

This section is an extract of the Ambient Air Quality Assessment conducted in 1996 and 1997/8 against guidelines applicable at the time. This document was in Annex A of the IPC Application.

It presents a description of the ambient air quality in the region of Chineham. Current concentrations of atmospheric pollutant concentrations can be used as a useful guide to the ambient air quality in the next ten years.

Concentrations of ambient pollutants vary according to both time and location. For example, concentrations of nitrogen dioxide tend to be higher in urban rather than rural areas with peak concentrations coinciding with peak traffic movements. On the other hand, maximum ozone concentrations usually occur in rural locations in the late afternoon during the summer. The location of the higher ozone concentrations depends on the wind speed and direction prevailing at the time. The reaction of the primary pollutants to form ozone takes time and during this time the primary pollutants may be blown some distance from their sources. Pollutant concentrations are affected by many factors, the most significant being the size, number and location of the sources of emissions and the prevailing weather.

Given the large degree of variation of pollutant concentrations, both with time and location, it is desirable to make measurements over a period of time that is long enough to ensure that a complete range of meteorological conditions have been experienced. Hampshire Waste Services (HWS) commissioned a year long period of monitoring in Hampshire at various sites, including five around the site of the proposed ERF. This monitoring programme has included a mobile monitoring trailer, capable of measuring hour-by-hour concentrations of the following pollutants:

- nitrogen dioxide (NO₂);
- nitric oxide (NO);
- sulphur dioxide (SO₂);
- carbon monoxide (CO);
- fine particulate matter (PM₁₀);
- total volatile organic compounds.

Time integrated measurements of the following pollutant concentrations have also been made:

- total suspended particulate matter (TSP);
- hydrogen chloride (HCl);
- mercury (Hg, vapour phase);
- trace metals as particulate matter;
- poly-cyclic aromatic hydrocarbons (PAH);
- dioxins and furans (PCDDs and PCDFs);
- NO₂, SO₂, benzene, toluene, ethylbenzene and xylene by diffusion tube.

In addition, samples of soil and grass have been taken from around the proposed ERF site and analysed for concentrations of metals and dioxins/furans.

The monitoring site locations were as follows, with dates for the period of sampling using the mobile trailer:

Sewage Treatment Works (CSTW)	SU677552	13 March 1997 to 10 April 1997.
Wildwood Cottage (CWWC)	SU675538	(diffusion tubes only)
Wildwood Farm (CWWF)	SU675536	19 December 1996 to 17 January 1997
North Foreland Lodge School (CNFL)	SU679571	26 September 1996 to 24 October 1996. And 5 June 1997 to 3 July 1997
Four Lanes Schools (CFLS)	SU658554	31 July 1997 to 28 August 1997.

The sites were chosen to describe the existing environmental conditions in the vicinity of the proposed facility. The sampling site selection criteria adopted to achieve this objective included:

- sites representative of a range of the ground level concentrations likely to occur in the locality;
- sites representative of sensitive receptors;
- distributions of ground level concentrations as a result of the proposed facility as predicted using dispersion modelling;
- relatively undisturbed sites with no history of use by polluting industries;
- areas that, as far as practicable, are not impacted by a dominant existing source such as traffic or industrial plant (other than the existing incinerators);
- consideration of existing air quality monitoring data sources;
- sampling sites likely to be available for monitoring in the foreseeable future.

For the air sampling locations, access to a secure, safe power supply and security from vandalism were also fundamental considerations. Sites meeting these criteria included schools, secure leisure facilities, farms (which often represent secure, unpolluted sites) and secure business premises.

Figure D3.1 shows the locations of the monitoring sites.

Additional information is also available in the more detailed monitoring reports (Background Monitoring Reports) prepared as part of the monitoring programme (1) and in the Summary Report (2) prepared for the Integra North site.

The baseline air quality for Integra North presented in this section draws on the following sources of information:

- The HWS monitoring programme;
- the UK urban air automatic monitoring networks (3);
- the national nitrogen dioxide diffusion tube survey;
- the national smoke and sulphur dioxide survey; and
- Environment Agency on dioxins and metals in soils (4)(5).

