2015 Air Quality Updating and Screening Assessment for

Darlington Borough Council

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

July 2015

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Executive Summary

This report is the sixth in the series of Air Quality Review and Assessments carried out in the Darlington 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 Darlington 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 Darlington 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 Darlington 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 Darlington 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.

The fifth 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 Darlington Council area would meet Government objectives by the due date, and there was no need to declare any Air Quality Management Areas.

For 2013 and 2014, 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 sixth Review and Assessment is an Updating and Screening process, recording significant emission data changes to the end of 2013 / 14, updating monitoring data to the end of 2014, 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

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 Darlington 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 few large industrial processes within the Council area, and there is no significant impact from industrial sources outside of the Council area. This is no change from earlier Review and Assessments. Road traffic fuel and exhaust emissions remain the largest source of air pollution at ground level.

While, in general, improved fuels, engines and exhaust systems are having an impact on 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_{10}. The Darlington Council area does not have very heavily congested roads, and there are no 'canyon' effect locations, with most buildings generally at low level and set back from the roadside. Traffic in the town centre is also restricted, with an inner ring road helping the flow of local through traffic, and giving access to town centre car parks. The north – south A1 motorway passes well to the west of the town, and there is a southern by-pass for east – west A66 traffic, both through rural areas. The eastern transport corridor, completed in 2008 and providing access to new development land, has eased traffic flows on two of the busiest road corridors (Haughton Road and Yarm Road).

In 2004, Darlington was one of three towns selected by the Department of Transport to participate in a national sustainable travel project ('Town on the move'), looking at ways to tackle traffic congestion. In 2007, pedestrianisation of a large part of the town centre was completed.

Continuous monitoring carried out within the Darlington Council area, as previously, shows that there is unlikely to be any exceedance of government objectives, even at the most heavily congested traffic location where there are no areas of relevant public exposure. Continuous monitoring carried out elsewhere in the Tees Valley area (see reference 1), at locations where traffic flows and vehicle composition is similar to that within the Darlington area, provides further support.

In 2005, a comprehensive traffic pollution study (reference 2) was carried out across the Tees Valley using the new Highways Agency model. Within Darlington the study looked at the continuous monitoring sites, diffusion tube sites, 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 Darlington Council area, and there is no need to declare any Air Quality Management areas.**

The next report is due in 2016 and will be an annual report to a format to be determined by Defra later in 2015.

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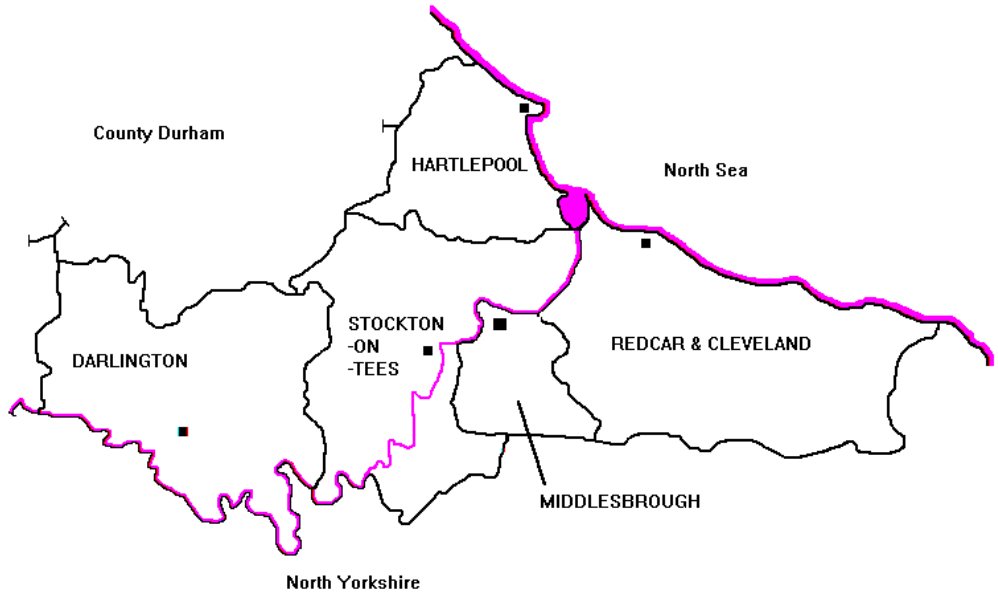
1 Introduction

1.1 Description of Local Authority Area

Darlington Borough Council is one of five unitary Councils forming the general area known as the Tees Valley. As shown below, it is the most westerly of these Councils and third largest in area, at 198.4 sq. km.



Darlington Borough has a densely populated central area, but is otherwise largely rural. It is a major shopping and commercial centre, and is the main railway centre for the Tees Valley. There is very little heavy industry compared with other Tees Valley Councils, and although some quarrying and other industrial processes lie just outside its boundary, they do not significantly impact on Darlington air quality.

The main A1 motorway (North – South), and the A66 trunk route (East – West) run through the Borough, but are mainly in rural areas, with no areas of relevant exposure. Within the urban area, there are some congested commuter routes, and in the absence of a northern by-pass, some heavy through traffic on the northern outskirts of the town. A major road change, completed in 2008, was the eastern transport corridor, formerly known as the cross-town route (eastern section). The main purpose of this scheme was to provide access to development land to the west of the A66 by-pass, but it has also contributed to significant reductions in traffic on two of the busiest road corridors in the town, Haughton Road and Yarm Road.

The majority of the Darlington area is subject to Smoke Control Orders, and natural gas is the main source of heating in all but a few rural villages. This means that air pollution from domestic and commercial sources are low. Industrial emissions 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.

Of the five Councils, Darlington is unique in not having large industrial areas, or being close to the industrial areas nearer the coast. Air quality in Darlington is therefore a good measure of emissions from domestic, commercial and road traffic sources.

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 exceedances 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 Assessment 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 $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances 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 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, 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 Darlington 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_{10}, 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

Darlington Borough Council published this report in May 2003. There was no significant change to domestic, commercial or industrial sources within, or close to the Darlington 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).

2006 Updating and Screening Report

Darlington Borough Council published this report in May 2006. There was no significant change to domestic, commercial or industrial sources within, or close to the Darlington Council area. Road traffic flows were updated and compared with the 2003 Updating and Screening Report, with no areas identified of particular concern.

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_2 and PM_{10}, and used the model to check building façade locations nearest to busy roads.

The study concluded that the model showed good agreement against the continuous monitors, and provided a useful method for looking at traffic related issues.

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

2007 Progress Report

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.

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

2008 Progress Report

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.

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

2009 Updating and Screening Report

Darlington Borough Council published this report in May 2009. There was no significant change to domestic, commercial or industrial sources within, or close to the Darlington Council area. Road traffic flows were updated and compared with the 2006 Updating and Screening Report, with no areas identified of particular concern.

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

2010 Progress Report

Darlington Borough Council published this report in May 2010. The report updated monitoring results across Darlington 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).

2011 Progress Report

Darlington Borough Council published this report in June 2011. The report updated monitoring results across Darlington 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).

2012 Updating and Screening Report

Darlington Borough Council published this report in August 2012. There was no significant change to domestic, commercial or industrial sources within, or close to the Darlington Council area. Road traffic flows were updated and compared with the 2009 Updating and Screening Report, with no areas identified of particular concern.

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

2013 Progress Report

Darlington Borough Council published this report in July 2013. The report updated monitoring results across Darlington 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).

2014 Progress Report

Darlington Borough Council published this report in July 2014. The report updated monitoring results across Darlington 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

Darlington Council has two continuous monitoring stations each monitoring hourly means of nitrogen oxides and particulate PM_{10}. Darlington air pollution is largely due to traffic, and these monitoring sites, along with the non-continuous sites below, have been chosen to provide a comprehensive view of Darlington air quality. In addition, Darlington Council have access to all air quality monitoring data throughout the Tees Valley (reference1, enclosed with this report) to provide further evidence regarding air quality.

