



2015 Updating and Screening  
Assessment for  
**Waveney District Council**

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

**November 2015**

|                                |                                                   |
|--------------------------------|---------------------------------------------------|
| <b>Local Authority Officer</b> | David Porter                                      |
|                                |                                                   |
| <b>Department</b>              | Environmental Health                              |
| <b>Address</b>                 | Riverside. 4 Canning Road, Lowestoft,<br>NR33 0EQ |
| <b>Telephone</b>               | 01502 523196                                      |
| <b>e-mail</b>                  | david.porter@eastsoffolk.gov.uk                   |
|                                |                                                   |
| <b>Report Reference number</b> | WAVUSA15                                          |
| <b>Date</b>                    | November 2015                                     |

## Executive Summary

This Updating and 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 since the last Updating and Screening Report, produced in 2012.

Air quality data is available in Waveney, via a network of 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. An additional tube has been used to measure urban background concentrations of NO<sub>2</sub> at a central location in Lowestoft. Air quality is also monitored in Beccles, using two tubes situated in the Ingate area, which is close to the town centre. A further diffusion tube has been stationed in Trinity Street, Bungay to monitor impact on air quality of a new one-way road scheme which has been designed to ease traffic pressure in the town centre.

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 Waveney District in 2015.

There are no newly identified or proposed point and diffuse sources that are likely to have a significant impact on air quality in the Waveney District in 2015.

Monitoring should continue in the area of the bascule Bridge in Lowestoft with additional diffusion tubes deployed , as heavy road traffic congestion often occurs at this location

The conclusion and the recommendation is that there is no need for Waveney District Council to proceed to a Detailed Assessment at any location in 2015 for any of the pollutants considered in this assessment.

# Table of contents

|          |                                                                                                                           |           |
|----------|---------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>Introduction .....</b>                                                                                                 | <b>8</b>  |
| 1.1      | Description of Local Authority Area .....                                                                                 | 8         |
| 1.2      | Purpose of Report.....                                                                                                    | 8         |
| 1.3      | Air Quality Objectives .....                                                                                              | 9         |
| 1.4      | Summary of Previous Review and Assessments .....                                                                          | 10        |
| <b>2</b> | <b>New Monitoring Data .....</b>                                                                                          | <b>13</b> |
| 2.1      | Summary of Monitoring Undertaken .....                                                                                    | 13        |
| 2.1.1    | Automatic Monitoring Sites .....                                                                                          | 13        |
| 2.1.2    | Non-Automatic Monitoring Sites .....                                                                                      | 16        |
| 2.2      | Comparison of Monitoring Results with Air Quality Objectives .....                                                        | 24        |
| 2.2.1    | Nitrogen Dioxide .....                                                                                                    | 24        |
| 2.2.2    | PM <sub>10</sub> .....                                                                                                    | 29        |
| 2.2.3    | Sulphur Dioxide.....                                                                                                      | 30        |
| 2.2.4    | Benzene.....                                                                                                              | 31        |
| 2.2.5    | Other pollutants monitored .....                                                                                          | 31        |
| 2.2.6    | Summary of Compliance with AQS Objectives .....                                                                           | 31        |
| <b>3</b> | <b>Road Traffic Sources .....</b>                                                                                         | <b>32</b> |
| 3.1      | Narrow Congested Streets with Residential Properties Close to the Kerb .....                                              | 32        |
| 3.2      | Busy Streets Where People May Spend 1-hour or More Close to Traffic.....                                                  | 34        |
| 3.3      | Roads with a High Flow of Buses and/or HGVs. ....                                                                         | 34        |
| 3.4      | Junctions.....                                                                                                            | 35        |
| 3.5      | New Roads Constructed or Proposed Since the Last Round of Review and<br>Assessment.....                                   | 35        |
| 3.6      | Roads with Significantly Changed Traffic Flows.....                                                                       | 36        |
| 3.7      | Bus and Coach Stations .....                                                                                              | 37        |
| <b>4</b> | <b>Other Transport Sources.....</b>                                                                                       | <b>38</b> |
| 4.1      | Airports.....                                                                                                             | 38        |
| 4.2      | Railways (Diesel and Steam Trains) .....                                                                                  | 38        |
| 4.2.1    | Stationary Trains.....                                                                                                    | 38        |
| 4.2.2    | Moving Trains .....                                                                                                       | 38        |
| 4.3      | Ports (Shipping) .....                                                                                                    | 38        |
| <b>5</b> | <b>Industrial Sources.....</b>                                                                                            | <b>40</b> |
| 5.1      | Industrial Installations .....                                                                                            | 40        |
| 5.1.1    | New or Proposed Installations for which an Air Quality Assessment has been<br>Carried Out.....                            | 40        |
| 5.1.2    | Existing Installations where Emissions have Increased Substantially or New<br>Relevant Exposure has been Introduced ..... | 40        |

|          |                                                                                         |           |
|----------|-----------------------------------------------------------------------------------------|-----------|
| 5.1.3    | New or Significantly Changed Installations with No Previous Air Quality Assessment..... | 41        |
| 5.2      | Major Fuel (Petrol) Storage Depots.....                                                 | 41        |
| 5.3      | Petrol Stations.....                                                                    | 41        |
| 5.4      | Poultry Farms.....                                                                      | 42        |
| <b>6</b> | <b>Commercial and Domestic Sources .....</b>                                            | <b>43</b> |
| 6.1      | Biomass Combustion – Individual Installations .....                                     | 43        |
| 6.2      | Biomass Combustion – Combined Impacts.....                                              | 46        |
| 6.3      | Domestic Solid-Fuel Burning .....                                                       | 46        |
| <b>7</b> | <b>Fugitive or Uncontrolled Sources.....</b>                                            | <b>47</b> |
| <b>8</b> | <b>Conclusions and Proposed Actions.....</b>                                            | <b>48</b> |
| 8.1      | Conclusions from New Monitoring Data .....                                              | 48        |
| 8.2      | Conclusions from Assessment of Sources .....                                            | 48        |
| 8.3      | Proposed Actions.....                                                                   | 49        |
| <b>9</b> | <b>References.....</b>                                                                  | <b>50</b> |

### 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 nitrogen dioxide diffusion tubes in 2014
- 2.4 Results of nitrogen dioxide diffusion tubes (2010-2014)

### List of Figures

Figure 2.1 Maps of Non-Automatic Monitoring Sites

Figure 2.2: Trends in the Measured Concentration of Nitrogen Dioxide Captured by the Automatic Air Quality Monitor Located in Belvedere Road (No longer in use).

Figure 2.3: Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites 2010-2014

### Appendices

Appendix 1 QA/QC Data

Appendix 2 Raw measured diffusion tube data for 2014

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

Appendix 4 List of Poultry Plants in Waveney with Environmental Permits from the Environment Agency

Appendix 5 Method used to Predict NO<sub>2</sub> Concentrations at Different Distances from Road

# **1 Introduction**

## **1.1 Description of Local Authority Area**

Population 115,300 (2011 Census)

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 the second largest town in Suffolk and a North Sea port.

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 located 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 Report**

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

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded.



A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

### 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  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 $\mu\text{g}/\text{m}^3$                                               | Running annual mean | 31.12.2010             |
| 1,3-Butadiene                               | 2.25 $\mu\text{g}/\text{m}^3$                                               | Running annual mean | 31.12.2003             |
| Carbon monoxide                             | 10.0 $\text{mg}/\text{m}^3$                                                 | Running 8-hour mean | 31.12.2003             |
| Lead                                        | 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             |
| 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             |
| Particles (PM <sub>10</sub> ) (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                                    | 24-hour mean        | 31.12.2004             |

|  |                                                                                   |                |            |
|--|-----------------------------------------------------------------------------------|----------------|------------|
|  | exceeded more than<br>3 times a year                                              |                |            |
|  | 266 $\mu\text{g}/\text{m}^3$ , not to be<br>exceeded more than<br>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  $\text{NO}_2$  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 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 they measured NO<sub>2</sub> concentrations were representative of relevant public exposure.

The 2011 Progress Report prepared by Waveney District Council recommended that monitoring of NO<sub>2</sub> 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 exceedance 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 prepared by Waveney District Council 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, as the area is subject to traffic congestion. 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. Diffusion tube monitoring of nitrogen oxides should also continue in the Ingate area of Beccles. to provide a more accurate picture of air quality in the town centre area.

The 2013 Air Quality Progress Report prepared by Waveney District Council concluded that there was unlikely to be an exceedance of the air quality objectives anywhere in the Waveney District. It was recommended that monitoring should continue in both the busy Port area and in the centre of Beccles.

The 2014 Air Quality Progress Report prepared by Waveney District Council concluded that there was unlikely to be an exceedance of the air quality objectives anywhere in the Waveney District. It was recommended that monitoring should continue in the busy Port area near the bascule bridge in Lowestoft, the centre of Beccles .and in Trinity Street, Bungay.

## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

There are no automatic continuous air quality monitor sites in the Waveney Council District. Previously, there was a monitor operated by Suffolk County Council and it measured the concentration of NO<sub>2</sub> and oxides of nitrogen at the roadside in Belvedere Road, Lowestoft, in close proximity to the Port. Routine calibrations and periodic site audits were carried out every two weeks by Waveney District Council. Unfortunately, the monitor has not been operational since August 2012 and before that time operation was spasmodic and problematic. Suffolk County Council reviewed the funding for the automatic air monitor in 2013 and decided not to continue with the funding for the equipment, therefore, no recent data is available for analysis from this source.

The historical data obtained by the automatic air quality is still a useful source of informative data and it has been included in this Updating and Screening Report. Some diffusion tube monitoring is still undertaken in the area and the results can be compared with the historical data and highlight significant changes in measured concentrations.



