Updating and Screening Assessment of Air Quality in the District of Richmondshire

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Executive Summary

An Updating and Screening Assessment of air quality has been carried out for the District of Richmondshire. This is a requirement of Part IV of the Environment Act 1995, which obliges local authorities to periodically, review and assess the current, and likely future, air quality in their area. The role of this process is to identify areas where it is unlikely that the air quality objectives will be achieved. These locations must then be designated as Air Quality Management Areas (AQMAs). The first round of Review and Assessment was completed for the District of Richmondshire in 2000. No potential exceedences of the air quality objectives were identified and therefore no AQMAs were declared. This report is the initial stage of the second round of Review and Assessment. It focuses on changes that have occurred since the previous round.

The conclusions of this report are that no further action is required for sources of carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide and PM_{10}. A Detailed Assessment is required for sulphur dioxide emissions from domestic solid fuel burning in a small number of densely populated villages that do not have a mains gas supply. This will probably follow the form of a survey to determine fuel use at these locations, the results of which will be presented in a Detailed Assessment report due before April 2004. After submission of the Detailed Assessment progress reports on air quality in the District will be completed by April each year. These will report monitoring data and any significant changes to sources of air pollution, until the third round of Review and Assessment begins in 2006.

Summary of the Conclusions of the Updating and Screening Assessment

Pollutant	**Conclusion**
Carbon monoxide	No further action required
Benzene	No further action required
1,3 butadiene	No further action required
Lead	No further action required
Nitrogen dioxide	No further action required
Sulphur dioxide	**Detailed assessment required**
PM_{10}	No further action required

1 Introduction

Introduction to the Second Round of Review and Assessment

1.1 The Government's Air Quality Strategy for England, Scotland, Wales and Northern Ireland[1] and the addendum to it, published in February 2003[2] set out a framework for air quality improvements, which includes a series of air quality objectives. National and international measures are likely to achieve these objectives in most locations, but where areas of poor air quality remain, local air quality management will be necessary. Part IV of the Environment Act 1995 requires local authorities to periodically review and assess the current, and likely future, air quality in their area. The role of this process is to identify areas where it is unlikely that the air quality objectives will be achieved. These locations must be designated as Air Quality Management Areas (AQMAs) and subject to active management.

1.2 Air quality will change in response to changes in emitting activities. Air quality objectives and Review and Assessment guidance change with advances in knowledge; much of which is learnt from the Review and Assessment process itself. As a result, Review and Assessment is a long-term, rolling process, structured as a series of 'rounds'. Most local authorities in England, Scotland and Wales have now completed the first round of Review and Assessment and the second round is currently underway.

1.3 The revised Local Air Quality Management Technical Guidance (LAQM. TG(03))[3] sets out a phased approach to Review and Assessment. This prescribes an initial Updating and Screening Assessment (USA), which all authorities must undertake. It is based on a checklist to identify any matters that have changed since the first round and may now require further assessment. The Updating and Screening Assessment should cover each of the following:

- Any new monitoring data.
- Any new objectives.
- Any new pollutant sources, or significant changes to existing sources, either locally or in neighbouring authorities.
- Any other local changes that might affect air quality.

If the USA identifies any potential areas where there is a risk that the objectives may be exceeded, which were not identified in the first round, then the Local Authority should progress to a Detailed Assessment (DA).

1.4 This report describes the USA for Richmondshire District Council. It aims to identify any potential exceedences of the air quality objectives. Such exceedences might result from changes in pollutant emissions, or they might be caused by pollutant sources not previously assessed or changes in the objectives themselves.

The Air Quality Objectives

1.5 The Government's Air Quality Strategy[1] defines both standards and objectives for each of a range of air pollutants. The 'standards' are set as concentrations below which health effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of a particular pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of the costs, benefits, feasibility and practicality of achieving the standards. The objectives are prescribed within The Air Quality (England) Regulations 2000[4] and The Air Quality (England) (Amendment) Regulations 2002[5]. This latter publication set revised, more stringent objectives for benzene and carbon monoxide which are relevant to this second round, but which were absent in the first. The addendum to the air quality strategy[2] contains provisional objectives for PM_{10} to be achieved in 2010. As these are not in the regulations, they do not strictly need to be covered in the Review and Assessment process. However, for completeness they are discussed in this report. Table 1 summarises the objectives, which are relevant to this report. Appendix 1 sets out the individual health effects of each of these "strategy pollutants".

1.6 These air quality objectives are only applicable where members of the public are likely to be regularly present and are likely to be exposed over the averaging time of the objective[3]. For annual mean and 24-hour objectives relevant exposure is limited to residential properties, schools and hospitals. The 1-hour and 15-minute objectives apply at these and at any outdoor location where a member of the public might reasonably be expected to stay for the averaging period of the objective, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

Table 1: Air Quality Objectives Relevant to This Report.

Pollutant	Time Period	Objective	To be achieved by[1]
Benzene	Running annual mean	16.25 μg/m^3	2003
	Annual mean	5 μg/m^3	2010
1,3-Butadiene	Running annual mean	2.25 μg/m^3	2003
Carbon Monoxide	Maximum daily running 8-hour mean	10 mg/m^3	2003
Lead	Annual mean	0.5 μg/m^3	2004
	Annual mean	0.25 μg/m^3	2008
Nitrogen Dioxide	1-hour mean	200 μg/m^3 not to be exceeded more than 18 times a year	2005
	Annual mean	40 μg/m^3	2005
Sulphur Dioxide	1-hour mean	350 μg/m^3 not to be exceeded more than 24 times a year	2004
	24-hour mean	125 μg/m^3 not to be exceeded more than 3 times a year	2004
	15-minutes mean	266 μg/m^3 not to be exceeded more than 35 times a year	2005
Fine particles (PM_{10})[2]	24-hour mean	50 μg/m^3 not to be exceeded more than 35 times a year	2004
	Annual mean	40 μg/m^3	2004
	24-hour mean [3]	50 μg/m^3 not to be exceeded more than 7 times a year	2010
	Annual mean [3]	20 μg/m^3	2010

[1] The achievement dates are all by the end of the specified year.

