



2009 Air Quality Updating and Screening Assessment for *Arun District Council*

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

April 2009

Local Authority Officer	John Green Principal Environmental Health Officer
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Department	Environmental Health
Address	Civic Centre, Maltravers Road, Littlehampton BN17 5LF
Telephone	01903 737693
e-mail	John.green@arun.gov.uk

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Executive Summary

Arun District Council has undertaken the 2009 Local Air Quality Management Updating and Screening Assessment of air quality for the district.

The report reviewed data on measurements of air pollutants in the district and compared these to the national air quality objectives for human health. In addition the report reviewed any new or existing potential sources of pollution and has assessed their potential impacts on air quality for the citizens of the district.

Arun District Council monitored key locations within the district in 2008, this monitoring identified no locations which exceeded air quality objectives. The report concluded that no air quality objectives measured in the authority exceeded the national air quality objectives for human health.

Arun District Council assessed potential new and existing sources of pollution from within the district. The assessment identified that no new or existing sources were likely to exceed national air quality objectives for human health.

Arun District Council concluded that no air quality objectives were exceeded in 2008 and the will not be required to undertake any Detailed Assessments of air quality in 2010.

Arun District Council will progress to a LAQM Progress Report in 2010.

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1 Introduction

1.1 Description of Local Authority Area

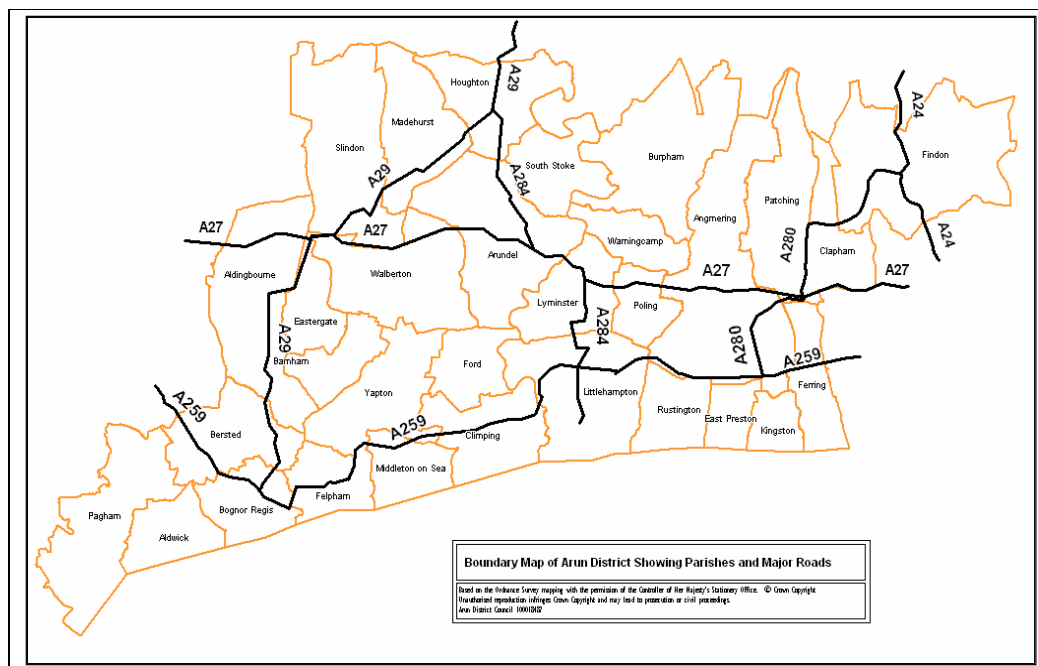
Arun District is a mixed urban / rural area covering 85 square miles, and has a population of over 140,000. Littlehampton and Bognor Regis are the main urban centres and the principal administrative and commercial centres within the district.

Arun District is served by transport links to London, Gatwick Airport, the M25, the coast and Europe. A network of subsidiary routes connects the villages and small centres of population.

A large proportion of the district is composed of countryside with a varied landscape of woodland, down-land, river valleys and meadows being represented. Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, and Sites of Nature Conservation Importance overlap the area. Agriculture remains a major user of land within the District.

Figure 1. Shows the Arun District boundaries, parishes and main roads.

Figure 1: Arun District



1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year 40 $\mu\text{g}/\text{m}^3$	1-hour mean	31.12.2005
		Annual mean	31.12.2005
Particles (PM ₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year 40 $\mu\text{g}/\text{m}^3$	24-hour mean	31.12.2004
		Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year 125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year 266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	1-hour mean	31.12.2004
		24-hour mean	31.12.2004
		15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Stage I, II and III

Arun District Council completed its stage I assessment in December 1998 and identified a number of pollutant sources within the district requiring further assessment. Further stage II AND III assessments followed.

Road sources

Advanced modelling was undertaken using the BREEZE ROADS model which incorporates emissions, traffic and meteorological data and provides estimates for both moving and idling vehicles. Predicted NO₂ concentrations for 2005 were found to be less than the required air quality objective, so it was not necessary to declare an Air Quality Management Area (AQMA).

Industrial sources

The contribution of SO₂ and PM₁₀ from the Lafarge Redland stack was estimated using the GSS Environment Agency model, incorporating geographical and engineering data. When this value was added to the predicted background concentration, the total SO₂ concentration for 2004/2005 was found to be below the air quality objectives set for SO₂. Therefore no further assessment was needed. However, for PM₁₀ the predicted total 2004 concentration was found to be within 5 mg/m³ of the annual mean air quality objective, so advanced modelling was undertaken to confirm whether the objective would be met by 2004. The advanced AERMOD model results were of similar concentration to those from the GSS model and therefore it was decided not to proceed further.

To conclude, all areas identified as being of possible concern from the Stage I review and assessment were predicted to meet the necessary air quality objectives by the target year. **Therefore, it was not necessary for this authority to declare any Air Quality Management Areas within the Arun District.**

2003 Updating and Screening Assessment

In 2003, an Updating and Screening Assessment (USA) was undertaken to account for changes to air quality objectives, monitoring data and pollutant sources since the Review and Assessment. The USA did not identify any changes to local air quality which would lead to a risk of any of the air quality objectives being exceeded. **Therefore no further detailed assessment was required.**

2004 Progress Report

The 2004 Progress Report identified no further locations of exceedence within the district for air quality. **Therefore no further detailed assessment was required.**

2005 Progress Report

The 2005 Progress Report identified no further locations of exceedence within the district for air quality. **Therefore no further detailed assessment was required.**

2006 Updating and Screening Assessment

Arun District Council USA 2009

The 2006 Updating and Screening Assessment (USA) was undertaken to review air quality and identify new likely sources of pollution in the district. The assessment included looking at further data from the monitoring sites, assessments for congested roads, junctions, busy streets, roads with high HGV and bus volumes, as well as new roads, bus stations, new and changed emissions from industrial sources.

The 2006 USA did not identify any changes to local air quality which would lead to a risk of any of the air quality objectives being exceeded. **Therefore no further detailed assessment was required.**

2007 Progress Report

The 2007 Progress Report provided a summary of all available monitoring data, indicating monitored pollutants and specific locations within Arun District.

The 2007 Progress Report identified no further locations of exceedence within the district. **Therefore no further detailed assessment was required.**

2008 Progress Report

The 2008 Progress Report identified no further locations of exceedence within the district. **Therefore no further detailed assessment was required.**

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Arun District Council has no automatic monitoring sites within its boundaries and has not closed any since the last Review and Assessment of Air Quality (2008).