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

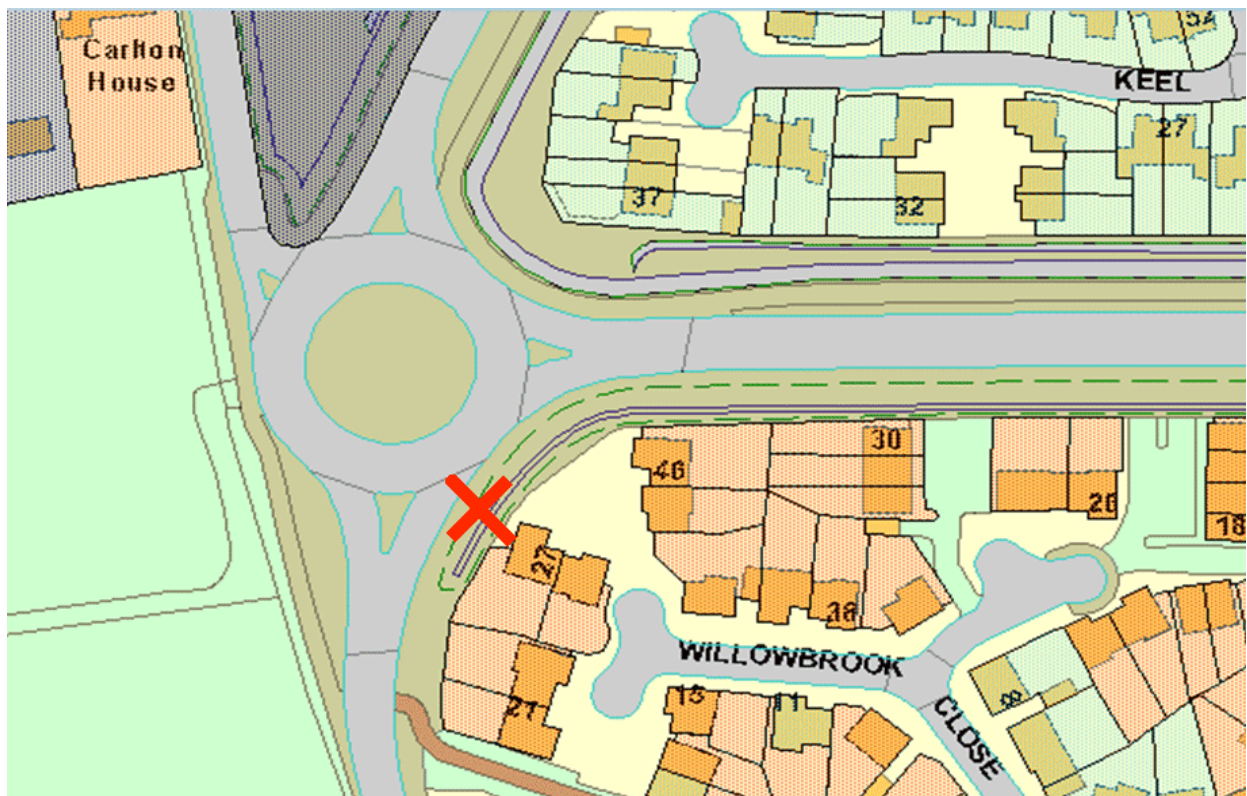
Table 2.1 Details of Automatic Monitoring Sites

| Site Name      | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Monitoring Technique | Relevant Exposure?<br>(Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road<br>(N/A if not applicable) | Does this location represent worst-case exposure? |
|----------------|-----------|---------------|---------------|----------------------|----------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------------|
| Belvedere Road | Roadside  | 654651        | 392651        | NO <sub>2</sub>      | N        | Chemiluminescent     | n                                                                  | 2.0m                                                        | Y                                                 |

### 2.1.2 Non-Automatic Monitoring Sites

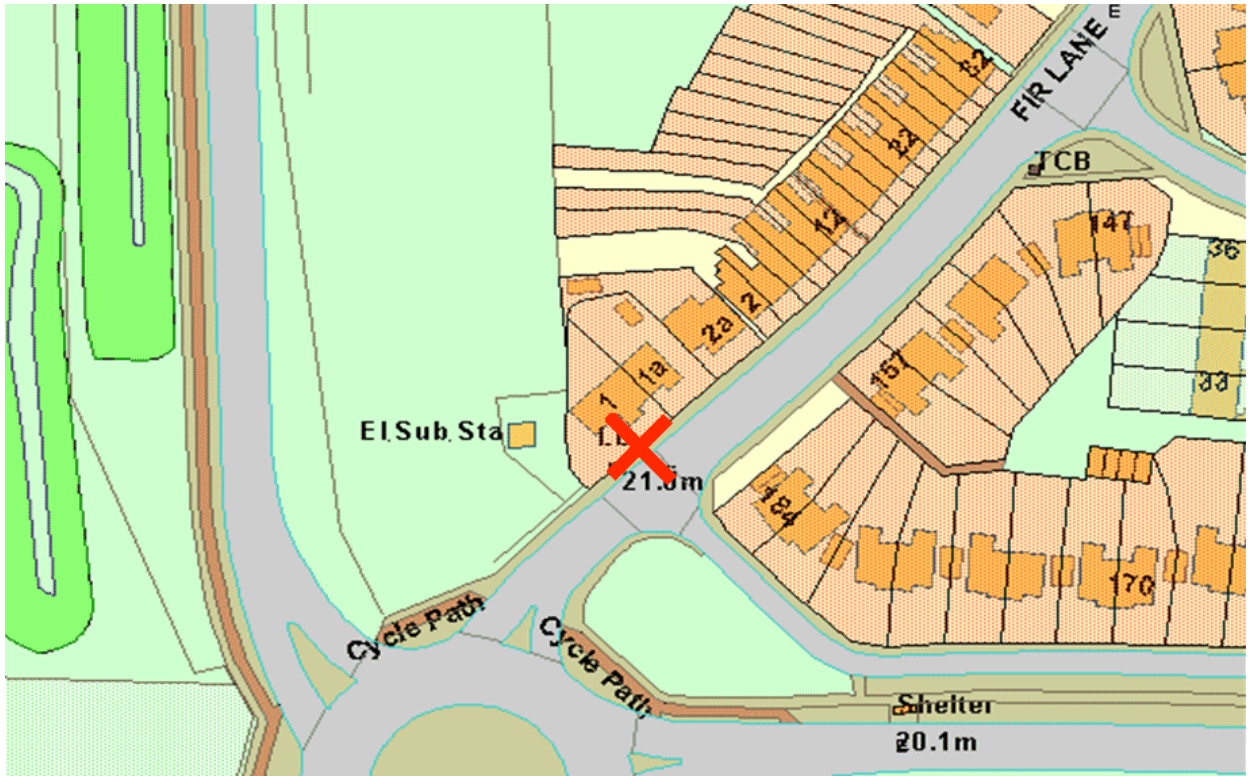
There are a number of diffusion tube monitoring sites in the Waveney District and these are located in Lowestoft, Beccles and Bungay. All of the tubes are situated by the roadside, apart from a single tube located in the St Margarets churchyard, which monitors urban background concentration levels of nitrogen dioxide. A number of the tubes were relocated a while ago to ensure that the results were representative of relevant public exposure.