HWS MONITORING PROGRAMME

D3.1

In this section the results of the mobile monitoring around the proposed ERF location are presented and discussed. Measurements made using the mobile monitoring laboratory have been compared to air quality standards in place at the time of the study. There have been subsequent changes to a number of standards, such as the 200 µg m³ hourly standard for nitrogen dioxide, which changed from a 98th percentile to a 99.8th percentile. However the statistics were calculated for the previous standards, and are presented as such in this report. Nevertheless they provide a useful assessment of current concentrations. This comparison is presented in Tables D3.1 to D3.6, for nitrogen dioxide, sulphur dioxide, total suspended particulate matter, PM₁₀, carbon monoxide and dioxins/furans.

- (1) ERM Background Monitoring Report: Air Quality, Soils and Vegetation First Report (January 1997), Third Report (May 1997), Fourth Report (June 1997), Sixth Report (November 1997) and Seventh Report (June 1998).
- (2) ERM (June 1998) Background Monitoring of Air Quality, Soils & Vegetation: Summary Report for Integra North.
- (3) www.aeat.co.uk/necen/agarwchive/archome.html
- (4) Environment Agency (August 1997) A Study of Dioxins and Trace Metals in Soil Around Four Municipal Waste Incinerators in Hampshire - Part 1: PCDDs and PCDFs HO-7/97-160-C-AZLM.
- (5) Environment Agency (September 1997) A Study of Dioxins and Trace Metals in Soil Around Four Municipal Waste Incinerators in Hampshire - Part 2: Trace Metals HO-7/97-210-C-AZLM.

Comparison has been made to air quality standards from the following:

- European Commission (EC) Directive limit and guide values;
- the World Health Organization (WHO) guidelines;
- the UK Air Quality Strategy (AQS) objectives;
- the Expert Panel on Air Quality Standards (EPAQS) guidelines.

Where air quality standards do not exist comparison has been made to typical UK background concentrations. In each case the monitored data are presented in the same statistical form as the air quality standard. However, it should be noted that the period of monitoring at each site was for a relatively short period relative to the averaging periods over which some air quality standards should be strictly applied, eg some standards relate to measurement periods of a year. Consequently, any comparison with these standards is a useful indication of compliance, but may not necessarily indicate compliance were monitoring to be carried out for the full relevant averaging period.

D3.1.1 Nitrogen Dioxide

A comparison of nitrogen dioxide measurements with air quality standards and guidelines is presented in Table D3.1.

Table D3.1 Comparison of Monitored Nitrogen Dioxide Data Near Chineham with Standards and Guidelines ($\mu\text{g m}^{-3}$) (a)(b)

Organisation	Standard or Guideline	CNFL (Sep/Oct)	CWWF (Dec/Jan)	CSTW (Mar/Apr)	CNFL2 (June)	CFLS (August)
EC limit/guide value ^(c)	200 ^(d)	50 (25%)	68 (34%)	63 (32%)	47 (23%)	68 (34%)
1997 NAQS (annual mean)	40	24 (60%)	35 (88%)	25 (63%)	20 (50%)	26 (65%)
WHO (1 hour)	200	61 (31%)	84 (42%)	84 (42%)	72 (36%)	82 (41%)
1997 NAQS (1 hour)	287	61 (31%)	84 (42%)	84 (42%)	72 (36%)	82 (41%)
EPAQS (1 hour)	287	61 (21%)	84 (29%)	84 (29%)	72 (25%)	82 (29%)

(a) The monitored values are expressed statistically in the same way as the standard or guideline.

(b) Figures in parentheses represent the percentage of the relevant air quality standard.

(c) The monitored value is the 98th percentile of hourly means measured over one month; the standard is based on a year of measurements.

(d) The EU objective allows 18 exceedences per year.

During the five monitoring periods, concentrations of nitrogen dioxide were within all of the relevant air quality standards and guidelines. For the majority of the air quality standards the measured concentrations were less than half the appropriate standard. Measured concentrations of nitrogen dioxide were in excess of half the NAQS objective, particularly at the CWWF.

A comparison of total suspended particulate matter and PM₁₀ measurements with air quality standards and guidelines is presented in Table D3.3 and Table D3.4, respectively.

