

# Air Quality Addendum II
# Whaley Road, Barnsley

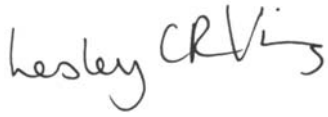
Prepared for:

**Hargreaves Services Plc**
**And Rocpower Ltd**

Prepared by:
**ENVIRON**
**Exeter, UK**

Date:
**May 2010**

Project or Issue Number:
**UK16-15064**

| | |
|---|---|
| Contract/Proposal No: | UK16-15064 Addendum II |
| Issue: | 3 |
| Author (signature): | Lesley Vining |
| |  |
| Project Manager/Director (signature): | Jeremy Cork |
| |  |
| Date: | May 2010 |

*This report has been prepared by ENVIRON with all reasonable skill, care and diligence, and taking account of the Services and the Terms agreed between ENVIRON and the Client. This report is confidential to the client, and ENVIRON accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by ENVIRON beforehand. Any such party relies upon the report at their own risk.*

*ENVIRON disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the Services.*

**Version Control Record**

| Issue | Description of Status | Date | Reviewer Initials | Authors Initials |
|---|---|---|---|---|
| 1 | First Draft | 22.04.10 | JC | LV |
| 2 | Updated Draft | 04.05.10 | JC | LV |
| 3 | Final | 06.05.10 | JC | LV |

# Table of Contents

**1 Introduction 1**

1.1 Introduction 1
1.2 Scope and Methodology 1

**2 Comments Raised by BMBC 2**

2.1 Comments Raised by Biofuelwatch 2
2.2 Additional Information Requested by BMBC 3

**3 Methodology 4**

3.1 Input Parameters 4
3.2 Receptors 4

**4 Air Dispersion Modelling Results 5**

4.1 Predicted Concentrations 5
4.2 Comparison of Process Contributions with Air Quality Objectives 6
4.3 Predicted Environmental Concentrations 7
4.4 Assessment of Predicted Concentrations 10

**5 Conclusions 12**

**Annex A: Predicted Concentrations for all years**

**Annex B: Contour Plots**

# 1 Introduction

## 1.1 Introduction

ENVIRON UK Ltd was commissioned by Hargreaves Services Plc and Rocpower Ltd to carry out an air quality assessment of a proposed biofuel power generation plant to be located at a former sub station on Whaley Road, Barnsley. The site is located within the Metropolitan Borough of Barnsley.

This addendum provides an assessment of the air quality impacts arising from the site utilising monitored emissions data from the similar Rocpower site at Featherstone. Impacts have been predicted from both a 15 m and a 20m stack. The report uses the same methodology as the previous assessment and should be read in conjunction with that document which considered the impacts arising as a result of estimated emissions data.

In addition, the report provides some additional information requested by Barnsley Metropolitan Borough Council (BMDC) and addresses concerns raised by Biofuelwatch in an e-mail sent to the planning officer at BMDC.

## 1.2 Scope and Methodology

The aim of the assessment is to determine the impact of pollutant emissions arising from the proposed site on ambient nitrogen dioxide concentrations with regard to human health and to provide additional information/assurance to BMBC regarding the emissions data used in the original assessment.

The scope and methodology of the assessment follows that used in the original report which was discussed and agreed with BMDC.

All information and data sources remain the same as used in the previous assessment unless detailed below.

# 2 Comments Raised by BMBC

A number of comments were raised regarding the air quality aspects of the proposed facility at a meeting with the BMBC planning officer Matthew Woodward on 26th April 2010 which have been addressed below.

## 2.1 Comments Raised by Biofuelwatch

Biofuelwatch raised a number of concerns regarding the emissions data used in the original air quality assessment.

$PM_{10}$ emission data was taken from a report issued by the Michigan Department of Environmental Quality relating to a General Permit for Diesel Fuel-Fired Engine Generators with a Maximum Nameplate Capacity of 5 Megawatts. This provided an initial emission rate for each of the engines. This emission rate was then reduced on the basis of the information provided by a study that looked at emissions from biodiesel in comparison to mineral diesel engines. This study reported that the biodiesel engines emitted approximately 50% less $PM_{10}$ than those run on mineral diesel. However, to ensure a conservative approach the ENVIRON report only assumed a reduction of 25% not the 75% assumed by Biofuelwatch.

It is accepted that this later report is in respect of biodiesel and not biofuels. However, the $PM_{10}$ data from the Michigan report is for a 1.8 MW engine, and the site at Barnsley will consist of 1.4 MW engines. This difference in size has not been taken into account in the emissions data, however $PM_{10}$ concentrations would be expected to be reduced in broadly the same ratio as the engine size and therefore the overall emissions would be reduced by 23 % similar to the emissions estimate used in the original report.

ENVIRON had proposed to obtain actual monitored $PM_{10}$ emissions data from the Hargreaves, Featherstone facility based in Wakefield. However, due to current operating difficulties it has not been possible to collect this data within the timeframe for this planning proposal.

The issues relating to the oxides of nitrogen emissions data raised by Biofuelwatch have been addressed by providing this addendum report which has updated the stack modelling using emissions data which was collected at the Featherstone site. This is considered to be the most appropriate form of emissions data and negates the need to address the outstanding comments relating to the previous emissions data.

Concern was raised regarding the validity of using Featherstone data as this plant may be utilising a different fuel mix. Hargreaves can confirm that it will use the same fuels at both the Featherstone and Barnsley sites and therefore this is considered to be the most reliable source of emissions data.

As there will be a range of fuels used at the Barnsley site, it would not be practical to measure the emissions arising from every type and blend of fuel. The fuel used during the emissions test at Featherstone is considered to be typical of that which will be used at Barnsley and therefore the most appropriate source of emissions data.

## 2.2 Additional Information Requested by BMBC

Hargreaves can confirm that all the fuels/blends of fuels that will be used on the site will be OFGEM approved and comply with the requirements of the Renewables Obligations Certificates. Palm oil will not be used.

During the start-up of the generators it is proposed to use a blended fuel to reduce its viscosity in order to run the generators until they reach a temperature of 60 ºC. Hargreaves is currently pursuing a number of options with regard to the lighter faction oil required for this; possibilities include used cooking oil or biodiesel. Once the generators have reached the required temperature it will be possible to switch to the more viscous tall oil or similar fuel. It is estimated that it will take approximately 20 minutes for the generators to reach 60 ºC from a cold start.

The impact of the start-up emissions has not been considered within the air quality assessment as they will only arise for short periods. It is anticipated that the generators will run continuously except for routine maintenance checks which will occur each month. Averaged over all five generators this equates to approximately one start-up period per week.

The modelling assumes continuous operation of all 5 generators for 24 hours a day 365 days per year. This will be an overestimate, as each generator will need to cool down for several hours before maintenance activities can take place and there may be other longer periods when the generators are inactive. Thus it is considered that even in the event that slightly higher emissions arise during the start-up period when the engines are cold, they will be more than compensated for during the periods of inactivity.

The requirement not to consider emissions during start-up within the assessment was agreed with BMBC.

Hargreaves is also considering the possibility of using a small amount of lighter fraction oil within the fuel mix on a continuous basis to improve the performance of the plant. It is considered that this will not have a significant impact on overall emissions.

As stated above, all fuels and blends of fuels used on a long term basis i.e. not just for start-up, will be OFGEM approved.

