




# 2016 Air Quality Annual Status Report (ASR)

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

June 2016

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## Executive Summary: Air Quality in Our Area

### Air Quality in North Lincolnshire

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

The principle town within North Lincolnshire, Scunthorpe, is home to an Integrated Iron and Steel Works, employing over 5,000 workers on a 2,000 acre site located directly to the East of the town of Scunthorpe. Emissions of PM<sub>10</sub> (particulate matter with an aerodynamic diameter of 10 microns or less) from this site have exceeded air quality objectives, leading to the declaration of Air Quality Management Areas (AQMA). There are a number of different operators on the site and particulate matter arises from a variety of sources, including point source emissions, for example: stacks, vents and chimneys and fugitive emissions, for example: roads, stockpiles and material handling operations.

The Council has been working with Industry, Health Professionals and the Environment Agency for a number of years to implement actions on the Integrated Steelworks Site. Monitoring data shows that the level of PM<sub>10</sub> has reduced.

Recent improvements in the level of PM<sub>10</sub> are analysed in detail in the forthcoming Detailed Assessment of the Scunthorpe PM<sub>10</sub> Air Quality Management Area 2016 Report.

In 2015 The Council did not identify any breaches of Air Quality Objectives.

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Levels of Polycyclic Aromatic Hydrocarbons (PAH) continue to exceed both The European Community target value and the UK Objective. Compliance with PAH limits is not the responsibility of local authorities, however North Lincolnshire Council continue to analyse data and support improvement measures that will benefit local residents.

The Council continues to monitor airborne pollutants at a number of locations throughout North Lincolnshire both for the Local Air Quality Management regime and for National Networks.

## **Actions to Improve Air Quality**

In 2015 a comprehensive review of the two AQMAs was undertaken to establish if it was appropriate to retain them, and if so, whether the boundary was appropriate. The review involved the analysis of a number of years data from all of the particulate monitors. This review forms the basis of the forthcoming Detailed Assessment of the Scunthorpe PM<sub>10</sub> Air Quality Management Area 2016 report. The key findings of the report are:

- A great deal of work has been done to improve the air quality in Scunthorpe
- The PM<sub>10</sub> 24-hour mean objective is not being breached in all the areas within the current Air Quality Management Area (AQMA) boundary, it is therefore proposed to amend the boundary to reduce the geographical area that it covers. This amendment would remove approximately 5,000 residential properties from within the AQMA.
- The PM<sub>10</sub> annual mean objective is no longer being breached at Low Santon and it is therefore proposed that this AQMA is revoked.

The Council also upgraded its monitoring network to ensure it meets DEFRA standards relating to air quality monitoring techniques and data capture. The upgraded sites were:

- Scunthorpe Town AURN – at this site a cabin and three separate enclosures were replaced by one cabin. The new cabin now incorporates all of the Council's monitors and the National Network monitoring equipment. Obsolete equipment was replaced with new technology and health and safety improvements were made to enable staff to fulfil their duties safely. Further,

the site now has extra capacity to incorporate new monitoring techniques as priorities evolve. The site and equipment are shown prior to the upgrade in Figure 1 and after the upgrade in Figure 2.



Figure 1 - Scunthorpe Town AURN site prior to upgrade, including internal cabin view



Figure 2 - Scunthorpe Town AURN site after upgrade, including internal cabin view

- Low Santon – at this site inoperative and irreparable equipment was replaced with the latest air quality monitoring technology. Health and safety improvements were also made to enable staff to fulfil their duties safely.

In 2015 the Council continued to work closely with Industry, Health Professionals and the Environment Agency to initiate improvement actions and to share best practice.

## **Local Priorities and Challenges**

2015 was an uncertain year for the UK Steel Industry, with a number of redundancies and plant closures. Fortunately the Scunthorpe site, which has recently been purchased from Tata by Longs Steel UK Ltd (trading as British Steel) has a future and the Council looks forward to working together to gain improvements for local residents.

There are a number of challenges the Council faces in achieving improvements in air quality:

- In North Lincolnshire the wind direction is predominantly from the South West, as shown in Figure 3. Particulate emissions therefore usually affect the Santon area, where improvements have previously been prioritised leading to a reduction in particulate levels. The direction and velocity of wind, along with the amount of rainfall, varies from year to year. Although operators on the Integrated Steelworks Site use pollution forecasting methods to adjust their operations as necessary, meteorological factors are largely responsible for PM<sub>10</sub> 24-hour mean exceedance days.

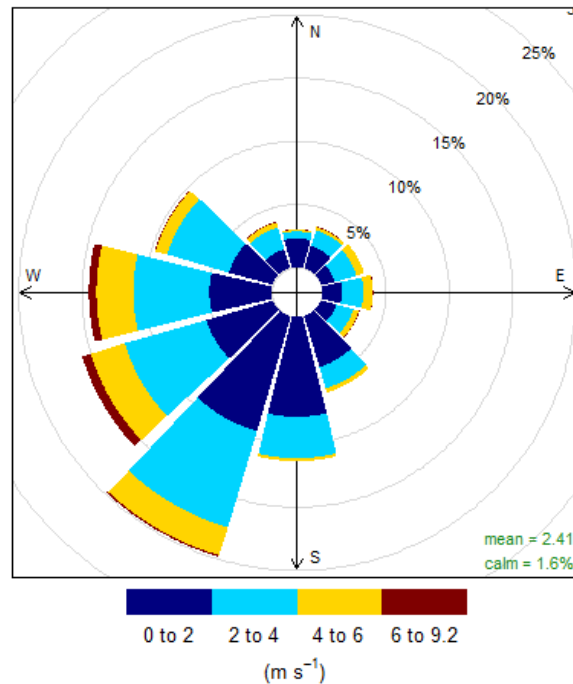


Figure 3 - Wind direction and velocity for 2015

- There are a number of emission sources and a number of different companies operating on the Integrated Steelworks Site. In addition to this, the majority of the site is regulated by The Environment Agency and not the Council.
- PAH emissions are not part of the Local Air Quality Management regime and the operations largely responsible for them – the coke ovens – are not regulated by the Council.

The Council's priorities for 2016 and beyond include:

- Continued operation of the air quality network and website, with associated data analysis
- Working closely with Industry, Stakeholders and the Environment Agency to gain air quality improvements for local residents
- Update the Air Quality Action Plan to include new initiatives

## How to Get Involved

Members of the public can help improve air quality by using public transport, or choosing to walk or cycle instead of using a car. Concerns about industrial emissions including dust, smoke and fumes should be reported to North Lincolnshire Council. Air quality information and reports along with air quality data is available at [www.nlincsair.info](http://www.nlincsair.info)



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## 1 Local Air Quality Management

This report provides an overview of air quality in North Lincolnshire during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by North Lincolnshire to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Currently across the UK over 700 AQMAs have been designated, mostly for Nitrogen Dioxide (NO<sub>2</sub>) from traffic related sources.

A summary of AQMAs declared by North Lincolnshire can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at [List of Local Authorities with AQMAs - Defra, UK](#)

We propose to revoke Low Santon AQMA (see monitoring section).

**Table 2.1 – Declared Air Quality Management Areas**

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Scunthorpe Town AQMA	PM <sub>10</sub> 24-hour mean	Scunthorpe	An area encompassing the integrated steelworks site and a number of properties to the east of Scunthorpe	Action Plan for the Scunthorpe PM <sub>10</sub> AQMA
Low Santon AQMA	PM <sub>10</sub> annual mean	Low Santon	An area encompassing three residential properties	Action Plan for Low Santon

Both the Scunthorpe and Low Santon Action Plans are available at the following website:

<http://www.northlincs.gov.uk/planning-and-environment/environmental-health/pollution-air-land-and-water/air-quality/>

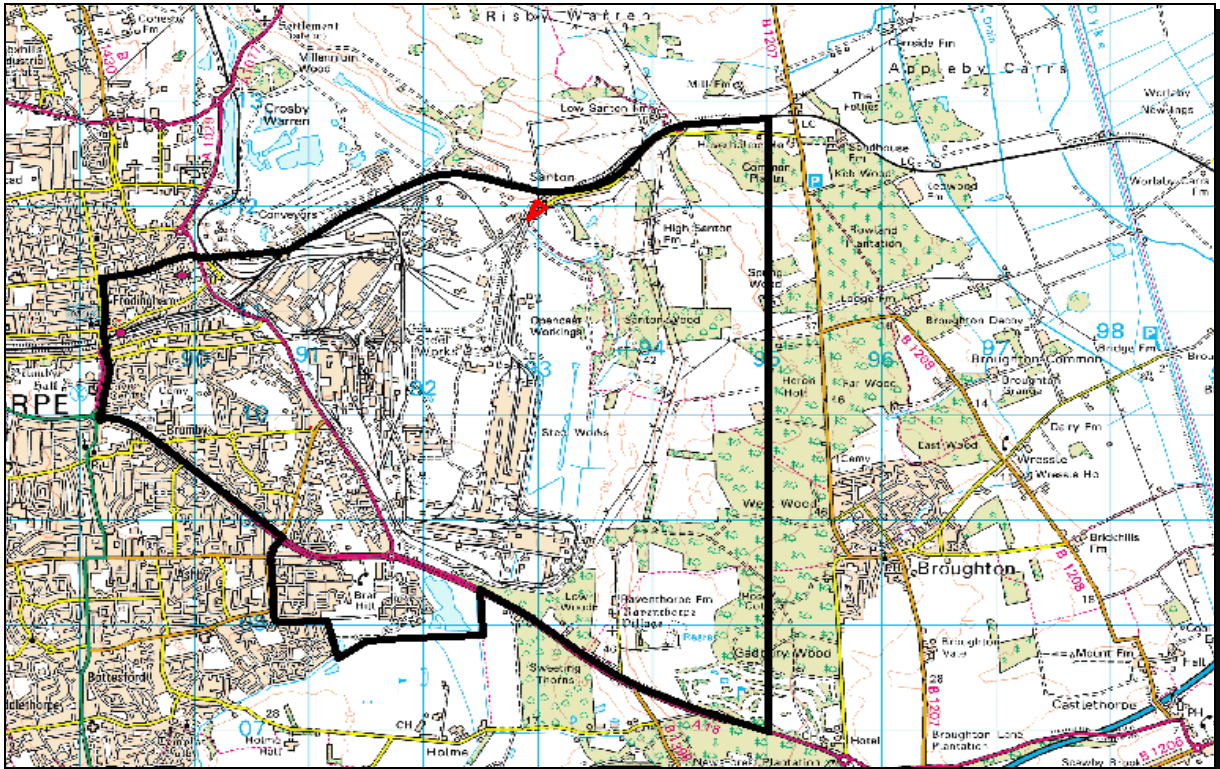


Figure 4 - The Scunthorpe Town AQMA Boundary

The boundary is shown in black. The small red area within the boundary is the 2008 Low Santon AQMA boundary for the PM<sub>10</sub> annual mean objective.

