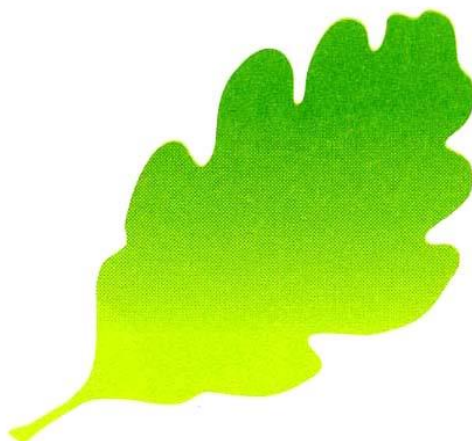


Annual Progress Report (APR)

Midlothian



**2018 Air Quality Annual Progress Report (APR) for
Midlothian Council**

**In fulfilment of Part IV of the
Environment Act 1995**

Local Air Quality Management

August 2018

Local Authority Officer	Lilianne Lauder, Principal Officer (Public Health)
Department	Education, Communities and Economy
Address	Fairfield House 8 Lothian Road Dalkeith EH22 3ZN
Telephone	0131 271 3370
E-mail	lilianne.lauder@midlothian.gov.uk
Report Reference number	APR. Midl.Aug.2018
Date	30 August 2018

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 very 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 Annual Progress Report 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 were identified in 2017 as requiring further assessment and there are currently no air quality issues in Midlothian.

The locations of the tubes were reviewed in December 2016, with changes implemented during the 2017 monitoring period. This has included the introduction of new monitoring sites in the village of Lasswade, the results of which are reported in Appendix B.

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.

The improvement in Pathhead in terms of PM₁₀, allowed Midlothian Council to revoke 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.

In terms of local priorities, a commitment was made by Midlothian Council 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. This work has been carried out and two new monitoring locations were introduced into the village of Lasswade.

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.

Table of Contents

Executive Summary: Air Quality in Our Area.....	i
Air Quality in Midlothian	i
Actions to Improve Air Quality	ii
Local Priorities and Challenges.....	iii
How to Get Involved.....	iii
1. Local Air Quality Management.....	1
2. Actions to Improve Air Quality.....	2
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in Midlothian	2
2.3 Cleaner Air for Scotland	4
2.3.1 Transport – Avoiding travel	4
2.3.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits	4
3. Air Quality Monitoring Data and Comparison with Air Quality Objectives	5
3.1 Summary of Monitoring Undertaken	5
3.1.1 Automatic Monitoring Sites	5
3.1.2 Non-Automatic Monitoring Sites.....	5
3.2 Individual pollutants.....	5
3.2.1 Nitrogen Dioxide (NO ₂).....	5
3.2.2 Particulate Matter (PM ₁₀).....	6
3.2.3 Particulate Matter (PM _{2.5})	6
3.2.4 Sulphur Dioxide (SO ₂)	6
3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene	7
4. New Local Developments	7
4.1 Road Traffic Sources.....	7
4.2 Other Transport Sources	7
4.3 Industrial Sources.....	7
4.4 Commercial and Domestic Sources	8
4.5 New Developments with Fugitive or Uncontrolled Sources.....	8
5. Planning Applications	8
6. Conclusions and Proposed Actions.....	8
6.1 Conclusions from New Monitoring Data.....	8
6.2 Conclusions relating to New Local Developments	9
6.3 Proposed Actions	9
Appendix A: Monitoring Results	10

Appendix B: Full Monthly Diffusion Tube Results for 2017.....	13
Appendix C: Supporting Technical Information / Air Quality Monitoring	
Data QA/QC	15
Glossary of Terms	16
References	17

List of Tables

Table 1.1 – Summary of Air Quality Objectives in Scotland	1
Table 2.1 – Declared Air Quality Management Areas.....	2
Table 2.2 – Progress on Measures to Improve Air Quality	3

List of Figures

Figure 1 – Schematic Showing Boundary of Midlothian.....	18
Figure 2 – Extent of the now Revoked Pathhead AQMA.....	19
Figure 3 – Location of Passive Diffusion Tubes, Dalkeith.....	20
Figure 4 - Location of Passive Diffusion Tubes, Pathhhead.....	21
Figure 5 - Location of Passive Diffusion Tubes, Penicuik.....	22
Figure 6 - Location of Passive Diffusion Tubes, Bonnyrigg.....	23
Figure 7 - Location of Passive Diffusion Tubes, Loanhead.....	24
Figure 8 - Location of Passive Diffusion Tubes, Lasswade.....	25
Figure 9 – SO ₂ Concentration at Pathhead (Jan 2008 – Jan 2013).....	26

1. Local Air Quality Management

This report provides an overview of air quality in Midlothian during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual 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 the AQMA boundary is available online at www.midlothian.gov.uk and summarised in Table 2.1. Further information, including a summary of all national AQMAs 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](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 an 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 – Declared 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 2017 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	2017 - 2021	Ongoing
4	Midlothian Council Travel plan	Promoting travel alternatives + Vehicle Fleet Efficiency	Travel plan updated, to cover period 2017 to 2021. Electric fleet vehicles available for staff to use on local business trips.	Midlothian Council	2017 - 2021	Ongoing
5	Midlothian Council Travel plan	Promoting travel alternatives + Alternative to private vehicle use	A tax free bike purchase scheme has been introduced + entitlement to a class bike mileage for business trips made by bike	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 proposals 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 travel plan 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 corporate 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

NO₂ levels are currently monitored at 17 locations in Midlothian. Measured NO₂ levels at all sites 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 <http://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 17 sites during 2017. Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Figures 3 - 8. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided 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.