St Cuthbert's Way is a Local station owned and operated by Darlington Council since year 2000. The unit is a kerbside site on a busy inner ring road roundabout, on the edge of the main shopping centre. Traffic is generally slow moving. The unit is in an area of relevant public exposure for the 1 hour nitrogen dioxide objective, and represents a worst case kerbside site for the whole of the Tees Valley. The station monitors nitrogen oxides and particulate PM_{10} from traffic.

A second continuous Local monitoring station used to be operated at Cockerton Bridge from 2004 to early April 2012, when the monitors became unserviceable and could not be economically repaired. The unit was a roadside site on one of the main radial routes into the town centre, with heavy, but relatively free flowing traffic. The monitor location was between kerbside and the nearest building façades, and was a worst-case site for all objectives relating to nitrogen oxides and particulate PM_{10} from traffic. It is noted here that a non-continuous nitrogen dioxide diffusion tube (D5 on the map, page 13) continues to be operated at a nearby roadside location on Woodland Road to provide an on-going measure of nitrogen dioxide trends.

LA staff carry out regular calibrations. A maintenance contract with Enviro Technology covers six-monthly service inspections.

The locations of the two monitoring sites are shown on the map, page 13.

2.1.2 Non-Automatic Monitoring Sites

There are a further ten non-continuous diffusion tube sites measuring annual mean nitrogen dioxide levels, four of which used to be national survey sites. Apart from the two background sites, all are kerbside or roadside sites as a measure of NO_2 concentrations arising from traffic.

At the end of 2010, the location of the diffusion tubes was reviewed in light of latest placement guidance. Two tubes (id D5 and D6) were set back from kerbside to roadside early in 2011 to better represent relevant public exposure. The results from 2011 provide evidence of the rapid fall-off of nitrogen dioxide levels away from kerbside.

These diffusion tubes are also 50% TEA in acetone, supplied and analysed by Gradko Environmental. The results are adjusted for bias (June 2015 final) using factors from the laboratory (Gradko) overall bias factor, as there is no triple tube location study. Further QA / QC information is provided in Appendix A of this report.

The location of the ten diffusion tube sites is shown on the page 13 map.

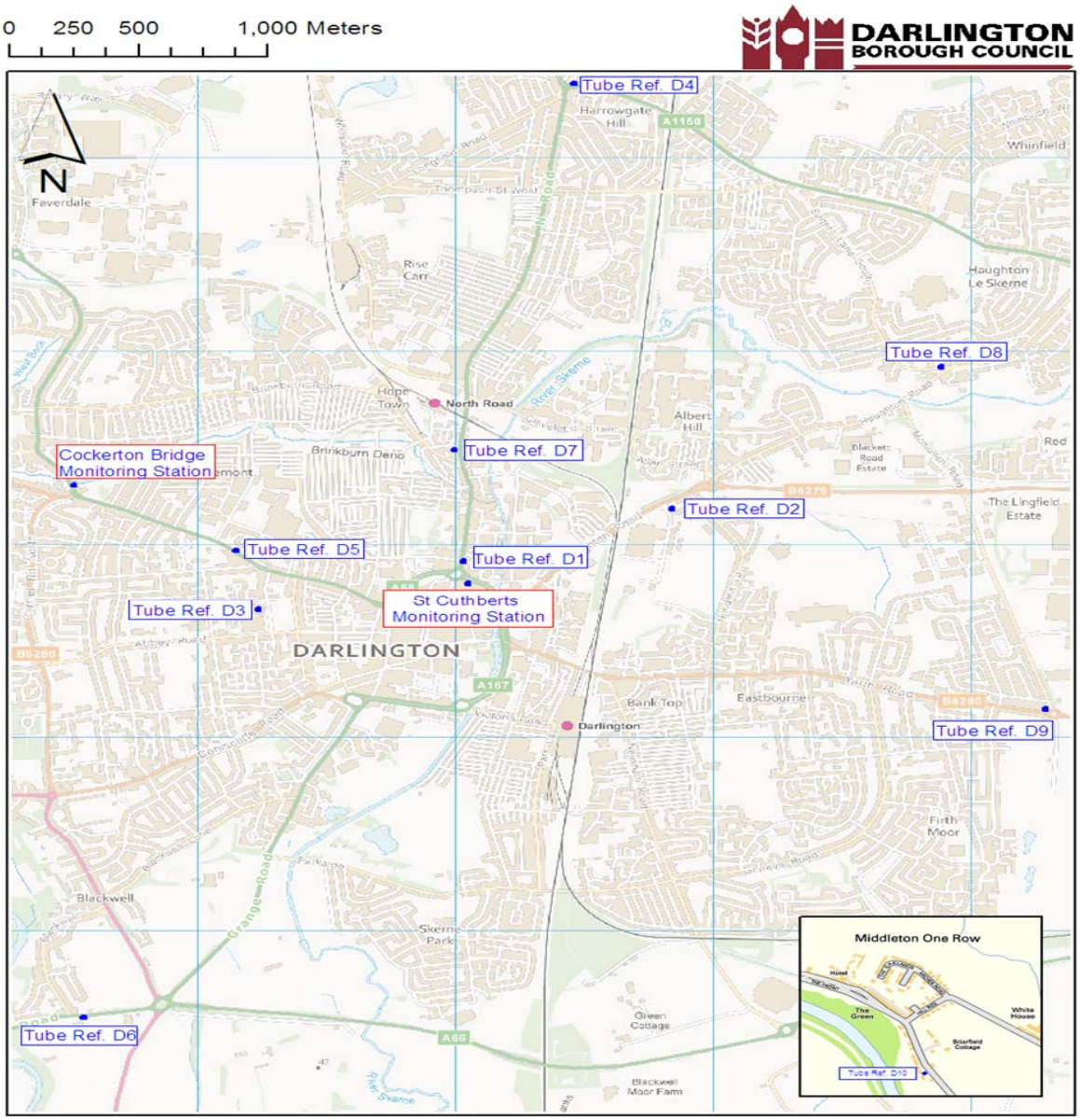
Figure 2.1 Map of Automatic and Non-Automatic Monitoring Sites

DARLINGTON COUNCIL AREA

showing locations of the two automatic monitoring stations
and the ten nitrogen dioxide diffusion tube locations

Diffusion Tube Locations

D1	Northgate	D5	Woodland Road	D9	Yarm Road
D2	Darlington College	D6	Blackwell Bridge	D10	Middleton-One-Row
D3	Arts Centre	D7	North Rd Station		
D4	Salters Lane	D8	Haughton Green		



For a general map showing the relative position of all monitoring points, see appendix H.

Table 2.1 Details of Automatic Monitoring Sites – Darlington 2014

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)
StC	St Cuthbert's Way (Local)	kerbside	429032	514818	NO_x 1.9 TEOM 2.0	NO_2, PM_{10}	N	NO_2 - Chemiluminescence PM_{10} - TEOM	Y (for 1hr NO_2) (1m)
Co **(closed April 2012)**	Cockerton Bridge (Local)	urban	427528	515309	2.9	NO_2, PM_{10}	N	NO_2 - Chemiluminescence PM_{10} - TEOM	Y (15m)

St Cuthbert's Way is a Local station owned and operated by Darlington Council since year 2000. 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 have been corrected to gravimetric equivalence using vcm since 2008, the 1.3 factor prior to that. The unit is a kerbside site on a busy inner ring road roundabout, on the edge of the main shopping centre. Traffic is generally slow moving. The unit is in an area of relevant public exposure for the 1 hour nitrogen dioxide objective only, and is a worst case kerbside site relevant to the whole of the Tees Valley.

