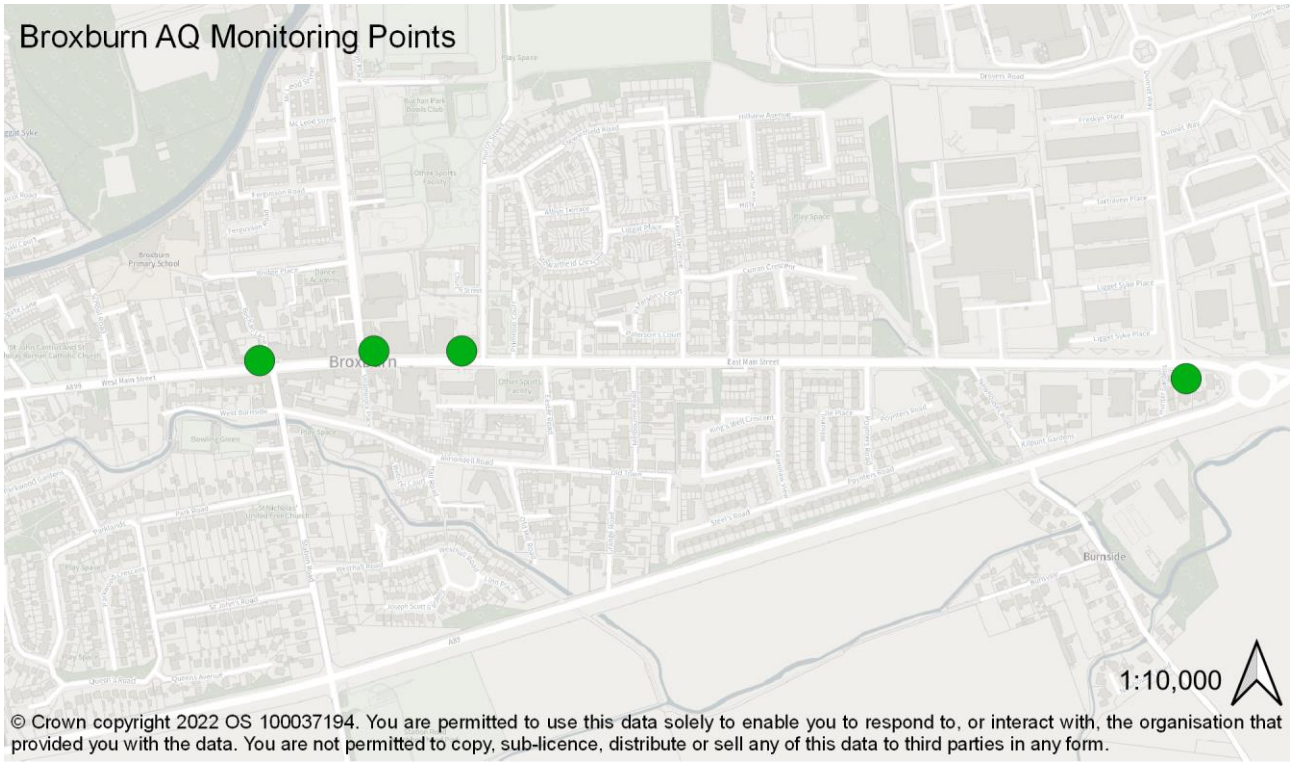
In considering all the information available from several years of monitoring and from modelling carried out in the 2022 detailed assessment, West Lothian Council intend to revoke the AQMA for both NO_2 and PM_{10}. The Council will, however, continue to monitor NO_2 and PM_{10} within Broxburn. If measured levels remain below the objective levels, West Lothian Council may utilise the monitoring equipment at other potential areas of poor air quality within the Council area. West Lothian Council is also aware of the ongoing pilot research by RICARDO, to investigate particulate matter monitoring techniques in Scotland. It is the Council's intention to continue with monitoring at Broxburn until such time as this research is complete. The Council will note any requirements and/or recommendations of this research once it is complete, and take any action deemed appropriate with regard to particulate matter monitoring.

West Lothian Council is therefore requesting the permission of the Scottish Government and Scottish Environment Protection Agency (SEPA) to revoke the Broxburn AQMA. Pending approval, West Lothian Council will notify all other statutory consultees and publicise the revocation through local / social media, so that the public, local businesses and other stakeholders are fully aware of the revocation proposal.

Map 3 – Map of Broxburn within West Lothian



Map 4 - Map of AQ monitoring points in Broxburn



10. References

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2. The Air Quality (Scotland) Regulations 2000 (31st March 2000, The Scottish Government)

3. The Air Quality (Scotland) Amendment Regulations 2002 (11th June 2002, The Scottish Government)

4. The Air Quality (Scotland) Amendment Regulations 2016 (1st April 2016, The Scottish Government)

5. The Scottish Air Quality Database QA/QC Process (28th March 2012, AEA Ricardo / The Scottish Government)

6. Annual Progress Report 2022 - (June 2022 West Lothian Council)

7. Pilot Research Study to Investigate Particulate Matter Monitoring Techniques in Scotland – RICARDO – 19.8.21

   https://www.scottishairquality.scot/technical-reports/pilot-research-study-investigate-particulate-matter-monitoring-techniques

8. Broxburn Air Quality Action Plan – RICARDO – 31.1.17

   https://www.westlothian.gov.uk/media/17039/2017-Broxburn-Air-Quality-Action-Plan-Approved/pdf/2017_Broxburn_Air_Quality_Action_Plan_final_for_consultation.pdf?m=638012653202700000

9. Broxburn Detailed Assessment 2011

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10. Broxburn Air Quality Management Order and Map - 29 March 2011

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12. West Lothian Council - Air Quality Planning Guidance

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