

**Air Quality Monitoring
and Noise Control Unit**

Annual Report 2005

**Air Quality Monitoring and Noise Control Unit
Dublin City Council
Block 3, Floor 1
Civics Offices
Wood Quay
Dublin 8**

Executive Summary

This Annual Report deals with the activities of the Air Quality Monitoring and Noise Control Unit of Dublin City Council during 2005. These activities include:

1. Enforcement of air pollution control legislation
2. Monitoring of environmental noise and enforcement of noise control legislation
3. Air pollution monitoring
4. Research and provision of expertise on an ongoing basis to other services and departments in Dublin City Council

The areas of enforcement of air pollution and noise control legislation continued to be a major challenge during 2005. While overall the number of complaints for air pollution and noise slightly decreased, there is still a large number of cases dealt with each year by the Unit.

Air quality during 2005 continued to be generally good. Levels of benzene, lead, sulphur dioxide, black smoke and carbon monoxide have been satisfactory. Compliance with a number of E.U. standards became mandatory during 2005. We need to look to the future and develop strategies to ensure that compliance with even more stringent standards that are due to be introduced over the next five years can be realistically achieved.

This will be a major challenge in the years ahead.

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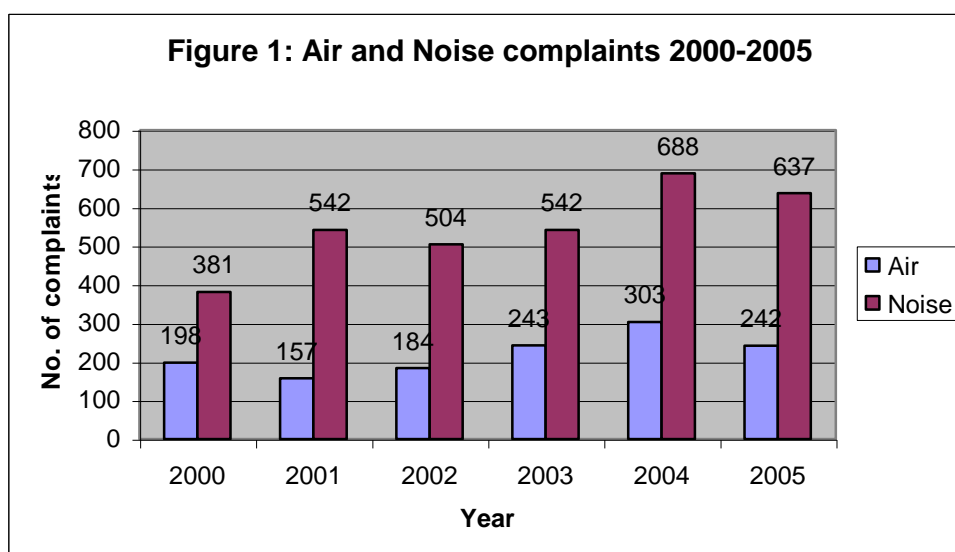
Staff List – 2005

Martin Fitzpatrick	Principal Environmental Health Officer
Paul Rutherford	Senior Environmental Health Officer
Sarah Middleton	Senior Environmental Health Officer
Barbara Halpenny	Senior Environmental Health Officer
Tracey Healy	Environmental Health Officer
Gerry Osborne	Environmental Health Officer
Anne Marie McCartan	Environmental Health Officer
Mark Whelan	Environmental Health Officer
Paddy Douglas	Technical Support Officer

Air and Noise Pollution Control

The Air Monitoring and Noise Control Unit, based in Dublin City Council's Civic Offices, Wood Quay, operates a number of fixed air quality monitoring sites around the city. In relation to air monitoring, the Air Quality Standards Regulations 2002 provide the framework in relation to limit values for pollutants. The Unit also enforces legislation under both the Environmental Protection Agency Act 1992 and the Air Pollution Act 1987, in addition to regulations made under these Acts. The Unit comprises of 8 Environmental Health Officers (EHOs) and 1 Technical Support Officer.

Investigation of complaints made by the public is a major element of the Unit's efforts, including general complaint investigations, out-of-hours calls to establish nuisance and court appearances. Although 2004 proved to be a record year in terms of complaints, 2005 did not reach the same high levels. In 2005, 242 air pollution complaints and 637 noise complaints were received. Overall, the total number of complaints reduced by 12% from the previous year, but such is the unpredictable nature of the volume of complaints, there is no definitive reason for such a drop in numbers. The breakdown and category of complaints are dealt with further into this section.



Air Pollution complaints

The Unit investigates complaints from members of the public made either by phone, email or in person at the public counter. Complaints range from neighbours burning garden/household waste, to emissions from spray booths to odours from food premises or factories, and dust from construction sites. The Air Pollution Act 1987 states that the occupier of any premises, other than a domestic dwelling, shall take best practicable means to limit and, if possible, to prevent an emission from such premises. It also states that the occupier of any premises shall not cause or permit an emission in such a quantity, or in such a manner, as to be a nuisance. The variety and complexity of

complaints make each investigation different, and site visits may take place with the owner of the premises and consultants specialising in the industry involved. On other occasions, it may suffice to send a warning letter to the premises involved advising compliance with the legislation. Should nuisance be established, and the property owners fail to take best practicable means to prevent or limit the nuisance, a Notice may be served under Section 26 of the Air Pollution Act 1987 giving at least 14 days for compliance. Non-compliance with the Notice can lead to court proceedings but in the majority of complaints, there is resolution within weeks of the first site visit, negating the need for legal proceedings.

