



2009 Air Quality Updating and Screening Assessment for Chesterfield Borough Council

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

March 2009

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Appendices

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1 Introduction

1.1 Description of Local Authority Area

Chesterfield is a small market town situated in North Derbyshire. The population is approximately 90,000, and the borough is surrounded by the boroughs of North East Derbyshire to the north, south and west, and Bolsover District to the east. The Borough of Chesterfield consists mostly of the Town Centre and immediate suburbs of Chesterfield with little or no rural or semi-rural areas. The town is a traditional, compact market town with many people still residing in the town centre. The M1 Motorway skirts the eastern fringes of the borough, and the town centre is bypassed by the A61 ring road. The main source of pollution in the borough comes from road transport, but there is also some traditional heavy industry still located in the borough.

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.

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 Local Air Quality Management 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 (PM₁₀) (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

Local air quality management was introduced in the Environment Act 1995 and subsequent regulations. It places a statutory duty on Local Authorities to review and assess the air quality in their area with respect to health-based Government Objectives for seven major air pollutants.

The second phase of this review & assessment was initiated in 2003 with an Update & Screening report. The findings for Chesterfield were that two of the seven air pollutants, namely Nitrogen Dioxide and PM₁₀, were at risk of exceeding these health-based Objectives. This led to a Detailed Assessment of these pollutants being conducted in 2004. The results of this Assessment revealed that although these pollutants should remain under close review, due to the marginality of the results and the large confidence error associated with the data, it was recommended that no immediate action be taken. Instead it was advised that improvements in air quality monitoring across the Borough should be implemented and to then review these pollutants in subsequent reports.

A Progress Report was submitted in 2005 detailing all new monitoring data. The results showed that there was little risk of exceedence of the Air Quality Objectives at Whittington Moor as had been previously predicted and that there was only a predicted marginal exceedence of the Provisional 2010 PM₁₀ Objective. However, diffusion tube monitoring over the course of 2004 highlighted a new potential hotspot area, Derby Road, which was showing elevated levels of NO₂. Unfortunately over the course of 2005 the data capture was not of sufficient accuracy for immediate action to be taken. As a consequence the Progress Report highlighted recommendations to improve the air quality monitoring strategy in Chesterfield which were actioned over the course of 2005.

The Update & Screening was completed in 2006 and this report reviewed all the air pollutants listed in the Air Quality Regulations 2000. It was found that the majority of the pollutants were not at risk of exceedence of the Air Quality Objectives. It also confirmed that the prediction of Whittington Moor exceeding the 2010 PM₁₀ Air Quality Objective remained valid, but since this is only a Provisional Objective, a Detailed Assessment was not required. However three locations were showing exceedence of the annual Nitrogen Dioxide Air Quality Objective, namely Chatsworth Road (A619) and Derby Road (A61 South) and Chesterfield Road, Staveley (A619).

Both the A619 and A61 are major arterial routes into Chesterfield. They experience high levels of traffic and frequently experience congestion and standing traffic especially at rush hour. Residential properties are positioned within 5-10m of the kerb at numerous points along the length of both roads. In addition there are Major Developments occurring adjacent to both the A61 and A619, which may increase the traffic flows on these roads and introduce new sensitive receptors to an area of elevated Nitrogen Dioxide.

It was therefore decided to proceed to a Detailed Assessment for Nitrogen Dioxide on Derby Road (A61) and Chatsworth (A619) and Chesterfield Road, Staveley (A619).

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Over the course of 2008, Chesterfield Borough Council monitored Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀) within the Borough. These pollutants were measured using automatic analysers housed in air quality monitoring stations and further NO₂ monitoring was achieved using 38 passive diffusion tubes distributed across the Borough.

There are two mobile automatic monitoring stations in Chesterfield, monitoring NO₂ and PM₁₀. Nitrogen Dioxide is monitored using a Monitor Labs chemiluminescence analyser and PM₁₀ using a R&P TEOM analyser. The analysers are all housed in secure air-conditioned cabins.

