

# 2011 Air Quality Progress Report for Waveney District Council

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

March 2011

<b>Local Authority Officer</b>	David Porter
--------------------------------	--------------

<b>Department</b>	Environmental Services
<b>Address</b>	Town Hall The High Street Lowestoft Suffolk NR32 1HS
<b>Telephone</b>	01502 523195
<b>e-mail</b>	david.porter@waveney.gov.uk

<b>Report Reference number</b>	WAV/AQ/R/2
<b>Date</b>	March 2011

## Executive Summary

This progress 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 from a continuous analyser located in Belvedere Road and a network of 8 passive diffusion tube sites measuring NO<sub>2</sub> at relevant roadside locations on the A146, A1117 and A12, the major A-roads which pass through Lowestoft. One diffusion tube has been used to measure urban background concentrations of NO<sub>2</sub> at a central location in Lowestoft. Further diffusion tubes have been used in a triplicate co-location study with the continuous analyser. Some of the sampling sites have been moved to improve the value of the air quality data and this ensures that the relevant public exposure can be determined with more confidence. The annual mean concentrations of NO<sub>2</sub> 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 district in 2012..Monitoring of NO<sub>2</sub> will continue in the port area because of the elevated annual mean concentration measured at the Pier Terrace site.

There are no newly identified or proposed point or diffuse sources which are likely have a significant impact on air quality in the Waveney District.

The conclusion is that there is no need for Waveney District Council to proceed to a detailed assessment in 2010 for any pollutants considered in this assessment. It is recommended that there is no need for Waveney District Council to proceed to a Detailed Air Quality Assessment at any of the locations surveyed.

## Table of contents

<b>1</b>	<b>Introduction</b>	<b>6</b>
1.1	Description of Local Authority Area	6
1.2	Purpose of Progress Report	6
1.3	Air Quality Objectives	6
1.4	Summary of Previous Review and Assessments	8
<b>2</b>	<b>New Monitoring Data</b>	<b>10</b>
2.1	Summary of Monitoring Undertaken	10
2.2	Comparison of Monitoring Results with Air Quality Objectives	19
<b>3</b>	<b>New Local Developments</b>	<b>24</b>
3.1	Road Traffic Sources	24
3.2	Other Transport Sources	25
3.3	Industrial Sources	<u>25</u>
3.4	Commercial and Domestic Sources	27
3.5	New Developments with Fugitive or Uncontrolled Sources	27
<b>4</b>	<b>Planning Applications</b>	<b>28</b>
<b>5</b>	<b>Air Quality Planning Policies</b>	<b>29</b>
<b>6</b>	<b>Local Transport Plans and Strategies</b>	<b>30</b>
<b>7</b>	<b>Conclusions and Proposed Actions</b>	<b>30</b>
7.1	Conclusions from New Monitoring Data	31
7.2	Conclusions relating to New Local Developments	31
7.3	Proposed Actions	31
<b>8</b>	<b>References</b>	<b>32</b>

## **Appendices**

### Appendix 1

QA/QC of Diffusion Tube Monitoring

QA/QC of Automatic Monitoring

### Appendix 2

Diffusion Tube Bias Adjustment Factors

Short- term to Long-term Data Adjustment

The Method Used to Predict NO<sub>2</sub> Concentrations at Different Distances from the Road

Raw (Unadjusted) Measurements Obtained from the Diffusion Tube Studies

## **List of Tables**

Table 1.1 Air Quality Objectives Included in Regulations for the Purposes Local Air Quality Management in England

Table 2.2 Details of Automatic Monitoring Sites

Table 2.3 (a) The Results Automatic Monitoring for Nitrogen Dioxide : Raw Data

Table 2.3 (b) Results of Automatic Monitoring for Nitrogen Dioxide :Comparison of Adjusted Data with the Annual Mean Objective.

Table 2.3 (c) Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with the 1-Hour Mean Objective.

Table 2.4 (a) Results of Nitrogen Dioxide Diffusion Tubes

Table 2.4 (b) Nitrogen Dioxide Concentration Levels Estimated at the Nearest Relevant Receptor.

## **List of Figures**

Figure 2.1 Map of the Location of the Automatic Monitoring Site

Figure 2.2 Maps of Non-Automatic Monitoring Sites

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites from 2007-2010

# 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

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 Local Air Quality Management (LAQM) in **England** are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (for carbon monoxide the units used are milligrammes per cubic metre,  $\text{mg}/\text{m}^3$ ). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

**Table 1.1 Air Quality Objectives Included in Regulations for the Purpose of Local Air Quality Management in England.**

<b>Pollutant</b>	<b>Concentration</b>	<b>Measured as</b>	<b>Date to be achieved by</b>
<b>Benzene</b>	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
<b>1,3-Butadiene</b>	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
<b>Carbon monoxide</b>	10.0 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
<b>Lead</b>	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
<b>Nitrogen dioxide</b>	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
<b>Particles (PM<sub>10</sub>) (gravimetric)</b>	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
<b>Sulphur dioxide</b>	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 NO<sub>2</sub> 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 has shown concentrations of NO<sub>2</sub> 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 NO<sub>2</sub> 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 NO<sub>2</sub> concentrations are measured with more confidence.

## 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 NO<sub>2</sub> and oxides of nitrogen. The monitor is located by the roadside in Belvedere Road, Lowestoft, in close proximity to the port. Data from the Belvedere Road site can be found at [www.airquality.co.uk](http://www.airquality.co.uk). Other pollutants considered by this report are not measured by the monitor.

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

Figure 2.1 Map of the Location of the Automatic Monitoring Site



**Table 2.2 Details of Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	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?
Belvedere Road	Roadside.	X654651	Y292619	NO <sub>2</sub>	Chemilumin escent	No	No	n/a	Y

