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Atmospheric Particulate Lead Levels in the Maltese Islands.

Final Report June 2002-August 2003

Presented to the
Malta Environment and Planning Authority.

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1. Introduction

The major sources of atmospheric pollution in urban areas primarily originate from traffic emissions. The existence of industrial activities may compound the problem even more. The atmospheric pollutants originating from vehicular and industrial emissions in the European Union are nitrogen oxides, sulphur oxides, particulates, carbon monoxide, volatile organic components and heavy metals notably lead, chromium, nickel (recent interest), cadmium, vanadium and manganese (heavy plant emissions), etc.

Statistical data evaluated from laboratory results indicate that over an annual spread, vehicular traffic is responsible for most of the measured levels of carbon monoxide, a high quotient of nitrogen oxides, and very frequently responsible for high levels of respirable suspended particles.

2. Accumulated results of particulate lead levels.

Tables 1A to 1I. show all the results obtained for samples collected from various points during the period 27 June 2002 and 30 April 2003. Sampling was carried out for a period varying between 4 – 8 hours at a flow rate of about 15 litres per minute at ambient temperature. Particulate matter was retained on a 0.45 µm membrane filter. The sampling was effected on most weekdays from police stations, local councils, commercial banks and private houses. The analysis of the membrane samples was carried out at CEFIT srl, a private fully accredited (ISO 17025) laboratory in Italy. CEFIT evaluated the atmospheric particulate lead results obtained. Standard analytical methods were carried out in the determination of lead present in the retained particulate matter. **The overall mean concentration of lead in atmospheric particles in the Maltese Islands during the period June 2002 and August 2003 was 0.208 µg/Nm³.**

Table 1A. Atmospheric particulate lead concentrations during the period 27 June 2002 to 17 July 2002.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
1	Paola	4 Guze Damato	27-Jun-02	0.463
2	Marsa	Race Course	27-Jun-02	0.401
3	Zabbar	49-51 Sanctuary Str	28-Jun-02	0.347
4	Marsascala	23 Dun Tarcisio Agius Square	28-Jun-02	0.112
5	B'Bugia	Pretty Bay	1-Jul-02	0.330
6	Zejtun	Republic Square	1-Jul-02	0.117
7	Mqabba	Trig Il-Madonna Tal Gilju	2-Jul-02	0.196
8	Zurrieq	St. Bartholomew Street	2-Jul-02	0.117
9	Luqa	Dun Pawl Street	3-Jul-02	0.178
10	Birgu	Couvre Port	3-Jul-02	0.071
11	Bormla	St. Gorg Band Club	4-Jul-02	0.185
12	Senglea	Misrah 4 Ta Settembru	4-Jul-02	0.305
13	Tarxien	73 Sta Maria	5-Jul-02	0.116
14	Marsaxlokk	Brabyns Santa Katerina	5-Jul-02	0.402
15	Trade Fair	Long Room	6-Jul-02	0.336
16	Trade Fair	Stand	6-Jul-02	0.137
17	Fgura	Wesghet Il Kunsill Tal Ewropa	8-Jul-02	0.413
18	Gudja	48 Main Str	8-Jul-02	0.380
20	Zebbug	254 Main Str	9-Jul-02	0.621
22	Balzan	Pjazza Bertu Fenech	10-Jul-02	0.096
23	Mosta	63 Constitution Str	11-Jul-02	0.182
24	B'Kara	1 Naxxar Road	11-Jul-02	0.224
25	Santa Venera	Fleur De Lys Junction	12-Jul-02	0.216
26	Hamrun	121 St. Joseph Road	12-Jul-02	0.224
27	Naxxar	Labour Avenue	15-Jul-02	0.503
28	Siggiewi	1-3 St. James Str	15-Jul-02	0.155
19	Qormi	38 St. Sebastian Str	16-Jul-02	0.175
29	Rabat	22 Saqqajja Square	16-Jul-02	0.126
30	St. Paul S Bay	85, St. Paul's Str	17-Jul-02	0.127

Table 1B. Atmospheric particulate lead concentrations during the period 17 July 2002 to 3 October 2002.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
31	Mellieha	34, G.Borg Olivier Street	17-Jul-02	0.418
32	Sliema	22 The Strand	18-Jul-02	0.489
33	San Gwann	Naxxar Road	18-Jul-02	0.413
35	Gzira	219 Xatt	22-Jul-02	0.546
36	Msida	212 Xatt	22-Jul-02	0.499
39	Paceville	Millenium Chapel	24-Jul-02	0.214
40	San Giljan	50 San Gorg	24-Jul-02	0.497
41	Pembroke	Alamein	25-Jul-02	0.398
42	Tal Ibragg	Church	25-Jul-02	0.417
43	G'mangia	St Lukes	26-Jul-02	0.312
44	Pieta	121 Xatt	26-Jul-02	0.508
37	Valetta	45 Republika	29-Jul-02	0.381
38	Floriana	Sta Anna	29-Jul-02	0.454
45	Ghaxaq	Labour Ave	2-Sep-02	0.131
48	Kirkop	Misrah Hal-Kirkop	3-Sep-02	0.017
49	Qrendi	Knisja	4-Sep-02	0.105
50	Zurrieq	Sta Katerina	4-Sep-02	0.025
51	G'Lapsi	Lapsi	5-Sep-02	0.066
54	Xghajra	KNISJA	6-Sep-02	0.161
52	Siggiewi	Manwel Dimech	9-Sep-02	0.238
53	Qawra	Turisti	9-Sep-02	0.091
55	Ta Xbiex	26 Kapinera, Abate Rigord	11-Sep-02	0.181
56	Mdina	San Publiju	11-Sep-02	0.207
57	Mgarr	Fischer	12-Sep-02	0.465
58	Mtarfa	Frans Galea	12-Sep-02	0.088
59	Mriehel	Ph Toledo	13-Sep-02	0.167
65	Marsa	Balbi	16-Sep-02	0.334
66	Paola	Valetta	16-Sep-02	0.233
60	Zabbar	Tac Cawqli	17-Sep-02	0.099
61	Zejtun	42 Mater Boni Consigli	17-Sep-02	0.259
63	Mqabba	29 Parrocca	18-Sep-02	0.347
64	Luqa	Parrocca	19-Sep-02	0.062
67	Birgu	Desain	19-Sep-02	0.253
68	Bormla	Pjazza San Pawl	20-Sep-02	0.344
69	Senglea	4 Settumbru	20-Sep-02	1.251
71	Fgura	Hompsch	23-Sep-02	0.721
72	Qormi	Kbira	24-Sep-02	0.583
73	Zebbug	Ebona	24-Sep-02	0.134
74	Attard	Kbira	25-Sep-02	0.143
75	Balzan	Kbira	25-Sep-02	0.120
76	Mosta	Knisja	26-Sep-02	0.082
77	B'Kara	Kbira	26-Sep-02	0.387
78	Santa Venera	Turretta	27-Sep-02	0.264
79	Hamrun	Fra Diego Square	27-Sep-02	0.251
80	Rabat	San Pawl	30-Sep-02	0.098
81	Dingli	G Ellul Mercer	30-Sep-02	0.107
83	St Pauls Bay	San Pawl	1-Oct-02	0.185
86	Sliema	Manwel Dimech	3-Oct-02	0.201

