
# 2011 Air Quality Progress Report for *Bolton Council*

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

January 2012

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# Executive Summary

The Environment Act 1995 places a responsibility on councils to periodically review and assess air quality within their boundaries. As part of this process, Bolton Council presents the 2011 Air Quality Progress Report. The Progress Report is for the period from 2009 to 2010 for the Bolton Metropolitan Area. The purpose of this report is to provide information on pollution sources, monitoring results and assess the risk of exceedences of the air quality objectives.

This report has been undertaken in compliance with Local Air Quality Management Technical Guidance LAQM.TG 09 (DEFRA 2009) and focussed on the progress of implementing local air quality management.

Bolton Council declared an Air Quality Management Area (AQMA) in March 2002 after the First Round Review & Assessment report in 2001 found that there would be areas of exceedences for Nitrogen Dioxide ($NO_2$) where relevant exposure occurred. The 2004 Detailed Assessment confirmed that predicted annual mean $NO_2$ exceedences of 40µg/$m^3$ had reduced back to the major road network when compared to the existing AQMA boundary. Several roads that were previously undeclared were indicating an exceedence in 2005 and therefore a revised AQMA was designated in Bolton in 2005. Bolton Council completed a Progress Report in April 2005, with an Updating and Screening Assessment completed in January 2006. Findings concluded that $NO_2$ and to a lesser extent $PM_{10}$ continued to indicate concentrations that may exceed or be at risk of exceeding their respective air quality Objectives.

The 2007 and 2008 Progress Reports showed that all pollutants were not expected to exceed the relevant air quality Objectives outside the designated AQMA. The 2009 Updating and Screening Assessment reflected these findings by demonstrating no exceedence of the $NO_2$ annual mean Objective at the continuous monitoring location at Bolton University, or at any of the diffusion tubes located outside of the Bolton AQMA.

This Progress Report considered new monitoring data for calendar years 2009 and 2010. During 2009, Bolton Council undertook ambient monitoring of $NO_2$ at 32 diffusion tube sites decreasing to 29 sites in 2010. In 2009, annual mean $NO_2$ concentrations (bias adjusted) exceedences of the air quality strategy Objective of 40ug/$m^3$ were indicated at 8 of the 20 diffusion tube monitoring sites within the AQMA. In 2010, exceedences were indicated at 6 of the diffusion tube sites within the AQMA.

All diffusion tube sites that indicated exceedences are located within Bolton Council's AQMA; and no long-term average concentrations above the Objective were measured at locations outside of the AQMA.

There have been no significant developments in construction or transport infrastructure reported since the last Updating and Screening Assessment in 2009.

The report shows that for five pollutants (carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide) as the air quality Objectives continue to be met. The focus of the previous LAQM reports has been upon $PM_{10}$ and $NO_2$, and in this Progress Report no additional breaches of the respective Objectives have been identified. Bolton Council is working in partnership with the other nine Greater Manchester authorities to undertake dispersion modelling which will include road, area and point sources.

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# 1 Introduction

## 1.1 Description of Local Authority Area

Bolton Metropolitan Borough lies on the edge of the West Pennine Moors and is bounded to the north by Lancashire and by the Greater Manchester districts of Wigan, Salford and Bury. The total area of the Borough is 140 square kilometres with 45% of the area being urban. The Borough covers the towns of Bolton, Blackrod, Farnworth, Horwich, Kearsley, Little Lever, Westhoughton and the village of South Turton. The M61 motorway crosses the south of the Borough.

## 1.2 Purpose of Progress Report

The 1995 Environment Act required the preparation of a national Air Quality Strategy (AQS) which set air quality standards and objectives for specified pollutants. The Act also outlined measures to be taken by local planning authorities (LPAs) in relation to meeting these standards and objectives (the Local Air Quality Management (LAQM) system). The LAQM regime established a rolling programme of local air quality assessment. Air Quality Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

Defra Policy and technical guidance advises that Progress Reports are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an air quality Objective, the Local Authority should undertake a Detailed Assessment immediately, and not wait until the next round of Review & Assessment.

## 1.3 Air Quality Objectives

The air quality Objectives applicable to Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 ((SI 3043) (DEFRA 2003a)). They are shown in **Table 1.1**. This table shows the objectives in units of micrograms per cubic metre of air ($\mu g/m^3$) for all pollutants except carbon monoxide, for which the units are expressed in milligrammes per cubic metre, $mg/m^3$). **Table 1.1** includes the number of permitted exceedences in any given year (where applicable).

**Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.**

| Pollutant | Objective | | Date to be achieved by |
|---|---|---|---|
| | Concentration | Measured as | |
| Benzene | 5.00 $\mu g/m^3$ | Annual mean | 31.12.2010 |
| 1,3-Butadiene | 2.25 $\mu g/m^3$ | Running annual mean | 31.12.2003 |
| Carbon monoxide | 10.0 $mg/m^3$ | Maximum daily running 8-hour mean | 31.12.2003 |
| Lead | 0.25 $\mu g/m^3$ | Annual mean | 31.12.2008 |
| Nitrogen dioxide ($NO_2$) | 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 ($SO_2$) | 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 & Assessments

### 1.4.1 Findings of the First and Second Rounds of Review & Assessment in Bolton

Bolton Council published its First Round Review & Assessment Report in April 2001 (Bolton MBC, 2001), proposing the designation of an AQMA as a result of likely breaches of the Nitrogen Dioxide ($NO_2$) annual mean Objective by 2005. Following a joint consultation with the other Greater Manchester Authorities, Bolton formally declared its AQMA on 8 March 2002.

An Updating and Screening Assessment of potential air pollution sources in and around the district of Bolton was published in January 2004, (Bolton MBC, 2004a). The Updating and Screening Assessment indicated that the geographical area of exceedence of the $NO_2$ annual mean Objective may not be as extensive as the existing AQMA. Conversely, the Updating and Screening Assessment also indicated that some locations *outside* the existing AQMA needed to be subject to a detailed assessment.

The First Round Review & Assessment in Bolton had concluded with the designation of an AQMA based on predicted exceedences of the annual mean Objective for $NO_2$ by 2005, and in more isolated hot-spots of the 24-hour fine Particulate Matter ($PM_{10}$) Objective. The findings of the Updating and Screening Assessment confirmed that, of the seven air pollutants reviewed, these two pollutants remained the most likely to exceed their respective Objectives.

Updated monitoring data and screening of traffic-related and industrial sources of Benzene, 1-3-Butadiene, Carbon Monoxide (CO), Lead and Sulphur Dioxide ($SO_2$) indicated that emissions were not significant in terms of their respective health-based future Objectives, and no detailed assessment of these pollutants was deemed to be required. The screening procedures resulted in the necessity to proceed to a detailed assessment of traffic-related $NO_2$ sources around busy roads and junctions, and on one additional road not currently within the AQMA boundary. Similarly traffic-related $PM_{10}$ emissions were required to be assessed in detail for road links which were previously close to the 24-hour Objective. Screening of industrial air pollutant sources concluded that fugitive dust emissions from two adjacent quarries would also need to be considered in a detailed assessment.

### 1.4.2 Findings of the 2004 Detailed Assessment in Bolton

The Detailed Assessment completed in July 2004 (Bolton MBC, 2004b) presented updated monitoring data for $NO_2$ and $PM_{10}$, together with the findings of a detailed dispersion modelling study, commissioned on behalf of the ten Greater Manchester authorities. The results of a further local modelling study in the district of Westhoughton were also reported in December 2004 (Bolton MBC, 2004c).

The conclusion of the Second Round Assessments in the Borough of Bolton and across the Greater Manchester conurbation was that the geographical spread of predicted annual means $NO_2$ exceedence of 40µg/m$^3$ had reduced back to the major road network when compared to the existing AQMA boundary. However, there were several areas across the ten authorities where, away from the regional centre, roads that were previously undeclared were indicating an exceedence in 2005 (and at a fewer number of locations by 2010). The decision to re-define the AQMA boundary as a result of these Second Round procedures was taken by the Association of Greater Manchester Authorities and its constituent joint working groups in 2005.

### 1.4.3 Findings of the 2006 Updating and Screening Assessment in Bolton

Bolton Council completed a Progress Report in April 2005 (Bolton MBC, 2005), with another Updating and Screening Assessment completed in January 2006 (Bolton MBC, 2006) in accordance with the procedures set out in LAQM.TG (03) (DEFRA, 2003b).

Five pollutants (CO, Benzene, 1,3-Butadiene, Lead and $SO_2$) continued to meet their respective air quality Objectives, and this process did not identify any need to proceed to a Detailed Assessment for these pollutants.

$NO_2$ and to a lesser extent $PM_{10}$ continued to indicate concentrations that may exceed or be at risk of exceeding their respective air quality Objectives. There were indications that a more Detailed Assessment could be required for $NO_2$ and $PM_{10}$ based on the screening approach and in particular due to changes in traffic flows since the completion of the Second Round Review & Assessment.

However, Bolton Council and all other Greater Manchester authorities, decided not to proceed to a Detailed Assessment for $NO_2$ and $PM_{10}$ at this time for the following reasons:

- The Updating and Screening Assessment identified no new exposures.
- All roads and junctions were adequately assessed in previous rounds of Review & Assessment, and an AQMA was declared in 2005 based on the findings of detailed dispersion modelling.
- There were difficulties in comparing the most recent traffic flow data with data from the Second Round Review & Assessment. Where there were recorded changes in traffic flows greater than 25%, these were largely a feature of the Greater Manchester strategic transport model, which had been enhanced since the second round Review & Assessment, rather than 'real' increases.
- There were no clear trends in the monitoring data, but the data collected by Bolton Council supported the existing AQMA boundary. Overall, this was the most reliable information available on whether a detailed assessment needed to be carried out to investigate the validity of the AQMA boundary.

### 1.4.4 Findings of the 2007 Progress Report in Bolton

Bolton Council completed a Progress Report for 2007 in January 2008 (Bolton MBC, 2008). Six pollutants (Benzene, 1,3-Butadiene, CO, lead, $SO_2$ and $PM_{10}$) met their corresponding air quality Objectives and limit values.

$NO_2$ continued to indicate that the annual mean air quality Objective would be exceeded in parts of the borough. Monitoring data at the urban background AUN station showed that the annual mean and short term hourly Objectives were met for years 2000-2004. Hourly data capture for 2005 and 2006 was not sufficient to draw conclusions with regard to the Objective. Bias corrected 2006 diffusion tube results showed exceedences in the annual mean Objective at the Astley Bridge and Quintins sites. All other diffusion tubes recorded $NO_2$ concentrations below the 40µg/$m^3$ Objective.

No new local developments which could significantly affect air quality had been granted planning permission since the previous Updating and Screening Assessment (2006). The Greater Manchester Air Quality Action Plan, air quality strategy 'Clearing the Air' and Local Transport Plan (LTP) continued to be implemented throughout the Borough.

Following the findings of the 2007 Progress Report, it was decided that Bolton Council did not need to progress to a Detailed Assessment for the following reasons:

- There had been no significant change with regard to local developments or road networks which could have significantly affected air quality within the Borough;
- $NO_2$ monitoring data supported the existing AQMA boundary;
- There were only two recorded $NO_2$ exceedences and these occurred within the designated AQMA.

### 1.4.5 Findings of the 2008 Progress Report in Bolton

The 2008 Progress Report (Bolton MBC, 2009a) confirmed that all pollutants except $NO_2$ were not expected to exceed the relevant air quality Objectives. Although there remained some exceedences of the annual mean $NO_2$ Objective, these were within the designated AQMA. Following the findings of the 2008 Progress Report it was decided that Bolton Council did not need to progress to a Detailed Assessment.

### 1.4.6 Findings of the 2009 Updating and Screening Assessment in Bolton

The 2009 Updating and Screening Assessment (Bolton MBC, 2009b) demonstrated no exceedence of the $NO_2$ annual mean Objective at the continuous monitoring location (Bolton University) or at any of the diffusion tubes located outside of the designated AQMA. The assessment identified several $NO_2$ diffusion tubes located within the AQMA recording concentrations below the annual mean $NO_2$ Objective, suggesting that the current AQMA boundary may be more extensive than it needed to be in certain locations. As further assessment would be required to confirm or amend the existing boundary, it was proposed that Bolton Council proceed to a Detailed Assessment of annual $NO_2$ concentrations in respect of road traffic emission sources, however the Assessment was delayed due to an update of emissions factors

There were no recorded exceedences of the respective air quality Objectives for $PM_{10}$, $SO_2$, CO, Benzene and Lead. In addition, the diffusion tube monitoring results for Benzene over the last three years demonstrated a decreasing trend.

