

AIR QUALITY REVIEW AND ASSESSMENT (THIRD ROUND) - SECOND UPDATE

1 SUMMARY

- 1.1 The purpose of this report is to update Members on progress of the third review and assessment of air quality within Rochford district and provide a resolution for future air quality monitoring and assessment.
- 1.2 A presentation will be made to the Area Committee on the proposals contained in this report. The previous update on this matter was presented to Members at the Executive Board meeting on 19 July 2007 (Min. 257). Under the new political arrangements issues related to air quality are to be determined by Area Committees.

2 INTRODUCTION

- 2.1 The Environment Act 1995 requires local authorities to periodically review and assess the air quality within their district on behalf of the UK Government, who is the responsible body for attainment of the National Air Quality Objectives for certain prescribed pollutants.
- 2.2 The Department for Environment, Food and Rural Affairs (Defra) have recently published a revised National Air Quality Strategy, a copy of which has been placed in the Members' Library, that sets out the Air Quality Objectives and describes the sources and health effects of each listed pollutant.
- 2.3 Reviews are carried out in a prescribed manner, where two types of report may be produced:-
- An **Updating and Screening Assessment (USA)** – this identifies those aspects that have changed since the previous round of reviews and which may require further assessment. The local authority will only be required to proceed to the second step (detailed assessment) if this report indicates areas that require further work.
 - A **Detailed Assessment (DA)** – this report is required for any pollutants and specific locations that have been identified as requiring further investigation by way of monitoring and/or modelling.
- 2.4 Where the results of a DA indicate the exceedance of an objective, the council must declare an Air Quality Management Area (AQMA), consult with local stakeholders and create an Action Plan in partnership with relevant agencies to reduce and maintain the pollutant concentration below the objective. Should the council fail to declare an AQMA, Defra can issue a Direction to the authority to make it do so.

History

- 2.5 The council's first air quality review was completed in December 2000 and concluded that there were no likely exceedances of the National Air Quality Objectives. The second review concluded that there might be exceedances of particulate matter objectives around Rawreth Industrial Estate.
- 2.6 Officers have now carried out the third round review and considered whether the National Air Quality Objectives have been met.
- 2.7 The USA for Rochford District Council's third review was completed and submitted to Defra in early Summer 2006. The USA was subsequently accepted. The findings of the USA were reported to Environmental Services Committee on 7 September 2006 (Min. 278).
- 2.8 The results of the first period of monitoring as part of the DA required for Nitrogen Dioxide (NO₂) in Rayleigh High Street were reported to Executive Board on 19 July 2007 (Min. 257). The results indicated that concentrations of NO₂ may exceed the national objective at the facades of residential properties and as a result, officers commissioned a modelling report to predict the concentrations more accurately and present them graphically.
- 2.9 Upon the request of this committee via a reference up to the Executive Board (Min. 257), the area to be modelled was extended from the vicinity of the Eastwood Road/High Street junction, to also encompass the crossroads of Love Lane and Castle Road. The Executive Board also asked that officers and the Portfolio Holder meet with Essex County Portfolio Holder and Officers to discuss road traffic issues. This meeting took place on 6 November 2007 and Essex County Council agreed that it would closely liaise with this Council regarding any potential work that may be required in this area. The traffic management arrangements within the Rayleigh area would be further considered as necessary.
- 2.10 The NO₂ modelling report is presented to Members today, along with the results of a separate period of monitoring carried out to investigate levels of PM₁₀ (fine particulates) in Victoria Avenue, near Rawreth Industrial Estate as part of the second DA required by the 2006 USA. Copies of these reports have also been placed in the Members' Library.
- 2.11 Both the NO₂ modelling report and the PM₁₀ monitoring report were submitted to Defra in November 2007. Officers are currently awaiting Defra's comments.
- 2.12 Further information regarding NO₂, PM₁₀, the reporting procedure and terminology and the locations maps mentioned within this report, will be included in the presentation and are contained in the appendices.

3 REPORT FINDINGS AND RECOMMENDATIONS

- 3.1 The monitoring history of each location and the latest report will be discussed in turn below.