Table 1C. Atmospheric particulate lead concentrations during the period 3 October 2002 to 19 November 2002.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
87	Msida	Dárgens	3-Oct-02	0.243
88	Valetta	L-Ifran	4-Oct-02	0.151
89	Floriana	Kalcidonio	4-Oct-02	0.074
62	Xlendi (G)	Ta Mulejja	7-Oct-02	0.037
70	Fontana (G)	Trieq Is Sajjieda	7-Oct-02	1.229
90	Kercem (G)	Sarg Street	8-Oct-02	0.020
91	Ta Pinu (G)	Trieq Ta Pinu	8-Oct-02	0.034
92	Gharb (G)	Pjazza Vizitazzjoni	9-Oct-02	0.067
93	San Lawrenz (G)	Pjazza S.Lawrenz	9-Oct-02	0.083
94	Marsalforn (G)	Trieq Il-Port	10-Oct-02	0.052
95	Zebbug (G)	Pjazza Assunta	10-Oct-02	0.081
96	Nadur (G)	St Peter&Paul St	11-Oct-02	0.036
97	Xaghra (G)	8 Sept Str	11-Oct-02	0.081
98	Qala (G)	28 April 1688	14-Oct-02	0.482
99	Ghajnsielem (G)	Seminat Street	14-Oct-02	0.192
100	Mgarr (G)	Mgarr Rd	15-Oct-02	0.038
101	Victoria (G)	Republic Str	15-Oct-02	0.259
102	Xewkija (G)	Independence	16-Oct-02	0.066
103	Ghasri (G)	Garden Str	16-Oct-02	0.046
104	Munxar (G)	Profs Guze Aquilina	17-Oct-02	0.037
105	Sannat (G)	Sannat Rd	17-Oct-02	0.336
82	Santa Lucia	12 St Georges Str	18-Oct-02	0.026
84	Rabat	Popejoh Paulii	18-Oct-02	0.092
106	Attard	Trieq Il-Mosta	28-Oct-02	0.084
107	Balzan	Trieq Il-Idmedja	28-Oct-02	0.133
108	Iklin	Geronimo Abos	29-Oct-02	0.209
109	B'Kara	Naxxar Road	29-Oct-02	0.061
110	Dingli	Main Street	30-Oct-02	0.229
111	Mtarfa	Frans Galea	30-Oct-02	0.087
112	Gharghur	San Bartilmew	31-Oct-02	0.244
113	Bahar Caq	Coast Road	31-Oct-02	0.101
114	Safi	St.Mary	1-Nov-02	0.075
115	Kirkop	S.Benedittu	1-Nov-02	0.066
116	Ghaxaq	Labour Avenue	4-Nov-02	0.279
118	Blata L Bajda	Marsa Road	5-Nov-02	0.883
119	Valletta	Lascaris Wharf	5-Nov-02	0.149
120	Sliema	Balluta	6-Nov-02	0.232
122	Santa Lucia	Dawret It-Torri	7-Nov-02	0.096
123	B Bugia	Pretty Bay	7-Nov-02	0.084
125	Kalafra	Malta Free Port	8-Nov-02	0.099
126	Kalkara	Misrah Arc Gonzi	11-Nov-02	0.060
130	Siggiewi	St James	13-Nov-02	0.020
131	Mgarr	Sir Harry Luke	13-Nov-02	0.020
132	Marsaxlokk	Zabbar Road	14-Nov-02	0.024
133	B'bugia	B'bugia Road	14-Nov-02	0.062
134	Mdina	Pjazza San Publiju	15-Nov-02	0.140
135	Gzira	Strand	15-Nov-02	0.065
138	Mriehel	Notabile	19-Nov-02	0.091

Table 1D. Atmospheric particulate lead concentrations during the period 19 November 2002 to 29 January 2003.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
139	Naxxar	Labou Ave	19-Nov-02	0.093
140	Paceville	Church Street	20-Nov-02	0.430
141	St Andrews	Trieq St Andrews	20-Nov-02	0.030
142	Tal Ibragg	Trieq Ibragg	21-Nov-02	0.520
144	San Giljan	St Georges Road	22-Nov-02	0.120
145	Ta Xbiex	G Mitrovich	22-Nov-02	0.220
146	Tal Ibragg	Triq Tal Ibragg	25-Nov-02	0.090
147	San Gwann	Naxxar Rd	25-Nov-02	0.264
150	St Pauls Bay	St Pawl	26-Nov-02	0.093
151	Mellieha	G Borg Olivier	26-Nov-02	0.191
148	Marsascala	Pjazza Dun	27-Nov-02	0.049
149	Paola	Valletta Rd	27-Nov-02	0.155
152	G'mangia	St Lukes	28-Nov-02	0.054
153	Pieta	Marina	28-Nov-02	0.165
154	Qrendi	Knisja	29-Nov-02	0.065
156	Paola	Valletta	6-Jan-03	0.108
157	Marsa	Racecourse	6-Jan-03	0.062
158	Bormla	Misrah Gavino Gulia	7-Jan-03	0.097
159	Senglea	Misrah L 4 Ta Settembru	7-Jan-03	0.041
160	Zabbar	Zabbar Road	8-Jan-03	0.062
162	Zejtun	42 Mater Boni Consigli	9-Jan-03	0.069
163	Gudja	48 Main Street	9-Jan-03	0.048
165	Marsaxlokk	Santa Katerina Square	10-Jan-03	0.070
161	Birgu	Misrah Arc Gonzi	11-Jan-03	0.546
166	Mqabba	Madonna Tal Gilju	13-Jan-03	0.208
167	Zurrieq	Santa Katerina Square	13-Jan-03	0.145
170	Fgura	Hompsch	15-Jan-03	0.265
171	Xghajra	Knisja	15-Jan-03	0.095
172	B'kara	Naxxar Road	16-Jan-03	0.102
173	Qormi	Kbira	16-Jan-03	0.329
168	Tarxien	Santa Marija	18-Jan-03	0.109
169	Luqa	Parrocca	18-Jan-03	0.130
174	Santa Venera	Fleur De Lys Junction	18-Jan-03	0.125
176	Mosta	Knisja	20-Jan-03	0.199
177	Naxxar	Labour	20-Jan-03	1.526
178	Sliema	Manwel Dimech	21-Jan-03	0.042
179	San Giljan	Pjazza Qalb Ta Gesu	21-Jan-03	0.277
180	Paceville	San Gorg	22-Jan-03	0.138
181	Gzira	Strand	22-Jan-03	0.055
182	Msida	d'Argens	23-Jan-03	0.208
183	G'mangia	St Lukes	23-Jan-03	0.055
184	Valletta	Old Bakery	24-Jan-03	0.020
185	Floriana	St Anne	24-Jan-03	0.069
186	Pieta	Marina	27-Jan-03	0.117
187	Ta Xbiex	Testaferrata	27-Jan-03	0.041
175	Hamrun	St Joseph	28-Jan-03	0.133
190	Dingli	G Ellul Mercer	29-Jan-03	0.030
191	Mtarfa	Frans Galea	29-Jan-03	0.018

Table 1E. Atmospheric particulate lead concentrations during the period 3 March 2003 to 24 March 2003.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
193	Lija	Mifsud Bonnici	3-Mar-03	0.015
194	Blata L Bajda	Blata L Bajda	3-Mar-03	0.350
195	San Gwann	Naxxar Road	3-Mar-03	0.062
218	Senglea	4 Settembru	3-Mar-03	0.331
219	Fgura	Hompsch	3-Mar-03	0.384
220	Gzira	Strand	4-Mar-03	0.513
221	Pieta	Marina	4-Mar-03	0.322
200	Gharb	Pjazza Vizitazzjoni	5-Mar-03	0.165
201	San Lawrenz	Pjazza San Lawrenz	5-Mar-03	0.022
222	Mellieha	Isqof Pace	5-Mar-03	0.201
223	San Gwann	Naxxar Road	5-Mar-03	0.231
202	Marsalforn	Triq Il Port	6-Mar-03	0.210
203	Zebbug	Main Street	6-Mar-03	0.056
224	Qormi	38 St. Sebastian Str	6-Mar-03	0.238
225	Tarxien	Santa Marija	6-Mar-03	0.273
204	Nadur	St Peter&Paul St	7-Mar-03	0.118
226	San Giljan	San Gorg	7-Mar-03	0.418
227	Naxxar	Labour	7-Mar-03	0.335
216	Victoria	Pope John Paul II	10-Mar-03	0.337
217	Santa Lucia	St Georges Road	10-Mar-03	0.034
228	Zebbug	Main Street	10-Mar-03	0.213
229	Qormi	38 St. Sebastian Str	10-Mar-03	0.238
230	Floriana	Capuccin	11-Mar-03	0.310
231	Floriana	St Anne	11-Mar-03	0.210
232	Valetta	Barriera	12-Mar-03	0.229
233	Valetta	Republic	12-Mar-03	0.312
234	Birkirkara	Naxxar Road	13-Mar-03	0.221
234	Tal Ibragg	Tal Ibragg	13-Mar-03	0.324
235	Sliema	Manwel Dimech	14-Mar-03	0.339
236	Iklin	Geronimo Abos	14-Mar-03	0.223
21	Attard	Triq Il-Mosta	17-Mar-03	0.122
34	B'kara	Valley Road	17-Mar-03	0.331
196	Xlendi	Ta Mulejja	17-Mar-03	0.110
197	Fontana	Is Sajjieda	17-Mar-03	0.319
117	Zabbar	Sanctuary	18-Mar-03	0.442
198	Kercem	Sarg Street	19-Mar-03	0.223
121	Kalkara	Misrah Mons Gonzi	20-Mar-03	0.116
124	Bir Id Deheb	Tal Barrani	20-Mar-03	0.215
208	Qala	28 Ta April 1688	20-Mar-03	0.100
209	Ghajnsielem	Seminat Street	20-Mar-03	0.018
128	Floriana	Capuccin	21-Mar-03	0.319
137	Valetta	Barriera	21-Mar-03	0.116
210	Mgarr (Gozo)	Mgarr Rd	21-Mar-03	0.301
211	Victoria	Republic	21-Mar-03	0.402
155	Ta Xbiex	Testaferrata	24-Mar-03	0.090
188	Pieta	Marina	24-Mar-03	0.331
212	Xewkija	Independence	24-Mar-03	0.386
213	Ghasri	Garden Str	24-Mar-03	0.202

