



2016 Air Quality Annual Status Report (ASR)

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

Date (June 2016)

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Executive Summary: Air Quality in Our Area

Air Quality in Isle of Wight Council

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Isle of Wight Council has been investigating air quality in the borough since 1999, following the guidance provided in the Local Air Quality Management process, as part of the requirements of the Environment Act 1995. Every Local Authority is required to review and assess air quality within its area annually, and if it is found that air quality objectives are not being achieved or are not likely to be achieved, then they are required to designate an Air Quality Management Area (AQMA). For each AQMA designated, local authorities have to produce an Air Quality Action Plan that details the measures to be taken to improve air quality in that area.

This review and assessment process over the years has identified that the most significant air quality objective, in terms of the one most likely to be breached in the borough, is the annual mean objective for nitrogen dioxide. Monitoring of nitrogen dioxide levels on the Isle of Wight has continued into 2016 and the results for 2015 show that air quality in the area is generally good. Air quality objectives are and will be achieved and the designation of an Air Quality Management Area within the Borough is not required.

Although the levels are within the objective levels, emissions from road traffic using Fairlee Road, Newport and Sandown Road, Lake will continue to be monitoring.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Whilst monitoring across the island shows that the relevant air quality objectives are being met, further improvements in air quality is always desirable, particularly close to main roads that experience a high volume of traffic. Isle of Wight Council will seek continuing improvements to air quality in these areas.

Actions to Improve Air Quality

Isle of Wight Council has produced a series of plans which guide the location, scale and type of future development on the island, as well as providing detailed development management policies to be used in determining planning applications.

Development should seek to protect, and where possible improve upon, the amenity of existing and future residents and on the environment in general. The most effective way of achieving this and securing a high quality environment is to ensure that air quality is considered at the earliest stages of the planning and design process. Planning policies will be included within the plans that will ensure that planning applications for major developments close to main roads and other potential sources of poor air quality will need to consider the impacts of the development on the existing air quality environment.

Local Priorities and Challenges

It is expected that high density residential developments in urban areas will continue with an continual increase in traffic numbers. The challenge will be to ensure that all such developments are considered carefully to ensure air quality is not affected. Any proposal for development that risks an exceedance of air quality objectives will be refused. In addition, demolition and construction sites will need to take appropriate measures to minimise dust emissions.

Isle of Wight Council will continue monitoring at all existing sites within the borough and, if identified as necessary, add additional monitoring sites to provide better coverage of the Borough.

How to Get Involved

Road traffic emissions are the main source of pollution in the borough, so there are a number of ways in which residents and businesses locally can help to improve air quality in the area. Reducing energy use in the home, at work and whilst travelling all can have a beneficial impact on local air quality, whilst saving money and reducing carbon emissions.

Reducing fuel use is easy and individual minor changes can collectively make a significant contribution to improving local air quality:

- A quarter of car journeys are under two miles and more than half are less than five miles. Walking, cycling or using public transport will significantly reduce emissions
- Car sharing is an easy way to reduce emission and fuel costs
- Improving your driving style can save lots of fuel
- Avoid aggressive acceleration and braking
- Driving at 50mph uses 30 per cent less fuel than driving at 70mph
- Driving in fifth gear uses 25 per cent less fuel than third gear
- Opening the windows increases 'drag' and fuel consumption
- Reduce excess weight if not needed (such as roof racks)
- Keep tyres inflated to the right pressure and balanced

Daily forecasts of air pollution across the UK can be found at: <https://uk-air.defra.gov.uk/forecasting/>

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1 Local Air Quality Management

This report provides an overview of air quality in Isle of Wight Council during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Isle of Wight Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

The Isle of Wight currently has no AQMAs. The Authority is in the process of producing an Air Quality Strategy. The strategy will be developed in a multidisciplinary manner involving all relevant departments and external partners to achieve improvements to air quality. It will acknowledge that economic growth and improving the local environment are not mutually exclusive. It will provide an overview of air quality across Wiltshire and focuses on key areas where air quality could and should be improved.

