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Air Quality Progress Report

2008

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Isle of Wight Air Quality Progress Report 2008

Executive summary

- There have been no significant changes in emissions of the pollutants of interest on the Isle of Wight.
- The monitoring results for nitrogen dioxide at Lake continue to show that there are unlikely to be exceedence of the air quality standard at this location.
- Monitoring results at Fairlee Road show an inexplicable pattern, and cannot be relied on.
- National trends, recently published, show that nitrogen dioxide concentrations have not been reducing to the extent previously predicted. This has implications for the Isle of Wight.
- Recently-adopted initiatives taken by the Isle of Wight Council, particularly the Transport Plan, are likely to result in reductions in the total emissions of nitrogen oxides on the Island.
- Additional diffusion tubes will be exposed at IOW4 (Fairlee Road, Newport - kerbside) for the indefinite future, to provide more reliable results to inform the 2009 Updating and Screening Assessment.
- We will try to find an additional (roadside) diffusion tube monitoring site along the same stretch of Fairlee Road. As the only candidate sites are within private front gardens, this will be dependant on the goodwill of householders.

Introduction

History

Isle of Wight Council has conducted Reviews and Assessments of air quality in accordance with the National Air Quality Strategy.

The first round Review was conducted in 2000, with subsequent Updating and Screening Assessments in 2004 and 2006.

The 2004 Updating and Screening Assessment was carried out on behalf of the Council by AEA Technology. Using data provided by Isle of Wight Council, and following the screening guidance in LAQM.TG(03)[1], this report concluded that there was unlikely to be any exceedences of the guideline standards for 1,3-butadiens, carbon monoxide, lead, nitrogen dioxide or particles.

However, the report highlighted the need for a detailed review for benzene and sulphur dioxide.

The Detailed Report was issued during 2005. This reported on modelling for SO2 and Benzene that had been carried out by Faber Maunsell, and demonstrated that the guideline standard for SO2 was unlikely to be exceeded, but recommended short-term monitoring for benzene close to the petrol terminal in Kingston.

The results of the benzene monitoring were released during 2005, and showed that were unlikely to be exceedences of the guideline standard for benzene.

In 2006, an Updating and Screening Assessment was carried out on behalf of the Isle of Wight Council by Faber Maunsell. This built on previous reports, and carefully examined the nitrogen oxides monitoring that continues to be carried out by Isle of Wight Council. This Assessment

[1] "Local Air Quality Management" Technical Guidance, Defra 2003) ISBN 0-85521-021-4

concluded that there were unlikely to be any exceedences of the regulated pollutants, with the possible exception of nitrogen dioxide.

The report on the Detailed Assessment for nitrogen dioxide was issued in 2007, and reported on the results of enhanced diffusion tube monitoring at two particular sites, being the only sites that had been identified as of particular concern.

The Detailed Assessment concluded that the guideline level for nitrogen dioxide was unlikely to be exceeded at either site, although the nitrogen dioxide concentration appeared to be close to the guideline at one site.

This Report reviews the current situation, and states what the Isle of Wight Council proposes to do in the future.

Pollutants of concern

The Air Quality Objectives are shown in the following table:

Objectives included in the Air Quality Regulations 2000 as amended, for the purposes of Local Air Quality Management			
Pollutant	**Air Quality Objective**		**Date to be achieved by**
	Concentration	**Measured as**	
Benzene	16.25 µ/m^3	Running annual mean	31.12.2003
	5.00 µ/m^3	Annual mean	31.12.2010
1,3-butadiene	2.25 µ/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 m/m^3	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 µ/m^3	Annual mean	31.12.2004
	0.25 µ/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µ/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µ/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µ/m^3 not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µ/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µ/m^3 not to be exceeded more than 24 time a year	1-hour mean	31.12.2004
	125 µ/m^3 not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µ/m^3 not to be exceeded more than 35 times a year		31.12.2005

Changes in emissions since 2006

Prescribed processes

There have been some changes in the smaller, less-polluting, installations. Some have closed; others have opened. However, the changes have not resulted in significant increases in pollutant emissions.

