Updating and Screening Assessment for Air Quality May 2003

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Executive Summary

In 1995 the Environment Act provided for a national air quality strategy requiring local authorities carry out reviews and assessments of the air quality in their area for seven specific pollutants. These are; carbon monoxide (CO), benzene, 1,3-butadiene, nitrogen dioxide (NO_2), lead, sulphur dioxide (SO_2) and PM_{10} (Particles under 10μm in diameter).

This document is an Updating and Screening Assessment of air quality across the Breckland Council district, which follows on from the Reviews and Assessments of Air Quality carried out by Breckland Council in 1999 and 2000.

The first review and assessment procedure was divided into four stages and progression to each stage was dependent upon the air quality in each local authority area. Authorities were required to progress to the next stage only if there was a likelihood of exceeding the air quality standards and objectives.

In Breckland Council's area, the first stage of the review and assessment process was published in 1999 and identified four pollutants with potential to result in an exceedence of the air quality standards, and thus a stage two study was carried out to assess them in more detail. The second stage report was published in 2000 and concluded that no exceedences of any of the pollutants was likely by the dates set.

To keep air quality on the agenda for all local authorities, and ensure that standards are maintained, new guidance – Local Air Quality Management Technical Guidance (03) (LAQM TG(03)) - has been issued by DEFRA which requires local authorities to carry out an Updating and Screening Assessment (USA) by the end of April 2003 (subsequently extended to the end of May). The USA is intended to identify significant changes that may have occurred since the last Review and Assessment, which might lead to a risk of the air quality objectives being exceeded. These might include new monitoring data, revised objectives or new or increased emission sources. All seven pollutants should be covered by the assessment and there are revised objectives for carbon monoxide, benzene, lead, nitrogen dioxide, sulphur dioxide, and particulate matter PM_{10}.

This report has considered all seven pollutants and concluded that all standards and objectives for carbon monoxide, benzene, 1,3 butadiene, lead, nitrogen dioxide and sulphur dioxide are likely to be met and thus a more detailed assessment is not required for these pollutants.

This report has considered PM_{10} and concluded that there is a possibility of the standards and objectives being exceeded for this pollutant and will thus proceed to a more detailed assessment for PM_{10}.

In order to ensure that air quality does not deteriorate, monitoring will continue in the Breckland Council area and a progress report will be published in 2004.

Chapter 1: Introduction

1.01 This document is an Updating and Screening Assessment of air quality across the Breckland Council district, which follows on from the Reviews and Assessments of Air Quality carried out by Breckland Council in 1999 and 2000.

1.02 Background

In 1995 the Environment Act provided for a national air quality strategy requiring local authorities carry out reviews and assessments of the air quality in their area for seven specific pollutants which are; carbon monoxide (CO), benzene, 1,3-butadiene, nitrogen dioxide (NO_2), lead, sulphur dioxide (SO_2) and PM_{10} (Particles under 10μm in diameter). Guidance on how to carry out the reviews and assessments was published by the Department for Environment Food and Rural Affairs (DEFRA). The review and assessment procedure was divided into four stages. The first was an initial desk-top study to identify likely "hot-spots" of pollution in areas where there are relevant "receptors" e.g. residential properties, schools or hospitals, near to sources of these pollutants. Where potential "hot-spots" were identified the second stage was to include simple monitoring and modelling of the relevant pollutants to identify whether the hot-spots were close enough to receptors for the appropriate length of time and thus likely to lead to an exceedence of the air quality standards. Where such exceedences were thought likely, a stage three study required more detailed and complex modelling and monitoring of the relevant pollutants. Stage four studies identified the extent of any areas affected by exceedences of the air quality standards and designated these as "Air Quality Management Areas".

In Breckland Council's area, the first stage of the review and assessment process was published in 1999 and identified four pollutants with potential to result in an exceedence of the air quality standards, and thus a stage two study was carried out to assess them in more detail. The second stage report was published in 2000 and concluded that no exceedences of any of the pollutants was likely by the dates set. The information set out in these reports also included an outline of the sources of pollution and population statistics for Breckland, and the health effects of each of the pollutants. This information is not repeated here and reference should be made to the previous documents held by Breckland Council if this is required (Breckland Council 1999, 2000)

1.03 Updating and Screening Assessment

To keep air quality on the agenda for all local authorities, and ensure that standards are maintained, new guidance – Local Air Quality Management Technical Guidance (03) (LAQM TG(03)) - has been issued by DEFRA which requires local authorities to carry out an Updating and Screening Assessment (USA) by the end of April 2003 (subsequently extended to the end of May). The USA is intended to identify significant changes that may have occurred since the last Review and Assessment, which might lead to a risk of the air quality objectives being exceeded. These might include new monitoring data, revised objectives or new or increased emission sources. All seven pollutants should be covered by the assessment and there are revised objectives for carbon monoxide, benzene, lead, nitrogen dioxide, sulphur dioxide, and particulate matter PM_{10}.

The assessment is to be based on the use of the checklists provided in LAQM TG(03) and on the Local Air Quality Management web site at *http://www.airquality.co.uk/archive/laqm/laqm.php*, which gives support with a package of tools and Helpdesk services. These will be used to identify significant changes requiring further consideration. Where such changes are identified, screening or other tools should be applied to determine whether or not there is sufficient risk of exceedence of the objective. Finally, a conclusion should be reached as to whether a detailed assessment is required for each or any pollutant and this must be carried out by the end of 2004.

