# South Holland District Council

## Updating Screening and Assessment 2012

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## Document Control Sheet

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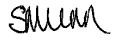
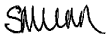
| Signature |  |  | | |
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# Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Updating and Screening Assessment is a requirement of the Fifth Round of Review and Assessment and is a requirement for all local authorities. The Report has been undertaken in accordance with the Technical Guidance LAQM.TG (09) and associated tools (as updated in 2010).

This Updating and Screening Assessment considers all new monitoring data and assesses the data against the Air Quality Strategy objectives. It also considers any changes that may have an impact on air quality.

Updated monitoring showed that there were no exceedences of the Air Quality Objectives within the district in 2011. Monitoring methods have shown that $NO_2$ and $PM_{10}$ concentrations have increased at the majority of monitoring sites from the 2010 concentrations.

Since the last round of review and assessment there has been the construction of two new roads within the district, the Spalding to Eye link road and the Wygate Park to Bourne End link road. Screening assessments have been undertaken and have determined that there are no requirements to proceed to a detailed assessment for either of the new roads.

Proposed actions arising from the USA are as follows:

- Continue diffusion tube and continous monitoring in the district to identify future changes in pollutant concentrations;
- Install a new monitoring location on the Spalding to Eye link road (A16) to monitor the impact that the new road is having upon local air quality;
- Proceed to a Progress Report in 2013.

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# 1 Introduction

## 1.1 Description of Local Authority Area

The district of South Holland comprises the principal town of Spalding surrounded by the small towns of Holbeach, Long Sutton, Sutton Bridge and Crowland. The rest of the district is rural in character.

The main source of air pollution in the district is road traffic emissions from major roads, notably the A16, A17 and A151 which connect South Holland with North Lincolnshire and the Humber estuary, and south west Lincolnshire. There are currently no Air Quality Management Areas (AQMAs) declared in South Holland.

## 1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

## 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, $mg/m^3$ for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

**Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England**

| Pollutant | Air Quality Objective | | Date to be achieved by |
|---|---|---|---|
| | Concentration | Measured as | |
| **Benzene** | 16.25 $\mu g/m^3$ | Running annual mean | 31.12.2003 |
| | 5.00 $\mu g/m^3$ | Running annual mean | 31.12.2010 |
| **1,3-Butadiene** | 2.25 $\mu g/m^3$ | Running annual mean | 31.12.2003 |
| **Carbon monoxide** | 10.0 $mg/m^3$ | Running 8-hour mean | 31.12.2003 |
| **Lead** | 0.5 $\mu g/m^3$ | Annual mean | 31.12.2004 |
| | 0.25 $\mu g/m^3$ | Annual mean | 31.12.2008 |
| **Nitrogen dioxide** | 200 $\mu g/m^3$ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| | 40 $\mu g/m^3$ | Annual mean | 31.12.2005 |
| **Particles ($PM_{10}$) (gravimetric)** | 50 $\mu g/m^3$, not to be exceeded more than 35 times a year | 24-hour mean | 31.12.2004 |
| | 40 $\mu g/m^3$ | Annual mean | 31.12.2004 |
| **Sulphur dioxide** | 350 $\mu g/m^3$, not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| | 125 $\mu g/m^3$, not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| | 266 $\mu g/m^3$, not to be exceeded more than 35 times a year | 15-minute mean | 31.12.2005 |

## 1.4 Summary of Previous Review and Assessments

South Holland District Council undertook the First Round of Review and Assessment of air quality between 1998 and 2001 (Stages 1, 2 and 3). The Stage 2 report recommended further assessment of $NO_2$ and $PM_{10}$ emissions in the Port Sutton Bridge Area and $NO_2$ emissions along the A17 at Holbeach and Sutton Bridge. The Stage 3 report concluded that predicted concentrations of $NO_2$ and $PM_{10}$ would be met at these locations and no AQMA was required. The conclusions of the First Round were that all AQS objectives were expected to be met by the target dates based on the available information at that time.

The first phase of the Second Round of Review and Assessment, the USA, was completed in August 2003 and this provided an update with respect to air quality issues in the District. The USA 2003 concluded that no Detailed Assessment of air quality was required. The Progress Reports 2004 and 2005 similarly concluded that all AQS objectives were expected to be met. A new continuous monitoring site was established in 2003 at Monkhouse School in Spalding to monitor $PM_{10}$ and $NO_2$ concentrations, and assess emissions from Spalding Power Station.

The first phase of the Third Round of Review and Assessment, the USA, was completed in June 2006 and this provided a further update with respect to air quality issues in the District. The USA 2006 concluded that all objectives were expected to be met and no Detailed Assessment was required. In 2007 and 2008 the Council submitted annual Progress Reports for air quality. The reports considered the latest monitoring data and concluded that no significant changes in pollutant concentrations had occurred and there were no predicted exceedences of the AQS objectives.

The Fourth Round 2009 USA provided a further update on local air quality and concluded that the objectives for benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide and sulphur dioxide would be met and that there was no requirement to undertake a Detailed Assessment for these pollutants. However, the Council confirmed that there were two poultry farms in Spalding that met the relevant assessment criteria and had nearby relevant exposure with respect to the $PM_{10}$ objectives. It was therefore proposed that the Council progress to a Detailed Assessment for $PM_{10}$ at these two poultry farm locations (Fleet Fen Farm Poultry Unit and Chapel Road Poultry Unit) in addition to the 2010 Annual Progress Report.

The Detailed Assessment, which was completed in May 2011, focused on Fleet Fen Farm, near Holbeach, which was considered to be the worst-case scenario due to the farm capacity

and proximity of sensitive properties downwind. The report concluded that emissions of $PM_{10}$ from the turkey-rearing units at Fleet Fen Farm did not present a significant risk of breaching the $PM_{10}$ AQS objectives, and that there was no need to declare an AQMA.

The Progress Reports 2010 and 2011 concluded that results at all monitoring sites still complied with the AQS objectives, apart from one kerbside site which, in 2009, exceeded the annual mean $NO_2$ objective. However, there was no relevant exposure near the site to warrant further consideration and this site met the objective in 2010. Both LAQM Progress Reports recommended the continued monitoring at existing sites.

# 2 New Monitoring Data

## 2.1 Summary of Monitoring Undertaken

### 2.1.1 Automatic Monitoring Sites

This section provides details of automatic monitoring carried out in 2009 to 2011, the years covered by this report.

There is currently automatic monitoring of $NO_2$ undertaken by South Holland District Council at two locations in the area using a chemiluminescence analyser:

- Spalding Monkhouse; and
- Westmere School.

Continuous monitoring of $PM_{10}$ is also undertaken at these sites using a Tapered Element Oscillating Microbalance (TEOM).

There is additionally monitoring of ozone ($O_3$) measured by ultra violet absorption at the Westmere School site. Ozone is a trans-boundary pollutant; the sources of ozone are frequently spatially distant from the measured site of the concentrations. Ozone is not prescribed in the Regulations for LAQM and is therefore reported here for information only.

