

## Zone of Rapid Taper measurements

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
20	6.36	0.19m	0.31
21	6.68	0.20m	0.33m
22	7.00	0.21m	0.35m
23	7.32	0.21m	0.36m
24	7.63	0.22m	0.38m
25	7.95	0.23m	0.39m
26	8.27	0.24m	0.41m
27	8.59	0.25m	0.42m
28	8.91	0.26m	0.44m
29	9.22	0.27m	0.47m
30	9.54	0.28m	0.47m
31	9.86	0.29m	0.49m
32	10.18	0.30m	0.50m
33	10.50	0.31m	0.52m
34	10.80	0.32m	0.54m
35	11.13	0.34m	0.55m
36	11.45	0.35m	0.57m
37	11.77	0.36m	0.58m
38	12.09	0.36m	0.60m
39	12.41	0.37m	0.62m
40	12.73	0.38m	0.63m
41	13.04	0.39m	0.65
42	13.36	0.40m	0.66m
43	13.68	0.41m	0.68m
44	14.00	0.42m	0.70m
45	14.32	0.42m	0.71m
46	14.64	0.43m	0.73m
47	14.95	0.44m	0.74m
48	15.27	0.45m	0.76m
49	15.59	0.46m	0.77m
50	15.91	0.47m	0.79m
51	16.23	0.48m	0.81m
52	16.54	0.49m	0.82m
53	16.86	0.50m	0.84m
54	17.18	0.51m	0.85m
55	17.50	0.52m	0.87m
56	17.82	0.53m	0.89m
57	18.14	0.54m	0.90m
58	18.45	0.55m	0.92m
59	18.77	0.56m	0.93m
60	19.09	0.57m	0.95m

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
61	19.41	0.58m	0.97m
62	19.73	0.59m	0.98m
63	20.05	0.60m	1.00m
64	20.36	0.61m	1.01m
65	20.86	0.62m	1.04m
66	21.00	0.63m	1.05m
67	21.32	0.63m	1.06m
68	21.64	0.64m	1.08m
69	21.96	0.65	1.09m
70	22.27	0.66m	1.11m
71	22.59	0.67m	1.12m
72	22.91	0.68m	1.14m
73	23.23	0.69m	1.16m
74	23.55	0.70m	1.17m
75	23.87	0.71m	1.19m
76	24.18	0.72m	1.20m
77	24.50	0.73m	1.22m
78	24.82	0.74m	1.24m
79	25.14	0.75m	1.25m
80	25.46	0.76m	1.27m
81	25.77	0.77m	1.28m
82	26.09	0.78m	1.30m
83	26.41	0.79m	1.32m
84	26.73	0.80m	1.33m
85	27.05	0.81m	1.35m
86	27.37	0.82m	1.36m
87	27.68	0.83m	1.38m
88	28.00	0.84m	1.40m
89	28.32	0.84m	1.41m
90	28.64	0.85m	1.43m
91	28.96	0.86m	1.44m
92	29.28	0.87m	1.46m
93	29.59	0.88m	1.47m
94	29.91	0.89m	1.49m
95	30.23	0.90m	1.51m
96	30.55	0.91m	1.52m
97	30.87	0.92m	1.54m
98	31.19	0.93m	1.55m
99	31.50	0.94m	1.57m
100	31.82	0.95m	1.60m
101	32.14	0.96m	1.62m