# 3 Methodology

## 3.1 Input Parameters

The data used in the modelling is provided below in Tables 3.1 to 3.2 and is the same as that used in the previous assessment with the exception of the emission rate of oxides of nitrogen which has been taken from a monitoring exercise carried out at the Rocpower site at Featherstone. Monitored data has not been obtained for $PM_{10}$ emissions and therefore the modelling of $PM_{10}$ has not been repeated.

| Table 3.1: Stack Data | |
|---|---|
| **Parameter** | **Data used** |
| **Stack Location** | Proposed Engine Building |
| **Stack Height (m)** | 15 or 20 |
| **Stack Diameter (m)** | 1.01 |
| **Volume Flowrate ($m^3s^{-1}$)** | 44.8 |
| **Efflux Velocity ($ms^{-1}$)** | 56.3 |
| **Stack Temperature (°C)** | 440 |

| Table 3.2: Emissions Data | |
|---|---|
| **Parameter** | **Data Used in Modelling** |
| **Surface Roughness (m)** | 0.5 |
| **Fuel** | Biofuel |
| **Measurement units** | $gs^{-1}$ |
| **Oxides of Nitrogen** | 19.65 |

## 3.2 Receptors

As in the previous assessment the model has been run to predict ground level concentrations both over a receptor grid and at a number of identified receptor locations.

# 4 Air Dispersion Modelling Results

## 4.1 Predicted Concentrations

The results of the assessment for each receptor point are provided below in Tables 4.1 and 4.2. The data provided is the maximum concentration from the 5 meteorological years assessed. The data for each meteorological year is provided in Annex A.

Contour plots depicting the process contribution to ground level concentrations of nitrogen dioxide for the worst meteorological year are provided in Annex B. It has been found that the meteorological conditions during 2008 resulted in the highest concentrations of oxides of nitrogen.

**Table 4.1: Predicted nitrogen dioxide concentrations (µgm$^{-3}$) 20m Stack**

| | Annual | | 99.8% 1-hour | |
|---|---|---|---|---|
| | Value | % AQO | Value | % AQO |
| **Point of Maximum concentration** | 16.07 | 40.2 | 92.64 | 46.3 |
| **Receptors** | | | | |
| 2 Dovebush Way | 1.57 | 3.9 | 31.53 | 15.8 |
| 1 Dovebush Way | 1.69 | 4.2 | 32.49 | 16.2 |
| 24 Deane Hall Fold | 1.86 | 4.7 | 35.42 | 17.7 |
| 104 Deane Hall Road | 2.12 | 5.3 | 29.96 | 15.0 |
| Public Track A | 8.03 | 20.1 | 52.02 | 26.0 |
| Public Track B | 4.66 | 11.6 | 77.78 | 38.9 |
| Public Track C | 11.66 | 29.2 | 76.39 | 38.2 |
| 2 Medway Close | 1.39 | 3.5 | 31.14 | 15.6 |
| Snow Hall Farm | 3.07 | 7.7 | 18.35 | 9.2 |
| Gawber BG Site | 0.96 | 2.4 | 12.03 | 6.0 |
| **Objective below which concentrations can be considered insignificant** | 40 | 1 | 200 | 10 |

AQO – Air Quality Objective

| Table 4.2: Predicted nitrogen dioxide concentrations (μgm$^{-3}$) 15m Stack | | | | |
|---|---|---|---|---|
| | Annual | | 99.8% 1-hour | |
| | Value | % AQO | Value | % AQO |
| **Point of Maximum concentration** | 29.92 | 74.8 | 187.75 | 93.9 |
| **Receptors** | | | | |
| 2 Dovebush Way | 1.90 | 4.8 | 36.70 | 18.4 |
| 1 Dovebush Way | 2.06 | 5.1 | 37.72 | 18.9 |
| 24 Dearne Hall Fold | 2.27 | 5.7 | 42.47 | 21.2 |
| 104 Dearne Hall Road | 2.55 | 6.4 | 34.75 | 17.4 |
| Public Track A | 28.25 | 70.6 | 123.97 | 62.0 |
| Public Track B | 13.58 | 34.0 | 163.76 | 81.9 |
| Public Track C | 25.77 | 64.4 | 131.24 | 65.6 |
| 2 Medway Close | 1.71 | 4.3 | 36.76 | 18.4 |
| Snow Hall Farm | 3.37 | 8.4 | 19.68 | 9.8 |
| Gawber BG Site | 1.02 | 2.6 | 12.88 | 6.4 |
| **Objective below which concentrations can be considered insignificant** | 40 | 1 | 200 | 10 |
| AQO – Air Quality Objective | | | | |

## 4.2 Comparison of Process Contributions with Air Quality Objectives

The predicted concentrations at both the point of maximum concentration and at each of the receptor locations have been compared with the relevant air quality objectives.

To determine the significance of the releases, the results have been assessed using the criteria given in H1. Releases can be considered to be insignificant if:-

- Process Contribution long term <= 1 % of the long term environmental benchmark; and
- Process Contribution short term <= 10 % of the short term environmental benchmark.

The predicted annual mean nitrogen dioxide concentrations emitted by the proposed electricity generation plant are greater than 1% of the annual mean objective at all the selected receptor locations for both the 20 m and 15 m stack. The short-term concentrations are over 10% of the short term objective at all locations with the exception of the Gawber background monitoring site and Snow Hall Farm. Emissions of nitrogen dioxide can not, therefore, be considered as insignificant.

## 4.3 Predicted Environmental Concentrations

Where the process concentrations cannot be considered to be insignificant, the next stage of assessment is to consider the process contribution together with the existing background concentration, to calculate the Predicted Environmental Concentration (PEC) to determine the overall impact on air quality. Through discussions with BMBC it has been agreed that this stage of the assessment would be carried out for all predicted results, regardless of whether they could be deemed as insignificant at stage 1 (detailed in section 3.2).

This is relatively straight forward with regard to annual impacts as the background concentration and process contribution can be easily combined. For short-term emissions the H1 guidance recommends that the PEC is calculated by adding the short-term PC to twice the long-term ambient background concentrations.

Background nitrogen dioxide concentrations have been taken from the Barnsley Gawber background continuous monitoring site. Concentrations recorded during 2004, where found to be the highest during the previous five years, therefore data for this year has been used as a worst case.

Calculation of the PEC for nitrogen dioxide at each of the receptor locations and the point of maximum concentration and comparison with the relevant environmental benchmarks is provided in Tables 4.4, and 4.5 for a 20 m stack and 4.6 and 4.7 for a 15 m stack.

**Table 4.4: Calculation of the PEC for Annual Mean Nitrogen Dioxide 20 m Stack**

| | AQO $\mu gm^{-3}$ | PC $\mu gm^{-3}$ | Background $\mu gm^{-3}$ | PEC $\mu gm^{-3}$ | % EAL/AQO |
|---|---|---|---|---|---|
| **Point of Maximum concentration** | 40 | 16.1 | 21.6[1] | 37.7 | 94.3 |
| | | | | | |
| 2 Dovebush Way | 40 | 1.6 | 21.6[1] | 23.2 | 57.9 |
| 1 Dovebush Way | | 1.7 | | 23.3 | 58.2 |
| 24 Dearne Hall Fold | | 1.9 | | 23.5 | 58.7 |
| 104 Dearne Hall Road | | 2.1 | | 23.7 | 59.3 |
| Public Track A | | 8.0 | | 29.6 | 74.1 |
| Public Track B | | 4.7 | | 26.3 | 65.6 |
| Public Track C | | 11.7 | | 33.3 | 83.2 |
| 2 Medway Close | | 1.4 | | 23.0 | 57.5 |
| Snow Hill Farm | | 3.1 | | 24.7 | 61.7 |
| Gawber BG Site | | 1.0 | | 22.6 | 56.4 |