Total Suspended Particulate Matter and PM₁₀

D3.1.3

(a) The monitored values are expressed statistically in the same way as the standard or guideline.
(b) Figures in parentheses represent the percentage of the relevant air quality standard.
(c) Directive is applicable until 22/4/2001. The monitored value is the median of daily means measured over one month; the standard is based on a year of measurements.
(d) Directive is applicable from 22/4/2001. The monitored value is the maximum daily mean measured over one month; the standard is based on a year of measurements and allows 24 exceedences per year.
(e) The monitored value is a 15-minute mean concentration.
(f) 99.9th percentile of 15 minute mean concentrations.

Organisation	Standard or Guideline	POEC (Aug/Sep)	PSFS (Nov/Dec)	PSFS (Feb/Mar)	PSFS2 (May/Jun)	PMFS (July)
EC limit	120	8	13	6	7	4
value(c)	(7%)		(11%)	(5%)	(6%)	(3%)
EC limit	350	17	37	12	10	17
value(d)	(5%)		(11%)	(3%)	(3%)	(5%)
WHO (10 minute)(e)	500	53	107	48	98	78
value(e)	(11%)		(21%)	(10%)	(20%)	(16%)
EPAQS	267	53	107	48	98	78
value(f)	(20%)		(40%)	(18%)	(37%)	(29%)
NAQS	267	39	104	46	28	67
value(f)	(15%)		(39%)	(17%)	(10%)	(25%)

Table D3.2 Comparison of Monitored Sulphur Dioxide Data Near Chineham with Standards and Guidelines ($\mu\text{g m}^{-3}$)(a)(b)

D3.1.2

A comparison of sulphur dioxide measurements with air quality standards and guidelines is presented in Table D3.2. Measured concentrations of sulphur dioxide were well within the air quality standards and guidelines at all of the five monitoring locations.

Sulphur Dioxide

D3.1.2

However, monitoring at the CWWF site was undertaken during the winter months (December and January) when concentrations of nitrogen dioxide are expected to be higher (due to higher emissions and lower removal rates in the winter). Therefore, the measurements made at CWWF during the four week period would not be representative of measurements made throughout the year.

Table D3.3 Comparison of Monitored Total Suspended Particulate Data Near Chineham with Standards and Guidelines ($\mu\text{g m}^{-3}$)(a)(b)

Organisation	Standard or Guideline	CNFL (Sep/Oct)	CWWF (Dec/Jan)	CSTW (Mar/Apr)	CNFL2 (June)	CFLS (August)
EC guide value (c)	150	20 (13%)	37 (25%)	32 (21%)	21 (14%)	32 (21%)

(a) The monitored values are expressed statistically in the same way as the standard or guideline.

(b) Figures in parentheses represent the percentage of the relevant air quality standard.

(c) Directive is applicable until 22/4/2001. The monitored value is the arithmetic mean of daily mean values over one month; the standard is based on a year of measurements.

Table D3.4 Comparison of Monitored PM₁₀ Data Near Chineham with Standards and Guidelines ($\mu\text{g m}^{-3}$)(a)(b)

Organisation	Standard or Guideline	CNFL (Sep/Oct)	CWWF (Dec/Jan)	CSTW (Mar/Apr)	CNFL2 (June)	CFLS (August)
EPAQS (24 hour running mean)	50	27 (54%)	68 (136%)	32 (64%)	22 (44%)	53 (106%)
Four week mean		15	22	19	14	21
PM ₁₀ as a % of TSP		73%	59%	58%	65%	66%

(a) The monitored values are expressed statistically in the same way as the standard or guideline.

(b) Figures in parentheses represent the percentage of the relevant air quality standard

Total suspended particulate matter concentrations are well within the EU Directive guide value at all of the five monitoring sites.

The EPAQS guideline for fine particulate matter (PM₁₀) is exceeded at the CWWF and at the CFLS sites. At the CWWF site, the guideline is exceeded on two days and for one day at the CFLS site.