The guidance also sets out a timetable for future reviews and assessments up to 2010 (LAQM TG(03)).

1.04 Summary of objectives of the UK Air Quality Strategy

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3 (5 ppb)	Running Annual Mean	31 December 2003
1,3-Butadiene	2.25 µg/m^3 (1 ppb)	Running Annual Mean	31 December 2003
Carbon monoxide	10 mg/m^3 (8.6 ppm)	Running 8 Hour Mean	31 December 2003
Lead	0.5 µg/m^3	Annual Mean	31 December 2004
	0.25 µg/m^3	Annual Mean	31 December 2008
Nitrogen dioxide*	200 µg/m^3 (105 ppb) Not to be exceeded more than 18 times per year	1 Hour Mean	31 December 2005
	40 µg/m^3 (21 ppb)	Annual Mean	31 December 2005
Particles (PM_{10})	50 µg/m^3 Not to be exceeded more than 35 times per year	24 Hour Mean	31 December2004
	40 µg/m^3	Annual Mean	31 December 2004
Sulphur dioxide	350 µg/m^3 (132 ppb) Not to be exceeded more than 24 times per year	1 Hour Mean	31 December 2004
	125 µg/m^3 (47 ppb) Not to be exceeded more than 3 times per year	24 Hour Mean	31 December 2004
	266 µg/m^3 (100 ppb) Not to be exceeded more than 35 times per year	15 Minute Mean	31 December 2005

Table 1.1. Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purposes of Local Air Quality Management

Notes: µg/m^3 - micrograms per cubic metre
mg/m^3 - milligrams per cubic metre
ppb - parts per billion
ppm - parts per million
* The objectives for nitrogen dioxide are provisional

Table 1.1 sets out the objectives to be included in the current USA and the assessments for each in the Breckland Council district are detailed in the following chapters.

Chapter 2: Review and assessment of carbon monoxide

2.01 Introduction

The Government and the Devolved Administrations have adopted an 8-hour running mean concentration of 11.6 mg/m^3 as the air quality standard for carbon monoxide (CO). The new objective has been set at the slightly tighter level of 10mg/m^3 as a maximum daily running 8-hour mean concentration, to be achieved by the end of 2003, bringing it into line with the second Air Quality Daughter Directive limit value.

Box 2.1: Checklist for carbon monoxide		
Reference no.	**Source, location or data to be assessed**	**Section/Page Number**
A	Monitoring data	2.03
B	Very busy roads	2.04

2.02 Result of first round of review and assessment of air quality

The first round of review and assessment of air quality, which was taken to stage two for CO, was completed in May 2000 and followed the Government's guidance for CO through the use of the recommended screening model and methodology. The guidance indicated that existing national policies were expected to deliver the national air quality objective by the end of the year 2003 with the possible exception of the near vicinity of heavily trafficked roads or in the vicinity of certain stationary sources.

All industrial sources thought to have the potential to lead to an exceedence of the air quality standard were investigated and modelling showed that the risk of the CO air quality objective being exceeded by the end of 2003 in localities where there might be exposure was negligible. Therefore, Breckland Council was not required to proceed any further and undertake a third stage review and assessment of CO.

2.03 Monitoring Data

Breckland Council has not carried out any monitoring for CO since the first review and assessment. However, there are no additional prescribed industrial sources of CO within the district since the first review and assessment was completed, and no previously existing sources have undergone changes that might lead to an increase in CO emissions. Industrial sources included in this assessment are those prescribed by Part I B of the Environmental Protection Act 1990 and regulated by local authorities, and those prescribed by the Pollution Prevention and Control (England and Wales) Regulations 2000 and regulated by the Environment Agency and local authorities.

2.04 Very busy roads

Technical Guidance LAQM TG(03) states that for the assessment of CO, "*very busy roads and junctions in areas where the 2003 background is expected to be above 1 mg/m^3*" should be identified. The criteria for very busy roads are given as single carriageway roads where the daily average flows exceed 80,000 vehicles per day or dual carriageway roads where the daily average flows exceed 120,000 vehicles per

day. Breckland Council has no areas where the 2003 background is expected to be above 1 mg/m^3 or any roads that meet the daily vehicle flows.

2.05 Conclusion for carbon monoxide

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is very little likelihood of exceedence of the air quality standard for carbon monoxide in 2003.

Chapter 3: Review and assessment of benzene

3.01 Introduction

The Government and the Devolved Administrations have adopted a running annual mean concentration of 16.25 μg/m^3 as the air quality standard for benzene, with an objective for the standard to be achieved by the end of 2003. However, in light of the health advice from EPAQS and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) to reduce concentrations of benzene in air to as low a level as possible, additional tighter objectives have also been set. The additional objective is for an annual mean of 5 μg/m^3 to be achieved by the end of 2010 in England and Wales. In Scotland and Northern Ireland, a running annual mean of 3.25 μg/m^3 has been adopted as an additional objective, to be achieved by the end of 2010.