PC=Process Contribution

PEC=Process + Background Concentration

[1] Background concentration from the Barnsley Gawber background monitoring site for 2004 (as a worst case)

| Table 4.5: Calculation of the PEC for Short-term Nitrogen Dioxide 20m Stack | | | | | |
|---|---|---|---|---|---|
| | AQO $\mu gm^{-3}$ | PC $\mu gm^{-3}$ | Background $\mu gm^{-3}$ | PEC $\mu gm^{-3}$ | % EAL/AQO |
| **Point of Maximum concentration** | 200 | 92.6 | 21.6[1] | 135.8 | 67.9 |
| **Receptors** | | | | | |
| 2 Dovebush Way | 200 | 31.5 | 21.6[1] | 74.7 | 37.4 |
| 1 Dovebush Way | | 32.5 | | 75.7 | 37.8 |
| 24 Deane Hall Fold | | 35.4 | | 78.6 | 39.3 |
| 104 Deane Hall Road | | 30.0 | | 73.2 | 36.6 |
| Public Track A | | 52.0 | | 95.2 | 47.6 |
| Public Track B | | 77.8 | | 121.0 | 60.5 |
| Public Track C | | 76.4 | | 119.6 | 59.8 |
| 2 Medway Close | | 31.1 | | 74.3 | 37.2 |
| Snow Hill Farm | | 18.4 | | 61.5 | 30.8 |
| Gawber BG Site | | 12.0 | | 55.2 | 27.6 |

PC=Process Contribution

PEC=Process + Background Concentration

[1] Background concentration from the Barnsley Gawber background monitoring site for 2004 (as a worst case)

| Table 4.6: Calculation of the PEC for Annual Mean Nitrogen Dioxide 15 m Stack | | | | | |
|---|---|---|---|---|---|
| | AQO $\mu gm^{-3}$ | PC $\mu gm^{-3}$ | Background $\mu gm^{-3}$ | PEC $\mu gm^{-3}$ | % EAL/AQO |
| **Point of Maximum concentration** | 40 | 29.9 | 21.6[1] | 51.5 | 128.8 |
| **Receptors** | | | | | |
| 2 Dovebush Way | 40 | 1.9 | 21.6[1] | 23.5 | 58.8 |
| 1 Dovebush Way | | 2.1 | | 23.7 | 59.1 |
| 24 Deane Hall Fold | | 2.3 | | 23.9 | 59.7 |
| 104 Deane Hall Road | | 2.6 | | 24.2 | 60.4 |
| Public Track A | | 28.3 | | 49.9 | 124.6 |
| Public Track B | | 13.6 | | 35.2 | 88.0 |
| Public Track C | | 25.8 | | 47.4 | 118.4 |
| 2 Medway Close | | 1.7 | | 23.3 | 58.3 |
| Snow Hill Farm | | 3.4 | | 25.0 | 62.4 |
| Gawber BG Site | | 1.0 | | 22.6 | 56.6 |

PC=Process Contribution
PEC=Process + Background Concentration
[1] Background concentration from 2008 Defra Background Maps

| Table 4.7: Calculation of the PEC for Short-term Nitrogen Dioxide 15m Stack | | | | | |
|---|---|---|---|---|---|
| | AQO $\mu gm^{-3}$ | PC $\mu gm^{-3}$ | Background $\mu gm^{-3}$ | PEC $\mu gm^{-3}$ | % EAL/AQO |
| **Point of Maximum concentration** | 40 | 187.8 | 21.6[1] | 231.0 | 115.5 |
| **Receptors** | | | | | |
| 2 Dovebush Way | 40 | 36.7 | 21.6[1] | 79.9 | 40.0 |
| 1 Dovebush Way | | 37.7 | | 80.9 | 40.5 |
| 24 Deane Hall Fold | | 42.5 | | 85.7 | 42.8 |
| 104 Deane Hall Road | | 34.8 | | 77.9 | 39.0 |
| Public Track A | | 124.0 | | 167.2 | 83.6 |
| Public Track B | | 163.8 | | 207.0 | 103.5 |
| Public Track C | | 131.2 | | 174.4 | 87.2 |
| 2 Medway Close | | 36.8 | | 80.0 | 40.0 |
| Snow Hill Farm | | 19.7 | | 62.9 | 31.4 |
| Gawber BG Site | | 12.9 | | 56.1 | 28.0 |

PC=Process Contribution
PEC=Process + Background Concentration
[1] Background concentration from 2008 Defra Background Maps

## 4.4 Assessment of Predicted Concentrations

### 4.4.1 20 m Stack

Calculation of the annual mean PEC for nitrogen dioxide is less than 70% of the annual mean objective at each of the residential receptors (Table 4.4). It is therefore considered that there is no risk of the contribution from the facility causing a breach of the air quality objective, given the existing background concentrations in the vicinity of the facility.

Slightly higher concentrations are predicted on the public track with a PEC of 33.3 $\mu gm^{-3}$ predicted at receptor C, which is still comfortably within the objective. The PEC at the point of maximum concentration is 37.7 $\mu gm^{-3}$, 94 % of the annual mean objective.

The short term PEC has been calculated as less than 70% of the objective concentration at all receptor locations and at the point of maximum concentration (Table 4.5). Therefore the potential for an exceedance of the objective to arise is considered to be minimal.

### 4.4.2 15 m Stack

Calculation of the annual mean PEC for nitrogen dioxide is less than 70% of the annual mean objective at each of the residential receptors (Table 4.6). It is therefore considered that there is no risk of the contribution from the facility causing a breach of the air quality objective, given the existing background concentrations in the vicinity of the facility.

However, the PEC calculated at the point of maximum concentration and at points A and C along the public track, located to the east of the rail line, exceeds the annual mean objective and is over 70% of the objective at point B. Therefore, the installation is predicted to result in an exceedance of the objective along the public track and in the vicinity of the point of maximum concentrations as shown in Figure B1 (Annex B).

The short-term PEC for nitrogen dioxide (Table 4.7) exceeds the objective limit of 200 $\mu gm^{-3}$ at one receptor location and at the point of maximum concentration. At the residential receptors, concentrations are less than 50% of the objective.

# 5 Conclusions

The assessment has considered the emissions from the proposed new power generation site, which will operate five 1.4 MWe engines fuelled with biofuels, to generate electricity to feed into the national grid. Ground level concentrations of pollutants have been predicted assuming a stack height of either 15 or 20 m and compared with the relevant air quality objectives.

This addendum provides an assessment of the air quality impacts arising from the site with a 15 m and a 20m stack, utilising monitored emissions data from the Rocpower site at Featherstone.

The assessment has indicated that with a 20 m stack the annual mean nitrogen dioxide PEC would not exceed 70% of the objective concentration at residential receptors. At all locations, including the point of maximum concentrations all concentrations are predicted to meet the annual objective. Predicted short term PEC are less than 70% of the objective in all locations.

With a 15 m stack, the annual mean nitrogen dioxide PEC would not exceed 70% of the objective concentration at residential receptors. However, on the public track and at the point of maximum concentration, the PEC is predicted to exceed the objective. The short-term PEC for nitrogen dioxide exceeds the objective limit of 200 $\mu gm^{-3}$ at one receptor location and at the point of maximum concentration, although at the residential receptors concentrations are less than 50% of the objective.

In addition, this report provides points of clarification raised by BMBC regarding the emissions data and the operations of the facility, particularly during start-up.

