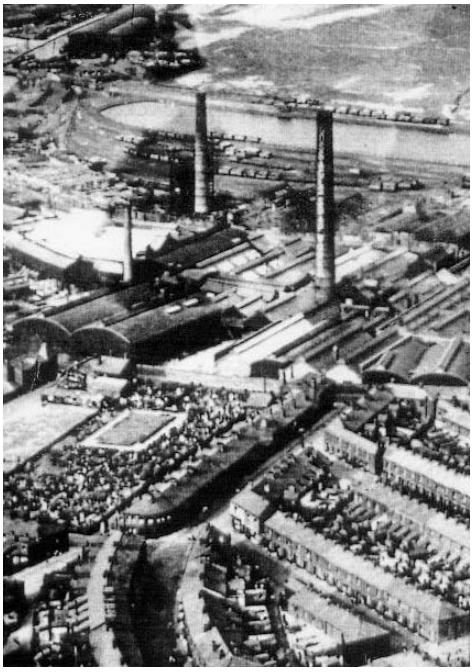
Report on Air Quality

in Halton

2015



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Introduction

Halton Borough Council received a petition entitled "Request for the Council to Monitor the Air Quality for $PM_{2.5}$ and other toxins" on 6th March 2015 with 5632 signatories.

The petition stated:

"Halton is a highly polluted area and our local authority have allowed a massive waste incinerator to be built. We have had a number of leaks already at the plant.

We want to protect the health of our children from these highly toxic contaminants, this can only be done by Monitoring the Air Quality for PM 2.5 and other toxins.

Our council to date has refused even though we are in an area that the British Government is being sued by the European Courts for failing comply with the European Directive on Air Quality"

This report represents a response to this petition and identifies the facts around air quality and air quality monitoring in Halton within the national and international frameworks and identifies recommendations going forward.

The report will look at:

- Air Quality legislation
- National and local trends in air quality
- Monitoring results within Halton
- Health in Halton

Background

There has been a perception from some members of the community for a number of years that Air Quality in Halton is poor and that this affects the health and wellbeing of people who live and work in Halton.

Poor air quality and pollutants in air can affect health and ensuring that the air we breathe is clean and does not cause harm to health is of local, national and international concern. There are a range of International, European and National Standards for air quality and requirements for monitoring of air quality to ensure compliance against these standards.

What is air pollution?

Air pollution is defined as a mixture of gases and particles that have been emitted into the atmosphere by man-made processes. Air pollution is a local, regional and international problem caused by the emission of pollutants, which either directly or through chemical reactions in the atmosphere lead to negative impacts on human health and ecosystems. There are many sources of air pollution, including power stations, traffic, household heating, agriculture and industrial processes.

Health and air pollution

Generally if you are in a good state of health, moderate air pollution levels are unlikely to have any lasting effects.. People with existing lung or heart disease are generally more susceptible to the effects of air pollution and are likely to see effects at lower concentrations. However, higher levels or long term exposure to air pollution can lead to more serious symptoms and conditions, mainly

affecting the respiratory and inflammatory systems, but also more serious conditions such as heart disease and cancer.

Specifically, chronic exposure to Particulate Matter (PM) contributes to the risk of developing cardiovascular diseases and lung cancer[1]. Health effects of PM are caused after their inhalation and penetration into the lungs. The smaller the particles, the deeper they penetrate into the lungs. PM's mortality effects are therefore strongly associated with the smaller $PM_{2.5}$ fraction, even though the coarser 2.5-10µm fraction known as PM_{10} also has clear health and mortality impacts.

The Committee on the Medical Effects of Air Pollution (COMEAP) produced a report on the mortality effects of long term air pollution in 2010[2]. The report estimated the number of deaths that may occur as a result of air pollution and concluded that based on 2008 levels of air pollution, 29,000 deaths in the UK per year may be attributed to air pollution equating to just over 5% of all deaths. A recent Public Health England report estimated that long term exposure to anthropogenic (man-made) fine particulate ($PM_{2.5}$) air pollution may contribute to 5.6% of deaths across England.[3]

Additional studies suggest that air pollution is estimated to reduce life expectancy of people in the UK by 6 months on average, which may cost the UK around £16 billion per year.

The National picture

DEFRA (Department for Environment, Food and Rural Affairs) are the responsible government body for ensuring the UK national and local obligations around air quality are met, a programme of air quality science and research to help develop and implement policies to improve air quality and to help assess the risks to people's health and to the environment, the concentrations of key pollutants are measured via a national network of monitoring sites, the Automatic Urban and Rural Network (AURN), which continuously captures ambient concentrations of selected pollutants throughout the UK.

Legislative frameworks

In the UK, actions taken to improve air quality are driven by the objectives set out in the 2007 Air Quality Strategy[4] and by EU standards for air quality which are set into English law through the Air Quality Standards Regulations (England) 2010[5] which transpose in to English Law the requirements of EU Directives on ambient air quality.

Other national policy directives include:

- Part IV of the Environment Act 1995 setting provisions for protecting air quality in the UK and for local air quality management[6].
- Air Quality (England) Regulations 2000 setting national objectives for local authorities in England[7].

[1] http://www.eea.europa.eu/publications/air-quality-in-europe-2013
[2] Committee on the Medical Effects of Air Pollution (COMEAP) 2010. Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom. https://www.gov.uk/government/publications/comeap-mortality-effects-of-long-term-exposure-to-particulate-air-pollution-in-the-uk
[3] Public Health England (PHE) 2015. Estimating Local Mortality Burdens Associated with Particulate Air Pollution.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf
[4] https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1
[5] http://www.legislation.gov.uk/uksi/2010/1001/contents/made
[6] http://www.legislation.gov.uk/ukpga/1995/25/part/IV

- The National Emission Ceilings Regulations 2002[8] transpose into UK legislation the requirements of the EU Emissions Directives.

The European Union Directives include:

- the Ambient Air Quality Directive (2008/50/EC)[9] and Directive 2004/107/EC,[10] which set limits for concentrations of pollutants in outdoor air
- the EU National Emissions Ceilings Directive (2001/81/EC)[11], which sets limits on total annual emissions of important air pollutants for all member states to help reduce 'trans-boundary air pollution' (pollution that is generated in one country but has an effect in others)

Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Figure 1. This table shows the objectives in units of micrograms per cubic metre (µg/m^3) or milligrammes per cubic metre, (mg/m^3) for carbon monoxide with the maximum number of permitted times, where applicable, this can be exceeded in each year (exceedences).

Figure **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 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (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

[7] http://www.legislation.gov.uk/uksi/2000/928/contents/made
[8] http://www.legislation.gov.uk/uksi/2002/3118/contents/made
[9] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008L0050
[10] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32004L0107
[11] http://ec.europa.eu/environment/air/pollutants/ceilings.htm

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

Integrated Pollution Prevention and Control (IPPC)

IPPC was introduced by an EC directive. It is about minimising pollution from various point sources throughout the European Union. In England and Wales the Directive is implemented by the Pollution Prevention and Control Act and the Environmental Permitting (England and Wales) Regulations.

Certain Industrial Processes which have the potential to emit significant amounts of Pollution are required to have a Permit. The Permit sets conditions which will keep pollution emissions to a minimum. Permits are issued under the Pollution Prevention and Control Act 1999.

The Environmental Permitting Regulations gives details of the Installations that require Permits and explains the rules governing these Permits. The requirement to have a Permit depends on the type of industry and the amount of processing or the quantity of certain chemicals that are used. Permits are issued by:

- Part A1 Installations: The Environment Agency

  A1 processes are the larger processes generally those activities which have greatest potential to cause pollution. The permit covers emissions to air, land and water (including sewers) as well as waste minimisation, efficient use of raw materials, energy usage and noise.

- Part A2 and Part B Installations: Local Authority

  A2 and B Processes are generally processes which have less significant polluting capacity and covers only emissions to air.

Following the planning application process for an industrial site development where emissions may be produced, or in order to vary the type of processes that an existing industry can undertake, the site operator applies for a Permit detailing how polluting activities will be controlled. The permit will be considered by the Environment Agency for large scale installations and significant processes, such as the Energy from Waste Process operated by Viridor. If approved a permit will be issued with conditions, including emission limits and it is the responsibility of the regulator (the Environment Agency for A1 processes) to regularly inspect sites and review monitoring data to ensure compliance, and take action where operations are found not to comply.

As part of the IPPC requirements, the emissions from industrial processes are managed and assessed by both the operator and regulator to ensure that emissions that are released are within permitted limits. All IPPC permitted industrial operations in Halton are monitored, assessed and regulated as per the legislation.

National trends in Air Quality

There have been significant reductions in recent decades of emissions of air pollutants. There is however a very complex relationship between the amount of emissions of pollutants and ambient local air quality. Air quality is strongly affected by weather and atmospheric conditions; for example, the gas ozone (O3) is an air pollutant but is not emitted directly as a result of manmade processes in significant quantities, but is created in the air through chemical reactions between other pollutants in sunlight, with more being created on hot, still, sunny days.

DEFRA released the most recent National Statistics Release: Air quality statistics in the UK, 1987 to 2014 on 23rd April 2015.[12] This statistical release covers annual average concentrations in the UK of two pollutants thought to have the greatest health impacts stated as:

- Chronic exposure to particulate matter contributes to the risk of developing cardiovascular and respiratory diseases, and there is increasing evidence suggesting that long-term exposure to even low levels of Particulate matter may have a significant effect on health. The annual average concentrations for Particulate matter are considered a useful measure of overall exposure to Particulate matter at all concentrations.
- The gas ozone (O3) can affect people's health and can damage, for example, wild plants, crops and forests. Higher levels of ground level ozone can cause breathing problems, trigger symptoms of asthma, reduce lung function and cause lung diseases. Several European studies have reported that current ozone concentrations in Europe have health effects, especially in the summer, and that daily mortality rises with increases in ozone exposure. The ozone concentration reported in this release is the annual average of the maximum daily eight-hour running mean.

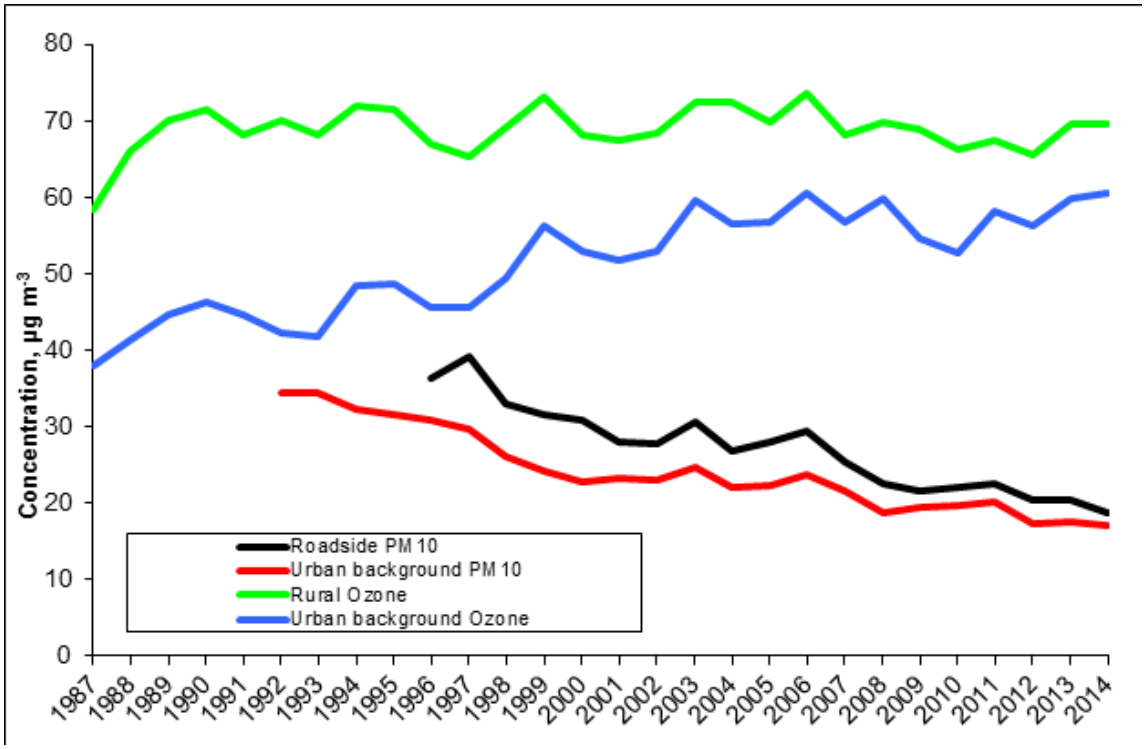
Data from the statistical release (**Figure 2**) shows that the average roadside and urban background levels of particulate matter have shown long-term improvement with small decreases in concentration shown from 2013 to 2014. Urban background ozone pollution has remained fairly stable nationally between 2003 and 2014, although concentrations have shown a long-term increase since monitoring began. Rural background ozone pollution has shown no clear long-term trend and stayed level at 66 µg/m^3 in 2014.