Monitoring of air quality across Sussex.

Arun District Council are members of the Sussex Air Quality Partnership (Sussex Air) which benefits from the co-ordinated monitoring of air pollutants across the region. The Sussex Air Quality Monitoring Network is managed and co-ordinated by King's College London ERG, on behalf of Sussex-air and they provide data calibration and ratification of results.

Table 2.1: Sussex air quality monitoring stations and pollutants monitored (2008).

	Authority	Location	Pollutant
1	Adur	Shoreham High St	NOx
2	Brighton & Hove/AURN	Brighton Pavilion	NOx, O3 ,
3	Brighton & Hove/AURN	Hove Roadside	NOx, O3 ,
4	Brighton & Hove CC	Foredown Tower	O3
5	Chichester D.C.	A27 Ring Road	PM10(grav), NOx
6	Chichester D.C.	Lodsworth	O3
7	Crawley B.C.	East Gatwick	NOx
8	Eastbourne B.C.	Devonshire Park	PM10, NOx, O3
9	Hastings B.C.	Hastings/Bexhill (A259)	PM10, NOx, O3
10	Hastings B.C.	Freshfields (A259)	PM10, NOx
11	Horsham D.C.	Horsham centre	PM10, NOx,
12	Lewes D.C.	Telscombe Cliffs	PM10, NOx, O3,
13	Lewes D.C.	Lewes Town Centre	PM10, NOx
14	Rother D.C	Rye Harbour	O3
15	Rother D.C.	Bexhill (A259)	NOx, PM10
16	Worthing B.C.	Grove Lodge, A27	NOx
17	Wealden D.C.	Isfield	O3
18	Sussex County Lab.	Mobile unit	PM10, NOx,O3, CO
19	DEFRA - AURN	Preston Park, Brighton	NOx, O3
20	DEFRA - AURN	Lullington Heath, Wealden	NOx, O3, SO2

Key:

CO	-	carbon monoxide
NOx	-	oxides of nitrogen (includes NO2 nitrogen dioxide)
O3	-	ozone
PM10(grav)	-	particles less than 10 microns (measured gravimetrically)
PM10	-	particles less than 10 microns (measured non gravimetrically)
SO2	-	sulphur dioxide

2.1.2 Non-Automatic Monitoring

Arun District Council undertakes monitoring with non-automatic methods using nitrogen dioxide (NO₂) diffusion tubes in various locations across the district. There are no AQMA's in Arun District. Site location maps are provided in Appendix B: Location Maps.

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Local	Site Type	OS Grid Ref	NO ₂	Relevant Exposure ?	Distance to kerb of nearest road	Worst-case Location?
BR High Street	Bognor	Urban Roadside	X 493778 Y 099135	NO ₂	No	1m	N
Church Lane	Bognor	Urban Backgrd	X 493429 Y 100381	NO ₂	No	N/A	Y
Mornington Crescent	Bognor	Urban Backgrd	X 495328 Y 100344	NO ₂	No	N/A	N
Canada Grove	Bognor	Urban Roadside	X 493313 Y 099228	NO ₂	No	1 m	Y
Terminus Road	Little'ton	Urban Roadside	X 502564 Y 102149	NO ₂	No	1 m	Y
Worthing Road	Little'ton	Urban Roadside	X 503439 Y 103364	NO ₂	No	1 m	Y
Thatchway Close	Little'ton	Urban Backgrd	X 502559 Y 102888	NO ₂	No	N/A	N
Westlands	Little'ton	Urban Backgrd	X 504380 Y 102687	NO ₂	No	N/A	N
Arundel High Street	Arundel	Urban Roadside	X 501825 Y 107165	NO ₂	No	1 m	N
The Causeway	Arundel	Rural Roadside	X 502337 Y 106555	NO ₂	Yes (8 m)	1 m	Y
King Street	Arundel	Urban Backgrd	X 501478 Y 107052	NO ₂	No	N/A	N
Priory Road	Arundel	Urban Backgrd	X 500886 Y 106491	NO ₂	No	N/A	N
Felpham Way	Bognor	Urban Roadside	X 495750 Y 100200	NO ₂	No	1 m	Y
The Causeway 2	Arundel	Rural Roadside	X 502337 Y 106555	NO ₂	Yes (8 m)	1 m	Y

Key:

Little'ton - Littlehampton

Arun District Council sub-contracts the supply and analysis of the NO₂ diffusion tubes with - South Yorkshire Laboratory.

The NO₂ tube preparation method used is 50% triethanolamine (TEA) in acetone.

The South Yorkshire Laboratory was on the working group and follows the procedures set out in the Harmonisation Practical Guidance.

No co-location study has been undertaken in the district or in neighbouring authority.

Data from the NO₂ diffusion tubes has been compared and bias corrected to the factors produced from the UK co-location data-base as produced by University of West of England (UWE) on behalf of DEFRA.

(<http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube270209.xls>)

The bias adjustment factor for the South Yorkshire Laboratory in 2008 = 0.99.

South Yorkshire Laboratory participate in the Workplace Analysis Scheme for Proficiency (WASP) and for the period April 2007 – April 2008, received a “Good” rating in both old and new criteria.

2.2 Comparison of Monitoring Results with AQ Objectives

Arun District Council monitoring results have shown that there has been no measured exceedance of the UK air quality objectives in 2008.

2.2.1 Nitrogen Dioxide

Arun District Council measures nitrogen dioxide using diffusion tubes to provide annual averaged (bias corrected) concentrations within the district.

Only one (diffusion tube) measured location in the district, (Causeway, Arundel ($40.1 \mu\text{g}/\text{m}^3$)) exceeded the annual mean concentration of $40 \mu\text{g}/\text{m}^3$ in 2008. The measurement location is adjacent (within 1.0m) of the kerb A27. There is a relevant location of exposure (House) a further 8.0m away from the road. This represents the likely highest closest relevant exposure location in the district.

When the measured concentration was re-calculated back to the closest location of relevant public exposure, the result of this calculation showed, that there was **no likely exceedance of the annual mean concentration of $40 \mu\text{g}/\text{m}^3$. The result was $28.0 \mu\text{g}/\text{m}^3$.**

In addition this location had two (duplicate) co-located nitrogen dioxide diffusion tubes. The second diffusion tube measured below the NO_2 objective, with an annual mean of $36.6 \mu\text{g}/\text{m}^3$. The averaged annual measured concentration for both diffusion tubes at the Causeway is $38.35 \mu\text{g}/\text{m}^3$, before the recalculation back to the closest location of relevant public exposure.

(The methodology used to calculate the fall-off in nitrogen dioxide concentrations with distance from the road is taken from TG09 Box 2.3, see Appendix C for calculation)

Automatic Monitoring Data

Arun District Council has no automatic monitoring sites within its' boundaries and has not closed any since the last Review and Assessment of Air Quality (2008).

Diffusion Tube Monitoring Data

Arun District Council measured nitrogen dioxide concentrations at thirteen locations across the district, including one duplicate monitoring site (The Causeway, Arundel).

All measurements are bias adjusted.

One diffusion tube measure $40.1 \mu\text{g}/\text{m}^3$, an exceedance of the $40 \mu\text{g}/\text{m}^3$ annual mean NO_2 objective, at the location known as the Causeway, adjacent to the A27, near Arundel. However this location has two (duplicate) nitrogen dioxide diffusion tubes co-located here and

the second diffusion tube measured below the NO₂ objective, with an annual mean of 36.6µg/m³. **The averaged annual measured concentration for both diffusion tubes at The Causeway is 38.35µg/m³, which is below the objective.**

In addition the Causeway NO₂ diffusion tubes are not located at the façade of the building which is the closest position of likely exposure. The closest likely location is an additional 8.0m from the diffusion tube measurement site.