The 242 complaints recorded in the Unit in 2005 follow a similar pattern to previous years with commercial dust and domestic burning contributing to almost half of the total number of complaints. Domestic burning actually increased to 24% of all complaints, an increase of 5% on the previous year. This can possibly be attributed to the ongoing national trend towards uncontrolled burning of domestic waste instead of disposing of it correctly.

The commercial sector continues to account for a quarter of the dust complaints made to the Unit, and these are mainly from construction/demolition sites.

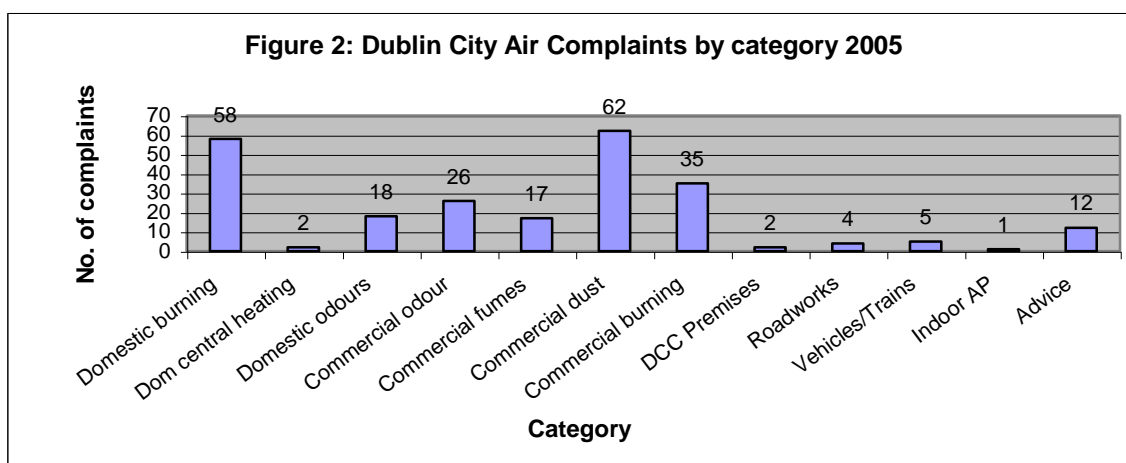
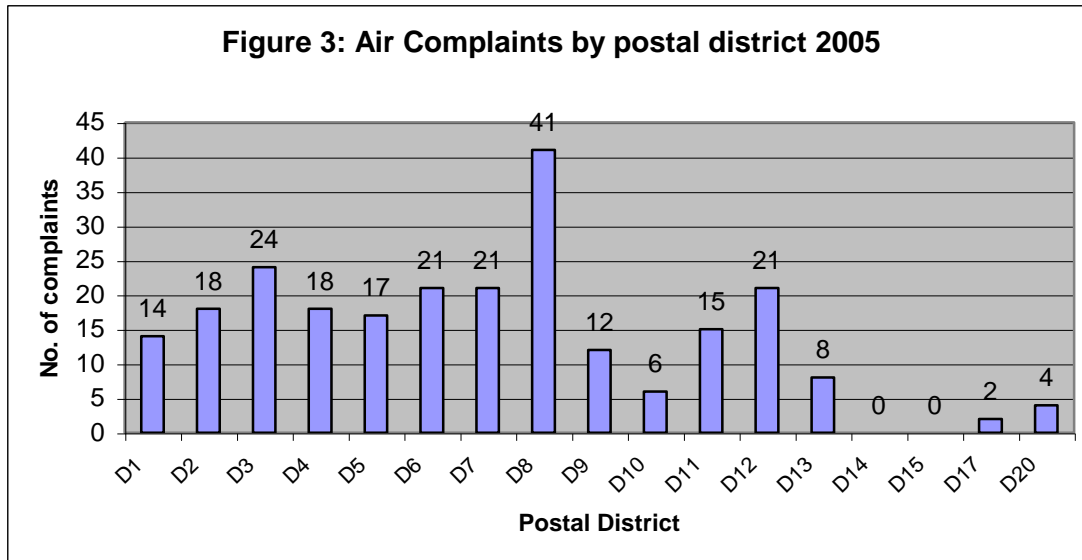


Figure 3 indicates the geographical spread of complaints in the City. As in 2004, the city centre areas were the source of the majority of complaints to the Unit. As can be seen from the graph, Dublin 3 and Dublin 8 were extremely busy throughout the year.



Complaint investigation

When a complaint is made to the Unit, it is assigned to the responsible EHO for that district. The complainant will be requested to keep a record of the times/dates they are affected by the emission. The EHO will then visit the premises to establish whether best practicable means are in place to prevent or limit a nuisance. In the case of backyard burning, a warning letter to those responsible is sent and this normally has the effect of stopping the burning although in some cases, a visit may be required.