The EPAQS guideline is particularly stringent and exceedance of the guideline occurs frequently throughout the UK. At the Southampton AUN monitoring site, the EPAQS guideline was exceeded on 313 occasions, during 26 days in 1996. Furthermore, as indicated from the comparison of concentrations measured around the site with the concentrations measured in Southampton the exceedance of the EPAQS guideline is a national/regional problem, rather than a local issue.

D3.1.4 Carbon Monoxide

A comparison of carbon monoxide measurements with air quality standards and guidelines is presented in Table D3.5. Measured concentrations at all of the five monitoring sites are well within the EPAQS and the WHO guidelines.

Table D3.5 Comparison of Monitored Carbon Monoxide Data Near Chineham with Standards and Guidelines (mg m⁻³)^(a)

Organisation	Standard or Guideline	CNFL	CWPF	CSTW	CNFL2	CFLS
EPAQS (8 hour running mean)	11.7	4.2	2.0	0.8	0.3	1.3
WHO (1 hour)	29	9.1	2.5	1.5	0.4	2.0
(a) The monitored values are expressed statistically in the same way as the standard or guideline.						

D3.1.5 Dioxins and Furans

A comparison of dioxin and furan measurements with rural and urban background air quality is presented in Table D3.6. Measured concentrations at all of the monitoring locations are significantly lower than measured in urban environments. Measured concentrations have also been compared to a rural data set of dioxin/furan concentrations obtained from Hazelrigg near Lancaster. Concentrations of dioxins/furans measured around the proposed Integra North facility site were, on occasions higher than those measured around the Hazelrigg site.

Table D3.6

Comparison of Monitored Dioxin/Furan Data Near Chineham with Background Data (fg I-TEQ m⁻³)

Four week mean	(Sep/Oct)	(Dec/Jan)	(Mar/Apr)	(June)	(August)
% of rural background (a)	88%	124%	48%	24%	76%
% of urban background (b)	19%	27%	11%	5%	17%
(a) Rural background of 33 fg I-TEQ m ⁻³ (Hazelrigg 1993 to 1995) (1)					
(b) Urban background of 150 fg I-TEQ m ⁻³ (mid range of data measured at London, Cardiff, Manchester and Middlesbrough) (1)					

D3.1.6 Metals

A comparison between trace metal data measured in and around the proposed Integra North facility site with typical UK background levels in Table D3.7.

Table D3.7 Comparison of Monitored Trace Metal Data Near Chineham with Background Data (ng m⁻³)

Species	Background (a)	CNFL (Sep/Oct)	CWWF (Dec/Jan)	CSTW (Mar/Apr)	CNFL2 (June)	CFLS (August)
Arsenic	6.4-7.7	0.12	0.35	0.15	0.42	0.65
Copper	22	42	101	23.9	259	- (d)
Lead	46 (b), 152 (c)	2.8	4.5	3.13	9.42	10.2
Cadmium	0.9	0.05	0.08	0.18	0.07	0.27
Chromium	4	0.16	0.33	1.55	0.56	0.73
Nickel	10	0.20	0.56	2.00	6.19	2.89
Manganese	21	0.62	1.43	6.12	3.24	7.28
Antimony	<7.5	0.12	0.32	0.22	1.27	1.05
Tin	170-280	0.08	0.20	0.16	0.28	0.52
Vanadium	25	0.47	1.26	0.55	0.84	3.28
Cobalt	<1.5	0.04	0.05	0.16	0.42	0.76
Thallium	<48	0.19	1.08	0.79	0.07	0.17
Total	3	3.6	6.41	2.86	7.14	4.30
Mercury						

(a) Annual mean data, source of data provided in the Background Monitoring Report: Air Quality, Soils and Vegetation, ERM Report, Seventh Report (March 1998)

(b) Typical rural background

(c) Typical urban background

(d) Not analysed

Except for copper and mercury, measured concentrations of trace metals in air are below typical UK background concentrations at all of the monitoring sites. For copper and mercury, concentrations were higher than typical background concentrations at all of the monitoring locations. Measured concentrations of copper were, on occasions, a factor of ten higher than background concentrations. The long term EAL ⁽¹⁾ for copper is 10,000 ng m⁻³ and so the concentrations found here are well below any levels that might cause harm.

