



# 2014 USA and 2015 Air Quality Annual Status Report (ASR)

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

June 2016

**South Somerset District Council**

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## Executive Summary: Air Quality in Our Area

### Air Quality in South Somerset

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

In South Somerset the only one of the pollutants included in the National Objectives which gives any cause for concern is Nitrogen dioxide. This pollutant is strongly linked with transport sources, particularly road transport. It is not surprising then to discover that the highest level of Nitrogen dioxide concentrations found in South Somerset are also the areas with the highest level of road traffic flows, namely the main commuter routes in Yeovil. These areas have been consistently monitored now for over a decade. During this period nitrogen dioxide levels have remained relatively unchanged, despite an increase in traffic flows. Isolated areas in Yeovil have been shown to exceed the Annual air quality objective for Nitrogen dioxide, other areas have been shown to be close to this objective.

During 2014 the concentration of nitrogen dioxide within the Yeovil Air Quality Management Area was measured to be greater than the annual mean objective value in three locations. In 2015 this increased to four locations, however the new site which exceeded the emission limit was at a curbside location and not thought to be a relevant receptor.

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

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Because of this ongoing issue an Air Quality Management Area was declared for Yeovil in 2005 and an Action Plan was developed in order to introduce measures to reduce pollutant concentrations where the objective levels have been shown to be breached. The action plan would also help prevent other areas which may be close to exceeding the objective from doing so.

Because the primary source of the pollutant is traffic, this Action Plan has been developed in Partnership with the Highways service at Somerset County Council and in conjunction with colleagues in the District Council's planning policy unit.

Figure 1: Map Showing the Boundary of the Yeovil Air Quality Management Area



Outside of these isolated hotspots in Yeovil, air quality in South Somerset is generally very good. This is largely due to the mainly rural character of the area. South Somerset covers a large area, extending some 64 miles from east to west with an area of 960 square kilometres. The population is mostly rural with almost 45% of the population living in settlements of fewer than 2500 people, with the two principle towns of Yeovil and Chard having more than 10,000 inhabitants each.

## **Actions to Improve Air Quality**

The Yeovil Air Quality Management Area will remain in order to help reinforce policies that help maintain and enhance air quality in Yeovil. As the district council has limited control over emissions from transport sources, it will continue to liaise with Highways at Somerset County Council and will continue to promote procedures that are sympathetic to air quality by both promoting modal shift in essential developments and by minimising new receptors being located within vulnerable areas.

## **Local Priorities and Challenges**

All relevant pollutants are less than objective values, except within the Yeovil Air Quality Management Area where concentrations of nitrogen dioxide were measured at three locations to still exceed the annual mean objective value of  $40 \mu\text{g}/\text{m}^3$ . This is due to emissions from road traffic. It is proving very challenging to reduce nitrogen dioxide concentrations at these location. Efforts continue to be made in relation to decreasing demand on road traffic as well as improving the road infrastructure around Yeovil in order to ease congestion. Should these improvements be delivered then concentrations will be positively affected.



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# 1 Local Air Quality Management

This report provides an overview of air quality in South Somerset District Council during the years 2014 and 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by South Somerset District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.



## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of the AQMA declared by South Somerset District Council can be found in Table 2.1. Further information related to the AQMA, including a map of AQMA boundary and monitoring locations are available online at

<http://www.southsomerset.gov.uk/environment/environmental-health/environmental-protection/air-quality/air-quality-reports/>

**Table 2.1 – Declared Air Quality Management Areas**

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Yeovil AQMA	<ul style="list-style-type: none"> <li>NO<sub>2</sub> annual mean</li> </ul>	Yeovil	Urban Area of yeovil	The link above leads to the Action Plan

### 2.2 Progress and Impact of Measures to address Air Quality in South Somerset

South Somerset District Council and Somerset Council County has taken forward a number of measures during the current reporting years of 2014 and 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

South Somerset District Council expects the following measures to be completed over the course of the next reporting year:

- Convert A359 Mudford Road/Lyde Road junction to a roundabout
- Convert A30 Sherborne Road / Lyde Road roundabout to traffic signals
- Convert A359 Mudford Road/Coombe Street lane junction to a roundabout

These improvements to the road infrastructure are expected to reduce congestion and provide an incremental gain the air quality.