NO₂ – High Street, Rayleigh

- 3.2 Diffusion tubes, a passive form of monitoring, have been located at the Eastwood Road/High Street junction in Rayleigh since 2004. The council's Third Round USA (2006) highlighted the potential exceedance of the annual mean objective (40µg/m³) based on the data gathered.
- 3.3 Therefore, a period of continuous monitoring was carried out between July and November 2006 as part of the required DA. Calculations based upon the results estimate annual mean concentrations of 60µg/m³ (2005) and 55µg/m³ (2006) at the monitoring location, falling to 43.9µg/m³ (2005) at the façade of the nearest property.
- 3.4 An estimate of the 2010 concentrations based on the verified model predictions at the same façade indicates that the annual mean concentration would be 37.0µg/m³ and therefore meet the objective. This is equivalent to a 1.35µg/m³ year-on-year reduction at the façade, significantly, without council intervention.
- 3.5 In their conclusions, the authors (ERG, King's College, London) recommend that the Council declare an AQMA even though the objective is likely to be achieved through improvements in vehicle emission standards alone.
- 3.6 Officers have submitted the modelling report to Defra and are awaiting the outcome of their consultants' analysis of the work. Although there continues to be an exceedance of the annual mean objective at the Eastwood Road/High Street junction, it is the view of officers that this is a minor short-term and decreasing issue that does not justify the declaration of an AQMA, with all of the additional resources that this would require.
- 3.7 Officers have identified locations at which diffusion tubes can be mounted along the affected area, A129 Crown Hill to Eastwood Road, in order to improve the robustness of the data captured. This form of monitoring will have to continue indefinitely.
- 3.8 Officers are also seeking quotes for both the hire and purchase of continuous monitoring equipment suitable for installation at the junction, subject to agreement with Essex County Council Highways, in readiness for the feedback from Defra. This equipment would not be required until 2008/09.

NO₂ – Other Locations in Rochford District

- 3.9 The council has two further sets of diffusion tubes located in triplicate at West Street, Rochford and Bedloes Corner, Rawreth. These sites do not show a history of exceedances where there is relevant public exposure. As such,

officers are in the process of identifying new monitoring points for some of the tubes currently at these locations.

- 3.10 As required by their planning consents, monitoring reports on the impacts of both the Somerfield and ASDA developments in Rochford and Rayleigh respectively are expected within the coming months. A pre-development modelling report for the Somerfield store indicated a marginal increase in NO₂ concentrations in North Street, with the maximum annual mean experienced post-development anticipated to be only 21.34µg/m³.

PM₁₀ – Rawreth Industrial Estate and Victoria Avenue, Rayleigh

- 3.11 The PM₁₀ objective that particularly relates to the council concerns the number of occasions in a year when the 24-hour mean (50µg/m³) is exceeded. The objective allows local authorities no more than 35 exceedances of the 24-hour mean in a year.
- 3.12 The 2006 USA required a DA to be carried out for PM₁₀ in the vicinity of Rawreth Industrial Estate. Two 3-month periods of continuous monitoring had previously been carried out in 2004 and 2005.
- 3.13 The monitoring equipment was located to the east of Rawreth Industrial Estate, each time in the rear garden of the same residential property.
- 3.14 In order to estimate the number of days in a year the objective might be exceeded, the monitoring results are entered in to a defined calculation, which includes an annualisation factor. The results of the monitoring and calculations are set out table below:-

Monitoring Period	Days Where PM₁₀ 24-Hour Mean >50µg/m³	Monitoring Period Mean PM₁₀ (µg/m³)	Annualisation Factor	Annualised Mean PM₁₀ (µg/m³)	Predicted Days Exceedance of PM₁₀ 24-Hour Mean* That Year
May-Aug 2004	7	31.4	1.04	32.7	39
Feb-May 2005	17	33.9	1.03	34.9	49
Apr-Jul 2007	6	32.0	1.33	42.6	98
Total (9 Months)	30	32.4	-	36.7	-

* Calculated using equation defined in Defra guidance LAQM TG (03).

- 3.15 In the latest monitoring period, although the number of days that the 24-hour mean was exceeded was only 6, the annualisation factor used for this year significantly raises the annualised mean PM₁₀, and in turn through calculation, the predicted number of days exceedance.
- 3.16 The authors of the report, Bureau Veritas, recommend that the council declares an AQMA on the basis of the results of the latest monitoring, particularly in light of the 2004 and 2005 predictions, which also indicate exceedances of the objective.
- 3.17 Officers have submitted the monitoring report to Defra and are awaiting the outcome of their consultants' analysis of the findings. Officers consider that there is value in commissioning a modelling report, similar to that of the High Street in Rayleigh, in order to determine and apportion the sources of the particulates and define the affected area.
- 3.18 As such, officers have requested that Defra wait for a formal declaration of an AQMA by the council until after any modelling work has been completed and the results analysed. Quotes for this modelling work are already being obtained.