Other industrial sources

There have been no new industries with the potential to emit significant amount of the pollutants of concern.

Road traffic

Traffic flows continue to show slight increases, year on year.

Air quality has been addressed in the Isle of Wight Council's Transport Plan for 2006-11. This was published in 2006.

Other transport

There have been no significant changes in the ferry fleets of the two companies serving the Island, Red Funnel and Wightlink.

Hovertravel have introduced a new, larger, hovercraft on the route between Ryde and Portsmouth. However, the Detailed Assessment for SO2 found that the larger ferries were unlikely to result in exceedances of the air quality standard. It is therefore equally unlikely that the introduction into service of the new hovercraft will result in exceedances of the air quality standard for sulphur dioxide.

Monitoring results

Nitrogen dioxide has been monitored at two locations on the Isle of Wight, as previously reported[2].

The Detailed Assessment concluded, as a result of enhanced diffusion tube monitoring at the two locations, that the 2010 guideline for NO_2 was unlikely to be exceed.

At the conclusion of the six months of enhanced monitoring, one tube only was exposed at each site. The results of this monitoring are shown below:

Uncorrected results, in µ/m^3									
	IOW4			IOW8			IOW10		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
January	41.74	38.02	21.96	36.64	33.74			19.36	
February	44.81	37.90		34.25	36.10			24.86	
March	30.04	Missing		34.72				23.63	
April	25.78	LOD[3]		28.41				33.46	
May	32.13	LOD		37.10				20.45	
June	40.05	LOD		51.76				23.46	
July	38.10	missing		missing				21.96	
August	38.39	47.90		42.14			19.03	25.69	
September	37.14	44.73		45.68			24.13	22.67	
October	41.30	52.76		38.92			25.46	29.25	
November	44.80	53.07		39.16			24.40	26.26	
December	38.09	38.87		33.15			22.13	29.12	

IOW8 was identified as an unsuitable location for monitoring, as there was unlikely to be exposure of an hour or more. A nearby site (designated IOW10) was therefore selected to supplement it for the Detailed Assessment.

At the end of the enhanced monitoring period, IOW8 was abandoned, and replaced by IOW10.

[2] Updating and Screening Assessment 2006; Detailed Assessment 2007
[3] LOD: below the limit of detection

Discussion

The economy of the Isle of Wight is heavily dependant on tourism. During the summer holiday season, the population of the island is estimated to double. Although there is a healthy trade in coach holidays, the majority of holidaymakers bring their cars. This results in a substantial increase in traffic flows during the summer.

Nitrogen dioxide concentrations in these two locations is attributable to emissions from road traffic. It is therefore probable that the unusually low results for April, May and June cannot be relied on.

Results for January and February 2007 show a reduction, in comparison with the same months the previous year. However, results for August, October and November are significantly higher. In previous years, the highest results have been 44.83 (January 2000), and 44.80 (November 2006). No previous result has been above 50 (October and November 2007).

Calculations and adjustments

Following discussion with Nurah on the Review and Assessment Helpdesk, the bias adjustment factor published on the website is used, without correction for seasonal variations in bias.

To obtain a seasonal short-term adjustment for the seven months of data for the Fairlee Road site, data from three continuous monitors, published on the National Air Quality Archive (www.airquality.co.uk) was used. The sites chosen are: Portsmouth Urban Background, Brighton Roadside, and Southampton Urban Centre.

The data published for all three sites is given as hourly averages. For each site, the hourly averages have been averaged over a calendar month to give monthly averages.