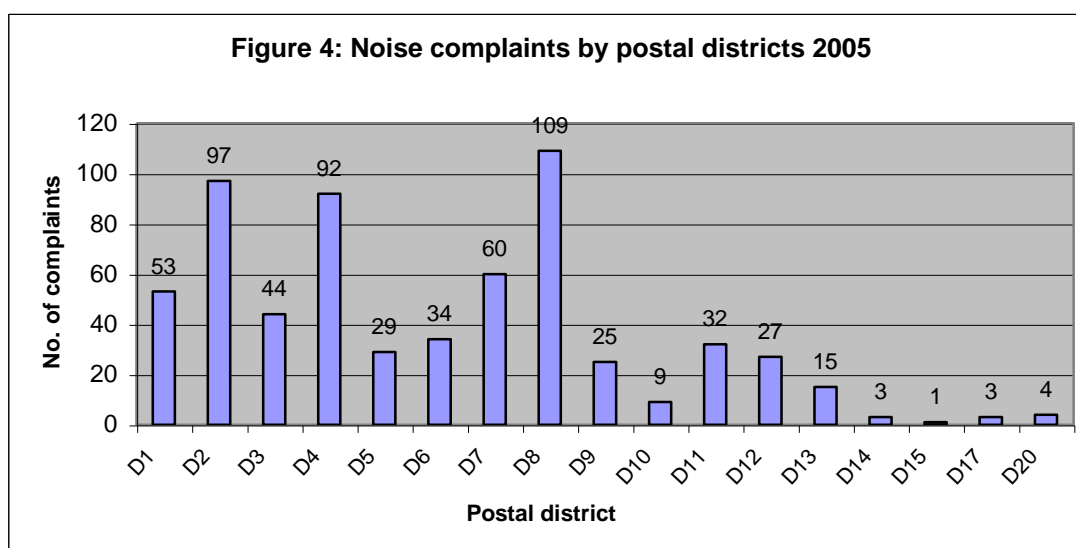
If it is established that best practice is not being taken, the EHO can informally discuss options to improve the premises. If the owner fails to make the suggested alterations, a Notice is served under Section 26 of the Air Pollution Act 1987 outlining the steps that must be taken to improve operations on the premises and alleviate the problem. In most cases, the improvements are made within the assigned time and the case can be closed. However, failure to comply with the Notice can lead to legal proceedings being initiated.

There were 12 notices served in 2005, with several prosecution reports issued for proceedings. At time of writing, the courts were still dealing with these cases.

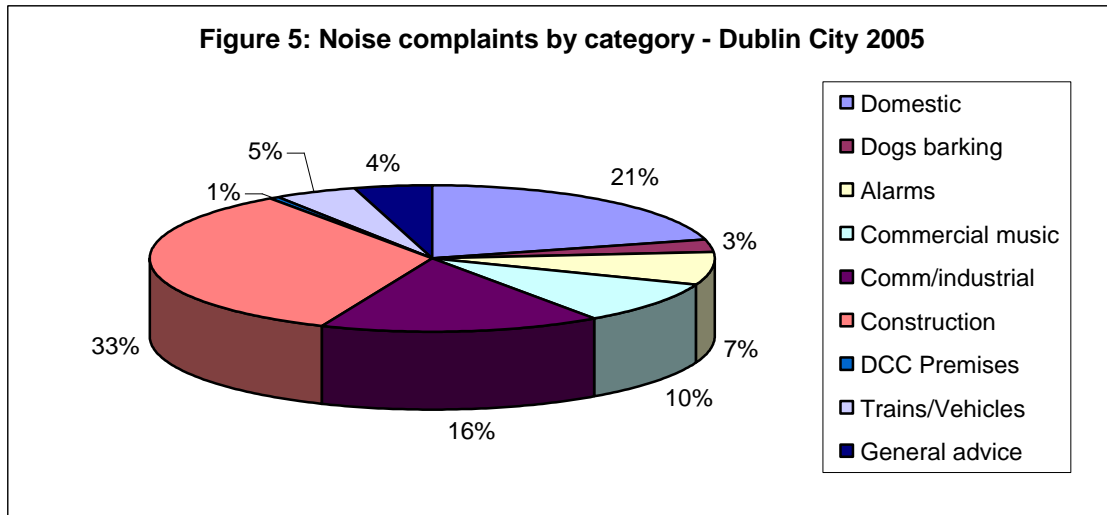
Noise complaints

The Unit also deals with complaints in relation to noise emanating from a variety of commercial and industrial premises. The complaint procedure is similar to the air pollution complaints. The complainant is again requested to keep a log sheet to record how often the noise is affecting them, and their property. This will establish a pattern to the noise and will assist EHOs in proving nuisance. In order to do so, the EHO must witness the nuisance and take noise readings, or install a noise meter to record the noise onto a Digital Audio Tape (DAT). The log sheet can also form part of evidence should the case go to court. Often the complete investigation of a complaint will require out of hours work by EHOs to establish nuisance and the cooperation of the complainants at various times of the day and night is essential. A Section 107 Notice can be served on the owner of the property causing the nuisance. Failure to comply with the terms of the Notice within the specified time given can lead to the initiation of legal proceedings. If an EHO serves a Section 108 Notice, they can look for an order to be made by the court to eliminate the noise nuisance.

The Unit does not generally deal with neighbour noise nuisance complaints as there is provision in the legislation for individuals to deal with this on their own behalf. EHOs will offer advice to the public about how they can go about taking their own action.