D3.1.7

HCl

Mean HCl measurements for the five monitoring periods are presented in Table D3.8. These data can be compared to background concentrations and the long term Environmental Assessment Level (EAL) for HCl. Measurements of HCl in other locations are not common and the only available data for comparison are recorded in Essex ⁽²⁾ Measured concentrations are well within the EAL and within the range of measurements obtained in Essex.

(1) Environmental Assessment Level, quoted in Environment Agency (1997) **Best Practicable Environmental Option Assessment for Integrated Pollution Control - Technical Guidance Note E1 HMSO.**

(2) Harrison RM and Allen AG (1990) **Measurements of Atmospheric HNO₃, HCl and Associated Species on a Small Network in Eastern England Atmospheric Environment, Vol.24 pp 369-376.**

Table D3.8 Comparison of Monitored HCl Data with Background Data ($\mu\text{g m}^{-3}$)

Background/ Guideline	CNFL	CWFC	CSTW	CNFL2	CFLS
Background (a)	0.3-1.1	0.27	0.69	0.26	0.68
EAL (b)	7/700				

(a) Two-monthly mean concentrations recorded in Essex.
 (b) Long term and short term Environmental Assessment Level (EAL) from the former HMIP's Technical Guidance Note (Environment) E1.

Measured concentrations are well within the EAL and within the range of measurements obtained in Essex.

D3.1.8

Diffusion Tube Measurements

To supplement data obtained using the mobile monitoring laboratory, monitoring of nitrogen dioxide, sulphur dioxide and BTEX (benzene, toluene, ethylbenzene and xylene) was also obtained using passive diffusion tube samplers at all five monitoring sites around the proposed Integra North site on a continuous basis.

Monthly mean samples were obtained throughout the monitoring

programme. However, monitoring at the CFLS site did not commence until

the end of July 1997 and monitoring of nitrogen dioxide and sulphur dioxide

at the CNFL site and the CFLS site continued until July 1998. Mean

concentrations throughout the monitoring programme are presented in Table

D3.9.

Table D3.9

Mean Diffusion Tube Measurements ($\mu\text{g m}^{-3}$) Monitoring Period 1 August 1996 to 28 August 1997

Site Code	NO ₂	SO ₂	Benzene	Toluene	Ethyl benzene	m-p-Xylene	o-Xylene
Standard or Guideline	50	80	16	1880	4350	4350	4350
Reference ^(b)	15-46	8-23	6-8	13-18	3-4	9-13	3-5
CSTW	21.9	7.1	1.74	2.89	0.41	0.92	0.48
CWFC	25.4	7.1	1.72	2.76	0.49	0.91	0.46
CNFL	23.0	9.3	2.38	2.73	0.43	0.81	0.42
CFLS	20.7	5.4	- (c)	- (c)	- (c)	- (c)	- (c)

(a) 50 $\mu\text{g m}^{-3}$ is the legal standard in the UK, 40 $\mu\text{g m}^{-3}$ is the AQS and WHO guideline / target
 (b) Range of background data for NO₂ and SO₂ is obtained from diffusion tube measurements and the Southampton AUN site, data for BTEX measured at the Southampton AUN
 (c) No data

Concentrations of all pollutants are within relevant air quality limits and guidelines. None of the values exceeded 51% of the relevant standard or

guideline and the organic compounds Toluene, Ethylbenzene and Xylene were all less than 0.2% of the relevant guideline.

D3.1.9 *Soil and Grass Sampling*

Soil and grass samples were obtained from three of the monitoring sites (CNFL, CWWC and CSTW) once every two months (six grass and six soil samples per site in total). These samples were analysed to determine the concentrations of dioxins/furans and the suite of trace metals (as listed in *Table D3.11*) present in each sample.

Dioxin/Furans

A summary of the dioxin/furan concentrations in soil and grass at the proposed Integra North location is presented in *Table D3.10*. These data are compared to other dioxin/furans measurements⁽¹⁾.

