



2012 Air Quality Updating and Screening
Assessment for
Middlesbrough Borough Council

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

August 2012

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Executive Summary

This report is the fifth 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 third 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 fourth 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 would meet Government objectives by the due date, and there was no need to declare any Air Quality Management Areas.

For 2009 and 2010, Progress reports were submitted to Government, updating monitoring data and trends, and recording significant developments and changes to pollutant emissions.

All reports submitted have been accepted in full by Defra.

This fifth Review and Assessment is an Updating and Screening process, recording significant emission data changes to the end of 2010 / 11, updating monitoring data to end 2011, and identifying any areas of concern where further, more detailed, analysis is required. The report applies the principles of the revised UK Air Quality Strategy 2008, and the updated approach to assessment as detailed in the revised Technical Guidance 2009.

Government objectives for air quality currently cover seven pollutants:

- Nitrogen dioxide
- Particulate PM10
- Sulphur dioxide
- Carbon monoxide
- Benzene
- 1,3-butadiene
- Lead

Middlesbrough

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 is 1 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 PM10. 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.

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

The next Updating and Screening report is due in 2015, with Progress reports in 2013 and 2014.

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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 target groups 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 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The Updating and Screening report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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, mg/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 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	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
Particles (PM ₁₀) (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

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 PM₁₀, 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).

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2006 Updating and Screening Report	<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 NO₂ and PM₁₀, 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>
2007 Progress Report	<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>
2008 Progress Report	<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>
2009 Updating and Screening Report	<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>
2010 Progress Report	<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>

2011 Progress Report

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.

The report was accepted in full by the Department for Environment, Food and Rural Affairs (DEFRA).

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 (AEAT), who carry out QA / QC. A maintenance contract with the instrument supplier covers six-monthly inspections.

Late in Q4 2008, the unmodified PM₁₀ TEOM was replaced with a PM₁₀ FDMS TEOM, and a PM_{2.5} FDMS TEOM added. The results shown below for particulate PM₁₀ for 2009 – 2011 are direct gravimetric equivalence. For 2008, results are unmodified TEOM, adjusted to gravimetric equivalence using vcm, and for 2007 unmodified TEOM adjusted to gravimetric equivalence using Government guidance factor of 1.3.

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 PM₁₀. LA staff carry out regular calibrations. A maintenance contract with the instrument supplier covers six-monthly inspections. The unmodified TEOM is not being upgraded, but results since 2008 have been adjusted to gravimetric equivalence using vcm. For 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 2003 monitoring nitrogen oxides and particulate PM₁₀. LA staff carry out regular calibrations. A maintenance contract with the instrument supplier covers six-monthly inspections. The unmodified TEOM is not being upgraded, but results since 2008 have been adjusted to gravimetric equivalence using vcm. For 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 14.

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 (NPL).

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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 (AEAT). 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