Figure 2.2 Maps of Non-Automatic Monitoring Sites



Diffusion Tube Site PN1: Castleton Avenue, Carlton Colville



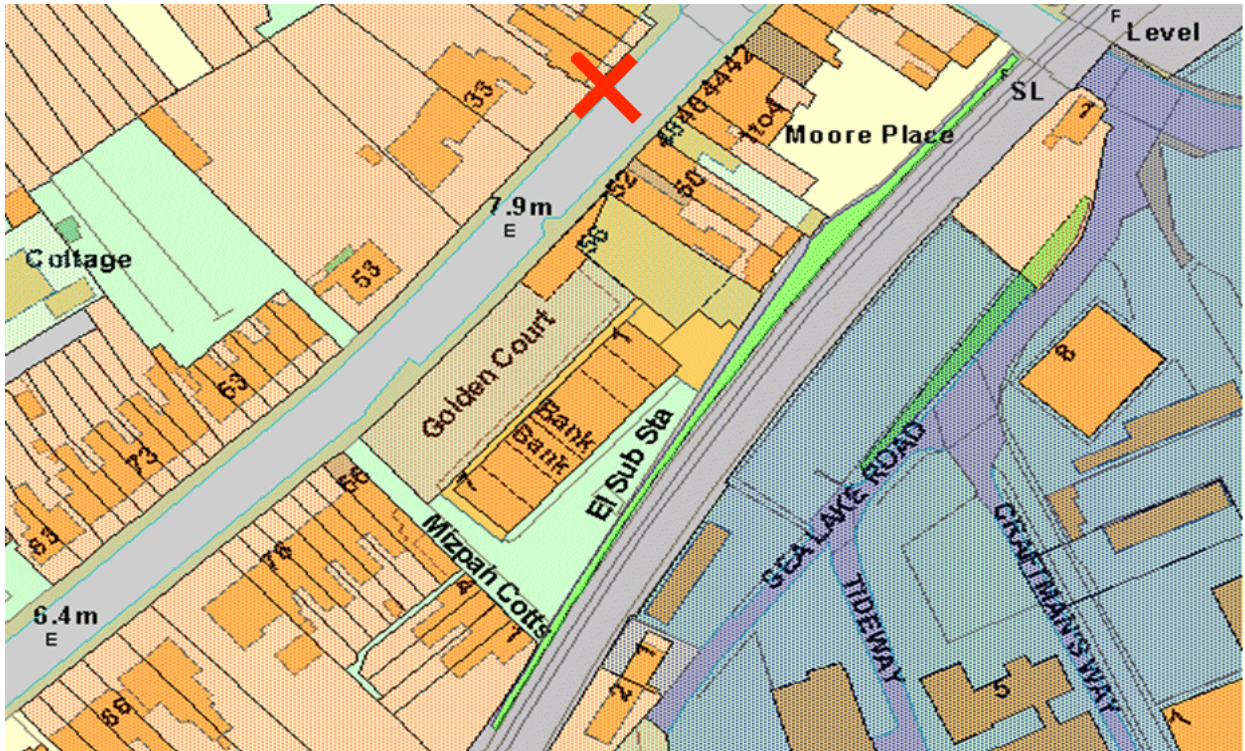


Diffusion Tube Site PN2: Fir Lane, Lowestoft

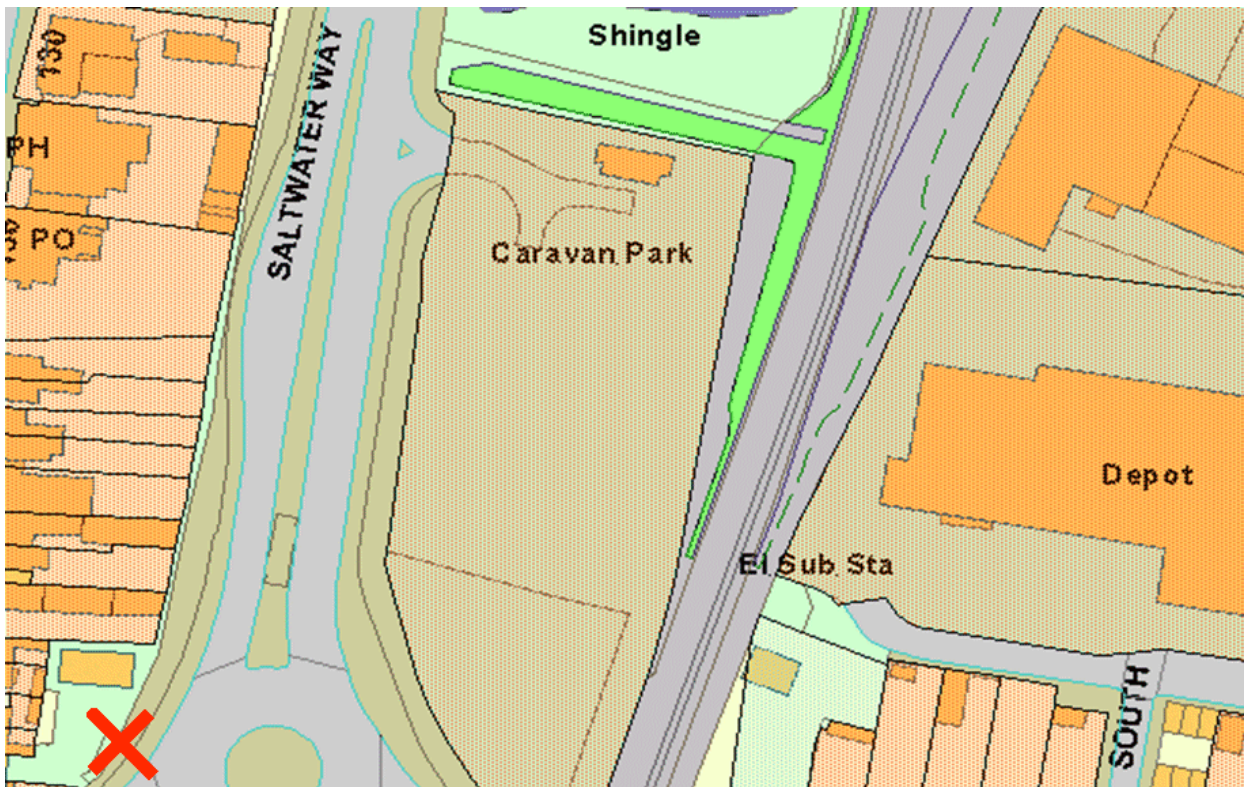


Diffusion tube site PN3 :The Flying Dutchman, Cotmer Road, Oulton Broad



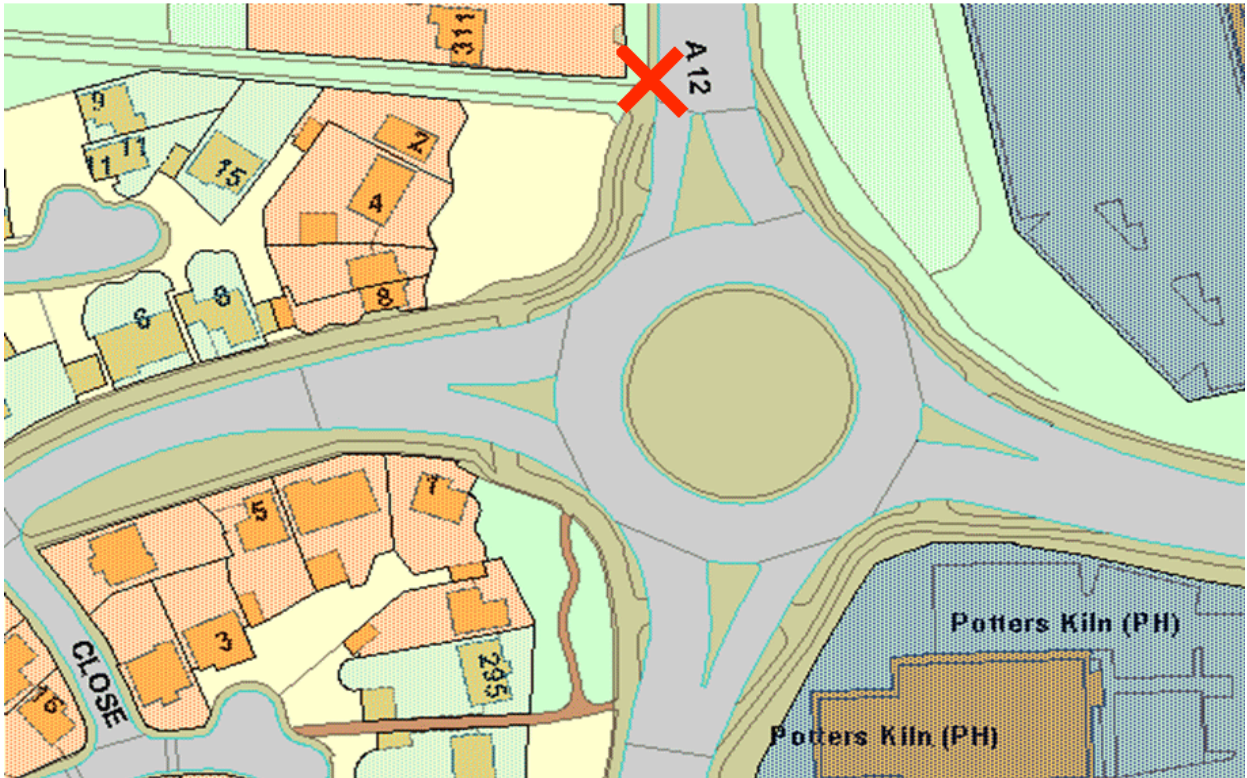


Diffusion Tube Site PN4 : Golden Court, Bridge Road, Oulton Broad

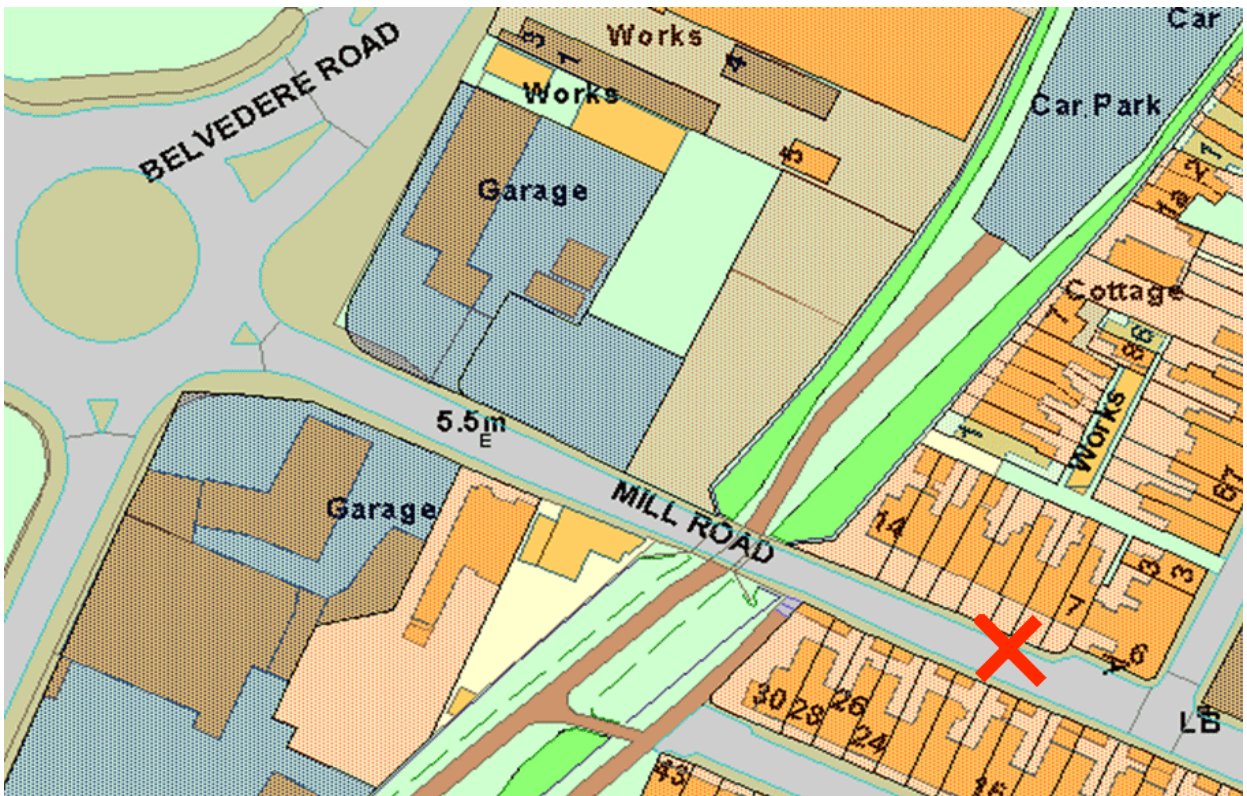


Diffusion Tube Site PN5 : Saltwater Way, Oulton Broad



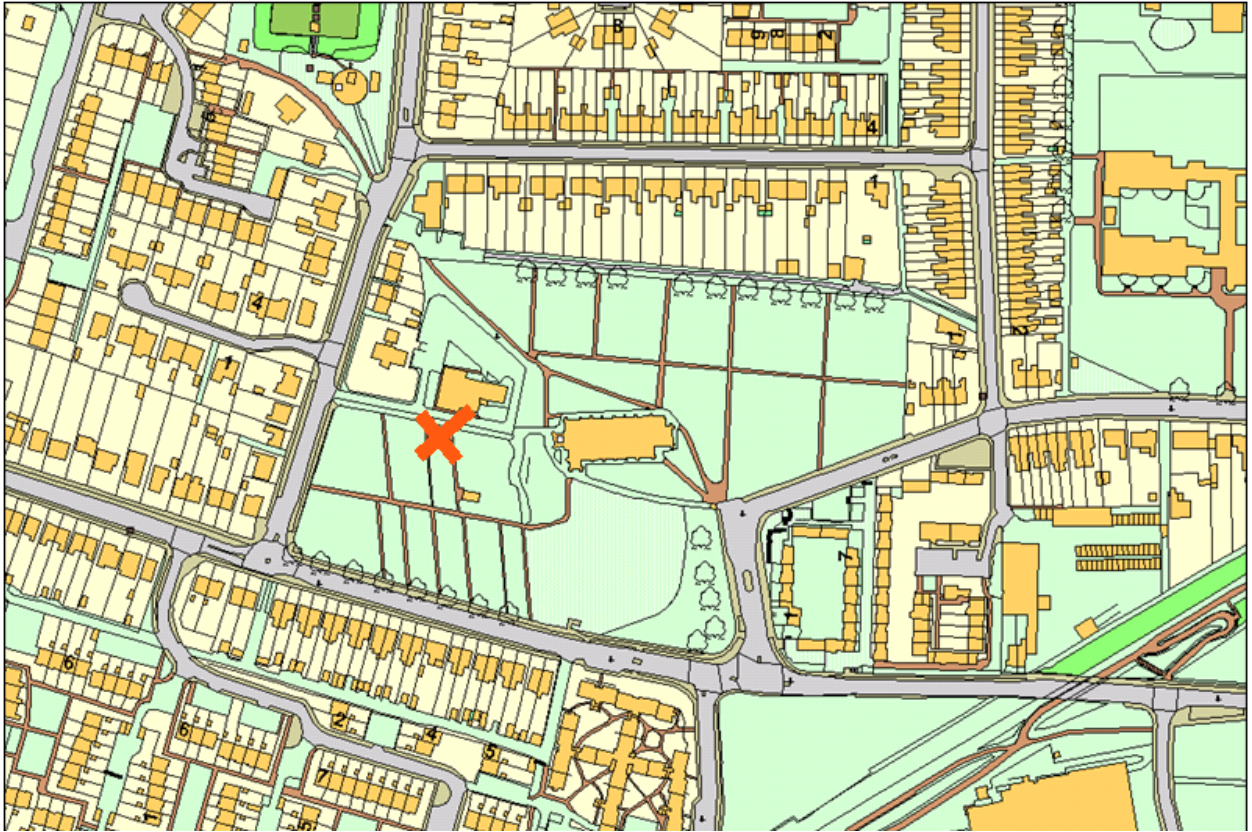


Diffusion Tube Site PN6 : Yarmouth Road, Lowestoft



Diffusion Tube Site PN7 : Mill Road, Lowestoft



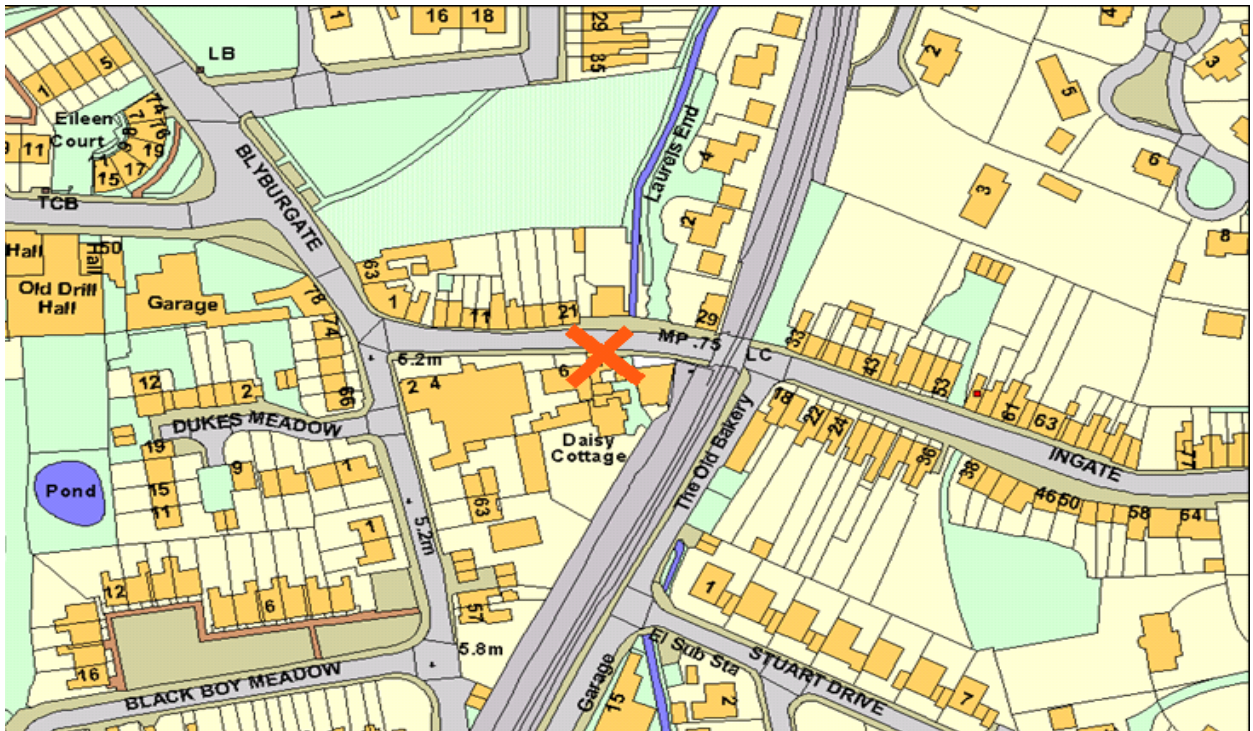


Diffusion Tube Monitoring Site PN8 St Margaret's Churchyard



Diffusion Tube Site PN9/10/11/12 : Pier Terrace/Belvedere Road, Lowestoft





Diffusion Tube Site PN14/15 : Ingate, Beccles



Diffusion tube sites PN13 : Trinity Street, Bungay

Table 2.2 Details of Non-Automatic Monitoring Sites

| Site Name                      | Site Type        | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|--------------------------------|------------------|---------------|---------------|----------------------|----------|-----------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|
| Castleton Avenue (PN1)         | Roadside         | 650608        | 290476        | NO <sub>2</sub>      | N        | N                                                         | Y (17m)                                                         | 1.9m                                                     | Y                                                 |
| Fir Lane (PN2)                 | Roadside         | 653220        | 293794        | NO <sub>2</sub>      | N        | N                                                         | Y(6m)                                                           | 0.5m                                                     | Y                                                 |
| Dutchmans Court (PN3)          | Roadside         | 651885        | 292105        | NO <sub>2</sub>      | N        | N                                                         | Y(5m)                                                           | 2.4m                                                     | Y                                                 |
| Golden Court (PN4)             | Roadside         | 652242        | 292955        | NO <sub>2</sub>      | N        | N                                                         | Y(4m)                                                           | 2m                                                       | Y                                                 |
| Saltwater Way (PN5)            | Roadside         | 652498        | 292751        | NO <sub>2</sub>      | N        | N                                                         | Y(6m)                                                           | 3m                                                       | Y                                                 |
| Yarmouth Road (PN6)            | Roadside         | 653049        | 295534        | NO <sub>2</sub>      | N        | N                                                         | Y(8.8m)                                                         | 0.5m                                                     | Y                                                 |
| Mill Road (PN7)                | Roadside         | 654470        | 292395        | NO <sub>2</sub>      | N        | N                                                         | Y(6.8m)                                                         | 1.2m                                                     | Y                                                 |
| St Margaret's Churchyard (PN8) | Urban Background | 654305        | 293914        | NO <sub>2</sub>      | N        | N                                                         | N                                                               | N                                                        | N                                                 |
