Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
43	Cupaniopsis anacardioides	Carrotwood	4	4	D	D	No	Yes
44	Cupaniopsis anacardioides	Carrotwood	7, 7	10	C	C	No	No
45	Cupaniopsis anacardioides	Carrotwood	5, 4	6	C	C-	No	No
46	Liquidambar styraciflua	American sweetgum	6	5	C	C	No	No
47	Cupaniopsis anacardioides	Carrotwood	17	16	B	D	No	Pin or Yes
48	Cupaniopsis anacardioides	Carrotwood	14	18	A	C	No	No
49	Cupaniopsis anacardioides	Carrotwood	11	11	A	C	No	No
50	Liquidambar styraciflua	American sweetgum	10	15	B	C	No	No
51	Liquidambar styraciflua	American sweetgum	18	19	B	C-	No	No
52	Pyrus kawakamii	Evergreen pear	12	11	C	D	No	Yes
53	Alnus rhombifolia	White alder	17	14	C	C-	No	No
54	Alnus rhombifolia	White alder	28 B	11	B	D	No	No
55	Lophostemon confertus	Brisbane box	6	4	D	D	No	Yes
56	Spathodea campanulata	African tulip tree	3	3	C	C-	No	No
57	Spathodea campanulata	African tulip tree	2	2	C	C	No	No
58	Spathodea campanulata	African tulip tree	3	4	C-	C	No	No
59	Alnus rhombifolia	White alder	23	18	B	C	No	No
60	Melaleuca quinquenervia	Cajeput tree	27	14	B	D	No	No
61	Pyrus kawakamii	Evergreen pear	14	12	B	C-	No	No
62	Quercus ilex	Holly oak	12	11	A	B	Yes	No
63	Liquidambar styraciflua	American sweetgum	10	10	C	D	No	No
64	Quercus ilex	Holly oak	11	8	A	B	Yes	No
65	Quercus ilex	Holly oak	8	10	B	C	No	No
66	Myoporum laetum	Ngaio	10, 10, 12	14	D	D	No	Yes
67	Agonis flexuosa	Peppermint tree	19	12	B	C	No	No
68	Agonis flexuosa	Peppermint tree	14	12	B	C	No	No
69	Agonis flexuosa	Peppermint tree	18, 18, 20	18	B	C	No	No
70	Agonis flexuosa	Peppermint tree	50	16	A	C	No	No
71	Eucalyptus camaldulensis	Red gum	20	14	B	B	No	No

ATTACHMENT No. 3.6

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
72	Eucalyptus camaldulensis	Red gum	5	4	D	D	No	Yes
73	Schinus terebinthifolius	Brazilian pepper	18	15	B	B	No	No
74	Schinus terebinthifolius	Brazilian pepper	10	9	C-	C	No	No
75	Pinus thunbergiana	Japanese black pine	7	7	C	C	No	No
76	Schinus terebinthifolius	Brazilian pepper	13	13	C	C	No	No
77	Fraxinus uhdei	Shamel ash	16	24	B	C-	No	No
78	Pinus canariensis	Canary Island pine	13	9	C	D	No	Yes
79	Lagunaria patersonii	Primrose tree	10	8	A	C	Yes	No
80	Myoporum laetum	Ngaio	26	10	C-	D	No	Yes
81	Schinus molle	California pepper	4, 5	9	B	C	No	No
82	Tipuana tipu	Tipu tree	23	19	B	C	No	No
83	Tipuana tipu	Tipu tree	26	25	C	C	No	No
84	Tipuana tipu	Tipu tree	22	18	B	C	No	No
85	Tipuana tipu	Tipu tree	20	18	B	C	No	No
86	Myoporum laetum	Ngaio	7, 10, 6	12	C	C-	No	No
87	Pyrus kawakamii	Evergreen pear	20	15	B	C	No	No
88	Pyrus kawakamii	Evergreen pear	16	11	B	C	No	No
89	Schinus terebinthifolius	Brazilian pepper	26	21	B	B	No	No
90	Pyrus kawakamii	Evergreen pear	10	10	C	C	No	No
91	Eucalyptus sideroxylon	Red ironbark	7	8	B	C	No	No
92	Platanus racemosa	California sycamore	12	10	B	B	Yes	No
93	Metrosideros excelsus	New Zealand Christmas tree	6, 6, 6, 6	14	A	C	No	No
94	Eucalyptus camaldulensis	Red gum	30	21	B	B	No	No
95	Pinus canariensis	Canary Island pine	7	6	C	D	No	No
96	Pinus canariensis	Canary Island pine	14	14	C	D	No	No
97	Eucalyptus camaldulensis	Red gum	25	19	C	C	No	No
98	Pinus canariensis	Canary Island pine	12	13	B	B	No	No
99	Pinus canariensis	Canary Island pine	14	8	B	C	No	No
100	Eucalyptus camaldulensis	Red gum	23	14	C	B	No	No

ATTACHMENT NO. 7.9

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
101	Myoporum laetum	Ngaio	4, 5, 5, 6	9	D	C-	No	Yes
102	Myoporum laetum	Ngaio	5, 5, 6	10	D	D	No	Yes
103	Myoporum laetum	Ngaio	7, 7, 6	14	D	C-	No	No
104	Myoporum laetum	Ngaio	4, 5, 5, 7	9	C	C-	No	No
105	Myoporum laetum	Ngaio	4, 5, 5, 5	10	C-	C-	No	No
106	Myoporum laetum	Ngaio	12	8	C-	C-	No	No
107	Myoporum laetum	Ngaio	6, 6	10	D	D	No	Yes
108	Myoporum laetum	Ngaio	9, 10, 13	12	D	D-	No	Yes
109	Myoporum laetum	Ngaio	6, 7	9	D	C	No	No
110	Myoporum laetum	Ngaio	5, 5, 7, 8	9	C-	C-	No	No
111	Myoporum laetum	Ngaio	5, 5, 6, 6	9	C-	C	No	No
112	Myoporum laetum	Ngaio	5, 5, 4	8	F	F	No	Yes
113	Myoporum laetum	Ngaio	4, 4, 4	8	C	C	No	No
114	Myoporum laetum	Ngaio	6, 5, 4, 4	7	D	D	No	Yes
115	Myoporum laetum	Ngaio	8	6	D	C-	No	No
116	Myoporum laetum	Ngaio	4, 5	5	D-	D	No	Yes
117	Myoporum laetum	Ngaio	5, 5, 6, 6	9	D-	D	No	Yes
118	Myoporum laetum	Ngaio	4, 4, 5	6	D-	D	No	Yes
119	Myoporum laetum	Ngaio	4	2	D-	D-	No	Yes
120	Myoporum laetum	Ngaio	2, 2, 2, 3	3	D	D	No	Yes
121	Myoporum laetum	Ngaio	4	4	D	D	No	Yes
122	Myoporum laetum	Ngaio	3, 4, 4	5	D	D	No	Yes
123	Myoporum laetum	Ngaio	3.5	5	C-	C-	No	No
124	Feijoa sellowiana	Pineapple guava	5, 5, 5, 4	10	B	C	No	No
125	Feijoa sellowiana	Pineapple guava	9 B	6	C	C	No	No
126	Metrosideros excelsus	New Zealand Christmas tree	6, 6, 6, 6	11	C-	C	No	No
127	Pinus canariensis	Canary Island pine	11	7	B	C	No	No
128	Eucalyptus camaldulensis	Red gum	23	33	C	C	No	No
129	Catalpa speciosa	Western catalpa	18	15	B	B	No	No