**Figure 2.1 Map of Automatic Monitoring Sites**

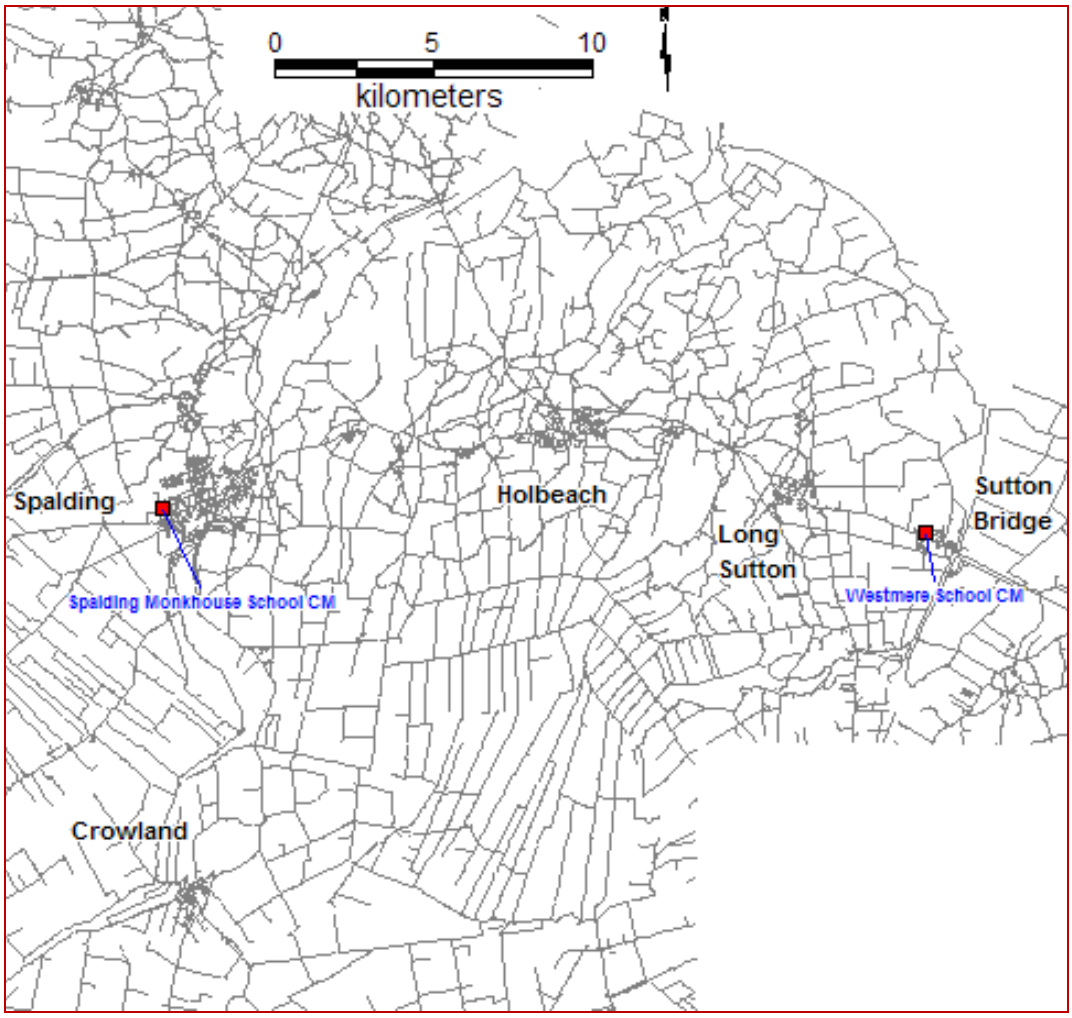


**Table 2.1 Details of Automatic Monitoring Sites**

| Site Name | Site Type | X OS GridRef | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Monitoring Technique | Relevant Exposure? *(Y/N with distance (m) to relevant exposure)* | Distance to kerb of nearest road *(N/A if not applicable)* | Does this location represent worst-case exposure? |
|---|---|---|---|---|---|---|---|---|---|
| SH1: Spalding Monkhouse School | Urban Background | 523168 | 322454 | $NO_2$, $PM_{10}$ | No | Chemiluminescence, TEOM | Y (1m) | 25m | N |
| SH2: Westmere School | Urban Background | 547264 | 321709 | $NO_2$, $O_3$, $PM_{10}$ | No | Chemiluminescence, UV Absorption, TEOM | Y (14m) | 190 | N |

### 2.1.2 Non-Automatic Monitoring Sites

South Holland District Council undertook monitoring using passive $NO_2$ diffusion tubes at 15 sites in 2011. No new sites have been installed since the LAQM Progress Report 2010.

Diffusion tubes in 2011 were prepared and analysed by Gradko International Limited using the tube preparation method of 50% TEA in Acetone. Gradko International Limited participates in the Workplace Analysis Scheme for Proficiency (WASP) for $NO_2$ diffusion tube analysis. This provides strict performance criteria for participating laboratories to meet, thereby ensuring $NO_2$ concentrations reported are of a high calibre. For WASP data rounds 112 through to 114 (January to September 2011) Gradko International Limited scored 100%, with round 115 (October to December 2011) scoring 37.5%, meaning the respective percentage of results submitted are deemed to be satisfactory based upon the z-score of $< \pm 2$.

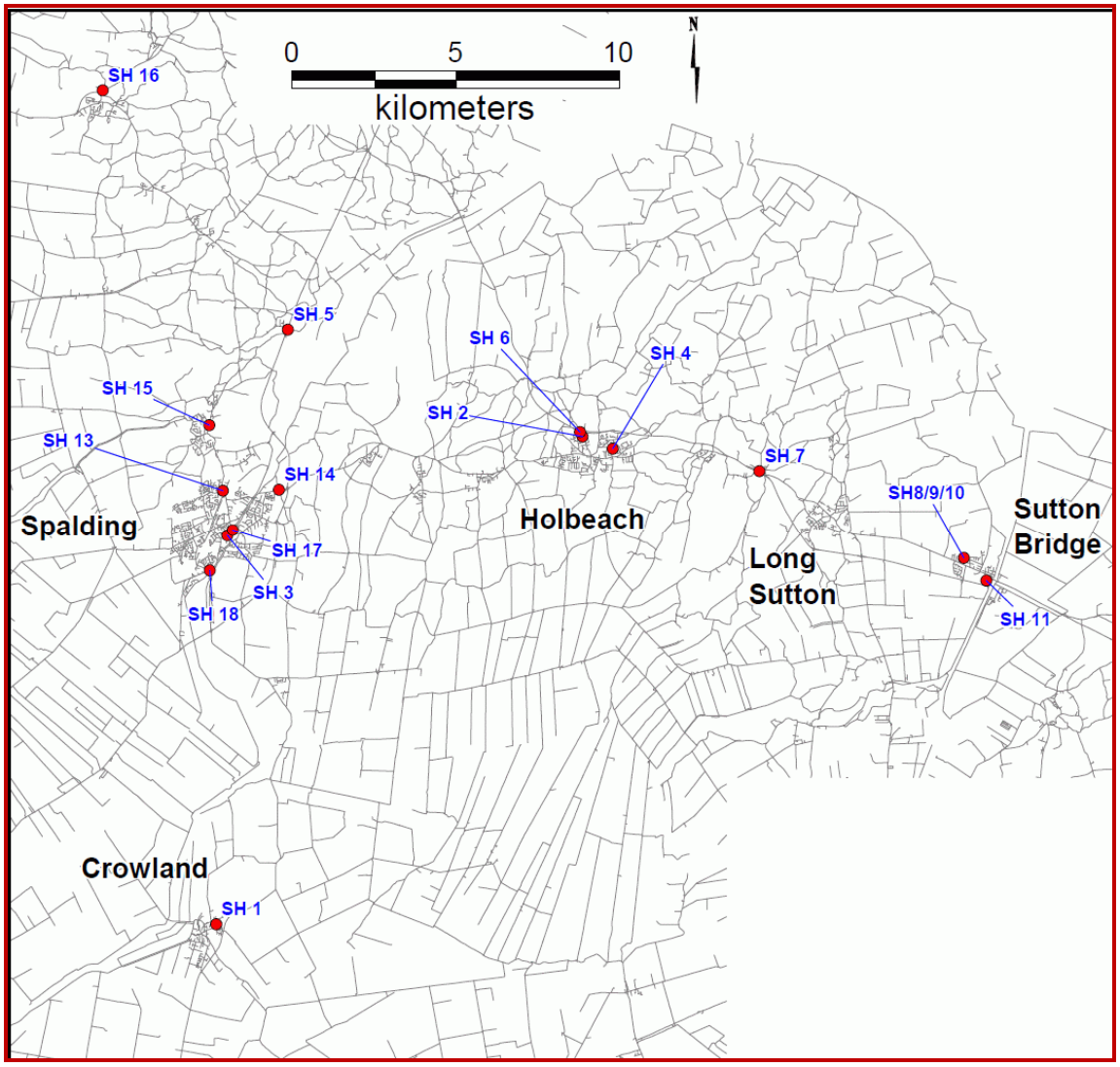
A bias adjustment factor has been applied to the data, which is an estimate of the difference between diffusion tube concentrations and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The technical guidance LAQM.TG (09) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tubes. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from $NO_x$ / $NO_2$ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