The statistical release also covers the number of days when air pollution was assessed as being moderate or higher. The indicator is intended to provide a summary measure of air pollutants that affect health. The five pollutants included in the indicator from the 1st January 2012 are as follows:

- Particulate matter ($PM_{2.5}$)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Particulate matter (PM_{10})
- Sulphur dioxide (SO_2)

[12] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/423353/National_Statistic_on_Air_Quality_2014.pdf

Figure 2 - Annual *levels of PM_{10} and Ozone in the UK, 1987 to 2014*



These five pollutants included in the indicator have known harmful effects on human health and the environment, (identified by the COMEAP - Committee on Medical Effects of Air Pollutants)[13]. These pollutants are principally the products of combustion from household and industrial heating, power generation or from motor vehicle traffic. Fine particles ($PM_{2.5}$) can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases. The gases irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases.

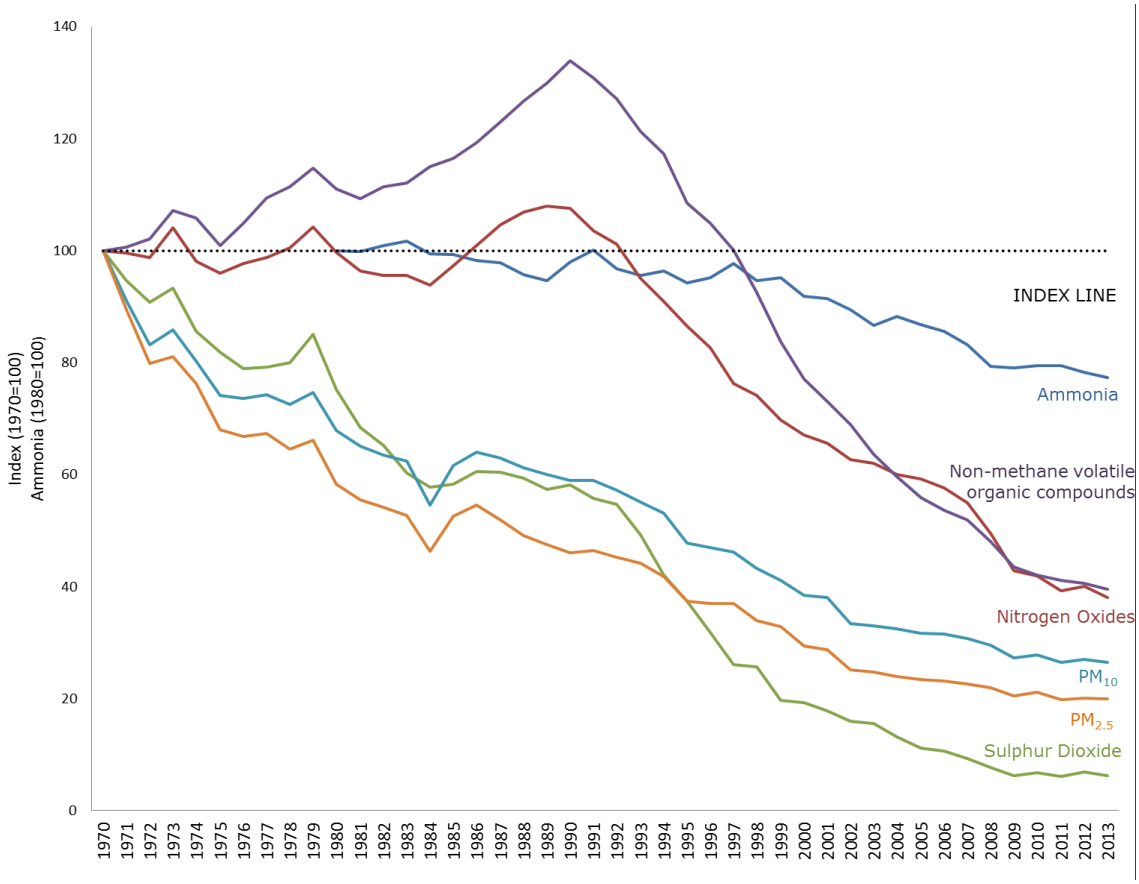
National data shows that the average number of days per year in which the concentrations of each of these pollutants is classed as moderate or higher in urban areas has decreased annually, showing a steady improvement in overall air quality nationwide.

National Emissions

Defra Statistical Release: 18 December 2014, Emissions of Air Pollutants in the UK, 1970 to 2013 states that there has been a long term decrease in the emissions of the pollutants: ammonia; nitrogen oxides; non-methane volatile organic compounds; particulate matter (PM_{10}, $PM_{2.5}$) and sulphur dioxide) as shown down the downward trend on the graph in **Figure 3**.

[13] https://www.gov.uk/government/groups/committee-on-the-medical-effects-of-air-pollutants-comeap

Figure 3: Downwards trends in UK sulphur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and particulate matter (PM_{10}, $PM_{2.5}$) emissions 1970 – 2013



History of Air Quality in Halton

Halton has been home to the chemical industry since the 18th century. Coal from Lancashire and Salt from Cheshire coupled with good transport links (canals, railway) gave prime position for industrial growth. Many of the processes used coal to fire the boilers and there were historically little, if any, control on the emissions to atmosphere.

Both industrial emissions and domestic coal burning (from the homes of workers) had a significant impact on the air quality in Halton. In the winter the burning often led to "smog" - a lethal mixture of acidic smoke-particles and fog.

The Clean Air Act 1956 gave powers to local authorities to curb domestic coal combustion and cut industrial smoke and sulphur dioxide emissions from furnaces and boiler plants. After the 1960's, exhaust emissions from the rising number of road vehicles also contributed to air pollution.

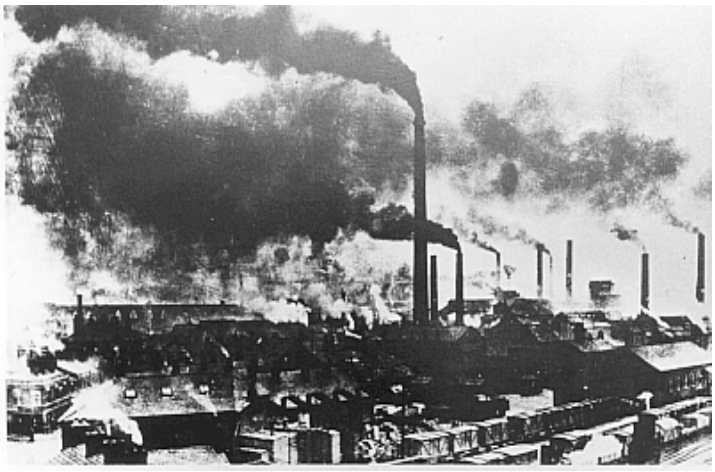
Halton's first smoke control zone was declared in 1961 and by 1976 the majority of domestic property in Halton had converted to smokeless low-sulphur fuels such as North Sea gas. Industrial boilers were legally required to be smoke free and many were converted to burn oil and/or gas.

The results of monitoring in Halton during that period showed that the levels of sulphur dioxide and smoke decreased significantly.

Since that time additional controls have been applied to industry to further reduce industrial emissions and minimise the levels of pollution.

The image and quotation below (**Figure 4**) show the industrial pollution in Halton in the 19th century with an associated quote. The Clean Air Act and smoke control zones significantly improved this outlook.

Figure 4: Widnes in the late 19th Century-Photograph and Quotation taken from The Halton Legacy[14]



"Those coming into Widnes, even from very dark and gloomy skies, enter the town with a certain awe and horror, and wonder if life can be sustained"

Monitoring undertaken in Halton

Halton Borough Council assesses Air Quality in accordance with National and European legislative requirements and has done for many years. This is in addition to the monitoring of industrial processes by the Environment Agency as required under the IPPC regulations. As part of the assessment, The Council have monitored various pollutants in a number of locations over the years 2006-2014 are shown on the map in **figure 5**.

These locations are chosen for monitoring sites as modelling has indicated they are the locations where factors (such as traffic flows and wind directions etc.) are likely to result in the highest concentrations of pollutants. [15]

Figure 6 shows a map of the locations across Halton where premises and processes are regulated by the Environment Agency. The Environment Agency undertakes additional monitoring or assessment as part of the statutory regulatory process.

[14] The Halton Legacy, Edwards E, Stevens R, Halton Borough Council 1991. ISBN 0946678014, 9780946678013

[15] A review of air quality data from monitoring locations is produced in an annual report and has been available on the Council website since 2006. These can be accessed at http://www4.halton.gov.uk/Pages/planning/air-quality.aspx