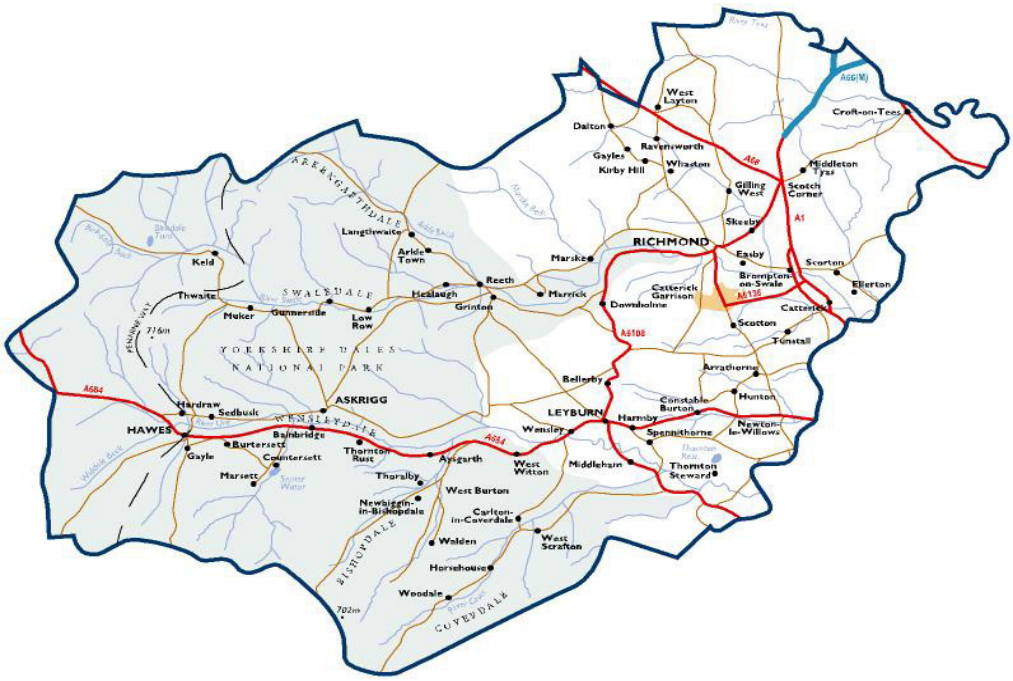
[2] Measured by the gravimetric method.

[3] Provisional objectives not included in the Regulations.

Richmondshire District

1.7 The District of Richmondshire (Figure 1) is largely rural, with a population of approximately 50,000 inhabitants, most of who reside in the small towns of Richmond, Leyburn and Hawes. Industry is limited to quarry processes and light industrial activities. The main source of emissions to air is vehicles on the A1 and A66 trunk routes, which pass through the east of the District.

Figure 1 The District of Richmondshire



Summary of the First Round of Review and Assessment

1.8 Reports from the first round of Review and Assessment are summarised in Appendix 2. Stage one[6] indicated that benzene, 1,3-butadiene, lead and sulphur dioxide were likely to meet the air quality standards throughout the district, but that carbon monoxide, nitrogen dioxide and PM_{10} required further investigation. The stage 2 report[7] included short-term monitoring data from a number of worst-case locations. These showed that exceedences of the carbon monoxide, nitrogen dioxide and PM_{10} objectives were unlikely and therefore no further work was required for round one. The appraisal carried out on behalf of Defra, accepted the conclusions although it was noted that the approach taken was not in accordance with the LAQM guidance.

2 Methodology

2.1 Air pollutant concentrations in the vicinity of an emission source will be related to both the source strength and the background concentration. Interpolated background concentrations of the strategy pollutants have been produced from the national map of background concentrations available from the Air Quality Archive on the internet[8]. The maps of the District of Richmondshire are presented in Appendix 3.

2.2 The results of the air quality monitoring carried out as part of the Government's Automatic Urban and Rural Network (AURN)[8] are published on the internet (www.airquality.co.uk). There are no AURN sites in the District of Richmondshire, however results from a selection of these sites in the north-east are presented in Appendix 4. Richmondshire District Council carries out nitrogen dioxide monitoring using diffusion tubes at four sites in the District the results of which are also included in Appendix 4 and the locations are shown in Appendix 5. In 1999 Richmondshire District Council carried out some additional short-term monitoring at a number of locations, the results from this monitoring have been adjusted to an annual mean by comparison with data from 3 AURN sites in the area using the method described in the Technical Guidance[3] (Appendix 8).

2.3 Trunk road traffic flow data have been obtained from the National Atmospheric Emissions Inventory[9]. Traffic data for other roads have been acquired from North Yorkshire County Council. The measured traffic data have been projected forward to 2005 and 2010 using local growth factors obtained from TEMPRO v4.2.1 combined with National Road Traffic Forecast data.

2.4 Using the Design Manual for Roads and Bridges screening method V1.01 (Feb'03)[10], nomograms which predict the traffic flow needed to create a potential exceedence of the nitrogen dioxide and PM_{10} objectives for a range of background concentrations have been generated using generally worst-case road conditions, (see Appendix 6). These have facilitated an initial screening of the traffic flow data in order to identify which roads might create an exceedence of the air quality objectives for nitrogen dioxide and PM_{10} given the local background concentrations. Where potential exceedences of the objectives have been

identified, detailed DMRB calculations have been carried out for these specific locations. Spreadsheets containing the input data used in these calculations are available.

2.5 Lists of industrial processes held by the District Council and the Environment Agency Pollution Inventory[11], have been used to identify point source emissions within the District of Richmondshire. The Environment Agency regulates large industrial processes, known as Part A1 sources, of which there are none within the District of Richmondshire. Smaller industrial sources, which are known as Part A2 and Part B processes, are regulated by Richmondshire District Council. Point sources in neighbouring Local Authority areas have also been taken into account by way of correspondence with Teesdale, Darlington, Hambleton, Harrogate, Craven, South Lakeland and Eden Councils. New or changed processes have been checked against the list of potentially significant processes that are set out in the Technical Guidance[3]. Large petrol stations, a list of which is also held by the District, were screened using the criteria, which are prescribed in the Technical Guidance[3].

2.6 The occurrence of other potential sources of air pollutants in the area, such as airports, railway sidings, bus stations, large boilers and fugitive sources of PM_{10} has been identified using local knowledge and screened using the criteria set out in the Technical Guidance[3].

3 Updating and Screening of Carbon Monoxide

Updating and Screening Summary for Carbon Monoxide.

