



2013 Air Quality Progress Report for  
**Middlesbrough**

In fulfillment of Part IV of the  
Environment Act 1995  
Local Air Quality Management

June 2013

<b>Local Authority Officer</b>	Paul MacGregor
<b>Department</b>	Public Protection
<b>Address</b>	PO Box 65, Vancouver House Gurney Street Middlesbrough, TS1 1QP
<b>Telephone</b>	01642 728240
<b>e-mail</b>	<a href="mailto:paul_macgregor@middlesbrough.gov.uk">paul_macgregor@middlesbrough.gov.uk</a>
<b>Report Reference number</b>	MPR13
<b>Date</b>	June 2013

# **Executive Summary**

This report is the twelfth in the series of Air Quality Review and Assessments carried out in the Middlesbrough Borough Council area under the Environment Act 1995.

The first Review and Assessment of Air Quality 2000, was submitted to Government in December 2000, and was based on a comprehensive review of pollutant emission and monitoring data between 1996 and 1999. The report concluded that air quality in the Middlesbrough Council area, judged against Government objectives, was generally good, and there was no need to declare any Air Quality Management Areas.

The second Review and Assessment of Air Quality, an Updating and Screening report, was submitted to Government in May 2003. The report concluded that air quality in the Middlesbrough Council area would meet Government objectives by the due date, and there was no need to declare any Air Quality Management Areas.

For 2004 and 2005, Progress reports were submitted to Government, updating monitoring data and trends, and recording significant developments and changes to pollutant emissions.

The fifth Review and Assessment of Air Quality, an Updating and Screening report, was submitted to Government in May 2006. The report concluded that air quality in the Middlesbrough Council area would meet Government objectives by the due date, and there was no need to declare any Air Quality Management Areas.

For 2007 and 2008, Progress reports were submitted to Government, updating monitoring data and trends, and recording significant developments and changes to pollutant emissions.

The eighth Review and Assessment of Air Quality, an Updating and Screening report, was submitted to Government in May 2009. The report concluded that air quality in the Middlesbrough Council area continued to meet Government objectives, and there was no need to declare any Air Quality Management Areas. This report was the first submitted under the new web-based reporting system.

For 2010 and 2011, Progress reports were submitted to Government, updating monitoring data and trends, and recording significant developments and changes to pollutant emissions.

The eleventh Review and Assessment of Air Quality, an Updating and Screening report, was submitted to Government in August 2012. The report concluded that air quality in the Middlesbrough Council area continued to meet Government objectives, and there was no need to declare any Air Quality Management Areas.

All reports submitted have been accepted in full by Defra.

This report for 2013 is a Progress report updating monitoring data for 2012, historical trends, and recording significant developments and changes to pollutant emissions.

Government objectives for air quality currently cover seven pollutants:

- Nitrogen dioxide
- Particulate PM<sub>10</sub>
- Sulphur dioxide
- Carbon monoxide
- Benzene
- 1,3-butadiene
- Lead

The main sources of these pollutants are domestic / commercial heating emissions, road traffic fuel and exhaust emissions, and industrial combustion and process emissions.

Within the Middlesbrough Council area, domestic / commercial heating is largely fuelled by natural gas, which gives low levels of emissions compared with other carbon based fuels. There are 3 part A industrial process within the Council area, with low emissions, but there are many more large industrial processes in the neighbouring Tees Valley Council areas. This is no significant change from the earlier reviews, and they can from time to time impact on ground level pollutant concentrations. Overall, however, it is road traffic fuel and exhaust emissions that remain the largest source of air pollution at ground level.

While, in general, improved fuels, engines and exhaust systems are reducing road traffic emissions, traffic volume increases and the low point of discharge is still giving rise to high kerbside concentrations of nitrogen dioxide and particulate PM<sub>10</sub>. This is particularly so where there are very heavily congested roads with tall buildings creating a 'canyon' effect and limiting dispersal, such as can be found in older city centres. The Middlesbrough Council area does not have roads of this type, even in the central area of Middlesbrough. Buildings are generally low level, and set back from the roadside. The main shopping area is now extensively pedestrianised, and while the busy main A66 east – west route acts as the main through-route and feeder to the town centre, there are no potential areas of relevant public exposure in its immediate vicinity. The north – south A19 trunk road passes to the west of Middlesbrough, but is also well away from areas of relevant public exposure.

Continuous monitoring carried out within the Middlesbrough Council area has shown that there is no exceedance of government objectives from traffic or from industry. Further support is provided by the results from continuous monitoring carried out elsewhere in the Tees Valley area.

In 2005, a comprehensive traffic pollution study (reference 3) was carried out across the Tees Valley using the Highways Agency model. Within Middlesbrough the study looked at a continuous monitoring site, and building façades close to busy roads. The study showed that the model provided a good representation of traffic pollution, and confirmed that there were no exceedances of Government objectives.

Further evidence of the generally good quality of air in the Tees Valley is found in reference 3, an eight year analysis 2004 – 2011 of all continuous monitoring results against the UK Air Quality Banding system. The report was published in July 2012, and included with the 2012 Updating and Screening submission.

The UK air quality banding system looks at potential health risks associated with short-term exposure to nitrogen dioxide, particulate PM<sub>10</sub>, sulphur dioxide, carbon monoxide and ozone. The report concluded that on this measure of air quality, Tees Valley air quality is better than the national average for UK urban areas.

## **Middlesbrough**

The report also looked at the implications of the changes to the UK air quality banding system which took effect from January 2012. Monitoring results over the period 2009 - 2011 were reanalysed using the 2012 bands. Again the analysis concluded that Tees Valley air quality will continue to be good, and better than the national average for UK urban areas.

The annual air quality report for the Tees Valley which accompanies this progress report will contain an analysis of 2012 monitoring results in the Tees Valley against the 2012 banding parameters.

**It is concluded that all Government objectives continue to be met within the Middlesbrough Council area, and there is no need to declare any Air Quality Management areas.**

The next report will be a Progress report in 2014, followed by an Updating and Screening report in 2015.

# Table of Contents

<b>1</b>	<b>Introduction</b>	<b>7</b>
1.1	Description of Local Authority Area	7
1.2	Purpose of Progress Report	8
1.3	Air Quality Objectives	8
1.4	Summary of Previous Review and Assessments	10
<b>2</b>	<b>New Monitoring Data</b>	<b>13</b>
2.1	Summary of Monitoring Undertaken	13
2.2	Comparison of Monitoring Results with Air Quality Objectives	18
<b>3</b>	<b>New Local Developments</b>	<b>30</b>
3.1	Road Traffic Sources	30
3.2	Other Transport Sources	30
3.3	Industrial Sources	30
3.4	Commercial and Domestic Sources	30
3.5	New Developments with Fugitive or Uncontrolled Sources	30
<b>4</b>	<b>Local / Regional Air Quality Strategy</b>	<b>31</b>
<b>5</b>	<b>Planning Applications</b>	<b>31</b>
<b>6</b>	<b>Air Quality Planning Policies</b>	<b>31</b>
<b>7</b>	<b>Local Transport Plans / Strategies</b>	<b>31</b>
<b>8</b>	<b>Climate Change Strategies</b>	<b>31</b>
<b>9</b>	<b>Implementation of Action Plans</b>	<b>32</b>
<b>10</b>	<b>Conclusions and Proposed Actions</b>	<b>33</b>
10.1	Conclusions from new monitoring data	33
10.2	Conclusions relating to New Local Developments	33
10.3	Other Conclusions	33
10.4	Proposed actions	33
<b>11</b>	<b>References</b>	<b>34</b>

**List of Tables**

Table 1.1	Air Quality Objectives	9
Table 2.1	Automatic Monitoring Sites	16
Table 2.2	Non-automatic Monitoring Sites	17
Table 2.3	Nitrogen Dioxide Automatic Monitoring Annual Means	19
Table 2.4	Nitrogen Dioxide Automatic Monitoring 1-Hour Means	20
Table 2.5	PM <sub>10</sub> Automatic Monitoring Annual Means	23
Table 2.6	PM <sub>10</sub> Automatic Monitoring 24-Hour Means	24
Table 2.7	SO <sub>2</sub> Automatic Monitoring 24-Hour, 1-Hour, and 15-Minute Means	25
Table 2.9	CO Automatic Monitoring 8-Hour Running Means	26
Table 2.10	O <sub>3</sub> Automatic Monitoring 8-Hour Running Means	28
Table 2.11	PM <sub>2.5</sub> Automatic Monitoring Annual Means	28

**List of Figures**

Figure 2.1	Map of Monitoring Networks	15
Figure 2.3	Nitrogen Dioxide Annual Mean Trends	19
Figure 2.4	Nitrogen Dioxide 1-Hour 99.8 <sup>th</sup> Percentile Trends	20
Figure 2.5	PM <sub>10</sub> Annual Mean Trends	23
Figure 2.6	PM <sub>10</sub> 24 Hour Exceedance Trends	24
Figure 2.7	SO <sub>2</sub> 1-Hour and 15-Minute Exceedance Trends	25
Figure 2.8	Benzene Annual Mean Trends	26
Figure 2.9	CO 8-Hour Running Mean Trends	27
Figure 2.10	O <sub>3</sub> 8-Hour Running Mean and Day Exceedance Trends	28
Figure 2.12	PAH Annual Mean Trends	29