Figure 5: Locations of Halton Borough Council monitoring sites 2006-2014

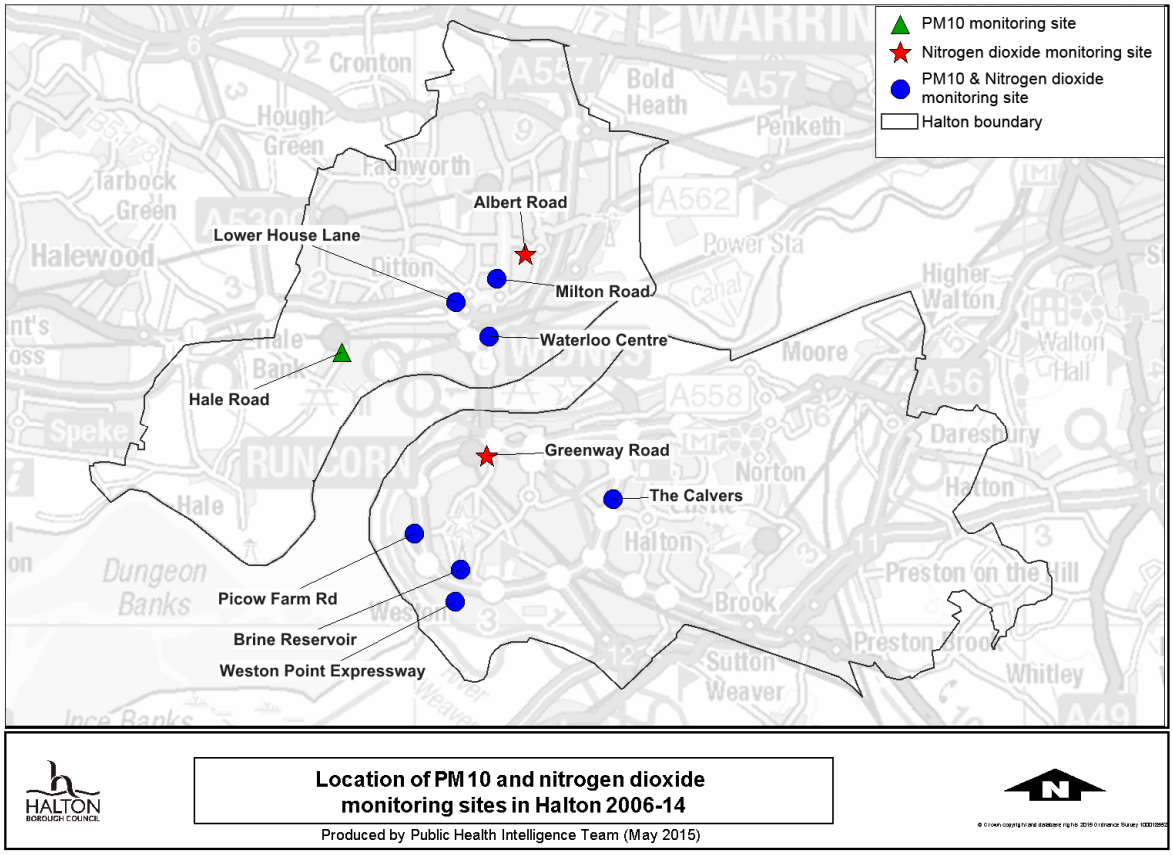
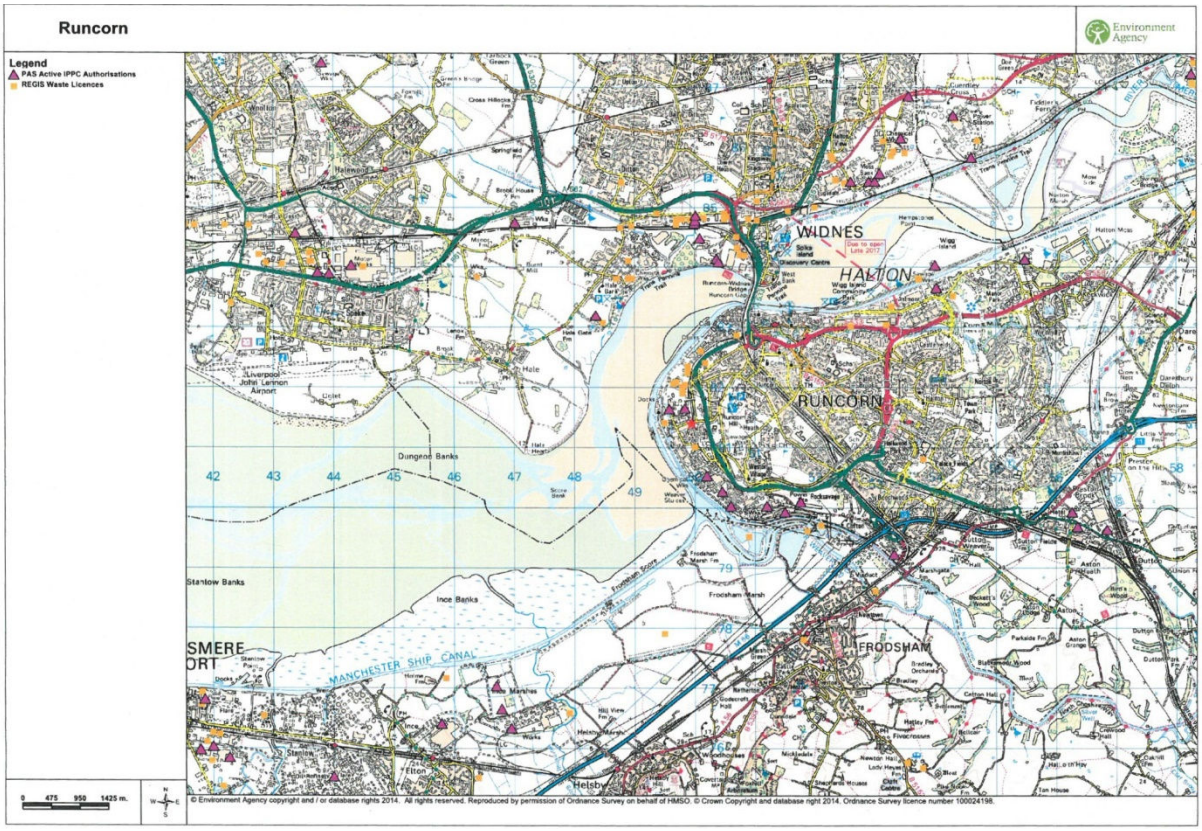


Figure 6: Location of Environment Agency regulated sites in Halton (1:50,000 scale map)



Nitrogen dioxide

Nitrogen dioxide (NO_2) and nitric oxide (NO), collectively known as nitrogen oxides (NO_x), are produced by all combustion processes. Over time the nitric oxide is then oxidised to nitrogen dioxide, largely by ozone present in the lower atmosphere.

Nitrogen dioxide has a variety of environmental and health impacts. It is a respiratory irritant, may exacerbate asthma and possibly increase susceptibility to infections. In the presence of sunlight, it reacts with hydrocarbons to produce photochemical pollutants such as ozone. Nitrogen oxides contribute to acid rain, depletion of the ozone layer and are greenhouse gases.

The principal source of nitrogen oxides emissions is road transport. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are city centres with congested traffic. However the increasing proportion of petrol-engine vehicles fitted with exhaust catalysts is significantly reducing emissions of nitrogen oxides as new cars replace older models without catalysts.

Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors. Emissions from both sources have also declined dramatically, due to the fitting of low nitrogen oxide burners, and the increased use of natural gas plant. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels, although breaches of the hourly nitrogen dioxide objective may occur under rare, extreme meteorological conditions, due to emissions from these sources.

An analysis of monitoring data in the vicinity of roads throughout the UK was undertaken, and provided additional guidance to authorities on where exceedences might occur[16]. The report concluded that, outside of major conurbations, exceedences of the annual mean objective are only likely to occur within about 10 metres of the kerbside of single carriageway roads. This includes roads with relatively low traffic flows (10000 – 20000 vehicles/day) if they are within congested town centres. It therefore recommended that authorities focus upon those locations where they expect pollutant concentrations to be the highest (often referred to as 'hot spots'). If there are no exceedences of the objectives at the most polluted locations, then it can be reasonably concluded that there should be no exceedences elsewhere.

The UK as a whole has not achieved the objectives for NO_2 and a recent Supreme Court hearing April 2015, has ordered the UK Government to submit additional plans for the reduction NO_2 to the European Commission by the end of the year.[17] There are several areas involved in the infraction proceedings which include Greater London, the West Midlands, Greater Manchester, West Yorkshire, Teesside, the Potteries, Hull, Southampton, Glasgow, the East, the South East, the East Midlands, Merseyside, Yorkshire & Humberside, the West Midlands, and the North East. Halton Local Authority is not included within the Liverpool Urban Area for the purposes of national air quality assessments and so is not included in the proceedings.

Nitrogen dioxide has been monitored extensively in Halton for a number of years. An Opsis monitoring station provided real time data and was used to measure the background concentration of nitrogen dioxide in various locations around Halton. In recent years diffusion tube surveys have been used and moved locations to focus on potential areas of concern.

The results of monitoring show that the air quality objectives for NO_2 have been achieved except within the designated Air Quality Management Areas (AQMAs).

[16] *Compilation of new roadside monitoring data obtained by local authorities as part of the review and assessment process.* A report prepared by Air Quality Consultants Ltd and University of West England on behalf of Defra, April 2002.

[17] http://www.bbc.co.uk/news/science-environment-32512152

Data from the NO_2 monitoring is shown and described in below in **figures 7 to 7.4**).

Figure 7: Air quality objective standards for nitrogen dioxide as part of the Air Quality Directives

Concentration	Averaging period	Allowed excursions	Date standard to be achieved by
200 μg/m^3	1-hour mean	18 times per year	31.12.2005
40 μg/m^3	Annual mean	none	31.12.2005

Two air quality management areas have been declared in Widnes town centre where NO_2 levels frequently exceed the annual mean objective of 40 μg/m^3. These are main town centre road routes with potential higher volume, slow moving traffic (Albert Road/Deacon Road and Milton Road/Gerard Street). Real time analysers are used in the AQMAs to continually assess air quality.

The mobile air monitoring station was used to measure the background concentration of nitrogen dioxide in Halton. The station was situated at several locations in Runcorn and Widnes and the results obtained show that the levels were consistently below the objectives.

Monitoring of NO_2 and PM_{10} was undertaken at various points across the Borough (**Figure 7.1**) which shows levels well below the objective levels.

Figure 7.1: Results from Mobile NO_2 Air Monitoring Station

Averaging Period	2000	2001	2002	2003	2004	2005	2006
	Result μg/m^3	Result μg/m^3	Result μg/m^3	Result μg/m^3	Result μg/m^3	Result μg/m^3	Result μg/m^3
Annual Mean	24	26	27	24	25	26	28
1-hour mean	118	93	84	92	94	84	92

No exceedences recorded in any time period

West Bank School Widnes
All Saints Runcorn
Runcorn Town Hall
Lower House Lane Widnes

Halton Council has also undertaken background monitoring data of NO_2 collected as a result of the planning consent for the Mersey Gateway proposals. Monitoring will be continued during and after construction and the results will then be compared with the baseline figures (**Figure 7.2**)

Figure 7.2: Mersey Gateway Monitoring

Site	2013 Seasonally Adjusted Annual Mean (µg/m^3)	Number of Hourly Means > 200µg/m^3
The Calvers, Runcorn	26.1	0
Waterloo Centre, Widnes	26.7	0

Pre-construction NO_2 monitoring results for the Mersey Gateway development show that the levels are below the air quality objectives.

Pre-monitoring was undertaken in response to the planned development of the new energy from waste facility in Runcorn (**Figure 7.3**). In line with planning conditions, monitoring will be continued once the facility is operational and the results will then be compared with the baseline figures.

Figure 7.3: Energy from Waste site Monitoring

Site	2012 Seasonally Adjusted Annual Mean (µg/m^3)	Number of Hourly Means > 200µg/m^3
Picow Farm Road	21.0[a]	0
Runcorn Hill Brine Reservoir	18.8[b]	0
Weston Point Expressway	27.4[c]	0

a Monitoring Period was 1st November 2011 – 31st January 2012

b Monitoring Period was 1st March 2012 – 28th February 2013

c Monitoring Period was 19th April 2012 - 2nd October 2012

Pre-construction monitoring for the Energy from Waste development show that the air quality objectives for both nitrogen dioxide and PM_{10} are well below the objectives

Halton has two areas which show higher than objective levels of NO_2, these have been designated as Air Quality Management Area and are subject to additional measures to reduce the levels of NO_2. Results of monitoring for the AQMA is shown in **figure 7.4**.

Figure 7.4 :Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site	Annual Mean Concentration (µg/m^3)						
	2008	2009	2010	2011	2012	2013	2014
Milton Road, Widnes	40.0	34.1	39.6‡	36.9	**41.1***	**45.0***	40.0

* Data exceeds the annual mean Objective threshold

‡ The 1-hour mean objective was exceeded on 2 occasions in 2010, but on no other occasions.

Annual mean NO_2 levels exceed air quality objective levels in designated Air Quality Management Areas as a result of town centre traffic activity.

An action Plan has been developed for AQMAs which identifies improvements required to reduce NO_2 levels over time. Actions include:

- Traffic flow moderation and alternative signage
- Potential road widening
- Improved alternative parking
- Active transport plans, including cycling/walking schemes
- Green Bus plan (cleaner fuels, particulate traps, improved technologies)

Particular Matter

Particulate Matter (PM) is breathable particulate matter that are small enough to penetrate deep into the lungs and so potentially pose significant risks to health including increased risk of heart and lung disease. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs. PM_{10} are particles that are less than 10 microns in diameter, $PM_{2.5}$ are particles that are less than 2.5 microns in diameter and can penetrate deeper in to the lungs and possibly further.

