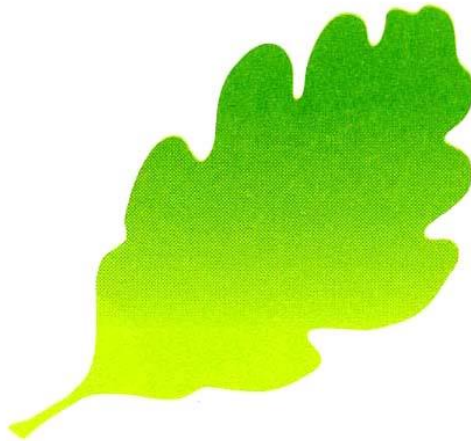


Annual Progress Report (APR)

Midlothian



2017 Air Quality Annual Progress Report (APR) for
Midlothian Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

November 2017

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Report Reference number	APR. Midl.Nov.2017
Date	17 November 2017

Executive Summary: Air Quality in Our Area

Air Quality in Midlothian

Midlothian comprises a number of small and medium-sized towns, together with many villages and hamlets. Penicuik is the largest town with a population of around 14,000, followed in size by Bonnyrigg and Dalkeith with populations of about 11,500 and 9,000 respectively. Loanhead, Gorebridge, Mayfield, Newtongrange and Pathhead are smaller settlements. A schematic map of Midlothian showing villages, towns and roads within the district is shown in Figure 1. The new town of Shawfair at the south eastern “wedge” between Danderhall and the City Bypass is currently under development and will include approximately 4,000 new homes, commercial and retail use.

Midlothian is largely a countryside setting. The area stretches from the Pentland Hills to the Moorfoots and Lammermuirs, and comprises a gently sloping plain, much of it intensively farmed, rising to moorland with upland country beyond. Much of this landscape is protected by policy designations such as the Green Belt.

There are currently no large industrial processes in close proximity to housing in Midlothian and the main issues with regards to air quality are due to road traffic emissions, particularly in the town and village centres. Another issue is domestic solid fuel combustion due to the rural setting of Midlothian and limited mains gas supply to some villages. This has been addressed in the village of Pathhead with the installation of a new gas main.

The report sets out the results of air quality monitoring carried out by Midlothian Council since the last round of review and assessment and considers the potential impacts from a range of sources such as road traffic and other transport emissions, industrial processes, commercial and domestic fuel use and fugitive emission sources.

A network of nitrogen dioxide diffusion tubes is maintained throughout the district. The monitoring results indicate that concentrations measured at all locations are within the annual mean air quality objective and that trends are fairly stable.

No new issues identified in 2016 as requiring further assessment.

The locations of the tubes were reviewed in December 2016, with changes to be implemented during the 2017 monitoring period. This review will see the introduction of new monitoring sites in the village of Lasswade, the results of which will be reported in subsequent LAQM reports.

Actions to Improve Air Quality

Midlothian Council has achieved significant improvements in air quality in Dalkeith and in the village of Pathhead, two areas of previous concern.

On the basis of the improvement in Pathhead in terms of PM₁₀, Midlothian Council revoked the Pathhead AQMA which declared in 2008. There are no outstanding Air Quality Managements Areas in Midlothian.

Midlothian Council forms part of East Central Scotland Vehicle Emissions Partnership, together with West Lothian Council, East Lothian Council, Falkirk Council and Scottish Government. The remit of the Vehicle Emissions Partnership is to help reduce vehicle emissions by encouraging drivers to switch off their engine whenever possible, educating the general public by the provision of free vehicle emissions testing and handling idling complaints. Further information is available on the partnership website at

<http://switchoffandbreathe.org>

Midlothian Council supports and encourages the development of a 'green network' in Midlothian to promote active travel by walking and cycling and which will form part of the Central Scotland Green Network. Further information is available in the Midlothian Council Travel Plan, which is available on Midlothian Council website: www.midlothian.gov.uk

Initiatives to move towards a cleaner Council fleet have also been introduced. Council staff have access to electric cars to use on local business trips, providing an eco-friendly way of travelling.



Midlothian Council encourages staff to actively travel to work, promoting a pool bike scheme to staff and promoting interest free loans to purchase a bicycle through the tax free Government 'Bike Purchase Scheme'.

Local Priorities and Challenges

In November 2015, Scottish Government launched the Cleaner Air for Scotland (CAFS) Strategy which is intended to shape the direction taken in Scotland as a whole to achieve compliance with the air quality objectives. This strategy incorporates actions on a range of related subjects such as transport, health, communication and climate change.

A commitment was made to review the diffusion tube locations during the later part of 2016, with a view to implementing changes at the commencement of the 2017 monitoring period.

Midlothian Council has not identified any new areas of concern which would require further assessment.

How to Get Involved

Information on Local Air Quality Management in Midlothian is available on the Council website www.midlothian.gov.uk This information includes copies of the Council's air quality reports and a link to the Pathhead AQMA Revocation Order.

Further information can be obtained by contacting Environmental Health at:
environmentalhealth@midlothian.gov.uk

The website also contains a link to the national Air Quality in Scotland webpage where members of the public can access historical monitoring data for Midlothian and sign up to receiving text / email alerts where poor air quality is forecast.

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1. Local Air Quality Management

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

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

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	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
	18 µg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual mean	31.12.2020
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-Hour mean	31.12.2003
Lead	0.25 µg/m ³	Annual Mean	31.12.2008

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 months, setting out measures it intends to put in place in pursuit of the objectives.

Midlothian Council currently does not have any Air Quality Management Areas. A summary of information related to the revoked Pathhead AQMA, including a map of AQMA boundary is available online at www.midlothian.gov.uk and summarised in Table 2.1. Further information, including a summary of all national AQMA is available on the DEFRA website at <http://uk-air.defra.gov.uk/aqma/list>

In Midlothian air quality is being addressed through the Midlothian Travel Plan,

https://www.midlothian.gov.uk/download/downloads/id/263/midlothian_travel_plan_2013_-_2017.pdf

and through the Midlothian Local Development Plan.

Policy ENV 17, specifically refers to air quality and which states that the Council may require further assessment (as part of a Environmental Impact Assessment or separately) to identify air quality impacts where the Council's Environment Health Service or the Scottish Environmental Protection Agency consider it requisite.

Table 2.1 – Revoked Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Date Declared	Date Revoked
AQMA Pathhead	PM ₁₀ annual mean	Pathhead, Midlothian	An area encompassing 2 square kilometres surrounding the village of Pathhead, Figure 2	30 April 2008	7 April 2014

2.2 Progress and Impact of Measures to address Air Quality in Midlothian

Midlothian Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date
1	New Borders railway linking Edinburgh, Midlothian and the Scottish Borders. Railway stations supported by park and ride facilities with reduced vehicle journeys.	Transport Planning and Infrastructure	Encouraging use of park and ride facilities and active travel routes to stations.	Waverley Railway Partnership	2015 onwards	Opened September 2015
2	Midlothian Council Travel plan	Vehicle fleet efficiency	Provide eco-driver training to staff. Review of fleet by Energy Savings Trust	Midlothian Council	Ongoing	Ongoing
3	Vehicle idling	Public Information	Patrols to educate regarding vehicle idling, targeting schools and other sensitive locations.	Joint Vehicle Emissions Partnership	Onwards	Ongoing
4	Midlothian Council Travel plan	Promoting travel alternatives	Travel plan updated, to cover period 2017 – 2021. Electric fleet vehicles available for staff to use on local business trips.	Midlothian Council	2017 - 2021	Ongoing

2.3 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at

<http://www.gov.scot/Publications/2015/11/5671/17>. Progress by Midlothian Council against relevant actions within this strategy is demonstrated below.