2.2 Progress and Impact of Measures to address Air Quality on the Isle of Wight

Local Air Quality Management on the Isle of Wight is influenced by a number of different policies. The following website concerning the Isle of Wight's Sustainable Transport Programs provides information relating to air quality interactions:

<https://www.iwight.com/Residents/Planning-Policy-new/Transport-Policy/Local-Sustainable-Transport-Fund-Project>

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and or Concentrations

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

The Isle of Wight Council and its partners are taking the measures outlined in Section 2.1 above to address PM_{2.5}

The 2010 and 2015 DEFRA Background Mapping data for local authorities was compared to identify the progress being made on the 15% reduction required for PM_{2.5} before 2020. The results show on average across the Island only a 5% reduction.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

The Isle of Wight Council has no automatic (continuous) monitoring sites.

3.1.2 Non-Automatic Monitoring Sites

Isle of Wight Council undertook non- automatic (passive) monitoring of NO₂ at two main sites during 2015. Table A.1 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Error! Reference source not found.¹ in Appendix B compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix A.

3.2.2 Particulate Matter (PM₁₀)

No monitoring is carried out of Particulate Matter (PM₁₀) as no areas have been identified through screening Tools to require this (See appendix C1).

3.2.3 Particulate Matter (PM_{2.5})

No monitoring is carried out of Particulate Matter (PM_{2.5}) as no areas have been identified through screening Tools to require this (See appendix C1).

3.2.4 Sulphur Dioxide (SO₂)

No monitoring is carried out of Sulphur Dioxide (SO₂) as no areas have been identified through screening Tools to require this (See appendix C1).

Appendix A: Full Monthly Diffusion Tube Results for 2015 Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
IOW4	Kerbside	450377	089557	NO ₂	N	N	N (11m)	0.5 m	Y	IOW4
IOW10	Kerbside	459008	083715	NO ₂	N	N	N (23 m)	2 m	Y	IOW10

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

(2) N/A if not applicable.

Table A.2 – NO₂ Monthly Diffusion Tube Results - 2015

Site ID	NO ₂ Mean Concentrations (µg/m ³)													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted ⁽¹⁾	
	IW4	43.9	43.2	43.1	42.0	37.8	41.4	42.2	42.9	45.6	45.2	39.3			29.3
IW10	27.1	27.5		23.6	21.7	27.5	22.3	26.1	26.0	26.2	25.6	31.8	25.9	20.1*	

(1) See Appendix C for details on bias adjustment

* The spread sheet used to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor, warns against using this where greater than 20m. Although this result should be considered with caution the raw data is well be the air quality objective.

Appendix B:

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$				
			2011 Bias Adjustment Factor = 0.93	2012 Bias Adjustment Factor = 0.79	2013 Bias Adjustment Factor = 0.81	2014 Bias Adjustment Factor = 0.81	2015 Bias Adjustment Factor = 0.81
IOW4	Kerbside	N	45.77	47.81	52.8	53.1	41.3
IOW10	Kerbside	N	24.58	21.83	26.68	33.5	25.9

Table B.1 – Comparison of NO₂ Annual Diffusion Tube results over last 5 years Results - 2015

Appendix C1: Supporting Technical Information

C1.1 Road Traffic Sources

The Highways Officer have confirmed there are no roads on the Isle of Wight which meet the following criteria.

Road Source Category	Criteria
1 - Narrow congested streets with residential properties close to the kerb.	5,000 vehicles/day- exposure within 2m from kerb - slow moving traffic with frequent stop/start
2 - Busy streets where people may spend 1 hour or more close to traffic	10,000 vehicles/day - exposure within 5m from kerb >= 1-hour
3 - Roads with a high flow of HDVs	2,500 HDVs/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)
4 - Junctions	10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)
5 - New roads constructed or proposed since the last round of Review and Assessment	if no air quality assessment available from planning application - 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)
6 - Roads with significantly changed traffic flows	25% traffic increase on roads > 10,000 vehicles/day - exposure within 10m from kerb (20m in conurbations > 2m inhabitants) - Roads previously identified at risk of exceeding (within 10% of objective)
7 - Bus and coach stations	2,500 bus/coach movements/day (5) - exposure within 10m from kerb (20m in conurbations > 2m inhabitants)

It can therefore be concluded that there is no risk of exceedance of any of the objectives for the NO₂ or PM₁₀ from road traffic sources. The authority will continue to site non- automatic (passive) monitoring of NO₂ at the two sites shown in Table A.2 of Appendix.