There are no AQMA's in the district.

Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations
				2008 (µg/m ³) Adjusted for bias
BR High Street	Bognor	No	100	29.9
Church Lane	Bognor	No	92	18.4
Mornington Crescent	Bognor	No	100	16.3
Canada Grove	Bognor	No	92	26.6
Terminus Road	Littlehampton	No	92	28.4
Worthing Road	Littlehampton	No	100	31.2
Thatchway Close	Littlehampton	No	100	17.3
Westlands	Littlehampton	No	100	19.2
Arundel High Street	Arundel	No	100	21.8
The Causeway	Arundel	No	100	40.1
King Street	Arundel	No	100	19.5
Priory Road	Arundel	No	100	14.8
Felpham Way	Bognor	No	100	35.9
The Causeway 2	Arundel	No	100	36.6

Figure 1. Annual Results of Background Nitrogen Dioxide Diffusion Tube Sites (2003 - 2008)

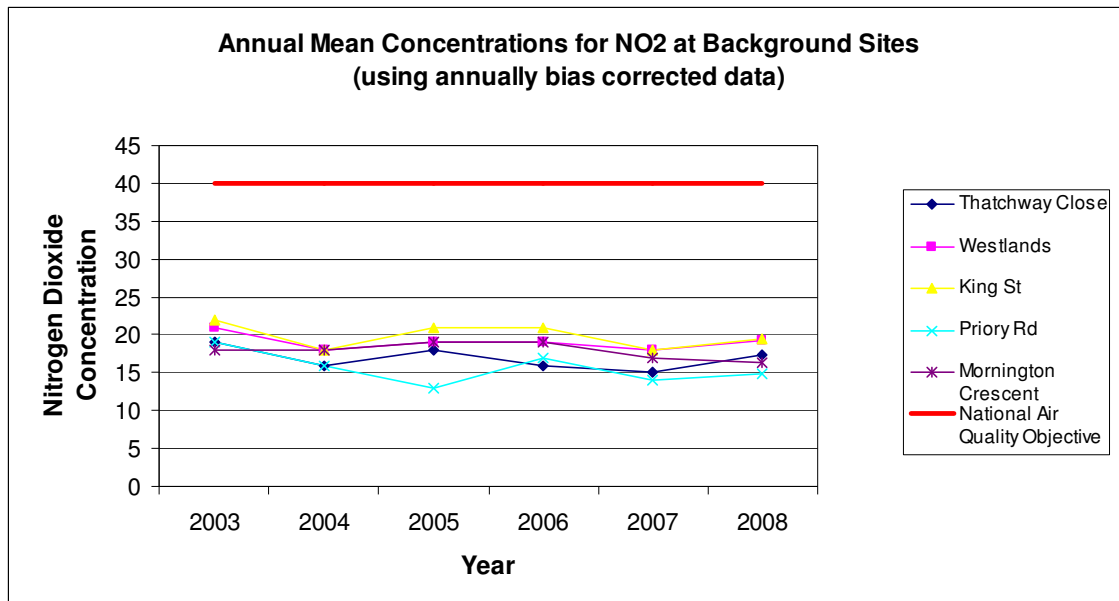
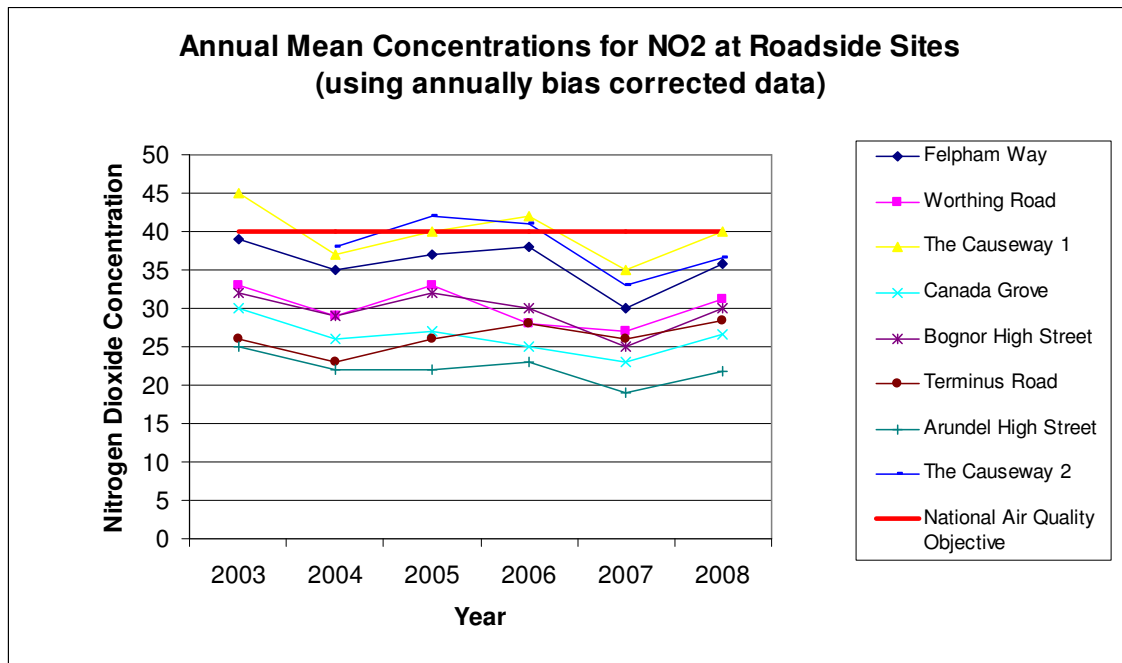


Figure 2. Annual Results of Roadside Nitrogen Dioxide Diffusion Tube Sites (2003 - 2008)



2.2.2 PM₁₀

Arun District Council has particulate monitoring sites within its' boundaries and has not closed any since the last Review and Assessment of Air Quality (2008).

2.2.3 Sulphur Dioxide

Arun District Council has no sulphur dioxide monitoring sites within its' boundaries and has not closed any since the last Review and Assessment of Air Quality (2008).

2.2.4 Benzene

Arun District Council has no benzene monitoring sites within its' boundaries and has not closed any since the last Review and Assessment of Air Quality (2008).

2.2.5 Other pollutants monitored

Arun District Council has no other monitoring sites or monitors within its' boundaries and has not closed any since the last Review and Assessment of Air Quality (2008).

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Arun District Council reviewed narrow congested streets in previous rounds of the review and assessment of air quality.

No streets were identified which fulfil the criteria previously and presently used to be categorised as a “congested street”.

No new streets have been identified as congested, nor has there been significant changes in congestion (traffic volumes).

No new locations of increased public exposure due to the building of residential properties adjacent to these types of roads has occurred.

Arun District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Arun District Council reviewed locations where people may spend 1-hour or more close to traffic in previous rounds of the review and assessment of air quality.

No locations were found to have individuals who may be exposed within 5 m of the kerb for 1-hour or more.

No new locations of exposure have been identified.

Arun District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

Arun District Council reviewed locations with high flows of buses and or heavy goods vehicles in previous rounds of the review and assessment of air quality.

No locations were identified which fulfil the criteria.

No roads in the area have a high proportion (>20%) of buses and/or heavy goods vehicles.