2.3.1 Transport – Avoiding Travel

Local Authorities are required to produce a corporate travel plan. Midlothian Council's corporate Travel plan has recently reviewed and is available on the Council's website at:

https://www.midlothian.gov.uk/downloads/download/468/midlothian_council_travel_plan

The aim of the plan is to reduce the adverse impacts of travel, most particularly car travel associated with the activities undertaken by Midlothian Council in the provision of its services. In particular the plan aims to reduce transport based pollutants and greenhouse gases entering the environment and reduce traffic congestion.

2.3.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. Midlothian Council has a Sustainable Energy Action Plan and Climate Change Strategy which can be found here:

https://www.midlothian.gov.uk/info/1231/environment/445/sustainable_development_and_climate_change/2

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

Measured NO₂ levels at all sites in Midlothian are well within the Air Quality Objective levels. No other pollutant is currently measured by Midlothian Council.

3.1.1 Automatic Monitoring Sites

Automatic (continuous) monitors in Dalkeith town centre and in Pathhead High Street were decommissioned during June 2011 and June 2013 respectively.

The automatic station in Dalkeith town centre was decommissioned following improvement in air quality following the opening of the Dalkeith Bypass and the Pathhead monitoring station was decommissioned in June 2013 following a reduction in fossil fuel use and associated improvements in PM₁₀. A significant improvement in the level of SO₂ in Pathhead was also recorded, figure 9.

The locations of the historic Dalkeith and the Pathhead monitoring stations are shown in Figures 3 and 4. Until decommissioned, the stations were included in the Air Quality in Scotland website www.scottishairquality.co.uk

No continuous monitoring is currently carried out in Midlothian.

3.1.2 Non-Automatic Monitoring Sites

Midlothian Council undertook non- automatic (passive) monitoring of NO₂ at 20 sites during 2016. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Figures 3 – 7.

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

The results set out in Table B.1, Appendix B indicate that the measured concentrations of nitrogen dioxide are within the annual mean air quality objective by some margin at all monitoring locations.

Figure 8 graphically compares the ratified and adjusted monitored NO₂ annual mean concentrations levels since 2003 with the air quality objective of 40µg/m³. Elevated levels of NO₂ were recorded between 2006 and 2008 at diffusion tube locations located adjacent to the A68 in Dalkeith. The Dalkeith Bypass opened in September 2008 resulting in reduced numbers of vehicles travelling through Dalkeith town centre. Consequently, measured concentrations of nitrogen dioxide within Dalkeith town centre have significantly decreased as a result.

The full 2016 dataset of monthly mean values is provided in Appendix B.

Measurements of nitrogen dioxide will continue using the diffusion tube method to monitor the ongoing trends in nitrogen dioxide concentrations in Midlothian

Table 2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full dataset of monthly mean values is provided in Appendix B. No continuous hourly monitoring of NO₂ is carried out.

3.2.2 Particulate Matter (PM₁₀)

Midlothian Council no longer monitors levels of PM₁₀.

PM₁₀ levels were monitored at Pathhead until June 2013 and at Dalkeith until end June 2011. Following installation of the gas mains into the village of Pathhead during 2011 a reduction in PM₁₀ level was noted over the 2011 and 2012 monitoring periods. On the basis of works having been undertaken to provide a sustained reduction in PM₁₀ concentrations, permission was given by the Scottish Government and the Scottish Environment Protection Agency to begin the process of revoking the Pathhead AQMA. The AQMA was revoked in April 2014.

3.2.3 Particulate Matter (PM_{2.5})

Midlothian Council does not monitor PM_{2.5}

3.2.4 Sulphur Dioxide (SO₂)

Midlothian Council no longer monitors levels of SO₂.

Following submission of Midlothian Council's 2010 Progress Report, the Scottish Environment Protection Agency commented that as the measured levels of SO₂ were so low, exceedance of the air quality objective was unlikely and therefore continued monitoring of this pollutant was no longer necessary. Monitoring of SO₂ ceased in Dalkeith at the end of the 2012 monitoring period and in Pathhead at the end of 2013.

The graph in figure 9 was created using the Openair Tools on the Scottish Air Quality website and shows a significant drop in SO₂ concentration in Pathhead from 2011 and until

monitoring ceased in 2013. The marked decrease in SO₂ coincides with the installation and connection of households to the new gas main.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Midlothian Council does not monitor carbon monoxide, lead or 1,3 butadiene.

4. New Local Developments

4.1 Road Traffic Sources

There are no new road traffic sources in Midlothian in 2016.

4.2 Other Transport Sources

The Waverly Line passenger service commenced operations in September 2015. There were no new other traffic sources in 2016.

4.3 Industrial Sources

An application for planning permission in principal for a mixed development use, including housing at Redheugh East, Gorebridge is yet to be determined. This large site extends close to the concrete batching plant at Lady Victoria Business Park, Newtongrange. The impact of the concrete plant in relation to any new consented housing development will be considered in future LAQM reports.

The Zero Waste facility at Millerhill Marshalling Yards currently contains an anaerobic digestion facility for food waste, with energy from waste facility currently under development. Land for housing is allocated at Shawfair in the Midlothian Local Plan. Consideration of the potential impact on Shawfair in terms of air quality has been considered in the Environmental Statement and will be included in future LAQM assessments. The site operator will be required to demonstrate that appropriate control techniques are being utilised through application of Best Available Techniques (BAT) in relation to the appropriate SEPA permit applications, together with a requirement for continuous in –stack emission monitoring.

4.4 Commercial and Domestic Sources

A small number of building warrant applications are received for the installation of wood burning stoves. Warrant is granted where they meet regulations however the applicant is advised to consult with Environmental Health in relation to minimising impact on air quality and sensitive neighbours.

4.5 New Developments with Fugitive or Uncontrolled Sources

Planning Permission has been granted in infill a second phase at Middleton Quarry. An Environmental Statement was submitted with the application, ref 15/00503/DPP. Conditions have been attached to control fugitive emissions, including a requirement to submit a dust management plan prior to commencement of site works.

There are no new potentially significant sources of fugitive particulate matter emissions in the Local Authority area.

5. Planning Applications

Midlothian has been subject to the following planning application which has the potential to affect air quality. The air quality assessment will be available on the Council's website at <https://www.midlothian.gov.uk/planning-and-building> :

- 16/00816/SCO Proposed extension to Dalhousie Sand Quarry – The EIA will consider the air quality impact on both existing and proposed. This will be considered in future Annual Progress Reports.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Monitoring of nitrogen dioxide was carried out at several locations across Midlothian using diffusion tubes. The results indicated that concentrations measured at all locations are within the annual mean air quality objective.