Source, location or data which need to be assessed	Action
New monitoring data	No further action required
Very busy roads or junctions in built up areas	No further action required

New monitoring data

3.1 Carbon monoxide was monitored at a location at Brompton, 6m from the A1, between July and October 1999. The results from this period have been adjusted to the equivalent annual mean and the results are shown in Appendix 4, Table 4.1. Monitoring has also been carried out as part of the AURN at an urban industrial location in Middlesborough and urban centre locations at Leeds and Bradford. The results, which are set out in Appendix 4, show that there have been no measured exceedences of the objective, which is a maximum daily running 8-hour concentration of less than 10 mg/m^3 to be achieved in 2003, at any of these locations.

Very busy roads or junctions in built-up areas

3.2 Monitoring data from across the country indicate that the carbon monoxide objective is only likely to be exceeded near to 'very busy' roads and junctions, where the 2003 background concentration is greater than 1 mg/m^3. The highest estimated background concentration is 0.240 mg/m^3. This confirms that the objective will be achieved at all locations within the District.

Conclusion

3.3 No further action required for carbon monoxide.

4 Updating and Screening of Benzene

Updating and Screening Summary for Benzene.

Source, location or data which need to be assessed	Action
New monitoring data	No further action required
Very busy roads or junctions in built-up areas	No further action required
Industrial sources	No further action required
Petrol stations	No further action required
Major petroleum storage depots	No further action required

New monitoring data

4.1 There has been no monitoring of benzene in the District of Richmondshire. Monitoring has been carried out as part of the national AURN at Leeds Potternewton (urban background) and Middlesborough (urban industrial). The results of which are shown in Appendix 4, Table 4.2. Concentrations in 2003 and 2010 have been estimated by projecting forward measured values for 2002 using factors in the Technical Guidance[3]. The results show that even at the urban industrial site in Middlesborough, where concentrations are higher than those that are likely to be found in Richmondshire, the annual mean benzene objectives of 16.25 $\mu g/m^3$ in 2003 and 5 $\mu g/m^3$ in 2010 are likely to be achieved.

Very busy roads or junctions in built-up areas

4.2 Monitoring data from across the country indicate that the benzene objective for 2010 is only likely to be exceeded near to 'very busy' roads and junctions where the 2010 background concentration is greater than 2 $\mu g/m^3$. The highest estimated background concentration is 0.211 $\mu g/m^3$. This confirms that the objective will be achieved at all locations within the District.

Industrial sources

4.3 No industrial processes were found to emit significant quantities of benzene in the previous round of Review and Assessment. There have been no new processes introduced and no significant changes to existing industrial processes either in the District of Richmondshire or nearby in neighbouring authorities. Therefore there continues to be no likely exceedence of the benzene objectives.

Petrol stations

4.4 Petrol stations are only likely to lead to an exceedence of the 2010 objective for benzene if they have a large throughput of petrol (greater than 2 million litres per annum) and are near to a busy road, with more than 30,000 vehicles per day. There must also be relevant exposure, i.e. a residential property, within 10 m of the petrol pumps. There are no petrol stations within the District of Richmondshire that fulfil these criteria, and therefore it is not likely that petrol stations will lead to an exceedence of the benzene objectives in 2003 or 2010.

Major fuel storage depots (petroleum only)

4.5 There are no major petrol storage depots in the District of Richmondshire.

Conclusion

4.6 No further action required for benzene.

5 Updating and Screening of 1,3-butadiene

Updating and Screening Summary for 1,3-butadiene.

Source, location or data which need to be assessed	Action
New monitoring data	No further action required
New industrial sources	No further action required
Existing industrial sources with significantly increased emissions	No further action required

New monitoring data

5.1 There has been no monitoring of 1,3-butadiene carried out within the District of Richmondshire. Monitoring has been carried out as part of the national AURN at Leeds Potternewton (urban background) and Middlesborough (urban industrial). The results, which are set out in Appendix 4, Table 4.3 show that the running annual mean objective of 2.25 $\mu g/m^3$ in 2003 is expected to be achieved at all of these locations. As there are no particular sources of 1,3-butadiene in Richmondshire, other than road traffic, it would be fair to assume that the objective will not be exceeded in the District.

New industrial sources

5.2 No new processes, which handle 1,3-butadiene, have been introduced in or near to the District of Richmondshire since the first round of Review and Assessment.

Existing industrial sources with significantly increased emissions

5.3 No industrial processes in or near to the District of Richmondshire were found to emit 1,3-butadiene in the first round of Review and Assessment.

Conclusion

5.4 No further action required for 1,3-butadiene.

6 Updating and Screening of Lead

Updating and Screening Summary for Lead.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required

New monitoring data outside an AQMA

6.1 There has been no monitoring of lead carried out within the District of Richmondshire. Monitoring has been carried out as part of the national AURN at Leeds Potternewton (urban background) and Middlesborough (urban industrial). The results, which are set out in Appendix 4, Table 4.4, show that the annual mean objectives of 0.5 $\mu g/m^3$ in 2004 and 0.25 $\mu g/m^3$ in 2008 are expected to be achieved at all of these locations. As there are no particular sources of lead in Richmondshire, it would be fair to assume that the objective will not be exceeded in the District.

New industrial sources

6.2 No new processes, which emit lead, have been introduced in or near to the District of Richmondshire since the first round of Review and Assessment.

Industrial sources with substantially increased emissions

6.3 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of lead in the first round of Review and Assessment.