ATTACHMENT NO. 4.10

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
130	Catalpa speciosa	Western catalpa	19	18	B	B	No	No
131	Pinus pinea	Italian stone pine	6	6	A	C	No	No
132	Pinus pinea	Italian stone pine	6	6	B	C	No	No
133	Catalpa speciosa	Western catalpa	15	10	C	D	No	Yes
134	Pinus halepensis	Aleppo pine	18	11	B	C	No	No
135	Eucalyptus camaldulensis	Red gum	41	26	B	D	No	Yes
136	Pinus halepensis	Aleppo pine	26	16	B	D	No	No
137	Pinus halepensis	Aleppo pine	33	18	B	C-	No	No
138	Pinus halepensis	Aleppo pine	32	19	B	C	No	No
139	Eucalyptus polyanthemos	Silver dollar gum	15	17	C	C	No	No
140	Pinus halepensis	Aleppo pine	21	16	B	D	No	Yes
141	Pinus halepensis	Aleppo pine	28, 13	14	A	C-	No	No
142	Pinus halepensis	Aleppo pine	27	15	B	C-	No	No
143	Eucalyptus lehmannii	Bushy yate	26	20	B	C-	No	No
144	Eucalyptus camaldulensis	Red gum	22	14	D	C	No	No
145	Liquidambar styraciflua	American sweetgum	20	18	B	D	No	***Yes**
146	Celtis laevigata	Sugar Hackberry	9	10	B	C	No	No
147	Pyrus kawakamii	Evergreen pear	9	10	C	C	No	No
148	Eucalyptus sideroxylon	Red ironbark	13	8	B	C-	No	No
149	Eucalyptus polyanthemos	Silver dollar gum	12	10	B	B	No	No
150	Eucalyptus sideroxylon	Red ironbark	18	16	B	C	No	No
151	Eucalyptus rudis	Desert gum	15	14	C	C	No	No
152	Eucalyptus polyanthemos	Silver dollar gum	11	11	C	C-	No	No
153	Pyrus kawakamii	Evergreen pear	7	7	B	D	No	Yes
154	Catalpa speciosa	Western catalpa	15	12	C	C	No	Yes
155	Agonis flexuosa	Peppermint tree	28, 18, 17	18	A	C	No	No
156	Eucalyptus sideroxylon	Red ironbark	19	15	A	C	No	No
157	Eucalyptus sideroxylon	Red ironbark	22	14	B	C	No	No
158	Eucalyptus sideroxylon	Red ironbark	18	12	C	D	No	Yes

ATTACHMENT NO. 7.11

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
159	Eucalyptus sideroxylon	Red ironbark	22	12	B	D	No	Yes
160	Eucalyptus sideroxylon	Red ironbark	16	20	B	C-	No	Yes
161	Eucalyptus sideroxylon	Red ironbark	18	21	C	C-	No	Yes
162	Eucalyptus sideroxylon	Red ironbark	16	19	C-	C-	No	Yes
163	Eucalyptus polyanthemos	Silver dollar gum	20	14	D	C-	No	No
164	Fraxinus uhdei	Shamel ash	32	20	B	C	No	Yes
165	Fraxinus uhdei	Shamel ash	22	22	D	D	No	Yes
166	Fraxinus uhdei	Shamel ash	16	15	C	C	No	No
167	Fraxinus uhdei	Shamel ash	24	14	D	C-	No	No
168	Cupaniopsis anacardioides	Carrotwood	9	10	C	C	No	No
169	Pyrus kawakamii	Evergreen pear	10	9	C	C	No	No
170	Pinus halepensis	Aleppo pine	26	20	B	D	No	?
171	Pyrus kawakamii	Evergreen pear	6	6	C	D	No	Yes
172	Pinus halepensis	Aleppo pine	20	14	C-	D	No	Yes
173	Pinus halepensis	Aleppo pine	12	14	B	D	No	Yes
174	Catalpa speciosa	Western catalpa	22	15	B	B	No	No
175	Pyrus kawakamii	Evergreen pear	7	6	C	D	No	Yes
176	Catalpa speciosa	Western catalpa	7, 11	15	C-	C-	No	Yes
177	Sophora japonica	Chinese scholar tree	4	5	C	C-	No	No
178	Sophora japonica	Chinese scholar tree	4	5	C	C-	No	No
179	Sophora japonica	Chinese scholar tree	4	5	C-	D	No	Yes
180	Pinus pinea	Italian stone pine	24	16	B	C	No	No
181	Pinus pinea	Italian stone pine	37	16	B	C-	No	No
182	Sophora japonica	Chinese scholar tree	4	5	D	D	No	Yes
183	Brachychiton populneus	Bottle tree	11	9	B	C	No	No
184	Brachychiton discolor	Pink flame tree	12	7	B	C	No	No
185	Brachychiton discolor	Pink flame tree	6.5	3	B	C	No	No
186	Brachychiton discolor	Pink flame tree	13	7	A	C	No	No
187	Brachychiton populneus	Bottle tree	8, 9	8	C-	C-	No	No

ATTACHMENT NO. 712

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
188	Brachychiton populneus	Bottle tree	12	7	B	C-	No	No
189	Brachychiton discolor	Pink flame tree	13	6	A	C	No	No
190	Brachychiton populneus	Bottle tree	11	9	B	C-	No	No
191	Pinus thunbergiana	Japanese black pine	13	12	B	C	No	No
192	Brachychiton populneus	Bottle tree	9	6	B	C	No	No
193	Brachychiton populneus	Bottle tree	7.3	6	B	C	No	No
194	Brachychiton populneus	Bottle tree	4	3	C-	D	No	Yes
195	Melaleuca quinquenervia	Cajeput tree	17	13	B	D	No	No
196	Eucalyptus rudis	Desert gum	13	18	D	D	No	Yes
197	Liquidambar styraciflua	American sweetgum	6, 7	9	C	C-	No	No
198	Eucalyptus polyanthemos	Silver dollar gum	26	19	B	C-	No	No
199	Eucalyptus polyanthemos	Silver dollar gum	17	17	B	C	No	No
200	Eucalyptus cladocalyx	Sugar gum	20	15	B	C-	No	No
201	Eucalyptus cladocalyx	Red gum	28	24	C	D	No	No
202	Platanus racemosa	California sycamore	23	14	C	C	No	No
203	Pinus eldarica	Afghan pine	11	7	B	C	No	No
204	Eucalyptus cladocalyx	Sugar gum	30	20	B	C	No	No
205	Eucalyptus cladocalyx	Sugar gum	24	22	B	C	No	No
206	Eucalyptus cladocalyx	Sugar gum	40	25	C	C	No	No
207	Pinus pinea	Italian stone pine	17	13	B	C	No	No
208	Pinus pinea	Italian stone pine	18	19	B	C	No	No
209	Pinus pinea	Italian stone pine	40	19	B	D	No	No
210	Melaleuca quinquenervia	Cajeput tree	19	10	B	C	No	No
211	Olmediella betschlerana	Guatemalan holly	11	9	C	C-	No	No
212	Olmediella betschlerana	Guatemalan holly	9	8	D	C-	No	No
213	Myoporum laetum	Ngaio	15	9	C-	D	No	No
214	Platanus racemosa	California sycamore	18	17	B	B	No	No
215	Liquidambar styraciflua	American sweetgum	13	15	B	C-	No	No
216	Liquidambar styraciflua	American sweetgum	14	15	B	C-	No	No