Although the number of complaints made in 2005 was down on the previous year, the Unit dealt with 637 complaints in total. As can be seen from the graph, the postal districts of Dublin 2, Dublin 4 and Dublin 8 proved to be the busiest areas of the city. The pattern has been the same for a number of years now.



As can be seen from the graph, the construction industry contributed significantly to the overall number of complaints made to the Unit with 215 (33%) complaints. Predominantly, the complaints related to early morning and late night working and not necessarily the noise levels from machinery in use on sites. The hours set out in the Dublin City Development Plan 2005-2011 are 07.00am-6.00pm, Monday to Friday and 08.00am-2.00pm on Saturday. No work should be carried out outside of those hours unless for compelling reasons of health and safety or traffic control. The criteria used for compliance is British Standard for Noise Control on Construction Sites (BS 5228).

Domestic neighbour related noise complaints accounted for 132 of the total complaints made to the Unit in 2005. As mentioned previously, the Unit does not directly investigate domestic noise complaints but provides more of an advisory role to the public. Information on how to take a Section 108 complaint to the District Court is sent to those requiring guidance.

As in the case of air pollution complaints, the commercial sector contributed significantly to the total number of complaints made with a total of 162 complaints or 26% of the total. Complaints from commercial properties mainly centred on noise emanating from amplified music, extraction, chiller systems and early morning deliveries.

Security alarms are another category of complaint that featured in 2005. A total of 45 complaints were made about premises causing nuisance following alarm activation. Noise from alarm activation is intermittent by nature and it can be difficult to prove nuisance. A warning letter is issued to the occupiers of the house or premises to remind them of their obligation to take all reasonable care to prevent a nuisance. There is a voluntary code of practice, ISEN 50131 for those installing alarms. The external audible alarm should have a maximum duration of 30 minutes, and a minimum duration of 15 minutes from activation. Two key-holders should be nominated who can access the property within 60 minutes of initial activation. The absence of coherent legislation to deal with this specific issue continues to cause difficulty to those affected by this form of noise nuisance.

Enforcement proceedings in 2005

In 2005, the Air Quality Monitoring and Noise Control Unit served notices under various articles of the Air Pollution Act 1987 and the Environmental Protection Agency Act 1992 in order to resolve complaints.

There were 12 Notices served under the Air Pollution Act 1987 - no prosecutions were required.

Under the Environmental Protection Agency Act 1992, 46 Section 107 Notices dealing with noise complaints were served, resulting in two successful prosecutions.

In the first prosecution, the owner of a pub was fined €500 for causing noise nuisance from amplified music and costs of €1200 were awarded to Dublin City Council.

In the second case, a Section 108 prosecution was secured against the owner of a restaurant for failure to take steps to prevent noise nuisance from an air conditioning plant. The defendant was fined €1000, with costs of €1200 awarded to Dublin City Council.

The Unit wishes to acknowledge the support of both the administrative staff in Dublin City Council and the solicitors involved in the cases.

Outdoor events in Dublin 2005

The wide variety of outdoor events held in Dublin annually contributes to the vibrant social scene in the city, with thousands of people travelling from all over the country to these events. The Unit carries out noise monitoring at the larger events as listed below. This involves monitoring both during the sound tests and actual live events.

Members of the Unit also attend pre-planning meetings and liaise with promoters, organisers and other sections of Dublin City Council involved in the event. A Section 107 Notice under the Environmental Protection Agency Act 1992, requiring the event promoter to comply with certain requirements is served in advance of all events. The standard for compliance used is the UK Noise Council Code of Practice on Environmental Noise Control at Concerts 1995. It includes the permissible operational hours for the event and maximum noise levels for the event. A noise level of 75dB(A) is set for outdoor events.

2005 was a busy year for the Unit with a number of concerts and festivals hosted, including 3 nights at Croke Park for U2.

Table 1: 2005 Outdoor Events

Date	Location	Event
April 30, May 1 st , May 2 nd	Dublin Castle	Green Energy Festival
June 9 th	Lansdowne Road	Destiny's Child
June 11 th	Lansdowne Road	Neil Diamond
June 24 th , 25 th , 27 th	Croke Park	U2
July 2 nd	RDS	Elton John
August 23 rd	Lansdowne Road	The Pixies
August 24 th	Lansdowne Road	Scissor Sisters
August 27 th	Phoenix Park	O2 in the Park
August 31 st	RDS	Iron Maiden

The Unit also provides control of other major outdoor events such as the ice rink in Smithfield and the Maritime Festival in the Docklands area.

There were no prosecutions taken on the basis of the monitoring results from any of the outdoor events in 2005.

Fuel Regulations

The Unit has had an active role in enforcing fuel regulations since the Air Pollution Act was introduced in 1987. This was brought in primarily to deal with the persistent smog problems in the City arising from the use of solid fuel in most homes. The banning of the marketing, sale and distribution of bituminous coal in Dublin City, coupled with the increase in natural gas consumption has led to a dramatic and sustained improvement in air quality. The Marketing, Sale and Distribution of Fuels Regulations 1998 & 2000 have since introduced similar bans to other parts of the country since then.

To enforce the regulations effectively, inspections must be carried out of all fuel merchants within the city on a regular but random basis. Fuel depots, coal yards, retail outlets, garage forecourts etc. are visited several times throughout the winter heating season. Inspection of any fuel merchant's vehicle can also take place at any time to establish the types and volume of fuel on board.

