lead

INTRODUCTION

Of all the common metals, lead (Pb) and lead compounds present the most common and greatest hazard. Lead dust and lead compounds are highly toxic cumulative poisons.

Most lead in ambient air is in the form of fine, submicron-sized particles and the major source is from the combustion of organic lead additives in motor fuels. The two most important compounds are tetraethyl and tetramethyl lead used as 'anti-knock' additives.

Lead fume and dust may also arise from weathering, burning and abrasive removal of old lead-based paints.

HEALTH EFFECTS

Lead is primarily a neurotoxin, causing damage to the brain and central nervous system. It is a cumulative poison and its effects may be more hazardous to younger people adversely affecting their concentration and intellectual development.

High intake of lead solely from air pollution is unlikely and clinical lead poisoning is comparatively rare. Poor diets, especially those deficient in calcium, vitamin D and iron may increase susceptibility to absorption.

OTHER EFFECTS

Lead is toxic to both plants and animals although no serious effects are generally seen.

Food crops grown in areas of elevated fallout provides the most important pathway for atmospheric lead entering the food chain. This may arise from either direct foliar contamination or, where soil has been contaminated, by uptake through roots.

SOURCES

Lead is a metallic element found naturally in rocks, soil, water and food. The principal source of atmospheric lead has been the combustion of alkyl lead additives in motor fuels. The contribution from this source is however decreasing as a result of reductions in lead content of fuel and the wider availability and use of lead free petrol.

Dust from lead based paints is difficult to quantify and although may give rise to locally elevated levels is generally insignificant against the background of levels from vehicles.

Industrial processes provide a third route by which lead is released into the atmosphere. Smelting and refining of the metal and manufacture of products such as lead-acid batteries all release airborne lead. Southwark was home to both industrial processing and manufacturing and as a consequence suffered locally elevated levels. In some areas the legacy of such activity remains as ground contamination.

STANDARDS

The air quality standard for lead is specified in EU Directive 82/884/EEC summarised in table 5.1 below. The WHO guideline is shown in table 5.2.

Table 5.1	Air Quality Standards for lead
EU Limit Value	
2μg/m^3	(annual mean)

Table 5.2	WHO lead guidelines
0.5 - 1.0μg/m^3	(annual mean)

MONOTORING SITES

Lead has been monitored at the locations shown in figure 5.1 below.

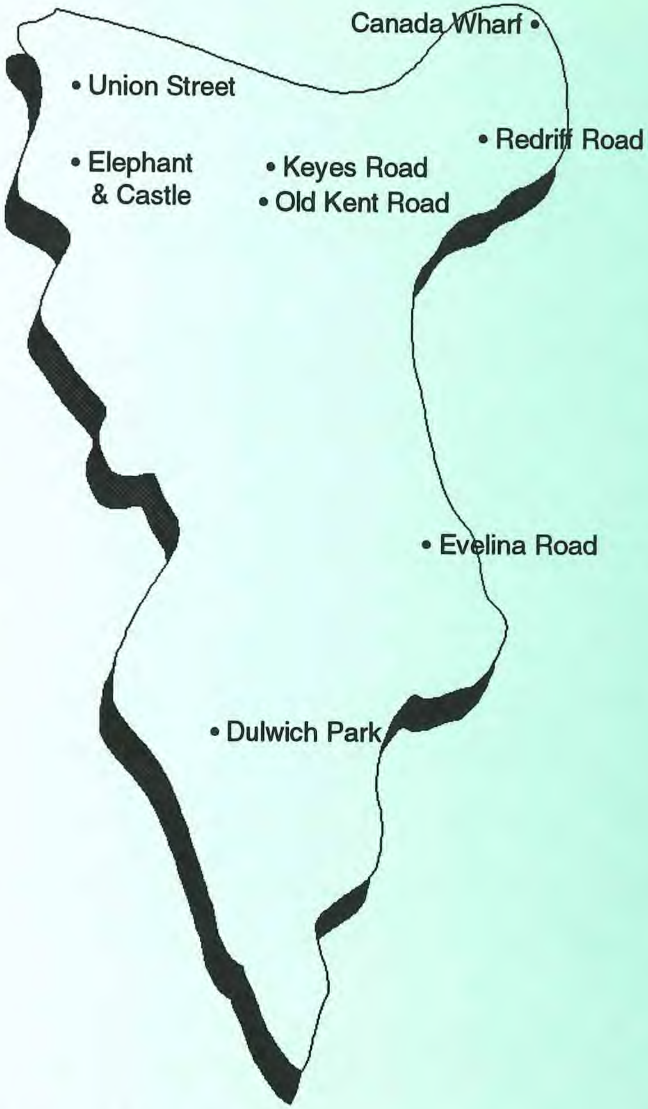

Figure 5.1 Lead monitoring sites.

