



Air Quality Review and Assessment Annual Progress Report

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Contact: Amanda Icke
Environmental Health
of: Thanet District Council¹

¹ Council Offices, Cecil Street, Margate, Kent, CT9 1XZ

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Executive Summary

Following the conclusions of the last year's Annual Progress Report (May 2004) a Detailed Assessment was submitted to the DEFRA in April 2005. The Detailed Assessment specifically focused on seven areas identified as being at risk of exceeding the Air Quality Objectives. In each case, the source of pollution was road traffic and breaches were confined to 'hot spots' at congested junctions. The Detailed Assessment, carried out by Casella Stanger consultancy, utilised sophisticated modelling techniques to ascertain pollution levels across the area of concern. The model clearly demonstrates that all but one of these junctions will meet the objectives. The Square, Birchington was found to exceed both the nitrogen dioxide annual mean objective for 2005 and 2010 as well as the annual and 24-hour mean PM₁₀ objectives for 2004.

The Council must now declare an Air Quality Management Area that at minimum encompasses the geographical extent of the air quality exceedence at The Square, Birchington. A full public consultation is currently underway and a further assessment is due to start in the autumn.

This Annual Progress Report signifies the final chapter of the second round of review and assessment and considers monitoring data collected during 2004. The results indicate a significant drop in pollution compared to 2003, on average nitrogen dioxide diffusion tube pollution levels fell by 9 % and continuous monitoring by 11%.

Only The Square, Birchington did not achieve AQ objectives, confirming the need to establish an AQMA and develop an Action Plan to reduce pollution.

The third round is due to begin in 2006 and will start with an Updating and Screening Assessment of all seven key pollutants.

1. Introduction

Introduction to the Annual Progress Report

- 1.1 The overall aim is to report progress in maintaining pollutant concentrations below the air quality objectives and to provide an annual review on air quality issues. Any significant developments can be acted upon immediately. This report will only consider new monitoring data gathered in 2004 and development that might affect local air quality which was given planning permission in 2004. No further consideration will be given to carbon monoxide, lead and 1,3-butadiene since there are no significant sources within or neighbouring the District. For a complete picture of air quality in Thanet this report should be read in conjunction with the Detailed Assessment (2004)¹. Reports from the first and second round of Review and Assessment are summarised in Appendix 1.

The Air Quality Objectives

- 1.2 The Government's Air Quality Strategy defines both standards and objectives for each of a range of air pollutants. The 'standards' are set as concentrations below which health effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of a particular pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of the costs, benefits, feasibility and practicality of achieving the standards. The objectives are prescribed within The Air Quality (England) Regulations 2000² and The Air Quality (England) (Amendment) Regulations 2002³. Table 1 summarises the objectives, which are relevant to this report. Appendix 1 sets out the individual health effects of each of these "strategy pollutants".
- 1.3 These air quality objectives are only applicable where members of the public are likely to be regularly present and are likely to be exposed over the averaging time of the objective. For annual mean and 24-hour objectives relevant exposure is

limited to residential properties, schools and hospitals. The 1-hour and 15-minute objectives apply at these and at any outdoor location where a member of the public might reasonably be expected to stay for the averaging period of the objective, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

Summary of the Second Round Review and Assessment

- 1.4 An Updating and Screening Assessment⁵ of air quality was carried out for Thanet District Council during May 2003. This is a requirement of Part IV of the Environment Act 1995, which obliges local authorities to periodically, review and assess the current and likely future air quality in their area. The role of this process is to identify areas where it is unlikely that the air quality objectives will be achieved. These locations must then be designated as Air Quality Management Areas (AQMAs).
- 1.5 The Updating and Screening Assessment (USA) did not identify any potential exceedences of the air quality objectives. Therefore, no further action was required for sources of carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide, nitrogen dioxide and PM₁₀.
- 1.6 Following on from the USA an Annual Progress Report was submitted to the Defra. This considered monitoring data gained during 2003. Nationally 2003 was a high pollution year principally due to stable meteorological conditions and increased precursor pollutants. Several busy junctions were identified as having the potential to exceed air quality objectives.
- 1.7 Casella Ltd consultancy was engaged to carry out a Detailed Assessment of air quality at these 'hot spots'. The DA utilised sophisticated air pollution modelling techniques and concluded that all but one junction would achieve air quality objectives. However, The Square, Birchington was confirmed as being at risk of failing standards for nitrogen dioxide and fine particles. Therefore, an AQMA is now in the process of being declared. This means action at a local level must be

taken to ensure that air quality in The Square will meet the objectives. To inform the Action Planning process a Further Assessment of air quality is required in the AQMA to determine both the extent of improvement required and the relative contributions of different air quality sources to the problem.