# Annex A: Predicted Concentrations for all years

Barnsley 15 m stack Hybrid Emission data

Maximum percentile concentrations

| Group | Pollutant | Averaging t | Units | Percentile | X(m) | Y(m) | Z(m) | 2004 Maximum | 2005 Maximum | 2006 Maximum | 2007 Maximum | 2008 Maximum value | Max all years | NO2 | % of objective |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All sources | NOx | 1hr - | µg/m³ | 99.8 | 431974.2 | 408635.6 | 0 | 523.84 | 532.80 | 536.23 | 507.59 | 536.44 | 536.44 | 187.754 | 93.877 |
| All sources | PM10 | 1hr - | µg/m³ | 90.4 | 432134.2 | 408615.6 | 0 | 19.80 | 23.99 | 22.77 | 25.71 | 27.26 | 27.26 | | |

Maximum long term average concentrations

| Group | Pollutant | Averaging t | Units | X(m) | Y(m) | Z(m) | Maximum | Maximum | Maximum | Maximum | Maximum value | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All sources | NOx | 1hr - | µg/m³ | 432114.2 | 408555.6 | 0 | 32.69 | 37.80 | 35.85 | 39.48 | 42.74 | 42.74 | 29.9159 | 74.78975 |
| All sources | PM10 | 1hr - | µg/m³ | 432114.2 | 408555.6 | 0 | 4.56 | 5.27 | 5.00 | 5.51 | 5.96 | 5.96 | | |

Barnsley 15 m stack Hybrid Emission data

2004

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 1.81 | 1.27 | 97.28 | 34.05 | 0.25 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.91 | 1.34 | 102.28 | 35.80 | 0.27 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 3.24 | 2.27 | 121.34 | 42.47 | 0.45 | 0.01 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 3.31 | 2.31 | 124.25 | 43.49 | 0.46 | 0.01 |
| DT 46 | 432007 | 407940 | 0 | 1.67 | 1.17 | 74.19 | 25.97 | 0.23 | 0.01 |
| DT 47 | 432056 | 407850 | 0 | 1.53 | 1.07 | 54.70 | 19.14 | 0.21 | 0.02 |
| DT 48 | 432116 | 407796 | 0 | 1.48 | 1.04 | 56.45 | 19.76 | 0.21 | 0.02 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.67 | 1.87 | 91.68 | 32.09 | 0.37 | 0.01 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 2.79 | 1.95 | 97.84 | 34.24 | 0.39 | 0.02 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 2.48 | 1.74 | 91.16 | 31.91 | 0.35 | 0.01 |
| Public Track A | 432088.8 | 408591 | 0 | 30.63 | 21.44 | 346.99 | 121.45 | 4.27 | 16.31 |
| Public Track B | 432036.5 | 408654.9 | 0 | 11.68 | 8.18 | 462.33 | 161.82 | 1.63 | 1.32 |
| Public Track C | 432152 | 408539.4 | 0 | 29.93 | 20.95 | 374.97 | 131.24 | 4.17 | 14.08 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.37 | 0.96 | 85.06 | 29.77 | 0.19 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 3.41 | 2.39 | 55.00 | 19.25 | 0.48 | 1.84 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.29 | 0.90 | 35.82 | 12.54 | 0.18 | 0.11 |

2005

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 1.57 | 1.10 | 89.72 | 31.40 | 0.22 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.77 | 1.24 | 96.71 | 33.85 | 0.25 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 1.99 | 1.39 | 112.82 | 39.49 | 0.28 | 0.00 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.02 | 1.41 | 114.76 | 40.17 | 0.28 | 0.00 |
| DT 46 | 432007 | 407940 | 0 | 1.86 | 1.30 | 73.11 | 25.59 | 0.26 | 0.02 |
| DT 47 | 432056 | 407850 | 0 | 1.66 | 1.16 | 54.52 | 19.08 | 0.23 | 0.02 |
| DT 48 | 432116 | 407796 | 0 | 1.55 | 1.09 | 55.98 | 19.59 | 0.22 | 0.03 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.83 | 1.98 | 98.66 | 34.53 | 0.40 | 0.01 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 3.08 | 2.16 | 108.20 | 37.87 | 0.43 | 0.02 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 3.73 | 2.61 | 94.17 | 32.96 | 0.52 | 0.04 |
| Public Track A | 432088.8 | 408591 | 0 | 34.12 | 23.88 | 348.18 | 121.86 | 4.76 | 19.54 |
| Public Track B | 432036.5 | 408654.9 | 0 | 15.76 | 11.04 | 458.05 | 160.32 | 2.20 | 2.95 |
| Public Track C | 432152 | 408539.4 | 0 | 24.17 | 16.92 | 358.84 | 125.59 | 3.37 | 11.55 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 2.34 | 1.64 | 101.83 | 35.64 | 0.33 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 4.18 | 2.93 | 56.15 | 19.65 | 0.58 | 2.17 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.46 | 1.02 | 35.92 | 12.57 | 0.20 | 0.15 |

2006

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 2.02 | 1.42 | 104.86 | 36.70 | 0.28 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 2.35 | 1.65 | 103.56 | 36.24 | 0.33 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 2.86 | 2.00 | 114.06 | 39.92 | 0.40 | 0.03 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.92 | 2.04 | 115.95 | 40.58 | 0.41 | 0.03 |
| DT 46 | 432007 | 407940 | 0 | 1.25 | 0.88 | 70.01 | 24.50 | 0.17 | 0.00 |
| DT 47 | 432056 | 407850 | 0 | 1.07 | 0.75 | 53.51 | 18.73 | 0.15 | 0.00 |
| DT 48 | 432116 | 407796 | 0 | 0.98 | 0.69 | 52.67 | 18.43 | 0.14 | 0.00 |
| 104 DHR | 431690.7 | 408860 | 0 | 3.65 | 2.55 | 99.28 | 34.75 | 0.51 | 0.31 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 3.95 | 2.76 | 107.98 | 37.79 | 0.55 | 0.29 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 4.59 | 3.21 | 94.79 | 33.18 | 0.64 | 0.65 |
| Public Track A | 432088.8 | 408591 | 0 | 33.02 | 23.11 | 348.87 | 122.10 | 4.60 | 17.87 |
| Public Track B | 432036.5 | 408654.9 | 0 | 19.40 | 13.58 | 458.93 | 160.62 | 2.71 | 5.44 |
| Public Track C | 432152 | 408539.4 | 0 | 26.07 | 18.25 | 361.53 | 126.53 | 3.63 | 12.78 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 2.44 | 1.71 | 105.04 | 36.76 | 0.34 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 4.36 | 3.05 | 55.67 | 19.48 | 0.61 | 2.23 |
| Gawber BG Site | 432550 | 407550 | 0 | 0.81 | 0.57 | 33.98 | 11.89 | 0.11 | 0.01 |

2007

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 1.18 | 0.82 | 84.62 | 29.62 | 0.16 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.27 | 0.89 | 85.86 | 30.05 | 0.18 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 1.98 | 1.39 | 112.74 | 39.46 | 0.28 | 0.00 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.02 | 1.41 | 114.71 | 40.15 | 0.28 | 0.00 |
| DT 46 | 432007 | 407940 | 0 | 1.28 | 0.90 | 70.21 | 24.57 | 0.18 | 0.00 |
| DT 47 | 432056 | 407850 | 0 | 1.10 | 0.77 | 54.20 | 18.97 | 0.15 | 0.00 |
| DT 48 | 432116 | 407796 | 0 | 1.02 | 0.72 | 54.78 | 19.17 | 0.14 | 0.00 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.59 | 1.81 | 95.44 | 33.41 | 0.36 | 0.01 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 2.78 | 1.95 | 103.25 | 36.14 | 0.39 | 0.01 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 3.22 | 2.25 | 92.18 | 32.26 | 0.45 | 0.01 |
| Public Track A | 432088.8 | 408591 | 0 | 38.02 | 26.62 | 352.10 | 123.24 | 5.30 | 22.11 |
| Public Track B | 432036.5 | 408654.9 | 0 | 11.97 | 8.38 | 456.84 | 159.89 | 1.67 | 1.47 |
| Public Track C | 432152 | 408539.4 | 0 | 36.81 | 25.77 | 366.48 | 128.27 | 5.13 | 18.28 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.85 | 1.30 | 102.10 | 35.73 | 0.26 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 3.88 | 2.72 | 56.23 | 19.68 | 0.54 | 2.05 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.10 | 0.77 | 36.79 | 12.88 | 0.15 | 0.02 |