Essex-Wide Perspective

- 3.19 Across Great Britain and Northern Ireland, a total of 214 Local Authorities have declared AQMAs, of which many will have had multiple sites. In Essex alone there are currently 27 AQMAs (7 in Brentwood, 1 in Chelmsford, 2 in Colchester, 14 in Thurrock, 3 in Uttlesford), with a further one in the process of being declared in Epping Forest. Most are due to NO₂ concentrations arising from vehicle emissions. The situations in Epping Forest and Brentwood High Streets are comparable examples to the situation in Rayleigh High Street.
- 3.20 Further information can be found at the websites of the Essex Air Quality Consortium, www.essexair.org, and the national Air Quality Archive at <http://www.airquality.co.uk/archive/laqm/list.php>.

4 RISK IMPLICATIONS

- 4.1 The council is required to declare an AQMA where the national air quality objectives are exceeded. This could have significant financial and human resource implications.
- 4.2 If an AQMA is required, this could have implications for businesses, residents and their properties within the designated area.

5 ENVIRONMENTAL IMPLICATIONS

- 5.1 The ongoing and future monitoring and modelling will establish the extent of any exceedance and whether any action is required to reduce emissions of any particular pollutant.

6 RESOURCE IMPLICATIONS

- 6.1 To date, the council has only carried out continuous monitoring on a periodic basis. The current budget continues to allow for this to occur next year.
- 6.2 However, depending on the outcome of the reports' appraisal by Defra, the council may have to install permanent monitoring stations in one or both locations, for which the budget does not allow. An analyser, without housing can be expected to cost £6000 plus calibration, maintenance and electricity costs. This budget pressure would not need to be addressed until 2008/09 at the earliest.
- 6.3 The declaration of an AQMA would effectively mean an officer working on air quality issues full-time, something for which the Environmental Protection Unit does not have staffing capacity amongst its other statutory functions.

7 LEGAL IMPLICATIONS

- 7.1 The secretary of state for Defra is responsible for the attainment of national air quality objectives.
- 7.2 The council has a duty in law to monitor the air quality in its district in accordance with the timetable attached in Appendix 2.
- 7.3 The council is required to declare an AQMA where a national air quality objective is exceeded. It must consult with the public and other relevant parties in order to create and implement an Action Plan to improve the air quality within that AQMA.
- 7.4 Should a council fail to declare an AQMA where there is an exceedance of an objective, Defra can direct a local authority to do so.

8 RECOMMENDATION

- 8.1 It is proposed that the Committee **RESOLVES**
- (1) That the contents of this report be noted; and
 - (2) Further reports be submitted following the receipt of responses from Defra and submission of reports from ASDA, to include updates on the progress of the modelling of PM10 at and around Rawreth Industrial Estate and with quotes for monitoring equipment, as appropriate.

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Background Papers: -

Local Air Quality Management Technical Guidance LAQM. TG (03) [2007]

Rochford District Council Local Air Quality Management – Updating and Screening Assessment October 2003

Rochford District Council Local Air Quality Management – Detailed Assessment (monitoring) November 2004

Rochford District Council Local Air Quality Management – Detailed Assessment (monitoring) May 2005

Rochford District Council Local Air Quality Management – Updating and Screening Assessment May 2006

Rochford District Council Local Air Quality Management – Detailed Assessment (monitoring) March 2007

Knight Environmental Ltd Air Quality Assessment Report for: Roche Close Site, Rochford March 2007

Rochford District Council Local Air Quality Management – Detailed Assessment (modelling) September 2007

Rochford District Council Local Air Quality Management – Detailed Assessment (monitoring) October 2007

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland [2007]

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If you would like this report in large print, braille or another language please contact 01702 546366.