A review of commercial and domestic sources did not identify any reason to proceed to a Detailed Assessment in respect of domestic solid-fuel burning. However, the Updating and Screening Assessment has identified the need to proceed to a Detailed Assessment of $NO_2$ and $PM_{10}$, in relation to the potential exceedence of the hourly mean $NO_2$ Objective and daily mean Objective for $PM_{10}$ at Marklands Farm, Blackrod. This was due to the presence of an individual 4MW biomass boiler at this location. The Environment Agency has not received a permitting application for the installation in relation to the operation and therefore a Detailed Assessment remains on hold.

**Table 1.2** outlines the conclusions of previous rounds of local air quality management Review & Assessment completed by Bolton Council.

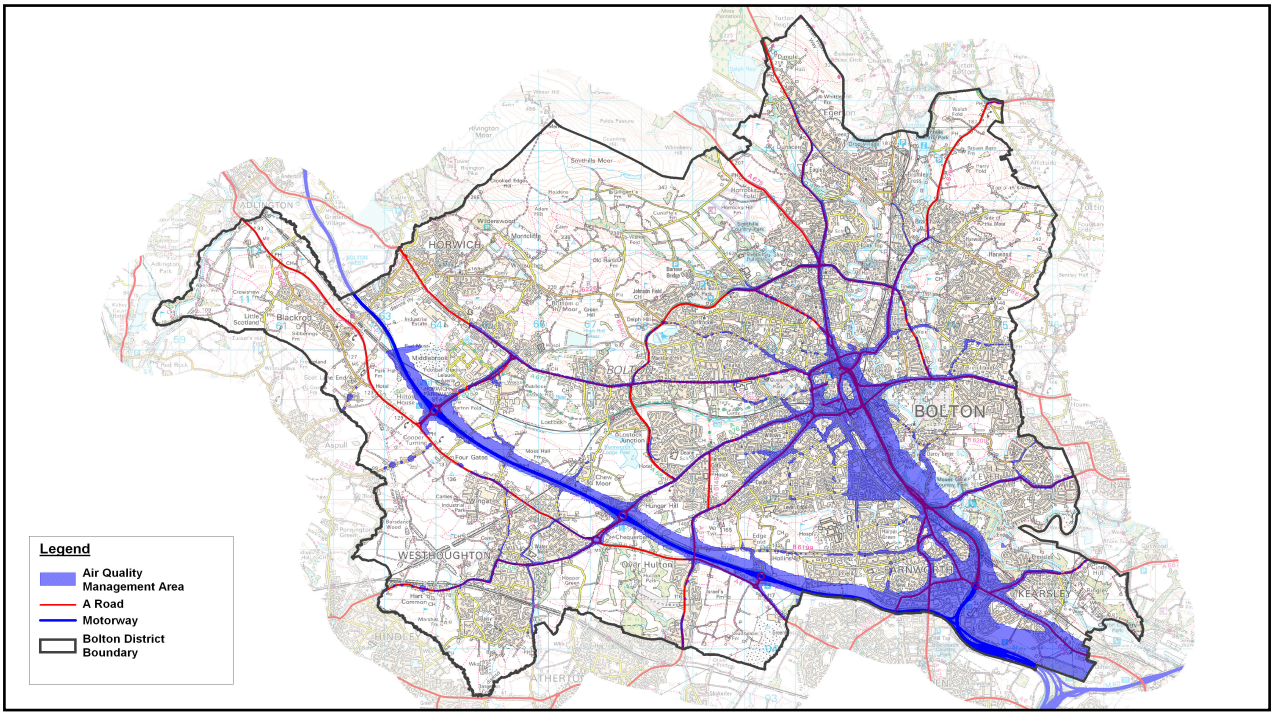
**Table 1.2 Summaries of Previous Reports**

| Report | Date | Outcome |
|---|---|---|
| First Round Review & Assessment Report | April 2001 | Proposed the designation of an AQMA as a result of likely breaches of $NO_2$ annual mean Objective by 2005. Designation of AQMA in March 2002. |
| Updating and Screening Assessment | January 2004 | Redesignated AQMA Boundary in 2005. Determined that $NO_2$ and $PM_{10}$ will be most likely to exceed their respective objectives. |

| Report | Date | Outcome |
|---|---|---|
| Detailed Assessment | July 2004 | Updated monitoring data for $NO_2$ and $PM_{10,}$ with local modelling study in the district of Westhoughton reported in December 2004. |
| Progress Report | April 2005 | $NO_2$ and to a lesser extent $PM_{10}$ indicated concentrations that may exceed or be at risk of exceeding respective air quality Objectives. |
| Updating and Screening Assessment | January 2006 | Detailed assessment could be required for $NO_2$ and $PM_{10}$ based on the screening approach due to changes in traffic flows since the completion of the second round Review & Assessment. Bolton Council decided not to proceed to a detailed assessment for $NO_2$ and $PM_{10}$ at this time. |
| Progress Report | January 2008 | $NO_2$ continued to indicate that the annual mean air quality Objective would be exceeded in parts of the borough. |
| Progress Report | January 2009 | All pollutants except $NO_2$ were not expected to exceed the relevant air quality Objectives. Although there remained some exceedences of the annual mean $NO_2$ Objective, these were within the AQMA. |
| Updating and Screening Assessment | December 2009 | $NO_2$ annual Objective continued to be exceeded at certain locations inside the AQMA. No exceedence of $NO_2$ outside of designated AQMA. Detailed assessment identified for a 4MW biomass boiler at Marklands Farm, Blackrod, however has not been undertaken as no permit application has been received by the Environment Agency. |

Previous rounds of Review & Assessment have predicted or identified exceedences of the annual mean $NO_2$ Objective. The most recent AQMA was redesignated in 2005 to reflect exceedences of the annual mean $NO_2$ Objective. The current AQMA is shown in **Figure 1.1**

**Figure 1.1 Bolton Council 2005 AQMA based on likely exceedences of $NO_2$ annual mean air quality Objective**




The current AQMA shows that the areas that may exceed the annual $NO_2$ Objective are primarily in the town centre, the main arterial road network and adjacent to the M61 motorway, reflecting that emissions associated with road transport are the primary cause of the designation.

# 2 New Monitoring Data

## 2.1 Summary of Monitoring Undertaken

### 2.1.1 Automatic Monitoring Sites

Bolton Council operates one automated monitoring station, located at Bolton University, College Way, (Grid Ref. 371000 408500).

The automated monitoring site is classified as an 'Urban Background' location, and monitoring instruments measuring ambient concentrations of CO, $NO_2$, $PM_{10}$, $SO_2$ and Ozone ($O_3$) are installed. The station was de-affiliated from the Department for Environment Food and Rural Affairs (DEFRA) Automated Urban & Rural Network (AURN) on 30 June 2008. However, monitoring continued and data quality was retained as Bolton Council is subscribed to AEA's 'Calibration Club' (see **Appendix A**).

The monitoring station is located close to the existing AQMA boundary, to the south-west of the town centre. Details relating to the location of the monitoring station are provided in **Table 2.1** below, and **Figure 2.1** displays its location.

**Table 2.1 Details of Automatic Monitoring Sites**

| Site Name | Site Type | OS Grid Ref | Pollutants Monitored | In AQMA? | Relevant Exposure? *(Y/N with distance (m) to relevant exposure)* | Distance to kerb of nearest road *(N/A if not applicable)* | Worst-case Location? |
|---|---|---|---|---|---|---|---|
| Bolton University | Urban Background | 371000, 408500 | CO, $NO_2$, $PM_{10}$, $SO_2$, $O_3$ | No | Yes (25m) | 170m | No |

**Figure 2.1 Map of Automatic Monitoring Site in Bolton**

### 2.1.2 Non-Automatic Monitoring Sites

A number of non-automatic monitoring locations are sited throughout the Borough, both within and outside the existing AQMA. $NO_2$ concentrations have been monitored at 32 locations during 2009 and 29 locations in 2010. There are 4 passive diffusion tube sites, operating since 2000, for monitoring Benzene concentrations. Lead concentrations are monitored at 2 non-automatic sites within the Borough.

Details relating to the location of all non-automatic monitoring sites are presented in **Table 2.2**.

Previous $NO_2$ diffusion tube analysis and reporting was provided by Eurofins Labs. From July 2009, Staffordshire Scientific Services provided and analysed $NO_2$ diffusion tubes for Bolton Council. The laboratory takes part in and meets QA/QC Field Inter comparison standards specified for the National $NO_2$ Network.

The summary of precision results for $NO_2$ diffusion tubes collocation studies by Laboratory, which is published on the Review & Assessment helpdesk operated by Air Quality Consultants/University of the West of England, classes precision for Staffordshire CCSS to be 'good'.

Tube preparation utilises a 20% v/v triethanolamine (TEA) in water methodology. Analysis using colorimetric techniques typically follows four/five week exposure period in accordance with the National $NO_2$ monitoring network schedule.

The statistical tool created by AEA Energy & Environment and provided for LAQM assistance on the UK National Air Quality Archive website was used to confirm good precision and accuracy of data from co-located tubes in Bolton.

**Table 2.2 Details of Non-Automatic Monitoring Sites for 2010**

| Site Name | Site Type | OS Grid Ref | | Pollutants Monitored | In AQMA? |
|---|---|---|---|---|---|
| Ainsworth Road, Little Lever | Urban Background | 375397 | 407457 | $NO_2$ | Y |
| Council Area Office, Market St, Little Lever | Urban Background | 375420 | 407386 | $NO_2$ | N |
| Council Area Office, Market St, Little Lever | Urban Background | 375420 | 407386 | $NO_2$ | N |
| Council Area Office, Market St, Little Lever | Urban Background | 375412 | 407365 | $NO_2$ | N |
| Front 3 Turton Road, Bromley Cross | Roadside | 373251 | 411970 | $NO_2$ | Y |
| Rear 3 Turton Cross, Bromley Cross | Urban Background | 373236 | 411968 | $NO_2$ | Y |
| 20 Laburnum Park, Bromley Cross, Bolton | Urban Background | 372908 | 412120 | $NO_2$ | N |
| Beehive PH, Chorley New Road, Horwich | Roadside | 365501 | 409887 | $NO_2$ | Y |
| 1007 Chorley New Road, Horwich | Urban Background | 365599 | 409845 | $NO_2$ | Y |
| 1007 Chorley New Road, Horwich | Urban Background | 365599 | 409845 | $NO_2$ | Y |
| 5 Crowborough Close, Horwich | Urban Background | 365694 | 410166 | $NO_2$ | N |
| Bolton Road / Manchester Rd, Westhoughton | Roadside | 366341 | 406571 | $NO_2$ | Y |
| White Horse Tavern, Bolton Rd, Westhoughton | Urban Background | 366286 | 406581 | $NO_2$ | Y |
| Quintins, 329 Derby Street, Bolton | Roadside | 370763 | 407929 | $NO_2$ | Y |
| Astley Bridge Library, Bolton | Urban Centre | 371387 | 411692 | $NO_2$ | Y |
| Weston House, Bolton [+] | Urban Centre | 372007 | 407726 | $NO_2$ | N |
| 134 Buckley Lane, Farnworth | Kerbside | 373287 | 405061 | $NO_2$ | Y |
| Primrose Street, Kearsley | Roadside | 374450 | 405207 | $NO_2$ | Y |
| 72/74 Hr Market Street | Urban Centre | 374194 | 405460 | $NO_2$ | Y |
| 2 Fern Street, Farnworth | Urban Background | 374282 | 406257 | $NO_2$ | Y |
| Bolton Gate | Roadside | 371965 | 409907 | $NO_2$ | Y |
| 2 Phoenix Street B | Urban Background | 372059 | 409877 | $NO_2$ | Y |
| 505 Blackburn Rd B | Kerbside | 371442 | 411599 | $NO_2$ | Y |
| 3 The Welland W | Urban Background | 365163 | 405640 | $NO_2$ | N |
| 24 Winslow Road B | Urban Background | 367672 | 406910 | $NO_2$ | Y |

| Site Name | Site Type | OS Grid Ref | | Pollutants Monitored | In AQMA? |
|---|---|---|---|---|---|
| Astley Bridge Clinic, Moss Bank Way | Roadside | 371433 | 411688 | $NO_2$, Benzene | Y |
| 63 Bankfield Street, Bolton | Urban Background | 370374 | 408178 | $NO_2$, Benzene | N |
| Drummond Street, Astley Bridge, Bolton | Urban Background | 371304 | 411748 | $NO_2$, Benzene | N |
| Manley Terrace | Urban Background | 371349 | 411718 | $NO_2$, Benzene | Y |
| Salford Road (Near CMP batteries) | Other | 370628 | 404750 | Lead | N |
| Minerva Road (Near Bolton Hospital) | Other | 371804 | 406279 | Lead | N |

+ - Monitoring closed in December 2009

DEFRA has produced monitoring site classifications as shown in **Table 2.3** below, which were used to define each site location in **Table 2.2**.

