



2013 Air Quality Progress Report for **Waveney District Council**

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

November 2013

Local Authority Officer	David Porter
	Andrew Reynolds, Environmental Protection Team Manager.
Department	Environmental Health
Address	The Town Hall, The High Street, Lowestoft NR32 1HS
Telephone	01502 562111
e-mail	Environment@waveney.gov.uk
Report Reference number	DP/AQ/PR/13
Date	November 2013

Executive Summary

This Progress Screening report has been produced as part of Waveney District Council's requirement to assess present and predicted future air quality against the objectives prescribed by the Air Quality Regulations 2000 (as amended). If an exceedence of any objective is considered likely, there is a requirement to proceed to a detailed assessment of that pollutant and to declare an Air Quality Management Area (AQMA), if the exceedence is confirmed. The Local Air Quality Management process set out in the 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 have all been followed.

In order to assess air quality in Waveney District, this report considers new monitoring data as well as assessing the impact of new development on air quality in the district.

Air quality data is available in Lowestoft via a network of 9 passive diffusion tube sites measuring NO₂ at relevant roadside locations on the A146, A1117 and A12, the major A-roads which pass through Lowestoft. In addition, 1 diffusion tube has been used to measure urban background concentrations of NO₂ at a central location in Lowestoft. A continuous analyser which measures oxide of nitrogen is located in Belvedere Road, close to the town bridge, but no meaningful data was obtained from this source in 2012, because of mechanical breakdown. The diffusion tubes used in a triplicate co-location study with the continuous analyser have remained in use and continued to collect data. Air quality monitoring has continued at Ingate, in the Market Town of Beccles with a second diffusion tube added to the monitoring programme, which has been located close to the original tube.

The annual mean concentrations of NO₂ obtained from the diffusion tube survey at the monitoring sites indicate that the national air quality objectives are unlikely to be exceeded anywhere in the Waveney district in 2013.

Monitoring of NO₂ should continue in the Port area, although an additional diffusion tube located at the façade of Leavington Court, at the Belvedere Road/London Road South/Pier Terrace junction, in 2012, did not indicate that there was likely to be an exceedence of the national air Quality objectives, close to the Port area.

Furthermore, the measured results obtained from other tubes in the area, also indicated that an exceedence of the national air quality objectives was unlikely. The tubes were located in Belvedere Road, one of the main approach roads to the Port and in Mill Lane, which is close by. Although the use of the continuous air quality monitor in Belvedere Road was problematic, the diffusion tubes co-located with it, continued to provide reliable data.

The monitoring continued in Ingate, Beccles, because of the relatively high levels of NO₂ measured at the location in 2011. The second diffusion tube located close to the Ingate/St Mary's Road junction confirmed that an exceedence of the air quality objectives was unlikely in the area, as the concentration measured was not significant. The measured results from the first tube were greater but still well below the target set by the national air quality objectives.

There are no newly identified or proposed point or diffuse sources of any of the pollutants considered in this assessment, which are likely to have a significant impact on air quality in the Waveney District.

The conclusion and the recommendation is that there is no need for Waveney District Council to proceed to a detailed assessment in 2013 for any of the pollutants considered in this assessment.

Table of Contents

1	Introduction	6
1.1	Description of Local Authority Area	6
1.2	Purpose of Progress Report	6
1.3	Air Quality Objectives	7
1.4	Summary of Previous Review and Assessments	9
2	New Monitoring Data	12
2.1	Summary of Monitoring Undertaken	12
2.2	Comparison of Monitoring Results with Air Quality Objectives	25
3	New Local Developments	37
3.1	Road Traffic Sources	37
3.2	Other Transport Sources	37
3.3	Industrial Sources	38
3.4	Commercial and Domestic Sources	38
3.5	New Developments with Fugitive or Uncontrolled Sources	38
4	Local / Regional Air Quality Strategy	40
5	Planning Applications	41
6	Air Quality Planning Policies	42
7	Local Transport Plans and Strategies	42
8	Conclusions and Proposed Actions	46
7.1	Conclusions from New Monitoring Data	46
7.2	Conclusions relating to New Local Developments	46
7.3	Other Conclusions	47
7.4	Proposed Actions	47
9	References	48

List of Tables

- 1.1 Air quality objectives included in regulations for the purpose of LAQM in England
- 2.1 Details of the automatic monitoring site
- 2.2 Details of non-automatic monitoring sites

- 2.3 Results of automatic monitoring of nitrogen dioxide :comparison with annual mean
- 2.4 Results of automatic monitoring for nitrogen dioxide :comparison with 1 hour mean
- 2.5 Results of nitrogen dioxide diffusion tubes in 2012
- 2.6 Results of nitrogen dioxide diffusion tubes (2007-2009)

List of Figures

Figure 2.1 Map of the Automatic Monitoring Site in Belvedere Road, Lowestoft

Figure 2.2 Maps of Non-Automatic Monitoring Sites

Figure 2.3: Trends in the Measured Concentration of Nitrogen Dioxide Captured by the Automatic Air Quality Monitor Located in Belvedere Road.

Figure 2.4: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites 2007-2009

.

Appendices

Appendix 1 QA/QC Data

Appendix 2 List of Poultry Plants in Waveney with Environmental Permits from the Environment Agency

Appendix 3 List of 'Permitted Processes'(under the Environmental Permitting Regulations

Appendix 4 Raw measured diffusion tube data for 2012

Appendix 5 Method used to Predict NO₂ Concentrations at Different Distances from Road

1 Introduction

1.1 Description of Local Authority Area

Population 117,700 (2009)

Situated in the northeast corner of Suffolk, Waveney District is bordered by the River Waveney in the north and the River Blyth in the south. The main urban conurbation is Lowestoft, which is a North Sea port and the second largest town in Suffolk.

Lowestoft sustains a variety of industries including food processing and engineering. The Port handles general cargo and is a base for servicing off-shore oil and wind energy installations.

Apart from Lowestoft the main urban centres are Beccles and Bungay situated on the River Waveney adjacent to the Norfolk border and Southwold and Halesworth, both on the River Blyth. The centre of the district is agricultural and is sparsely populated. The whole district has a steadily developing holiday trade.

1.2 Purpose of Progress 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

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 microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (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 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particulate Matter (PM ₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Detailed reviews of air quality within the Waveney District have concluded that the standards and objectives contained within the National Air Quality Strategy would be achieved by the relevant dates and accordingly it has not been necessary to declare any Air Quality Management Areas within the District at any time.

1.4.1 First Round of Review and Assessment

Waveney District Council completed the first round of air quality review and assessment in 2000, concluding that the risk of any of the UK air quality objectives being exceeded was negligible.

1.4.2 Second Round Review and Assessment

The Second Round Updating and Screening Assessment for Waveney District Council was published in May 2003. This assessment indicated that three specific and very localised areas (all associated with busy road junctions) needed a more detailed assessment to be sure that air quality in the Waveney District was still on target to meet the relevant criteria. However, further assessment determined that concentrations did not exceed 2004 objectives. The report recommended that a detailed survey of traffic flow at all three locations be commissioned when the South Lowestoft Relief Road bypass was opened.

In 2005, the Progress Report commissioned by Waveney District Council recommended that although there had been no exceedences of the air quality objectives in 2004, significant developments in Lowestoft town centre warranted monitoring of NO₂ and traffic flow to assess the effects on air quality.

1.4.3 Third Round of Review and Assessment

The Updating and Screening Assessment completed for Waveney District Council in May 2006 predicted that no exceedences of the air quality objectives for the UK would occur in Waveney. The review concluded that whilst there were no areas of the District exposed to levels of pollution exceeding national guidelines, it was

necessary to keep the situation under review to monitor the effects of the new South Lowestoft Relief Road. In particular, an “Urban Traffic Management and Control” system was proposed, to improve traffic flow and a real time pollution monitor to be installed at a key point in Belvedere Road. The area in close proximity to the Port was identified as requiring further monitoring and as a consequence a new diffusion tube survey at Mill Road was established in 2007, which did show concentrations of NO₂ close to the objectives albeit with small data sets

1.4.4 The Fourth Round of Review and Assessment

The 2009 Air Quality Updating and Screening Assessment commissioned by Waveney District Council concluded that there was no need to proceed to a Detailed Assessment in 2009 for any of the pollutants considered in the assessment. However it was recommended that monitoring should continue in the Mill Road area due to possible exceedence of air quality objectives in the area of the Port. There were no new developments nor existing sources identified in Waveney District that were likely to significantly affect air quality at locations with relevant public exposure.

In 2010, the Progress Report prepared by Waveney District Council recommended that although there had been no exceedences of the air quality objectives in 2009, monitoring of NO₂ and traffic flow to assess the effects on air quality should continue in the area of the Port. It was also recommended that the location of diffusion tube monitoring stations should be reviewed to ensure that the relevant public exposure to NO₂ concentrations are measured with more confidence.

The 2011 Progress Report prepared by Waveney District Council recommended that monitoring of NO₂ should continue in the Port area. There were no exceedences of the air quality objectives in 2010 for any of the pollutants considered in the report. Larger data sets confirmed that an exceedence of the national air quality objectives was unlikely in Mill Road.