ATTACHMENT NO. 7.3

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
217	Schinus terebinthifolius	Brazilian pepper	13	10	B	C-	No	No
218	Cupaniopsis anacardioides	Carrotwood	16	16	B	C	No	No
219	Cupaniopsis anacardioides	Carrotwood	17	16	B	C-	No	No
220	Pyrus kawakamii	Evergreen pear	8	10	C-	C-	No	No
221	Pyrus kawakamii	Evergreen pear	13	12	C	C-	No	No
222	Pyrus kawakamii	Evergreen pear	12	12	C	C	No	No
223	Pyrus kawakamii	Evergreen pear	10	10	B	C	No	No
224	Platanus x acerifolia	London plane	7	6	D	D-	No	***Yes**
225	Platanus x acerifolia	London plane	6	8	D	D	No	Yes
226	Platanus x acerifolia	London plane	7	8	D	D	No	Yes
227	Platanus x acerifolia	London plane	7	9	C-	C-	No	Yes
228	Platanus x acerifolia	London plane	10	10	C	C-	No	Yes
229	Platanus x acerifolia	London plane	7	6	C-	D	No	Yes
230	Platanus x acerifolia	London plane	6	9	C-	D	No	Yes
231	Platanus x acerifolia	London plane	8	10	C-	C-	No	Yes
232	Platanus x acerifolia	London plane	6	9	C-	C-	No	Yes
233	Platanus x acerifolia	London plane	5	5	D	D	No	Yes
234	Platanus x acerifolia	London plane	7	10	C	C-	No	Yes
235	Pyrus kawakamii	Evergreen pear	13	13	C	C	No	No
236	Pyrus kawakamii	Evergreen pear	11	11	C	C	No	No
237	Pyrus kawakamii	Evergreen pear	16	10	C	C	No	No
238	Ficus rubiginosa	Rusty leaf fig	18	12	B	B	Y	No
239	Liquidambar styraciflua	American sweetgum	10	8	C	C-	No	No
240	Eucalyptus citriodora	Lemon-scented gum	16	21	C	C	No	No
241	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	10	7	A	B	No	No
242	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	10	7	A	B	No	No
243	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	9	7	A	B	No	No
244	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	10	6	A	B	No	No
245	Juniperus chinensis 'Torulosa'	Hollywood juniper clump	11	7	A	B	No	No

ATTACHMENT NO. 7-14

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
246	Platanus racemosa	California sycamore	11	15	B	C	No	No
247	Melaleuca quinquenervia	Cajeput tree	7, 9, 12	13	C	C-	No	No
248	Lophostemon confertus	Brisbane box	5, 6, 6	11	C	C	No	No
249	Melaleuca quinquenervia	Cajeput tree	7, 8, 10	9	C	C-	No	No
250	Melaleuca quinquenervia	Cajeput tree	9, 10, 10	9	B	C-	No	No
251	Catalpa speciosa	Western catalpa	8, 8	17	C	C	No	No
252	Eucalyptus ficifolia	Red flowering gum	13	11	C	C	No	No
253	Melaleuca quinquenervia	Cajeput tree	11	9	C	C-	No	No
254	Melaleuca quinquenervia	Cajeput tree	12	8	B	C-	No	No
255	Melaleuca quinquenervia	Cajeput tree	15	9	C-	C-	No	No
256	Melaleuca quinquenervia	Cajeput tree	11	9	C-	C	No	No
257	Melaleuca quinquenervia	Cajeput tree	18	9	B	C-	No	No
258	Agonis flexuosa	Peppermint tree	16 B	10	C	D	No	No
259	Ulmus parvifolia	Chinese elm	16	18	B	B	Okay	No
260	Eucalyptus citriodora	Lemon-scented gum	11	11	C	D-	No	No
261	Lophostemon confertus	Brisbane box	11	10	B	C	No	No
262	Zelkova serrata	Sawtooth zelkova	14	17	A	B	Yes	No
263	Eucalyptus camaldulensis	Red gum	26	16	B	C-	No	No
264	Eucalyptus camaldulensis	Red gum	15	20	C	C-	No	No
265	Fraxinus uhdei	Shamel ash	22	17	A	B	No	No
266	Fraxinus uhdei	Shamel ash	15	16	C	C-	No	No
267	Fraxinus uhdei	Shamel ash	13	16	B	C	No	No
268	Fraxinus uhdei	Shamel ash	8, 8	17	D	D	No	No
269	Fraxinus uhdei	Shamel ash	12	13	C	C	No	No
270	Fraxinus uhdei	Shamel ash	17	21	B	C-	No	No
271	Fraxinus uhdei	Shamel ash	15	19	B	C	No	No
272	Liquidambar styraciflua	American sweetgum	14	17	B	B	No	No
273	Liquidambar styraciflua	American sweetgum	11 B	14	B	D	No	No
274	Liquidambar styraciflua	American sweetgum	13	18	B	C	No	No

ATTACHMENT NO. 7-15

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
275	Liquidambar styraciflua	American sweetgum	14	15	C	C-	No	No
276	Olea europaea	Olive	18	18	B	B	No	No
277	Liquidambar styraciflua	American sweetgum	15	10	B	C	No	No
278	Metrosideros excelsus	New Zealand Christmas Tree	18	10	A	B	No	No
279	Platanus racemosa	California sycamore	17	16	B	C	No	No
280	Platanus racemosa	California sycamore	16	14	B	B	Yes	No
281	Platanus x acerifolia	London plane	19	15	B	C-	No	No
282	Fraxinus uhdei	Shamel ash	18	17	B	C-	No	No
283	Fraxinus uhdei	Shamel ash	23	16	B	C	No	No
284	Fraxinus uhdei	Shamel ash	19	18	B	D	No	No
285	Fraxinus uhdei	Shamel ash	17	17	C	D	No	Yes
286	Fraxinus uhdei	Shamel ash	17	15	B	C	No	No
287	Platanus racemosa	California sycamore	16, 18	20	B	B	No	No
288	Liquidambar styraciflua	American sweetgum	10	14	C	C	No	No
289	Liquidambar styraciflua	American sweetgum	10	13	B	D	No	Yes
290	Platanus racemosa	California sycamore	20	15	B	B	No	No
291	Lophostemon confertus	Brisbane box	9	10	C	C-	No	No
292	Liquidambar styraciflua	American sweetgum	27	17	B	D	No	No
293	Pinus halepensis	Aleppo pine	28	19	C-	D	No	Yes
294	Liquidambar styraciflua	American sweetgum	16	15	B	C	No	No
295	Liquidambar styraciflua	American sweetgum	7	9	C	D	No	No
296	Pinus pinea	Italian stone pine	16	14	B	C-	No	No
297	Pinus halepensis	Aleppo pine	39	30	B	C	No	No
298	Pinus halepensis	Aleppo pine	17	14	B	C-	No	No
299	Eucalyptus citriodora	Lemon-scented gum	23	29	B	C	No	No
300	Eucalyptus citriodora	Lemon-scented gum	16	13	D	D	No	Yes
301	Platanus racemosa	California sycamore	34	18	A	A	No	No
302	Platanus racemosa	California sycamore	20	12	B	B	No	No
303	Liquidambar styraciflua	American sweetgum	14	17	B	C	No	No