South Holland has a set of diffusion tubes co-located with the continuous analyser at Westmere School. The locally derived bias-adjustment factor of 1.28 has been used in the data reported here.

For datafrom years 2007 to 2010, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used were 0.99 (2007), 1.13 (2008), 1.33 (2009) and 0.99 (2010).

Details of the non-automatic monitoring undertaken in the district are presented in Table 2.2 and Figure 2.2.

**Figure 2.2 Map of Non-Automatic Monitoring Sites**



## Table 2.2 Details of Non-Automatic Monitoring Sites

| Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? *(Y/N with distance (m) to relevant exposure)* | Distance to kerb of nearest road *(N/A if not applicable)* | Does this location represent worst-case exposure? |
|---|---|---|---|---|---|---|---|---|---|
| 21 Millfield Gardens | Background | 524388 | 310520 | $NO_2$ | N | N | Y ( 6.8m) | 2.9m | N |
| Nutten Stoven | Kerbside | 535595 | 325453 | $NO_2$ | N | N | Y (5.6m) | 21.8m | Y |
| Priory Road | Background | 524734 | 322403 | $NO_2$ | N | N | N (38.4m) | <2m | N |
| 46 The Hollies | Background | 536523 | 325078 | $NO_2$ | N | N | Y (8.4m) | 0.2m | N |
| Station Road | Roadside | 526585 | 328726 | $NO_2$ | N | N | Y (24.9m) | 1.5m | Y |
| 103 Boston Road | Kerbside | 535525 | 325589 | $NO_2$ | N | N | Y (25.7m) | 9.5m | Y |
| Field End | Roadside | 541013 | 324393 | $NO_2$ | N | N | Y (5.9m) | <2m | Y |
| Westmere (Triplicate) | Background | 547264 | 321709 | $NO_2$ | N | Y | N (69.4m) | 61.2m | N |
| Metalair Site | Roadside | 547957 | 321013 | $NO_2$ | N | N | N | <2m | Y |
| Pinchbeck Road | Kerbside | 524595 | 323793 | $NO_2$ | N | N | Y (20.7m) | 0.7m | Y |
| Springfields Roundabout | Kerbside | 526309 | 323820 | $NO_2$ | N | N | N (54.2m) | 11m | Y |
| Church Street, Pinchbeck | Roadside | 524182 | 325804 | $NO_2$ | N | N | Y ( 0m) | 1.5m | Y |
| Bicker Road, Donington | Roadside | 520917 | 336064 | $NO_2$ | N | N | Y (7.5m) | 16.5m | Y |
| High Road, Spalding | Roadside | 524892 | 322571 | $NO_2$ | N | N | Y (0m) | 1.5m | Y |
| Hawthorn Bank, Spalding | Roadside | 524191 | 321328 | $NO_2$ | N | N | Y (1.5m) | 3m | Y |

## 2.2 Comparison of Monitoring Results with AQ Objectives

### 2.2.1 Nitrogen Dioxide

There are two Air Quality Objectives for nitrogen dioxide, namely:

- the annual mean of 40µg/$m^3$, and
- the 1-hour mean of 200µg/$m^3$ not to be exceeded more than 18 times a year.

#### Automatic Monitoring Data

The ratified annual monitoring results for 2007 – 2011 for the automatic monitoring sites are shown Table 2.3 while Figure 2.3 shows the trend in $NO_2$ annual mean.

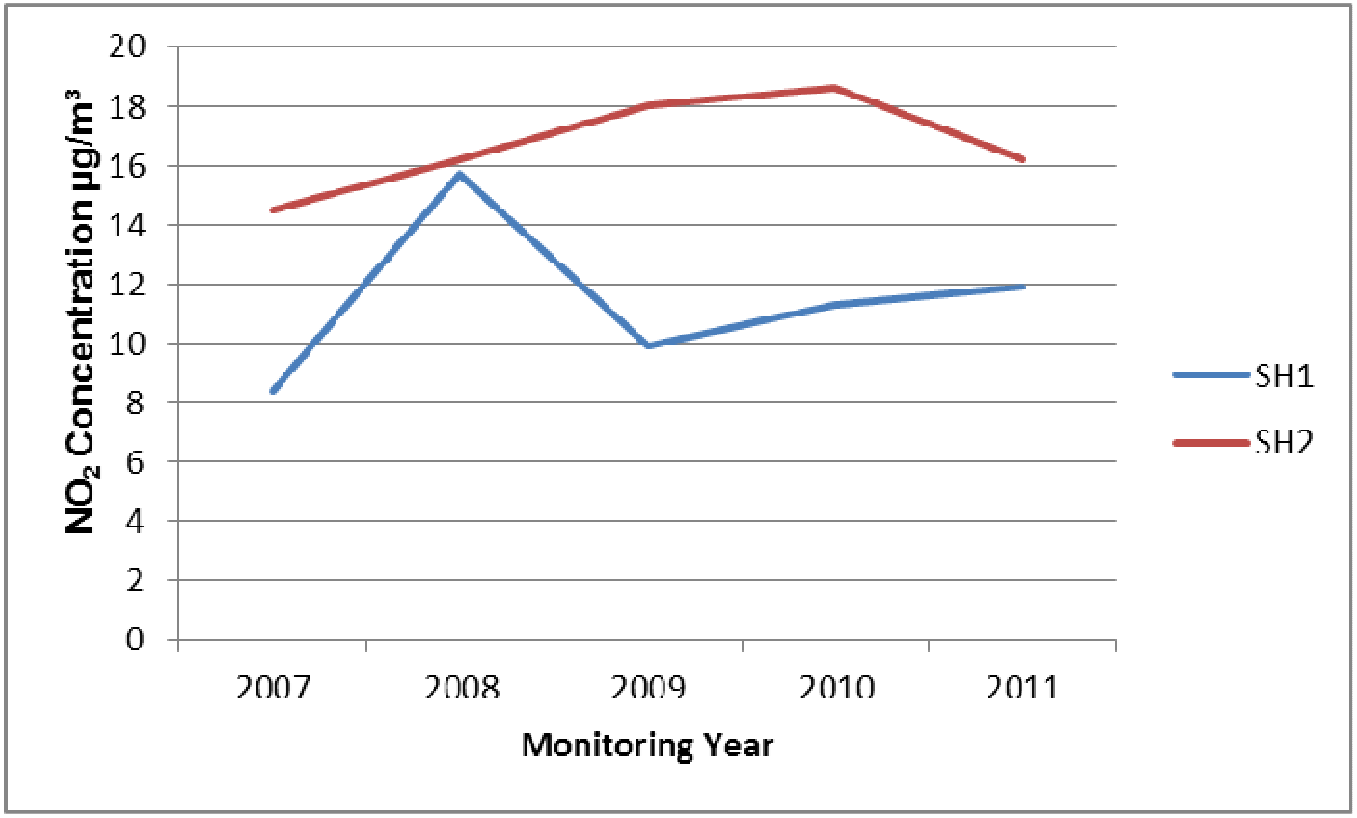
The annual mean is well below the objective for $NO_2$, with concentrations falling at Westmere School and only showing a slight increase at Spalding Monkhouse when compared to the 2010 concentrations.