Table 1F. Atmospheric particulate lead concentrations during the period 25 March 2003 to 5 May 2003.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
189	Naxxar	Labour	25-Mar-03	0.231
192	Bahar Ic Caghaq	Bahar Ic Caghaq	25-Mar-03	0.185
207	Zebbug (Gozo)	Pjazza Assunta	26-Mar-03	0.227
214	Sannat	Sannat Rd	27-Mar-03	0.181
237	Pembroke	Alamein	27-Mar-03	0.245
215A	Munxar	Profs Guze Aquilina	27-Mar-03	0.117
206	Ghajnsielem	Seminat Street	28-Mar-03	0.334
238	Mosta	Knisja	28-Mar-03	0.333
239	Hamrun	Kbira	28-Mar-03	0.333
205A	Xaghra	8 Sept Str	28-Mar-03	0.300
240	Gzira	Strand	1-Apr-03	0.445
241	G'mangia	St Lukes	1-Apr-03	0.282
242	Paceville	Church	2-Apr-03	0.338
243	Gharghur	San Bartilmew	2-Apr-03	0.127
244	Mellieha	Mifsud Bonnici	3-Apr-03	0.404
245	Siggiewi	St James	3-Apr-03	0.081
246	Iklin	Geronimo Abos	4-Apr-03	0.310
247	Mriehel	Notabile	4-Apr-03	0.227
247A	Blata L Bajda	Marsa Road	5-Apr-03	0.487
248	San Giljan	San Gorg	7-Apr-03	0.441
249	Birkirkara	Naxxar Road R/About	7-Apr-03	0.486
250	Santa Lucia	Xintill R/About	8-Apr-03	0.371
251	Kirkop	Industry	8-Apr-03	0.116
252	Paola	Guze Dámato	9-Apr-03	0.338
253	Marsa	Salib Tal Marsa	9-Apr-03	0.384
254	Zabbar	Sanctuary	10-Apr-03	0.610
255	Marsascala	Dun Tarcisio Agius	10-Apr-03	0.190
256	B'Bugia	Pretty Bay	11-Apr-03	0.310
257	Zejtun	Republic	11-Apr-03	0.322
258	Mqabba	Madonna Tal Gilju	21-Apr-03	0.037
259	Zurrieq	St Bartholomew	21-Apr-03	0.231
260	Luqa	Dun Pawl Street	22-Apr-03	0.300
261	Birgu	Couvre Port	22-Apr-03	0.210
262	Bormla	Pjazza San Pawl	23-Apr-03	0.334
263	Senglea	4 Settembru	23-Apr-03	0.400
264	Tarxien	Santa Marija	24-Apr-03	0.322
265	Marsaxlokk	Santa Katerina Square	24-Apr-03	0.103
266	Qormi	38 St. Sebastian Str	25-Apr-03	0.286
267	Zebbug	Kbira	25-Apr-03	0.300
268	Birgu	Desain	28-Apr-03	0.183
269	Bormla	Pjazza San Pawl	28-Apr-03	0.285
270	Rabat	San Pawl	29-Apr-03	0.101
271	Kalkara	Misrah Mons Gonzi	29-Apr-03	0.078
272	Zurrieq	Santa Katerina Square	30-Apr-03	0.182
273	Mgarr	Fischer	30-Apr-03	0.002
274	Ghaxaq	Labour	2-May-03	0.112
275	Gudja	Main Street	2-May-03	0.087
276	Santa Venera	Fleur De Lys Junction	5-May-03	0.124

Table 1G. Atmospheric particulate lead concentrations during the period 5 May 2003 to 5 June 2003.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
277	Balzan	Triq Il-Idmedja	5-May-03	0.018
278	Birgu	Desain	6-May-03	0.205
279	Xaghjra	8 Sept Str	6-May-03	0.120
280	Bormla	Pjazza San Pawl	7-May-03	0.311
281	Senglea	4 Settembru	7-May-03	0.283
282	Rabat	San Pawl	8-May-03	0.188
283	Dingli	G Ellul Mercer	8-May-03	0.176
282	Fgura	Hompsch	9-May-03	0.324
283	Paola	Guze Dámato	9-May-03	0.416
284	Ghaxaq	Labour	12-May-03	0.172
285	Safi	St.Mary	12-May-03	0.017
286	Luqa	Parrocca	13-May-03	0.189
287	Gudja	Main Street	13-May-03	0.100
288	Mdina	Pjazza San Publiju	14-May-03	0.018
289	Mgarr	Fischer	14-May-03	0.030
290	Floriana	St Anne	15-May-03	0.189
291	Mqabba	Madonna Tal Gilju	15-May-03	0.100
292	Zejtun	42 Mater Boni Consigli	16-May-03	0.205
293	Marsaxlokk	Santa Katerina Square	16-May-03	0.024
294	Qrendi	Knisja	19-May-03	0.029
295	Zurrieq	Santa Katerina Square	19-May-03	0.100
296	San Gwann	Naxxar Road	20-May-03	0.281
297	Sliema	Manwel Dimech	20-May-03	0.228
298	St Pauls Bay	San Pawl	21-May-03	0.200
299	Qawra	Turisti	21-May-03	0.381
300	Paola	Guze Dámato	22-May-03	0.331
301	Marsa	Salib Tal Marsa	22-May-03	0.272
302	Zabbar	Sanctuary	23-May-03	0.322
303	Marsascala	Dun Tarcisio Agius	23-May-03	0.189
304	B'bugia	Pretty Bay	26-May-03	0.095
305	Zejtun	42 Mater Boni Consigli	26-May-03	0.199
306	Zurrieq	Santa Katerina Square	27-May-03	0.077
307	Luqa	Parrocca	27-May-03	0.188
308	Tarxien	Santa Marija	28-May-03	0.200
309	Fgura	Hompsch	28-May-03	0.303
310	Santa Lucia	St Georges Street	29-May-03	0.018
311	Safi	St.Mary	29-May-03	0.010
312	Gudja	Airport	30-May-03	0.119
313	Mosta	Knisja	30-May-03	0.217
313A	Blata L Bajda	Marsa Road	1-Jun-03	0.578
314	Qormi	38 St. Sebastian Str	2-Jun-03	0.166
315	Kalkara	Misrah Mons Gonzi	2-Jun-03	0.173
316	Mellieha	Mifsud Bonnici	3-Jun-03	0.053
317	San Gwann	Naxxar Road	3-Jun-03	0.231
318	Gzira	Trieq Ix Xatt	4-Jun-03	0.337
319	Msida	D'argens	4-Jun-03	0.333
320	Paceville	Church	5-Jun-03	0.287
321	San Giljan	Pjazza Qalb Ta Gesu	5-Jun-03	0.178