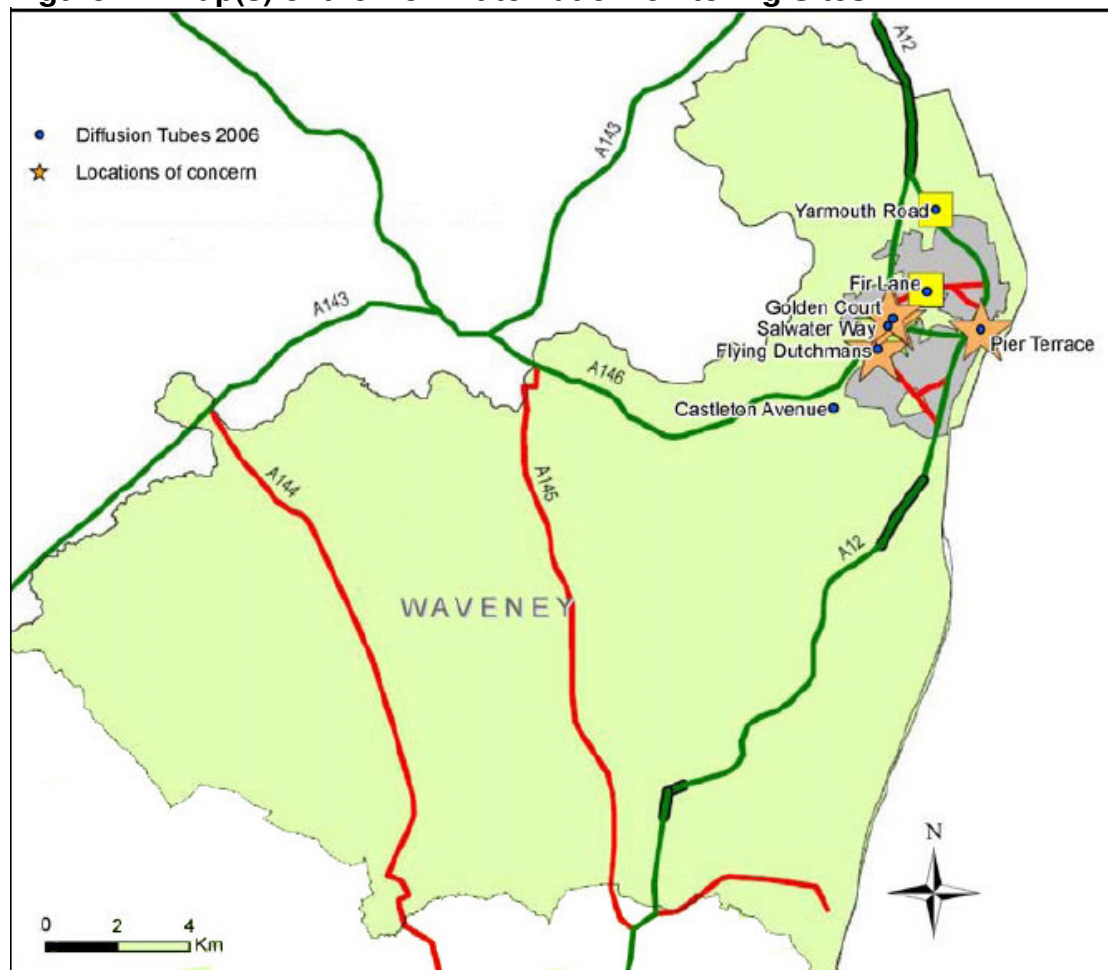
**2.1.2 Non-Automatic Monitoring**

There are two new monitoring sites in Waveney District and none have been discontinued since the 2009 Updating and Screening Report.

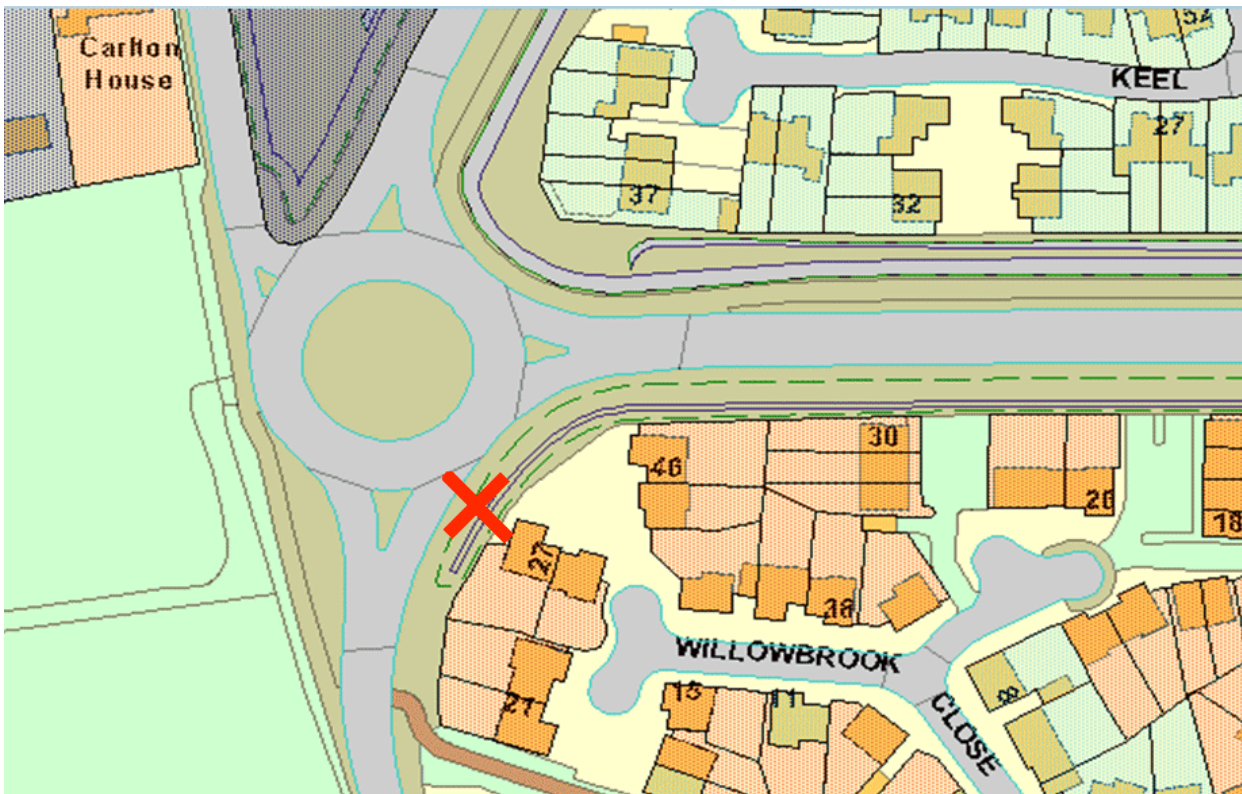
A network of 9 NO<sub>2</sub> diffusion tube monitoring sites extend coverage around the main urban centre of Lowestoft. The sites are situated around the port area and by the roadside of busy roundabouts on the major A-roads which pass through the town. One diffusion tube has been situated centrally to measure urban background levels of NO<sub>2</sub> and this is a new site. No non- automatic monitoring is carried out to measure the other pollutants considered in this report.

Thee second addition to the monitoring regime is a triplicate co-location study using diffusion tubes established at the site of the continuous air quality monitor.