ATTACHMENT NO. 7 16

Tag#	Botanic Name	Common Name	Caliper – DBH*	Dripline radius	Health	Condition	Transplant	Remove
304	Catalpa speciosa	Western catalpa	10, 11	18	C	C-	No	No
305	Cupaniopsis anacardioides	Carrotwood	6, 7	10	C	C-	No	No
306	Cupaniopsis anacardioides	Carrotwood	4.3	6	C-	D	No	Yes
307	Cupaniopsis anacardioides	Carrotwood	3.7	7	C-	C	No	No
308	Ficus rubiginosa	Rusty leaf fig	18	16	C-	C	No	No
309	Leptospermum laevigatum	Australian tea tree	17	8	C	D	No	Yes
310	Syagrus romanzoffianum	Queen palm	Palm	10	B	B	Yes	No
311	Syagrus romanzoffianum	Queen palm	Palm	8	B	C	No	No
312	Syagrus romanzoffianum	Queen palm	Palm	7	C-	C-	No	No
313	Liquidambar styraciflua	American sweetgum	11	12	C	C-	No	Yes
314	Howea forsteriana	Kentia palm	Palm	6	C	C	Yes	No
315	Eucalyptus citriodora	Lemon-scented gum	14	15	D	C	No	Yes
316	Eucalyptus citriodora	Lemon-scented gum	17	20	B	C	No	No
317	Washingtonia robusta	Mexican fan palm	Palm	5	A	A	No	No
318	Syagrus romanzoffianum	Queen palm	Palm	7	C-	C	No	No
319	Washingtonia robusta	Mexican fan palm	Palm	5	B	A	No	No

* Calipers with "B" indicated basal measurements below first scaffold limbs.
¥ With the drafting assistance of Nuvis, a tree map was produced listing the trees by tag number in their approximate locations.

Discussion

Turf grass impacts and effects on tree health

The custom of dotting trees within the lawns creates a maintenance conflict and an irrigation conflict between turf care and tree care, so most of Edison Park's trees are shallow rooted and make poor candidates for transplanting. Trees in turf suffer from several common problems. Generally, their wood is weaker, excurrent trees tend to lose their primary or central leaders, and they have shallow root systems that are frequently injured by lawn mowers. Trunks and root crowns are also injured by turf maintenance equipment. And soil compaction is higher in turf areas due to frequent foot and lawn mower traffic over wet or moist soil. Most of

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these trees are either directly planted in turf or have root systems that have grown into adjoining turf. Even if in recent history the lawn areas have been kept fairly dry, it appears that at least during the period when their structure was developing turf conditions were moister and more fertile.

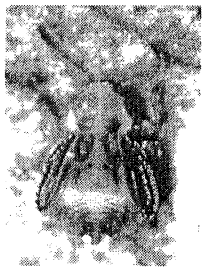
Life expectancy and longevity

Trees in parks often have shorter life spans than in nature, because of "people pressures", soil compaction, competition with turf, damage from turf equipment, and perhaps vandalism, according to one adjoining resident. The trees in Edison Park have a few signs of vandalism, but many indications of lawn mower injuries. They also show the other impacts of soil compaction to various degrees. Areas where park maintenance vehicles drive over the turf on a regular basis are nearly void of turf.

Most trees in older parks needs to be replaced or upgraded periodically to reflect the success or failure of species, pest or disease outbreaks, and challenging locations. Life spans for some species of trees in Edison park have already been reached in several cases. Though in nature some superior specimens may live for hundreds of years, genetically inferior trees and trees less ideally situated live much shorter lives. In most cases trees with the longest life span are in nature, untouched by man. Some trees in Edison Park appear to be about 50 years old. With the "people pressures" found here, few of their trees will not last another 50 years. Based on the analysis to follow, the less successful species should be avoided in future planting and in some cases removed.

Pest and diseases observed

Some trees in this park are declining prematurely due to pest or disease problems, such as the red gum eucalyptus. Redgum lerp psyllid, *Glycaspis brimblecombei*, (RLP) is the primary pest affecting the red gums and flooded gums on site. There are now only half as many of these two species as when the last inventory was done. However, in the mean time the state release of a predatory wasp has brought this pest under control. Only minor infestations of psyllids were observed at this time, but even in Australia, with full natural controls, flare ups do occur.



Redgum lerp psyllids are small insects that suck sap from leaves. Adults are about the size of a gnat. Even with natural biological controls in place, psyllid densities can become so high that partial or total defoliation of trees occasionally results, tree appearance becomes unsightly, and tree vigor is reduced. Psyllids also produce a sticky substance called honeydew, which drops to the ground on cars and sidewalks. The honeydew will often be fed on by black sooty mold and ants.

< *Immature lerp psyllid*

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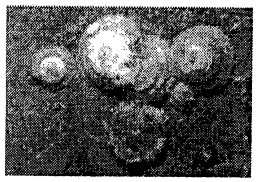

< *"Lerps" are caps made of crystallized sap, under which immature psyllids feed. RLP forms a lerp, which is a structure produced by the nymphs as a protective cover resembling a scale.*

Over the past ten years or so, eight to ten eucalyptus pests have arrived in California. The redgum lerp psyllid, one of the more deadly pests on California's eucalyptus trees, was discovered in 1998 in Los Angeles County. Fortunately, the biological control program run by the state has finally become effective as the wasps spread and parasitized the psyllid eggs.

Another relatively new eucalyptus pest is the fern leaf psyllid, *Eucalyptolyma maidenii*. This psyllid feeds on lemon gum and spotted gum. The first known trees to be attacked were at the Loyola Marymount campus in West Los Angeles. This pest will definitely stress these trees and trees already stressed by other causes may be eventually killed. Almost no damage was found on the seven lemon gum specimens in Edison Park. There were also seven lemon gums in the last inventory, so none have died yet.

There is also some minor damage from the Australian tortoise beetle, *Trachymela sloanei*. The red gums, flooded gums, and sugar gums are also fed upon by this beetle. While being attacked by psyllids, additional foliage loss from tortoise beetles can be serious. There is no control and I know of no biological control programs underway.

The white alders have either been removed for structural problems, or over half have died from borers or other issues. This is a fairly short lived species, and many of the remaining ones on site are likely to split apart due to structural weaknesses, such as codominant crowded leaders with included bark.

Myoporums are currently in serious decline due to a recent outbreak of Teuchothrips. I have yet to see a successful spray program for this pest and many of the trees on site are too far declined to recover.

Evergreen pears have always had spells of fire blight damage. When properly treated and not spread by pruning tools, it is only serious in wetter years. There are now eight fewer pears than at the last inventory.

Several other species have disappeared totally from the park for unknown reasons. The silver maple, Indian laurels, white birch, coral trees, Wilson holly, yew pine, and Xylosma have been removed since the last inventory for one reason or another.

Visible Decay or Structural Defects

The most common defects are related to turf maintenance around trees. The large, exposed primary roots have been shaved off by lawn mowers. Lawn mowers or string trimmers have damaged the root flares of many trees to the extent that decay has resulted to various degrees. Some of the trees are so damaged that they are leaning, apparently from lack of root support on one side.

The primary overall structural defects in the canopies of trees at Edison Park are overly long, end-heavy branches and crowded scaffold limbs, with narrow crotches and included bark. Most of the excurrent species have multiple leaders. In most cases it is merely lack of proper maintenance pruning to shorten overly long limbs or subordinate codominant leaders. In either case, overly

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long, end-heavy limbs are associated with sudden limb drop in eucalyptus and other species. A number of trees have split apart or dropped large limbs. In both lawn maintenance related matters and pruning matters, arboriculture has been abrogated.