With respect to the hourly mean objective, no exceedences of the short-term objective were recorded at the Spalding Monkhouse or Westmere School monitoring sites in 2011.

**Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for period of monitoring % | Valid Data Capture 2011 % | Annual Mean Concentration μg/m$^3$ | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2007 | 2008 | 2009 | 2010 | 2011 |
| SH1 | Background | N | 94 | 94 | 8.4 | 15.7 | 9.9 | 11.3 | 11.9 |
| SH2 | Background | N | 95 | 95 | 14.5 | 16.2 | 18.0 | 18.6 | 16.2 |

**Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measures at Automatic Monitoring Sites**




The above figure shows the trends in annual mean $NO_2$ concentration at the two automatic monitoring sites. From this it can be seen that there has been a decrease in concentrations at SH2 (Westmere School), to concentrations close to those recorded in 2008. With regards to SH1 (Spalding Monkhouse) there has been a slight increase in concentrations, continuing an increasing trend observed since 2009.

**Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for period of monitoring % | Valid Data Capture 2011 % | Number of Exceedences of Hourly Mean (200 µg/m$^3$) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2007 | 2008 | 2009 | 2010 | 2011 |
| SH1 | Background | N | - | 94 | 0 | 0 | 0 | 0 (63) | 0 |
| SH2 | Background | N | - | 95 | 0 | 0 | 0 | 0 (156.5) | 0 |

If the period of valid data is less than 90%, the 99.8$^{th}$ percentile of hourly means is included in brackets

## Diffusion Tube Monitoring Data

The nitrogen dioxide diffusion tube data are summarised in Table 2.5. The full dataset (monthly mean values) are included in Appendix A.

The $NO_2$ annual mean Air Quality Objective of 40µg/$m^3$ was met at all locations throughout the District in 2011.

**Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2011**

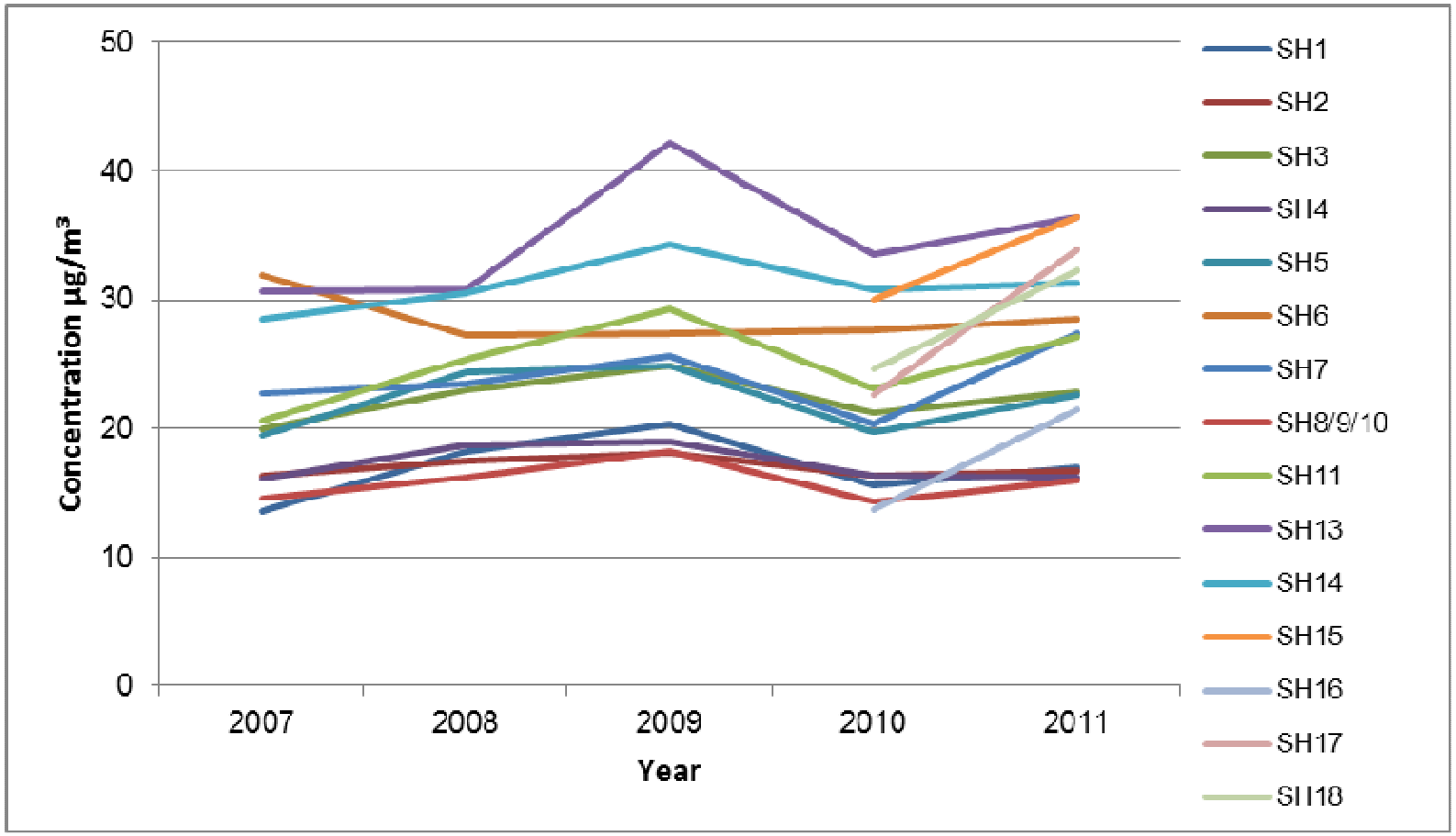
| Site ID | Location | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2011 (Number of Months or %) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Local Bias Adjustment factor =1.28) 2011 (µg/m$^3$) |
|---|---|---|---|---|---|---|---|---|
| SH 1 | 21 Millfield Gardens | Background | N | N | 100% | - | N | 17.0 |
| SH 2 | Nutten Stoven | Kerbside | N | N | 100% | - | N | 16.7 |
| SH 3 | Priory Road | Background | N | N | 92% | - | N | 22.8 |
| SH 4 | 46 The Hollies | Background | N | N | 100% | - | N | 16.2 |
| SH 5 | Station Road | Roadside | N | N | 100% | - | N | 22.6 |
| SH 6 | 103 Boston Road | Kerbside | N | N | 92% | - | N | 28.5 |
| SH 7 | Field End | Roadside | N | N | 100% | - | N | 27.4 |
| SH8/9/10 | Westmere (Triplicate) | Background | N | Triplicate and Collocated | 97% | - | N | 16.8 |
| SH 11 | Metalair Site | Roadside | N | N | 100% | - | N | 27.1 |
| SH 13 | Pinchbeck Road | Kerbside | N | N | 100% | - | N | 36.4 |
| SH 14 | Springfields Roundabout | Kerbside | N | N | 100% | - | N | 31.3 |
| SH 15 | Church Street, Pinchbeck | Roadside | N | N | 100% | - | N | 36.4 |
| SH 16 | Bicker Road, Donington | Roadside | N | N | 92% | - | N | 21.5 |
| SH 17 | High Road, Spalding | Roadside | N | N | 92% | - | N | 33.9 |
| SH 18 | Hawthorn Bank, Spalding | Roadside | N | N | 83% | - | N | 32.3 |

**Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)**

| Site ID | Site Type | Within AQMA? | Annual mean concentration (adjusted for bias) µg/m$^3$ | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2007* (Bias Adjustment Factor =0.99) | 2008* (Bias Adjustment Factor = 1.13) | 2009* (Local Bias Adjustment Factor = 1.33) | 2010* (National Bias Adjustment Factor = 0.99) | 2011 (Local Bias Adjustment Factor = 1.28) |
| SH 1 | 21 Millfield Gardens | N | 13.5 | 18.2 | 20.3 | 15.6 | 17.0 |
| SH 2 | Nutten Stoven | N | 16.3 | 17.4 | 18.1 | 16.3 | 16.7 |
| SH 3 | Priory Road | N | 19.9 | 23 | 24.8 | 21.2 | 22.8 |
| SH 4 | 46 The Hollies | N | 16.1 | 18.7 | 18.9 | 16.3 | 16.2 |
| SH 5 | Station Road | N | 19.4 | 24.3 | 24.8 | 19.7 | 22.6 |
| SH 6 | 103 Boston Road | N | 31.9 | 27.3 | 27.4 | 27.6 | 28.5 |
| SH 7 | Field End | N | 22.7 | 23.5 | 25.6 | 20.3 | 27.4 |
| SH8/9/10 | Westmere (Triplicate) | N | 14.5 | 16.2 | 18.2 | 14.3 | 16.0 |
| SH 11 | Metalair Site | N | 20.6 | 25.3 | 29.2 | 23.1 | 27.1 |
| SH 13 | Pinchbeck Road | N | 30.6 | 30.8 | **42.2** | 33.5 | 36.4 |
| SH 14 | Springfields Roundabout | N | 28.5 | 30.5 | 34.3 | 30.8 | 31.3 |
| SH 15 | Church Street, Pinchbeck | N | - | - | - | 30.0 | 36.4 |
| SH 16 | Bicker Road, Donington | N | - | - | - | 13.7 | 21.5 |
| SH 17 | High Road, Spalding | N | - | - | - | 22.6 | 33.9 |

| Site ID | Site Type | Within AQMA? | Annual mean concentration (adjusted for bias) µg/m$^3$ | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2007* (Bias Adjustment Factor =0.99) | 2008* (Bias Adjustment Factor = 1.13) | 2009* (Local Bias Adjustment Factor = 1.33) | 2010* (National Bias Adjustment Factor = 0.99) | 2011 (Local Bias Adjustment Factor = 1.28) |
| SH 18 | Hawthorn Bank, Spalding | N | - | - | - | 24.6 | 32.3 |

**Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites**




The above figure shows the trend in $NO_2$ concentrations from 2007 to 2011. The figure shows that there has been an increase in the $NO_2$ concentrations at the majority of sites from the 2010 levels. The most significant increases have been from the four sites introduced in 2010. The highest concentration was recorded at sites SH13 and SH15.

### 2.2.2 $PM_{10}$

There are two Air Quality Objectives for $PM_{10}$, namely:

- the annual mean of 40µg/$m^3$; and
- the 24-hour mean of 50µg/$m^3$ not to be exceeded more than 35 times a year.

The 2011 results show that the annual mean and the 24-hour mean continue to be met at both monitoring locations within the district. The 2011 pollutant levels show a continuing increasing trend from 2009 onwards.

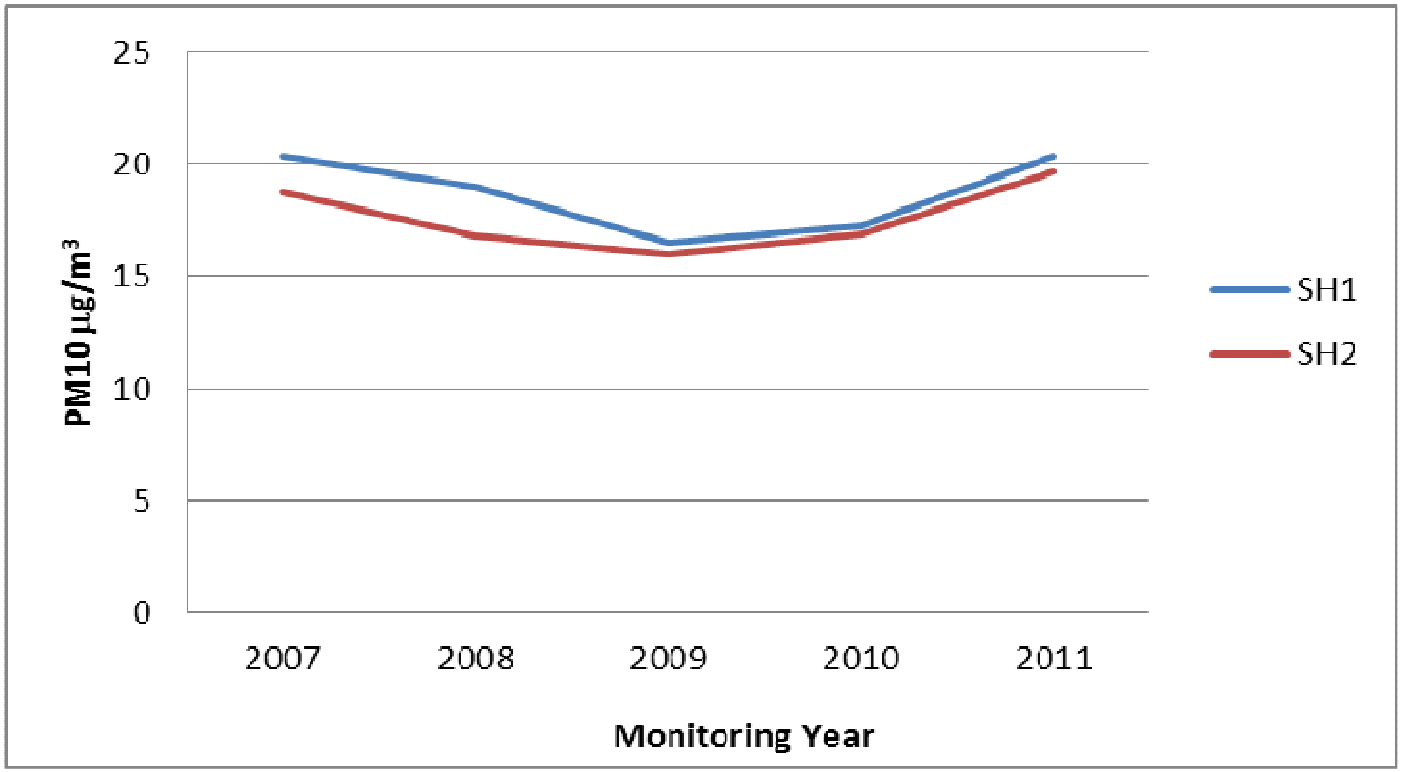
**Table 2.7 Results of Automatic Monitoring of $PM_{10}$: Comparison with Annual Mean Objective**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for monitoring Period % | Valid Data Capture 2011 % | Confirm Gravimetric Equivalent (Y or NA) | Annual Mean Concentration μg/m$^3$ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2007 (TEOM x 1.3) | 2008 (TEOM x 1.3) | 2009 (TEOM x 1.3) | 2010 (VCM) | 2011 (VCM) |
| SH1 | Background | N | | 98 | Y | 20.4 | 19.0 | 16.5 | 17.3 | 20.4 |
| SH2 | Background | N | - | 97 | Y | 18.8 | 16.8 | 16.0 | 16.9 | 19.7 |