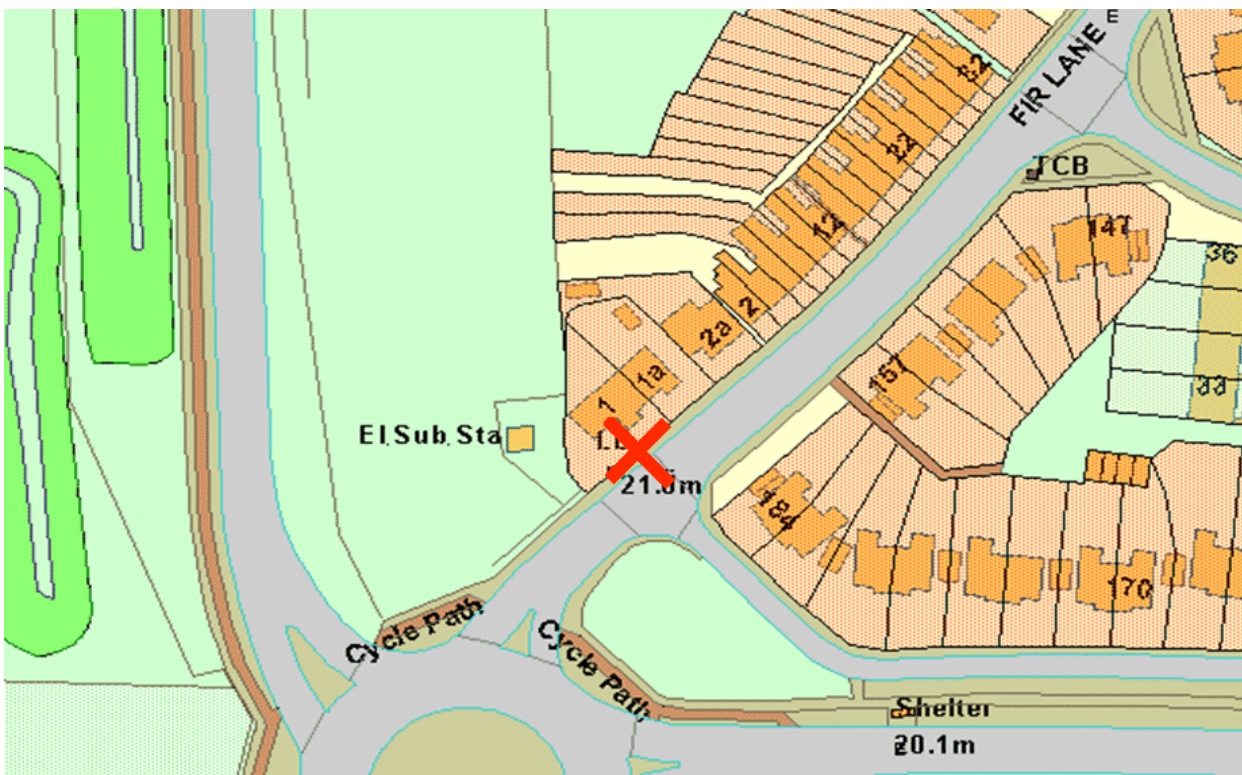
**Figure 2.2 Map(s) of the Non-Automatic Monitoring Sites**



NO<sub>2</sub> monitoring sites in Waveney district  
 © Crown Copyright. All rights reserved by Suffolk County Council. License No. 100023395 (2007).



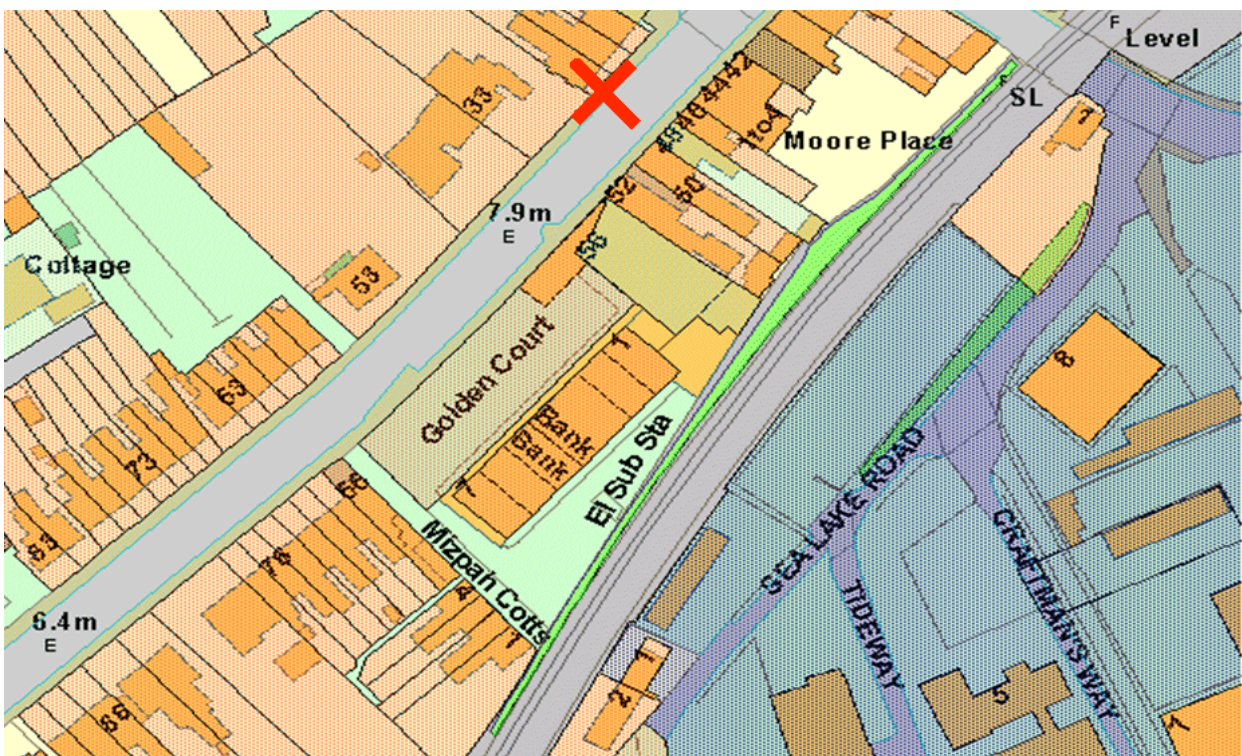
**Diffusion Tube Site 1: Castleton Avenue, Carlton Colville.**



**Diffusion Tube Site 2: Fir Lane, Lowestoft**



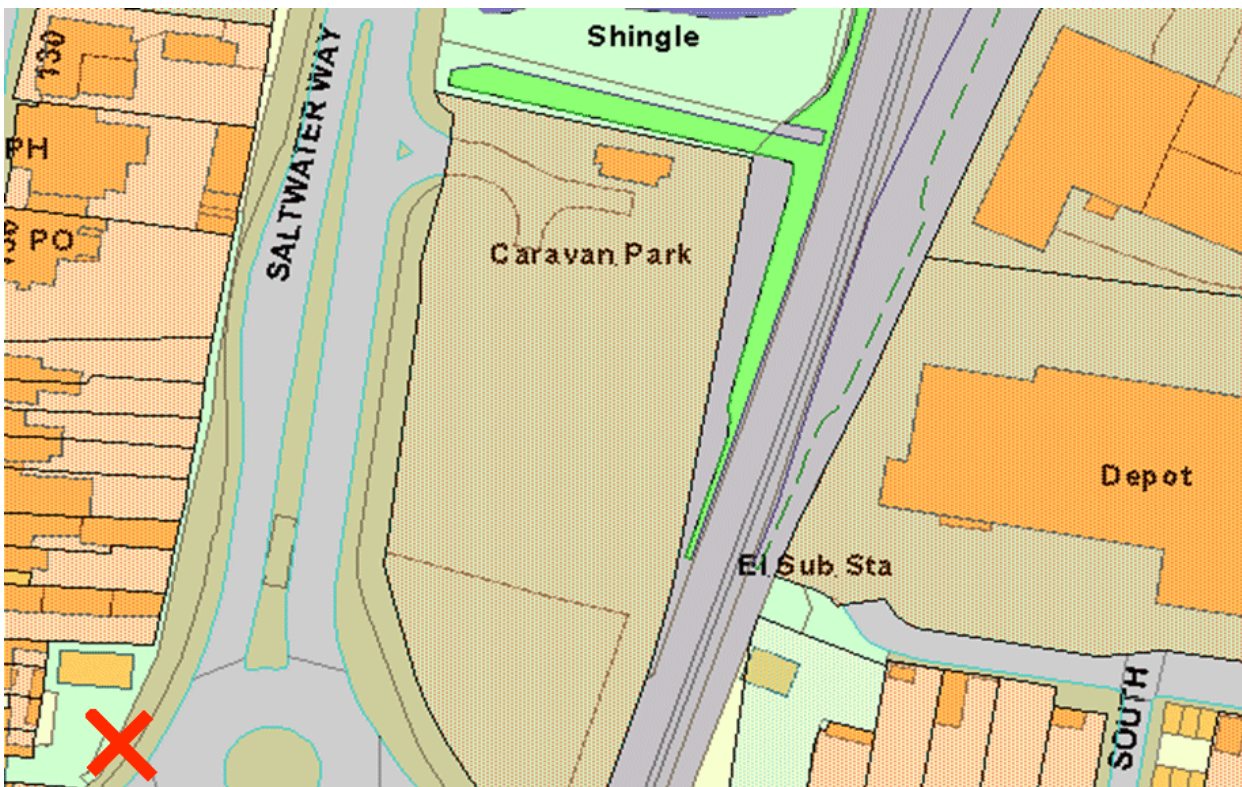
**Diffusion tube site 3 :The Flying Dutchman, Cotmer Road, Oulton Broad**