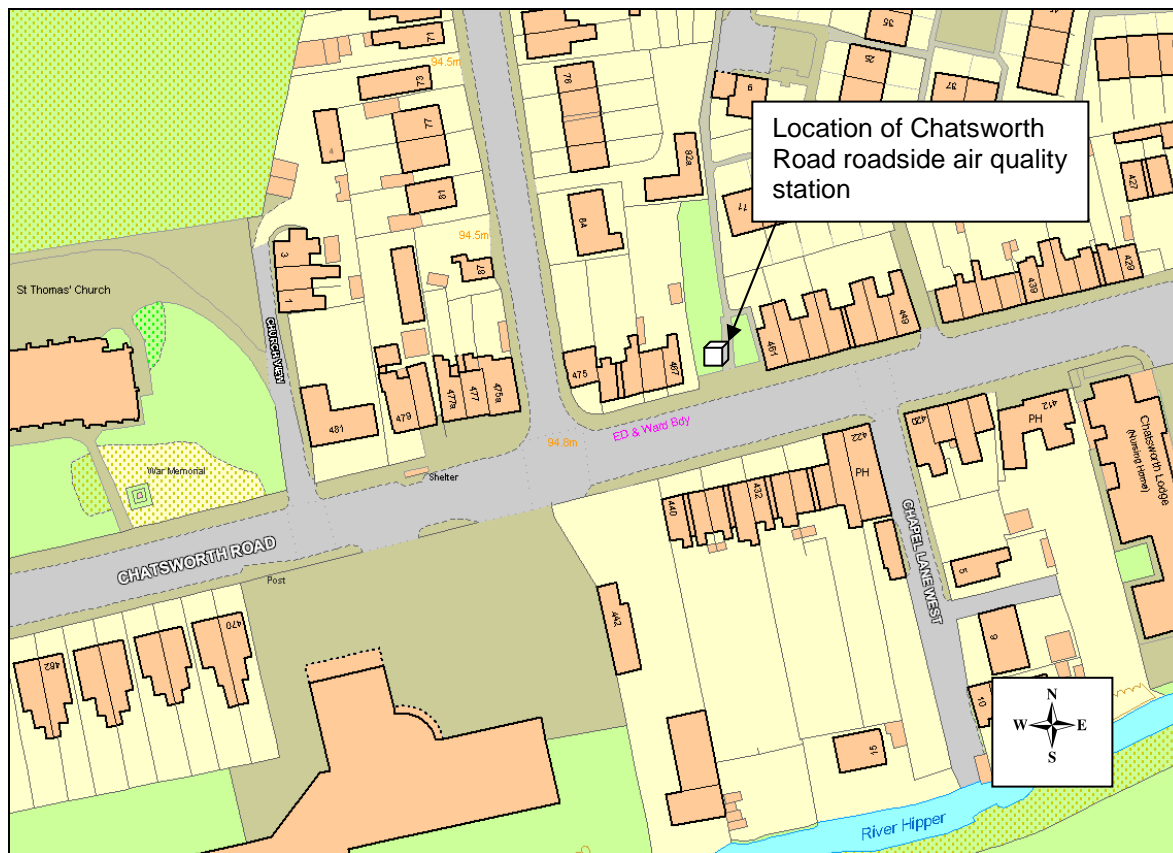
Both stations undergo a routine maintenance service every six months by Casella ETi and are also audited on a six monthly basis by AEA Energy and Environment. The stations are visited every two weeks by a Local Site Operator, who performs calibrations and equipment checks in accordance with the Site Operators Manual AEAT/ENV/R1595. The results are submitted to AEA Energy and Environment for verification after each calibration. Both stations were affiliated into the national monitoring network Automatic Urban and Rural Network (AURN) in March 2009.