Measured concentrations of nitrogen dioxide within Dalkeith town centre decreased significantly following the opening of the Dalkeith Bypass in September 2008, resulting in reduced numbers of vehicles travelling through Dalkeith town centre.

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 6 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2017 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}. There are no plans in the immediate future to commence monitoring of 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 considered 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 2017.

4.2 Other Transport Sources

Since the opening of the Waverly Line and commencement of the passenger service in September 2015, there has been no new other traffic sources in Midlothian.

4.3 Industrial Sources

An application for a planning permission for a major petrol filling station at Costco, Straiton was granted planning permission in November 2016, with development commencing in April 2017. The development consists of 5 x 100, 000 gallon tanks and one 22, 000 gallon tank. The closest housing is greater than 10 m from the pumps and the station has benefited from the installation of both Stage 1 and Stage 2 recovery systems. No detailed assessment is considered necessary.

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. Whilst house building in Shawfair has commenced, the allocated housing sites adjacent to the anaerobic digestion plant and energy from waste facility are not yet developed. 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.

An application for planning permission in principal for a mixed development use, including housing at Redheugh East, Gorebridge has been granted planning permission (ref 15/00045/PPP). This large site extends close to the concrete batching plant at Lady Victoria Business Park, Newtongrange. Emissions from the concrete batching plant are controlled through the PPC permitting process by the Scottish Environment Protection Agency. Any impact of the concrete plant in relation to the newly consented housing development will be considered in future LAQM reports.

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.

Planning Permission to install a biomass boiler within Pentland Industrial Estate, Loanhead has been granted, ref 17/00846/DPP, subject to agreed emission levels and conditions relating to the operation and maintenance of the biomass boiler being met.

4.5 New Developments with Fugitive or Uncontrolled Sources

Planning Permission has been granted in infill a second phase at Middleton Quarry, Gorebridge. Conditions have been attached to control fugitive emissions, including submission of a dust management plan to discharge condition 13 of planning permission 15/00503/DPP. This has been submitted and requires dust suppression and monitoring to be undertaken, with temporary cessation of activities in extreme adverse conditions.

5. Planning Applications

Midlothian Council 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> :

- 17/00380/SCO Proposed extension of time for the extraction and restoration of Dalhousie Sand Quarry – The air quality impact will be considered as part of the initial consent (06/00689/FUL), which is to be amended to cover the impact on existing and proposed residences (which will be occupied during operations on site) and to include dust generated during re-instatement operations, demonstrating that the air quality objectives in relation to PM₁₀ and PM_{2.5} will be met and detailing steps which will be taken to avoid nuisance. This impact of the proposed extension to Dalhousie Sand Quarry 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.

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 the City of Edinburgh Council.

The air quality assessment concludes that for all modelled scenarios, the predicted concentrations of NO₂ and PM₁₀ following completion of the development are within the annual mean objectives at all modelled receptors. 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. At the end of the 2018 monitoring period it is proposed to further review those diffusion tubes locations where the measured levels of NO₂ remain very low. This review will be undertaken in consultation with SEPA and Scottish Government.

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 2019.

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
LW1	Lasswade	Roadside	330343	666138	NO ₂	N	0m	1.5	N
LW2	Lasswade	Roadside	330470	666125	NO ₂	N	0m	0.5	N

(1) '0m' if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

Table A.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾					2017
					2012	2013	2014	2015	2016	
J2	Road side	Diffusion Tube	100	100	29.7	25.3	23.6	23.1	25.3	17.8
E1 ⁽⁴⁾	Urban Bground	Diffusion Tube	N/A	N/A	14.6	15.1	10.4	12.9	12.1	*
BD1	Road side	Diffusion Tube	100	100	35.4	29.0	29.3	23.1	26.4	22.5
ED1	Road side	Diffusion Tube	100	100	32.5	30.1	29.1	27.8	32.5	25.0
ED2	Road side	Diffusion Tube	100	92	28.0	24.2	23.1	19.1	19.9	17.7
X1 ⁽⁴⁾	Road side	Diffusion Tube	N/A	N/A	17.7	16.5	14.7	14.8	15.1	*
HD1	Road side	Diffusion Tube	100	92	16.3	14.7	13.0	14.5	14.7	13.6
ND1	Road side	Diffusion Tube	100	100	31.1	27.2	37.3	23.7	25.4	24.8
DL1	Road side	Diffusion Tube	100	100	33.6	29.4	28.2	26.9	26.2	25.4
P1 ⁽⁴⁾	Urban Bground	Urban Bground	N/A	N/A	8.7	7.8	6.8	6.4	7.4	*
P2	Road Side	Diffusion Tube	100	100	22.9	20.9	19.7	19.5	20.1	17.1
P3 ⁽⁴⁾	Road Side	Diffusion Tube	N/A	N/A	14.4	12.1	11	9.4	11.4	*
PD1	Road Side	Diffusion Tube	100	100	21.5	20.1	18.4	17.2	17.8	13.2
PD2	Road Side	Diffusion Tube	100	100	18.9	18.3	16.3	15.1	14.8	13.3
BR1	Road Side	Diffusion Tube	100	100	24.2	23.2	21.5	20.5	21.4	17.5
BR2	Road Side	Diffusion Tube	100	100	23.8	21.2	20.1	20.9	20.1	18.2
LH1	Road Side	Diffusion Tube	100	100	22.9	21.2	18.7	18.2	21.1	17.3
SN1	Road Side	Diffusion Tube	100	100	23.3	23.6	21.6	20.0	21.7	17.5
SN2	Road Side	Diffusion Tube	100	100	28.3	25.0	22.3	21.8	24.5	22.8
LW1 ⁽⁴⁾	Road Side	Diffusion Tube	92	83	N/A	N/A	N/A	N/A	N/A	20.1
LW2 ⁽⁴⁾	Road Side	Diffusion Tube	92	83	N/A	N/A	N/A	N/A	N/A	24.8

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

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

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

(3) 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.