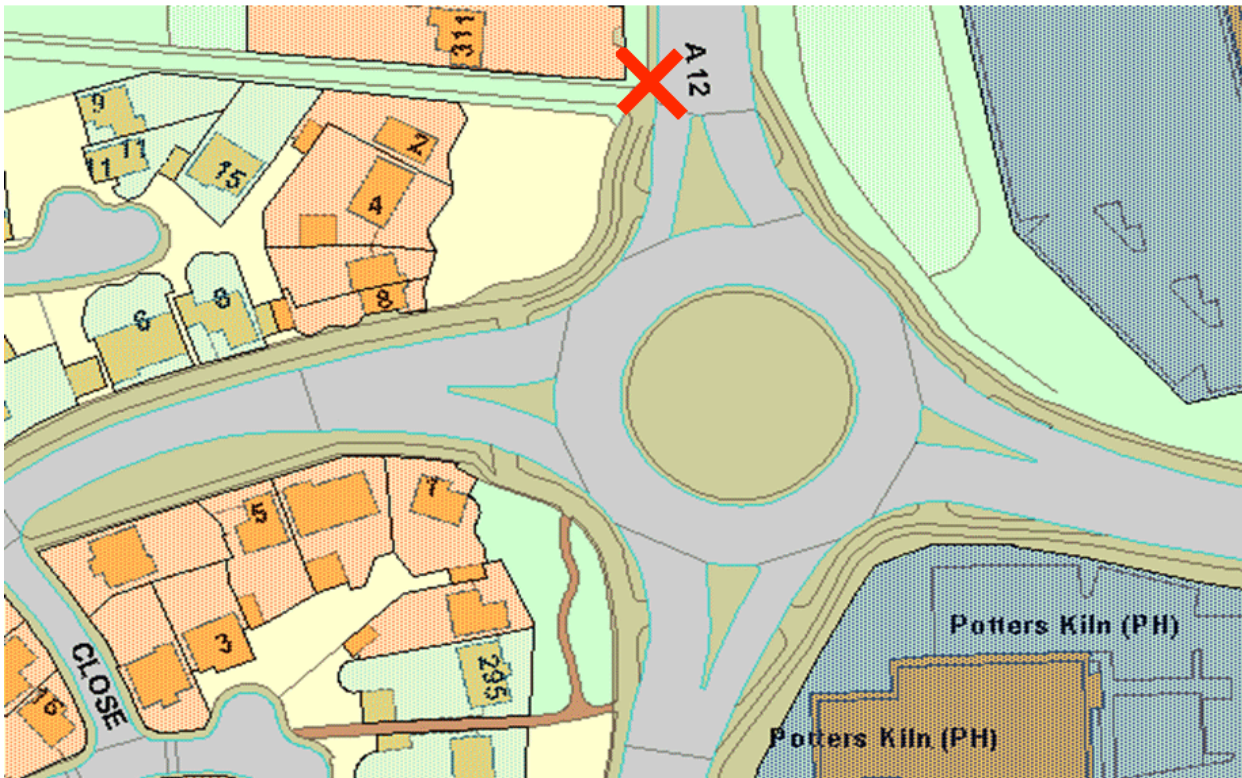
**Diffusion Tube Site 4 : Golden Court, Bridge Road, Oulton Broad**



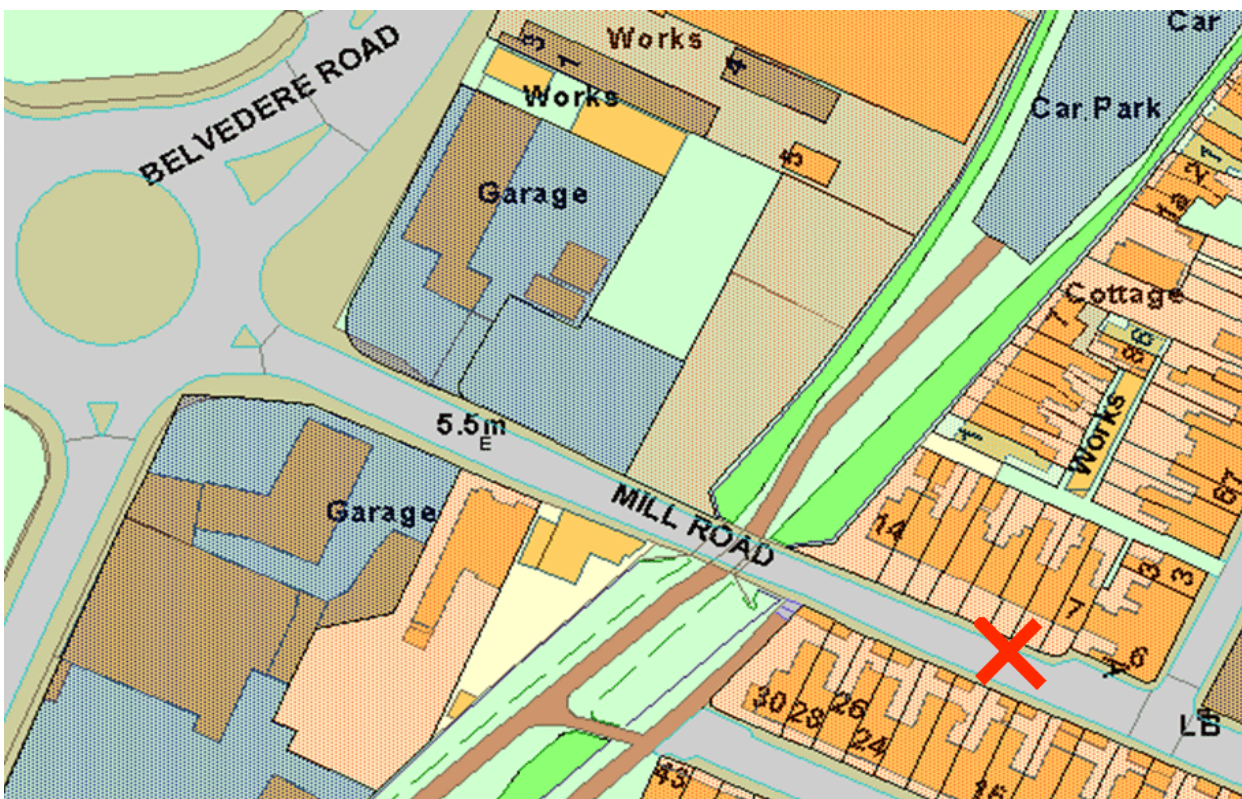
**Diffusion Tube Site 5 : Pier Terrace/Belvedere Road, Lowestoft**