**Appendices**

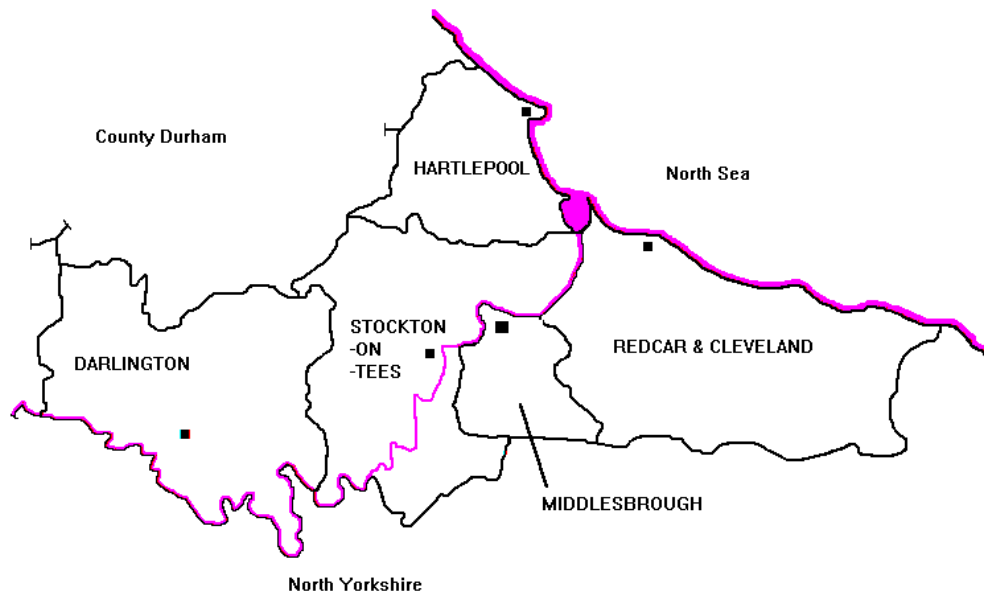
**35**

Appendix A	QA / QC	35
Appendix B	DMRB Calculation	36
Appendix C	Emission Source Update	37

# 1 Introduction

## 1.1 Description of Local Authority Area

Middlesbrough Borough Council is one of five unitary Councils forming the general area known as the Tees Valley. As shown below, it is central, but has the smallest area, at 53.9 sq km.



Middlesbrough Borough is the most densely populated of the five Councils, with little in the way of rural area. It has well-developed retail areas in the town centre, with new commercial expansion planned for the Middlehaven development in the old port area of the Tees. Rail traffic is relatively light, with diesel-operated local services to Darlington, Newcastle, and York, and some through freight traffic from industrial areas to the East. There is no significant port traffic.

Three IPPC small scale chemical and waste oil recovery industrial processes are located within the Council area, but these are not significant emitters of air pollutants. Many larger processes are located in neighbouring Tees Valley Councils to the East and North, and while these have been known to impact from time to time on Middlesbrough air quality, they are not on prevailing wind directions.

The main A19 trunk road runs north – south to the West of the Borough, but this, and its feeder A174 east – west trunk route from the East, run through wide landscaped transport corridors, with no areas of relevant public exposure in the vicinity. The main A66 east – west trunk route runs to the North of the town centre, but again is within its own transport corridor. Middlesbrough has the first two Tees crossings from the estuary, and has substantial through traffic from the east and west. It is also a significant commercial centre within the region, with substantial commuter traffic into the centre.

The majority of the Middlesbrough area is subject to Smoke Control Orders, and natural gas is the main source of heating. This means that air pollution from domestic and commercial sources is low. Industrial emissions from within the Council area are also low, leaving road transport as the most significant air pollution source.

The Tees Valley Environmental Protection Group (TVEPG) is a joint committee of the five Tees Valley Councils, which looks at a range of environmental issues of mutual concern. Air pollution matters are an important part of the work of the Group, drawing together a better understanding of the sources of pollutants, and their impact across the Tees Valley.



There is a wide range of air pollution monitoring carried out between the five Councils. This data is collated and published annually (reference 1), and forms a key part of review and assessment for each of the Councils.

Middlesbrough is a large urban area. In addition to commuter traffic, it has the first road crossings of the Tees, with substantial through traffic. There are significant areas of light industry and commerce, but little or no heavy industry within its area.

Air quality in Middlesbrough is therefore a measure of emissions from domestic, light industry and road traffic sources, and provides an indication of emissions from the large industrial complexes in neighbouring Council areas to the north and east. Road Traffic, however, is the main source of pollution at ground level.

Middlesbrough Council operates three continuous monitoring sites, all located in areas of relevant public exposure at some level. Breckon Hill is an AURN station located to monitor industrial emissions as well as urban background levels. MacMillan College and Elm Street Local stations are more oriented towards traffic source emissions.

## 1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

## 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in **England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

**Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> ) (gravimetric)	50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

There are three other pollutants for which Air Quality Objectives have been set, but which are not yet included in regulation for LAQM purposes. These pollutants are Particulate PM<sub>2.5</sub>, Polycyclic Aromatic Hydrocarbons (PAHs), and Ozone. In addition, four heavy metals cadmium, arsenic, nickel and mercury are under consideration.

Monitoring data for these unregulated pollutants is included within this report.

## 1.4 Summary of Previous Review and Assessments

### REVIEW and ASSESSMENT SUBMISSIONS

Reports up to 2006 are held in the main reference library of each Tees Valley Council. Later reports are held by each Council on their web-site under air quality. All submissions have been approved by Defra. No Air Quality Management Areas have been declared.

- 2000 Review and Assessment** Stage 1 of the first Review and Assessment was a joint report published by the TVEPG in December 1998. A more detailed 2nd / 3rd stage Review and Assessment, which included work from consultants commissioned to undertake advanced air quality modelling (AAQuIRE 2000), was published by Middlesbrough Council in December 2000. This confirmed that road traffic was the main source of air pollution at ground level in the form of nitrogen dioxide and particulate PM<sub>10</sub>, but that there was no need to declare any Air Quality Management Areas.
- The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).
- 2003 Updating and Screening Report** Middlesbrough Borough Council published this report in May 2003. There was no significant change to domestic, commercial or industrial sources within, or close to the Middlesbrough Council area. Road traffic flows were updated and compared with the 2000 Review and Assessment, with no areas identified of particular concern.
- The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).
- 2004 Progress Report** This report was a joint report published by the TVEPG in April 2004. The report updated monitoring results across the Tees Valley, showed pollution trends, and recorded any significant developments that may affect air quality.
- The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).
- 2005 Progress Report** This report was a joint report published by the TVEPG in April 2005. The report updated monitoring results across the Tees Valley, showed pollution trends, and recorded any significant developments that may affect air quality.
- The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).

<b>2006 Updating and Screening Report</b>	<p>Middlesbrough Borough Council published this report in May 2006. There was no significant change to domestic, commercial or industrial sources within, or close to the Middlesbrough Council area. Road traffic flows were updated and compared with the 2003 Updating and Screening Report, with no areas identified of particular concern.</p> <p>An attachment to the above report was a traffic pollution study carried out in 2005, and published as a joint Council report in July 2005. The report tested the DMRB roadside air quality model against roadside continuous monitors for NO<sub>2</sub> and PM<sub>10</sub>, and used the model to check building façade locations nearest to busy roads.</p> <p>The study concluded that the model showed good agreement against the continuous monitors, and provided a useful method for looking at traffic related issues.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>
<b>2007 Progress Report</b>	<p>This report was a joint report published by the TVEPG in April 2007. The report updated monitoring results across the Tees Valley, showed pollution trends, and recorded any significant developments that may affect air quality.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>
<b>2008 Progress Report</b>	<p>This report was a joint report published by the TVEPG in April 2008. The report updated monitoring results across the Tees Valley, showed pollution trends, and recorded any significant developments that may affect air quality.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>
<b>2009 Updating and Screening Report</b>	<p>Middlesbrough Borough Council published this report in May 2009. There was no significant change to domestic, commercial or industrial sources within, or close to the Middlesbrough Council area. Road traffic flows were updated and compared with the 2006 Updating and Screening Report, with no areas identified of particular concern.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>
<b>2010 Progress Report</b>	<p>Middlesbrough Borough Council published this report in May 2010. The report updated monitoring results across Middlesbrough and the Tees Valley, showed pollution trends, and recorded any significant developments that may affect air quality.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>

<b>2011 Progress Report</b>	<p>Middlesbrough Borough Council published this report in June 2011. The report updated monitoring results across Middlesbrough and the Tees Valley, showed pollution trends, and recorded any significant developments that may affect air quality.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>
<b>2012 Updating and Screening Report</b>	<p>Middlesbrough Borough Council published this report in August 2012. There was no significant change to domestic, commercial or industrial sources within, or close to the Middlesbrough Council area. Road traffic flows were updated and compared with the 2009 Updating and Screening Report, with no areas identified of particular concern.</p> <p>An attachment to the above report was an air quality banding report published as a joint Council report in July 2012. The report analysed Tees Valley monitoring results over the period 2004 – 2011 against the UK banding parameters as an alternative way of looking at air quality for key pollutants.</p> <p>The report concluded that on this measure of air quality, Tees Valley air quality is better than the national average for UK urban areas, and is expected to continue to be so.</p> <p>The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).</p>
<b>AQMAs</b>	<p>There are no Air Quality Management Areas within the Middlesbrough Borough Council area</p>

## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Middlesbrough Council has three continuous monitoring stations.