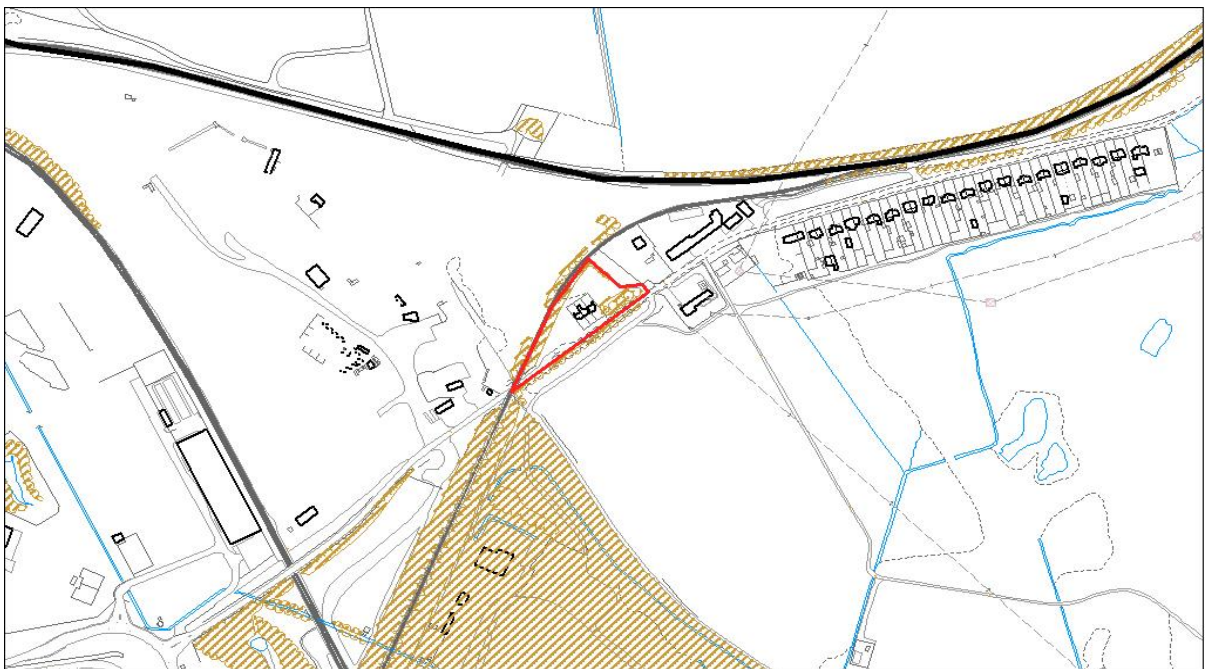


Figure 5 - The Low Santon AQMA Boundary

## 2.2 Progress and Impact of Measures to address Air Quality in North Lincolnshire

North Lincolnshire Council has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures contained within the Action Plan for the Scunthorpe PM<sub>10</sub> AQMA are contained within Table 2.2. Key current and completed measures from this Action Plan are:

- Air quality monitoring sites have been upgraded, along with provision made for future network expansion
- A PM<sub>10</sub> source identification monitoring exercise on the Integrated Steelworks site has been completed
- The Air Quality Website contract has been extended and awarded to a new provider
- Air pollution forecasting continues to be used to inform the actions and activities of operators on the Integrated Steelworks Site
- The Council continue to investigate complaints relating to emissions including dust and smoke and enforce as appropriate
- The Strategic Air Quality AQMA Meetings and Local Industry Forum Meetings continue to be held, with participation from stakeholders
- Environmental Permits are enforced and reviewed as appropriate
- Development within or affecting the AQMAs continues to be reviewed
- The Local Transport Plan continues to be implemented

The Action Plan for Low Santon contained a number of measures for the following regulators and operators:

- The Environment Agency
- Tata Steel
- Tarmac
- Harsco Metals

- North Lincolnshire Council

Actions and improvements undertaken by site operators are discussed in detail in the forthcoming Detailed Assessment of the Scunthorpe PM<sub>10</sub> Air Quality Management Area 2016 Report. This report recommends that, due to an improvement in the level of PM<sub>10</sub> at Low Santon, the annual mean AQMA should be revoked, thus making this Action Plan complete.

The recent difficulties experienced by the UK steel industry created uncertainty whether further improvements would be undertaken. However with the future of the Scunthorpe site now secure and with the proposed implementation of new actions, the Council will take this opportunity to review and update the Action Plan.

Any future Action Plan will use the format provided by DEFRA. Previously measures have not been assigned Key Performance Indicators or targets for a predicted pollution reduction; these are therefore not reported in Table 2.2. In contrast to traffic related emissions, due to the sheer variety of sources coupled with the unpredictable effect of meteorological conditions, it is extremely difficult to quantify the effectiveness of single proposed measures. Experience shows that it takes the coordinated impact of a number of actions to produce demonstrable improvements.

North Lincolnshire Council's priorities for the coming year are to:

- Continue to operate the air quality network and make data available to the public, regulators and industry
- To analyse the data to target areas for improvement
- To actively engage with industry and regulators to seek improvements
- To review and update the Action Plan



Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A1	Maintain network of PM <sub>10</sub> analysers	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NLC	Implemented	Implemented			Ongoing	To Continue	The network maintains focus on AQ issues and enables the Council to measure the effectiveness of any schemes. Sites are located and upgraded as appropriate.
A2	Boundary monitoring of PM <sub>10</sub> , PM <sub>2.5</sub> , PM <sub>1</sub> and Total Suspended Particles at Permitted sites AQMA.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NLC EA	Implemented	Implemented			Complete	Complete	This monitoring, completed in 2015, allowed greater analysis and identification of sources. Subsequent improvements in the level of PM <sub>10</sub> at Santon are largely due to actions taken as a result of this monitoring exercise.
A3	Traffic count and visual observations at Santon to assess likely contribution from re-suspended road dust.	Traffic Management	Other	NLC	Implemented	Implemented			Complete	Complete	

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A4	PPC Permit Improvement Programme. Tata UK Ltd to undertake an investigation to monitor and quantify point source and fugitive particulate matter including PM <sub>10</sub> and PM <sub>2.5</sub> emissions from the BOS Plant, Sinter Plant, Blast Furnaces, Appleby/Dawes Lane Coke Ovens point source emissions and associated activities.	Environmental Permits	Other measure through permit systems and economic instruments	Tata UK Ltd EA	Implemented	Implemented			Complete	Complete	
A5	Study into a local TEOM to Partisol correction factor. Consideration of alternative measurements techniques or correction factors as developed.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NLC	Implemented	Implemented			Complete	Complete	The Partisol monitor was removed in December 2014. There are no current plans to use this monitor again
A6	PPC Permit Improvement Programme. Tata UK Ltd shall assess the monitoring data to identify process areas/outside influences making significant contribution (short and/or long term) to the pollutant levels measured.	Environmental Permits	Other measure through permit systems and economic instruments	Tata UK Ltd EA	Implemented	Implemented			Complete	Complete	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A7	PPC Permit Improvement Programme. Tata UK Ltd to review annually the emissions to air impact assessment and amend as necessary following progressive completion of relevant improvement programme requirements.	Environmental Permits	Other measure through permit systems and economic instruments	Tata UK Ltd EA	Implemented	Implemented			Complete	Complete	
A8	PPC Permit Improvement Programme. Tata UK Ltd to 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.	Environmental Permits	Other measure through permit systems and economic instruments	Tata UK Ltd EA	Implemented	Implemented			Complete	Complete	

**North Lincolnshire Council**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
B1	Launch and maintain North Lincolnshire air quality website with: <ul style="list-style-type: none"> <li>• Access to real time &amp; historical data,</li> <li>• Production of graphs and pollution roses</li> <li>• Access to air quality reports and latest news updates</li> <li>• General information</li> </ul>	Public Information	Via the Internet	NLC	Implemented	Implemented			Ongoing	To continue	The council has operated a dedicated air quality website since 2008, a new contract has recently been awarded to ensure it continues
B2	Review existing methods of communication of real time data to the public and consider alternatives to internet access.	Public Information	Other	NLC	Implemented	Implemented			Complete	Complete	Internet remains the preferred communication method for air quality information
B3	Investigate the potential for air pollution forecasting in Scunthorpe	Environmental Permits	Other measure through permit systems and economic instruments	NLC	Implemented	Implemented			Ongoing	To continue	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	Public Information	Other	NLC	Implemented	Implemented			Ongoing	To continue	Issue-specific campaigns have previously been undertaken using the internet, local press and council publications. Further campaigns will be developed as appropriate.

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
C1	Raise profile & encourage attendance at organised community bonfire celebrations rather than individual bonfires	Public Information	Other	NLC	Implemented	Implemented			Ongoing	To continue	
C2	Conduct a publicity campaign advising commercial organisations about their legal obligations in relation to their waste, with particular reference to burning of trade waste	Public Information	Via leaflets	NLC	Implemented	Implemented			Complete	Complete	The Council has produced a leaflet and delivered it to businesses, including all within the Scunthorpe AQMA.
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.	Policy Guidance and Development Control	Other policy	NLC	Implemented	Implemented			Ongoing	To continue	Enforcement action is taken against those contravening legislation

North Lincolnshire Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
C4	Identify current road sweeping schedules within the Scunthorpe AQMA and realign schedules as appropriate to minimise re suspended dust emissions from areas such as Brigg Road.	Transport Planning and Infrastructure	Other	NLC	Implemented	Implemented			Complete	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.	Public Information	Via the internet	NLC	Implemented	Implemented			Ongoing	To continue	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.	Policy Guidance and Development Control	Other policy	NLC	Implemented	Implemented			Ongoing	To continue	Enforcement action is taken against those contravening legislation

North Lincolnshire Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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.	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	NLC HPA PCT EA	Implemented	Implemented			Ongoing	To continue	
D2	Set up a Local Industry Forum involving the Environment Agency, North Lincolnshire Council and Local Industry representatives with the potential to emit PM <sub>10</sub> . The purpose of the group is to identify key issues, agree measures for reduction of PM <sub>10</sub>	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	NLC	Implemented	Implemented			Complete Ongoing	To continue	

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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.	Environmental Permits	Other	NLC	Implemented	Implemented			Complete	Complete	
D4	Continue to lobby central government in relation to permitting of mobile plants and look to identify improved mechanisms of regulation and enforcement.	Environmental Permits	Other measure through permit systems and economic instruments	NLC	Implemented	Implemented			Complete	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 <sub>10</sub> emissions.	Environmental Permits	Other measure through permit systems and economic instruments	NLC	Implemented	Implemented			Ongoing	To continue	



North Lincolnshire Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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 <sub>10</sub> .	Environmental Permits	Other measure through permit systems and economic instruments	NLC	Implemented	Implemented			Ongoing	To continue	
D7	Work with local industry and EA towards the development of relevant measurable indicators of changes in significant emissions of PM <sub>10</sub> .	Environmental Permits	Other	NLC EA Industry	Implemented	Implemented			Ongoing	To continue	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.	Environmental Permits	Other	NLC EA Industry	Implemented	Implemented			Ongoing	To continue	The Detailed Assessment report recommend that, due to improvements in the level of PM <sub>10</sub> , the Santon AQMA can be revoked and the Scunthorpe AQMA reduced in size

North Lincolnshire Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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 <sub>10</sub> will need to be appropriately addressed until such time as action E2 has been completed.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NLC	Implemented	Implemented			Ongoing	To continue	The Environmental Health (Commercial) Team reviews all planning applications. For air quality purposes, geographical zones have been identified within the Scunthorpe Town AQMA. Advice is given to applicants and Development Control colleagues based on current air quality data.
E2	Develop a Supplementary Planning Document (SPD), which identifies the constraints and mitigation to development within the Air Quality Management Area	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NLC	Implemented	Implemented			Ongoing	2017	A draft SPD has been prepared, however this will need reviewing to reflect the proposed AQMA changes. It is likely that the SPD will be completed following the Action Plan review.
F1	Review new and existing development sites, to monitor the impact of road, rail, air and water traffic and their emission levels.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NLC	Implemented	Implemented			Ongoing	To continue	The Environmental Health (Commercial) Team reviews all planning applications. These are looked at on a case by case basis and impact upon local air quality and residential amenity are examined.

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Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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	Traffic Management	Strategic highway improvements	NLC	Implemented	Implemented			Stopped	N/A	Implementing bus priority measures in new developments has been extremely difficult to achieve. However, we do encourage existing and potential bus services to be considered as an integral part of new developments, particularly at the planning application stage.
F3	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.	Traffic Management	Strategic highway improvements	NLC	Implemented	Implemented			Ongoing	To continue	The implementation of this action is incorporated within the Council's current Local Transport Plan. Full details are available at the following website: <a href="http://www.northlincs.gov.uk/transport-and-streets/roads-highways-and-pavements/highway-documents/local-transport-plan/">http://www.northlincs.gov.uk/transport-and-streets/roads-highways-and-pavements/highway-documents/local-transport-plan/</a>
F4	Implementation of an urban traffic control (UTC) system to assist the traffic manager in delivering a smoother flow of traffic in the urban area of Scunthorpe and reduce levels of congestion.	Traffic Management	UTC, Congestion management, traffic reduction	NLC	Implemented	Implemented			Stopped	N/A	This scheme is not currently being pursued.

**North Lincolnshire Council**

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
F5	Reducing incidents of dangerous driving and enforcing compliance with speed limits to maintain a smooth flow of traffic and minimise sudden braking acceleration	Traffic Management	Other	NLC	Implemented	Implemented			Ongoing	To continue	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.
F6	Continued enforcement of speed limits and driving standards	Traffic Management	Other	NLC	Implemented	Implemented			Ongoing	To continue	
F7	Working with operators to encourage the replacement of vehicles to the latest European emission standards wherever possible	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	MLC	Implemented	Implemented			Ongoing	To continue	North Lincolnshire Council and local bus operators are part of a Quality Partnership. 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.