- 1.8 All air quality reports, real time monitoring data and further information may be viewed on line at www.thanet.gov.uk/airquality
- 1.9 The third round of Review and Assessment is due to begin in 2006, until then Thanet Council will continue to monitor pollution levels in key locations and submit annual progress reports to Defra as required.

Table 1: Air Quality Objectives Relevant to This Report.

Pollutant	Time Period	Objective	To be achieved by¹
Benzene	Running annual mean	16.25 µg/m ³	2003
	Annual mean	5 µg/m ³	2010
1,3-Butadiene	Running annual mean	2.25 µg/m ³	2003
Carbon Monoxide	Maximum daily running 8-hour mean	10 mg/m ³	2003
	Annual mean	0.5 µg/m ³	2004
Lead	Annual mean	0.25 µg/m ³	2008
Ozone ³	100 µg/m ³	Running 8 hour Mean not to be exceeded more than 10 times per year	2005
Nitrogen Dioxide	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year	2005
	Annual mean	40 µg/m ³	2005
Sulphur Dioxide	1-hour mean	350 µg/m ³ not to be exceeded more than 24 times a year	2004
	24-hour mean	125 µg/m ³ not to be exceeded more than 3 times a year	2004
	15-minutes mean	266 µg/m ³ not to be exceeded more than 35 times a year	2005
Fine particles (PM ₁₀) ²	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	2004
	Annual mean	40 µg/m ³	2004
	24-hour mean ³	50 µg/m ³ not to be exceeded more than 7 times a year	2010
	Annual mean ³	20 µg/m ³	2010

¹ The achievement dates are all by the end of the specified year.

² Measured by the gravimetric method.

³ Provisional objective not included in the Regulations

2. Air Quality Monitoring Results for 2004

2.1 Nitrogen Dioxide

New Monitoring Data

- 2.1.1 Following on from the recommendations made in last year's APR⁶ Thanet Council has extended the number of nitrogen dioxide diffusion tubes. The total number of diffusion tubes located throughout the District is currently 29 at 23 locations. Kentmere Avenue, Ramsgate and Boundary Road, Ramsgate have triplicate tubes and are sited alongside a continuous nitrogen dioxide analyser. The number of tubes at The Square, Birchington was extended to 3 to improve accuracy and in January 2005 another two tubes were added to help define the extent of the Air Quality Management Area. All monitoring locations are shown in Appendix 3.

Continuous Monitoring

- 2.1.2 Nitrogen dioxide is continuously monitored at Salmestone School, Margate; Boundary Road, Ramsgate; and Kentmere Avenue, Ramsgate. The continuous monitoring stations are part of Kent & Medway Air Quality Monitoring Network and as such adhere to rigorous QA/QC procedures. Therefore, all continuous data presented in this report have been ratified. The results from the continuous environmental monitors are presented in Appendix 5 Table 5 and figures 4, 5. & 6. These data show that for all locations the objective for nitrogen dioxide is unlikely to be exceeded.

Diffusion Tube Monitoring

- 2.1.3 The annual mean diffusion tube concentrations for Thanet during 2004 have on average decreased by 9% compared to 2003 results. Particularly stable

weather conditions during 2003 caused an unusually high number of pollution episodes across Kent and south-east England. During 2004 the pollution episodes were not as significant but do show an overall upward trend compared to 2000-2002. Average concentrations are presented in Table 2, Appendix 4.

- 2.1.4 Figure 1, Appendix 4, show results for seven diffusion tube sites in Thanet that have been in operation for four or more years. A comparison of results show no clear trend in nitrogen dioxide levels and it must be remembered that weather patterns can affect results. Therefore, comparisons from one year to the next have to be made with some caution.
- 2.1.5 In order to account for any laboratory bias, data from tubes co-located with a continuous environmental monitor were used to determine the bias correction. Appendix 10 shows how the bias adjustment factor has been achieved. The results show that the tubes over-estimated nitrogen dioxide concentrations by around 8.4%. The diffusion tube results used in this report have therefore been adjusted to account for this bias. Further details of supply, analysis and QA/QC methods are presented in Appendix 9.
- 2.1.6 The 2004 nitrogen dioxide diffusion tubes results are presented in Figure 2 Appendix 4. Concentrations for 2005 have been estimated by projecting forward measured values from 2004 using factors given by LAQM.TG(03)⁴.
- 2.1.7 All sites with results greater than $36 \mu\text{g}/\text{m}^3$ are considered at risk of exceeding the annual objective i.e. to ± 1 standard deviation. Where there is a risk of an exceedence and relevant exposure, authorities are obliged to proceed to a Detailed Assessment of air quality at those locations. The annual air quality objective is only applicable to areas where members of the public are likely to be exposed over the averaging time of the objective i.e. residential properties, schools and hospitals.
- 2.1.8 There are five sites in Thanet that are at risk of exceeding the annual mean objective for nitrogen dioxide. Each diffusion tube location and nearest receptor is shown in Appendix 6, Maps A to E.