**Table 2.3 DEFRA Site Classifications**

| Site Classification | Site characteristics |
|---|---|
| Kerbside (U1) | Sites with sample inlets within 1m of the edge of a busy road. Sampling heights are within 2-3m. |
| Roadside (U2) | Sites with sample inlets between 1m of the kerbside of a busy road and the back of the pavement. Typically this will be within 5m of the kerbside. Sampling heights are within 2-3m. |
| Urban Centre (U3) | Non-kerbside sites located in an area representative of typical population exposure in town or City Centre areas e.g. pedestrian precincts and shopping areas. Sampling heights are typically within 2- 3m. |
| Urban Background (U4) | Urban locations distanced from sources and broadly representative of city-wide background concentrations e.g. elevated locations, parks and urban residential areas. |
| Urban Industrial (U5) | Sites where industrial emissions make a significant contribution to measured pollution levels. |
| Suburban (SU) | Sites typical of residential areas on the outskirts of a town or city. |
| Rural (R1) | Open country locations distanced from population centres, roads and industrial areas. |
| Remote (R2) | Open country locations within isolated rural areas, experiencing regional background pollution levels for much of the time. |

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

### 2.2.1 Nitrogen Dioxide ($NO_2$)

#### 2.2.1.1 Previous Review and Assessments of Nitrogen Dioxide

During the First Round of Review & Assessment, it was agreed by all the Greater Manchester authorities that the AQMA boundary would be drawn on a precautionary basis at 19ppb (36.3µg/$m^3$). Bolton formally declared its original AQMA on 8 March 2002 based on predicted $NO_2$ annual mean exceedences.

In January 2004 the Updating and Screening Assessment and collation of local monitoring data indicated that it remained likely that there would be exceedences of the $NO_2$ annual mean Objective by 2005, primarily at major roadside and junction locations. However the review also showed that the geographical area of exceedence may not be as extensive as the existing AQMA. Conversely, the Updating and Screening Assessment indicated that some locations *outside* the existing AQMA needed to be included in the Detailed Assessment.

For the purposes of the subsequent Detailed Assessment, published in July 2004, a dispersion modelling study was commissioned. 40 receptor locations were selected, which were residential properties in closest proximity to the major roads, and were therefore locations where people would be exposed for a relevant period and where the annual mean $NO_2$ Objectives are at the greatest risk of exceedence. Of these 40 locations, 9 showed a predicted exceedence of the annual mean $NO_2$ Objective in 2005. By 2010, model outputs indicated that all but two such receptors, in Astley Bridge and Farnworth, would reduce to below the Objective value.

The decision to re-draw the AQMA boundary as a result of these Second Round procedures was taken by the Association of Greater Manchester Authorities and its constituent joint working groups, in 2005.

Other than the closure of one of 4 main industrial $NO_2$ emission sources (Horwich Castings Limited), there have been no significant changes to the sources considered in the 2004 assessments.

Monitoring data recorded for 2008 demonstrated no exceedence of the $NO_2$ annual mean Objective at any of the diffusion tubes located outside of the designated AQMA. Several $NO_2$ diffusion tubes located within the AQMA recorded concentrations below the annual mean $NO_2$ Objective, in all of the previous three years, from 2006 to 2008, suggesting that the current AQMA boundary may be more extensive than it needed to be in certain locations. It was proposed that Bolton Council proceeded to a Detailed Assessment of annual $NO_2$ concentrations in respect of road traffic emission sources. The Assessment has been delayed due to an update of emissions factors.

#### 2.2.1.2 Monitoring Data Update

The previous Updating and Screening Assessment, Detailed Assessment and Progress Reports presented data from one automated monitoring station in Bolton. The monitoring station is situated at the Bolton University, on College Way. The station is classified as an 'Urban Background' location, and monitoring equipment measures ambient concentrations of CO, $NO_2$, $PM_{10}$, $SO_2$ and $O_3$. The monitoring station is located close to the AQMA boundary, to the south-west of the town centre.

$NO_2$ monitoring results, updated to 2010 are presented in **Table 2.4a** below, which gives data capture and annual mean concentrations. **Table 2.4b** displays the comparison between the results and the 1-hour mean Objective for $NO_2$.

**Table 2.4a Results of Automatic Monitoring for $NO_2$: Comparison with Annual Mean Objective**

| Site ID | Location | Within AQMA? | Data Capture 2009 % | Data Capture 2010 % | Annual mean concentrations (µg/m$^3$) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 2008 | 2009 | 2010 |
| Bolton | Bolton University, College Way | No | 84.1 | 91.2 | 25.0 | 27.0 | 28.0 |
| **Annual Mean Objective** | | | | | **40 µg/m$^3$** | | |

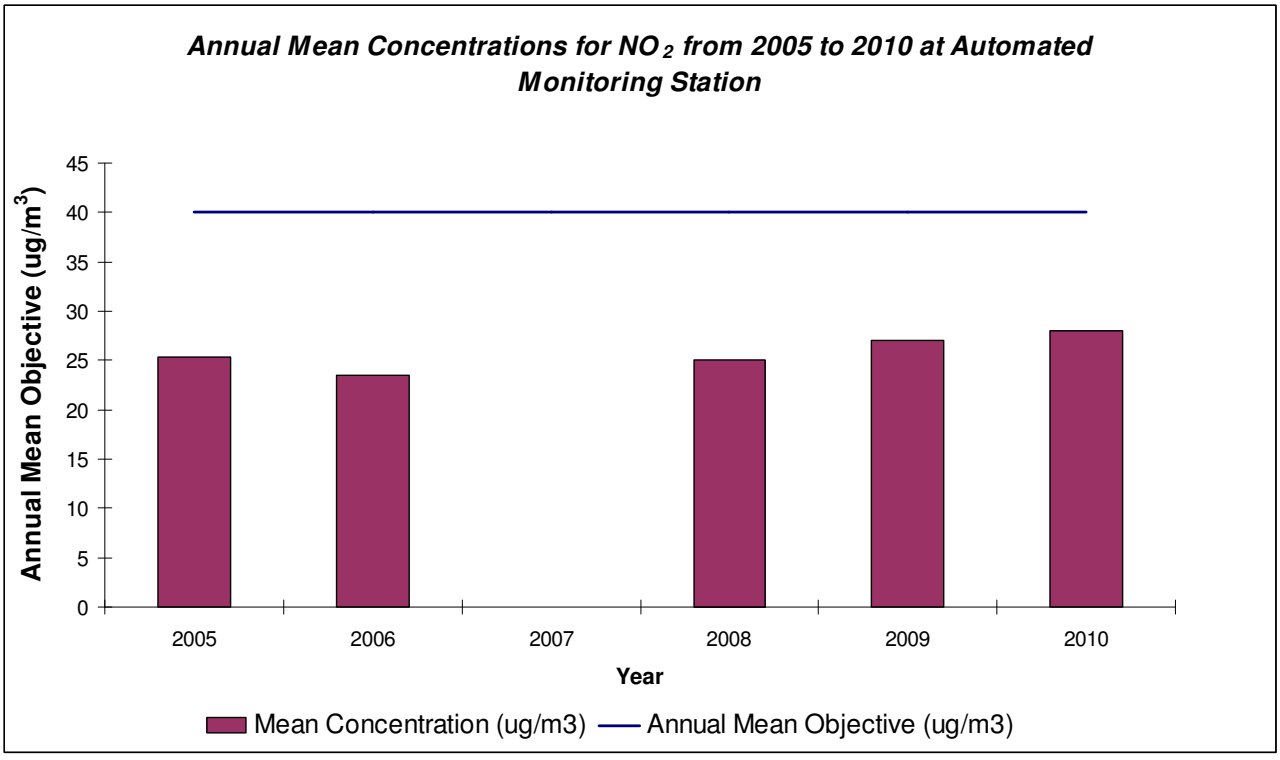
**Table 2.4b Results of Automatic Monitoring for $NO_2$: Comparison with 1-hour Mean Objective**

| Site ID | Location | Within AQMA? | Data Capture 2009 % | Data Capture 2010 % | Number of Exceedences of hourly mean (200 µg/m$^3$) (99.8th %tile of hourly means in brackets) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 2008 | 2009 | 2010 |
| Bolton | Bolton University, College Way | No | 84.1 | 91.2 | 0 (118) | 0 (109) | 0 (128) |
| **Hourly Mean Objective (Number of hours exceeding 200 µg/m3)** | | | | | **18 Exceedences** | | |

The previous three years of monitoring data recorded at the automatic monitoring station indicate a slight increase in annual mean $NO_2$ concentrations from 2008 to 2010. However, it is evident that the monitored annual mean concentrations for the period were well below the annual mean Objective.

**Figure 2.2** below summarises the annual mean $NO_2$ concentrations from monitoring over the last 5 years.

**Figure 2.2 Trends in Annual Mean $NO_2$ Concentration Measured at Bolton Automatic Monitoring Site**




No exceedences of the 1-hour mean Objective for $NO_2$ were recorded throughout 2008 to 2010 which is also consistent with the previous 5 years of data.

### 2.2.1.3 Diffusion Tube Monitoring Data

Diffusion tubes provide a picture of the spatial distribution of $NO_2$ across the borough, as well as long-term trends at particular locations. Diffusion tube monitoring data are presented for 32 $NO_2$ monitoring sites across Bolton from 2008 to 2010 **in Table 2.5**. Exceedences of the $NO_2$ annual mean Objective as measured by the diffusion tubes (> 40 ug/$m^3$) are highlighted in **bold**.

A full data set of uncorrected 2009 and 2010 monthly mean values and details of the method used to correct the diffusion tubes results are provided in **Appendix A**.