Box 3.1: Checklist for benzene		
Reference no.	**Source, location or data that need to be assessed**	
A	Monitoring data	3.03
B	Very busy roads or junctions in built-up areas	3.04
C	Industrial sources	3.05
D	Petrol stations	3.06
E	Major fuel storage depots (petroleum only)	3.07

3.02 Result of first round of review and assessment of air quality

The first round of review and assessment of air quality for Breckland Council was completed in May 1999 and was taken only as far as stage one for benzene. At this time the government stated that existing national policies, particularly with regard to improvements in vehicle technology such as greater use of catalytic converters, were expected to deliver the national air quality objective by the end of 2005. The stage one report stated that there were no sources of benzene emissions or any major roads likely to lead to an exceedence of the air quality standards in Breckland. In conclusion it was stated that “By 2005 all petrol service stations will have vapour balancing equipment installed and in use which will contribute to overall reductions in quantities of benzene in ambient air. In conclusion, it is likely that the air quality objective for benzene will be met and it is not intended to move to a second stage review for this pollutant”.

3.03 Monitoring data

Breckland Council has carried out no monitoring of benzene since the last review and assessment as it was thought unlikely that concentrations would exceed those found at the first stage.

3.04 Very busy roads or junctions in built-up areas

The guidance LAQM TG(03) states that EU legislation and national policy measures have led to a reduction in the benzene content of petrol from 5% to 1%. Again there

are no heavily trafficked roads across the district which are likely to lead to an exceedence of the air quality standard for benzene.

3.05 Industrial sources

There are no industrial sources of benzene emissions in Breckland Council's district which are likely to lead to an exceedence of the air quality standard.

3.06 Petrol stations

The main sources of benzene emissions in the UK are from petrol-engined vehicles, petrol refining and refuelling of vehicles at petrol stations forecourts. Petrol vapour recovery systems on underground storage tanks have now been installed at all service stations with a throughput of more than 500m^3 per year in Breckland Council's district. Petrol vapour recovery systems for refuelling at pumps at service stations are not yet required. LAQM TG(03) states that petrol stations with a throughput of less than 1000m^3 are unlikely to have a significant effect on benzene emissions. The majority of petrol stations in the Breckland Council area have a throughput of more than 1000m^3 per year. LAQM TG(03) states that only petrol stations with a throughput of petrol of more than 2000m^3 per year which are close to a busy road with daily flows of more than 30,000 vehicles and with relevant receptors within 10m of the pumps should be considered. Breckland has no petrol stations that meet all of these criteria.

3.07 Major fuel storage depots (petroleum only)

There are no petroleum storage depots in the Breckland Council district.

3.08 Conclusion for benzene

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is very little likelihood of exceedence of the air quality standard for benzene in 2003.

Chapter 4: Review and assessment of 1,3-butadiene

4.01 Introduction

The Government and the Devolved Administrations have adopted a maximum running annual mean concentration of 2.25 μg/m^3 as an air quality standard for 1,3-butadiene. The objective is for the standard to be achieved by the end of 2003.

Box 4.1: Checklist for 1,3-butadiene		
Reference no.	**Source, location or data that need to be assessed**	
A	Monitoring data	4.03
B	New industrial sources	4.04
C	Existing industrial sources with significantly increased emissions	4.05

4.02 Result of first round of review and assessment of air quality for 1,3-butadiene

The first round of review and assessment of air quality was taken only as far as stage one for benzene. At this time the government stated that existing national policies were expected to deliver the national air quality objective by the end of 2005. The stage one report stated that there were no industrial sources of benzene emissions or any major roads likely to lead to an exceedence of the air quality standard for 1,3-butadiene in Breckland, and concluded that it was likely that the air quality objective for 1,3-butadiene would be met.

4.03 Monitoring data

Breckland Council has carried out no monitoring of 1,3-butadiene since the last review and assessment as it was thought unlikely that concentrations would exceed those found at the first stage.

4.04 New industrial sources

There have been no new industrial sources of 1,3-butadiene in Breckland, or in adjacent local authorities, since the first review and assessment.

4.05 Existing industrial sources with significantly increased emissions

There are no existing industrial sources of 1,3-butadiene in Breckland, or in adjacent local authorities.

4.06 Conclusion for 1,3,butadiene

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is very little likelihood of exceedence of the air quality standard for 1,3-butadiene in 2003.

Chapter 5: Review and assessment of lead

5.01 Introduction

The Government and the Devolved Administrations have adopted an annual mean concentration of 0.5 μg/m^3 as the air quality standard for lead, with an objective for the standard to be achieved by the end of 2004. In addition, a lower air quality objective of 0.25 μg/m^3 to be achieved by the end of 2008 has also been set.

Box 5.1: Checklist for lead		
Reference no.	**Source, location or data that needs to be assessed**	
A	Monitoring data outside an AQMA	5.03
B	New industrial sources	5.04
C	Industrial sources with substantially increased emissions	5.05

5.02 Result of first round of review and assessment of air quality for lead

The first round of review and assessment of air quality was taken only as far as stage one for lead. The report concluded that in view of the lack of industrial sources for lead, supporting monitoring data and the continuing decrease in the use of leaded petrol by motor vehicles it is expected that the objective for lead will be met by 2005. It was not proposed therefore to carry out a second stage review for lead.

5.03 Monitoring data outside an AQMA

No monitoring for lead has been carried out and there are no AQMAs in, or adjacent to, Breckland Council's district.

5.04 New industrial sources

There are no new industrial sources of lead since the last review and assessment.

5.05 Industrial sources with substantially increased emissions

There is one foundry within the Breckland Council district that is a source of lead. However there has been no increase in the amount of lead used at the foundry in the casting process and thus the emissions are not likely to have increased since the first Review and Assessment of air quality.

5.06 Conclusion for lead

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is very little likelihood of exceedence of the air quality standard for lead in 2004.