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Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
102	32.46	0.97m	1.62m
103	32.78	0.98m	1.63m
104	33.09	0.99m	1.65m
105	33.41	1.00m	1.67m
106	33.73	1.01m	1.68m
107	34.05	1.02m	1.70m
108	34.37	1.03m	1.71m
109	34.69	1.04m	1.73m
110	35.00	1.05m	1.75m
111	35.32	1.05m	1.76m
112	35.64	1.06m	1.78m
113	35.96	1.07m	1.79m
114	36.28	1.08m	1.81m
115	36.60	1.09m	1.83m
116	36.91	1.10m	1.84m
117	37.23	1.11m	1.86m
118	37.55	1.12m	1.87m
119	37.87	1.13m	1.89m
120	38.19	1.14m	1.90m
121	38.51	1.15m	1.92m
122	38.82	1.16m	1.94m
123	39.14	1.17m	1.95m
124	39.46	1.18m	1.97m
125	39.78	1.19m	1.98m
126	40.10	1.20m	2.00m
127	40.42	1.21m	2.02m
128	40.73	1.22m	2.03m
129	41.05	1.23m	2.05m
130	41.37	1.24m	2.06m
131	41.69	1.25m	2.08m
132	42.01	1.25m	2.10m
133	42.32	1.26m	2.11m
134	42.64	1.27m	2.13m
135	42.96	1.28m	2.14m
136	43.28	1.29m	2.16m
137	43.60	1.30m	2.18m
138	43.92	1.31m	2.19m
139	44.23	1.32m	2.21m
140	44.55	1.33m	2.22m
141	44.87	1.34m	2.24m
142	45.19	1.35m	2.25m

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
143	45.51	1.36m	2.27m
144	45.83	1.37m	2.29m
145	46.14	1.38m	2.30m
146	46.46	1.39m	2.32m
147	46.78	1.40m	2.33m
148	47.10	1.41m	2.35m
149	47.42	1.42m	2.37m
150	47.74	1.43m	2.38m
151	48.05	1.44m	2.40m
152	48.37	1.45m	2.41m
153	48.69	1.46m	2.43m
154	49.01	1.47m	2.45m
155	49.33	1.47m	2.46m
156	49.64	1.48m	2.48m
157	49.96	1.49m	2.49m
158	50.28	1.50m	2.51m
159	50.60	1.51m	2.53m
160	50.92	1.52m	2.54m
161	51.24	1.53m	2.56m
162	51.55	1.54m	2.57m
163	51.87	1.55m	2.59m
164	52.19	1.56m	2.60m
165	52.51	1.57m	2.62m
166	52.83	1.58m	2.64m
167	53.15	1.59m	2.65m
168	53.46	1.60m	2.67m
169	53.78	1.61m	2.68m
170	54.10	1.62m	2.70m
171	54.42	1.63m	2.72m
172	54.74	1.64m	2.73m
173	55.06	1.65m	2.75m
174	55.37	1.66m	2.76m
175	55.69	1.67m	2.78m
176	56.01	1.68m	2.80m
177	56.33	1.68m	2.81m
178	56.65	1.69m	2.83m
179	56.97	1.70m	2.84m
180	57.28	1.71m	2.86m
181	57.60	1.72m	2.88m
182	57.92	1.73m	2.89m
183	58.24	1.74m	2.91m

## Zone of Rapid Taper measurements

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
184	58.56	1.75m	2.92m
185	58.87	1.76m	2.94m
186	59.19	1.77m	2.95m
187	59.51	1.78m	2.97m
188	59.83	1.79m	2.99m
189	60.15	1.80m	3.00m
190	60.47	1.81m	3.02m
191	60.78	1.82m	3.03m
192	61.10	1.83m	3.05m
193	61.42	1.84m	3.07m
194	61.74	1.85m	3.08m
195	62.06	1.86m	3.10m
196	62.38	1.87m	3.11m
197	62.69	1.88m	3.13m
198	63.01	1.89m	3.15m
199	63.33	1.89m	3.16m
200	63.65	1.90m	3.18m
201	63.97	1.91m	3.19m
202	64.29	1.92m	3.21m
203	64.60	1.93m	3.23m
204	64.92	1.94m	3.24m
205	65.24	1.95m	3.26m
206	65.56	1.96m	3.27m
207	65.88	1.97m	3.29m
208	66.19	1.98m	3.30m
209	66.51	1.99m	3.32m
210	66.83	2.00m	3.34m
211	67.15	2.10m	3.35m
212	67.47	2.02m	3.37m
213	67.79	2.03m	3.38m
214	68.10	2.04m	3.40m
215	68.42	2.05m	3.42m
216	68.74	2.06m	3.43m
217	69.06	2.07m	3.45m
218	69.38	2.08m	3.46m
219	69.70	2.09m	3.48m
220	70.01	2.10m	3.50m
221	70.33	2.10m	3.51m
222	70.65	2.11m	3.53m
223	70.97	2.12m	3.54m
224	71.29	2.13m	3.56m