The Unit carried out 149 inspections in 2005-06. The breakdown of inspection was as follows:

Table 2: Fuel Regulations inspections 2005	
Vehicles	9
Shops/Garages	139
Depots	1

In comparison with other years, the number of depots inspected was dramatically down. This is because several of the larger depots have closed and the land sold for redevelopment. With the price of oil and natural gas steadily rising, coal may again become a popular source of heating fuel for those living in Dublin City. The Unit therefore has to remain vigilant to ensure that the current levels of compliance with the Regulations are maintained.

Air Quality Monitoring

There are a number of air monitoring sites around Dublin City that are operated and maintained by the Air Monitoring and Noise Control Unit. The Air Quality Standards Regulations 2002 sets out the requirements for monitoring pollutants, and the limit values for each pollutant. This includes sulphur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), benzene (C₆H₆), particulates (PM₁₀) and lead (Pb).

Some of the sites have been established for many years, while others are more recent additions to the network. Legal requirements for locating monitoring points are a factor in setting up and maintaining the sites. Several of the sites are deemed to be 'multi-pollutant', i.e., monitoring two or more pollutants at one location. The multi-pollutant sites at Winetavern Street, Coleraine Street and Ballyfermot have been in operation for a number of years and provide a good picture of air quality in populated areas of the city.

The analysers used to monitor SO₂, NO₂, benzene and CO at the multi-pollutant sites run continuously, producing data every 15 minutes. They require monthly internal calibration checks, and a six monthly external calibration and maintenance check. In 2005, a new system of collating data was introduced. The ENVIEW system allows for retrieval of data remotely, with additional tools for graphs and reports. Introduced in March 2005, it dials directly to each multi-pollutant site at set times of the day. The raw data is edited monthly in conjunction with the calibration results to produce final figures for each month.

Sites:

Along with the multi-pollutant sites, there are other individual sites operated by members of the Unit. All of the sites have been incorporated into the Quality Management System.

Multi-pollutant sites

Winetavern Street – PM₁₀, NO₂, BTX, CO, SO₂, Lead

Coleraine Street - PM₁₀, NO₂, CO, SO₂, Lead

Ballyfermot – PM₁₀, NO₂, SO₂

PM10 sites

Marino

Phoenix Park

Rathmines

Lead

Kilbarrack

Rathmines

Black Smoke

Ringsend

Crumlin

Finglas

Cabra

Continuous Sulphur Dioxide (SO₂)

Exposure and health effects

There are a number of health effects associated with exposure to high levels of SO₂. This includes breathing problems and worsening respiratory and cardiovascular disease. People with asthma, or chronic lung disease or heart disease are the most sensitive to SO₂.

SO₂ also damages trees and crops, and along with NO₂, is a precursor of acid rain. It is therefore also responsible for acidification of lakes and streams and accelerated corrosion of buildings. The main source of SO₂ in Dublin is space heating from residential and industrial premises.

The limit values for SO₂ are found in Schedule 1 of the Air Quality Standards Regulations 2002. They are as follows:

Table 3: Limit values for SO ₂			
	Averaging Period	Limit Value	Margin of tolerance
Hourly limit value for the protection of human health	1 hour	350µg/m ³ not to be exceeded more than 24 times a calendar year	90µg/m ³ from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by 30µg/m ³ to reach 0µg/m ³ by 1 January 2005
Daily limit value for the protection of human health	24 hours	125µg/m ³ not be exceeded more than 3 times a calendar year	None
Limit value for the protection of ecosystems	Calendar year and winter (1 Oct-31 Mar)	20µg/m ³	None

Results and discussion

Levels of SO₂ in Dublin at the three multi-pollutant sites are outlined below. The results are extremely low and well within the limits set out in the Standards.

Table 4: Monitoring results for SO ₂ – Dublin 2005				
Site:	Annual daily mean µg/m ³	Hourly mean µg/m ³	Daily maximum µg/m ³	Hourly maximum µg/m ³
Coleraine St	3.4	3.4	23.0	60.1
Winetavern St	5.0	5.1	22.0	42.1
Ballyfermot	2.3	2.3	28.4	71.8

Nitrogen Dioxide (NO₂)

Exposure and health effects

Nitrogen Dioxide (NO₂) is a gas produced from the burning of fossil fuels in vehicles, industrial plant, power plants and other commercial and residential sources that burn fuel. The major indoor source is cooking with gas, although kerosene heaters and cigarette smoke can also contribute significantly. NO₂ irritates the lungs and lowers resistance to respiratory infection, especially for those already suffering with breathing difficulties e.g. asthma, bronchitis.

Nitrogen oxides and sulphur dioxide react with other substances in the air to form acid rain, which is associated with the acidification of soils, lakes, and streams, accelerated corrosion of buildings and monuments, and reduced visibility.

Nitrogen oxides (NO_x) are some of the main ingredients in the formation of ground-level ozone. Ground-level ozone is formed when nitrogen oxides and volatile organic compounds react in the presence of sunlight.