This inspection was not intended to be exhaustive, no internal decay testing was done, nor were loss of strength calculations done to determine if decay was critical. With the high incidence of lawn mower injuries to roots and trunks, more decay might be found with Resistograph or sonic tomography testing, but the degree of root decay would be nearly impossible to determine.

The alders and liquidambars have poor structure due to lack of training, improper pruning cuts, and loss of a central leader due to topping and/or excessive fertilizer. Their overall health and growth rate has declined and these specimens are not especially large. When secondary leaders are growing too large they may be reduced proportionately by drop-crotch style pruning or subordination. This will stunt the growth of the competing leaders while allowing the main leader to increase proportionately. Improving their overall vigor will also aid in this process.

Carrotwoods standards are commonly topped by the growers, which causes a brush of dense and closely spaced scaffold limbs. These crowded limbs tend to pinch each other out over time. Carrotwood multi-trunked trees tend to have included bark between trunks and later in life one or more trunks split out. Make-up multi-trunked specimens often tend to strangle each other when the roots of the adjoining tree grow around the trunk of the other(s). Many of the carrotwoods here are in weak health and may never grow large.

As red gums, sugar gums and other trees get older their chance of dropping limbs increases significantly and the size of those limbs also increase. I observed several large breaks in old eucalypts. These may be caused by storm damage or just excessive end weight. Defects and decay are not as much the cause, as age and overly long and end-heavy limbs. Keeping foot traffic and activities out from under these trees is the best remedy short of good pruning or removal. The reader will note in the Appendix charts that document the hazard profile of red gums, ironbarks and 2 other eucalyptus species.

Current Maintenance

Current maintenance practice is impacting the health of the trees in the areas of pruning, turf maintenance and soils management.

Substandard pruning practices include poor or lack of early training, such as allowing codominant leaders to form or crowded scaffolds with included bark; making flush cuts, and lion-tailing. Codominant or equal size leaders often split out; they are inherently weak since they do not form good branch collars. When scaffold limbs are not properly spaced at an early age they often grow together, but don't fuse together. Eucalypts are more likely to fuse when the branch angles are less than 30 degrees.

Codominant limbs are inherently weak. The branch collar cannot form uniformly around the base of the limb and they often fail. Flush cuts cut through the branch collar into trunk or limb tissue and lead to decay. Lion-tailing leaves all the foliage and

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weight at the branch ends. This concentrates the weight at the end rather than evenly distributing it along the limb and it also eliminates the ability to drop-crotch limbs when they get old, long, and end-heavy.

Shallow roots are common for trees in turf, since the compaction of the soil and the frequent irrigation of the turf keeps the roots near the surface. However, as these roots expand to the point where the lawn mower nick them on every pass, it is time to move the turf back and install a larger mulch basin below the tree. When roots are exposed near the base it is not acceptable to just mow off the tops. Each such injury to the trunk or root crown is one more wound that the tree must expend stored carbohydrates to compartmentalize. Each such injury is a possible point of infection and decay.

A number of trees in Edison Park have had the turf pulled back 3 or 4 feet from the trunk. For larger trees on this site, this is inadequate. Keeping the turf back from trees also reduces the competition for water and nutrients. One study of young trees found that keeping the turf back eighteen inches allowed 50 % faster growth than allowing the turf to grow up to the trunk.

The early history of this site may be an important factor in the chemistry and condition of the soil on site. Good soil management should start with good sampling and testing of soils on site.

Lawn mowing should be scheduled for periods when the soil is at its driest, just before irrigation. The irrigation cycles should also be governed by the times the sports fields are in use and activities scheduled for periods when the soil is drier.

Turf aeration can reduce compaction to surface layers and will be helpful to trees as well, but it must be kept away from the larger primary roots. Mulching will improve water penetration, reduce soil compaction near trees, improve biotic life in the soil and reduce injury to exposed roots.

Periodic leaching of salts is probably necessary, being so close to the ocean. If reclaimed irrigation water is used, it will require more frequent leaching.

Soil Compaction

One of the major effects of heavy foot traffic and vehicle traffic is soil compaction. To the experienced eye, the effect of compacted soil on trees is obvious. Other plants that happen to be rooted in compacted soil, shrubs, annuals, perennials, even turf, will suffer from compaction as well. Bare soils on urban playgrounds where grass cannot grow back are common. The places at Edison Park where City vehicles leave the paved roads and walkways are also devoid of turf and tree roots suffer as well. During the time I was on site I noticed several vehicles parking under trees. In a coastal climate like this, the shade of trees is simply not that important compared to the damage it does to the soil and roots. Root systems are very demanding and simply will not grow in compacted soil.

Here are several signs of soil compaction:

- Standing water on the soil surface long after moderate rain.

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- Roots of plants, especially trees, close to or exposed on the surface.
- Yellowing of foliage, especially in early spring during leaf-out and prior to leaf maturity, coupled with diminished development of leaves throughout the growing season. Do not confuse this with several nutrient deficiency symptoms. Cross-checking with foliar and soil analyses may be required.
- Presence of certain grasses or weeds that thrive on compacted soils, e.g., plantain.
- Incidence of various plant diseases that are related to poor drainage and lack of oxygen.
- Resistance to penetration of the soil by shovel, pick, or penetrometer.

Several of these symptoms may be present on a heavily used site. It is unlikely that one symptom alone - except resistance to penetration - indicates compaction, and that varies with soil moisture. Moreover, individual features may occur on uncompacted soils; shallow-rooted tree species such as ficus, fruitless mulberry and Chinese elm, for example, exhibit roots near the surface even on uncompacted soils.

Significant effects of soil compaction as they affect management of this site include:

- Crusting. Crusting occurs when the soil aggregates are pulverized and the fines fill the smaller pores. Foot and vehicle traffic compacts the surface more than lower soil depths. The crust can then repel even light rainfall and irrigation.
- Decreased infiltration. The crust formation coupled with the reduced pore space and its smaller average-pore size reduces the infiltration capacity of the compacted soil under heavy rainfall, creating runoff and soil erosion.
- Increased density. As soil fragments fill voids in compressed soil, the total pore space is reduced and the larger air-filled pores are destroyed or at least reduced in size.
- Decreased water-holding capacity. Since water is held in the pore space, any pore space decrease will generally decrease water-holding capacity.
- Decreased soil aeration. Diffusion of gases, such as oxygen and carbon dioxide, into and out of the soil can be greatly reduced. Macro-pores become discontinuous and the smaller pores that are water-filled act as a barrier to diffusion of gases. Even if the surface soil is the only portion compacted, infiltration and diffusion are determined by the least permeable layer of the soil profile; so the entire profile may suffer from reduced diffusion.
- Root impedance. Roots penetrate only pores as large or larger in diameter than their root tip; the root will penetrate a smaller pore only if the soil is loose. If the soil is firm, the root simply cannot penetrate the smaller pore.
- Poor leaching of salts. The compaction and crust reduces water penetration, but leaves behind a thin layer of salts near the surface. The salts prevent good soil structure and reduce tree health in less tolerant species.

