



2014 Air Quality Progress Report for North Lincolnshire Council

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

10 June 2015

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Executive Summary

The 2014 Progress Report highlights that there are no new locations that breach the air quality objectives applicable to LAQM in England as set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). This report reconsiders all potential sources of pollution, primarily industry and traffic related sources. The purpose of the report is to review and assess local air quality, and to determine whether or not air quality objectives are likely to be achieved.

Continuing problems have been highlighted within the local area relating to PM₁₀ exceedances which previously resulted in the declaration of two Air Quality Management Areas (AQMA) as below:

2005 Scunthorpe AQMA for breaches of PM₁₀ daily mean objective.

2008 Low Santon AQMA for breaches of the PM₁₀ annual mean objective.

Data from 2013 demonstrates that although there are a number of exceedances of the PM₁₀ daily mean objective in the Santon area, the number is reducing as is the annual mean. The same cannot be said for monitoring locations on the eastern side of Scunthorpe within the 2005 AQMA. Accordingly, this area will be prioritised for improvement schemes as Santon has been previously.

Elevated NO₂ concentrations at South Killingholme, due to traffic related emissions at the A160 road to Immingham, are now being monitored by an automatic NO₂ analyser to enable a Detailed Assessment to be undertaken to determine if there is a breach of the relevant air quality objectives.

All other sources assessed have not met the criteria required to proceed to a Detailed Assessment. These will be assessed again in the 2015 Updating and Screening Assessment Report to ensure that they do not have a detrimental effect on the air quality of North Lincolnshire.

Table of Contents

1	Introduction	6
1.1	Description of Local Authority Area	6
1.2	Purpose of Progress Report	6
1.3	Air Quality Objectives	7
1.4	Summary of Previous Review and Assessments	8
2	New Monitoring Data	18
2.1	Summary of Monitoring Undertaken	18
2.2	Comparison of Monitoring Results with Air Quality Objectives	30
3	New Local Developments	50
4	Local / Regional Air Quality Strategy	51
5	Air Quality Planning Policies	52
6	Local Transport Plans and Strategies	53
7	Climate Change Strategies	55
8	Implementation of Action Plans	56
9	Conclusions and Proposed Actions	66
9.1	Conclusions from New Monitoring Data	66
9.2	Conclusions relating to New Local Developments	66
9.3	Other Conclusions	66
9.4	Proposed Actions	67
10	References	68

List of Tables

Table 1.1: Air Quality Objectives included in Regulations for the purpose of LAQM in England	7
Table 1.2: List of previous reports produced by North Lincolnshire Council	8
Table 2.1: Details of Automatic Monitoring Sites	22
Table 2.2: Details of Non- Automatic Monitoring Sites	25
Table 2.3: Results of Automatic Monitoring for NO ₂ : Comparison with Annual Mean Objective	31
Table 2.4: Results of Automatic Monitoring for NO ₂ : Comparison with 1-hour Mean Objective	32
Table 2.5: Results of NO ₂ Diffusion Tubes 2013	36
Table 2.6: Results of NO ₂ Diffusion Tubes (2009 to 2013)	38
Table 2.7: Results of Automatic Monitoring for PM ₁₀ : Comparison with Annual Mean Objective	41
Table 2.8: Results of Automatic Monitoring for PM ₁₀ : Comparison with 24-hour Mean Objective	43
Table 2.9: Results of Automatic Monitoring for SO ₂ : Comparison with Objectives	46
Table 2.10: Heavy metal monitoring results for 2013 calendar year	47
Table 2.11: PAH monitoring results for 2013 calendar year	48
Table 8.1: Action Plan Progress	56
Table 10.1: Factors from local co-location studies	69
Table 10.2: Checking the diffusion tube precision and accuracy from co-location study	71

List of Figures

Figure 1.1: 2005 Scunthorpe Town AQMA Boundary	16
Figure 1.2: 2008 Low Santon AQMA Boundary	17
Figure 2.1: All Automatic monitoring location	21
Figure 2.2: Diffusion tube monitoring location	24
Figure 5.1: 2010 AQMA Zone Map	52

Appendices

Appendix A: New Local Developments Considered for Air Quality Impacts	69
Appendix B: QA:QC Data	69

1 Introduction

1.1 Description of Local Authority Area

North Lincolnshire is an area of around 85,000 hectares located on the southern side of the Humber estuary and occupying tracts of land on either side of the River Trent. Parliamentary Order created the administrative area of North Lincolnshire in March 1995 and on 1st April 1996 the new Unitary Authority area of North Lincolnshire came into being. North Lincolnshire covers a large, mainly agricultural area. The pattern of settlements in the area reflects this with market towns surrounded by many small villages. An important exception to this is the substantial urban area of Scunthorpe and the adjoining town of Bottesford. More than half of North Lincolnshire's population, approximately 89,260 people out of a 167,446 total population (2011 Census data), live in Scunthorpe and the adjacent town of Bottesford. Overall, according to 2011 Census data 85 percent of the population live in this main urban area and other towns. The local economy of North Lincolnshire was built on traditional industries such as steel manufacturing and related industries and agriculture. More recently there has been the establishment of two oil refineries and the introduction of several gas fired power stations. The M180 motorway and several primary and strategic routes, including the A18 and A15, are located within North Lincolnshire. By rail there are regular freight movements to and from Scunthorpe Steelworks and Humber port related industries. With several wharf facilities along the banks of the Humber and the Trent, North Lincolnshire is well positioned to take advantage of water transport.

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) 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 exceedances are considered likely, the local authority must then declare an Air

Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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

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

1.3 Air Quality Objectives

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

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005

Particulate Matter (PM₁₀) (gravimetric)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m ³	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Under the Part IV of the Environment Act (1995) local authorities are required to review local air quality within their designated areas and assess whether any pollutants pose any risk of breaching air quality objectives. If it is predicted that these health based air quality objectives will not be achieved then an Air Quality Management Area must be declared. Table 1.2 below shows a list of previous reports produced by the Council as part of the Review and Assessment process.

Table 1.2: List of previous reports produced by North Lincolnshire Council

Report Number	Type of Report	Pollutants considered	Year produced	Outcome
1	Updating and Screening Assessment	Carbon Monoxide, Benzene, 1,3-Butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀	2003	<ul style="list-style-type: none"> Suggested a detailed PM₁₀ assessment
2	Detailed Assessment	Benzene, Sulphur Dioxide, Particulate Matter	2004	<ul style="list-style-type: none"> Suggested further data required for Benzene and Sulphur Dioxide. Recommended an AQMA shall be declared in Scunthorpe for breaching PM₁₀ exceedances

3	Detailed Assessment	Benzene	2005	<ul style="list-style-type: none"> Monitoring showed concentration within acceptable limit, therefore no further action required
4	Progress Report	Benzene, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀ , PAH's	2005	<ul style="list-style-type: none"> Suggested Further Benzene diffusion tube survey for 12 months Identified two locations in Scunthorpe likely to breach PM₁₀ air quality objective for declaration of AQMA
5	Updating and Screening Assessment	Carbon Monoxide, Benzene, 1,3-butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀	2006	<ul style="list-style-type: none"> Proposed detailed assessment required for: 1,3-butadiene at North Killingholme Lead at TATA Steelworks Nitrogen dioxide diffusion tube at Doncaster Rd / Hilton Avenue, Scunthorpe, Junction of Brigg Road and A18, Mortal Ash, Scunthorpe
6	Detailed Assessment	PM ₁₀	2008	<ul style="list-style-type: none"> Confirmed PM₁₀ objective has been breached in the vicinity of Low Santon TEOM monitoring station
7	Further Assessment	PM ₁₀	2008	<ul style="list-style-type: none"> Concluded PM₁₀ concentration level remained non-compliant
8	Progress Report	Carbon Monoxide, Benzene, 1,3-butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀ , Heavy Metals, Ozone, PAH's, PM2.5	2008	<ul style="list-style-type: none"> Suggested NO₂ concentration within Killingholme had decreased

9	Updating and Screening Assessment	Carbon Monoxide, Benzene, 1,3-butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀	2009	<ul style="list-style-type: none"> The USA highlighted no new areas of non-compliance. Report highlighted that the existing problem with PM₁₀ breaches within Scunthorpe AQMA's still on going
10	Progress Report	Carbon Monoxide, Benzene, 1,3-butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀	2010	<ul style="list-style-type: none"> No new exceedances found but highlighted the continuing issue with PM₁₀ exceedances which resulted declaration of two AQMA within Scunthorpe
11	Further Assessment	PM ₁₀	2010	<ul style="list-style-type: none"> Highlighted the number of factors likely to influence the elevated concentrations recorded at the Low Santon monitoring site
12	Progress Report	Benzene, 1,3-butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide, PM ₁₀	2011	<ul style="list-style-type: none"> Highlighted a new exceedence due to potential breach of nitrogen dioxide in South Killingholme area and suggested detailed assessment
13	Updating and Screening Assessment	NO ₂ , PM ₁₀ , Sulphur Dioxide, Benzene, PAH, Heavy Metals	2012	<ul style="list-style-type: none"> No new exceedances found but highlighted the continuing issue with PM₁₀ exceedances which resulted declaration of two AQMA's within Scunthorpe
14	Progress Report	NO ₂ , PM ₁₀ , Sulphur Dioxide, Benzene, PAH, Heavy Metals	2013	<ul style="list-style-type: none"> No new exceedances found but highlighted the continuing issue with PM₁₀ exceedances at the west of steel works during easterly winds

Previous rounds of review and assessment have led to a number of focused assessments of different pollutants and sources. Summaries of the assessment findings are as follows:

1.4.1 Updating & Screening Assessment 2003

Results of monitoring and the screening exercises in this Review & Assessment, proposed that a detailed assessment of PM₁₀ would be conducted in relation to the following:

- Industrial emissions of PM₁₀ in Scunthorpe.
- Emissions of PM₁₀ from quarries and landfills in Barnetby.
- Emissions of PM₁₀ and SO₂ from domestic solid fuel burning in Keadby.
- Industrial emissions of SO₂ in Killingholme
- Industrial emissions of Benzene in Killingholme and Scunthorpe

1.4.2 Detailed Assessment 2004

Continuing on from the 2003 USA, recommendations for each pollutant were as follows:

Benzene

To gather further data in both Scunthorpe and Killingholme and review and report findings in the next annual Progress Report.

Sulphur Dioxide

To gather further data at Keadby and review and report findings in the next annual Progress Report. No further action was required in respect of sulphur dioxide at Killingholme. No further action was required in connection with stationary railway locomotives at Scunthorpe Station.

PM₁₀

An Air Quality Management Area or Areas shall be defined and then designated for the Scunthorpe area where there is likely exceedance of the Air Quality Objectives. Gather additional PM₁₀ data at Keadby and subsequently review and report conclusions in the next annual Progress Report. No further action is required in respect of PM₁₀ in Croxton/Barnetby.

1.4.3 Benzene Detailed Assessment 2005

The annual mean of benzene concentrations at relevant locations did not exceed the 2010 objective, although at one location at Santon, Scunthorpe some monthly concentrations did exceed 5µg/m³ and consequently further investigations were required. The monthly concentrations at certain boundary locations were greater than

5µg/m³ at installations in Scunthorpe and Killingholme, however where there were no relevant receptors and exposure is unlikely to affect human health, no further investigation was required in relation to air quality assessment.

1.4.4 Progress Report 2005

From the results of the monitoring data in this Progress Report, it was proposed that the following actions be implemented; A benzene diffusion tube survey would continue for a further 12-month period commencing March 2005 at two sites in Scunthorpe identified as having the potential to breach the 2010 annual mean objective of 5µg/m³. The two locations identified in Scunthorpe are likely to breach the annual mean air quality objective for nitrogen dioxide of 40µg/m³, a chemiluminescence NO_x analyser was installed.

The council will declare an Air Quality Management Area for PM₁₀ in Scunthorpe, in relation to the 24 hour mean objective of 50µg/m³ not to be exceeded more than 35 times a year, and continue with the further assessment work to determine the relative contributions of different sources of PM₁₀.