Chapter 6: Review and assessment of nitrogen dioxide

6.01 Introduction

The Government and the Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide, as an annual mean concentration of 40 μg/m^3 and a 1-hour mean concentration of 200 μg/m^3 not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005. The first Air Quality Daughter Directive also sets limit values for nitrogen dioxide to be achieved by 2010, of 200 μg/m^3 as a 1-hour limit not to be exceeded more than 18 times per year and an annual mean limit value of 40 μg/m^3.

Box 6.1: Checklist for nitrogen dioxide		
Reference no.	**Source, location or data that need to be assessed**	
A	Monitoring data outside an AQMA	6.03
B	Monitoring data within an AQMA	6.04
C	Narrow congested streets with residential properties close to the kerb	6.05
D	Junctions	6.06
E	Busy streets where people may spend 1-hour or more close to traffic	6.07
F	Roads with high flow of buses and/or HGVs	6.08
G	New roads constructed or proposed since first round of review and assessment	6.09
H	Roads close to the objective during the first round of review and assessment	6.10
I	Roads with significantly changed traffic flows	6.11
J	Bus stations	6.12
K	New industrial sources	6.13
L	Industrial sources with substantially increased emissions	6.14
M	Aircraft	6.15

6.02 Result of first round of review and assessment of air quality for nitrogen dioxide

Since completion of the first review and assessment of air quality, Breckland Council has continued monitoring of nitrogen dioxide using diffusion tubes and one continuous analyser. In the second stage of the review and assessment the Government's guidance for NO_2 was followed through the use of the recommended screening models and methodology, and included information which supported the final conclusion. The guidance indicated that the existing national policies will ensure that the national air quality objectives will be achieved by the end of the year 2005 for all areas. Thus the second stage review and assessment concluded that the risk of the nitrogen dioxide air quality objectives being exceeded by the end of 2005 is negligible in the Council's area. Breckland Council did not therefore undertake a third stage of review and assessment of nitrogen dioxide.

6.03 Monitoring data outside an AQMA

Breckland Council monitors NO_2 concentrations using a chemiluminescent analyser and diffusion tubes. The chemiluminescent analyser is serviced every 6 months and calibrated using gases every two weeks. The analyser is not part of the national network and all quality controls are in accordance with Breckland Council protocols only.

The Breckland Council diffusion tube network is also not part of the national network. Because laboratories can differ in their results of diffusion tube analysis LAQM TG(3) recommends that a "bias correction" is carried out. This correction is required in order to make adjustment to the result by taking into account the differences between laboratories. LAQM TG(3) gives a method for this which involves the co-location of three diffusion tubes and a chemiluminescent analyser. The minimum period for which this can be carried out is 9 months. Breckland Council has started to co-locate three tubes with the chemiluminescent analyser but has not collected 9 months data at the time of this report. These results will be included in the 2004 air quality report as required by DEFRA.

6.04 Monitoring data within an AQMA

Breckland Council did not declare any AQMAs in the first round of reviews and assessments of air quality.

6.05 Narrow congested streets with residential properties close to the kerb

There are no such streets in Breckland Council's district that meet this criterion.

6.06 Junctions

LAQM TG(03) suggests that junctions were possibly not modelled adequately in the first round of reviews and assessments and that all "busy" junctions with traffic movements greater than 10,000 vehicles per day should be considered in the USA. The modelling tool provided to local authorities for assessing NO_2 concentrations from traffic is from the Design manual for Roads and Bridges (DMRB). Diffusion tubes have been located at the busiest junctions in Breckland Councils district. Where possible the results (from the year 2002) from these tubes have been used for the DMRB model and where there are no results available the background concentrations for 2001 have been used and multiplied by the factor given in LAQM TG(03) to give the concentration for 2005 and 2010. Results for this modelling are presented in Table 6.1 below.

6.07 Busy streets where people may spend 1- hour or more close to traffic

There are short stretches of such streets in the town centres of Dereham, Attleborough and Swaffham where people may be exposed to NO_2 arising from traffic at certain times of day, but it is unlikely that they would be in these areas for 1 hour or more.

These areas were also identified in the first round of reviews and assessment and found not likely to lead to an exceedence of the air quality standard for NO_2. LAQM TG(03) states that if these areas were identified in the first stage then there is no

need to proceed further with he USA (page 6-19). However, These locations have been included in the DMRB modelling and the results are set out in Table 6.1 below. Furthermore, using results from diffusion tubes, which have been located at these sites for almost 10 years (albeit not bias corrected), have at no time in this period exceeded the annual average NO_2 concentration of 40 µg/m^3 and thus it is unlikely that an hourly concentration of 200 µg/m^3 would be exceeded for more than 18 hours (LAQM TG(03) page 6-19).