**Diffusion Tube Site 6 : Saltwater Way, Oulton Broad**

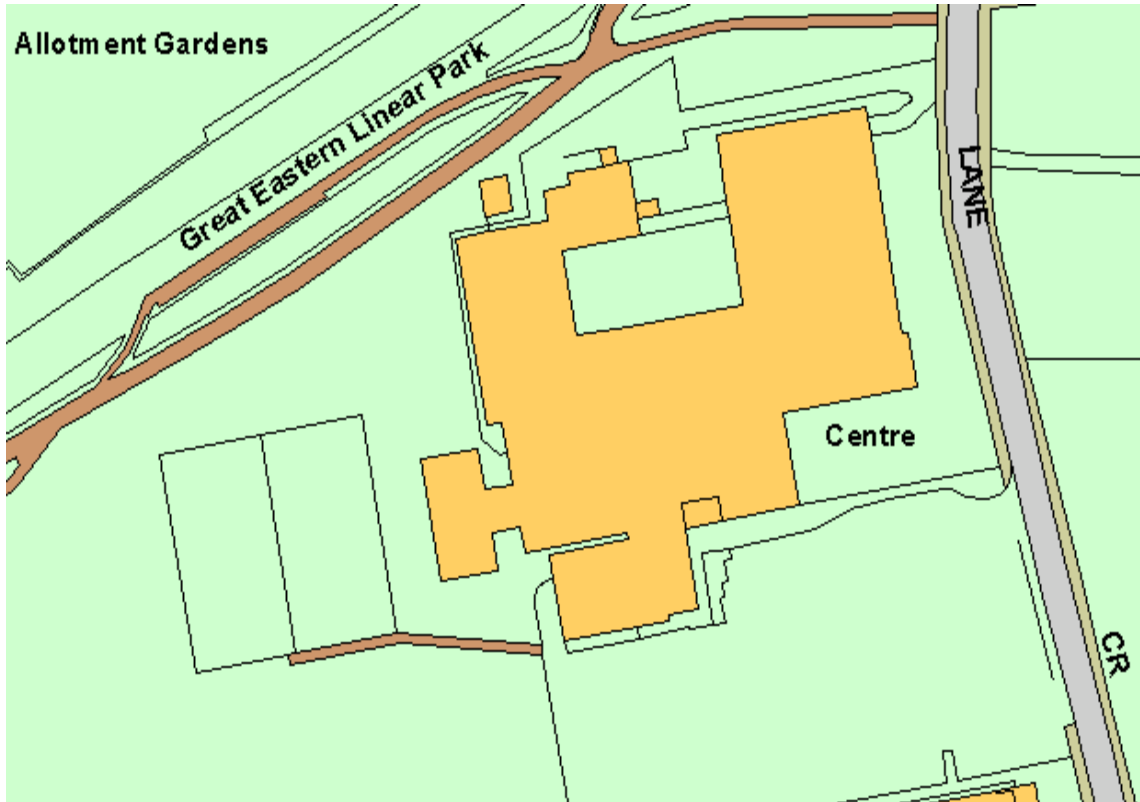


**Diffusion Tube Site 7 : Yarmouth Road, Lowestoft**



**Diffusion Tube Site 8 : Mill Road, Lowestoft**





**Diffusion Tube Site 9: The Water Lane Sports Centre, Lowestoft**

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	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?
Castleton Avenue	Roadside	X650608	Y290476	NO <sub>2</sub>	Diffusion Tubes	N	Y (17m)	1.9m	Y
Fir lane	Roadside	X653220	Y293794	NO <sub>2</sub>	Diffusion Tubes	N	Y (6m)	0.5m	Y
Dutchmans Court	Roadside	X651885	Y292103	NO <sub>2</sub>	Diffusion Tubes	N	Y (5m)	2.4m	Y
Golden Court	Roadside	X652301	Y293016	NO <sub>2</sub>	Diffusion Tubes	N	Y (4.0m)	2.0m	Y
Pier Terrace	Roadside	X654658	Y292598	NO <sub>2</sub>	Diffusion Tubes	N	Y(7.0m)	3.0m	Y
Saltwater Way	Roadside	X652498	Y292751	NO <sub>2</sub>	Diffusion Tubes	N	Y (6.0m)	3.0m	Y
Yarmouth Road	Roadside	X653049	Y295534	NO <sub>2</sub>	Diffusion Tubes	N	Y(8.5m)	0.5m	Y
Mill Road	Roadside	X654470	Y292395	NO <sub>2</sub>	Diffusion Tubes	N	Y (6.8)	1.2m	Y
Sports Centre	Urban Background	X654305	Y293914	NO <sub>2</sub>	Diffusion Tubes	N	N	N/A	N/A
Belvedere Road co-location study	Roadside	X654651	Y292619	NO <sub>2</sub>	Diffusion Tubes	N	N	N	Y
Belvedere Road co-location study	Roadside	X654651	Y292619	NO <sub>2</sub>	Diffusion Tubes	N	N	N	Y
Belvedere Road co-location study	Roadside	X654651	Y292619	NO <sub>2</sub>	Diffusion Tubes	N	N	N	Y

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

### 2.2.1 Nitrogen Dioxide

#### Automatic Monitoring Data

The data obtained by the monitor has been ratified from the start of monitoring in June 2008 through to December 2010.

The annual mean for the Belvedere Road site is shown below. The average mean in 2008 and 2009 were both annualised because of limited data collection.

**Table 2.3 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison of Adjusted Data with the Annual Mean Objective**

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )		
					2008	2009	2010
A1	Belvedere Road	N	96.4	96.4	32	30.0	28.0

There have been no exceedences of the  $40\mu\text{g}/\text{m}^3$  annual objective.

**Table 2.3(b) Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective**

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Number of Exceedences of hourly mean ( $200\mu\text{g}/\text{m}^3$ )		
					2008	2009	2010
A1	Belvedere Road	N	96.4	96.4	0 (181)	0 (126.7)	0

There have been no exceedences of the 1-hour mean objective. The 99.8<sup>th</sup> percentile of the hourly means (in brackets) have been used in years 2008 and 2009 because the period of valid data was less than 90% of a full year.