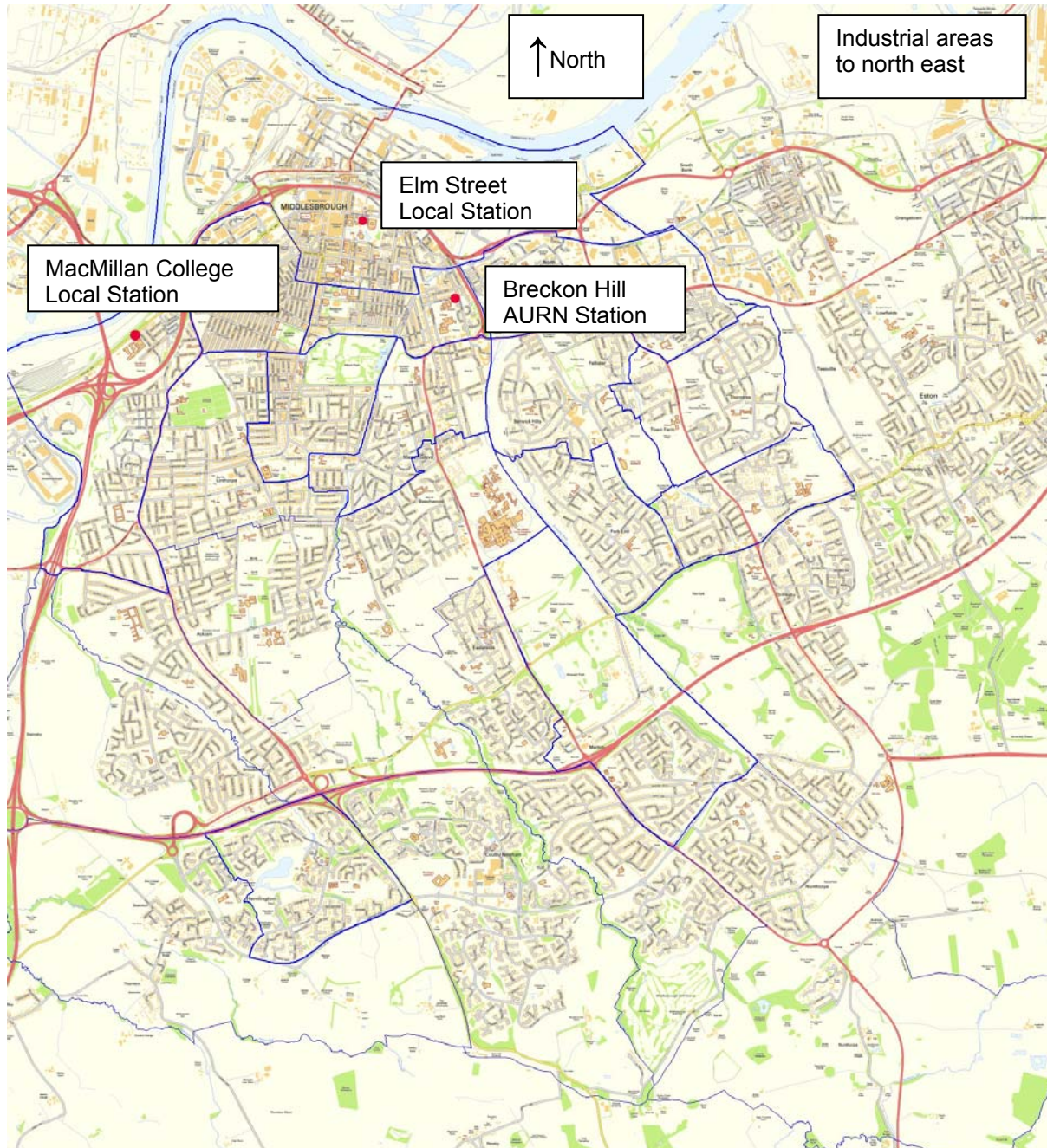


Table 2.1 Details of Automatic Monitoring Sites – Middlesbrough 2011

Site Name	Site Type	X OS GridRef	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	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	NO ₂ , PM ₁₀ , PM _{2.5} , SO ₂ , CO, O ₃	N	NO ₂ - Chemiluminescence PM ₁₀ – Beta Attenuated (BAM) PM _{2.5} – Beta Attenuated (BAM) SO ₂ - UV fluorescence CO – continuous gas correlation O ₃ – UV Absorbtion	Y (1m)	20 metres	Y
MacMillan College (Local)	Urban background	447800	519300	NO ₂ , PM ₁₀	N	NO ₂ - Chemiluminescence PM ₁₀ - TEOM (vcm correction)	Y (1m)	230 metres to A19 trunk route	Y
Elm Street (Local)	Urban	449700	520300	NO ₂ , PM ₁₀	N	NO ₂ - Chemiluminescence PM ₁₀ - TEOM (vcm correction)	Y (for 1-hour NO ₂) (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 PM₁₀ TEOM was replaced with a PM₁₀ FDMS TEOM, and a PM_{2.5} 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 PM₁₀. The unmodified TEOM is 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.

The location of the three monitoring sites is shown on the page 14 map.

Table 2.2 Details of Non-Automatic Monitoring Sites – Middlesbrough 2011

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	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	Benzene	N	N	Y (1m)	20 metres	Y
Breckon Hill (AURN)	Urban industrial	450500	519400	PAH	N	N	Y (1m)	20 metres	Y
Breckon Hill (AURN)	Urban industrial	450500	519400	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 PM₁₀ Digitel DHA-80 samplers which comply with the CEN (European Committee for Standardisation) standard.

The location of Breckon Hill is shown on the page 14 map.

2.2 Comparison of Monitoring Results with AQ 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 small 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

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 99.8th 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 99.8th 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.

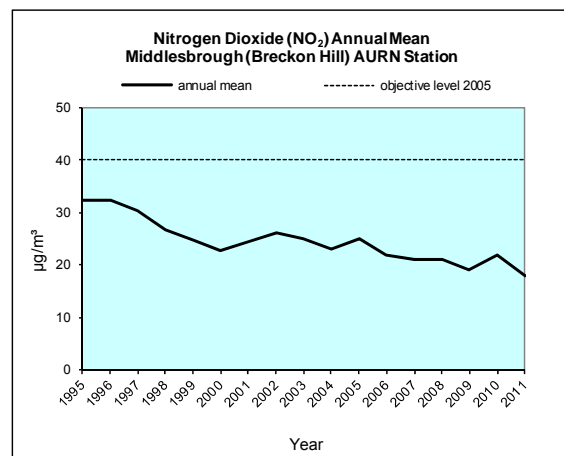
The 1 hour mean objective is readily met, with no exceedances and 99.8th percentiles well below the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective of 40 µg/m³

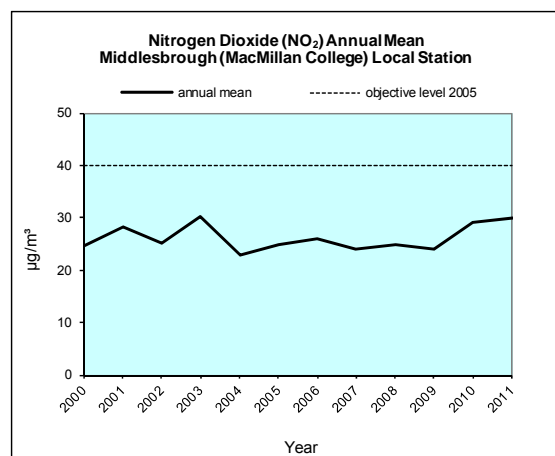
Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Annual Mean Concentration				
					2007	2008	2009	2010	2011
Breckon Hill (AURN)	Urban industrial	N	Full year	99	21.3	21.1	18.6	21.9	18.3
MacMillan College	Urban background	N	Full year	96	24.2	25.1	23.9	28.5	29.5
Elm Street (Local)	Urban	N	Full year	95	23.6	27.2	25.9	28.1	22.5