COMMENTARY

The levels at most sites show a continuing decline in ambient lead concentrations. This is due almost solely to the reduction in lead in petrol and later the availability of lead free petrol. This is most notable in the graphs of sites close to major roads such as at the Old Kent Road, Evelina Road and Union Street. On these graphs the impact can clearly be seen from the dramatic drop in 1986.

The exception is the site at the Elephant and Castle. Here the levels show a steady increase due largely to the junction's strategic location resulting in increased road usage and rising congestion.

Those sites remote from highways have considerably lower levels confirming the primary source of atmospheric lead in Southwark.

Figure 5.2 Road traffic now accounts for most of the airborne lead in Southwark.

lead

lead

LEVELS AND TRENDS

The following eight graphs show the levels of lead at the sites indicated in figure 5.2.

Note: all graphs in this chapter have the same scale vertical axis and are therefore directly comparable.

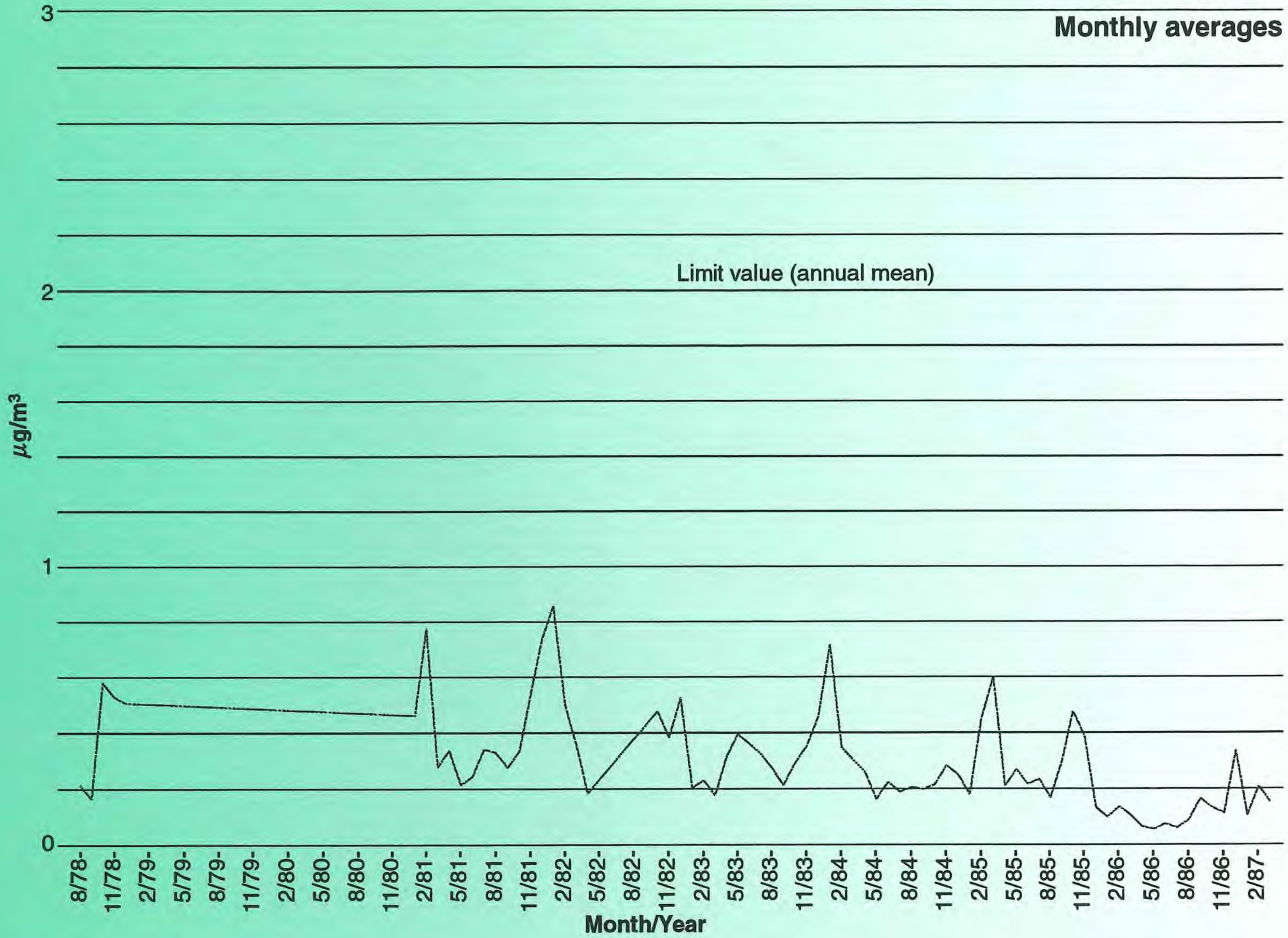

Figure 5.3 Lead levels at Canada Wharf
August 1978 to March 1987