1.4.5 Updating & Screening Assessment 2006

From the results of the monitoring and the screening exercises in this Review & Assessment, it was proposed that detailed assessments would be conducted in relation to the following: -

- Industrial emissions of 1,3-butadiene in the vicinity of the Conoco Phillips Ltd and Total UK Ltd Oil Ltd Refineries, North Killingholme.
- Industrial emissions of Lead in the vicinity of the Corus (UK) Ltd Integrated Steelworks, Scunthorpe.
- Emissions of Nitrogen Dioxide in the vicinity of Doncaster Rd / Hilton Avenue, Scunthorpe, Junction of Brigg Road and A18, Mortal Ash, Scunthorpe

1.4.6 Detailed Assessment PM₁₀ in Scunthorpe 2008

The results presented indicate that the annual PM₁₀ objective has been breached in the vicinity of the Low Santon TEOM monitoring station in 2006 and 2007. The mean concentration recorded between October and December 2005 was also greater than 40 µg/m³.

1.4.7 Further Assessment of PM₁₀ in Scunthorpe 2008

Further assessment of past monitoring data recorded at continuous sites within the AQMA Scunthorpe shows levels remain non-compliant with the short-term objective. The Council has no current plans to move the monitors within the AQMA.

1.4.8 Progress Report 2008

The progress report concluded that NO₂ concentrations within Killingholme had decreased and there had been no significant changes to road traffic flows or other transportation.

1.4.9 Updating & Screening Assessment 2009

The Updating & Screening Assessment 2009 highlighted no new areas of non-compliance. Existing problems such as the ongoing issues with the Integrated Steel Works were again noted and are due to be addressed within forthcoming Further Assessments and Action Plans.

1.4.10 Progress Report 2010

The 2010 Progress Report did not highlight any new exceedances of the air quality objectives. The report reconsidered all potential sources of pollution (primarily industry and traffic related sources) with respect to PM₁₀ (particulate matter), nitrogen dioxide, sulphur dioxide & benzene.

Continuing problems have been highlighted within the local area relating to PM₁₀ and at present have resulted in the declaration of two Air Quality Management Areas; (AQMA)

- 2005 Scunthorpe AQMA for breaches of PM₁₀ daily mean objective.
- 2008 Low Santon AQMA for breaches of the PM₁₀ annual mean objective.

Problems persisted at both of these locations although improvements are beginning to show. Daily objective breaches are becoming less frequent throughout the AQMA although East Common Lane and Santon, which surround the Integrated Steelworks site, still exceed the objective. The annual mean objective at Santon has also seen a decrease since 2006 and the application of the Volatile Correction Model in 2008 has resulted in the site being compliant. These results should be treated with caution due

to the downturn in the manufacturing industry and the relevance of the VCM FDMS correction which up until 2010 was taken from over 100km away.

1.4.11 Further Assessment of PM₁₀ at Low Santon

This Further Assessment was undertaken because of continued exceedances of the Annual Mean Objective of 40µg/m³ at Low Santon, Scunthorpe. Because of this an Air Quality Management Area was declared on the 10th December 2008.

The study looked at a number of factors likely to influence the elevated concentrations being recorded at Low Santon including:

- Location of the monitoring stations
- Method of measurement
- Historical MET data
- Particle size fractions
- Relationships with other pollutants
- Triangulation with other monitoring stations
- Directional analysis

The study also reviewed ongoing work designed to inform interested parties of exceedance risk and ongoing area contributions including:

- North Lincolnshire Council Tea Break Report
- North Lincolnshire Council Daily Review Analysis
- North Lincolnshire Council PM₁₀ Alert System
- North Lincolnshire Council Low Santon PM₁₀ Risk Assessment
- AEA Low Santon Modelling Report
- Environment Agency PM₁₀ Action Plan

1.4.12 Progress Report 2011

The 2011 Progress Report highlighted a new exceedance of the air quality objectives. The report reconsidered all potential sources of pollution (primarily industry and traffic related sources) with respect to PM₁₀ (particulate matter), nitrogen dioxide, sulphur dioxide & benzene. Additional NO₂ tubes identified a potential exceedance along the A160 Road in South Killingholme. This is currently being investigated. Problems persisted within the two declared AQMA's:

- 2005 Scunthorpe AQMA for breaches of PM₁₀ daily mean objective.
- 2008 Low Santon AQMA for breaches of the PM₁₀ annual mean objective.

Low Santon demonstrated an improvement on previous years but was still well in excess of the Daily Mean Objective. Sites within Scunthorpe recorded compliant results for both Objectives.

1.4.13 Updating & Screening Assessment 2012

This report considers all potential sources of air pollution within North Lincolnshire which are made up primarily of industrial and traffic sources. Continuing problems have been highlighted within the local area relating to PM₁₀ which has previously resulted in the declaration of two Air Quality Management Areas (AQMA):

- 2005 Scunthorpe AQMA for breaches of PM₁₀ daily mean objective.
- 2008 Low Santon AQMA for breaches of the PM₁₀ annual mean objective.

2011 PM₁₀ data has shown an overall increase in the number of exceedances across the network due to unusual meteorological conditions throughout the year 2011.

A potential new exceedance of the air quality objective for NO₂ was identified at South Killingholme in the 2011 Progress Report. A Detailed Assessment of this location is currently being prepared and will be sent to DEFRA when finalised. All other sources assessed have not met the criteria required to proceed to a Detailed Assessment.

1.4.14 Progress Report 2013

The 2013 Progress Report highlighted no new locations that breached the air quality objectives. This report reconsidered all potential sources of pollution primarily industry and traffic related sources. The main purpose of the report is to identify those aspects that have changed since completion of the 2012 Updating & Screening Assessment. Continuing problems were highlighted within the local area relating to PM₁₀ daily mean exceedances which previously resulted in the declaration of two Air Quality Management Areas. Data from 2012 has shown an overall improvement at the relevant monitoring sites but the report suggested that any improvement should be met with caution because of changing meteorological conditions with considerable amount of rainfall throughout the year and reductions in overall steel production.

1.4.15 North Lincolnshire Council Air Quality Management Areas

North Lincolnshire Council has declared two Air Quality Management areas due to the continuing problems relating to PM₁₀ air quality objective breaches:

- 2005 Scunthorpe AQMA for breaches of PM₁₀ daily mean objective (Figure 1.1).
- 2008 Low Santon AQMA for breaches of the PM₁₀ annual mean objective (Figure 1.2).

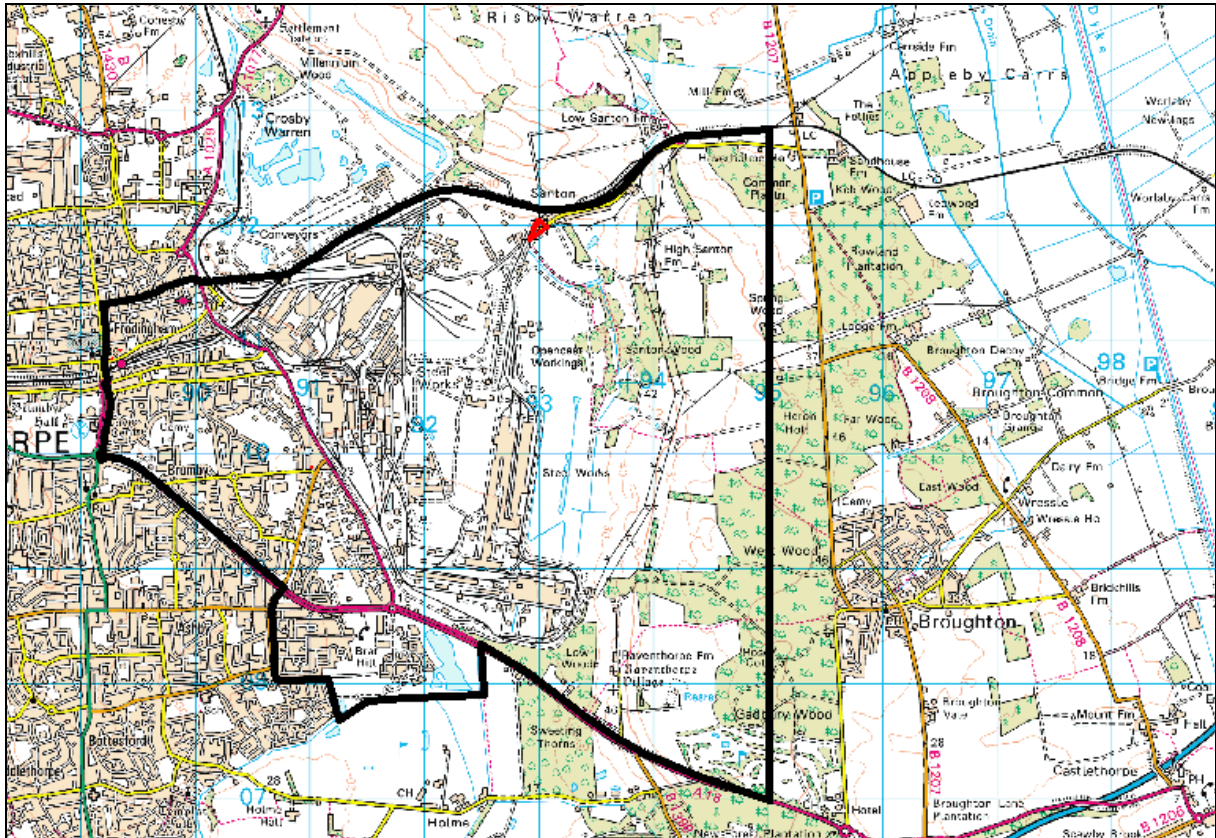


Figure 1.1: 2005 Scunthorpe Town AQMA Boundary in black. The small red area within the boundary is the 2008 Low Santon AQMA boundary for PM₁₀ annual mean objective.

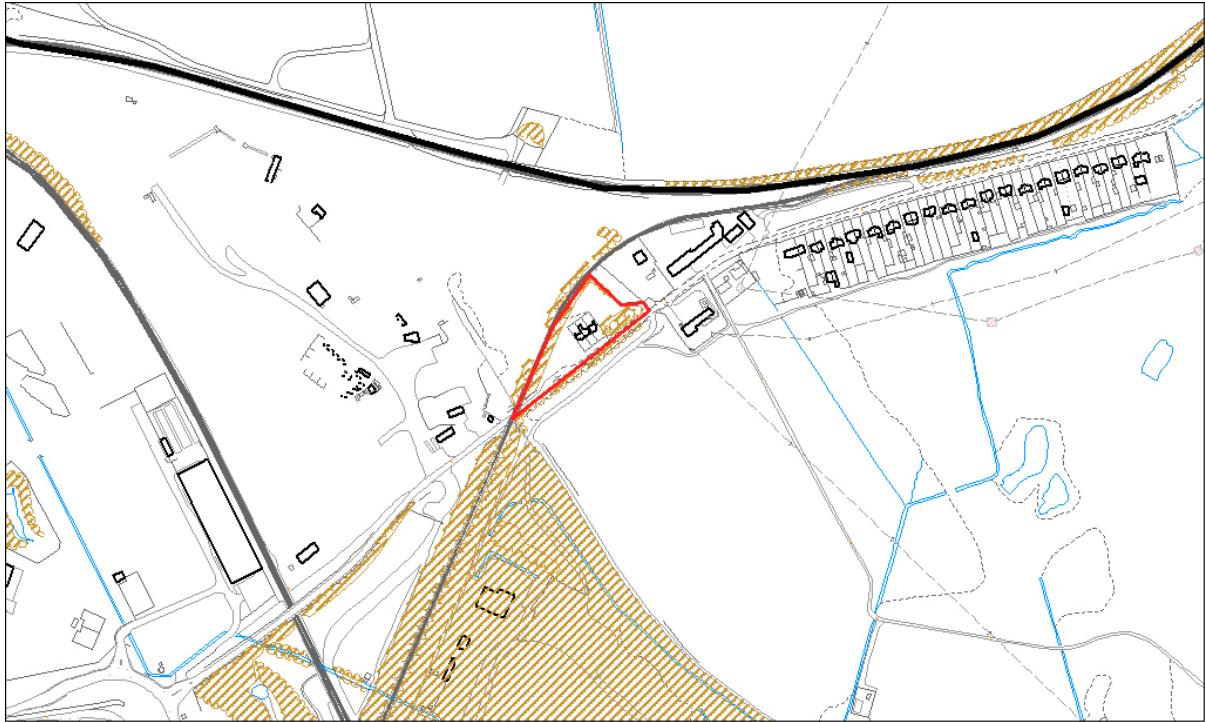


Figure 1.2: 2008 Low Santon AQMA Boundary, which sits inside the boundary of the 2005 Scunthorpe Town AQMA Boundary.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Scunthorpe Town AURN (Rowland Road)

This monitoring station is housed within an enclosed air-conditioned unit in the northeast of Scunthorpe approximately 10 metres to the north of Rowland Road. The nearest busy road is Brigg Road (A1029), at its closest point it is 124 metres to the northeast of the monitoring site. The monitoring equipment at the station consists of an Enviro-Technology Services model 100A Fluorescent sulphur dioxide (SO₂) analyser, a Monitor Labs Inc ML9841B oxides of nitrogen chemi-luminescence analyser and a Rupprecht & Patterschnick TEOM 1400a PM₁₀ monitor. The logging system used is an Odessa DSM3260. In addition wind direction and wind speed are measured at this site. The PM₁₀, NO_x and SO₂ analysers are affiliate members of the AURN (Automatic and Urban Rural Network). The site also comprises of an equivalent Partisol Particulate Monitor (Now Suspended 31/03/2010), a National Physical Laboratory funded Heavy Metals sampler and a Digital DHA-80 High volume PAH sampler. An FDMS C was installed in the Monitoring Station in January 2010 designed to increase confidence in the Volatile Correction Model currently used to correct the TEOM network.