**Table 2.8 Results of Automatic Monitoring for $PM_{10}$: Comparison with 24-hour mean Objective**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for monitoring Period % | Valid Data Capture 2011 % | Confirm Gravimetric Equivalent | Number of Exceedences of 24-Hour Mean (50 μg/m$^3$) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2007* | 2008* | 2009* | 2010* | 2011 |
| SH1 | Background | N | - | 98 | Y | 7 | 1 | 1 (22.4) | 0 | 7 |
| SH2 | Background | N | - | 97 | Y | 3 | 1 | 0 | 0 (39.4) | 8 |

**Figure 2.5 Trends in Annual Mean $PM_{10}$ Concentrations**




The above figure shows that $PM_{10}$ concentrations reduced from 2007 to 2009. From 2009 onwards both sites have been closely aligned in terms of $PM_{10}$ concentrations. Both sites have shown the same increasing trend in concentrations since 2009, with a greater increase observed between the 2010 annual mean and the 2011 annual mean, bringing $PM_{10}$ concentrations close to those observed in 2007.

### 2.2.3 Other pollutants monitored

In addition to the $PM_{10}$ and $NO_2$ automatic analysers, South Holland District Council also monitors ozone at the Westmere School.

Ozone is a trans-boundary pollutant; the sources of ozone are frequently spatially distant from the measured site of the concentrations. This pollutant is not a prescribed air quality objective for LAQM and therefore, results are provided for information only.

Data capture for 2011 was 90% and the maximum of 8-hour running means exceeded 100µg/m³ on 91 occasions during the year. The Air Quality Strategy objective permits 10 exceedences per year and therefore the objective was not met.

**Table 2.9 Results of Automatic Monitoring for Ozone – Comparison with Objectives**

| Location | Within AQMA? | Description | % Data capture 2011 | Number of Exceedences in 2011 |
|---|---|---|---|---|
| **SH2** | No | Maximum 8-hour running mean > 100 µg/m$^3$ | 90% | **91** |

### 2.2.4 Summary of Compliance with AQS Objectives

South Holland District Council has examined the results from monitoring in the district. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

# 3 Road Traffic Sources

## 3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Technical Guidance TG(09) defines narrow congested streets to have the following:

- Daily traffic flow (AADT) of around 5,000 vehicles per day
- Congested street is one that has slow moving traffic that is frequently stopping and starting throughout the day.
- A narrow street is one with residential properties within 2 m of the kerb and buildings on both sides of the road

South Holland District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

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

There will be some street locations where individuals may regularly spend 1-hour or more, for example, streets with many shops and streets with outdoor cafes and bars. People occupationally exposed in such locations should not be included, as they are not covered by the regulations.

South Holland District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

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

A road with a high flow of buses or HGVs would be one where the proportion of these vehicles would be greater than 20%.

South Holland District Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

## 3.4 Junctions

Since the last round of review and assessment works have been undertaken to widen the Wygate Road/Pinchbeck Road junction. The aim of the works was to improve traffic flow at the junction and surrounding roads.

South Holland District Council confirms that there are no new/newly identified busy junctions/busy roads.

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

Since the last round of review and assessment there has been the construction of two new roads within the district. These are the;

- Spalding to Eye link road (A16)
- Wygate Park residential estate and Bourne Road link road

The new Spalding to Eye link road (A16) was constructed to move traffic from the old road (A1073) onto this new road.

An Air Quality screening assessment has been undertaken using the Highways Agency Design Manual for Road and Bridges (DMRB) methodology to assess the impact that the Spalding to Eye link road (A16) is likely to have upon $NO_2$ and $PM_{10}$ concentrations in the local area. The nearest receptor to the A16 is located 38m from the road, for this assessment this location has been used for the screening assessment as a worst case scenario for the remainder of the route. The result of the DMRB modelling is shown in Appendix B. No exceedences of the air quality objectives are predicted and therefore there is no requirement to proceed to a Detailed Assessment. It is recommended that a diffusion tube is installed at the nearest receptor on the new road to monitor future $NO_2$ concentrations.

The original Environmental Impact Assessment has also been reviewed. In this assessment the road was assessed using DMRB. .'Do minimum' and 'all transfer' scenarios were assessed against 2005 background levels. The assessments found that for $NO_2$ neither the annual mean or the hourly limit would be exceeded at any of the receptor locations. With regards to $PM_{10}$, it was found that the $90^{th}$ percentile 24 hour means and annual mean would be below exceedence levels.

The Wygate Park to Bourne End link road completed in 2011 has been screened to determine if further assessment is required. Technical Guidance TG(09) states that a new road should be assessed if traffic flow is greater than 10,000 vehicles per day and if there is relevant exposure within 10m of the road. For the link road there is no relevant exposure within 10m of the road, therefore a detailed assessment is not required.

South Holland District Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

## 3.6 Roads with Significantly Changed Traffic Flows

South Holland District Council confirmed that there have been no roads with changed traffic flows greater than 10,000 vehicles per day.

South Holland District confirms that there are no new/newly identified roads with significantly changed traffic flows.

## 3.7 Bus and Coach Stations

The assessment considers both $NO_2$ and $PM_{10}$ emissions at bus stations that are not enclosed with >2500 movements per day.

South Holland District Council confirms that there are no relevant bus stations in the Local Authority area.

# 4 Other Transport Sources

## 4.1 Airports

South Holland District Council confirms that there are no airports in the Local Authority area.

## 4.2 Railways (Diesel and Steam Trains)

The assessment for stationary trains considers $SO_2$ emissions, while the assessment for moving diesel trains considers $NO_2$ emissions. If there are no railways carrying diesel or steam trains in the Local Authority area, there is no need to proceed further with this part.

### 4.2.1 Stationary Trains

South Holland District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

### 4.2.2 Moving Trains

Rail lines with a heavy traffic of diesel passenger trains are listed in the Technical Guidance TG (09). Of the lines listed none pass through South Holland.

South Holland District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

## 4.3 Ports (Shipping)

The Technical Guidance TG (09) states that ports where 5,000 and 15,000 movements per year take place and where there is exposure within 250 metres should be assessed.