(4) Note diffusion tubes E1, X1, P1 and P3 were removed and LW1 and LW2 added following the review of diffusion tube locations at the end of 2016

Appendix B: Full Monthly Diffusion Tube Results for 2017

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

Site ID	NO ₂ Mean Concentrations (µg/m ³)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted ⁽¹⁾
J2	29	33.9	24.5	17.3	17.6	14.1	14.3	16	21.2	20.4	27.5	27.8	21.97	17.8
BD1	34.6	29.9	36.8	21.7	29.6	18.3	20.2	22.5	30.2	23.2	30.4	35.7	27.76	22.5
ED1	21.9	40.6	40.5	28	43	21.3	24.3	23	33.6	29.4	34.8	29.3	30.81	25.0
ED2	-	22.1	27.7	17.5	24.6	14.9	16.7	16.7	21.9	24.2	26.6	26.9	21.8	17.7
HD1	22.5	21	21.3	14.7	12.7	10.3	9	12.7	-	17.7	20.4	22.2	16.77	13.6
ND1	36.7	34.8	34	29.4	29.6	23.9	21.4	23.9	29.3	32.9	38.9	32.8	30.63	24.8
DL1	39	44.8	28.4	29.3	27.5	23.1	21.8	25.2	29.6	29	40	38.1	31.32	25.4
P2	24.7	30.6	29.1	15.4	21.5	13.3	14.2	15.3	20.1	18.8	28.1	22.6	21.14	17.1
PD1	18.7	22.9	15.6	13.3	15.6	12.1	11.8	12	21.7	17	18.3	16.4	16.28	13.2
PD2	21.4	21.4	16.3	10.9	13.7	11.3	10.1	12.3	16.1	16.2	28.5	19.3	16.46	13.3
BR1	22.9	30	22.2	22.7	26.3	17.6	18	14.6	19.5	21.5	25.1	18.8	21.60	17.5
BR2	33	31.5	24	16.7	23.6	13.3	8.3	14.8	20.9	23.5	31.3	28.6	22.46	18.2
LH1	28.3	32.1	30.7	13.1	23.4	14.9	15.7	15.4	20.4	18.6	23.1	20.9	21.38	17.3
SN1	26.4	31.3	25.3	12.7	28.1	14.1	16.7	17	21.4	21.5	23.2	22.2	21.66	17.5
SN2	39.5	37.5	36.8	21.1	27.6	18.7	18.1	18.9	27.4	25.3	31.7	35.2	28.15	22.8

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⁾
LW1	N/C	30	29.7	26.6	22.9	17.6	16.8	19.6	31.8	24.9	-	28.2	24.81	20.1
LW2	N/C	-	39.9	23.3	37.5	24	27.5	27.5	31.7	28	34.2	32.4	30.6	24.8

(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.

(4) N/C means monitoring at location not commenced

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 2017 listed in the Spreadsheet of Bias Adjustment Factors v.06/18 (Ref. 2) is 0.81. This is based on a co-location study at a kerbside site carried out by Marylebone Road, four roadside studies carried out in Edinburgh and one roadside study carried out in Stirling. This study 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 06/18, accessed at <http://lagm.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