Appendix 1 – Information on Nitrogen Dioxide and Particulates

Pollutant	Description and main UK sources	Potential effects on health/ environment
Particulate Matter (PM-PM10 and PM2.5)	<p>Particulate Matter is generally categorised on the basis of the size of the particles (for example PM2.5 is particles with a diameter of less than 2.5µm). PM is made up of a wide range of materials and arises from a variety of sources. Concentrations of PM comprise primary particles emitted directly into the atmosphere from combustion sources and secondary particles formed by chemical reactions in the air. PM derives from both human-made and natural sources (such as sea spray and Saharan dust). In the UK the biggest human-made sources are stationary fuel combustion and transport. Road transport gives rise to primary particles from engine emissions, tyre and brake wear and other non-exhaust emissions. Other primary sources include quarrying, construction and non-road mobile sources. Secondary PM is formed from emissions of ammonia, sulphur dioxide and oxides of nitrogen as well as from emissions of organic compounds from both combustion sources and vegetation.</p>	<p>Both short-term and long-term exposures to ambient levels of PM are consistently associated with respiratory and cardiovascular illness and mortality as well as other ill-health effects. The associations are believed to be causal. It is not currently possible to discern a threshold concentration below which there are no effects on the whole population's health. PM10 roughly equates to the mass of particles less than 10 micrometres in diameter that are likely to be inhaled into the thoracic region of the respiratory tract. Recent reviews by WHO and Committee on the Medical Effects of Air Pollutants (COMEAP) have suggested exposure to a finer fraction of particles (PM2.5, which typically make up around two thirds of PM10 emissions and concentrations) give a stronger association with the observed ill health effects, but also warn that there is evidence that the coarse fraction between (PM10 – PM2.5) also has some effects on health.</p>

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)

Pollutant	Description and main UK sources	Potential effects on health/ environment
Oxides of nitrogen (NO _x)	All combustion processes in air produce oxides of nitrogen (NO _x). Nitrogen dioxide (NO ₂) and nitric oxide (NO) are both oxides of nitrogen and together are referred to as NO _x . Road transport is the main source, followed by the electricity supply industry and other industrial and commercial sectors.	NO ₂ is associated with adverse effects on human health. At high levels NO ₂ causes inflammation of the airways. Long-term exposure may affect lung function and respiratory symptoms. NO ₂ also enhances the response to allergens in sensitive individuals. High levels of NO _x can have an adverse effect on vegetation, including leaf or needle damage and reduced growth. Deposition of pollutants derived from NO _x emissions contribute to acidification and/or eutrophication of sensitive habitats leading to loss of biodiversity, often at locations far removed from the original emissions. NO _x also contributes to the formation of secondary particles and ground level ozone, both of which are associated with ill-health effects. Ozone also damages vegetation.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)

Appendix 2 – Timetable for submission of Local Air Quality Management reports

LAQM Activity	Completion Date	Which Authorities?
Updating & Screening Assessment*	End of May 2003	All Authorities
Detailed Assessment* (2 – both PM_{10})	End of April 2004	Those authorities which have identified the need for a Detailed Assessment in their May 2003 Updating & Screening Assessment
8.2 Progress Report	End of April 2004	Those authorities which have identified no need for a Detailed Assessment in their May 2003 Updating & Screening Assessment
Progress Report*	End of April 2005	All Authorities
Updating & Screening Assessment*	End of April 2006	All Authorities
Detailed Assessment* (1 x NO_2 , 1 x PM_{10})	End of April 2007	Those authorities which have identified the need for a Detailed Assessment in their April 2006 Updating & Screening Assessment
Progress Report	End of April 2007	Those authorities which have identified no need for a Detailed Assessment in their April 2006 Updating & Screening Assessment
Progress Report*	End of April 2008	All Authorities
Updating & Screening Assessment*	End of April 2009	All Authorities
Detailed Assessment	End of April 2010	Those authorities which have identified the need for a Detailed Assessment in their April 2009 Updating & Screening Assessment

Progress Report	End of April 2010	Those authorities which have identified no need for a Detailed Assessment in their April 2009 Updating & Screening Assessment
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* Denotes those reports that have been, or are known to have to be, produced by Rochford District Council at this time.

USA – These reports are produced on behalf of most of the Essex Air Quality Consortium members by a single company to aid consistency and keep costs down.

DA – Rochford District Council contracts out this work to a variety of firms.

Progress Report – These are produced by Essex County Council on behalf of all the members of the Essex Air Quality Consortium.

Appendix 3 – Glossary**AQAP – Air Quality Action Plan**

A plan, created in consultation with other relevant organisations, to reduce concentrations of the pollutant of concern within an AQMA.