South Holland District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

# 5 Industrial Sources

## 5.1 Industrial Installations

The assessment of industrial installations considers all of the regulated pollutants, although those most at risk of requiring further work are $SO_2$, $NO_2$, $PM_{10}$ and benzene.

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

South Holland District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

### 5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

South Holland District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

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

South Holland District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

## 5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

## 5.3 Petrol Stations

The specififed criteria for petrol stations requiring assessment as stated in the Technical Guidance TG (09) is a petrol station with the following:

- Annual throughput of more than 2,000$m^3$ of petrol per annum

- A busy road nearby, with more than 30,000 vehicles per day

South Holland District Council confirms that there are no petrol stations meeting the specified criteria**.**

## 5.4 Poultry Farms

South Holland District Council has previously identified a potential source of particulates, at two turkey farms with over 145,000 bird capacity and proceeded to a Detailed Assessment, which was completed in May 2011. The detailed assessment concluded that there was no need to declare an AQMA near the poultry farms.

South Holland District Council confirms that poultry farms meeting the specified criteria have already been assessed through a detailed assessment. As such there is no need to complete a further detailed assessment at this stage.

# 6 Commercial and Domestic Sources

Technical Guidance TG (09) provides guidance as to if an assessment is required on biomass combustion.

## 6.1 Biomass Combustion – Individual Installations

South Holland District Council have confirmed that there are no installations burning biomass in 50kW to 20MW units.

South Holland District Council confirms that there are no biomass combustion plant in the Local Authority area.

## 6.2 Biomass Combustion – Combined Impacts

South Holland District Council confirms that there are no biomass combustion plant in the Local Authority area.

## 6.3 Domestic Solid-Fuel Burning

The assessment considers $SO_2$ emissions (only) from significant areas of residential properties that use solid fuel to heat their houses. 'Significant' areas are those of about 500 x 500 m with more than 50 houses burning coal/smokeless fuel as their primary source of heating. $PM_{10}$ from domestic solid fuel burning is covered under the Biomass combustion – combined impacts section above.

South Holland District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

# 7 Fugitive or Uncontrolled Sources

The assessment of fugitive and uncontrolled sources considers the $PM_{10}$ objectives. This included consideration to quarries, landfill sites, opencast coal mining, waste transfer sites, and materials handling (i.e. ports, major construction sites). Only locations not covered by previous rounds of review and assessment, or where there is new relevant exposure, require consideration. In the case of proposed new sources, these are only required to be considered if planning approval has been granted.

South Holland District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

# 8 Conclusions and Proposed Actions

## 8.1 Conclusions from New Monitoring Data

The review of new monitoring data has identified no exceedances of the AQS objectives at any of South Holland District Council's diffusion tube or continuous monitoring sites.

The diffusion tube monitoring network showed an increasing trend in $NO_2$ concentrations when compared to previous year's data at the majority of sites. With regards to continuous $NO_2$ data, the Westmere School site has shown a decrease in concentrations with the Spalding Monkhouse School showing a slight increase. An increasing trend was also observed with regards to the continuous $PM_{10}$ data.

On the basis of the 2011 monitoring data there is no need to progress to a Detailed Assessment for any pollutant.

## 8.2 Conclusions from Assessment of Sources

### 8.2.1 Road Sources

South Holland District Council has identified two new roads which have not previously been assessed as part of the review and assessment.

DMRB modelling for the Spalding to Eye link road (A16), displayed in Appendix B suggests that there will be no exceedences of the air quality objectives for $NO_2$ or $PM_{10}$. This was also found to be the case for the 'do minimum' and 'all transfer' options assessed as part of the Environmental Impact Assessment. Verification of the modelled results was not possible as no monitoring is currently undertaken on the new road.

The Wygate Road to Bourne End link road was completed in 2011. The road has been screened and it was found that further assessment was not required as the closest relevant exposure is greater than 10m from the road.

There is no requirement for any further assessment to be undertaken for either of the new roads.

## 8.3 Proposed Actions

Proposed actions arising from the USA are as follows:

- Continue diffusion tube and continous monitoring in the district to identify future changes in pollutant concentrations;
- Install a new monitoring location on the Spalding to Eye link road (A16) to monitor the impact that the new road is having upon local air quality;
- Proceed to a Progress Report in 2013.

# 9 References


- Highways Agency's Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 Air Quality, May 2007, and accompanying spreadsheet DMRB Screening Method V1,03.xls. July 2007
- Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- South Holland District Council 2009 Updating and Screening Assessment
- South Holland District Council 2011 Local Air Quality Management Annual Progress Report
- A1073 Spalding to Eye Improvement Scheme, Environmental Statement, Babtie Group, July 2002

# Appendices

Appendix A: QA/QC Data

Appendix B: DMRB Calculations

# Appendix A: QA:QC Data

### Factor from Local Co-location Studies (if available)

There is a co-located triplicate of diffusion tubes installed at the urban background Westmere School monitoring site. Data captures for the site continuous monitor and the diffusion tubes were robust enough to calculate the local bias correction factor; 1.28

### Diffusion Tube Bias Adjustment Factors

Diffusion tubes in 2011 were prepared and analysed by Gradko International Limited. The tube preparation was 50% TEA in acetone. The National bias correction for 2011 (version 03_12) was 0.93.

### Discussion of Choice of Factor to Use

The local bias adjustment factor has been used to correct the diffusion tube concentrations. The local factor was the most conservative estimate and has therefore been used on a precautionary basis.

### PM Monitoring Adjustment

VCM correction, individually for Spalding and Westmere.

| Summary | Text /Value |
|---|---|
| **Site Name** | Spalding Monkhouse |
| **Organisation** | South Holland DC |
| **Start Date** | 01/01/2011 |
| **End Date** | 01/01/2012 |
| **TEOM data already corrected with 1.3 factor** | No |
| **EPA Constant A** | 3 |
| **EPA Constant B** | 1.03 |
| **Instrument Temperature** | 25 |
| **Instrument Pressure** | 1013 |
| **Instrument reports to local ambient readings** | No |
| **Timescale** | Hourly |
| **Pressure Site** | Enfield - Bowes Primary School (EN5) |
| **Pressure Site Warning** | BP Distant site ( 130km). |
| **Temperature Site** | Camden - Swiss Cottage (CD1) |
| **Temperature Site Warning** | TMP Distant site ( 138km). |
| **FDMS Site 1** | Leicester Centre AURN (LC0) |
| **FDMS Site 1 Warning** | FDMS1 Correction includes unratified data. |
| **FDMS Site 2** | Nottingham Centre (NT0) |
| **FDMS Site 2 Warning** | FDMS2 Correction includes unratified data. |
| **FDMS Site 3** | Average of remaining sites within range |
| **FDMS Site 3 Warning** | FDMS3 Correction includes unratified data. |

| Summary | Text /Value |
|---|---|
| **Site Name** | Westmere School |
| **Organisation** | South Holland DC |
| **Start Date** | 01/01/2011 |
| **End Date** | 01/01/2012 |
| **TEOM data already corrected with 1.3 factor** | No |
| **EPA Constant A** | 3 |
| **EPA Constant B** | 1.03 |
| **Instrument Temperature** | 25 |
| **Instrument Pressure** | 1013 |
| **Instrument reports to local ambient readings** | No |
| **Timescale** | Hourly |
| **Pressure Site** | Enfield - Bowes Primary School (EN5) |
| **Pressure Site Warning** | BP Distant site ( 130km). |
| **Temperature Site** | Camden - Swiss Cottage (CD1) |
| **Temperature Site Warning** | TMP Distant site ( 138km). |
| **FDMS Site 1** | Leicester Centre AURN (LC0) |
| **FDMS Site 1 Warning** | FDMS1 Correction includes unratified data. |
| **FDMS Site 2** | Nottingham Centre (NT0) |
| **FDMS Site 2 Warning** | FDMS2 Correction includes unratified data. |
| **FDMS Site 3** | Average of remaining sites within range |
| **FDMS Site 3 Warning** | FDMS3 Correction includes unratified data. |

### Short-term to Long-term Data adjustment

Data capture for the $NO_2$ diffusion tubes for all sites was above 75% and required no annualisation. Data Capture for continuous $NO_2$, $O_3$ and $PM_{10}$ were all at or above 90% and also did not require annualisation.