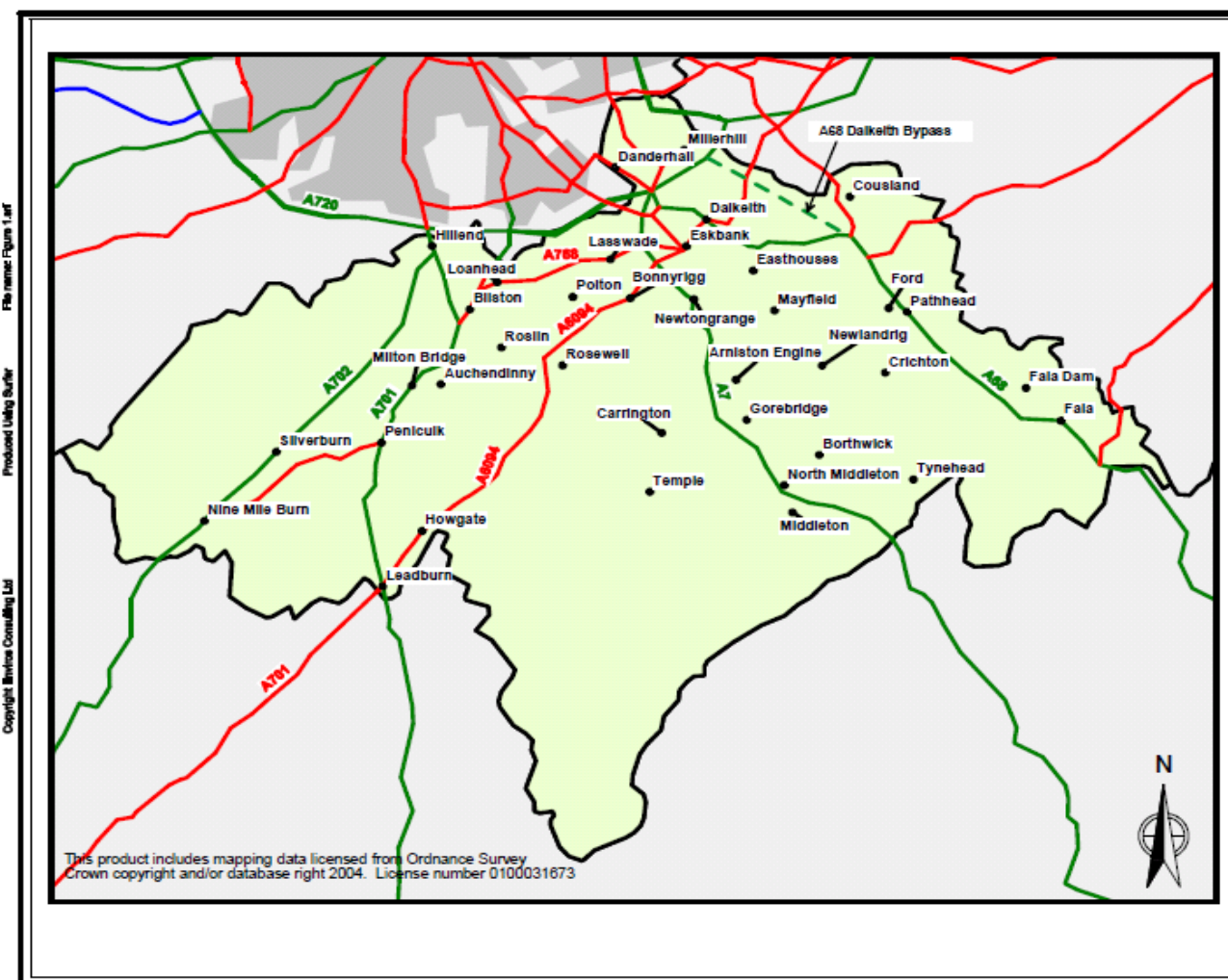


Figure 2 Extent of Revoked Air Quality Management Area, Pathhead

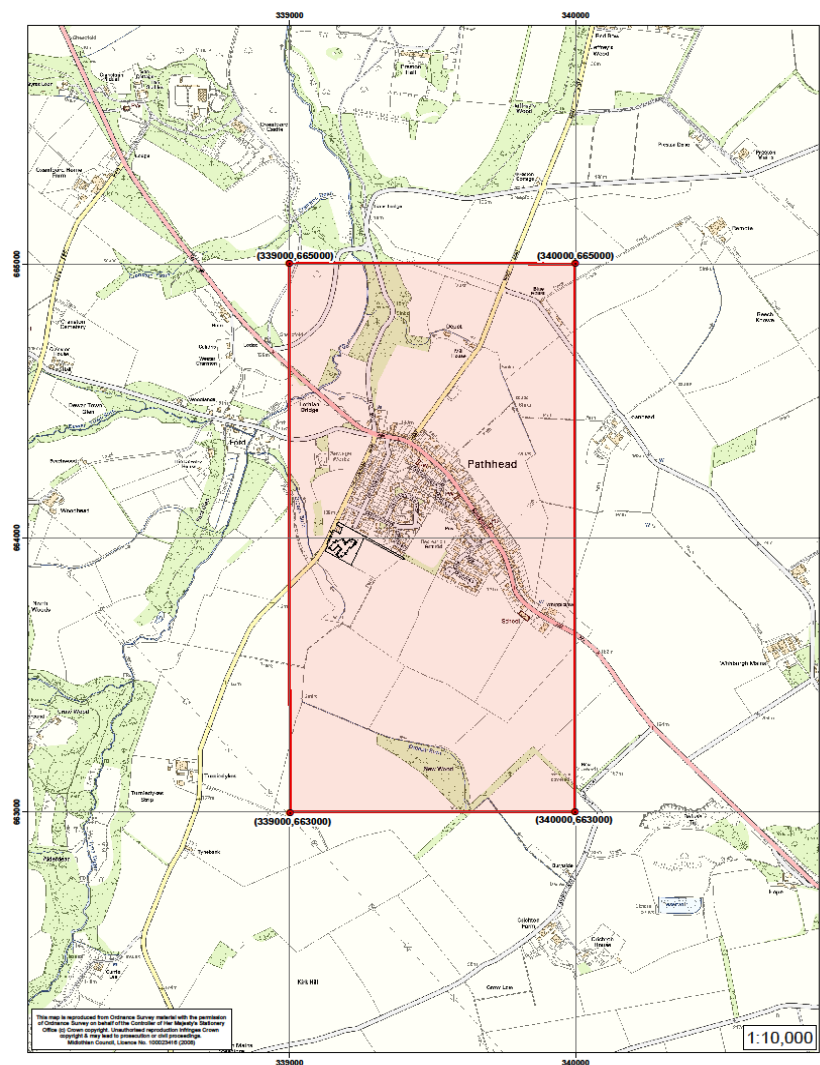


Figure 3 Location of passive diffusion tubes and (decommissioned) automatic monitoring station, Dalkeith