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
225	71.61	2.14m	3.58m
226	71.92	2.15m	3.59m
227	72.24	2.16m	3.61m
228	72.56	2.17m	3.62m
229	72.88	2.18m	3.64m
230	73.20	2.19m	3.66m
231	73.52	2.20m	3.67m
232	73.83	2.21m	3.69m
233	74.15	2.22m	3.70m
234	74.47	2.23m	3.72m
235	74.79	2.24m	3.73m
236	75.11	2.25m	3.75m
237	75.42	2.26m	3.77m
238	75.74	2.27m	3.78m
239	76.06	2.28m	3.80m
240	76.38	2.29m	3.81m
241	76.70	2.30m	3.83m
242	77.02	2.31m	3.85m
243	77.33	2.31m	3.86m
244	77.65	2.32m	3.88m
245	77.97	2.33m	3.89m
246	78.29	2.34m	3.91m
247	78.61	2.35m	3.93m
248	78.93	2.36m	3.94m
249	79.24	2.37m	3.96m
250	79.56	2.38m	3.97m
251	79.88	2.39m	3.99m
252	80.20	2.40m	4.01m
253	80.52	2.41m	4.02m
254	80.84	2.42m	4.04m
255	81.15	2.43m	4.05m
256	81.47	2.44m	4.07m
257	81.79	2.45m	4.08m
258	82.11	2.46m	4.10m
259	82.43	2.47m	4.12m
260	82.74	2.48m	4.13m
261	83.06	2.49m	4.15m
262	83.38	2.50m	4.16m
263	83.70	2.51m	4.18m
264	84.02	2.52m	4.20m
265	84.34	2.53m	4.21m

## Zone of Rapid Taper measurements

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
266	84.65	2.53m	4.23m
267	84.97	2.54m	4.24m
268	85.29	2.55m	4.26m
269	85.61	2.56m	4.28m
270	85.93	2.57m	4.29m
271	86.25	2.58m	4.31m
272	86.56	2.59m	4.32m
273	86.88	2.60m	4.34m
274	87.20	2.61m	4.36m
275	87.52	2.62m	4.37m
276	87.82	2.63m	4.39m
277	88.16	2.64m	4.40m
278	88.47	2.65m	4.42m
279	88.79	2.66m	4.43m
280	89.11	2.67m	4.45m
281	89.43	2.68m	4.47m
282	89.75	2.69m	4.48m
283	90.07	2.70m	4.50m
284	90.38	2.71m	4.51m
285	90.70	2.72m	4.53m
286	91.02	2.73m	4.55m
287	91.34	2.74m	4.56m
288	91.66	2.75m	4.58m
289	91.97	2.76m	4.59m
290	92.29	2.77m	4.61m
291	92.61	2.77m	4.63m
292	92.93	2.78m	4.64m
293	93.25	2.80m	4.66m
294	93.57	2.80m	4.67m
295	93.88	2.81m	4.69m
296	94.20	2.82m	4.71m
297	94.52	2.83m	4.72m
298	94.84	2.84m	4.74m
299	95.16	2.85m	4.75m
300	95.48	2.86m	4.77m
301	95.79	2.87m	4.78m
302	96.11	2.88m	4.80m
303	96.43	2.89m	4.82m
304	96.75	2.90m	4.83m
305	97.07	2.91m	4.85m
306	97.39	2.92m	4.86m