The two Cockerton Bridge monitors became unserviceable early April 2012 and could not be economically repaired. The station has been decommissioned and will not be replaced.
Results for both NO_2 and PM_{10} have consistently met objectives at this busy roadside site. Diffusion tube D5 (Woodlands Road) on the page 13 map monitors NO_2 levels on this stretch of road, and has shown comparable concentrations since 2011, when the diffusion tube was set back from kerbside to roadside.

The location of the two monitoring sites is shown on the page 13 map.

Table 2.2 Details of Non-Automatic Monitoring Sites – Darlington 2014 – Nitrogen Dioxide Diffusion Tubes

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	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?
D1	Northgate	kerbside	429026	514898	2.6	NO_2	N	N	N	<1 metre	Y
D4	Salters Lane	roadside	429478	517375	2.8	NO_2	N	N	Y (5m)	1 metre	Y
D2	Darlington College	background	429857	515168	2.0	NO_2	N	N	N	5 metres	N
D3	Arts centre	background	428250	514684	2.1	NO_2	N	N	Y (50m)	10 metres	N
D5	Woodland Rd	roadside	428152	514966	2.9	NO_2	N	N	Y (20m)	1 metre	Y
D6	Blackwell Bridge	roadside	427734	512591	2.6	NO_2	N	N	Y (10m)	1 metre	Y
D7	North Rd Station	kerbside	429007	515504	3.0	NO_2	N	N	N	<1 metre	N
D8	Haughton Green	kerbside	430905	515918	2.5	NO_2	N	N	Y (20m)	<1 metre	N
D9	Yarm Road	roadside	431299	514137	2.6	NO_2	N	N	Y (20m)	1 metre	Y
D10	Middleton-one-Row	rural	435431	512030	2.6	NO_2	N	N	Y (10m)	1 metre	Y

Darlington has ten NO_2 diffusion tube sites, four of which were the original national survey sites. Apart from the two background sites and one rural site, all are worst-case kerbside or roadside sites as a measure of NO_2 concentrations arising from traffic. The location of tube ids D5 and D6 were moved from kerbside to roadside at the beginning of 2011 to better represent relevant public exposure.
The results are adjusted for bias (June 2015 final) using factors from the laboratory (Gradko) overall bias factor, as there is no triple tube location study. Tubes are all 50% TEA in acetone. Further QA / QC information is provided in Appendix A of this report.
The location of the ten diffusion tube sites is shown on the page 13 map.

2.2 Comparison of Monitoring Results with AQ Objectives

The following sections record monitoring data over the last five 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 Darlington is from road transport, any improvements in emission levels seem to have been largely offset by traffic flow increases.

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

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

St Cuthbert's Way is a kerbside site, but is not a relevant public exposure site for the annual mean. Exceedances of the annual mean objective frequently occur, the extent to which is normally due to weather variations such as high pressure episodes which limit normal dispersion. The nearest area of relevant public exposure (for the annual mean) is over 20 metres away. Although the 2014 annualised annual mean was below the objective level at 35.7 µg/m^3 for the first time in many years, the calculator for NO_2 falloff with distance for 2014 (table 2.1a below) has been again used to calculate the predicted relevant public exposure at 24.8 µg/m^3, well within the objective level

.

Table 2.1a

Calculation based on

Monitor from kerb	0.5m
Receptor from kerb	20m
2014 background level (from 2010 maps x 0.966)	19.0 µg/m^3
2014 measured level (annualised)	35.7 µg/m^3
2014 predicted level	24.8 µg/m^3

The 1 hour mean objective is readily met. The 99.8th percentiles are also shown.

Cockerton Bridge was a worst case indicator for relevant public exposure, being set back from kerbside towards the building façade. The monitor had consistently shown annual concentrations well below the objective level, and this is supported by the D5 diffusion tube located on Woodlands Road. Early in April 2012, this monitor became unserviceable and beyond economic repair.

The 1 hour mean objective was readily met. The 99.8th percentiles have also been recorded.

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective of 40 μg/m^3

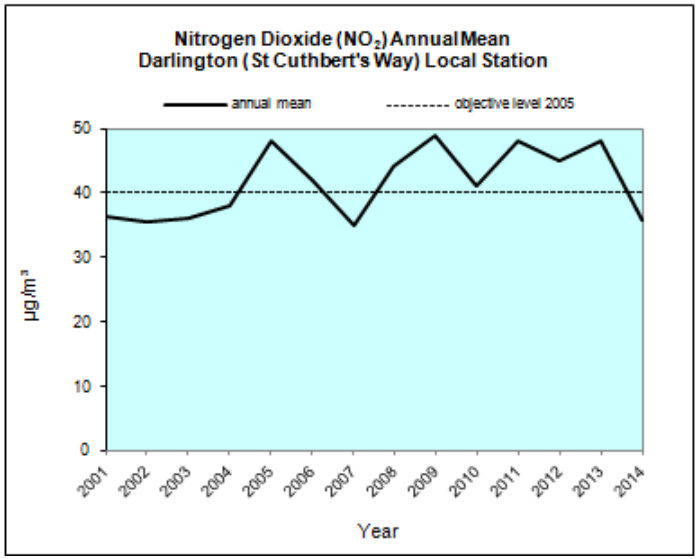
Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2014 %	Annual Mean Concentration (μg/m^3)				
					2010	2011	2012	2013	2014
StC	kerbside	N	Full year	81	**41.1**(29.3) [a]	**48.0**(30.2) [a]	**44.6**(28.8) [a]	**48.4**(28.8) [a]	35.7(24.8) [a]
Co	urban	N	Full year	-	29.3	33.4	27.8	-	-

a Figures in brackets for St Cuthbert's Way are the projected public exposure concentration annual means derived from the NO_2 fall off with distance calculator at 20 metres.

2014 data has been annualised using three Tees Valley continuous monitor datasets. Calculations are shown in Appendix F

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

DARLINGTON (St Cuthbert's Way) Local Station
(urban kerbside site)



DARLINGTON (Cockerton Bridge) Local Station
(urban roadside site) **closed April 2012**

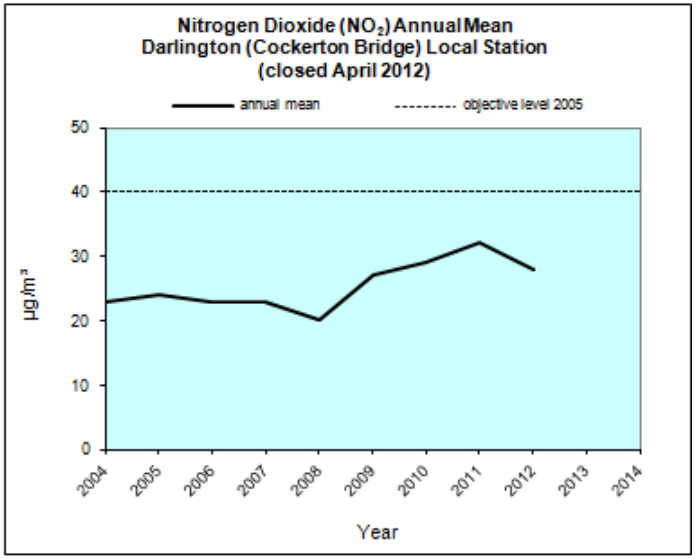
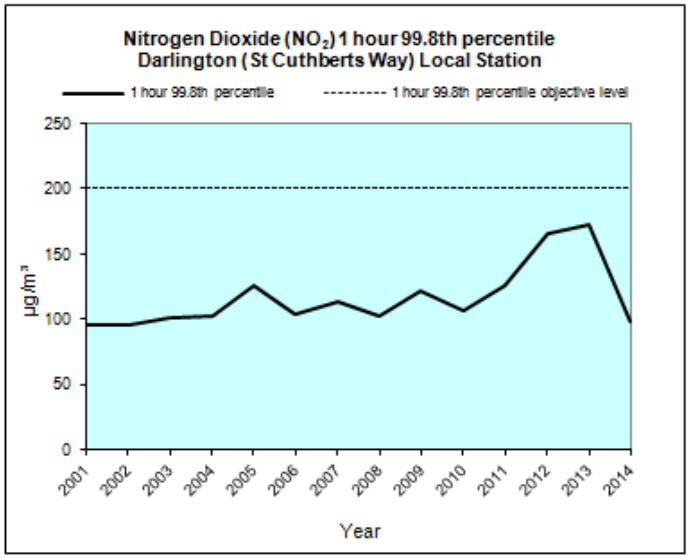


Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective of 200 μg/m^3

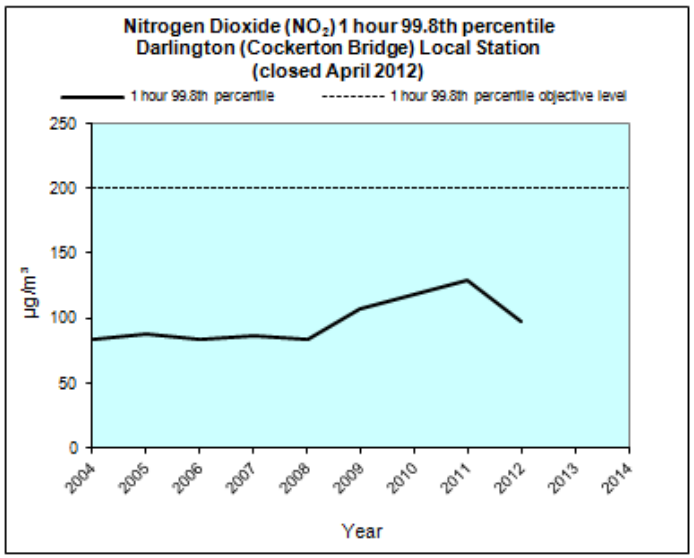
Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2014 %	Number of Exceedances of Hourly Mean (99.8th μg/m^3 percentile shown in brackets)				
					2010	2011	2012	2013	2014
StC	kerbside	N	Full year	81	0 (107)	1 (125)	1 (166)	4 (172)	0 (98)
Co	urban	N	Full year	-	0 (118)	1 (129)	0 (97)	-	-

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

DARLINGTON (St Cuthbert's Way) Local Station
(urban kerbside site)



DARLINGTON (Cockerton Bridge) Local Station
(urban roadside site) **closed April 2012**



Diffusion Tube Monitoring Data

The full monthly mean dataset for 2014 is shown in Appendix D. All sites have between two and five months data missing and the annual means have been adjusted using three Tees Valley continuous monitor datasets prior to the bias factor being applied. The calculations are shown in Appendices D and E.

All kerbside sites show bias adjusted concentrations below the objective level for 2014. This is partly due to the repositioning of two kerbside sites (D5 and D6) to roadside in 2011 to better represent relevant public exposure, leading to a fall in measured levels. There was no need to correct any data for distance.

The kerbside sites D1, D7, D8 were also considered for repositioning in line with latest guidance on diffusion tube location to better represent relevant public exposure. There was no practical relocation point available.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Site Type	Within AQMA ?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with 10 months or less data has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration * (Bias Adjustment factor =0.98) 2014(μg/m^3)
D1	Northgate (was national survey site)	kerbside	N	N	10 months	Y	N	34.8
D4	Salters Lane (was national survey site)	roadside	N	N	9 months	Y	N	31.2
D2	Darlington College (was national survey site)	background	N	N	10 months	Y	N	17.7
D3	Arts centre (was national survey site)	background	N	N	10 months	Y	N	13.8
D5	Woodland Rd (local)	roadside	N	N	9 months	Y	N	29.5
D6	Blackwell Bridge (local)	roadside	N	N	7 months	Y	N	39.9
D7	North Rd Station (local)	kerbside	N	N	10 months	Y	N	31.3
D8	Haughton Green (local)	kerbside	N	N	10 months	Y	N	36.1
D9	Yarm Road (local)	roadside	N	N	9 months	Y	N	27.5
D10	Middleston-one-Row (local)	rural	N	N	10 months	Y	N	9.4

The location of tube ids D5 and D6 were moved from kerbside to roadside at the beginning of 2011 to better represent possible public exposure.

* The ten tubes had between two and five months data missing. The data has been annualised using three Tees Valley continuous monitor datasets prior to the bias adjustment. Calculations are shown in Appendices D and E.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) μg/m^3				
			2010 (Bias Adjustment Factor = 0.99)	2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = 1.01)	2014 (Bias Adjustment Factor = 0.98)
D1	kerbside	N	**41.8**	36.7	39.9	36.3	34.8
D4	kerbside	N	33.5	32.3	36.6	34.2	31.2
D2	background	N	24.9	16.9	19.3	18.3	17.7
D3	background	N	16.8	13.4	14.4	14.2	13.8
D5 #	roadside	N	**40.6**	33.5 #	33.1	29.1	29.5
D6 #	roadside	N	**40.4**	28.6 #	32.4	36.9	39.9
D7	kerbside	N	**37.7**	32.2	32.8	33.4	31.3
D8	kerbside	N	39.2	37.0	37.7	36.3	36.1
D9	roadside	N	30.7	26.4	29.4	26.2	27.5
D10	rural	N	12.9	9.9	10.1	10.3	9.4

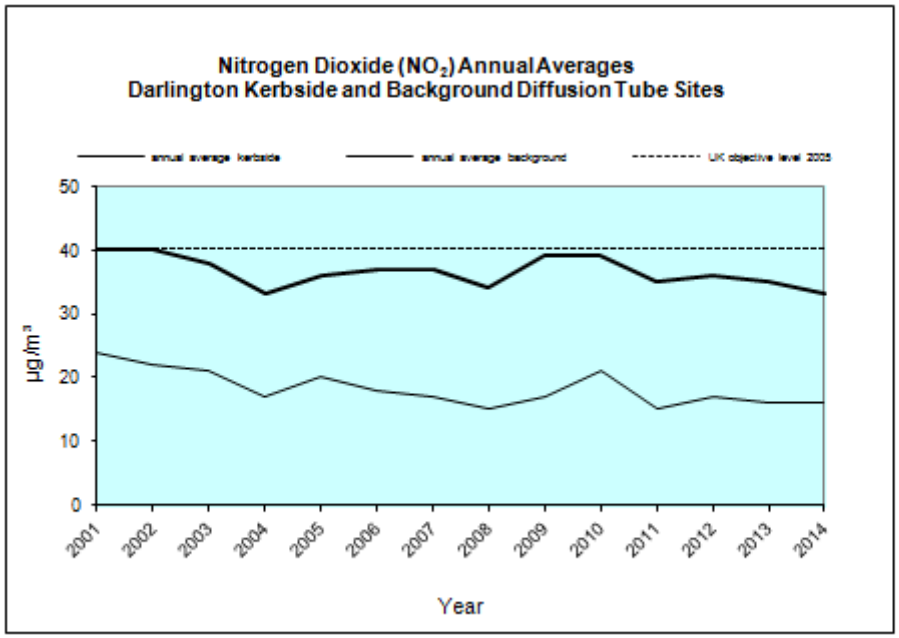
Diffusion tubes D5 and D6 were set back from kerbside to roadside starting 2011 in order to better represent possible public exposure. In the case of tube 5, the fall in measured levels is quite pronounced. This is less so for tube D6, which is on the access road to the A1(M).

The ten tubes had between two and five months data missing for 2014. The data has been annualised using three Tees Valley continuous monitor datasets prior to the bias adjustment. Calculations are shown in Appendices D and E.

Figure 2.5 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites

DARLINGTON

kerbside = average of d1,d4,(d5,d6 to 2010),d7,d8 (new ID)
background = average of d2, d3 (new ID)



2014 data, 9 or 10 months only, annualised using three Tees Valley Continuous Monitor datasets.