All receptors			Pollutant concentrations at receptor (2005)						
Receptor number	Name	Year	CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Days >50µg/m^3
1	Besthorpe By-Pass TM 956046	2005	0.26	0.34	0.23	60.24	27.26	24.75	11.81
2	North Tuddenham TG 142039	2005	0.26	0.32	0.20	56.73	26.50	24.86	12.06
3	Swaffham By pass TF 819001	2005	0.25	0.31	0.18	54.54	26.01	24.26	10.70
4	Swaffham By pass TF 819002	2005	0.23	0.29	0.14	39.01	22.28	22.70	7.54
5	London St Swaffham TF 819017	2005	0.28	0.35	0.20	49.59	24.88	23.92	9.96
6	Yaxham Road Dereham TF 995124	2005	0.28	0.35	0.18	45.20	23.84	23.52	9.12
7	Dereham By pass TF 997123	2005	0.29	0.34	0.22	70.19	29.30	26.01	14.94
8	Mundford Rd Thetford TF 836877	2005	0.36	0.44	0.31	75.70	30.37	26.89	17.36
9	Teasel Drive Thetford TF 830876	2005	0.27	0.34	0.19	48.84	24.71	23.84	9.79
10	Autumn Close Thetford TF 830878	2005	0.33	0.41	0.26	67.93	28.25	26.01	14.93
11	A1075 Thetford TF 841884	2005	0.35	0.43	0.27	73.59	29.97	26.66	16.70
12	Boston Road Thetford TF 834854	2005	0.28	0.33	0.28	76.26	30.48	26.58	12.66
13	A47 Wendling TF 931132	2005	0.27	0.32	0.20	64.91	28.24	25.67	14.06
14	Dereham High Street TF 989127	2005	0.27	0.24	0.18	42.93	32.65	23.24	8.56

Table 6.1. DMRB Projections of CO, Benzene, 1,3-butadiene, NO_x, NO_2 and PM_{10} for 2005

Table 6.1 shows the results of the DMRB model for five pollutants at 15 locations projected for 2005. Local information was input to the model where available and where it was not, the database of background concentrations for all relevant pollutants on the LAQM website was used. County Transport Planners provided all traffic flow information. It can be seen that all locations are projected to be well below the annual average for NO_2.

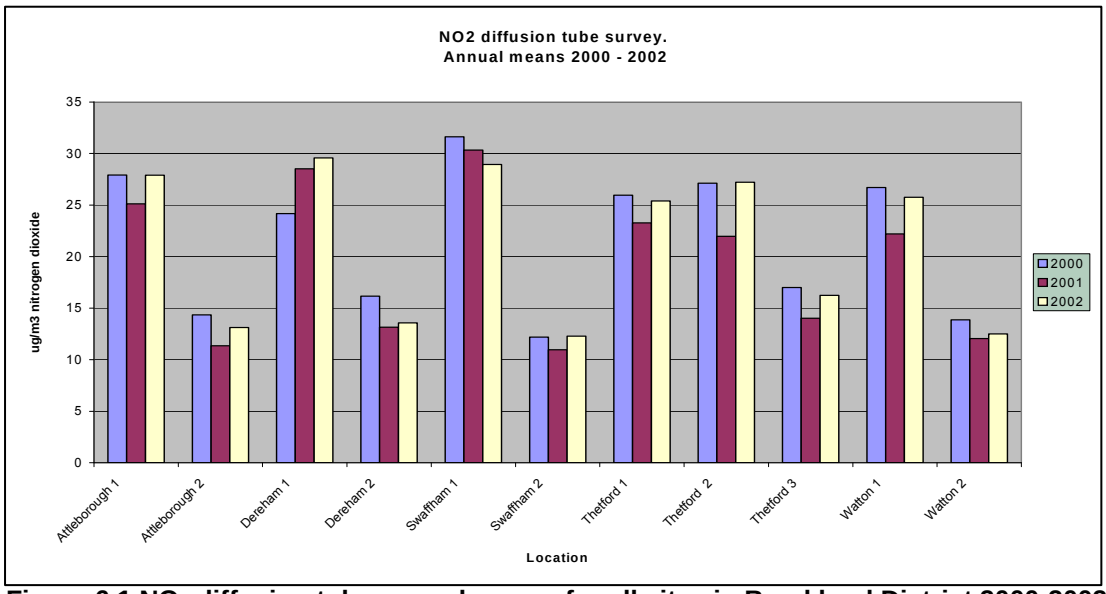

Figure 6.1 NO_2 diffusion tube annual means for all sites in Breckland District 2000-2002

Figure 6.1 shows that none of the sites in the local NO_2 diffusion tube survey exceeded the 40µg/m^3 annual mean limit between 2000 and 2002.

Town	Site Type	Grid Reference
Attleborough	Kerbside	TM 604579 295147
	Background	TM 603846 294072
Dereham	Kerbside	TF 598897 313345
	Background	TF 599276 313563
Thetford	Kerbside	TL 587127 283334
	Kerbside	TL 586847 282700
	Background	TL 87041 284051
Swaffham	Kerbside	TF 581964 308975
	Background	TF 581781 307599
Watton	Kerbside	TF 591557 300816
	Background	TF 591885 300621

Table 6.2. Grid references for diffusion tube sites in Breckland Council area

Table 6.2 shows the grid references for the NO2 diffusion tube network that has been in place since 1993.