Arun District Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions

Arun District Council reviewed junctions in the area in previous rounds of the review and assessment of air quality.

No new busy junctions were identified which fulfil the criteria.

Arun District Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

The 2008 LAQM Progress Report noted that there was the potential for the redevelopment of Bognor Regis. This continues to be in the planning stages and therefore considerations of any impacts on Air Quality will be explored in the future reports if the development occurs.

No new roads were built since last review and assessment.

Arun District Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

No significant changes in vehicles on major roads were identified. In some instances reductions were observed, refer to Appendix D for table of AADT traffic count data.

No significant changes in traffic flows were identified which fulfil the criteria.

Arun District Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Arun District Council contains no major bus or coach stations and there have been none built since the last review and assessment.

Arun District Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

The closest airports to Arun District Council are Gatwick and Shoreham. These airports are not situated within the local authority area nor do they border the district.

Arun District Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

Arun District Council contains no locations where there are steam or diesel locomotives in operation.

- Arun District Council contains no major rail lines identified in Table 5.1 (LAQM TG (09)).
- Arun District Council does not have any location in 2008 within its area with a background concentration of nitrogen dioxide higher than $25 \mu\text{g}/\text{m}^3$. (refer to para 5.24 LAQM TG(09)) The maximum background nitrogen dioxide concentration in 2008 is $17.2 \mu\text{g}/\text{m}^3$. (ref: NAEI, Arun D.C. background data 2008 www.airquality.co.uk/archive/tools.php)

4.2.1 Stationary Trains

Arun District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Arun District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Arun District Council borders onto the English channel with one harbour at Littlehampton, however this port does not have significant numbers of ship movements. Littlehampton's harbor traffic is predominantly pleasure craft with some aggregate loader ships (approx. 50 per year).

Arun District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

Industrial sources of emissions are set out in Appendix E. There are no significant changes in emissions from existing process nor have there been additional new sources of emissions within or neighbouring the district.

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Several installations, for which an Air Quality Assessment was required, have been given permission to operate since the last review and assessment.

- Cliniserve Ltd waste treatment plant, Littlehampton. This was permitted to operate by the Environment Agency from 02/04/2008. The permit to operate falls under Integrated Pollution Prevention and Control (IPPC) regulations (2000) and has had an air quality assessment made under the permit. **No further action is required.**
- Midmar Energy Onshore Ltd - oil well, Lidsey. The air quality impact from this process is of no concern. The site monitors and controls emission of hydrogen sulphide (H₂S). This pollutant does not fall under LAQM. **No further action is required.**
- Viridor Waste Management – Materials Waste Facility, Ford. The planning permission to operate was granted in 2008. An air quality assessment was undertaken as part of the application. The assessment showed no significant air quality impacts were likely from the operations or vehicle movements to and from the site. **No further action is required.**

No new or proposed installations have been made in the adjacent councils, Chichester, Horsham and Worthing, which would impact on Arun district.

Arun District Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment..

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

No existing installations have increased emissions from processes.

No addition relevant exposures have been introduced since the review and assessment.

Arun District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

There are no new/proposed industrial installations in the district.

Arun District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) Storage depots in the district.

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Arun District Council has 11 licensed petrol stations operating within its area, (*refer to Appendix E for Industrial Sources list*). The assessment for the petrol station follows:

There are few roads in the district which exceed 30,000 (AADT) vehicles per annum and only one petrol station is located near to one of these, the Shell Fontwell petrol station, adjacent to the A27. (*Refer to Appendix D for AADT of major roads and Appendix E for the list of petrol stations.*)

Shell Fontwell petrol station:

- The station is adjacent to the A27, which at this location had an AADT flow of 40,860 in 2008.
- Shell Fontwell uses Stage 2 recovery.
- The through put of petrol for this station is in excess of 3.5 million litres.
- There is no relevant exposure within 10m of these stations pumps. The nearest relevant location of exposure is 35m to the nearest house. A Travel-Inn hotel is closer at 15m, however this is not a location of relevant exposure.

**Shell Fontwell does not meet the specified criteria for a further assessment.
No further action required.**

Arun District Council confirms that there are no petrol stations meeting the specified criteria.

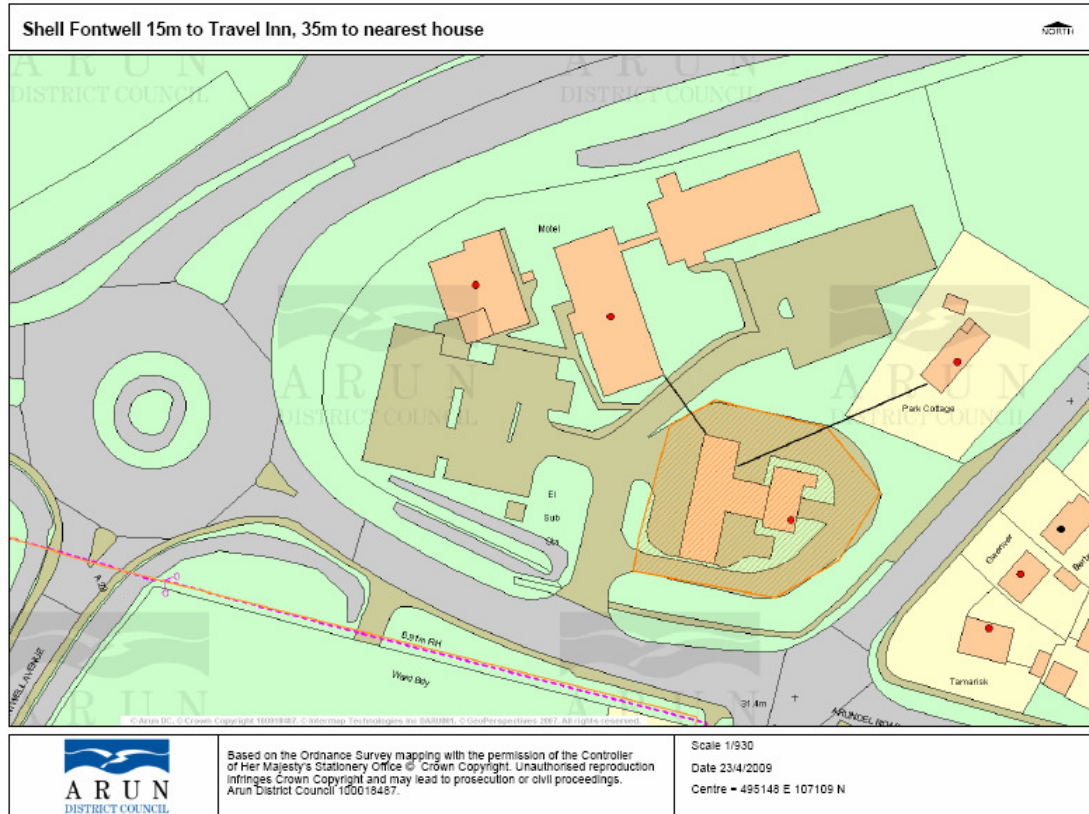


Figure 3. Shell Fonwell petrol station and nearest relevant exposure locations.

5.4 Poultry Farms

Arun District Council contains no significant poultry farms within its area.

Arun District Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Arun District Council has had 2 planning permission applications for Biomass combustion within it's area. These units burn biomass in 50kW to 20MW units. The assessments for these are detailed in Appendix F.

The assessment determined that these biomass plants need no further detailed assessment.

Arun District Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

The combined impact of biomass combustion was assessed in the semi commercial area of Littlehampton, refer to Appendix G: Combined biomass assessment.