Conclusion

6.4 No further action required for lead.

7 Updating and Screening of Nitrogen Dioxide

Updating and Screening Summary for Nitrogen Dioxide.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New monitoring data within an AQMA	N/A
Narrow congested streets with residential properties close to the kerb	No further action required
Junctions	No further action required
Busy streets where people may spend 1-hour or more close to traffic	No further action required
Roads with high flow of buses and/or HGVs	No further action required
New roads constructed or proposed since first round of Review and Assessment	No further action required
Roads close to the objective during the first round of Review and Assessment	No further action required
Roads with significantly changed traffic flows	No further action required
Bus Stations	No further action required
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required
Aircraft	No further action required

New monitoring data outside an AQMA

7.1 Nitrogen dioxide has been monitored using diffusion tubes at four locations in Richmond, as part of the National Diffusion Tube Network. The results are shown on Figure 2 and Appendix 4, Table 4.6. Jesmond Dene Laboratory analyses the diffusion tubes, which are supplied by Harwell Scientifics. This laboratory is part of the WASP laboratory intercomparison scheme. Further details of the supply, analysis and QA/QC methods are presented in Appendix 7. Studies have indicated that there are systematic differences in the performance of different laboratories and preparation methods of diffusion tubes. In order to account for any such bias in the diffusion tubes used by Richmondshire District Council, data from 2 sites where diffusion tubes from the same laboratory have been collocated with continuous monitors for more than 9 months have been examined. Details of this exercise are included in Appendix 8. The results show that the tubes used over-estimated nitrogen dioxide concentrations by around 20%. The results from the national network diffusion tubes sites, presented in this report have therefore been adjusted to account for this bias. Figure 2, shows that measured concentrations of nitrogen dioxide at these diffusion tube sites within the District of Richmondshire are all below the annual mean objective of 40 $\mu g/m^3$. The locations of these monitoring sites are shown in Appendix 5.

7.2 In 1999 a short-term monitoring study was carried out near to the A1. At this time, Jesmond Dene Laboratory used diffusion tubes supplied by Gradko. Collocation studies carried out in 2000 indicated that these tubes underestimated concentrations by around 7% and therefore these results have been adjusted to account for this bias (see Appendix 8). These short-term results have also been adjusted to be equivalent to annual mean by comparison with results from 3 AURN sites in the region, using the method specified in the Technical Guidance[3]. The results (Appendix 4, Table 4.7) show that even at the Brompton site, which was 6m from the kerb of the A1, the annual mean objective of 40 µg/m^3 in 2005 will be achieved.

7.3 Concentrations have also been measured outside the District, as part of the AURN, at a roadside location in Yarm, which is in Stockton-on-Tees, and urban background locations in Leeds, Bradford and Middlesborough (Appendix 4, Table 4.5). The results presented in Figure 3 also support the view that the annual mean objective is likely to be achieved within the District of Richmondshire.

Figure 2 Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) measured by Diffusion Tube at Locations in Richmondshire and Estimated for 2005

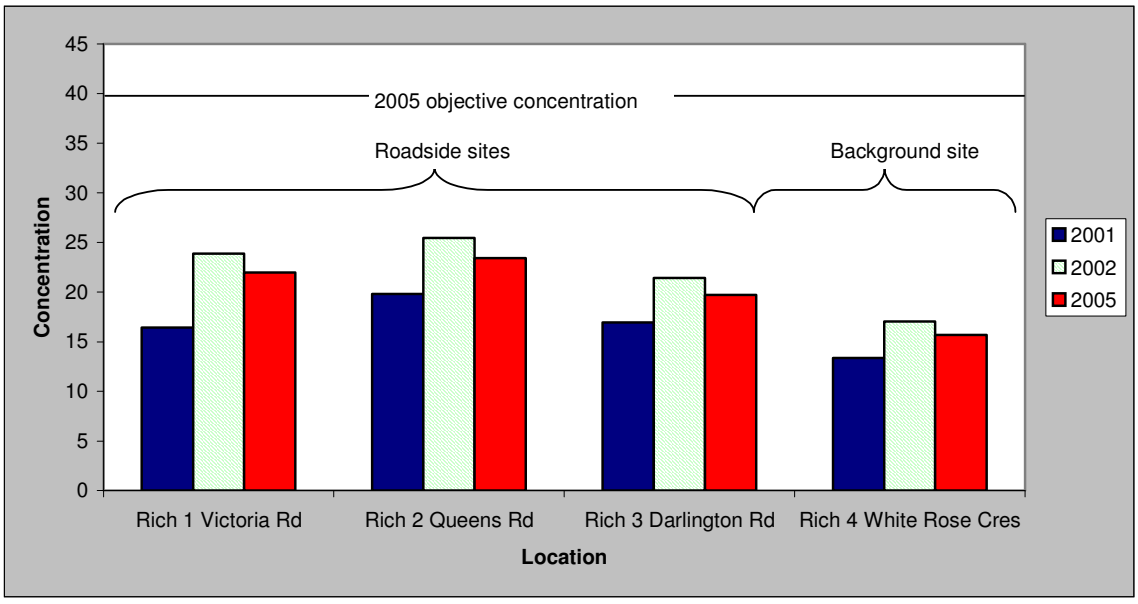
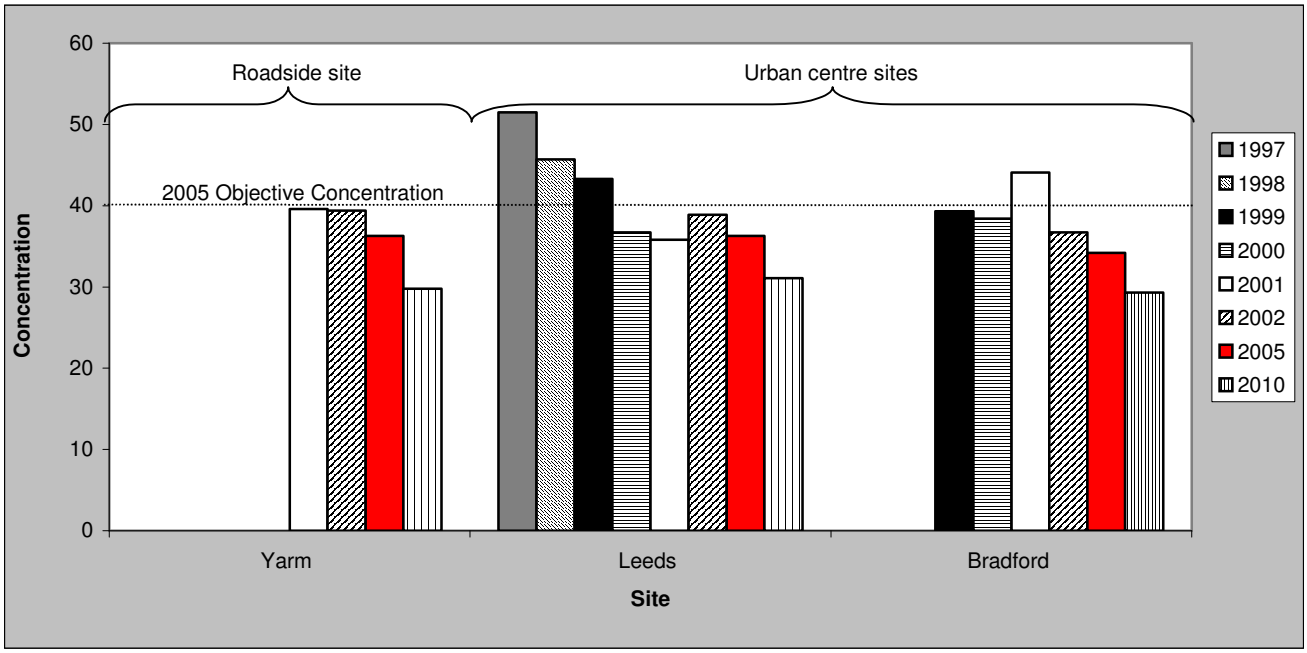