2.2.2 PM_{10}

St Cuthbert's Way monitoring station continues to show an annual mean within the objective level, and both stations have done so historically. The number of exceedances at St Cuthbert's Way has on occasion been just above the objective level, entirely due to high pressure weather conditions.

St Cuthbert's Way is a kerbside location, but is not a relevant public exposure site for particulate PM_{10}, the nearest being over 20 metres away. The number of exceedances and 90th percentile clearly show the influence of traffic. In general, the exceedance variation year on year generally reflect weather conditions, with the highest number of exceedances being realised during high-pressure episodes when dispersion conditions are poor. For 2011, the higher level of exceedances, and the 90th percentile being just above the objective level, was due to a particulate episode in March that affected the whole Tees Valley area, and indeed the UK. This was as a result of extended high pressure conditions over the UK limiting dispersal, and trans boundary pollution from the continent.

The Cockerton Bridge monitoring station, which was set back from kerbside towards the building façade, was representative of relevant public exposure, and showed much lower concentrations than the St Cuthbert's Way kerbside site. Normally, the small variations from year to year reflected shorter-term weather conditions, in particular high pressure episodes with limited dispersion leading to a rapid build-up of particles. 2011 levels were higher than earlier years due to a particulate episode in March 2011 mentioned above.
Early in April 2012, this monitor became unserviceable and beyond economic repair.

Darlington particulate PM_{10} monitors are unmodified TEOMs. All results since 2008 have been adjusted to gravimetric equivalence using the final ratified data vcm model for each year.

Results from other particulate monitors across the Tees Valley all show results well below the objective level where there is relevant public exposure (reference 1).

Table 2.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective of 40 μg/m^3

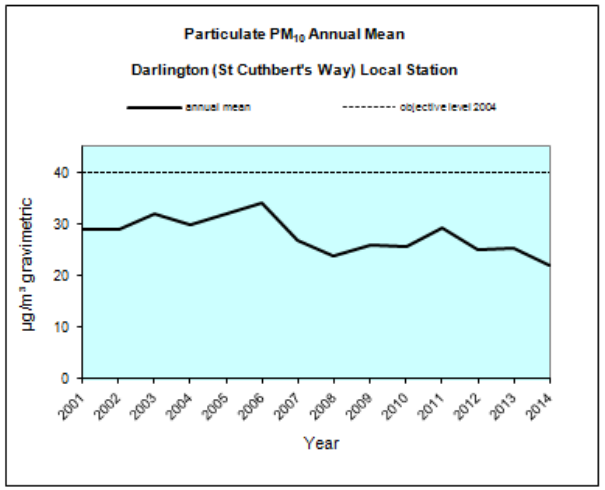
Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2014%	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3				
						2010	2011	2012	2013	2014
StC	kerbside	N	Full year	82	Y	25.8	29.2	25.2	25.3	22.8
Co	urban	N	Full year	-	Y	18.5	21.4	22.8	-	-

All results unmodified TEOM, adjusted to gravimetric using the vcm method 2008 onwards. Data for 2014 has been annualised using three Tees Valley continuous monitor datasets. Calculations are shown in Appendix F.

Figure 2.6 Trends in Annual Mean PM_{10} Concentrations

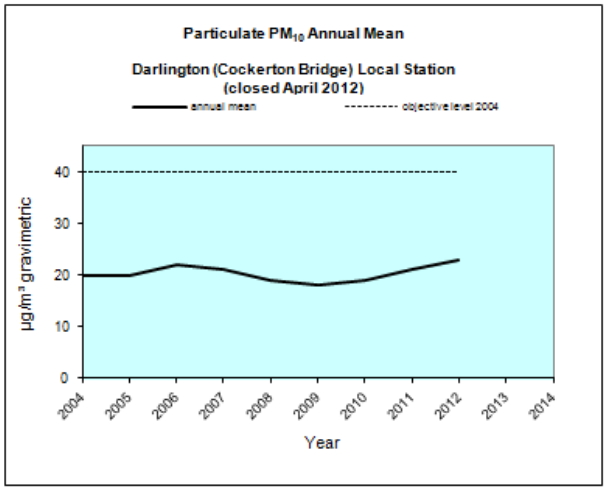
DARLINGTON (St Cuthbert's Way) Local Station
(urban kerbside site)

Particulate PM_{10} Annual Mean Trend 2001 - 2014



DARLINGTON (Cockerton Bridge) Local Station
(urban roadside site) closed April 2012

Particulate PM_{10} Annual Mean Trend 2004 - 2012



note: site closed April 2012

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective of 50 µg/m^3

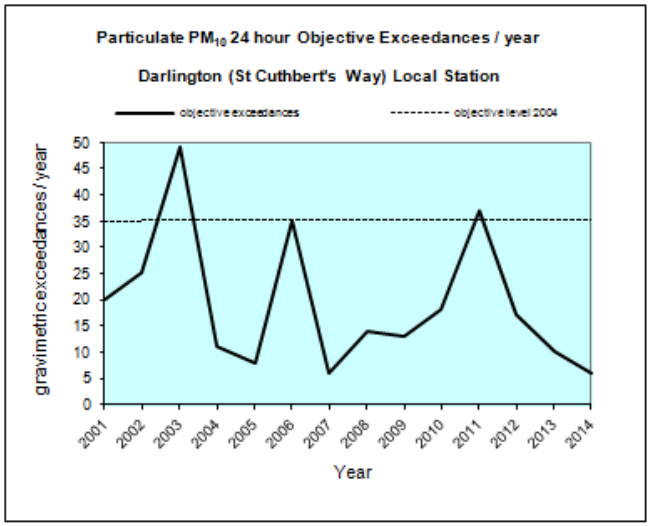
Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2014 %	Confirm Gravimetric Equivalent	Number of Exceedances of 24-Hour Mean (90th percentile shown in brackets)				
						2010	2011	2012	2013	2014
StC	kerbside	N	Full year	82	Y	18 (42)	37 (51)	17 (43)	10 (40)	6 (37)
Co	urban	N	Full year	-	Y	2 (33)	6 (38)	2 (39)	-	-

All results unmodified TEOM, adjusted to gravimetric using the vcm method 2008 onwards

Figure 2.7 Trends in 24-hour PM_{10} Objective Exceedances / year

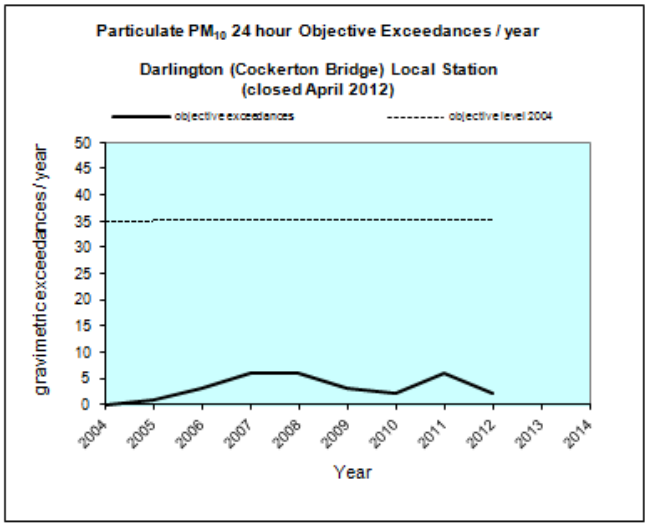
DARLINGTON (St Cuthbert's Way) Local Station
(urban kerbside site)

Particulate PM_{10} 24 hour Objective Exceedances / year 2001 - 2014



DARLINGTON (Cockerton Bridge) Local Station
(urban roadside site) closed April 2012

Particulate PM_{10} 24 hour Objective Exceedances / year 2004 - 2012



note: site closed April 2012

2.2.3 Sulphur Dioxide

Darlington Council no longer monitors sulphur dioxide concentrations, and there is no requirement in the absence of industrial sources or significant domestic coal burning. For many years, Darlington did monitor sulphur dioxide concentrations in the town centre using an 8 port sampler, but this site was closed in 2004 when sulphur dioxide concentrations fell below the limit of detection.