Breckon Hill has been part of the AURN network since 1993 as an affiliated site monitoring nitrogen oxides, particulates, sulphur dioxide, carbon monoxide and ozone. LA staff carries out regular calibrations, with details passed to the network operator (Ricardo-AEA), who carry out QA / QC. A maintenance contract with the instrument supplier covers six-monthly inspections.

Late in Q4 2008, the unmodified PM<sub>10</sub> TEOM was replaced with a PM<sub>10</sub> FDMS TEOM, and a PM<sub>2.5</sub> FDMS TEOM added. The results shown below for particulate PM<sub>10</sub> for 2009 – 2012 are direct gravimetric equivalence. For 2008, results are unmodified TEOM, adjusted to gravimetric equivalence using vcm.

The unit is in school grounds within a residential area surrounded by busy commuter routes. It is a key public exposure location for all pollutants, and lies on a north-easterly wind direction (frequency around 15% pa) from the main chemical and steel industrial areas along the river Tees estuary.

MacMillan College is a Local station owned and operated by Middlesbrough Council since year 2000, monitoring nitrogen oxides and particulate PM<sub>10</sub>. LA staff carry out regular calibrations. A maintenance contract with Supporting U Ltd covers six-monthly inspections. The unmodified TEOM is not being upgraded, but results since 2008 have been adjusted to gravimetric equivalence using vcm. Up to and including 2007, results were adjusted to gravimetric equivalence using Government guidance factor of 1.3.

The unit is in school grounds surrounded at distance by high volume trunk road routes, and is an important public exposure location for the transport corridor, and for all monitored objectives.

Elm Street is a Local station owned and operated by Middlesbrough Council since 2001 monitoring nitrogen oxides and particulate PM<sub>10</sub>. LA staff carry out regular calibrations. A maintenance contract with Supporting U Ltd covers six-monthly inspections. The unmodified TEOM is not being upgraded, but results since 2008 have been adjusted to gravimetric equivalence using vcm. Up to and including 2007, results were adjusted to gravimetric equivalence using Government guidance factor of 1.3.

The unit lies just off a busy town centre access road, and provides a measure of pollution trends from vehicles, which is used in the transport plan. The unit is a public exposure location for the 1 hour nitrogen dioxide objective.

The locations of the three monitoring sites are shown on the map, page 15.

#### 2.1.2 Non-Automatic Monitoring Sites

Middlesbrough does not use nitrogen dioxide diffusion tubes, preferring automatic monitoring at the key locations above.

A benzene monitor is located at the Breckon Hill AURN station. It is a pumped diffusion tube, and has been part of the national network since 2002. Tubes are replaced by Middlesbrough staff at agreed times. QA / QC is carried out by the national network operators (Ricardo-AEA).

## Middlesbrough

Breckon Hill is a key public exposure location for benzene, and lies on a north-easterly wind direction (frequency around 15% pa) from the main chemical and steel industrial areas along the river Tees estuary.

There used to be a 1,3-butadiene monitor at Breckon Hill. This was a plain diffusion tube, and part of the national network from 2003 to 2007, when monitoring stopped as a result of national network rationalisation. This was also a key public exposure location for 1,3-butadiene, being on a north-easterly wind direction (frequency around 15% pa) from the main chemical source at Wilton.

The Breckon Hill AURN station is also the location for a PAH digital monitor, part of the national network. QA / QC is carried out by the national network operators (NPL). The digital monitor started operation in Q4 2007, when it replaced the TOMPS network Anderson monitor installed close by at an elevated non-public exposure location.

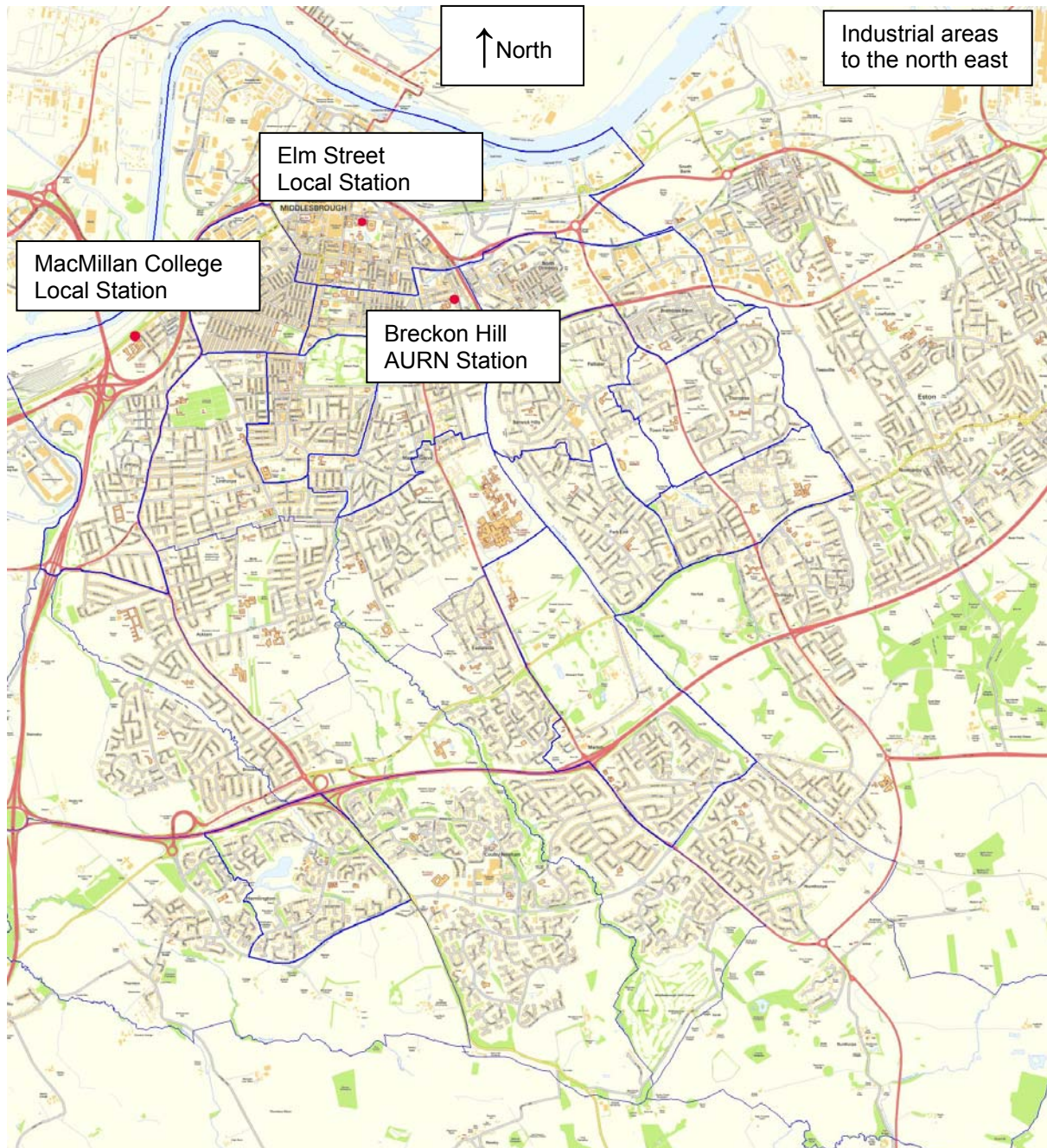
Breckon Hill is a key public exposure location for PAH, and lies on a north-easterly wind direction (frequency around 15% pa) from the main chemical and steel industrial areas along the river Tees estuary.

PAH is not yet a regulated pollutant, but results are included in this report.

Figure 2.1 Map of Automatic and Non-Automatic Monitoring Sites

### MIDDLESBROUGH COUNCIL AREA

showing locations of the three automatic monitoring stations





**Table 2.1 Details of Automatic Monitoring Sites – Middlesbrough 2012** (see map page 15)

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Breckon Hill	Breckon Hill (AURN)	Urban industrial	450500	519400	3.5	NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , CO, O <sub>3</sub>	N	NO <sub>2</sub> - Chemiluminescence PM <sub>10</sub> – FDMS TEOM PM <sub>2.5</sub> – FDMS TEOM SO <sub>2</sub> - UV fluorescence CO – continuous gas correlation O <sub>3</sub> – UV Absorbtion	Y (1m)	20 metres	Y
MacMillan College	MacMillan College (Local)	Urban background	447800	519300	3.0	NO <sub>2</sub> , PM <sub>10</sub>	N	NO <sub>2</sub> - Chemiluminescence PM <sub>10</sub> - TEOM (vcv correction)	Y (1m)	230 metres to A19 trunk route	Y
Elm Street	Elm Street (Local)	Urban	449700	520300	3.0	NO <sub>2</sub> , PM <sub>10</sub>	N	NO <sub>2</sub> - Chemiluminescence PM <sub>10</sub> - TEOM (vcv correction)	Y (for 1-hour NO <sub>2</sub> ) (1 m)	15 metres	Y

Breckon Hill is an affiliated AURN station operated by Middlesbrough Council since 1993. Pollutants monitored are nitrogen oxides, particulates, sulphur dioxide, carbon monoxide and ozone. Late in Q4 2008, the unmodified PM<sub>10</sub> TEOM was replaced with a PM<sub>10</sub> FDMS TEOM, and a PM<sub>2.5</sub> FDMS TEOM added.