Figure 3 Annual Mean Nitrogen Dioxide Concentrations (µg/m^3) Measured by Continuous Monitor at Locations outside Richmondshire as part of the AURN and Estimated for 2005 and 2010



New monitoring data within an AQMA

7.4 No AQMAs have been declared for nitrogen dioxide in the District of Richmondshire and therefore this section is not applicable.

Narrow congested streets with residential properties close to the kerb

7.5 Queens Road, Victoria Road and Cravengate in Richmond and High Street, Leyburn are fairly narrow and congested with residential properties close to the kerb. There are busy junctions on all of these roads. Pollutant concentrations are expected to be highest at locations near to these junctions and therefore are dealt with in the next section.

Junctions

7.6 The busiest junction in Richmondshire is that of the A1 with the A66 at Scotch Corner. However, there is no relevant exposure within 10m of the road. In the rest of the district, the only fairly busy junctions, with relevant exposure are; the junctions of Victoria Road and Queens Road, and Reeth Road and Victoria Road, in Richmond, and junction of High Street and Commercial Square in Leyburn. Nitrogen dioxide concentrations in 2005 have been

calculated at the nearest receptors to these junctions using the DMRB and the results are presented in Table 2. The streets in Richmond and Leyburn are canyon type streets, where the buildings on either side are generally higher than the distance between them. The concentration of nitrogen dioxide calculated to be generated from the road at these sites has therefore been doubled to account for poor dispersion of pollutants at these locations. At the Reeth Road/Victoria Road location, the concentration calculated using the DMRB method is 21.9 $\mu g/m^3$, whereas the measured concentration at the same location (Rich 1), projected forward to 2005, is 22.0 $\mu g/m^3$. These results show that at this location, the DMRB method estimates nitrogen dioxide concentrations fairly accurately. The results set out in Table 2 indicate that the annual mean objective of 40 $\mu g/m^3$ is unlikely to be exceeded at junctions in the District of Richmondshire.

Table 2 Summary of DMRB Calculations for Nitrogen Dioxide

Receptor Location	Predicted (2005) Annual Mean Concentration ($\mu g/m^3$)
Middleton Tyas Lane, 100m East A1 at Scotch Corner	20.6
Moor View, 7m from the A1	33.3
West View Bungalow, West of Scotch Corner	24.5
Junction of Victoria Rd and Queens Rd, Richmond	23.2*
Junction of Reeth Rd and Victoria Road, Richmond	21.9*
Junction of High St with Commercial Square, Leyburn	24.8*
Objective	**40**

*Canyon

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

7.7 There are no busy streets where people could potentially spend an hour or more close to traffic.

Roads with high flow of buses and/or HGVs

7.8 According to traffic data obtained from North Yorkshire County Council and the National Atmospheric Emissions Inventory[9] the traffic flows on the A1 and A66 through Richmondshire are made up of more than 25% buses and/or HGVs. This finding is consistent with local knowledge of the District. DMRB calculations have been carried out for these

roads, and the results are presented in Table 2. Concentrations of nitrogen dioxide have been calculated at a location 100m to the east of Scotch Corner, where the A1 joins the A66, on Middleton Tyas Lane, at a receptor to the west of Scotch Corner, near to the A108 and at a receptor 7m from the A1. The results show that even at these worst case locations the annual mean objective is expected to be achieved in 2005. The 1999 monitoring result from a location similar to Moor View (Brompton) projected forward to 2005 is 20.8 $\mu g/m^3$ which is much lower than the modelled concentration, which is 33.3 $\mu g/m^3$. This suggests that the DMRB may over-estimate concentrations at this type of location and therefore the calculations using the DMRB in these situations are conservative.

New roads constructed or proposed since first round of Review and Assessment

7.9 No new roads have been constructed since the previous round of Review and Assessment. There are proposals to widen sections of the A1 and A66 through Richmondshire, however, this is unlikely to be carried out before 2005. This development will be followed in the Progress Reports.

Roads close to the objective during the first round of Review and Assessment

7.10 During the first round of Review and Assessment, no roads were identified as being close to the annual mean objective. The busiest roads in the District, away from junctions, have been screened out of any further assessment using the nomograms derived from the most recent version of the DMRB (Appendix 6), which includes the latest published emission factors, as shown in Table 3.

Table 3 Specific Roads Screened Using the Nomograms in Appendix 6.

Receptors Beside:	NO_2 Objective Exceedence Likely?
A1, Barton	>10% HDV, nomogram not relevant, DMRB calculation carried out, see Table 2
A684, Hawes	No
A684, Leyburn	No
A6108, Leyburn	No
A6108, Richmond	No
A6136, Richmond	No
A1, Scotch Corner	>10% HDV, nomogram not relevant, DMRB calculation carried out, see Table 2
A66, Scotch Corner	>10% HDV, nomogram not relevant, DMRB calculation carried out, see Table 2
A6108, Skeeby	No

Roads with significantly changed traffic flows

7.11 There are no roads in Richmondshire that have experienced a significant change in traffic flow since the previous round of Review and Assessment.

Bus Stations

7.12 There are no bus stations in the District of Richmondshire.

New industrial sources

7.13 No new industrial processes, which emit significant quantities of nitrogen dioxide have been introduced in or near to the District of Richmondshire.

Industrial sources with substantially increased emissions

7.14 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of nitrogen dioxide in the first round of Review and Assessment. No existing sources have substantially increased emissions.