	Portsmouth	Brighton	Southampton
Jan-07	20.59	37.03	29.55
Feb-07	24.12	43.35	37.92
Mar-07	23.16	50.99	32.50
Apr-07	27.88	47.65	36.40
May-07	15.50	39.39	26.73
Jun-07	14.55	34.62	31.94
Jul-07	13.71	28.35	
Aug-07	18.15	36.51	28.18
Sep-07	21.18	37.87	27.57
Oct-07	29.72	44.72	44.016
Nov-07	34.05	44.75	44.25
Dec-07	31.27	45.12	32.51
Annual average	22.82	40.87	33.78
Seasonal average	25.58	41.34	34.86
Annual/period	0.8921	0.98	0.96

Average ratio, R, of annual mean / period mean = 0.95

From the “Uncorrected results”, above:[4]

IOW4 period mean (Jan, Feb, Aug-Dec) = 44.75 µ/m^3

Corrected to annual mean: 44.75 x 0.95 = 42.51 µ/m^3

Adjusted for bias: 42.51 x 0.93 = 39.53 µ/m^3

[4] All figures calculated in a spreadsheet, and later reduced to 2 places of decimals

Distance correction (kerbside to faced of dwelling): 39.53 x 0.95 = 37.56 μ/m^3

Following a similar procedure, but without the period correction, for IOW10:

Annual average (uncorrected) = 25.01; adjusted for bias -> 23.26; distance correction not required (site is c 1m from the edge of the road).

The Isle of Wight has a significant increase in population temporarily during the summer months, as the economy of the Island is heavily dependant on tourism. Seasonal variation may, therefore, differ significantly from seasonal variations at other sites.

Of the three datasets used to calculate the ratio between the period results and the annual average, one (Portsmouth) was an Urban Background site. The ratio here was somewhat different from those calculated from the Urban Roadside (Brighton) and the Urban Centre (Southampton).

There is, therefore, a degree of uncertainty about the final result. Nevertheless, the corrected result for Fairlee Road, at 37.56, is sufficiently below the Guideline of 40 as to indicate that it is unlikely that the Nitrogen dioxide levels at this location will exceed the guideline.

It remains the case that the Declaration of an Air Quality Management Area for this location is not justified.

The future

Predicted changes in NO2 emissions

The Air Quality Expert Group report "Trends in Primary Nitrogen Dioxide in the UK" (Defra 2007) shows that, although emissions of NOx from motor vehicles has been going down, the ratio between emissions of NO_2 and other oxides of nitrogen has been going up.

The overall result has been that, after a peak in 2003, measured levels of NO_2 have remained steady. This is of concern for the Isle of Wight Council, as the annual average of NO_2, as monitored at Fairlee Road (IOW4), is close to the guideline limit.

Isle of Wight Council initiatives

1. Isle of Wight Council Transport Plan

The Isle of Wight Council Transport Plan 2006-11 includes proposals to limit emissions from road traffic. These include:

"*Traffic growth* – taking into account the agreed aim to regenerate the Island, restrict our traffic growth to 2.3% per annum."

"*CO_2 emission* – stabilise CO_2 emissions from transport by promoting alternative fuels."

"*Improve travel choices* – increase travel options through the development of workplace and school travel plans."

"*Public transport* – embrace pricing options that will help make travelling by public transport more attractive."

"*Walking and cycling* – put in place measures that will help make walking and cycling safer and more attractive and taking into account the SEA[5]. Extend cycle routes, including Newport to Yarmouth, East Cowes to Newport, East Cowes to Wootton and Shanklin to Ventnor."

[5] Strategic Environmental Assessment

The Transport Plan also includes the statement “the Plan includes a target not to have an AQMA”. Two locations in particular are singled out – Coppins Bridge (a major traffic intersection just outside Newport town centre. One of the sites at risk of potential future declaration of an AQMA is one of the roads feeding into this intersection), and Lake (the other site possibly at risk of declaration of an AQMA in future).

The Transport Plan states: “Help reduce traffic related pollution at Coppins Bridge”, and under that heading includes four paragraphs. Three of them repeat what was said earlier: *Increase travel options; Public Transport; Walking and cycling.* In addition “*Improved traffic management* – using traffic management techniques to help keep traffic moving and reduce congestion (SCOOT).”