Table 5: Limit values for Nitrogen Dioxide

	Averaging period	Limit value	Margin of tolerance
Hourly limit value for the protection of human health	1 hour	200 µg/m ³ not to be exceeded more than 18 times in a calendar year	40% from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by 1 January 2010
Annual limit value for the protection of human health	Calendar year	40 µg/m ³	40% from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by 1 January 2010

Results and discussion

There are 3 sites around Dublin monitoring NO₂ continuously – Ballyfermot, Winetavern Street and Coleraine Street. The site at Ballyfermot is located some distance from the main traffic route while the other two sites are situated at junctions where traffic queues for many hours of the day. As can be seen from the results, the Air Quality Standards Regulations 2002 have been met at all of the sites despite one exceedance at Winetavern Street.

Table 6: Dublin City NO₂ results 2005			
Site:	Annual mean µg/m³	Maximum hourly µg/m³	No. of times NO₂ hourly level >200µg/m³
Coleraine St	28	192	0
Winetavern St	33	231	1
Ballyfermot	26	187	0

The highest annual mean was recorded in Winetavern Street this year, compared to Coleraine Street in 2004. This is an increase of 3µg/m³ on 2004 but still below the 40µg/m³ in the Standards.

The site at Ballyfermot continued to experience equipment problems during 2005 problems, with an extremely low data capture rate. These problems have now been resolved with the purchase of replacement equipment.

One exceedance was recorded in Winetavern Street during the course of the year but overall there was compliance with the Air Quality Standards Regulations 2002.

Table 7: 2002-05 NO₂ Dublin City				
Site	2002 Annual Mean µg/m³	2003 Annual Mean µg/m³	2004 Annual Mean µg/m³	2005 Annual Mean µg/m³
Coleraine St	38	37	32	28
Winetavern St	35	38	30	33
Ballyfermot	No data	26	23	26

From 20-23 November 2005, there were several days of elevated NO₂ levels that were registered at the sites. The levels were noticeably higher than other days in the month and it was during this time that the exceedance occurred at Winetavern Street. There were freezing, foggy weather conditions during this period.

Carbon Monoxide (CO)

Exposure and health effects

Carbon monoxide (CO) is colourless, odourless gas produced during the incomplete combustion of fuels such as gas, kerosene, oil, wood or charcoal. Sources include space heaters, gas boilers and stoves, generators and tobacco smoke. It becomes hazardous when appliances are not ventilated adequately or are not functioning properly.

CO interferes with the distribution of oxygen in the blood to the rest of the body. Depending on the level of exposure, the symptoms include fatigue, headache, disorientation, nausea and dizziness. These symptoms are similar to that of flu or food poisoning so it may prove difficult to diagnose. However, it has potential to kill or poison in high levels, especially in poorly ventilated premises.

The Air Quality Standards Regulations 2002 set a limit value of 10mg/m³ measured as an 8-hour average.

Table 8: Limit value for Carbon Monoxide

	Averaging Period	Limit value	Margin of tolerance
Limit value for the protection of human health	Maximum daily 8-hour mean	10 mg/m ³	6 mg/m ³ from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by 2 mg/m ³ to reach 0 mg/m ³ by 1 January 2005

Results and discussion

There are two sites monitoring CO in the city, at Winetavern Street and Coleraine Street. The levels for 2005 increased slightly at Coleraine Street and reduced at Winetavern Street. The results are still low in comparison with the limit set out in the legislation.

Table 9: Results for carbon monoxide 2004 & 2005		
Site	Annual mean 2004 (mg/m³) 8-hr rolling mean	Annual mean 2005 (mg/m³) 8-hr rolling mean
Winetavern St	0.3	0.2
Coleraine St	0.9	1.1

Benzene (C₆H₆)

Exposure and health effects

Benzene is a component of products derived from coal, and is found in petrol and fuels. It is also widely used in the manufacturing industry, particularly the plastics, pesticides and pharmaceutical sectors. It is found in emissions from exhausts, coal and oil and at petrol stations. Tobacco is also another source of benzene.

The symptoms of high-level benzene exposure are dizziness, headaches, rapid heart rate and confusion. There is no identifiable threshold below which there is no risk to human health. Benzene is a known carcinogen and is also linked with birth defects in humans and animals.

Table 10: Limit value for Benzene			
	Averaging period	Limit value	Margin of tolerance
Limit value for the protection of human health	Calendar year	5 µg/m ³	5 µg/m ³ from the date of entry into force of these Regulations, reducing on 1 January 2006 and every 12 months thereafter by 1 µg/m ³ to reach 0 µg/m ³ by 1 January 2010

Results and discussion

There is only one site monitoring for Benzene in Dublin - Winetavern Street. The annual mean for 2005 was 1.37µg/m³. This is a slight increase on the 2004 level of 1.29µg/m³ and below the legislative limit of 5µg/m³. The analyser performed better in 2005 and there was a much better data capture, with 75% return for the year.

Particulate Matter (PM₁₀)

Exposure and health effects

The main sources of particulate matter (PM) are vehicles, dust from construction sites, construction equipment and any crushing and grinding operations. Indoors, the main sources are tobacco smoke, wood burning stoves, fireplaces and other home heating sources.

When inhaled, the particles can evade the body's natural defence system and lodge in the lungs. Symptoms of exposure include a sore throat, persistent cough, wheezing, shortness of breath and chest pain. PM can increase the number of asthma attacks, or aggravate bronchitis depending on the exposure. However, those already susceptible are a greater cause for concern. This includes children, the elderly and those already suffering with breathing difficulties.