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

MIDDLESBROUGH (Breckon Hill) AURN Station
(urban-industrial site classification)



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



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

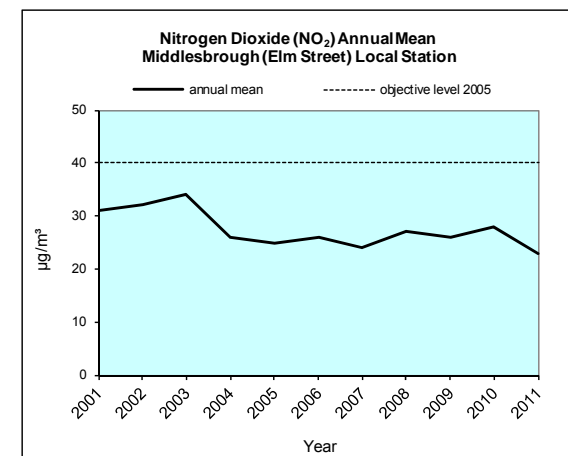
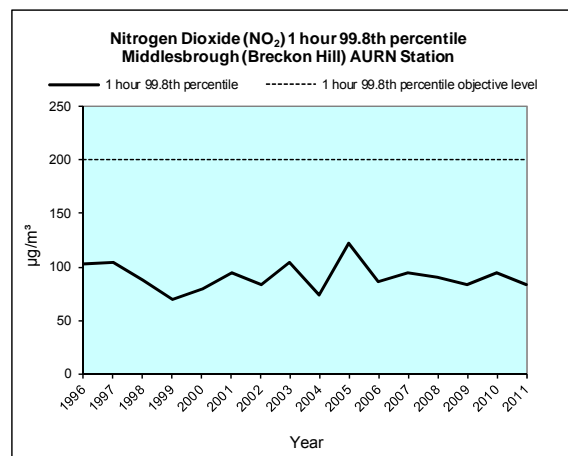


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective of 200 µg/m³

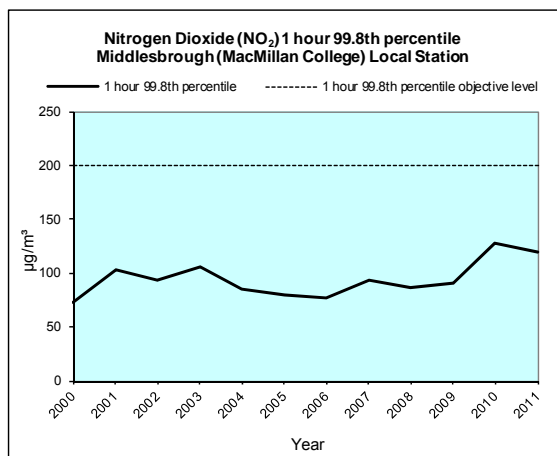
Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Number of Exceedences of Hourly Mean (99.8 th µg/m ³ percentile shown in brackets)				
					2007	2008	2009	2010	2011
Breckon Hill (AURN)	Urban industrial	N	Full year	99	0 (95)	0 (90)	0 (83)	0 (94)	0 (84)
MacMillan College	Urban background	N	Full year	96	0 (93)	0 (87)	0 (90)	0 (128)	0 (120)
Elm Street (Local)	Urban	N	Full year	95	0 (84)	0 (89)	0 (86)	0 (101)	0 (84)

Figure 2.4 Trends in 1-hour 99.8th percentile Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites

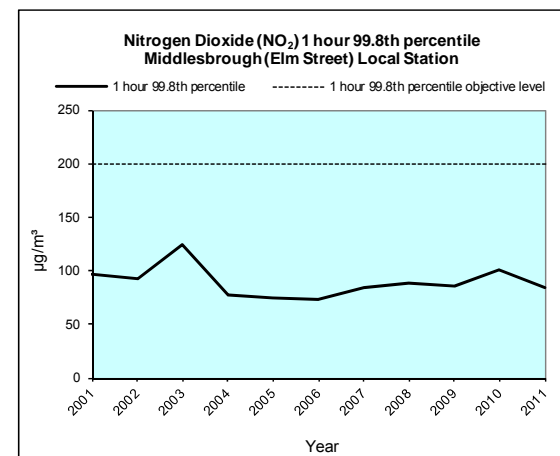
MIDDLESBROUGH (Breckon Hill) AURN Station
(urban-industrial site classification)



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 PM₁₀

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 90th percentiles well below the objective level. Year to year variations on the trend graph mainly reflect weather conditions.