C1.2 Non-Road Transport Sources

i) Airports

There are two light aircraft airports on the Isle of Wight in Lake and Bembridge. There are relevant exposures within 1km of the boundary of the airport. However, the criteria of where there is a risk of exceedances is where there are more than 10 million passenger or 1000,000 tonnes of freight per year. Based on an average commercial aircraft carrying 500 passengers, would equate to 20000 aircraft movement per year. Air craft movements at either of the island's airports will be

well below this figure. Furthermore emissions from commercial aircrafts will be many times greater than light aircraft. It can therefore be concluded that there is no risk of exceedance of the NO₂ annual mean objective from aircraft transport.

ii) Railways

There is no diesel stock on the Isle of Wight and as such there is no risk of exceedance of the.

The Isle of Wight Steam Railway operates between Smallbrook station and Wootton. There will be steam engines stationary at Havenstreet Station more than 3 times a day each for periods of 15 minutes or greater. However the nearest exposure receptor is greater than 20m from the location.

It can therefore be concluded that there is no risk of exceedance of the SO₂ 15-minute mean objective or NO₂ annual mean objective from Railway transport.

iii) Ports

There are three ports on the Isle of Wight (Fishborne Yarmouth and East Cowes) where there are more than 5,000 large ship movements per year with relevant exposures within 250m of the berths and main areas of movements. In January 2005 FaberMaunsell was commissioned by the Isle of Wight Council to undertake a detailed modelling study of SO₂ concentrations only arising from emissions from ferries in East Cowes, Fishbourne and Yarmouth ports. The results of the SO₂ study indicate that the 15-minute mean objective will not be exceeded in East Cowes, Fishbourne and Yarmouth in 2004/2005. Ferry movements in East Cowes have not changed significantly to cause any increase in the predicted emissions. It can therefore be concluded that there is no risk of exceedance of the SO₂ 15-minute mean objective from Ports.

C1.3 Non-Road Mobile Machinery

All Decision Notices under planning permission for significant developments to include Construction Environmental Management Plans where it will be expected to include the following controls:

- *Ensure all equipment complies with the appropriate NRMM standards⁴⁵;*
- *Where feasible, ensure further abatement plant is installed on NRMM equipment, e.g. Diesel Particulate Filters (DPFs);*
- *Ensure all vehicles switch off engines when stationary – no idling vehicles;*
- *Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible; and*
- *Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).*

C1.4 Industrial sources

i) Industrial installations

Industrial installation operating under Part A, A2 and B Environmental Permits on the Isle of Wight which include emissions from point sources that may impact on air quality