Table D3.10 *PCDD/F Concentrations in Soils and Grass (ng I-TEQ kg⁻¹ DW)*

Site Code ^(a)	Soil Concentration ^(b)	Grass Concentration ^(b)
CSTW	18	1.3
CWWC	6.2	1.2
CNFL	14	0.92
Reference Concentration	5 ^(c) 28 ^(d) 20 ^(e)	0.9 ^(f)

(a) Information on site codes and site descriptions are presented in the seven Background Monitoring Reports
 (b) Concentrations are the mean of the six samples collected to date
 (c) For rural locations (mean of eleven samples)
 (d) For urban locations (mean of five samples)
 (e) Concentrations measured around municipal waste incinerators in Hampshire
 (f) As measured at Rothamsted

Although measured background concentrations of dioxins and furans in soils and vegetation are limited, the monitoring results have been compared to typical background concentrations, which are taken as follows:

- 5 ng I-TEQ kg⁻¹ (range 0.8 -18) as a rural UK soil concentration;
- 28 ng I-TEQ kg⁻¹ (range 5 - 87) as an urban UK soil concentration;
- 20 ng I-TEQ kg⁻¹ (range 1.7 - 160) for soils around waste incinerators in Hampshire as measured on behalf of the Environment Agency;
- 20 ng I-TEQ kg⁻¹ (range 2.2 - 53) for soils around the waste incinerator at Chineham as measured on behalf of the Environment Agency;
- 0.9 ng I-TEQ kg⁻¹ as a rural grass concentration.

Concentrations in soil were up to three times higher than measured in rural locations but half that measured in urban locations. Measured concentrations

(1) A Study of Dioxins and Trace Metals in Soil Around Four Municipal Waste Incinerators in Hampshire - Part 1: PCDDs and PCDFs, Environment Agency Report HC-7/97-160-C-AZLM (August 1997)

in soil were comparable to measurements made in Hampshire around four waste incinerators, all of which are now closed.

Concentrations of dioxins and furans in the grass samples are comparable to background concentrations.

Trace Metals

Mean trace metal concentrations measured at the three sites around the proposed Integra North facility are presented in Table D3.11 for soil and Table D3.12 for grass. Typical concentrations of trace metals in soil and grass are also presented for comparison. The source of these data is provided in the Background Monitoring Reports and from the Environment Agency (1).

Table D3.11 Mean Trace Metal Concentrations in Soil for the Monitoring Locations Around Chineham (mg kg⁻¹) (a)

Metal	Background, Hampshire				Soil (e)	Soil (d)	Soil	CWCW	CNFL
	Soil (b)	Soil (c)	Chinaham	CSTW					
As	<5-40	2-8	2-9.8	4.8	4.4	4.6	12	19	26
Cu	2-60	2-240	7-160	26	19	12	23	21	25
Pb	10-150	16-8,300	17-69	25	21	23	0.5	0.5	0.5
Cd	<1-2	0.1-5.7	0.1-5	0.5	0.5	6.7	15	15	15
Cr	15-300	10-200	10-160	15	15	3.8	9.0	9.0	9.0
Ni	2-100	4-87	5.8-26	14	14	184	316	316	316
Mn	400-1000	130-2,400	130-830	289	316	1.8	1.8	1.8	1.8
Sb	1.1-8.6	- (e)	- (e)	1.8	1.8	1.8	1.8	1.8	1.8
Sn	1-10	0.8-65	0.8-31	1.8	1.8	1.8	1.8	1.8	1.8
V	150	- (e)	- (e)	25	24	12	24	24	24
Co	10-15	- (e)	- (e)	4.9	6.4	2.5	6.4	6.4	6.4
Tl	0.5-1	- (e)	- (e)	1.8	1.8	1.8	1.8	1.8	1.8
Hg	0.008-0.2	0.1-2.8	0.1-1.1	0.5	0.5	0.5	0.5	0.5	0.5

(a) Mean of samples taken on 26 September 1996, 21 November 1996, 16 January 1997, 13 March 1997, 8 May 1997 and 3 July 1997

(b) Concentrations typical of non-contaminated soils

(c) Trace metal concentrations around waste incinerators in Hampshire

(d) Trace metal concentrations around the old waste incinerator in Chineham

(e) No data

For trace metal concentrations in soil, the majority of measured concentrations are within the typical soil concentration range. Concentrations of thallium (Tl) and mercury (Hg) were slightly in excess of typical concentrations, by a factor of approximately two for Tl. For Hg, measured concentrations were below the limit of detection and were taken to be half the detection limit

(1) Environment Agency Report (August 1997) A Study of Dioxins and Trace Metals in Soil Around Four Municipal Waste Incinerators in Hampshire - Part 2: Trace Metals Environment Agency Report HO-7/97-210-C-AZLN

(0.5 mg kg⁻¹). Therefore, actual concentrations of Hg in soil could be lower than the levels indicated in *Table D3.11*.