The Elm Street site is not 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 90th 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 2.7 Results of Automatic Monitoring of PM₁₀: Comparison with Annual Mean Objective of 40 µg/m³

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration µg/m ³				
						2007	2008	2009	2010	2011
Breckon Hill (AURN)	Urban industrial	N	Full year	83	Y	21.0	19.0	18.1	15.3	19.1
MacMillan College	Urban background	N	Full year	98	Y	21.4	18.3	17.6	17.2	19.8
Elm Street (Local)	Urban	N	Full year	99	Y	20.8	19.0	18.0	18.3	20.5

Breckon Hill results FDMS-TEOM monitor, direct gravimetric equivalence since 2008. MacMillan College and Elm Street results unmodified TEOM, vcm correction 2008 onwards. All three sites adjusted to gravimetric using 1.3 factor for 2007

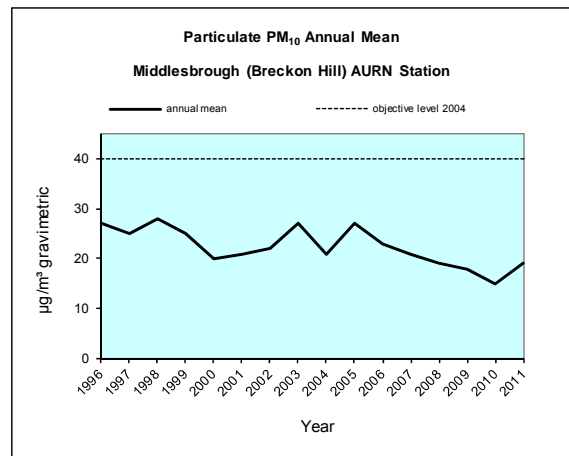
Table 2.8 Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour mean Objective of 50 µg/m³

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (90 th percentile shown in brackets)				
						2007	2008	2009	2010	2011
Breckon Hill (AURN)	Urban industrial	N	Full year	84	Y	11 (31)	13 (36)	3 (33)	0 (26)	11 (34)
MacMillan College	Urban background	N	Full year	98	Y	9 (33)	12 (34)	3 (28)	0 (28)	8 (35)
Elm Street (Local)	Urban	N	Full year	99	Y	9 (31)	15 (35)	2 (30)	0 (30)	10 (35)

Breckon Hill results FDMS-TEOM monitor, direct gravimetric equivalence since 2008. MacMillan College and Elm Street results unmodified TEOM, vcm correction 2008 onwards. All three sites adjusted to gravimetric using 1.3 factor for 2007

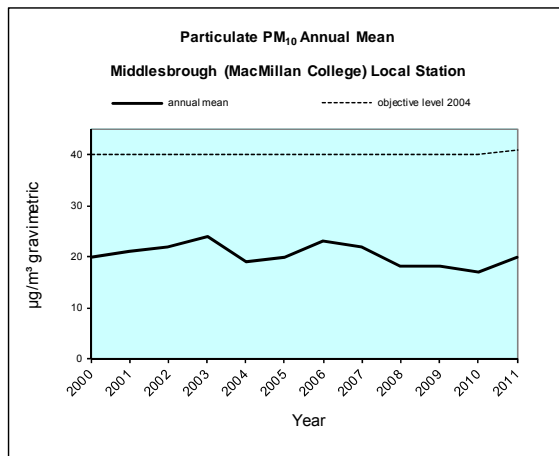
Figure 2.7 Trends in Annual Mean PM₁₀ Concentrations, and 24 hour exceedances

MIDDLESBROUGH (Breckon Hill) AURN Station
(urban-industrial site classification)

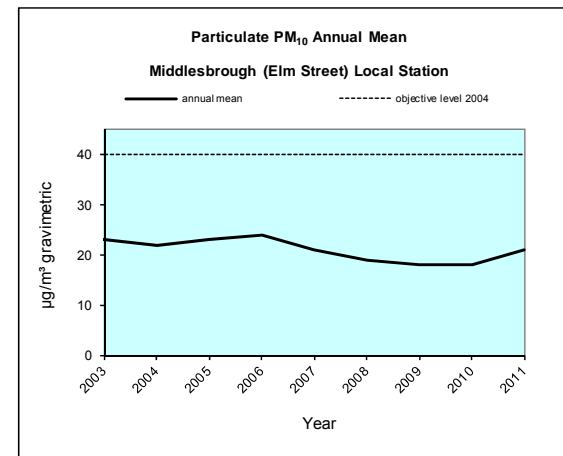


2009 data is from a new TEOM FDMS monitor

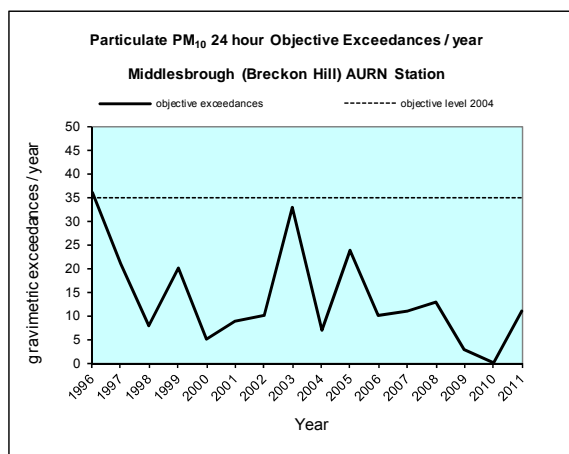
MIDDLESBROUGH (MacMillan College) Local Station
(urban background site)