AQMA – Air Quality Management Area

A defined geographical area designated for action where NAQO has been exceeded or is predicted to be exceeded.

DA – Detailed Assessment

A report created following more thorough monitoring/modelling of a pollutant identified as potentially exceeding a NAQO.

Defra – Department of Environment, Food and Rural Affairs

The central government department with responsibility for overseeing the LAQM process, including the production of guidance, strategies and assessment of local authority LAQM reports.

LAQM – Local Air Quality Management

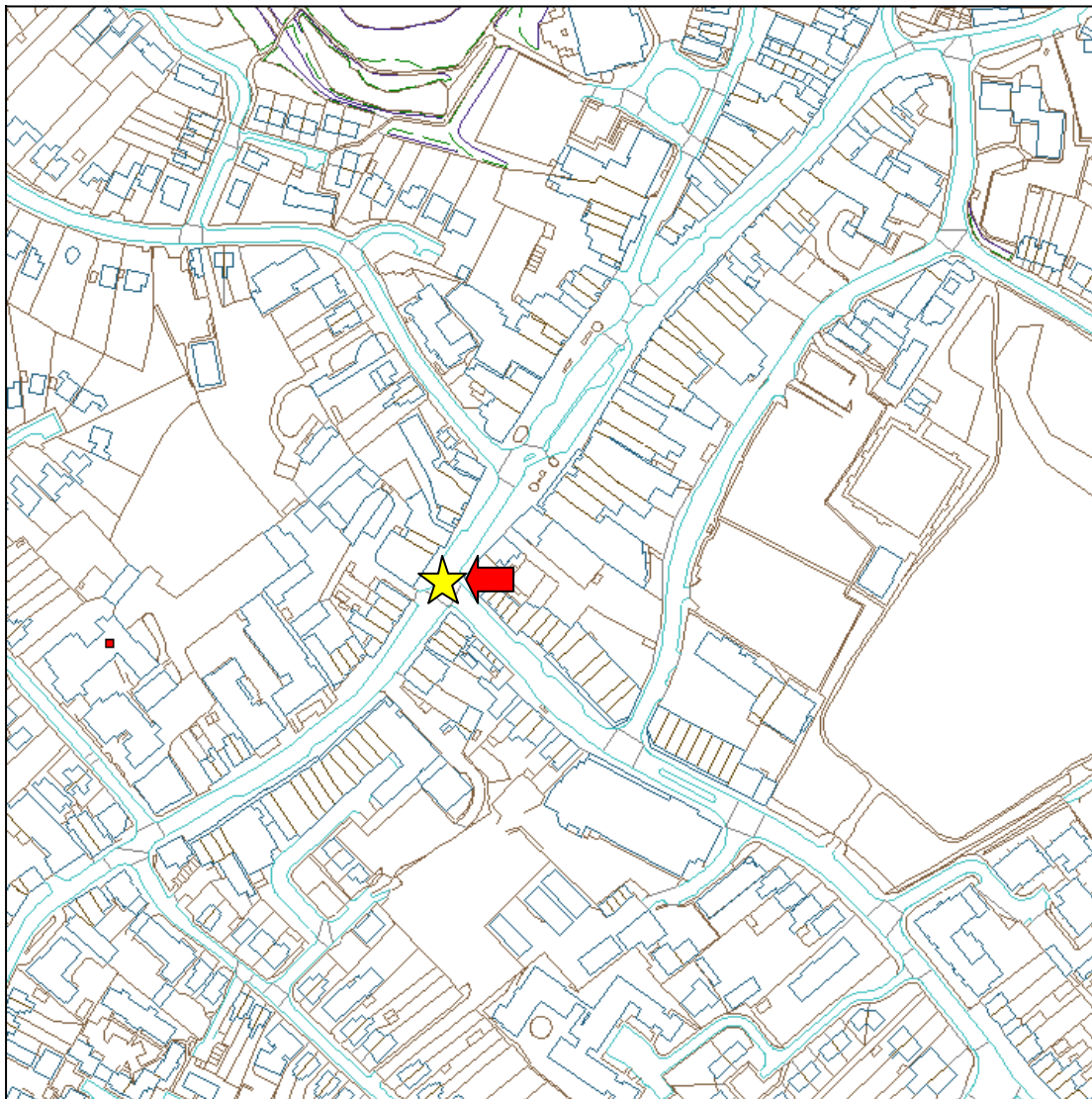
The requirement on local authorities to carry out regular reviews and assessments of air quality in their area against NAQOs.