The station is in school grounds within a residential area surrounded by busy commuter routes. It is a key public exposure location for all pollutants, and lies on a north-easterly wind direction (frequency around 15% pa) from the main chemical and steel industrial areas along the river Tees estuary.

MacMillan College and Elm Street are Local stations owned and operated by Middlesbrough Council since year 2000, monitoring nitrogen oxides and particulate PM<sub>10</sub>. The unmodified TEOMs are not being upgraded, but results since 2008 have been corrected to gravimetric equivalence using vcm.

MacMillan College is in school grounds surrounded at distance by high volume trunk road routes, and is an important public exposure location for the transport corridor, and for all monitored objectives. Elm Street lies just off a busy town centre access road, and provides a measure of pollution trends from vehicles, which is used in the transport plan. The unit is a public exposure location for the 1 hour nitrogen dioxide objective.

**Table 2.2 Details of Non- Automatic Monitoring Sites – Middlesbrough 2012**

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Breckon Hill (AURN)	Urban industrial	450500	519400	2.5	Benzene	N	N	Y (1m)	20 metres	Y
Breckon Hill (AURN)	Urban industrial	450500	519400	2.5	PAH	N	N	Y (1m)	20 metres	Y
Breckon Hill (AURN)	Urban industrial	450500	519400	2.5	1,3-butadiene (to 2007)	N	N	Y (1m)	20 metres	Y

Middlesbrough does not use nitrogen dioxide diffusion tubes, preferring automatic monitoring at the key locations detailed on page 15.

Benzene is monitored using a pumped diffusion tube, and is part of the national network. 1,3-butadiene was also monitored until 2007 using a diffusion tube as part of the national network. PAH is monitored using the PM<sub>10</sub> Digital DHA-80 samplers which comply with the CEN (European Committee for Standardisation) standard.

The location of Breckon Hill is shown on the page 15 map.

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

The following sections record monitoring data over recent years, and compare them with the relevant AQ objectives. With regard to regulated pollutants, monitored levels are well within the objective level where relevant public exposure exists, with no borderline cases. Trend graphs covering the operating periods of the monitoring stations are also shown, but generally have no discernable trend, with variations each year mainly reflecting weather conditions. As most ground level pollution within Middlesbrough is now from road transport, any improvements in emission levels seem to have been largely offset by traffic flow increases.

Reference 1 (report attached to this assessment) includes results from other monitoring stations in the neighbouring Council areas of the Tees Valley. In every case, a similar picture to that in Middlesbrough is shown, with monitored levels relatively stable, within the objective levels, and no discernable trend.

### 2.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

#### Automatic Monitoring Data

Breckon Hill is a worst case indicator for relevant public exposure, within school grounds in a residential area surrounded by busy commuter routes. The monitor is in an open location, with good dispersion under normal conditions, and shows annual concentrations well below the objective level. Variations from year to year are mainly due to weather conditions, but this monitor can also pick up industrial emissions from the chemical and steel complexes to the east on a north east wind (around 15% of the year). The trend graph shows annual means since 1998 showing a decline, but this is due to a shift in transport flows, and such a trend is not seen at the two other Middlesbrough locations, or indeed elsewhere within the Tees Valley.

The 1 hour mean objective is readily met, with no exceedances and 99.8<sup>th</sup> percentiles less than half of the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

The MacMillan College site is also a worst case indicator for relevant public exposure, within school grounds on the edge of a residential area surrounded at distance by high volume trunk routes. The monitor is in an open location, with good dispersion under normal conditions, and shows annual concentrations comfortably below the objective level. Variations from year to year on the trend graph are mainly due to weather conditions. There is no discernable downward trend.

The 1 hour mean objective is readily met, with no exceedances and 99.8<sup>th</sup> percentiles well below the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

The Elm Street site is a worst case indicator for relevant public exposure for the 1 hour mean, being a town centre site within a commercial area just off a busy town centre access road with slow moving traffic and a high proportion of buses. The site could also be seen as representative of residential building façades close to busy town access routes. The monitor is in an open location, with good dispersion under normal conditions, and shows annual concentrations comfortably below the objective level. Variations from year to year on the trend graph are mainly due to weather conditions, with no discernable downward trend.

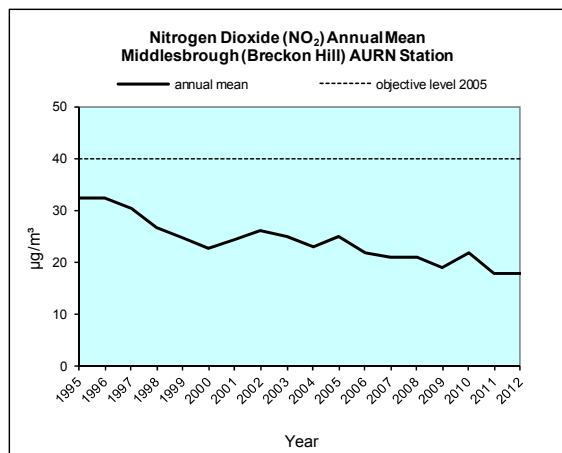
The 1 hour mean objective is readily met, with no exceedances and 99.8<sup>th</sup> percentiles well below the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

**Table 2.3 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with Annual Mean Objective of 40 µg/m<sup>3</sup>**

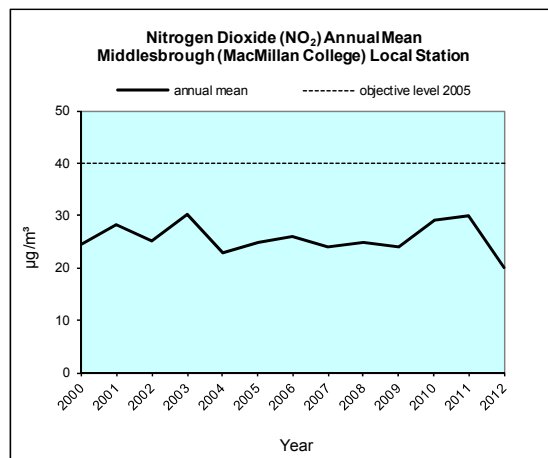
Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2012 %	Annual Mean Concentration (µg/m <sup>3</sup> )				
					2008	2009	2010	2011	2012
Breckon Hill	Urban industrial	N	Full year	98	21.1	18.6	21.9	18.3	18.2
MacMillan College	Urban background	N	Full year	95	25.1	23.9	28.5	29.5	19.8
Elm Street	Urban	N	Full year	99	27.2	25.9	28.1	22.5	25.1

**Figure 2.3 Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Automatic Monitoring Sites**

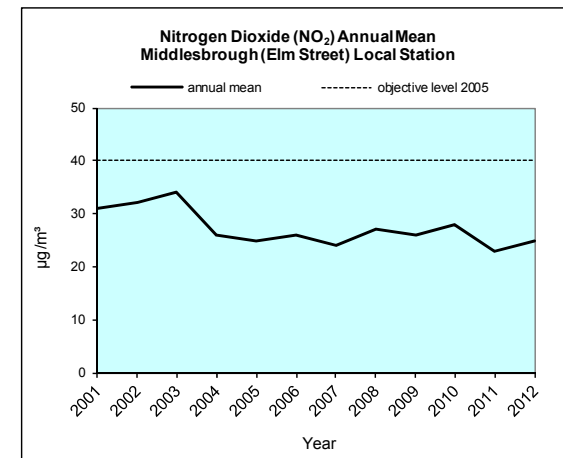
MIDDLESBROUGH (Breckon Hill) AURN Station  
(urban background site classification)



MIDDLESBROUGH (MacMillan College) Local Station  
(urban background site)



MIDDLESBROUGH (Elm Street) Local Station  
(urban roadside site)