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

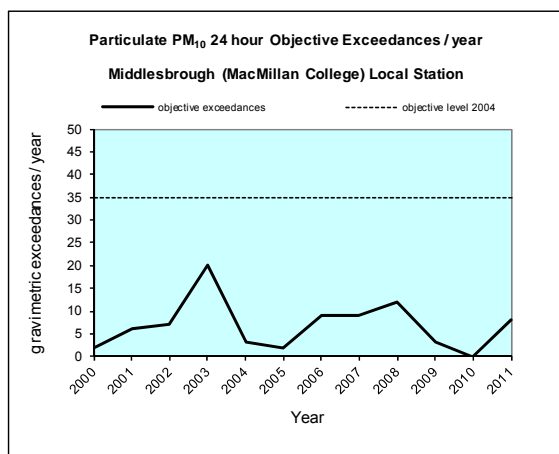


MIDDLESBROUGH (Breckon Hill) AURN Station
(urban-industrial site classification)

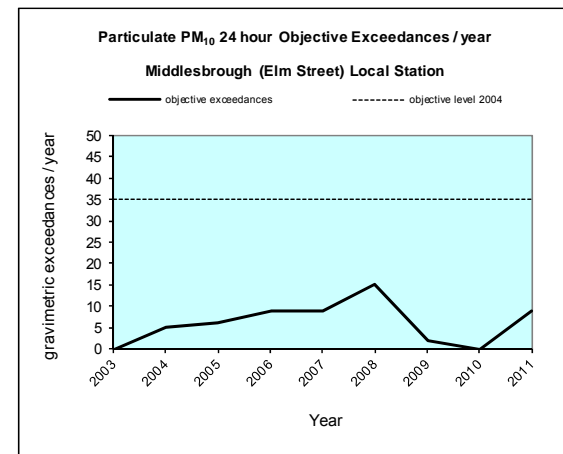


2009 and 2010 data is from a new TEOM FDMS monitor

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



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



2.2.3 Sulphur Dioxide

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.

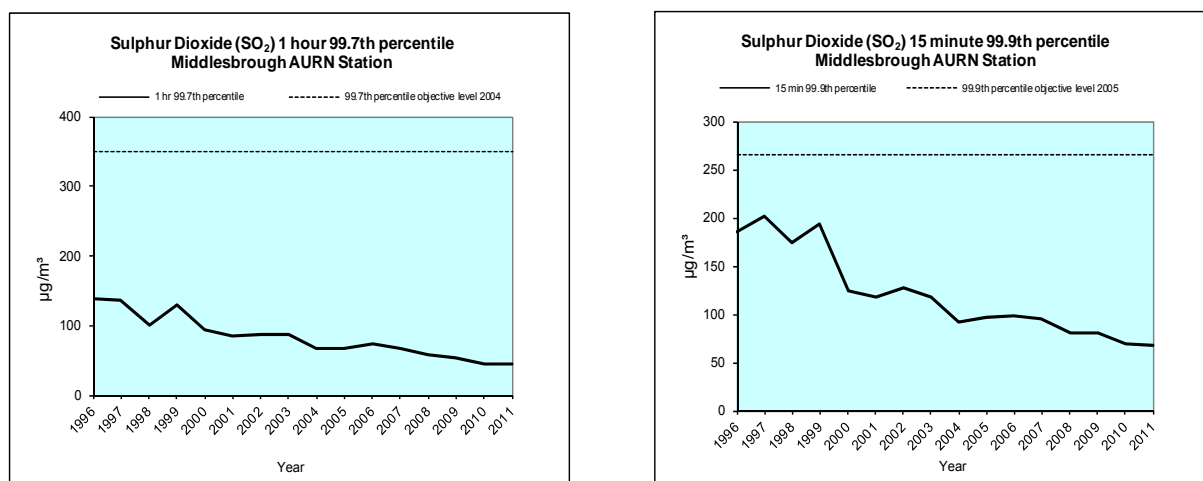
The Middlesbrough monitor supplements sulphur dioxide monitoring at the Billingham Local station to the north-west, and the Redcar & Cleveland Local station to the east. These monitors are closer to more significant industrial emissions and on a more prevailing wind, and results are shown in the annual 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 2.9 Results of Automatic Monitoring of SO₂: Comparison with the Three Objectives

Site ID	Site Type	Within AQM A?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Number of Exceedences (percentile in bracket µg/m ³)		
					15-minute Objective (266 µg/m ³)	1-hour Objective (350 µg/m ³)	24-hour Objective (125 µg/m ³)
Middlesbrough AURN station	Urban Industrial	N	Full year 2011	99	0 (68)	0 (44)	0 (16)

Figure 2.8 Trends in SO₂ Concentrations (1 hour and 15 minute percentiles)

MIDDLESBROUGH (Breckon Hill) AURN Station
(urban-industrial 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 2011 annual mean was 0.89 µg/m³.

This location represents a worst-case example for Middlesbrough, and is well below the 2010 benzene objective level of 5 µg/m³ as an annual mean.