Aircraft

7.15 There are no airports in the District of Richmondshire.

Conclusion

7.16 No further action is required for nitrogen dioxide.

8 Updating and Screening of Sulphur Dioxide

Updating and Screening Summary for Sulphur Dioxide.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New monitoring data within an AQMA	N/A
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required
Areas of domestic coal burning	Detailed Assessment required
Small boilers (>5MW(thermal)) burning coal or oil	No further action required
Shipping	No further action required
Railway Locomotives	No further action required

New monitoring data outside an AQMA

8.1 There has been no continuous monitoring of sulphur dioxide carried out in the District of Richmondshire. However, monitoring is carried out as part of the AURN at urban centre locations in Leeds and Bradford. The results from these sites are presented in Appendix 4, Table 4.8. These data indicate that the 24-hour, 1-hour and 15-minute objectives are expected to be achieved at these urban locations in the relevant years. It can also be presumed that away from any significant local sources of sulphur dioxide in Richmondshire, the objectives will also be achieved.

Monitoring data within an AQMA

8.2 No AQMAs have been declared for sulphur dioxide in the District of Richmondshire and therefore this section is not applicable.

New industrial sources

8.3 There have been no new processes, which emit significant quantities of sulphur dioxide, introduced in or near the District of Richmondshire since the first round of Review and Assessment.

Industrial sources with substantially increased emissions

8.4 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of sulphur dioxide in the first round of Review and Assessment. None of the existing processes have substantially increased their emissions. There are 2 roadstone coating plant in the District which use waste oil. However, the sulphur content of the waste oil used is much less that that of heavy fuel oil (0.2-0.3% compared with 1% in heavy fuel oil) and therefore it is unlikely that these processes will lead to an exceedence of any of the sulphur dioxide objectives.

Areas of domestic coal burning

8.5 Within the District of Richmondshire there are a number of villages which do not have a mains gas supply and therefore may have a higher than average density of households burning solid fuel. Of these villages, those with the highest housing densities are Reeth and Middleham which both have over 300 properties in a single 500m x 500m area. The only available information about fuel use in Richmondshire is a Housing Condition Survey, which inspected 1,000 properties across the whole of the District in 2000. This found that on average 27% of houses in the District do not have central heating and therefore have some other method of heating, which in many cases may be solid fuel. However, this survey included areas where a mains gas supply is available and therefore the proportion of properties in villages such as Reeth and Middleham could be much greater than this. On this basis it is proposed to progress to a Detailed Assessment for domestic coal burning sources of sulphur dioxide. This will probably involve a detailed survey of fuel use in these areas to determine whether it is likely that the sulphur dioxide objectives will be exceeded.

Small boilers (>5MW(thermal)) burning coal or oil

8.6 The existence of any schools, hospitals or other large institutional or commercial buildings, which may have boilers using coal or heavy fuel oil has been determined by contacting those institutions which exist within Richmondshire and determining the type of fuel used. The Hospital of St John of God in Scorton was identified as having 4 boilers, 2 of which burn coal. It has been estimated from information provided by the hospital that these boilers use 336 tonnes of coal per year. Using the emission factors from the National Atmospheric Emissions Inventory[9] it has been calculated that 6.7 tonnes of sulphur dioxide are emitted from this source per year. Based on the nomograms supplied in the Technical Guidance[3], the maximum

sulphur dioxide emission rate from a stack of the same height (17m) and diameter (0.5m), which would required a Detailed Assessment, is 131 tonnes per year. Therefore, emissions from this boiler do not have the potential to lead to an exceedence of the sulphur dioxide objectives. No other boilers using coal or heavy fuel oil have been identified in the District.

Shipping

8.7 There is no shipping activity in the District of Richmondshire.

Railway Locomotives

8.8 There are currently no locations, with relevant exposure, in Richmondshire where there are stationary diesel locomotives. There are plans to re-open the section of line from Wensley for use by passenger diesel locomotives. If this goes ahead, it will be ensured that locomotives turn off their engines, if they are stationary for 15 minutes or more.

Conclusion

8.9 A Detailed Assessment is proposed for sulphur dioxide emissions from domestic solid fuel use. This will probably follow the form of a fuel use survey in the most densly populated villages that do not have a mains gas supply. No further action is required for any other sources of sulphur dioxide.

9 Updating and Screening of Particles (PM_{10})

Updating and Screening Summary for PM_{10}.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New monitoring data within an AQMA	N/A
Junctions	No further action required
Roads with high flow of buses and/or HGVs	No further action required
New roads constructed or proposed since first round of Review and Assessment	No further action required
Roads close to the objective during the first round of Review and Assessment	No further action required
Roads with significantly changed traffic flows	No further action required
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required
Areas with domestic solid fuel burning	No further action required
Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc	No further action required
Aircraft	No further action required

New monitoring data outside an AQMA

9.1 There is no PM_{10} monitoring carried out in Richmondshire at present. In 1999 a short survey took place at 3 locations, the results of which are presented in Figures 4 & 5 and Appendix 4. A monitor was located adjacent to the A1 at Brompton, and near to quarry works at Leyburn and Barton. The Barton site was also near to a lorry park, which lies close to the A1. Monitoring is also carried out, outside Richmondshire, as part of the AURN at urban centre locations in Leeds and Bradford and a roadside location in Yarm. These results are also shown in Figures 4 & 5 and Appendix 4, Table 4.9. The results support the view that even at the roadside locations in Richmondshire, annual mean and 24-hour objectives are expected to be achieved.

New monitoring data within an AQMA

9.2 No AQMAs have been declared for PM_{10} in the District of Richmondshireand therefore this section is not applicable.