Sulphur dioxide monitoring results from other Tees Valley Councils (reference 1 annual report attached) with significant emissions consistently show the objectives being met, and this will be the case within the Darlington Council area.

2.2.4 Benzene / 1,3-Butadiene

Darlington Council does not monitor either benzene or 1,3-butadiene concentrations, and there is no requirement in the absence of industrial sources. Pumped diffusion tube monitoring of benzene is carried out within the Stockton-on-Tees Council (Eaglescliffe) area to the east, at a roadside site on a very busy road. This is a relevant public exposure location with an annual mean in 2014 of 0.94 µg/m³.
This location represents a worst-case example for Darlington, and is well below the 2010 benzene objective level of 5 µg/m^3.

Diffusion tube monitoring of 1,3-butadiene was carried out within the Middlesbrough Council area to the East over the years 2004 – 2007. This site was close to the main industrial emitter of 1,3-butadiene and in a target group location. Annual means in 2006/7 were below 0.2 µg/m³, almost entirely due to industrial releases.
Levels of 1,3-butadiene concentrations within the Darlington Council area will be below those at Middlesbrough due to distance from the industrial source, and will readily meet the 2003 1,3-butadiene objective of 2.25 µg/m^3.

2.2.5 Other pollutants monitored

No other pollutants are monitored within the Darlington Council area.

Of the regulated pollutants, **carbon monoxide** and **lead** concentrations have been monitored within other Tees Valley Council areas until recently, and have been found to be well below the objective levels. With no significant source emissions within the Darlington Council area, it is safe to predict no exceedance of objectives.

Of the unregulated pollutants, **ozone** levels in other Tees Valley Council areas tend to show exceedances of the objective, particularly close to the east coast. Darlington is well inland, and has relatively high ozone-scavenging nitrogen oxide emissions from traffic. This makes it less likely that urban areas will have ozone exceedances, but they cannot be entirely ruled out in times of hot summer weather.

Particulate $PM_{2.5}$ levels are monitored at the Stockton-on-Tees AURN site at Eaglescliffe to the east. This is a roadside site of relevant public exposure and will represent a worst case example for Darlington. Monitored levels at Eaglescliffe range between 10 µg/m^3 and 12 µg/m^3, well below the target objective of 25 µg/m^3 as an annual mean.
As an alternative approach, monitored levels of $PM_{2.5}$ are nationally around 70% or less of particulate PM_{10}, so that at the St Cuthbert's kerbside site, levels should not exceed 20 µg/m^3, and in areas of relevant public exposure, levels should not exceed 15 µg/m^3, again well below the target objective of 25 µg/m^3 as an annual mean.
Greater emphasis is expected to be placed on this pollutant in the future in view of its importance to Public Health.

Polycyclic aromatic hydrocarbons (PAHs) are mainly associated with traditional industrial processes. There are no such processes near to Darlington, and levels of PAH should not exceed the 0.2 ng/m^3 recorded at Newcastle centre, below the target objective of 0.25 ng/m^3.

2.2.6 Summary of Compliance with AQS Objectives

Darlington 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 AI (M) north / south motorway runs to the west of the town in a rural corridor. The A66 east / west trunk route by-passes the town to the south, again through a rural corridor. While some development is taking place towards both routes, there is no air quality issue for areas with relevant public exposure. This is no change over 2012.

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.

The one major road change in recent years has been the eastern transport corridor, formerly known as the cross-town route (eastern section). This was completed in 2008. The main purpose of this scheme was to provide access to development land to the west of the A66 by-pass, but there have also been reductions in traffic on two of the busiest road corridors in the town, Haughton Road and Yarm Road.

The town centre is protected by an inner ring road system which largely runs in a defined transport corridor away from target group members of the public. Recent measures have been taken to improve traffic flow on this inner ring road, helping to reduce congestion and improve air quality.
Road traffic access within the town centre is restricted to car parking and other access, with a one-way bus system now in force. A pedestrianisation scheme for the central areas of the town, Northgate, Tubwell Row, and High Row, was completed in 2007.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Darlington does not have narrow congested streets with residential properties close to the kerb. This is no change over 2012.

Darlington 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 Darlington town centre remains largely unchanged from 2012, with significant pedestrianised areas. There are no new street locations identified where individuals may regularly spend 1-hour or more.

Darlington 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 Darlington town centre remains unchanged from 2012, with significant pedestrianised areas. There are no new roads identified where there are an unusually high proportion of buses / HGV.

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

3.4 Junctions

The layout of Darlington town centre remains unchanged from 2012, with significant pedestrianised areas. There are no new busy junctions identified that have not been previously assessed, or streets with new exposure.

Traffic flows and air quality have been improved by the replacement of Stonebridge Roundabout on the inner ring road with a traffic light system controlled junction, bus only lanes and creation of extra lanes on the approaches to Freemans Place roundabout.

Darlington 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 construction of a new road and alterations to the North Road / Whessoe Road Junction has been completed. An Air Quality Impact Assessment was submitted with the planning application in 2011 which demonstrated that the air quality objectives would be met at the nearest sensitive receptors.

Darlington Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

The Darlington road system has not changed materially since 2012. Road traffic flows have not shown any significant increase since then.

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

3.7 Bus and Coach Stations

Road traffic within the town centre is heavily restricted. In the absence of a bus station, buses have the principal access with a new one-way system, and the town centre area has been partially pedestrianised. No busy streets have been identified where people may spend more than one hour close to heavy traffic.

A gas fuelling station was introduced in 2013 at a bus company depot in Darlington otherwise there is no change from 2012.

Darlington 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 in a rural area on the boundary between Darlington and Stockton-on-Tees Councils. Plans to extend cargo-handling facilities at the airport have been postponed indefinitely, but a detailed environmental impact study had shown no significant impact on air quality in the region. The airport has total equivalent passenger throughput well below the 10 mppa criteria, and is now significantly less than 1 mppa. Diffusion tube monitoring at the nearby village of Middleton One-row, shows annual NO_2 levels consistently below 15 $\mu g/m^3$.

This is no change over 2012.

Darlington 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)

The main eastern rail route between London and Scotland passes through Darlington. Although a busy main-line route, the line is electrified. Cross country main-line services, freight trains, and the two branch lines to the East (Saltburn) and north-west (Bishop Auckland) are diesel operated, but this traffic is relatively light and not considered a significant emission source.

This is no change over 2012.

4.2.1 Stationary Trains

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

Darlington 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 Darlington Council area that has a large number of movements of diesel locomotives.

Darlington 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)

There is no shipping port within the Darlington Council area.

Darlington 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

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 Darlington Council area, Central Park will be a locally funded site. The scheme is not expected to have any adverse impact on Darlington air quality.

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

Darlington 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

Darlington 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

Darlington 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

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

5.3 Petrol Stations

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

5.4 Poultry Farms

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Darlington Council confirms that there have been no new biomass combustion plants since the 2012 USR in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

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

6.3 Domestic Solid-Fuel Burning

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

7 Fugitive or Uncontrolled Sources

Darlington 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 Darlington continues to be road traffic, with nitrogen dioxide and particulate PM_{10} the important pollutants. The one continuous monitor is strategically placed at worst-case kerbside location to monitor these pollutants, with ten diffusion tube locations also monitoring kerbside, roadside and background concentrations of nitrogen dioxide. All monitoring results clearly show that concentrations of the two air pollutants continue to meet air quality objectives in areas of relevant public exposure at these locations, and that this will be the case across the entire Darlington Council area.

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.

It is noted that monitoring in the neighbouring Tees Valley Councils supports the Darlington conclusions, and provides evidence that other regulated pollutants will also meet air quality objectives.