Operator Name	Site Address	Process Type	
Innogy PLC	Cowes Gt Power Station, Kingston Road, East Cowes, Isle of Wight, PO32 6JF	Combustion Processes	Limited operation
Contract Heat and Power Ltd	Forest Park, Forest Road, Newport, Isle of Wight, PO30 5YS	Combustion Processes	Existing plant not operational. Proposed plant under construction. Detailed air quality impact assessment for proposed plant provided with application which showed negligible increase in PM ₁₀ and NO ₂ and receptors
GKN Westland Aerospace (Holdings) Ltd	Maresfield Works, Maresfield Road, East Cowes, Isle of Wight, PO32 6AF	Inorganic Chemical Processes	Industrial screening tool to be used following receipt of annual emissions monitoring
Isle of Wight Crematorium	Station Lane, Whippingham, E Cowes, Whippingham PO32 6NJ	Crematorium	Industrial screening tool to be used following receipt of annual emissions monitoring
GKN Aerospace	Ferry Works, East Cowes, Isle of Wight	Surface treatment and coating	Industrial screening tool to be used following receipt of annual emissions monitoring
Trucast Ltd	Doncasters Trucast, Marlborough Road, Ryde, Isle Of Wight, PO33 1AD	Non-ferrous Metals foundry	Industrial screening tool to be used following receipt of annual emissions monitoring
Isle of Wight Fuels Ltd	Cowes (Isle of Wight) Depot, Kingston Road, East Cowes, Isle of Wight PO32 6HF	Petrol Storage	See section below on Major Petrol Storage depots
Wight Building Materials	St Georges Lane, Newport, Isle Of Wight, PO30 3BX	Roadstone Coating	Detailed air Quality impact assessment provided with application which showed negligible increase in PM ₁₀ and NO ₂ and receptors
Jewson Ltd	43-53 Trafalgar Road, Newport, PO30 1QF	Timber processing	Wood dust particles unlikely to impact on PM ₁₀ levels in area

ii) Major Petrol Storage depots

In 2004 the Isle of Wight Council commissioned FaberMaunsell to undertake a detailed modelling study of benzene concentrations arising from emissions from a petrol storage depot in East Cowes. The benzene model was run for 2003 and 2010.

The assessment was performed using the AAQuIRE 6.1 regional dispersion model, which has been independently and extensively validated, and widely used for the past 12 years.

Emissions and meteorological data, and background concentrations of benzene was inputted to the model to produce pollutant concentration plots for the required years.

The annual mean benzene concentrations predicted to occur in East Cowes in 2004 and 2010 was well below both the 2003 and 2010 air quality standards for benzene. It was determined that emissions from the vapour recovery unit contribute very little to the predicted concentrations. The lack of data regarding fugitive emissions was identified as an issue, particularly as a new housing development is sited within 40m of the petrol storage depot. There has been no significant increase in activity at this depot and therefore it can be concluded that there is no risk of exceedance of the Benzene C₆H₆ objectives from major petrol storage depots.

iii) Petrol stations

There are no petrol storage stations with relevant exposure within 10m of the pumps. It can therefore be concluded that there is no risk of exceedance of the Benzene C₆H₆ objectives from Petrol Stations.

iv) Poultry farms

There are no poultry farms on the Isle of Wight Council housing in excess of 100,000 birds. It can therefore be concluded that there is no risk of exceedance of the PM₁₀ objectives from Poultry farms.

C1.5 Commercial and domestic sources

i) Gas-fired CHP Combustion - Individual Installations

Case Reference	Location
	2x 1 MW Gas boiler - "St Marys Hospital", Parkhurst Road, Newport, Isle Of Wight
P/01378/12	1x 500kw gas CHP plant - Blackdog Biogas, Stag Lane Newport Isle Of Wight PO30
P/01592/14	1x 5.6 MW gas fire engine - Wight Salads Ltd Hale Common Newport Isle Of Wight PO30
P/01592/14	1x 5.6 MW gas fire engine - Wight Salads Ltd Macketts Lane, Newport Isle Of Wight PO30
P/01220/12	380 kW CHP plant - Sandown Wastewater Treatment Works East Yar Road Sandown Isle Of Wight PO36

Detailed assessments were carried out for the installations at St Marys Hospital and Wight Salads which showed there would be no risk of exceedance of the NO₂ objectives from the installations.