The emission density from the combined biomass installation is 169 kg/year, this is significantly below the threshold of 7,000 kg/year for the assessed area.

There is no requirement to undertake a further detailed assessment.

Arun District Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

No areas within the district were identified as having significant coal burning, defined as any area of about 500x500 with more than 50 houses burning coal/smokeless fuel as their primary source of heating.

Arun District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

No locations of signification have been identified in previously review and assessments. No new sources or relevant exposures have been introduced since the last review and assessment.

Arun District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

New monitoring data for 2008 has shown that there are no areas likely to exceed the air quality objectives in Arun district.

Monitoring with NO₂ diffusion tubes at background sites (Figure 1) has shown to be consistent with the NAIE mapped background concentrations (17 µg/m³). Most locations have stayed between 15 - 20 µg/m³ over the last 5 years monitoring.

Monitoring with NO₂ diffusion tubes at roadside sites (Figure 2), since 2003 initially showed a slight decline but now levelled off to range between 20 - 40 µg/m³. The location with the highest measured concentration, the Causeway near Arundel, did measure an exceedance of the objective at 40.1 µg/m³. However as since 2004 a duplicate diffusion tube has been co-located to provide a more robust measurement method. This duplicate (second tube) measured below the NO₂ objective, with an annual mean of 36.6µg/m³. The averaged annual measured concentration for both diffusion tubes at the Causeway was 38.35µg/m³, which is below the objective.

No further Detailed Assessment required.

8.2 Conclusions from Assessment of Sources

The review and assessment of air quality for Arun District Council in 2008, has identified no new likely sources of emissions to air which are likely to lead to further detailed assessments.

The major roads in the district showed no significant changes in traffic flows, in fact some declined in flows since 2007. This occurred across West Sussex County Council managed roads as well as the Highways Agency managed network roads. In addition no new roads have been built or altered since the last review and assessment.

There were no other transport sources which required further assessment. These include airports, railways, ports and shipping.

There were no industrial sources which required further assessments. Some new industrial installations were given planning permission since the last review and assessment. These new installations require no further detailed assessment.

One petrol station was identified as being within the criteria distance of a major road with over 30,000 vehicles (AADT). This station has no relevant exposure within the criteria distances and therefore required no further detailed assessment.

There were two biomass installations assessed as part of this USA 2008. The assessment identified that the emissions from these biomass installations were not likely to breach air quality objectives. An assessment of the combined biomass appliances also determined that there would be no likely exceedances of air quality objectives. Therefore no further detailed assessment is required.

No further Detailed Assessment required.

8.3 Proposed Actions

The Updating and Screening Assessment for 2009 has identified no likely measured exceedences of the air quality objectives.

Arun District Council will continue to monitor at locations which are determined to be relevant locations of exposure to air pollutants. The council will also utilise data from neighbouring authorities within the Sussex Air Quality Partnership Network and have access to the Sussex County Air Quality Laboratory for monitoring any new locations which may be determined a risk in the future.

The assessments for newly introduced processes/installations in TG 09, such as biomass and solid fuel burning, indicated that there are no likely exceedences.

The monitoring of new biomass applications will now be undertaken and new guidance will be utilised to review new applications, such as the draft Biomass guidance document (from EPuk and LACORS).

Arun District Council will be submitting a Progress Report in 2010.

9 References

- | | |
|---------------|--|
| DEFRA (2009) | Local Air Quality Management Technical Guidance, (LAQM .TG (09)) |
| DEFRA (2009) | Local Air Quality Management Policy Guidance, (LAQM .PG (09)) |
| | The Environment Act (1995) |
| | The Environmental Protection Act (1990) |
| EMEP/CORINAIR | Emissions Inventory Guidebook 2006 |
| DEFRA | Technical Guidance: Screening assessment for biomass boilers |

Appendices

Appendix A: QA/QC Data

Appendix B: Location Maps

Appendix C: Fall-off calculations for nitrogen dioxide (with distance from the road).

Appendix D: Major road AADT traffic count data in Arun District Council

Appendix E: Industrial Sources (LAPC)

Appendix F : Biomass calculations

Appendix G: Combined biomass assessment

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Arun District Council utilises the national bias adjustment figures for the laboratory it contracts to supply and analyse the results.

Data from the NO₂ diffusion tubes has been compared and bias corrected to the factors produced from the UK co-location data-base as produced by University of West of England (UWE) on behalf of DEFRA. www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube270209.xls

The NO₂ tube preparation method used is 50% triethanolamine (TEA) in acetone.

The supplier is the South York Laboratory

The bias adjustment factor for the South Yorkshire Laboratory in 2008 = 0.99.

Factor from Local Co-location Studies (if available)

Arun District Council undertakes no co-location studies

QA/QC of diffusion tube monitoring

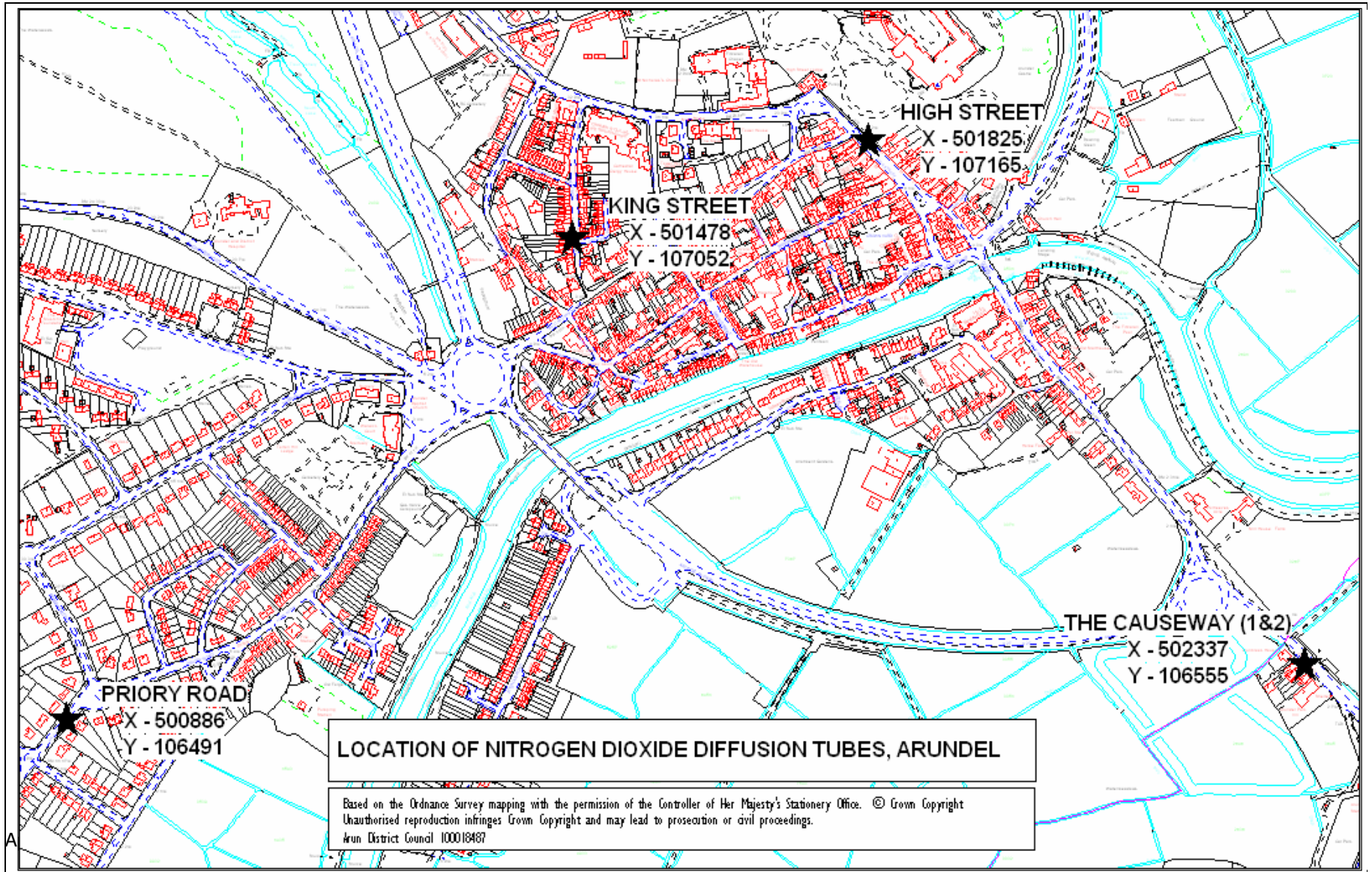
South Yorkshire Laboratory participate in the Workplace Analysis Scheme for Proficiency (WASP) and for the period April 2007 – April 2008, received a “Good” rating in both old and new criteria.

