

I Introduction

- 1.1 This report presents the results of the 1992/93 London Wide Benzene Monitoring Programme. The report describes results collected from July 1992 to December 1993 which covers the second and third year during which the programme was in operation. The Benzene Monitoring Programme forms part of the London Wide Environmental Programme (LWEP).
- 1.2 The 1992/93 Benzene Monitoring Programme was sponsored by the following London Boroughs:
- London Borough of Bexley
 - London Borough of Brent
 - London Borough of Camden
 - London Borough of Enfield
 - London Borough of Harrow
 - Royal Borough of Kensington and Chelsea
 - Royal Borough of Kingston upon Thames
 - London Borough of Richmond
 - London Borough of Wandsworth
 - City of Westminster
- 1.3 The main objective of the Benzene Monitoring Programme is to determine the ambient concentrations of benzene to which people are exposed in urban areas. The programme was initiated in response to continuing concern that people living within urban areas are often exposed to elevated concentrations of benzene which may be harmful to human health.
- 1.4 During the 1992/93 programme, participating boroughs maintained up to 5 monitoring sites, giving a total of 48 sites across Greater London. Benzene levels were surveyed using the passive diffusion sampler technique developed at TBV Science (formerly Rendel Science and Environment) specifically for monitoring ambient benzene levels. Diffusion samplers were despatched to participating boroughs at regular intervals, exposed by local staff and returned to TBV Science following a standard exposure period.

1.5

As road traffic and petrol stations are major sources of atmospheric benzene, at least one site in each Borough was located near one of these point sources. However, as the overall objective of the study was to determine long term concentrations to which the general public are exposed to for significant periods of time, the majority of sites within each Borough were located at background sites away from direct sources, such as residential areas. Usually sites were located at varying distances from busy roads which enabled the importance of road traffic as a source of benzene to be assessed.

6.2.6 Royal Borough of Kensington and Chelsea (Figure 15)

Mean concentrations for 1992 ranged from 3 ppb, recorded at Park Offices, a Background site (KC 02) to 18 ppb at Warwick Road Service Station (KC 03). Although inter-site trends in the data for 1992 are generally consistent with those recorded in 1993, the absolute values differ; for example 1992 means for the petrol station and Roadside site are 3 and 4 ppb higher. However, the mean for the Background site is consistent between the two years at 3 ppb. In 1992 the DoE Standard was exceeded at two of the sites, KC 01 and KC 03, and equalled at a third, KC 03.

6.2.7 Royal Borough of Kingston Upon Thames (Figure 16)

Mean concentrations for 1992 ranged from 2 ppb, recorded at Portsmouth Road, a Background site (KT 04), to 9 ppb, recorded at Combe Girl's School, also a Background site (KT 01). There appears to be an inverse relationship between mean concentrations and distance from Roadsides, with the DoE Standard exceeded at 2 of the 5 sites, both background locations. Levels are generally higher than those recorded in 1993, specifically at 3 of the 5 sites.

6.2.8 London Borough of Richmond (Figure 17)

Mean concentrations ranged from 3 ppb, recorded at Russell Walk and Alexander Hall, both Background sites (RM 32 and 31) to 5 ppb recorded at the Civic Centre, a Roadside site (RM 33), this latter site was the only location at which the DoE Standard was exceeded. Distance from roadsides has a clear influence on mean benzene levels, with levels decreasing with increasing distance from the nearby busy road. The 1992 data can not be compared to the results for 1993, which cover only two monitoring periods.

* [The January data have not been included in the calculation of the 1992 means due to doubts regarding the accuracy of these data.

6.2.9 London Borough of Wandsworth (Figure 18)

1992 values ranged from 3 ppb, recorded at Beavers Holt School, a Background Site (WS 01), to 8 ppb, recorded at Upper Tooting Road, a Roadside Site (WS 04). In contrast to 1993, there was a clear relationship between mean concentrations and distance from roadsides. Only at the two Background sites did absolute levels differ significantly between the two years, with 1992 values both being lower and below the DoE Standard, which was exceeded at the remaining three sites.

6.3.7 Royal Borough of Kingston Upon Thames (Figure 27)

A peak in benzene levels was evident at all sites during the monitoring period from 24.8.92 to 7.9.92, with the largest increase recorded at KT 01, a Background site, where levels increased to 28 ppb from 1 ppb recorded in the previous monitoring period. Apart from this summer elevation, there was little intersite difference in both temporal trends and absolute values, particularly from April 1993 onwards.

6.3.8 London Borough of Richmond (Figure 28)

Values at all sites increased from October to November 1992, with the increase being most pronounced at RM 33, a Roadside site, where values increased to 7 from 3 ppb in October. Generally the greatest temporal variation was evident at this site, while comparatively less temporal variation was evident at the two Background sites.