The other installations were screened using the DEFRA CHP Excel tool, and showed the actual emission rate of the appliance provided by the manufactures' were lower than the target emission rate calculated by the DEFRA Excel tool. It

can therefore be concluded that there is no risk of exceedance of the NO₂ objectives from Biomass Combustion - Individual Installations.

ii) Biomass Combustion - Individual Installations

Case Reference	Location
P/00635/09	200 kW Biomass boiler- land to the west of, H M Prison Parkhurst, Clissold Road, Newport, Isle Of Wight, PO30
P/00340/10	2 x 100kW Biomass boilers - Quarry Farm, Cheverton Shute, Shorwell, Newport, Isle Of Wight, PO303JE
P/01271/12 (Not yet operational)	3.6MW Biomass boiler - Pan Meadows, land between Staplers Road and, St. Georges Way, Newport, Isle Of Wight, PO30
P/01787/12	200 kW Biomass boiler - West Wight Sports Centre, Moa Place, Freshwater, Isle Of Wight, PO409XH
P/01968/12	140 kW Biomass boiler - Northcourt House, Main Road, Shorwell, Newport, Isle Of Wight, PO303JG
P/00502/13	2x 70kw Biomass boilers - Old Coach House, Brook, Newport, Isle Of Wight, PO304EJ
P/00688/13	500kW Biomass boiler - Medina Leisure Centre, Fairlee Road, Newport, Isle Of Wight, PO302EW
P/01027/13	2 x 100kw Biomass boilers - Barton Manor, Barton Estate, East Cowes, Isle Of Wight, PO326LB
P/00973/12	190 kW Biomass boiler - IOW Grain Medina Wharf Arctic Road Cowes Isle Of Wight PO317PG
P/00849/15	? kW Biomass boiler (No details submitted with planning application) - Prince Of Wales York Avenue East Cowes Isle Of Wight PO326JT

The Pan Meadows Biomass planning application was provided with an Air Quality Detailed Assessment which showed there would be no risk of exceedance of the PM₁₀ and NO₂ objectives from the installation.

The remainder of the installations were screened using the DEFRA biomass Excel tool, and showed the actual emission rate of the appliance provided by the manufactures' was lower than the target emission rate calculated by the DEFRA biomass Excel tool. It can therefore be concluded that there is no risk of exceedance of the PM₁₀ and NO₂ objectives from Biomass Combustion - Individual Installations.

iii) Commercial and Domestic Biomass Combustion – Combined Installations

Reports from Isle of Wight Council Building Control show insignificant numbers for any 500m x 500m square area across the island to require any screening assessment to be carried out. There are no areas where any of the following have occurred from a cluster of installations:

- *Complaints about nuisance dust or odour relating to burning;*

- *Visual signs of chimney smoke being emitted from several properties near to each other;*
- *Smell of burning solid fuel;*
- *Known high levels of sales of solid fuel via home delivery or local outlets; and*
- *Areas known to have limited or no access to mains gas.*

It can therefore be concluded that there is no risk of exceedance of the Short-Term PM₁₀ objectives for Commercial and Domestic Biomass Combustion – Combined Installations.

iv) Domestic other solid-fuel combustion

There are no clusters of coal burning premises over 100 in any 500m x 500m area of the Isle of Wight. It can therefore be concluded that there is no risk of exceedance of the SO₂ objectives for Domestic other solid-fuel combustion. Information was obtained from local coal suppliers.

C1.6 Fugitive or Uncontrolled Sources

There are several quarry's, aggregate storage facilities, landfill sites, numerous waste transfer stations, concrete batching plants and major construction sites. With some there is relevant exposure is within 50m of their off-site roads used to access the site and before intervention from Environmental Health, visible deposits on the road. As there are no locations on the Isle of Wight where the PM₁₀ annual mean background concentration is above 15µg/m³, it can be concluded that there is no risk of exceedance of the PM¹⁰ objectives for Fugitive or Uncontrolled Sources. A detailed assessment would be required if the background PM₁₀ was above 25µg/m³.and there is relevant exposure within 50m of access roads where there are deposits of dust.

Appendix C2: Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

Bias adjustment is effectively a calculated factor which shows whether diffusion tubes are over or under reading ambient concentrations and therefore allows for a correction to be made.

As there is no local automatic monitoring, Isle of Wight Council uses a national factor as given on the review and assessment help desk website⁴ for Bureau Veritas (Gradko 50% TEA in acetone).