Table 3. Summary of Diffusion Tube Locations Exceeding the Annual Objective of 40µg/m³ to ±1 Standard deviation

Site Ref.	Location	Description	Measured ¹	Bias adjusted ²	2005 correction ³
TH26	King Street, Ramsgate	Kerbside	45.6	42.0	40.9
TH35	Margate Rd, Ramsgate	Kerbside	48.6	44.7	43.5
TH23	Cecil Square, Margate	Kerbside	46.2	42.5	41.4
TH05	The Broadway, Broadstairs	Kerbside	40.9	37.6	36.6
TH13	The Square, Birchington	Kerbside	48.8	44.9	43.7

¹ 2004 diffusion tube data exceeding 36 µg/m³

² Bias adjustment factor 0.92

Box 6.6 Correction factor of 0.974 Technical Guidance LAQM. TG(03)

2.1.9 King Street

This site was considered in the Detailed Assessment¹ and concluded that the Objective is likely to be met at all receptors. During 2004 diffusion tube results decreased compared by 4.6 µg/m³ as too did the continuous results, which dropped from 34µg/m³ to 28 µg/m³. Therefore the conclusions of the Detailed Assessment remain valid and these areas are expected to meet 2005 objectives.

2.1.10 Margate Road

The diffusion tube located in Margate Road, Ramsgate (shown in Map B, Appendix 6) is on a busy roundabout and has recently undergone major redevelopment. Residential properties were demolished in February 2004 to make way for a new retail development which was completed in June 2005. It is likely that members of the public will congregate here and the most appropriate air quality objective for this location is the hourly mean which must not exceed 200µg/m³ more than 18 times per year. Only locations where the annual mean exceeds 60µg/m³ are at risk of exceeding the hourly mean objective. The results in Table 2 Appendix 4 indicate that the 1-hour objective will be achieved even at the kerbside of the busiest section of this roundabout. Given the loss of

residential properties at this site the tube has been relocated into Westwood Road, to assess the exposure at nearest dwellings.

2.1.11 Cecil Square, Margate & The Broadway, Broadstairs

The 2004 diffusion tube results for Cecil Square and The Broadway have decreased by 6.1 and 7.5 $\mu\text{g}/\text{m}^3$ respectively compared to 2003. They are busy junctions where there are no residential properties nearby. Both sites were considered by the Detailed Assessment and are expected to meet the 2005 Objective. The diffusion tubes will remain as an indicator of long-term trends.

2.1.12 The Square, Birchington

During 2004 levels decreased by 6.5 $\mu\text{g}/\text{m}^3$ to 44.9 $\mu\text{g}/\text{m}^3$ but continue to exceed the annual mean objective 40 $\mu\text{g}/\text{m}^3$. The Detailed Assessment¹ confirmed that Nitrogen Dioxide would exceed the 2005 and 2010 annual objectives. As there are residential properties nearby, an AQMA is in the process of being declared so an Action Plan drawn up to reduce pollution within this area.

2.2 **PM₁₀**

New Monitoring Data

2.2.1 In February 2003 Thanet Council installed a continuous analysers at a busy roadside location in Boundary Road, Ramsgate. The junction of Boundary Road, King Street and Hereson Road was identified as a potentially significant junction during the USA. The location of the analyser is shown in Appendix 3 and also in Appendix 6 Map A. The Boundary Road PM₁₀ Beta Attenuation Monitor achieved 78% data capture, the continuous results are shown in Appendix 5, Figures 7 & 8. The annual mean was 32 $\mu\text{g}/\text{m}^3$ and 71 days exceeded 50 $\mu\text{g}/\text{m}^3$. The annual objective of 40 $\mu\text{g}/\text{m}^3$ was achieved but the 24-hour mean objective was not i.e. the number of days exceeding 50 $\mu\text{g}/\text{m}^3$ must not exceed 35.

2.2.2 The APEG⁶ report indicates that BAM measurement significantly over read by as much as 20% above TEOM. The Detailed Assessment¹ concluded that when monitoring traffic pollution, PM₁₀ is only likely to be a problem where nitrogen dioxide exceeds 42 µg/m³. The nitrogen dioxide level at this location was 28 µg/m³ and therefore the 2004 objectives are considered achieved.