There are 3 main sources of particulates:

(i) Primary combustion particles

These are derived from road traffic exhaust, power generation and other industrial combustion processes.

(ii) Secondary particles

Gaseous pollutants in the atmosphere, such as sulphur dioxide and nitrogen oxides, are oxidised over time to form airborne particles of sulphates and nitrates.

(iii) "Coarse" and "other"

These include dust re-suspended by road traffic, emissions from construction and mineral working, windblown dust and even sea salt.

Progress has been made in reducing emissions of particles from both the transport and industrial sectors. Emissions from industry have been reduced as a result of stricter controls on sites through the implementation of emission limits and reduction of fugitive emissions. Emissions from road transport have been reduced as a result of the tightening of emissions controls (Euro standards) and by the reduction of the sulphur content of diesel fuel, which affects the emissions of particles from vehicles. Planning applications for new large scale developments must demonstrate how they will control dust during construction.

Figure 8 to 8.3 show the appropriate PM_{10} Air Quality objective and results of monitoring.

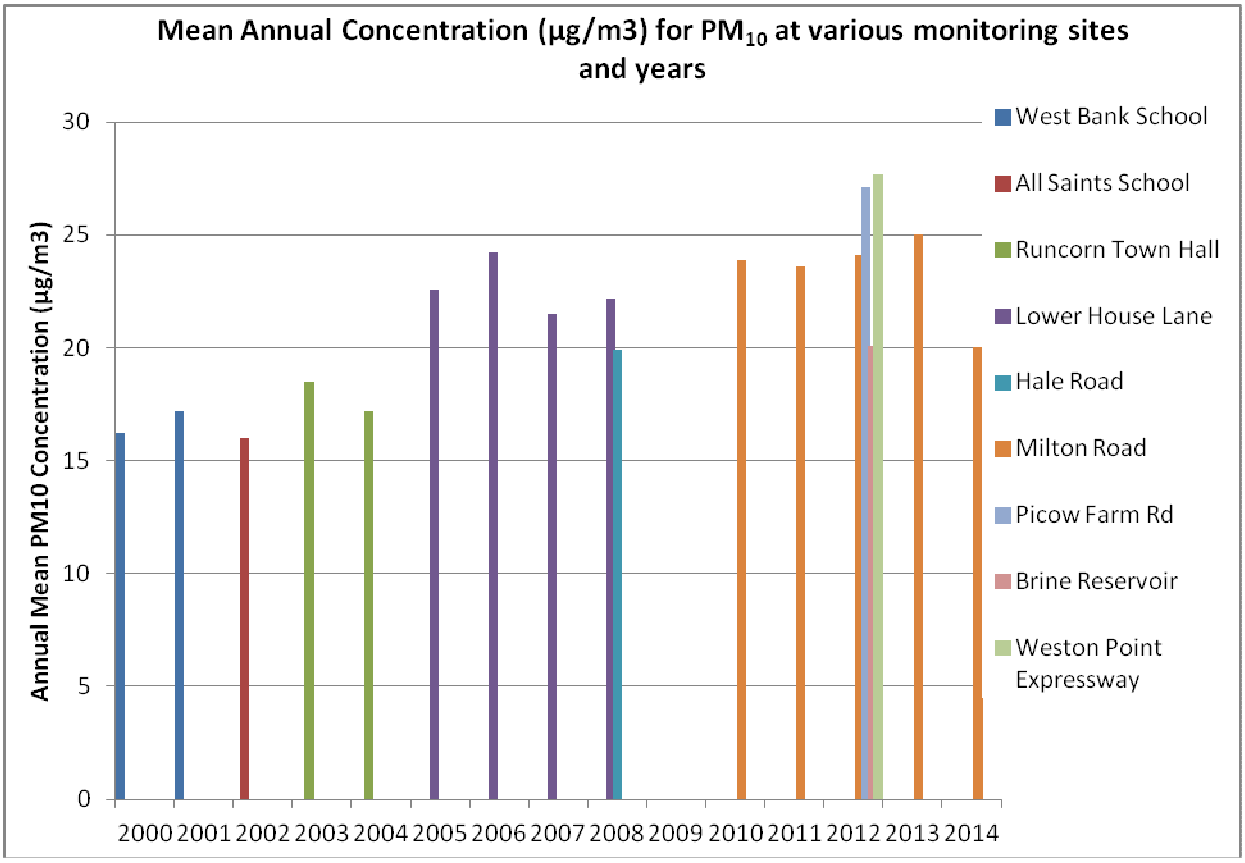
Figure 8: Air quality objective for PM_{10}

Concentration	Averaging Period	Allowed excursions	Date standard to be achieved by
50	24-hour mean	35 times per year	31.12.2004
40 $\mu g/m^3$	Annual mean	none	31.12.2004

In Halton, there have been no breaches of the objectives for PM_{10}

General monitoring sites are relocated regularly in order to identify whether different areas may become a problem and areas where mitigation may be required. **Figure 8.1** shows a graph of the locations and annual mean PM_{10} levels for each location (all of which are below objective levels). The monitors have not been in fixed locations and therefore it is not possible to identify any trend in change of levels over time.

Figure 8.1: shows the locations and results of most recent monitoring sites for PM_{10} over a number of years



The results of PM_{10} monitoring show that the air quality objectives for PM_{10} have been achieved across the borough.

In addition to the mobile monitoring sites, PM_{10} monitoring was undertaken prior to the development of the new Energy from Waste plant in Runcorn (**Figure 8.2**) and Mersey Gateway (**Figure 8.3**) shows that the levels in both these areas are below the objective levels.

Figure 8.2: PM_{10} monitoring for the Energy from Waste development

Site	2012 Seasonally Adjusted Annual Mean (µg/m^3)	Number of Hourly Means > 50µg/m^3 (35 exceedences permitted)
Picow Farm Road	27.1[a]	6
Runcorn Hill Brine Reservoir	20.1[b]	5
Weston Point Expressway	27.7[c]	0

a Monitoring Period was 1st November 2011 – 31st January 2012

b Monitoring Period was 1st March 2012 – 28th February 2013

c Monitoring Period was 19th April 2012 - 2nd October 2012

Pre-construction PM_{10} monitoring results for the Energy from Waste development show that the levels are below the air quality objectives

Figure 8.3: PM_{10} monitoring for the Mersey Gateway development

Site	2013 Seasonally Adjusted Annual Mean (µg/m^3)	Number of Hourly Means > 50µg/m^3
The Calvers, Runcorn	15.4	6
Waterloo Centre, Widnes	22.0	8

Pre-construction PM_{10} monitoring results for the Mersey Gateway development show that the levels are below the air quality objectives

There are currently no agreed and implemented UK objectives for $PM_{2.5}$ however the European Union have suggested a guideline annual average $PM_{2.5}$ level of 25µg/m^3. $PM_{2.5}$ has been monitored on Runcorn Hill in Halton and most recent data (2012) shows that the annual average concentration is 13.14ug/m^3 which is below the EU guideline levels. Additional modelling undertaken shows that $PM_{2.5}$ is expected to remain well below the EU guideline level.

Measurements of $PM_{2.5}$ in the Borough show that levels are below and predicted to remain below the EU objective level.

Sulphur Dioxide

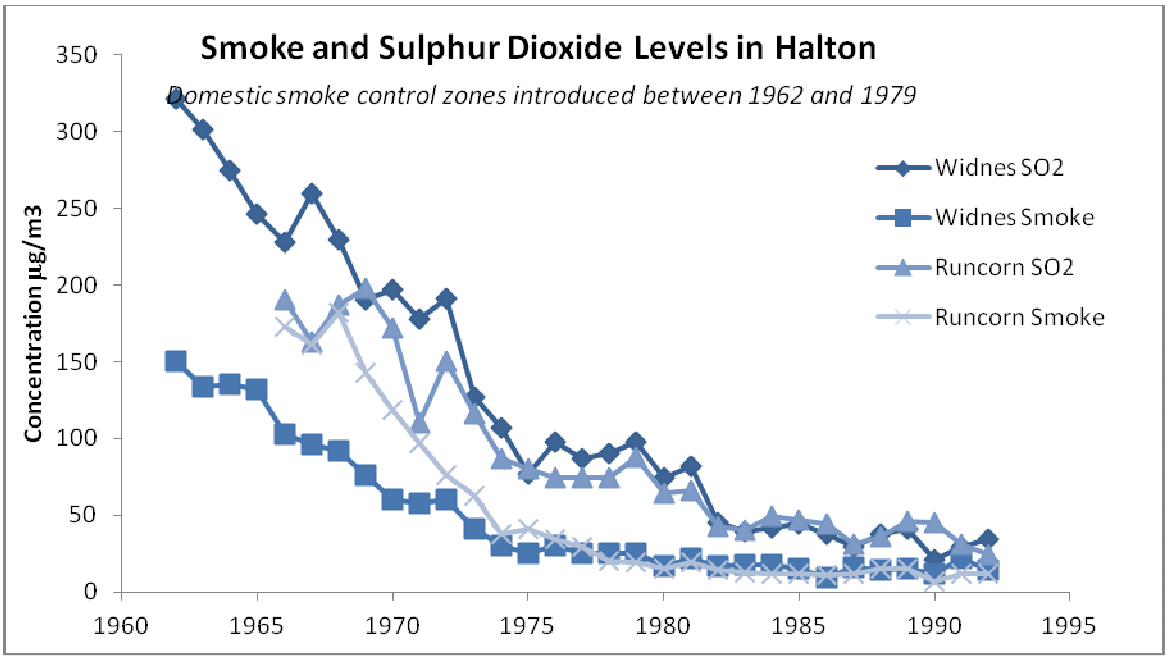
Sulphur dioxide contributes to the formation of acid rain and is associated with asthma and chronic bronchitis. The main source of sulphur dioxide is the combustion of sulphur containing fossil fuels in power stations.

A national survey was undertaken from 1962 to 1992. There were two monitoring stations – Widnes Municipal Building and Runcorn Library. At each monitoring station air was drawn through a filter paper and then through a bubbler containing Hydrogen Peroxide. The smoke concentration was

estimated using a reflectometer reading of the stain produced and the sulphur dioxide concentration was calculated from a titration of the acidity produced in the bubbler.

Levels of smoke and sulphur dioxide show a dramatic decrease over the 1960s and 1970s and a levelling off during the 1980s. The decrease coincides with the implementation of smoke control zones in Halton leading to controls on coal burning, introducing cleaner solid fuels and building taller power station stacks. Filtering equipment at power stations, burning low sulphur coal and using alternative methods for electricity production have reduced sulphur dioxide levels further. **Figure 9** shows the local results from the national survey and highlights the steep downward trend in smoke and SO_2 levels.

Figure 9: Local results from the National Survey for Smoke and Sulphur Dioxide



Subsequent monitoring of sulphur dioxide has shown that the levels remain low and are consistently below the objectives. **Figures 10 to 10.1** show the SO_2 objectives and local monitoring data.

Figure 10: Air quality objectives for sulphur dioxide

Concentration	Averaging period	Allowed excursions	Date standard to be achieved by
350 µg/m^3	1-hour mean	24 times per year	31.12.2004
125 µg/m^3	24-hour mean	3 times per year	31.12.2004
266 µg/m^3	15-minute mean	35 times per year	31.12.2005

A mobile air monitoring station was used to measure the background concentration of SO_2 in Halton to monitor achievement of SO_2 Air Quality Objectives. The station was situated at several locations in Runcorn and Widnes and the results obtained show that the levels were consistently below the objectives (**Figure 10.1**).