| Belvedere                      | Roadside         | 654651        | 292619        | NO <sub>2</sub>      | N        | N                                                         | N                                                               | 1m                                                       | Y                                                 |

Waveney District Council

| Site Name                     | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|-------------------------------|-----------|---------------|---------------|----------------------|----------|-----------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|
| Road 1 (PN9)                  |           |               |               |                      |          |                                                           |                                                                 |                                                          |                                                   |
| Belvedere Road 2 (PN11)       | Roadside  | 654651        | 292619        | NO <sub>2</sub>      | N        | N                                                         | N                                                               | 1m                                                       | Y                                                 |
| Pier Terrace 1 (PN11)         | Roadside  | 654658        | 292598        | NO <sub>2</sub>      | N        | N                                                         | Y(7m)                                                           | 3m                                                       | Y                                                 |
| Pier Terrace 2 (PN12)         | Roadside  | 654658        | 292598        | NO <sub>2</sub>      | N        | N                                                         | Y(Façade)                                                       | 11m                                                      | Y                                                 |
| Trinity Street, Bungay (PN13) | Roadside  | 633661        | 289813        | NO <sub>2</sub>      | N        | N                                                         | Y(Façade)                                                       | 1m                                                       | Y                                                 |
| Ingate, Beccles 1(PN14)       | Roadside  | 642614        | 289906        | NO <sub>2</sub>      | N        | N                                                         | Y(Façade)                                                       | 1m                                                       | Y                                                 |
| Ingate Beccles 2(NP15)        | Roadside  | 642614        | 289906        | NO <sub>2</sub>      | N        | N                                                         | 4m                                                              | 2m                                                       | Y                                                 |

## **2.2 Comparison of Monitoring Results with Air Quality Objectives**

Waveney District Council has considered only Nitrogen Dioxide in this report,

No sites exceeded Air Quality Standards in 2014 and there were no borderline sites where the Air Quality Standards was close to being exceeded in 2014.

No automatic monitoring data was captured in 2014 because Suffolk County Council have made a decision not to continue to fund a replacement air quality monitor.

### **2.2.1 Nitrogen Dioxide**

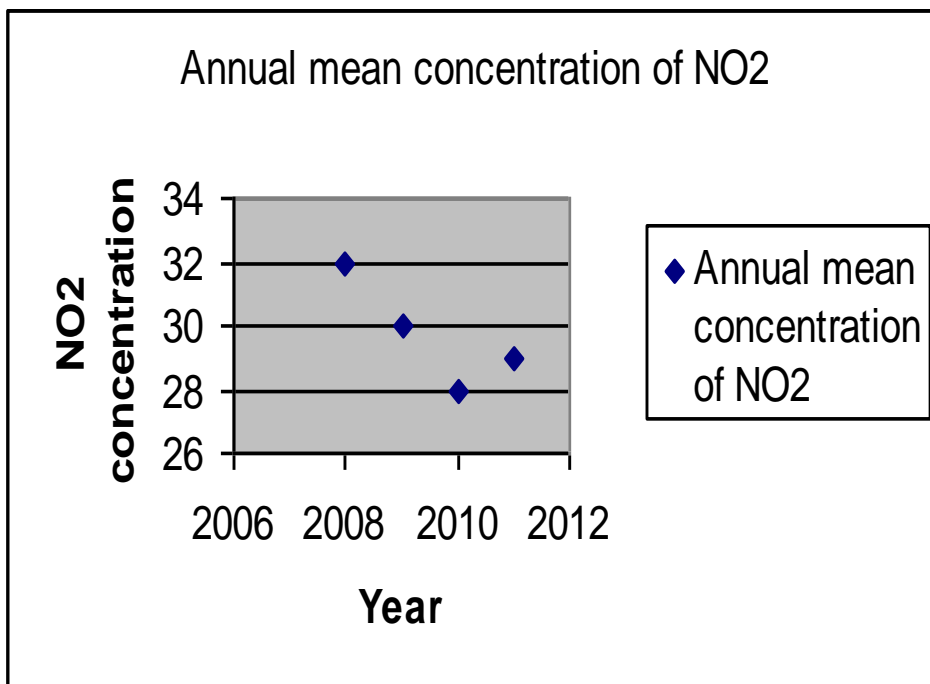
Data and trends obtained via an automatic monitor during the previous periods of review have been included in this Updating and Screening Report. Data capture had often been problematic and on occasion results have been annualised using the methodology outlined in LAQM TG(09).