2.3 Benzene

New Monitoring Data

2.3.1 Although Thanet has no significant sources of benzene, monitoring is carried out along certain busy roads and junctions as well as locations around Manston Airport. Thanet Council monitors benzene by diffusion tube and continuous analyser.

Continuous Monitoring

2.3.2 Benzene has been continuously monitored since December 2001. The VOC analyser measures benzene by gas chromatography and is located at a site close to Manston Airport in Kentmere Avenue, Ramsgate. This position was selected as it falls directly under the flight path of aircraft approaching from the east over Ramsgate onto runway 28.

2.3.3 During 2004 the annual mean concentration measured at Kentmere Avenue was 1.1µg/m³. However due to various faults, the analyser only managed to attain 71% data capture. In order for this result to be reliable data capture must exceed 75%. Although caution must be taken with this result it does compare well with a co-located benzene diffusion tube which measured an annual mean of 0.9 µg/m³. The benzene levels at Kentmere Avenue, are shown in Figure 7, Appendix 5.

Diffusion Tube Monitoring

- 2.3.4 Monitoring of benzene using diffusion tubes was carried out at eight sites during 2004. Details of the laboratory that supplies and analyses the tubes, and quality assurance measures are detailed in Appendix 9. The results are presented in figure 3, Appendix 4. Concentrations for 2010 have been estimated by projecting forward measured values from 2004 in accordance with method given in LAQM. TG (03)⁴. The results show that the annual mean benzene objective for 2010 of 5 µg/m³ has been achieved.

2.4 Sulphur Dioxide

- 2.4.1 The first round of review and assessment concluded that no further action was required for sulphur dioxide. The only source of sulphur dioxide at this time were shipping movements from Port Ramsgate, which were below the criteria of 5,000 necessary for a Detailed Assessment. No monitoring of sulphur dioxide is currently carried out in Thanet. During 2004 shipping movements increased to 5,479 an additional 383 compared to 2003.
- 2.4.2 TG(03) suggests that Local Authorities should proceed to a Detailed Assessment if shipping movements exceed 5,000 per annum. All movements at the Port are freight; there are no passenger ferries at present. Thanet has no other significant sources of sulphur dioxide. Appendix 7 shows the location of the Port in relation to residential properties. Members of the public are not regularly present within 1km of the shipping berths and are unlikely to be exposed over a 15-minute period. Consequently, the sulphur dioxide objectives are unlikely to be exceeded.

New Monitoring Data

No local monitoring programme necessary.

2.5 Carbon monoxide

2.5.1 There has been a continued decrease in national carbon monoxide concentrations in recent years due principally to improved emission control technology, especially catalytic converters.² Thanet has no significant sources.

New Monitoring Data

2.5.2 No local monitoring programme necessary.

2.6 1,3 Butadiene

2.6.1 As detailed in our previous assessments Thanet has no significant sources and no difficulty achieving the relevant objective.

New Monitoring Data

2.6.2 No local monitoring programme necessary.

2.7 Lead

2.7.1 As detailed in our previous assessments Thanet has no significant sources and no difficulty achieving the relevant objective.

New Monitoring Data

2.7.2 No local monitoring programme necessary.

2.8 Ozone

2.8.1 Ozone is a secondary pollutant formed by chemical reaction in the atmosphere primarily between nitrogen oxides and hydrocarbons in the presence of light. Ozone is identified in the UK National Air Quality Strategy as an ambient pollutant that has the potential to cause harm to human health. Due to the

transboundary nature of ozone it has been omitted from the Air Quality (England) Regulations 2000 because it requires action at a national and international level. However, the UK Air Quality Strategy² suggested the objective level of 100 µg/m³ daily max measured as a running 8hr mean, not to be exceeded more than 10 times per year.

New Monitoring Data

- 2.8.2 Ozone is continuously monitored at Marsh Farm Road, Minster. The results of monitoring carried out during 2004 are presented in Appendix 5, Figure 10.

3. New Local Development

'Local planning decisions have the potential to affect local air quality significantly, through the location and design of emission sources and receptor locations. Equally, local air quality management has the potential to affect the location and design of development, in order to minimise the exposure of people to high concentrations of certain pollutants' (NSCA).¹⁰ Local Authorities should integrate air quality considerations within the planning process at an early stage to help improve air quality in the longer term.

It is fundamental to the achievement of the air quality objectives to have a Local Transport Plan and Local Plan that recognise the importance of air quality impacts of development and need for sustainable transport measures. The LTP is currently under review and will be updated to take account of the proposed Air Quality Management Area. The emerging Local Plan (March 2003) recognises the importance of air quality, policy EP5 will not permit development that would result in air quality objectives being exceeded and any development that may lead to a significant deterioration in air quality must be accompanied by a full assessment.