East Common Lane

PM₁₀ is monitored at this site using a TEOM 1400a. This site is located behind a block of flats, 34m south of East Common Lane, to the west of the site is a residential area; whilst to the northeast and southeast are several industrial estates. The site is approximately 500 m west of the steelworks site boundary.

Low Santon

This monitoring station is housed within an enclosed air-conditioned unit to the north east of Scunthorpe on the eastern boundary of the steelworks. Dawes Lane is 5m to the south of the station, running from a rural location in the east through the steelworks and into Scunthorpe. A raised embankment 5m north of the site carries freight traffic along one of the major rail lines into the steelworks. The surrounding area consists of arable fields with a number of trees and to the east, a small

residential area. The monitoring equipment at this station consists of a Signal Ambitech Ambirak analyser, monitoring sulphur dioxide and oxides of nitrogen, and a Rupprecht & Patterschnick TEOM 1400a monitoring PM₁₀. In addition, a Digitel DHA-80 High volume PAH sampler began operation at the site in September 2007. A Partisol 2000 was installed in April 2008 to measure concentrations of heavy metals. Further to this an additional Rupprecht & Patterschnick TEOM 1400a was installed in June 2008 to monitor PM_{2.5}. An FDMS C was installed in the Monitoring Station in March 2010 designed to increase confidence in the Volatile Correction Model currently used to correct the TEOM network and to aid the Further Assessment at Low Santon.

High Santon

This monitoring station is located in a domestic garden 400m from the Low Santon monitoring station. The site comprises of a Partisol 2000 equivalent particulate monitor and was installed in January 2008.

Redbourn Club

PM₁₀ is monitored at this site using a TEOM 1400a. Redbourn Club is a sports and social club situated 1km from the boundary of the local Integrated Steelworks. The monitoring station is sited away from buildings and trees close to the boundary of the clubs cricket pitch.

Lakeside

The Lakeside monitoring station sits within a newly built housing development 600m to the south of the local Integrated Steelworks. Its placement was due to the introduction of receptors close to the boundary of the steel making facility. It is sited within the front garden of a house.

Appleby Village

This site is located on a playing field in the village of Appleby, see figure 1.4; the village is surrounded by arable fields and open fields and is 6 km northeast of Scunthorpe. PM₁₀ is monitored at this site using a TEOM 1400a.

Killingholme Main site

The site is located within the grounds of South Killingholme Primary School and is approximately 200m north of the dual-carriage A160; see figure 2.3. Two refineries

are located to the northeast and east of the site. The site is approximately 4 km west of the River Humber and the Port of Immingham. The site is approximately 20 km east of the Air Quality Management Area in Scunthorpe. Sulphur dioxide, oxides of nitrogen and PM₁₀ are the three pollutants measured at this site. In addition wind direction and speed, relative humidity, pressure and temperature are also measured. A pumped Benzene Tube was installed in September 2008 as part of the National Hydrocarbon Network.

Killingholme NOx Analyser

The site is located close to Habrough Roundabout on A160 Humber Road and situated on a council owned grass land approximate 10m from the adjacent A160 road when travelling east from Habrough road. This site has been installed recently (late 2013) and currently monitoring only oxides of nitrogen from the traffic movement on the A160.

Church Square

The site was located west of Scunthorpe Steelworks and close to 20-21 Visual Arts Centre at Church Square on council owned land. The nearest road is Brigg Road and the distance from the site is approximately 78m. The site started operated from July 2013 monitoring PM₁₀ using a Rupprecht & Patterschnick TEOM 1400a monitor. This monitor was removed in July 2014 as the site is currently being redeveloped.

High Street East (Operational Since August 2014)

In August 2014 a Rupprecht & Patterschnick TEOM 1400a monitor was installed on High Street East.

The following figure 2.1 shows the location of the North Lincolnshire Council automatic monitoring stations and table 2.1 shows the details of the automatic monitoring stations.

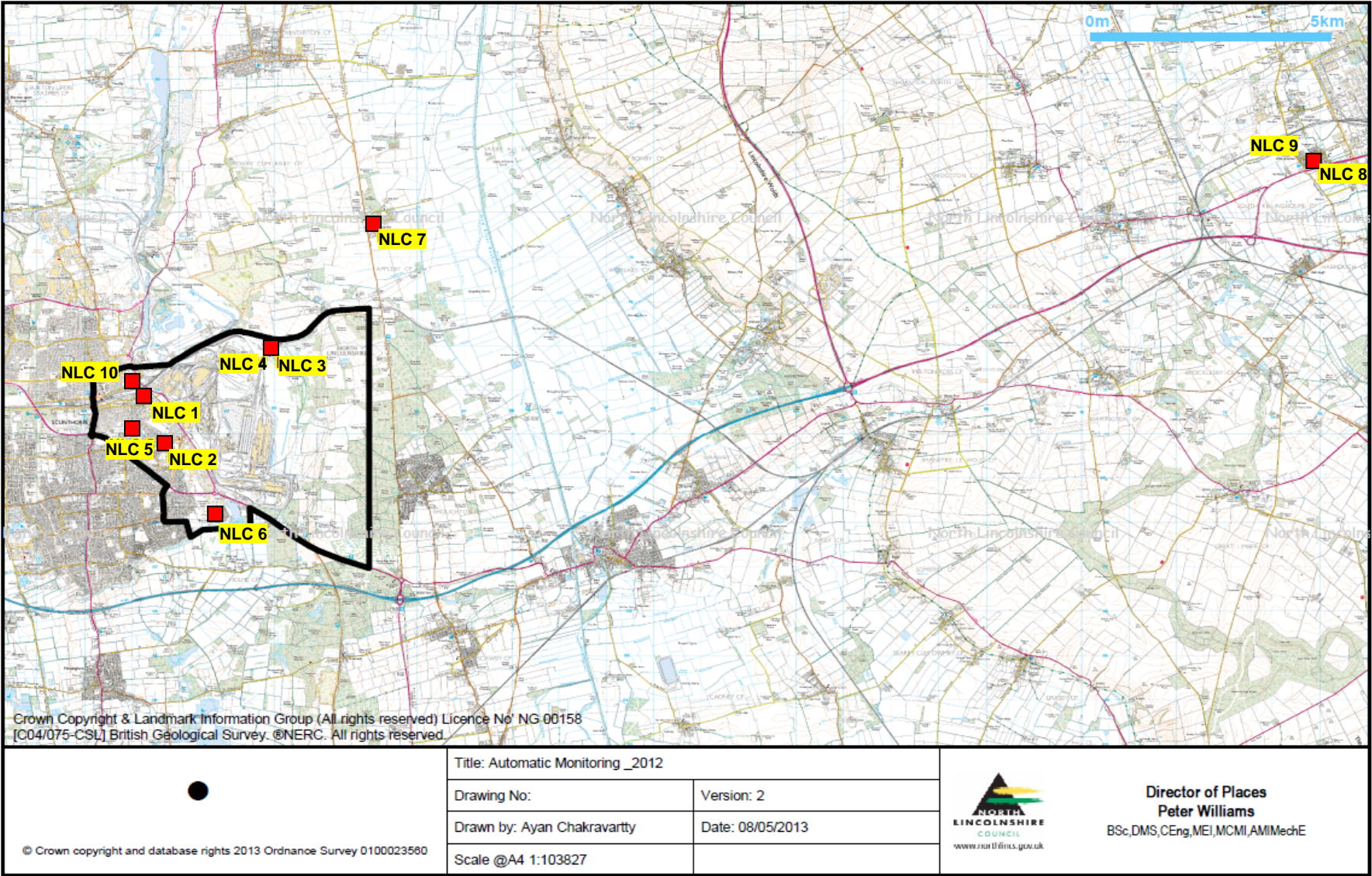


Figure 2.1: All Automatic monitoring location

Table 2.1: Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	*1Relevant Exposure?	Distance to kerb of nearest road	Does this location represent worst-case exposure?
NLC 1	Scunthorpe Town (AURN)	Urban Industrial	490320	410831	PM ₁₀ , SO ₂ , NO ₂	Yes	FDMS, TEOM, Gas	Y (21m)	7m	N
NLC 2	East Common Lane	Urban Industrial	490663	409789	PM ₁₀	Yes	TEOM	Y (3m)	N/A	N
NLC 3	Low Santon	Industrial	492945	411931	PM ₁₀ , SO ₂ , NO ₂	Yes	FDMS, TEOM, Gas	Y (41m)	5m	N
NLC 4	High Santon	Industrial	492945	411931	PM ₁₀	Yes	Partisol	Y (8m)	5m	N
NLC 5	Redbourn Club	Urban	490002	410069	PM ₁₀	Yes	TEOM	Y (15m)	N/A	N
NLC 6	Lakeside	Urban Industrial	491750	408127	PM ₁₀	Yes	TEOM	Y (4m)	8m	N
NLC 7	Appleby	Rural	495075	414767	PM ₁₀	No	TEOM	Y (17m)	N/A	N
NLC 8	Killingholme (main site)	Urban Industrial	514880	416133	PM ₁₀ , SO ₂ , NO ₂	No	TEOM, Gas	Y (9m)	N/A	N
NLC 9	South Killingholme NO _x analyser	Urban Industrial	514810	415991	NO ₂	No	Gas	Y (9m)	10m	N
NLC10	Church Square House	Urban Industrial	489989	411430	PM ₁₀	Yes	TEOM	NA (17m)	N/A	N

*1 (Y/N with distance (m) from monitoring site to relevant exposure)

2.1.2 Non-Automatic Monitoring Sites

North Lincolnshire Council operated a nitrogen dioxide diffusion tube network consisting up to 36 sites during 2011. The number of tubes has been reduced in 2012 to 23 due to consistent compliance of some of the tubes over a number of years. During 2013 we introduced 3 more tubes for colocation study at South Killingholme, totalling 26 diffusion tubes within North Lincolnshire.

The diffusion tubes are supplied and analysed by Environmental Scientifics Group (ESG). Each diffusion tube is analysed in accordance with ESG's standard operating procedure HS/WI/1015 issue 15. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance.

The tubes were prepared by spiking acetone:triethanolamine (50:50) onto 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.

North Lincolnshire Council has followed the guidance in relation to applying a bias adjustment calculation. Only one full calendar year colocation study was conducted within North Lincolnshire in 2013 at Scunthorpe Town AURN site. A new colocation study has been introduced with the new South Killingholme NO_x analyser towards the end of 2013.

The bias adjustment for this report was calculated using data from Scunthorpe Town NO₂ triplicate study and the collocated AURN chemiluminescence NO_x analyser. Data capture for the AURN site over the period was good for both the automatic and non-automatic methods allowing for the local bias to be applied.

A summary of precision results for nitrogen dioxide diffusion tube colocation studies indicates that Environmental Scientific Group operates to a high level of precision in accordance with the Laboratory Workplace Analysis Scheme for Proficiency, (WASP) scheme. This can be viewed in the appendix of this document.