North Lincolnshire Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
F8	A fleet of vehicles that are powered by LPG already operates (predominantly in waste management), we 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	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	NLC	N/A	Not Implemented			Stopped	N/A	NLC does not operate any LPG fuelled vehicles and there are no plans to introduce any. Particulate traps are also now not required given the advances made in engine technology and the current Euro class engines. The Council used to retrospectively fit these to large goods vehicles when the exhaust PM <sub>10</sub> emissions were at 0.15 - 0.1 g/kWh. Since the introduction of EURO IV PM <sub>10</sub> emissions have been reduced to 0.02 g/kWh on the production line. This information will be added to the final report.
F9	The council will aim to: <ul style="list-style-type: none"> <li>• Reduce traffic flows through promotion of sustainable travel and demand management measures</li> <li>• Reduce transport related emissions by reducing traffic flows and making more efficient use of the network</li> <li>• Deliver environmental improvements</li> </ul>	Traffic Management	UTC, Congestion management, traffic reduction	NLC	Implemented	Implemented			Ongoing	To continue	The implementation of this action is incorporated within the Council's current Local Transport Plan.

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Committee on the Medical Effects of Air Pollutants (COMEAP) estimate the mortality burden of existing levels of PM<sub>2.5</sub> air pollution on the population of the UK as being equivalent to 29,000 deaths and an associated loss to the population of 340,000 life-years.

The Department of Health data tool for England – the Public Health Outcomes Framework (PHOF) - is intended to focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between communities. The tool uses indicators to assess improvements. Recognising the significant impact that poor air quality can have on health, the PHOF includes an indicator relating to fine particulate matter (PM<sub>2.5</sub>):

*Fraction of annual all-cause adult mortality attributable to long-term exposure to current levels of anthropogenic particulate air pollution (measured as fine particulate matter, PM<sub>2.5</sub>\*)*

DEFRA guidance states that where no appropriate local sites measuring both PM<sub>10</sub> and PM<sub>2.5</sub> are available, then a nationally derived correction ratio of 0.7 can be used. This factor was calculated as the average of all ratios of PM<sub>2.5</sub>/PM<sub>10</sub> found for years 2010 to 2014 for forty sites within the Automatic Urban and Rural Network (AURN) where both PM<sub>10</sub> and PM<sub>2.5</sub> are measured on an hourly basis.

Actions that the Council and other organisations are taking to reduce emissions of PM<sub>10</sub> are contained within the Action Plan. Due to the proportion of PM<sub>2.5</sub> contained within PM<sub>10</sub>, any initiatives to address PM<sub>10</sub> will have a corresponding effect on the reduction of PM<sub>2.5</sub>. Key initiatives include:

- Maintaining a network of particulate analysers, including monitoring of PM<sub>2.5</sub>
- Environmental Permit improvement programmes

- Campaigns to discourage waste burning and bonfires
- Liaison with Industry, Health Professionals and the Environment Agency to initiate improvements and share good practice
- Transport improvement schemes
- Public transport and fleet improvements

The Action Plan for Low Santon which was principally aimed at the operators on the Integrated Steelworks site contained a number of practical measures that would reduce particulate emissions, including PM<sub>2.5</sub>:

- Reduction of speed limits on site roads
- Targeted road sweeping
- Improved dust suppression
- Road surfacing and landscaping
- Improved material handling and storage

In 2016 the Council intend to review the Action Plan to specifically incorporate measures to address PM<sub>2.5</sub> emissions. Further, Tata Steel did locate an Osiris monitor at the East Common Lane monitoring site. Data for this monitor was not available for this report and its future operation is in doubt. The Council therefore intend to take on the responsibility of monitoring PM<sub>2.5</sub> at this location, again using an Osiris monitor. In future years the Council will be able to determine a local factor for the PM<sub>2.5</sub>/PM<sub>10</sub> quotient.

## 3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

### 3.1 Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

North Lincolnshire Council undertook automatic (continuous) monitoring at 13 sites during 2015. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

In addition to the Council's monitoring network, for the National Networks, we also operate:

- Two Digital Polycyclic Aromatic Hydrocarbon (PAH) monitors, with one each at Scunthorpe Town AURN and at Low Santon. These are operated for the National Physical Laboratory (NPL) on behalf of DEFRA
- Two Heavy Metals Partisols, with one each at Scunthorpe Town AURN and at Low Santon. These are operated for NPL on behalf of DEFRA
- A Benzene sampler at Scunthorpe Town AURN. This is operated for Ricardo Energy & Environment on behalf of DEFRA

National monitoring results are available at: <https://uk-air.defra.gov.uk/data/>



### 3.1.2 Non-Automatic Monitoring Sites

North Lincolnshire Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 23 sites during 2015. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

## 3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

For the general public, the most prominent sources of NO<sub>2</sub> are internal combustion engines burning fossil fuels. Chronic exposure to NO<sub>2</sub> can cause respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma.

In 2015 the Council undertook continuous monitoring of NO<sub>2</sub> at four sites:

- Scunthorpe Town AURN (site ID: CM1)
- Low Santon (site ID: CM3)
- Killingholme School (site ID: CM9)
- Killingholme Roadside (site ID: CM10)

The Killingholme Roadside site was installed in 2013 specifically to measure NO<sub>2</sub> concentrations at properties adjacent to the A160 in South Killingholme as data from NO<sub>2</sub> diffusion tubes suggested there may be elevated concentrations in this area.

Subsequently, data from the continuous monitor was analysed in-depth in the 2015 Detailed Assessment of NO<sub>2</sub> at South Killingholme report, which concluded that an air quality objective was not being breached and an AQMA should not be declared.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Figure 6, below, shows compliance with this objective for years 2011 to 2015:

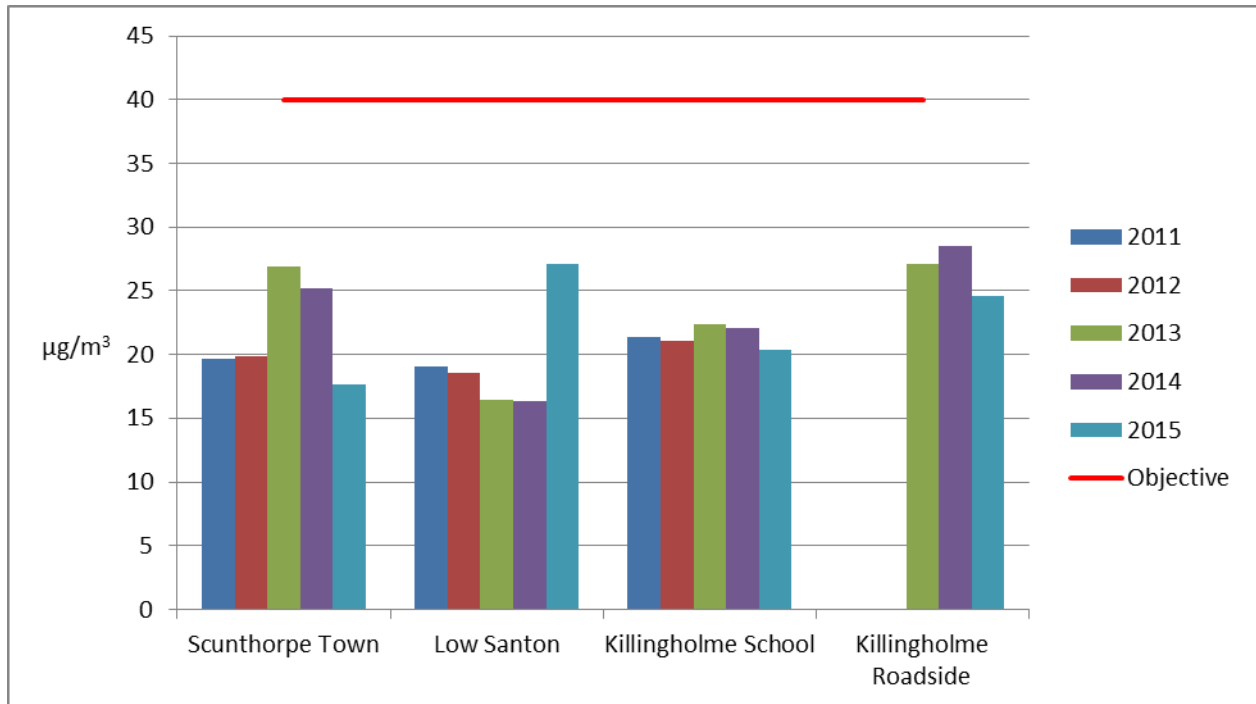


Figure 6 - NO<sub>2</sub> annual mean concentrations for the four continuous monitoring sites, 2011 to 2015

All sites, apart from Low Santon show a slight decline in the NO<sub>2</sub> annual mean concentration for 2015. Due to equipment failure the Low Santon monitor achieved only 55.4% data capture in 2015 and the result has been annualised. This may account for the reported concentration of 27.1 µg/m<sup>3</sup>. Monitoring will continue to be undertaken at this location to identify if this is an anomaly.

The diffusion tubes did not identify an exceedance of the NO<sub>2</sub> annual mean objective. The full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

In 2015 there were no recorded exceedances of this objective.

### 3.2.2 Particulate Matter (PM<sub>10</sub>)

PM<sub>10</sub> is particulate matter less than 10 microns in diameter. These particles are composed of a wide range of materials arising from a variety of sources including industry, road traffic and natural sources such as soil, dust and sea salt. PM<sub>10</sub> is of particular importance in terms of health effects because the particles are small enough to be breathed in and carried deep into the lungs where they can cause inflammation and a worsening of the condition of people with heart and lung diseases. Children and the elderly are particularly vulnerable. In addition, they may carry cancer causing compounds into the lungs.

The principal source of PM<sub>10</sub> emissions is the Integrated Steelworks Site, both from direct sources: chimneys and stacks, and indirect sources: stockpiles and roads.

In 2015 the Council monitored PM<sub>10</sub> at 12 sites. At two of these sites, Scunthorpe Town AURN (site ID: CM1) and Low Santon (site ID: CM3) an FDMS monitor was co-located with a TEOM.

The FDMS monitor is a more accurate method of measuring PM<sub>10</sub> and the results are reported uncorrected. In contrast, a Standard TEOM requires data to be corrected to compensate for volatile particulates lost by the elevated operating temperatures of the monitor. Further details on data correction are provided in Appendix C.

The Council continue to operate TEOM monitors at the Scunthorpe Town AURN and Low Santon sites for analysis of data trends.

PM<sub>10</sub> data for Osiris monitors located at Dawes Lane (site ID: CM11), Tarmac (site ID: CM12) and South Ferriby (site ID: CM13) is included within this report, however Osiris monitors do not meet the standard for the European reference method for particulate monitoring within the UK and the results should be treated with caution.

The Council only deploys Osiris monitors to monitor PM<sub>10</sub> for specific project: The Dawes Lane and Tarmac monitors are located on the Integrated Steelworks Site to assist with source apportionment, and the South Ferriby Monitor has been located at the request of a Local Environmental Liaison Committee to monitor emissions from a cement plant.