All receptors			Pollutant concentrations at receptor (2010)						
Receptor number	Name Grid Reference	Year	CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m^3	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Days >50$\mu g/m^3$
1	Besthorpe By-Pass TM 956046	2010	0.17	0.24	0.15	44.29	22.38	23.55	9.19
2	North Tuddenham TG 142039	2010	0.16	0.22	0.12	40.09	21.36	23.15	8.39
3	Swaffham By pass TF 819001	2010	0.17	0.21	0.11	41.26	21.65	23.28	8.65
4	Swaffham By pass TF 819002	2010	0.15	0.20	0.08	30.22	18.77	22.30	6.82
5	London St Swaffham TF 819017	2010	0.19	0.25	0.12	37.79	20.79	23.04	8.18
6	Yaxham Road Dereham TF 995124	2010	0.20	0.25	0.12	35.59	20.22	22.93	7.97
7	Dereham By pass TF 997123	2010	0.20	0.25	0.15	51.05	23.93	24.21	11
8	Mundford Rd Thetford TF 836877	2010	0.25	0.32	0.21	56.27	25.07	24.78	11.88
9	Teasel Drive Thetford TF 830876	2010	0.19	0.24	0.12	38.43	20.95	23.03	8.15
10	Autumn Close Thetford TF 830878	2010	0.23	0.29	0.18	50.96	23.91	24.26	10.69
11	A1075 Thetford TF 841884	2010	0.25	0.31	0.19	54.93	24.78	24.65	11.57
12	Boston Road Thetford TF 834854	2010	0.17	0.23	0.18	51.66	24.07	23.94	10.00
13	A47 Wendling TF 931132	2010	0.17	0.22	0.13	45.35	22.63	23.55	9.19

Table 6.3. DMRB Projections of CO, Benzene, 1,3-butadiene, NO_x, NO_2 and PM_{10} for 2010

Table 6.1 shows the results of the DMRB model for five pollutants at 15 locations projected for 2010. Dereham High Street is omitted, as there is a major redevelopment of the town centre planned to be completed before this date. The development includes pedestrianised areas and traffic will be diverted around the town centre. National air quality initiatives and improvements in vehicle exhaust emissions are expected to reduce NO_2 concentrations still further and this is reflected in the projections for 2010

6.08 Roads with high flow of buses and/or HGVs

LAQM TG(03) states that an unusually high proportion of HGVs can be taken to be greater than 25%. There are no such roads in Breckland Council with particularly high flows of buses or HGVs. The DMRB model requires the percentage of HGVs for all roads to be input and the information made available for this by County Transport Planners showed that no roads had a percentage of HGVs greater than 11%.

6.09 New roads constructed or proposed since first round of review and assessment

Since the first round of review and assessment, two new roads have been constructed which might impact on air quality. These are the dualling of the A11 at Snetterton and the north-south link road in Dereham.

Emissions of NO_2 along the dualled section of the A11 are likely to be lower due to the reduced congestion and improved flow of traffic. In the unlikely event that this is not the case, there are no relevant receptors along the new section of the road.

In Dereham, the north-south link road has diverted some traffic away from the town centre and thus emission of NO_2 is likely to be lower in the town centre due the reduction in traffic. Daily traffic flows along the new road are not known, but information supplied by County Transport Planners for the flows in the roads feeding the new road have not increased substantially.

6.10 Roads close to the objective during the first round of review and assessment

All roads modelled in the first round of reviews and assessments were included in this USA, and as seen in Table 6.1 and 6.2, none are likely to exceed the air quality standards for 2005 or 2010.

6.11 Roads with significantly changed traffic flows

LAQM TG(03) defines "significantly changed" traffic flows as increasing by 25% since the first round of reviews and assessments. There are no roads that meet this criterion in Breckland.

6.12 Bus stations

LAQM TG(03) states that only bus stations with more than 1000 movements per day should be considered. There are no such bus stations in Breckland.

6.13 New industrial sources

The Norfolk Local Air Quality Management Group made up of the seven Norfolk local authorities, has discussed the contribution of industrial sources since the first round of reviews and assessments. The group concluded that there have been no new industrial sources of NO_2 in Breckland Council's district or any adjacent local authority areas since the first round of reviews and assessments. There have however been some factory closures in Breckland Council's district since this time, notably Thermos in Thetford, which will have reduced the overall NO_2 burden in the immediate area.

6.14 Industrial sources with substantially increased emissions

The Norfolk Local Air Quality Management Group concluded that there have been no substantially increased industrial sources of NO_2 in Breckland Council's district or any adjacent local authority areas since the first round of reviews and assessments.

6.15 Aircraft

There are no airports in the Breckland Council district.

6.16 Conclusion for nitrogen dioxide

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is very little likelihood of exceedence of the air quality standard for NO_2 in 2005 or 2010.

Chapter 7:Review and assessment of sulphur dioxide

7.01 Introduction

The Government and the Devolved Administrations have adopted a 15-minute mean of 266 μg/m^3 as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005. Additional objectives have also been set which are equivalent to the EU limit values specified in the First Air Quality Daughter Directive. These are for a 1-hour mean objective of 350 μg/m^3, to be exceeded no more than 24 times per year, and a 24-hour objective of 125 μg/m^3, to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

Box 7.1: Checklist for sulphur dioxide		
Reference no.	**Source, location or data that need to be assessed**	
A	Monitoring data outside an AQMA	7.03
B	Monitoring data within an AQMA	7.04
C	New industrial sources	7.05
D	Industrial sources with substantially increased emissions	7.06
E	Areas of domestic coal burning	7.07
F	Small boilers (5MW$_{(thermal)}$ burning coal or oil	7.08
G	Shipping	7.09
H	Railway Locomotives	7.10

7.02 Result of first round of review and assessment of air quality for sulphur dioxide

The first stage review and assessment for SO_2 indicated that the risk of the air quality objective being exceeded by the end of 2005 was not negligible. Details of large industrial processes were collated for the first stage review and assessment of SO_2 and from this the Part A industrial source within Breckland was modelled using the Environment Agency guidance document - GN24. Also further information was obtained on other Part A sources outside the district which might impact within the Council's area.