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
307	97.70	2.93m	4.88m
308	98.02	2.94m	4.90m
309	98.34	2.95m	4.91m
310	98.66	2.95m	4.93m
311	98.98	2.96m	4.94m
312	99.29	2.97m	4.96m
313	99.61	2.98m	4.98m
314	99.93	2.99m	4.99m
315	100.25	3.00m	5.01m
316	100.57	3.01m	5.02m
317	100.89	3.02m	5.04m
318	101.20	3.03m	5.05m
319	101.52	3.04m	5.07m
320	101.84	3.05m	5.09m
321	102.16	3.06m	5.10m
322	102.48	3.07m	5.12m
323	102.80	3.08m	5.14m
324	103.11	3.09m	5.15m
325	103.43	3.10m	5.17m
326	103.75	3.11m	5.18m
327	104.07	3.12m	5.20m
328	104.39	3.13m	5.21m
329	104.71	3.14m	5.23m
330	105.02	3.15m	5.25m
331	105.34	3.16m	5.26m
332	105.66	3.16m	5.28m
333	105.98	3.17m	5.29m
334	106.30	3.18m	5.31m
335	106.61	3.19m	5.33m
336	106.93	3.20m	5.34m
337	107.25	3.21m	5.36m
338	107.57	3.22m	5.37m
339	107.89	3.23m	5.39m
340	108.21	3.24m	5.41m
341	108.52	3.25m	5.42m
342	108.84	3.26m	5.44m
343	109.16	3.27m	5.45m
344	109.48	3.28m	5.47m
345	109.80	3.29m	5.49m
346	110.12	3.30m	5.50m
347	110.43	3.31m	5.52m

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Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
348	110.75	3.32m	5.53m
349	111.07	3.33m	5.55m
350	111.39	3.34m	5.56m
351	111.71	3.35m	5.58m
352	112.03	3.36m	5.60m
353	112.34	3.37m	5.61m
354	112.66	3.37m	5.63m
355	112.98	3.38m	5.64m
356	113.30	3.39m	5.66m
357	113.62	3.40m	5.68m
358	113.94	3.41m	5.69m
359	114.25	3.42m	5.71m
360	114.57	3.43m	5.72m
361	114.89	3.44m	5.74m
362	115.21	3.45m	5.76m
363	115.53	3.46m	5.77m
364	115.84	3.47m	5.79m
365	116.16	3.48m	5.80m
366	116.48	3.49m	5.82m
367	116.80	3.50m	5.84m
368	117.12	3.51m	5.85m
369	117.44	3.52m	5.87m
370	117.75	3.53m	5.88m
371	118.07	3.54m	5.90m
372	118.39	3.55m	5.91m
373	118.71	3.56m	5.93m
374	119.03	3.57m	5.95m
375	119.35	3.58m	5.96m
376	119.66	3.58m	5.98m
377	119.98	3.59m	5.99m
378	120.30	3.60m	6.01m
379	120.62	3.61m	6.03m
380	120.94	3.62m	6.04m
381	121.26	3.63m	6.06m
382	121.57	3.64m	6.07m
383	121.89	3.65m	6.09m
384	122.21	3.66m	6.11m
385	122.53	3.67m	6.12m
386	122.85	3.68m	6.14m
387	123.16	3.69m	6.15m
388	123.48	3.70m	6.17m

Circumference	Diameter cms	Zone of Rapid Taper x 3	Zone of Rapid Taper x 5
389	123.80	3.71m	6.19m
390	124.12	3.72m	6.20m
391	124.44	3.73m	6.22m
392	124.76	3.74m	6.23m
393	125.07	3.75m	6.25m
394	125.39	3.76m	6.26m
395	125.71	3.77m	6.28m
396	126.03	3.78m	6.30m
397	126.35	3.79m	6.31m
398	126.67	3.80m	6.33m
399	126.98	3.81m	6.34m
400	127.30	3.82m	6.36m
401	127.62	3.83m	6.38m
402	127.94	3.83m	6.39m

### What is the Zone of Rapid taper?

Below the trunk flare, the trunk divides into many roots that are quite large at the trunk and quickly taper as the forces within the root lessen. This segment of the root is called the zone of rapid taper.

In a mature tree, these roots typically taper from 25cms to 30cms diameter or greater at the trunk to about 75mm to 100mm in diameter, 1.8 metres to 2.4 metres from the trunk. Tapering roots cause the greatest conflict with paving.

Tapering large roots can withstand compaction and exert significant lifting force. Zone of Rapid taper roots add more wood along the top side of a root as it responds to stress within. As the wood increases in girth, the soil at the base of the tree will lift (heave) at a rate of 50mm to 75mm every ten years.

This process is what makes zone of rapid taper roots so damaging to paving.

James Urban 2008 *Up by Roots: Healthy Soils and Trees in the Built Environment* ISA.