Factor from Local Co-location Studies (if available)

As the council does not carry out any continuous monitoring on the Island the national bias adjustment factor for Bureau Veritas (Gradko 50% TEA in acetone) has instead been used. The factors used in this assessment are as follows:

2000 - 1.2
2001 - 1.45
2002 - 1.27
2003 - 1.11
2004 - 1.1
2005 - 1.1
2006 - 1.01
2007 - 0.98
2008 - 0.93
2009 - 0.97
2010 - 1.03
2011 – 0.93
2012 – 0.79
2013 – 0.81
2014 – 0.81

Discussion of Choice of Factor to Use

The Council has used the national factor for Bureau Veritas (Gradko 50% TEA acetone) as no local continuous monitoring is carried out.

PM Monitoring Adjustment

The Council does not carry out any local monitoring for PM₁₀.

Short-term to Long-term Data adjustment

This has not been necessary for the three years covered by this report.

QA/QC of automatic monitoring

No automatic monitoring is carried out on the Island.

QA/QC of diffusion tube monitoring

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO₂ Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in their Local Air Quality Management work.

Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the WASP scheme.

Out of a rating of GOOD, ACCEPETABLE, WARNING AND FAILURE, the results for 2008 show that Bureau Veritas (Gradko) were rated as GOOD. This is classified as follows:

GOOD: Results obtained by the participating laboratory, Bureau Veritas (Gradko 50% TEA in acetone) are on average within 13% of the assigned value. This equates to an RPI of 169 or less.

I attach a copy of a report on methodology and QA / QC from Environmental Scientific Group Ltd., Didcot (Appendix B). This report is copyright Environmental Scientifics Group Ltd., Unit 12, Moorbrook, Southmead Industrial Estate, Didcot, Oxfordshire, OX11 7HP and may not be reproduced without their consent.

Report from the laboratory

NO₂ Diffusion Tube Information – 2014/5

Supplier: Environmental Scientifics Group Ltd

Address: Unit 12
Moorbrook
Southmead Industrial Estate
Didcot
Oxfordshire
OX11 7HP

Diffusion Tube Performance:

Tube Type: 50% Acetone : 50% TEA

Uncertainty: Under European guidelines, diffusion tubes are considered an indicative method, and as such the uncertainty is defined as <20%. (In field intercomparisons ESG's diffusion tubes perform at <10% uncertainty.)

Quality Control: A quality control sample of known concentration is run every 10 samples. The data generated is compared to acceptable limits as determined statistically using a Shewhart Chart control system.

Analytical Repeatability: In 2011 several thousand QC samples were analysed, achieving a relative standard deviation of 1.09%

Confidence Intervals: Assuming a normal distribution, 95.45% of results should fall within 2σ ($\pm 2.18\%$) and 99.73% of results should fall within 3σ ($\pm 3.18\%$) of the expected value.

Limit Of Detection: 0.03 μ g NO₂ on the tube.
Over a 4-week exposure this would equate to 0.6 μ g/m³, or 0.3ppb

Quality Assurance: The manufacture and analysis of NO₂ diffusion tubes is covered by our UKAS accreditation

The method meets the requirements laid out in DEFRA's "Diffusion Tubes For Ambient NO₂ Monitoring: A Practical Guidance."

The laboratory has taken part in the WASP proficiency scheme since it's inception, and has maintained the highest ranking of 'Satisfactory'

Analytical Information :

Analytical Technique: Colorimetric

Instrument: Continuous Flow Auto-analyser

Principle: Nitrite ions react with Sulphanilamide to form a diazonium compound. In acidic conditions, this couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a purple azo dye. Utilising spectrophotometric analysis at 540nm, the NO₂ concentration is calculated by quantification of the colour change in comparison to that produced by known standards.