Predictions of annual means and 99.9th percentile of 15-minute average concentrations for SO_2 were based on the Environment Agency GN 24 method. This provided an estimate of the size of the "impact footprint" for each stack. The result of the screening with GN24 indicated that the maximum concentration from the Part A process within the Council's area would not exceed the 15 minute mean objective level of 266μg/m^3 (100ppb) with background added.

There was one Part B process that was thought to be a significant source of SO_2 (roadstone coating plant using waste oil). Using GN24, results showed that the 15 minute mean objective level of 266μg/m^3 (100ppb) with background added was unlikely to be exceeded. The guidance issued to local authorities at the time - LAQM TG4(00) - stated that in the case of elevated stacks it may be assumed that if the 15

minute objective is met the daily and hourly objectives are also unlikely to be exceeded.

The stage two report concluded that the Government's guidance for SO_2 had been followed through the use of the recommended screening model and methodology and included information which supported the final conclusion. The guidance highlighted that exceedences in the vicinity of industrial processes were unlikely. Thus the risk of any of the SO_2 air quality objectives being exceeded by the end of 2004 or 2005 was negligible.

Since completion of the first review and assessment of air quality, Breckland Council has continued monitoring of sulphur dioxide using diffusion tubes. In the second stage of the review and assessment the Government's guidance for SO_2 was followed through the use of the recommended screening models and methodology, and included information which supported the final conclusion. The guidance indicated that the existing national policies would ensure that the national air quality objectives will be achieved by the end of the year 2005 for all areas. Thus the second stage review and assessment concluded that the risk of the sulphur dioxide air quality objectives being exceeded by the end of 2005 is very unlikely.

7.03 Monitoring data outside an AQMA

Breckland Council has used diffusion tubes for monitoring SO_2 in the vicinity of the poultry litter fired power station near Thetford. The 38MW station is controlled under Pollution Prevention and Control Act 1999 by the Environment Agency. Monthly concentrations of SO_2 are very low ranging between 0 and 14 ug/m^3 between 2000 – 2002. However, although these monthly means are not comparable to the air quality standards which are based on short term exposures, it is not thought likely that any of the objectives for SO_2 will be exceeded.

7.04 Monitoring data within an AQMA

Breckland has no AQMAs for SO_2.

7.05 New industrial sources

The Norfolk Local Air Quality Management Group has discussed the contribution of industrial sources since the first round of reviews and assessments. The group concluded that there have been no new industrial sources of SO_2 in Breckland Council's district or any adjacent local authority areas since the first round of reviews and assessments.

7.06 Industrial sources with substantially increased emissions

The Norfolk Local Air Quality Management Group concluded that there have been no substantially increased industrial sources of SO_2 in Breckland Council's district or any adjacent local authority areas since the first round of reviews and assessments.

7.07 Areas of domestic coal burning

Domestic coal burning was not considered likely to lead to an exceedence of the air quality objective for SO_2 in the first round of reviews and assessments. Levels of coal burning have not increased and thus it is still unlikely that such activity would lead to an exceedence of the air quality standard for SO_2 in 2004.

7.08 Small boilers (5MW$_{(thermal)}$ burning coal or oil)

There have been no changes to the existing coal and oil burning appliances in the Breckland district since the first round of reviews and assessments and thus the air quality standard for SO_2 is unlikely to be exceeded.

7.09 Shipping

There is no shipping in the Breckland Council's district.

7.10 Railway Locomotives

There are several railway stations and stops on the main Norwich to London line in the Breckland district, but none are likely to have diesel locomotives stationary for 15 minutes. There is one station in Dereham on the Dereham to Wymondham line, run at weekends and holidays only, where diesel powered locomotives may be stationary for 15 minutes. The Mid Norfolk Railway company have stated that the only time that engines run while stationary is at Christmas in order to change batteries and keep the heating running. It is thus unlikely that any short-term objectives for SO_2 would be exceeded.

7.11 Conclusion for sulphur dioxide

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is unlikely to be an exceedence of the 15 minute or 1 hour objective for sulphur dioxide in 2004.

Chapter 8: Review and assessment for PM_{10}

8.01 Information

The Government and the Devolved Administrations have adopted two Air Quality Objectives for fine particles (PM_{10}), which are equivalent to the EU Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40 µg/m^3 as the annual mean, and 50 µg/m^3 as the fixed 24-hour mean to be exceeded on no more than 35 days per year, to be achieved by the end of 2004. The objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent.

The EU has also set indicative limit values for PM_{10} which are to be achieved by 1 January 2010. These stage 2 limit values are considerably more stringent and are:

20 µg/m^3 as the annual mean and 50 µg/m^3 as the 24 hour mean to be exceeded on no more than 7 days per year.

The objectives are:

For all parts of England (except London) Wales and Northern Ireland, a 24 hour mean of 50 µg/m^3 not be exceedence more than 7 times per year and an annual mean of 20 µg/m^3 to be achieved by the end of 2010.