Annual Mean PM<sub>10</sub> Monitoring Results

Table A.5 in Appendix A compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Figure 7, below, shows compliance with this objective using 2015 data:

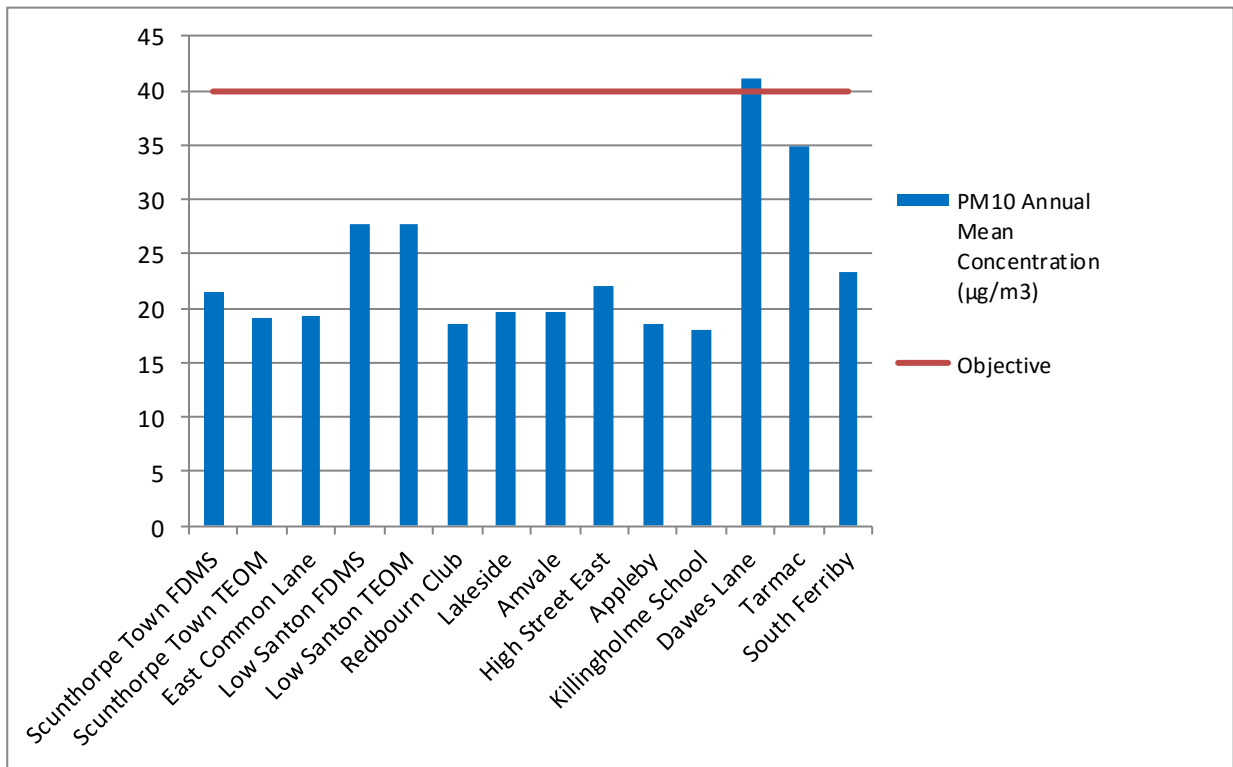


Figure 7 - PM<sub>10</sub> annual mean concentrations, 2015

This shows that there was one monitor that appears to exceed the annual mean objective in 2015. However this site at Dawes Lane (site ID: CM11) is an Osiris monitor and it is not located in an area of relevant exposure.

The AQMA at Low Santon is the subject of a forthcoming Detailed Assessment; this recommends that the AQMA is revoked due to five years of compliance with the annual mean objective.

24-Hour Mean PM<sub>10</sub> Monitoring Results

Table A.6 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than 35 times per year. Figure 8, below, shows compliance with this objective using 2015 data:

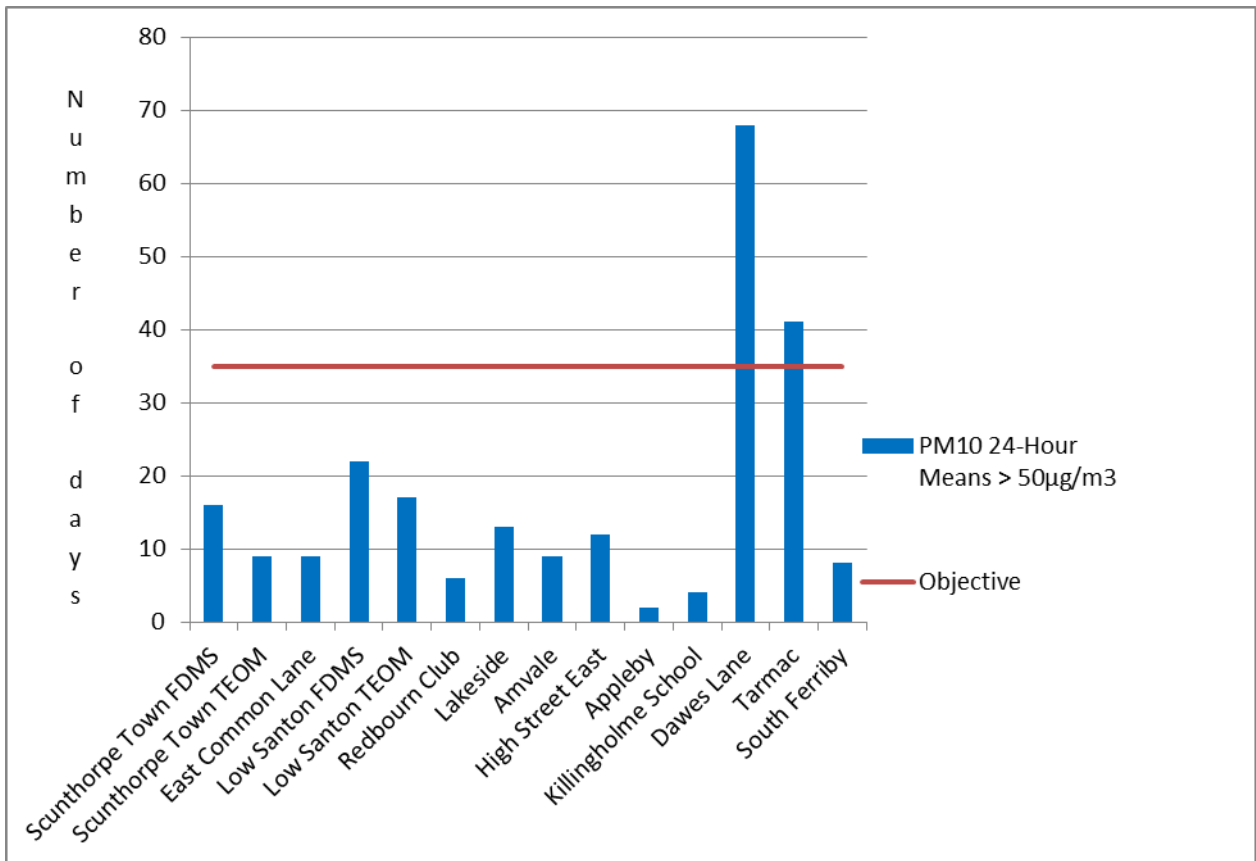


Figure 8 - PM<sub>10</sub> 24-hour mean exceedances, 2015

This shows that there were two monitors that appear to exceed the 24-hour mean objective in 2015. However, these sites, Dawes Lane (site ID: CM11) and Tarmac (site ID: CM12) are Osiris monitors and they are not located in areas of relevant exposure.

Data shows that some of the monitoring locations within the Scunthorpe AQMA are not likely to breach the 24-hour mean objective.

### 3.2.3 Particulate Matter (PM<sub>2.5</sub>)

PM<sub>2.5</sub> has been monitored by the Council at four locations within North Lincolnshire in 2015:

- Amvale (site ID: CM6)
- Dawes Lane (site ID: CM11)
- Tarmac (site ID: CM12)
- South Ferriby (site ID: CM13)

The monitoring instrument used at all the sites is an Osiris.

The Council recognises that Osiris monitors do not meet the standard for the European reference method for particulate monitoring within the UK, however data from the Osiris monitors is included within this report as no other PM<sub>2.5</sub> monitoring method is available to the Council at this time.

The Dawes Lane and Tarmac sites are located on the Integrated Steelworks Site, which is not an area of relevant exposure. These monitors have recently been removed and PM<sub>10</sub> and PM<sub>2.5</sub> data will therefore not be reported for these sites in future years.

Table A.7 in Appendix A presents the monitored PM<sub>2.5</sub> annual mean concentrations for the past five years where available. Figure 9 below shows compliance with the EU annual mean air quality objective of 25 µg/m<sup>3</sup>

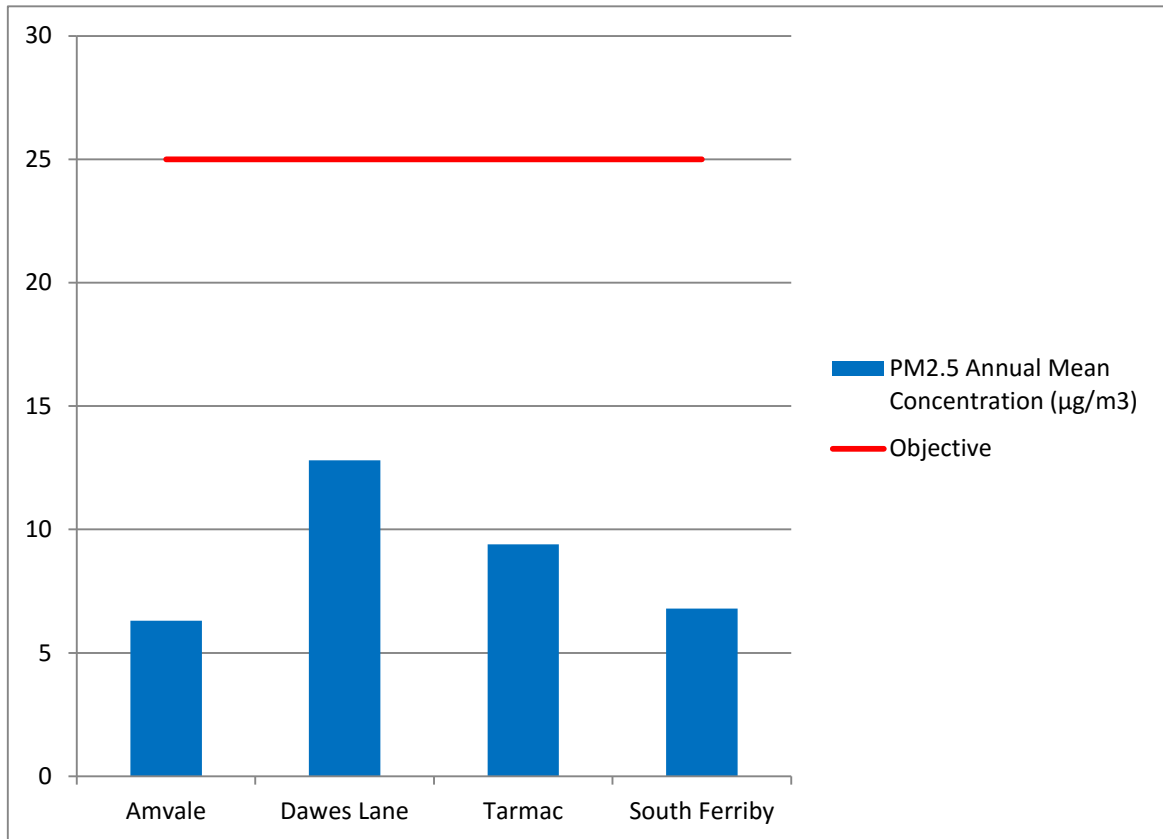


Figure 9 - PM<sub>2.5</sub> Annual Mean Concentrations, 2015

Background concentration maps provided by DEFRA for 2011 show an average PM<sub>2.5</sub> concentration for North Lincolnshire of 11.3 µg/m<sup>3</sup>.

### 3.2.4 Sulphur Dioxide (SO<sub>2</sub>)

UK emissions of SO<sub>2</sub> are dominated by combustion of fuels containing sulphur, such as coal and heavy oils. Exposure to SO<sub>2</sub> may irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases

Table A.8 in Appendix A compares the ratified continuous monitored SO<sub>2</sub> concentrations for the year 2015 with the air quality objectives for SO<sub>2</sub>. Like in previous years, no exceedances of any of the SO<sub>2</sub> air quality objectives were recorded. The Council continue to monitor SO<sub>2</sub> and will report on compliance in future years.

### 3.2.5 Benzene

Benzene is one of the elementary petrochemicals and has a variety of sources, but it primarily arises from domestic and industrial combustion and road transport. Exposure to Benzene increases the risk of cancer and other illnesses.

For Benzene, the annual mean objective is  $5 \mu\text{g}/\text{m}^3$ . The annual mean recorded at Scunthorpe Town AURN in 2015 was  $1.12 \mu\text{g}/\text{m}^3$ .

Monitoring results are displayed in Table A.9 in Appendix A.