#### **Automatic Monitoring Data**

Automatic monitoring of Nitrogen Dioxide levels effectively ceased in 2012 and beyond this time a number of equipment malfunctions meant that no worthwhile data was obtained.



**Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measures 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.

**Diffusion Tube Monitoring Data**

Data obtained via diffusion tube monitoring indicated that no sites exceeded Air Quality Standards in 2014 and there were no borderline sites where the Air Quality Standards were close to being exceeded in 2014.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2014

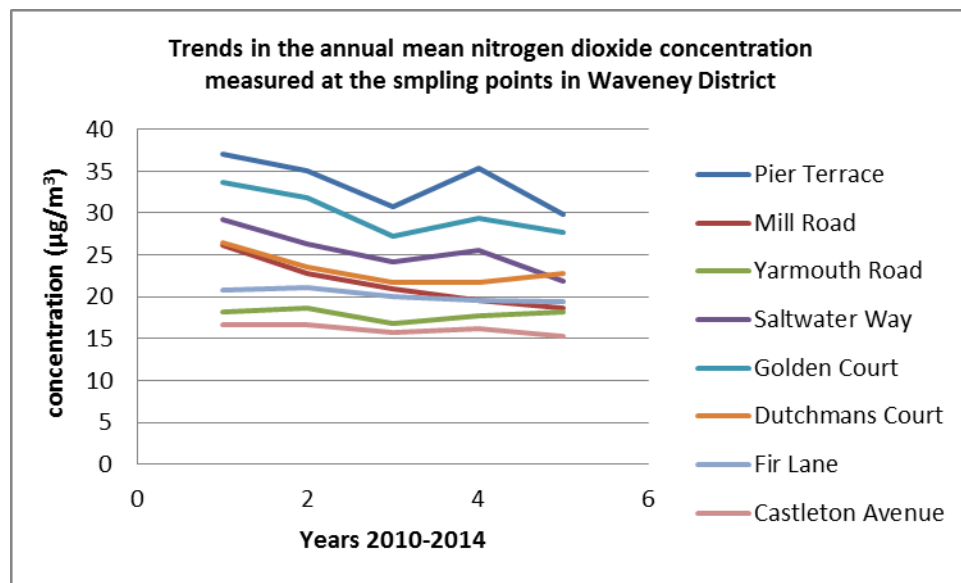
| Site ID | Location                 | Site Type        | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2014 (Number of Months or %) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor = 0.81) |
|---------|--------------------------|------------------|--------------|-------------------------------|-------------------------------------------|--------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------|
|         |                          |                  |              |                               |                                           |                                                        |                                                   | 2014 ( $\mu\text{g}/\text{m}^3$ )                         |
| PN1     | Castleton Avenue         | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 15.2                                                      |
| PN2     | Fir Lane                 | Roadside         | N            | N                             | 10 months                                 | N                                                      | Y                                                 | 19.4                                                      |
| PN3     | Dutchman's Court         | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 22.8                                                      |
| PN4     | Golden Court             | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 27.7                                                      |
| PN5     | Saltwater Way            | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 21.8                                                      |
| PN6     | Yarmouth Road            | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 18.2                                                      |
| PN7     | Mill Road                | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 18.7                                                      |
| PN8     | St Margaret's Churchyard | Urban Background | N            | N                             | 11 months                                 | N                                                      | N                                                 | 16.5                                                      |
| PN9     | Belvedere Road 1         | Roadside         | N            | N                             | 11 months                                 | N                                                      | N                                                 | 29.3                                                      |
| PN10    | Belvedere Road 2         | Roadside         | N            | N                             | 11 months                                 | N                                                      | N                                                 | 31.2                                                      |
| PN11    | Pier Terrace 1           | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 29.9                                                      |
| PN12    | Pier Terrace 2           | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 25.2                                                      |
| PN13    | Trinity Street           | Roadside         | N            | N                             | 10 months                                 | N                                                      | N                                                 | 29.5                                                      |
| PN14    | Ingate 1                 | Roadside         | N            | N                             | 11 months                                 | N                                                      | N                                                 | 31.6                                                      |
| PN15    | Ingate 2                 | Roadside         | N            | N                             | 11 months                                 | N                                                      | Y                                                 | 23.9                                                      |

Please note that the 2014 values highlighted in the results tables are those where an estimate has been made to assess relevant public exposure using the [“NO<sub>2</sub> fall-off with distance” calculator](#). The remaining results did not require a fall-off with distance calculation because of the diffusion tube locations.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014)

| Site ID | Site Type        | Within AQMA? | Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias <sup>a</sup> |                                      |                                      |                                      |                                      |
|---------|------------------|--------------|-----------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|         |                  |              | 2010 (Bias Adjustment Factor = 0.82)                                                    | 2011 (Bias Adjustment Factor = 0.84) | 2012 (Bias Adjustment Factor = 0.79) | 2013 (Bias Adjustment Factor = 0.81) | 2014 (Bias Adjustment Factor = 0.81) |
| PN1     | Roadside         | N            | 16.7                                                                                    | 16.7                                 | 15.7                                 | 16.2                                 | 15.2                                 |
| PN2     | Roadside         | N            | 20.8                                                                                    | 21.1                                 | 20.1                                 | 19.5                                 | 19.4                                 |
| PN3     | Roadside         | N            | 26.5                                                                                    | 23.5                                 | 21.7                                 | 21.7                                 | 22.8                                 |
| PN4     | Roadside         | N            | 33.6                                                                                    | 31.9                                 | 27.3                                 | 29.4                                 | 27.7                                 |
| PN5     | Roadside         | N            | 29.3                                                                                    | 26.3                                 | 24.2                                 | 25.6                                 | 21.8                                 |
| PN6     | Roadside         | N            | 18.2                                                                                    | 18.6                                 | 16.8                                 | 17.8                                 | 18.2                                 |
| PN7     | Roadside         | N            | 26.1                                                                                    | 22.8                                 | 20.9                                 | 19.6                                 | 18.7                                 |
| PN8     | Urban background | N            | n/a                                                                                     | 17.8                                 | 16.28                                | 16.5                                 | 16.5                                 |
| PN9     | Roadside         | N            | 34.0                                                                                    | 32.8                                 | 29.2                                 | 24                                   | 29.3                                 |
| PN10    | Roadside         | N            | 34.8                                                                                    | 32.8                                 | 30.0                                 | 25.7                                 | 31.2                                 |
| PN11    | Roadside         | N            | 37.1                                                                                    | 35.1                                 | 30.8                                 | 35.3                                 | 29.9                                 |
| PN12    | Roadside         | N            | n/a                                                                                     | n/a                                  | 25.8                                 | 26.0                                 | 25.2                                 |
| PN13    | Roadside         | N            | n/a                                                                                     | n/a                                  | n/a                                  | 31.4                                 | 29.5                                 |
| PN14    | Roadside         | N            | n/a                                                                                     | 35.4                                 | 31.2                                 | 32.3                                 | 31.6                                 |
| PN15    | Roadside         | N            | n/a                                                                                     | n/a                                  | 25.1                                 | 33.2                                 | 23.9                                 |

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



The trend at most locations in the 4 year period between 2010 and 2014 has been one of a reduction in nitrogen dioxide concentration at the sampling points. In 2013 there was a marked increase in the concentration measured at the Pier Terrace (PN12) and Golden Court (PN4) locations, but this has not continued into 2014, with a noticeable decrease at both sites, so the interruption to the trend of decreasing pollutant concentration appears temporary.

### 2.2.2 PM<sub>10</sub>

No monitoring of PM<sub>10</sub> has been undertaken by Waveney District Council in 2014, as the 2012 Updating and Screening Assessment concluded that it was not necessary. There are no newly identified sources in the Waveney District .and estimates of 2014 background levels provided by the Local Air Quality Management 2011 NO<sub>x</sub> NO<sub>2</sub> PM<sub>10</sub> CSV Format Background Maps ([laqm.defra.gov.uk/review](http://laqm.defra.gov.uk/review) and [assessment/tools/background-maps](http://laqm.defra.gov.uk/assessment/tools/background-maps)) indicate that concentration levels at every location in the area remain low.

**2.2.3 Sulphur Dioxide**

No monitoring of SO<sub>2</sub> has been undertaken by Waveney District Council in 2014, as the 2012 Updating and Screening Report concluded that none was necessary. There are no newly identified sources in the Waveney District, so that the situation is unchanged and monitoring is not required.

#### **2.2.4 Benzene**

No monitoring of C<sub>6</sub>H<sub>6</sub> has been undertaken by Waveney District Council in 2014, as the Updating and Screening Report of 2012 concluded it was not necessary. There are no newly identified sources in the Waveney District, so that the situation is unchanged and monitoring is not required.

#### **2.2.5 Other pollutants monitored**

No monitoring is carried out for other pollutants.

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

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

## **3 Road Traffic Sources**

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

#### **Trinity Street, Bungay – new one way system**

Trinity Street was considered and assessed in the 2014 Progress Report.

Waveney District Council received a request from Suffolk County Council to include this location as part of the Waveney District Council diffusion tube monitoring programme, following complaints from local residents concerned about air quality. Rather than delay the process it was considered appropriate to undertake a screening assessment straight away and not wait until the next Updating and Screening Report

A new one-way road scheme was introduced in the centre of Bungay, which had the result of re-routing traffic through Trinity Street.

The entrance to Trinity Street is very narrow and the width at the entrance: from building facade to facade is approximately 6 metres. The layout at the entrance comprises of a 1 metre footpath, a 3 metre wide single lane road and a 2 metre wide loading bay to the side of a large 3 storey department store. The building heights are in the region of 5 - 7 metres either side of the road. There appears to be two occupied relevant receptors opposite the store,, numbers 1 and 5 Trinity Street. Both residential properties have direct access onto the pavement via the front door.