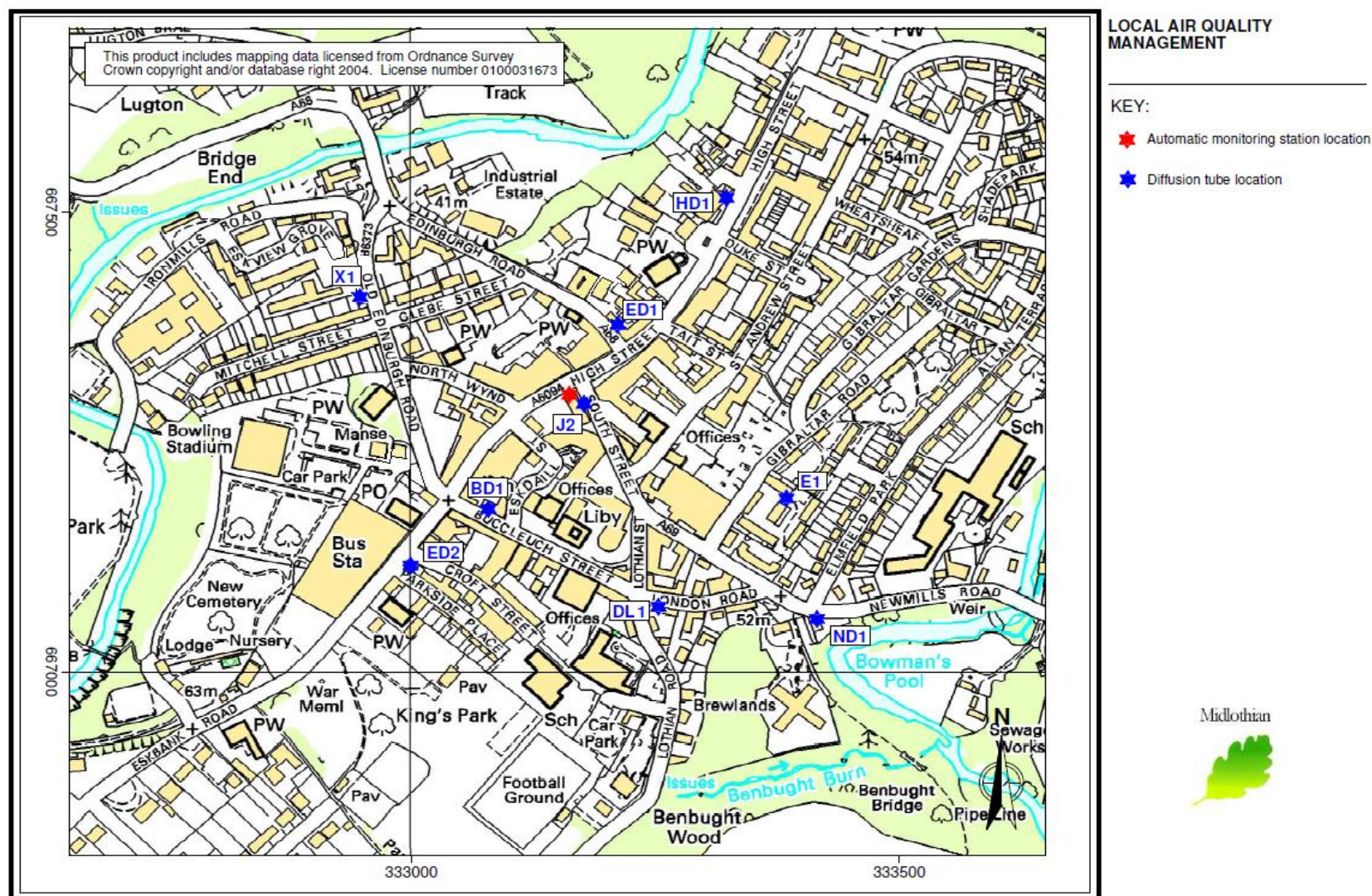


Figure 4 Location of passive diffusion tubes and (decommissioned) automatic monitoring station, Pathhead