8.2 Conclusions from Assessment of Sources

There have been no significant new developments that will have any adverse impact on Darlington air quality, either within the Council area, or within neighbouring Council areas. The Darlington Eastern Transport Corridor (completed 2008) is the last new road constructed, linking the town centre with the A66 trunk route by-pass. This is easing traffic flows on two of the main radial routes into town, and provides access for new development land for the future. Other developments are relatively small-scale housing / commercial developments on brown field land, and will meet environmental planning requirements, including air quality. There are no new industrial installations within Darlington, or neighbouring Council areas, which will impact on air quality.

8.3 Proposed Actions

This updating and screening assessment for Darlington 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.

Darlington 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 report is due in 2016 and will be an annual report to a format to be determined by Defra later in 2015.

9 References

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

Published by the Tees Valley Environmental Protection Group, July 2015

2, 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

Gradko International Ltd supply and analyse nitrogen dioxide diffusion tubes for Darlington Council. Tube preparation is 50% TEA in acetone. The bias adjustment factor for 2014 has been obtained from the R&A helpdesk database, and as at June 2015, was 0.98.

Factor from Local Co-location Studies (if available)

Darlington Council does not have a co-location study.

Discussion of Choice of Factor to Use

Not applicable.

PM Monitoring Adjustment

All measurements for PM_{10} at the Local stations are TEOM based. Results since 2008 have been adjusted by the vcm method to provide gravimetric equivalence.

Short-term to Long-term Data adjustment

The St Cuthbert's continuous monitoring station had 10 months data only in 2014. The nitrogen dioxide and particulate PM10 annual means were annualised using three Tees Valley continuous monitor datasets. The calculations are shown in Appendix F.
The ten diffusion tubes had between 2 and 5 months data missing. The data has been annualised using the results at three Tees Valley continuous monitoring sites. The calculations are shown in Appendices D and E.

QA/QC of automatic monitoring

The two Darlington fixed continuous Local monitoring stations (both NO_x and PM_{10}), are modern installations, operated under a comprehensive service contract with the supplier, in both cases Enviro Technology. 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, Darlington 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	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. Data is recorded monthly and compared with earlier results. Data is collated quarterly with that from other monitors within the Tees Valley, including AURN stations, as a further check on accuracy.

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

QA/QC of diffusion tube monitoring

The Darlington nitrogen dioxide diffusion tube programme is operated through an approved laboratory (Gradko) with formal accreditation to BS standards, and one that participates in the WASP programme. Particular attention is paid to proper installation of the tubes at the site, and reliable exposure duration.
Tube precision for this laboratory is consistently shown as good for 2014 for tube preparation 50% TEA in acetone. Gradko also demonstrated good performance in the WASP scheme January 2013 – December 2014.

Appendix B: DMRB Calculations

A comprehensive investigation (reference 2) of congested traffic areas within Darlington 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 Darlington. Validation with continuous monitors showed good correlation, and the results confirmed that air quality objectives for particulate PM_{10} 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 2012 - 2014. The list has been used to complete this updating and screening report.

Darlington Emission Changes 2012 / 13 / 14

Housing and Commercial Development

2012 There are no significant new developments.

2013 There are no significant new developments.

2014 There are no significant new developments.

Road Traffic

2012 Construction of a new road and alterations to the North Road / Whessoe Road Junction has been completed.

2013 There are no new roads, or significant road modifications.

2014 Replacement of Stonebridge Roundabout on the inner ring road with a traffic light system controlled junction, bus only lanes and creation of extra lanes on the approaches to Freemans Place roundabout.

Part B and A2 (small industrial and commercial) Installations

2012 There are no new developments.

2013 There are no new developments.

2014 Darlington Borough Council regulated 32 Part B Installations. There were no significant changes and there are no new developments. One permit for cement batching was surrendered and five permits for mobile screening and crushing were transferred to Darlington Borough Council.

Part A (large industrial) Installations

2012 There are no new processes, or deleted processes, which will significantly affect air quality.

2013 There are no new processes, or deleted processes, which will significantly affect air quality.

2014 There are currently five Part A1 installations either within the borough or on the border with Durham County Council.
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.

2013 There have been no new landfill sites or quarries with nearby relevant exposure.

2014 There have been no new landfill sites or quarries with nearby relevant exposure.

Appendix D: NO2 Diffusion Tube Dataset

All results µg/m^3

2014	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Jan	44.4	25.3	18.5	38.2	41.8	32.0	39.7	43.5	35.1	15.6
Feb	35.8	19.9	16.7	37.1	40.3	-	43.9	41.8	31.5	11.0
Mar	36.7	22.6	14.2	-	25.7	-	32.2	36.6	-	6.9
Apr	37.2	14.9	13.5	27.1	26.7	-	25.6	34.3	28.1	8.3
May	-	-	-	-	-	-	-	-	-	-
Jun	-	-	-	-	-	-	-	-	-	-
Jul	36.5	14.0	14.4	33.3	27.5	49.4	29.1	36.8	30.6	10.8
Aug	26.8	11.1	8.2	24.4	-	43.4	24.6	36.7	23.3	4.8
Sep	41.7	16.8	13.9	29.8	27.8	44.3	31.2	38.5	28.0	8.6
Oct	34.1	16.7	12.5	33.3	26.4	38.3	36.2	37.7	25.5	9.2
Nov	45.1	27.5	20.8	42.9	39.2	50.2	39.5	38.5	36.1	16.4
Dec	30.3	19.0	12.9	32.0	38.9	38.8	29.6	38.5	24.7	8.4
Yr Ave	36.9	18.8	14.6	33.1	32.7	42.3	33.2	38.3	29.2	10.0
Annualisation factor (see Appendix E below)	0.963	0.963	0.963	0.961	0.920	0.963	0.963	0.963	0.961	0.963
Annualisation	35.5	18.1	14.1	31.8	30.1	40.7	32.0	36.9	28.1	9.6
Bias 06/15	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj Yr Ave	34.8	17.7	13.8	31.2	29.5	39.9	31.3	36.1	27.5	9.4

Appendix E: NO_2 (diffusion tubes) Data Adjustment

Three Tees Valley Continuous Monitoring Sites Final NO_2 Annual Results 2014

	Redcar Dormanstown continuous monitor	Stockton Eaglescliffe AURN continuous monitor	Middlesbrough MacMillan College continuous monitor
Jan	17.9	19.3	24.5
Feb	16.7	10.8	17.7
Mar	15.4	18.6	22.8
Apr	11.4	19.0	28.5
May	8.8	14.6	23.8
Jun	7.1	13.7	22.0
Jul	8.1	14.2	23.6
Aug	8.5	9.4	19.2
Sep	10.1	20.2	29.9
Oct	11.6	12.8	23.7
Nov	18.9	28.6	33.0
Dec	19.2	13.3	31.7
months	12	12	12
Year Average	**12.8**	**16.2**	**25.0**

Derived annualisation factors from 3 Tees Valley Continuous Monitoring Sites to Appendix D

	For tube ID	Redcar Dormanstown	Stockton Eaglescliffe	Middlesbrough MacMillan College	Average (to Appendix D)
Annual Mean		12.8	16.2	25.0	
10 month	D1;D2;D3;D7 D8;D10	13.8	16.6	25.4	
	Ratio AM/PM	0.928	0.976	0.984	0.963
9 month	D4;D9	13.6	16.4	25.7	
	Ratio AM/PM	0.941	0.988	0.953	0.961
7 month	D6	13.5	16.8	25.6	
	Ratio AM/PM	0.948	0.964	0.957	0.956
9 month	D5	14.4	17.4	26.1	
	Ratio AM/PM	0.889	0.931	0.939	0.920

Appendix F: NO_2 and PM_{10} Data Adjustment St Cuthbert's Way for 2014

St Cuthbert's Way continuous monitor had 10 months data for 2014 (excluding February and March results). Data is annualized as below using final NO_2 and PM_{10} 2014 data from three Tees Valley continuous monitoring sites