Figure 10.1: Results from SO_2Mobile Air Monitoring Station

Averaging Period	2000	2001	2002	2003	2004	2005
	Result $\mu g/m^3$	Result $\mu g/m^3$	Result $\mu g/m^3$	Result $\mu g/m^3$	Result $\mu g/m^3$	Result $\mu g/m^3$
1-hour mean	70	80	62	42	35	32
24-hour mean	48	40	30	24	19	18
15-minute mean	94	114	125	64*	47	52

*1 result exceeded objective during the monitoring period

West Bank School Widnes

All Saints Runcorn

Runcorn Town Hall

Lower House Lane Widnes

More recent monitoring of sulphur dioxide has been undertaken as a result of the planning consent for the new energy from waste plant in Runcorn. Background Monitoring on Runcorn Hill undertaken between March 2012 and February 2013 shows that the levels are well below the objectives with no exceedences recorded.

The results of SO_2 monitoring show that the air quality objectives have been achieved across the borough.

Lead

Lead is a cumulative poison to the central nervous system. It can also cause abdominal pain, kidney damage, high blood pressure and can affect fertility. The main sources of lead are now restricted to industrial applications, such as the manufacture of batteries, paint pigments, alloys, radiation shielding, inert tank lining and piping.

Lead used to be added to petrol to enhance its performance but the EC Directive on the Quality of Petrol and Diesel Fuels led to a ban on the sale of leaded petrol with effect from the 1st January 2000.

Monitoring at UK National Network Sites has shown a significant decline in the ambient concentration of lead (as sales of leaded petrol were phased out) and annual means are now well within the objectives.

In Halton, Lead particles were monitored up to 1998 by capture on membrane filter and analysis by atomic absorption spectroscopy. The filters were changed at 14-day intervals. The results show that both the 2004 and 2008 objectives were achieved in Halton as shown in **Figure 11 to 11.2**).

Figure 11: Air quality objectives for Lead

Concentration	Averaging period	Date standard to be achieved by
0.5 μg/m^3	Annual mean	31.12.2004
0.25 μg/m^3	Annual mean	31.12.2008

The results of the monitoring show that the levels of lead were persistently below the limits. Levels decrease, despite the increased traffic, because the lead content of petrol has been reduced.

The sites of lead monitoring were:

1. Runcorn Library, Runcorn

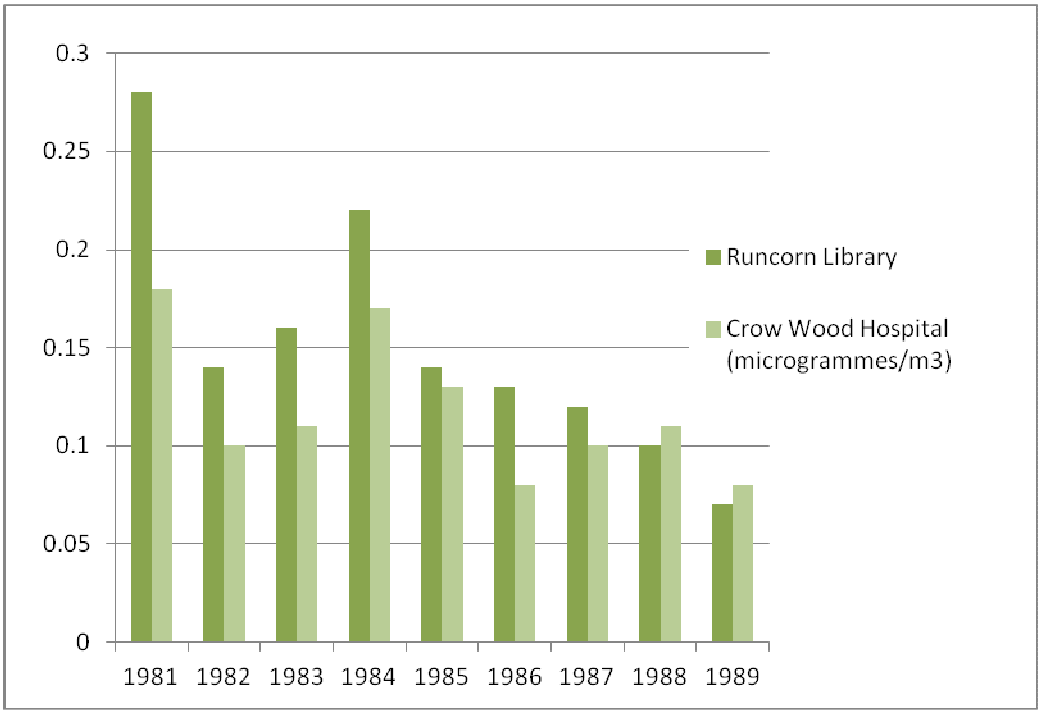
   The library is 84 metres from the overhead approach to the Silver Jubilee Bridge and is sited in a residential area of terraced housing.

2. Crow Wood Health Park, Widnes.

   The health park was formerly a hospital and is sited in a residential area away from major roads.

The annual mean concentrations (μg/m^3) of lead at these sites per year of monitoring are shown in **Figure 11.1** which highlights the downward trend over the years to well below Objective levels.

Figure 11.1: Annual Mean Lead concentrations (μg/m^3)



Additional monitoring has been undertaken on an ad hoc basis at West Bank School, Widnes. The school is sited adjacent to the Silver Jubilee Bridge approach road (Figure **11.2**). This continues to show levels well below objective levels.

Figure 11.2: Lead monitoring at West Bank School

Sampling period	Mean lead concentration $\mu g/m^3$
Feb to July 1979	0.28
Dec 1990 to Oct 1991	0.23
May 1994 to 1995	0.08
July 1997 to July 1998	0.11

With the implementation of lead free fuels, restriction of lead in paint products and other factors, alongside no additional developments in Halton resulting in the significant increase in lead, levels of lead are not predicted to approach objective levels.

The results of lead monitoring show that the air quality objectives have been achieved across the borough.

Benzene

Benzene is an aromatic volatile organic compound (VOC) that contributes to the formation of ground level ozone and is a known carcinogen. The main sources of benzene are petrol-engine vehicle exhausts and associated activities; petrol refining, distribution and petrol station forecourts.

In general VOC emissions increased until the late 1980s, but then declined due to tighter controls on vehicle emissions and improved vehicle technologies. Since 1991 average benzene concentrations fell as new cars equipped with exhaust catalysts replaced the older models. Emissions of benzene from the majority of petrol station forecourts during tanker discharge to storage tanks have been reduced by the introduction of vapour recovery systems (introduced by 1st January 1999 where fuel throughput is greater than 1000m3 per year). In addition, in January 2000 the maximum benzene content of petrol was reduced from 5% to 1%.

The Air quality objective concentrations and local monitoring data is tabled below (**Figure 12 to 12.2**)

Figure 12: Air quality objective for benzene

Concentration	Averaging period	Date standard to be achieved by
16.25 $\mu g/m^3$	Running annual mean	31.12.2003
5.0 $\mu g/m^3$	Annual mean	31.12.2010

Benzene was monitored in Halton up to 1998 using different monitor types, Opsis and diffusion tubes in different locations across Halton. Data show that the objective was achieved by 1996.

Figure 12.1: Summary of Opsis data

Site	Monitored running annual mean benzene (μg/m^3)		
	1994	1995	1996
Runcorn Town Hall	11.7	6.8	9.8
Widnes Path 1	13.0	6.8	15.0
Widnes Path 2	N/A	11.7	10.1

Figure 12.2: Summary of diffusion tube data (μg/m^3)

Date:- Jan 97 to Aug 98	Bradley Way		Morrisons	West Bank School
	Site 1	Site 2		
Benzene Mean μg/m^3	3.0	3.5	2.5	2.5

The results of benzene monitoring show that the air quality objectives have been achieved across the borough.

Sulphur Dioxide, Lead and Benzene are no longer regularly monitored in Halton, the previous data results show that levels were well below the national objectives and with continued improvements in technologies and no new developments in the area that would influence these pollutants, it is not considered necessary to measure these locally. National data remains low.

1,3 butadiene

1,3-butadiene is an aromatic VOC that contributes to the formation of ground level ozone and is a known carcinogen. The main source of 1,3-butadiene is motor vehicle exhausts although there are a few important industrial chemical sites where the chemical is handled in bulk.

Like benzene, 1,3-butadiene is a VOC emitted into the atmosphere principally from fuel combustion of petrol and diesel vehicles. Unlike benzene, however, it is not a constituent of the fuel but is produced by the combustion process. Since 1991 new petrol-engine vehicles have been fitted with exhaust catalysts and this has significantly reduced 1,3-butadiene emissions despite the increasing number of vehicles on the road.

Monitoring of 1,3-butadiene nationally, at urban background locations, urban centres and at roadside locations, demonstrated that the 2003 objective had been achieved. 1,3-butadiene has not been monitored in Halton. Concentrations of 1,3-butadiene will correlate with benzene as the major source of both pollutants is vehicle exhausts. There have no significant developments within Halton since the achievement of the air quality objective that would increase the levels of 1,3-butadiene above objective levels.

The results of 1,3 butadiene monitoring show that the air quality objectives have been achieved across the borough.

Carbon monoxide

Carbon monoxide is a colourless, odourless and tasteless gas that inhibits the blood's capacity to carry oxygen. It can also contribute to the formation of ground level ozone, which can cause breathing difficulties for humans and can damage plants and crops. Carbon monoxide also contributes to the green house affect and global warming through reactions with other gases in the lower atmosphere. It is the product of incomplete combustion with road traffic being the main source.

Concentrations of Carbon Monoxide are highest near busy and congested roads. National monitoring data demonstrated that the objective for carbon monoxide was met by the target date of 31st December 2003. Cleaner fuels together with the improved engine efficiency and the increasing proportion of petrol-engine vehicles that are fitted with exhaust catalysts ensured a reduction in Carbon Monoxide emissions despite the increasing number of vehicles on the road.

National carbon monoxide monitoring show that the air quality objectives have been achieved.

Air Quality Modelling in Weston Point

The development of the Energy from Waste Plant at Weston Point in Runcorn has raised concern regarding air quality in that area. As previously identified, Halton Borough Council have undertaken monitoring as part of the planning consent process in and around the affected areas. All the pre development monitoring has shown that levels of key pollutants are well within accepted levels. In order to assess the impact that the plant operations may have on air quality in the longer term, the Council commissioned an independent Air Quality Consultancy to undertake a series of modelling to determine the levels of 3 main pollutants most commonly associated with combustion processes (NO_2 PM_{10} and $PM_{2.5}$) to predict changes to air quality around Weston Point as a result of likely emission levels and environmental factors.

The report that was commissioned was based on baseline data collected in 2013. The model predicts both the long term and short term average concentrations. Where the model predicts short term averages it assumes the worst case weather conditions and so is likely to over-predict the anticipated concentrations.

The model took background air quality levels from the national air pollution inventory. It also included emissions data from surrounding industrial plants incuding Ineos, Mexichem, Scottish Power Station and Rocksavage Power Station and Hanson Quarry, together with traffic data from 66 locations on approximately 20 roads and slip roads in the area.

The results of the modelling demonstrate that current concentrations are well below the objective levels in all relevant exposure locations (ie the locations where members of public are likely to be exposed). The predicted concentrations across Weston Point with the Energy from Waste plant in full operation will remain well below the objective levels. The model demonstrates some exceedences of the annual objective for PM_{10} and NO_2 along the edge of the expressway which are a direct result of emissions from traffic. The concentration of both PM_{10} and NO_2 falls quickly within a short distance of the edge of the roadside and members of the public are not likely to be exposed.

The consultancy identified 4 'worst case receptors' (these are 4 locations, which include properties, in the areas that could to be most affected by any emissions from the plant). The model demonstrates that concentrations of the NO_2, PM_{10} and $PM_{2.5}$ as modelled are currently well below the objective levels and will remain well below objective levels once the Energy from Waste Plant is in full operation.