Calibration: Standards are made from brought in 1000ppm standard – These standards hold Iso Guide 34 and ISO/IEC 17025 certification

The instrument is calibrated every run

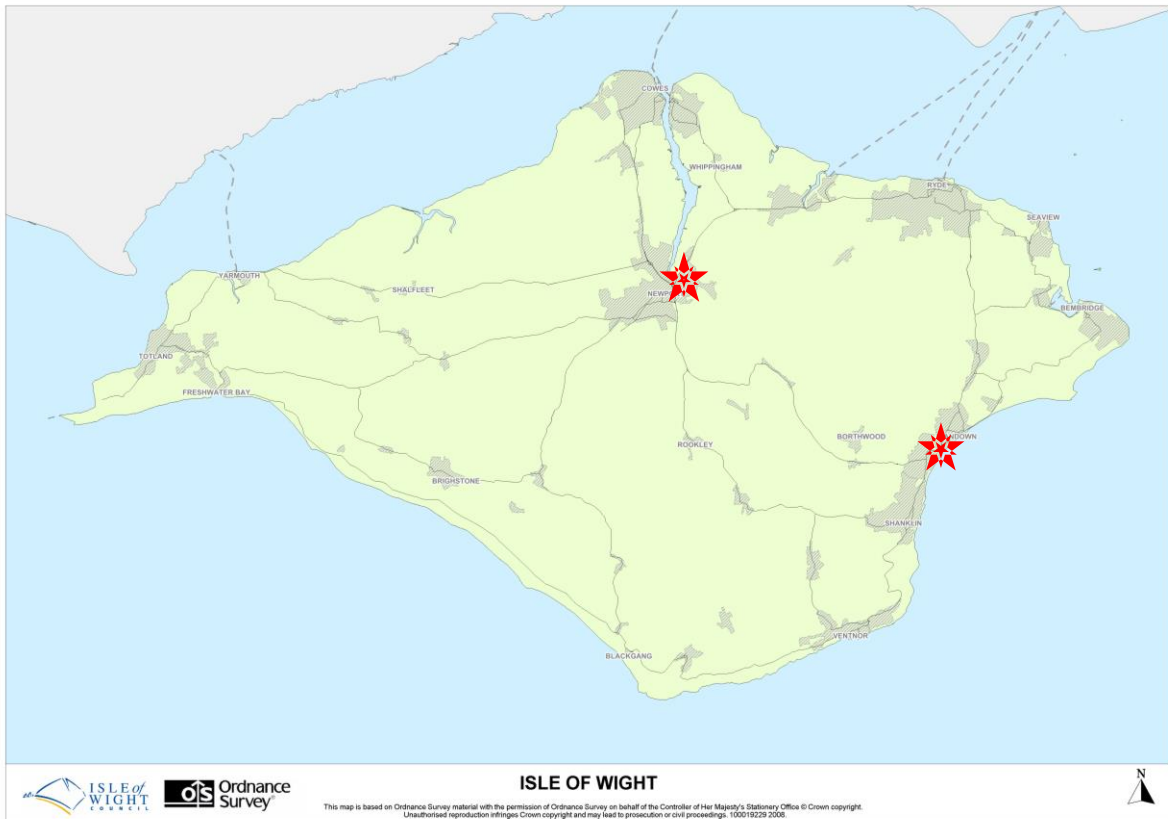
The instrument calibration must achieve a coefficient of linearity >0.999 to be considered acceptable.

System Suitability Checks: System suitability checks are used to ensure performance within expected criteria. These include baseline, peak height and gain.

Extraction: To ensure complete, homogeneous extraction, tubes are mixed on a vibrating tray for not less than 30 minutes.

Appendix D: Maps of Monitoring Locations

Figure D.1 Map 1 General map of Non-Automatic Monitoring Sites



Red markers indicate permanent sites and blue markers indicate temporary sites.

