

General Summary.

Monitoring was carried out at the Ellen Field Park site for a full calendar year in 1998. This site could be described as representing typical levels of air pollution to which the general population is exposed to in suburbia.

A multi-pollutant site monitored for Particulate Matter under 10 microns in size (PM_{10}), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Ozone (O_3) and Lead (Pb). This annual report covers all these pollutants with the exception of Lead which is dealt with elsewhere. The results of monitoring were compared with proposed new EU limits which are expected to be in a form of a EU Directive by the end of 1999. These proposed standards are more stringent than current EU limits. However the current EU requirements are also reported on.

Calibration and servicing of the equipment was carried out by Forbairt. A twice yearly overhaul and calibration to a reference standard was carried out by Enviro Technology, the equipment suppliers. There were no major loss of data or faults with the equipment throughout the year.

Sulphur Dioxide (SO_2)

The current and proposed EU Directive guide and mandatory limits were comfortably met at this site. The figures reflect the current situation at Dublin Corporations 14 other Smoke and Sulphur Dioxide sites within the City.

Nitrogen Dioxide (NO_2)

The current guide and mandatory EU Directive limits were also comfortably met at this site. There are two other sites continuously monitoring for NO_2 in Dublin City - College Street (City Centre) and Rathmines. The levels at Ellen Field are marginally higher than published figures at Rathmines but substantially lower than College Street. The limits in the proposed EU Directive for NO_2 have also been comfortably complied with.

Particulate Matter (PM_{10})

There is currently no EU Directive for PM_{10} . The limits in the proposed new EU Directive are being met at this site. PM_{10} is being monitored at four other sites in Dublin City, College Street, Wood Quay, Phoenix Park and Rathmines. PM_{10} levels at Ellen Field are below the published figures at all these sites.

Carbon Monoxide (CO)

There are no EU or proposed EU limit levels in place. The World Health Organisation (WHO) standards have been used for comparison purposes. The CO monitor consistently 'drifted' into a minus situation. The self diagnostics on the machine and the twice yearly overhaul showed no inherent fault with the machine. It is considered that levels of CO are so low at this site that they constantly hovered around zero and thus gave minus figures for a large amount of the time. Levels at this site comfortably meet the WHO guidelines. Compared with the only other site that monitors for CO in the City - College St, levels are below CO levels at this site.

Ozone(O₃)

There are four threshold values for Ozone set out the EU Directive. There were two marginal excursions of one of these limits in 1998. The EPA maintain a national Ozone network. The nearest site to Dublin City is Pottery Rd Dun Laoire. The results from Ellen Field are lower than published levels recorded at this site.

**Air Quality Monitoring
Ellen Field Park,
Santry.**

Dublin Port Tunnel Project

Annual Report 1998

**Traffic Noise and Air Quality Unit,
Office of The Director of Traffic,
Dublin Corporation,
Block 2 Floor 4,
Civic Offices
Fishamble St.,
Dublin 8
Tel: 01 - 6723847**

Sulphur Dioxide (SO₂) - Review of 1998 Monitoring - Ellen Field

Results of monitoring at this site show that levels are low and comfortably comply with both the current and proposed EU Directives.

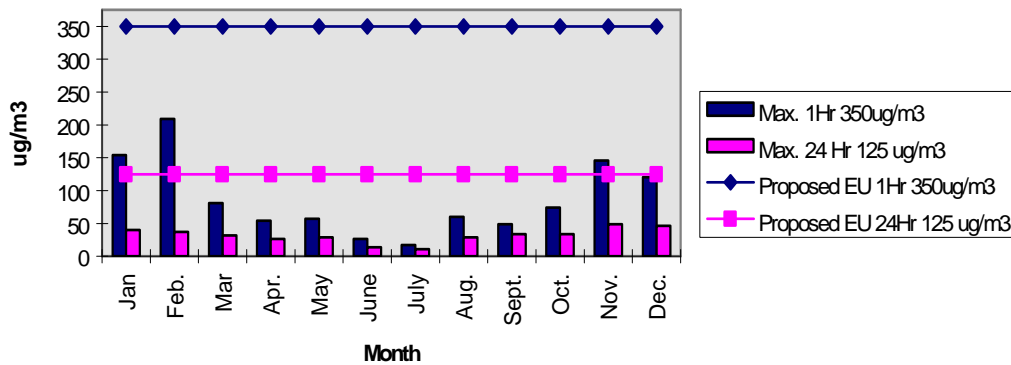
Summary of SO₂ results(Hourly Figs.)