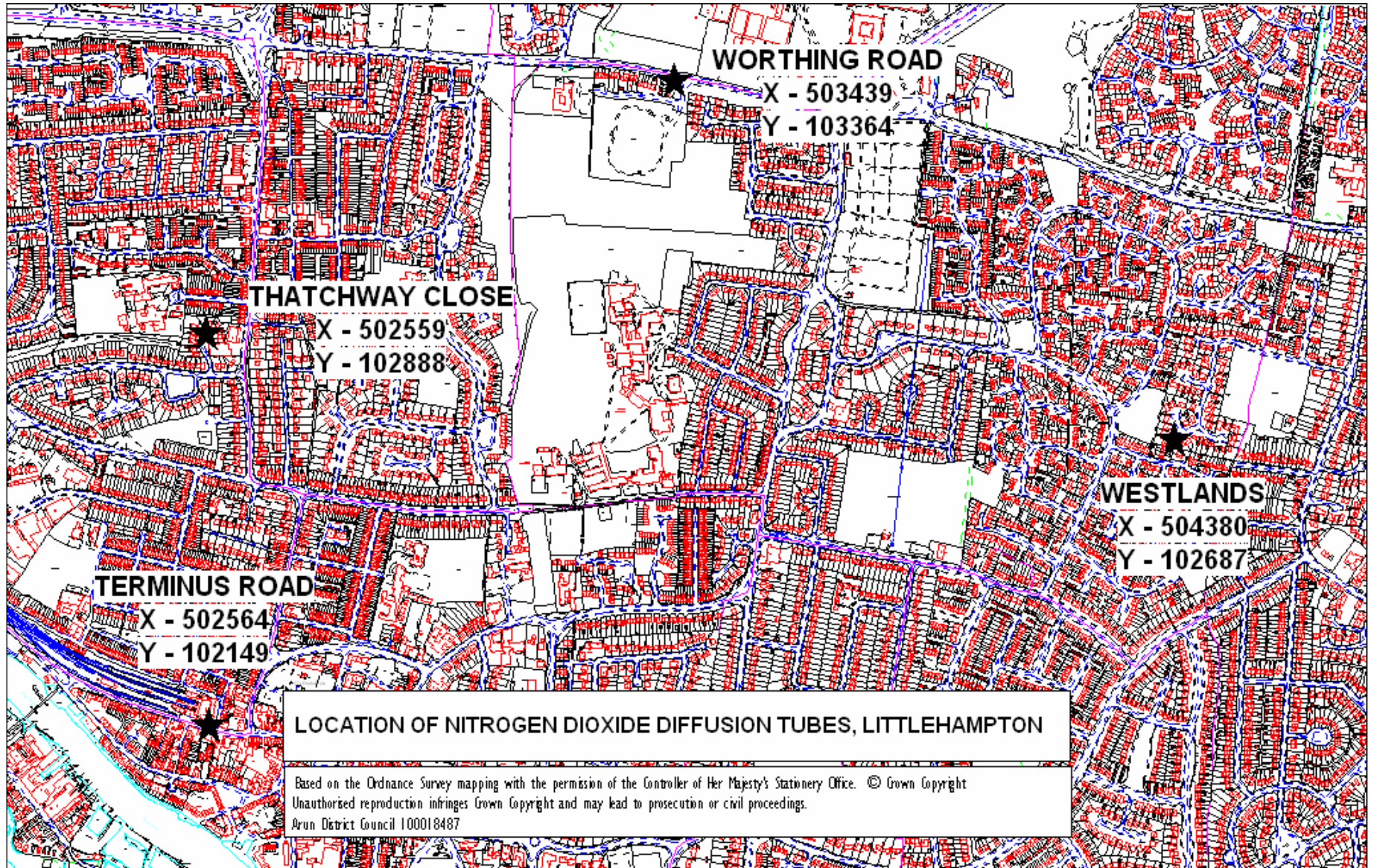
South Yorkshire Laboratory participate in the Workplace Analysis Scheme for Proficiency (WASP) and for the period April 2007 – April 2008, received a “Good” rating in both old and new criteria.