The graphs in Figure 8 continue to show a steady trend in those areas monitored by nitrogen dioxide diffusion tubes and all sites are well below the annual mean objective.

No other issues have been identified which would warrant a Detailed Assessment at this time.

6.2 Conclusions relating to New Local Developments

A large number of housing sites allocated in the local plan are coming forward for consideration, including a proposed housing development at Cauldcoats Farm, close to the boundary with City of Edinburgh Council.

The air quality assessment concludes that for all modelled scenarios, the predicted concentrations of NO₂ and PM₁₀ are within the annual mean objectives at all modelled receptors following completion of the development. The predicted impact at most modelled receptors is reported as being negligible however at one receptor location, taking into account all proposed and committed development, a slight adverse impact is predicted. The application is still under consideration and the outcome will be reported in future LAQM reports.

6.3 Proposed Actions

Midlothian Council will continue to monitor the concentration of NO₂ through the district, including the new diffusion tubes locations introduced, following the review undertaken at the end of 2016.

The results of air quality monitoring and other air quality work will be included in the next Annual Progress Report due to be submitted by June 2018.

Appendix A: Monitoring Results

Table A.1 – 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 co-located with a Continuous Analyser?
BR1	Bonnyrigg	Roadside	330895	665229	NO ₂	N	0 m	1.5	N
BR2	Bonnyrigg	Roadside	330973	665219	NO ₂	N	0 m	1.5	N
J2	Dalkeith	Roadside	333178	667290	NO ₂	N	>10 m	0.1	N
E1	Dalkeith	Urban Background	333407	667186	NO ₂	N	1.5 m	1	N
BD1	Dalkeith	Roadside	333055	667183	NO ₂	N	0.1 m	1.5	N
ED1	Dalkeith	Roadside	333206	667372	NO ₂	N	0.1 m	1.5	N
ED2	Dalkeith	Roadside	332996	667122	NO ₂	N	0.1 m	2	N
X1	Dalkeith	Roadside	332959	667392	NO ₂	N	1.5 M	1.5	N
HD1	Dalkeith	Roadside	333326	667514	NO ₂	N	2.5 m	1.5	N
ND1	Dalkeith	Roadside	333410	667059	NO ₂	N	2 m	1.5	N
DL1	Dalkeith	Roadside	333247	667073	NO ₂	N	0 m	1.5	N
LH1	Loanhead	Roadside	328242	665585	NO ₂	N	2.3 m	0.9	N
SN1	Loanhead	Roadside	327142	666337	NO ₂	N	3.1 m	0.1	N
SN2	Loanhead	Roadside	327262	666588	NO ₂	N	0 m	3.6	N
P1	Penicuik	Urban Background	323146	659818	NO ₂	N	0.5 m	1.4	N
P2	Penicuik	Roadside	323677	661000	NO ₂	N	2.5 m	2.5	N
P3	Penicuik	Roadside	323551	659725	NO ₂	N	0.5 m	1.5	N
PD1	Pathhead	Roadside	339601	664172	NO ₂	N	3 m	1.5	N
PD2	Pathhead	Roadside	339450	664310	NO ₂	N	0 m	6.5	N

Table A.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
J2	Dalkeith	Road side	Diffusion Tube	100	29.7	25.3	23.6	23.1	25.3
E1	Dalkeith	Urban Bground	Diffusion Tube	100	14.6	15.1	10.4	12.9	12.1
BD1	Dalkeith	Road side	Diffusion Tube	100	35.4	29.0	29.3	23.1	26.4
ED1	Dalkeith	Road side	Diffusion Tube	100	32.5	30.1	29.1	27.8	32.5
ED2	Dalkeith	Road Side	Diffusion Tube	92	28.0	24.2	23.1	19.1	19.9
X1	Dalkeith	Road Side	Diffusion Tube	100	17.7	16.5	14.7	14.8	15.1
HD1	Dalkeith	Road Side	Diffusion Tube	100	16.3	14.7	13.0	14.5	14.7
ND1	Dalkeith	Road Side	Diffusion Tube	100	31.1	27.2	37.3	23.7	25.4
DL1	Dalkeith	Road Side	Diffusion Tube	100	33.6	29.4	28.2	26.9	26.2
P1	Penicuik	Urban Bground	Diffusion Tube	92	8.7	7.8	6.8	6.4	7.4
P2	Penicuik	Road Side	Diffusion Tube	100	22.9	20.9	19.7	19.5	20.1
P3	Penicuik	Road side	Diffusion Tube	100	14.4	12.1	11	9.4	11.4
PD1	Pathhead	Road side	Diffusion Tube	100	21.5	20.1	18.4	17.2	17.8
PD2	Pathhead	Road side	Diffusion Tube	100	18.9	18.3	16.3	15.1	14.8
BR1	Bonnyrigg	Road side	Diffusion Tube	100	24.2	23.2	21.5	20.5	21.4
BR2	Bonnyrigg	Road side	Diffusion Tube	100	23.8	21.2	20.1	20.9	20.1
LH1	Loanhead	Road side	Diffusion Tube	92	22.9	21.2	18.7	18.2	21.1
SN1	Loanhead	Road side	Diffusion Tube	100	23.3	23.6	21.6	20.0	21.7
SN2	Loanhead	Road side	Diffusion Tube	100	28.3	25.0	22.3	21.8	24.5

Notes: Any exceedences of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedence of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

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

Site ID	NO ₂ Mean Concentrations (µg/m ³)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted ⁽¹⁾
J2	34.3	37.9	28	34.1	31.4	26	30.2	31	31	26.3	47.1	36.6	32.8	25.3
E1*	18.6	15.6	12.4	13.6	7.8	6.7	8.1	8.5	8.5	13.8	16.8	14.2	12.1	12.1
BD1	31.5	31.9	28.8	54.9	36.6	38.2	23.9	29.2	29.2	34.6	41.8	31.4	34.3	26.4
ED1	45.4	44.9	36.7	57.2	41.3	44.2	26.6	37.5	37.5	55.2	40.3	39.9	42.2	32.5
ED2	32.8	26.4	24.2	-	24.8	26.8	15	23.1	23.1	35	30.8	23.2	25.9	19.9
X1	23	25.2	17.4	23.2	16.5	16.5	17.5	13.1	13.1	19.7	25.6	24.1	19.6	15.1
HD1	27.3	22	15.1	19.1	12.6	11.1	14	16.8	16.8	16.2	29.8	28.1	19.1	14.7
ND1	33.5	35.5	25.6	38.4	31.7	31.6	27.4	31.8	31.8	31.8	43.1	33.3	32.9	25.4
DL1	34.1	33.5	29.5	34.9	30.5	33.3	29.7	30.1	30.1	37.5	49.1	35.7	34	26.2
P1*	10.6	9	7.1	-	8	8.2	3.6	5.6	5.6	9.6	8.9	5.6	7.4	7.4
P2	25.2	25.3	28.4	34.8	23.7	31.3	16.6	19.5	19.5	30.5	35	22.8	26.1	20.1
P3	15.7	13.5	15	19.4	16.6	21.2	6.4	12.7	12.7	20.4	15.2	9.3	14.8	11.4
PD1	26.2	24.3	18.8	31.1	21.6	21.7	14.5	20.8	20.8	32.4	28.7	16.3	23.1	17.8
PD2	18.8	22.6	20	22.8	16.6	15.4	14.7	17.6	17.6	19.3	27.1	17.7	19.2	14.8
BR1	27.8	26.4	24.8	37.1	32	30	17.2	23.6	23.6	38.7	31.2	21.1	27.8	21.4