### 3.2.6 Polycyclic Aromatic Hydrocarbons (PAH)

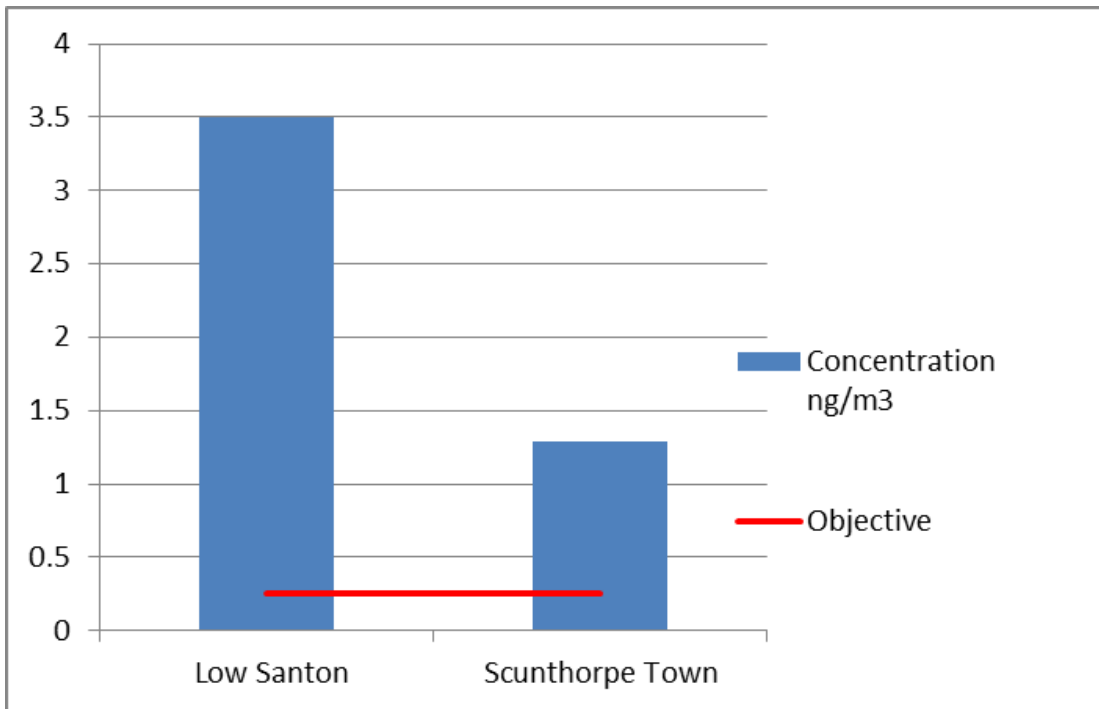
PAHs are a group of persistent organic compounds, some of which are toxic and/or possible or proven human carcinogens; they are produced via incomplete combustion of carbon containing fuels from industrial, commercial, vehicular and residential sources.

Historically North Lincolnshire records some of the highest levels of PAH's in the United Kingdom. This is principally due to the two coke ovens on the Integrated Steelworks Site.

The European Community's fourth Air Quality Daughter Directive (2005/107/EC) specifies a target value of  $1 \text{ ng}/\text{m}^3$  for the annual mean concentration of benzo[a]pyrene as a representative PAH, to be achieved by 2012.

The UK objective for PAH's however is an annual average  $0.25 \text{ ng}/\text{m}^3$ . Like in previous years both of the North Lincolnshire sites exceeded the objective, in 2015 the annual average for Scunthorpe Town AURN was  $1.29 \text{ ng}/\text{m}^3$ , and for Low Santon it was  $3.5 \text{ ng}/\text{m}^3$ . Figure 10 below shows the 2015 results compared to the UK objective.





Monitoring results are displayed in Table A.10 in Appendix A.

### 3.2.7 Heavy Metals

The Heavy Metals network records concentrations of heavy metals in air near industrial sources and areas of population. The Heavy Metals Network now forms the basis of the UK's compliance monitoring for:

- The Air Quality Directive (2008/50/EC) which provides a Limit Value for lead concentration in air of 0.5 µg/m<sup>3</sup>, expressed as an annual mean.
- The 4th Air Quality Daughter Directive (2004/107/EC), which sets target values for arsenic, cadmium, nickel (and polycyclic aromatic hydrocarbons) in the PM<sub>10</sub> particulate fraction of ambient air.

In 2015 there were no exceedances of the target or limit values. Monitoring results are displayed in Table A.11 in Appendix A.

## 4 Local Developments and Planning Applications

### 4.1 New Local Developments

North Lincolnshire Council has considered all new local developments for the 2015 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:

- Developments leading to a significant change in road traffic flows or other transport sources
- Industrial Installations
- Biomass boilers
- Combined Heat and Power (CHP) plant
- Landfill sites and quarries

### 4.2 Planning Applications

Two planning applications were made in 2015 to commence the Lincolnshire Lakes development. The Lincolnshire Lakes development is the creation of a series of village settlements providing around 6,000 new homes, a business park, leisure facilities and office accommodation on land West of Scunthorpe. A new football stadium, for Scunthorpe United FC, is proposed for this area and an application has been submitted for de-trunking of the M181 to facilitate access to this area. The extent of the Lincolnshire Lakes development area is shown in Figure 11.



Figure 11 - The Lincolnshire Lakes development area

The Council routinely review air quality assessments for planning applications and new local developments. For the 2015 calendar year there were no proposed local developments which may have an impact on air quality within the Local Authority area. Appendix F contains details of the New Local Developments and Planning Applications considered.

## 5 Conclusions and Proposed Actions

### 5.1 Conclusions from New Monitoring Data

North Lincolnshire Council has continued to operate an extensive air quality monitoring network. This has identified that there have been no breaches of air quality objectives in 2015.

The FDMS instrument at Low Santon has not recorded a breach of the PM<sub>10</sub> annual mean objective since it was sited; further the existing TEOM has not recorded a breach of this objective using VCM corrected data since 2008. The Low Santon AQMA could therefore be revoked.

Although in 2015 there was no exceedance of the PM<sub>10</sub> 24-hour mean objective, some areas still experience elevated concentrations of this pollutant. These areas include the area immediately around the Scunthorpe Integrated Steelworks site including Low Santon and the East Common Lane area to the West of the site. Some of the monitoring locations within the Scunthorpe Town AQMA however are not likely to breach this objective and could be removed from this AQMA.

The Council's PM<sub>2.5</sub> monitors did not record a breach of the EU annual mean objective, however further monitoring at locations most affected by PM<sub>10</sub> would be beneficial.

North Lincolnshire continue to record some of the highest levels of PAH's in the United Kingdom.

### 5.2 Conclusions relating to New Local Developments and Planning Applications

North Lincolnshire Council has considered all new local development and planning applications during the 2015 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.

The Lincolnshire Lakes and proposed football stadium developments will, over time, create extra traffic to the West of Scunthorpe.

### 5.3 Proposed Actions

The PM<sub>10</sub> 24-hour mean objective is not being breached in all the areas within the current Air Quality Management Area (AQMA) boundary and the Council propose to amend the boundary to reduce the geographical area that it covers to remove approximately 5,000 residential properties from within the AQMA.

The PM<sub>10</sub> annual mean objective is no longer being breached at Low Santon and the Council propose to revoke this AQMA.

The Action Plan contains a number of actions that have been completed; this will be reviewed and updated to include new initiatives.

PM<sub>10</sub> reduction schemes implemented in the Low Santon area have led to an improvement in the level of PM<sub>10</sub> experienced by local residents. The Council will now work with Industry, Health Professionals and the Environment Agency to initiate actions that will have a similar beneficial effect in locations to the East of Scunthorpe, particularly around East Common Lane and Rowland Road.

The Council will continue to monitor pollutants on behalf of the National Networks and review the resulting data, particularly for PAHs where, since the closure of the Dawes Lane Coke Ovens in March 2016, an improvement is expected in the levels of PAHs.

The Council will continue to operate its air quality monitoring network, review data and locate new sites as appropriate. The Council have already installed NO<sub>2</sub> diffusion tubes to monitor the cumulative impact of development in the Lincolnshire Lakes development area and we are hoping to install an Osiris monitor at the East Common Lane monitoring site in July 2016 to monitor PM<sub>2.5</sub>.

The Council will submit the forthcoming Detailed Assessment of the Scunthorpe PM<sub>10</sub> Air Quality Management Area 2016 report to DEFRA and act on their recommendations.

## Appendix A: Monitoring Results

Table A.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	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
CM1	Scunthorpe Town AURN	Industrial	490320	410831	SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>10</sub>	Y	Chemiluminescent, Fluorescent, FDMS & TEOM	21	7	2
CM2	East Common Lane	Urban background	490663	409789	PM <sub>10</sub>	Y	TEOM	3	28	1.5
CM3	Low Santon	Industrial	492945	411931	SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>10</sub>	Y	Fluorescent, FDMS, TEOM	41	5	2
CM4	Redbourn Club	Urban background	490002	410069	PM <sub>10</sub>	Y	TEOM	15	N/A	1.5
CM5	Lakeside	Urban background	491750	408127	PM <sub>10</sub>	Y	TEOM	4	8	1.5
CM6	Amvale	Industrial	491343	408782	PM <sub>10</sub> , PM <sub>2.5</sub>	Y	TEOM & Osiris	150	100	1.5
CM7	High Street East	Industrial	490224	411301	PM <sub>10</sub>	Y	TEOM	18	10	1.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
CM8	Appleby	Rural	495075	414767	PM <sub>10</sub>	N	TEOM	17	N/A	1.5
CM9	Killingholme School	Other	514880	416133	SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>10</sub>	N	Chemiluminescent & TEOM	9	N/A	2
CM 10	Killingholme Roadside	Roadside	514810	415980	NO <sub>2</sub>	N	Chemiluminescent	20	10	1
CM 11	Dawes Lane	Industrial	492481	411887	PM <sub>10</sub> , PM <sub>2.5</sub>	Y	Osiris	500	N/A	1.5
CM 12	Tarmac	Industrial	492736	411585	PM <sub>10</sub> , PM <sub>2.5</sub>	Y	Osiris	450	N/A	1.5
CM 13	South Ferriby	Other	497931	420993	PM <sub>10</sub> , PM <sub>2.5</sub>	N	Osiris	10	45	1.5

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
DT1	Frodingham Road	Urban background	489099	411723	NO <sub>2</sub>	N	3	1	N	2
DT2	Doncaster Road/Hilton Avenue	Roadside	486928	411156	NO <sub>2</sub>	N	12	3	N	2
DT3	Scotter Road (North side of roundabout)	Roadside	487239	411259	NO <sub>2</sub>	N	9	2	N	2
DT4	Britannia Corner	Urban background	489190	411285	NO <sub>2</sub>	Y	4	2	N	2
DT5	Oswald Road	Urban background	489209	411118	NO <sub>2</sub>	Y	4	3	N	2
DT6	Ashby Road	Roadside	489210	410353	NO <sub>2</sub>	Y	20	3	N	2
DT7	Jct A18/Ashby Road	Roadside	489172	409926	NO <sub>2</sub>	N	20	2	N	2



Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
DT8	Ashby Road (Old Brumby Street)	Roadside	489112	409463	NO <sub>2</sub>	N	15	1	N	2
DT9	Dudley Road/Queensway	Roadside	491628	408658	NO <sub>2</sub>	Y	80	2	N	2
DT10	Lakeside Parkway	Urban background	491737	408378	NO <sub>2</sub>	Y	60	2	N	2
DT11	Jct Brigg Road/A18	Roadside	491838	408641	NO <sub>2</sub>	Y	15	9	N	1.5
DT12	Ashby Lodge	Roadside	491859	408645	NO <sub>2</sub>	Y	1	9	N	2
DT13	Barnard Ave, Brigg	Roadside	499975	407421	NO <sub>2</sub>	N	30	3	N	2
DT14	Humber Road, Chip Shop	Urban background	515452	416107	NO <sub>2</sub>	N	2	5	N	2
DT15	Humber Road, LP 695	Roadside	515279	416085	NO <sub>2</sub>	N	5	2	N	2
DT16	Holydyke, Barton	Suburban	503048	421907	NO <sub>2</sub>	N	15	1	N	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
DT17	Scunthorpe Town AURN	Industrial	490316	410837	NO <sub>2</sub>	Y	21	6	Y	2
DT18	Scunthorpe Town AURN	Industrial	490316	410837	NO <sub>2</sub>	Y	21	6	Y	2
DT19	Scunthorpe Town AURN	Industrial	490316	410837	NO <sub>2</sub>	Y	21	6	Y	2
DT20	Station Rd/Brigg Rd	Roadside	490080	411258	NO <sub>2</sub>	Y	20	1	N	2
DT21	Killingholme 4	Roadside	514573	415901	NO <sub>2</sub>	N	15	1	N	2
DT22	Killingholme 5	Roadside	514827	415982	NO <sub>2</sub>	N	15	1	N	2
DT23	Kirmington Vale	Other	508974	410543	NO <sub>2</sub>	N	10	N/A	N	2
DT24	Killingholme Nox Analyser	Roadside	514782	415971	NO <sub>2</sub>	N	15	1	N	2
DT25	Killingholme Nox Analyser	Roadside	514782	415971	NO <sub>2</sub>	N	15	1	N	2
DT26	Killingholme Nox Analyser	Roadside	514782	415971	NO <sub>2</sub>	N	15	1	N	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
DT27	Lindum Street 1	Urban background	489832	411226	NO <sub>2</sub>	Y	12	1	N	2
DT28	Lindum Street 2	Urban background	489832	411226	NO <sub>2</sub>	Y	12	1	N	2