The following figures 2.4 to 2.9 below show the location of North Lincolnshire Council non-automatic monitoring stations and the table 2.2 showing the details of the non-automatic monitoring stations.

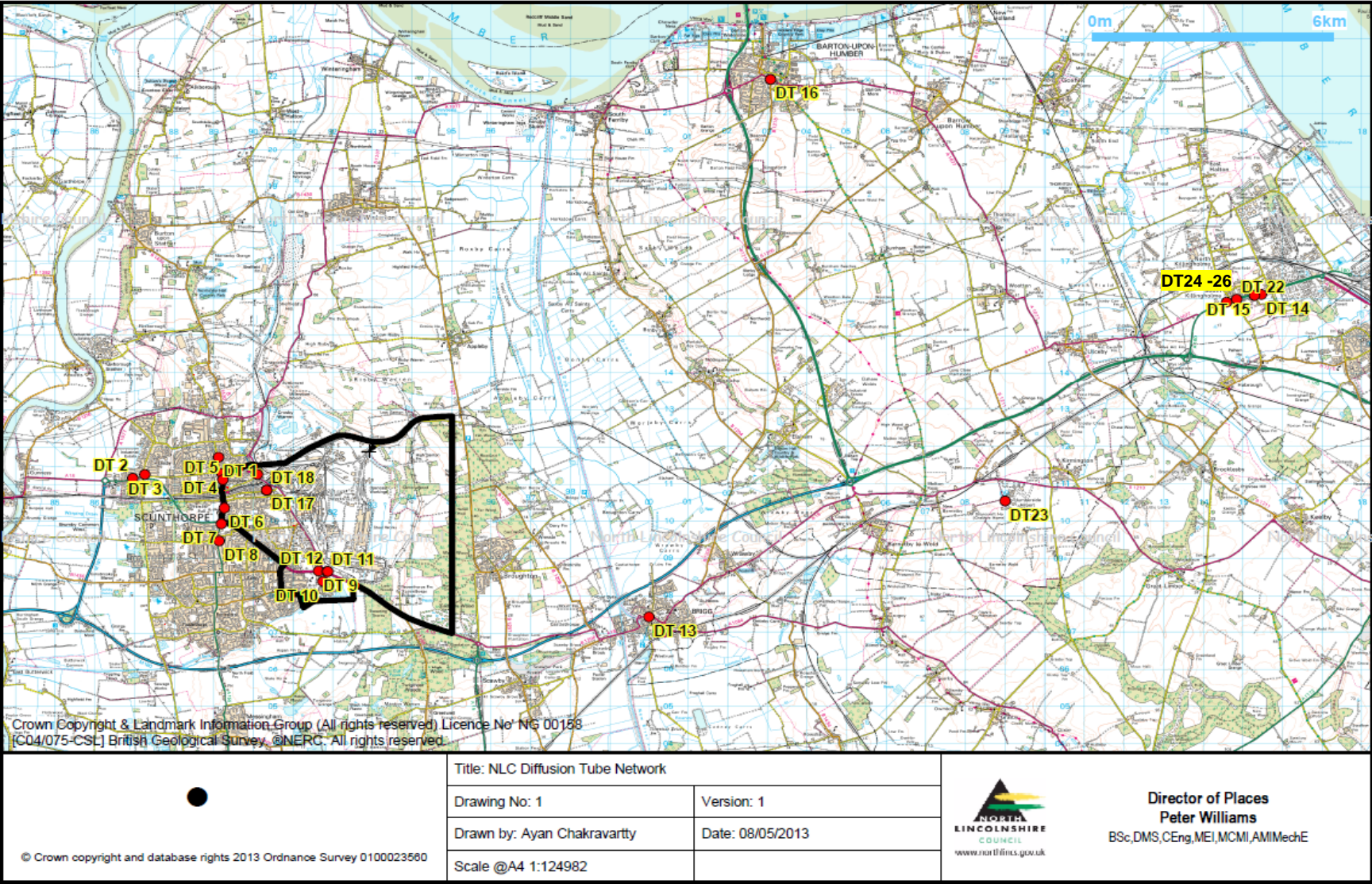


Figure 2.2: Diffusion tube monitoring location

Table 2.2: Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA ?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure ? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT 1	Frodingham Road	Urban	489099	411723	2-2.5(m)	NO ₂	No	No	3m	1m	Y
DT 2	Doncaster Road Hilton Avenue	Suburban Roadside	486928	411156	2-2.5(m)	NO ₂	No	No	12m	3m	Y
DT 3	Scotter Road (North side of roundabout)	Suburban Kerbside	487239	411259	2-2.5(m)	NO ₂	No	No	9m	2m	Y
DT 4	Britannia Corner	Urban Roadside	489190	411285	2-2.5(m)	NO ₂	Yes	No	4m	2m	Y
DT 5	Oswald Road	Urban Kerbside	489209	411118	2-2.5(m)	NO ₂	Yes	No	4m	3m	Y
DT 6	Ashby Road	Urban Kerbside	849247	410355	2-2.5(m)	NO ₂	Yes	No	20m	1m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA ?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure ? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT 7	Jct A18/Ashby Road	Urban Kerbside	489172	409926	2-2.5(m)	NO ₂	Yes	No	20m	2m	Y
DT 8	Ashby Road (Brumby Street)	Urban Kerbside	489112	409463	2-2.5(m)	NO ₂	No	No	15m	1m	Y
DT 9	Dudley Road/Queens way	Urban Roadside	491628	408658	2-2.5(m)	NO ₂	Yes	No	30m	2m	Y
DT 10	Lakeside Parkway	Suburban Roadside	491737	408378	2-2.5(m)	NO ₂	Yes	No	NA	2m	Y
DT 11	Junction Brigg Road/A18	Industrial Roadside	491838	408641	2-2.5(m)	NO ₂	Yes	No	NA	9m	Y
DT 12	Front of Ashby Lodge Pub	Industrial Roadside	491859	408645	2-2.5(m)	NO ₂	Yes	No	13m	9m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA ?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure ? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT 13	Barnard Avenue Brigg	Urban Kerbside	499975	407421	2-2.5(m)	NO ₂	No	No	60m	3m	Y
DT 14	Humber Road, Chip shop	Industrial Roadside	515452	416107	2-2.5(m)	NO ₂	No	No	35m	20m	N
DT 15	Humber Road, LP 695	Industrial Kerbside	515279	416085	2-2.5(m)	NO ₂	No	No	10m	1m	N
DT 16	Holydyke Barton	Suburban Kerbside	503048	421907	2-2.5(m)	NO ₂	No	No	10m	1m	Y
DT 17	Rowland Road AQ station	Industrial Roadside	490316	410837	2-2.5(m)	NO ₂	Yes	Yes	NA	6m	N
DT 18	Rowland Road AQ station	Industrial Roadside	490316	410837	2-2.5(m)	NO ₂	Yes	Yes	NA	6m	N
DT 19	Rowland Road AQ station	Industrial Roadside	490316	410837	2-2.5(m)	NO ₂	Yes	Yes	NA	6m	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA ?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure ? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT 20	Station Road (Outside Asda)	Industrial Roadside	490080	411258	2-2.5(m)	NO ₂	Yes	No	NA	2m	N
DT 21	Killingholme 4	Suburban Roadside	514573	415901	2-2.5(m)	NO ₂	No	No	15m	2m	Y
DT 22	Killingholme 5	Suburban Roadside	514827	415982	2-2.5(m)	NO ₂	No	No	19m	1m	Y
DT23	Humberside Airport	Suburban Roadside	508974	410543	2-2.5(m)	NO ₂	No	No	NA	NA	N
DT24	Killingholme NOx analyser	Suburban Roadside	514770	415967	2-2.5(m)	NO ₂	No	Yes	NA	1m	Y
DT25	Killingholme NOx analyser	Suburban Roadside	514770	415967	2-2.5(m)	NO ₂	No	Yes	NA	1m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Site Height (m)	Pollutants Monitored	In AQMA ?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure ? (Y/N <i>with distance (m) from monitoring site to relevant exposure)</i>	Distance to Kerb of Nearest Road (m) (N/A <i>if not applicabl e)</i>	Does this Location Represent Worst- Case Exposure?
DT26	Killingholme NOx analyser	Suburban Roadside	514770	415967	2- 2.5(m)	NO2	No	Yes	NA	1m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

This section will outline the ratified 2013 monitoring data for internal and external monitoring network. During 2013 North Lincolnshire Council operated 10 automatic monitoring sites and 26 non-automatic (diffusion tube) monitoring sites. North Lincolnshire Council also continued to facilitate a number of external networks within its boundary such as the PAH network and Heavy Metals network. The most recent results available from the external monitoring network will also be presented in this section. The guidelines stated in LAQM.TG(09) was used for air quality data review and assessment and where data capture is less than 75% of a full calendar year, available data was annualised before being compared to annual mean objectives.

2.2.1 Nitrogen Dioxide (NO₂)

Automatic Monitoring Data

North Lincolnshire Council currently operates 3 sites for monitoring NO₂ as shown in table 2.3 which confirms all NO₂ measurement sites were compliant during 2013. Previous Air Quality reports also have no record of any exceedances of the annual mean objective since the NO₂ automatic monitoring began. All sites have demonstrated compliance with relevant Objectives. However, it should be noted that the annual average concentration at Scunthorpe Town during 2013 has increased considerably compared to previous years. Year to date data for 2014 at Scunthorpe Town has indicated a further increase of NO₂ concentration compared to last year. This could be due to increases in traffic movement (particularly HGV's) on Brigg Road. The next Updating and Screening Assessment in 2015 will report the findings from 2014 monitoring.

As highlighted in the 2013 progress report, the council previously identified a possible issue with higher NO₂ concentrations at South Killingholme due to traffic related emissions at the A160 road to Immingham. As part of the detailed assessment procedure an automatic NO₂ analyser has been installed close to Habrough Roundabout on the A160 Road near South Killingholme. A detailed assessment will be produced once a full calendar year data is available. However, the early indication from the year to date monitoring data indicates that the monitor will not breach the relevant air quality objectives.

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

Site Name	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2013 % ^b	Annual Mean Concentration (µg/m ³)				
					2009 ^c	2010 ^c	2011 ^c	2012 ^c	2013 ^c
Scunthorpe Town	Urban Industrial	Yes	NA	93.4	17.8	19.7	19.9	19.7	27.0
Low Santon	Industrial	Yes	NA	98.9	18.7	18.9	19.1	18.6	16.41
Killingholme School Site	Urban Industrial	No	NA	99.2	18.7	21	21.4	21.1	22.4
Killingholme A160 Roadside NOx Analyser									27.1 ^(19.4)

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

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

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

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

* Annual mean concentrations for previous years are optional

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

Site Name	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2013 % ^b	Number of Hourly Means > 200µg/m ³				
					2009 ^c	2010 ^c	2011 ^c	2012 ^c	2013 ^c
Scunthorpe Town	Urban Industrial	Yes	NA	93.4	0	0	0	0	2
Low Santon	Industrial	Yes	NA	98.9	0	0	0	0	0
Killingholme School Site	Urban Industrial	No	NA	99.2	0	0	0	0	0
Killingholme A160 Roadside NOx Analyser	Urban Industrial	No	NA	13.2					0

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

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

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

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

* Number of exceedences for previous years is optional

Diffusion Tube Monitoring Data

For most of 2013 North Lincolnshire Council operated a diffusion tube network consisting of 23 tubes and towards the end of the year, 3 new diffusion tubes were introduced near the new Killingholme A160 Roadside monitor for the purpose of future bias adjustment. Table 2.5 shows the results of the 2013 diffusion tube network and table 2.6 shows the comparison of 2013 results with previous years results.

North Lincolnshire Council elected to use its own bias adjustment for the 2013 Nitrogen Dioxide diffusion tube study as it has done in previous years. The method is explained in Appendix 1 of this document. Table 2.5 shows that during 2013 ten of the NO₂ diffusion tube locations (tube DT3, 4, 11, 13, 15, 21, 22, 24, 25 and 26) have breached the annual mean objective of 40µg/m³. Only two tubes, DT4 and 11, are within our current air quality management area. Two tubes, DT3 and 13, are situated at kerbside locations and represent worst case scenarios. The remaining six tubes are located in South Killingholme.