Figures 13, 14 and 15 show the modelled annual average levels of NO_2, PM_{10} and $PM_{2.5}$ across Weston Point with the Energy from Waste plant in full operation.

The independent report concludes that based on the available data and modelling, with the Energy from Waste plant in full operation:

'Concentrations of NO_2, PM_{10} and $PM_{2.5}$ are well below the respective air quality objectives, which have been set to protect the most sensitive members of the community'

Figure 13: Annual Mean NO_2 Concentration with Energy for Waste plant in operation, µg/m3
(Objective is 40 µg/m3)

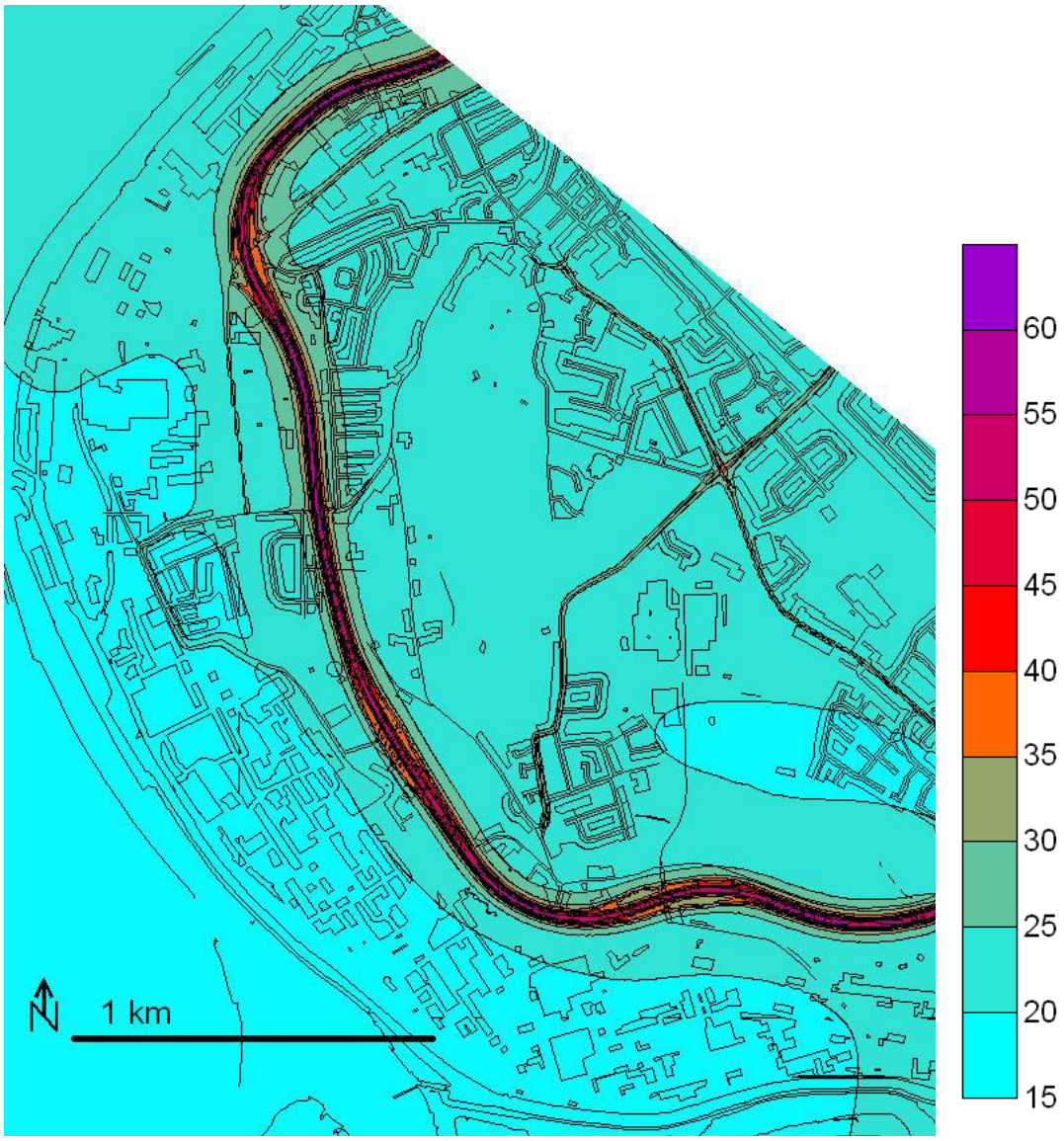


Figure 14: Annual Mean PM_{10} Concentration with Energy for Waste plant in operation, µg/m3
(Objective is 40 µg/m3)

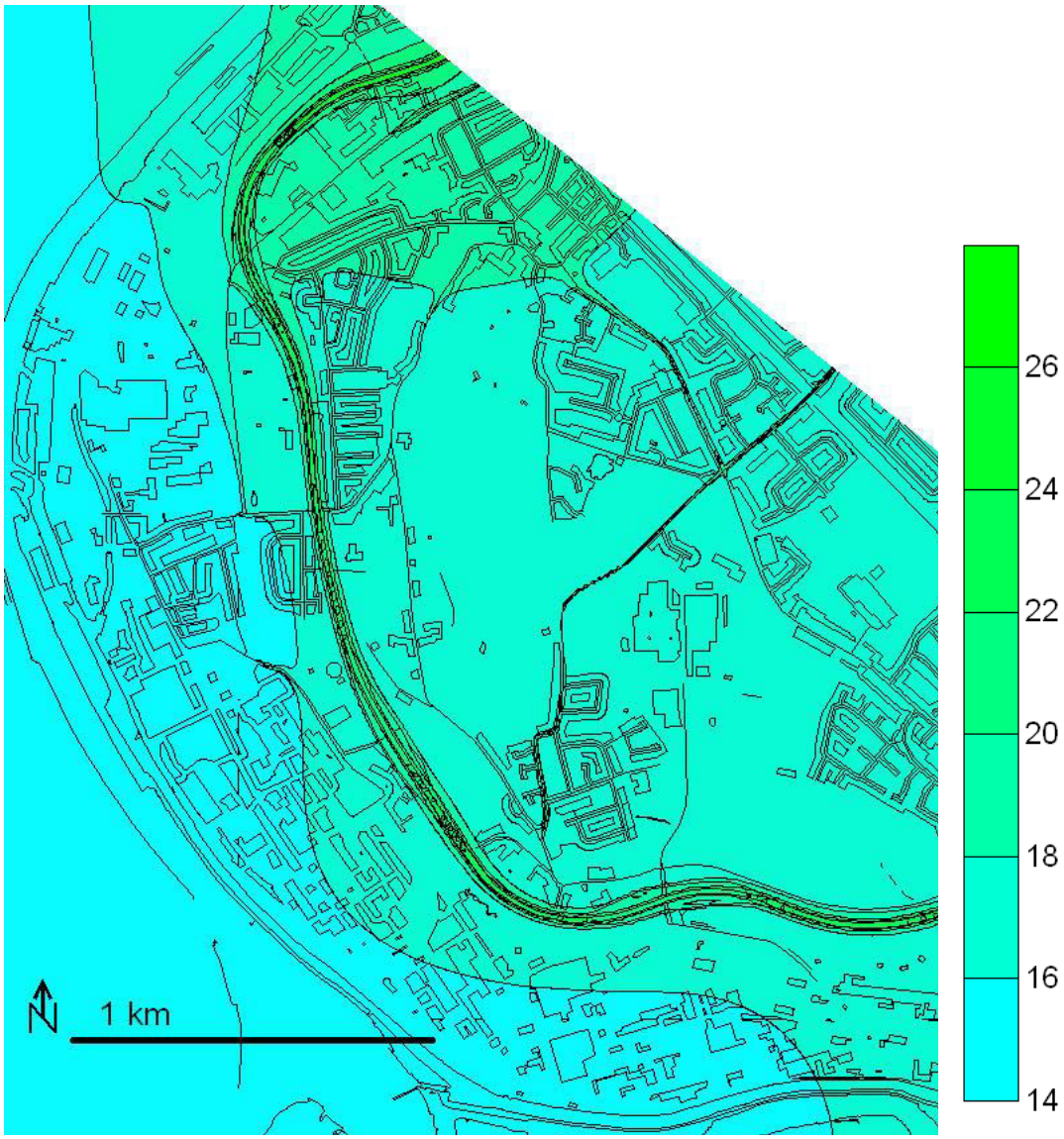
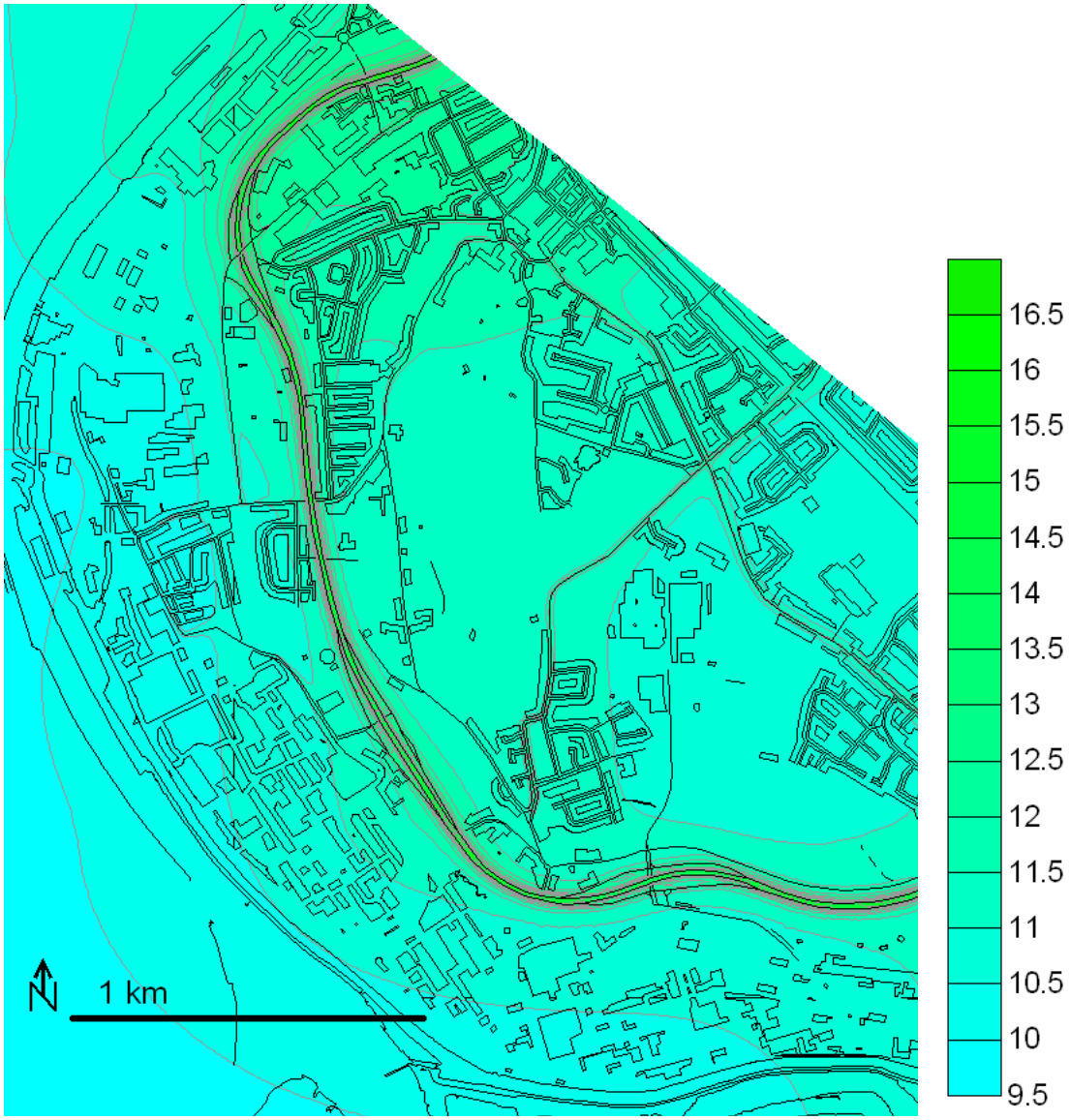