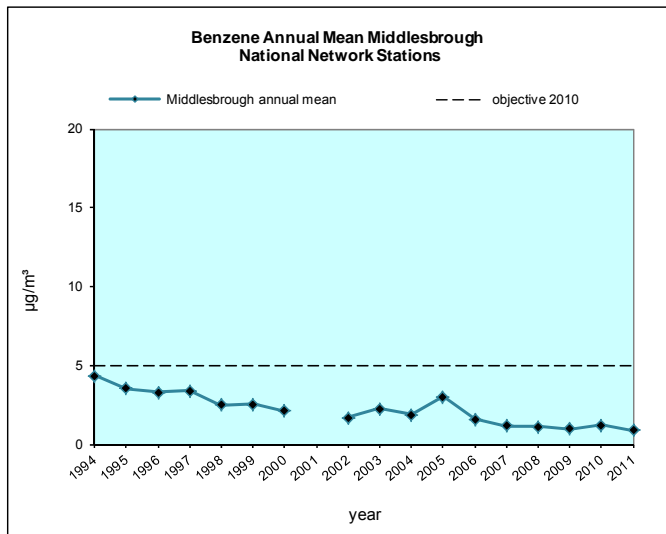


Figure 2.9 – Benzene Trend

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.

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/m³, 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/m³ 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_{2.5}, and PAH as unregulated pollutants.

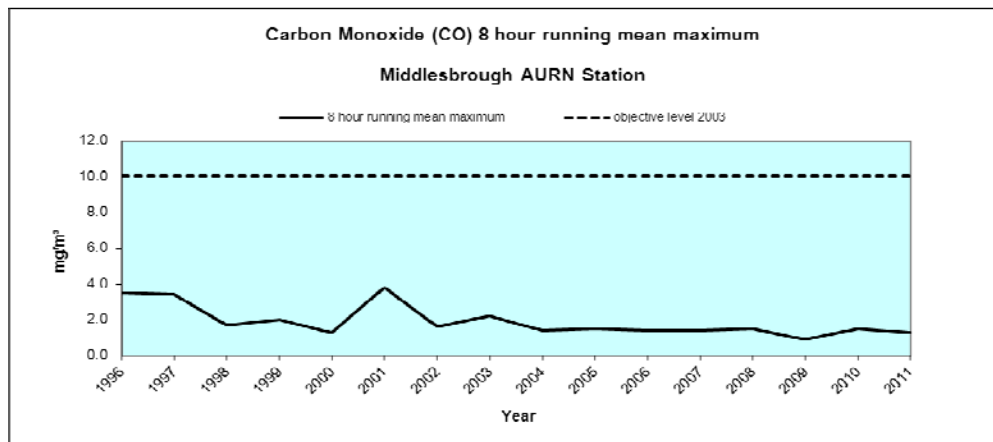
Table 2.10 Results of Carbon Monoxide Automatic Monitoring: Comparison with 8-hour Running Mean Objective of 10 mg/m³, with no exceedances.

Site ID	Location	Within AQMA?	Data Capture 2011 %	Maximum of 8 hour running mean concentrations (mg/m ³)		
				2009	2010	2011
BH	Breckon Hill	N	82	0.9	1.5	1.3

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.

Figure 2.10 Carbon Monoxide Trend



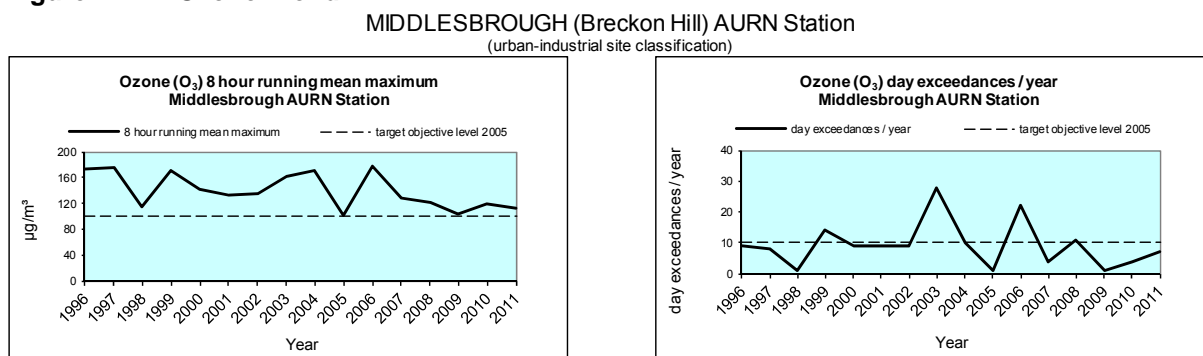
Lead has not been monitored within the Middlesbrough Council area as there is no lead-based industry, and lead has been removed from petrol. Lead is monitored within the Redcar & Cleveland Council area to the east as part of the national heavy metal monitoring programme around the large steel complex, 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 2.11 Results of Ozone Automatic Monitoring: Comparison with 8-hour Running Mean Target of 100 µg/m³, with a maximum of 10 day exceedances.

Site ID	Location	Within AQMA?	Data Capture 2011 %	Number of Day Exceedances of 8 hour running mean target (100 µg/m³)		
				2009	2010	2011
BH	Breckon Hill	N	99	1	4	7

Figure 2.11 – Ozone Trend



Middlesbrough

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.