2008

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 2.72 | 1.90 | 102.61 | 35.91 | 0.38 | 0.02 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 2.94 | 2.06 | 107.78 | 37.72 | 0.41 | 0.01 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 2.68 | 1.87 | 112.42 | 39.35 | 0.37 | 0.05 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.72 | 1.90 | 114.34 | 40.02 | 0.38 | 0.05 |
| DT 46 | 432007 | 407940 | 0 | 0.87 | 0.61 | 71.77 | 25.12 | 0.12 | 0.00 |
| DT 47 | 432056 | 407850 | 0 | 0.77 | 0.54 | 53.74 | 18.81 | 0.11 | 0.00 |
| DT 48 | 432116 | 407796 | 0 | 0.73 | 0.51 | 47.10 | 16.48 | 0.10 | 0.00 |
| 104 DHR | 431690.7 | 408860 | 0 | 3.45 | 2.41 | 98.06 | 34.32 | 0.48 | 0.09 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 3.72 | 2.61 | 105.76 | 37.02 | 0.52 | 0.10 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 4.18 | 2.92 | 93.73 | 32.81 | 0.58 | 0.06 |
| Public Track A | 432088.8 | 408591 | 0 | 40.36 | 28.25 | 354.19 | 123.97 | 5.63 | 23.36 |
| Public Track B | 432036.5 | 408654.9 | 0 | 18.42 | 12.89 | 467.89 | 163.76 | 2.57 | 3.87 |
| Public Track C | 432152 | 408539.4 | 0 | 28.91 | 20.24 | 367.43 | 128.60 | 4.03 | 13.19 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 2.32 | 1.62 | 104.49 | 36.57 | 0.32 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 4.81 | 3.37 | 56.01 | 19.60 | 0.67 | 2.60 |
| Gawber BG Site | 432550 | 407550 | 0 | 0.94 | 0.66 | 36.32 | 12.71 | 0.13 | 0.00 |

Max of all years

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | | 2.72 | 1.90 | 104.86 | 36.70 | 0.38 | 0.02 |
| 1 Dovebush Way | 431616.3 | 408427.2 | | 2.94 | 2.06 | 107.78 | 37.72 | 0.41 | 0.01 |
| 24 DHF | 431650.7 | 408728.2 | | 3.24 | 2.27 | 121.34 | 42.47 | 0.45 | 0.05 |
| 24 DHF Garden | 431657.4 | 408727.9 | | 3.31 | 2.31 | 124.25 | 43.49 | 0.46 | 0.05 |
| DT 46 | 432007 | 407940 | | 1.86 | 1.30 | 74.19 | 25.97 | 0.26 | 0.02 |
| DT 47 | 432056 | 407850 | | 1.66 | 1.16 | 54.70 | 19.14 | 0.23 | 0.02 |
| DT 48 | 432116 | 407796 | | 1.55 | 1.09 | 56.45 | 19.76 | 0.22 | 0.03 |
| 104 DHR | 431690.7 | 408860 | | 3.65 | 2.55 | 99.28 | 34.75 | 0.51 | 0.31 |
| 104 DHR Garden | 431710.4 | 408845.7 | | 3.95 | 2.76 | 108.20 | 37.87 | 0.55 | 0.29 |
| 142 DHR | 431735.4 | 408906.7 | | 4.59 | 3.21 | 94.79 | 33.18 | 0.64 | 0.65 |
| Public Track A | 432088.8 | 408591 | | 40.36 | 28.25 | 354.19 | 123.97 | 5.63 | 23.36 |
| Public Track B | 432036.5 | 408654.9 | | 19.40 | 13.58 | 467.89 | 163.76 | 2.71 | 5.44 |
| Public Track C | 432152 | 408539.4 | | 36.81 | 25.77 | 374.97 | 131.24 | 5.13 | 18.28 |
| 2 Medway Close | 431709.7 | 408271.1 | | 2.44 | 1.71 | 105.04 | 36.76 | 0.34 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | | 4.81 | 3.37 | 56.23 | 19.68 | 0.67 | 2.60 |
| Gawber BG Site | 432550 | 407550 | | 1.46 | 1.02 | 36.79 | 12.88 | 0.20 | 0.15 |

Barnsley 20m stack Hybrid emission data

Maximum percentile concentrations

| Group | Pollutant | Averaging | Units | Percentile | X(m) | Y(m) | Z(m) | 2004 Maximum | 2005 Maximum | 2006 Maximum | 2007 Maximum | 2008 Maximum value | max of all years | | % obj |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All sources | NOx | 1hr - | µg/m³ | 99.8 | 432134.2 | 408535.6 | 0 | 213.11 | 214.18 | 264.69 | 234.34 | 236.74 | 264.69 | 92.6415 | 46.32075 |
| All sources | PM10 | 1hr - | µg/m³ | 90.4 | 432214.2 | 408655.6 | 0 | 11.89 | 14.11 | 12.84 | 14.04 | 14.41 | 14.41 | | 28.822 |

Maximum long term average concentrations

| Group | Pollutant | Averaging | Units | X(m) | Y(m) | Z(m) | Maximum | Maximum | Maximum | Maximum | Maximum value | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All sources | NOx | 1hr - | µg/m³ | 432194.2 | 408635.6 | 0 | 17.13 | 20.31 | 18.59 | 20.79 | 22.95 | 22.95 | 16.0678 | 40.1695 |
| All sources | PM10 | 1hr - | µg/m³ | 432194.2 | 408635.6 | 0 | 2.39 | 2.83 | 2.59 | 2.90 | 3.20 | 3.20 | | 8.00175 |

Barnsley 20m stack Hybrid emission data

2004

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 1.50 | 1.05 | 85.88 | 30.06 | 0.21 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.57 | 1.10 | 89.00 | 31.15 | 0.22 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 2.66 | 1.86 | 101.19 | 35.42 | 0.37 | 0.00 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.70 | 1.89 | 102.74 | 35.96 | 0.38 | 0.00 |
| DT 46 | 432007 | 407940 | 0 | 1.48 | 1.04 | 67.88 | 23.76 | 0.21 | 0.01 |
| DT 47 | 432056 | 407850 | 0 | 1.38 | 0.97 | 50.79 | 17.78 | 0.19 | 0.01 |
| DT 48 | 432116 | 407796 | 0 | 1.35 | 0.94 | 52.54 | 18.39 | 0.19 | 0.02 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.24 | 1.57 | 80.11 | 28.04 | 0.31 | 0.01 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 2.31 | 1.62 | 83.19 | 29.12 | 0.32 | 0.01 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 2.09 | 1.46 | 78.59 | 27.51 | 0.29 | 0.01 |
| Public Track A | 432088.8 | 408591 | 0 | 8.40 | 5.88 | 125.86 | 44.05 | 1.17 | 4.50 |
| Public Track B | 432036.5 | 408654.9 | 0 | 3.71 | 2.60 | 195.10 | 68.28 | 0.52 | 0.29 |
| Public Track C | 432152 | 408539.4 | 0 | 13.71 | 9.60 | 211.66 | 74.08 | 1.91 | 7.33 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.11 | 0.77 | 73.68 | 25.79 | 0.15 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 3.10 | 2.17 | 51.17 | 17.91 | 0.43 | 1.61 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.20 | 0.84 | 33.91 | 11.87 | 0.17 | 0.10 |