Priorities for the coming year are to continue to work with colleagues and stakeholders to ensure that improvements to the road infrastructure are delivered, that efforts to reduce demand are continued and alternative transport options through the planning system are provided. Work will also continue with developers to ensure that development gain relating to infrastructure is provided in relation to the key site developments, especially with those developments which may have an adverse impact on the Yeovil Air Quality management Area.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Roundabout Improvement schemes	Transport Planning and Infrastructure	Other	SCC Highways	Complete	2015	efficient use of road capacity	NO <sub>2</sub> , Particulates	Hospital and Police Station roundabouts completed. Fiveways scheme under review.	2016	A30/A37 Hospital roundabout A30/A3088 Police Station roundabout Signalise A37/A359 Fiveways roundabout
2	Improvements to A30 Sherborne Road	Transport Planning and Infrastructure	Other	SSC Highways	Complete	2017	efficient use of road capacity	NO <sub>2</sub> , Particulates	Reprioritised with developers target dates (developer funding via planning system).	2017	Convert A30 Sherborne Road / Lyde Road roundabout to traffic signals
3	Market Street/ Reckleford Junction	Transport Planning and Infrastructure	Other	SSC Highways	2016	2017	efficient use of road capacity	NO <sub>2</sub> , Particulates	Section 106 agreement pending	2018	Re-prioritisation of junction has taken place in 2016.
4	Improvements to North Yeovil	Transport Planning and Infrastructure	Other	SSC Highways	2016	2017	efficient use of road capacity	NO <sub>2</sub> , Particulates	Under review with developer	2017	Convert A359 Mudford Road/Lyde Road junction to a roundabout

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
5	Improvements to North Yeovil	Transport Planning and Infrastructure	Other	SSC Highways	2016	2017	efficient use of road capacity	NO <sub>2</sub> , Particulates	Under review with developer	2017	Convert A359 Mudford Road/Coombe Street lane junction to a roundabout
6	Interchange at the bus station & Town Centre	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	SSC Highways and SSDC	2017	2018	Uptake of bus services	NO <sub>2</sub> , Particulates	Under Review	2018	The interchanges at the bus station and the town centre are on hold pending the results/review being undertaken by Yeovil Vision
7	Improve interchange at Yeovil Junction railway station	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	SSC Highways and SSDC	2016	2017	Uptake of bus and railway services	NO <sub>2</sub> , Particulates	The interchange at Yeovil Junction has been designed and consulted upon. Works are planned to commence shortly.	2017	
8	Improve interchange at Yeovil Pen Mill railway station	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	SSC Highways and SSDC	2017	2018	Uptake of bus and railway services	NO <sub>2</sub> , Particulates	Dependent on funds being released from development	2018	Proposal to link Yeovil's two railways stations via a bus route.

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
9	Improve standard of bus service: Access	Promoting Travel Alternatives	Other	SCC Highways	2016	2016	Uptake of bus services	NO2, Particulates	7 SLF Buses provided for Yeovil	Ongoing	
10	Improve standard of bus service: Frequency	Promoting Travel Alternatives	Other	SCC Highways	2016	2017	Uptake of bus services	NO2, Particulates	Increase in fleet size	Ongoing	
11	Improve standard of bus service: Quality	Promoting Travel Alternatives	Other	SCC Highways	2016	2017	Uptake of bus services	NO2, Particulates	New fleet vehicles, bespoke timetables	Ongoing	
12	Information and Marketing	Promoting Travel Alternatives	Personalised Travel Planning	SCC Highways and SSDC	Complete	2016	Uptake of bus services	NO2, Particulates	Software has been purchased to provide bespoke Timetables	Ongoing	Still awaiting stop-specific timetables. Audit reveals less than a third of Yeovil bus stops have timetable cases.
13	Quality Bus Partnership	Promoting Travel Alternatives	Other	SC Highways and SSDC	Complete	2018	Uptake of bus services	NO2, Particulates	QBPs agreements in place for service 376/7 and 54 Somerset County Council is currently unable to contribute funding to QBP initiatives	Ongoing	