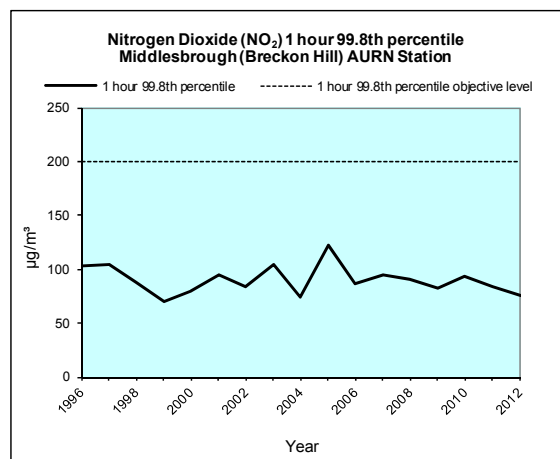


**Table 2.4 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with 1-hour Mean Objective of 200 µg/m<sup>3</sup>**

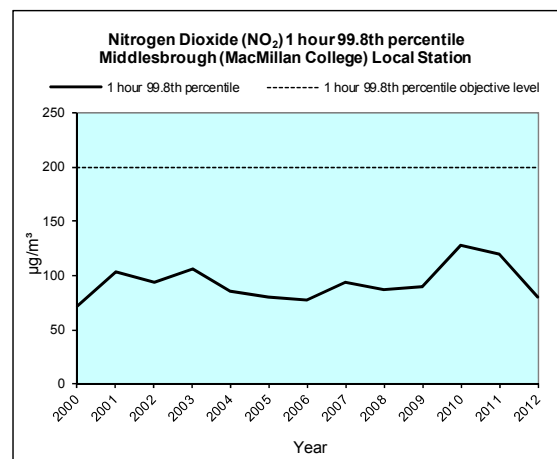
Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2012 %	Number of Exceedences of Hourly Mean (99.8 <sup>th</sup> µg/m <sup>3</sup> percentile shown in brackets)				
					2008	2009	2010	2011	2012
Breckon Hill	Urban industrial	N	Full year	98	0 (90)	0 (83)	0 (94)	0 (84)	0 (78)
MacMillan College	Urban background	N	Full year	95	0 (87)	0 (90)	0 (128)	0 (120)	0 (80)
Elm Street	Urban	N	Full year	99	0 (89)	0 (86)	0 (101)	0 (84)	0 (92)

**Figure 2.4 Trends in 1-hour 99.8<sup>th</sup> percentile Nitrogen Dioxide Concentrations measured at Automatic Monitoring Sites**

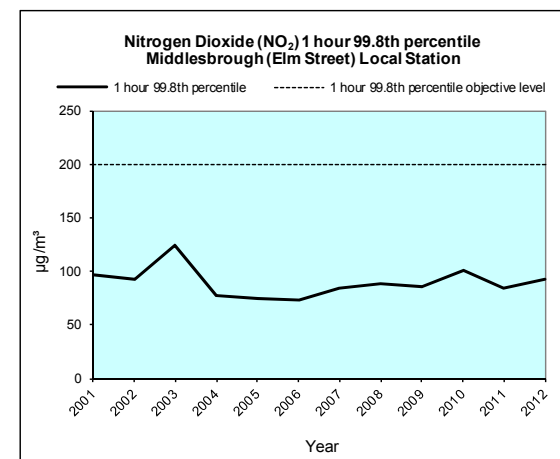
MIDDLESBROUGH (Breckon Hill) AURN Station  
(urban background site classification)



MIDDLESBROUGH (MacMillan College) Local Station  
(urban background site)



MIDDLESBROUGH (Elm Street) Local Station  
(urban roadside site)



### Diffusion Tube Monitoring Data

There are no nitrogen dioxide diffusion tubes used within the Middlesbrough Council area.

There are a number of nitrogen dioxide diffusion tube locations in other Tees Valley council areas (Darlington, Hartlepool, and Stockton-on-Tees), and results are shown in reference 1 (report attached).

These are mainly located in residential areas alongside busy roads, which are similar to many Middlesbrough locations. The results consistently confirm that there is no concern in areas of relevant public exposure.

### 2.2.2 Particulate Matter (PM<sub>10</sub>)

The three stations show annual means well within the objective level.

Breckon Hill is a worst case indicator for relevant public exposure, within school grounds in a residential area surrounded by busy commuter routes. The monitor is in an open location, with good dispersion under normal conditions, and shows annual concentrations well below the objective level. Variations from year to year are mainly due to weather conditions, but this monitor can also pick up industrial emissions from the chemical and steel complexes to the east on a north east wind (around 15% of the year). The trend graph shows annual means since 1998 showing a decline, but this is more likely to be due to a shift in transport flows, as such a trend is not seen at the two other Middlesbrough locations, or indeed elsewhere within the Tees Valley.

The 24 hour mean objective is also readily met. There have been large variations in the number of 24-hour exceedances, but year to year variations on the trend graph mainly reflect weather conditions, especially over recent years.

The MacMillan College site is also a worst case indicator for relevant public exposure, within school grounds on the edge of a residential area surrounded at distance by high volume trunk routes. The monitor is in an open location, with good dispersion under normal conditions, and shows annual concentrations comfortably below the objective level. Variations from year to year on the trend graph are mainly due to weather conditions. There is no discernable downward trend.

The 24 hour mean objective is readily met, with no exceedances and 90<sup>th</sup> percentiles well below the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

The Elm Street site is not an indicator for relevant public exposure for particulates. It is a town centre site within a commercial area just off a busy town centre access road with slow moving traffic and a high proportion of buses. The site, however, can be seen as representative of residential building façades close to busy town access routes. The monitor is in an open location, with good dispersion under normal conditions, and shows annual concentrations comfortably below the objective level. Variations from year to year on the trend graph are mainly due to weather conditions. There is no discernable downward trend.

The 24 hour mean objective is readily met, with no exceedances and 90<sup>th</sup> percentiles well below the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

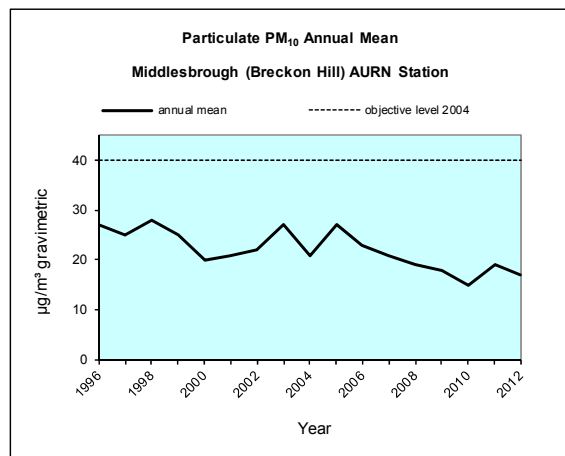
There is a wider range of sources of particulates, ranging from traffic, to industrial, and a variety of natural sources. Road traffic tends to be the most consistent source, but the others do impact occasionally, although industrial sources have declined over recent years as older plants have closed.

**Table 2.5 Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with Annual Mean Objective of 40 µg/m<sup>3</sup>**

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2012 %	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m <sup>3</sup> )				
						2008	2009	2010	2011	2012
Breckon Hill	Urban industrial	N	Full year	99	Y	19.0	18.1	15.3	19.1	17.2
MacMillan College	Urban background	N	Full year	99	Y	18.3	17.6	17.2	19.8	17.4
Elm Street	Urban	N	Full year	99	Y	19.0	18.0	18.3	20.5	17.2

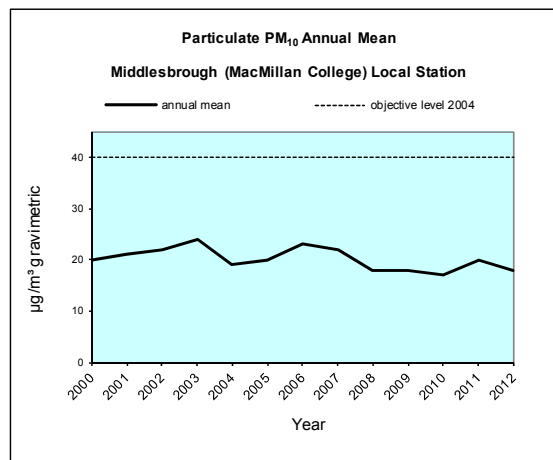
**Figure 2.5 Trends in Annual Mean PM<sub>10</sub> Concentrations**

MIDDLESBROUGH (Breckon Hill) AURN Station  
(urban background site classification)

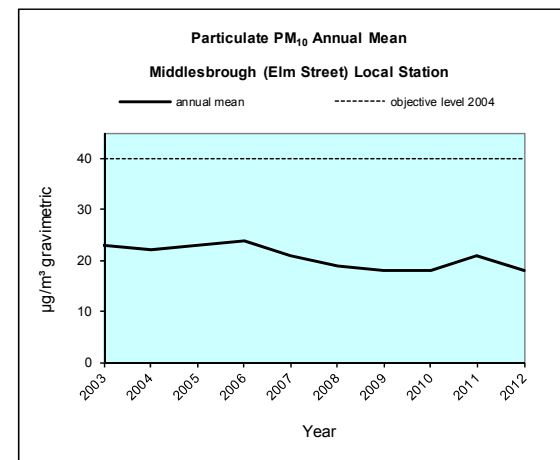


2009 onwards data is from a new TEOM FDMS monitor

MIDDLESBROUGH (MacMillan College) Local Station  
(urban background site)



MIDDLESBROUGH (Elm Street) Local Station  
(urban roadside site)