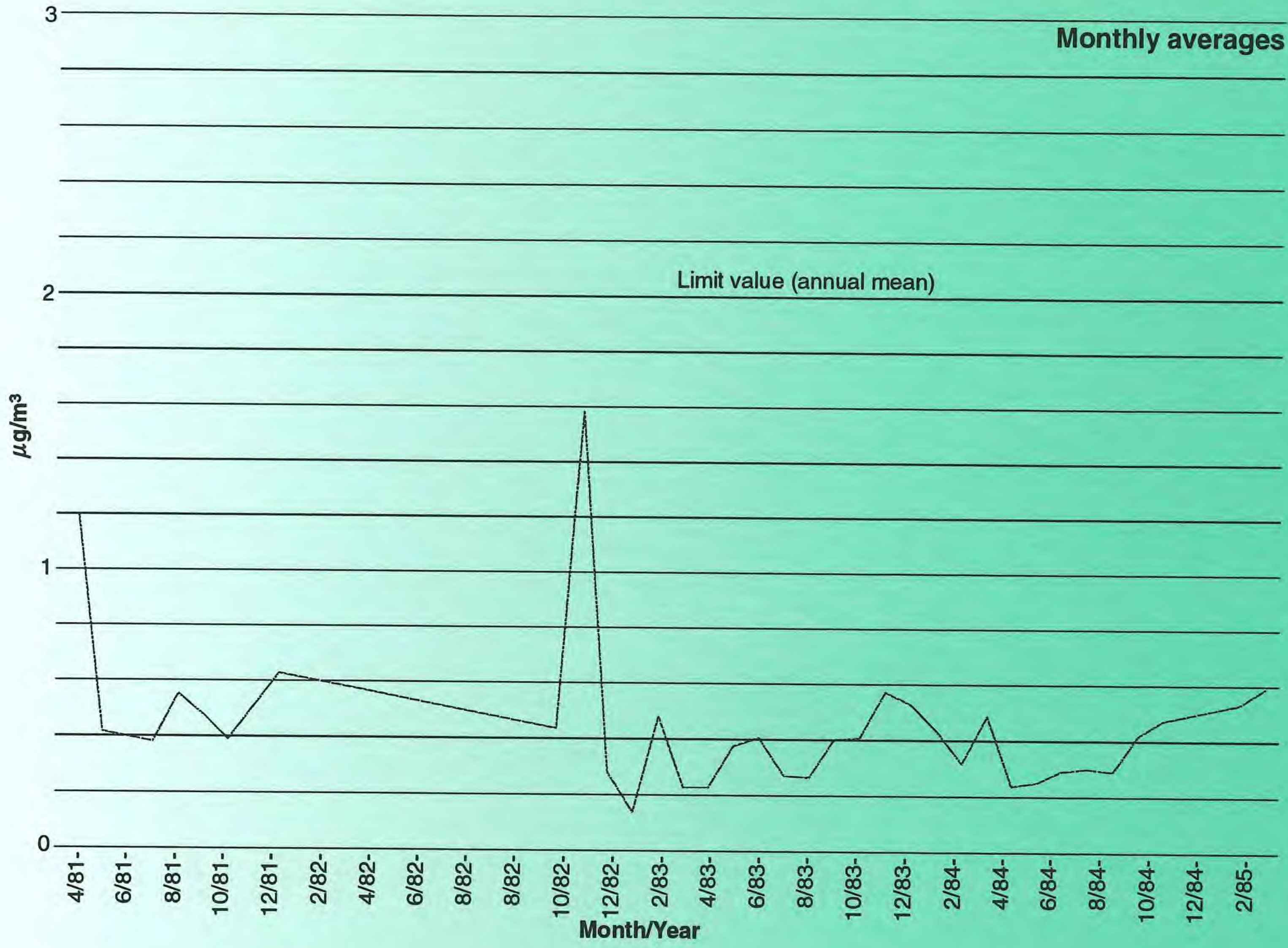

Figure 5.4 Lead levels at Dulwich Park
April 1981 to March 1985

lead

lead

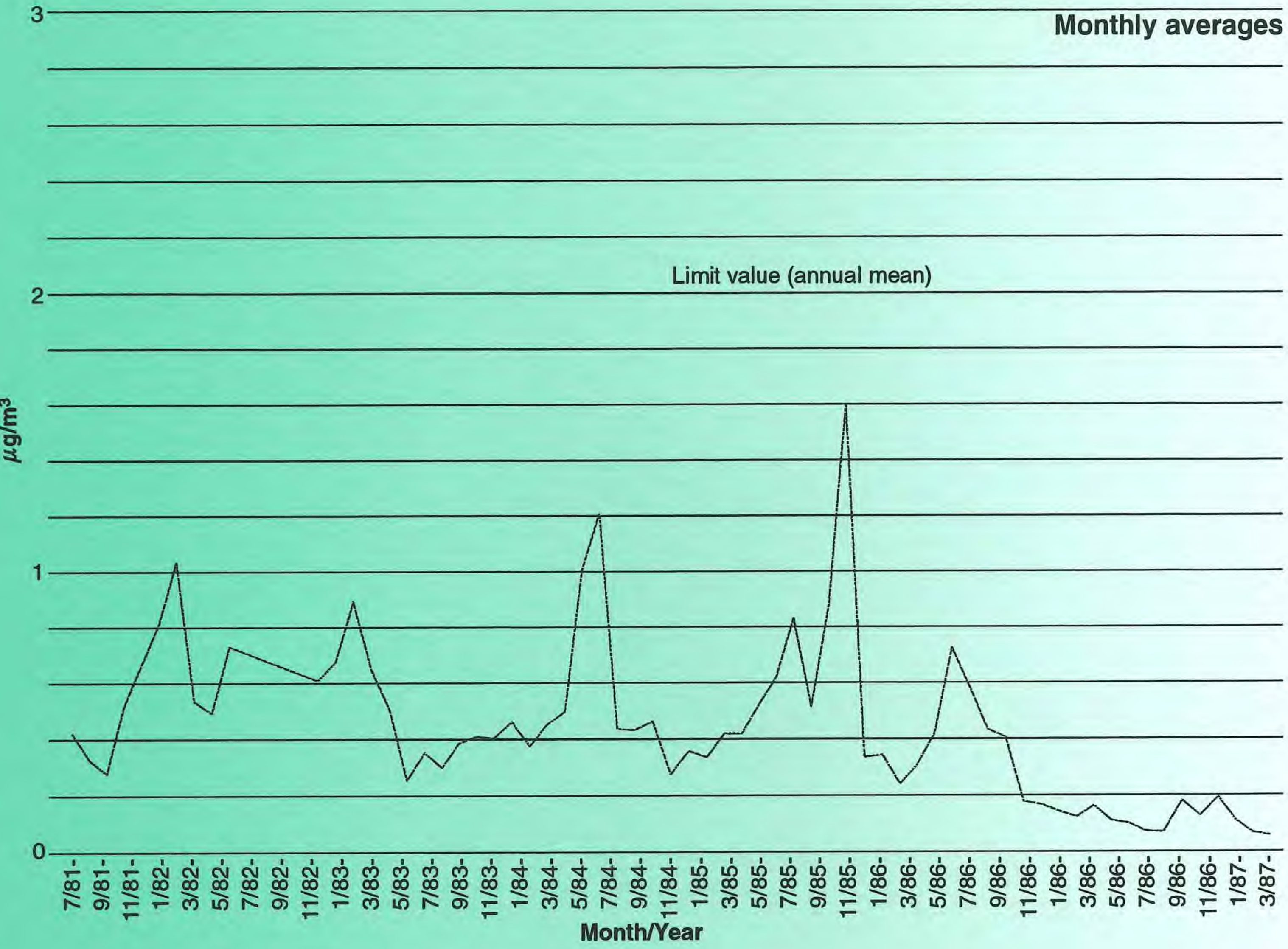

Figure 5.5 Lead levels at Keyse Road
July 1981 to March 1987

AIR AWARE

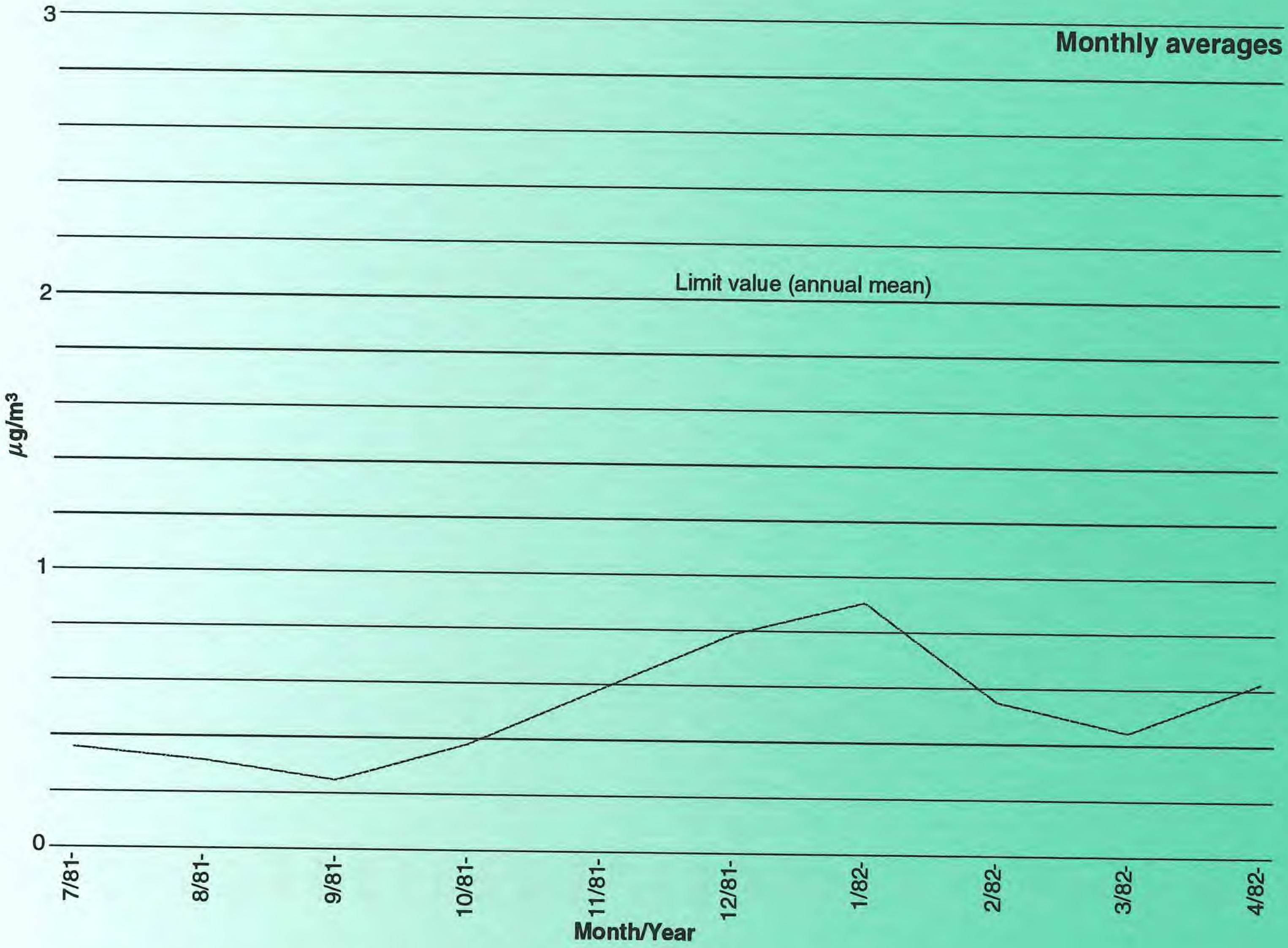