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
14	Provision of new cycling facilities along key corridors	Promoting Travel Alternatives	Promotion of cycling	SSC Highways and SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	Classified as low – medium priority. Measures under review	Ongoing	Somerset's Cycling Strategy has been updated for the period 2011-2026. It includes a commitment to develop a Cycling Network Development Plan for Yeovil.
15	Provision of cycling facilities at key site developments	Promoting Travel Alternatives	Promotion of cycling	SSC Highways and SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	All proposed new developments should incorporate cycling facilities.	Ongoing	Somerset's Cycling Strategy has been updated for the period 2011-2026
16	Cycle routes to other settlements.	Promoting Travel Alternatives	Promotion of cycling	SSC Highways and SSDC	Complete	Complete	Uptake of cycling	NO2, Particulates	Assessment of potential cycle routes between Montacute and Odcombe to Westlands site.	Ongoing	Somerset's Cycling Strategy has been updated for the period 2011-2026
17	Trip end cycle parking	Promoting Travel Alternatives	Promotion of cycling	SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	Long stay cycle parking in Town Centre.	Ongoing	
18	Residential cycle parking	Promoting Travel Alternatives	Promotion of cycling	SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	Ensure that residential cycle parking is catered for in new developments	Ongoing	



## South Somerset District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
19	Pedestrian phases at signalised junctions	Promoting Travel Alternatives	Promotion of walking	SSC Highways and SSDC	Complete	2016		NO2, Particulates	Pedestrian facilities incorporated into infrastructure upgrade	2016	
20	All proposed new employment and residential developments should incorporate pedestrian facilities.	Promoting Travel Alternatives	Promotion of walking	SSDC	Complete	Ongoing		NO2, Particulates	Pedestrian facilities incorporated into infrastructure of key sites	Ongoing	
21	Include Air Quality considerations in planning decisions.	Policy Guidance and Development	Air Quality Planning and Policy Guidance	SSDC	Complete	Ongoing		NO2, Particulates	Policy EQ7 adopted to ensure AQ is considered	Complete	EQ7 includes - "New development should not exacerbate air quality problems in existing and potential AQMAs"
22	Support drive down pollution campaign.	Public Information	Via other mechanisms	SSDC	Complete	Ongoing		NO2, Particulates	Continued promotion of air quality issues	Ongoing	

## South Somerset District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
23	Improve coordination of works by public utilities.	Traffic Management	Other	SCC Highways	Complete	Ongoing		NO2, Particulates	The computerised map based Highway Scheme Proposal Register (HSPR Environmental) is used to coordinate works on the highway. GIS is being used to coordinate works	Ongoing	
24	Yeovil car parking strategy	Traffic Management	Other	SCC Highways and SSDC	Ongoing	Ongoing		NO2, Particulates	Reduction of single yellow line parking zones, repaint as double (Ashford)		Progress on Countywide car parking strategy stalled
25	Encourage Somerset Car Sharing Scheme	Public Information	Via other mechanisms	SCC Highways	Complete	Ongoing	Uptake of Car Share Scheme	NO2, Particulates	Car share website ongoing	Ongoing	
26	SSDC Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	SSDC	Ongoing	Ongoing		NO2, Particulates	Currently on hold	Unknown	

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

South Somerset District Council is not currently taking any specific measures to address PM<sub>2.5</sub>, however most measures currently being implemented with the existing Yeovil Air Quality Management Area Action Plan will have a direct positive impact on PM<sub>2.5</sub> concentrations.

There are currently no plans to directly measure PM<sub>2.5</sub> concentrations within South Somerset District Council. However, via the review of the Somerset Air Quality Strategy, which includes partnership working with Public Health England, Somerset Local Authorities will be examining the scope of any future monitoring requiring and how best to deliver any such requirement. The expectation is that any such monitoring will be designed in order to inform the Public Health Outcomes Framework.

It is hoped that any future modelling will help refine the baseline modelled concentrations of fine particulate air pollution (PM<sub>2.5</sub>) for 2010. This will enable Directors of Public Health to appropriately prioritise action on air quality in Somerset. It may be appropriate that any actions which are identified are delivered as part of a revised Air Quality Strategy for Somerset. Such a strategy would need to engage all stakeholders in Somerset and seek to raise political as well as public awareness to this issue.

## **3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance**

### **3.1 Summary of Monitoring Undertaken**

#### **3.1.1 Automatic Monitoring Sites**

South Somerset District Council undertook no automatic (continuous) monitoring at any sites during 2014 and 2015.

Previous continuous monitoring which was undertaken in Yeovil ceased operation following failure of equipment and the subsequent demolition of the Station for alternative use by Yeovil District Hospital.

### 3.1.2 Non-Automatic Monitoring Sites

South Somerset District Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 20 sites during 2014 and 2015. In Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

## 3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

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

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For diffusion tubes, the full 2014 and 2015 dataset of monthly mean values is provided in Appendix B.

## Appendix A: Monitoring Results

There are no Urban background or Roadside automatic monitoring sites in South Somerset.