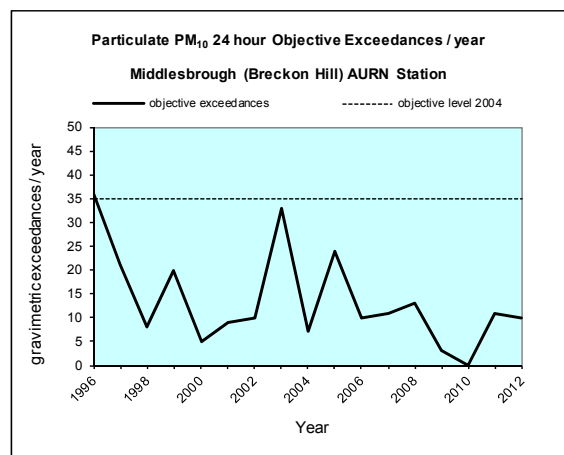


**Table 2.6 Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with 24-hour Mean Objective of 50 µg/m<sup>3</sup>**

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2012 %	Confirm Gravimetric Equivalent (Y or N/A)	Number of Exceedences of 24-Hour Mean (90 <sup>th</sup> percentile shown in brackets)				
						2008	2009	2010	2011	2012
Breckon Hill	Urban industrial	N	Full year	99	Y	13 (36)	3 (33)	0 (26)	11 (34)	9 (32)
MacMillan College	Urban background	N	Full year	99	Y	12 (34)	3 (28)	0 (28)	8 (35)	7 (31)
Elm Street	Urban	N	Full year	99	Y	15 (35)	2 (30)	0 (30)	10 (35)	7 (30)

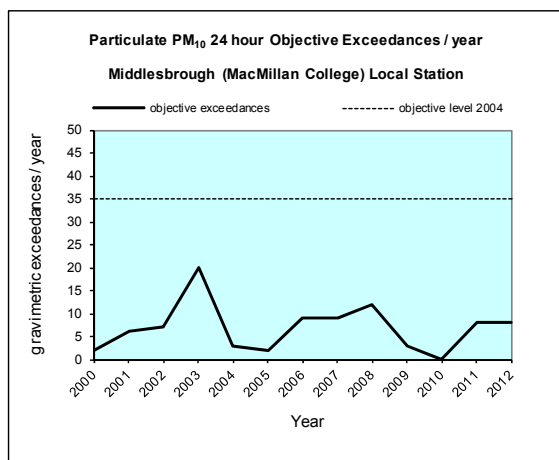
**Figure 2.6 Trends in 24-hour PM<sub>10</sub> Objective Exceedences / year**

MIDDLESBROUGH (Breckon Hill) AURN Station  
(urban background site classification)

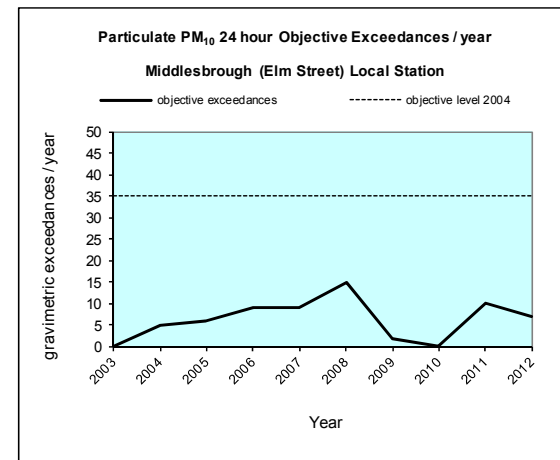


2009 onwards data is from a new TEOM FDMS monitor

MIDDLESBROUGH (MacMillan College) Local Station  
(urban background site)



MIDDLESBROUGH (Elm Street) Local Station  
(urban roadside site)



### 2.2.3 Sulphur Dioxide (SO<sub>2</sub>)

Middlesbrough Council has monitored sulphur dioxide concentrations at the Breckon Hill AURN station since 1993.

There is no significant domestic coal burning within the Middlesbrough Council area, and the main sources are the industrial chemical and steel complexes to the east. These emissions are now well down on earlier years due to older plant closures and the requirement for lower sulphur fuels. There is an occasional import from the large coal burning power stations to the south, but this is not the prevailing wind direction.

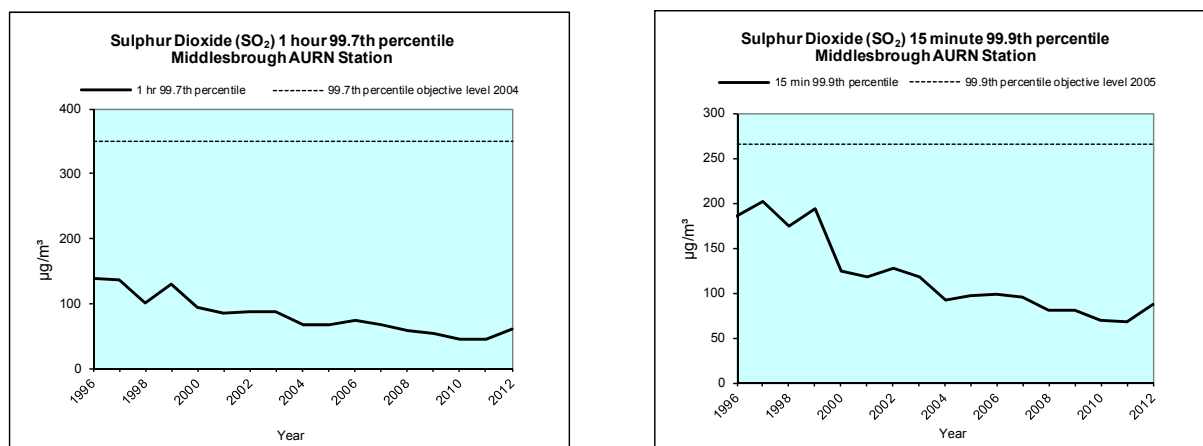
The Middlesbrough monitor supplements sulphur dioxide monitoring at the Billingham Local station to the north-west, and the Redcar & Cleveland Local station to the east. These monitors are closer to more significant industrial emissions and on a more prevailing wind, and results are shown in the annual report attached (reference 1). They confirm that all sulphur dioxide objectives are readily met, and this will be the case within the Middlesbrough Council area.

**Table 2.7 Results of Automatic Monitoring of SO<sub>2</sub>: Comparison with the Three Objectives**

Site ID	Site Type	Within AQM A?	Valid Data Capture for monitoring Period %	Valid Data Capture 2012 %	Number of Exceedences (percentile in bracket µg/m <sup>3</sup> )		
					15-minute Objective (266 µg/m <sup>3</sup> )	1-hour Objective (350 µg/m <sup>3</sup> )	24-hour Objective (125 µg/m <sup>3</sup> )
Breckon Hill	Urban Industrial	N	Full year 2012	98	0 (82)	0 (58)	0 (19)

**Figure 2.7 Trends in SO<sub>2</sub> Concentrations (1 hour and 15 minute percentiles)**

MIDDLESBROUGH (Breckon Hill) AURN Station  
(urban background site classification)

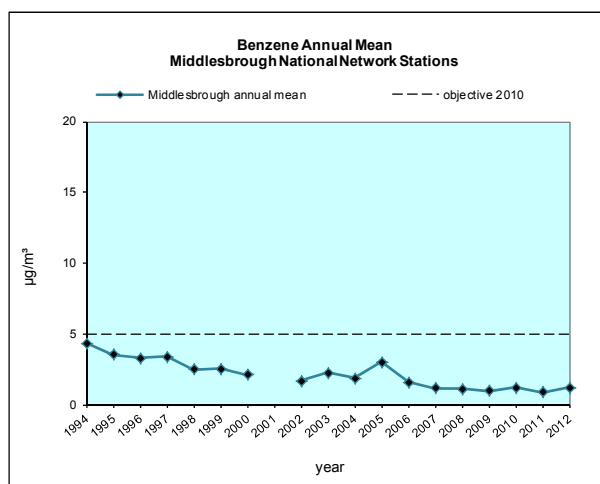


These trend graphs clearly show a declining sulphur dioxide level, well within the objective level. This will continue to be the case as long as industrial use of high sulphur fuels is regulated.

## 2.2.4 Benzene / 1,3-Butadiene

**Benzene** is monitored at the Middlesbrough Breckon Hill AURN site using a pumped diffusion tube, and is part of the national benzene monitoring network. This is an urban site within school grounds surrounded by busy commuter routes, and is representative of relevant public exposure. The site can pick up benzene emissions from the chemical and steel complexes to the east, and ship loading and unloading activities along the Tees estuary, but is not on the prevailing wind. The 2012 annual mean was 1.90 µg/m<sup>3</sup>.

This location represents a worst-case example for Middlesbrough, and is well below the 2010 benzene objective level of 5 µg/m<sup>3</sup> as an annual mean.



**Figure 2.8 – Benzene Trend**

Benzene was measured using a continuous monitor from 1994 to 2000 as part of the hydrocarbon national network, but was closed and replaced by a pumped diffusion tube from 2002. Industrial source emissions have reduced significantly over recent years due to tighter regulation, and road traffic sources are probably now the more significant.

Middlesbrough AURN continuous monitor closed December 2000. No 2001 data  
Replaced with a national network Benzene pumped diffusion type system from February 2002.

Diffusion tube monitoring of **1,3-butadiene** was carried out at the Middlesbrough Breckon Hill AURN site over the years 2004 – 2007 as part of the national network. The site is close to the main industrial emitter of 1,3-butadiene to the east and is a relevant public exposure location. Annual means in 2006/7 were below 0.2 µg/m<sup>3</sup>, almost entirely due to industrial releases.