1.4.5 The Fifth Round of Review and Assessment

The 2012 Air Quality Updating and Screening Assessment concluded that there was no need to proceed to a Detailed Assessment in 2012 for any of the pollutants considered in the assessment. However, it was recommended that monitoring for nitrogen oxides should continue in the Port area due to possible exceedence of air quality objectives because of traffic congestion at the town bridge. There were no new developments nor existing sources identified in Waveney District that were likely to significantly affect air quality at locations with relevant public exposure. It was recommended that diffusion tube monitoring of nitrogen oxides should also continue in the Ingate area of Beccles, with an additional tube,. to provide a more accurate picture of air quality in the town centre area.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There is one automatic continuous air quality monitor, which is operated by Suffolk County Council and this measures the concentration of NO₂ and oxides of nitrogen. The monitor is located by the roadside in Belvedere Road, Lowestoft, in close proximity to the Port and the town bridge. Data from the Belvedere Road site can be found at www.airquality.co.uk. Other pollutants considered by this report are not measured by the monitor.

Routine calibrations and periodic site audits are normally been carried out every two weeks by Waveney District.

Unfortunately the monitor has not been operational at all since August 2012 and before this time operation was spasmodic and problematic. Therefore, no data is available for analysis from this source, which can be included in this report. Data discussed in previous reports has been included in this report.

The monitor is linked to the UTMC traffic management system and has been funded by the Transport Services section of Suffolk County Council. Discussions are ongoing with the County Council to see if a decision can be made over the future of the monitor, which requires repair or replacement.

Waveney District Council sees a value in the continued use of the automatic air monitor to identify trends, but will not take over the funding of the equipment because the measurements over time have shown that the air quality objectives for nitrogen oxides at the location have not been exceeded.

Figure 2.1 Map of the Automatic Monitoring Site in Belvedere Road, Lowestoft



Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
AN1	Belvedere Road	Roadside	654651	292619	2.0	NO ₂	N	Chemiluminescent	N (1m)	1.8	Y

2.1.2 Non-Automatic Monitoring Sites

A network of 9 NO₂ diffusion tube monitoring sites extend coverage around the main urban centre of Lowestoft. The sites are situated around the Port area and by the roadside of busy roundabouts on the major A-roads which pass through the town. One diffusion tube has been situated centrally to measure urban background levels of NO₂.

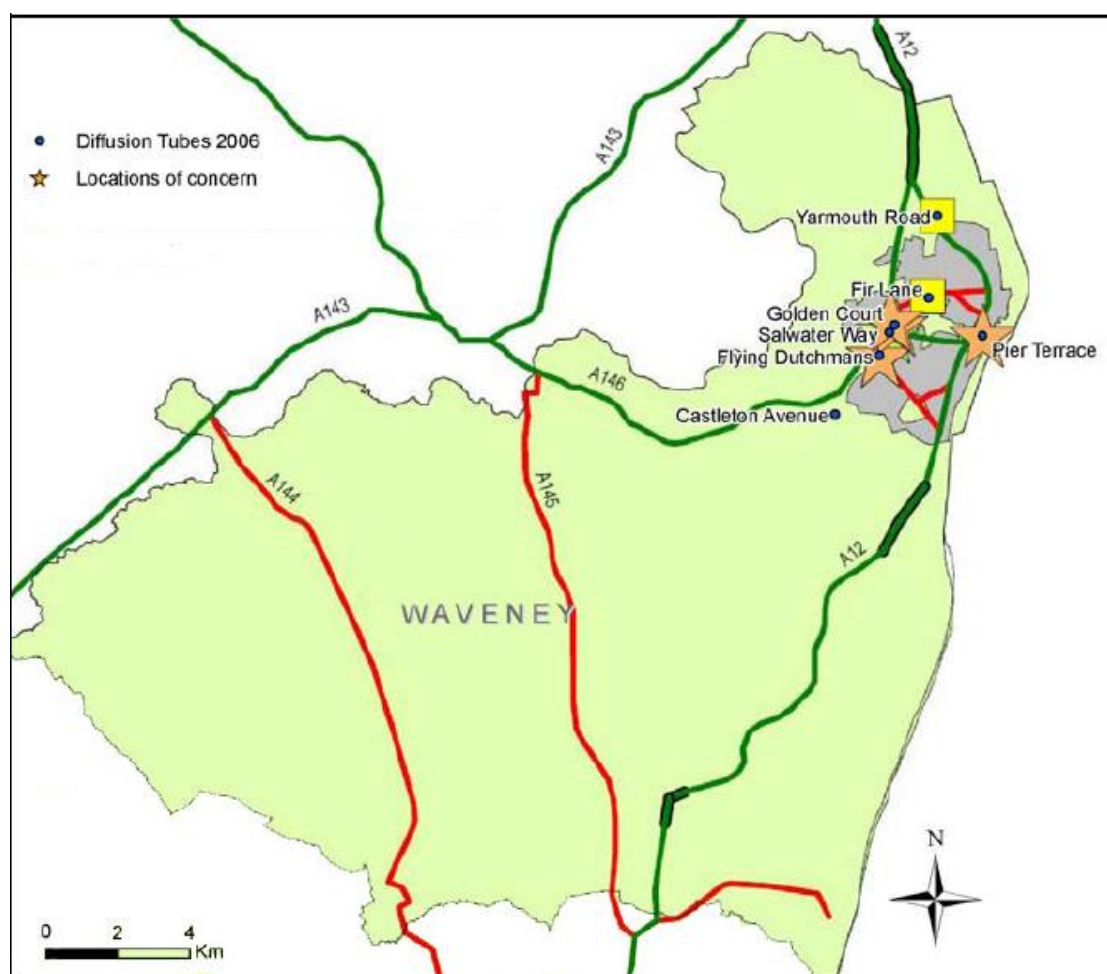
A triplicate co-location study using diffusion tubes is established at the site of the continuous air quality monitor in Belvedere Road close to the Town Bridge and Port area.

A new roadside monitoring site was identified in the 2012 Air Quality Updating and Screening Assessment and this has been established at Ingate in Beccles.

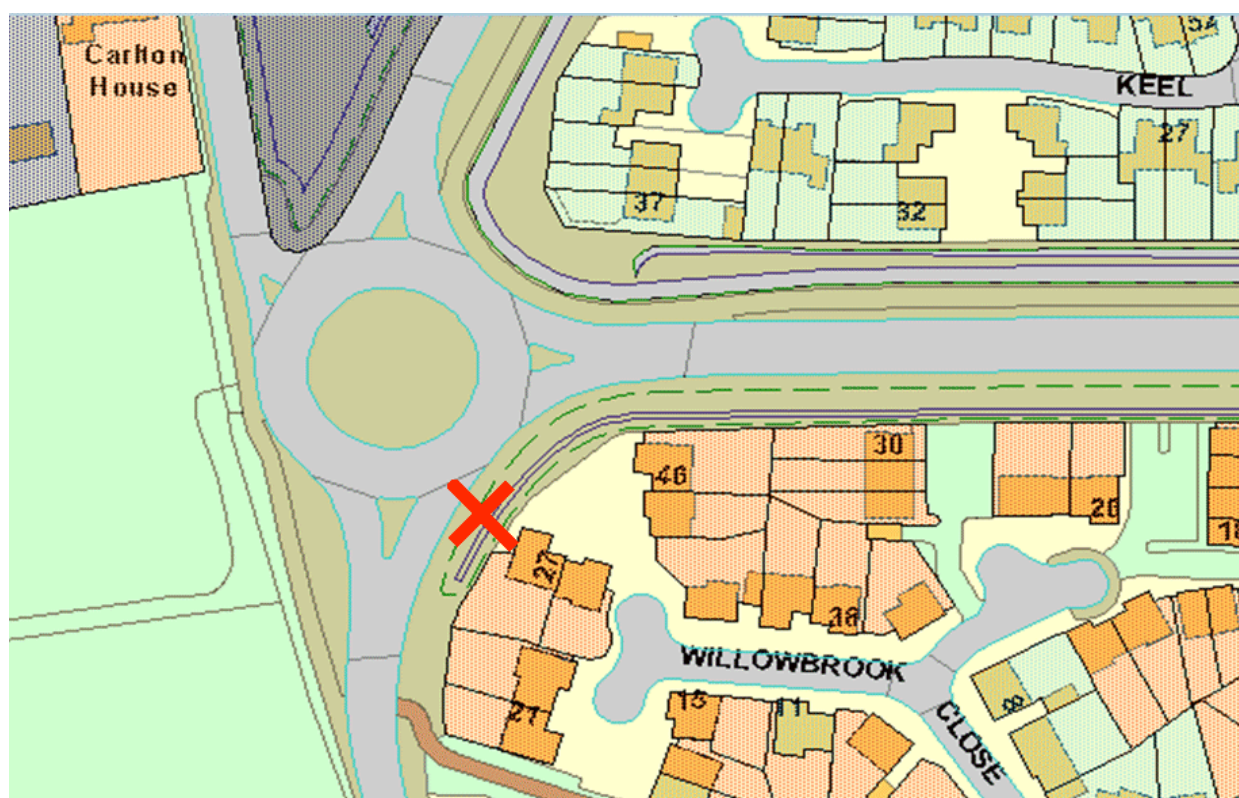
No other non-automatic monitoring is carried out to measure the other pollutants considered in this report.

Details of the QA/QC of the diffusion tubes are included in Appendix 1.

Figure 2.2 Maps of Non-Automatic Monitoring Sites



NO₂ monitoring sites in Waveney district
 © Crown Copyright. All rights reserved by Suffolk County Council. License No. 100023395 (2007).