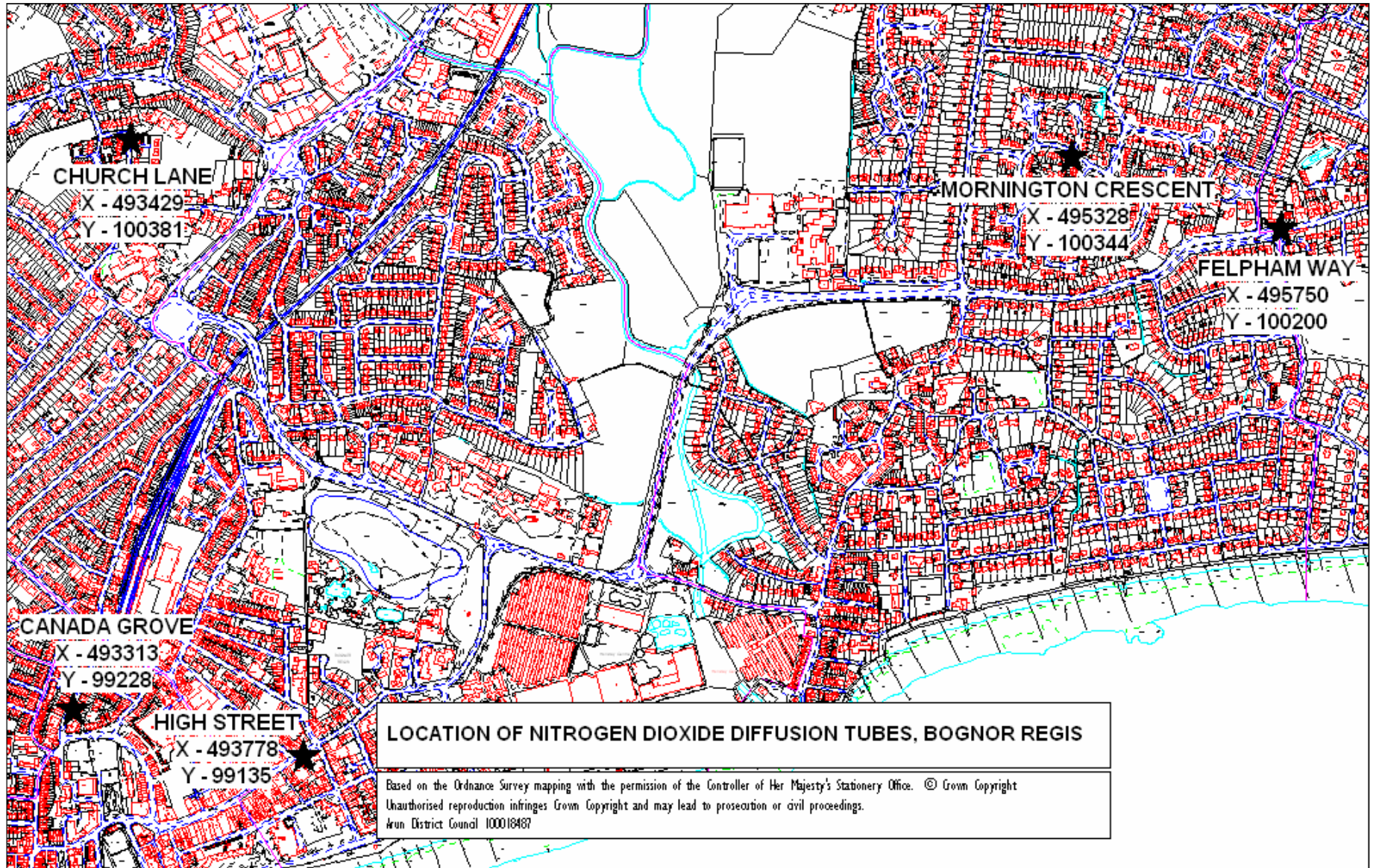
Appendix B: Location Maps

Distribution of Nitrogen Dioxide Diffusion Tubes

The location of nitrogen dioxide (NO₂) diffusion tubes in Arun district are shown on following pages:







Appendix C: Fall-off calculations for nitrogen dioxide (with distance from the road).

Step 1:

Identify local background concentration in $\mu\text{g}/\text{m}^3$ (Source: www.airquality.co.uk).

Local background concentration for NO_2 = $11.16 \mu\text{g}/\text{m}^3$

Closest background grid square reference source = 502500, 111500.

Location of diffusion tube = 502337, 106555.

Step 2:

Apply the calculation:

$$CZ = ((C_y - C_b) / (-0.5476 \times \ln(D_y) + 2.7171)) \times (-0.5476 \times \ln(D_z) + 2.7171) + C_b$$

Where:

C_z is the total predicted concentration ($\mu\text{g}/\text{m}^3$) at distance D_z ;

C_y is the total measured concentration ($\mu\text{g}/\text{m}^3$) at distance D_y ;

C_b is the background concentration ($\mu\text{g}/\text{m}^3$);

D_y is the distance from the kerb at which concentrations were measured; and

D_z is the distance from the kerb (m) at which concentrations are to be predicted.

$\ln(D)$ is the natural log of the number D .

$$CZ = ((40.1 - 11.2) / (-0.5476 \times \ln(1) + 2.7171)) \times (-0.5476 \times \ln(8) + 2.7171) + 11.2$$

$$\underline{CZ = 28.0 \mu\text{g}/\text{m}^3}$$

Where:

$C_y = 40.1 \mu\text{g}/\text{m}^3$

$C_b = 11.2 \mu\text{g}/\text{m}^3$

$D_y = 1 \text{ m}$

$D_z = 8 \text{ m}$

Appendix D: Major road AADT traffic count data in Arun District Council

Table D1: Major roads in Arun District Council.

Road	Location	ID (HA ref)	2007 AADT (*HA 2007)	2008 AADT (*HA Trads)	Difference
A27	Worthing - Patching	5214/5213	*26162	*25077	-1085
A27	Patching – B2225	407/408	*29998	*29579	-419
A27	B225 – Crossbush	30013124/5	*30098	*30097	-1
A27	Lyminster Rd/Station/Causeway Arundel (284-284)	30013129/8	*33149	*32352	-797
A27	Arundel bypass	30013134/5	*30548	*29865	-683
A27	Chichester Rd – B2132(Walberton)	411/412	*27864	*27031	-833
A27	B2132 – Fontwell	30013136/7	*42082	*40860	-1222
A27	Fontwell – Chichester border	30013132/3	*40747	*39378	-1369
A259	A2031 Junction – Ferring Lane		37121	No count	
A259	Ferring Lane – B2140		40294	30871	-9423
A259	Roundstone Bypass		25144	26254	1110
A259	B2140 Junction – B2187		No count	29752	
A259	B2187 Junction – Watersmead		26699	25792	-907
A259	Watersmead - Toddington Lane		26582	No count	
A259	Toddington Lane – B284		29743	No count	
A259	B284 Junction (Wick) – B2187		No count	21094	
A259	B2187 Junction – Church Lane		29275	26864	-2411
A259	Church Lane Junction – B2233		25762	20529	-5233
A259	Grevatts Lane		17094	16893	-201
A259	Felpham Way – Summerly Lane		24638	23780	-858
A259	Felpham Way		31383	22512	-8871
A259	Upper Bognor Rd		25469	No count	
A259	Hotham Way		23713	No count	
A259	A29 Junction – Orchard Way		24432	No count	
A259	Orchard Way – North Bersted		18583	No count	
A259	North Bersted - Chi.DC Border		23813	22684	-1129

Reference: Data sources

A27 - Jacobs Babbie for the Highways Agency (Area 4), 2007 HA report and HA Trads database (2008).

A259 – West Sussex County Council.

Appendix E: Industrial Sources

Table E1: Process installations in Arun District Council

PROCESS/INSTALATION	ADDRESS OF INSTALLATION/PROCESS
Part B/A2	
Roadstone Coating Plant	Tarmac Southern Ltd., Quayside, Littlehampton, West Sussex, BN17 5DD
Production of Formed Concrete Blocks	Tarmac Topblock Ltd., Ford Aggregate Works, Ford Airfield Industrial Estate, Yapton, Nr Arundel, West Sussex, BN18
Cremation of human remains	The Worthing Crematorium, Horsham Road, Findon, West Sussex
Waste wood combustion	Eurotek Office Furniture Ltd, Southern Cross Trading Estate, Bognor Regis, West Sussex, PO22 9SB
Breeding of Maggots	Marine Pack Ltd., T/A National Bait Company, Lidsey Farm, Lidsey, West Sussex
Aluminum Foundry Process	Finecast Foundry Ltd, Unit 1, Lineside Way, Lineside Industrial Estate, Littlehampton, West Sussex BN17
Respraying of Road Vehicles	
Respraying of Road Vehicles	Poling Motor Company, Fordingbridge Industrial Estate, Barnham Road, Barnham, West Sussex, PO22 0HD
Small Waste Oil Burner	
Small Waste Oil Burner	Bognor Garage/J & S Motors, Shripney Road, Bognor Regis, West Sussex, PO22 9NJ
Small Waste Oil Burner	Chris Clarke Cars, Spencer Street, Bognor Regis, West Sussex, PO22 1AN
Small Waste Oil Burner	Arundel Road Garage, Arundel Road, Angmering, West Sussex, BN16 4JZ
Small Waste Oil Burner	Yeomans Honda, Chichester Road, Elbridge, Chichester, West Sussex, PO21 5EH
Small Waste Oil Burner	Yeomans Honda, Chichester Road, Elbridge, Chichester, West Sussex, PO21 5EH
Small Waste Oil Burner	Marina Workshop, Littlehampton Marina, Ferry Road, Littlehampton, West Sussex, BN17 5DS
Petrol Stations (through put of petrol if available)	
Unloading of Petrol into Storage (m ³ /annum)	Rose Green Service Station, Hewarts Lane, Bognor Regis, West Sussex, PO21 3DS
Unloading Petrol into Storage (m ³ /annum)	Pace Petrol Filling Station, 97, Felpham Way, Bognor Regis, West Sussex, PO22
Unloading Petrol into Storage (m ³ /annum)	Pace Petrol Filling Station, Nyton Road, Westergate, Chichester, West Sussex, PO20 8QB
Unloading Petrol into Storage (m ³ /annum)	Tesco Stores Limited, Broadpiece, Littlehampton, West Sussex, BN17 5RA
Unloading Petrol into Storage (m ³ /annum)	Tesco Stores Limited, Shripney Road, Bognor Regis, West Sussex, PO22 9ND