NAQO – National Air Quality Objectives

Concentration levels of seven pollutants as set out in the national Air Quality Strategy and prescribed in regulations for the purposes of LAQM.

USA – Updating and Screening Assessment

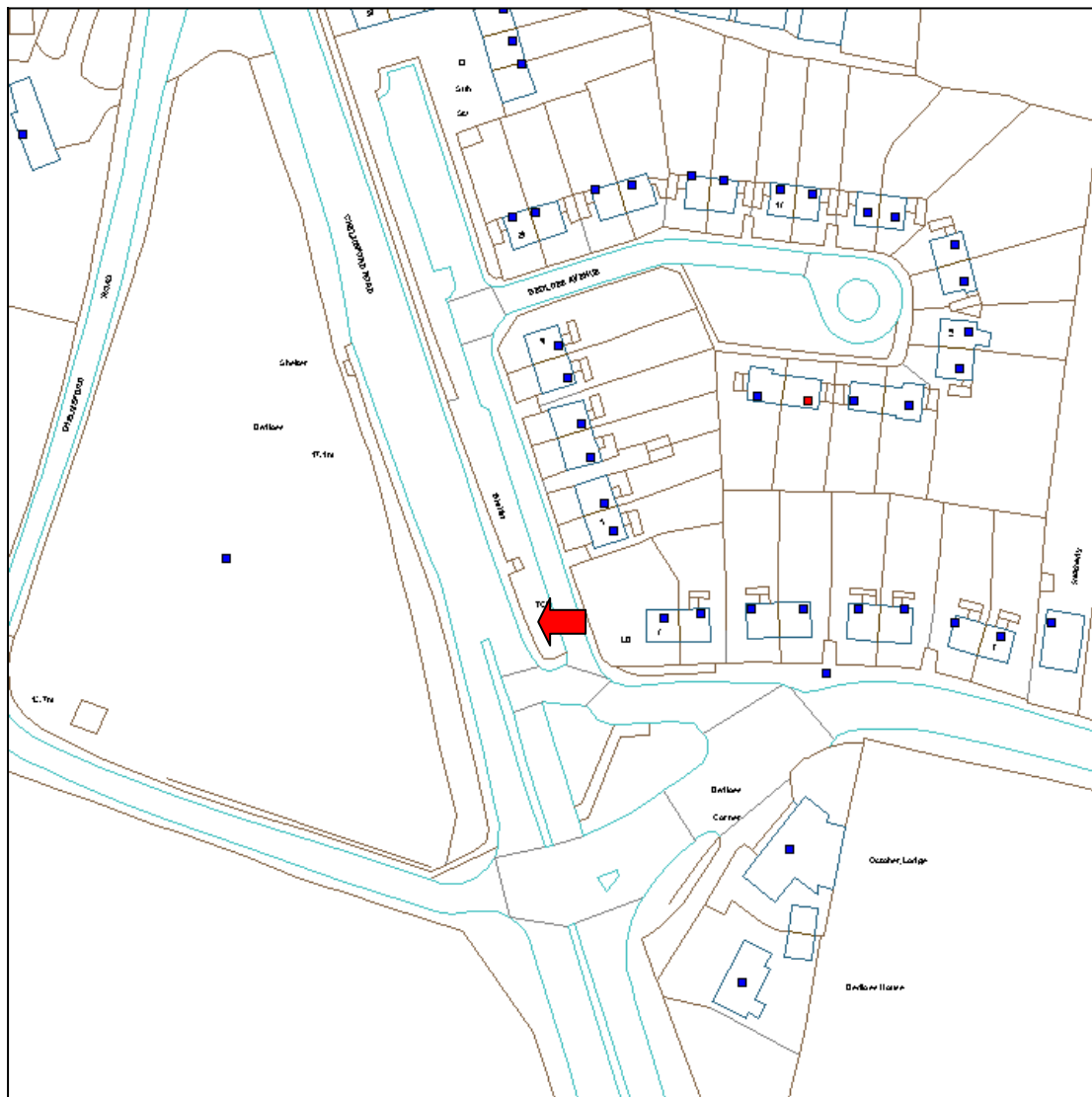
A desktop study of the potential sources and levels of prescribed pollutants and the potential for relevant exposure to exceedances of NAQOs.