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

**Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results**

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
						2011	2012	2013	2014	2015
CM1	Scunthorpe Town AURN	Industrial	Automatic	N/A	94.5	19.7	19.9	26.9	25.2	17.6
CM3	Low Santon	Industrial	Automatic	N/A	55.4	19.1	18.6	16.4	16.3	27.1
CM9	Killingholme School	Other	Automatic	N/A	96.1	21.4	21.1	22.4	22.1	20.4
CM10	Killingholme Roadside	Roadside	Automatic	N/A	94.9	N/A	N/A	27.1	28.5	24.6

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
						2011	2012	2013	2014	2015
DT1	Frodingham Road	Urban background	Diffusion Tube	N/A	83.3	25.0	26.7	34.6	31.1	24.5
DT2	Doncaster Road/Hilton Avenue	Roadside	Diffusion Tube	N/A	100	25.6	22.8	34.1	29.5	22.1
DT3	Scotter Road (North Side of Roundabout)	Roadside	Diffusion Tube	N/A	100	30.0	26.2	<b>41.0</b>	33.2	26.3
DT4	Britannia Corner	Urban background	Diffusion Tube	N/A	100	29.5	30.3	<b>41.4</b>	32.2	25.2
DT5	Oswald Road	Urban background	Diffusion Tube	N/A	100	27.0	26.6	37.5	31.4	24.2
DT6	Ashby Road	Roadside	Diffusion Tube	N/A	91.7	23.6	25.2	36.2	27.3	23.1
DT7	Jct A17/Ashby Road	Roadside	Diffusion Tube	N/A	91.7	26.2	26.9	37.4	32.1	25.8
DT8	Ashby Road (Old Brumby Street)	Roadside	Diffusion Tube	N/A	100	28.1	27.9	39.4	32.2	26.3
DT9	Dudley Road/Queensway	Roadside	Diffusion Tube	N/A	100	21.4	21.7	29.8	24.4	19.4

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
						2011	2012	2013	2014	2015
DT10	Lakeside Parkway	Urban background	Diffusion Tube	N/A	91.7	20.1	21.9	32.2	26.5	20.0
DT11	Jct Brigg Road/A18	Roadside	Diffusion Tube	N/A	100	<b>43.5</b>	<b>43.4</b>	<b>60.1</b>	<b>45.4</b>	36.3
DT12	Ashby Lodge	Roadside	Diffusion Tube	N/A	100	26.1	24.8	32.7	27.3	22.9
DT13	Barnard Ave, Brigg	Roadside	Diffusion Tube	N/A	100	22.0	27.1	39.7	30.8	26.1
DT14	Humber Road, Chip Shop	Urban background	Diffusion Tube	N/A	100	19.4	20.7	30.0	27.3	19.4
DT15	Humber Road, LP 695	Roadside	Diffusion Tube	N/A	100	29.7	30.3	<b>45.3</b>	35.1	27.0
DT16	Holydyke, Barton	Suburban	Diffusion Tube	N/A	91.7	22.4	25.2	33.7	25.6	22.4
DT17	Scunthorpe Town AURN	Industrial	Diffusion Tube	N/A	100	18.8	21.0	26.1	21.5	18.2
DT18	Scunthorpe Town AURN	Industrial	Diffusion Tube	N/A	100	20.1	19.9	26.4	20.3	17.0
DT19	Scunthorpe Town AURN	Industrial	Diffusion Tube	N/A	100	20.2	19.0	28.4	21.5	16.5

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
						2011	2012	2013	2014	2015
DT20	Station Road/ Brigg Road	Roadside	Diffusion Tube	N/A	75	22.1	20.9	33.2	27.9	22.7
DT21	Killingholme 4	Roadside	Diffusion Tube	N/A	100	<b>44.3</b>	37.6	<b>51.3</b>	<b>42.9</b>	26.2
DT22	Killingholme 5	Roadside	Diffusion Tube	N/A	75	<b>40.1</b>	<b>42.5</b>	<b>64.3</b>	<b>51.8</b>	32.2
DT23	Kirmington Vale	Other	Diffusion Tube	N/A	93.3	10	12.3	16.1	11.7	10.6
DT24	Killingholme Nox Analyser	Roadside	Diffusion Tube	N/A	100	N/A	N/A	<b>48.0</b>	<b>46.7</b>	33.7
DT25	Killingholme Nox Analyser	Roadside	Diffusion Tube	N/A	100	N/A	N/A	<b>51.3</b>	<b>41.0</b>	29.6
DT26	Killingholme Nox Analyser	Roadside	Diffusion Tube	N/A	100	N/A	N/A	<b>53.2</b>	<b>52.2</b>	36.1
DT27	Lindum Street 1	Urban background	Diffusion Tube	N/A	91.7	N/A	N/A	N/A	24.6	18.8
DT28	Lindum Street 2	Urban background	Diffusion Tube	N/A	100	N/A	N/A	N/A	26.4	19.3

Notes: Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

**Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results**

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
						2011	2012	2013	2014	2015
CM1	Scunthorpe Town AURN	Industrial	Automatic	N/A	94.5	0	0	2	9	0
CM3	Low Santon	Industrial	Automatic	N/A	55.4	0	0	0	0	0 (80.3)
CM9	Killingholme School	Other	Automatic	N/A	96.1	0	0	0	0	0
CM10	Killingholme Roadside	Roadside	Automatic	N/A	94.9	N/A	N/A	N/A	0	0

Notes: Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8<sup>th</sup> percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
CM1 FDMS	Scunthorpe Town AURN	Industrial	N/A	90.1	22.1	20.8	22.6	21.2	21.4
CM1 TEOM	Scunthorpe Town AURN	Industrial	N/A	93.9	22.3	20.9	23.4	21.5	19.1
CM2	East Common Lane	Urban background	N/A	94.4	25.6	22.3	25.2	22.9	19.3
CM3 FDMS	Low Santon	Industrial	N/A	88.5	34.9	26.4	27.5	25.1	27.7
CM3 TEOM	Low Santon	Industrial	N/A	83.3	38.7	28.5	33.3	29.6	27.8
CM4	Redbourn Club	Urban background	N/A	98.9	22.1	19.7	21.8	21.3	18.6
CM5	Lakeside	Urban background	N/A	92.9	23.3	21.7	23.1	21.6	19.7
CM6	Amvale	Industrial	N/A	89.1	-	-	22.5	20.6	19.7



Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
CM7	High Street East	Industrial	N/A	94.2	-	-	-	21.4	22.0
CM8	Appleby	Rural	N/A	92.6	21.1	18.0	17.5	16.0	18.5
CM9	Killingholme School	Other	N/A	95.1	21.1	20.2	19.3	19.1	18.0
CM11	Dawes Lane	Industrial	N/A	83.3	-	<b>41.9</b>	<b>41.6</b>	27.3	<b>41.1</b>
CM12	Tarmac	Industrial	N/A	85.5	-	25.2	35.1	27.1	34.9
CM13	South Ferriby	Other	N/A	86.0	-	23.3	28.4	15.8	23.4

Notes: Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
					2011	2012	2013	2014	2015
CM1 FDMS	Scunthorpe Town AURN	Industrial	N/A	90.1	20	10 <b>(38)</b>	20 <b>(40)</b>	17	16
CM1 TEOM	Scunthorpe Town AURN	Industrial	N/A	93.9	24	16	24	18	9
CM2	East Common Lane	Urban background	N/A	94.4	29	19	35	27	9
CM3 FDMS	Low Santon	Industrial	N/A	88.5	<b>55</b>	16	20	18 <b>(47)</b>	22
CM3 TEOM	Low Santon	Industrial	N/A	83.3	<b>73 (63)</b>	21	<b>43</b>	32	17 <b>(68)</b>
CM4	Redbourn Club	Urban background	N/A	98.9	22	10	17	18	6
CM5	Lakeside	Urban background	N/A	92.9	15 <b>(39)</b>	12 <b>(39)</b>	12	10	13

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
					2011	2012	2013	2014	2015
CM6	Amvale	Industrial	N/A	89.1	-	-	9 ( <b>46</b> )	13	9
CM7	High Street East	Industrial	N/A	94.2	-	-	-	5 ( <b>41</b> )	12
CM8	Appleby	Rural	N/A	92.6	7	1	6	4	2
CM9	Killingholme School	Other	N/A	95.1	9	4 (34)	5	6	4
CM11	Dawes Lane	Industrial	N/A	83.3	<b>73</b>	<b>88</b>	<b>85</b>	13 ( <b>51</b> )	<b>68</b> ( <b>77</b> )
CM12	Tarmac	Industrial	N/A	85.5	5	15	<b>58</b>	20 ( <b>49</b> )	<b>41</b>
CM13	South Ferriby	Other	N/A	86.0	11	10	20	4 (30)	8

Notes: Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets.

Table A.7 – PM<sub>2.5</sub> Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>2.5</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
CM6	Amvale	Industrial	74.8	44.7	-	6.1	-	-	6.3
CM11	Dawes Lane	Industrial	N/A	83.3	-	10.9	11.5	10.3	12.8
CM12	Tarmac	Industrial	N/A	85.5	-	7.6	9.7	8.9	9.4
CM13	South Ferriby	Other	N/A	86.0	-	6.9	9.1	5.8	6.8

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been “annualised” as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.8 – SO<sub>2</sub> Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2014 (%) <sup>(2)</sup>	Number of Exceedances (percentile in bracket) <sup>(3)</sup>		
					15-minute Objective (266 µg/m <sup>3</sup> )	1-hour Objective (350 µg/m <sup>3</sup> )	24-hour Objective (125 µg/m <sup>3</sup> )
CM1	Scunthorpe Town AURN	Industrial	N/A	93.7	0	0	0
CM3	Low Santon	Industrial	N/A	41.8	0 (40)	0 (29)	0 (24)
CM9	Killingholme School	Other	N/A	79.6	0	0	0

Notes: Exceedances of the SO<sub>2</sub> objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%)

(3) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets. 15-min mean = 99.9<sup>th</sup> ; 1-hour mean = 99.7<sup>th</sup> ; 24-hour mean = 99.2<sup>th</sup> percentile

**Table A.9 – Benzene Monitoring Results**

Start Date	End Date	Scunthorpe Town AURN (CM1) Concentration µg/m <sup>3</sup>
30/12/2014	14/01/2015	0.61
14/01/2015	28/01/2015	0.92
28/01/2015	11/02/2015	0.93
11/02/2015	25/02/2015	2.77
25/02/2015	12/03/2015	0.79
12/03/2015	25/03/2015	1.9
25/03/2015	08/04/2015	0.91
08/04/2015	22/04/2015	1.63

Start Date	End Date	Scunthorpe Town AURN (CM1) Concentration µg/m3
22/04/2015	06/05/2015	1.89
06/05/2015	20/05/2015	0.93
20/05/2015	03/06/2015	0.3
03/06/2015	17/06/2015	0.98
17/06/2015	06/07/2015	data not available
06/07/2015	15/07/2015	0.48
15/07/2015	29/07/2015	1.03
29/07/2015	12/08/2015	0.53
12/08/2015	26/08/2015	1.47