Site ID	NO ₂ Mean Concentrations (µg/m³)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted ⁽¹⁾
BR2	34.6	26.7	27.2	28.1	22	23.4	20.2	20.9	20.9	27.6	35	27.4	26.2	20.1
LH1	29.7	32.8	24.6	38.8	35	-	17.4	20.3	20.3	29.8	30.1	22.4	27.4	21.1
SN1	34.2	28.8	24.7	36.7	22.4	32.8	18	20.9	20.9	40.7	33.6	25.1	28.2	21.7
SN2	29.2	30.4	27.7	41.8	35.4	32.8	18.6	28.2	28.2	36.1	37.4	36	31.8	24.5

(1) See Appendix C for details on bias adjustment

(2) Dash represents no data due to missing tube

(3) * Bias correction applied to roadside measurements only.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are analysed by Edinburgh Scientific Services using the 50% triethanolamine (TEA) in acetone method.

ESS has confirmed that the procedures set out in the Harmonisation Practical Guidance are followed during the analysis. The laboratory is UKAS accredited for the analysis and also participates in the Workplace Analysis Scheme for Proficiency (WASP) scheme. ESS has reported that the results from the WASP scheme confirm that the laboratory is performing satisfactorily. The laboratory uses the 50% v/v triethanolamine (TEA) in acetone method where the adsorbent pads are dipped into this solution, dried and then inserted into the acrylic diffusion tubes. All exposure times and dates are recorded by Midlothian Council and sent to the laboratory with the exposed tubes. Midlothian Council also sends one unexposed tube with each batch to check that there has been no contamination during handling or analysis.

Diffusion Tube Bias Adjustment Factors

The bias adjustment factor for this laboratory and method for the year 2016 listed in the Spreadsheet of Bias Adjustment Factors v.09/17 (Ref. 2) is 0.77. This is based on a co-location study at a kerbside site carried out by Marylebone Road and five studies carried out in Edinburgh (4 roadside and 1 kerbside). This was chosen since the Dalkeith Monitoring Station has been decommissioned.

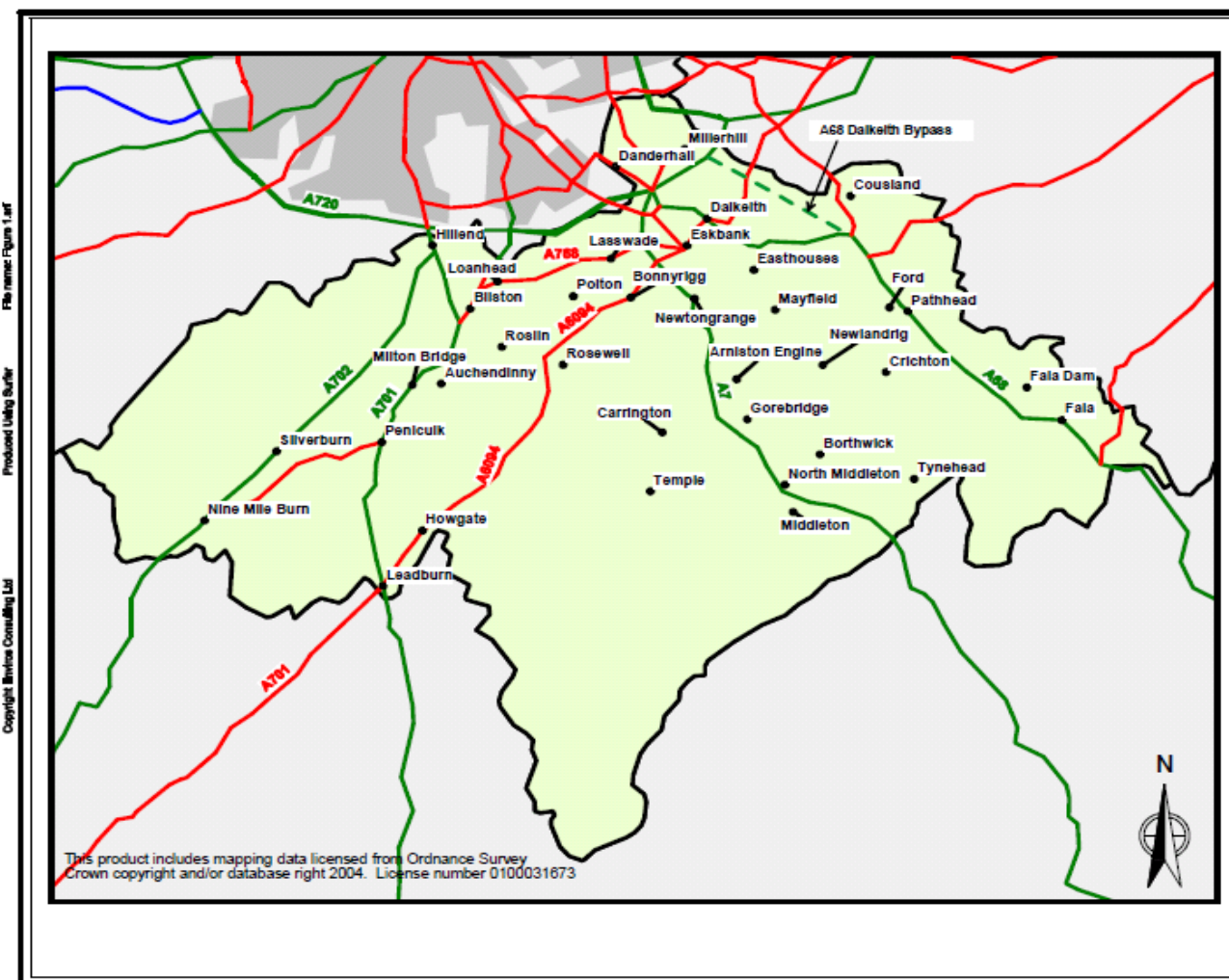
Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA 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
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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

References

1. Defra and the Devolved Administrations, Local Air Quality Management, Technical Guidance (TG17), April 2016.
2. Defra and the Devolved Administrations, Spreadsheet of Bias Adjustment Factors, version 09/17, accessed at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>.
3. Cleaner Air for Scotland: The Road to a Healthier Future, Scottish Government
4. Midlothian Council Transport Plan 2013 to 2017
5. Midlothian Local Development Plan 2017