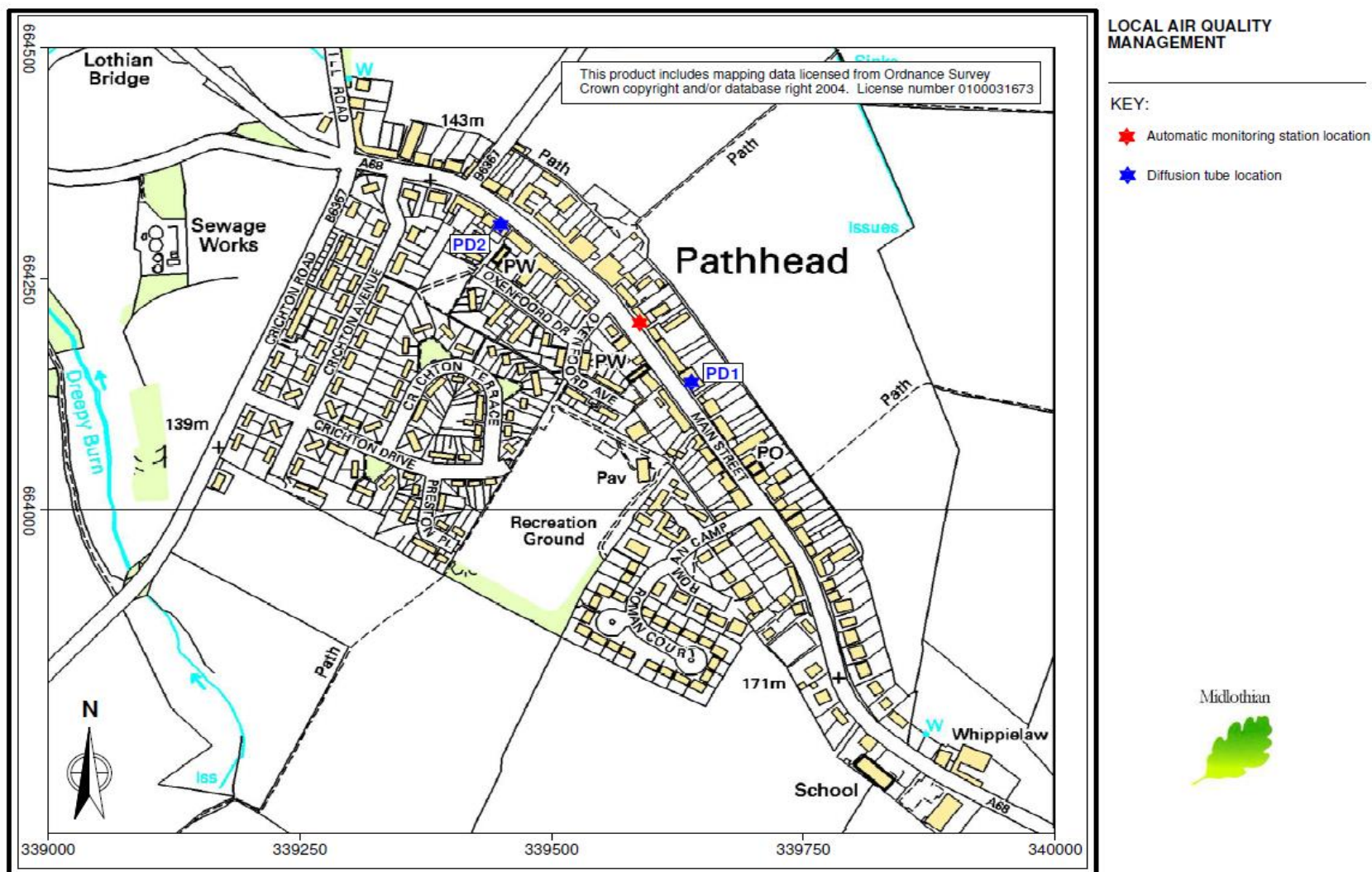


Figure 5 Location of passive diffusion tubes in Penicuik

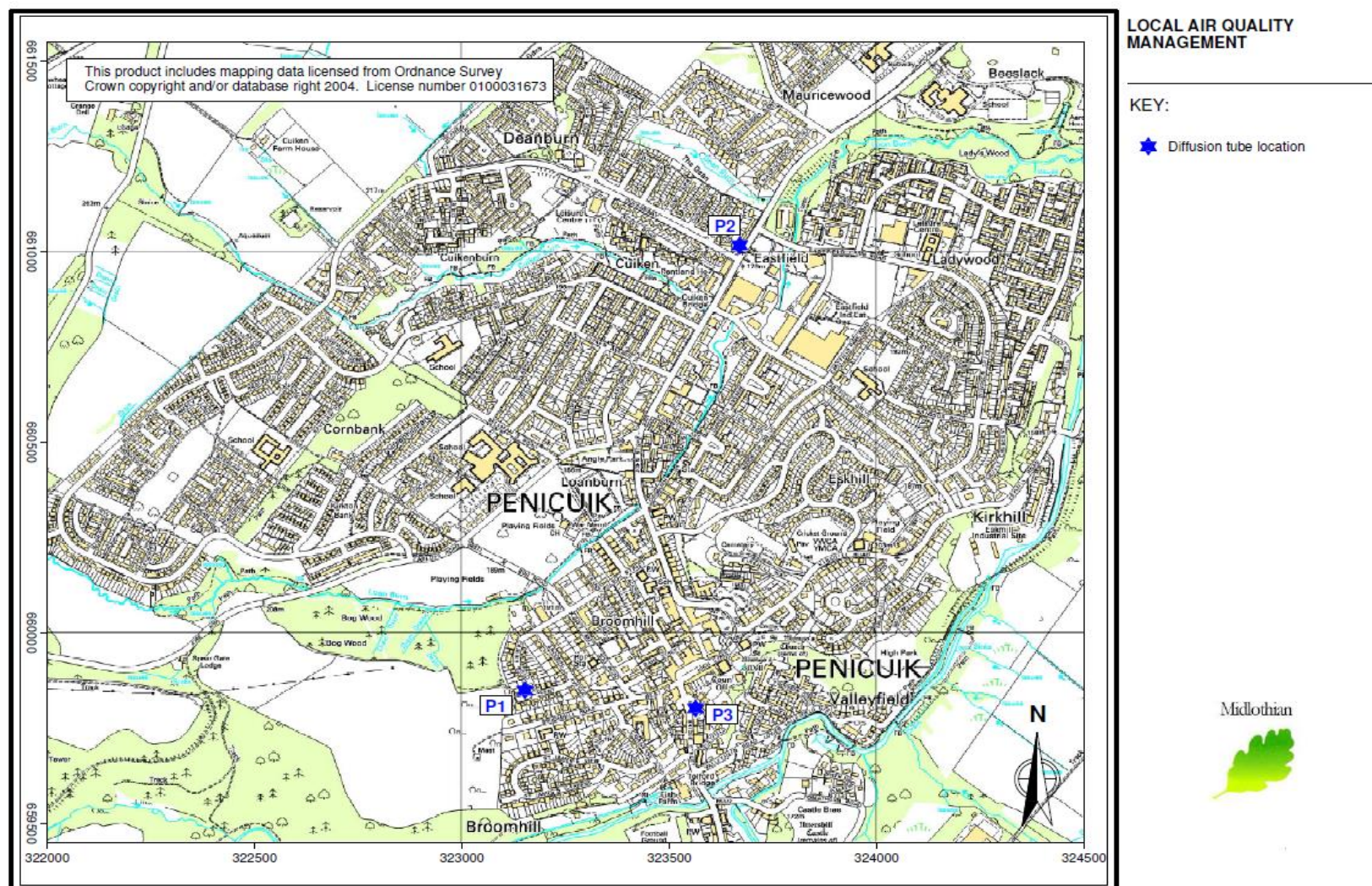


Figure 6 Location of passive diffusion tubes in Bonnyrigg