	Redcar Dormanstown continuous monitor NO_2	Stockton Eaglescliffe AURN continuous monitor NO_2	Middlesbrough MacMillan College continuous monitor NO_2		Redcar Dormanstown continuous monitor PM_{10}	Stockton Eaglescliffe AURN continuous monitor PM_{10}	Middlesbrough MacMillan College continuous monitor PM_{10}
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$		$\mu g/m^3$ (gravimetric)	$\mu g/m^3$ (gravimetric)	$\mu g/m^3$ (gravimetric)
Jan	17.9	19.3	24.5		13.1	11.3	14.3
Feb	16.7	10.8	17.7		11.2	9.5	11.2
Mar	15.4	18.6	22.8		23.8	21.6	26.0
Apr	11.4	19.0	28.5		21.7	21.7	22.3
May	8.8	14.6	23.8		15.3	17.2	17.0
Jun	7.1	13.7	22.0		12.9	14.8	14.3
Jul	8.1	14.2	23.6		14.6	17.7	15.9
Aug	8.5	9.4	19.2		12.9	11.7	11.7
Sep	10.1	20.2	29.9		18.0	26.3	25.5
Oct	11.6	12.8	23.7		12.2	15.5	16.2
Nov	18.9	28.6	33.0		17.2	21.4	22.0
Dec	19.2	13.3	31.7		12.4	10.6	12.9
months	12	12	12		12	12	12
Year Average	**12.8**	**16.2**	**25.0**		**15.4**	**16.6**	**17.4**
10 month average	**12.2**	**16.5**	**26.0**		**15.0**	**16.8**	**17.2**
Ratio AM / PM	**1.049**	**0.982**	**0.962**		**1.027**	**0.988**	**1.012**
		average	**0.998**			**average**	**1.009**

St Cuthbert's Way Annualisation

	NO2 $\mu g/m^3$		**particulate PM_{10} – $\mu g/m^3$ (gravimetric)**
2014	StC	2014	StC
Jan	48.6	Jan	19.9
Feb	-	Feb	-
Mar	-	Mar	-
Apr	35.6	Apr	33.1
May	32.6	May	22.3
Jun	31.5	Jun	19.1
Jul	30.0	Jul	18.5
Aug	27.0	Aug	14.4
Sep	34.8	Sep	29.7
Oct	35.8	Oct	21.7
Nov	42.1	Nov	28.9
Dec	40.1	Dec	18.3
Ave	35.8	Ave	22.6
Ratio (from above)	0.998	Ratio (from above)	1.009
Annualisation	35.7	Annualisation	22.8

Appendix G: Supplementary Information

- **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.

- **Planning Applications**

  In 2014 there were no planning applications which would have a potential impact on air quality.

- **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.

- **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 the Tees Valley Joint Strategy Unit (now called Tees Valley Unlimited from 1st April 2010).

- **Climate Change Strategies**

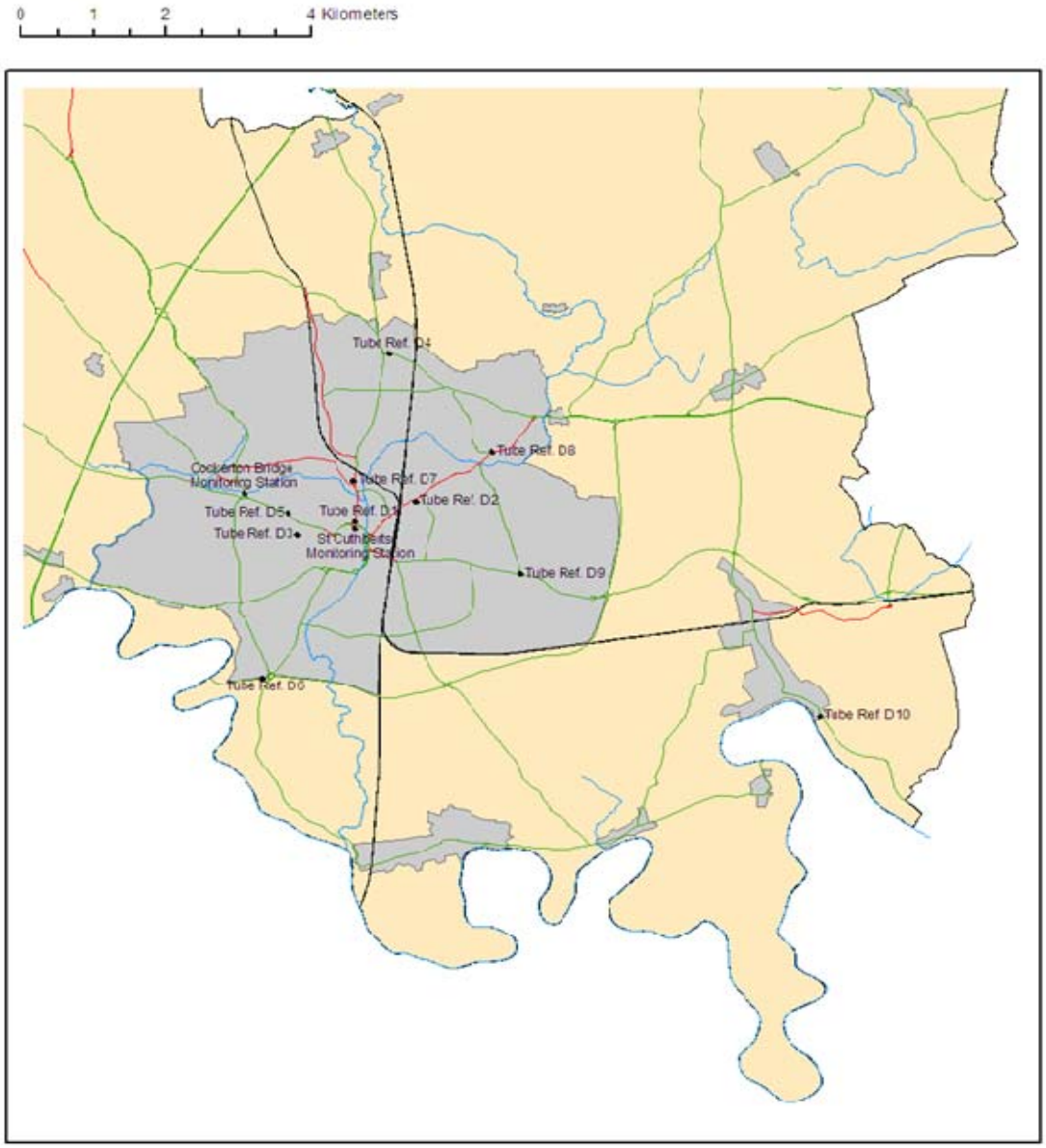
  The Council and Darlington Partnership signed the Nottingham Declaration in 2005, committing to address the causes of Climate Change and prepare the community for the impacts.
  In 2009 the Council signed up to the EU Covenant of Mayors on energy management, committing to exceed EU CO2 emission targets, develop a Sustainable Energy Action Plan and reduce Borough-wide emissions by 20% by 2020 from a 2005 baseline. By 2013, according to the latest data available, there was a 17% reduction in total emissions with 85% of the target reduction achieved. As such the Council is currently on track to meeting the 2020 target.
  The Council is working jointly with Tees Valley Unlimited, who have published the Tees Valley Climate Change Strategy 2010 – 2020.
  In 2010, the Council adopted its first Carbon Management Plan. This plan sets out the Council's ambition for reducing carbon emissions from its own operations by 25% by the end of 2013/14 (end March 2014) from 2008/9 levels. The Plan's progress is currently under review.

- **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.

Appendix H: General Map of Darlington Area

Showing relative locations of all air quality monitoring points



Title - Location of Air Quality Monitoring Stations and Nitrogen dioxide Diffusion Tubes

Scale - 1:75,000

DARLINGTON BOROUGH COUNCIL