**Table 2.5 Results of $NO_2$ Diffusion Tubes**

| Site ID | Location | Within AQMA? | Annual mean concentrations (µg/$m^3$) (Adjusted for bias) | | |
|---|---|---|---|---|---|
| | | | 2008 [1] | 2009 [2] | 2010 [3] |
| 3 | Quintins, 329 Derby Street, Bolton | Y | **53.12** | **52.02** | **46.03** |
| 4 | Manley Terrace | Y | 30.36 | 31.86 | 27.77 |
| 8 | Le Mans Crescent, Bolton * | Y | **40.99** | - | - |
| 10 | 63 Bankfield Street, Bolton | N | 15.77 | 20.28 | 18.63 |
| 11 | Allotments, Lever Park Avenue, Horwich * | N | 20.29 | - | - |
| 14 | Town Hall, Market Street, Farnworth * | Y | 27.11 | - | - |
| 15 | Astley Bridge Clinic, Moss Bank Way | Y | **40.67** | **47.41** | 36.66 |
| 16 | Drummond Street, Astley Bridge, Bolton | N | 23.24 | 23.30 | 21.04 |
| 18 | Astley Bridge, Bolton | Y | - | 27.42 | 24.78 |
| 34 | Weston House, Bolton # | N | - | 30.27 | - |
| 40 | Bolton Road / Manchester Road | Y | 38.08 | **43.09** | 38.08 |
| 41 | White Horse Tavern, Bolton Road, | Y | 29.13 | 30.45 | 33.14 |
| 43 | Beehive PH, Chorley New Road. Horwich | Y | **45.72** | **45.74** | **40.16** |
| 44 | 1007 Chorley New Road, Horwich | Y | 30.92 | 29.57 | 27.75 |
| 45 | 1007 Chorley New Road, Horwich | Y | 31.08 | 30.29 | 29.03 |
| 46 | 5 Crowborough Close, Horwich | N | 16.74 | 16.89 | 16.54 |
| 48 | Ainsworth Road, Little Lever | Y | 33.89 | 34.45 | 31.41 |
| 49 | Council Office, Market Street, Little Lever | N | 25.17 | 24.61 | 25.54 |
| 50 | Council Office Market Street, Little Lever | N | 25.38 | 25.17 | 25.58 |
| 51 | Council Office Market Street, Little Lever | N | 23.39 | 24.00 | 26.31 |
| 52 | Front 3 Turton Road, Bromley Cross | Y | **40.42** | **42.18** | **40.79** |
| 53 | Rear 3 Turton Cross, Bromley Cross | Y | 21.73 | 21.72 | 21.89 |
| 54 | 20 Laburnum Park, Bromley Cross, Bolton | N | 19.65 | 18.81 | 17.69 |
| 60 | 134 Buckley Lane, Farnworth | Y | - | 37.32 | 34.57 |
| 61 | Primrose Street, Kearsley | Y | - | **42.00** | **43.33** |
| 62 | 72/74 Hr Market Street | Y | - | **44.82** | **46.55** |
| 63 | 2 Fern Street, Farnworth | Y | - | 32.42 | 30.14 |
| 64 | Bolton Gate | Y | - | 33.79 | 31.09 |
| 65 | 2 Phoenix Street, Bolton | Y | - | 32.11 | 32.28 |
| 66 | 505 Blackburn Rd, Bolton | Y | - | **46.58** | **48.85** |
| 67 | 3 The Welland, W | N | - | 27.35 | 27.56 |
| 68 | 24 Winslow Road, Bolton | Y | - | 36.54 | 32.93 |
| | **Annual Mean Objective** | | | **40 µg/$m^3$** | |

*1 National bias correction factor of 0.83 applied to the 2008 measured value using UWE Spreadsheet version 09/09.*
*2 Eurofins bias correction factor of 0.82 applied to measured data from July 2009, with Staffordshire Scientific Services bias correction factor of 0.81 applied from August 2009.*
*3 National bias correction factor of 0.85 applied to the 2010 measured value using UWE Spreadsheet version 06/11.*
***Bold** = exceedence of the Air Quality Objective, * = monitoring stopped in 2008, # = monitoring stopped in 2009.*

New monitoring data recorded between 2009 and 2010 demonstrated no exceedence of the $NO_2$ annual mean Objective at any of the diffusion tubes located outside of the designated AQMA.

Of the 20 diffusion tubes located within the AQMA, 8 diffusion tubes demonstrated exceedence of the annual mean Objective in 2009, and 6 demonstrated exceedence of the annual mean Objective in 2010. The monitoring sites at, "Quintins, 329 Derby Street, Bolton", "Beehive PH, Chorley New Road Horwich", "Front 3 Turton Road, Bromley Cross", "Primrose Street, Kearsley", "72/74 Hr Market Street" and "505 Blackburn Road, Bolton" continue to indicate a breach of the Objective. As these locations are within the existing AQMA, it is not deemed necessary to proceed to a Detailed Assessment.

The remaining $NO_2$ diffusion tubes located within the AQMA recorded concentrations below the annual mean $NO_2$ Objective in 2010 and therefore is not considered necessary to proceed to a Detailed Assessment.

### 2.2.2 Particulate Matter ($PM_{10}$)

#### 2.2.2.1 Previous Review and Assessments of Particulate Matter

The AQMA declared in Bolton included exceedence of the 2004 24-hour mean $PM_{10}$ Objective in combination with $NO_2$ associated with road traffic sources. The spatial extent of the 24-hour mean $PM_{10}$ exceedence was smaller than that for the $NO_2$ annual mean Objective. The geographical boundary of the AQMA was defined by predicted annual mean $NO_2$ exceedences, although localised exceedences of the $PM_{10}$ 24-hour Objective were predicted at receptor locations around major roads in Astley Bridge. However in the revised AQMA, no $PM_{10}$ exceedences were predicted.

The Detailed Assessment published in July 2004 concluded that the annual and 24-hourly mean $PM_{10}$ Objective would be met at the 40 receptor locations considered in the dispersion modelling study, and the isopleth plots also indicated compliance with the annual mean Objective of 40µg/$m^3$.

The Bolton Council Updating and Screening Assessments in 2006 and 2009 showed that the 24-hour and annual mean $PM_{10}$ concentration complied with the UK Objectives. It was concluded that a Detailed Assessment was not required.

### 2.2.3 Monitoring Data Update

$PM_{10}$ measurements at the monitoring station in Bolton are made with a Tapered Element Oscillating Microbalance (TEOM), and for comparison with the Objectives and EU Limit Values, data were corrected to the gravimetric equivalent using a factor of 1.3. Recent $PM_{10}$ values corrected to gravimetric equivalent and updated to 2010, measured at this station, are given in **Table 2.6a** and **Table 2.6b**.

**Table 2.6a Results of $PM_{10}$ Automatic Monitoring: Comparison with Annual Mean Objective**

| Site ID | Location | Within AQMA? | Data Capture 2009 % | Data Capture 2010 % | Annual mean concentrations (µg/$m^3$) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 2008 [1] | 2009 | 2010 |
| Bolton | Bolton University, College Way | N | 70.9 | 91.1 | 16.8 | 19.0 | 18.0 |
| **Annual Mean Objective** | | | | | **40 µg/$m^3$** | | |

**Table 2.6b Results of $PM_{10}$ Automatic Monitoring: Comparison with 24-hour Mean Objective**

| Site ID | Location | Within AQMA? | Data Capture 2009 % | Data Capture 2010 % | Daily Mean Objective | | |
|---|---|---|---|---|---|---|---|
| | | | | | 2008 [1] | 2009 | 2010 |
| Bolton | Bolton University, College Way | N | 70.9 | 91.1 | 0 **(29.2)** | 0 **(28.0)** | 0 **(28.0)** |
| **Daily Mean Objective (Number of hours exceeding 50 µg/m3) (90.4th %tile of daily means in brackets)** | | | | | **35 Exceedences** | | |

[1] - Data corrected in accordance with Volatile Correction Model (VCM) See **Appendix A**.

There were no recorded exceedences of the $PM_{10}$ 24-hour mean Objective from 2008 to 2010. The short-term values are reported as a 90.4$^{th}$ percentile of monitored $PM_{10}$ concentrations, and these were found to be below the Objective. Current measured $PM_{10}$ concentrations at this location comply with annual and daily mean Objectives.

## 2.2.3 Sulphur Dioxide ($SO_2$)

### 2.2.3.1 Previous Review and Assessments of Sulphur Dioxide

There were a small number of AQMAs declared from the First Round of Review & Assessment based on predicted exceedences of the $SO_2$ Objectives. These related to emissions from coal-fired boilers at a cellophane process and a food processing plant, a coal-fired boiler at a hospital, domestic coal burning, and shipping at a major port.

Whilst the Bolton Council First Round Review & Assessment stated that there were potentially significant sources of $SO_2$ in Bolton, the stage two review concluded that there was no significant risk of the Objectives being exceeded.

Under the Second Round procedures in 2004, the Updating and Screening Assessment considered potentially significant industrial sources of $SO_2$ in accordance with the screening approach prescribed in LAQM.TG (03). The conclusion was that a Detailed Assessment was not required. Other than the closure of one of the 4 industrial $SO_2$ potential emission sources (Horwich Castings Limited), there had been no significant changes to the sources considered and the assessment remained valid in 2008.

The Third Round procedures in 2006 aimed to identify those matters that had changed since the Second Round of Review & Assessment, and which may have required further assessment. The Bolton Council third round Updating and Screening Assessment concluded that there was no risk of the $SO_2$ Objectives being exceeded and therefore a Detailed Assessment was not required.

The 2009 Updating and Screening Assessment confirmed that the $SO_2$ Objectives would be met by their respective dates.

### 2.2.3.2 Monitoring Data Update

$SO_2$ is currently measured at the automated monitoring station at college way, Bolton. The station houses $SO_2$ (UV fluorescence) monitoring equipment.

Summary data for this station are given in **Table 2.7,** updated to 2010, (expressed as percentile values and with the number of exceedences also given), demonstrating compliance with the three Objectives over the last three years.

**Table 2.7: Results of Automatic Monitoring for $SO_2$: Comparison with Air Quality Objectives**

| Site ID | Location | Within AQMA | Data Capture 2009 % | Data Capture 2010 % | $SO_2$ Objectives | | |
|---|---|---|---|---|---|---|---|
| | | | | | 15-minute Objective (266 µg/m$^3$) | 1-hour Objective (350 µg/m$^3$) | 24-hour Objective (125 µg/m$^3$) |
| Bolton | Bolton University, College Way **2009** | N | 85.2 | 91.3 | 19 µg/m$^3$ | 13 µg/m$^3$ | 8 µg/m$^3$ |
| | **No. of Exceedences** | | | | 0 | 0 | 0 |
| Bolton | Bolton University, College Way **2010** | N | 85.2 | 91.3 | 19 µg/m$^3$ | 16 µg/m$^3$ | 9 µg/m$^3$ |
| | **No. of Exceedences** | | | | 0 | 0 | 0 |

The automatic monitoring results for $SO_2$ exhibit concentrations well below the respective Objectives for 15-minute, 1-hour and 24-hour means over the previous 3 years. As such, a detailed assessment for $SO_2$ is not considered necessary.

### 2.2.4 Benzene

#### 2.2.4.1 Previous Reviews and Assessments of Benzene

There were no AQMAs declared from the First Round of Review & Assessment in respect of the Benzene UK Objective. The Bolton Council First Round Review & Assessment concluded that there were no significant sources of benzene in or around Bolton, and there was therefore no requirement to proceed beyond a Stage One screening review.

Under the Second Round procedures in 2004, the Updating and Screening Assessment considered potentially significant road traffic and industrial sources of Benzene in accordance with the screening approach prescribed in LAQM.TG (03). The conclusion was that a Detailed Assessment was not required.

The Third Round procedures in 2006 aimed to identify those matters that had changed since the Second Round Review & Assessment, and which may had required further assessment. The Bolton Council Third Round Updating and Screening Assessment concluded that there was no risk of the Benzene Objective being exceeded and therefore a Detailed Assessment was not required. There were no material changes to the sources considered in this screening and the assessment remained valid in 2008.

The 2009 Updating and Screening Assessment confirmed no new recorded exceedences of the respective air quality Objectives for Benzene. There are no major industrial installations in Bolton that have significant emissions of Benzene, and the borough is not thought to be generally at risk of exceedence of the air quality Objective for Benzene.

#### 2.2.4.2 Monitoring Data Update

Ambient Benzene concentrations are routinely measured at 4 locations in Bolton using passive diffusion tubes exposed for monthly periods, and analysed at a UKAS-accredited laboratory by thermal desorption and gas chromatography.

The uncorrected results as annual mean concentrations are presented in **Table 2.8**, updated to 2010 together with a data capture as a percentage of the number of months with valid data in the year.

**Table 2.8: Results of Diffusion tube monitoring for Benzene: Comparison with Annual Mean Objective**

| Site | Bankfield Street | Astley Bridge | Manley Terrace | Drummond Street |
|---|---|---|---|---|
| OS Grid Reference | 370374,408178 | 371433,411688 | 371349,411718 | 371304,411748 |
| Location | Urban Background | Roadside | Urban Background | Roadside |
| Concentration | µg/m$^3$ | µg/m$^3$ | µg/m$^3$ | µg/m$^3$ |
| 2008 | 0.47 | 1.19 | 0.84 | 0.62 |
| | (75%) | (100%) | (100%) | (92%) |
| 2009 | 0.70 | 1.15 | 0.91 | 0.89 |
| | (92%) | (92%) | (67%) | (92%) |
| 2010 | 1.23 | 1.96 | 1.21 | 0.87 |
| | (67%) | (100%) | (83%) | (92%) |
| Annual Mean Objective | 5 µg/m$^3$ | | | |

The results in **Table 2.8** show that measured Benzene concentrations are below the 2010 air quality Objective. A Detailed Assessment for Benzene is not considered necessary.