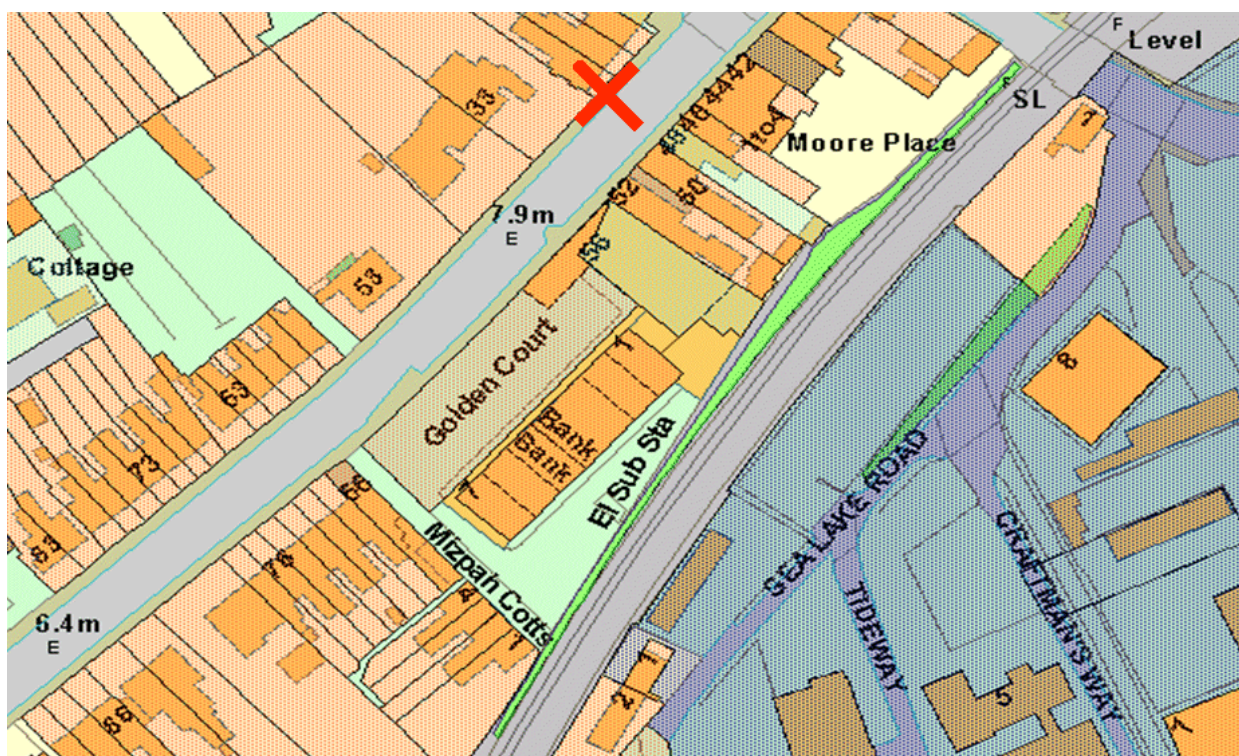
Diffusion Tube Site PN1: Castleton Avenue, Carlton Colville.



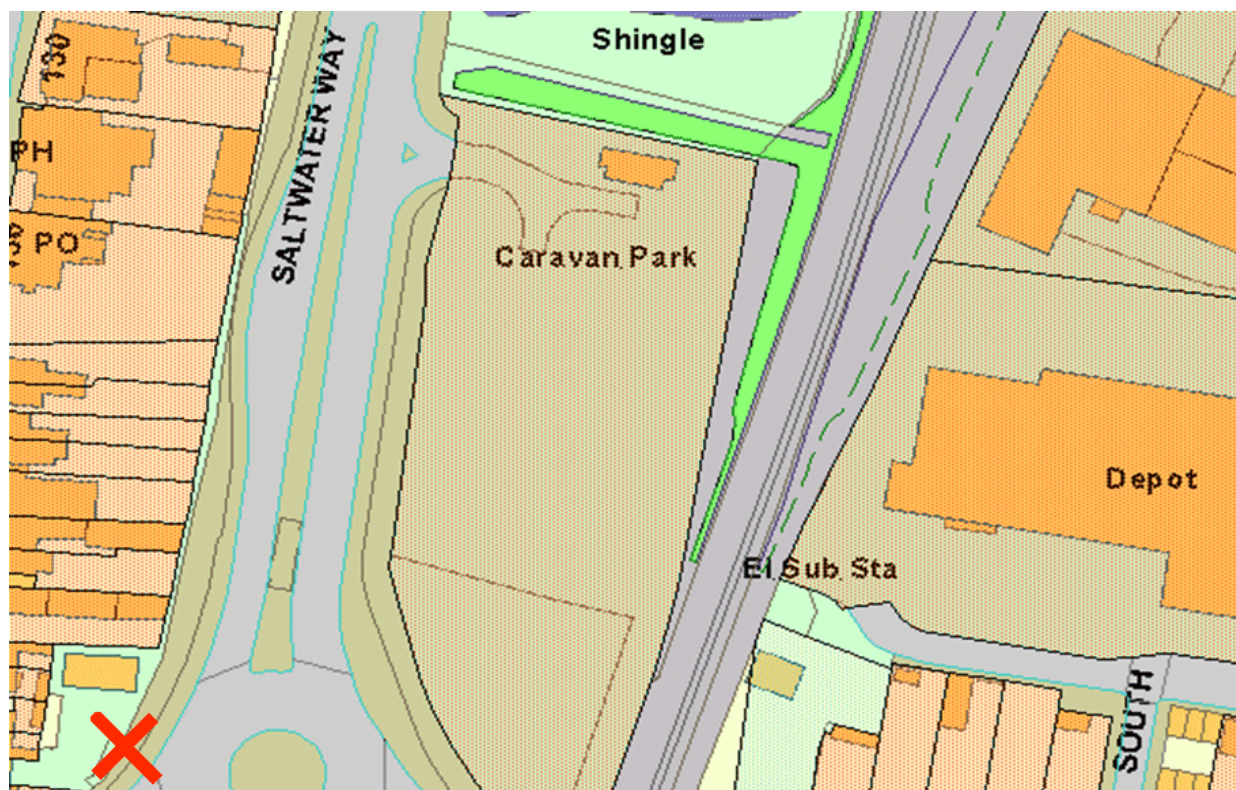
Diffusion Tube Site PN2: Fir Lane, Lowestoft



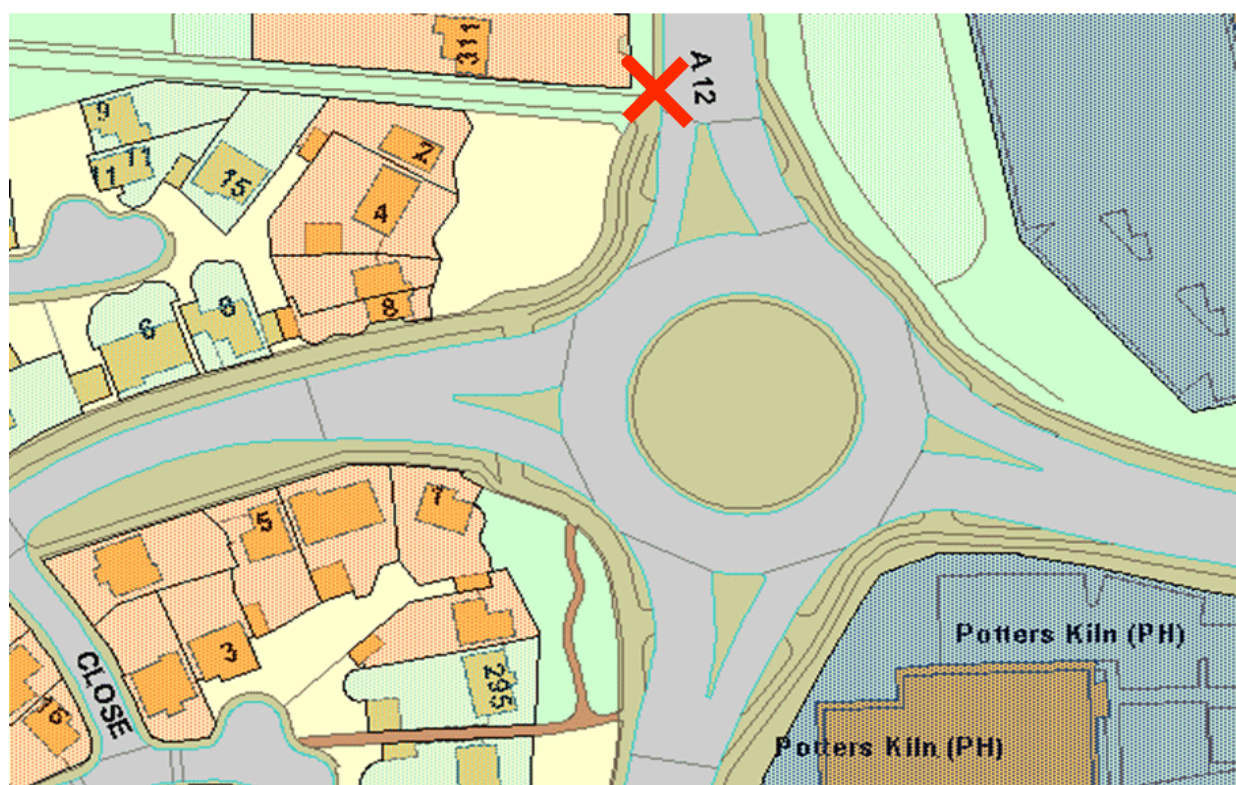
Diffusion tube site PN3 :The Flying Dutchman, Cotmer Road, Oulton Broad