The majority of the soil measurements are within the concentration range for trace metals in soils around the Hampshire waste incinerators, made on behalf of the Environment Agency. Only chromium and nickel concentrations at CNFL were outside, but below, the range provided by the Environment Agency.

Table D3.12 *Mean Trace Metal Concentrations in Grass for the Monitoring Locations Around Chineham (mg kg⁻¹)^(a)*

Metal	Background Grass ^(b)	CSTW Grass	CWWC Grass	CNFL Grass
As	1-1.7	1.9	1.8	1.8
Cu	5-30	5.6	5.6	5.7
Pb	5-10	8.5	6.9	5.7
Cd	0.05-0.2	0.5	0.5	0.5
Cr	0.1-0.5	1.8	1.9	2.0
Ni	0.1-5	14	9.1	13
Mn	20-300	124	245	312
Sb	7-50	1.9	1.9	1.8
Sn	no data	1.8	1.8	1.7
V	0.2-1.5	2.3	2.3	1.7
Co	0.02-1.0	1.8	1.8	1.7
Tl	no data	31	1.8	11
Hg	no data	0.5	0.5	0.5

(a) Mean of samples taken on 26 September 1996, 21 November 1996, 16 January 1997, 13 March 1997, 8 May 1997 and 3 July 1997

(b) Representative of normal leaf tissue in mature leaf tissue

For trace metal concentrations in grass, concentrations of arsenic (As), copper (Cu), lead (Pb), manganese (Mn), antimony (Sb), vanadium (V) and cobalt (Co) were within, or comparable, to typical concentrations in vegetation. No background data were available for tin (Sn), thallium (Tl) and mercury (Hg). Concentrations of chromium (Cr) and nickel (Ni) are factors of four and three higher than typical levels, respectively. For cadmium (Cd), measured concentrations were below the limit of detection and were taken to be half the detection limit (0.5 mg kg⁻¹). Therefore, actual concentrations of Cd in grass could be lower than the levels indicated in *Table D3.12*

D3.2

NATIONAL NITROGEN DIOXIDE SURVEY DATA

Basingstoke District Council operates four sites as part of DETR's national nitrogen dioxide diffusion tube survey. The results of monitoring at these locations during 1995 and 1996 are presented in *Table D3.13*.

The annual mean NO₂ concentrations for the same three years were 45, 46 and 43 µg m⁻³ respectively (the NAQS target for 2005 is 40 µg m⁻³). The peak hourly mean NO₂ concentration measured in each of the three years was 182, 163 and 249 µg m⁻³ respectively (the NAQS target for 2005 is 287 µg m⁻³). There were no exceedences of the AQ5 one-hour target for 2005. However, the target for 2005 expressed as an annual mean was exceeded for each of the three most recent years for which data are available.

The 98th percentiles of hourly mean NO₂ concentrations at Southampton AUN in 1995 to 1997 were 98, 101 and 98 µg m⁻³ respectively. These values should be compared to the EC Directive limit value of 200 µg m⁻³ (which allows 18 exceedences per year).

D3.4.1

Nitrogen Dioxide (NO₂)

Data are available from the UK Automated Urban Network (AUN) operated on behalf of the DEFRA at Southampton. This site is in the centre of Southampton, and whilst air quality is likely to differ from that of the development site data are presented here for comparison with the monitoring undertaken around the proposed Integra North facility and also because this is the nearest station for which hourly data are available for whole years. Hourly data are required to compare to some guidelines and standards.

D3.4

AUTOMATIC URBAN NETWORK SITE AT SOUTHAMPTON

There are no sites in the vicinity of the facility for which daily mean concentrations of smoke and SO₂ are recorded. The nearest site is located at Alton and monitoring at this site ceased in 1988.