SO ₂ 1998	Jan	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PPB												
Median	3	2	4	5	3	3	2	4	7	9	10	4
98%tile	22	11	17	14	12	6	4	10	14	17	25	21
Mean	5	3	5	6	4	3	2	5	7	10	11	6
Max.	54	73	28	19	20	9	6	21	17	26	51	42
Min	0	0	1.5	3	1	2	0	2	5	5	1	0

Proposed Directive	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.	Max. Lev.
1Hr 350ug/m3	154	209	81	54	57	26	17	60	49	74	146	120
24Hr 125 ug/m3	40	37	32	26	29	14	11	29	34	34	49	46

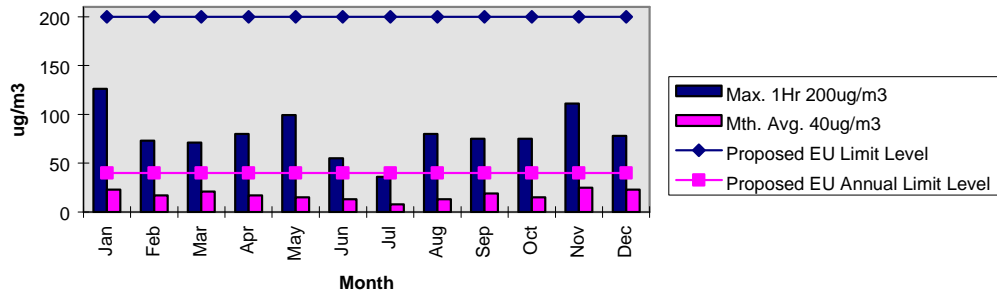
As the proposed directive is more stringent than current directive on SO₂ the monitored results set out below in chart form are plotted against the proposed limits.

SO₂ levels v Proposed EU limit levels



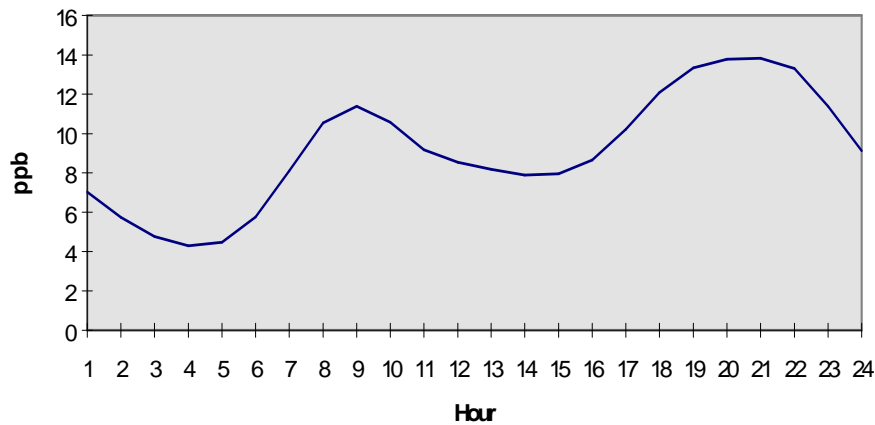
Proposed EU Directive -Nitrogen Dioxide (NO₂) cont.

NO₂ Levels v Proposed EU Limit Levels



Set out below is a typical average day for the year in relation to NO₂ levels. It can be seen that levels vary with peak rush hour traffic. This is in line with published diurnal variations at the two other NO₂ monitoring sites at College St. and Rathmines.