### Diffusion Tube Monitoring Data

The diffusion tubes were exposed according to the calendar of suggested exposure periods for 2010 and the monitoring period at all diffusion tube sites was twelve months.

**Table 2.4(a) Results of Nitrogen Dioxide Diffusion Tubes (Bias Adjusted)**

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )		
					2008	2009	2010
1	Castleton Avenue	N	100	100	22.3	18.9	25.17
2	Fir Lane	N	100	100	29.9	23.2	27.3
3	Dutchmans Court	N	100	100	26.4	27.0	30.0
4	Golden Court	N	100	100	33.5	32.6	37.7
5	Pier Terrace	N	91.6	91.6	38.4	34.2	46.8
6	Saltwater Way	N	100	100	29.0	26.4	32.7
7	Yarmouth Road	N	100	100	27.6	26.0	25.0
8	Mill Road	N	100	100	42.3	33.8	32.06
9	Sports Centre	N	75	75	n/a	n/a	21.7

The results represent the annual mean concentrations measured at the road site monitoring sites and are unrepresentative of public exposure. To address the issue of public exposure Table 2.4(b) predicts the  $\text{NO}_2$  concentration at the façade of the nearest relevant receptors.

The bias adjustment factor used was the 'national' combined one and the reasons behind this choice are discussed in the appendix 2, but essentially the more conservative bias adjustment factor was used..

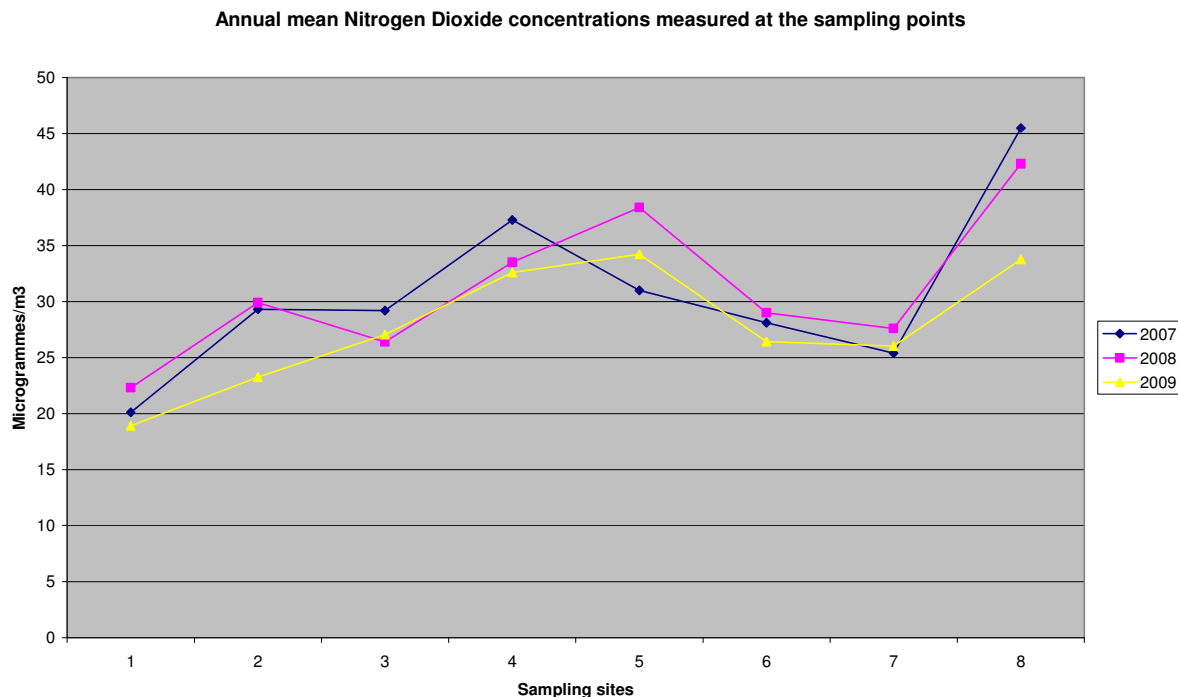
Please note that the tube at the Sports Centre site measures background levels and there is no relevant public exposure. It should also be noted that most of the sampling locations have changed from the previous years, which makes comparisons impossible.

**Table 2.4(b) Nitrogen Dioxide Concentration Levels Estimated at the Nearest Relevant Receptor**

Site name	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ ) at the façade of the nearest sensitive receptor in 2010
Castleton Avenue	16.7
Fir Lane	20.8
Dutchmans Court	26.5
Golden Court	33.6
Pier Terrace	37.1
Saltwater Way	29.3
Yarmouth Road	18.2
Mill Road	26.1
Sports Centre	n/a

This prediction allows for the pattern of decline of  $\text{NO}_2$  concentrations with distance from the road. This does result in reduction in annual mean concentrations of  $\text{NO}_2$ . Please note that comparisons with previous years annual mean concentrations are not helpful because of the repositioning of the diffusion tubes which was done in 2010.

**Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites from 2007- 2009.**



The trend shows 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 PM<sub>10</sub>**

No monitoring of PM<sub>10</sub> has been undertaken by Waveney District Council in 2010 as the 2009 Updating and Screening Assessment concluded that it was not necessary.

**2.2.3 Sulphur Dioxide**

No monitoring of SO<sub>2</sub> has been undertaken by Waveney District Council in 2010, as the 2009 Updating and Screening Report concluded that none was necessary

**2.2.4 Benzene**

No monitoring of C<sub>6</sub>H<sub>6</sub> has been undertaken by Waveney District Council in 2010, as the Updating and Screening Report of 2009 concluded it was not necessary.

### **2.2.5 Other pollutants monitored**

No monitoring of other pollutants has been undertaken by Waveney District Council in 2010 as the Updating and Screening Assessment Report 2009 concluded that none was necessary.

Waveney District Council investigated 182 complaints in 2010 alleging smoke, dust or odour nuisance..

### **2.2.6 Summary of Compliance with AQS Objectives**

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

## **3 New Local Developments**

### **3.1 Road Traffic Sources**

#### **3.1.1 Narrow congested streets with residential properties close to the kerb**

There are no new identified congested streets in Waveney with a flow of above 5000 vehicles per day and residential properties close to the kerb that have not been previously considered in the Updating and Screening Report 2009.

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

There are no new or newly identified streets in Waveney where people may spend one hour or more close to traffic that have not been previously considered in the Updating and Screening Report 2009.

#### **3.1.3 Roads with a high flow of buses and or HGVs**

There are no new or newly identified roads in Waveney with high flows of buses or HGVs that have not been previously considered in the Updating and Screening Report 2009.

#### **3.1.4 Junctions**

There are no new or newly identified busy road junctions in Waveney that have not been previously considered in the Updating and Screening Report 2009.

#### **3.1.5 New roads constructed or proposed since the last Updating and Screening Assessment Report 2009.**

There are no newly constructed or proposed roads in Waveney District that have not been previously considered in the Updating and Screening Report 2009.