The LAQM Screening and Updating Assessment (USA) was used to assess the area in terms of a potential area of poor air quality. The best description of Trinity Street, as a potential area of poor quality due to road traffic emissions of NOX, appears in



TG(09), on page 5 - 10, in Box 3, where there is the A 1 category which is used to describe ' Narrow congested streets with residential properties close to the kerb'.

TG(09) outlines A1 criteria:

If there is an approximated AADT traffic flow of around 5000 vehicles per day or more (this can be obtained from a single 5 minute count which indicates a traffic flow of 35 vehicles). A brief road traffic count was carried out (the Local Air Quality Management Guidance (LAQM) guidance. TG (09) recommends, a 5 minute count) and from a sample of four 5 minute counts a average mean of 41 vehicles was obtained. The maximum count gave a figure of 49 vehicles.

A narrow street is defined as one with residential properties within 2 metres of the kerb and buildings on both sides of the road (the buildings on the other side of the road can be further from the road than 2 metres and in this case it is about 2 metres).

A congested street will be one with slow moving traffic that is frequently stopping and starting due to pedestrian crossings , parked vehicles, throughout much of the day (not just during rush hours) The average speed is likely to be less than about 25kph (15mph). In the case of Trinity Street, the traffic is quite free flowing, but traffic entering the street is travelling at low speed and accelerating from the square and up a gradient, which means that NOX emissions will be enhanced for a short period until the speed limit is achieved. As vehicles start to climb a gradient, the power demanded from the vehicle engine will increase, although the speed of the vehicles may remain similar. As the power demand increases, the emissions will also increase.

TG(09) concludes that if the relevant criteria above are met then it will be necessary to proceed to a Detailed Assessment. A Detailed Assessment should initially comprise of diffusion tube monitoring at relevant locations.

The LAQM helpdesk at DEFRA confirmed that the area required a more detailed assessment and that a diffusion tube study would be appropriate.

2 triplicate sets of tubes were installed at the front facades of the relevant receptors at 1 and 5 Trinity Street. An additional single tube was installed away from the entrance at the point where Trinity Street opens out in the vicinity of a Churchyard.

Air quality sampling began in March 2013 and was concluded in March 2014. **The results confirmed that an exceedance of the National Air Quality Objectives was unlikely.**

Suffolk County Council have decided not to fund air quality sampling for a second year, so Waveney District Council will include this location in its sampling programme with a single tube located at the entrance of the Street, during 2014, where the NO<sub>2</sub> concentration has shown to be at its greatest. The results from the single diffusion tube survey in 2014 also suggested that an exceedance of the National Air Quality objectives was unlikely.

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

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

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

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

...

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

### **3.4 Junctions**

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

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

#### **The Northern Spine Road, Lowestoft – Planning Application Reference PL\0320\13**

The change in air quality at 36 receptor locations was considered.

Construction impacts including demolition, earthwork, construction and trackout activities were expected to have a negligible impact on local receptors.

The air quality assessment was sufficient for review and assessment purposes.

Properties adjacent to the proposed new route would experience an insignificant deterioration in air quality when compared to the existing situation, however, a net beneficial impact in air quality has been determined. Nowhere would the national

objective limit levels for either nitrogen dioxide or particulate matter be exceeded along the new route. Small benefits in air quality would occur for residents adjacent to Bentley Drive, where traffic flows are expected to reduce and also, to a lesser extent, along Yarmouth Road. Waveney District Council currently monitors air quality in this area.

The air quality assessment reports can be viewed in full on line at [WWW.suffolk.gov.uk/environment](http://WWW.suffolk.gov.uk/environment).

**The Brooke Peninsula development, Planning Application Reference DC/13/3482/OUT**

The air quality assessment for the proposed Brooke Peninsula development, Planning Application Reference DC/13/3482/OUT was submitted as part of an Environmental Impact Assessment.

The proposal is for a mixed development including infrastructure, such as a school and will include the construction of access roads linked to a roundabout in Victoria Road, Oulton Broad. The air quality assessment indicated that air quality impacts resulting from the proposed development are likely to be insignificant. The air quality assessment using ADMS was sufficient for the purposes of LAQM. The potential air quality impacts at the Bascule Bridge and Bridge Road, which are the main routes to the centre of town were specifically requested by the Air Quality Officer.

Waveney District Council confirms that there are no new/proposed roads where a detailed assessment is required

### **3.6 Roads with Significantly Changed Traffic Flows**

**Trinity Street, Bungay – new one way system**

Trinity Street was considered and assessed in the 2014 Progress Report and discussed previously in **section 3.1, Narrow Congested Streets with Residential Properties Close to the Kerb**

Waveney District Council has assessed new/newly identified roads with significantly changed traffic flows, and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **3.7**

#### **Bus and Coach Stations**

There are no relevant bus stations in Waveney that meet the criteria outlined in TG(09)

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

## **4 Other Transport Sources**

### **4.1 Airports**

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

### **4.2 Railways (Diesel and Steam Trains)**

#### **4.2.1 Stationary Trains**

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

#### **4.2.2 Moving Trains**

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

### **4.3 Ports (Shipping)**

The 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. Vessels with a gross tonnage of up to 500 tonnes visit the Port and these are the largest vessels that can be received. Vessel movements to service the offshore wind farms have increased, but the number of vessel movements is still below the threshold of 5000. 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.

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

## 5 Industrial Sources

### 5.1 Industrial Installations

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

##### **Proposed CHP installation at the Birds Eye Factory, Whapload Road, Lowestoft.- Planning Application Reference DC/13/0435/VOC**

The proposed development comprises of the installation of a 3.3MW CHP gas fired turbine.

An air quality screening assessment using ADMS, prepared by the Air Quality Consultants confirmed that the air quality objectives for NO<sub>2</sub> and particulate's would not be exceeded and that the air quality impacts would not be significant at the nearest relevant receptors.

Comments made in respect of the air quality impact and the air quality assessment can be viewed on the Waveney District Council planning portal, quoting the application reference.

The air quality assessment was sufficient for Review and Assessment purposes.

Waveney District Council have assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

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



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

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

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

## **5.2 Major Fuel (Petrol) Storage Depots**

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

### **5.3 Petrol Stations**

Waveney District Council confirms that there are no petrol stations meeting the specified criteria.

## 5.4 Poultry Farms

Seven poultry plants were considered and these are listed in the Appendix.

Waveney confirms that there are no poultry farms meeting the specified criteria.

## **6 Commercial and Domestic Sources**

### **6.1 Biomass Combustion – Individual Installations**

A number of individual commercial biomass installations have received planning permission since the last Updating and Screening Report and are considered in this report. All of the installations have been assessed using the methodology outlined in the technical guidance, Technical Guidance: 'Screening assessment for biomass boilers', and the Technical Guidance LAQM. TG(09).

#### **Ilketshall Hall, Ilketshall St Lawrence, Beccles – Planning Application Reference. DC/12/1453/FUL**

Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact can be viewed on the Waveney District Council planning portal, quoting the application reference.

#### **Oakland Farm, Flixton –Planning Application Reference DC/13/0350/FUL**

Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact can be viewed on the Waveney District Council planning portal, quoting the application reference.

#### **Carlton Hall, Carlton Colville – Planning Application Reference DC/13/2005/FUL**

Installation of a biomass boiler with a thermal capacity of 199kW

Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact can be viewed on the Waveney District Council planning portal, quoting the application reference.

#### **Redisham Hall -- Planning Application Reference DC/13/2234/FUL**

Installation of a biomass boiler with a thermal capacity of 195kW

Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact can be viewed on the Waveney District Council planning portal, quoting the application reference.

**Benjamin Britten High School, Blyford Road, Lowestoft – Planning Application Reference PL/0149/13.**

An air quality assessment was produced by Pick Everard for Coffey Technical services (Report reference 130614/R001/Issue2 dated 13 June 2013)

The ADMS screening confirmed that the air quality objectives for both NO<sub>2</sub> and particulates were unlikely to be exceeded and that there was considerable headroom when comparatively low background concentration levels are taken into account.

Comments made in respect of the air quality impact and the air quality assessment can be viewed on the Suffolk County Council planning portal, quoting the application reference.

**Bernard Matthews, Ellough Farm, Warrens Lane Ellough, Beccles – Planning Application Reference DC/13/2571/FUL**

The development comprises of six biomass plant room heating systems – each boiler has a maximum thermal capacity of 201kW.

The ADMS screening confirmed that the air quality objectives for NO<sub>2</sub> and particulates would not be exceeded and that there was considerable headroom when the comparatively low background concentration levels were taken into account.

Comments made in respect of the air quality impact and the air quality assessment can be viewed on the Waveney District County Council planning portal, quoting the application reference.

**Church Farm, London Road, Shadingfield – Planning Application Reference DC/13/0169/FUL**

A biomass boiler installation with a thermal capacity of 456kW

Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact can be viewed on the Waveney District Council planning portal, quoting the application reference.

**Jubilee Court, Lansbury Road, Halesworth, Planning Application Reference DC/14/2847/RGS**

The installation at a sheltered housing complex of a biomass boiler with a thermal capacity of 130kW.

Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact and the air quality assessment can be viewed on the Waveney District Council planning portal, quoting the application reference.

**St Johns Hall, Halesworth Road , Ilketshall St John, Bungay – DC/14/1080/FUL**

The installation of two biomass boilers with a combined thermal capacity of 198kW  
Screening indicated that the emissions from the boiler installation were likely to be well below the pollutant concentration level where a detailed assessment would be required. Comments made in respect of the air quality impact and the air quality assessment can be viewed on the Waveney District Council planning portal, quoting the application reference.

Waveney District Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **6.2 Biomass Combustion – Combined Impacts**

Waveney District Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

## **6.3 Domestic Solid-Fuel Burning**

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

## 7 Fugitive or Uncontrolled Sources

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

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

There were no exceedences of the National Air Quality Objectives in 2014 at any location where air quality sampling takes place in the Waveney District and none are expected in 2015.

Diffusion tube 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 2015. Monitoring should continue at these locations, so that new trends in the local air quality can be identified and confirmed. It is also proposed that the air quality monitoring should be extended at the Bascule Bridge by deploying additional tubes to investigate the impact of increasing traffic congestion at the Bridge and in Station Square.