## Appendix B: Full Monthly Diffusion Tube Results for 2014

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results -2014 (1) See Appendix C for details on bias adjustment

Site	02/01/14	03/02/14	06/03/14	04/04/14	30/04/14	28/05/14	02/07/14	30/07/14	28/08/14	02/10/14	30/10/14	03/12/14	Raw Data	Bias Adjusted
	03/02/14	06/03/14	04/04/14	30/04/14	28/05/14	02/07/14	30/07/14	28/08/14	02/10/14	30/10/14	03/12/14	07/01/15		
Fiveways	58.17	70.27	58.04	52.38	52.16	48.00	45.90	51.42		65.81	57.94	54.92	55.91	<b>50.88</b>
Ilchester Rd No. 85	73.02	67.25	67.86	55.79	59.27	46.91	53.70	50.64	60.17	58.88	63.52	58.14	59.60	<b>54.23</b>
Ilchester Rd No. 98	31.91	26.76	36.30	34.17	33.25	30.28	26.51	25.17	36.62	30.59	39.23	30.35	31.76	<b>28.90</b>
Sparrow Road	34.33	34.01	34.27	31.78	32.08	28.10	27.12	28.29	29.58	32.47	40.69	43.38	33.01	<b>30.04</b>
Lyde Rd	42.87	40.08	43.63	39.13	44.23	38.98	39.57	47.32	42.86	42.61	41.73	63.07	43.84	<b>39.89</b>
Wyndam St	29.37	22.49		30.23	27.44	25.81	25.59	20.14	36.99	25.59	37.85	29.64	28.29	<b>25.74</b>
Bus Station	29.04	30.31	32.63	29.39	27.99	26.44	20.52	28.79	32.25	29.47	34.28	31.15	29.36	<b>26.71</b>
73 Sherborne Rd	31.04	31.66	33.63	29.68	31.46	27.79	27.99	32.22	35.44	27.08	32.77	38.08	31.57	<b>28.73</b>
Hillside Residential	31.43	32.00	33.80	24.75	25.61	25.29	26.23	27.60	31.61	33.11	33.43	34.73	29.97	<b>27.27</b>
167 Sherborne Rd	32.44	35.93		40.83	39.19	33.09	38.03	43.88	47.05	37.12	42.95	47.65	39.83	<b>36.25</b>
Fiveways Flats	47.40	42.23	42.28	40.24	37.77	34.56	41.53	39.94	37.78	41.52	38.99	47.18	40.95	<b>37.27</b>
42 The Crescent	22.63	21.53	27.60	25.26	23.40	22.67	20.90	15.57	29.02	22.04	32.53	19.60	23.56	<b>21.44</b>
26 Everton Road	38.86	46.91	44.37	40.61	37.19	35.30	32.18	43.43	34.96	41.42	38.72	44.99	39.91	<b>36.32</b>
4 Yarn Barton	22.52	19.31	23.79	19.24	16.43	17.32	16.95	13.99	24.21	17.56	26.84	25.04	20.27	<b>18.44</b>
New Town	20.30	17.51	18.82	16.11	12.40	12.27	13.72	14.88	17.81	15.71	23.59	27.22	17.53	<b>15.95</b>
Summerlands	14.19	10.97	14.27	8.47	7.70	7.94	8.70	6.69	11.33	8.98	18.28	15.73	11.10	<b>10.10</b>
Hospital Sign	44.612	44.114	48.39	49.584	48.747	45.03	51.81	46.43	61.73	40.35	51.55	61.48	49.49	<b>45.03</b>

## Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.2 – NO<sub>2</sub> Monthly Diffusion Tube Results -2015 (1) See Appendix C for details on bias adjustment