#### **3.1.6 Roads with significantly changed traffic flows**

The South Lowestoft Relief Road (SLRR) and the traffic management and control system continues to operate, which offers co-ordination of traffic signals enabling more efficient management of traffic, preventing traffic queues and traffic building in the port area around the Bridge. The system also checks air quality by means of the continuous air quality monitor located in Belvedere Road

#### **3.1.7 Bus or coach stations**

There are no relevant bus stations in Waveney District with the number of bus movements greater than 2,500 per day and there is relevant residential exposure within 10m of any part of a bus station where buses are present. The largest bus station within Waveney has less than 1,000 movements per day and this is below the threshold level requiring further investigation.



## **3.2 Other Transport Sources**

### **3.2.1 Airports**

There are no airports in Waveney District that have a throughput of 5 million passengers per year and / or 500,000 tonnes of freight.

### **3.2.2 Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.**

There are no locations in Waveney District where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with a potential for relevant exposure within 15m.

### **3.2.3 Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m**

There are no locations in Waveney District where there is a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

### **3.2.4 Ports for shipping**

The port of Lowestoft is located in Waveney and 2010 saw 70 vessels with a gross tonnage of 500 tonnes visit the port. No further action is needed as the total vessel movements are below the threshold (greater than 5000) requiring a Detailed Assessment.

## **3.3 Industrial Sources**

### **3.3.1 Industrial installations: new or proposed installations for which an air quality assessment has been carried out**

There are no new or proposed installations for which an air quality assessment has been carried out as part of a planning application granted by Waveney District Council or by a neighbouring local authority.

### **3.3.2 Industrial installations: existing installations where emissions have increased substantially or new relevant exposure has been introduced.**

There is no existing installation in Waveney District where emissions have increased substantially or new relevant exposure introduced since the last Updating and Screening Report.

3.3.3 Industrial installations: new or significantly changed installations with no previous air quality assessment.

There are no new or significantly changed installations in Waveney District with no previous air quality assessment.

3.3.4 Major fuel storage depots storing petrol

There are no major fuel storage depots located in the Waveney District area storing petrol.

3.3.5 Poultry Farms

There are no new relevant poultry plants operating in Waveney District which have not been considered previously.

### **3.3 Commercial and Domestic Sources**

#### **3.4.1 Biomass combustion plant – individual installations**

Two installations have come to light:

The Edgar Sewter CP School , Halesworth, Ip19 8BU,  
Output:140kW :  
Fuel type: wood pellets.

The Barnby and Northcove CP School, Barnby, NR34 7QB,  
Output:50kW:  
Fuel type: woodchip

Further information is being sought in respect of these installations.

#### **3.4.2 Areas where the combined impact of several biomass combustion sources may be relevant**

There are no areas identified in Waveney District where there could be a combined impact from several biomass combustion sources.

#### **3.4.3 Areas where domestic solid fuel burning may be relevant**

There are no new areas of significant solid fuel use (coal, anthracite, wood or smokeless fuel) as a primary source of heating in Waveney district.

### **3.4 New Developments with Fugitive or Uncontrolled Sources**

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.

## 4 Planning Applications

- 5.1 Waveney District Council confirms that there is one planning application for a new development which has been approved and could impact on air quality.

**The Lowestoft High School, London Road, Pakefield, Lowestoft**

A biomass combustion plant is to be installed as part of the new High School project in Pakefield and the impact of emissions from this installation will be considered in the 2012 Progress report.

- 5.2 Waveney District Council confirms that there is one planning application for a new development which has not been approved at this time but could impact on air quality.

**Sotterley Estate and Biocore AD2 Ltd**

Waveney District Council has been consulted prior to the submission of a planning application to build a biofuels anaerobic digestion facility with a combined heat and power at a site on the Ellough industrial estate, south of Beccles. This will be considered in the 1212 Progress Report if the application progresses.

An air quality assessment, which models the atmospheric dispersion of pollutants has been requested.

## **5 Air Quality Planning Policies**

5.1 Environmental Health staff check all relevant planning applications for their potential impact on air quality.

5.2 The Suffolk Air Quality Management Group which Waveney District Council has membership of has recently prepared a supplementary planning document for use by the Suffolk local authorities. The document will be used primarily by planning officers, air quality officers and developers, and is currently at the formal consultation stage.

## 6 Local Transport Plans and Strategies

**6.1** The Local Transport Plan 2006-2011 produced by Suffolk County identified a number of objectives to be achieved in Waveney and these are:

- A to facilitate movement in and around Lowestoft: and
- B to improve public transport, (including bus and interchange facilities), walking and cycling in and around Lowestoft: and
- C to relieve congestion in and around Lowestoft town centre: and finally
- D to minimise the impact of traffic and transport infrastructure (including air quality) in market towns, villages and tourism honeypots to protect the county's environment and built heritage.

**6.2** A local transport plan 2006-2011 progress report has been produced by Suffolk County Council and this report notes a number of achievements and these are :

- A the increase in the number of cyclists at certain points in Lowestoft due to a number of schemes which have introduced high quality cycle lanes: and
- B the construction of the South Lowestoft Relief is now complete and traffic management measures are now operational which are designed to co-ordinate and monitor traffic levels and priority's to reduce congestion in the town centre: and
- C as part of the South Lowestoft Relief Road and Associated Measures project, Suffolk County Council has installed one real time pollution analyser close to the A12 Bascule Bridge to monitor nitrogen dioxide in Belvedere Road: and
- E work is being done with Bungay Town Council to develop a scheme to improve traffic flow in the Bungay town centre.

Suffolk County Council have prepared a new Local Transport Plan for 2011-2031 and the draft document is under consultation.

## **7 Conclusions and Proposed Actions**

### **7.1 Conclusions from New Monitoring Data**

Automatic and 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 2011. The greatest nitrogen dioxide concentrations are to be found at Pier Terrace and the sampling point has been moved to measure relevant public exposure at Levington Court, which is adjacent to the traffic lights where the tube is situated. The data obtained from the real time continuous air quality analyser situated in Belvedere Road also indicates that monitoring should continue in the port area. An additional tube could be installed in this area, perhaps on the premises at Levington Court, if the 2011 annual mean concentration remains high.. There has been no exceedances of the National Air Quality Strategy objectives elsewhere on the district.

There is no evidence to suggest that there is a need to proceed to a Detailed Assessment for any of the pollutants considered in this report, but monitoring needs to continue in the Port area.

### **7.2 Conclusions relating to New Local Developments**

There are no new Developments in Waveney District which will impact on local air quality significantly. Likewise the assessment of relevant sources indicates that there are no changes which will result in a significant impact on local air quality. Therefore, there is no need to proceed to a Detailed Assessment as exceedances of the National Air Quality Strategy Objectives are unlikely.

### **7.3 Proposed Actions**

There is no need to proceed to a Detailed Assessment for any of the pollutants considered in this report.. The co-location study using triplicate diffusion tubes installed at the automatic air quality monitor will be continued in Belvedere Road during 2011. Passive monitoring, using diffusion tubes will continue in the port area as the nitrogen dioxide concentrations remain the highest in Waveney District. Urban background concentrations of NO<sub>2</sub> in the central location will continue to be monitored and the sampling site will be moved to St Margaret's Church Yard a short distance away from the Sports Centre site.