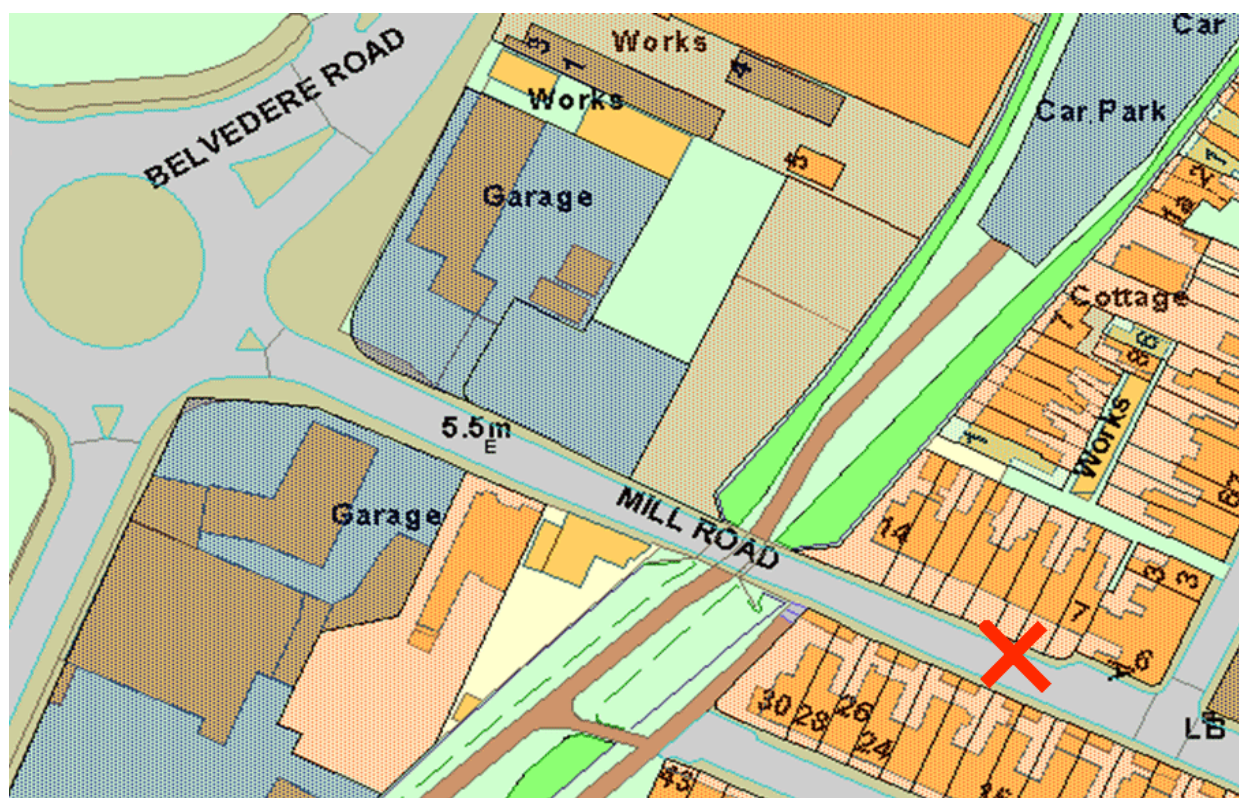
Diffusion Tube Site PN4 : Golden Court, Bridge Road, Oulton Broad



Diffusion Tube Site PN5 : Saltwater Way, Oulton Broad



Diffusion Tube Site PN6 : Yarmouth Road, Lowestoft



Diffusion Tube Site PN7 : Mill Road, Lowestoft



Diffusion Tube Monitoring Site PN8 St Margaret's Churchyard

21

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PN1	Castleton Avenue	Roadside	650608	290476	2.5	NO ₂	N	N	Y (17m)	1.9	Y
PN2	Fir Lane	Roadside	653220	293794	2.5	NO ₂	N	N	Y(6m)	0.5m	Y
PN3	Dutchmans Court	Roadside	653220	293794	3.0	NO ₂	N	N	Y(5m)	2.4m	Y
PN4	Golden Court	Roadside	652301	293016	2.5	NO ₂	N	N	Y(4m)	2.0m	Y
PN5	Saltwater Way	Roadside	652498	292751	3.0	NO ₂	N	N	Y(6m)	3.0	Y
PN6	Yarmouth Road	Roadside	653049	295534	3.0	NO ₂	N	N	Y(8.5m)	0.5m	Y
PN7	Mill Road	Roadside	654470	292395	2.5	NO ₂	N	N	Y(6.8M)	1.2m	Y

Waveney District Council

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PN8	St Margarets Churchyard	Urban Background	654305	293914	2.5	NO ₂	N	N	N	n/a	N
PN9	Belvedere Road Co-location	Roadside	654651	292619	2.0	NO ₂	N	Y	N	n/a	Y
PN10	Belvedere Road Co-location	Roadside	654651	292619	2.0	NO ₂	N	Y	N	n/a	Y
PN11	Belvedere Road Co-location	Roadside	654651	292619	2.0	NO ₂	N	y	N	n/a	Y
PN12	Pier Terrace 1	Roadside	654658	292598	2.5	NO ₂	N	N	Y(7m)	3.0m	Y
PN13	Pier Terrace 2	Roadside	654658	292598	2.5	NO ₂	N	N	Y(façade)	n/a	Y

Waveney District Council

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PN14	Ingate Beccles 1	Roadside	642614	289906	2.5	NO ₂	N	N	Y(façade)	n/a	Y
PN15	Ingate Beccles 2	Roadside	642614	289906	2.5	NO ₂	N	N	Y(2m)	2.0m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO₂)

Automatic Monitoring Data

As previously mentioned, it is not possible to provide a report this year of measurements obtained from the automatic monitor.

A relevant section from the 2012, Updating and Screening Assessment Report (USA) is included below to provide the most recent analysis. Please note that in 2011 the data capture was poor and the results had to be annualised.

The 2011 annual mean for the Belvedere Road site was 29.0 µg³ (annualised) and 28.5 µg³ (monitored average mean). Data capture at Belvedere Road during 2011 was 46.7%, which is well below the 90% threshold desirable for LAQM purposes. Therefore conclusions drawn from the monitoring data should be treated with caution as they may not be representative of the full monitoring period.

The data indicated that there were no exceedences of the national annual mean NO₂ objective at the Belvedere Road location in 2011. There were also no exceedences of the hourly mean NO₂ objective, and the 99.8th percentile of hourly mean NO₂ concentration was 137.4 µg³.

Table 2.3 Results of Automatic Monitoring for NO₂: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2012 % ^b	Annual Mean Concentration (µg/m ³)				
					2008* ^c	2009* ^c	2010* ^c	2011* ^c	2012 ^c
CM1	Roadside	N	0	0	32.0	30.0	28.0	29.0	N/A

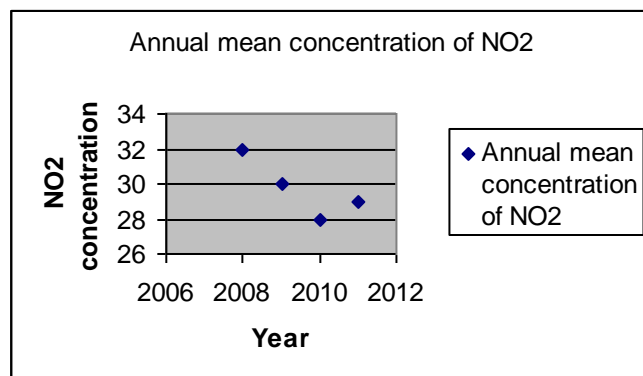
In bold, exceedence of the NO₂ annual mean AQS objective of 40µg/m³

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

^c Means should be “annualised” as in Box 3.2 of TG(09) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>), if valid data capture is less than 75%

Annual mean concentrations for previous years are optional, but they have been included to indicate that concentrations have fallen over a four year period, taking the 2008 measurement as a base. The results of measurements of diffusion tubes colocated with the monitor do not indicate significant increases when compared to those obtained in 2011, so there does not appear to be a deterioration in air quality. Taking this into account I would have expected the data from a fully functioning air monitor to be similar to that recorded in 2011.

Figure 2.3 Trends in Annual Mean NO₂ Concentrations Measured at Automatic Monitoring Sites

Trends in the measured concentration of nitrogen dioxide captured by the automatic monitor during a four year period (2008-2011) show a reduction for three years and then a small rise in 2011. The average mean values in 2008, 2009 and 2011 were all annualised because of poor data capture and in contrast the greatest reduction of nitrogen dioxide occurred in 2010 when data capture was good. It should be noted that the mean values are well below the national air quality objective standards. Although the annualised results should be treated with caution when attempting to identify trends, it is encouraging to find that the annualised mean concentrations do not vary much from annual mean concentration calculated during a year of good data capture.

Table 2.4 Results of Automatic Monitoring for NO₂: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2012 % ^b	Number of Hourly Means > 200µg/m ³				
					2008* ^c	2009* ^c	2010* ^c	2011* ^c	2012 ^c
CM1	Roadside	N	0	0	0 (181)	0(126.7)	0	0(137.4)	N/A

In bold, exceedence of the NO₂ hourly mean AQS objective (200µg/m³ – not to be exceeded more than 18 times per year)

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

^c If the data capture for full calendar year is less than 90%, include the 99.8th percentile of hourly means in brackets

It can be noted that there have been no exceedences of the 1-hour Mean Objective.