3.1 Industrial

Industrial Emissions are controlled by:

- Environment Agency Integrated Pollution Prevention and Control (IPPC) which covers A(1) installations.
- Local Authority Integrated Pollution Prevention and Control (LA-IPPC) which covers A(2) installations.
- Local Authority Pollution Prevention Control (LAPPC) which regulate Part B installations.

An up to date list of all permitted installations is given in Appendix 8. There are currently 2 A(1) and 24 Part B processes operating in Thanet. One process, AEM Ltd, Haine Road Industrial Estate transferred over from LA Part B control to EA A(1) regulation, due to the use of chemicals for surface treatment of metal

aircraft components. No new Part B industrial installations have been permitted since the start of the second round of review and assessment.

3.2 Transport

No new roads have been constructed or proposed since the previous Updating & Screening Assessment. Nor have there been any significant changes to existing roads.

3.2.1 Airports

Eujet started operations at Manston Airport from 1st September 2004 and had an annual passenger throughput of 103,855 during 2004. Only airports with a total equivalent passenger throughput of more than 5 million passengers per year and/or 500,000 tonnes of freight require a Detailed Assessment. Thanet Council operate an extensive monitoring programme around the airport and any change in air quality will be reported in subsequent review and assessment.

3.2.2 Shipping

The number of shipping movements at Ramsgate Port the time of the USA was 4,800 below the criteria of 5,000 necessary for a Detailed Assessment. The total shipping movements increased during 2003 to 5096 and to 5479 during 2004. As discussed in s2.4 there are no receptors in close proximity to the Port. This will be reviewed again for USA 2006.

3.3 Residential and Commercial

No developments have been approved through the planning system in 2004 that are identified to have significant impact on local air quality.

4. AQMA & Action Plan

- 4.1 Following completion of the Council's Detailed Assessment, an AQMA for nitrogen dioxide and fine particles is in the process of being declared at The Square, Birchington. A Further Assessment and source apportionment is due to start in autumn 2005. The results from the Further Assessment will inform the Action Plan which will help to reduce pollution below objectives. LAQM.LTP (05) recommends where AQMA are the result of road transport action plans will be integrated into the Local Transport Plan.

5. Summary of conclusions and recommendations

- 5.1 This progress report indicates:

- Generally pollution has decreased compared to last year.
- The only location that failed Air Quality Objectives during 2004 was The Square Birchington. This area had been identified in last years APR as being at risk of failing Air Quality Objectives for nitrogen dioxide and fine particles. The Detailed Assessment confirmed this area would fail Objectives. Thanet Council is in the process of declaring an AQMA for PM₁₀ and nitrogen dioxide at The Square, Birchington.
- Thanet already has an extensive monitoring programme for nitrogen dioxide, benzene, PM₁₀ and ozone at key locations. However, additional monitoring will be carried out within the AQMA and suspected hot spots.

Glossary

Standards	A nationally defined set of concentrations for eight pollutants below which health effects do not occur or are minimal.
Objectives	A nationally defined set of concentrations for seven pollutants, incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality.
Exceedence	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.
AQMA	Air Quality Management Area
USA	Updating and Screening Assessment
DA	Detailed Assessment
Defra	Department for Environment Food and Rural Affairs
TG(03)	Technical guidance document provided by Defra to assist local authorities in completion of the next round of the Air Quality Review & Assessment process
DMRB	Design Manual for Roads and Bridges (Highways Agency 2003)
KMAQN	Kent & Medway Air Quality Monitoring Network
PM ₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.
NO ₂	Nitrogen dioxide
m	Metres
µm	Micrometres (one millionth of a metre)
µg/m ³	Microgrammes per cubic metre.

References

- ¹ Casella Stanger (Feb 2005) Local Air Quality Management – Detailed Assessment Report.
- ² DETR (January 2000), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.
- ³ Defra, (February 2003), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum.
- ⁴ Defra, (February 2003), Local Air Quality Management, Technical Guidance LAQM.TG(03)
- ⁵ Air Quality Consultants (May 2003) Updating and Screening Assessment of Air Quality in the District of Thanet
- ⁶ Annual Progress Report (May 2004)
- ⁷ Air Quality Expert Group (2005) Particulate Matter in the United Kingdom
- ⁸ Defra, (February 2003), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum.
- ⁹ Defra (November 2004) Local Air Quality Management, Policy Guidance: Addendum
- ¹⁰ NSCA (November 2004) Development Control: Planning for Air Quality