Figure 1 - Schematic showing boundary of Midlothian, including towns, villages and significant roads



6. Figure 2 Extent of the now Revoked Pathhead AQMA

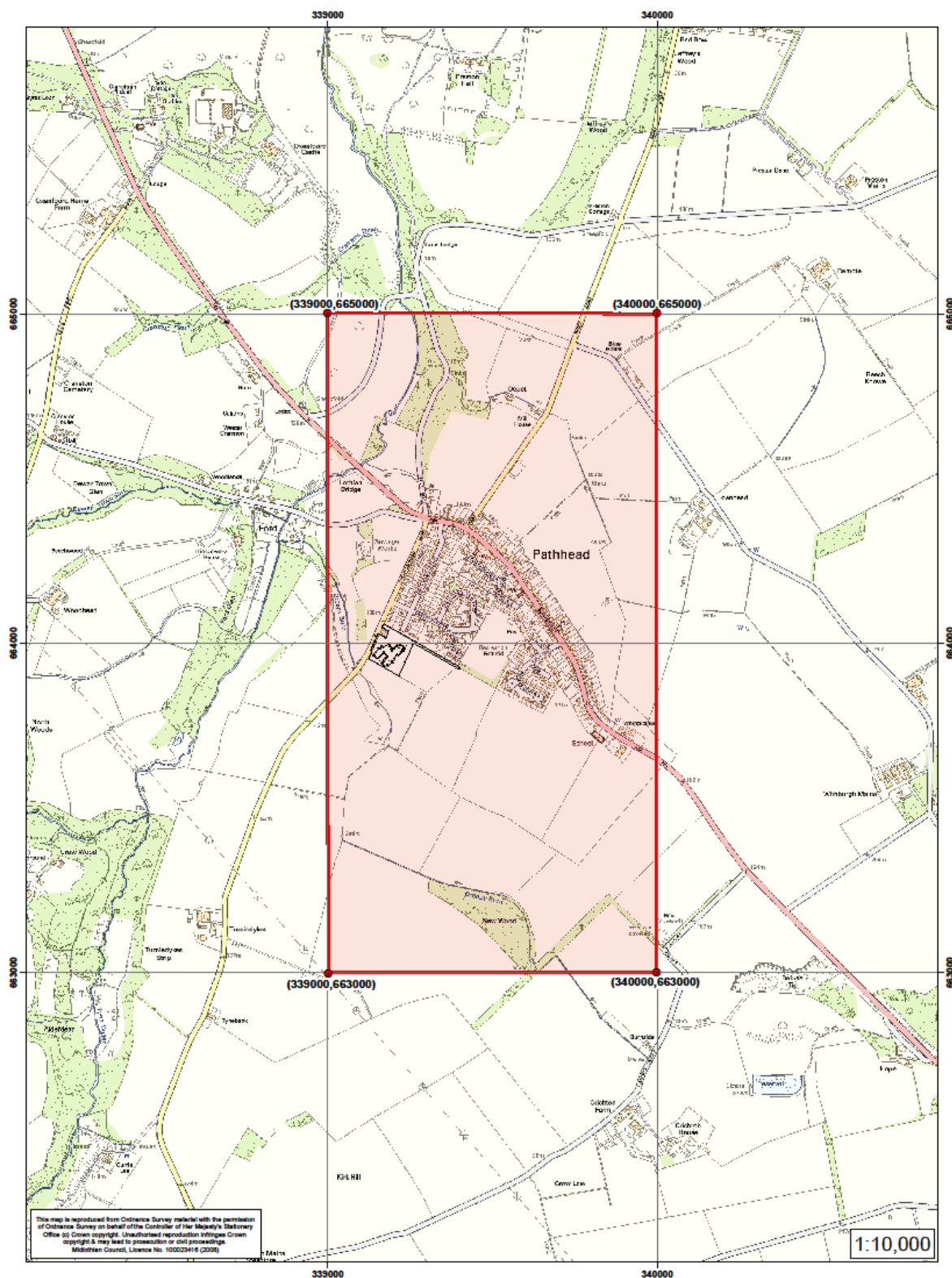


Figure 3 Location of passive diffusion tubes and (decommissioned) automatic monitoring station, Dalkeith