The data is downloaded by GSM modem from both stations every 24 hours directly to a standalone PC in the Environmental Health Department at Chesterfield Borough Council. The data is also downloaded on a daily basis by AEA Energy and Environment, who then validate and ratify the raw data and provide ratified data reports to Chesterfield Borough Council on a monthly basis. Since both stations received AURN status in 2008, Bureau Veritas also now download the data on a daily basis and check for any faults with the analysers. The data is also available on national websites which greatly improves public access to local air pollution information at www.airquality.co.uk

Chatsworth Road roadside air Quality station

This roadside air quality station was commissioned at Chatsworth Road in March 2008. Prior to this, it has been located at Whittington Moor since 14th April 2004. The Chatsworth Road roadside site is located adjacent to 461 Chatsworth Road, Chesterfield, within 5m of the busy A619 Chatsworth Road, just outside the proposed AQMA. Figure 1 shows the location of the roadside monitoring station. This air quality station has been affiliated into the national AURN network and so all details and data from this station are now available to view online at www.airquality.co.uk. The new location is equidistant to the road as the residential properties along Chatsworth Road and so should provide invaluable data regarding the levels of pollutants experienced by nearby residents.

Figure1: Location of Chatsworth Road roadside air quality monitoring station (2008).



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Queens Park Annexe urban background air quality station (2008)

The second mobile air quality station has been relocated to several background locations since 2004. The locations are as follows:

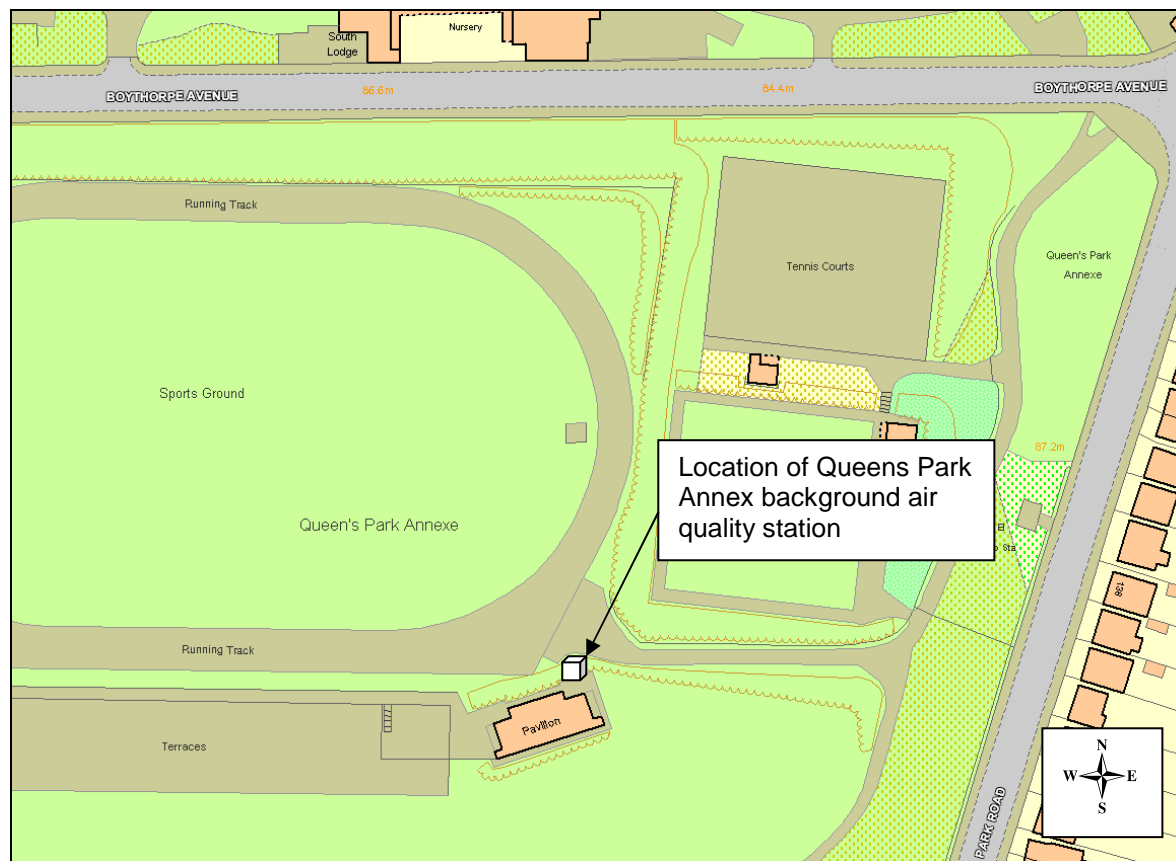
Site Name	Monitoring Start Date	Address	Grid reference
Birdholme Primary School	30th October 2004	Birdholme Infants School, Derby Road, S40 2EU	438 296 369 383
Bacons Lane	26th January 2006	55/59 Bacons Lane, St Augustines, S40 2SX	437 943 369 705
Queens Park Annexe	13th March 2008	Adjacent to Pavilion, Queens Park Annexe	437 909 370545