Figure 15: Annual Mean $PM_{2.5}$ Concentration with Energy for Waste plant in operation, µg/m3
(Objective is 25 µg/m3)



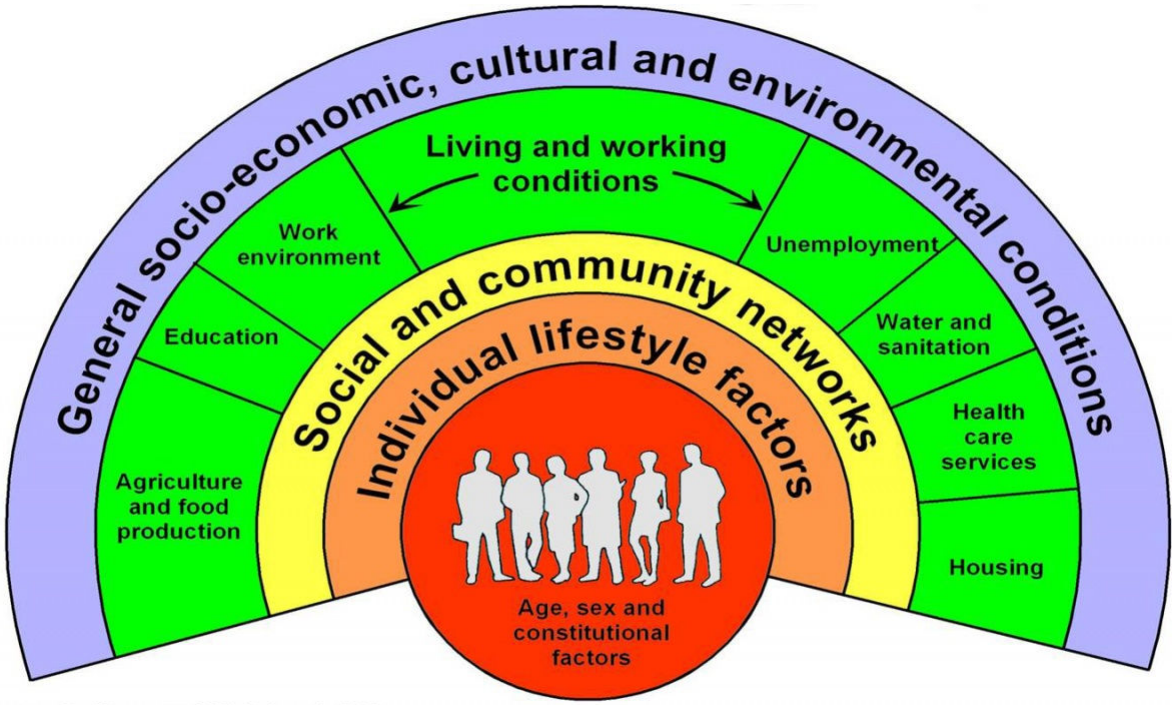
Health in Halton

Halton health profile

The health of people in Halton is generally worse than the England average for a number of indicators. The heath profile for England identifies key outcomes that are significantly worse for people in Halton than the England average.[18] There are a variety of factors which have a significant influence in determining the health of an individual, as well as the health of a population.

The main determinant of health, after individual physical and genetic factors, are the lifestyle choices that we make, and the social context in which we live, eg, the educational, employment, housing choices that we have available. The environmental factors that influence our health represent only a small part of determining our overall health. **Figure 16** shows the Dahlgren and Whitehead model of Determinants in Health and describes the key influences in determining the health of a population.

Figure 16: Dahlgren and Whitehead model of Determinants in Health



Source: Dahlgren and Whitehead, 1991

Halton has higher rates of less healthy lifestyle activities undertaken within the borough, such as smoking, poor diet, reduced physical activity, unhealthy alcohol consumption. Halton is an area of high deprivation, with around 50% of the population living in some of the most deprived areas in England.

These factors play a significant role in determining the health of people in Halton and can, in part, explain some of the poorer health outcomes facing people in Halton, compared to other parts of the Country.

[18] Halton: Health Profile 2014. Public Health England
http://www.apho.org.uk/resource/item.aspx?RID=142121

Mortality associated with Air Pollution

A report by Public Health England estimate that 5.6% of deaths across England may be attributed to long term exposure to man-made fine particulate ($PM_{2.5}$) air pollution.[19] This report estimates that in Halton, 5.5% of deaths (approximately 62 deaths per year) can be attributed to $PM_{2.5}$ pollution. The proportion of deaths attributable to air pollution is similar to the national average and to neighbouring authorities (although direct comparison cannot be made). Attributable deaths in local neighbouring authorities are shown in **Figure 17**.

Figure 17: Table showing population size, number of deaths, and the number and fraction of deaths attributable to $PM_{2.5}$ as estimated in the PHE 2015 report

	Population age 25+ (x1000)	**No. Deaths age 25+**	**No. Attributable deaths age 25+**	**% deaths attributed to $PM_{2.5}$**
England	35878	458743	25002	**5.6**
North West	4733	67871	3427	**5.1**
Halton	80.6	1131	62	**5.5**
Warrington	138.1	1746	95	**5.4**
St Helens	123.8	1792	98	**5.5**
Knowsley	99.9	140	77	**5.5**
Liverpool	289.3	4388	239	**5.4**

The impact of $PM_{2.5}$ on the contribution made towards deaths varies between authorities due to demography and epidemiology and so comparisons are difficult. Proportion of attributable deaths is not solely associated with either deprivation or amount of local industry. **Figure 17.1** shows the population size, number of deaths, and the number and fraction of deaths attributable to $PM_{2.5}$ as estimated in the PHE 2015 report in London and some central London Boroughs.

Figure 17.1: Table showing population size, number of deaths, and the number and fraction of deaths attributable to $PM_{2.5}$ as estimated in the PHE 2015 report

	Population age 25+ (x1000)	**No. Deaths age 25+**	**No. Attributable deaths age 25+**	**% deaths attributed to $PM_{2.5}$**
London	5330.6	47998	3389	**7.2**
Kensington and Chelsea	128.0	842	68	**8.3**
Westminster	182.5	1061	88	**8.3**

[19] Public Health England (PHE) 2015. Estimating Local Mortality Burdens Associated with Particulate Air Pollution. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf

Illnesses associated with Air Pollution

There are a number of illnesses that have been associated with long term exposure to poor air quality and/or specific types of air pollution. The proportion that air quality contributes to the rate of these illnesses has not been quantified. The illnesses most commonly associated with poor air quality and their prevalence in Halton are described below.

Cardiovascular disease/heart disease

A COMEAP report in 2006 assessed the range of evidence to suggest a link between cardiovascular disease and air pollution and identified that there is likely to be an association. [20] The contribution that air pollution plays in the development of or worsening of existing of cardiovascular disease is unknown. There are a number of more significant risk factors in the development of cardiovascular disease.

In Halton, the known prevalence (4.3% of the population) and modelled prevalence of coronary heart disease (6.0%, this includes the numbers expected to have heart disease but who have not been diagnosed) are slightly higher than the England Average (known prevalence 3.3%, modelled 5.8%)[21]. The risk factors which are also more strongly associated with cardiovascular disease are also higher amongst the Halton population, which are most likely to account for the higher rates of cardiovascular disease locally than the national average. These risk factors include:

- Tobacco use and smoking
  Smoking is known to increase the risk of coronary heart disease by between 2 and 4 times. The 2013 Health Survey for England (HSE)[22] suggests that 18.4% of all people in Halton smoke, which is the same as the national average. However, a survey carried out in Halton for the Merseyside lifestyle survey 2012/13 suggests that 30% of people in Halton smoke. As it is not possible to determine a true number, the real level of smoking in Halton is likely to lie between 18-30%, which represents a significant population placing themselves at increased risk of coronary heart disease.

- Poor diet
  A balanced healthy diet with at least 5 fruit and vegetables a day, low salt intake and appropriate fat consumption is needed to maximise heart and circulatory heath. Poor diet can significantly increase the risk of cardiovascular disease. The Merseyside Health Survey suggests that on average, adults in Halton eat 1.9 portions of fruit and two portions of vegetables per day. One in three eat the recommended daily amount of five portions of fruit and vegetables per day (35%). Half of people tend to add salt to their food during cooking (52%), and a further 28% generally do so at the dinner table. Poorer diets of people within Halton will be contributing to higher rates of cardiovascular disease.

- Low Physical activity

[20] Committee on the Medical Effects of Air Pollutants (COMEAP), 2006. Cardiovascular Disease and Air Pollution
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304668/COMEAP_cardiovascular_disease_and_air_pollution.pdf
[21] Halton Joint Strategic Needs Assessment: Long Term Conditions – Cardiovascular Disease 2014/2015
http://www3.halton.gov.uk/Pages/health/JSNA/longterm/CardiovascularDisease.pdf
[22] Health and Social Care Information Centre (2014) *Health Survey for England 2013*
http://www.hscic.gov.uk/catalogue/PUB16076

The Merseyside Lifestyle Survey 2012/13 suggests that just over a third of Halton residents engage in moderate-intensity activities such as brisk walking, cycling, or swimming for at least 10 minutes continuously (36%) and one in five adults (19%) engage in vigorous-intensity activities such as running or football, this means that just under half of our population (45%) do not participate in moderate or vigorous exercise. Adults in Halton estimate that they spend an average 263 minutes (almost 4 and a half hours) each day either sitting down or reclining (excluding sleep). Being physically inactive increases the risk of cardiovascular disease. There are lower rates of physical activity amongst men and women in Halton compared to the Merseyside and England average, increasing the likelihood of Halton residents developing cardiovascular diseases compared to other areas.

- Obesity
  Based on the Body Mass Index, 36% of people in Halton are overweight and 25% are obese according to the Merseyside Lifestyle Survey. Excess weight is a significant modifiable factor to help prevent cardiovascular disease. A population with excess weight will lead to higher rates of cardiovascular disease in Halton.

- Excess alcohol
  The Merseyside Lifestyle Survey identifies that two in three adults in Halton drink alcohol (67%). This is higher than both the overall Merseyside figure of 59%, the national average of 62%. Among those who drink alcohol, two in three drink at least once a week (66%). Among all Halton residents one in nine people drink at increasing levels (11%) and four per cent drink at higher risk levels, which is in line with the average across Merseyside. Excess alcohol consumption will contribute to the higher burden of cardiovascular disease in Halton.

Respiratory disease

- Chronic Obstructive Pulmonary Disease (COPD)
  COPD is a group of lung diseases that block airflow and make breathing difficult. Emphysema and chronic bronchitis are the two most common conditions. Halton Clinical Commissioning group (CCG) Quality and Outcome Framework data identifies that COPD prevalence in Halton is 2.5% which is higher than the England average of 1.7%. The most common risk factor for COPD is smoking. Smoking is thought to account for around 90% of all COPD cases.[23] The higher than average smoking rates (and high historical smoking rates) are the most likely causal factor for Halton's higher rates of COPD. High levels of air pollution, particularly dust, could also contribute to some COPD, although current evidence is limited. Levels of particulate matter in Halton are well within European Directive levels.

- Asthma
  Halton Clinical Commissioning group (CCG) Quality and Outcome Framework data identifies that the prevalence of asthma in Halton is 6.9% which is higher than the England average of 6.0%. There are a number of factors that can cause asthma, the exact cause is unknown, but amongst these are:
  - Family history of asthma can increase the likelihood of an individual developing asthma and this is largely not preventable.
  - A high proportion of asthma can be brought about allergies to things such as dust, dust mites, animal hair etc.