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Unloading Petrol into Storage (m ³ /annum)	Shell Eastfield, Rustington Bypass, Rustington, Littlehampton, West Sussex, BN17 6LE
Unloading Petrol into Storage (m ³ /annum)	Shell Fontwell, Arundel Rd, Fontwell, BN18 OSB
Unloading Petrol into Storage (m ³ /annum)	Rustington Filling Station, 102, Worthing Road, Rustington, Littlehampton, West Sussex, BN16 3LS
Unloading Petrol into Storage (m ³ /annum)	Snax 24 Ltd, Lyminster Road, Lyminster, Littlehampton, West Sussex
Unloading Petrol into Storage (m ³ /annum)	Regis Service Station, 449 Chichester Road, Bognor Regis, West Sussex, PO21 5DS
Unloading Petrol into Storage (m ³ /annum)	Cuff Miller & Co (Littlehampton) Ltd, Horsham Road, Littlehampton, BN17 6BX
Dry Cleaners	
Dry Cleaners	Sandra's Village Laundry & Dry Cleaners, 146 Sea Road, East Preston, BN16 1NN
Dry Cleaners	Colshaz Limited, T/A James Dry Cleaners, 39a Queensway, Bognor Regis, PO21 1QN
Dry Cleaners	East Preston Laudrette, 132 Downs Way, East Preston, BN16 1AF
Dry Cleaners	Johnson Cleaners UK Ltd, 166 The Street, Rustington, BN16 3DA
Dry Cleaners	Johnson Cleaners UK Ltd, 2 Central Buildings, London Road, Bognor Regis, PO21 1PW
Dry Cleaners	Kingfisher Cleaners, Shop 3 Station Parade, Station Road, East Preston BN16 3AE
Dry Cleaners	Beach Road Dry Cleaners, 4 Beach Road, Littlehampton, BN17 5HT

Appendix F: Biomass calculations

This section covers the calculation for commercial and domestic sources of biomass, set out in Box 5.8: Updating and Screening Checklist.

(D) Commercial and domestic sources D.1a Biomass combustion – Individual installations

Approach

Step 1:

Identify plant burning biomass in 50kW to 20MW units.

Step 2:

Obtain information to assess emissions to air

Step 3:

Calculate emission rates

Step 4:

Calculate effect stack height

Step 5:

Use nomograms to determine whether the source requires further assessment

Step 1:

Two existing installations have been identified.

1. Eurotek Office furniture, Bognor Regis
2. Matchboard International, Littlehampton.

Step 2:

	Eurotek	Matchboard
Stack height/effective	18.0m	8.64m
Diameter of stack	275mm	300mm
Dim's buildings within 5x stack height (lxwxh).	Building 1: 25m x 50m x 3.5m Building 2: 25m x 50m x 3.5m Building 3: 50m x 20m x 3.5m	Building 1: 60m x 25m x 3.5m
Combustion appliance	143kW	"TalbottsC4" 389kW unit 1,000,000 btu/hr 90 kg/hr, chipboard, MFC, MDF, shavings and sawdust. 18.6MJ/kg
Max emission rates:		
PM10	= 0.1023 g/sec	= *0.027 g/sec
NO2	= * 0.04125 g/sec	= *0.027 g/sec

*Calculation of emission rates from EMEP/CORINAIR Emissions Inventory Guidebook 2006 and Technical Guidance: Screening assessment for biomass boilers

Step 3:

	Eurotek	Matchboard
Background-adjusted emission rates:		
PM10	$\frac{E}{(32-G)}$	$\frac{E}{(32-G)}$
	= 0.1023 / (32- 17)	= 0.072 / (32- 17)
	= 0.0068	= 0.002
NO2	$\frac{E}{(40-G)}$	$\frac{E}{(40-G)}$
	= 0.04125 / (40- 13)	= 0.027 / (40- 13)
	= 0.0015	= 0.001
NO2, 1-hour mean	$\frac{40E}{(200-2G)}$	$\frac{40E}{(200-2G)}$
	=0.04125 / (200- 26)	= 0.027 / (200- 26)
	= 0.00024	= 0.00015

Step 4:

	Eurotek	Matchboard
Effective stack height	= 18m	= 8.64

Step 5:

	Eurotek		Matchboard	
	Nomogram result	Background-adjusted emission rates	Nomogram result	Background-adjusted emission rates
PM10	= 0.0175 g/s	= 0.0068	= 0.003 g/s	= 0.002
NO2	= 0.045 g/s	= 0.0015	= 0.011 g/s	= 0.001
NO2, 1-hour mean	= 0.11 g/s	= 0.00024	= 0.06 g/s	= 0.00015

Conclusion

	Eurotek	Matchboard
Conclusion		
PM10	Background adjusted emission rate is lower than threshold emission rate = No further action required	Background adjusted emission rate is lower than threshold emission rate = No further action required
NO2	Background adjusted emission rate is lower than threshold	Background adjusted emission rate is lower than threshold emission rate

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	emission rate = No further action required	= No further action required
NO2, 1-hour mean	Background adjusted emission rate is lower than threshold emission rate = No further action required	Background adjusted emission rate is lower than threshold emission rate = No further action required

Appendix G: Combined biomass assessment

Following the guidance in TG(09) the assessment for combined biomass was undertaken.

Approach

Step 1:

- Identify 500m x 500m area in district, which are likely to be burning biomass fuels, domestically and commercially.
- = Littlehampton. NW sector of town bordered by the River Arun.

Step 2:

- The area is urban with 1x school and commercial sector (30%).
- 1x biomass installation (Matchboard Ltd) 398kW, 1 x school (advanced) boiler (school = 0.25hect) and domestic heating appliances (fireplaces), estimated at 20.

Step 3:

Estimate PM10 emissions

- Residential area = 20 x 27.43 = 548.6 kg
- School = 0.25 x 295 = 73.75 kg
- Commercial = 1 x 1074 = 1074 kg

Total = 1696 kg

Step 4:

Estimate the fraction of area within 500m x 500m square occupied by solid fuel burning and estimate emissions density.

- Area occupied by solid fuel burning = 10% (max)
- Emissions density: = 1,696 x 0.1 = 169 kg/year

Step 5:

Assess emissions density against background concentration to determine if contribution exceeds threshold emission density:

- Background concentration for PM10 = 17 µg/m³
- Threshold emissions rate for 17 µg/m³ = 7000kg/year

The emission density from the combined biomass installation is 169 kg/year, this is significantly below the threshold of 7,000 kg/year.

There is no requirement to undertake a further detailed assessment.