At Lake is one of the stations on the Island’s electric rail link between Ryde and Shanklin. The Transport Plan states “*Rail* – work with operator to ensure that this traffic free option remains a popular alternative to car use. (Community Rail Partnership. Park and Ride)”

Under the heading “General traffic related problems” the Transport Plan includes:

“*Partnerships and communication* – continue working in partnership with town and Parish Councils.”

“*Alternative fuel* – where possible support and encourage the use of alternative fuels. LPG, electric power, biomass, fuel cells etc.”

“*Fleet use* – working with the Hospital and others actively pursue the purchase and use of vehicles powered by more environmentally friendly fuels (low sulphur diesel, Liquid *(sic)* Petroleum Gas (LPG), electric vehicles, bikes and electric bikes and powered two-wheelers (PTWs) etc.”

2. Transport Plan Annual Progress Report 2007

Included in this Report is information about the progress towards School Transport Plans. This Report includes a new Target: (T16 / LTP4): “Reduce car use by 4% by 2011”. This is in relation to journeys to school, rather than to any other location.

The Council is currently consulting on proposals to re-organise education on the Island. This may include school closures, and therefore a change in the patterns of travel to school. The result of the consultation is not yet known. The consequential impact on the target to reduce car journeys to school is, therefore, currently imponderable.

The TPAPR also reports good progress towards the targets of achieving a 12.1% increase in bus patronage over 2003/4 levels by 2010/11, and increasing train patronage over 1999/2000 levels of 20% by 2010/11. The target of keeping traffic growth below 2.3% is also achieved. The aim of increasing cycling is not on target.

3. Isle of Wight Council’s transport fleet

Andy Morris, Transport Manager, has advised me that they are trialling the use of biodiesel in the fleet. He is also reviewing the current availability of electric vehicles.

4. Carbon Management Programme

In May 2007 the Isle of Wight Council published it’s Carbon Management Strategy (amended October 2007). This aims to reduce the Council’s contribution to carbon emissions from a baseline in 2005/06 of 28,440 tonnes by 4% per annum. Although not directly related to Air Quality issues, yet the emissions of CO2 are, in general, from the same sources as those that emit NOx.

The expected reductions in carbon emissions, by reducing energy use, will have a beneficial knock-on effect in reducing NOx emissions. As none of the Island's electricity is generated on the Island (except at times of peak load, when a gas-turbine powered generator at East Cowes comes on stream), this is likely to have little impact on the Island's air quality.

However, reductions in carbon emissions from the Council's vehicle fleet will have consequent beneficial effects on air quality.

Future monitoring

Diffusion tube monitoring at IOW4 (Fairlee Road) and IOW10 (Lake) will continue. The number of tubes exposed at IOW4 will be increased to three for the indefinite future. The number of tubes exposed at IOW10 (Lake) will remain at one.

We will look for another site along Fairlee Road. The road at this site has relatively narrow pavements, with houses both sides which have small front gardens. There is therefore a "canyon effect" which may result in local conditions being different to conditions at other sites on Fairlee Road, where road traffic flows are the same, but which are more open in character.

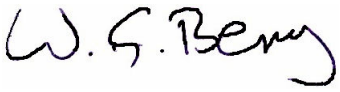
The existing site is a kerbside site (within 1 metre of the edge of the road), on a lamp-post. Roadside concentrations have been extrapolated, using a conversion factor. A roadside site (between 1 metre and 5 metres from the edge of the road) would be preferable.

However, all the candidate sites are within the front gardens of private houses. The use of such a site will therefore be dependant on the good will of a private householder.

Conclusions

Evidence available to the Isle of Wight Council does not support the declaration of an Air Quality Management Area. However, additional monitoring of nitrogen dioxide by diffusion tubes will be carried out.

Initiatives taken by Isle of Wight Council, in partnership with others, will hopefully minimise traffic growth, and keep traffic pollution levels down.



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