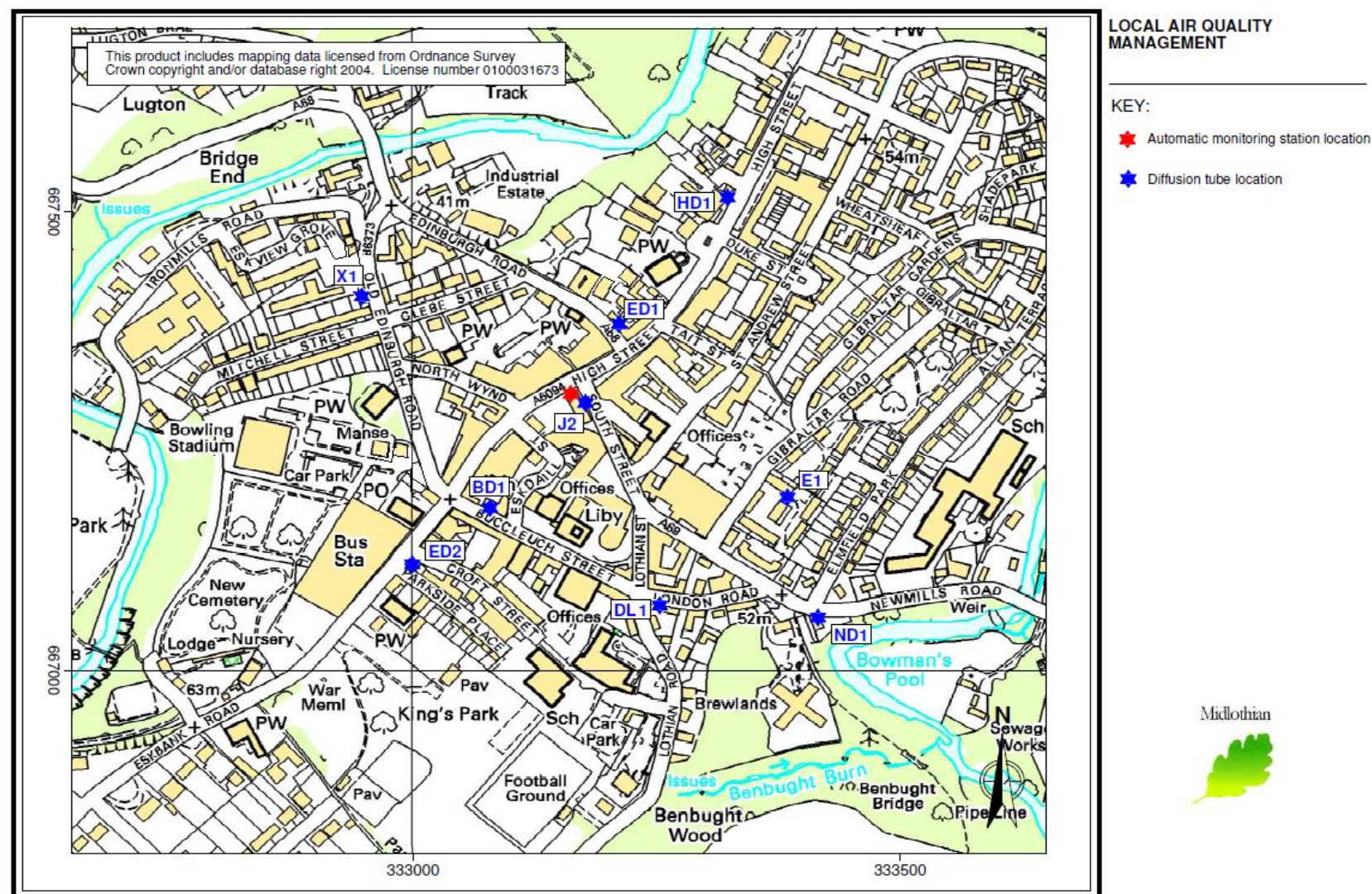


Figure 4 Location of passive diffusion tubes and (decommissioned) automatic monitoring station, Pathhead