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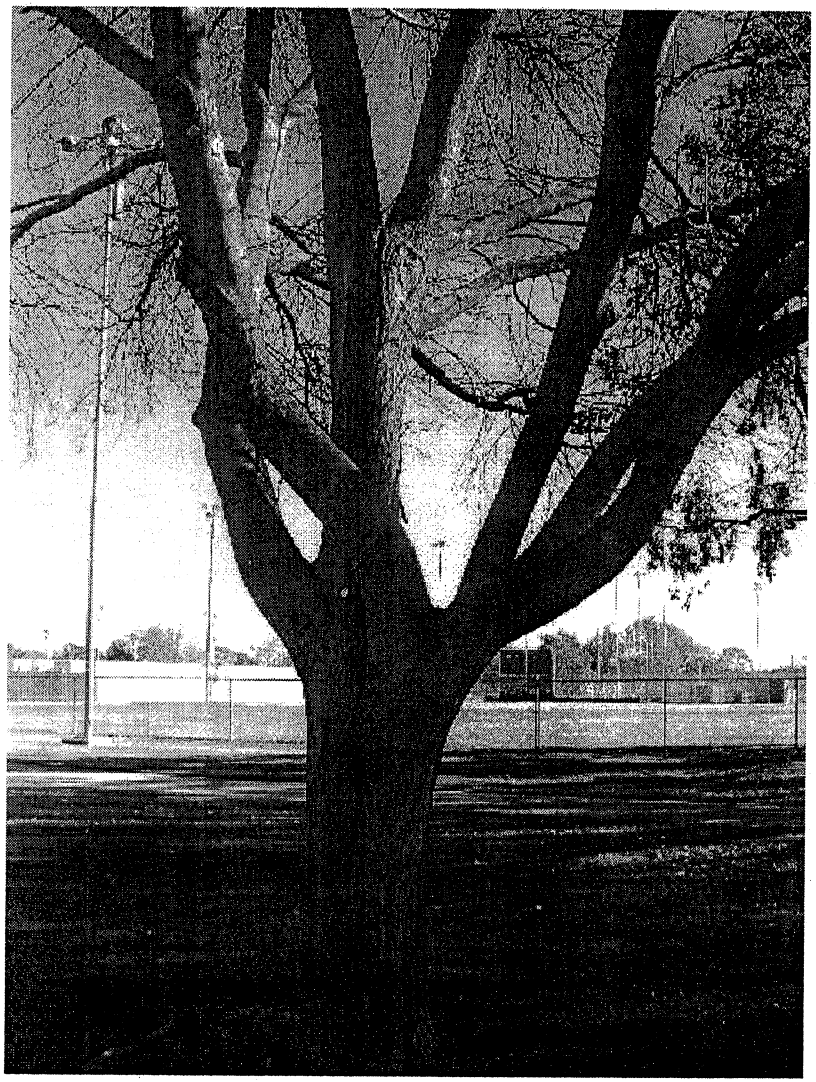
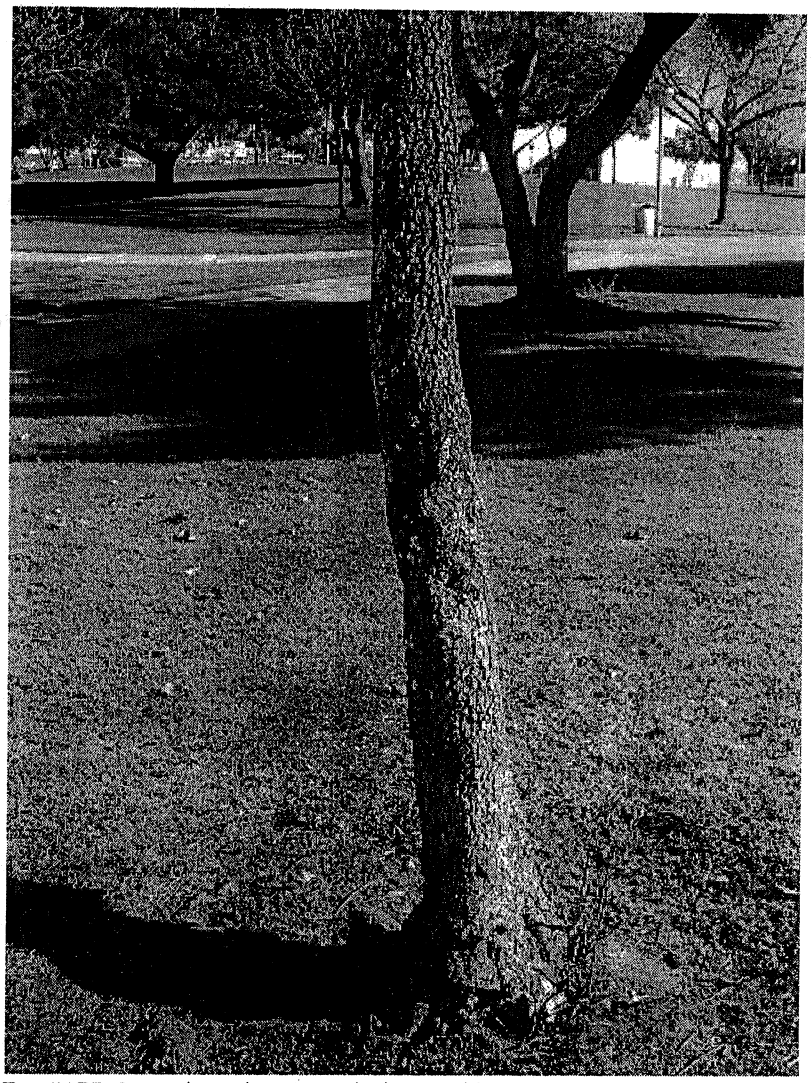
Photographic Documentation