Appendix 4 – Maps of monitoring locationsHigh Street, Rayleigh

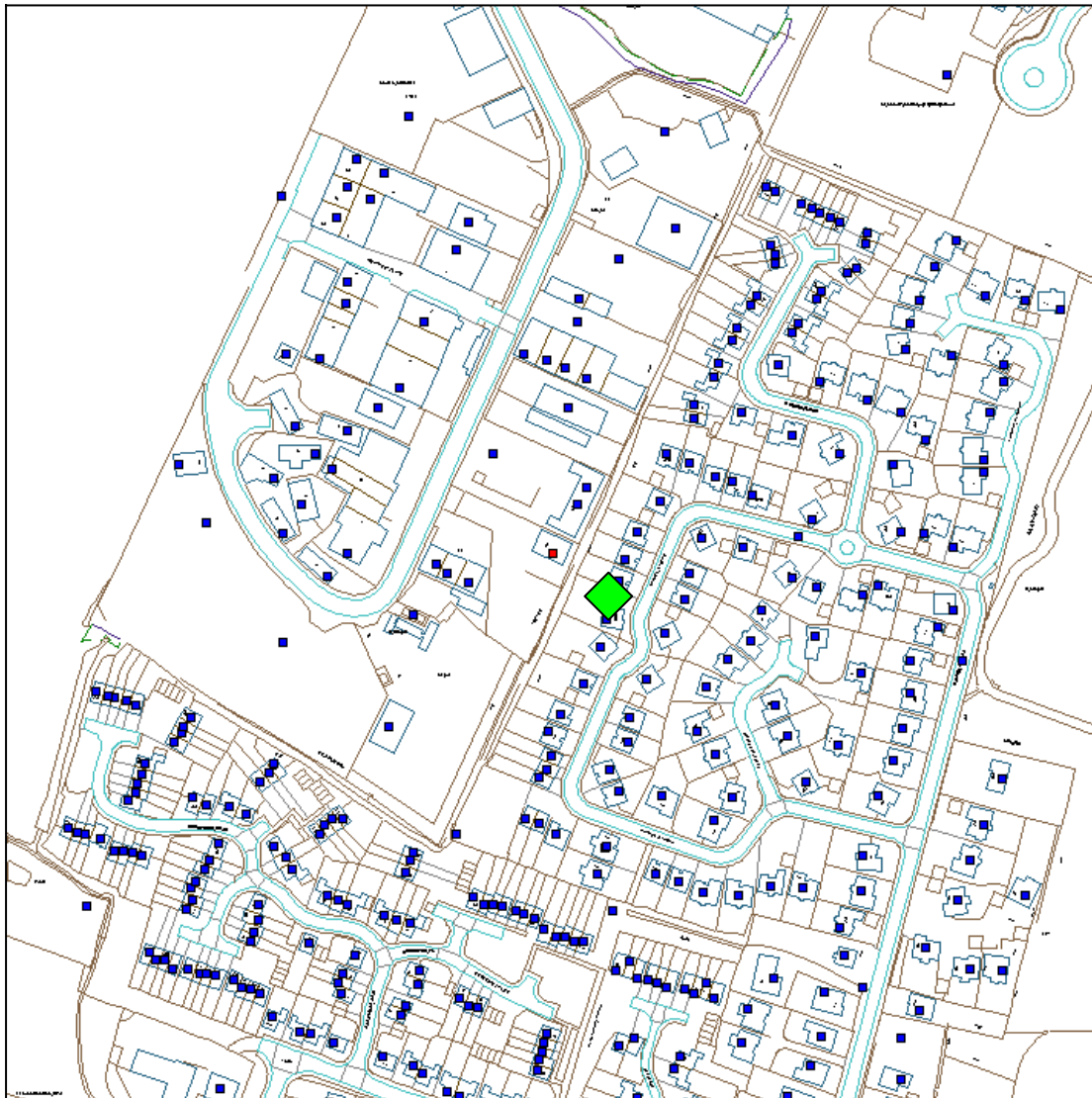
Location of NO₂ diffusion tubes



Location of 3-month NO₂ continuous monitoring

Bedloes Corner, Rawreth

Location of NO₂ diffusion tubes

Victoria Avenue, Rayleigh

PM₁₀ monitoring location