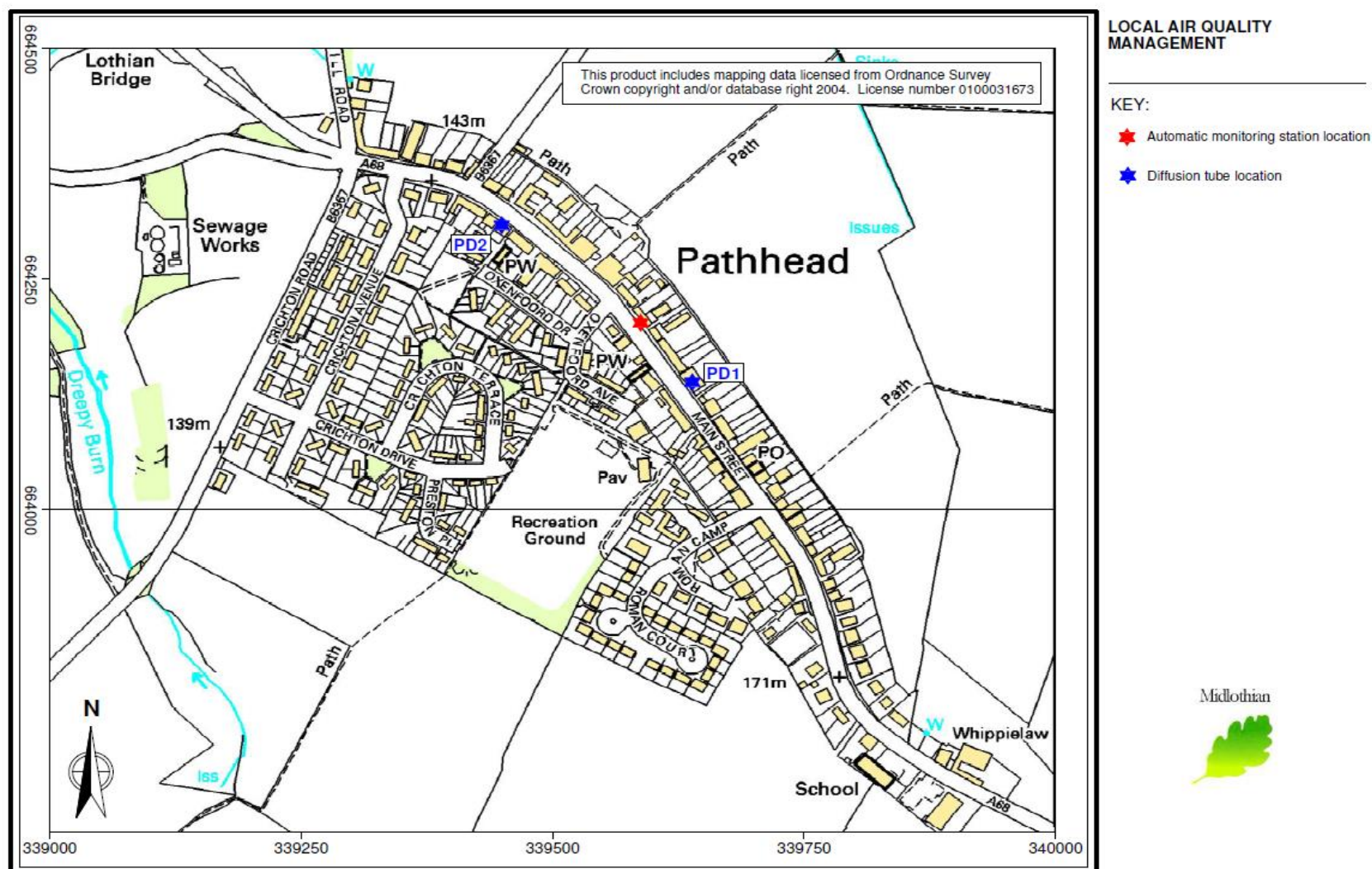


Figure 5 Location of passive diffusion tubes in Penicuik

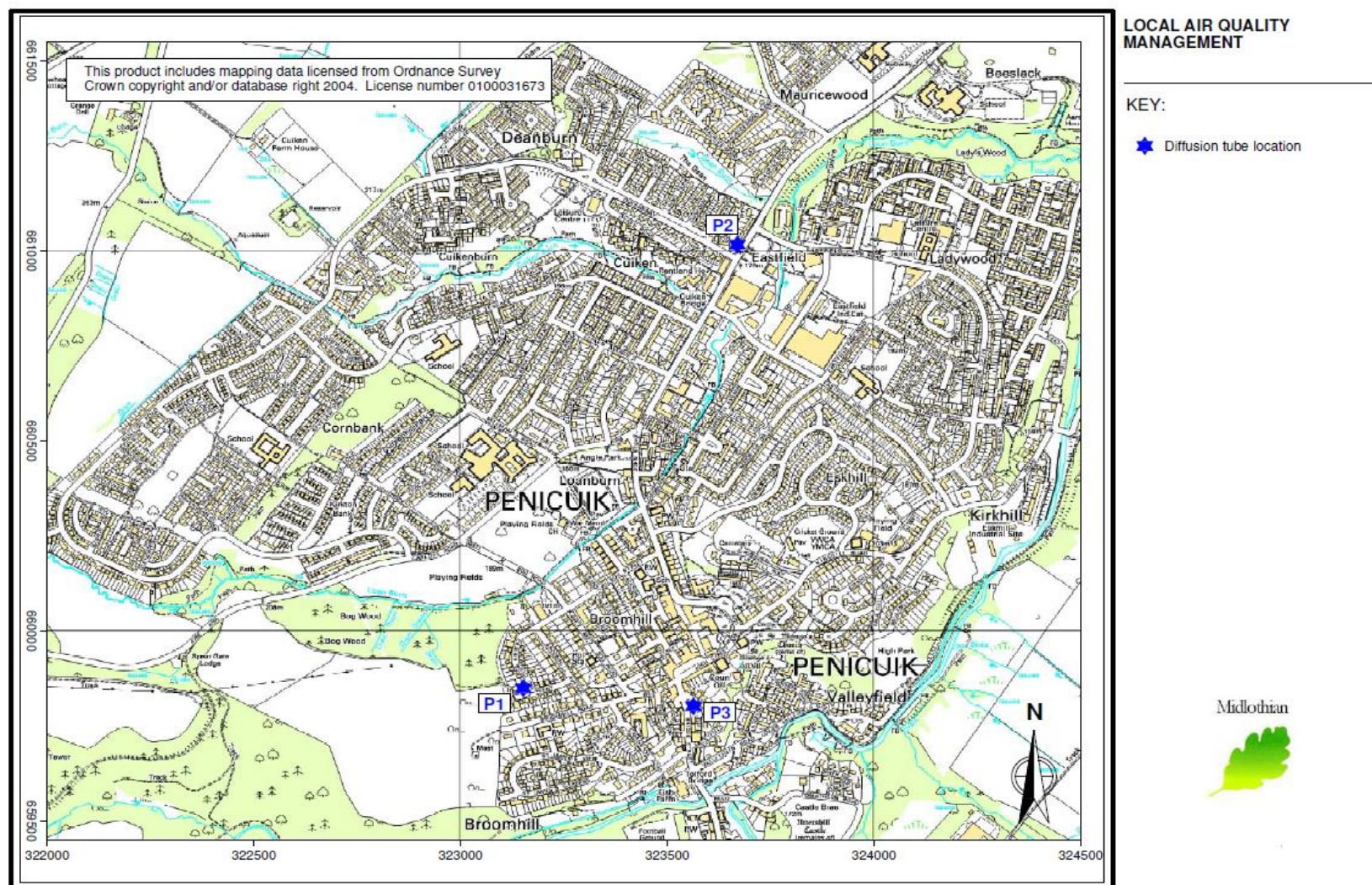


Figure 6 Location of passive diffusion tubes in Bonnyrigg

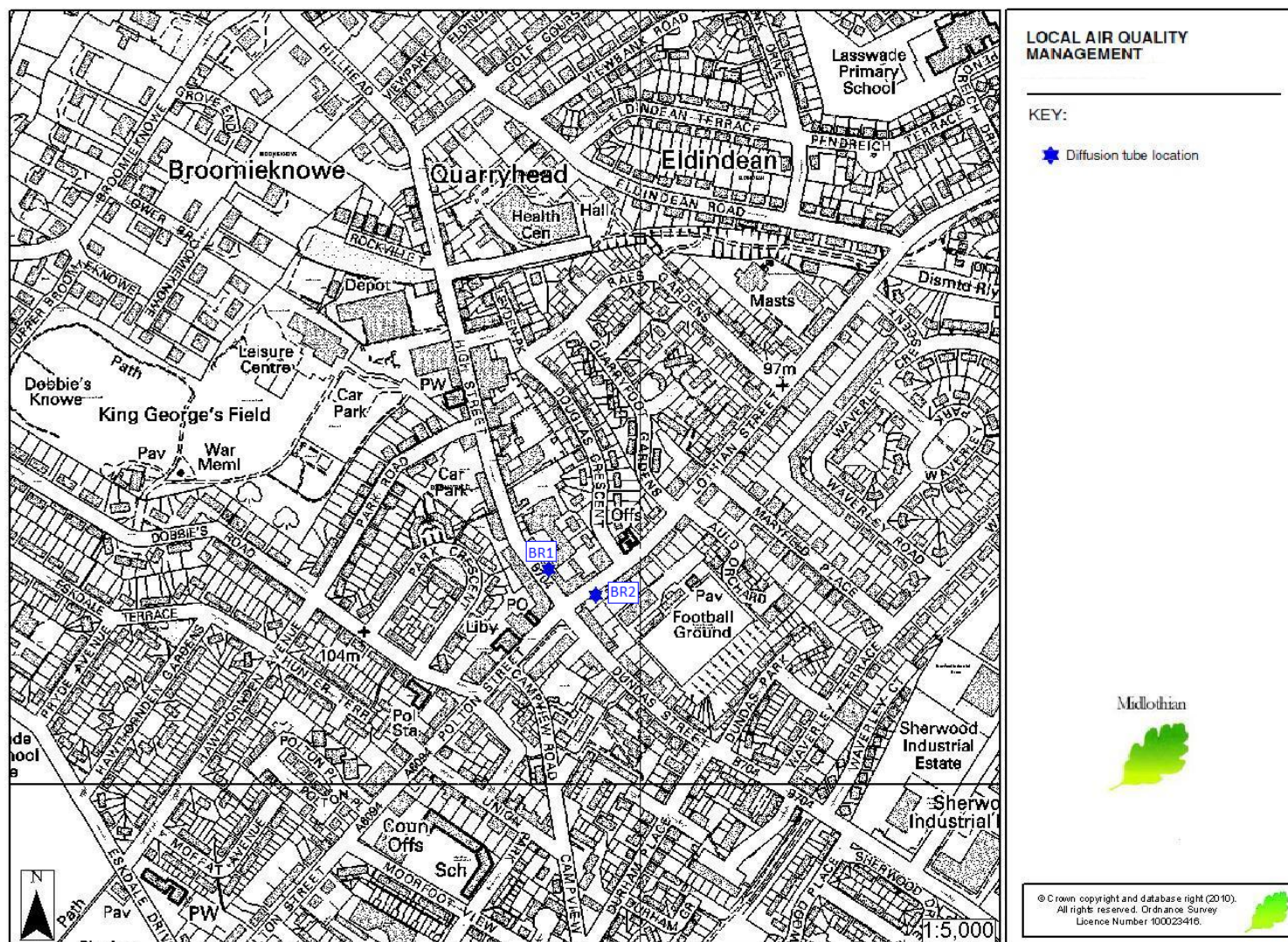


Figure 7 Location of passive diffusion tubes in Loanhead