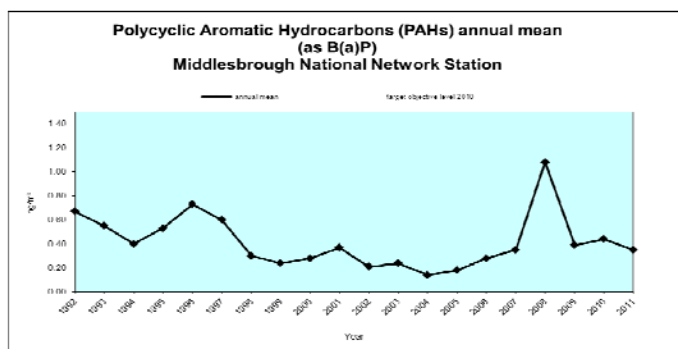
Particulate PM_{2.5} levels have been monitored at the Breckon Hill AURN site since 2009, with annual means ranging from 9 – 11 µg/m³, well below the objective target of 25 µg/m³. This is a site of relevant public exposure and will represent a worst case example for the whole of Middlesbrough. In general terms, monitored levels of PM_{2.5} are around 70% or less of particulate PM₁₀, and with these levels rarely exceeding 20 µg/m³ in areas of relevant public exposure, PM_{2.5} levels should not exceed 15 µg/m³, again well below the target objective of 25 µg/m³ as an annual mean.

Table 2.12 Results of Particulate PM_{2.5} Automatic Monitoring: Comparison with the Annual Mean Target of 25 µg/m³, with no exceedances.

Site ID	Location	Within AQMA?	Data Capture 2011 %	Annual Mean Concentration µg/m ³		
				2009	2010	2011
BH	Breckon Hill	N	99	10.3	9.5	10.6

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/m³, above the target objective of 0.25 ng/m³ as an annual mean, but below the EU target of 1.0 ng/m³.

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 Road Traffic Sources

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. Sections of the A66 within the Middlesbrough boundary have been expanded from two to three lanes to reduce rush hour traffic congestion, and improve access to the Riverside development area, helping to further improve air quality.

This is no change over 2009.

The main roads radiate out from the town centre, and are very busy, particularly during the main rush hour period. Even so, traffic maintains a flow, houses are mainly set back from kerbside, and there are no ‘canyon’ effect areas. Where brownfield sites have been redeveloped for housing or commercial / light industry use, road access has been significantly improved to minimise further road congestion.

Middlesbrough has an on-going programme of traffic control measures around the town centre and on the main commuter routes into the town designed to reduce traffic congestion. A new interchange on the A66 cross-town trunk road (replacing an existing roundabout) has improved access and traffic flow to the new Middlehaven development, and further improvements to the A66 are on-going.

Consideration within the Tees Valley is also being given to a new Tees crossing further downstream, which would significantly reduce through traffic on Middlesbrough roads.

This is no change over 2009.

The town centre area is now extensively pedestrianised, and there are no busy streets identified where people may spend more than 1 hour close to traffic.

There is a bus station on the west side of the town centre, and some commercial roads in the vicinity have a high proportion of buses. Other road traffic here is relatively low, with access to car parks only, and there are no residential areas in the immediate vicinity.

This is no change over 2009.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Middlesbrough does not have narrow congested streets with residential properties close to the kerb. This is no change over 2009.

Middlesbrough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

The layout of Middlesbrough town centre remains unchanged from 2009. There are no new street locations identified where individuals may regularly spend 1-hour or more.

Middlesbrough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

The layout of Middlesbrough town centre remains unchanged from 2009. There are no new roads identified where there is an unusually high proportion of buses / HDV.

Middlesbrough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

The layout of Middlesbrough town centre remains unchanged from 2009. There are no new busy junctions identified that have not been previously assessed, or streets with new exposure.

Middlesbrough Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

The new link road from the A66 to the Riverside Park light industrial development area at Newport Bridge has been opened in 2010. The air quality impact of the new road was carried out at the planning stage with no adverse effects identified for Middlesbrough air quality.

Middlesbrough Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

The Middlesbrough road system has not changed materially since 2009. Road traffic flows have not significantly increased since then.

Middlesbrough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The layout of Middlesbrough bus station has not changed since 2009. All passenger access areas are enclosed, and there is no relevant exposure within 20 metres of any part of the bus station where buses are present.

Middlesbrough Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Durham and Tees Valley airport lies 15 kilometres to the West of the Middlesbrough boundary, and has no impact on Middlesbrough air quality. This is no change over 2009.

Middlesbrough Council confirms that there is no new or existing airport in the Local Authority area that meets the specified criteria.

4.2 Railways (Diesel and Steam Trains)

Middlesbrough is on the Tees Valley rail line from Saltburn to Darlington, and is a starting point for the Transpennine service to York, Leeds and Manchester. The line is also a freight route to the industrial areas to the East. Although diesel operated, traffic is relatively light and not considered a significant emission source. This is no change over 2009.

4.2.1 Stationary Trains

The railway system in Middlesbrough is in an open transport corridor, with no relevant exposure within 15 metres. Trains are not normally stationary for any significant period of time.