Tag #145, Liquidambar styraciflua with crowded codominant limbs



Tag #175, Pyrus kawakamii, with decayed base

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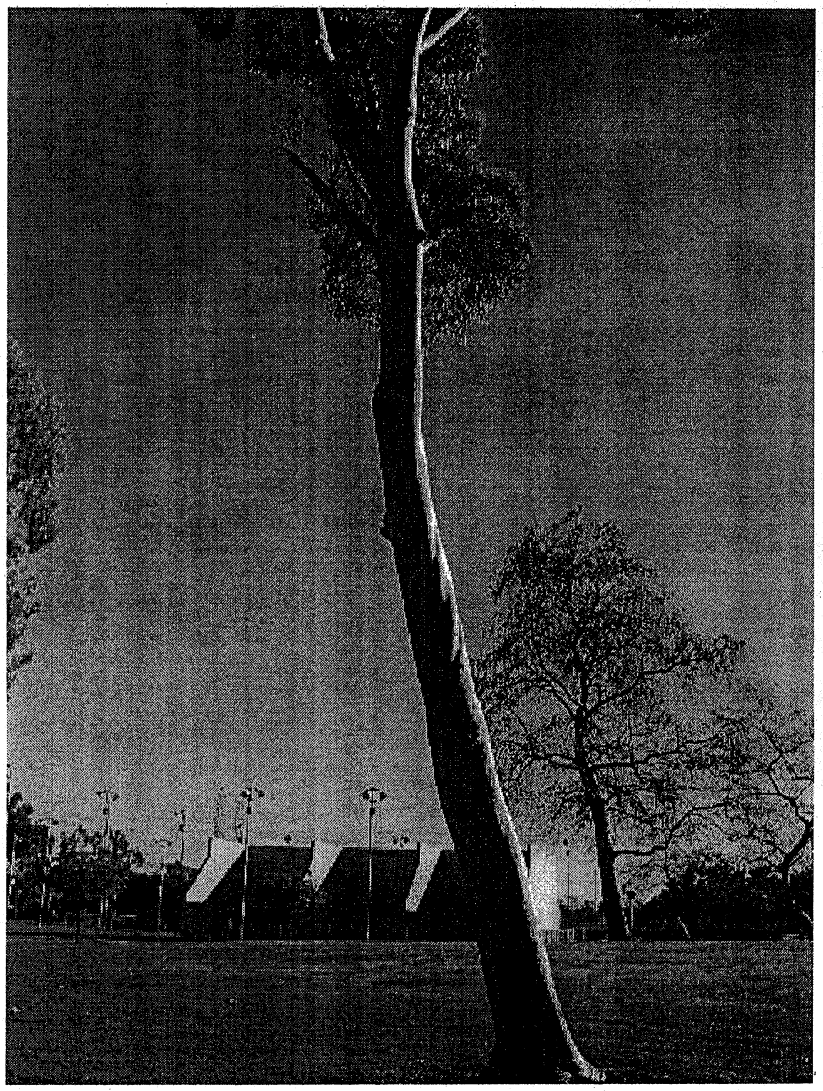
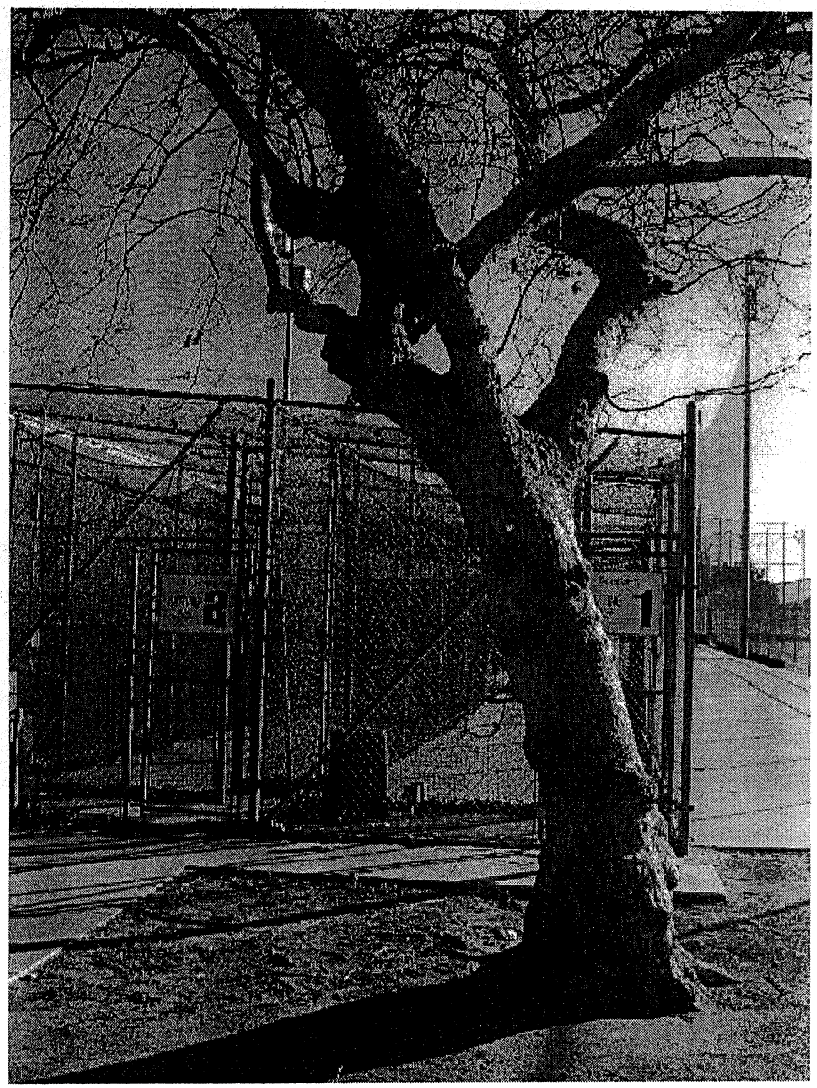


Tag #299, Eucalyptus citriodora with broken limbs and chlorosis



Tag #281, Platanus x acerifolia with dog-leg limbs and decline due to soil compaction.