Table 1H. Atmospheric particulate lead concentrations during the period 6 June 2003 to 9 July 2003.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
322	Marsa	Salib Tal Marsa	6-Jun-03	0.218
323	Zabbar	Sanctuary	6-Jun-03	0.185
324	Marsascalea	Dun Tarcisio Agius	9-Jun-03	0.018
325	Tarxien	Santa Marija	9-Jun-03	0.253
326	Qormi	38 St. Sebastian Str	10-Jun-03	0.283
327	Zebbug	Kbira	10-Jun-03	0.286
328	Kalkara	Misrah Mons Gonzi	11-Jun-03	0.195
329	Santa Venera	Fleur De Lys Junction	11-Jun-03	0.093
330	Rabat	San Pawl	12-Jun-03	0.183
331	St Pauls Bay	San Pawl	12-Jun-03	0.236
332	Qawra	Turisti	13-Jun-03	0.219
333	Mgarr	Fischer	13-Jun-03	0.189
334	Ta Xbiex	Testaferrata	16-Jun-03	0.167
335	Bahar Ic Caghaq	Bahar Ic Caghaq	16-Jun-03	0.211
336	Birgu	Desain	17-Jun-03	0.202
337	Bormla	Pjazza San Pawl	17-Jun-03	0.236
338	Marsaxlokk	Santa Katerina Square	18-Jun-03	0.101
339	Xghajra	Knisja	18-Jun-03	0.101
340	Santa Lucia	St Georges Street	19-Jun-03	0.056
341	Marsa	Salib Tal Marsa	19-Jun-03	0.211
342	Zabbar	Sanctuary	20-Jun-03	0.217
343	Marsascalea	Dun Tarcisio Agius	20-Jun-03	0.025
344	Zurrieq	Santa Katerina Square	23-Jun-03	0.180
345	G'lapsi	Lapsi	23-Jun-03	0.006
346	Gzira	Trieq Ix Xatt	24-Jun-03	0.175
347	Msida	D'argens	24-Jun-03	0.189
348	Valletta	St Pauls	25-Jun-03	0.200
349	Floriana	St Anne	25-Jun-03	0.201
350	Paceville	Church	26-Jun-03	0.185
351	San Giljan	Pjazza Qalb Ta Gesu	26-Jun-03	0.208
352	Tal Ibragg	Tal Ibragg	27-Jun-03	0.300
353	Mtarfa	Frans Galea	27-Jun-03	0.017
354	B'bugia	Pretty Bay	30-Jun-03	0.128
355	Zejtun	42 Mater Boni Consigli	30-Jun-03	0.173
356	Senglea	4 Settembru	1-Jul-03	0.212
357	Fgura	Hompsch	1-Jul-03	0.283
358	Gudja	Main Street	2-Jul-03	0.283
359	Mosta	Knisja	2-Jul-03	0.300
360	B'kara	Naxxar	3-Jul-03	0.202
361	Hamrun	Kbira	3-Jul-03	0.232
362	Naxxar	Labour	4-Jul-03	0.199
363	St Pauls Bay	San Pawl	4-Jul-03	0.201
364	Trade Fair	Trade Fair Grounds	7-Jul-03	0.224
365	Trade Fair	Trade Fair Grounds	7-Jul-03	0.202
366	Qormi	38 St. Sebastian Str	8-Jul-03	0.202
367	Siggiewi	Manwel Dimech	8-Jul-03	0.029
368	Mellieha	Mifsud Bonnici	9-Jul-03	0.173
369	San Gwann	Naxxar Road	9-Jul-03	0.195

Table II. Atmospheric particulate lead concentrations during the period 10 July 2003 to 8 August 2003.

Prog. No.	Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
370	Sliema	Manwel Dimech	10-Jul-03	0.192
371	Gzira	Trieq Ix Xatt	10-Jul-03	0.203
372	Msida	D'argens	11-Jul-03	0.295
373	Valetta	St Pauls	11-Jul-03	0.203
373A	Blata L Bajda	Marsa Road	11-Jul-03	0.738
374	Floriana	St Anne	14-Jul-03	0.220
375	G'mangia	St Lukes	14-Jul-03	0.302
376	Pieta	Marina	15-Jul-03	0.286
377	Bahar Ic Caghaq	Bahar Ic Caghaq	15-Jul-03	0.210
378	Ghaxaq	Labour	16-Jul-03	0.021
379	Kirkop	Church	16-Jul-03	0.009
380	Dingli	G Ellul Mercer	17-Jul-03	0.195
381	Qawra	Turisti	17-Jul-03	0.208
382	Mdina	Pjazza San Publiju	18-Jul-03	0.196
383	Gharghur	San Bartilmew	18-Jul-03	0.028
384	Xlendi	Ta Mulejja	21-Jul-03	0.078
385	Fontana	Is Sajjieda	21-Jul-03	0.211
386	Kercem	Sarg Street	22-Jul-03	0.018
387	Ta Pinu	Triq Ta Pinu	22-Jul-03	0.019
388	Gharb	Pjazza Vicitazzjoni	23-Jul-03	0.024
389	San Lawrenz	Pjazza San Lawrenz	23-Jul-03	0.010
390	Marsalforn	Triq Il Port	24-Jul-03	0.188
391	Zebbug	Kbira	24-Jul-03	0.018
392	Nadur	St Peter&Paul St	25-Jul-03	0.029
393	Xaghra	8 Sept Str	25-Jul-03	0.068
394	Ghajnsielem	Seminat Street	28-Jul-03	0.073
395	Zebbug	Kbira	28-Jul-03	0.017
396	Qala	28 Ta April 1688	29-Jul-03	0.112
397	Ghajnsielem	Seminat Street	29-Jul-03	0.034
398	Mgarr	Fischer	30-Jul-03	0.189
399	Victoria	Republic	30-Jul-03	0.202
400	Xewkija	Independence	31-Jul-03	0.230
401	Ghasri	Garden Str	31-Jul-03	0.029
402	Sannat	Sannat Rd	1-Aug-03	0.072
403	Munxar	Profs Guze Aquilina	1-Aug-03	0.073
404	Fgura	Hompsch	04-Aug-03	0.178
405	Bormla	Pjazza San Pawl	4-Aug-03	0.201
406	Valetta	L-Ifran	5-Aug-03	0.210
407	Floriana	St Anne	5-Aug-03	0.199
408	Bkara	Valley Road	6-Aug-03	0.115
409	Hamrun	Kbira	6-Aug-03	0.093
410	Selmun	Hotel	7-Aug-03	0.007
411	Comino	Santa Marija Bay	7-Aug-03	0.002
412	Gharb	Pjazza Vicitazzjoni	8-Aug-03	0.022
413	Blata L Bajda	Marsa Road	8-Aug-03	0.668

3. Ranges of Lead concentrations.

EU Directive 1999/30/EC lists the maximum level of atmospheric particulate lead concentration at $0.5 \mu\text{g}/\text{Nm}^3$. The sampled points that gave lead concentrations in the various lead concentration ranges are given in Tables 2A to 2F.

Table 2A. Sampled points with lead concentrations exceeding the EU level of $0.5 \mu\text{g}/\text{Nm}^3$.

Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
Naxxar	Labour	20-Jan-03	1.526
Senglea	4 Settembru	20-Sep-02	1.251
Fontana (G)	Triq Is Sajjieda	07-Oct-02	1.229
Blata L Bajda	Marsa Road	05-Nov-02	0.883
Blata L Bajda	Marsa Road	11-Jul-03	0.738
Fgura	Hompesch	23-Sep-02	0.721
Blata L Bajda	Marsa Road	37841	0.668
Zebbug	254 Main Str	09-Jul-02	0.621
Zabbar	Sanctuary	10-Apr-03	0.61
Qormi	Kbira	24-Sep-02	0.583
Blata L Bajda	Marsa Road	01-Jun-03	0.578
Birgu	Misrah Arc Gonzi	11-Jan-03	0.546
Gzira	219 Xatt	22-Jul-02	0.546
Tal Ibragg	Triq Ibragg	21-Nov-02	0.52
Gzira	Strand	04-Mar-03	0.513
Pieta	121 Xatt	26-Jul-02	0.508
Naxxar	Labour Avenue	15-Jul-02	0.503

Table 2B. Sampled points with lead concentrations within the range 0.499 and 0.400 $\mu\text{g}/\text{Nm}^3$.

Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
Msida	212 Xatt	22-Jul-02	0.499
San Giljan	50 San Gorg	24-Jul-02	0.497
Sliema	22 The Strand	18-Jul-02	0.489
Blata L Bajda	Marsa Road	05-Apr-03	0.487
Birkirkara	Naxxar Road R/About	07-Apr-03	0.486
Qala (G)	28 April 1688	14-Oct-02	0.482
Mgarr	Fischer	12-Sep-02	0.465
Paola	4 Guze D'amato	27-Jun-02	0.463
Floriana	Sta Anna	29-Jul-02	0.454
Gzira	Strand	01-Apr-03	0.445
Zabbar	Sanctuary	18-Mar-03	0.442
San Giljan	San Gorg	07-Apr-03	0.441
Paceville	Church Street	20-Nov-02	0.43
Mellieha	34, G.Borg Olivier Street	17-Jul-02	0.418
San Giljan	San Gorg	07-Mar-03	0.418
Tal Ibragg	Church	25-Jul-02	0.417
Paola	Guze Dámato	09-May-03	0.416
Fgura	Wesghet Il Kunsill Tal Ewropa	08-Jul-02	0.413
San Gwann	Naxxar Road	18-Jul-02	0.413
Mellieha	Mifsud Bonnici	03-Apr-03	0.404
Marsaxlokk	Brabyns Santa Katerina	05-Jul-02	0.402
Victoria	Republic	21-Mar-03	0.402
Marsa	Race Course	27-Jun-02	0.401
Senglea	4 Settembru	23-Apr-03	0.4

Table 2C. Sampled points with lead concentrations within the range 0.399 and 0.300 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Pembroke	Alamein	25-Jul-02	0.398
B'Kara	Kbira	26-Sep-02	0.387
Xewkija	Independence	24-Mar-03	0.386
Fgura	Hompsch	03-Mar-03	0.384
Marsa	Salib Tal Marsa	09-Apr-03	0.384
Qawra	Turisti	21-May-03	0.381
Valletta	45 Republika	29-Jul-02	0.381
Gudja	48 Main Str	08-Jul-02	0.38
Santa Lucia	Xintill R/About	08-Apr-03	0.371
Blata L Bajda	Blata L Bajda	03-Mar-03	0.35
Mqabba	29 Parrocca	18-Sep-02	0.347
Zabbar	49-51 Sanctuary Str	28-Jun-02	0.347
Bormla	Pjazza San Pawl	20-Sep-02	0.344
Sliema	Manwel Dimech	14-Mar-03	0.339
Paceville	Church	02-Apr-03	0.338
Paola	Guze Dámato	09-Apr-03	0.338
Gzira	Trieq Ix Xatt	04-Jun-03	0.337
Victoria	Pope John Paul II	10-Mar-03	0.337
Sannat (G)	Sannat Rd	17-Oct-02	0.336
Trade Fair	Long Room	06-Jul-02	0.336
Naxxar	Labour	07-Mar-03	0.335
Bormla	Pjazza San Pawl	23-Apr-03	0.334
Ghajnsielem	Seminat Street	28-Mar-03	0.334
Marsa	Balbi	16-Sep-02	0.334
Hamrun	Kbira	28-Mar-03	0.333
Mosta	Knisja	28-Mar-03	0.333
Msida	D'argens	04-Jun-03	0.333
B'kara	Valley Road	17-Mar-03	0.331
Paola	Guze Dámato	22-May-03	0.331
Pieta	Marina	24-Mar-03	0.331
Senglea	4 Settembru	03-Mar-03	0.331
B'Bugia	Pretty Bay	01-Jul-02	0.33
Qormi	Kbira	16-Jan-03	0.329
Fgura	Hompsch	09-May-03	0.324
Tal Ibragg	Tal Ibragg	13-Mar-03	0.324
Pieta	Marina	04-Mar-03	0.322
Tarxien	Santa Marija	24-Apr-03	0.322
Zabbar	Sanctuary	23-May-03	0.322
Zejtun	Republic	11-Apr-03	0.322
Floriana	Capuccin	21-Mar-03	0.319
Fontana	Is Sajjieda	17-Mar-03	0.319

Table 2C cont'd. Sampled points with lead concentrations within the range 0.399 and 0.300 $\mu\text{g}/\text{Nm}^3$.

Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
G'mangia	St Lukes	26-Jul-02	0.312
Valletta	Republic	12-Mar-03	0.312
Bormla	Pjazza San Pawl	07-May-03	0.311
B'Bugia	Pretty Bay	11-Apr-03	0.31
Floriana	Capuccin	11-Mar-03	0.31
Iklin	Geronimo Abos	04-Apr-03	0.31
Senglea	Misrah 4 Ta Settembru	04-Jul-02	0.305
Fgura	Hompesch	28-May-03	0.303
G'mangia	St Lukes	14-Jul-03	0.302
Mgarr (Gozo)	Mgarr Rd	21-Mar-03	0.301
Luqa	Dun Pawl Street	22-Apr-03	0.3
Mosta	Knisja	02-Jul-03	0.3
Tal Ibragg	Tal Ibragg	27-Jun-03	0.3
Xaghra	8 Sept Str	28-Mar-03	0.3
Zebbug	Kbira	25-Apr-03	0.3

Table 2D. Sampled points with lead concentrations within the range 0.299 and 0.200 $\mu\text{g}/\text{Nm}^3$.

Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
Msida	D'argens	11-Jul-03	0.295
Paceville	Church	05-Jun-03	0.287
Pieta	Marina	15-Jul-03	0.286
Qormi	38 St. Sebastian Str	25-Apr-03	0.286
Zebbug	Kbira	10-Jun-03	0.286
Bormla	Pjazza San Pawl	28-Apr-03	0.285
Fgura	Hompesch	01-Jul-03	0.283
Gudja	Main Street	02-Jul-03	0.283
Qormi	38 St. Sebastian Str	10-Jun-03	0.283
Senglea	4 Settembru	07-May-03	0.283
G'mangia	St Lukes	01-Apr-03	0.282
San Gwann	Naxxar Road	20-May-03	0.281
Ghaxaq	Labour Avenue	04-Nov-02	0.279
San Giljan	Pjazza Qalb Ta Gesu	21-Jan-03	0.277
Tarxien	Santa Marija	06-Mar-03	0.273
Marsa	Salib Tal Marsa	22-May-03	0.272
Fgura	Hompesch	15-Jan-03	0.265
San Gwann	Naxxar Rd	25-Nov-02	0.264
Santa Venera	Turretta	27-Sep-02	0.264
Victoria (G)	Republic Str	15-Oct-02	0.259
Zejtun	42 Mater Boni Consigli	17-Sep-02	0.259
Birgu	Desain	19-Sep-02	0.253
Tarxien	Santa Marija	09-Jun-03	0.253
Hamrun	Fra Diego Square	27-Sep-02	0.251

Table 2D cont'd. Sampled points with lead concentrations within the range 0.299 and 0.200 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Pembroke	Alamein	27-Mar-03	0.245
Gharghur	San Bartilmew	31-Oct-02	0.244
Msida	Dárgens	03-Oct-02	0.243
Qormi	38 St. Sebastian Str	06-Mar-03	0.238
Qormi	38 St. Sebastian Str	10-Mar-03	0.238
Siggiewi	Manwel Dimech	09-Sep-02	0.238
Bormla	Pjazza San Pawl	17-Jun-03	0.236
St Pauls Bay	San Pawl	12-Jun-03	0.236
Paola	Valletta	16-Sep-02	0.233
Hamrun	Kbira	03-Jul-03	0.232
Sliema	Balluta	06-Nov-02	0.232
Naxxar	Labour	25-Mar-03	0.231
San Gwann	Naxxar Road	05-Mar-03	0.231
San Gwann	Naxxar Road	03-Jun-03	0.231
Zurrieq	St Bartholomew	21-Apr-03	0.231
Xewkija	Independence	31-Jul-03	0.23
Dingli	Main Street	30-Oct-02	0.229
Valletta	Barriera	12-Mar-03	0.229
Sliema	Manwel Dimech	20-May-03	0.228
Mriehel	Notabile	04-Apr-03	0.227
Zebbug (Gozo)	Pjazza Assunta	26-Mar-03	0.227
B'Kara	1 Naxxar Road	11-Jul-02	0.224
Hamrun	121 St. Joseph Road	12-Jul-02	0.224
Trade Fair	Trade Fair Grounds	07-Jul-03	0.224
Iklin	Geronimo Abos	14-Mar-03	0.223
Kercem	Sarg Street	19-Mar-03	0.223
Birkirkara	Naxxar Road	13-Mar-03	0.221
Floriana	St Anne	14-Jul-03	0.22
Ta Xbiex	G Mitrovich	22-Nov-02	0.22
Qawra	Turisti	13-Jun-03	0.219
Marsa	Salib Tal Marsa	06-Jun-03	0.218
Mosta	Knisja	30-May-03	0.217
Zabbar	Sanctuary	20-Jun-03	0.217
Santa Venera	Fleur De Lys Junction	12-Jul-02	0.216
Bir Id Deheb	Tal Barrani	20-Mar-03	0.215
Paceville	Millenium Chapel	24-Jul-02	0.214
Zebbug	Main Street	10-Mar-03	0.213
Senglea	4 Settembru	01-Jul-03	0.212
Bahar Ic Caghaq	Bahar Ic Caghaq	16-Jun-03	0.211
Fontana	Is Sajjieda	21-Jul-03	0.211