Diffusion Tube Monitoring Data

The diffusion tubes were exposed according to the calendar of suggested exposure periods for 2012 and the monitoring period at most diffusion tube sites was twelve months

A full dataset of monthly mean values is included as an appendix.

As in previous years, results have been distance adjusted to predict the NO₂ concentration at the nearest relevant receptor, where appropriate and the methodology for this calculation is included as an appendix.

Results have been bias adjusted using the national bias adjustment factor of **0.79** and the decisions behind the choice of the bias adjustment factor used and the relevant methodology are detailed in Appendix1.

Lack of data from the automatic air quality monitor meant that it was not possible to calculate a local bias adjustment factor.

Table 2.5 Results of NO₂ Diffusion Tubes 2012

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2012 (Number of Months or %) ^a	2012 Annual Mean Concentration (µg/m ³) - Bias Adjustment factor = XX ^b
PN1	Castleton Avenue	Roadside	N	N	12	15.7
PN2	Fir Lane	Roadside	N	N	12	20.1
PN3	Dutchmans Court	Roadside	N	N	12	21.7
PN4	Golden Court	Roadside	N	N	12	27.3
PN5	Saltwater Way	Roadside	N	N	12	24.2
PN6	Yarmouth Road	Roadside	N	N	12	16.8
PN7	Mill Road	Roadside	N	N	11	20.9
PN8	St Margarets Churchyard	Urban Background	N	N	12	16.28

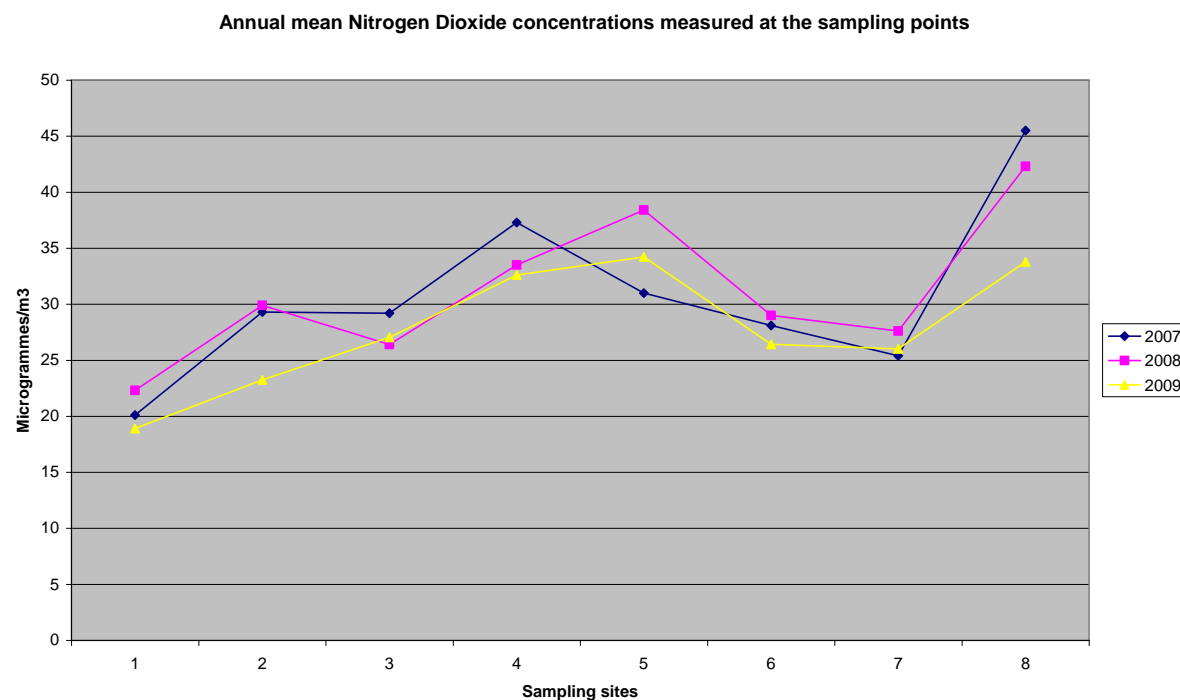
Waveney District Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2012 (Number of Months or %) ^a	2012 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = XX ^b
PN9	Belvedere Road Co-location	Roadside	N	Triplicate and Co	12	29.2
PN10	Belvedere Road Co-location	Roadside	N	Triplicate and Co	11	30.0
PN11	Belvedere Road Co-location	Roadside	N	Triplicate and Co	12	28.8
PN12	Pier Terrace 1	Roadside	N	N	12	30.8
PN13	Pier Terrace 2	Roadside	N	N	12	25.8
PN14	Ingate Beccles 1	Roadside	N	N	11	31.2
PN15	Ingate Beccles 2	Roadside	N	N	11	25.1

There was **no exceedence** of the NO₂ annual mean AQS objective of 40µg/m³, nor was there an indication of a potential exceedence of the NO₂ hourly mean AQS objective at any of the locations where air quality is monitored in the Waveney District

Table 2.6 Results of NO₂ Diffusion Tubes (2008 to 2012)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ^a				
			2008 (Bias Adjustment Factor = 0.80)	2009 (Bias Adjustment Factor = 0.82)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.84)	2012 (Bias Adjustment Factor = 0.79)
PN1	Roadside	N	17.00	15.4	16.7	16.7	15.7
PN2	Roadside	N	n/a	n/a	20.8	21.1	20.1
PN3	Roadside	N	23.8	24.4	26.5	23.5	21.7
PN4	Roadside	N	n/a	n/a	33.6	31.9	27.3
PN5	Roadside	N	n/a	n/a	29.3	26.3	24.2
PN6	Roadside	N	n/a	n/a	18.2	18.6	16.8
PN7	Roadside	N	32.0	25.0	26.1	22.8	20.9
PN8	Urban Background	N	n/a	n/a	n/a	17.8	16.28
PN9	Roadside	N	n/a	n/a	34	32.8	29.2
PN10	Roadside	N	n/a	n/a	34.8	32.8	30.0
PN11	Roadside	N	n/a	n/a	34.8	33.0	28.8
PN12	Roadside	N	n/a	n/a	37.1	35.1	30.8
PN13	Roadside	N	n/a	n/a	n/a	n/a	25.8
PN14	Roadside	N	n/a	n/a	n/a	35.4	31.2
PN15	Roadside	N	n/a	n/a	n/a	n/a	25.1

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

Trend data from previous years is limited because the monitoring programme was reviewed and revised in 2010 and this has resulted in changes of the locations for all of the diffusion tubes. This was done to enable pollutant concentrations to be measured at relevant receptors with increased confidence. Only two years reliable data is available at this time and a minimum of five years data is usually considered necessary to identify significant trends. The results in Table 2.6 show that measured concentrations have fallen at all locations in 2012 when compared to those obtained in 2011.

The trend shown in figure 2.4 which has been reproduced from the 2011 Progress Report suggests that nitrogen dioxide concentrations have reduced at most roadside locations in 2009 when compared to the 2008 measurements. The only exception to this was at Dutchmans Court where there was a very slight increase. This trend can be explained as the 2009 annual means were calculated using a much larger data set, whereas in 2008 an annualised mean was used using data from an AURN roadside monitor, which is likely to over estimate concentrations.

Please note that the comparisons are made using the data obtained direct from the measurements made by the roadside and not estimates of relevant public exposure. In 2010 the diffusion tube sampling locations were reviewed and changed to ensure that the maximum relevant exposure was measured and as a result it is not possible analyse trends this year.

2.2.2 Particulate Matter (PM₁₀)

No monitoring of PM₁₀ has been undertaken by Waveney District Council in 2012, as the 2012 Updating and Screening Assessment concluded that it was not necessary. There are no newly identified sources in Waveney District

2.2.3 Sulphur Dioxide (SO₂)

No monitoring of SO₂ has been undertaken by Waveney District Council in 2012, as the 2012 Updating and Screening Report concluded that none was necessary. There are no newly identified sources in the Waveney District.

2.2.4 Benzene

No monitoring of C₆H₆ has been undertaken by Waveney District Council in 2012, as the Updating and Screening Report of 2012 concluded it was not necessary. There are no newly identified sources in the Waveney District.

2.2.5 Other Pollutants Monitored

No monitoring of other pollutants named in the AQS objectives has been undertaken by Waveney District Council in 2012 as the Updating and Screening Assessment Report 2012 concluded that none was necessary. There are no newly identified sources of pollutants in Waveney District.

2.2.6 Summary of Compliance with AQS Objectives

Waveney District Council has examined the results from monitoring in the district and concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment for any of the pollutants named in the AQS Objectives..

3 New Local Developments

No new developments or changes to existing ones have been identified since the last Updating and Screening Assessment that will impact on the local air quality,

3.1 Road Traffic Sources

This section deals with any changes in the Local Authority area that may affect air quality. It is only necessary to consider locations which:

- have not been assessed during the earlier rounds,
- have experienced a significant change in traffic flows
- have a new development, or
- have new exposure that has not been assessed previously.

These have been considered and it can be confirmed that there are no new changes to report since the last Updating and Screening Assessment.

.