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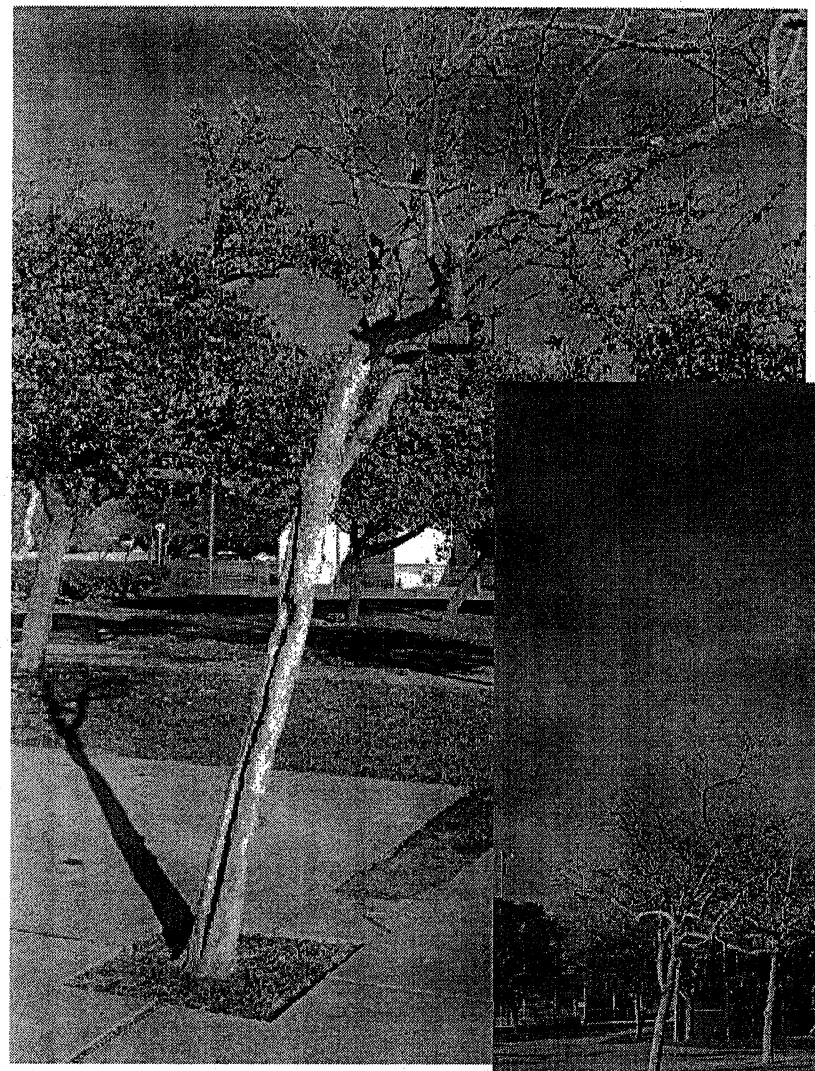
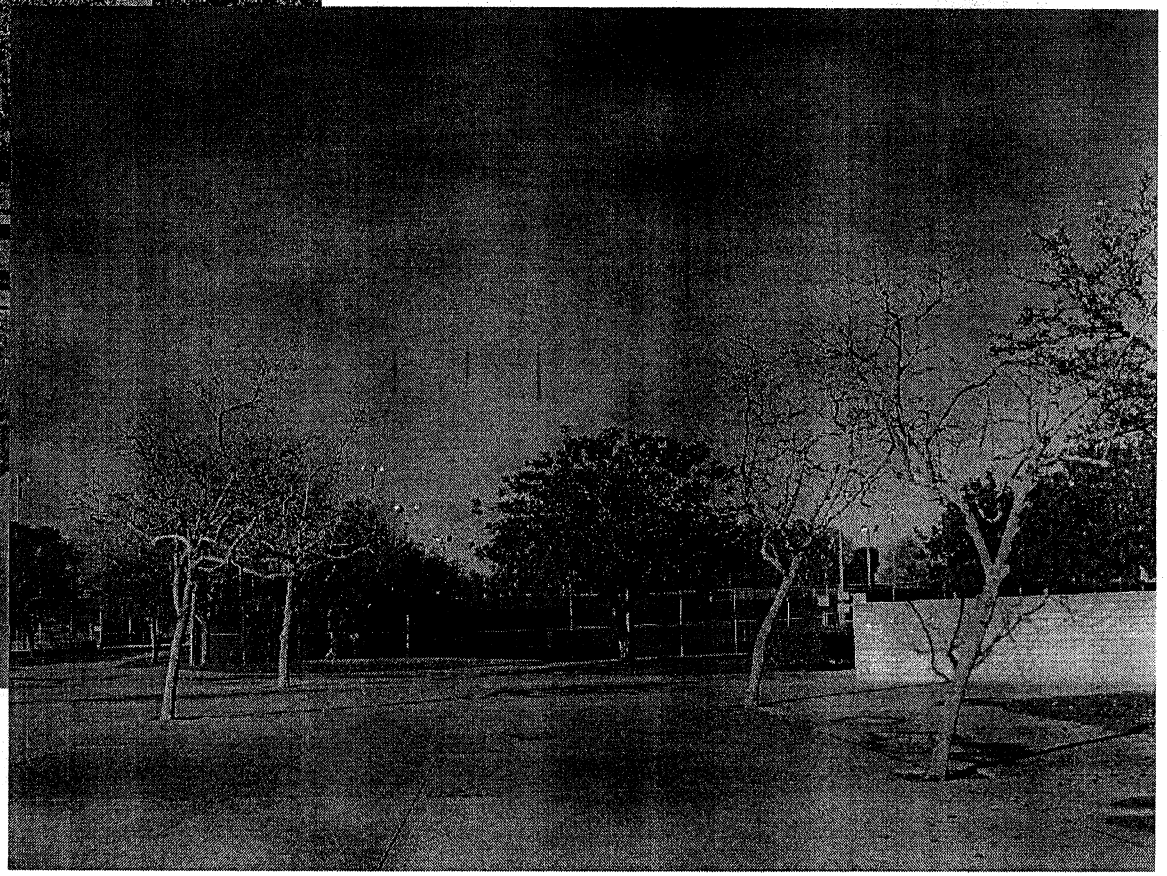


< Tag #224, Platanus x acerifolia with severely decayed trunk, lean, dieback, and one sided canopy.



The whole group of London planes in the plaza are in tiny cut-outs and in poor health.>

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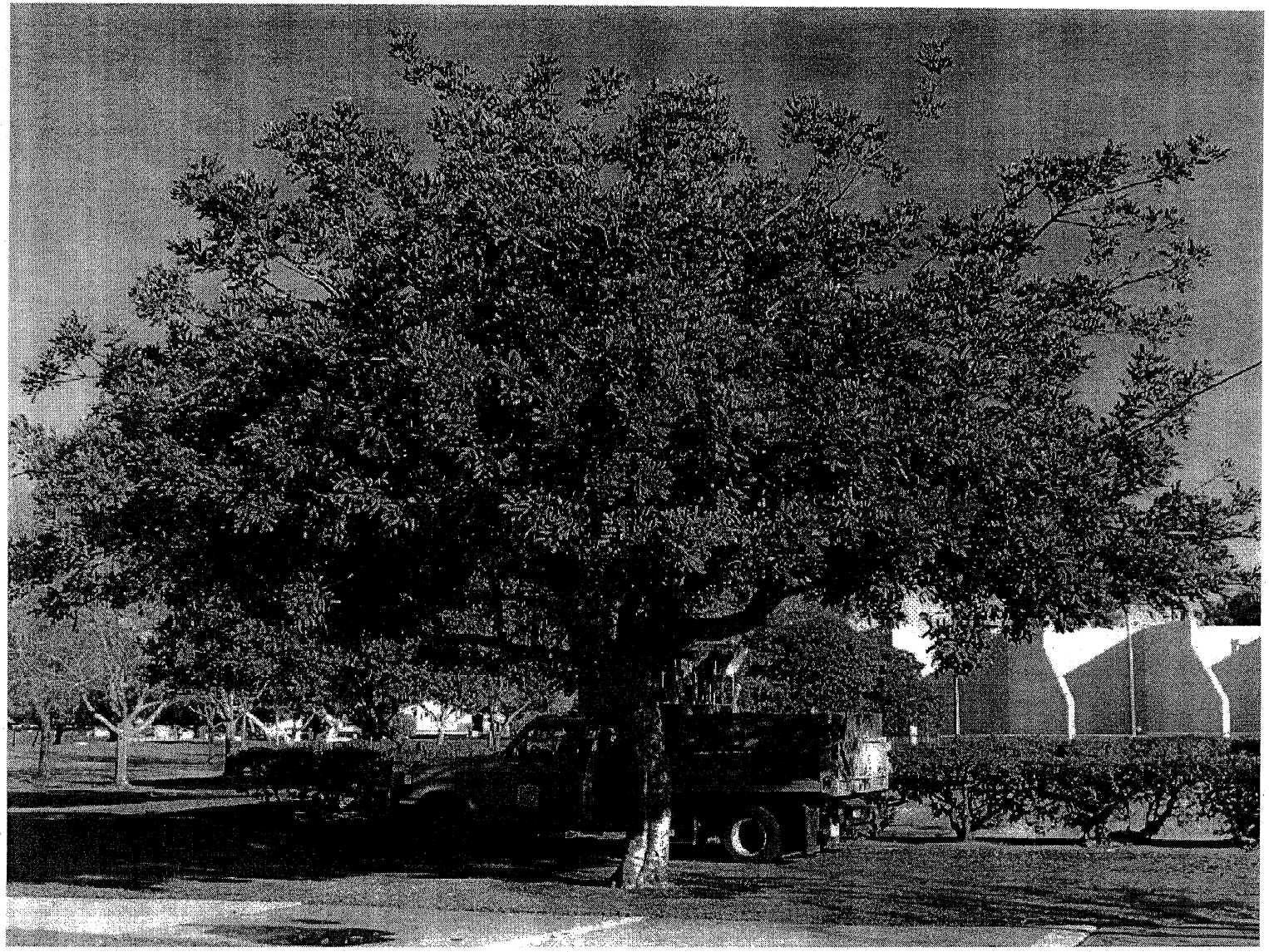

Tag #218, Cupaniopsis anacardioides with crowded scaffold limbs and included bark. Also note minor chlorosis.

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