There are different types of PM, but the coarse particles known as PM₁₀ are monitored at 6 sites around the city. Finer particles known as PM_{2.5} are not currently monitored but it is expected that legislation will soon be introduced to monitor them in the future. Schedule 3 of the Air Quality Standards Regulations 2002 provides legal requirements for monitoring PM₁₀. There are 2 stages for compliance, 2005 and 2010. 2005 was the final year of the first stage of legislation.

Table 11: Stage 1 (2005) Limit values for PM₁₀

	Averaging period	Limit value	Margin of tolerance
24 hour limit value for the protection of human health	24 hours	50µg/m ³ PM ₁₀ not to be exceeded more than 35 times in a calendar year	30% from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by 1 January 2005
Annual limit value for the protection of human health	Calendar year	40µg/m ³ PM ₁₀	12% from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by 1 January 2005

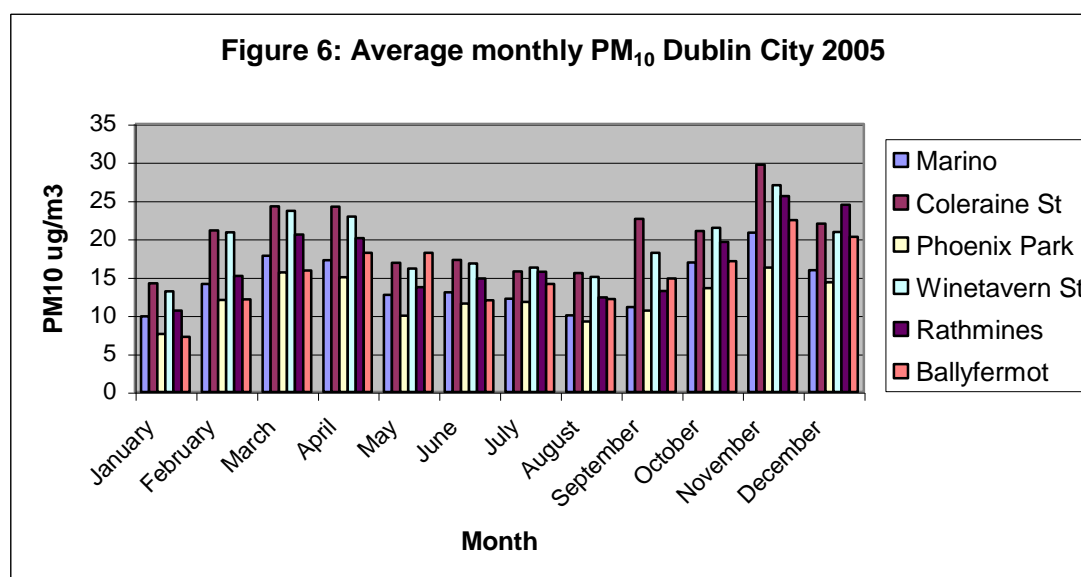
Table 12: Stage 2 (2010) Limit values for PM₁₀

	Averaging Period	Limit value	Margin of tolerance
24 hour limit value for the protection of human health	24 hours	50 µg/m ³ PM ₁₀ not to be exceeded more than 7 times in a calendar year	Not to be exceeded more than 28 times by 1 January 2006, 21 times by 1 January 2007, 14 times by 1 January 2008, 7 times by 1 January 2009 and 0 times by 1 January 2010
Annual limit value for the protection of human health	Calendar year	20 µg/m ³ PM ₁₀	50% from 1 January 2005, reducing every 12 months thereafter by equal annual percentages to reach 0% by 1 January 2010

Results and discussion

The results from 6 monitoring sites in 2005 were almost identical to the results from the previous year. There was also a reduction in the number of days during which there were exceedances of the 50µg/m³ set out in the Standards – a total of 35 days, which is a reduction on the previous year.

The graph below indicates the average PM₁₀ at all sites throughout the year. The highest averages were in November. This is possibly due to the weather conditions during that month, which were frosty and foggy with low temperatures and little wind.



The results below indicate just how similar the results from 2004 & 2005 were. The data capture during 2005 was excellent with all sites recording data capture above 90%. The filters were weighed both before and after being placed out on site and all of the laboratory work was carried out in-house.

Table 13: Levels of PM₁₀ recorded 2004 & 2005 Dublin City				
Location	2004 Annual Mean (µg/m³)	2005 Annual Mean (µg/m³)	2004 No. of days >50µg/m³	2005 No. of days >50µg/m³
Phoenix Park	12	12	2	2
Coleraine St	20	20	16	10
Marino	14	14	4	3
Rathmines	17	17	6	8
Winetavern St	20	19	14	8
Ballyfermot	14	15	5	4

Atmospheric Lead (Pb)

Exposure and health effects

Lead was widely used in petrol until the early 1990s in Ireland but since the introduction of lead free petrol, the levels of lead detectable have dramatically reduced. Internally, lead based paint was also popular in the past. Other industries that produce lead particles are metal processing plants and incinerators, and these industries are not widespread in Dublin City so levels are at their lowest levels for many years.

Lead is a highly toxic substance, exposure to which can produce a wide range of adverse health effects such as fatigue, irritability, loss of appetite and insomnia. Lead poisoning in children can result in brain and kidney damage, learning disabilities, hyperactivity and behavioural problems. Young children under the age of six are especially vulnerable to lead's harmful health effects, because their brains and central nervous system are still developing.