6.3.9 London Borough of Wandsworth (Figure 29)

With the exception of the petrol station site (WS 05), there was a pronounced peak in benzene concentrations at all sites in early 1993; levels showed a steady increase from January to April/May with the largest increase being recorded at WS 03, a Roadside site, where levels increased from 4 ppb in January to 11 ppb February and again to 23 ppb in April/May. Levels typically showed the largest variation at this site over the two year monitoring period. Benzene levels were generally least variable at WS 05, located at Warwick Road Service Station, where levels varied from 2 ppb to 9 ppb.

6.3.10 London Borough of Westminster (Figure 30)

Levels at all sites were elevated in during the monitoring period from 24.01.92 - 10.02.92, after which levels remained very stable with only small intersite differences until February 1993, when benzene levels at all sites increased to reach a peak in April. The largest increase was recorded at WM 04, where levels increased to 14 ppb in April from 10 ppb in February. Since July/August 1993 levels at all sites have again been relatively stable.

Royal Borough of Kingston Upon Thames

Site Code	Location	Distance from Busy Road (m)	Classification
KT 01	Coombe Girl's School	270	Background
KT 02	Beverly Boy's School	130	Background
KT 03	Chessington Community College	100	Background
KT 04	Portsmouth Road	70	Background
KT 05	Eden Street	4	Roadside

London Borough of Richmond

Site Code	Location	Distance from Busy Road (m)	Classification
RM 31	Alexander Hall	50	Background
RM 32	Russell Walk	38	Intermediate
RM 33	Civic Centre	11	Roadside
RM 34	Elmfield House	20	Roadside
RM 35	Park Road	19	Roadside

* Prior to April 1992, sites RM 31 to 35 were referred to as RM 1 to 5 respectively.

London Borough of Wandsworth

Site Code	Location	Distance from Busy Road (m)	Classification
WS 01	Beavers Holt School	500	Background
WS 02	Garrett Lane	44	Background
WS 03	Tooting Library Road	6	Roadside
WS 04	Upper Tooting Road	6	Roadside
WS 05	John Keale House	44	Petrol Station