3.2 Other Transport Sources

There are no new/newly identified non-road traffic sources to report since the last Updating and Screening Assessment.

The procedure set out in Section B.3 of Box 5.4 of TG(09) has been used to assess the emissions of sulphur dioxide released by shipping sources.

The Port of Lowestoft does not receive the large ships defined in 8.3 of LAQM. TG(09), which are described as Ro-Ro, container ships, cruise liners and cross channel ferries. Vessel movements to service the offshore wind farms have increased, but the number of movements are still below the threshold of 5000 and the size of the vessels are small. The conclusion is that no further action is needed as the total vessel movements are below the threshold (greater than 5000) and below the size criteria requiring a Detailed Assessment.

3.3 Industrial Sources

No new industrial sources have been identified since the last Updating and Screening Assessment.

3.4 Commercial and Domestic Sources

No new sources have been identified since the 2012 Updating and Screening Assessment:

- Biomass combustion plant-individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.
- Areas where domestic solid fuel burning may be relevant.

All of the above have been considered.

3.5 New Developments with Fugitive or Uncontrolled Sources

The assessment needs to consider PM₁₀ and the procedure set out in Box E of chapter 5, TG(09) has been followed.

In Waveney District there are no new fugitive sources of PM₁₀ that have not been covered by previous rounds of review, There is also no new relevant exposure which has not been covered by previous rounds of review and assessment, No further assessment is necessary.

Waveney District Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Waveney District Council confirms that all of the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Local / Regional Air Quality Strategy

Waveney District Council has not had to declare an AQMA and does not expect to declare one in the future, as it currently has no areas close to the AQS Objectives. Therefore, it has not drawn up a Local Air Quality Strategy document.

5 Planning Applications

There are no planning applications for new developments that have been approved in 2012, which could impact on air quality.

6 Air Quality Planning Policies

The Local Development Order's (LDO), adopted on 24th March , 2012, by Waveney District Council, introduced permitted development rights for specific types of development.

These rights apply to businesses operating in the Energy, Offshore Engineering and Ports & Logistics sectors and for other businesses which provide a demonstrable supporting role to businesses operating in those sectors thereby helping to facilitate wider economic growth in the area.

The existence of this Local Development Order does not necessarily preclude alternative development to that permitted by the Order. Those proposals would however, continue to require planning permission.

The areas covered by the simplified planning arrangements permitted in an LDO are:

Benacre Road, Ellough, Beccles

Mobbs Way, Oulton Broad

PowerPark, Lowestoft

Riverside Road, Lowestoft

South Lowestoft Industrial Estate

Although simplified planning arrangements are permitted, air quality is a consideration in planning applications for developments within area's with designated LDO status. Large developments may still require the submission of a transport assessment, environmental impact assessment (EIA) and an air quality assessment. Detailed information is provided for developers in a General Information Guide.

Local Transport Plans and Strategies

The following commentary is taken from the Suffolk County Council local Transport Plan for Waveney and it covers the period 2011 to 2031.

It is likely that there will be growth of around 3,000 new dwellings and 5,000 new jobs in Waveney. Most of this development is planned for Lowestoft as part of a jobs-led regeneration project for the town. Some growth is also likely within the market towns. Growth in these areas will place additional demand onto the transport networks and, if no measures are put in place, will result in greater levels of congestion and delays to journeys, particularly in Lowestoft. Housing and jobs growth within Lowestoft and the market towns will, however make it possible to build upon existing sustainable transport networks and reduce the impact of potential traffic growth arising from the new developments

Throughout the wider district access to services by public transport can be difficult, particularly in the more remote parts of the district. Conditions are better in the market towns and a commercially viable bus service operates within Lowestoft. The East Suffolk line provides a rail service between Ipswich, Halesworth and Lowestoft at a two-hourly frequency. From the end of 2012 an improved service frequency will make this service more useful for many journeys. Trains connect Lowestoft and Norwich about once an hour.

In Lowestoft, as with most urban centres, there is a high dependency on cars for many short trips. This highlights the opportunity that exists to promote and improve cycling and walking for many trips within the town, particularly the peak hour trips to work that take place at the busiest times.

There are a number of long standing aspirations for highway improvements in Lowestoft that the county council is actively promoting. These include: completion of the northern spine road that will allow the re-routing of the A12 in North Lowestoft, and the improvement of Denmark road; a new access road south of Lake Lothing to unlock development sites in this regeneration area; additional pedestrian/cycle bridges across Lake Lothing; and, in the longer term a third vehicular bridge across

Lake Lothing. Improvements to the Commercial Road junction would also unlock development sites on the northern side of the regeneration area.

The A12 between Lowestoft and Ipswich is an important route for both freight and people accessing Lowestoft, and the resilience of this road especially with regards to flooding is critical. For much of the district the A12 provides a key north/south route and a link for the market towns and villages in the district and to the north in Waveney.

The impact of climate change (increased flooding, sea level rise) is likely to affect the A12 at Lattymere Dam, the A1095 at Wolsey Bridge and the B1127 at Potters Bridge. It will also impact on the alignment of the Suffolk coast and could significantly affect Lowestoft and Corton.

The East Suffolk railway line between Ipswich and Lowestoft currently has limitations as to the level of service that is able to be provided. However, the service does provide connections to the centre of Ipswich and London, so there is an opportunity to encourage greater use of the service with or without any improvements. The current frequency is a train every two hours, however improvement works at Beccles to provide a passing loop is a key priority for the county council and it is anticipated that this work can be completed by Network Rail by the end of 2012, paving the way for a full hourly service between Ipswich and Lowestoft. This is a viable alternative to commuting by car using the A12.

There is also scope to improve integrated transport links at the East Suffolk Line Stations to improve north/south access. Reinstatement of a passenger line to Leiston is a long-term aspiration.

The following have been identified as the key transport issues for Waveney;

- Lack of bus connections to/from Lowestoft, market towns and rural areas.
- Access to development sites south of Lake Lothing in Lowestoft.
- Impact of traffic in north Lowestoft.
- Impact of lorries in Beccles.
- Impact of lorries in Bungay Town Centre.
- Poor frequency of service on the East Suffolk line.

- Traffic congestion at Oulton Broad Rail Station.
- Poor transport connections at rail stations on the East Suffolk Line
- Lack of pedestrian /cycle bridges over Lake Lothing
- Pinch points for north/south traffic in Lowestoft
- Sea level change and coastal erosion

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

There were no exceedences of the National Air Quality Objectives in 2012 at any location where air quality sampling takes place in the Waveney District and none are expected in 2013.

Non-automatic monitoring data obtained near the Port of Lowestoft shows that nitrogen dioxide concentrations at Belvedere Road, Mill Road and Pier Terrace are below the National Air Quality Strategy Objectives and are unlikely to exceed the Objectives in 2013.

Monitoring should continue at these locations, so that trends in the local air quality can be identified.

The results of the diffusion tube study in Ingate, Beccles, indicate that the NO_2 concentration is in the region of the low 30's ($\mu\text{g}/\text{m}^3$). This suggests that monitoring of the air quality in the town centre should continue in 2013.

7.2 Conclusions relating to New Local Developments

There are no new developments in Waveney District, that will impact on local air quality significantly. Therefore, there is no need to proceed to a Detailed Assessment, as exceedences of the National Air Quality Strategy Objectives are unlikely..

7.3 Other Conclusions

There are no new identified sources of pollutants which will impact on local air quality significantly. Therefore, there is no need to proceed to a Detailed Assessment, as exceedences of the National Air Quality Strategy Objectives are unlikely..

7.4 Proposed Actions

There has been **no exceedances** of the National Air Quality Strategy objectives for any of the pollutants in the Waveney District and therefore, there is no need to proceed to a Detailed Assessment for any of the pollutants considered in this report.

Monitoring should continue at the present locations.

The next course of action is to submit the 2014 Air Quality Progress Report.

8 References

Air Quality Consultants Ltd, Nitrogen Dioxide fall off with Distance Calculator accessed on the Air Quality Archive website (<http://www.airquality.co.uk/archive/aqm/tools/NO2withDistancefromRoadscalculatorIssue2.xls>)

Air Quality Consultants Ltd Spreadsheet of Bias Adjustment Factors (v.02/10) accessed on the Review @ Assessment Helpdesk website (<http://www.uwe.ac.uk/aqm/review/R@Asupport/diffusiontube31009.xls>)

Air Quality Review and Assessment Progress Report (2007), AEA Technology plc., Report AEAT/ENV/R/2562

Air Quality Review and Assessment Progress Report (2008), AEA Technology plc., Report AEAT/ENV/R/2645

Air Quality Review and Assessment Detailed Assessment Report (2009), AEA Technology plc., Report AEAT/ENV/R/2805.

Department for Environment, Food and Rural Affairs (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Department of the Environment, Transport and the Regions. Cm 7169, NIA 61/06-07

Department for Environment, Food and Rural Affairs, (2009) Part IV of the Environment Act 1995. Local Air Quality Management Technical Guidance LAQM. TG (09), February 2009.

The 2012 Air Quality Updating and Screening Assessment For Waveney District Council

Progress Report on Air Quality in Waveney District (2005)

Progress Report on Air Quality in Waveney District (2010)

Progress Report on Air Quality in Waveney District (2011)

The Review and Assessment of Air Quality within Waveney District 2006

The Air Quality (England) Regulations 2000 (SI 928, The Air Quality (England) (Amendment) Regulations 2002 (SI3043).