Table 2D cont'd. Sampled points with lead concentrations within the range 0.299 and 0.200 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Marsa	Salib Tal Marsa	19-Jun-03	0.211
Bahar Ic Caghaq	Bahar Ic Caghaq	15-Jul-03	0.21
Birgu	Couvre Port	22-Apr-03	0.21
Floriana	St Anne	11-Mar-03	0.21
Marsalforn	Triq Il Port	06-Mar-03	0.21
Valletta	L-Ifran	05-Aug-03	0.21
Iklin	Geronimo Abos	29-Oct-02	0.209
Mqabba	Madonna Tal Gilju	13-Jan-03	0.208
Msida	d'Argens	23-Jan-03	0.208
Qawra	Turisti	17-Jul-03	0.208
San Giljan	Pjazza Qalb Ta Gesu	26-Jun-03	0.208
Mdina	San Publiju	11-Sep-02	0.207
Birgu	Desain	06-May-03	0.205
Zejtun	42 Mater Boni Consigli	16-May-03	0.205
Gzira	Trieq Ix Xatt	10-Jul-03	0.203
Valletta	St Pauls	11-Jul-03	0.203
Birgu	Desain	17-Jun-03	0.202
B'kara	Naxxar	03-Jul-03	0.202
Ghasri	Garden Str	24-Mar-03	0.202
Qormi	38 St. Sebastian Str	08-Jul-03	0.202
Trade Fair	Trade Fair Grounds	07-Jul-03	0.202
Victoria	Republic	30-Jul-03	0.202
Bormla	Pjazza San Pawl	04-Aug-03	0.201
Floriana	St Anne	25-Jun-03	0.201
Mellieha	Isqof Pace	05-Mar-03	0.201
Sliema	Manwel Dimech	03-Oct-02	0.201
St Pauls Bay	San Pawl	04-Jul-03	0.201
St Pauls Bay	San Pawl	21-May-03	0.2
Tarxien	Santa Marija	28-May-03	0.2
Valletta	St Pauls	25-Jun-03	0.2

Table 2E. Sampled points with lead concentrations within the range 0.199 and 0.100 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Floriana	St Anne	05-Aug-03	0.199
Mosta	Knisja	20-Jan-03	0.199
Naxxar	Labour	04-Jul-03	0.199
Zejtun	42 Mater Boni Consigli	26-May-03	0.199
Mdina	Pjazza San Publiju	18-Jul-03	0.196
Mqabba	Triq Il-Madonna Tal Gilju	02-Jul-02	0.196
Kalkara	Misrah Mons Gonzi	11-Jun-03	0.195
Dingli	G Ellul Mercer	17-Jul-03	0.195
San Gwann	Naxxar Road	09-Jul-03	0.195
Ghajnsielem (G)	Seminat Street	14-Oct-02	0.192
Sliema	Manwel Dimech	10-Jul-03	0.192
Mellieha	G Borg Olivier	26-Nov-02	0.191
Marsascala	Dun Tarcisio Agius	10-Apr-03	0.19
Floriana	St Anne	15-May-03	0.189
Luqa	Parrocca	13-May-03	0.189
Marsascala	Dun Tarcisio Agius	23-May-03	0.189
Mgarr	Fischer	13-Jun-03	0.189
Mgarr	Fischer	30-Jul-03	0.189
Msida	D'argens	24-Jun-03	0.189
Luqa	Parrocca	27-May-03	0.188
Marsalforn	Triq Il Port	24-Jul-03	0.188
Rabat	San Pawl	08-May-03	0.188
Bahar Ic Caghaq	Bahar Ic Caghaq	25-Mar-03	0.185
Bormla	St. Gorg Band Club	04-Jul-02	0.185
Paceville	Church	26-Jun-03	0.185
St Pauls Bay	San Pawl	01-Oct-02	0.185
Zabbar	Sanctuary	06-Jun-03	0.185
Birgu	Desain	28-Apr-03	0.183
Rabat	San Pawl	12-Jun-03	0.183
Mosta	63 Constitution Str	11-Jul-02	0.182
Zurrieq	Santa Katerina Square	30-Apr-03	0.182
Sannat	Sannat Rd	27-Mar-03	0.181
Ta Xbiex	26 Kapinera, Abate Rigord	11-Sep-02	0.181
Zurrieq	Santa Katerina Square	23-Jun-03	0.18
Fgura	Hompsch	04-Aug-03	0.178
Luqa	Dun Pawl Street	03-Jul-02	0.178
San Giljan	Pjazza Qalb Ta Gesu	05-Jun-03	0.178
Dingli	G Ellul Mercer	08-May-03	0.176
Gzira	Trieq Ix Xatt	24-Jun-03	0.175
Qormi	38 St. Sebastian Str	16-Jul-02	0.175

Table 2E cont'd Sampled points with lead concentrations within the range 0.199 and 0.100 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Kalkara	Misrah Mons Gonzi	02-Jun-03	0.173
Mellieha	Mifsud Bonnici	09-Jul-03	0.173
Zejtun	42 Mater Boni Consigli	30-Jun-03	0.173
Ghaxaq	Labour	12-May-03	0.172
Mriehel	Ph Toledo	13-Sep-02	0.167
Ta Xbiex	Testaferrata	16-Jun-03	0.167
Qormi	38 St. Sebastian Str	02-Jun-03	0.166
Gharb	Pjazza Vizzitazzjoni	05-Mar-03	0.165
Pieta	Marina	28-Nov-02	0.165
Xghajra	KNISJA	06-Sep-02	0.161
Paola	Valletta Rd	27-Nov-02	0.155
Siggiewi	1-3 St. James Str	15-Jul-02	0.155
Valetta	L-Ifran	04-Oct-02	0.151
Valletta	Lascaris Wharf	05-Nov-02	0.149
Zurrieq	Santa Katerina Square	13-Jan-03	0.145
Attard	Kbira	25-Sep-02	0.143
Mdina	Pjazza San Publiju	15-Nov-02	0.14
Paceville	San Gorg	22-Jan-03	0.138
Trade Fair	Stand	06-Jul-02	0.137
Zebbug	Ebona	24-Sep-02	0.134
Balzan	Triq II-Idmedja	28-Oct-02	0.133
Hamrun	St Joseph	28-Jan-03	0.133
Ghaxaq	Labour Ave	02-Sep-02	0.131
Luqa	Parrocca	18-Jan-03	0.13
B'bugia	Pretty Bay	30-Jun-03	0.128
Gharghur	San Bartilmew	02-Apr-03	0.127
St. Paul S Bay	85, St. Paul's Str	17-Jul-02	0.127
Rabat	22 Saqqajja Square	16-Jul-02	0.126
Santa Venera	Fleur De Lys Junction	18-Jan-03	0.125
Santa Venera	Fleur De Lys Junction	05-May-03	0.124
Attard	Triq II-Mosta	17-Mar-03	0.122
Balzan	Kbira	25-Sep-02	0.12
San Giljan	St Georges Road	22-Nov-02	0.12
Xaghjra	8 Sept Str	06-May-03	0.12
Gudja	Airport	30-May-03	0.119
Nadur	St Peter&Paul St	07-Mar-03	0.118
Munxar	Profs Guze Aquilina	27-Mar-03	0.117
Pieta	Marina	27-Jan-03	0.117
Zejtun	Republic Square	01-Jul-02	0.117
Zurrieq	St. Bartholomew Street	02-Jul-02	0.117

Table 2E cont'd Sampled points with lead concentrations within the range 0.199 and 0.100 $\mu\text{g}/\text{Nm}^3$.

Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
Kalkara	Misrah Mons Gonzi	20-Mar-03	0.116
Kirkop	Industry	08-Apr-03	0.116
Tarxien	73 Sta Maria	05-Jul-02	0.116
Valletta	Barriera	21-Mar-03	0.116
Bkara	Valley Road	06-Aug-03	0.115
Ghaxaq	Labour	02-May-03	0.112
Marsascalea	23 Dun Tarcisio Agius Square	28-Jun-02	0.112
Qala	28 Ta April 1688	29-Jul-03	0.112
Xlendi	Ta Mulejja	17-Mar-03	0.11
Tarxien	Santa Marija	18-Jan-03	0.109
Paola	Valletta	06-Jan-03	0.108
Dingli	G Ellul Mercer	30-Sep-02	0.107
Qrendi	Knisja	04-Sep-02	0.105
Marsaxlokk	Santa Katerina Square	24-Apr-03	0.103
B'kara	Naxxar Road	16-Jan-03	0.102
Bahar ic-Caghaq	Coast Road	31-Oct-02	0.101
Marsaxlokk	Santa Katerina Square	18-Jun-03	0.101
Rabat	San Pawl	29-Apr-03	0.101
Xghajra	Knisja	18-Jun-03	0.101
Gudja	Main Street	13-May-03	0.1
Mqabba	Madonna Tal Gilju	15-May-03	0.1
Qala	28 Ta April 1688	20-Mar-03	0.1
Zurrieq	Santa Katerina Square	19-May-03	0.1

Table 2F. Sampled points with lead concentrations within the range 0.099 and 0.000 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Kalafrana	Malta Free Port	08-Nov-02	0.099
Zabbar	Tac Cawqli	17-Sep-02	0.099
Rabat	San Pawl	30-Sep-02	0.098
Bormla	Misrah Gavino Gulia	07-Jan-03	0.097
Balzan	Pjazza Bertu Fenech	10-Jul-02	0.096
Santa Lucia	Dawret It-Torri	07-Nov-02	0.096
B'bugia	Pretty Bay	26-May-03	0.095
Xghajra	Knisja	15-Jan-03	0.095
Hamrun	Kbira	37839	0.0934
Naxxar	Labou Ave	19-Nov-02	0.093
Santa Venera	Fleur De Lys Junction	11-Jun-03	0.093
St Pauls Bay	St Pawl	26-Nov-02	0.093
Rabat	Popejoh Paulii	18-Oct-02	0.092
Mriehel	Notabile	19-Nov-02	0.091
Qawra	Turisti	09-Sep-02	0.091
Ta Xbiex	Testaferrata	24-Mar-03	0.09
Tal Ibragg	Triq Tal Ibragg	25-Nov-02	0.09
Mtarfa	Frans Galea	12-Sep-02	0.088
Gudja	Main Street	02-May-03	0.087
Mtarfa	Frans Galea	30-Oct-02	0.087
Attard	Triq Il-Mosta	28-Oct-02	0.084
B Bugia	Pretty Bay	07-Nov-02	0.084
San Lawrenz (G)	Pjazza S.Lawrenz	09-Oct-02	0.083
Mosta	Knisja	26-Sep-02	0.082
Siggiewi	St James	03-Apr-03	0.081
Xaghra (G)	8 Sept Str	11-Oct-02	0.081
Zebbug (G)	Pjazza Assunta	10-Oct-02	0.081
Dingli	G Ellul Mercer	29-Apr-03	0.078
Xlendi	Ta Mulejja	21-Jul-03	0.078
Zurrieq	Santa Katerina Square	27-May-03	0.077
Safi	St.Mary	01-Nov-02	0.075
Floriana	Kalcidonio	04-Oct-02	0.074
Ghajnsielem	Seminat Street	28-Jul-03	0.073
Munxar	Profs Guze Aquilina	01-Aug-03	0.073
Sannat	Sannat Rd	01-Aug-03	0.072
Birgu	Couvre Port	03-Jul-02	0.071
Marsaxlokk	Santa Katerina Square	10-Jan-03	0.07
Floriana	St Anne	24-Jan-03	0.069
Zejtun	42 Mater Boni Consigli	09-Jan-03	0.069

Table 2F cont'd Sampled points with lead concentrations within the range 0.099 and 0.000 µg/Nm³.

Town	Street	Date	Lead µg/Nm³
Xaghra	8 Sept Str	25-Jul-03	0.068
Gharb (G)	Pjazza Vizzitazzjoni	09-Oct-02	0.067
G'Lapsi	Lapsi	05-Sep-02	0.066
Kirkop	S.Benedittu	01-Nov-02	0.066
Xewkija (G)	Independence	16-Oct-02	0.066
Gzira	Strand	15-Nov-02	0.065
Qrendi	Knisja	29-Nov-02	0.065
B'bugia	B'bugia Road	14-Nov-02	0.062
Luqa	Parrocca	19-Sep-02	0.062
Marsa	Racecourse	06-Jan-03	0.062
San Gwann	Naxxar Road	03-Mar-03	0.062
Zabbar	Zabbar Road	08-Jan-03	0.062
B'Kara	Naxxar Road	29-Oct-02	0.061
Kalkara	Misrah Arc Gonzi	11-Nov-02	0.06
Santa Lucia	St Georges Street	19-Jun-03	0.056
Zebbug	Main Street	06-Mar-03	0.056
G'mangia	St Lukes	23-Jan-03	0.055
Gzira	Strand	22-Jan-03	0.055
G'mangia	St Lukes	28-Nov-02	0.054
Mellieha	Mifsud Bonnici	03-Jun-03	0.053
Marsalforn (G)	Triq Il-Port	10-Oct-02	0.052
Marsascala	Pjazza Dun	27-Nov-02	0.049
Gudja	48 Main Street	09-Jan-03	0.048
Ghasri (G)	Garden Str	16-Oct-02	0.046
Sliema	Manwel Dimech	21-Jan-03	0.042
Senglea	Misrah L 4 Ta Settembru	07-Jan-03	0.041
Ta Xbiex	Testaferrata	27-Jan-03	0.041
Mgarr (G)	Mgarr Rd	15-Oct-02	0.038
Mqabba	Madonna Tal Gilju	21-Apr-03	0.037
Munxar (G)	Profs Guze Aquilina	17-Oct-02	0.037
Xlendi (G)	Ta Mulejja	07-Oct-02	0.037
Nadur (G)	St Peter&Paul St	11-Oct-02	0.036
Ghajnsielem	Seminat Street	29-Jul-03	0.034
Santa Lucia	St Georges Road	10-Mar-03	0.034
Ta Pinu (G)	Triq Ta Pinu	08-Oct-02	0.034
Dingli	G Ellul Mercer	29-Jan-03	0.03
Mgarr	Fischer	14-May-03	0.03
St Andrews	Trieq St Andrews	20-Nov-02	0.03
Ghasri	Garden Str	31-Jul-03	0.029
Nadur	St Peter&Paul St	25-Jul-03	0.029
Qrendi	Knisja	19-May-03	0.029
Siggiewi	Manwel Dimech	08-Jul-03	0.029

Table 2F. cont'd Sampled points with lead concentrations within the range 0.099 and 0.000 $\mu\text{g}/\text{Nm}^3$.