The next action is the submission of the 2012 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/diffusiantube31009.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.

Progress Report on Air Quality in Waveney District (2005)

Progress Report on Air Quality in Waveney District (2010)

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](http://www.airquality.co.uk)

UK National Air Quality Information Archive, NO<sub>x</sub> NO<sub>2</sub> PM<sub>10</sub> Background CSV Formal Background Maps for 2006 to 2020, accessed on the UK Air Quality Archive Website (<http://www.airquality.co.uk/archive/laqmtools.php?tool=background06>)  
UK National Air Quality Information Archive (2009) Monitoring data from AURN Sites ([www.airquality.co.uk](http://www.airquality.co.uk)).

NO<sub>2</sub> Diffusion Tubes for LAQM: Guidance Note for Local Authorities, Prepared for Defra and the Devolved Administrations, AEAT/env/r/2140/Issue 1, March 2006.



NO<sub>2</sub> Concentrations and Distance from Roads, prepared by Professor Duncan Laxen and Dr Ben Marner of Air Quality Consultants Ltd

## Appendices

### Appendix 1: QA:QC Data

#### QA/QC of diffusion tube monitoring

The diffusion tubes used in Waveney District Council are supplied and analysed by Environmental Scientifics Group (ESG), formerly known as Harwell Scientifics, which is currently ranked as a **Category Good** laboratory in the WASP inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes. 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's standard operating procedure HS/W1/1015 issue 14 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.

The reported results were not bias adjusted by ESG.

The diffusion tubes are stored and installed by Waveney District Council in accordance with "NO<sub>2</sub> Diffusion Tubes for LAQM:Guidance Note for Local Authorities"

The NO<sub>2</sub> diffusion tube calendar of exposure periods was followed and as a consequence tubes were changed every month within +/- 2 days of the date specified by the calendar.

#### 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<sub>x</sub> 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<sub>x</sub> analyser are conducted every two to three weeks by the Local Site Operator (LSO) to quantitatively determine instrumental drift. Air Liquide 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<sub>x</sub> 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<sub>x</sub> concentrations to obtain drift-corrected NO<sub>2</sub> concentrations.
- Conversion factors are applied to the ratified drift-corrected data to report concentrations in µg/m<sup>3</sup>.
- 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.



## Appendix 2

### Diffusion Tube Bias Adjustment Factors

In 2010 a local co-location study, using triplicate diffusion tubes was carried out using the air quality analyser and a local 'Bias Adjustment Factor', of 0.69 was calculated using the 'Checking Precision and Accuracy of Triplicate Tubes', version 03 (November 2006) spreadsheet available on the [www.laqm.defra.gov.uk](http://www.laqm.defra.gov.uk) website. The survey achieved overall good precision with eleven out of the twelve periods having a CV less than 20% (with 95% confidence interval).

Both locally obtained and combined Bias Adjustment Factors have been applied to determine an adjusted mean, but for the purposes of this report, the latter is used to develop conclusions, as it provides a more cautious final value.

The combined 'Bias Adjustment Factor' used in the studies was obtained from the spreadsheet, version 04/11, which is published by the Air Quality Consultants Limited on behalf of Defra, the Welsh Assembly Government, the Scottish Government and the Department of the Environment for Northern Ireland. An overall factor of 0.85 was used and this was obtained from 18 separate studies of Harwell Scientific Services, which is a laboratory achieving good precision. The coefficient of variation (CV) of diffusion tubes replicates is considered good (good precision) when the CV of eight or more periods is less than 20%, and the average CV of all monitoring periods is less than 10%.

The bias adjusted means and raw means obtained from all diffusion tube sites are shown in the table below.

Site ID	Raw mean	Bias adjustment factor	Adjusted mean	Local bias adjustment factor	Adjusted mean (local)
Castleton Avenue	29.5	0.85	25.07	0.69	20
Fir Lane	32.1	0.85	27.28	0.69	22
Dutchmans Court	35.3	0.85	30.0	0.69	24
Golden Court	44.4	0.85	37.74	0.69	31
Pier Terrace	54.2	0.85	46.07	0.69	37
Saltwater Way	38.5	0.85	32.7	0.69	27
Yarmouth Road	29.4	0.85	24.99	0.69	20
Mill Road	37.5	0.85	31.87	0.69	26
Sports Centre	25.5	0.85	21.67	0.69	18

**Method used to Predict NO<sub>2</sub> 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 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. The local background concentration in µg/m<sup>3</sup> of the appropriate year (2011) has been obtained from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk). 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.airquality.co.uk](http://www.airquality.co.uk) and is shown below.

<b>This calculator allows you to predict the annual mean NO<sub>2</sub> 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.</b>					
<b>Enter data into the yellow cells</b>					
<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b>	(Note 1)	0	<b>2.4</b>	metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b>	(Note 1)	0	<b>5</b>	metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	0	<b>12.13</b>	µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b>	(Note 2)	0	<b>26.4</b>	µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b>	(Note 3)		<b>23.8</b>	µg/m <sup>3</sup>
<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 <a href="http://www.airquality.co.uk">www.airquality.co.uk</a>, 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 Marnier; Approved by Prof Duncan Laxen. Contact: <a href="mailto:benmarnier@aqconsultants.co.uk">benmarnier@aqconsultants.co.uk</a></p>					

Location	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10	Period 11	Period 12
Castleton Avenue	40.2	44.7	30	29	23.4	27	21.2	19.2	25	22.5	31.9	39.6
Fir Lane	47	44.6	35	26.7	18.5	23.9	28.7	22.9	25.8	26.6	46.4	40.6
Dutchmans Court	41.8	57.4	37.2	34.2	23.3	29.3	30.8	26.4	29.4	43.9	32	37.6
Golden Court	44.1	70.2	45.7	49.1	52.2	48.5	39.7	39.4	41.6	24.3	33.4	44.1
Pier Terrace	0	81.6	51.1	55	46.6	51.5	51.7	43.4	50.7	46.2	56.7	61.9
Saltwater Way	52.8	63.1	47.7	36.5	30.2	34.1	24	23	29.6	37.8	39.7	43.9
Yarmouth Road	41.5	46.8	31.6	26.5	22	26.2	23.3	19.1	24.7	27.7	30.5	32.6
Mill Road	48	55.2	40.2	35.4	34.2	36.7	34.6	26.7	28.3	33.4	35.6	41.7
Sports Centre	45.7	44.6	32.6	23.7	18.2	18.5	17.9	12.5	16	0	0	0
Belvedere Road (1)	50.1	60.2	41.7	40.9	33.8	32.1	41.1	36.4	36.7	37.4	45.7	28.1
Belvedere Road (2)	55.8	66.2	42.2	43.4	34.4	38.1	35.8	38.4	23.5	38.8	46.6	27.7
Belvedere Road (3)	50.5	65.5	39.6	41.5	34.2	39.1	39	37.7	35.4	39.5	32.8	27.8

**Raw (unadjusted) Measurements Obtained from the Diffusion Tube Studies**