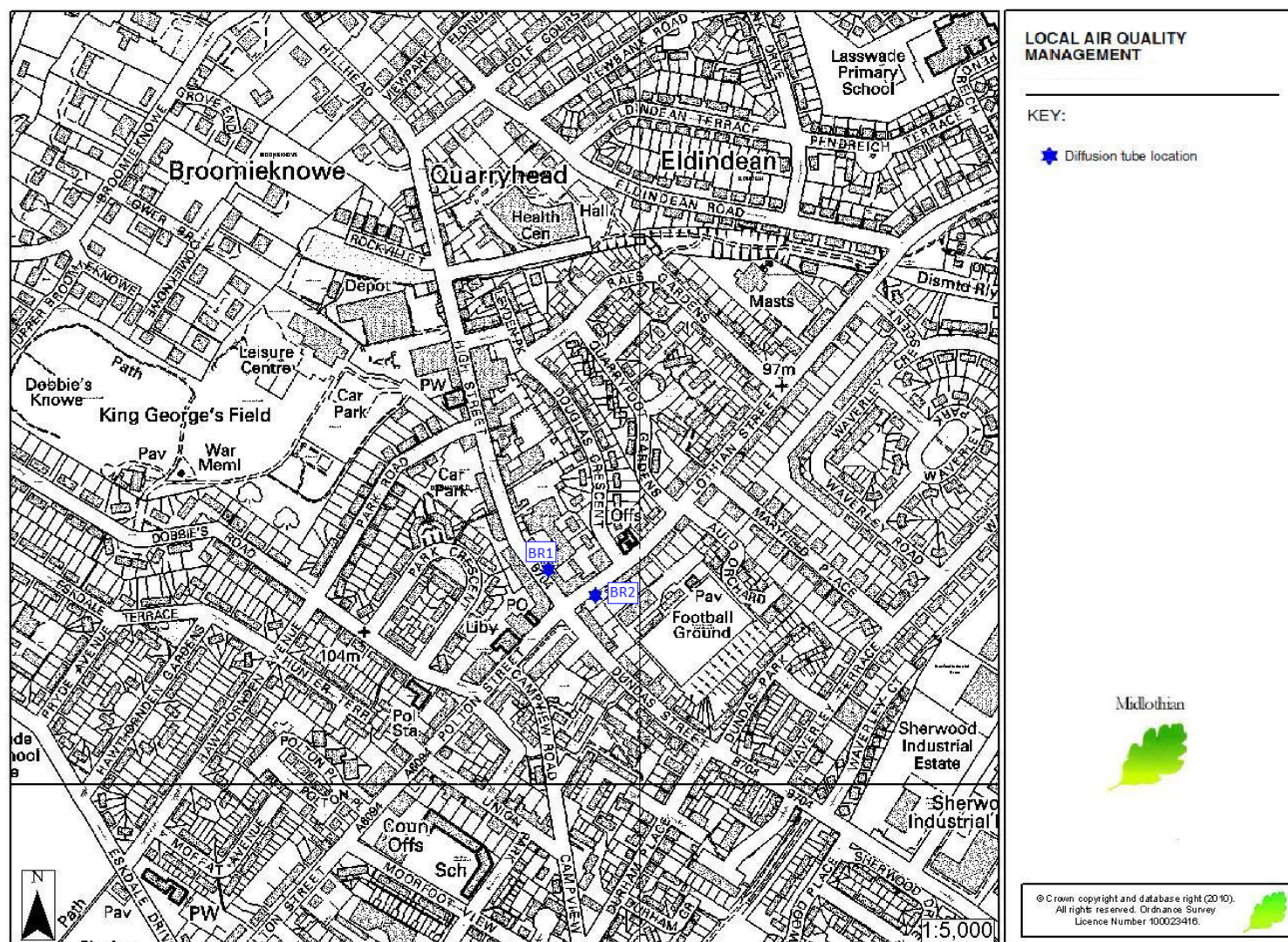


Figure 7 Location of passive diffusion tubes in Loanhead

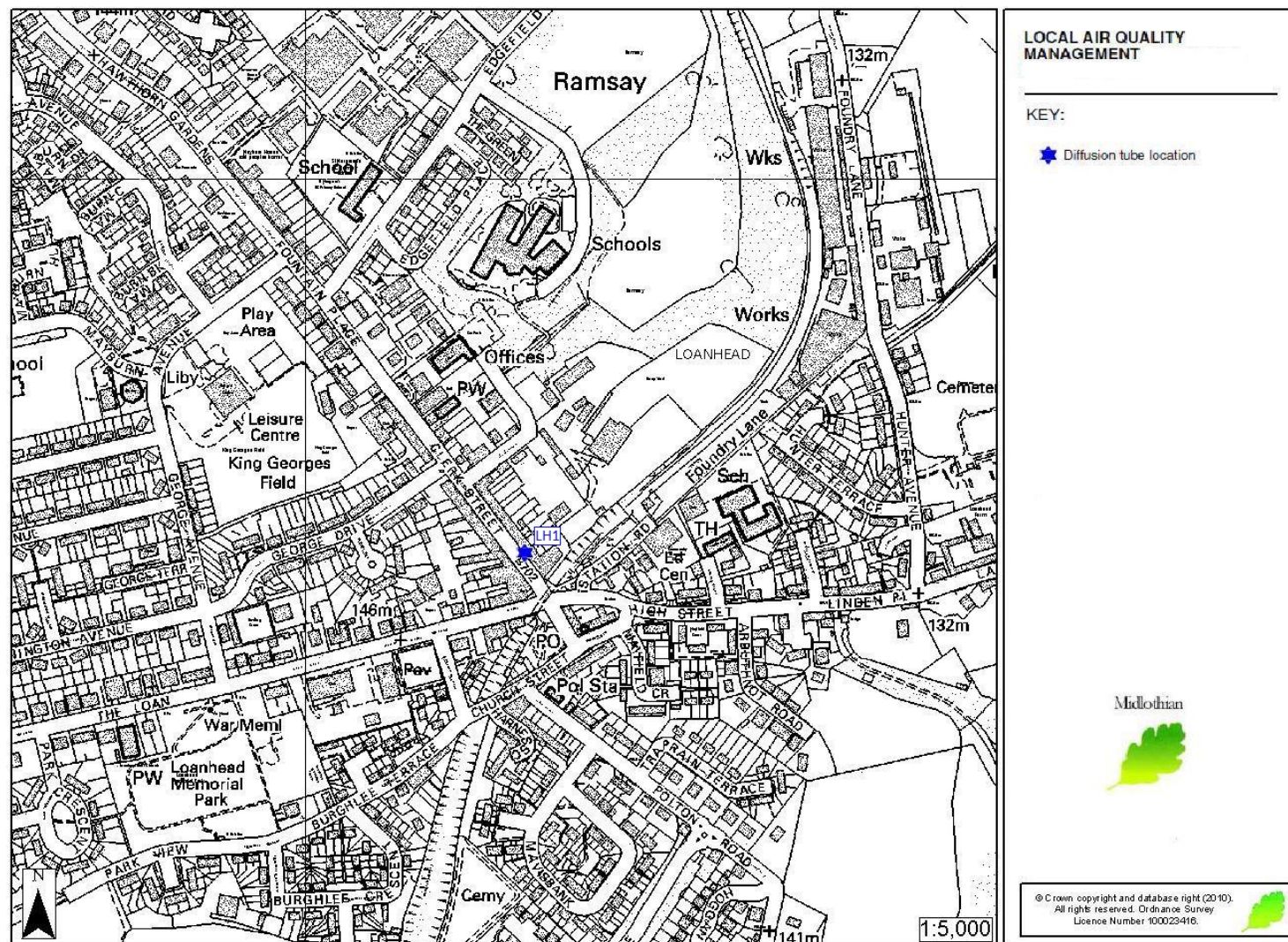