2005

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 1.33 | 0.93 | 79.49 | 27.82 | 0.19 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.48 | 1.04 | 85.46 | 29.91 | 0.21 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 1.61 | 1.13 | 96.22 | 33.68 | 0.22 | 0.00 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 1.63 | 1.14 | 97.55 | 34.14 | 0.23 | 0.00 |
| DT 46 | 432007 | 407940 | 0 | 1.65 | 1.16 | 66.81 | 23.38 | 0.23 | 0.01 |
| DT 47 | 432056 | 407850 | 0 | 1.50 | 1.05 | 50.66 | 17.73 | 0.21 | 0.01 |
| DT 48 | 432116 | 407796 | 0 | 1.41 | 0.99 | 52.72 | 18.45 | 0.20 | 0.02 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.35 | 1.64 | 84.91 | 29.72 | 0.33 | 0.01 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 2.52 | 1.76 | 91.07 | 31.87 | 0.35 | 0.01 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 3.14 | 2.19 | 80.39 | 28.14 | 0.44 | 0.02 |
| Public Track A | 432088.8 | 408591 | 0 | 9.51 | 6.66 | 146.25 | 51.19 | 1.33 | 5.13 |
| Public Track B | 432036.5 | 408654.9 | 0 | 4.93 | 3.45 | 205.73 | 72.00 | 0.69 | 0.93 |
| Public Track C | 432152 | 408539.4 | 0 | 10.79 | 7.55 | 199.55 | 69.84 | 1.50 | 5.66 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.93 | 1.35 | 88.33 | 30.92 | 0.27 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 3.80 | 2.66 | 52.33 | 18.32 | 0.53 | 1.91 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.37 | 0.96 | 34.38 | 12.03 | 0.19 | 0.13 |

2006

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 1.69 | 1.18 | 90.08 | 31.53 | 0.24 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.94 | 1.36 | 87.49 | 30.62 | 0.27 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 2.34 | 1.64 | 98.41 | 34.44 | 0.33 | 0.02 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.38 | 1.66 | 99.79 | 34.93 | 0.33 | 0.02 |
| DT 46 | 432007 | 407940 | 0 | 1.13 | 0.79 | 64.91 | 22.72 | 0.16 | 0.00 |
| DT 47 | 432056 | 407850 | 0 | 0.98 | 0.69 | 49.81 | 17.43 | 0.14 | 0.00 |
| DT 48 | 432116 | 407796 | 0 | 0.90 | 0.63 | 48.13 | 16.85 | 0.13 | 0.00 |
| 104 DHR | 431690.7 | 408860 | 0 | 3.03 | 2.12 | 85.59 | 29.96 | 0.42 | 0.22 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 3.24 | 2.27 | 91.57 | 32.05 | 0.45 | 0.20 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 3.86 | 2.70 | 82.16 | 28.75 | 0.54 | 0.45 |
| Public Track A | 432088.8 | 408591 | 0 | 9.36 | 6.55 | 143.74 | 50.31 | 1.31 | 4.83 |
| Public Track B | 432036.5 | 408654.9 | 0 | 6.65 | 4.66 | 222.22 | 77.78 | 0.93 | 1.56 |
| Public Track C | 432152 | 408539.4 | 0 | 11.88 | 8.31 | 201.23 | 70.43 | 1.66 | 6.40 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.99 | 1.39 | 88.97 | 31.14 | 0.28 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 3.97 | 2.78 | 51.78 | 18.12 | 0.55 | 1.98 |
| Gawber BG Site | 432550 | 407550 | 0 | 0.76 | 0.53 | 32.65 | 11.43 | 0.11 | 0.01 |

2007

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 0.98 | 0.69 | 74.18 | 25.96 | 0.14 | 0.00 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 1.05 | 0.74 | 75.22 | 26.33 | 0.15 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 1.59 | 1.12 | 96.29 | 33.70 | 0.22 | 0.00 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 1.62 | 1.13 | 97.62 | 34.17 | 0.23 | 0.00 |
| DT 46 | 432007 | 407940 | 0 | 1.13 | 0.79 | 64.54 | 22.59 | 0.16 | 0.00 |
| DT 47 | 432056 | 407850 | 0 | 0.99 | 0.70 | 50.39 | 17.63 | 0.14 | 0.00 |
| DT 48 | 432116 | 407796 | 0 | 0.93 | 0.65 | 51.80 | 18.13 | 0.13 | 0.00 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.15 | 1.50 | 84.02 | 29.41 | 0.30 | 0.00 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 2.28 | 1.59 | 89.25 | 31.24 | 0.32 | 0.00 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 2.71 | 1.89 | 81.25 | 28.44 | 0.38 | 0.01 |
| Public Track A | 432088.8 | 408591 | 0 | 10.81 | 7.56 | 147.98 | 51.79 | 1.51 | 5.35 |
| Public Track B | 432036.5 | 408654.9 | 0 | 3.79 | 2.65 | 191.21 | 66.92 | 0.53 | 0.37 |
| Public Track C | 432152 | 408539.4 | 0 | 16.66 | 11.66 | 218.17 | 76.36 | 2.32 | 9.12 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.50 | 1.05 | 85.45 | 29.91 | 0.21 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 3.53 | 2.47 | 52.42 | 18.35 | 0.49 | 1.79 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.03 | 0.72 | 34.21 | 11.97 | 0.14 | 0.02 |