Atmospheric lead can be removed from the air by rain, and deposited on soil. This is the greatest risk to children playing in contaminated soil due to the chance of them ingesting the soil.

The limit value for lead is set out in Schedule 4 of the Air Quality Standards Regulations 2002.

Table 14: Limit value for Lead

	Averaging period	Limit value	Margin of tolerance
Annual limit value for the protection of human health	Calendar year	0.5 $\mu\text{g}/\text{m}^3$	60% from the date of entry into force of these Regulations, reducing on 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by January 2005

Results and discussion

There were 5 sites operating in 2005 - Winetavern Street, Coleraine Street, Rathmines, Kilbarrack and Branch Road. The filters are placed out on site for 14 days, retrieved and sent for external analysis at a laboratory in Dublin.

The results indicate the presence of very little lead in the atmosphere, and are identical at each site except Branch Road, which is located in the industrial docks area of the city. This site was originally a loading area for a lead mining industry that has since scaled back on its production. Otherwise, all the other sites have identical results to 2004. The data capture was quite good for most of the sites, but Winetavern Street had ongoing problems with air flow so a return of only 44% was made at that site.

Table 15: Lead results for Dublin City 2005

Site	2005 Mean $\mu\text{g}/\text{m}^3$	2005 Median $\mu\text{g}/\text{m}^3$	Data capture 2005
Branch Road	0.10	0.07	82%
Coleraine St	0.01	0.01	75%
Winetavern St	0.01	0.01	44%
Kilbarrack	0.01	0.01	68%
Rathmines	0.01	0.01	81%

Table 16: Lead results 2002 - 2005

Site	2002 Mean $\mu\text{g}/\text{m}^3$	2003 Mean $\mu\text{g}/\text{m}^3$	2004 Mean $\mu\text{g}/\text{m}^3$	2005 Mean $\mu\text{g}/\text{m}^3$
Branch Road	0.12	0.05	0.06	0.10
Coleraine St	0.02	0.02	0.01	0.01
Winetavern St	0.02	0.01	0.01	0.01
Kilbarrack	0.01	0.01	0.01	0.01
Rathmines	0.01	0.01	0.01	0.01

Background Air Quality Monitoring

Daily black Smoke and sulphur dioxide (SO₂)

The original Smoke and SO₂ network comprised approximately 18 sites back in the 1980s and mid-1990s. This provided information on weekly air quality at all of these sites during the particularly bad years of smog in the city. Results were sent to the Department of the Environment as soon as they became available. However, with the great improvement in air quality since the introduction of the coal ban, the sites have been dramatically scaled down in number and there are currently only 4 sites operational – Finglas, Cabra, Crumlin and Ringsend. Due to the use of continuous SO₂ monitoring, these sites only measure levels of smoke since September 2005. The legislation governing Smoke and SO₂ monitoring is EC Directive 80/779/EEC.

**Table 17: EC Limit Values and Guide Values for SO₂ and suspended particulates
EC Directive 80/779/EEC**

EC Limit Values		
Pollutant	Reference period	Limit values
Sulphur Dioxide	1 year (median of daily values)	120µg/m ³ if black smoke <40µg/m ³ 80µg/m ³ if black smoke >40µg/m ³
	Winter (median of daily values)	180µg/m ³ if black smoke <60µg/m ³ 130µg/m ³ if black smoke >60µg/m ³
Black smoke	1 year (median of daily values)	80µg/m ³
	Winter (median of daily values)	130µg/m ³
	98 percentile of daily mean	250µg/m ³
EU Guide Values		
Pollutant	Reference period	Guide Values
Sulphur Dioxide	24-hour mean	100-150µg/m ³
Black smoke	1 year mean	40-60µg/m ³

Results and discussion

The results for 2005 indicate that the sites all comply with the EU limit values. The data capture for Smoke was above 80% for all of the sites.

The maximum level of smoke was recorded at Finglas, with $31\mu\text{g}/\text{m}^3$. This is a slight increase on last year ($27\mu\text{g}/\text{m}^3$). The highest SO_2 level was also recorded at Finglas in 2005, although it is a drop from the $80\mu\text{g}/\text{m}^3$ recorded at Cabra in 2004.

Table 18: Smoke and SO_2 results 2005

Site	Annual Mean $\mu\text{g}/\text{m}^3$ Smoke	Annual Mean $\mu\text{g}/\text{m}^3$ SO_2	Annual Median Smoke $\mu\text{g}/\text{m}^3$	Annual Median SO_2 $\mu\text{g}/\text{m}^3$	Maximum Smoke $\mu\text{g}/\text{m}^3$	Maximum SO_2 $\mu\text{g}/\text{m}^3$
Ringsend	1	3	0	0	11	32
Cabra	2	9	1	8	24	40
Crumlin	6	3	5	0	26	26
Finglas	5	8	4	0	31	56

Reference material and Internet addresses:

For real time air quality monitoring results:

<http://www.epa.ie/OurEnvironment/Air/AccessMaps/>

For updates on national environmental issues

<http://www.environ.ie>

For updates on developments at European Union level on noise control

<http://www.europa.eu.int/scadplus/leg/en/s15003.htm>

For updates on developments at European Union level on air quality

<http://www.europa.eu.int/scadplus/leg/en/s15004.htm>