Figure 4 Annual Mean PM_{10} Concentrations ($\mu g/m^3$) Measured at Locations in and Around Richmondshire, together with Estimated Values for 2004 and 2010

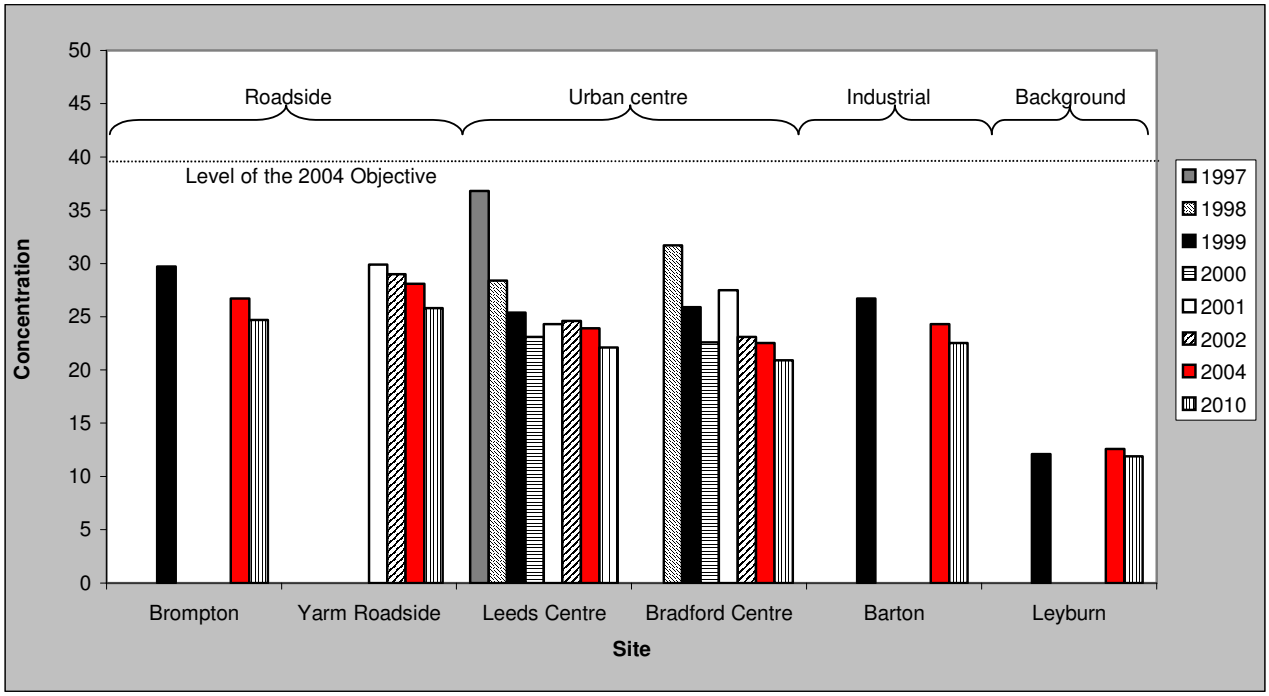
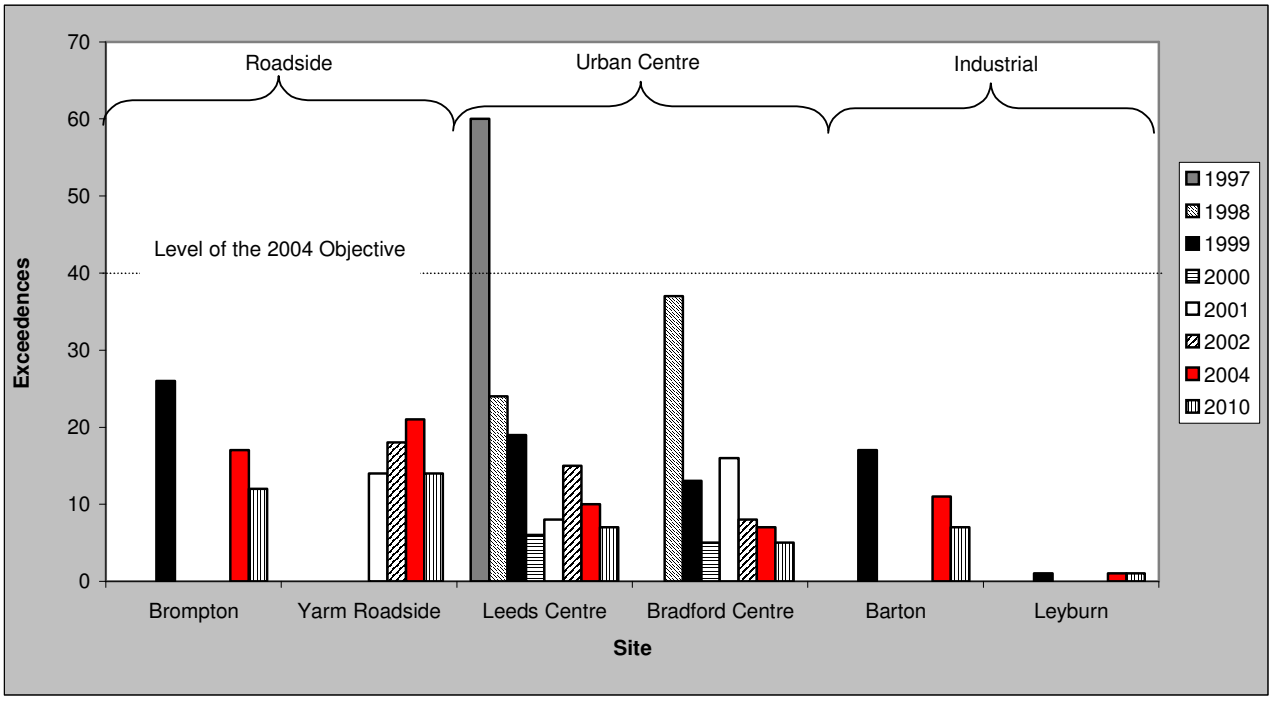


Figure 5 Exceedences of the 24-hour PM_{10} Objective of 50 $\mu g/m^3$ Measured at Locations in and Around Richmondshire, together with Estimated Values for 2004 and 2010



Junctions

9.3 The busiest junction in Richmondshire is the junction of the A1 with the A66 at Scotch Corner. However, there is no relevant exposure within 10m of the road. In the rest of the district, the only fairly busy junctions, with relevant exposure are; the junctions of Victoria Road and Queens Road, and Reeth Road and Victoria Road, in Richmond, and junction of High Street and Commercial Square in Leyburn. PM_{10} concentrations in 2004 and 2010 were calculated at the nearest receptors to these junctions using the DMRB and the results are presented in Table 4. Results from the DMRB suggest that the 2004 objectives of 40 $\mu g/m^3$ as an annual mean and fewer than 36 days with a 24-hour average concentration greater than 50 $\mu g/m^3$ will be achieved. No junctions have been identified in the District of Richmondshire where the 2010 PM_{10} objectives are likely to be exceeded.