[23] http://www.nhs.uk/Conditions/Chronic-obstructive-pulmonary-disease/Pages/Causes.aspx

- Smoking during pregnancy has considerable consequence to the growth and development of the child, including a significantly greater likelihood of the child developing severe asthma in childhood and later life. Halton also has a considerably higher proportion of women smoking at the time of delivery, with 18.9% of women smoking at delivery compared to 12.7% across England (2012/13).

Lung Cancer

The most predictive factor for the development of lung cancer is smoking and exposure to tobacco smoke. The risk of developing lung cancer is 25 times greater in a person who smokes than in a person who doesn't smoke. As previously identified, Halton has a higher rate of smoking than the national average, up to 30% of people living in Halton are putting themselves at a 25 times greater chance of developing lung cancer. The smoking rate in Halton has recently decreased, but data suggests that historically smoking rates could have been 35% or higher in Halton. The risk of developing lung cancer as a result of smoking does not disappear immediately if someone stops and so there will be a period of time where the impact of smoking are still felt locally, and higher levels of lung cancer (and other smoking related conditions) can be expected locally whilst there is a legacy of high smoking rates.

Petition response

Halton Borough Council received a petition entitled "Request for the Council to Monitor the Air Quality for $PM_{2.5}$ and other toxins" on 6th March 2015.

The petition stated:

"Halton is a highly polluted area and our local authority have allowed a massive waste incinerator to be built. We have had a number of leaks already at the plant.

We want to protect the health of our children from these highly toxic contaminants, this can only be done by Monitoring the Air Quality for PM 2.5 and other toxins.

Our council to date has refused even though we are in an area that the British Government is being sued by the European Courts for failing comply with the European Directive on Air Quality

For many years Halton claim to fame was the title of the highest cancer rates in the country not to mention asthma as a common household ailment. We also have a very high rate of multiple scleroses. Runcorn and Widnes, in the past, had a very large chemical industry and wielded great power. With the public becoming aware of the serious risk to health we of course want to protect our children (they are our future). Our local council maintain they meet the Government requirements which shows the air quality is good. If this is the case then why do they not monitor for Particulate Matter 10 (PM) or PM 2.5 The Silent Killer.

We need the monitors to get the proof our Air Quality is the cause of all the breathing ailments in our area. This is supported by the findings of the European Research."

The petition was signed by 5632 people, 946 (17%) of those signing the petition lived outside of the Halton area.

Response to statements made in the petition

The petition focusses on the development of the Energy from Waste incinerator and indicates that this is a significant cause of pollution locally including some leaks.

The Energy from Waste incinerator has been developed in Weston Point, operated by Viridor. The Incinerator was developed following a lengthy planning application process including local consultation. The development of the facility came under the Electricity Act 1989 and as such, consent for the development was given by the Secretary of State for Business, Enterprise and Regulatory Reform.

Following the planning application process an IPPC permit is required to control and assess emission activities. The Energy from Waste process is an A1 process and as such, the permit was issues and is regulated by the Environment Agency. **The Council have not been informed by the Environment Agency of any infringements to the permitted processes.**

Halton Borough Council to date has refused to monitor for PM 2.5 and other toxins, even though we are in an area that the British Government is being sued by the European Courts for failing comply with the European Directive on Air Quality.

The body of the report highlights the breadth and duration of air quality monitoring which takes place within the Borough. Halton Borough Council complies with the EU Air Quality Directives and assesses all pollutants required under legislation. Halton achieves the objective measures for all required pollutants, with the exceptions of NO_2 in two areas which have been identified as Air Quality Management Areas. These areas regularly exceeded permitted levels of NO_2 as a result of localised traffic flow issues and additional measures, previously highlighted, are being implemented to improve this situation.

Measurement of $PM_{2.5}$ is not current a requirement as part of the UK Air Quality legislation and the Council is not required to continually monitor this. **Halton Borough Council have however monitored $PM_{2.5}$ and levels have been found to be well below EU guideline objectives**. An independent Air Quality model to identify the effect of the Energy from Waste site operations has shown that $PM_{2.5}$ are predicted to remain well below EU guideline Objectives levels even during full plant operations. Should the EU Air Quality Directives change to require Local Authorities to monitor $PM_{2.5}$ on a continual basis, Halton Borough Council will comply with this.

The European Commission has launched legal proceedings against the UK for its failure to cut excessive levels of nitrogen dioxide and create a national plan to do so. This is based on NO_2 levels exceeding EU objectives at zonal levels and does not relate to individual Local Authority areas. **Halton is not included in any of the zonal areas to which the proceedings apply.** The EU directive standards are determined using a network of air quality monitors in populated areas which are distinct from the monitors used by local authorities to assess and monitor air quality within their own area as part of their own legal requirement. DEFRA are responsible for this network of monitors. Halton have a network affiliated monitor which contributes to the national network.

For many years Halton claim to fame was the title of the highest cancer rates in the country not to mention asthma as a common household ailment. We also have a very high rate of multiple scleroses

More than one in three people in the UK will develop some form of cancer during their lifetime.[24]Although there are more than 200 different types, lung, breast, prostate and bowel cancers account for more than half of cancer diagnoses each year.

Cancer is a group of conditions where cells in a specific part of the body grow and reproduce uncontrollably. It accounts for a quarter of all deaths in England. Halton **does not** have the highest cancer rate in the country. However, it must be recognised there is a higher incidence of all cancers than the England average. The directly standardised incidence all age, all cause cancer rate is 705/100,000 population in 2012 (for every 100,000 people in Halton, 705 on average will develop a cancer in that year). The regional North West rate of 626/100,000, and an average England rate of 586/100,000. In terms of deaths as a result of cancer, between 2011-13, there were 188 deaths per 100,000 population in Halton, this is ranked as 143rd highest out of all 150 England Local Authorities.[25]

The most common causes of cancer are widely accepted to be Smoking, Poor diet and Alcohol consumption. Smoking is by far the most important preventable cause of cancer. It is responsible for one in four UK cancer deaths, and nearly a fifth of all cancer cases. Nearly half of all smokers will eventually die from smoking-related diseases.[26] After smoking, poor diet is one of the most important avoidable causes of cancer, and has been linked to bowel cancer, pancreatic cancer and oesophageal cancer. Alcohol has been classified as a Group 1 carcinogen since 1988, and is responsible for around 4 per cent of cancers in the UK each year – around 12,500 cases. It is known to increase the risk of liver, mouth and bowel cancer among many others. Higher rates of these lifestyle factors within a community will lead to higher incidences of cancer. As previously described Halton has significantly higher than the England average rates of smoking, poor diet, and excess alcohol.

The contribution that air pollutants make to cancer incidence is unknown. However, **European Air Quality Objectives are set at levels to protect health, and air Quality in Halton complies with these directives**.

There is no accurate GP register for multiple sclerosis (MS) and it is therefore not possible to identify the actual number of people with Halton in a specific area. The MS Trust estimates that between 100 and 140 people per 100,000 have multiple sclerosis. There is no reason to believe that rates are higher in Halton. There is also no evidence in the scientific literature of a plausible link for air pollution as a significant cause of multiple sclerosis. The MS Trust identifies the cause of MS is still unknown but the widely acknowledged theory is that MS is an auto immune condition, where by the patients' own immune system attacks the nerves. There are also some correlation between MS and smoking.[27]

Our local council maintain they meet the Government requirements which shows the air quality is good. If this is the case then why do they not monitor for Particulate Matter 10 (PM) or PM 2.5 The Silent Killer

As identified within the body of the report, Halton Borough Council does monitor PM_{10} as part of the Air Quality legislation, and the results of this are publically available. The Annual

[24] Annual Report of the Chief Medical Officer: Volume 1, 2011: On the State of the Public's Health
[25] PHE Longer Lives, http://healthierlives.phe.org.uk/topic/mortality/area-details#are/E06000006/par/E92000001/ati/102/pat/ accessed 19th May 2015
[26] Mortality in relation to smoking: 50 years' observations on male British doctors. US National Library of Medicine. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC437139
[27] http://www.mstrust.org.uk/atoz/cause.jsp

Air Quality Review and Assessment is published on the Halton Borough Council Website and has been available since 2006.[28]

As previously identified, there is no legal obligation under the UK Air Quality Directives for the Council to monitor $PM_{2.5.}$ Halton Borough Council have, however, undertaken $PM_{2.5}$ monitoring and undertaken robust modelling analysis which show that $PM_{2.5}$ is well within EU guideline objectives and is predicted to remain below.

If the EU Directive guideline for $PM_{2.5}$ is implemented into UK law, the Council will meet the required obligations as part of any that legislation.

We need the monitors to get the proof our Air Quality is the cause of all the breathing ailments in our area. This is supported by the findings of the European Research

The petition is not clear to what European Research is being referred. However the European Commission has developed an extensive body of legislation which establishes health based standards and objectives for a number of air pollutants in order to protect health. Halton Borough Council has achieved all Air Quality Objectives (with the exceptions of NO_2 which exceeds the permissible number of exceedences of NO_2 mean levels in 2 Air Quality Management Areas within Widnes).

Conclusion

Air quality in Halton is assessed and monitored regularly in order to comply with UK and EU Air Quality legislation. Air Quality objectives have been achieved in Halton for all current pollutants with the exceptions of Nitrogen Dioxide.

Halton has identified two Air Quality Management Areas, both of them in Widnes, where levels of NO_2 exceed the objective levels on more occasions than is permissible as part of the objective standards. The levels of NO_2 are higher in these two areas as a result of higher town centre traffic activity. As a result of the declaration of Air Quality Management Areas, these areas are subject to additional measures and Halton Borough Council is working hard to ensure that the levels of NO_2 in these areas fall to within permitted levels as soon as possible. These activities include investigating traffic flow alterations and promoting alternative access to the town centre, cycling, walking etc.

National and European Air Quality Objectives are determined at levels to protect health. As Halton meets all these criteria (except in designated AQMAs) the air quality cannot be considered to be at levels poor enough to affect health.

Halton experiences poorer levels of health than many other areas in the country. This however can be explained in the most part by lifestyle factors and the higher rates of people making less healthy lifestyles choices in Halton. The Council and local partners are continuing address the factors which impact greatly on health including encouraging people to stop smoking, improving access to and

[28] http://www4.halton.gov.uk/Pages/planning/air-quality.aspx

awareness of healthy diets, access to weight management programmes, improvements in local amenities and encouraging more active lifestyles. The Council have a set of Key Health and Wellbeing Priorities to improve the health of the population, and is engaged in improving life chances and making it easier to make healthy lifestyle choices by ensuring we work across all agencies to improve education, enhance employment opportunities, and provide healthy safe and thriving homes and communities.

Over 4600 people who live in Halton have signed a petition believing that the Council do not monitor air quality and that air quality in Halton is poor enough to affect health despite evidence being available that both of these assertions are incorrect.

Recommendations

In order to address the issues raised in this report and ensure that air quality in Halton remains good and ultimately to improve health and wellbeing in Halton, the Council has identified a number of recommendations for future action:

i. Undertake a series of public engagement events to build a greater understanding of the concerns local people have regarding air quality in Halton and identify opportunities to build improved relationships to ensure a clear way forward in all concerns.
ii. Develop an active multi agency Air Quality Forum (including lay representation) to enable issues and concerns to be raised and discussed in an open, engaged forum and facilitate agreement on actions and outcomes.
iii. Investigate further opportunities to limit emissions and reduce NO_2 in areas of potential high traffic activity around built up areas and achieve compliance with NO_2 Air Quality Objectives.
iv. Develop a full Air Quality Strategy, based on available local and national data and evidence to ensure that Halton is able to sustain recent improvements in Air Quality across the borough and proactively seek to remove the declaration of Air Quality Management Areas within the borough.