Town	Street	Date	Lead $\mu\text{g}/\text{Nm}^3$
Gharghur	San Bartilmew	18-Jul-03	0.028
Santa Lucia	12 St Georges Str	18-Oct-02	0.026
Marsascala	Dun Tarcisio Agius	20-Jun-03	0.025
Zurrieq	Sta Katerina	04-Sep-02	0.025
Gharb	Pjazza Vitztazzjoni	23-Jul-03	0.024
Marsaxlokk	Zabbar Road	14-Nov-02	0.024
Marsaxlokk	Santa Katerina Square	16-May-03	0.024
Gharb	Pjazza Vitztazzjoni	37841	0.0221
San Lawrenz	Pjazza San Lawrenz	05-Mar-03	0.022
Ghaxaq	Labour	16-Jul-03	0.021
Kercem (G)	Sarg Street	08-Oct-02	0.02
Mgarr	Sir Harry Luke	13-Nov-02	0.02
Siggiewi	St James	13-Nov-02	0.02
Valletta	Old Bakery	24-Jan-03	0.02
Ta Pinu	Triq Ta Pinu	22-Jul-03	0.019
Balzan	Triq Il-Idmedja	05-May-03	0.018
Ghajnsielem	Seminat Street	20-Mar-03	0.018
Kercem	Sarg Street	22-Jul-03	0.018
Marsascala	Dun Tarcisio Agius	09-Jun-03	0.018
Mdina	Pjazza San Publiju	14-May-03	0.018
Mtarfa	Frans Galea	29-Jan-03	0.018
Santa Lucia	St Georges Street	29-May-03	0.018
Zebbug	Kbira	24-Jul-03	0.018
Kirkop	Misrah Hal-Kirkop	03-Sep-02	0.017
Mtarfa	Frans Galea	27-Jun-03	0.017
Safi	St.Mary	12-May-03	0.017
Zebbug	Kbira	28-Jul-03	0.017
Lija	Mifsud Bonnici	03-Mar-03	0.015
Safi	St.Mary	29-May-03	0.01
San Lawrenz	Pjazza San Lawrenz	23-Jul-03	0.01
Kirkop	Church	16-Jul-03	0.009
Selmun	Hotel	37840	0.0067
G'lapsi	Lapsi	23-Jun-03	0.006
Mgarr	Fischer	30-Apr-03	0.002
Comino	Santa Marija Bay	37840	0.002

The total number of results that were found to be within the respective lead concentration ranges are given in Table 3. The table shows that the major number of samples gave relative values well below the EU maximum of 0.5 µg/Nm³.

Table 3 Number of samples within the respective ranges.

Range	Number of samples	% of Total Samples
0,000 to 0.099	116	28 %
0.100 to 0.199	103	25 %
0.200 to 0.299	94	23 %
0.300 to 0.399	56	14 %
0.400 to 0.499	24	6 %
> 0.500	18	4 %

4. Assessment Threshold levels

EU Directive 96/62/EC Article 6, envisages various possibilities in measurements to be taken in order to carry out the assessment of air quality. Once the corresponding limit values have been set, the Upper Target Assessment Threshold and the Lower Alert Assessment Threshold have to be established. Most EU countries have adopted the following criteria for establishing the limits:

Limit Value	Set by Directive 99/30/EC:	0.5 µg/Nm³
Upper Target Assessment Threshold	70 % of the 0.5 µg/Nm ³ limit:	0.35 µg/Nm³
Lower Alert Assessment Threshold	50 % of the 0.5 µg/Nm ³ limit:	0.25 µg/Nm³

On the basis of these calculations, the annual mean levels of lead found in the respective towns and villages have been grouped accordingly in Tables 4A to 4E.

Table 4A: Towns where the levels have been found to exceed the EU level of 0.5 µg/Nm³

Blata L Bajda	0.617
Fontana (G)	0.586

Table 4B: Towns where the levels have been found to exceed the Upper Target Assessment Threshold of 0.35 µg/Nm³

Naxxar	0.481
Senglea	0.403
Fgura	0.359

Table 4C: Towns where the levels have been found to exceed the Lower Target Assessment Threshold of 0.25 $\mu\text{g}/\text{Nm}^3$

Tal Ibragg	0.330
Pembroke	0.322
San Giljan	0.306
Victoria (G)	0.300
Msida	0.295
Gzira	0.292
Paola	0.292
Pieta	0.288
Zabbar	0.286
Qormi	0.278
Marsa	0.269
Paceville	0.265
Zebbug	0.262

Table 4D: Towns where the levels have been found to be close to the Lower Target Assessment Threshold of 0.25 $\mu\text{g}/\text{Nm}^3$

Bormla	0.249
Iklin	0.247
Sliema	0.246

Table 4E: Towns where the levels have been found to be below the Lower Target Assessment Threshold of 0.25 µg/Nm³

Mellieha	0.240
San Gwann	0.240
Birgu	0.239
Birkirkara	0.237
Qala (G)	0.231
Xewkija (G)	0.227
Trade Fair	0.225
Qawra	0.225
Floriana	0.225
Mosta	0.219
Bir Id Deheb	0.215
Tarxien	0.212
Hamrun	0.211
G'mangia	0.201
Valletta	0.197
Sannat (G)	0.196
Zejtun	0.192
Mqabba	0.178
Bahar Ic Caghaq	0.177
Mgarr (Gozo)	0.176
Luqa	0.175
St. Paul S Bay	0.174
Gudja	0.170
Birzebbugia	0.168
Santa Venera	0.164
Mriehel	0.162
Marsalforn (G)	0.150
Xaghra (G)	0.150
Dingli	0.147
Ghaxaq	0.143
Mdina	0.140
Ta Xbiex	0.140
Gharghur	0.133
Zurrieq	0.132
Rabat	0.131
Ghajnsielem (G)	0.130
Mgarr	0.129
Kalkara	0.124
Marsaxlokk	0.121
Xaghjra	0.119
Attard	0.116
Siggiewi	0.105

Table 4E cont'd: Towns where the levels have been found to be below the Lower Target Assessment Threshold of 0.25 µg/Nm³

Santa Lucia	0.100
Kalafrana	0.099
Marsascala	0.097
Zebbug (Gozo)	0.095
Ghasri (G)	0.092
Balzan	0.092
Kercem (G)	0.087
Munxar (G)	0.076
Xlendi (G)	0.075
Gharb (G)	0.070
Qrendi	0.066
Nadur (G)	0.061
Mtarfa	0.053
Kirkop	0.052
San Lawrenz (G)	0.038
G'lapsi	0.036
Safi	0.034
St Andrews	0.030
Ta Pinu (G)	0.027
Lija	0.015
Selmun	0.007
Comino	0.002

5. Actions to be taken:

A. Where the limit value is exceeded.

Although the levels of lead given in Table 4A are not excessively higher than the 0.5 µg/Nm³ EU limit, (in fact it may be considered as being below a “tolerance level” as described in 96/62/EC), the levels have to be reduced by the year 2005.

It is recommended that a fortnightly sampling and analysis in the two zones be carried out.

B. Where the levels are lower than the limit value

It must be assured that the levels of lead indicated in the towns shown in Table 2B, Table 2C and Table 2D, are maintained below the limit values and shall endeavour to preserve the best ambient air quality, compatible with sustainable development.

It is recommended that each of these towns is monitored at least 10 times a year.

C. All other towns.

In view of the relatively low mean values found for the remaining sixty odd towns, it is not necessary to carry out routine sampling from these sites.

It is recommended that an annual total of 30 tests would be enough to carry out random monitoring of the lead levels in these towns.

6. Costings

Based on the recommendations given in Section 5. the total budget required for sampling and analysis should not exceed Lm 10,000. However it must be emphasised at this point that this sampling and analysis programme should be complemented by determining other parameters such as heavy metals, sulphur dioxide, nitrogen oxides, PM₁₀ and PM_{2.5}. Indeed these parameters are included in Directives 96/62/EC. For a comprehensive monitoring programme, the budget should not exceed Lm 40,000 annually.

7. Charts

Chart 1 shows a smoothed line chart of all the results given in Table 1, plotted against the respective progressive number, in line with the sampled dates. The red trendline shows that the concentration of lead was continuously decreasing during the whole period.

Chart 2 groups the values of lead concentrations found in the months from June 2002 to August 2003. A marked decrease was observed during the months. This was possibly due to the introduction of lead-free fuel by Enemalta in January 2003. There was some inexplicable increase of atmospheric particulate lead levels during the first four months of 2003. However this trend appeared to taper off during the second quarter of the year.

Chart 3 shows the relative distribution of the atmospheric lead particulate levels as an annual mean, in the towns sampled.

Enclosed:

1. EU Directive 1999/30/EC
2. Decissione della Commissione Europea del 17 Ottobre 2001.