Start Date	End Date	Scunthorpe Town AURN (CM1) Concentration µg/m <sup>3</sup>
26/08/2015	09/09/2015	0.58
09/09/2015	23/09/2015	2.23
23/09/2015	07/10/2015	2.65
07/10/2015	21/10/2015	1.64
21/10/2015	04/11/2015	1.71
04/11/2015	18/11/2015	0.52
18/11/2015	02/12/2015	0.62
02/12/2015	16/12/2015	0.89
16/12/2015	30/12/2015	0.5

Note: The Benzene annual mean objective is 5µg/m<sup>3</sup>



Table A.10 – PAH Monitoring Results

Concentration ng/m <sup>3</sup>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Time Weighted Average
Scunthorpe Town (CM1)	0.42	1.26	1.36	2.45	1.76	1.17	1.63	0.72	3.34	1.73	0.41	0.23	<b>1.29</b>
Low Santon (CM3)	9.08	3.95	4.25	3.12	5.02	3.09	3.29	2.06	2.15	1.48	3.25	1.22	<b>3.5</b>

Notes: Exceedances of the UK PAH annual mean objective of 0.25 ng/m<sup>3</sup> are shown in bold

Table A.11 – Heavy Metals Monitoring Results

Heavy Metal	Scunthorpe Town AURN (CM1) Annual Mean Concentration ng/m <sup>3</sup>	Low Santon (CM3) Annual Mean Concentration ng/m <sup>3</sup>	Target Value ng/m <sup>3</sup>
Arsenic (As)	0.71	0.82	6
Cadmium (Cd)	0.26	0.33	5
Chromium (Cr)	1.69	2.76	
Copper (Cu)	4.94	4.95	
Iron (Fe)	664.84	1960.16	
Manganese (Mn)	23.73	93.29	
Nickel (Ni)	1.13	1.51	20

Heavy Metal	Scunthorpe Town AURN (CM1) Annual Mean Concentration ng/m3	Low Santon (CM3) Annual Mean Concentration ng/m3	Target Value ng/m3
Lead (Pb)	14.11	17.71	500
Vanadium (V)	1.38	9.49	
Zinc (Zn)	20.97	26.01	
Cobalt	0.12	0.21	
Selenium	1.12	1.49	

Notes: Exceedances of any Target Values are shown in bold

## Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2015

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted <sup>(1)</sup>	
	DT1	-	45.2	38.2	30.4	-	30.4	29.3	30.1	33.5	32.7	34.1			31.7
DT2	36.5	42.8	30.5	23.4	21.3	23.4	25.6	24.5	30.2	34.1	30.7	39.6	30.8	22.1	
DT3	36.7	50.9	32.9	29.7	31.1	29.7	31.7	33.7	34.9	45.7	42.3	33.3	36.9	26.3	
DT4	39.4	38.7	36.5	28.1	26.5	28.1	30.6	31.6	36.3	42.1	39.0	36.7	36.1	25.2	
DT5	33.3	44.6	38.4	24.4	25.5	24.4	29.1	28.9	36.6	46.7	34.7	32.0	34.7	24.2	
DT6	38.2	48.7	37.0	20.4	27.1	20.4	21.8	26.0	31.9	39.3	-	37.0	31.2	23.1	
DT7	34.9	47.8	-	26.6	27.7	26.6	29.6	30.3	35.5	45.1	35.6	33.4	34.9	25.8	
DT8	43.2	51.9	39.4	27.2	29.7	27.2	30.6	31.5	40.6	44.1	38.2	29.3	35.7	26.3	
DT9	31.2	40.4	31.2	19.1	16.3	19.1	20.2	22.6	27.0	38.0	26.5	27.9	27.0	19.4	
DT10	29.1	39.1	31.7	19.9	21.2	19.9	21.0	21.2	32.9	45.1	19.7	-	28.0	20.0	
DT11	55.1	63.0	51.3	44.1	48.3	44.1	58.5	45.0	21.7	61.1	55.9	49.1	48.6	36.3	
DT12	35.0	40.4	32.3	24.8	28.0	24.8	26.2	25.0	29.6	33.9	30.8	29.7	29.2	22.9	
DT13	39.0	49.5	39.4	26.0	28.6	26.0	29.9	30.2	39.3	39.9	41.1	40.5	36.8	26.1	
DT14	24.3	40.1	34.3	22.0	13.2	22.0	21.0	17.7	35.5	37.1	27.4	23.6	27.1	19.4	
DT15	25.7	49.3	42.0	35.7	40.8	35.7	36.4	28.7	41.5	44.9	40.4	22.2	35.7	27.0	

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted <sup>(1)</sup>	
	DT16	35.2	45.1	-	25.7	25.2	25.7	28.9	26.2	36.5	34.2	31.8			22.8
DT17	29.7	35.7	28.5	16.9	22.0	16.9	16.7	18.2	25.3	39.7	27.0	22.7	24.9	18.2	
DT18	30.6	35.5	26.1	15.8	12.4	15.8	15.3	16.4	24.7	32.6	26.7	27.0	23.8	17.0	
DT19	32.2	33.2	20.9	14.5	18.4	14.5	15.0	16.5	22.7	26.1	24.1	21.5	21.0	16.5	
DT20	-	-	27.2	23.6	-	23.6	24.1	29.6	31.5	43.0	28.7	36.3	32.2	22.7	
DT21	30.7	20.8	38.1	34.7	35.2	34.7	39.0	37.8	31.9	47.7	41.3	38.0	39.3	26.2	
DT22	52.9	33.8	46.3	20.2	53.5	20.2	46.3	-	57.4	67.0	-	-	56.9	32.2	
DT23	20.8	12.1	17.1	7.4	10.1	7.4	-	9.5	12.0	15.8	-	18.8	14.0	10.6	
DT24	58.5	33.4	50.6	43.1	43.7	43.1	41.7	41.8	46.3	54.8	42.8	38.2	44.3	33.7	
DT25	37.9	25.7	41.9	30.9	41.4	30.9	37.1	41.3	41.7	49.1	48.6	43.1	43.5	29.6	
DT26	53.7	24.9	50.0	48.9	51.6	48.9	47.1	47.0	45.8	52.3	65.2	58.4	52.6	36.1	
DT27	35.8	19.8	31.9	17.9	21.5	17.9	20.8	21.3	27.2	37.3	16.1	-	24.5	18.8	
DT28	32.8	20.3	27.3	24.7	22.3	24.7	20.5	24.0	32.3	35.1	16.6	36.3	27.5	19.3	

(1) See Appendix C for details on bias adjustment

## Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

### Annualising Continuous Monitoring Data

#### NO<sub>2</sub> Annual Mean

Due to instrument failure it has only been possible to retrieve NO<sub>2</sub> monitoring data for the Low Santon site (Site ID: CM2) for the period 27 May 2015 to 31 December 2015, resulting in 55.4% data capture for the year. This is below the 75% data capture threshold and therefore the data should be annualised. The method to undertake this procedure is presented in Air Quality Technical Guidance TG16.

Formula to use: **M x Ra**

The measured mean concentration **M** for this period was 25.1 µg/m<sup>3</sup>

Background Site	Annual mean 2015 (Am)	Period Mean 2015 (Pm)	Ratio (Am/Pm)
Barnsley Gawber (Urban Background)	18.6	17.7	1.050
Hull Freetown (Urban Background)	24.4	22.7	1.075
Leeds Centre (Urban Background)	31.1	29.5	1.054
Sheffield Tinsley (Urban Background)	33.8	29.5	1.146
<b>Average (Ra)</b>		<b>1.081</b>	

**25.1 x 1.081 = 27.1 µg/m<sup>3</sup>**. This is the figure used in Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

#### PM<sub>2.5</sub> Annual Mean

An Osiris monitor was re-installed at the Amvale site (Site ID: CM6) on 27 May 2015, resulting in an annual data capture rate of 44.7%. This is below the 75% data capture threshold and therefore the data has been annualised.

Formula: **M x Ra**

The measured mean concentration **M** for this period was 5.9 µg/m<sup>3</sup>.

Background Site	Annual mean 2015 (Am)	Period Mean 2015 (Pm)	Ratio (Am/Pm)
Hull Freetown (Urban Background)	10.9	9.9	1.101
Leeds Centre (Urban Background)	11.4	11.1	1.027
<b>Average (Ra)</b>		<b>1.064</b>	

**5.9 x 1.064= 6.3 µg/m<sup>3</sup>**. This is the figure used in Table A.7 – PM<sub>2.5</sub> Monitoring Results

## 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 2015 was 0.73.

### Factor from Local Co-location Studies

North Lincolnshire Council had only 1 co location study site in 2015, at CM1: Scunthorpe Town an industrial site:

Site	Analyser Annual Mean	Tube Annual Means	Bias Adjustment Factor
<b>CM1: Scunthorpe Town AURN</b>	<b>17</b>	<b>24</b>	<b>0.73</b>

### 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. 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 undertaken by Ricardo.

Checking Precision and Accuracy of Triplicate Tubes



Diffusion Tubes Measurements									
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
1	31/12/2014	03/02/2015	29.7	30.6	32.2	31	1.3	4	3.1
2	03/02/2015	27/02/2015	35.7	35.5	33.2	35	1.4	4	3.5
3	27/02/2015	30/03/2015	28.5	26.1	20.9	25	3.9	15	9.7
4	30/03/2015	30/04/2015	16.9	15.8	14.5	16	1.2	8	3.0
5	30/04/2015	28/05/2015	22.0	12.4	18.4	18	4.8	28	12.0
6	28/05/2015	02/07/2015	16.9	15.8	14.5	16	1.2	8	3.0
7	02/07/2015	31/07/2015	16.7	15.3	15.0	16	0.9	6	2.3
8	31/07/2015	28/08/2015	18.2	16.4	16.5	17	1.0	6	2.5
9	28/08/2015	28/09/2015	25.3	24.7	22.7	24	1.4	6	3.4
10	28/09/2015	29/10/2015	39.7	32.6	26.1	33	6.8	21	16.9
11	29/10/2015	26/11/2015	27.0	26.7	24.1	26	1.6	6	4.0
12	26/11/2015	07/01/2016	22.7	27.0	21.5	24	2.9	12	7.2
13									

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
22	94	Good	Good
24	100	Good	Good
18	100	Good	Good
15	99	Good	Good
12	80	Poor Precision	Good
12	71	Good	or Data Capture
12	99	Good	Good
12	99	Good	Good
19	95	Good	Good
25	100	Poor Precision	Good
18	100	Good	Good
16	100	Good	Good
		Good precision	Good Overall DC

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

Overall survey ->

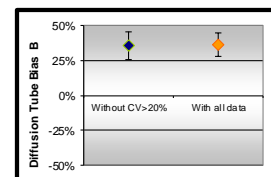
Site Name/ ID: \_\_\_\_\_

<b>Accuracy</b> (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 9 periods of data Bias factor A <b>0.73 (0.68 - 0.79)</b> Bias B <b>37% (27% - 47%)</b>
Diffusion Tubes Mean: <b>24 <math>\mu\text{g m}^{-3}</math></b> Mean CV (Precision): <b>7</b>
Automatic Mean: <b>17 <math>\mu\text{g m}^{-3}</math></b> Data Capture for periods used: <b>98%</b>
Adjusted Tubes Mean: <b>17 (16 - 19) <math>\mu\text{g m}^{-3}</math></b>

Precision **10 out of 12 periods have a CV smaller than 20%**

<b>Accuracy</b> (with 95% confidence interval) <b>WITH ALL DATA</b>
Bias calculated using 11 periods of data Bias factor A <b>0.73 (0.69 - 0.78)</b> Bias B <b>37% (28% - 45%)</b>
Diffusion Tubes Mean: <b>24 <math>\mu\text{g m}^{-3}</math></b> Mean CV (Precision): <b>10 caution</b>
Automatic Mean: <b>18 <math>\mu\text{g m}^{-3}</math></b> Data Capture for periods used: <b>97%</b>
Adjusted Tubes Mean: <b>17 (17 - 19) <math>\mu\text{g m}^{-3}</math></b>

(Check average CV & DC from Accuracy calculations)



Jaume Targa, for AEA  
Version 04 - February 2011

### PM<sub>10</sub> Monitoring Adjustment

Where particulate matter within North Lincolnshire is measured using a TEOM, data reported has had a factor of 1.3 applied and then corrected using the Volatile Correction Model (VCM) as recommended in TG16.