The Stationary Office (1995) The Environment Act 1995: Part IV

UK National Air Quality Information Archive, accessed at www.airquality.co.uk

Local Air Quality Management: Note on Predicting NO₂ Concentrations, April 2012, prepared for DEFRA by Bureau Veritas ([laqm.defra.gov.uk/review and assessment/tools/background-maps](http://laqm.defra.gov.uk/review%20and%20assessment/tools/background-maps))

Local Air Quality Management 2010 NO_x NO₂ PM₁₀ CSV Format Background Maps ([laqm.defra.gov.uk/review and assessment/tools/background-maps](http://laqm.defra.gov.uk/review%20and%20assessment/tools/background-maps)).

UK National Air Quality Information Archive (2009) Monitoring data from AURN Sites (www.airquality.co.uk).

NO₂ Diffusion Tubes for LAQM: Guidance Note for Local Authorities, Prepared for Defra and the Devolved Administrations, AEAT/env/r/2140/Issue 1, March 2006.

NO₂ Concentrations and Distance from Roads, prepared by Professor Duncan Laxen and Dr Ben Marner of Air Quality Consultants Ltd

Appendices

Appendix 1: Quality Assurance / Quality Control (QA/QC) Data

Appendix 2 Poultry plants in Waveney with Environmental Permits from the Environment Agency

Appendix 3 Environmental Permitting Regulations, Public Register of "Permitted Processes"

Appendix 4 Raw Diffusion tube results

Appendix 5: Method used to Predict NO₂ Concentrations at Different Distances from Road

.....

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The diffusion tubes used in Waveney District Council are supplied and analysed by ESG Scientifics. The tubes were prepared by spiking acetone:triethanolamine (50:50) into the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow auto-analyser with ultraviolet detection. The samples were analysed in accordance with ESG Scientifics standard operating procedure ANU/SOP/1015 issue 1, which meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient no2 Monitoring practical Guidance'

The results were initially calculated assuming an ambient temperature of 11°C, and the reported values adjusted to 20 °C to allow for direct comparison with EU limits.

Please note that the reported results were not bias adjusted by ESG Scientifics. The diffusion tubes are stored and installed by Waveney District Council in accordance with "NO₂ Diffusion Tubes for LAQM:Guidance Note for Local Authorities"

The national bias adjustment factor was used and this was obtained from the National Diffusion Tube bias adjustment factor spreadsheet version number 09/13. A factor of 0.79 was obtained from a sample of 38 separate studies of ESG Scientifics..

Factor from Local Co-location Studies (if available)

The collection of data from the automatic monitor was problematic throughout 2012, and insufficient data was obtained to calculate local bias adjustment factor.

Discussion of Choice of Factor to Use

The national factor was used because of circumstances outside of the control of Waveney District Council.

QA/QC of automatic monitoring

The organisation which carries out the QA /QC is AECOM, Registered Office: AECOM House, 63-77 Victoria Street, St Albans, Herts, AL1 3ER.

QA/QC Procedures

Monitoring in Lowestoft is performed in accordance with the guidelines outlined in Technical Guidance Notes LAQM.TG(09), LAQM.TG(03) and LAQM.TG1(00). The continuous chemiluminescence NO_x analyser was set up and calibrated in strict accordance with the manufacturers' recommended procedures prior to and during use. An overview of QA/QC procedures are provided below.

Manual calibrations of the NO_x analyser are conducted every two to three weeks by the Local Site Operator (LSO) to quantitatively determine instrumental drift. Air Liquid specialist calibration gases are used to obtain span values and instrumental drift is accounted for during the processing of the data. The analyser filter is also changed during routine calibrations, with span and zero determinations being made before and after. Instrument span or zero drift between calibrations is assumed to be linear between discrete checks, and the data corrected linearly in accordance with any drift.

All fittings in contact with the sample gas stream are either polytetrafluoroethene (PTFE) or stainless steel, so that surface losses are kept to a minimum. Qualified engineers service the analyser at six monthly intervals. The analyser is covered by an unlimited 48-hour emergency call-out agreement, which allows serious analyser malfunctions and technical issues to be resolved in a timely manner.

Remote communications are possible by means of a web logger containing an internal GPRS device, which provides a continuous connection to a web-based server. All data are downloaded automatically to this server and can be displayed in real-time. The web logger and server facilitate easy visual screening of the data and

allow any problems with the analyser to be detected at an early stage. This screening helps to minimise data loss due to technical issues.

Data Validation and Ratification Procedures

The raw NO and NO_x monitoring data are recorded in fifteen-minute increments. The data are downloaded continuously to a web-based server, which is refreshed every fifteen minutes. Validation of the data is carried out manually on a daily basis to 'flag' any suspicious data and remove obvious erroneous values. All validated data are marked as 'Provisional' and remains so until full data ratification is completed.

Data ratification is carried out quarterly and involves a thorough check of the raw data to identify erroneous data (those identified during validation and any additional spurious data that becomes apparent upon closer inspection), adjustment of the raw data for calibration factors and ensuring that good data lies above the zero baseline.

The main steps taken in the ratification process are:

- Collate all calibration records and ensure that the calibration factors are applied correctly to the raw data.
- The calibration-corrected data are examined to identify any anomalies in the dataset, including comparisons made with other nearby monitoring sites.
- Data shown to be erroneous are deleted.
- The monitoring data, calibration records and service reports are used to correct for baseline drift.
- Drift-corrected NO concentrations are subtracted from drift-corrected NO_x concentrations to obtain drift-corrected NO₂ concentrations.
- Conversion factors are applied to the ratified drift-corrected data to report concentrations in µg/m³.
- The ratified 15-minute data are then processed to provide hourly mean pollutant concentrations.
- Basic statistical analysis of the data is performed to determine mean concentrations, maximum hourly mean concentrations and data capture rates.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes used in Waveney District Council are supplied and analysed by ESG Scientifics, which is currently ranked as a Category **Satisfactory** laboratory in the WASP inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes.

Results from tubes that are giving "good" precision will improve the overall reliability of the annual mean concentrations derived from diffusion tubes. Precision will reflect the laboratory's performance/consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Any laboratory can show "poor" precision for a particular period/collocation study, if this is due to poor handling of the tubes in the field.

For the purposes of Local Air Quality Management, tube precision is separated into two categories, "Good" or "Poor", as follows: tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have "poor" precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

A summary of precision results for Nitrogen Dioxide diffusion tube studies by laboratory show that the ESG laboratory (formerly Harwell Scientifics) achieved a **good for precision** in 32 studies and **poor for precision** in 6 studies in 2012.

...

Appendix 2: Poultry plants in Waveney with Environmental Permits from the Environment Agency

RP3934LN	Bernard Matthews	Ellough Poultry Farm
GP3631MV	Vion Agriculture Ltd	Frostenden Poultry Farm & Wangford Farm Poultry Unit
HP3034MF	Moy Park Ltd	Westhall Poultry Unit
QP3331MD	St Lawrence Hall Farms Ltd	Ilketshall Hall Farm
QP3033US	Hook 2 Sisters Ltd	Flixton Site
LP3333UL	Crown Chicken Ltd.	Hill Farm, Brampton, Beccles
MP3933UV	Crown Chicken Ltd.	Becks Farm, Ilketshall St Andrews, Beccles

Appendix 3: Environmental Permitting Regulations, Public Register of

"Permitted Processes"

(as at: 11/04/2012)

Reference	Trading name/Address	Processes	Granted Date	Map Reference
07/00011/B	P W Waters Ltd Unit 6 P Waters Ltd Harbour Road Lowestoft Suffolk NR32 3LX	PG3_1: Cement and lime Processes	06-Sep- 2007	652538 292967
07/00007/B	The Concrete Company Ltd. Street Record Sandpit Lane Worlingham Suffolk	PG3_1: Cement and lime Processes	06-Sep- 2007	644785 288756
07/00005/B	Cemex Eastern Flixton Gravel Pit Homersfield Road Flixton Bungay Suffolk NR35 1NN	PG3_1: Cement and lime Processes	06-Sep- 2007	629961 286662
07/00010/B	Dudman (Lowestoft) Ltd The Dudman Group Of Companies Commercial Road Lowestoft Suffolk NR32 2TE	PG3_1: Cement and lime Processes	30-Nov- 2005	654178 292777
07/00009/B	C&H Quickmix Ltd Quickmix Sandpit Lane Worlingham Beccles Suffolk NR34 7TH	PG3_1: Cement and lime Processes	06-Sep- 2007	644860 288471
07/00014/B	William Clowes Ltd William Clowes Ltd Copland Way Worlingham	PG6_16: Coating activities, printing &	27-May- 2003	645234 288540