Middlesbrough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

There are no sections of track within the Middlesbrough Council area that has a large number of movements of diesel locomotives.

Middlesbrough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

The Middlesbrough port area now has very light traffic and shipping is not considered a significant emission source. The land of the old port area has been reclaimed for future development, and is known as the Middlehaven area of Middlesbrough.

This is no change over 2009.

Middlesbrough Council confirms that there are no ports or shipping that meets the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

At the end of 2011, there were 3 part A industrial process within the Council area, no change over 2009. They are associated with the chemical and waste oil recovery industries, and are not significant emitters of air pollutants. A number of large industrial emitters are also to be found to the east / north-east along both sides of the Tees estuary, in the neighbouring Council area of Redcar & Cleveland and Stockton-on-Tees. In general, though, these are not on the prevailing wind direction, and are sufficiently far away not to impact significantly on the main urban areas of Middlesbrough.

In the 2011 Budget, the Tees Valley was announced as being one of 11 areas awarded an Enterprise Zone. The purpose of the Enterprise Zone is to stimulate business and job growth in the private sector by concentrating on the opportunities offered by the priority sectors of the local economy. Within the Middlesbrough Council area, the Advanced Manufacturing Park will be a business rate relief area, and St Hilda's will be a locally funded site. There are no current developments, and the scheme is not expected to have any adverse impact on Middlesbrough air quality.

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Middlesbrough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been introduced

Middlesbrough Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Middlesbrough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

Middlesbrough Council confirms that there are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Middlesbrough Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Middlesbrough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Since 2009, there have been five small scale and unrelated developments which have been constructed with biomass combustion units. Each of the developments was assessed for air quality impacts as part of the planning process, with no adverse impact identified for Middlesbrough air quality.

The developments include one primary and three secondary schools built as part of the Building Schools for the Future programme, with boilers rated as one at 200kW, two at 500 kW, and one at 600kW. The fifth boiler is at a residential apartment block located in the Middlehaven area, with the boiler rated at 510 kW.

Middlesbrough Council has assessed the biomass combustion plants, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

Middlesbrough Council confirms that there are no combined impacts from biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Middlesbrough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Middlesbrough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The main source of air pollution within Middlesbrough continues to be road traffic, with nitrogen dioxide and particulate PM₁₀ 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.

8.2 Conclusions from Assessment of Sources

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.

8.3 Proposed Actions

This updating and Screening assessment 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 annual report on all monitoring carried out within the Tees Valley (reference 1) is attached to this Review and Assessment.

A second report attached to this Review and Assessment provides a breakdown of all continuous monitoring results within the Tees Valley over the last eight years into the relevant air quality banding categories, and also looks at the impact of the air quality banding changes that have been introduced for 2012. This report shows that most monitoring results are in the low category, with only particulate PM₁₀ (of the regulated pollutants) showing some transition into the moderate category. Of the non-regulated pollutants, ozone is a potential problem area in hot sunny weather conditions.

The next submission to Defra will be a Progress report for 2013 in May 2013, based on 2012 monitoring data.

9 References

1. Annual Air Quality Report for the Tees Valley (attached)

Published by the Tees Valley Environmental Protection Group, July 2012

2. Air Quality Banding Report (attached)

Published by the Tees Valley Environmental Protection Group, July 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 PM₁₀ 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 Ltd, with QA / QC carried out by AEAT. Operators of the site have received supplier training.

The two Middlesbrough fixed continuous Local monitoring stations (both NO_x and PM₁₀), are modern installations, operated under a comprehensive service contract with the supplier, in both cases Casella Measurement 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 PM₁₀ 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 the years 2009 - 2011. The list has been used to complete this updating and screening report.

Middlesbrough Emission Changes 2009 / 10 / 11

Housing and Commercial Development

2009 There are no significant new developments.

2010 There are no significant new developments.

2011 There are no significant new developments.

Road Traffic

2009 A new short road from the A66 to the Riverside industrial area has been completed. The road improvement was assessed for air quality impact at the planning stage and it was determined that the road would have no adverse effect on air quality, and would reduce traffic congestion at busy times.

2010 The new link road from the A66 to the Riverside Park light industrial development area at Newport Bridge was opened in 2010. The air quality impact of the new road was carried out at the planning stage with no adverse effects identified for Middlesbrough air quality.

2011 There are no new roads, or significant road modifications.

Part B and A2 (small industrial and commercial) Installations

2009 There is one new Part B waste oil burner installation.

2010 There are no new developments.

2011 In the 2011 Budget, the Tees Valley was announced as being one of 11 areas awarded an Enterprise Zone. The Middlesbrough areas of the Advanced Manufacturing Park and St Hilda's are covered by the scheme. There are no current developments.

Part A (large industrial) Installations

2009 There are no new processes, or deleted processes, which will significantly affect air quality.

2010 There are no new processes, or deleted processes, which will significantly affect air quality.

2011 There are no new installations, or deleted installations, which significantly affect air quality

Landfill Sites, Quarries

Middlesbrough

- 2009 There have been no new landfill sites or quarries with nearby relevant exposure.
- 2010 There have been no new landfill sites or quarries with nearby relevant exposure.
- 2011 There have been no new landfill sites or quarries with nearby relevant exposure.