The Britannia corner tube (DT4) is situated at an urban roadside location at a busy junction in a worst case scenario and despite this the tube only just exceeded the annual objective. In 2012 this tube recorded 30µg/m³ and therefore this location will be closely monitored over the next year to ensure that it does not deteriorate further.

The Brigg Road/ A18 junction tube (DT11) is situated in an industrial background site close to a busy road junction. The 2009 Updating and Screening Assessment investigated this location further to rule out the need to progress to a Detailed Assessment. The report highlighted the nearest relevant receptor is a residential estate located 300m to the south. According to the method stated in LAQM TG(09), fall-off in Nitrogen Dioxide concentrations with distance from roads, the predicted levels of Nitrogen Dioxide at 50m distance was 34.0 µg/m³ which is within the air quality annual mean objective of 40 µg/m³. In addition a tube was located at the façade of the closest building (DT12) which demonstrates compliance with the objective in 2013.

In order to investigate the elevated NO₂ level in South Killingholme, a new automatic NO_x analyser has been installed at South Killingholme next to the A160 road as part of the Detailed Assessment process that will follow shortly once a full calendar year data is available. To provide better access to the Port of Immingham and surrounding

area, the Highways Agency are upgrading the A160 and A180. Work has already started on the A160/A180 Port of Immingham Improvement Scheme. It is anticipated that construction will take approximately 16 months and should be completed by autumn 2016. The objectives of the scheme are to reduce traffic congestion and improve journey time reliability to meet the needs of current traffic flows and predicted growth in traffic resulting from existing and future developments. The scheme seeks to improve safety for road users and the local community. The upgrade works will affect the Habrough roundabout junction close to the automatic NO_x analyser; therefore monitoring will be required for a period of at least twelve months after the works have been completed to assess the effect on NO₂ concentrations.

Table 2.5: Results of NO2 Diffusion Tubes 2013

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months) ^a	Uncorrected results	2013 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.99 ^b
DT 1	Frodingham Road	Urban	No	Single	8	35	35
DT 2	Doncaster Road Hilton Avenue	Suburban Roadside	No	Single	12	34	34
DT 3	Scotter Road (North side of roundabout)	Suburban Kerbside	No	Single	11	41	41
DT 4	Britannia Corner	Urban Roadside	Yes	Single	11	42	41
DT 5	Oswald Road	Urban Kerbside	Yes	Single	11	38	38
DT 6	Ashby Road	Urban Kerbside	Yes	Single	12	37	36
DT 7	Jct A18/Ashby Road	Urban Kerbside	Yes	Single	12	38	37
DT 8	Ashby Road (Brumby Street)	Urban Kerbside	No	Single	11	40	39
DT 9	Dudley Road/Queensway	Urban Roadside	Yes	Single	12	30	30
DT 10	Lakeside Parkway (Towards partisol)	Suburban Roadside	Yes	Single	10	33	32
DT 11	Junction Brigg Road/A18	Industrial Roadside	Yes	Single	12	61	60
DT 12	Front of Ashby Lodge Pub	Industrial Roadside	Yes	Single	12	33	33
DT 13	Barnard Avenue Brigg	Urban Kerbside	No	Single	11	40	40
DT 14	Humber Road, Chip shop	Industrial Roadside	No	Single	12	30	30

DT 15	Humber Road, LP 695	Industrial Kerbside	No	Single	12	46	45
DT 16	Holydyke Barton	Suburban Kerbside	No	Single	12	34	34
DT 17	Rowland Road AQ station	Industrial Roadside	Yes	Triplicate & Colocated	12	26	26
DT 18	Rowland Road AQ station	Industrial Roadside	Yes	Triplicate & Colocated	12	27	26
DT 19	Rowland Road AQ station	Industrial Roadside	Yes	Triplicate & Colocated	12	29	28
DT 20	Station Road (Outside Asda)	Industrial Roadside	Yes	Single	9	34	33
DT 21	Killingholme 4	Suburban Roadside	No	Single	12	52	51
DT 22	Killingholme 5	Suburban Roadside	No	Single	12	65	<u>64</u>
DT23	Humberside Airport	Suburban Roadside	No	Single	12	16	16
DT24	Killingholme NO _x Analyser	Suburban Roadside	No	Triplicate & Colocated	3	49	48
DT25	Killingholme NO _x Analyser	Suburban Roadside	No	Triplicate & Colocated	3	52	51
DT26	Killingholme NO _x Analyser	Suburban Roadside	No	Triplicate & Colocated	3	54	53

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

Underlined, annual mean > 60µg/m³, indicating a potential exceedence of the NO₂ hourly mean AQS objective

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

^b If an exceedence is measured at a monitoring site not representative of public exposure, NO₂ concentration at the nearest relevant exposure should be estimated based on the “NO₂ fall-off with distance” calculator (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>), and results should be discussed in a specific section. The procedure is also explained in Box 2.3 of Technical Guidance LAQM.TG(09) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=30>).

Table 2.6: Results of NO₂ Diffusion Tubes (2009 to 2013)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ^a				
			2009 (Bias Adjustment Factor = 0.69)	2010 (Bias Adjustment Factor = 0.71)	2011 (Bias Adjustment Factor = 0.68)	2012 (Bias Adjustment Factor = 0.67)	2013 (Bias Adjustment Factor = 0.99)
DT 1	Frodingham Road	Urban	22.0	23.7	25.0	26.7	35
DT 2	Doncaster Road Hilton Avenue	Suburban Roadside	23.1	22.3	25.6	23.8 ^a	34
DT 3	Scotter Road (North side of roundabout)	Suburban Kerbside	32.8	32.8 ^a	27.9 ^a	26.2	41
DT 4	Britannia Corner	Urban Roadside	27.1	29.5	29.5	30.3	41
DT 5	Oswald Road	Urban Kerbside	24.4	26.7	27.0	26.6	38
DT 6	Ashby Road	Urban Kerbside	21.3	24.2	23.6	25.2	36
DT 7	Jct A18/Ashby Road	Urban Kerbside	24.2	26.1	26.2	26.9	37
DT 8	Ashby Road (Brumby Street)	Urban Kerbside	26.8	28.8	28.1	27.9	39
DT 9	Dudley Road/Queensway	Urban Roadside	19.6	22.8	21.4	21.7	30
DT 10	Lakeside Parkway (Towards partisol)	Suburban Roadside	19.1	22.5	20.1	21.9	32
DT 11	Junction Brigg Road/A18	Industrial Roadside	35.9	41.9	43.5	43.4	60
DT 12	Front of Ashby Lodge Pub	Industrial Roadside	23.9	22.2	26.1	24.8	33
DT 13	Barnard Avenue Brigg	Urban Kerbside	25.5	25.6	22.0	21.0	40
DT 14	Humber Road, Chip shop	Industrial Roadside	23.8	22.9	19.4	19.9	30

DT 15	Humber Road, LP 695	Industrial Kerbside	28.5	29.5	29.7	19.0	45
DT 16	Holydyke Barton	Suburban Kerbside	20.7	24.8	22.4	20.9	34
DT 17	Rowland Road AQ station	Industrial Roadside	17.9	19.8	18.8	25.2	26
DT 18	Rowland Road AQ station	Industrial Roadside	17.1	20.0	20.1	27.1	26
DT 19	Rowland Road AQ station	Industrial Roadside	19.0	19.7	20.2	20.7	28
DT 20	Station Road (Outside Asda)	Industrial Roadside	21.7	24.1	22.1	30.3	33
DT 21	Killingholme 4	Suburban Roadside			44.3	37.6	51
DT 22	Killingholme 5	Suburban Roadside			40.1	42.5	<u>64</u>
DT23	Humberside Airport	Suburban Roadside			11.6 ^a	12.3	16
DT24	Killingholme NO _x Analyser	Suburban Roadside					48
DT25	Killingholme NO _x Analyser	Suburban Roadside					51
DT26	Killingholme NO _x Analyser	Suburban Roadside					53

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

Underlined, annual mean > 60µg/m³, indicating a potential exceedence of the NO₂ hourly mean AQS objective

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

2.2.2 Particulate Matter (PM₁₀)

Table 2.7 reports data collected using the TEOM, FDMS and Partisol measurement methods. The TEOM measurement data has been subject to the Volatile Correction Model (VCM). Where data capture was less than the minimum annual requirement, data has been annualised as per Box 3.2 of TG (09). North Lincolnshire Council has declared two air quality management areas for breaches of both PM₁₀ Objectives. The main source of PM₁₀ emission in Scunthorpe is the Integrated Steelworks. Previous assessments have addressed many of the poor air quality issues around the Integrated Steelworks. Recent data demonstrates that efforts to reduce emissions around the Santon area have led to a decrease in measured PM₁₀. Sites to the west of the steelworks, specifically Scunthorpe Town, Redbourn Club and East Common Lane, do not show this level of improvement. The East Common Lane site is a specific concern with 35 exceedances of the daily objective in 2013 and a breach of this objective looking possible in 2014. This issue has been highlighted with the Environment Agency and operators on the integrated steelworks site at the Local Industry Forum. Further analysis of the data will be undertaken by the Technical Working Group and operators are being encouraged to implement schemes to reduce PM₁₀ emissions in this area.

Table 2.7: Results of Automatic Monitoring for PM10: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2013 % ^b	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)					
						2008 ^c	2009 ^c	2010 ^c	2011 ^c	2012 ^c	2013 ^c
NLC 1. Scunthorpe Town (FDMS)	Urban Industrial	Y	N/A	86.6	Y			23	22.2	20.8	22.6
NLC 1. Scunthorpe Town (TEOM)	Urban Industrial	Y	N/A	94	Y	21.8	20.9	21.3 ^c	22.5	20.9	23.4
NLC 2. East Common Lane	Urban Industrial	Y	N/A	99.2	Y	23.6	21.1	22.7	24.3	22.3	25.2
NLC 3. Low Santon (FDMS)	Industrial	Y	N/A	94	Y			34.3 ^c	34.5	26.4	27.5
NLC 3. Low Santon (TEOM)	Industrial	Y	N/A	92.6	Y	36.6	37.8	32.6	38.7	28.5	33.3
NLC 4. High Santon	Industrial	Y	N/A	90.7	Y	30.6	26.8	23.7	29.5	4.8	25.3
NLC 5. Redbourn Club	Urban	Y	N/A	96.2	Y			19.9 ^c	22.2	19.7	21.8

NLC 6. Lakeside	Urban Industrial	N	N/A	79.8	Y				25.4 ^c	21.7	23.1
NLC 7. Appleby	Rural	N	N/A	94.3	Y	20.6	19.3	18.2	21.2	17.5	19.9
NLC 8. Killingholme	Urban Industrial	N	N/A	77.3	Y	20.1	19.8	19.4	21	19.3	18.4
NLC 9. Church Square	Urban Industrial	Y	N/A		Y						19.6
NLC 10. Amvale	Urban Industrial	Y	N/A		Y						22.5

In bold, exceedence of the PM₁₀ annual mean AQS objective of 40µg/m³

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

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

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

* Annual mean concentrations for previous years are optional

Table 2.8: Results of Automatic Monitoring for PM10: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2013 % ^b	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m ³					
						2008 ^c	2009 ^c	2010 ^c	2011 ^c	2012 ^c	2013 ^c
NLC 1. Scunthorpe Town (FDMS)	Urban Industrial	Y	N/A	86.6	Y			13 (39)	20	10 (38)	20 (43)
NLC 1. Scunthorpe Town (TEOM)	Urban Industrial	Y	N/A	94	Y	20 (45)	9	6 (36)	24	16	24
NLC 2. East Common Lane	Urban Industrial	Y	N/A	99.2	Y	35	17	11	29	19	35
NLC 3. Low Santon (FDMS)	Industrial	Y	N/A	94	Y			33 (57.5)	55	16	20
NLC 3. Low Santon (TEOM)	Industrial	Y	N/A	92.6	Y	66 (64)	77	58	73 (63)	21	43
NLC 4. High Santon	Industrial	Y	N/A	90.7	Y	34 (50)	27	13 (38)	34	10	12
NLC 5. Redbourn Club	Urban	Y	N/A	96.2	Y			5 (31)	22	10	17

NLC 6. Lakeside	Urban Industrial	N	N/A	79.8	Y				15 (40)	12 (39)	12 (46)
NLC 7. Appleby	Rural	N	N/A	94.3	Y	5	3	1 (27)	7	1	6
NLC 8. Killingholme	Urban Industrial	N	N/A	77.3	Y	9	5	2	9	4 (34)	5 (33)
NLC 9. Church Square	Urban Industrial	Y	N/A	46.7	Y						2
NLC 10. Amvaley	Urban Industrial	Y	N/A	86.7	Y						9 (46)

In bold, exceedance of the PM₁₀ daily mean AQS objective (50µg/m³ – not to be exceeded more than 35 times per year)

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

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

^c if data capture for full calendar year is less than 90%, include the 90.4th percentile of 24-hour means in brackets

* Number of exceedances for previous years is optional

2.2.3 Sulphur Dioxide (SO₂)

North Lincolnshire Council continues to operate three automatic Sulphur Dioxide monitoring units located at Low Santon, Scunthorpe Town (AURN) and Killingholme. The results for the year 2013 can be seen in the table 2.9. There has been only one breach recorded for the 15 minute mean but this is well below the SO₂ objective threshold. All Sulphur Dioxide sites have historically demonstrated compliance even though they are all sited adjacent to major industrial activities. We do not anticipate any changes but will continue to monitor SO₂ at these locations.