Figure 8 **Location of Passive Diffusion Tubes in Lasswade**

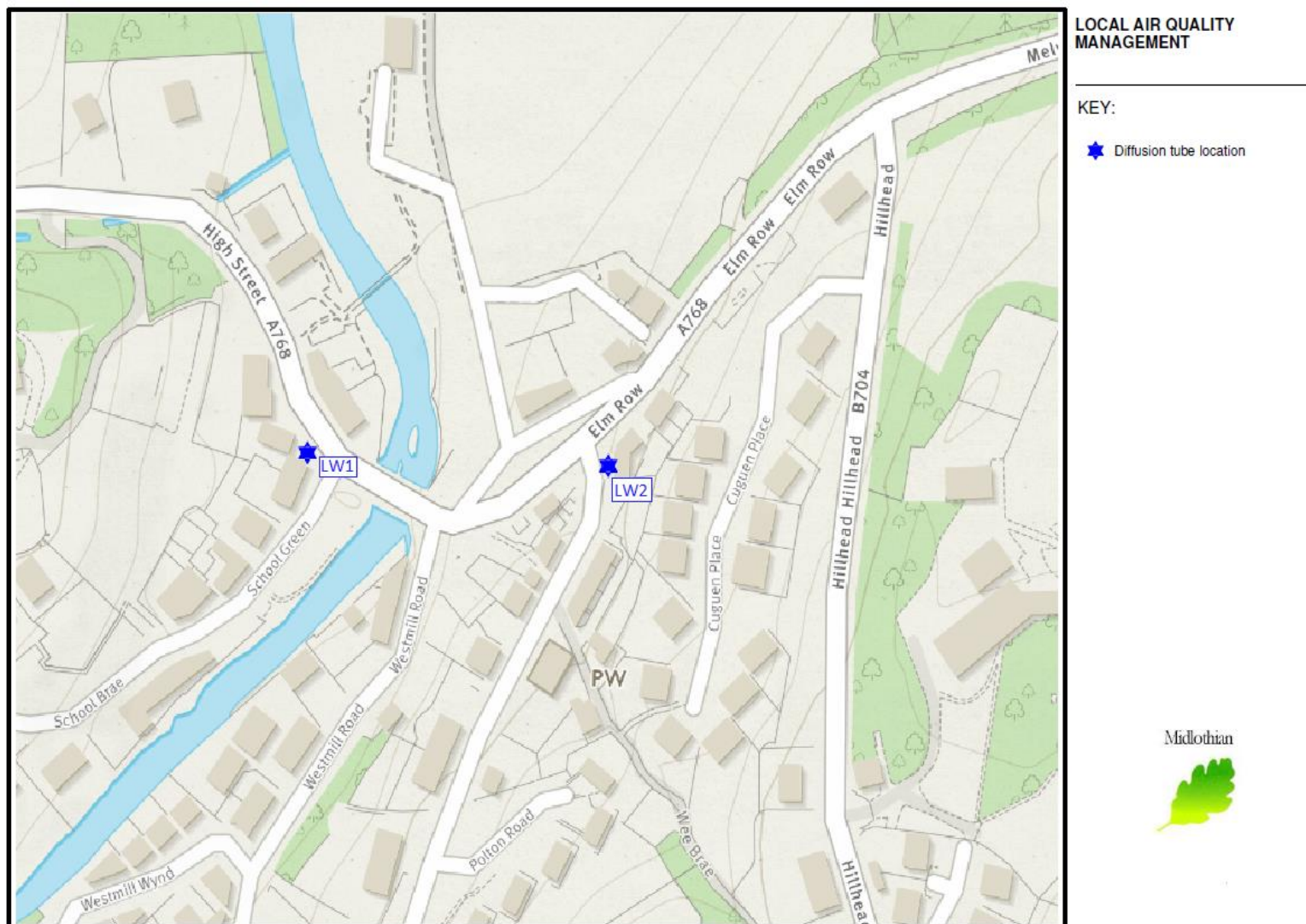


Figure 9 **SO₂ Concentration at Pathhead, Midlothian (Jan 2008 – Jan 2013)**