NO₂ Average Diurnal Variations, Jan - December, DPT



Monthly Summaries NO₂ in ug/m³

1998 Ellen Field v 1997 monthly summaries of NO₂ College Street

	MEDIAN		98%tile		MEAN		Max.	
	Santry	College	Santry	College	Santry	College	Santry	College
	St	St	St	St	St	St	St	St
JAN	19	63	64	178	23	72	126	296
FEB.	15	59	57	126	17	60	73	156
MAR	91	69	59	149	21	72	71	237
APR	13		53		17		80	
MAY	13	104	57	204	15	104	99	271
JUN.	11	94	38	188	13	95	55	257
JUL.	8	90	25	185	8	93	36	290
AUG.	10	73	53	163	13	77	80	215
SEPT.	15	70	53	180	19	77	75	241
OCT.	11	62	55	190	15	75	75	253
NOV.	19	99	68	206	25	100	111	283
DEC	19	80	65	184	23	86	78	228
YEAR	13	76	59	185	17	82	126	296

Carbon Monoxide (CO) - Review of 1998 Monitoring - Ellen Field

There is no EU directive covering the monitoring of CO, although it is anticipated that there will be one forthcoming. However the WHO propose guide levels which are as follows :-

1. A maximum one hour exposure of 25ppm*
2. An 8hr hour exposure level of 10ppm*.

(*ppm = parts per million)

The results from the Carbon Monoxide monitor show a continual drift into the minus region. The figures have not been recalculate as calculations show a negative drift of just under 4%. It

is considered that levels of CO are so low at this site that they consistently hovered around

Carbon Monoxide (CO) - Review of 1998 Monitoring - Ellen Field *cont.*

zero and thus gave minus figures for a large amount of the time. The current figures are well within the WHO guidelines of an 8 hour exposure of 10ppm and a one hour level of 25ppm. The WHO guidelines have been complied with at this site.

Summary of Carbon Monoxide results

Ellen Field (1998) v College St (1997) in ppm

	Santry 1998	College St. 1997
98%tile	1	4.58
Median	0	1.4
Mean	0	1.61
Maximum	7	9.0
Minimum	-2	0.0

PM₁₀ - Review of 1998 Monitoring - Ellen Field

There is currently no EU Directive on PM₁₀. However one is currently being developed. The proposed limits are as follows :-

PM₁₀ 24 hour primary standard

<35 exceedances of 50 $\mu\text{g m}^{-3}$ by 1 st January 2005.
< 7 exceedances of 50 $\mu\text{g m}^{-3}$ by 1 st January 2010.

An annual mean value

40 $\mu\text{g m}^{-3}$ by 1 st January 2005.
20 $\mu\text{g m}^{-3}$ by 1 st January 2010.

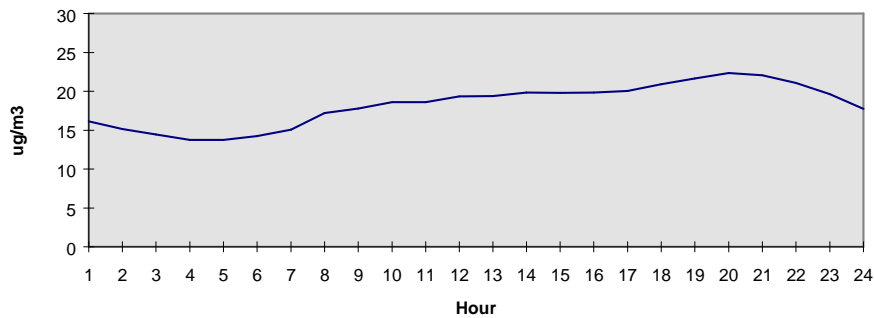
PM₁₀

The proposed 24hr value for PM₁₀ at 50 $\mu\text{g/m}^3$ was not "exceeded" in 1998. There was only one marginal excursion of 50 $\mu\text{g/m}^3$, - 52 $\mu\text{g/m}^3$ in September. The proposed annual limit of 40 $\mu\text{g/m}^3$ was also complied with. The annual average was 18 $\mu\text{g/m}^3$.

PM₁₀ - Review of 1998 Monitoring - Ellen Field *cont.*

Set out below is a chart indicating a typical average day in relation to PM₁₀ levels. As can be seen there is a rise in levels at the morning peak traffic hours, which dips only late into the evening/night time. This is more than likely due to a combination of traffic and domestic emissions.