Roads with high flow of buses and/or HGVs

9.4 According to traffic data obtained from North Yorkshire County Council and the National Atmospheric Emissions Inventory[9] the traffic flows on the A1 and A66 through Richmondshire are made up of more than 20% buses and/or HGVs. This finding is consistent with local knowledge of the District. DMRB calculations have been carried out for these roads, and the results are presented in Table 4. Concentrations of PM_{10} have been calculated at a location 100m to the east of Scotch Corner, where the A1 joins the A66, on Middleton Tyas Lane, at a receptor to the west of Scotch Corner, near to the A108 and at a receptor 7m from the A1. The results show that even at these worst case locations the annual mean and 24-hour objectives are expected to be achieved in 2004.

9.5 Annual mean concentrations in 2010 may be slightly above the provisional objective of 20 $\mu g/m^3$, near to the A1, which is expected to be the case at a large number of locations across the UK. However, the 2010 objectives are currently provisional and do not need to be considered for the purposes of this assessment.

Table 4 Summary of DMRB Calculations For PM_{10}.

	2004	2004	2010	2010
Receptor Location	**Predicted Annual Mean Concentration ($\mu g/m^3$)**	**Predicted Number of Exceedences of 50 $\mu g/m^3$ as a 24-Hour Mean**	**Predicted Annual Mean Concentration ($\mu g/m^3$)**	**Predicted Number of Exceedences of 50 $\mu g/m^3$ as a 24-Hour Mean**
Middleton Tyas Lane, 100m East A1 at Scotch Corner	18.4	2	16.2	0
Moor View, 15m from the A1	25.5	14	20.1	4
West View Bungalow, West of Scotch Corner	20.3	4	17.1	1
Junction of Victoria Rd and Queens Rd, Richmond	18.0	1	16.0	0
Junction of Reeth Rd and Victoria Road, Richmond	17.5	1	15.7	0
Junction of High St with Commercial Square, Leyburn	18.7	2	16.4	0
Objective	**40**	**35**	**20**	**7**

New roads constructed or proposed since first round of Review and Assessment

9.6 No new roads have been constructed since the previous round of Review and Assessment. There are proposals to widen sections of the A1 and A66 through Richmondshire, however, this is unlikely to be carried out before 2004. This development will be followed in the Progress Reports.

Roads close to the objective during the first round of Review and Assessment

9.7 During the first round of Review and Assessment, no roads were identified as being close to the annual mean objective. The busiest roads in the District, away from junctions, have been screened out of any further assessment using the nomograms derived from the most recent version of the DMRB (Appendix 6), which includes the latest published emission factors, as shown in Table 5.

Table 5 Specific Roads Screened Using the Nomograms in Appendix 6.

Receptors Beside:	PM_{10} Objective Exceedence Likely?
A1, Barton	>10% HDV, nomogram not relevant, DMRB calculation carried out, see Table 4
A684, Hawes	No
A684, Leyburn	No
A6108, Leyburn	No
A6108, Richmond	No
A6136, Richmond	No
A1, Scotch Corner	>10% HDV, nomogram not relevant, DMRB calculation carried out, see Table 4
A66, Scotch Corner	>10% HDV, nomogram not relevant, DMRB calculation carried out, see Table 4
A6108, Skeeby	No

Roads with significantly changed traffic flows

9.8 There are no roads in Richmondshire that have experienced a significant change in traffic flow since the previous round of Review and Assessment.

New industrial sources

9.9 A new concrete block process is due to be introduced at Brompton on Swale, before 2004. Emissions to air will be minimised through the use a pressurised system and filters on the silos and the nearest residential premises are 120m from the process. It is therefore unlikely that it will lead to any exceedences of the objectives. There have been no other new processes, which emit significant quantities of PM_{10}, introduced in or near to the District of Richmondshire since the first round of Review and Assessment.

Industrial sources with substantially increased emissions

9.10 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of PM_{10} in the first round of Review and Assessment. None of the existing processes have substantially increased their emissions.

Areas with domestic solid fuel burning

9.11 Within the District of Richmondshire there are a number of villages which do not have a mains gas supply and therefore may have a higher than average density of households burning solid fuel. Of these villages, those with the highest housing densities are Reeth and

Middleham which both have over 300 properties in a single 500m x 500m area. However, the background PM_{10} concentrations in these areas are low (less than 15 $\mu g/m^3$ in 2004) and therefore according to the nomograms provided in the Technical Guidance, even if all of these households used coal, it would be unlikely that there would be an exceedence of the objectives.

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

9.12 There are a number quarries, landfill sites or other dusty operations in the District of Richmondshire that have the potential to have a significant effect on PM_{10} concentrations at residential properties. However, these were assessed in the previous round of Review and Assessment and monitoring was carried out at two worst-case locations. The results of this monitoring indicated that exceedences of the objectives due to these sources were unlikely at relevant locations. The Local Authority continues to monitor the situation at dusty operations as part of the routine inspections carried out in accordance with LAPC and LAPPC.

Aircraft

9.13 There are no airports in the District of Richmondshire.

Conclusion

9.14 No further action is required for PM_{10}.

Glossary

Standards	A nationally defined set of concentrations for eight pollutants below which health effects do not occur or are minimal.
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
Exceedence	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.
AQMA	Air Quality Management Area
USA	Updating and Screening Assessment
DA	Detailed Assessment
Defra	Department for Environment Food and Rural Affairs
TG(03)	Technical guidance document provided by Defra to assist local authorities in completion of the next round of the Air Quality Review & Assessment process3
DMRB	Design Manual for Roads and Bridges (Highways Agency 2003)
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.
NO_2	Nitrogen dioxide.
m	Metres.
µm	Micrometres (one millionth of a metre)
$\mu g/m^3$	Microgrammes per cubic metre.

References

[1] DETR (January 2000), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.
[2] Defra, (February 2003), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum.
[3] Defra, (February 2003), Local Air Quality Management, Technical Guidance LAQM.TG(03).
[4] The Air Quality (England) Regulations 2000, Statutory Instrument 928
[5] The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043
[6] Richmondshire District Council (1999) Stage 1 Air Quality Review and Assessment.
[7] Laxen, D (December 1999) Air Quality Monitoring in Richmondshire
[8] www.airquality.co.uk
[9] www.naei.co.uk
[10] Highways Agency (February 2003), Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 Air Quality.
[11] www.environment-agency.gov.uk/yourenv/