Waveney District Council

	Beccles Suffolk NR34 7TL	textile		
07/00016/B	Clays Ltd Clays Ltd Popson Street Bungay Suffolk NR35 1EB	PG6_16: Coating activities, printing & textile	02-Nov- 2007	633377 289987
07/00017/B	Supersine Duramark Ltd Supersine Duramark Ltd Freemantle Road Lowestoft Suffolk NR33 0EA	PG6_23: Coating activities, printing & textile	02-Nov- 2007	654392 292192
08/00018/B	Automotive Cleaning Chemicals Ltd. 4 Hadenham Road Gisleham Lowestoft Suffolk NR33 7NF	PG6_44: Coating manufacture	08-Feb- 2008	652968 289524
08/00019/B	Gardwell Coatings Ltd Unit 4c6 Site 3 Ellough Industrial Estate Ellough Airfield Ellough Suffolk	PG6_23: Coating, SED Activities (not dry clean)	08-Feb- 2008	644566 288397
11/00005/B	Gardwell Coatings Limited Germans Yard Hamilton Road Lowestoft Suffolk NR32 1XF	PG6_23: Coating, SED Activities (not dry clean)	16-May- 2011	655361 293190
08/00019/B	Gardwell Coatings Ltd Unit 4c6 Site 3 Ellough Industrial Estate Ellough Airfield Ellough Suffolk	PG6_31: Coating - Polymer, IsoCyan & Dry Powder	08-Feb- 2008	644566 288397
06/00003/B	Wm Morrison Supermarkets Ltd 18 Tower Road Gisleham Lowestoft Suffolk NR33 7NG	PG6_46: Dry cleaners	28-Oct- 2006	652979 289260
08/00008/B	Fashion Clean 140 London Road South	PG6_46: Dry cleaners	06-Jun- 2008	654519 292238

Waveney District Council

	Lowestoft Suffolk NR33 0AZ			
11/00002/B	Linen Press 21B New Market Beccles Suffolk NR34 9HA	PG6_46: Dry cleaners	21-Apr- 2011	642123 290356
03/00022/B	Lafarge Aggregates Ltd Flixton Gravel Pit Homersfield Road Flixton Bungay Suffolk NR35 1NN	PG315A: Roadstone coating burning waste oil	06-Sep- 2007	629961 286662
10/00001/B	Asda Asda Stores Limited Belvedere Road Lowestoft Suffolk NR33 0PX	PG1_14: Service Stations	29-Sep- 2010	654189 292547
03/00020/B	R Charlish Ltd St Johns Garage Bardolph Road Bungay Suffolk NR35 1BN	PG1_14: Service Stations	01-Apr- 2003	633922 289286
03/00018/B	Carlton Colville Service Station Carlton Colville Service Station The Street Carlton Colville Lowestoft Suffolk	PG1_14: Service Stations	01-Apr- 2003	651196 289812
03/00016/B	Oulton Broad Express Broadlands Filling Station 122 Beccles Road Lowestoft Suffolk NR33 8QY	PG1_14: Service Stations	01-Apr- 2003	651406 291804
03/00007/B	Anglia Regional Co- operative Society Rainbow Filling Station Saxons Way Halesworth Suffolk IP19 8LU	PG1_14: Service Stations	01-Apr- 2003	638636 277147
03/00005/B	AW&D Hammond A W And D Hammond Ltd	PG1_14: Service Stations	01-Apr- 2003	638767 277886

Waveney District Council

	Norwich Road Halesworth Suffolk IP19 8BU			
08/00007/B	Morrisons 18 Tower Road Gisleham Lowestoft Suffolk NR33 7NG	PG1_14: Service Stations	18-Jan- 2008	652979 289260
03/00014/B	Shell Oulton Broad (262) Travellers Check Garage Normanston Drive Lowestoft Suffolk NR32 2PY	PG1_14: Service Stations	01-Apr- 2003	652453 293178
03/00012/B	Malthurst Ltd Mill Road Service Station Mill Road Lowestoft Suffolk NR33 0PP	PG1_14: Service Stations	01-Apr- 2003	654361 292419
07/00008/B	Jubilee Filling Station Jubilee Filling Station High Street Lowestoft Suffolk NR32 1HU	PG1_14: Service Stations	14-Dec- 2007	655111 294050
05/00001/B	Anglia Regional Co-op Rainbow Foodstore Hillside Road East Bungay Suffolk NR35 1RX	PG1_14: Service Stations	10-Nov- 2005	634512 289226
07/00018/B	Morrisons Morrisons George Westwood Way Beccles Suffolk NR34 9EJ	PG1_14: Service Stations	14-Dec- 2007	642725 291090
02/00001/B	Tesco Stores Ltd Tesco Superstore Leisure Way Lowestoft Suffolk NR32 4TZ	PG1_14: Service Stations	01-Apr- 2003	653597 296081
06/00005/B	Tesco Stores Ltd Tesco Gresham Road Beccles Suffolk	PG1_14: Service Stations	16-Jan- 2006	642340 290556

Waveney District Council

	NR34 9QH			
03/00009/B	Pageant Garage Pageant Garage Gosford Road Beccles Suffolk NR34 9QP	PG1_14: Service Stations	01-Apr- 2003	642660 290216
03/00003/B	Kirkley Run Service Station 99 Kirkley Run Lowestoft Suffolk NR33 0NH	PG1_14: Service Stations	27-May- 2003	653240 291975
03/00001/B	Gunton Garage Gunton Garage 265-271 Yarmouth Road Lowestoft Suffolk NR32 4AA	PG1_14: Service Stations	29-Jun- 2009	653448 295716
07/00002/B	Hammonds Accident Repair Unit 6 Blyth Road Industrial Estate Blyth Road Halesworth Suffolk IP19 8EN	PG6_34: Vehicle re-finishing	06-Sep- 2007	639021 276820
07/00003/B	Belle Coach Works Ltd 28 Pinbush Road Gisleham Lowestoft Suffolk NR33 7NL	PG6_34: Vehicle re-finishing	06-Sep- 2007	652666 289953
07/00004/B	John Grose Group Ltd 2 Barley Way Gisleham Lowestoft Suffolk NR33 7NH	PG6_34: Vehicle re-finishing	06-Sep- 2007	652982 289786
07/00001/B	Robinsons Accident Repair Centre 2 Cooke Road Gisleham Lowestoft Suffolk NR33 7NA	PG6_34: Vehicle re-finishing	06-Sep- 2007	653067 289754
11/00007/B	Wrights Street Record Common Lane North Beccles	PG1_1: Waste oil burners (under 0.4MW)	05-Dec- 2011	642398 290913

Waveney District Council

	Suffolk			
10/00003/B	Emerald Auto Services Ltd. Unit 2 Ellough Industrial Estate Ellough Airfield Worlingham Beccles Suffolk	PG1_1: Waste oil burners (under 0.4MW)	18-Nov-2010	644637 288414

Appendix 4: Raw Diffusion tube results

Location	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8
Castleton Avenue	23	26.2	39.4	20.5	22.7	18.7	19.7	18.5
Ingate	38	34.1	46.9		36.9	32.7	36.4	41.2
Saltwater Way	23.8	33.8	40	35	27.1	30.3	24	32.6
Fir Lane	28.7	31.4	39.2	35.5	20.9	25.5	27.6	29
Mill Road	35.1	33.6	34.2		29.1	25.3	21.1	25
Golden Court	30.2	39.6	42.3	40.6	38.2	33.8	36.4	35.2
Yarmouth Road	26.1	24.3	25.6	25	23.8	23.4	25.3	24.8
Pier Terrace 1	46	48.8	48.9	46.7	44.3	37.4	37.7	32.1
St Margarets	24	26.1	25.9	16.9	14.9	13.9	15	11.5
Belvedere Road	32.8	38.7	44.4	32.2	31.1	32.4	31.8	35.7
Belvedere Road	42.2	44.1	43.9	27.7	31.5	34.1	31.3	32.9
Belvedere Road	35.9	34.6	42.9	31	31.3	30.6	27.9	37
Dutchmans Court	29.7	31.3	34.2	25.9	21.2	24.4	25.7	31.6
PierTerrace 2	36.1	32.2	42.2	28.7	31	26.3	28.6	30.2
Ingate 2	41.6	44.5		36.7	28.6	26.1	28.2	27.8
Blank								
Co-location Study Mean Values	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8
Tube 1	32.8	38.7	44.4	32.2	31.1	32.4	31.8	35.7
Tube 2	42.2	44.1	43.9	27.7	31.5	34.1	31.3	32.9
Tube 3	35.9	34.6	42.9	31	31.3	30.6	27.9	37

Appendix 5

Method used to Predict NO₂ Concentrations at Different Distances from Road

The monitoring sites are located in the areas of concern to represent the worst-case public exposure, but it is not always possible to measure concentrations at the desired location because of practical reasons and in most cases the relevant public exposure is located a short distance away. The calculator described in LAQM.TG(09) has been used to predict concentrations at the nearest point of relevant public exposure. Results derived in this way will have a greater uncertainty than measured data and this uncertainty increases as the distance between the measuring location and relevant receptor grows larger.

The calculator as a spreadsheet is available on www.laqm.defra.gov.uk, and it can be viewed below.

The local background concentration in µg/m³ of the appropriate year (2012) has been obtained from the national maps published at www.laqm.defra.gov.uk.

The influence of the 2010 high NO₂ pollution year has been accounted for and the estimates for 2012 have been scaled down, using the NO₂ Background Sector Removal tool, which is again available at www.laqm.defra.gov.uk.

<p>This calculator allows you to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.</p>						
<p align="center"><u>Enter data into the yellow cells</u></p>						
Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	0	2.4	metres	
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	0	5	metres	
Step 3	What is the local annual mean background NO₂ concentration (in µg/m³)?	(Note 2)	0	12.13	µg/m ³	
Step 4	What is your measured annual mean NO₂ concentration (in µg/m³)?	(Note 2)	0	26.4	µg/m ³	
Result	The predicted annual mean NO₂ concentration (in µg/m³) at your receptor	(Note 3)		23.8	µg/m ³	
<p>Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.</p>						
<p>Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.</p>						
<p>Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.</p>						
<p>Issue 2: 16/03/09. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk</p>						