PM10, Average Diurnal Variations, Jan - December, DPT



Summary of PM₁₀ measurements at all sites, 1996 and 1997 and Santry 1998

	College Street		Rathmines		Ashtown Grove		Wood Quay		Phoenix Park		Santry
	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996	1998
Maximum	151	163	79	90	65	108	149	149	99	96	52
Median	40	38	18	18	19	19	37	34	15	12	16
Mean	43	44	21	23	22	25	41	40	17	16	18
98 percentile	102	110	55	65	62	74	92	101	50	51	39
Daily Counts	250	275	240	277	106	149	281	100	287	144	351
% Counts	68%	75%	66%	76%	29%	41%	77%	27%	79%	39%	96%



Ozone(O₃) - Review of 1998 Monitoring - Ellen Field

The EU Directive on Ozone prescribes various threshold values that must be complied with. They are as follows:-

- Health protection threshold**
 - 110ug/m³ for the mean value over 8 hours
- Population protection threshold**
 - 180ug/m³ for the mean value over one hour
- Population warning threshold**
 - 360 ug/m³ for the mean value over one hour
- Vegetation protection threshold**
 - 200ug/m³ for the mean value over one hour
 - 65ug/m³ for the mean value over 24 hours

The 8hr 110ug/m³ threshold value as set out in EU Directive 92/72/EEC was marginally exceeded for two non continuous hours in 1998 with levels of 116 and 114 ug/m³. All the other thresholds values were complied with.

Levels in ug/m³ at Santry 1998

- Max. 1hr level - 128 ug/m³
- Max. mean values over 24 hr level - 44 ug/m³
- Max. mean values over 8hr Level - 116 ug/m³

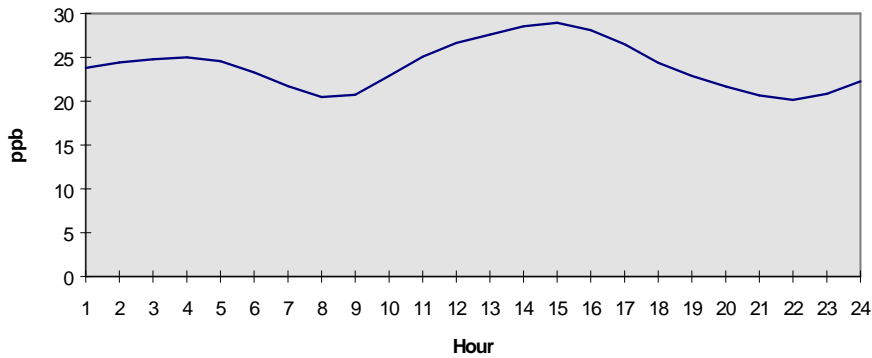
Ozone Summary(Hourly Figs.)

O3 1998	Jan	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PPB												
Median	22	27	25	29	31	26	24	25	23	25	20	23
98%tile	35	38	39	43	52	48	36	48	44	38	36	36
Mean	21	24	23	27	30	27	24	25	22	24	19	21
Max.	38	40	43	51	64	55	44	68	54	49	39	38
Min	1	2	-1	0	-1	4	6	4	-1	2	0	1

EU Directive	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level	Max. Level
8hr 110ug/m3	70	76	82	92	116	104	82	114	90	82	74	72
1hr 180ug/m3	76	80	86	102	128	110	88	136	108	98	78	76

Set out below is a chart indicating a typical average day in relation to Ozone. When compared with the NO₂ chart one can see O₃ charting in the opposite direction to NO₂ i.e. increase levels of Ozone means reduced levels of NO₂. This is to be expected as it is recognised that NO₂ is a precursor for O₃

O3, Average Diurnal Variations, Jan. - December, DPT



Appendix

Mean daily figure - Sum of all the monitored daily figures divided by the number of monitoring periods throughout a 24 hour period.

Median - The middle value of recorded values arranged in order from the smallest to the largest,

98%tile - The position of a value which lies in an array of figures arranged in order from the smallest to the largest, whose position in relation to the smallest number within the array is 98 percent of the number of values in the array.

The conversion factors from PPB to $\mu\text{g}/\text{m}^3$ are as follows (as per WHO) O_3 - 1ppb = $2\mu\text{g}/\text{m}^3$: CO 1ppb = $1.145\mu\text{g}/\text{m}^3$: SO_2 1ppb = $2.860\mu\text{g}/\text{m}^3$:
 NO_2 1ppb = $1.91\mu\text{g m}^3$.