During 2006, the location at Birdholme Primary School was no longer viable as the school was undergoing redevelopment of the area where the station was located. Therefore the station was moved to an alternative background site at Bacons Lane in 2007. This location was chosen to reflect the air quality at residential locations in Chesterfield, distanced from traffic sources. However in March 2008, the land on which the air quality station was located was sold and so it had to be moved to a further background location. A suitable site was found at Queens Park Annexe and the station was commissioned in March 2008.

This air quality station has been affiliated into the national network and so all details and data from this station are now available at to view online at www.airquality.co.uk.

The new location is distanced from any road or industrial sources and so is indicative of the air quality experienced by the majority of Chesterfield residents.

Figure 2: Location of Queens Park Annexe urban background air quality monitoring station.



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Table 2.1 Details of Automatic Monitoring Sites

Site Name	Address	Site type	Monitoring Start Date	Grid reference
Queens Park Annexe	Adjacent to Pavilion, Queens Park Annexe	Urban Background	13th March 2008	437 909 370545
Chatsworth Road	Adjacent to 461 Chatsworth Road, Chesterfield	Urban Roadside	13 March 2008	436 349 370 657

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2.1.2 Non-Automatic Monitoring

Nitrogen Dioxide diffusion tubes

Over the course of 2008, 38 diffusion tubes were distributed across the Borough, each being exposed for a four-week period. The locations of these tubes are available to view on an online map at www.chesterfield.gov.uk. In 2006, new mounts were created for all the diffusion tubes and they were positioned in secure locations on the façade of residential properties. As a consequence the retention rates were improved by 20% between 2004 and 2006, with less than 2% of tubes being lost in 2008. This is a significant improvement in data capture of the diffusion tube network over the past two years.

The diffusion tubes are supplied and analysed by South Yorkshire Laboratories. They purchase the tubes uncoated from Gradko, treat with 50% acetone and 50% triethanolamine, allow to evaporate and then mount into tubes. Analysis of the tubes is by colourimetric determination. South Yorkshire laboratories received UKAS accreditation in 2006 for their in house methods and are members of WASP and the Inter Laboratory Field Comparison. They will implement the new harmonised analysis methods from January 1st 2009 as co-ordinated by Netcen.

Travel blanks are not used. South Yorkshire Laboratories retain co-prepared samplers to determine the preparation and storage blank concentrations for each batch prepared and automatically correct results for this blank. This system was adopted due to elevated travel blanks consistently being associated with inappropriate handling of the diffusion tubes and therefore the elevated values were rarely used to correct their associated diffusion tube results. This new system of co-prepared samplers was therefore agreed with all the users of South Yorkshire Laboratories in February 2004.

Diffusion tubes were also collocated in triplicate at both air quality stations so that local background and roadside bias adjustment factors could be calculated. The results of these tube precision and accuracy calculations for 2008 have been submitted to the Air Quality Consultant for inclusion in their national bias adjustment factor database. The diffusion tube locations and results for 2006 onwards were also inputted onto national diffusion tube database and can be viewed at www.airquality.co.uk. The data being available on national websites greatly improves their accessibility to the public and any other interested parties.

According to Local Air Quality Management Technical Guidance (LAQM.TG03) reports revealed that the results from diffusion tube collocation studies varied considerably between the different laboratories responsible for analysing the tubes. It is recommended therefore that this bias should be taken into account when using diffusion tube data.

Ideally each local authority should be able to calculate their own bias correction factor by collocating NO₂ diffusion tubes with a chemiluminescence analyser for a period of at least nine months. However, in the event this not possible, adjustment factors are compiled by the Air Quality Consultants and are available to download on the Air Quality Review & Assessment website at <http://www.uwe.ac.uk/aqm/review>.