Industrial source emissions have reduced significantly over recent years due to tighter regulation, and the levels of 1,3-butadiene concentrations within the Middlesbrough Council area will continue to readily meet the 2003 1,3-butadiene objective of 2.25 µg/m<sup>3</sup> as an annual mean.

## 2.2.5 Other Pollutants Monitored

Breckon Hill has carbon monoxide monitoring as a regulated pollutant, and also measures ozone, particulate PM<sub>2.5</sub>, and PAH as unregulated pollutants.

**Table 2.9 Results of Carbon Monoxide Automatic Monitoring: Comparison with 8-hour Running Mean Objective of 10 mg/m<sup>3</sup>, with no exceedances.**

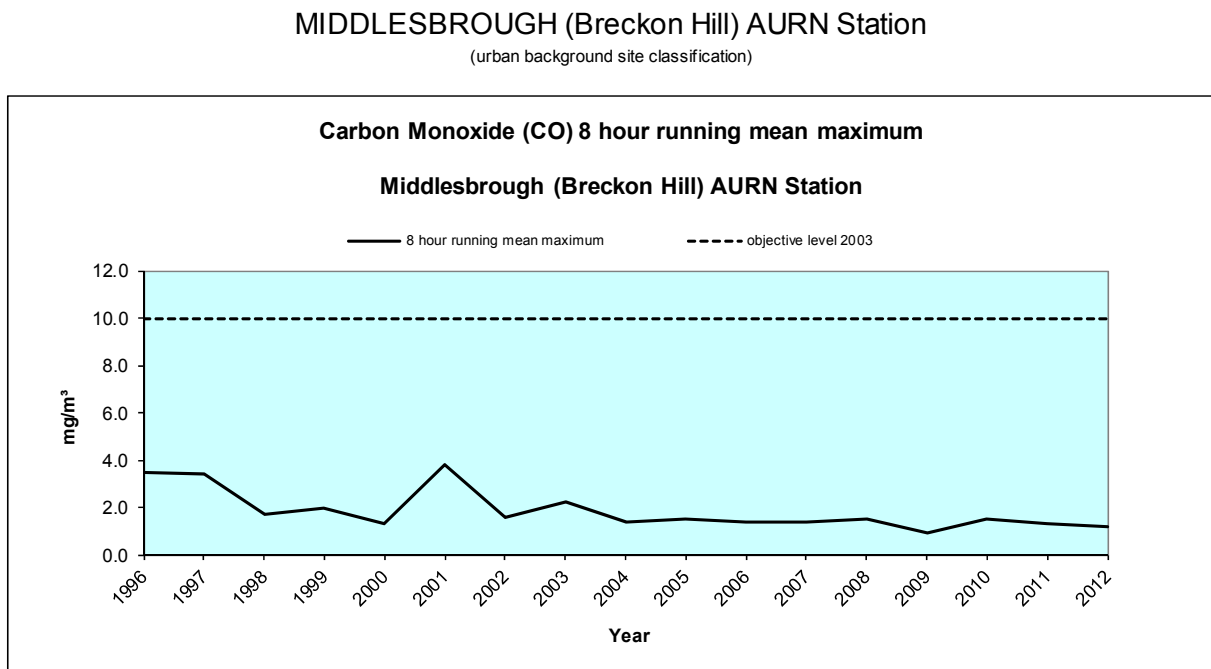
Site ID	Site Type	Within AQMA?	Data Capture 2012 %	Maximum of 8 hour running mean concentrations (mg/m <sup>3</sup> )		
				2010	2011	2012
Breckon Hill	Urban Industrial	N	98	1.5	1.3	1.2

## Middlesbrough

Breckon Hill is representative of relevant public exposure for carbon monoxide. Concentrations are stable year on year at less than 20% of the objective level, and the objective is readily met, as shown by the trend graph below.

The AURN network stopped carbon monoxide monitoring across most of the UK from the end of December 2012 in view of the consistently low results and no exceedances of the objective at any location. The monitor has been removed.

**Figure 2.9 Carbon Monoxide Trend**



**Lead** has not been monitored within the Middlesbrough Council area as there is no lead-based industry, and lead has been removed from petrol. Lead is monitored within the Redcar & Cleveland Council area to the east as part of the national heavy metal monitoring programme around the large steel complex, with monitored levels well below the objective levels. This will certainly be the case within the Middlesbrough Council area.

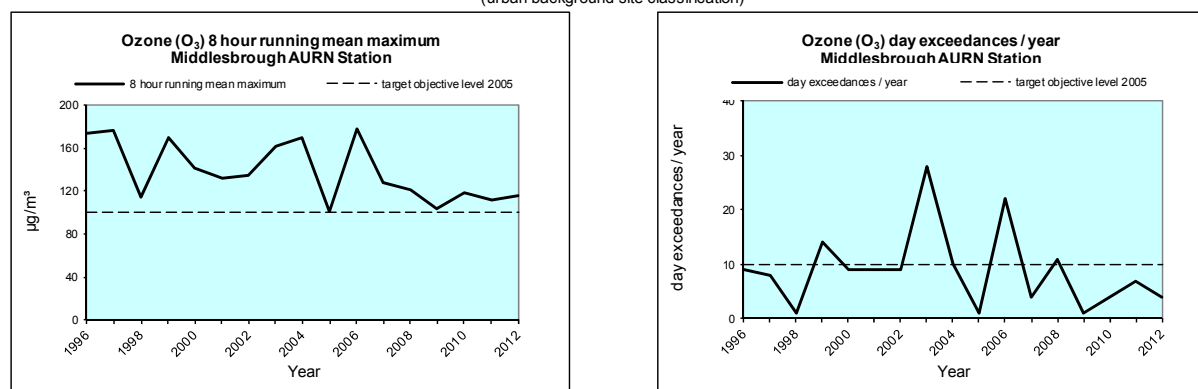
Of the unregulated pollutants, **ozone** continues to be monitored the Breckon Hill AURN station.

**Table 2.10 Results of Ozone Automatic Monitoring: Comparison with 8-hour Running Mean Target of 100 µg/m<sup>3</sup>, with a maximum of 10 day exceedances.**

Site ID	Site Type	Within AQMA?	Data Capture 2012 %	Number of Day Exceedances of 8 hour running mean target (100 µg/m <sup>3</sup> )		
				2010	2011	2012
Breckon Hill	Urban Industrial	N	98	4	7	4

**Figure 2.10 – Ozone Trend**

MIDDLESBROUGH (Breckon Hill) AURN Station  
(urban background site classification)



This shows that ozone objective exceedances are likely across the whole of the Middlesbrough Council area, particularly at times of hot summer weather, such as 2006.

Monitored levels of ozone within other Tees Valley Council areas (reference 1 attached) also show exceedances of the objective, particularly close to the east coast. Ozone is not a regulated pollutant as it is recognised that there is little action that can be taken locally to meet the objective.

**Particulate PM<sub>2.5</sub>** levels have been monitored at the Breckon Hill AURN site since 2009, with annual means ranging from 9 – 11 µg/m<sup>3</sup>, well below the objective target of 25 µg/m<sup>3</sup>. This is a site of relevant public exposure and will represent a worst case example for the whole of Middlesbrough.

In general terms, monitored levels of PM<sub>2.5</sub> are around 70% or less of particulate PM<sub>10</sub>, and with PM<sub>10</sub> levels rarely exceeding 20 µg/m<sup>3</sup> in areas of relevant public exposure, PM<sub>2.5</sub> levels should not exceed 15 µg/m<sup>3</sup>, again well below the target objective of 25 µg/m<sup>3</sup> as an annual mean.

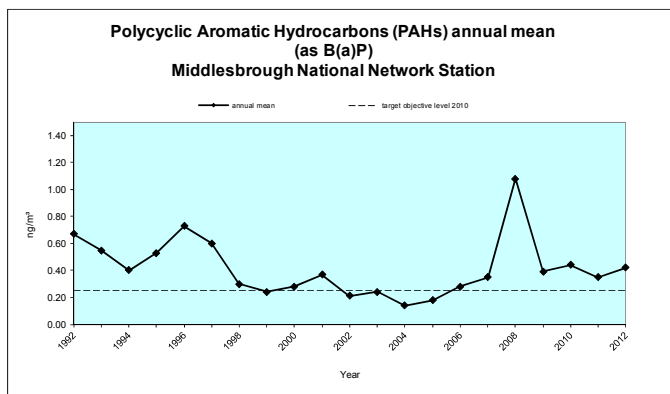
**Table 2.11 Results of Particulate PM<sub>2.5</sub> Automatic Monitoring: Comparison with the Annual Mean Target of 25 µg/m<sup>3</sup>, with no exceedances.**

Site ID	Site Type	Within AQMA?	Data Capture 2012 %	Annual Mean Concentration µg/m <sup>3</sup>		
				2010	2011	2012
Breckon Hill	Urban Industrial	N	99	9.5	10.6	10.2

## Middlesbrough

**Polycyclic aromatic hydrocarbons (PAHs)** have been monitored at Breckon Hill AURN site since 2008 using a digital sampler. Breckon Hill is a site of relevant public exposure. PAHs are mainly associated with traditional industrial processes such as coke ovens associated with steel complexes. The steel complex at Redcar has two coke ovens, between 4 and 7 kilometres to the north-east. This is not a prevailing wind (a north-east wind is around 15% pa), but emissions are picked up by this monitor from time to time. Concentrations at this upwind location over the last three years have ranged between 0.35 and 0.45 ng/m<sup>3</sup>, above the target objective of 0.25 ng/m<sup>3</sup> as an annual mean, but below the EU target of 1.0 ng/m<sup>3</sup>.