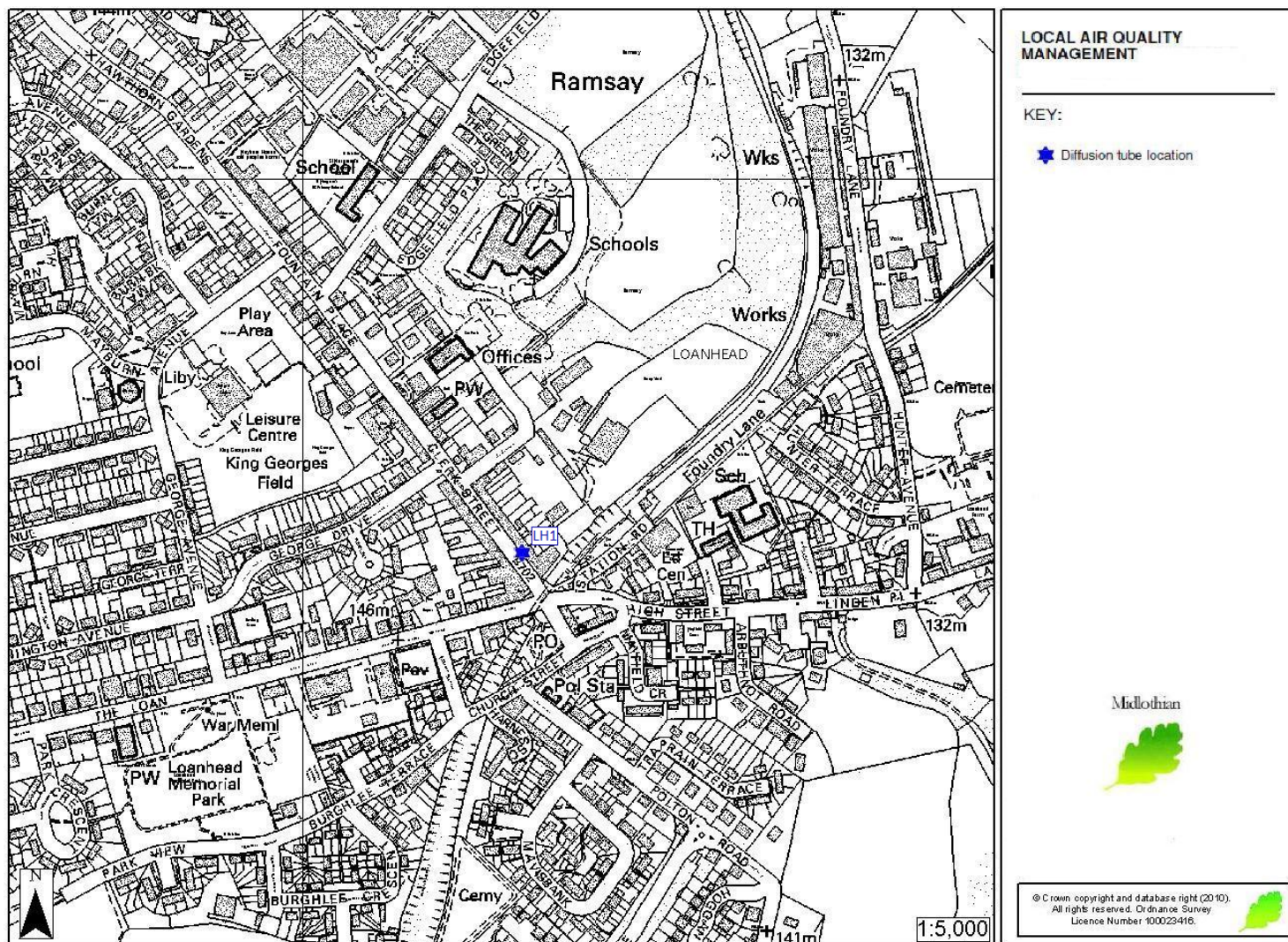


Figure 8 Annual mean nitrogen dioxide diffusion tube concentrations in Midlothian 2003 – 2016

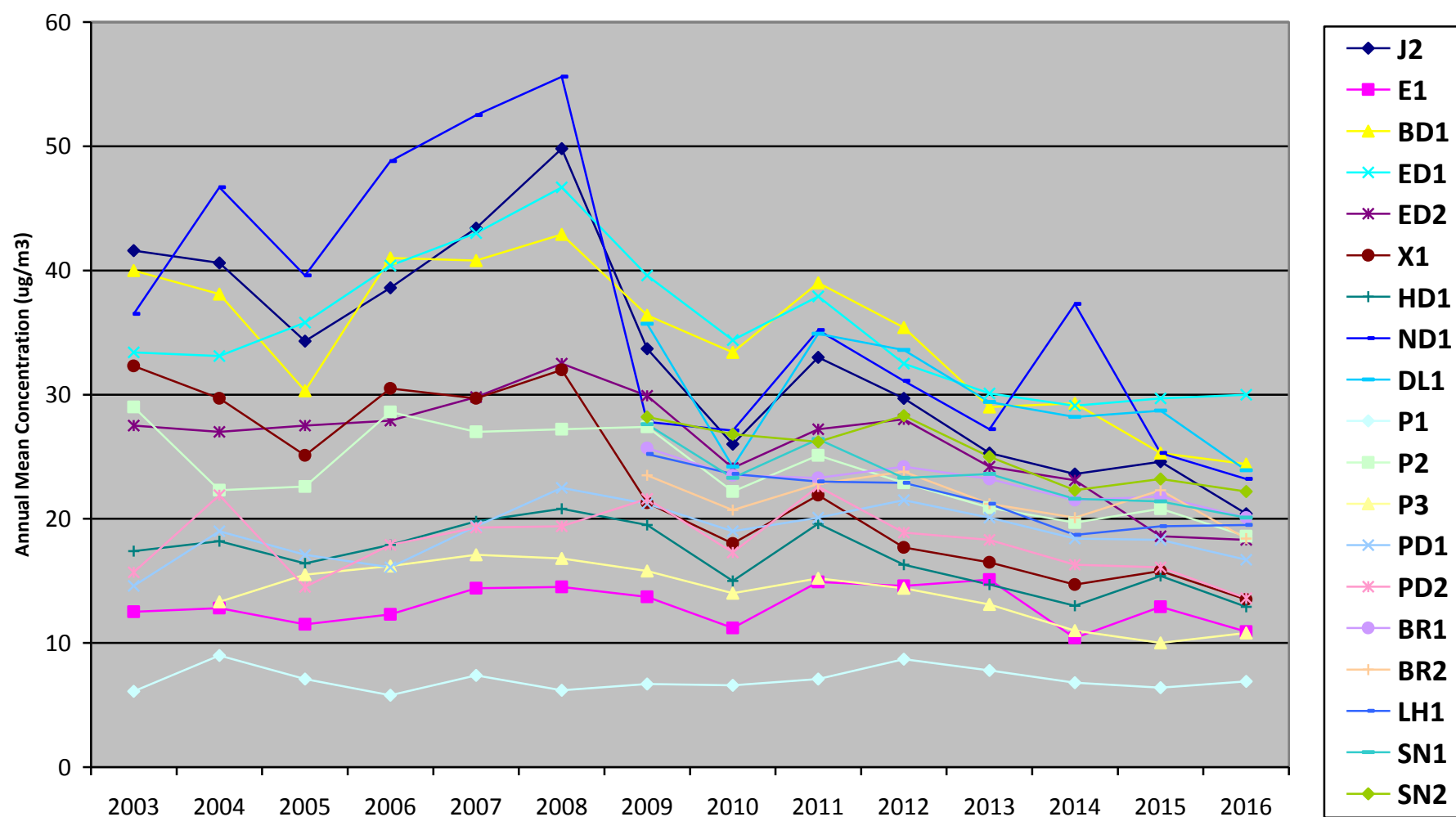


Figure 9 **SO₂ Concentration at Pathhead, Midlothian (Jan 2008 – Jan 2013)**