Figure D.2 Map 2 Fairlee Road, Newport Non-Automatic Monitoring Sites

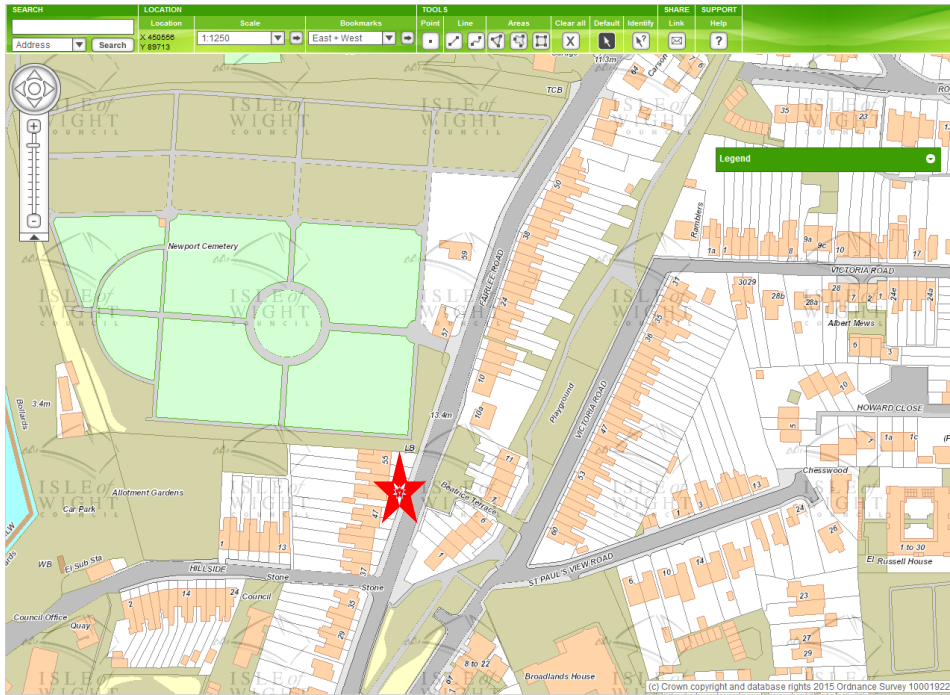
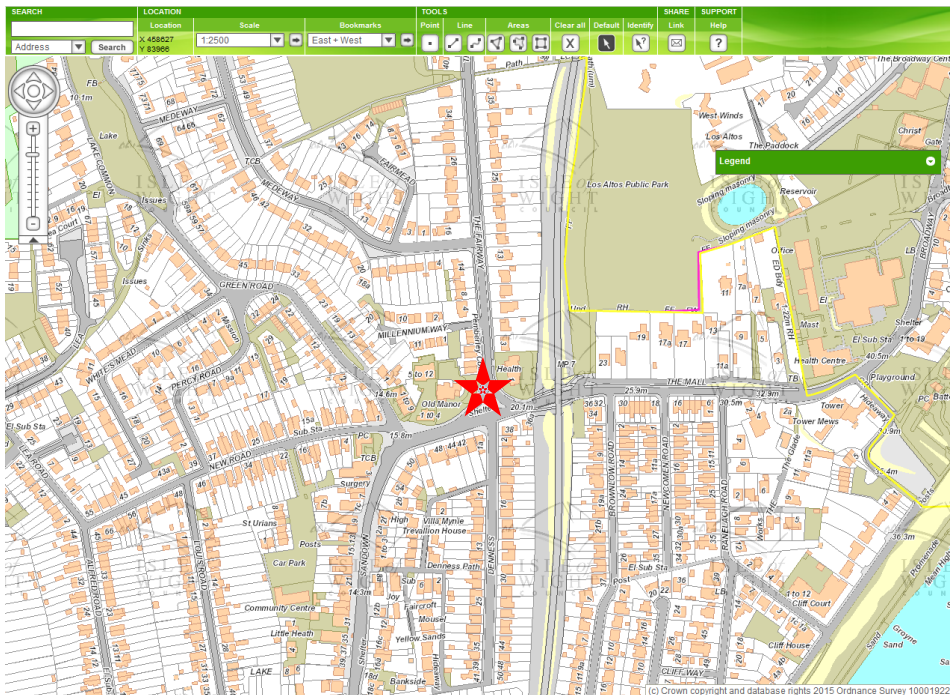


Figure D.2 Map 2 Lake Non-Automatic Monitoring Sites



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁵	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁵ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

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