Chesterfield Borough Council collocated diffusion tubes in triplicate at both air quality stations over the course of 2008, allowing the precision and accuracy of the tubes to be calculated and a local bias adjustment factor to be produced. This information has been submitted to the Air Quality Consultants to be included in the national adjustment factors database. The information has been collated into Table 6.

Diffusion tube precision, data capture and bias adjustment factors (2008).

Data Origin	Tube Precision	Overall Data Capture	Data capture for periods used	No. of months data	Bias Adjustment Factor
Chatsworth Road AQ Station	Good	Good	91%	12	0.88
Queens Park Annexe AQ Station	Good	Good	90%	12	1.05

Using the collocation data, the local background bias adjustment factor has been used to adjust the background diffusion tube results in Chesterfield and the local roadside bias adjustment factor has been used to adjust the roadside diffusion tubes.

2.2 Comparison of Monitoring Results with AQ Objectives

Non-Automatic Monitoring results

Table 7 presents the annual mean for each diffusion tube location, the bias adjustment factor used and adjusted annual means. The data capture at each location was excellent over 2008, therefore all tube locations achieved the minimum data capture of three month summer and winter exposure and so require no extrapolation.

The table shows that of the 38 diffusion tubes, 3 locations continue to show exceedance of the NO₂ annual mean air quality objective in 2008. These locations are Markham Road, Chesterfield Road Roundabout and Compton Street (tube numbers 2, 6 and 24 respectively). The first two locations are within the proposed AQMA however the 3rd location, tube 24, is a new diffusion tube location at Compton Street and as such is a newly identified area of exceedance. This will therefore require a Detailed Assessment to be completed in 2010 to investigate the air quality at this location further.

There are two locations that monitored NO₂ levels within 10% of the NO₂ annual mean air quality objective in 2008, which although are not currently exceeding the objective, they should be closely monitored over the coming year. These locations are Derby Road near Storforth lane, Derby Road at Lincoln Street, Duke Street at Staveley and Whittington Hill. The first three locations are within the AQMA. Whittington Hill is being investigated as part of a Detailed Assessment to be conducted in 2009, where Whittington Moor will be investigated for elevated levels of both NO₂ and PM₁₀.

Table 7: NO₂ diffusion tube annual mean results for all tube locations in Chesterfield (2008).

Tube No.	Tube Location	Bias Adj Factor used	NO ₂ Annual Mean (µgm ³)	
			Raw Annual Mean 2008	Adjusted Annual Mean 2008
1	Bradbury Club, 150 Chatsworth Road, (A619)	0.88	36.7	32.3
2	Markham Road, (A619)	0.88	55.5	48.8
3	3, St Augustines Road	0.88	26.3	23.1
4	Derby Road Development (A61)	0.88	26.9	23.7
5	17 South Place	0.88	37.5	33.0
6	Chest Rd Rndbt	0.88	51.3	45.1
7	Dukes Street, Staveley	0.88	44.5	39.1
8	St Augustines Church, 212 Derby Road	0.88	40.8	35.9
9	Lincoln Street, 287 Derby Road,	0.88	41.1	36.2
10	18, Chesterfield Road, Brimington	0.88	36.5	32.1
11	42, Whittington Hill (B6052)	0.88	45.0	39.6
12	460 Sheffield Road	0.88	35.5	31.2
13	99, Chesterfield Road, Staveley	0.88	37.3	32.8
14	348 Derby Road, Storforth Lane	0.88	42.4	37.3
15	Chatsworth Road	0.88	28.4	25.0