The results of the diffusion tube study in Ingate, Beccles, indicate that the annual mean Nitrogen Dioxide concentration is in the region of the low 30's ( $\mu\text{g}/\text{m}^3$ ), and this suggests that monitoring of the air quality in the town centre should continue in 2014.

Monitoring results in Trinity Street Bungay do not give rise to concern because the concentration of  $\text{NO}_2$  at the most exposed receptor was again well below the national air quality objectives

### **8.2 Conclusions from Assessment of Sources**

All new local developments have been considered and there are no new sources in the 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.



### 8.3 Proposed Actions

Monitoring should continue at the present locations and this should include a continuation of the diffusion tube air quality survey at Trinity Street in Bungay, albeit with a single tube. Monitoring should continue close to the location of the former co-location study and air quality monitor in Belvedere Road, using two tubes, which will enable new trends to be identified as the quayside is redeveloped. Belvedere Road is likely to be one of the main road routes into the town centre for most of the quayside developments and is the main road link to the Bascule Bridge. The diffusion tube sampling programme will be extended in 2015 by an additional 12 diffusion tubes, deployed as 4 triplicate sets at locations close to the Bascule Bridge in the Pier Terrace and Station Square area.

The next course of action is to submit the 2016 Air Quality Progress Report.

## 9 References

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

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

Air Quality Updating and Screening Assessment Report on Air Quality in Waveney I (2009), AEA Technology plc, Report AEAT/ENV/R/2805.

Air Quality Review and Assessment Progress Report on Air Quality in Waveney District (2010)

Air Quality Review and Assessment Progress Report on Air Quality in Waveney District (2011)

Air Quality Updating and Screening Assessment on Air Quality in Waveney District (2012)

Air Quality Review and Assessment Progress Report on Air Quality in Waveney District (2013)

Air Quality Review and Assessment Progress Report on Air Quality in Waveney District (2014)

Department for Environment, Food and Rural Affairs (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

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

The Stationary Office (1995) The Environment Act1995, Part IV

UK National Air Quality Information , accessed at <http://www.airqualityengland.co.uk/laqm>

Local Air Quality Management: Note on Predicting NO<sub>2</sub> Concentrations, April 2012, prepared for DEFRA by Bureau Veritas ([laqm.defra.gov.uk/review](http://laqm.defra.gov.uk/review) and [assessment/tools/background-maps](http://laqm.defra.gov.uk/assessment/tools/background-maps))

Local Air Quality Management 2014 NO<sub>x</sub> NO<sub>2</sub> PM<sub>10</sub> CSV Format Background Maps at <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>.

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, accessed on the Local Air Quality Management Support Website at <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Air Quality Consultants Ltd, Nitrogen Dioxide fall off with Distance Calculator accessed on the Local Air Quality Management Support Website at <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Air Quality Consultants Ltd Spreadsheet of Bias Adjustment Factors (09/15) accessed on the Local Air Quality Management Support Website at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

# Appendices

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

Appendix 2 Raw Diffusion tube results

Appendix 3 Poultry plants in Waveney with Environmental Permits from the Environment Agency

Appendix 4 Environmental Permitting Regulations, Public Register of "Permitted Processes"

Appendix 5: Method used to Predict NO<sub>2</sub> Concentrations at Different Distances from Road

## Appendix 1: QA/QC Data

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

Waveney District Council did not undertake a local co-location study.

### Diffusion Tube Bias Adjustment Factors

Waveney District Council has used the national bias adjustment factor of 0.81, spreadsheet version 09/15, available on the LAQM website. The factor of 0.81 was obtained from a sample of 34 separate studies of ESG Scientifics.

### QA/QC of Automatic Monitoring

No longer applicable.

### QA/QC of Diffusion Tube Monitoring

The diffusion tubes used in Waveney District Council are supplied and analysed by ESG Scientifics at Didcot. 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 are not bias adjusted by ESG Scientifics.

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

### Summary of Laboratory Performance in AIR/WASP NO<sub>2</sub> Proficiency Testing Scheme (April 2013 – February 2015).

Reports are prepared by HSL for BV/NPL on behalf of Defra and the Devolved Administrations.

## **Background**

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and the HSL WASP PT scheme.

AIR offers a number of test samples designed to test the proficiency of laboratories, undertaking analysis of chemical pollutants in ambient indoor, stack and workplace air. One such sample is the AIR NO<sub>2</sub> test sample type, which is distributed to participants on a quarterly basis.

AIR NO<sub>2</sub> PT forms an integral part of the UK NO<sub>2</sub> Network's QA/QC, and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM).

With consent from the participating laboratories, LGC Standards provides summary proficiency testing data to the LAQM Helpdesk for hosting on the webpages, at <http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>.

This information is updated on a quarterly basis following completion of each AIR PT round.

ESG Scientifics, at Didcot achieved a satisfactory score of 100% during 2014.

## Appendix 2: Raw Diffusion tube results

| Diffusion tube results 2014 |          |          |          |          |          |          |          |          |          |           |           |           |            |                |       |
|-----------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|------------|----------------|-------|
| 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 | Mean       | bias ad factor | 0.81* |
| 1 Castleton Avenue          | 23.5     | 21.4     | 28.6     | 24.7     | 16.7     | 17.5     | 15       | 22       | 25.5     |           | 32.3      | 28.5      | 23.2454545 | 18.82882       |       |
| 2 Ingate                    | 44.2     | 41.9     | 54.2     | 32.9     | 38.9     | 32.3     | 32.2     | 33.7     | 39.2     |           | 46.2      | 33        | 38.9727273 | 31.56791       |       |
| 3 Saltwater Way             | 31.5     | 36.3     | 29.9     | 31.7     | 23.4     | 22.3     | 19.2     | 26       | 31.9     |           | 39.1      | 27.4      | 28.9727273 | 23.46791       |       |
| 4 Fir Lane                  | 46.1     | 28.6     | 34.8     | 26.9     |          | 19.4     | 21.7     | 23.9     | 31       |           | 30.1      | 33.2      | 29.57      | 23.9517        |       |
| 5 Mill Road                 | 29.4     | 26.3     | 39.1     | 36.7     | 19.8     | 18.4     | 13.3     | 23       | 26.3     |           | 30.2      | 23.2      | 25.9727273 | 21.03791       |       |
| 6 Golden Court              | 34.8     | 33.4     | 45.9     | 80.2     | 28.8     | 24.1     | 29.7     | 32.4     | 40.3     |           | 36.4      | 26.7      | 37.5181818 | 30.38973       |       |
| 7 Yarmouth Road             | 30.4     | 27.7     | 31.3     | 26.2     | 23.6     | 16.1     | 18.7     | 22.2     | 26.9     |           | 38.1      | 21.2      | 25.6727273 | 20.79491       |       |
| 8 Pier Terrace 1            | 33.8     | 39.9     | 48.1     | 43.4     | 35.4     | 32       | 40.3     | 45.4     | 52.4     |           | 49.9      | 43.6      | 42.2       | 34.182         |       |
| 9 St Margarets              | 31.4     | 23.2     | 29.1     | 17.5     | 13.9     | 9.4      | 10.8     | 10.1     | 17.5     |           | 39.2      | 22.5      | 20.4181818 | 16.53873       |       |
| 10 Belvedere Road           | 42.1     | 43.4     | 50.4     | 33       | 29.9     | 25.8     | 28.9     | 32.5     | 33.3     |           | 38.5      | 39.8      | 36.1454545 | 29.27782       |       |
| 11 Belvedere Road           | 51.4     | 44       | 54.2     | 36.6     | 36.8     | 29.6     | 30.4     | 33.1     |          |           | 37.1      | 31.4      | 38.46      | 31.1526        |       |
| 12 PierTerrace 2            | 39       | 33.5     | 35.9     | 28.5     | 21.6     | 21.7     | 24       | 30.2     | 32.2     |           | 38.9      | 37.4      | 31.1727273 | 25.24991       |       |
| 13 Dutchmans Court          | 35.9     | 33.1     | 39.4     | 31.4     | 28.2     | 23.4     | 18.6     | 23.2     | 29.4     |           | 43.6      | 33        | 30.8363636 | 24.97745       |       |
| 14 Ingate 2                 | 29.8     | 27.8     | 40.2     | 31.8     |          | 25.4     | 27.8     | 37.9     | 37.7     |           | 33        | 30.2      | 32.16      | 26.0496        |       |
| 15 Trinity Street           | 37.7     | 34.6     | 44.1     | 38       | 37.4     |          | 33       | 34.2     | 41.4     |           | 35        | 29        | 36.44      | 29.5164        |       |
| 16 blank                    | 0.05     | 0.05     | 0.07     | 0.02     | 0.06     | 0.07     |          | <0.03    | 0.08     |           | 0.03      | 0.08      | 0.05666667 | 0.0459         |       |

## Appendix 3: Poultry plants in Waveney with Environmental Permits from the Environment Agency

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



**Appendix 4: Environmental Permitting Regulations, Public Register  
of "Permitted Processes"  
(as at: 02/04/2013)**

| Reference  | Trading name/Address                                                                                              | Processes                                               | Granted Date    | Map Reference    |
|------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------|------------------|
| 07/00011/B | P W Waters Ltd<br>Unit 6 P Waters Ltd<br>Harbour Road<br>Lowestoft<br>Suffolk<br>NR32 3LX                         | PG3_1: Cement<br>and lime<br>Processes                  | 06-Sep-<br>2007 | 652538<br>292967 |
| 07/00007/B | The Concrete Company Ltd.<br>Street Record<br>Sandpit Lane<br>Worlingham<br>Suffolk                               | PG3_1: Cement<br>and lime<br>Processes                  | 06-Sep-<br>2007 | 644785<br>288756 |
| 07/00005/B | Cemex<br>Eastern<br>Flixton Gravel Pit<br>Homersfield Road<br>Flixton<br>Bungay<br>Suffolk<br>NR35 1NN            | PG3_1: Cement<br>and lime<br>Processes                  | 06-Sep-<br>2007 | 629961<br>286662 |
| 07/00010/B | Dudman (Lowestoft) Ltd<br>The Dudman Group Of<br>Companies<br>Commercial Road<br>Lowestoft<br>Suffolk<br>NR32 2TE | PG3_1: Cement<br>and lime<br>Processes                  | 30-Nov-<br>2005 | 654178<br>292777 |
| 07/00009/B | C&H Quickmix Ltd<br>Quickmix<br>Sandpit Lane<br>Worlingham<br>Beccles<br>Suffolk<br>NR34 7TH                      | PG3_1: Cement<br>and lime<br>Processes                  | 06-Sep-<br>2007 | 644860<br>288471 |
| 07/00014/B | William Clowes Ltd<br>William Clowes Ltd<br>Copland Way<br>Worlingham<br>Beccles<br>Suffolk<br>NR34 7TL           | PG6_16: Coating<br>activities, printing<br>&<br>textile | 27-May-<br>2003 | 645234<br>288540 |
| 07/00016/B | Clays Ltd                                                                                                         | PG6_16: Coating                                         | 02-Nov-         | 633377           |