D3.3

NATIONAL SMOKE AND SULPHUR DIOXIDE SURVEY

Measured concentrations at the background sites are within air quality standards and guidelines. At the kerbside and intermediate sites the annual NAQS objective for 2005 (40 µg m⁻³) was exceeded.

Site	1995 (*)	1996
Basingstoke 1N (kerbside)	55	55
Basingstoke 3N (background)	36	38
Basingstoke 4N (background)	34	40
Basingstoke 5N (intermediate)	46	48
(a) Less than 75% data capture		

Table D3.13 National Nitrogen Dioxide Survey Results for 1995 and 1996 (µg m⁻³)

D3.4.2 *Carbon Monoxide (CO)*

The maximum hourly mean CO concentrations at Southampton AUN in 1995 to 1997 were 12.2, 9.7 and 21.6 mg m⁻³ respectively. These values should be compared to the WHO Guideline value of 30 µg m⁻³.

There were no exceedences of the AQS 8-hour running mean target for 2005 (of 11.6 mg m⁻³) in the last three years for which data are available (1994-1996).

D3.4.3 *Sulphur Dioxide (SO₂)*

The maximum 15-minute mean SO₂ concentrations at Southampton AUN in 1995 to 1997 were 208, 399 and 226 µg m⁻³ respectively. The number of times per year that the 15-minute mean can exceed the AQS target for 2005 of 267 µg m⁻³ depends on the data capture. For 100% data capture 35 15-minute means can be greater than 267 µg m⁻³. As data capture rates decrease so do the number of allowable exceedences. In 1994 and 1996 the data capture was 97% and so 34 exceedences would be permitted - there were actually only 2 and 3 exceedences in these two years (1994 and 1996 respectively). In 1995 there were no exceedences of the target value.

Maximum 1-hour mean SO₂ concentrations at Southampton AUN in 1995 to 1997 were 165, 287 and 162 µg m⁻³ respectively. These values should be compared to the WHO Guideline of 350 µg m⁻³.

There were no exceedences of the AQS target for 2005 or the WHO guideline.

D3.5 *COMMENTARY ON BACKGROUND AIR QUALITY*

The data collected as part of the HWS background air quality programme, in conjunction with routine measurements made by DETR sponsored networks in Hampshire, indicate that existing air quality at and around the proposed Integra North Energy Recovery Facility site is such that air quality standards are not generally exceeded or approached. The rural location of this site means that it is subject to few influences from emission sources. Whilst operational, the old incinerator may have had some influence on local air quality and traffic emissions will influence air quality within more urban locations such as within Basingstoke. Consequently, concentrations of NO₂ are relatively high in Basingstoke when compared to the more rural locations around the proposed facility. Data measured in the centre of Southampton indicates that air quality targets for the year 2005 are not currently being met, but this is not an unusual situation for city centres in the UK.

Importantly, in the context of an assessment of an energy recovery facility, concentrations of dioxins and metals in air, and also in the soil and grass, are comparable with what is known of similar locations in the UK.

Ambient air quality data collected as part of the HWS background air quality program, in conjunction with routine measurements made by DETR sponsored networks in Hampshire, indicate that existing air quality at and

around the proposed Integra North Energy Recovery Facility site is such that air quality standards are not generally exceeded or approached. The rural location of this site means that it is subject to few influences from emission sources. Whilst operational, the old incinerator may have had some influence on local air quality and traffic emissions will influence air quality within more urban locations such as within Basingstoke. Consequently, concentrations of NO₂ are relatively high in Basingstoke when compared to the more rural locations around the proposed facility. Data measured in the centre of Southampton indicates that air quality target concentrations for the year 2005 are not currently being met, but this is not an unusual situation for city centres in the UK.

Importantly, in the context of an assessment of an energy recovery facility, concentrations of dioxins and metals in air, and also in the soil and grass, are comparable with what is known of similar locations in the UK.

The available evidence suggests that the Energy Recovery Facility is not proposed for an area with air quality problems of a scale which preclude waste management facilities of this type .