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16	Chatsworth Road	0.88	27.1	23.8
17	Chatsworth Road	0.88	28.1	24.7
18	Queens Park Annexe	1.05	18.2	16.0
19	Queens Park Annexe	1.05	18.0	15.8
20	Queens Park Annexe	1.05	16.5	14.6
21	Staveley Stables	1.05	24.1	21.2
22	35, Ringwood Road, Brimington	0.88	39.2	34.5
23	1 Beetwell Street	0.88	28.6	25.2
24	10, Compton Street, near Saltergate	0.88	46.3	40.7
25	501, Chatsworth Road, nr Vincent Crescent	0.88	22.9	20.2
26	114 Saltergate	0.88	35.8	31.5
27	Lowgates	0.88	39.5	34.7
28	45 Hollis Lane	0.88	34.8	30.6
29	Hollywell Cross Rnbt, Old Post Restaurant	0.88	40.0	35.2
30	348, Chatsworth Road, Brampton Mile	0.88	38.8	34.1
31	24, Derby Road, Jawbones Hill	0.88	29.4	25.9
32	Hasland By-Pass (A617)	0.88	27.6	24.3
33	Oak Farm	0.88	31.3	27.6
34	451, Chatsworth Rd, opp Chapel Lane West	0.88	31.2	27.4
35	632, Chatsworth Road, near Storrs Road	0.88	39.3	34.6
36	Queens Park	1.01	21.3	18.8
37	15 Muirfield Road	0.88	25.3	22.3
38	Eastside Road	0.88	32.0	28.2

Automatic Analyser Data: Nitrogen Dioxide

The Nitrogen Dioxide (NO₂) data provided by the Chatsworth Road roadside and Queens Park Annexe background air quality stations are both for nine months and can be seen in Table 8. The data has been fully ratified as part of the AURN Network.

Table 8: Hourly and annual mean NO₂ concentrations for Chesterfield Borough Council air quality stations (2008).

Air Quality Station Name	Site Type	Months of Data Capture	Maximum Hourly Mean 2008 (µgm ³)	Annual Mean 2008 (µgm ³)
Chatsworth Road	Roadside	9	117	22
Queens Park Annexe	Background	9	82	17

The NO₂ annual mean air quality objective is 40µgm³. The 2008 annual mean for Chatsworth Road and Queens Park Annexe is 22µgm³ and 17µgm³ respectively. Therefore the NO₂ annual mean air quality objective has been met at both locations.

The NO₂ hourly mean air quality objective is 200µgm³ with 18 exceedences. The maximum hourly mean is 117ugm³ monitored at Chatsworth Road air quality station. This is well below the objective and therefore the NO₂ hourly air quality objective has been met at both locations.

Automatic analyser data: Particulate Matter (PM10)

The current EU Limits and UK objectives are based upon measurements carried out using the European Transfer Reference Sampler or equivalent and therefore the results from the Teom need to be adjusted so they can be compared with the UK objectives.

The reason for this is because the Teom instrument houses the filter at a temperature of 50°C in order to minimise errors associated with the evaporation and condensation of water vapour. This can lead to a loss of the more volatile particles (such as ammonium nitrate etc). Whilst there will also be some losses of volatile species from the filter of the Transfer Reference Sampler, it will be less than that from the Teom.

To compensate for this difference there is a volatile correction model which can be used to correct the TEOM data using FDMS data at a nearby monitoring data. This model can be downloaded from the <http://laburnum.aeat.co.uk/archive/laqm/tools.php>

Table 10: PM10 24-hour and annual mean concentrations at Chatsworth Road and Queens Park Annexe air quality monitoring stations (2008).

Air Quality Station Name	Site Type	Number of Months data	Maximum 24-Hr Mean 2008 (µgm ³)	Annual Mean 2008 (µgm ³)
Chatsworth Road	Roadside	9	56 (3 exceedences).	27
Queens Park annex	Background	9	50 (1 exceedance)	20

The PM10 24-hour mean air quality objective is 50µgm³ with 35 exceedences.

The PM10 annual mean air quality objective is 40µgm³.

Therefore the PM10 annual mean and 24 hour maximum mean air quality objective has been met at both locations

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Concentrations are often higher where traffic is slow moving with stop/start driving, and where buildings on either side reduce dispersion. The assessment need only consider nitrogen dioxide.

Relevant exposure within 5m of the kerb
Flow greater than 5,000 vehicles per day
Roads where the average speed is 50kph or less
Roads where carriageway width is less than 10m

Chesterfield is a traditional market town and as such is particularly vulnerable to the street canyon effect influencing the air quality on some of its roads. All roads in Chesterfield which meet any of these criteria have been assessed in previous reports. There are only two roads that fulfil this criteria, namely Chatsworth Road and Derby Road and these have been assessed at length in previous reports and are included in Chesterfield AQMA. Therefore no further assessment is required.