**Figure 2.12 – PAH Trend**



Prior to the digital sampler installed at Breckon Hill in 2008, PAH was monitored from 1995 to 2007 at an elevated location nearby, at Longlands Road, Middlesbrough, as part of the TOMPS national network. This was not a relevant exposure site, but results are shown on the trend graph.

### 2.2.6 Summary of Compliance with AQS Objectives

Middlesbrough has examined the results from monitoring in the borough, and where relevant in neighbouring council areas. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

## **3 New Local Developments**

### **3.1 Road Traffic Sources**

There are no new roads, or significant road modifications.

### **3.2 Other Transport Sources**

There are no changes involving other transport sources.

### **3.3 Industrial Sources**

There are no new industrial processes.

### **3.4 Commercial and Domestic Sources**

There are a number of new small scale housing developments.

### **3.5 New Developments with Fugitive or Uncontrolled Sources**

There are no new developments with fugitive or uncontrolled sources.

Middlesbrough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Middlesbrough Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

## **4 Local / Regional Air Quality Strategy**

In the absence of air quality management areas, there is no formal air quality strategy, although this is kept under review by the Council and through the TVEPG.

## **5 Planning Applications**

There were no planning applications in 2012 / 13 that required an air quality assessment.

## **6 Air Quality Planning Policies**

Air quality within the Council area is generally good, and there is a corporate commitment to maintain, and where possible, improve air quality. However, there is no strong economic case for substantial improvement plans.

## **7 Local Transport Plans / Strategies**

The Council regularly reviews the local transport plan, and has a commitment to support measures that improve air quality where economically viable.

The Council is a partner in Tees Valley Unlimited (known as the Tees Valley Joint Strategy Unit prior to 1<sup>st</sup> April 2010).

## **8 Climate Change Strategies**

Middlesbrough Council signed up to the Nottingham Declaration Climate Change in 2002. Since that time Middlesbrough Council has been commended as a Beacon Council for tackling climate change, awarded the Carbon Trust Standard award and become a signatory to the European Covenant of Mayors scheme.

In 2011 Middlesbrough Council was endorsed by environmental charity BioRegional as a One Planet Living region for its commitment to delivering sustainable long term environmental, economic and social improvements to the town as well as tackling climate change, with ambitious carbon reduction targets proposed in the Council's One Planet Living Action Plan.

Middlesbrough Council has led a Climate Change Partnership since 2004 who have written, developed and worked to the Middlesbrough Climate Change Community Action Plan since 2005. During 2013 the Climate Change Partnership will refresh the Climate Change Action Plan to fit alongside the Climate Local framework.



## 9 Implementation of Action Plans

In the absence of air quality management areas, there are no formal action plans, although this topic is kept under review by the TVEPG.

## **10 Conclusions and Proposed Actions**

### **10.1 Conclusions from New Monitoring Data**

The main source of air pollution within Middlesbrough continues to be road traffic, with nitrogen dioxide and particulate PM<sub>10</sub> the important pollutants. Three continuous monitors are strategically placed at worst case locations to monitor these pollutants, with Breckon Hill AURN station also well placed to monitor potential air pollutants from the industrial areas in neighbouring Council areas to the East and North.

All monitoring results clearly show that concentrations of regulated air pollutants continue to meet air quality objectives at these locations, and that this will be the case across the entire Middlesbrough Council area.

It is noted that monitoring in the neighbouring Tees Valley Councils supports the Middlesbrough conclusions.

### **10.2 Conclusions relating to New Local Developments**

There have been no significant new road, commercial / domestic, or other developments that will have any adverse impact on Middlesbrough air quality, either from within the Council area, or from within neighbouring Council areas.

There are no new industrial installations within Middlesbrough, or neighbouring Council areas that will impact on air quality.

### **10.3 Other Conclusions**

Other non-regulated pollutants that are included, or are likely to be included in the UK air quality strategy, have been given full consideration. The ozone objective is likely to be exceeded in many parts of the Council area during periods of hot sunny summer weather. The UK PAH objective is also exceeded in parts of Council area.

### **10.4 Proposed Actions**

This progress report for Middlesbrough has not identified any areas of concern for regulated pollutants, and there is no need to proceed to any detailed assessment. No additional air quality monitoring is required, or changes to the existing monitoring, which are all at strategic locations.

Middlesbrough Council will continue to work closely with the other four Tees Valley Councils on air quality matters through the Tees Valley Environmental Protection Group.

The next submission to Defra will be a Progress report for 2014 in May 2014, based on 2013 monitoring data.

## 11 References

1. Annual Air Quality Report for the Tees Valley (attached)  
Published by the Tees Valley Environmental Protection Group, June 2013
2. Air Quality Banding Report  
Published by the Tees Valley Environmental Protection Group, June 2012
3. Tees Valley Traffic Pollution Study 2005  
Published by the Tees Valley Environmental Protection Group, July 2005

# Appendices

## Appendix A: QA/QC Data

### Diffusion Tube Bias Adjustment Factors

Middlesbrough Council does not use nitrogen dioxide diffusion tubes.

### Factor from Local Co-location Studies (if available)

Not applicable

### Discussion of Choice of Factor to Use

Not applicable

### PM Monitoring Adjustment

All measurements for PM<sub>10</sub> at the MacMillan College and Elm Street Local stations are unmodified TEOM based. Results since 2008 have been adjusted by the vcm method to provide gravimetric equivalence, with earlier years having been multiplied by Government guidance factor of 1.3 to give an approximate gravimetric equivalence. The Breckon Hill AURN monitor is TEOM-FDMS direct gravimetric equivalence.

### Short-term to Long-term Data adjustment

All monitoring data has been full year, with no adjustment required.

### QA/QC of automatic monitoring

The Breckon Hill AURN station is operated under a comprehensive service contract with Enviro Technology Services plc, with QA / QC carried out by Ricardo-AEA. Operators of the site have received supplier training.

The two Middlesbrough fixed continuous Local monitoring stations (both NO<sub>x</sub> and PM<sub>10</sub>), are modern installations, operated under a comprehensive service contract, in both cases Supporting U Ltd. Operators of the site have received supplier training.

The Council is committed to achieving accuracy, precision, data capture, traceability and long term consistency to ensure that data is representative of ambient air quality. In common with other Tees Valley Councils, Middlesbrough has a documented quality assurance and control programme, which includes an established schedule of regular site calibrations, validation of data, and documentation of all procedures. Details are summarised as follows:

Calibration      daily 'automatic' calibration with frequent (usually fortnightly) manual checks.

Calibration gas obtained from approved gas standard suppliers.

Equipment	comprehensive service agreement with the supplier.
Data capture	site operators are experienced and trained personnel, monitoring data capture on a daily basis where possible to ensure that faults are detected and corrected quickly.
Ratification	<p>data is screened, where possible on a daily basis, to check for unusual measurements. Suspicious data is investigated fully, and if found to be faulty, is deleted from the records. Particular attention is paid to possible environmental changes in the vicinity of the analyser.</p> <p>Data is recorded monthly and compared with earlier results.</p> <p>Data is collated quarterly with that from other monitors within the Tees Valley, including AURN stations, as a further check on accuracy.</p>

All data is published annually (reference 1) by the Tees Valley Environmental Protection Group.

### **QA/QC of diffusion tube monitoring**

Middlesbrough Council does not use nitrogen dioxide diffusion tubes.

## **Appendix B: DMRB Calculations**

A comprehensive investigation (reference 3) of congested traffic areas within Middlesbrough was carried out as part of a Tees Valley wide study using DMRB v1.02 (2003), and submitted along with the 2006 Updating and Screening assessment for Middlesbrough. Validation with continuous monitors showed good correlation, and the results confirmed that air quality objectives for particulate PM<sub>10</sub> and nitrogen dioxide were met at building façades where members of the public may be exposed.

An update of the study will be considered should a new DMRB model version be released.

## Appendix C: Emission Source Update

The list below shows the emission change updates for 2012. The list will be used to complete the next updating and screening report in 2015.

### **Middlesbrough Emission Changes 2012**

#### **Housing and Commercial Development**

2012 There are no significant new developments.

#### **Road Traffic**

2012 There are no new roads, or significant road modifications.

#### **Part B and A2 (small industrial and commercial) Installations**

2012 Middlesbrough Borough Council regulated 39 Part B Installations, two less than 2011.

#### **Part A (large industrial) Installations**

2012 There are currently three Part A1 installations and one waste authorisation within the borough.  
There are no new installations, or deleted installations, which significantly affect air quality.

#### **Landfill Sites, Quarries**

2012 There have been no new landfill sites or quarries with nearby relevant exposure.