Site	07/01/15	05/02/15	04/03/15	01/04/15	29/04/15	28/05/15	02/07/15	29/07/15	26/08/15	25/09/15	23/10/15	30/11/15	Raw Data	Bias Adjusted
	05/02/15	04/03/15	01/04/15	29/04/15	28/05/15	02/07/15	29/07/15	26/08/15	25/09/15	23/10/15	30/11/15	06/01/16		
Fiveways	50.2	63.9	56.5	56.2	53.2	65.0	55.4	58.8	52.2	48.0	53.3	69.5	57.7	<b>51.3</b>
Ilchester Rd No. 85	70.5	74.1	68.5	56.0			44.6	68.9	49.8	62.7	54.7	57.5	60.7	<b>54.0</b>
Ilchester Rd No. 98	30.7	39.0	3.6.9	33.4	24.7	34.6	23.4	36.2	31.1	43.0	29.4	21.4	32.0	<b>28.5</b>
Sparrow Road	36.7	40.3	37.2	26.2	30.2	29.7	27.1	34.3	31.4	38.6	34.4	31.6	33.1	<b>29.5</b>
Lyde Rd	52.4	62.0	50.8	48.2	41.9	46.0	41.1	50.6	47.5	54.0		34.2	48.1	<b>42.8</b>
Wyndam St	30.8	32.5	34.8	31.3	21.1	23.1	21.3			42.1	29.7	20.7	28.7	<b>25.6</b>
Bus Station	41.4	44.7	39.5	30.8	28.5	28.9	29.6	35.3	29.9	35.6	34.1	30.3	34.1	<b>30.3</b>
73 Sherborne Rd	35.8	40.3			30.6	32.2	30.8	31.8	34.7	40.3	30.8	25.4	33.3	<b>29.6</b>
Hillside Residential	34.4	36.0	33.2	27.1	28.8	25.2	25.7	25.3	29.9	32.6	31.5	30.4	30.0	<b>26.7</b>
167 Sherborne Rd	49.1	53.8	52.4	38.0	43.4		33.4	40.1	43.8		36.4	28.4	41.9	<b>37.3</b>
Fiveways Flats	48.9	55.2	44.9	23.4	40.0	38.9	39.6	37.7	25.1	40.0	40.2	39.8	39.5	<b>35.1</b>
42 The Crescent		26.5	26.7	24.0	15.4	19.0	17.8	24.1	22.7	33.1	23.1	16.4	22.6	<b>20.1</b>
26 Everton Road	43.2	46.7	46.2	37.0	39.9	36.1	38.5	38.3	37.0	37.9	42.1	43.6	40.5	<b>36.1</b>
4 Yarn Barton	21.9	24.5	23.6	19.6	14.2	16.1	14.2	17.0	17.8	26.4	20.7	15.7	19.3	<b>17.2</b>
New Town	24.5	20.7	19.4	14.0	12.8	11.5	13.8		10.2	20.8	21.3	18.8	17.1	<b>15.2</b>
Summerlands	13.4	13.5	13.4	9.9	6.9	6.5	8.5	9.0	47.3	17.2	12.9	9.9	14.0	<b>12.5</b>
Hospital Sign	48.9	55.9			42.5	48.4	35.4	45.1	65.9	66.2	42.1	38.5	48.9	<b>43.5</b>

## Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

### QA/QC of diffusion tube monitoring

The nitrogen dioxide diffusion tubes are prepared with 50% v/v Triethanolamine in Acetone. They are deployed according to the procedures given in Box A1.7 “Instructions for Exposing Nitrogen dioxide Diffusion Tubes” of the Technical Guidance. A travel blank is included in each batch.

The diffusion tube gauges are analysed by a Somerset Scientific Services. This laboratory participates in the AIR NO<sub>2</sub> PT intercomparison scheme. The purpose of scheme is to test each participating laboratory’s analytical performance on a quarterly basis and continues the format used in the preceding WASP PT scheme.

Every quarter, roughly January, April, July and October each year, each laboratory receives four diffusion tubes doped with an amount of nitrite, known to LGC Standards, but not the participants.

At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. The masses of nitrite on the spiked tubes are different each quarter, and reflect the typical analytical range encountered in actual NO<sub>2</sub> ambient monitoring in the UK.

The participants analyse the test samples and report the results via their on-line data management system. LGC Standards assign a performance score to each laboratory’s result, based on how far their results deviate from the assigned values for each test samples.

At the completion of the round, laboratories receive a report detailing how they have performed and how their results relate to those of their peers.

A Z score  $\leq 2$  indicates satisfactory laboratory performance.

**Table AC.1 Diffusion Tube Intercomparison Results. % of Z scores  $\leq 2$**

AIR PT Round	AR001	AR003	AR004	AR006	AR007	AR009	AR010	AR012
	April – May 2014	July – Aug 2014	Oct – Nov 2014	Jan – Feb 2015	Apr – May 2015	July – Aug 2015	Oct – Nov 2015	Jan – Feb 2016
Percentage Satisfactory	100%	100%	100%	100%	100%	100%	100%	100%

Therefore Somerset Scientific Services have performed satisfactory during the entire period of the 2014 and 2015 reporting cycle.