### QA/QC of automatic monitoring

South Holland District Council contracts data management for their continuous analysers to AEA. The Quality Assurance/Quality Control (QA/QC) procedures employed by AEA are equivalent to the UK Automatic Urban and Rural Network (AURN) procedures.

### QA/QC of diffusion tube monitoring

Gradko International Ltd currently holds UKAS accreditation and participates in the Workplace Analysis Scheme for Proficiency (WASP) for $NO_2$ diffusion tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring $NO_2$ concentrations reported are of a high calibre. The WASP calculations were reviewed in 2010-2011 such that the z-scores for laboratories rather than a value judgement were provided. The criteria against which to determine laboratory performance is the percentage of results which met the criteria of a z-score $<\pm 2$ (satisfactory). Assuming there is no systematic error in analysis 19 out of 20 z-scores (95%) should meet the 'satisfactory' criterion. For the rounds which occurred during

2011 Gradko scored 100% for the first three trials; however, performance which occurred during the analysis in the final round produced a lower score 37.5%. The tube precision for the Annual Field Inter-comparison at Marylebone Road was rated as ‘Good’.

**Raw Monthly $NO_2$ diffusion tube concentrations**

| Site | Jan | Feb | Mar | April | May | June | July | Aug | Sept | October | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SH1 | 19.19 | 17.81 | 13.02 | 11.83 | 8.93 | 7.09 | 8.58 | 9.56 | 13.82 | 16.85 | 25.39 | 6.69 |
| SH2 | 19.27 | 16.5 | 16.43 | 10.63 | 9.66 | 7.49 | 11.64 | 9.19 | 10.53 | 14.23 | 19.51 | 10.88 |
| SH3 | 27.56 | 22.75 | 20.58 | 14.2 | 13.24 | 13.14 | 11.29 | 15.41 | 17.85 | 17.42 | 22.6 | - |
| SH4 | 20.96 | 16.62 | 19.42 | 9.25 | 8.81 | 9 | 8.56 | 9.92 | 12.19 | 1.36 | 22.94 | 12.19 |
| SH5 | 25.03 | 21.23 | 20.31 | 17.59 | 12.81 | 15.73 | 15.47 | 16.15 | 19.04 | 6.27 | 22.65 | 18.95 |
| SH6 | 29.39 | - | 27.98 | 23.96 | 15.12 | 14.94 | 29.26 | 22.28 | 17.27 | 19.37 | 29.98 | 15.02 |
| SH7 | 24.19 | 17.35 | 21.72 | 18 | 19.15 | 17.31 | 17.62 | 20.81 | 24.31 | 23.96 | 30.29 | 22.08 |
| SH8 | 17.56 | 15.77 | 13.64 | 10.32 | 9.87 | 5.12 | 7.62 | 11.24 | 6.92 | 14.08 | 24.75 | 12.87 |
| SH9 | 16.76 | 16.47 | 13.35 | 10.57 | 9.38 | 8 | 9.34 | 10.03 | 10.43 | 13.52 | 24.24 | 14.51 |
| SH10 | 18.93 | 18.45 | 14.75 | 11.38 | 8.33 | 7.82 | 8.22 | 10.62 | - | 13.24 | 24.44 | 16.48 |
| SH11 | 23.08 | 25.13 | 23.79 | 21.52 | 15.49 | 14.87 | 18.9 | 13.35 | 21.47 | 24.74 | 33.6 | 17.4 |
| SH13 | 37.33 | 28.34 | 33.15 | 22.94 | 24.45 | 24.82 | 22.01 | 31.77 | 31.2 | 24.34 | 36.57 | 23.73 |
| SH14 | 31.07 | 28.45 | 25.41 | 23.89 | 20.45 | 19.32 | 22.26 | 9.99 | 23.04 | 25.35 | 39.01 | 24.34 |
| SH15 | 36.76 | 29.75 | 29.76 | 29.05 | 19.82 | 20.11 | 29.14 | 29.22 | 29.12 | 26.73 | 37.09 | 23.77 |
| SH16 | 21.94 | 21.87 | 17.87 | 13.73 | 12.54 | 12.16 | 10.77 | 12.76 | - | 18.13 | 24.8 | 17.95 |
| SH17 | 32.56 | 30.22 | 29.6 | 20.29 | 19.62 | 19.01 | 21.2 | 23.8 | - | 29.69 | 39.88 | 24.86 |
| SH18 | 32.08 | 27.61 | 28.15 | 22.53 | 19.7 | 18.6 | 21.81 | - | 24.97 | 27.05 | 29.05 | - |

# Appendix B: DMRB Calculations

A DMRB screening assessment was undertaken for the Spalding to Eye link road (A16).

**Input Data**

| Location/ Receptor | Grid Ref | Background Concentrations | | | |
|---|---|---|---|---|---|
| | | Year | NOx | $NO_2$ | $PM_{10}$ |
| A | X526500 Y318500 | 2010 | 15.72 | 11.24 | 17.35 |

| Location/ Receptor | Link number | Distance from link centre to receptor (m) | Traffic flow & speed | | Traffic composition | | |
|---|---|---|---|---|---|---|---|
| | | | AADT (combined, veh/day) | Annual average speed (km/h) | Road type (A,B,C,D) | Total % LDV (<3.5t GVW) | Total % HDV (>3.5t GVW) |
| A | 1 | 38 | 11740 | 48 | A | 82 | 18 |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 4 | | | | | | |
| B | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| | 4 | | | | | | |

**Verification**

It was not possible to undertake verification for the model, as there are no monitoring sites located in the vicinity of the new road. It is recommended that a $NO_2$ diffusion tube is placed onto the nearest sensitive receptor location to determine the impact of the road.

**Results**

| Location/ Receptor | Name | Year | Rd $NO_x$ [1] | Verification Factor | Adj Rd $NO_x$ [2] | Adj Total $NO_x$ [3] | Total $NO_2$ [4] | $PM_{10}$ | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 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$^3$ |
| **A** | Cowbit | 2011 | 12.70 | - | - | - | 17.71 | 18.37 | 0 |

[1] Rd $NO_x$ = Road $NO_x$ direct from DMRB local output sheet (following Box 1 from DMRB guidance note provided at http://laqm.defra.gov.uk/laqm-faqs/)
[2] Adj Rd $NO_x$ = Rd $NO_x$ x verification factor (state verification factor used)
[3] Adj Total $NO_x$ = Adj Rd $NO_x$ + Background $NO_x$
[4] Total $NO_2$ = from $NO_x$ to $NO_2$ calculator (available at from LAQM Support website)