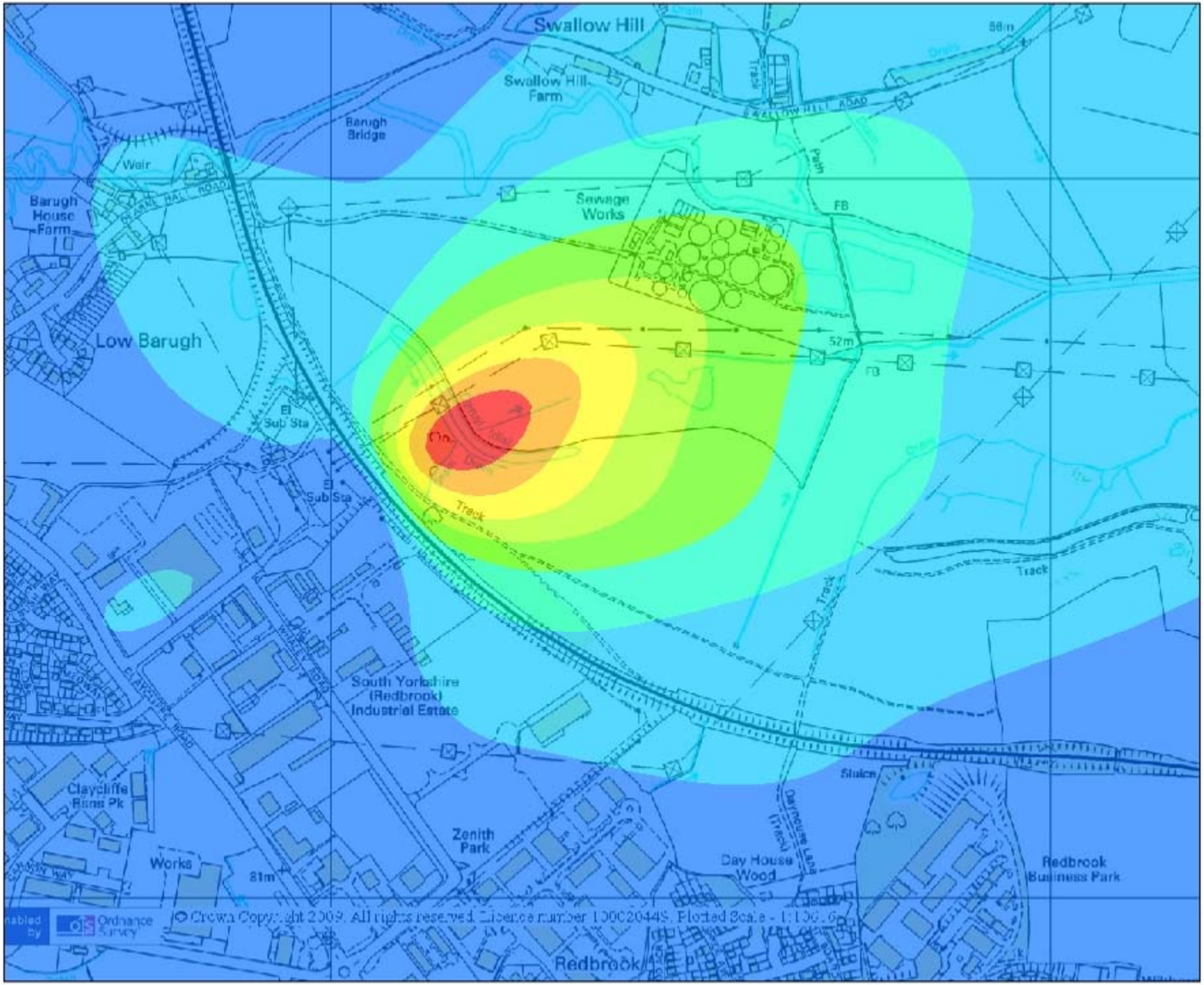
2008

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 2.24 | 1.57 | 88.66 | 31.03 | 0.31 | 0.01 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 2.41 | 1.69 | 92.83 | 32.49 | 0.34 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 2.18 | 1.52 | 96.32 | 33.71 | 0.30 | 0.03 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.20 | 1.54 | 97.50 | 34.13 | 0.31 | 0.03 |
| DT 46 | 432007 | 407940 | 0 | 0.78 | 0.54 | 65.08 | 22.78 | 0.11 | 0.00 |
| DT 47 | 432056 | 407850 | 0 | 0.69 | 0.49 | 49.80 | 17.43 | 0.10 | 0.00 |
| DT 48 | 432116 | 407796 | 0 | 0.67 | 0.47 | 44.05 | 15.42 | 0.09 | 0.00 |
| 104 DHR | 431690.7 | 408860 | 0 | 2.90 | 2.03 | 85.01 | 29.75 | 0.40 | 0.05 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 3.09 | 2.16 | 91.22 | 31.93 | 0.43 | 0.06 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 3.55 | 2.48 | 80.87 | 28.30 | 0.49 | 0.04 |
| Public Track A | 432088.8 | 408591 | 0 | 11.48 | 8.03 | 148.63 | 52.02 | 1.60 | 5.66 |
| Public Track B | 432036.5 | 408654.9 | 0 | 6.18 | 4.32 | 196.99 | 68.95 | 0.86 | 1.30 |
| Public Track C | 432152 | 408539.4 | 0 | 13.82 | 9.67 | 218.26 | 76.39 | 1.93 | 7.16 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.89 | 1.33 | 88.84 | 31.09 | 0.26 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 4.39 | 3.07 | 52.25 | 18.29 | 0.61 | 2.28 |
| Gawber BG Site | 432550 | 407550 | 0 | 0.88 | 0.61 | 34.21 | 11.98 | 0.12 | 0.00 |

Max all years

| Receptor name | X(m) | Y(m) | Z(m) | Ann Nox | Ann NO2 | 1 hr Nox | 1 hr NO2 | Ann PM10 | 24 hr PM1( |
|---|---|---|---|---|---|---|---|---|---|
| 2 Dovebush Way | 431592.2 | 408448.1 | 0 | 2.24 | 1.6 | 90.08 | 31.53 | 0.31 | 0.01 |
| 1 Dovebush Way | 431616.3 | 408427.2 | 0 | 2.41 | 1.7 | 92.83 | 32.49 | 0.34 | 0.00 |
| 24 DHF | 431650.7 | 408728.2 | 0 | 2.66 | 1.9 | 101.19 | 35.42 | 0.37 | 0.03 |
| 24 DHF Garden | 431657.4 | 408727.9 | 0 | 2.70 | 1.9 | 102.74 | 35.96 | 0.38 | 0.03 |
| DT 46 | 432007 | 407940 | 0 | 1.65 | 1.2 | 67.88 | 23.76 | 0.23 | 0.01 |
| DT 47 | 432056 | 407850 | 0 | 1.50 | 1.0 | 50.79 | 17.78 | 0.21 | 0.01 |
| DT 48 | 432116 | 407796 | 0 | 1.41 | 1.0 | 52.72 | 18.45 | 0.20 | 0.02 |
| 104 DHR | 431690.7 | 408860 | 0 | 3.03 | 2.1 | 85.59 | 29.96 | 0.42 | 0.22 |
| 104 DHR Garden | 431710.4 | 408845.7 | 0 | 3.24 | 2.3 | 91.57 | 32.05 | 0.45 | 0.20 |
| 142 DHR | 431735.4 | 408906.7 | 0 | 3.86 | 2.7 | 82.16 | 28.75 | 0.54 | 0.45 |
| Public Track A | 432088.8 | 408591 | 0 | 11.48 | 8.0 | 148.63 | 52.02 | 1.60 | 5.66 |
| Public Track B | 432036.5 | 408654.9 | 0 | 6.65 | 4.7 | 222.22 | 77.78 | 0.93 | 1.56 |
| Public Track C | 432152 | 408539.4 | 0 | 16.66 | 11.7 | 218.26 | 76.39 | 2.32 | 9.12 |
| 2 Medway Close | 431709.7 | 408271.1 | 0 | 1.99 | 1.4 | 88.97 | 31.14 | 0.28 | 0.00 |
| Snow Hall Farm | 432394.5 | 409130.4 | 0 | 4.39 | 3.1 | 52.42 | 18.35 | 0.61 | 2.28 |
| Gawber BG Site | 432550 | 407550 | 0 | 1.37 | 1.0 | 34.38 | 12.03 | 0.19 | 0.13 |