Figure 5.6 Lead levels at Redriff Road July 1981 to April 1982

lead

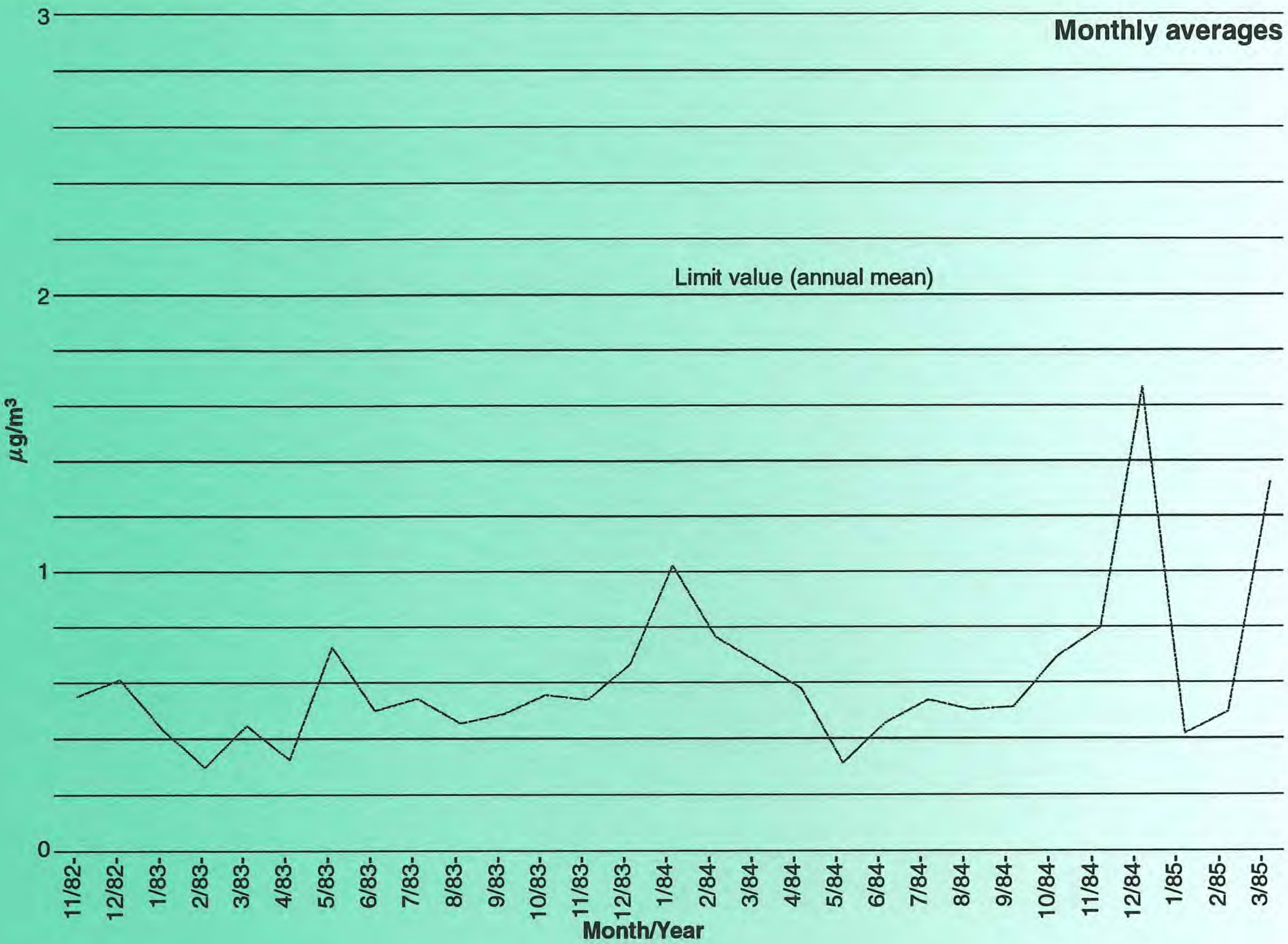

Figure 5.7 Lead levels at Elephant & Castle November 1982 to March 1985

lead

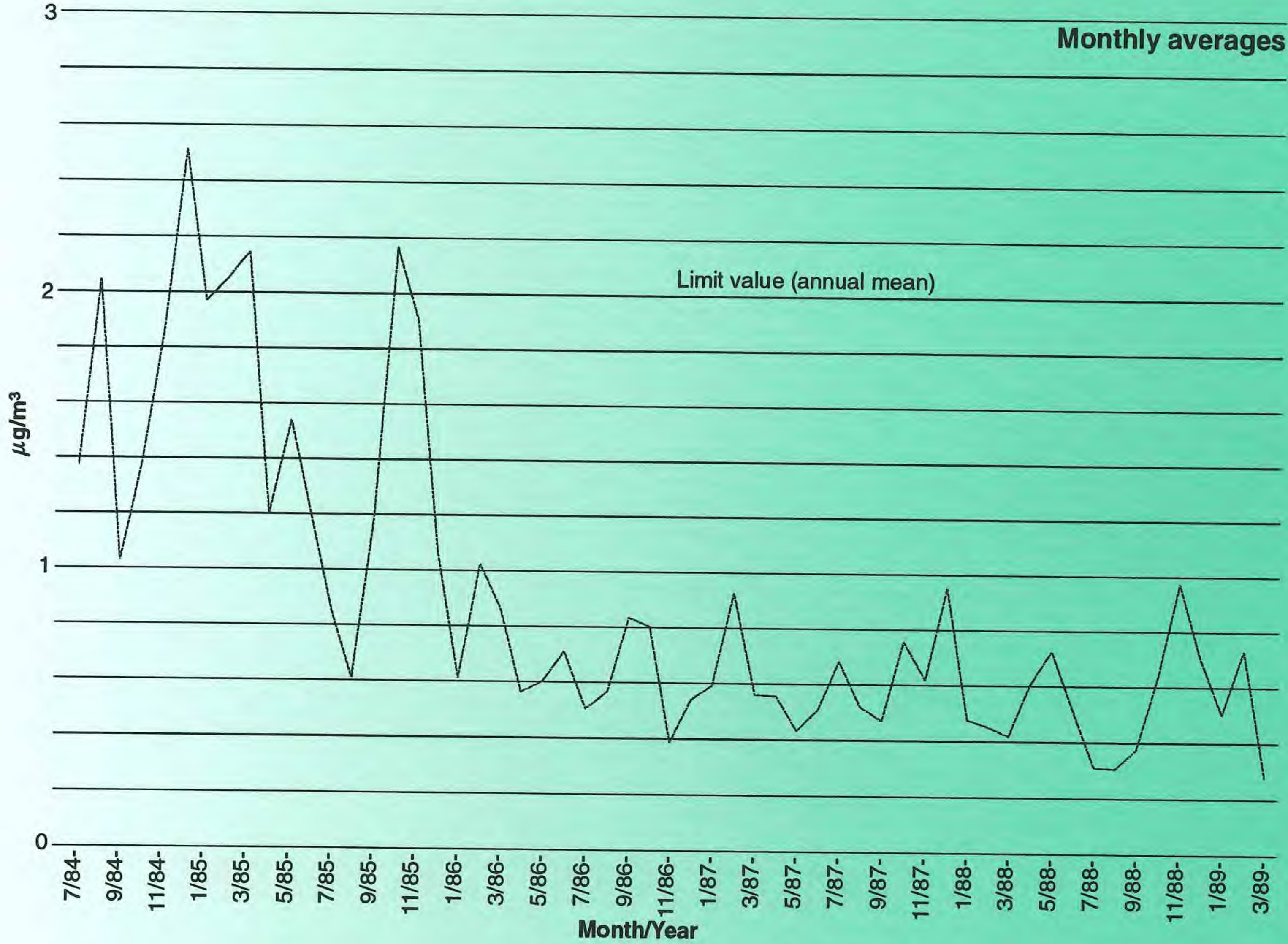

Figure 5.8 Lead levels at Old Kent Road
July 1984 to March 1989

AIR AWARE