Table 2.9: Results of Automatic Monitoring for SO₂: Comparison with Objectives

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2012 % ^b	Number of: ^c		
					15-minute Means > 266µg/m ³	1-hour Means > 350µg/m ³	24-hour Means > 125µg/m ³
NLC 1. Scunthorpe Town	Urban Industrial	Y	NA	97	1	0	0
NLC 3. Low Santon	Industrial	Y	NA	94	0	0	0
NLC 8. Killingholme	Urban Industrial	N	NA	95	0	0	0

In bold, exceedence of the relevant AQS objective (15-min mean = 35 allowed/year; 1-hour mean = 24 allowed/year; 24-hour mean = 3 allowed/year)

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

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

^c if data capture for full calendar year is less than 90%, include the relevant percentile in bracket (in µg/m³): 15-min mean = 99.9th; 1-hour mean = 99.7th; 24-hour mean = 99.2th percentile

2.2.4 Benzene

North Lincolnshire Council is currently monitoring Benzene at the Scunthorpe Town AURN site on behalf of Defra. Data collected from Defra confirmed none of the two objectives have breached at this site and the 2013 annual mean was 2.16 $\mu\text{g}/\text{m}^3$.

North Lincolnshire Council ceased the measurement of Benzene at Killingholme Primary School in 2009 after 18 months of compliant monitoring. There are no plans at this time to carry out further Benzene monitoring.

2.2.5 Other Pollutants Monitored

The 2008 ambient air quality directive (2008/50/EC) replaces all the previous EU legislation and sets targets for main air pollutants. The 2008 Directive along with the Fourth Daughter directive (2004/07/EC) was made law in the England Air Quality (Standards) Regulations 2010. The Fourth Daughter Directive sets target values for B[a]P, arsenic, cadmium and nickel and measurement requirements for mercury.

In addition to the pollutants presented below, North Lincolnshire Council also operate two heavy metals monitors and two PAH monitors at Scunthorpe Town and Low Santon. These are operated for NPL on behalf of DEFRA. The latest results are shown in Table 2.10 as follows:

Table 2.10: Heavy metal monitoring results for 2013 calendar year

Heavy Metal	Scunthorpe Town 2013 ng/m^3	Low Santon 2013 ng/m^3	Target value (calendar year)
Arsenic (As)	0.69	0.74	6 ng/m^3
Cadmium (Cd)	0.14	0.22	5 ng/m^3
Chromium (Cr)	5.6	3.87	
Copper (Cu)	5.1	4.79	
Iron (Fe)	621.1	1753.5	
Manganese (Mn)	21.45	7	
Nickel (Ni)	1.21	1.29	20 ng/m^3

Heavy Metal	Scunthorpe Town 2013 ng/m ³	Low Santon 2013 ng/m ³	Target value (calendar year)
Lead (Pb)	10.37	15.1	0.5 µg/m ³
Platinum (Pt)	0.004	0.004	
Vanadium (V)	1.51	4.2	
Zinc (Zn)	21.9	29.4	
Mercury (Hg)	0.02	0.01	
Cobalt	0.12	0.2	

North Lincolnshire records some of the highest specific heavy metal compounds and PAHs in the UK. These have previously been highlighted in all our previous review and assessment reports. PAH concentrations are influenced by coke processing on the Integrated Steelworks. The Environment Agency are working with Tata Steel to identify schemes to reduce PAHs in the Scunthorpe area. Table 2.11 shows that Low Santon recorded the highest concentrations out of all the UK PAH monitoring sites and previous reports state that the Low Santon site did not achieve compliance in any of the previous years since the monitoring station was installed.

Table 2.11: PAH monitoring results for 2013 calendar year

PAH Compound	2013 Low Santon ng/m ³	2013 Scunthorpe Town ng/m ³	Target (calendar year)
Benzo(a)pyrene	3.4	3.9	1 ng/m ³

2.2.6 Summary of Compliance with AQS Objectives

North Lincolnshire Council has examined the results from monitoring within and outside the AQMA boundary. Results highlighted that concentrations within the AQMA still have the potential to exceed the daily exceedance objective for PM₁₀ and the AQMA should remain. Continued effort from all concerned parties is required to reduce the number of air quality breaches.

Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

Elevated concentrations of NO₂ in Killingholme are being monitored by an automatic NO₂ Analyser and a Detailed Assessment report will be completed when sufficient data has been obtained.

Significant investment is required at the coke ovens to reduce the level of PAHs, however this may not be made in the short term as Tata have requested a derogation from meeting the relevant BAT conclusion requirements.

3 New Local Developments

North Lincolnshire Council has considered all new local developments for the 2013 calendar year and confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area. North Lincolnshire Council confirms that all the following have been considered:

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

Appendix A details the developments considered

4 Local / Regional Air Quality Strategy

North Lincolnshire Council does not have a formally adopted Air Quality Strategy. LAQM TG(09) suggests that councils who have declared AQMA's need not develop an Air Quality Strategy on the basis that the process of developing an AQMA is similar to the process of producing an Air Quality Strategy. North Lincolnshire Council has two AQMA's in place at present. The 2005 Scunthorpe AQMA for breaches of the PM₁₀ daily objective and the 2008 Low Santon AQMA for the breach of the annual mean objective. North Lincolnshire Council has implemented and directed a number of initiatives designed to tackle air quality concerns within the area. These initiatives form the basis of an Air Quality Strategy.

Local Industry Forum

Designed to bring all interested parties around the table and share monitoring results and share views on the likely origins of the problem. It is an opportunity for local industry to share best practice and report ongoing site improvements with other local operators.

AQMA Meetings

Strategic meetings involving Council Service Directors and Officers, Environment Agency, Public Health England and the Director of Public Health. Its purpose is to discuss monitoring results, review progress and set priorities across the stakeholder organisations.

Technical Working Group

A technical meeting to discuss monitoring results attended by AEAT, National Physical Laboratory, Environment Agency, North Lincolnshire Council, Tata Steel, Lafarge Tarmac, DEFRA, Lancaster and Leeds University. As a result of these meetings a number of initiatives have been put in place in order to reduce the impacts of the Integrated Steelworks. This group was originally set up to address issues around the Low Santon area, however it's brief is to expand in order to initiate and monitor site-wide improvements that would benefit the eastern side of Scunthorpe.

5 Air Quality Planning Policies

During 2012 North Lincolnshire Council produced an action plan for Low Santon and updated the existing action plan for Scunthorpe:

- Action Plan for Low Santon – 2012
- Action Plan for the Scunthorpe PM₁₀ AQMA – 2012

Both the reports can be found on the North Lincolnshire Council dedicated air quality website (www.nlincsair.info) through the following link:
<http://www.nlincsair.info/reports-and-guidance?view=reports>

The 2010 Progress Report initially presented guidance for the North Lincolnshire Council Planning Department designed to aid decision making on residential developments. This piece of work zoned the 2005 AQMA into areas where residential development was inappropriate at that time.

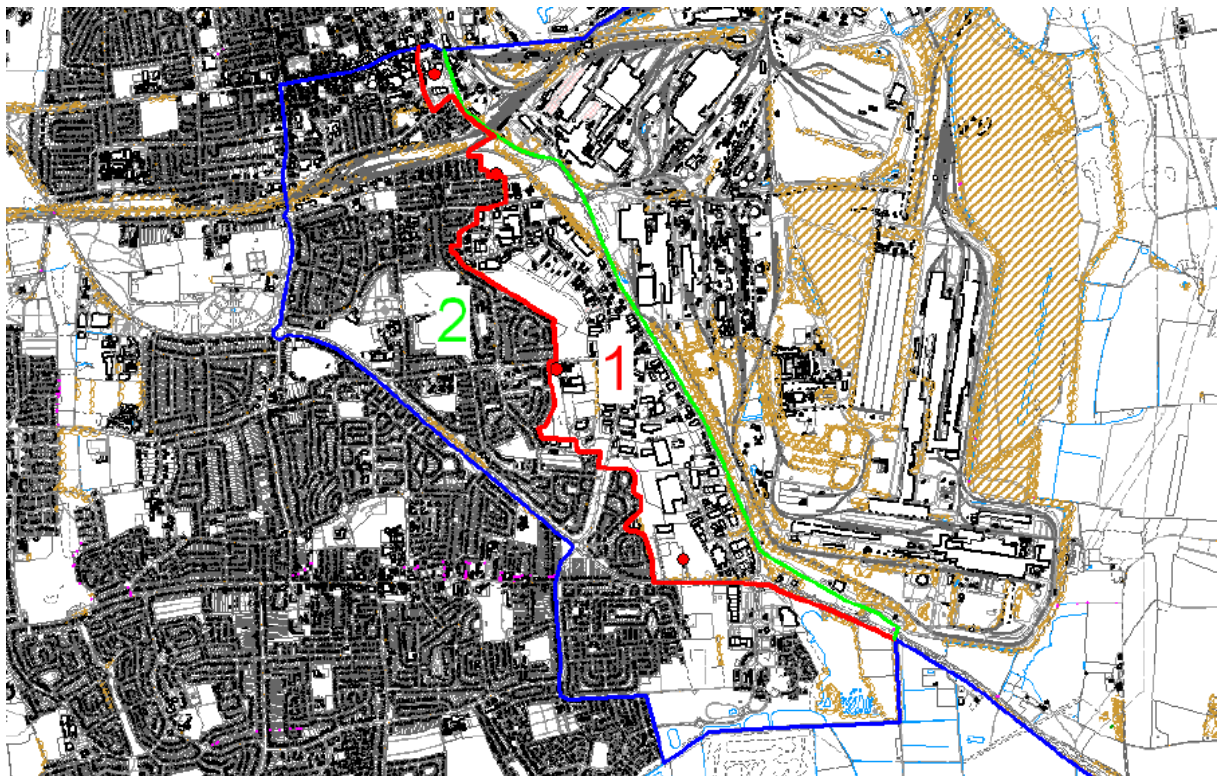


Figure 5.1: 2010 AQMA Zone Map

Following the 2010 original AQMA zoning, a number of indicative monitoring stations were deployed in order to further investigate areas of suspected exceedance. These monitoring sites indicated areas which have elevated PM₁₀ levels and areas within the AQMA that do not. As a result of this the zones have been redrawn to reflect this data and presented in the 2012 Scunthorpe Action Plan for PM₁₀ (figure 5.1).

6 Local Transport Plans and Strategies

A Local Transport Plan (LTP) sets out how strategic transport improvements will be delivered in a local area over a given period of time. North Lincolnshire's 3rd Local Transport Plan (LTP3) consists of a Transport Strategy and Implementation Plan. The Transport Strategy outlines the strategic approach to transport in North Lincolnshire until 2026 and the Implementation Plan provides specific details on how the Transport Strategy is to be delivered. Each local authority in England (outside of London) has been required to produce an LTP every five years, since the passing of the Transport Act 2000. The first and second Local Transport Plans covered the periods from 2001 to 2006 and 2006 to 2011 respectively.

Whilst the Local Transport Act 2008 retained the statutory requirement to produce and review a LTP, local authorities were given greater flexibility over particular aspects in developing their third Local Transport Plans (LTP3).