Figure 17. Annual Mean Benzene Concentrations – 1992
London Borough of Richmond

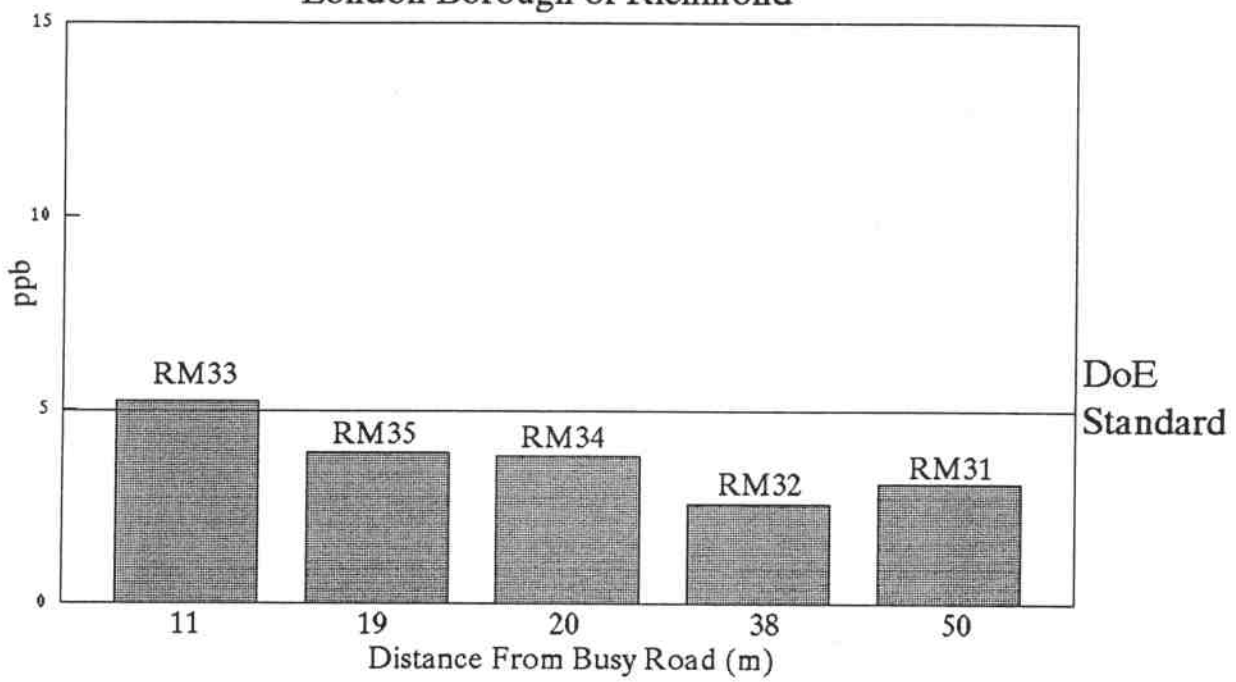


Figure 28. Temporal Variation - London Borough of Richmond

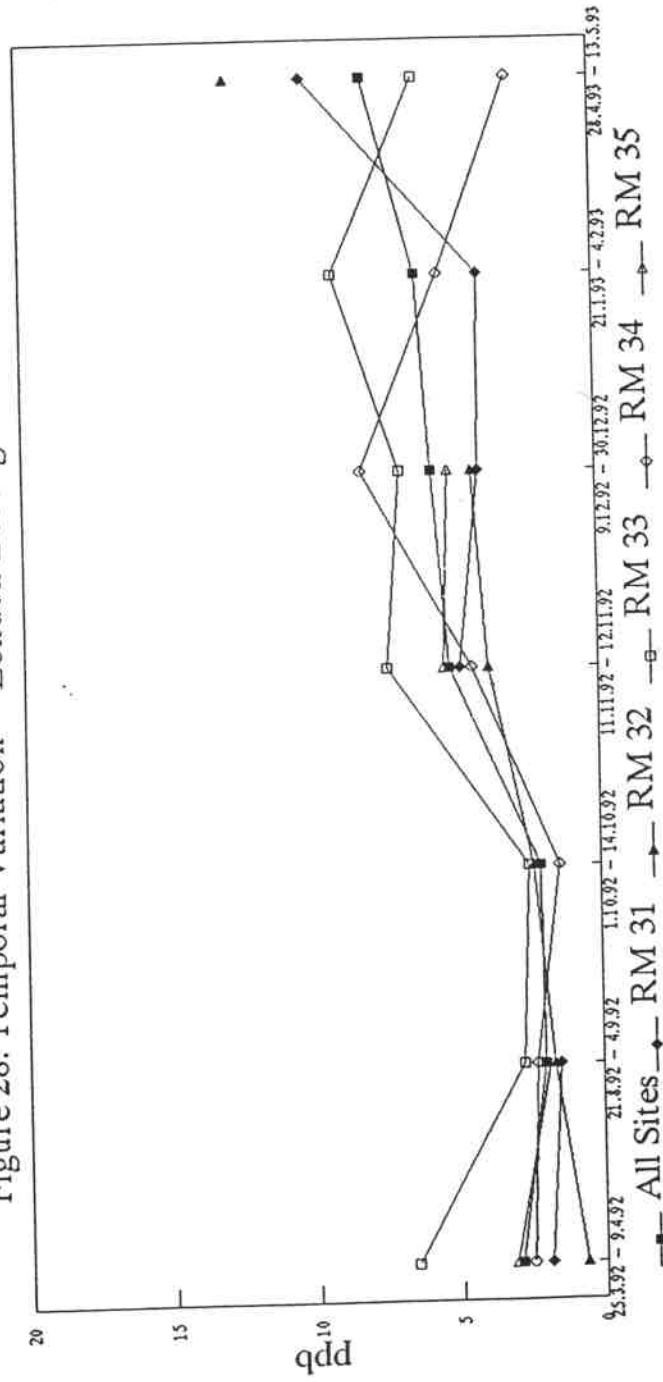


Table 8a. London Borough of Richmond – 1992

Exposure Dates	Site Code	benzene ppb
29.01.92 – 13.02.92	RM31	96.87
	RM32	*
	RM33	99.69
	RM34	21.63
	RM35	17.55
25.03.92 – 09.04.92	RM31	1.88
	RM32	0.63
	RM33	6.58
	RM34	2.51
	RM35	3.13
21.8.92 – 4.9.92	RM31	1.49
	RM32	1.69
	RM33	2.77
	RM34	2.30
	RM35	1.85
1.10.92 – 14.10.92	RM31	*
	RM32	2.34
	RM33	2.49
	RM34	1.43
	RM35	*
11.11.92 – 12.11.92	RM31	4.86
	RM32	3.83
	RM33	7.41
	RM34	4.43
	RM35	5.43
9.12.92 – 30.12.92	RM31	4.11
	RM32	4.33
	RM33	6.85
	RM34	8.25
	RM35	5.18
1992 Mean (ALL DATA)	RM31	21.84
	RM32	2.56
	RM33	20.97
	RM34	6.76
	RM35	6.63
1992 Mean (EXCLUD JAN)	RM31	3.08
	RM32	2.56
	RM33	5.22
	RM34	3.78
	RM35	3.90