Diffusion Tube Bias Adjustment Factors

The national bias adjustment spreadsheet (version 09/15) has been used to calculate the bias adjustment factor for 2014 and 2015. The national bias adjustment factor was calculated as 0.9 in 2014 and 0.89 in 2015. A copy of the national bias adjustment spreadsheets are included below.

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 09/15				
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of March 2016				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet										
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.							
If other sites are used, see how to use the list below	Choose TEA in water if you are using the Diffusion Tube as a backup for the method of the laboratory	Do not select 'Other' unless you have your own data	If you have your own co-location study then see footnote*. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327353							
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (ug/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (ug/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>n</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Somerset County Council	20% TEA in water	2015	R	South Gloucestershire Council	11	29	26	3.3%	G	0.92
Somerset County Council	20% TEA in water	2015	R	Bath & North East Somerset	12	56	57	-1.2%	G	1.01
Somerset County Council	20% TEA in Water	2015	KS	Marglebone Road Intercomparison	11	89	80	23.0%	G	0.81
Somerset County Council	20% TEA in water	2015		<b>Overall Factor* (3 studies)</b>					<b>Use</b>	<b>0.90</b>

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 09/15				
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of March 2016				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet										
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.							
If other sites are used, see how to use the list below	Choose TEA in water if you are using the Diffusion Tube as a backup for the method of the laboratory	Do not select 'Other' unless you have your own data	If you have your own co-location study then see footnote*. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327353							
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (ug/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (ug/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>n</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Somerset County Council	20% TEA in water	2014	R	Bath & North East Somerset	12	62	57	5.2%	G	1.07
Somerset County Council	20% TEA in water	2014	UB	Bristol City Council	12	24	21	8.2%	G	0.94
Somerset County Council	20% TEA in water	2014	R	Bristol City Council	12	59	52	4.3%	G	0.95
Somerset County Council	20% TEA in water	2014	R	Bristol City Council	12	46	46	0.4%	G	1.00
Somerset County Council	20% TEA in water	2014	UB	Bristol City Council	9	30	26	16.1%	G	0.88
Somerset County Council	20% TEA in water	2014	KS	Bristol City Council	11	43	41	7.9%	G	0.94
Somerset County Council	20% TEA in water	2014	KS	Marglebone Road Intercomparison	12	117	88	45.5%	G	0.69
Somerset County Council	20% TEA in water	2014	R	South Gloucestershire Council	12	27	24	16.0%	G	0.86
Somerset County Council	20% TEA in water	2014		<b>Overall Factor* (8 studies)</b>					<b>Use</b>	<b>0.89</b>

## Appendix D: Monitoring Locations

Table A.2

<b>Site Name</b>	<b>Site Ref</b>	<b>Pollutants Monitored</b>	<b>In AQMA?</b>	<b>Distance to kerb</b>
Fiveways	Y7	NO <sub>2</sub>	Y	1m
Ilchester Rd	Y11	NO <sub>2</sub>	Y	3m
Ilchester Rd No. 98	Y12	NO <sub>2</sub>	Y	4m
Maternity Unit	Y13	NO <sub>2</sub>	Y	12m
Sparrow Road	Y17	NO <sub>2</sub>	Y	2m
Lyde Rd*	Y26	NO <sub>2</sub>	Y	2m
Wyndam St	Y102	NO <sub>2</sub>	Y	2m
Bus Station	Y204	NO <sub>2</sub>	Y	1m
73 Sherborne Road*	Y401	NO <sub>2</sub>	Y	4m
Hillside Residential	Y402	NO <sub>2</sub>	Y	7m
Sherborne Road	Y403	NO <sub>2</sub>	Y	6m
Fiveways Flats	Y407	NO <sub>2</sub>	Y	4m
42 The Crescent	Y501	NO <sub>2</sub>	Y	8m
Everton Road	Y502	NO <sub>2</sub>	Y	8m
4 Yarn Barton	Y503	NO <sub>2</sub>	Y	4m
New Town*	Y504	NO <sub>2</sub>	Y	1m
Summerlands	Y505	NO <sub>2</sub>	Y	8m
1 Brimsgrove Court	Y701	NO <sub>2</sub>	Y	5m
59 Muchelney Way	Y702	NO <sub>2</sub>	Y	9m
71 Hendford Hill	Y703	NO <sub>2</sub>	Y	7m







## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide
...	...

## References

Environmental equity, air quality, socioeconomic status and respiratory health, 2010

Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Somerset Health Protection Strategic Action Plan, March 2015