Waveney District Council

|            |                                                                                                                 |                                                             |                 |                  |
|------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------|------------------|
|            | Clays Ltd<br>Popson Street<br>Bungay<br>Suffolk<br>NR35 1EB                                                     | activities, printing<br>&<br>textile                        | 2007            | 289987           |
| 07/00017/B | Supersine Duramark Ltd<br>Supersine Duramark Ltd<br>Freemantle Road<br>Lowestoft<br>Suffolk<br>NR33 0EA         | PG6_23: Coating<br>activities, printing<br>&<br>textile     | 02-Nov-<br>2007 | 654392<br>292192 |
| 08/00018/B | Automotive Cleaning Chemicals<br>Ltd.<br>4 Hadenham Road<br>Gisleham<br>Lowestoft<br>Suffolk<br>NR33 7NF        | PG6_44: Coating<br>manufacture                              | 08-Feb-<br>2008 | 652968<br>289524 |
| 08/00019/B | Gardwell Coatings Ltd<br>Unit 4c6 Site 3<br>Ellough Industrial Estate<br>Ellough Airfield<br>Ellough<br>Suffolk | PG6_23: Coating,<br>SED Activities<br>(not<br>dry clean)    | 08-Feb-<br>2008 | 644566<br>288397 |
| 11/00005/B | Gardwell Coatings Limited<br>Germans Yard<br>Hamilton Road<br>Lowestoft<br>Suffolk<br>NR32 1XF                  | PG6_23: Coating,<br>SED Activities<br>(not<br>dry clean)    | 16-May-<br>2011 | 655361<br>293190 |
| 08/00019/B | Gardwell Coatings Ltd<br>Unit 4c6 Site 3<br>Ellough Industrial Estate<br>Ellough Airfield<br>Ellough<br>Suffolk | PG6_31: Coating<br>-<br>Polymer, IsoCyan<br>&<br>Dry Powder | 08-Feb-<br>2008 | 644566<br>288397 |
| 06/00003/B | Wm Morrison Supermarkets Ltd<br>18 Tower Road<br>Gisleham<br>Lowestoft<br>Suffolk<br>NR33 7NG                   | PG6_46: Dry<br>cleaners                                     | 28-Oct-<br>2006 | 652979<br>289260 |
| 08/00008/B | Fashion Clean<br>140 London Road South<br>Lowestoft<br>Suffolk<br>NR33 0AZ                                      | PG6_46: Dry<br>cleaners                                     | 06-Jun-<br>2008 | 654519<br>292238 |
| 11/00002/B | Linen Press<br>21B New Market<br>Beccles<br>Suffolk<br>NR34 9HA                                                 | PG6_46: Dry<br>cleaners                                     | 21-Apr-<br>2011 | 642123<br>290356 |

**Waveney District Council**

|            |                                                                                                                                   |                                                      |                 |                  |
|------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------|------------------|
| 03/00022/B | Lafarge Aggregates Ltd<br>Flixton Gravel Pit<br>Homersfield Road<br>Flixton<br>Bungay<br>Suffolk<br>NR35 1NN                      | PG315A:<br>Roadstone<br>coating<br>burning waste oil | 06-Sep-<br>2007 | 629961<br>286662 |
| 10/00001/B | Asda<br>Asda Stores Limited<br>Belvedere Road<br>Lowestoft<br>Suffolk<br>NR33 0PX                                                 | PG1_14: Service<br>Stations                          | 29-Sep-<br>2010 | 654189<br>292547 |
| 03/00020/B | R Charlsh Ltd<br>St Johns Garage<br>Bardolph Road<br>Bungay<br>Suffolk<br>NR35 1BN                                                | PG1_14: Service<br>Stations                          | 01-Apr-<br>2003 | 633922<br>289286 |
| 03/00018/B | Carlton Colville Service Station<br>Carlton Colville Service<br>Station<br>The Street<br>Carlton Colville<br>Lowestoft<br>Suffolk | PG1_14: Service<br>Stations                          | 01-Apr-<br>2003 | 651196<br>289812 |
| 03/00016/B | Oulton Broad Express<br>Broadlands Filling Station<br>122 Beccles Road<br>Lowestoft<br>Suffolk<br>NR33 8QY                        | PG1_14: Service<br>Stations                          | 01-Apr-<br>2003 | 651406<br>291804 |
| 03/00007/B | Anglia Regional Co-operative<br>Society<br>Rainbow Filling Station<br>Saxons Way<br>Halesworth<br>Suffolk<br>IP19 8LU             | PG1_14: Service<br>Stations                          | 01-Apr-<br>2003 | 638636<br>277147 |
| 03/00005/B | AW&D Hammond<br>A W And D Hammond Ltd<br>Norwich Road<br>Halesworth<br>Suffolk<br>IP19 8BU                                        | PG1_14: Service<br>Stations                          | 01-Apr-<br>2003 | 638767<br>277886 |
| 08/00007/B | Morrisons<br>18 Tower Road<br>Gisleham<br>Lowestoft<br>Suffolk<br>NR33 7NG                                                        | PG1_14: Service<br>Stations                          | 18-Jan-<br>2008 | 652979<br>289260 |
| 03/00014/B | Shell Oulton Broad (262)<br>Travellers Check Garage                                                                               | PG1_14: Service<br>Stations                          | 01-Apr-<br>2003 | 652453<br>293178 |

Waveney District Council

|            |                                                                                                       |                             |                 |                  |
|------------|-------------------------------------------------------------------------------------------------------|-----------------------------|-----------------|------------------|
|            | Normanston Drive<br>Lowestoft<br>Suffolk<br>NR32 2PY                                                  |                             |                 |                  |
| 03/00012/B | Malthurst Ltd<br>Mill Road Service Station<br>Mill Road<br>Lowestoft<br>Suffolk<br>NR33 0PP           | PG1_14: Service<br>Stations | 01-Apr-<br>2003 | 654361<br>292419 |
| 07/00008/B | Jubilee Filling Station<br>Jubilee Filling Station<br>High Street<br>Lowestoft<br>Suffolk<br>NR32 1HU | PG1_14: Service<br>Stations | 14-Dec-<br>2007 | 655111<br>294050 |
| 05/00001/B | Anglia Regional Co-op<br>Rainbow Foodstore<br>Hillside Road East<br>Bungay<br>Suffolk<br>NR35 1RX     | PG1_14: Service<br>Stations | 10-Nov-<br>2005 | 634512<br>289226 |
| 07/00018/B | Morrisons<br>Morrisons<br>George Westwood Way<br>Beccles<br>Suffolk<br>NR34 9EJ                       | PG1_14: Service<br>Stations | 14-Dec-<br>2007 | 642725<br>291090 |
| 02/00001/B | Tesco Stores Ltd<br>Tesco Superstore<br>Leisure Way<br>Lowestoft<br>Suffolk<br>NR32 4TZ               | PG1_14: Service<br>Stations | 01-Apr-<br>2003 | 653597<br>296081 |
| 06/00005/B | Tesco Stores Ltd<br>Tesco<br>Gresham Road<br>Beccles<br>Suffolk<br>NR34 9QH                           | PG1_14: Service<br>Stations | 16-Jan-<br>2006 | 642340<br>290556 |
| 03/00009/B | Pageant Garage<br>Pageant Garage<br>Gosford Road<br>Beccles<br>Suffolk<br>NR34 9QP                    | PG1_14: Service<br>Stations | 01-Apr-<br>2003 | 642660<br>290216 |
| 03/00003/B | Kirkley Run Service Station<br>99 Kirkley Run<br>Lowestoft<br>Suffolk<br>NR33 0NH                     | PG1_14: Service<br>Stations | 27-May-<br>2003 | 653240<br>291975 |
| 03/00001/B | Gunton Garage<br>Gunton Garage                                                                        | PG1_14: Service<br>Stations | 29-Jun-<br>2009 | 653448<br>295716 |

Waveney District Council

|            |                                                                                                                           |                                              |                 |                  |
|------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------|------------------|
|            | 265-271 Yarmouth Road<br>Lowestoft<br>Suffolk<br>NR32 4AA                                                                 |                                              |                 |                  |
| 07/00002/B | Hammonds Accident Repair<br>Unit 6<br>Blyth Road Industrial Estate<br>Blyth Road<br>Halesworth<br>Suffolk<br>IP19 8EN     | PG6_34: Vehicle<br>re-finishing              | 06-Sep-<br>2007 | 639021<br>276820 |
| 07/00003/B | Belle Coach Works Ltd<br>28 Pinbush Road<br>Gisleham<br>Lowestoft<br>Suffolk<br>NR33 7NL                                  | PG6_34: Vehicle<br>re-finishing              | 06-Sep-<br>2007 | 652666<br>289953 |
| 07/00004/B | John Grose Group Ltd<br>2 Barley Way<br>Gisleham<br>Lowestoft<br>Suffolk<br>NR33 7NH                                      | PG6_34: Vehicle<br>re-finishing              | 06-Sep-<br>2007 | 652982<br>289786 |
| 07/00001/B | Robinsons Accident Repair<br>Centre<br>2 Cooke Road<br>Gisleham<br>Lowestoft<br>Suffolk<br>NR33 7NA                       | PG6_34: Vehicle<br>re-finishing              | 06-Sep-<br>2007 | 653067<br>289754 |
| 11/00007/B | Wrights<br>Street Record<br>Common Lane North<br>Beccles<br>Suffolk                                                       | PG1_1: Waste oil<br>burners (under<br>0.4MW) | 05-Dec-<br>2011 | 642398<br>290913 |
| 10/00003/B | Emerald Auto Services Ltd.<br>Unit 2<br>Ellough Industrial Estate<br>Ellough Airfield<br>Worlingham<br>Beccles<br>Suffolk | PG1_1: Waste oil<br>burners (under<br>0.4MW) | 18-Nov-<br>2010 | 644637<br>288414 |

## **Appendix 5**

### **Method used to predict NO<sub>2</sub> Concentrations at Different Distances from the 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 <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

The local background concentration in  $\mu\text{g}/\text{m}^3$  of the appropriate year (2014) has been obtained from the national maps published at <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>