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

There will be some locations where individuals may regularly spend 1-hour or more, for example streets with many shops and streets with outdoor cafes and cars. People occupationally exposed in such locations should not be included, as they are not covered by the regulations. The assessment only needs to consider nitrogen dioxide.

Flow greater than 10,000 vehicles per day
Relevant exposure within 5m of the kerb for 1 hour or more.

Since the main town centre shopping area in Chesterfield is pedestrianised there are no roads that fall into this category, therefore no further assessment is required. All such areas have been considered in during earlier rounds, therefore there is no need to proceed further.

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

There will be some locations where traffic flows are not necessarily high (fewer than 20,000 vehicles per day) but there is an unusually high proportion of buses or HGV's. The assessment needs to consider both nitrogen dioxide and PM10.

Roads where HDV's comprise more than 25% of traffic flow.
Relevant exposure within 10m of these roads
The flow of HDV's is greater than 2,500 vehicles per day

There is one road in Chesterfield that partially fulfils these criteria, namely New Beetwell Street. It runs through the centre of the town, parallel to Markham Road. The majority of cars and HDV's which pass through Chesterfield use this adjacent Markham Road, leaving New Beetwell Street to be used predominantly by buses. It also hosts the highest concentration of bus stops in Chesterfield Town Centre. As such it is used somewhat as a bus station and the vehicle flow would undoubtedly comprise more than 25% HDV's although exact traffic proportion data is currently unavailable. There are two residential properties within 10m of New Beetwell Street. However the number of bus movements on this road per day is approximately 700 which is below the 2500 trigger criteria triggered as outlined above.

Continuous monitoring using a mobile Air Quality Station was conducted adjacent to the residential property on New Beetwell Street from 1st April to 1st September 2002 and was reported in the Update & Screening 2003. The extrapolated annual mean for 2003 was calculated to be 37.4µg/m³, which projected to 2005, is 34.0µg/m³. This is below the annual mean Air Quality Objective of 40µg/m³. The number of bus routes via New Beetwell Street remains comparable to those in 2003 and as such the Air Quality Objective at this location should not be at risk of exceedence. Nevertheless, as part of the diffusion tube re-assessment in 2005, a new diffusion tube location (23) was mounted near the residential development on New Beetwell Street to ensure the levels continue to remain below the objective. This has shown consistently to be below the nitrogen dioxide air quality objective over the past three years.

Taking into consideration the low number of bus movements along this road coupled with the projected annual mean NO₂ at this location, there is no need for further assessment.

3.4 Junctions

Concentrations are usually higher close to junctions, due to the combined impact of traffic emissions on two roads, and to the higher emissions due to stop start driving. The assessments needs to consider both nitrogen dioxide and PM₁₀.

Flow greater than 10,000 vehicles per day

Relevant exposure within 10m of the kerb

All junctions that meet these criteria have been assessed in previous rounds and therefore no further assessment is required.

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

This approach to considering new roads will depend on whether or not an assessment was carried out in advance of building the new roads.

There have been no new roads constructed or proposed since the previous round of Review & Assessment, therefore no further assessment is required.

3.6 Roads with Significantly Changed Traffic Flows

There may be roads, which have experienced a large increase in traffic since the last Review & Assessment, or there may be existing roads that have new relevant exposure. In order to identify these roads, the following criteria should be used:

Flow greater than 10,000 vehicles per day

25% increase in traffic flows on these roads since the last Review & Assessment or new relevant exposure.

Have these roads been previously identified as being at risk of exceeding the Objectives (i.e. >36µg/m³)

There are no roads that fall into this category in Chesterfield therefore no further assessment is required.

3.7 Bus and Coach Stations

As part of the screening process bus stations that are not enclosed must be identified and an assessment should be made as to their impact on any relevant receptors. There is one coach station in Chesterfield, built in 2004, which is located on Beckingham Way and is not enclosed. However there is no relevant exposure within 10m of the coach station and the flow of buses is less than 1000 per day, therefore no further assessment is required.