North Lincolnshire's LTP3 consists of a Transport Strategy and an Implementation Plan. The Transport Strategy outlines the strategic approach to transport in North Lincolnshire over the next 15 years, the Implementation Plan provides specific details on how the Transport Strategy is to be delivered and will be updated every three years during the life of LTP3. This approach is different from the previous Local Transport Plans, which were single documents and covering a five year period. In terms of coverage LTP3 is the same as the previous documents, in that it extends to North Lincolnshire's local authority boundaries. Where there are clear cross boundary links with neighbouring areas, these have been considered.

The long term vision for transport in North Lincolnshire is:

“A well maintained transport system that supports sustainable communities within a safe and prosperous environment and which contributes to the wider environmental, economic and social well-being of the people who live and work in North Lincolnshire.”

Five Local Transport Goals have been identified for North Lincolnshire to deliver the vision:

- Facilitate economic growth by targeting transport improvements in key development areas and along key strategic network corridors;
- Reduce transport related carbon dioxide emissions and protect and enhance the natural and built environment through sustainable transport solutions;

- Improve transport safety and security relating to death or injury from transport, in order to contribute towards safer and stronger communities;
- Provide equal opportunities through improvements in accessibility to key local hubs and services by sustainable modes of transport;
- Enhance people's health and well-being through the promotion of healthy modes of travel and provision of a high quality integrated transport system that contributes towards long term sustainable regeneration.

Having outlined the problems and challenges to delivering these goals, the Transport Strategy generated and appraised a number of possible transport options, based on existing evidence and an extensive consultation process with both stakeholders and members of the community.

The Transport Strategy identifies a number of transport options that could be implemented during the lifetime of LTP3, which are organised into the following themes:

- Pedestrian Improvements
- Cycling Improvements
- Public Transport Improvements
- Safer Routes to School
- Local Safety Schemes
- Demand Management
- Maintaining the Existing Infrastructure

The Implementation Plan provides more detail on how the schemes will be delivered over three years and is updated every three years.

Further information on North Lincolnshire Council's LTP3 can be found at:

<http://www.northlincs.gov.uk/transport-and-streets/roads-highways-and-pavements/highway-documents/local-transport-plan/>

7 Climate Change Strategies

Currently energy from all North Lincolnshire Council sectors (including schools) amounts to £5.2 million and this is set to increase to £8.7 million over the next 5 years if the current volatility in energy prices continues.

The Carbon Management Plan set out a target for reducing our carbon footprint by 33% over the next 5 years, which was achieved. The effect of achieving this target is that our energy costs reduce to £4.7 million in the next 5 years. This could equate to £11.5 million in savings over those five years (based on Ofgen energy cost predictions).

Over the five-year period the council will be carrying out intensive work in key council buildings and making changes to improve the energy performance of those buildings. The council will also be working with staff to improve energy management.

The first of these changes took place on 1 October 2010 when the council's heating systems were switched on. Buildings were heated to a target temperature of 19 degrees to prevent buildings from overheating and make a significant reduction in fuel consumption. The current plan expires in October 2015 and will be revised shortly.

North Lincolnshire Council have also trained a number of staff who have volunteered to become energy wardens. These wardens will encourage and educate their fellow staff members in reducing the amount of energy used in offices.

Details of North Lincolnshire Councils initiatives can be found at:

<http://www.northlincs.gov.uk/planning-and-environment/energy-and-carbon/>

8 Implementation of Action Plans

Table 8.1: Action Plan Progress

Action	Action Detail	Lead Role	Timescale	Progress	Further Information if Ongoing
A1	Maintain network of ten PM ₁₀ analysers at nine locations. Four locations are within the AQMA and five outside.	NLC	Ongoing	Ongoing	Presently there are 12 PM ₁₀ Monitors at 10 Locations. 7 of these locations are within the AQMA. In 2015 the Church Square TEOM will be re-sited
A2	Boundary monitoring of PM ₁₀ , PM _{2.5} , PM ₁ and Total Suspended Particles at Part A2 and 5 PPC Sites within the AQMA. Including a PM _{2.5} (TEOM) monitor at Low Santon.	NLC / EA	2008	Ongoing	The Council currently has 2 Osiris monitors placed at industrial locations on the integrated steelworks site. These are used for source identification. Tata Steel and Lafarge Tarmac also have their own particulate monitoring regimes on the site.
A3	Traffic count and visual observations at Santon to assess likely contribution from re-suspended road dust.	NLC	2008	Complete	

A4	<p>PPC Permit Improvement Programme IP 9, 15, 17 & 22 Tata UK Ltd shall undertake a further investigation to monitor and quantify point source and fugitive particulate matter including PM₁₀ and PM 2.5 emissions from the BOS Plant, Sinter Plant, Blast Furnaces, Appleby/ Dawes Lane Coke Ovens point source emissions and associated activities. The investigation should aim to confirm and establish typical release rates/ emission characteristics from significant sources and include localised ambient air quality monitoring. The proposed scope and method to be adopted, with timescales, should be submitted in advance of any study and agreed with the Environment Agency. A report of the investigation shall be sent to the Environment Agency</p>	EA / Tata	2008	Complete
A5	<p>Study into a local TEOM to Partisol correction factor. Consideration of alternative measurements techniques or correction factors as developed.</p>	NLC	2008	Complete
A6	<p>PPC Permit Improvement Programme IP 33 Tata UK Ltd shall assess the monitoring data recorded by the air quality monitoring stations and the local NETCEN station (including triangulation between stations) to identify process areas/outside influences making significant contribution (short and/or long term) to the pollutant levels measured. The operator shall submit quarterly reports of interpreted monitoring to the Environment Agency. (format to be proposed with the first submission).</p>	EA / Tata	2008	Complete

A7	PPC Permit Improvement Programme IP 37 Tata UK Ltd shall review annually the emissions to air impact assessment and amend as necessary following progressive completion of relevant improvement programme requirements contained within this permit or the identification of any other relevant information or data concerning emissions, dispersion or environmental impact. An annual review report shall be submitted to the Environment Agency	EA / Tata	2008	Complete
A8	PPC Permit Improvement Programme IP 38 Tata UK Ltd shall formulate an air quality management plan for the installation aimed at reducing the impact of pollutants emitted from the installation and ensuring it does not significantly contribute to breaches of the national Air Quality Strategy standards/objectives or EU Directive Limits. Initially, the plan should be based on current emissions and impact assessment knowledge and developed further from the conclusions drawn from the responses made to relevant improvement programme requirements contained within this Permit. The plan should take account of any Local Authority air quality management plans. The operator shall review the air quality management plan annually and include actions to ensure the aim of the plan is delivered. The initial plan and annual reviews shall be submitted to the Environment Agency.	EA / Tata	2008	Complete

B1	<p>Launch and maintain North Lincolnshire air quality website with:</p> <ul style="list-style-type: none"> • Access to real time & historical data, • Production of graphs and pollution roses • Access to air quality reports and latest news updates • General information 	NLC	2008	Complete Ongoing	The air quality website has recently been updated to improve appearance and functionality. General information and reports are available to the public on pollution levels and the council's monitoring regime. A password protected dedicated area is provided for industry, health professionals and the Environment Agency to access data and produce custom graphs.
B2	Review existing methods of communication of real time data to the public and consider alternatives to internet access. Implement one further method.	NLC	2009	Complete	
B3	Investigate the potential for air pollution forecasting in Scunthorpe	NLC	2009	Complete Ongoing	Pollution forecasting is undertaken by operators on the integrated steelworks site. Currently there are no plans for this to be extended for the public to utilise.
B4	Provide information to the public through publicity campaigns about how they can improve air quality from domestic situation e.g. bonfires and heating fuels	NLC	2008	Ongoing	Issue-specific campaigns have previously been undertaken using local press and council publications. Further campaigns will be developed as appropriate.
C1	Raise profile & encourage attendance at organised community bonfire celebrations rather than individual bonfires.	NLC	2008	Complete	
C2	Conduct a publicity campaign advising commercial organisations about their legal obligations in relation to their waste arisings with particular reference to burning of trade waste. To be conducted in co-operation with the Environment Agency.	NLC	2008	Complete	

C3	Complaints in respect of dust and smoke from commercial premises (not regulated under IPPC regime) will be investigated as a priority and enforcement action taken in accordance with the enforcement policy.	NLC	Ongoing	Ongoing	High priority is given to complaints of this nature and appropriate enforcement action is taken. Publicity resulting from successful prosecutions has resulted in a decrease in instances of commercial bonfires.
C4	Identify current road sweeping schedules within the Scunthorpe AQMA and realign schedules as appropriate to minimise resuspended dust emissions from areas such as Brigg Road	NLC	2009	Complete	
C5	Conduct a publicity campaign advising local residents the implications of living in a domestic smoke control area and encourage people to complain if they are affected by smoke from domestic chimneys.	NLC	Ongoing	Ongoing	A publicity campaign was launched authority-wide in 2008. This information is currently available on the council's internet site and residents are advised as required
C6	Complaints in respect of domestic smoke control will be investigated as a priority and enforcement action taken in accordance with the enforcement policy.	NLC	Ongoing	Ongoing	High priority is given to complaints of this nature and appropriate enforcement action is taken.
D1	The Council will organise strategic air quality management meeting with other relevant organisations with an interest in air quality issues, including the Health Protection Agency, Primary Care Trust and the Environment Agency. The purpose of the group will be to identify key air quality issues and agree measures for reduction. Meetings to be scheduled approximately quarterly.	NLC EA PCT Tata HPA	2009	Complete Ongoing	The Council continues to organise these meetings, the role of the participants and the objectives have recently been reviewed. The meetings are now to be held annually. Improvement strategies that will benefit eastern Scunthorpe are to be identified.

D2	Set up a Local Industry Forum involving the Environment Agency, North Lincolnshire Council and Local Industry representatives with the potential to emit PM ₁₀ . The purpose of the group is to identify key issues, agree measures for reduction of PM ₁₀ and formulate a memorandum of understanding between all industrial operators particularly in respect of issues falling outside the scope of permitting. Meetings to be scheduled approximately every six months. This group may include representatives from other steelwork area sites (Council, EA and Tata)	NLC	2009	Complete Ongoing	The Council continues to organise these meetings, the role of the participants and the objectives have recently been reviewed. The meetings are now to be held annually. Improvement strategies that will benefit eastern Scunthorpe are to be identified.
D3	Formulate an industry overview for the integrated steelworks site. Identifying process areas, haul routes, vehicle flows and operating hours to consider in conjunction with monitoring data. Identify areas of responsibility within general areas of the steelworks site, areas outside the permit regime and regulatory responsibility for the same.	NLC	Ongoing	Complete Ongoing	A number of reports have been produced to identify processing areas and regulatory responsibility. Recently the Environment Agency has taken over regulation of a previously regulated council installation to enable a more consistent and holistic approach to be taken.
D4	Continue to lobby central government in relation to permitting of mobile plant and look to identify improved mechanisms of regulation and enforcement.	NLC	2008	Complete	
D5	Ensure that the requirements of the PPC permitting regime are appropriately enforced with inspections prioritised on a risk basis taking account of PM ₁₀ emissions. Regulators will work closely with process operators to minimise PM ₁₀ emissions and seek long term solutions to address dusty operations.	NLC	Ongoing	Ongoing	Inspections and permit reviews are undertaken as required. A number of site improvements have been implemented including the provision of wheel washes and dust suppression, site-wide hard surfacing and the enclosure of dusty processes.