Box 8.1: Checklist for PM_{10}		
Reference no.	**Source, location or data that need to be assessed**	
A	Monitoring data outside an AQMA	
B	Monitoring data within an AQMA	
C	Busy roads and junctions in Scotland	
D	Junctions	
E	Roads with high flow of buses and/or HGVs	
F	New roads constructed or proposed since first round of review and assessment	
G	Roads close to the objective during the first round of review and assessment	
H	Roads with significantly changed traffic flow	
I	New industrial sources	
J	Industrial sources with substantially increased emissions	
K	Areas with domestic solid fuel burning	
L	Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc	
M	Aircraft	

8.02 Result of first round of review and assessment of air quality for PM_{10}

PM_{10} was one of the four pollutants taken forward in the Breckland Council area to a second stage review and assessment. This second stage report concluded that the guidance for the second stage review and assessment of PM_{10} had been followed

and the appropriate screening models used. National measures in place will further reduce PM_{10} by 2004. It was further stated that these measures were not aimed at agricultural activity, which was thought to be a major source of PM_{10} in Breckland district. However, the second stage review and assessment of the Council's area indicated that the risk of the PM_{10} air quality objective being exceeded by the end of 2004 was negligible.

8.03 Monitoring data outside an AQMA

Breckland Council monitors PM_{10} continuously at one site using a beta attenuation instrument. The site is surrounded by heath land and arable farming on very light sandy soil and is thus thought to represent a worst possible case for PM_{10}, although many Breckland residents live in similar locations. LAQM TG(03) does not include such local sources for projections of PM_{10} to future years.

Results from this site for 2002 were adjusted to reflect the heated manifold on the instrument, i.e. the results were multiplied by 1.3 to account for loss of volatile PM_{10} due to heating. The objective for PM_{10}, to be achieved by the end of 2004, is 50 $\mu g/m^3$ as the fixed 24-hour mean to be exceeded on no more than 35 days per year. In 2002, there were 42 days when this was exceeded, although the annual mean was 28 $\mu g/m^3$. Using the method set out in LAQM TG(03) boxes 8.6 and 8.7, the annual mean PM_{10} concentrations were projected for 2004 at 27.2 $\mu g/m^3$ and for 2007 at 24.27 $\mu g/m^3$.

Thus the 2004 annual mean objective is not likely to be exceeded but the 2010 annual mean objective does appear likely to be exceeded. Projections of exceedences of the daily mean have not been made as the information set out in the method for this procedure in box 8.1 of LAQM TG(03) includes only transport and industry as the main contributory source of PM10 at the local level. This is not felt to be appropriate in this situation. It should be borne in mind that these projections relate only to sites which are similar to the location of the monitoring station.

8.04 Monitoring data within an AQMA

Breckland has no AQMAs.

8.05 Busy roads and junctions in Scotland

Not applicable.

8.06 Junctions

The results of modelling PM_{10} for junctions were included in the modelling of nitrogen dioxide for 2005 and 2010. Background concentrations for PM_{10} for these years were calculated, using the method set out in LAQM TG(03) Box 8.6, and entered into the DMRB spreadsheet. Tables 6.1 and 6.2 show the results for the busiest roads projected for 2005 and 2010. There are no exceedences for the annual objective and the number of daily exceedences are within the limits for the daily objective.

8.07 Roads with high flow of buses and/or HGVs

LAQM TG(03) states that an unusually high proportion of HGVs can be taken to be greater than 25%. There are no such roads in Breckland Council with particularly high flows of buses or HGVs. The DMRB model requires the percentage of HGVs

for all roads to be input and the information made available for this by County Transport Planners showed that no roads had a percentage of HGVs greater than 11%.

8.08 New roads constructed or proposed since first round of review and assessment

Relevant new roads were included for the assessment of NO_2 and the associated modelling of PM_{10} indicates that there is unlikely to be an exceedence of the (PM_{10}) objectives in 2005 or 2010 – and thus also not likely in 2004 which is the relevant date of the PM_{10} objective.

8.09 Roads close to the objective during the first round of review and assessment

All roads modelled in the first round of reviews and assessments were included in this USA, and as seen in Table 6.1 and 6.2, none are likely to exceed the air quality standards for 2005 or 2010 - and thus also not likely in 2004 which is the relevant date of the PM_{10} objective.

8.10 Roads with significantly changed traffic flow

LAQM TG(03) defines "significantly changed" traffic flows as increasing by 25% since the first round of reviews and assessments. There are no roads that meet this criterion in Breckland.

8.11 New industrial sources

The Norfolk Local Air Quality Management Group concluded that there have been no new industrial sources of PM_{10} in Breckland Council's district or any adjacent local authority areas since the first round of reviews and assessments.

8.12 Industrial sources with substantially increased emissions

The Norfolk Local Air Quality Management Group concluded that there have been no substantially increased industrial sources of PM_{10} in Breckland Council's district or any adjacent local authority areas since the first round of reviews and assessments.

8.13 Areas with domestic solid fuel burning

Domestic coal and wood burning was not considered likely to lead to an exceedence of the air quality objective for PM_{10} in the first round of reviews and assessments. Levels of coal burning have not increased and thus it is still unlikely that such activity would lead to an exceedence of the air quality standard for PM_{10} in 2004.

8.14 Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc

There are a number of quarries in the Breckland Council area but these were not thought to be significant sources of PM_{10} at relevant receptors.

8.15 Aircraft

There are no airports in Breckland.

8.16 Conclusion for PM_{10}

Breckland Council has considered all relevant background, industrial and traffic criteria and found that there is very little likelihood of exceedence of the air quality standard for PM_{10} in 2004 or 2010 for traffic or industrial sources. However there is a likelihood of an exceedence of the annual mean for 2010 and possibly the daily mean for 2004 and 2010 in areas under large scale cultivation (agricultural areas).

Breckland Council proposes that a detailed assessment of PM10 in the more rural areas should be made.

References

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