Pumped sampling for Benzene is not implemented within the Bolton network, with the nearest co-location study implemented by Manchester City Council. A co-located passive Benzene diffusion tube is positioned at the Manchester Piccadilly Gardens monitoring site with a pumped Benzene sampler. This forms part of the UK Hydrocarbon network (as operated by DEFRA).

Co-located pumped sorbent tube and passive diffusion tube data were used to derive a bias correction factor for the diffusion tubes from 2008 to 2010, and as the same laboratory and analytical method is used for tubes exposed by Bolton and Manchester councils, the bias correction factors contained within **Table 2.9** (Manchester CC, 2011), were applied in this Progress Report.

**Table 2.9** gives the bias-corrected annual mean data for 2008 to 2010 for comparison with the Benzene Objective value (in accordance with the factor given in box 3.4 of LAQM.TG (09) for roadside measurements up to 15 m from the road).

**Table 2.9 Bias Adjusted Mean concentrations for Benzene 2008 - 2010**

| Location | 2008 | 2009 | 2010 |
|---|---|---|---|
| **Bias Adjustment Value** | **1.30** | **1.19** | **0.90** |
| Bankfield Street | 0.61 | 0.84 | 1.11 |
| Astley Bridge | 1.55 | 1.37 | 1.77 |
| Manley Terrace | 1.09 | 1.08 | 1.09 |
| Drummond Street | 0.81 | 1.06 | 0.78 |
| **Annual Mean Objective** | | **5 µg/m$^3$** | |

**Table 2.9** indicates that at representative 'Roadside' and 'Urban Background' locations in Bolton the corrected annual mean Benzene concentrations from 2008 to 2010 were well below the UK Objective value.

### 2.2.5 Lead

#### 2.2.5.1 Previous Reviews and Assessments of Lead

There were no AQMAs declared in relation to the annual mean air quality Objective for Lead, as a result of the First Round of Review & Assessment. Only those authorities with relevant locations within the vicinity of major industrial processes that emit significant quantities of Lead, were expected to need to progress beyond the Updating and Screening Assessment.

The Bolton Council First Round Review & Assessment included detailed dispersion modelling of Lead emissions from four industrial sources, reported in the Stage Four Review & Assessment report, and the conclusions were that there was no significant risk of the lead Objective being exceeded near these sites. One of the installations closed in 2004.

Under the Second Round procedures in 2004, the Updating and Screening Assessment considered potentially significant industrial sources of lead in accordance with the screening approach prescribed in LAQM.TG (03). The conclusion was that a Detailed Assessment was not required.

The Third Round procedures in 2006 aimed to identify those matters that had changed since the Second Round of Review & Assessment, and which may had required further assessment.

The Bolton Council Third Round Updating and Screening Assessment concluded that there was no risk of the UK lead Objectives being exceeded and therefore a Detailed Assessment was not required. Other than the closure of one emission source, there had been no changes to the sources considered and this screening and assessment remained valid in 2008.

The 2009 Updating and Screening Assessment reported that there were no exceedences of the annual mean air quality Objective for lead.

### 2.2.5.2 Monitoring Data Update

Lead is monitored in Bolton near two potential Lead emission sources, a Part A regulated battery manufacturing process, and a Part A regulated clinical waste incinerator. Monitoring results updated to 2010 are presented in **Table 2.10**, with the percentage data capture given for each year.

**Table 2.10: Results of Lead Monitoring: Comparison with Annual Mean Objective**

| | Annual mean Objective for Lead, µg/m$^3$ | | |
|---|---|---|---|
| | **2008** | **2009** | **2010** |
| A6 Salford Road (CMP Batteries) | 0.050 (83%) | 0.035 (88%) | 0.0132 (96%) |
| Minerva Road (Bolton Hospital CWI) | 0.023 (94%) | 0.016 (81%) | 0.031 (96%) |
| **Annual Mean Objective** | **0.25 µg/m$^3$** | | |

All Lead monitoring results recorded from 2008 to 2010 exhibit concentrations well below the 2008 annual mean Objective.

A Detailed Assessment for Lead is therefore not considered necessary at this time.

## 2.2.6 Carbon Monoxide (CO)

### 2.2.6.1 Previous Reviews and Assessments of Carbon Monoxide

There were no AQMAs declared from the First Round of Review & Assessment in respect to the air quality Objective for CO. The Bolton Council First Round Review & Assessment stated that whilst there were potentially significant sources of CO in Bolton, the Stage Two review concluded that there was no significant risk of the Objective being exceeded.

Under the Second Round procedures in 2004, the Updating and Screening Assessment considered potentially significant road traffic and industrial sources of CO in accordance with the screening approach prescribed in LAQM.TG (03). The conclusion was that a Detailed Assessment was not required.

The Third Round procedures in 2006 aimed to identify those matters which had changed since the Second Round of Review & Assessment, and which could require further assessment.

The Bolton Council Third Round Updating and Screening Assessment concluded that there was no risk of the CO Objective being exceeded and therefore a Detailed Assessment was not required.

The 2009 Updating and Screening Assessment reported that there were no exceedences of the annual mean air quality Objective for CO.

### 2.2.6.2 Monitoring Data Update

CO is monitored at the Bolton University continuous monitoring station, using an Infra Red Absorption automatic analyser. The instrument has been serviced and calibrated, with data being collected and ratified in accordance with AURN QA/QC procedures as part of AEA's 'Calibration Club', since June 2008. Monitoring results for CO, updated to 2010 are presented in **Table 2.11**.

**Table 2.11: Results of Automatic CO Monitoring: Comparison with Annual Mean Objective**

| Site ID | Location | Within AQMA? | Data Capture % 2009 | Data Capture % 2010 | Running 8-hour mean mg/m$^3$ | | |
|---|---|---|---|---|---|---|---|
| | | | | | 2008 | 2009 | 2010 |
| Bolton | Bolton University, College Way | N | 62.4 | 91.3 | 2.6 | 1.3 | 2.4 |
| **Objective: Maximum daily running 8-hour mean (to be achieved by December 2003)** | | | | | | **10 mg/m$^3$** | |

Automatic monitoring results for CO from 2008 to 2010 demonstrate concentrations well below the maximum daily running 8-hour mean Objective.

A Detailed Assessment of CO is not considered necessary at this time.

### 2.2.7 Summary of Compliance with air quality strategy Objectives

**Bolton Council has examined the results from monitoring in the borough. Pollutant concentrations outside of the AQMA are all below the Objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.**

# 3 New Local Developments

## 3.1 Road Traffic Sources

Bolton Council confirms that there are no new or newly identified road traffic sources which may have an impact on air quality within the Local Authority area, since the last Updating and Screening Assessment.

## 3.2 Other Transport Sources

Bolton Council confirms that there are no new or newly identified other transport sources that may have an impact on air quality within the Local Authority area.

## 3.3 Industrial Sources

### 3.3.1 Industrial Installations

Industrial pollutant emission sources are regulated either by the Environment Agency or the Local Authority, depending on the activity and in some cases facility capacity, under the Environmental Permitting regime. Local Authorities also have regulatory control over some smaller industrial and commercial installations in accordance with the Clean Air Act, 1993.

Industrial releases to atmosphere are unlikely to significantly affect annual mean pollutant concentrations; however there is a potential for exceedence of short-term Objectives near significant emission sources.

Previous rounds of Review & Assessment have involved a detailed consideration of industrial emissions in the Bolton area. All pollutants within the LAQM regime were considered, with particular attention afforded to $SO_2$, $NO_2$, $PM_{10}$ and Benzene, and no breaches of the respective short-term Objectives were identified.

#### 3.3.1.1 New or Proposed Installations for which an Air Quality Assessment has been undertaken

Bolton Council confirms that there are no new/proposed industrial installations for which an air quality assessment has been carried out.

#### 3.3.1.2 Existing Installations where Emissions have increased substantially or New Relevant Exposure has been introduced

Bolton Council confirms that there are no industrial installations with substantially increased (>30%) emissions or new relevant exposure in their vicinity within its area.

#### 3.3.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

New or significantly changed installations introduced since the last LAQM Round of Review & Assessment are presented in **Table 3.1**.

**Table 3.1: New Installations for which an Air Quality Assessment has not been completed**

| Installation Process | Reference | Location | New/Significantly Changed | Exceedences of Objectives Predicted? |
|---|---|---|---|---|
| Waste Oil Burning | 363855, 410922 | Citroen Car Care Centre, Higher Bridge St, Bolton | New | No |

This installation will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

## 3.4 Major Fuel (Petrol) Storage Depots

There is evidence to suggest that major fuel depots could emit Benzene levels that may give rise to an exceedence of the 2010 UK air quality Objective.

There are no major fuel (petrol) storage depots identified within Bolton Council's administrative boundary since the previous round of Review & Assessment.

## 3.5 Petrol Stations

Bolton Council confirms that there are no petrol stations meeting the specified criteria, set out in section C.3 of Box 5.5 of TG(09), which have not previously been assessed or have significantly changed since the previous round of Review & Assessment.

## 3.6 Poultry Farms

Bolton Council confirms that there are no poultry farms meeting the specified criteria set out in section C.4 of Box 5.5 of TG(09),, which have not previously been assessed or have significantly changed since the previous round of Review & Assessment.

## 3.7 Commercial and Domestic Sources

Bolton Council confirms that there are no new or newly identified commercial and domestic sources that may have an impact on air quality within the Local Authority area.

## 3.8 New Developments with Fugitive or Uncontrolled Sources

Bolton Council confirms that there are no new or newly identified potential sources of fugitive or uncontrolled particulate matter, which are new since the last Updating and Screening Assessment, and has considered the following

- Landfill sites.
- Quarries.
- Unmade haulage roads on industrial sites.
- Waste transfer stations etc.
- Other potential sources of fugitive particulate emissions.

# 4 Local / Regional Air Quality Strategy

The development of local and regional air quality strategies can provide an opportunity for Local Authorities to set out the key air quality issues in the region and the principles for improving air quality, whilst taking into account regional and national policies in place. Each Local Authority is responsible for a number of functions that may affect air quality and is therefore in a position to influence local measures to improve air quality.

In Greater Manchester, a regional approach was adopted by the ten constituent Greater Manchester boroughs to consider the issue of air quality and develop policies for improving air quality on a regional scale.

The original Greater Manchester air quality strategy, 'Clearing the Air', was produced in 2002 setting out the framework for improving air quality in the region. To deliver the strategy, the ten Local Authorities published an Air Quality Action Plan in 2004 following extensive consultation with stakeholders. Each authority produced a local annex setting out what they intended to do within their own area within the Air Quality Action Plan. Bolton Council's contribution is contained within Annex 1 of that Action Plan.

The 2004 Air Quality Action Plan can be accessed via the following link:

http://www.manchester.gov.uk/download/14851/greater_manchester_air_quality_action_plan-2004

# 5 Planning Applications

Bolton Council Planning Department provided a list of development schemes that have been given planning permission since the last Progress Report. Schemes considered included biomass combustion plant, hotel, industrial, leisure, office and retail developments. Those major developments with a potential to significantly impact upon local air quality as a result of direct process or traffic-related emissions are presented in **Table 5.1**.