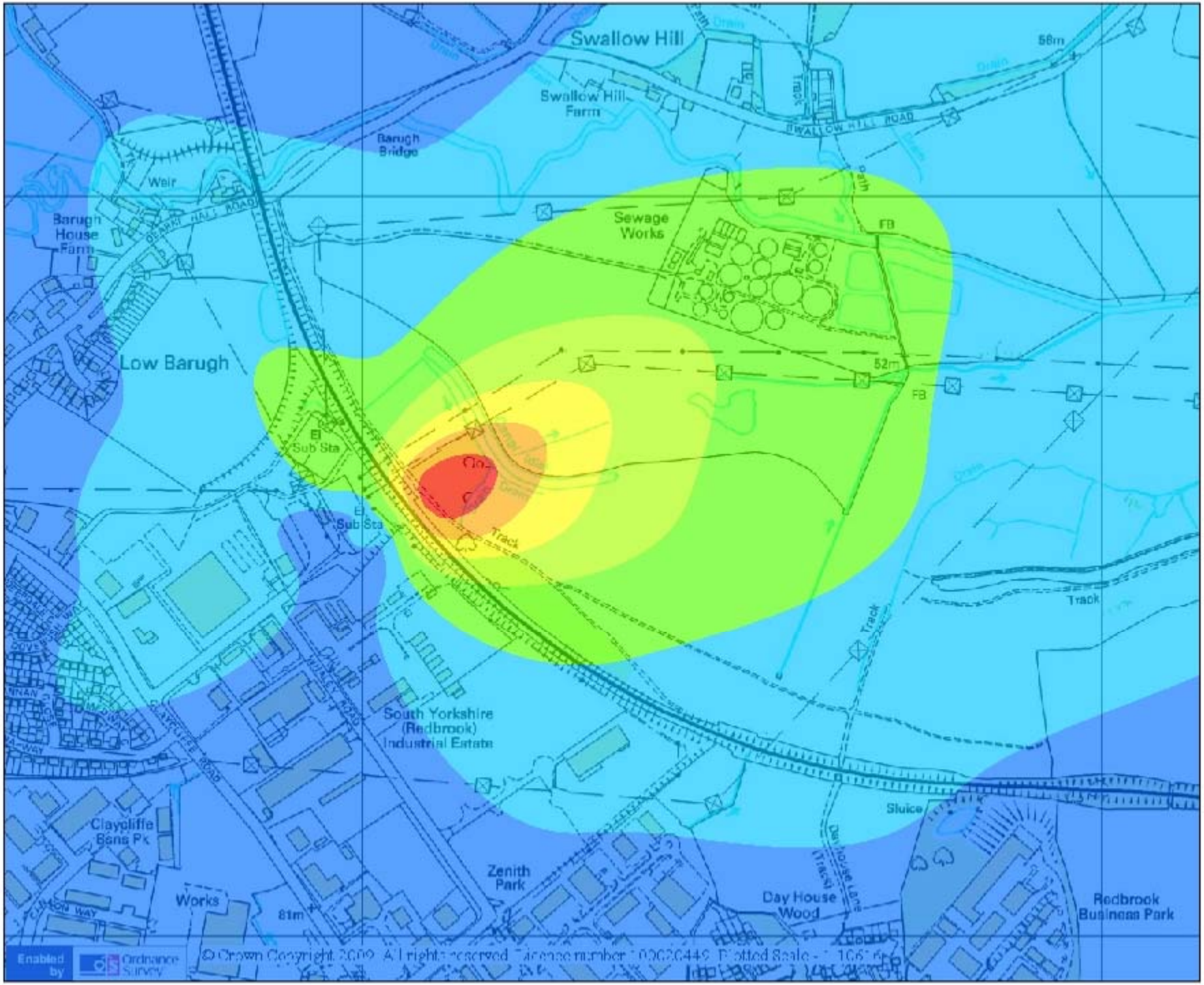
# Annex B: Contour Plots

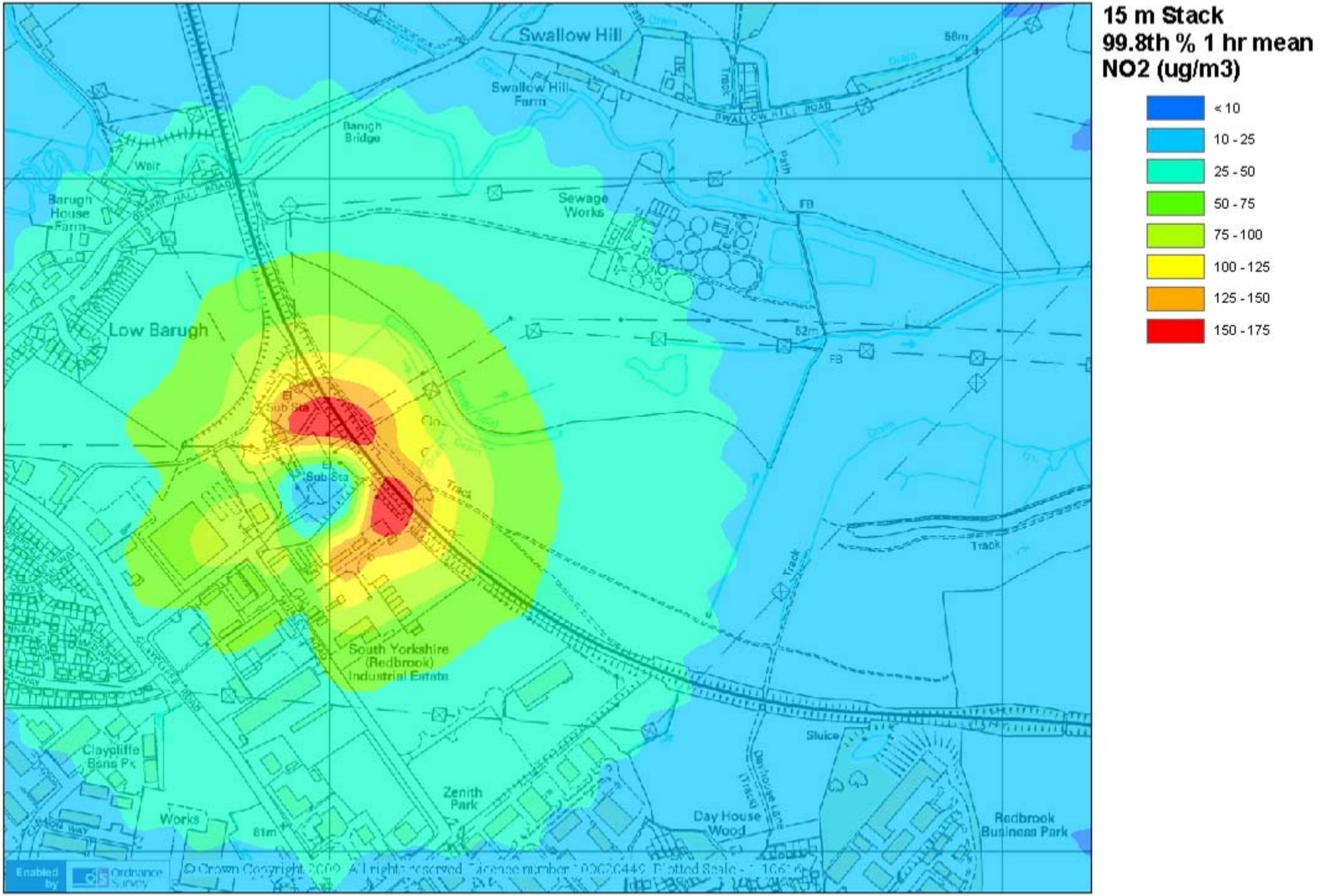

20m Stack
Annual mean
NO2 (ug/m3)
< 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 12
12 - 14
14 - 16
Swallow Hill
Swallow Hill Farm
Barugh Bridge
Weir
Barugh House Farm
Sewage Works
Low Barugh
Sub Sta
Track
South Yorkshire (Redbrook) Industrial Estate
Claycliffe Rans Pk
Works
Zenith Park
Day House Wood
Redbrook Business Park
Redbrook
Sluice
52m
81m
Crown Copyright 2009. All rights reserved. Licence number 100020449. Plotted Scale - 1:1500.
Ordnance Survey




**20m Stack**
**99.8% 1 hr mean**
**NO2 (ug/m3)**

- < - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80


15 m Stack
annual mean
NO2 (ug/m3)
< 2
2 - 5
5 - 10
10 - 15
15 - 20
20 - 25
< 30
Swallow Hill
Swallow Hill Farm
Barugh Bridge
Weir
Barugh House Farm
Sewage Works
Low Barugh
Sub Sta
South Yorkshire (Redbrook) Industrial Estate
Claycliffe Bsns Pk
Works
Zenith Park
Day House Wood
Redbrook Business Park
Sluice
Track
FB
52m
81m
Enabled by
Ordnance Survey


15 m Stack
99.8th % 1 hr mean
NO2 (ug/m3)
< 10
10 - 25
25 - 50
50 - 75
75 - 100
100 - 125
125 - 150
150 - 175
Swallow Hill
Swallow Hill Farm
Barugh Bridge
Weir
Barugh House Farm
Sewage Works
Low Barugh
Sub Sta
South Yorkshire (Redbrook) Industrial Estate
Claycliffe Bsns Pk
Zenith Park
Day House Wood
Redbrook Business Park
Sluice
Track
FB
52m
81m
Works
Enabled by Ordnance Survey
© Crown Copyright 2009. All rights reserved. Licence number 100020449. Plotted Scale - 1:10[illegible]