D6	Ensure permits issued under LA-IPPC are reviewed in accordance with guidance, with particular attention to processes within the AQMA with the potential to emit PM ₁₀ .	NLC	Ongoing	Ongoing	All permits are reviewed when appropriate and in accordance with DEFRA timescales. Attention is given to potential PM ₁₀ emissions and appropriate conditions used.
D7	Work with local industry and EA towards the development of relevant measurable indicators of changes in significant emissions of PM ₁₀	NLC	2009	Ongoing	Data is reviewed by the Technical Working Group to analyse trends and determine areas for improvement. Daily pollution episodes are identified and action is taken to review the cause and analyse the process contribution.
D8	Work with local industry and EA to develop targets for the reduction of the area covered by the AQMA so that the number of properties affected will be reduced.	NLC	2010	Ongoing	Data shows that there are still exceedances of the Daily Mean Objective within the area covered by the 2005 AQMA. A zoning exercise has been undertaken to identify areas that are not currently suitable for residential development. The Council and the EA are ensuring that the local operators concentrate their efforts on the affected areas that require a reduction in emissions.
E1	The impact of development within the Air Quality Management Area shall be considered in relation to air quality. Exposure of new receptors or the introduction of significant new sources of PM ₁₀ will need to be appropriately addressed until such time as action E2 has been completed.	NLC	Short Term	Complete Ongoing	The Environmental Health (Commercial) Team reviews all planning applications. Applications will be recommended for refusal if they are for residential development (or other uses that will introduce sensitive receptors) within Zone 1 of the AQMA. Applications for similar developments within Zone 2 will be reviewed on a case by case basis and the appropriate recommendation made. Applications for industrial development in the Authority area are looked at on a case by case basis and impact upon local air quality and residential amenity are examined. If emissions cannot be abated or minimised to an acceptable level, then the recommendation would be for refusal of the application.

E2	Develop a Supplementary Planning Document (SPD), which identifies the constraints and mitigation to development within the Air Quality Management Area	NLC	2009	Ongoing	A draft SPD is currently being prepared.
F1	Review new and existing development sites, to monitor the impact of road, rail, air and water traffic and their emission levels.	NLC	Short Term	Complete Ongoing	The Environmental Health (Commercial) Team reviews all planning applications. Applications for development in the Authority area involving transport related emissions are looked at on a case by case basis and impact upon local air quality and residential amenity are examined. If emissions cannot be abated or minimised to an acceptable level, then the recommendation would be for refusal of the application.
F2	Implementing bus priority measures as appropriate at new residential developments to help ensure that public transport is a quicker and more direct transport than the car	NLC	Ongoing	Complete Ongoing	Developers are required to submit Transport Statements/Assessments, supported by Residential Travel Plans for appropriately sized residential developments.
F3	The main measures to implement are improving facilities for pedestrians and cyclists, school and workplace travel planning, implementation of school safety zones, bus and infrastructure enhancements and simplification of the network, ticketing in Scunthorpe and the main rural routes and managing our car parks and tariff structure.	NLC	Ongoing	Ongoing	The implementation of this action is incorporated within the Council's current Local Transport Plan. Full details are available at the following website: http://www.northlincs.gov.uk/transport-and-streets/roads-highways-and-pavements/highway-documents/local-transport-plan/
F4	The implementation of an urban traffic control system will assist the traffic manager in delivering a smoother flow of traffic in the urban area of Scunthorpe and reduce levels of congestion. This has been programmed for delivery during the period of this and the next Local Transport Plan	NLC	Ongoing	Ongoing	The urban traffic control system is being rolled out on area by area basis.

F5	Reducing incidents of dangerous driving and enforcing compliance with speed limits will also help maintain a smooth flow of traffic and minimise sudden braking acceleration	NLC	Ongoing	Ongoing	The overall responsibility of reducing dangerous driving is handled by the North Lincolnshire Road Safety Partnership. The North Lincolnshire Road Safety Partnership was established to; Significantly reduce the numbers of people killed and seriously injured on roads in North Lincolnshire, raise public awareness of road safety issues, encourage safer driving behaviour through a combination of education, training, publicity and enforcement and to ensure the effective utilisation of resources and a co-ordinated approach to road safety in North Lincolnshire.
F6	Through the North Lincolnshire Road Safety and Safety Camera Partnerships we will deliver continued enforcement of speed limits and driving standards	NLC	Ongoing	Ongoing	See Action F5
F7	Through the quality bus partnership we will work with the operators to encourage the replacement of vehicles to the latest European emission standards wherever possible	NLC	Ongoing	Ongoing	North Lincolnshire Council and local bus operators are part of a Quality Partnership and operators are encouraged to use vehicles that meet these standards. The two largest operators in the Authority area currently use vehicles that meet the latest standards and it is also a contractual obligation for school bus routes.
F8	A fleet of vehicles that are powered by LPG already operates (predominantly in waste management), we	NLC	Ongoing	Stopped	North Lincolnshire Council does not operate any LPG fuelled vehicles and there are no plans to introduce any. Particulate traps are also now not

will continue to update and operate our fleet vehicles to use more environmentally friendly forms of fuel. Particulate traps on our vehicles are also used and we will continue to promote their use to reduce particulate matter

required given the advances made in engine technology and the current Euro IV class engines. The Council used to retrospectively fit these to large goods vehicles when the exhaust PM10 emissions were at 0.15 - 0.1 g/kWh (Euro II - III standards) as the cost of the particulate trap was offset by a reduction in vehicle excise duty as these vehicles were issued with a reduced pollution certificate. Since the introduction of EURO IV PM10 emissions have been reduced to 0.02 g/kWh on the production line. This information will be added to the final report.

The council will aim to:

- Reduce traffic flows through promotion of sustainable travel and demand management measures
- Reduce transport related emissions by reducing traffic flows and making more efficient use of the network
- Deliver environmental improvements
- Improve the street scene
- Make communities places where people want to live

F9

NLC

Ongoing

Ongoing

The implementation of this action is incorporated within the Council's current Local Transport Plan.

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

North Lincolnshire Council has continued to operate an extensive air quality monitoring network. The data captured from this network has not identified any new areas of exceedance and has continued to identify known areas of poor air quality. These areas include the area immediately around the Scunthorpe Integrated Steelworks including Low Santon and Eastern Scunthorpe for PM₁₀ and the A160 (Humber Road) in Killingholme for NO₂, now the subject of a Detailed Assessment.

9.2 Conclusions relating to New Local Developments

North Lincolnshire Council has considered all new local development during the 2013 calendar year and confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

9.3 Other Conclusions

In relation to the scrutiny of planning applications, detailed in Action E1 of the Action Plan, a number of applications have been submitted recently for development that conflict with the AQMA zoning arrangements. Increased synergy with Development Control has provided a more consistent and coherent approach and helped to manage the expectations of developers.

9.4 Proposed Actions

Monitoring data demonstrates that the two AQMA's should remain with their current boundaries. There are no new actions that need adding to complement the existing Action Plan as a result of new monitoring data or the assessment of sources. Ongoing actions will need to continue, as detailed in Section 8 of this report. It is now clear that the relevant parties will need to focus more of their efforts on PM₁₀ reduction schemes that will benefit the Eastern side of Scunthorpe. This agenda will be driven by the Council and the Environment Agency to ensure that a demonstrable reduction in emissions can be achieved, as has been the case in the Santon area.

Regarding NO₂ emissions at South Killingholme, North Lincolnshire Council will produce a Detailed Assessment Report for NO₂ when at least 12 months of continuous data is available. It is expected that the report will be produced early in 2015.

Further actions for the air quality network will include the ongoing monitoring and analysis of the existing AQMA's and siting of monitors where appropriate. In 2015 the Council plan to upgrade both the Low Santon and Scunthorpe Town monitoring stations, this will involve the acquisition and installation of new analysers.

10 References

Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009.
Published by Defra in partnership with the Scottish Government, Welsh Assembly
Government and Department of the Environment Northern Ireland

Appendices

Appendix A: New Local Developments Considered for Air Quality Impacts

1. Continued Construction at Lakeside, Scunthorpe
2. Wren Kitchens Environmental Permit Application

Appendix B: QA:QC Data

Diffusion Tube Bias Adjustment Factors

North Lincolnshire Council currently uses ESG for both supply and analysis of its Nitrogen Dioxide Diffusion Tubes. The Bias Adjustment factor for ESG in 2013 was 0.99.

Factor from Local Co-location Studies

North Lincolnshire Council had only 1 ongoing co location study at Scunthorpe Town site, the results are as below:

Table 10.1: Factors from local co-location studies

Site	Analyser Annual Mean	Tube Annual Means	Bias Adjustment Factor
Scunthorpe Town	27	27	0.99

Discussion of Choice of Factor to Use

The decision to use a Bias Adjustment Factor generated from our own co location study was reached due to the complexity of the issues within North Lincolnshire. As the AQMA's declared within North Lincolnshire are predominantly industry related it was felt that using an average of other authority figures would be unsuitable.

Our NO₂ analysers suffered major faults in 2009 falling in to 2010. The Gallagher Retail Park & Kingsway House analysers suffered major reductions in data capture, consequently neither site could be used for the bias adjustment. This left Rowland Road.

Although the tube network is spread over a wide area of North Lincolnshire the tubes are situated in relatively similar situations, all at the same height and if the tubes are not co located most are held on roadside lampposts. This study has been ongoing since 2006 and has presented different adjustment factors each year. We have

confidence within our AURN continuous monitor at this location due to its strict calibration programme and ratification procedures carried out by AEA.

PM Monitoring Adjustment

Particulate matter within North Lincolnshire is currently measured using TEOM. The sites at Santon and Scunthorpe Town have co located Partisols as discussed in the monitoring data section of this report. Numbers reported with results from a TEOM have had a factor of 1.3 applied and then corrected using the Volatile Correction Model as recommended by the Technical Guidance 2009.

QA/QC of automatic monitoring

AEA Technology currently carry out the QA/QC amendments to our data via their Calibration Club service. Each of the gas analysers is calibrated every 2 weeks with the TEOMs calibrated fortnightly and filter changed every 4 weeks.

Diffusion Tube Bias adjustment

North Lincolnshire Council has carried out its own diffusion tube co-location study. The Department of Environment Food and Rural Affairs (Defra) developed a spreadsheet to assist in calculating the precision and accuracy of the diffusion tube results by their results from co-location studies by comparing with automatic analysers. The result provides a bias adjustment factor with a 95% confidence interval as an estimate of the uncertainty on the bias adjustment. The bias adjustment factor was then applied to the annual mean results from other NO₂ diffusion tube sites according to the LAQM.TG (09) guidance (Table 9.2).

Table 10.2: Checking the diffusion tube precision and accuracy from co-location study

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{g m}^{-3}$	Tube 2 $\mu\text{g m}^{-3}$	Tube 3 $\mu\text{g m}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1			37.7	37.6	40.1	38	1.4	4	3.5	28.3373	99.87	Good	Good
2			28.6	29.0	36.2	31	4.3	14	10.6	23.7335	100	Good	Good
3			28.0	28.8	27.9	28	0.5	2	1.2	22.2567	100	Good	Good
4			20.9	22.4	27.6	24	3.5	15	8.7	15.2579	99.72	Good	Good
5			20.9	21.7	16.3	20	2.9	15	7.2	13	100	Good	Good
6			20.2	18.7	21.5	20	1.4	7	3.5	12	99.72	Good	Good
7			21.5	17.2	19.6	19	2.2	11	5.4	14	99.46	Good	Good
8			21.1	23.6	25.6	23	2.3	10	5.6	22	99.33	Good	Good
9			22.6	25.1	28.8	26	3.1	12	7.7	33	100	Good	Good
10			25.6	24.6	26.1	25	0.8	3	1.9	33	99.73	Good	Good
11			40.5	44.4	43.7	43	2.1	5	5.2	57.7703	99.72	Good	Good
12			29.3	26.6	30.3	29	1.9	7	4.8	48.6867	99.73	Good	Good
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Site Name/ ID:	
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Precision 12 out of 12 periods have a CV smaller than 20%	Overall survey -->	Good precision	Good Overall
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(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20% Bias calculated using 12 periods of data Bias factor A 0.99 (0.8 - 1.29) Bias B 1% (-23% - 25%) Diffusion Tubes Mean: 27 $\mu\text{g m}^{-3}$ Mean CV (Precision): 9 Automatic Mean: 27 $\mu\text{g m}^{-3}$ Data Capture for periods used: 100% Adjusted Tubes Mean: 27 (22 - 35) $\mu\text{g m}^{-3}$	Accuracy (with 95% confidence interval) WITH ALL DATA Bias calculated using 12 periods of data Bias factor A 0.99 (0.8 - 1.29) Bias B 1% (-23% - 25%) Diffusion Tubes Mean: 27 $\mu\text{g m}^{-3}$ Mean CV (Precision): 9 Automatic Mean: 27 $\mu\text{g m}^{-3}$ Data Capture for periods used: 100% Adjusted Tubes Mean: 27 (22 - 35) $\mu\text{g m}^{-3}$
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