**Table 5.1: Planning Applications Approved by Bolton Council**

| Type of Development | Site Name | Description | Application Reference |
|---|---|---|---|
| Biomass Boiler | ESSA Academy, Lever Edge Lane, Bolton, BL3 3HH | Demolition of Existing School Buildings and Construction of a new Academy with central Courtyard and central covered space for 900 pupils and associated landscaping works. | 83395/09<br>Approved: 18/03/10<br>*Constructed* |
| Commercial | Former Farnworth Neighbourhood Shopping Centre, Longcauseway, Farnworth, Bolton | Erection of Food Superstore, 450 Car Parking Spaces and proposed vehicle access from Longcauseway. | 79672/08, 86199/11 (addition of petrol station)<br><br>Approved: 18/08/11<br>*79672/08*<br>*In Operation*<br>*86199/11*<br>*Under Construction* |

Planning application 83395/09 for 'Demolition of Existing School Buildings and Construction of a new Academy with central Courtyard and central covered space for 900 pupils and associated landscaping works' was approved on 18 March 2010. A Biomass Boiler Screening Assessment and Traffic and Accessibility Statement were submitted in connection with this application. The Biomass Screening Assessment concluded that, *"as the 'background adjusted' emission rates for $NO_2$ are below the threshold emission, a detailed assessment of both annual mean and hourly mean $NO_2$ emissions from the biomass boiler was not required".*

The Transport and Accessibility Statement concluded that, there was no material transport or highways issues preventing the revised development proposals from being approved and that, *"The traffic impact of the scheme is likely to be relatively minimal, given that parking on site is to remain approximately constant…"* and *"…The development will build upon the existing Academy travel plan and the additional students will benefit from the measures and initiatives within the travel plan".*

Planning application 86199/11 'Addition of a Petrol Filling Station' was approved on 18 August 2011. This planning application was supplemental to planning application 79672/08 'Erection of Food Superstore with 450 Car Parking Spaces and proposed vehicle access from Longcauseway.' An Air Quality Assessment and a revised Transport Assessment was provided in support of the application. The Air Quality Assessment took into account potential impacts of air quality, dust and odour during the construction and operational phases of development, and concluded that*, "the marginal impacts associated with the operational phase road vehicle exhaust emissions were predicted to be intermediate to negligible"* and *"…provided that good practice measures are implemented, the significance of potential air quality impacts on identified discrete receptors during the operational phase of the scheme are assessed as being intermediate, adverse to negligible in significance".*

The revised Traffic Assessment confirmed the findings from the previous application, with good existing public transport provision, and *"…Having considered all relevant transport issues, it is concluded that the proposed development, with appropriate mitigation, is consistent with council transport policy and is entirely acceptable in transport terms*".

# 6 Air Quality Planning Policies

National planning policy in respect of local air quality is given in Policy Statement 23 (PPS23) 'Planning and Pollution Control' (Nov 2004) and takes into account the air quality strategy and the system of LAQM, together with other key policies. PPS23 states that, *"air quality considerations can be a material planning consideration in the planning process and also in the development of Local Development Frameworks."*

Bolton Council continues to use Unitary Development Plan (UDP) policies and develop Local Development Framework Core Strategy policies to ensure air quality issues are considered in the planning process. The Core Strategy for Bolton was adopted in March 2011.

Core Strategy Policy IPC1 requires contributions to be made for development within Bolton in relation to air quality, seeking to improve the air quality within AQMAs. The policy ensures that developers make reasonable provisions or contributions towards appropriate physical, social and green infrastructure and help minimise and mitigate the local impact of emissions from traffic generated by a development, as well as emissions created by the use of the development itself in terms of sustainable development.

Core Strategy Policy CG4 ensures that new developments will be compatible with the surrounding environment by protecting amenity, privacy, safety and security. The policy outlines that any proposed development should not cause detrimental impact in relation to air quality, ground and water quality, and should not generate unacceptable nuisance, odour or noise pollution. Local Authorities may refuse planning applications for developments that may have an adverse impact with respect to air quality. Specifically, Core Strategy policy CG4.2 aims to protect air quality through the planning system. The Bolton AQMA seeks to reduce pollutants such as $NO_2$, $PM_{10}$ and $SO_2$, which are prevalent pollutants in and around the town centre and major highway roads such as the M61 and the A666.

Further information on planning policy can be found at:

http://www.bolton.gov.uk/website/pages/Planning.aspx

# 7 Local Transport Plans and Strategies

Bolton Council works through the Greater Manchester Local Transport Plan (GMLTP) to improve movement across the region. The Bolton Local Area Implementation Plan (LAIP) is part of the third Greater Manchester Local Transport Plan (GMLTP3) and covers all modes of travel, including buses, heavy rail, metrolink, walking, cycling, cars and freight, as well as the other issues which affect people's travel choices - fares, ticketing, passenger information, accessibility and safety.

The GMLTP3 transport strategy builds on successful policies and interventions adopted during the first two Local Transport Plans, including the Greater Manchester Transport Fund, an agreed programme of major road and public transport schemes which includes the Bolton town centre public transport scheme (Bolton Interchange).

As required by the Local Transport Act, 2008, the GMLTP3 contains the policies of the 'Transport for Greater Manchester' Authority for the provision of safe, integrated, efficient and economic transport to, from and within their area for the next 15 years.

The GMLTP3 document can be accessed via the following link:

http://www.tfgm.com/ltp3/documents/Greater_Manchester_Local_Transport_Plan_Core_Strategy.pdf

The Bolton LAIP (Bolton MBC 2011a) outlines a set of strategic transport objectives that Bolton Council believes will ensure:

- The transport network supports the Greater Manchester economy to improve the life chances of residents and the success of business;
- Carbon emissions from transport are reduced in line with UK Government targets, to minimise the impact on climate change;
- The adverse impact of transport on public health and community safety is minimised;
- The design and maintenance of the transport network and provision of services supports sustainable neighbourhoods and public spaces; and
- Value for money is maximised in the provision and maintenance of transport infrastructure and services.

The Bolton LAIP document can be accessed via the following link:

http://www.tfgm.com/ltp3/documents/LAIP-Bolton-Final.pdf

# 8 Climate Change Strategies

The Adopted Core Strategy Development Plan (Bolton MBC 2011b) is the key document in the Local Development Framework, which is the planning policy framework for Bolton Council. The Core Strategy forms part of the development plan for Bolton and replaces some elements of the 2005 UDP. The strategy gives direct actions to combat climate change and the impacts within the Bolton region and sets out a spatial strategy for a sustainable community to 2026.

Bolton Council is committed to improving environmental quality, and addressing and minimising the causes of climate change. Sustainable development and climate change issues are addressed directly through the *'Cleaner and Greener Bolton'* section of the strategy, and form an underlying thread through all the Sustainable Community Strategy themes expressed within the Core Strategy.

Contained within the '*Cleaner and Greener Bolton'* section of the adopted Core Strategy, there are four key strategic objectives that Bolton Council have identified with reference to climate change:

- SO10 To minimise Bolton's contribution to climate change and mitigate and adapt to its adverse effects;
- SO11 To conserve and enhance the best of Bolton's built heritage and landscapes, and improve the quality of open spaces and the design of new buildings;
- SO12 To protect and enhance Bolton's biodiversity; and
- SO13 To reduce the likelihood and manage the impacts.

The Council has indentified within the Core Strategy a need to reduce greenhouse gas emissions, especially $CO_2$. In line with national targets, Bolton Council has outlined a per capita reduction of $CO_2$ emissions of 10% for 2010/2011, with a reduction of 15% by 2012/2013 and 26% by 2017/2018. New residential development will need to be zero carbon by 2016 and non-residential development by 2019.

The Adopted Core Strategy can be accessed via the following link:

http://www.bolton.gov.uk/sites/DocumentCentre/Documents/Adopted%20Core%20Strategy%20Bolton%202011.pdf

# 9 Implementation of Action Plans

The ten constituent Local Authorities in Greater Manchester published an Air Quality Action Plan in 2004 in order to improve air quality in the conurbation. Each authority produced a Local Air Quality Action Plan, and these are contained within the Greater Manchester Air Quality Action Plan (GMAQAP) document as a local annex. In 2006, the plan was incorporated into the Local Transport Plan. Local Authorities continue to work together to develop various elements of the Action Plan, with the overall aim of the plan to reduce the effects of poor air quality on the health of people within the Greater Manchester boroughs.

The current Greater Manchester Air Quality Action Plan covers the period from 2006/07 to 2010/11 and is developed jointly with the Local Transport Plan owing to the fact that the largest proportion of air pollution (in particular $NO_2$) directly experienced by people in the urban areas of the region arises from road traffic.

Work is still in progress for the Air Quality Action Plan by Bolton Council, with **Table 9.1** showing the most recent submission to DEFRA in September 2011.

The GMLTP2 air quality strategy and action plan can be assed via the following link:

http://www.greatairmanchester.org.uk/documents/LTP2%20AQ%20Strategy%20and%20Action%20Plan%202006.pdf

The GMLTP3 summary document can be accessed via the following link:

http://www.tfgm.com/ltp3/documents/LTP3_Summary_060511.pdf

**Table 9.1: Bolton Council's AQAP submission to DEFRA in 2011**

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| **A1** | **Roadside Emission Testing** Implement the Vehicle Emissions (Fixed Penalty) (England) Regulations 2002 | On-going | Vehicle emission testing in greater Manchester and smarter driving tips | Bolton was unable to take part. Vehicles tested and advice given. Joint program With the energy savings trust to promote smarter driving and reduce emissions of $CO_2$, $PM_{10}$ and $NO_X$ emissions. 375 vehicles tested across GM excl Bolton | 2003 - 2009 4000 vehicles tested. Results showing fall in vehicle emissions for hydrocarbons and CO. NOx trend not as clear | Bolton to look again into taking part |
| **A9** | **Air Quality Monitoring** Produce annual reports and publish results | April annually | No specific air quality report produced | Monitoring results now incorporated into the Review & Assessment reports | Reports submitted to DEFRA | Monitoring data is in the Air Quality Management Progress Report. |
| **A9** | **Air Quality Info on Website** Publish AQ action plan on web with links to AQ sites and include other service info. | On-going | Air quality Management area is now on the web | Air quality management area on the web site | | Councils web site update. Next stage to upload AQ reports |
| **A9** | **Review Current Monitoring** Assess suitability of current monitoring sites and amend as appropriate | April 2005 | New monitoring sites now operational. | Review of Monitoring sites brought forward due to savings and efficiencies review 2010 | Report produced 2006/07. Monitoring programme now updated. Real time site closure 1 April 2011 Also stopped, smoke and $SO_2$ and lead | |
| **E7** | **Pedestrianisation** Town Centre schemes | Dec 2003/04 | | | The pedestrianisation and shared surface scheme on Bath St has been complete. Plans for the | National funding cuts and a prioritisation of major schemes at the Greater Manchester level as well as a |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | | | | | pedestrianisation of Le Mans Cres/Cheadle Square is currently on hold due to budget restraints. | slow down in economic growth and therefore a reduction in section 106 funding will delay any further pedestrianisation of the town centre. |
| **E7** | **Improved Cycling and Walking Provision**<br>Produce and implement a Walking Strategy.<br><br>Monitor the implementation of the Cycling Strategy. | April 2004 | Much activity on small (DDA) schemes across the town including improved public realm works.<br><br>Bolton to Bury cycle route using old railway forms part of the Greater Manchester Local Sustainable Transport Fund Bid.<br><br>Successful Greater Manchester Local Sustainable Transport Fund Key Component Bid includes new cycle point in Bolton town centre to be complete 2014. | | Cycling Forum established and active.<br><br>Adopted Cycling Strategy.<br><br>Middlebrook cycle route to Town Centre in operation.<br><br>Off-road route from town centre to General Hospital completed.<br><br>Sustrans has taken on the maintenance liability for the two viaducts of the proposed Bolton to Bury Off Road Cycle Route. | The Council's walking strategy is now out of date and replaced by the guidance set out in the Greater Manchester Local Transport Plan 3 and Bolton Local Area Implementation Plan<br><br>Bolton – Bury cycleway scheme is part of the GM Local Sustainable Transport Fund Bid to DfT. |
| **A3** | **Taxi Controls**<br>Investigate the regulation of Taxi emissions.<br><br>Encourage use of LPG. | Short Term | No change.<br><br>Approx. 25 cars run on LPG | No change | On-going policy of testing 100% of vehicles twice yearly.<br><br>Approx. 25 cars run on LPG | Trade have requested the Council have an age policy. |
| **E5** | **Use of Cleaner and Alternative Fuels**<br>Continue the fitting of particulate traps as part of the annual replacement program for Council fleet | On-going | All new vehicle purchases meet Euro 4 standard. Now moving to Euro 5. | | Continual improvement in emission standards of new vehicles. Particle traps fitted where necessary.<br><br>5% bio diesel in use for entire fleet (approx. 600 vehicles) | |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | Trial other methods to reduce emissions from the Council fleet | | | | | |
| **D2** | **Quality Bus Partnership** Northern Orbital to start 2003/04 | Dec 2006 | Bolton has signed a Quality Partnership Scheme with Transport for Greater Manchester and Bus Operators on the existing Quality Bus Corridor between Bolton and Leigh.<br><br>Outline Planning Permission granted for new bus station in Bolton town centre. | | Quality Bus Partnership operational.<br><br>Bolton part of Northern Orbital Quality Bus Corridor completed. | On-going programme of schemes.<br><br>Full planning permission will be sort in September for a new bus station in Bolton town centre. |
| **E8** | **Travel Plans** Develop the key areas of the BMBC travel plan. | Medium Term | Development of staff travel plan delayed and linked with the implementation of the pay and grading review. | | Car share scheme implemented.<br><br>Mileage allowance for larger cars removed.<br><br>Cycle sheds provided. | Travel benefits will be considered in the final phase of the pay and grading review. |
| **E8** | **Work in Partnership with Local Businesses to Produce Travel Plans** | Medium Term | | | Approximately 15 businesses have travel plans approved.<br><br>Travel Plan guidance in place as part of the planning application process | Limited resources available to work with local employers to progress travel plans. The Council will require new employment units over the specified criteria to provide a workplace travel plan to be approved by the Council |
| **E9** | **Walk to school plans, etc.** | Aim to achieve 100% of schools with STPs by 2010 | The School Travel Adviser post ended in March 2011. The council no longer has any officer supporting schools with travel plans or reviews etc.<br><br>Encouragement with walking schemes. Living Streets have been able to support Schools with the | | 125 schools in Bolton have approved travel plans as of April 2010 which equates to 96.1% of mainstream schools.The schools received £489, 207 in capital grants.<br><br>13 schools took part in WOW for 2010/2011 with 50% funding from the Department of Health. 17 schools will be undertaking the Walk on Wednesday (WOW) | Aim to achieve 100% of schools with STPs by 2010. Capital funding available from DCSF.<br><br>Schools taking part have actively seen a percentage rise in the numbers of pupils walking to school at least once a week and normally more than once. |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | | | Walk on Wednesday (WOW) scheme due to funding for schools to be part-funded by 50% by the Department of Health. The Greater Manchester Public Health Network have provided additional funding, enabling them to offer resources to a limited number of schools in the Lower Super Output areas with low walking rates to school **free of charge**. The School Travel Adviser has been able to promote the scheme to school up to March 2010.<br><br>Walking Buses encouraged.<br><br>Primary School s which are expanding due to the need for primary school places are currently reviewing their travel plans and given support by officers in the Asset Management Team, Children's Services. They will be encouraged to take part in schemes such as WOW and Walk To School Week.<br><br>A high percentage of primary schools and nurseries do take part in | | scheme from September 2011 – 12 are receiving 50% funding from and 5 are receiving 100% funding from GM Public health.<br><br>8 schools currently have active weekly walking buses.<br><br>. | More schools being encouraged to take part in Walk to School Week.<br><br>Training is still available via Bolton Council Road Safety Team. Schools will need to contact them directly. |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | | | Walk to School Week. However resources and support from the Schools Travel Adviser is no longer available. | | | |
| **NTA5** | **Policy Measures Development Control** Investigate the practicality of the S106 agreements to secure balancing measures in application where AQ is an issue. | Long Term | Small amount of progress made in researching this subject. | | Small amount of progress made in researching this subject. | |
| **NTA5** | **Development Control** Provide guidance in relation to AQ for developers to follow when submitting Planning Applications. | Long Term | Some progress made in developing a Gtr Manchester planning advice document. | none | Workplace travel guidance note written and provided to applicants. | Need to develop one for Bolton |
| **NTA1** | **Industrial Emissions** Continue to enforce the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended) | On-going | All premises permitted continue to be inspected as per their risk rating | | Annual programme of inspections maintained. | |
| **NTA2** | **Domestic Emissions** Smoke Control Areas. Whole of Bolton SCA – Publicise | On-going | All complaints about domestic emissions are investigated and dealt with appropriately. Review of procedure underway to be more effective. | Review of procedure underway to be more effective. | Policy of investigation and enforcement maintained. | Revised procedure operational before 1 Jan 2011 |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | implications of SCA Enforce Legislation | | | | | |
| **NTA4** | **Information on Bonfires and Air Quality** Provide information to residents on environmental issues relating to bonfires to discourage inappropriate burning. | Short Term | No further progress. | Review of procedure on going | Bonfire leaflet produced. Draft procedure produced | Leaflet to go out to all those alleged to have had bonfires operational before 1 Jan 2011 |
| **NTA2** | **Affordable Warmth Strategy** (Home Energy and Fuel Poverty) Implementation of the Strategy | Medium term | Funding secured for Affordable Warmth Coordinator for 2007-08.<br><br>Awareness raising events including Energy Efficiency Advice Shop which over 1600 people attended.<br>Affordable Warmth Project Officer in post to deliver training to newly formed households.<br><br>**Public sector**<br>629+ heating systems fitted with A rated boilers.<br>3837 homes insulated to the required standards.<br><br>**Private sector**<br>approx. 1874 homes were insulated (2789 measures – Loft insulation, Cavity Wall Insulation and Draught proofing).<br>Better Behaving Boiler Scheme - 111 grants | Data for 2010-11:<br>**Installation of efficient heating systems (Warm Front top up scheme): 10**<br><br>Approximate annual savings on fuel bills in Bolton: £3k<br>Approximate annual carbon dioxide savings: 12,200kg (Based on replacing a g-rated boiler, at £300 and 1,220kg annual savings per boiler)<br><br>**Installation of efficient heating systems (Better Behaving Boiler Scheme, including health** | Affordable Warmth Officer in post (funded from Carbon Emission Reduction Target).<br><br>Large number of private sector properties improved.<br><br>Funding secured for measures in 2011-12. | |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | | | awarded.<br>Warm Front Top Up Scheme - 278 grants awarded. | **grants): 70**<br><br>Approximate annual savings on fuel bills in Bolton: £21k<br>Approximate annual carbon dioxide savings: 85,400kg<br>(Based on replacing a g-rated boiler, at £300 and 1,220kg annual savings per boiler)<br><br>**Installation of Insulation (Borough wide scheme): 647**<br><br>Approximate annual savings on fuel bills in Bolton: £113k<br>Approximate annual carbon dioxide savings: 465,840kg<br>(Based on loft insulation, at £175 and 720kg annual savings per installation)<br><br>Working towards AGMA (Low Carbon Economic Area) based targets, for | | |

| GM LTP2 AQ Ref. | Action plan measure/target | Original timescale | Progress with measure in 2007/08 | Progress in last 12 months | Outcome to date | Comments |
|---|---|---|---|---|---|---|
| | | | | number of insulation measures installed.<br><br>Several community events have taken place where free energy efficiency advice has been provided to (+2,000) Bolton residents, as well as energy saving devices.<br><br>1,000 Energy Saving Devices (Standby Savers and Energy Monitors) acquired through Utility Companies at no cost to the Council at a total RRP value of: £21,470. These are being distributed to vulnerable customers in Bolton. | | |

# 10 Conclusions and Proposed Actions

## 10.1 Conclusions from New Monitoring Data

New monitoring data for 2009 and 2010 as presented in this report indicate that $NO_2$ levels do not exceed the air quality strategy Objectives at monitoring locations positioned outside the existing AQMA.

There were no new recorded exceedences of the respective air quality Objectives for $PM_{10}$, $SO_2$, CO, Benzene and Lead. Based on the most recent monitoring data, it is not considered necessary to proceed to a Detailed Assessment for any of the air quality strategy pollutants.

## 10.2 Conclusions relating to New Local Developments

Bolton Council has no new major developments that may have a significant impact on local air quality. Planning applications received were reviewed, and it was concluded that they would have no significant negative impact on existing local air quality, in their construction, operation or in combination. It is therefore not considered necessary to proceed to a Detailed Assessment based on new local developments or potential emission sources.

## 10.3 Proposed Actions

The Progress Report for 2011 has identified no likely exceedence of the air quality objectives for $PM_{10}$, $SO_2$, CO, Benzene, 1-3 butadiene or lead.

Monitoring data presented in this report would indicate it is not necessary to proceed to a Detailed Assessment for any pollutant. A number of diffusion tube monitoring sites within the existing AQMA exceed the $NO_2$ annual mean Objective of 40µg/$m^3$.

An extensive $NO_2$ monitoring network exists throughout Bolton and currently captures all areas of potential concern, therefore it is not envisaged the existing network will be increased unless a change in local circumstances is identified. $NO_2$ continues to be identified as the pollutant most likely to exceed its Objective value, with road traffic as the main emission source.

Bolton Council will continue to monitor at locations which are determined to be relevant locations of exposure to air pollutants.

Under the Local Air Quality Management Review & Assessment process the next course of action for Bolton Council will be to submit an Updating and Screening Assessment in 2012 as part of Fifth Round of Review & Assessment.

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# Appendices

**Appendix A: QA/QC Data**

# Appendix A: QA/QC Data

## Diffusion Tube Bias Adjustment Factors

In the past, diffusion tube monitoring for $NO_2$ was prepared using the 10% triethanolamine (TEA) in water method and analysed by Eurofins Ltd, a UKAS accredited laboratory located at Trafford Park, Salford. Based on this method of preparation, the Review & Assessment Helpdesk Database bias adjustment spreadsheet (version 09/09) was used to obtain the appropriate bias adjustment factor (0.83) to apply to all diffusion tube results in 2008. The bias adjustment factor of 0.82 was applied to all results up until August 2009.

Currently, diffusion tube monitoring has been undertaken at 28 locations within the Bolton Council area, with the tubes analysed by Staffordshire Scientific Services using a 20% TEA in water preparation method. Data capture at all of the sites was high, with at least eleven months data at all sites. The bias adjustment factors for Staffordshire Scientific Services from the national database, found at:
http://laqm.defra.gov.uk/documents/Diffusion_Tube_Bias_Factors_v06_11.xls was 0.81 from August 2009 and 0.85 for 2010.

Co-location of the tubes with the automatic analyser is impracticable, and national bias adjustment factors relevant for the analytical methodology employed were therefore applied..

## QA/QC of Automatic Monitoring

AEA Technology carries out the QA/QC procedures for the automatic monitors within the automatic monitoring station and they are calibrated approximately every 6 months.

These analysers are subject to the same QA/QC procedures as for those that form part of the DEFRA National AURN. The only difference is that AEA Technology carries out the initial capture and screening of the data, as well as the data ratification. The data are not published on the UK Air Quality Archive internet website, as central funding for the station is not provided.

## QA/QC of Diffusion Tube Monitoring

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK $NO_2$ Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of LAQM. The laboratory participants analyse four spiked tubes, and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte.

The outcomes of these QA/QC schemes are evaluated on a regular basis against a set of pre-defined performance criteria.

The Performance criteria are based on the 'z-score' system to assess the performance of laboratories participating in the WASP $NO_2$ scheme. Laboratory summary performances as reported for LAQM will continue to be based upon this methodology.

## Benzene Diffusion Tube Bias Correction

Pumped sampling for Benzene is not implemented within the Bolton network, with the nearest co-location study implemented by Manchester City Council. A co-located passive Benzene diffusion tube is positioned at the Manchester Piccadilly Gardens monitoring site with a pumped Benzene sampler. This forms part of the UK Hydrocarbon network (as operated by DEFRA).

The bias adjustment results from 2006 from the Manchester Piccadilly Gardens monitoring site are presented in **Table A1** below.

**Table A1: Bias adjustment results for Benzene at Manchester Piccadilly Gardens**

| Year | Pumped Benzene Sampler Results | | Benzene Diffusion Tube Results | | Bias Adj. Factor |
|---|---|---|---|---|---|
| | Annual Mean Benzene Concentration (µg/m$^3$) | Capture % | Annual Mean Benzene Concentration (µg/m$^3$) | Capture % | |
| 2006 | 1.02 | 100 | 1.12 | 92 | 0.91 |
| 2007 | 1.00 | 100 | 0.66 | 100 | 1.52 |
| 2008 | 0.78 | 100 | 0.60 | 92 | 1.30 |
| 2009 | 0.86 | 96 | 0.72 | 100 | 1.19 |
| 2010 | 0.89 | 100 | 0.99 | 100 | 0.90 |

The Benzene diffusion tubes used by Manchester City Council are currently supplied by Staffordshire Scientific Services. Preparation and analysis is subcontracted to another UKAS accredited Laboratory. The Benzene diffusion tubes for Bolton Council are prepared and analysed by the same method and therefore it was deemed appropriate to use the bias adjusted factors in **Table A1.**

## $PM_{10}$ Monitoring Adjustment

In 2008, $PM_{10}$ was monitored using a TEOM, thus requiring adjustment in accordance with the Volatile Correction Model (VCM) method, as outlined in Box 3.4 of LAQM TG (09).