4 Other Transport Sources

4.1 Airports

Aircraft are potentially significant sources of nitrogen oxide emissions, especially during takeoff. However emissions from aircraft once they are above 200m will make a negligible contribution to ground level concentrations, therefore the criteria to screen for impact from airports is relevant exposure within 1000m of the airport boundary. The nearest airport to Chesterfield is Sheffield Airport, which is approximately 24km, therefore no further assessment if required.

4.2 Railways (Diesel and Steam Trains)

Stationary locomotives, both diesel and coal fired, can give rise to high levels of sulphur dioxide close to the point of emission. Recent evidence suggests that moving diesel locomotives, in sufficient numbers, can also give rise to high nitrogen dioxide concentrations close to the track. These two potentially significant sources are considered separately below. People occupationally exposed to these sources should not be included, as they are not covered by the regulations.

In order to identify these locations the following criteria should be used.

Locations where diesel or steam locomotives are regularly stationary for periods >15 minutes or more
Regular outdoor exposure within 15m of the stationary locomotives.

There are no locations within Chesterfield that meet these criteria therefore no further assessment is required.

4.2.1 Stationary Trains

Chesterfield Borough 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

Chesterfield Borough 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)

Large ships generally burn oils with a high sulphur content in their main engines (bunker oils). If there are sufficient movements in a port they can give rise to sufficient number of 15 minute periods above 255ug/m³ to exceed the 15 minute objective.

Chesterfield is a landlocked authority, distanced from any ports therefore no further assessment is required.

5 Industrial Sources

5.1 Industrial Installations

Although industrial sources are unlikely to make a significant contribution to annual mean concentrations, they could be significant in terms of the short term Objectives. However no industrial sources were identified during previous rounds of Review & Assessment as likely to give rise to exceedence of the 1-hour Objective. There are currently no industrial sources, new relevant exposure or sources with substantially increased emissions, therefore no further assessment is required.

Emissions from industrial sources in Chesterfield have not increased substantially and have not received any new relevant exposure since the last round of review and as assessment

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

Chesterfield Borough 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

Chesterfield Borough 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

Chesterfield Borough 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

There is some evidence that major petrol fuel depots could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads.

There are no major fuel storage depots in Chesterfield therefore no further assessment is required.

5.3 Petrol Stations

There is some evidence that petrol stations could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined either higher levels from nearby busy roads. To identify these roads, the following criteria should be used:

Annual throughput of more than 2000m³

Relevant exposure within 10m of the pumps.

No petrol stations were identified in the previous rounds of Review and Assessment as fulfilling these criteria and there are no new sources therefore no further assessment is required.

5.4 Poultry Farms

A small number of local authorities have identified potential exceedences of the PM10 objectives associated with emissions from poultry farms.

There are no poultry farms within Chesterfield; therefore no further assessment is required.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Biomass burning can lead to an increase in MO10 emissions, due to the process of combustion – aerosol formation from volatile materials distilled from the wood is also an issue. Compared to conventional gas burning, biomass burning can also result in an increase in the overall Nox emissions due to the fuel-derived portion that is not present in gas.

There have been no proposals for biomass burning submitted through planning applications or otherwise since the last review and assessment therefore no further assessment is required.

6.2 Biomass Combustion – Combined Impacts

There is the potential that many small biomass combustion installations whilst individually acceptable, could in close combination lead to unacceptably high PM10 concentrations, particularly in areas where PM10 concentrations are close to or above the objectives.

Since there are currently no biomass boilers in Chesterfield, no further assessment is required at this time.

6.3 Domestic Solid-Fuel Burning

Areas of domestic coal burning could be a significant local source of SO₂. Areas of significance are deemed to be approximately 500m x 500m with more than 100 houses burning solid fuel as their primary source of heating. Previous rounds of Review & Assessment did not identify any areas of domestic coal burning fulfilling these criteria and so were not likely to give rise to exceedence of the Air Quality Objective for SO₂. There are no new sources or any areas of new exposure, therefore no further assessment is required.