TEOM measurements are corrected by the VCM for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. The resulting corrected measurements have been demonstrated as equivalent to the gravimetric reference equivalent. The VCM works by using the volatile particulate matter measurements provided by nearby FDMS instruments (within 130 km) to assess the loss of PM<sub>10</sub> from the TEOM; this value is then added back onto the TEOM measurements. The VCM model used by North Lincolnshire Council uses The FDMS monitor at Scunthorpe Town AURN along with data from the Leeds AURN site and an average of other sites within range.

### QA/QC of Automatic Monitoring

Ricardo has performed QA/QC amendments to the data via their Calibration Club service. Each of the gas analysers is calibrated every 2 weeks. The TEOMs are calibrated at the same frequency, with the filter changed whenever required.



# Appendix D: Map(s) of Monitoring Locations

## Automatic Monitoring Sites

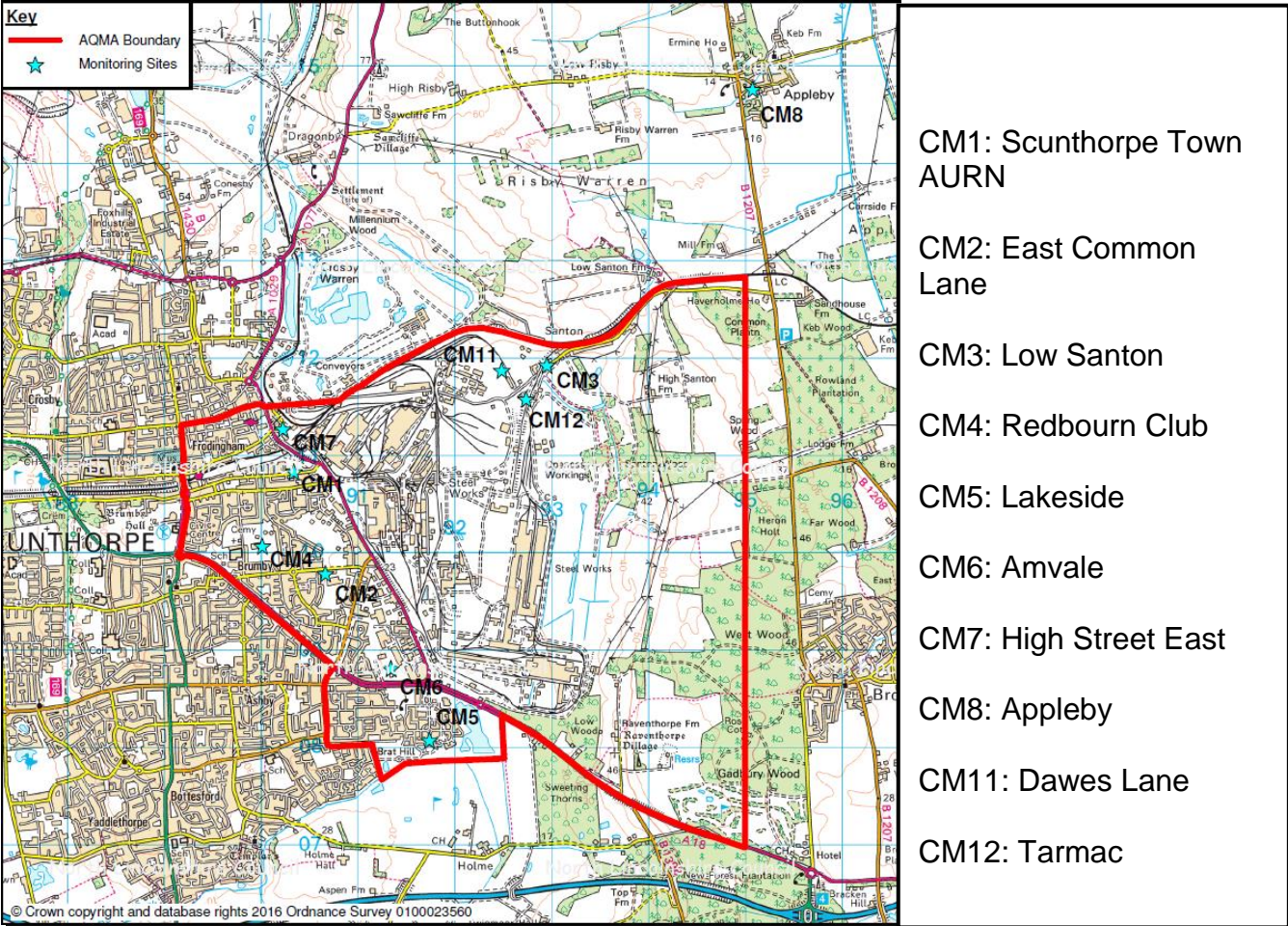


Figure 12 - Location of the continuous monitoring sites in relation to the Scunthorpe Town AQMA boundary

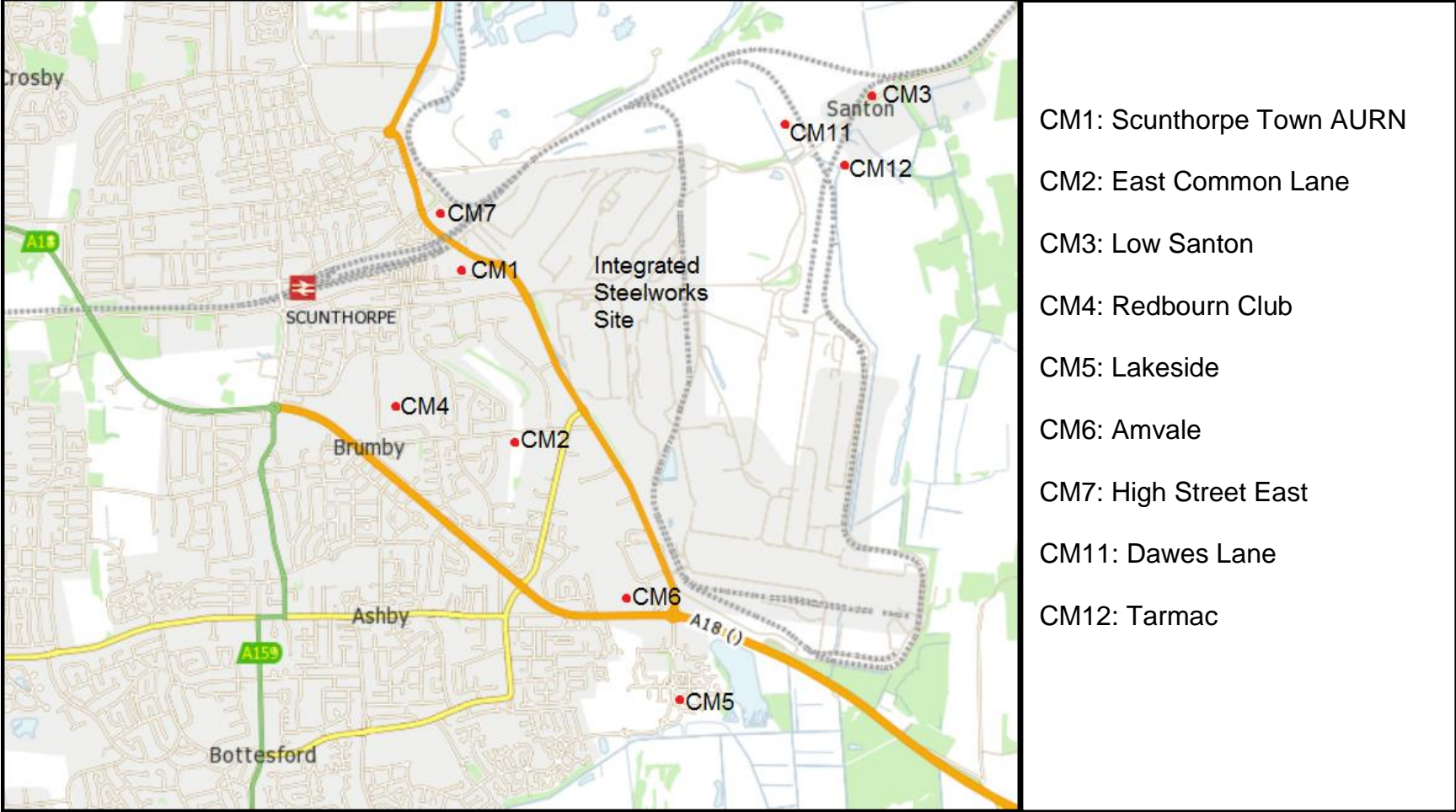


Figure 13 - Location of continuous monitoring sites in Scunthorpe and Santon



Figure 14 - Location of the Appleby monitoring site, Site ID: CM8



Figure 15 - Location of the Killingholme School monitoring site (Site ID: CM9) and the Killingholme Roadside monitoring site (Site ID: CM10)



Figure 16 - Location of the South Ferriby monitoring site, Site ID: CM13

Non-Automatic Monitoring Sites



Figure 17 - Location of diffusion tube monitoring locations

The Scunthorpe Town AQMA boundary is shown in black

## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in micrograms of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Appendix F: New Local Developments and Planning Applications

Reference	Description of Development	Location
PA/2015/0762	Planning permission to retain the sitting of a biomass boiler	Holme Farm, Elsham
PA/2015/0797	Planning permission to install a new biomass boiler	Althorpe & Keadby School
PA/2015/0208	Planning Permission to erect an extension to existing motel to house biomass boiler	Schiphol Way, Humberside Airport
WD/2015/1196	Planning permission to install an anaerobic digestion plant with associated infrastructure	Normanby Enterprise Park, Waldo Way
WD/2015/0983	Planning permission to install storage tanks and combined heat and power unit to form a bio refinery.	Ram Boulevard, Scunthorpe
WD/2015/0887	Planning permission for the import of construction, demolition and excavation wastes	Main Street, Thornton Curtis
PA/2015/0025	Planning permission for construction of a new football stadium, café, offices, hotel, gym, football pitches.	Brumby Common, Scunthorpe
PA/2015/0396	Outline planning permission for the development of up to 2500 new homes including a village centre (use classes A1, A2, A3, A4, A5, B1, D1), a health care facility (Class D1), community facilities (Use D1), a 3 form of entry primary school (Use D1), new roads & footpaths, informal areas of open space, play spaces, new wildlife habitat, water bodies & wetland with all matters reserved for subsequent approval.	Lincolnshire Lakes, Scunthorpe
PA/2015/0628	Application for full new road and footpaths, informal areas of open space, parklands, play areas and new wildlife habitats, attenuation ponds, recreational lakes and wetlands community. AND Outline application with all matters reserved for non-residential institutions (D1, D2) leisure facilities (A1, A3) and storage (B8)	Lincolnshire Lakes, Scunthorpe



Reference	Description of Development	Location
PA/2015/1106	Planning permission for construction of a 20MW embedded short-term operating reserve and peak power (STOR) generating plant, auxiliary equipment and access	Mannaberg Way, Scunthorpe
PA/2015/0597	Planning permission to erect 71 dwellings with associated access, open space, landscaping and infrastructure	Ashby Decoy, Scunthorpe
PA/2015/0627	Planning permission for highway works to deliver the new terminating junction to the M181 motorway (due to the de-trunked section of the highway to the north and south of the terminating junction)	Lincolnshire Lakes, Scunthorpe
National Infrastructure Project	River Humber Gas Pipeline Replacement Project	Goxhill - Paull

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
AURN	Automatic Urban and Rural Network - the main network used for compliance reporting against the Ambient Air Quality Directives
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EA	The Environment Agency
EU	The European Union
FDMS	Filter Dynamics Measurement System
HPA	The Health Protection Agency
LAQM	Local Air Quality Management
NLC	North Lincolnshire Council
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PCT	Primary Care Trust
PHE	Public Health England
PHOF	Public Health Outcomes Framework
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

TEOM	Tapered Element Oscillating Microbalance
UK	The United Kingdom
VCM	Volatile Correction Model – A method used to correct TEOM PM <sub>10</sub> monitoring data

## References

DEFRA Local Air Quality Management Technical Guidance (TG16)

DEFRA Local Air Quality Management Policy Guidance (PG16)

NPL Annual Report for 2014 on the UK Heavy Metals Monitoring Network

Detailed Assessment of the Scunthorpe PM10 Air Quality Management Area 2016

<https://uk-air.defra.gov.uk/>

<http://www.northlincs.gov.uk/jobs-business-regen/regeneration/lincolnshire-lakes/>