The VCM was based on the assumption that the volatile component of $PM_{10}$, lost during the heated sampling of particulate matter within a TEOM, is consistent across a defined geographical area. Therefore, measurements of the volatile component at one location may be used to correct measurements at another. The VCM model uses the Filter Dynamics Measurement System (FDMS) "purge measurement" as an indicator of the volatile component of $PM_{10}$. This allows the mean $PM_{10}$ concentration measured by a TEOM to be corrected to a concentration equivalent to the European reference method using the following equation:

$TEOM_{VCM}$ $PM_{10}$ = TEOM $PM_{10}$ + (1.87 x Regional FDMS $PM_{10}$ purge)

A $TEOM_{VCM}$ $PM_{10}$ adjustment factor of 1.12 was applied to the 2008 annual mean $PM_{10}$ recorded at the TEOM located at Bolton University.

**Table A2: 2009 $NO_2$ diffusion tube monthly mean values**

| Site ID | Site name | 2009 Monitoring Periods | | | | | | | | | | | | Raw Annual Mean Concentration | Data Capture % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | | |
| 10 | 63 Bankfield Street B NS6 | 40 | 31 | 23 | 28 | 18 | 17 | 15 | 15 | 17 | 28 | 29 | 32 | 24.44 | 100 |
| 15 | Astley Bridge B lamp post NS1 | 74 | 56 | 52 | 64 | 47 | 52 | 46 | a | a | 54 | 70 | 66 | 58.05 | 83 |
| 4 | Manley Terrace B | 62 | 37 | 36 | 39 | 30 | a | 33 | 24 | 26 | 40 | 51 | 51 | 39.06 | 92 |
| 18 | Astley Bridge B library inside | 46 | 44 | 37 | 36 | 32 | 35 | 23 | 21 | 27 | 28 | 34 | 41 | 33.59 | 100 |
| 16 | Drummond Street B NS8 | 47 | 32 | 26 | 30 | 18 | 22 | 21 | 18 | 20 | 33 | 35 | 41 | 28.56 | 100 |
| 3 | Quintins B NS9 | 89 | 71 | 57 | a | 55 | a | a | a | a | a | 57 | 53 | 63.67 | 50 |
| 34 | Weston House B | 61 | 50 | 39 | 44 | 19 | 29 | 28 | 22 | 32 | 43 | 41 | a | 37.07 | 92 |
| 48 | Ainsworth Road LL | 57 | a | 44 | 52 | 44 | 39 | 32 | 32 | 34 | a | 42 | 45 | 42.20 | 83 |
| 49 | Little Lever Office front | 45 | 39 | 28 | 34 | 21 | 24 | 22 | 21 | 25 | 35 | 26 | 42 | 30.17 | 100 |
| 50 | Little Lever office front | 42 | 38 | 28 | 33 | 20 | 27 | 23 | 20 | 25 | 33 | 34 | 48 | 30.86 | 100 |
| 51 | Little Lever office rear | 33 | 35 | 24 | 30 | 18 | 51 | 16 | 17 | 22 | 32 | 32 | 43 | 29.42 | 100 |
| 54 | 20 Laburnum Park | 42 | 28 | 22 | 21 | 15 | 14 | 12 | 15 | 14 | 28 | 28 | 37 | 23.06 | 100 |
| 53 | 3 Turton Road rear | 44 | 33 | 26 | 29 | 21 | 23 | 17 | 19 | 18 | 29 | 35 | a | 26.60 | 92 |
| 52 | 3 Turton Road front | 60 | 63 | 58 | 56 | 39 | 54 | 52 | 40 | 50 | a | 39 | 58 | 51.65 | 92 |
| 44 | 1007 Chorley New Road H | 49 | 53 | 40 | 36 | 28 | 26 | 31 | 25 | 31 | 41 | 31 | 44 | 36.23 | 100 |
| 45 | 1007 Chorley New Road H | 48 | 55 | 37 | 37 | 28 | 26 | 33 | 30 | 34 | 47 | 32 | 38 | 37.13 | 100 |
| 41 | White Horse, 259 Bolton Rd | 53 | 46 | 32 | 48 | 28 | 35 | 27 | 28 | 31 | 42 | 41 | 38 | 37.32 | 100 |
| 40 | Bolton Rd/Manc Road W | 60 | 58 | a | 53 | a | a | 38 | a | a | a | 54 | a | 52.68 | 42 |
| 43 | Beehive 991 Chorley New Rd | 84 | 70 | 44 | 66 | 44 | a | 45 | 41 | 44 | 61 | 61 | 57 | 56.07 | 92 |
| 46 | 5 Crowborough Close H | 34 | 28 | 16 | 20 | 13 | 13 | 13 | 14 | 15 | 25 | 27 | 30 | 20.71 | 100 |
| 60 | 134 Buckley Lane F | 73 | 56 | 39 | 50 | a | 36 | 31 | 29 | 40 | 51 | 44 | 53 | 45.75 | 92 |
| 61 | Primrose Street K | 78 | 46 | 42 | 60 | 40 | a | 39 | 33 | 46 | 63 | 54 | 66 | 51.51 | 92 |
| 62 | 72/74 Hr Market St F | a | 80 | 56 | 69 | 52 | 53 | 23 | 47 | 26 | 65 | 65 | 68 | 54.96 | 92 |
| 63 | 2 Fern St F | 52 | 42 | 29 | 40 | 22 | | 57 | 24 | 51 | 36 | 37 | 47 | 39.75 | 92 |
| 64 | Bolton Gate | 63 | 52 | 39 | 48 | 32 | 28 | 29 | 30 | 30 | a | 55 | 50 | 41.39 | 92 |
| 65 | 2 Phoenix Street B | 53 | 49 | 35 | 43 | 35 | 34 | 30 | 30 | 34 | 46 | 44 | a | 39.33 | 92 |
| 66 | 505 Blackburn Rd B | a | a | 67 | 66 | 48 | 61 | 56 | 41 | 54 | 61 | 62 | 56 | 57.14 | 83 |
| 67 | 3 The Welland W | 51 | 38 | 31 | 40 | 23 | 27 | 20 | 20 | 25 | 35 | 36 | 56 | 33.53 | 100 |
| 68 | 24 Winslow Road B | 70 | 50 | 48 | 54 | 39 | 27 | 30 | 36 | 35 | 47 | 46 | 56 | 44.78 | 100 |

a = absent result

**Table A3: 2010 $NO_2$ diffusion tube monthly mean values**

| Site ID | Site name | 2010 Monitoring Periods | | | | | | | | | | | | Raw Annual Mean Concentration | Data Capture % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | | |
| 10 | 63 Bankfield Street B NS6 | 31 | a | a | a | 19 | a | 14 | 17 | 21 | 25 | 27 | a | 21.91 | 58 |
| 15 | Astley Bridge B lamp post NS1 | 43 | 50 | 39 | 37 | 37 | 44 | 42 | 37 | 51 | 49 | 48 | 43 | 43.13 | 100 |
| 4 | Manley Terrace B | 37 | 41 | 31 | 27 | 21 | 22 | 25 | 19 | 33 | 39 | 34 | 62 | 32.68 | 100 |
| 18 | Astley Bridge B library inside | 27 | 37 | 28 | 32 | 28 | 31 | 24 | 22 | 30 | 24 | 33 | 36 | 29.15 | 100 |
| 16 | Drummond Street B NS8 | 34 | 37 | a | 17 | 16 | 17 | 17 | 15 | 26 | 23 | 32 | 40 | 24.75 | 92 |
| 3 | Quintins B NS9 | 58 | 61 | 54 | 46 | 40 | 54 | 42 | 43 | 57 | 61 | 64 | 71 | 54.16 | 100 |
| 48 | Ainsworth Road LL | 46 | 44 | 34 | 30 | 28 | 31 | 30 | 28 | 41 | 43 | 44 | 45 | 36.95 | 100 |
| 49 | Little Lever Office front | 38 | 43 | 30 | 23 | 21 | 23 | 21 | 22 | 26 | 33 | 34 | 46 | 30.05 | 100 |
| 50 | Little Lever office front | 35 | 43 | 32 | 26 | 22 | 21 | 20 | 22 | 28 | 35 | 32 | 47 | 30.09 | 100 |
| 51 | Little Lever office rear | 36 | 39 | 26 | 22 | 22 | a | a | a | 25 | 28 | 35 | 46 | 30.96 | 75 |
| 54 | 20 Laburnum Park | 31 | 30 | 21 | 16 | 14 | 12 | 14 | 14 | 19 | 24 | 26 | 31 | 20.81 | 100 |
| 53 | 3 Turton Road rear | 32 | 37 | 32 | 21 | 20 | 19 | 16 | 15 | 24 | 28 | 29 | 37 | 25.76 | 100 |
| 52 | 3 Turton Road front | 49 | 56 | 44 | 44 | 44 | 46 | 42 | 47 | 46 | 50 | 48 | 60 | 47.98 | 100 |
| 44 | 1007 Chorley New Road H | 38 | 43 | 31 | 25 | 28 | 27 | 28 | 29 | 36 | 35 | 31 | 41 | 32.65 | 100 |
| 45 | 1007 Chorley New Road H | 42 | 40 | 30 | 24 | 27 | 28 | 34 | 28 | 35 | 37 | 36 | 47 | 34.16 | 100 |
| 41 | White Horse, 259 Bolton Rd | 50 | 52 | 38 | 30 | 31 | 32 | 27 | a | a | a | 39 | 54 | 38.99 | 75 |
| 40 | Bolton Rd/Manc Road W | 52 | a | 44 | 36 | 42 | 40 | 36 | 39 | 46 | 47 | 51 | 61 | 44.80 | 92 |
| 43 | Beehive 991 Chorley New Rd | 53 | 58 | 44 | 40 | 37 | 39 | 44 | 41 | 53 | 56 | 49 | 53 | 47.25 | 100 |
| 46 | 5 Crowborough Close H | 27 | 28 | 18 | 12 | 12 | 20 | 14 | 13 | 18 | 22 | a | 30 | 19.45 | 92 |
| 60 | 134 Buckley Lane F | a | 41 | 36 | 39 | 30 | 32 | 32 | a | 44 | 52 | 46 | 57 | 40.67 | 83 |
| 61 | Primrose Street K | 54 | 67 | 60 | 39 | 37 | 46 | a | 36 | 50 | 51 | 56 | 66 | 50.98 | 92 |
| 62 | 72/74 Hr Market St F | 55 | 65 | 46 | 47 | 42 | 50 | a | 48 | 53 | 60 | 65 | 72 | 54.76 | 92 |
| 63 | 2 Fern St F | 45 | 47 | 37 | 31 | 26 | 25 | a | 23 | 31 | 35 | 39 | 52 | 35.45 | 92 |
| 64 | Bolton Gate | 48 | 39 | 36 | 24 | 27 | 31 | a | 29 | 31 | 42 | 47 | 49 | 36.57 | 92 |
| 65 | 2 Phoenix Street B | 48 | 51 | 35 | 24 | 27 | 30 | a | 31 | 37 | 39 | 45 | 51 | 37.98 | 92 |
| 66 | 505 Blackburn Rd B | a | 68 | 59 | 51 | 48 | 56 | a | 47 | 56 | 61 | 58 | 71 | 57.47 | 83 |
| 67 | 3 The Welland W | 43 | 49 | 30 | 22 | 20 | 21 | a | 19 | 35 | 36 | 37 | 45 | 32.43 | 92 |
| 68 | 24 Winslow Road B | 40 | 48 | 42 | 31 | 31 | 27 | a | 34 | 42 | a | 45 | 46 | 38.74 | 83 |

a = absent result