UNLOCKING THE VALUE OF URBAN TREES

OSLO – 5th March 2020

Kenton Rogers.

Treeconomics

Sustainable treescapes for everyone

Treeconomics

Progress and Highlights

2011

Pilot Urban Forest Assessment in Torbay Featured on ITV News

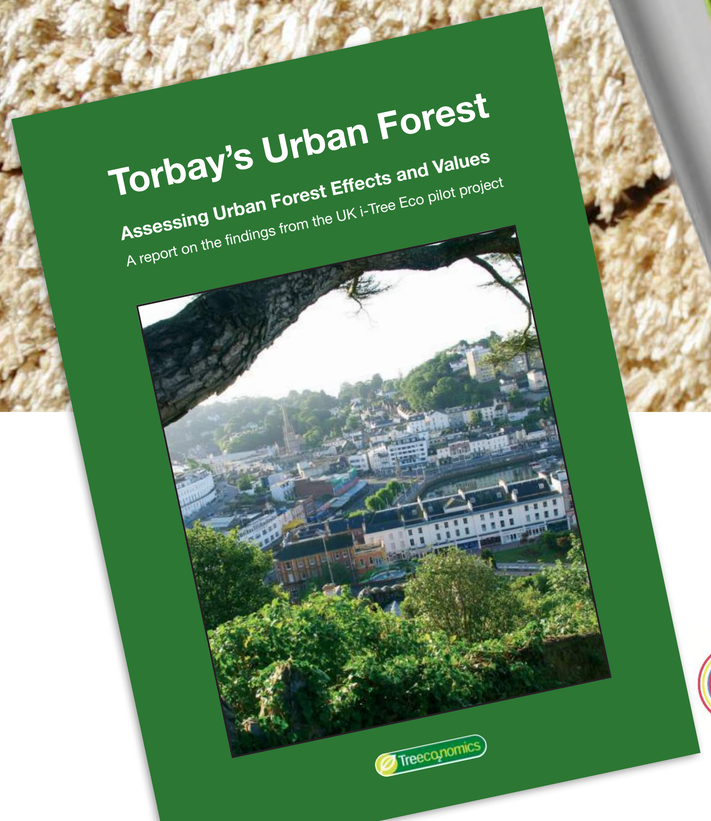
2016

Innovation Award for Highways England project

TORBAY
i-Tree Trail

2019

Over 30 Urban Forestry Projects Completed



2013

Completed School for Social Entrepreneurs

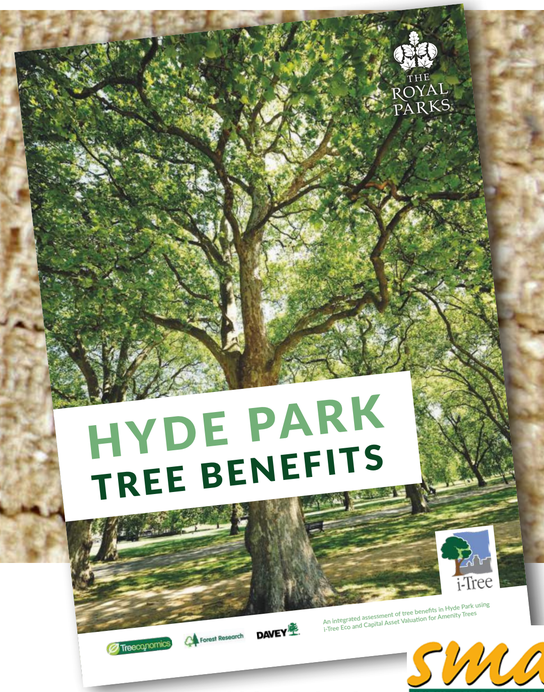
school for social entrepreneurs

2015

Undertook and advised on valuing London's urban forest

2017

Lottery Funding for interactive tree trail



Society of Municipal Arborists (US Based) Award for Innovation

sma SOCIETY OF MUNICIPAL ARBORISTS

20 Urban Forestry Projects Completed

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Sidmouth Herald

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Sidmouth News | Education | Nostalgia | Election 2015 | Weather | Tide Times | East Devon News

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The value of protecting our trees: £170million replacement cost

12:35 23 October 2015 | Eleanor Pipe

A talk on trees and hedges was given at Kennaway House on Wednesday as part of Sidmouth Science Week. Ref shs 4332-42-155H. Picture: Simon Horn

A major survey of trees in the Sid Valley has marked the first step towards protecting and improving the environment for years to come.

Sidmouth ARBORETUM

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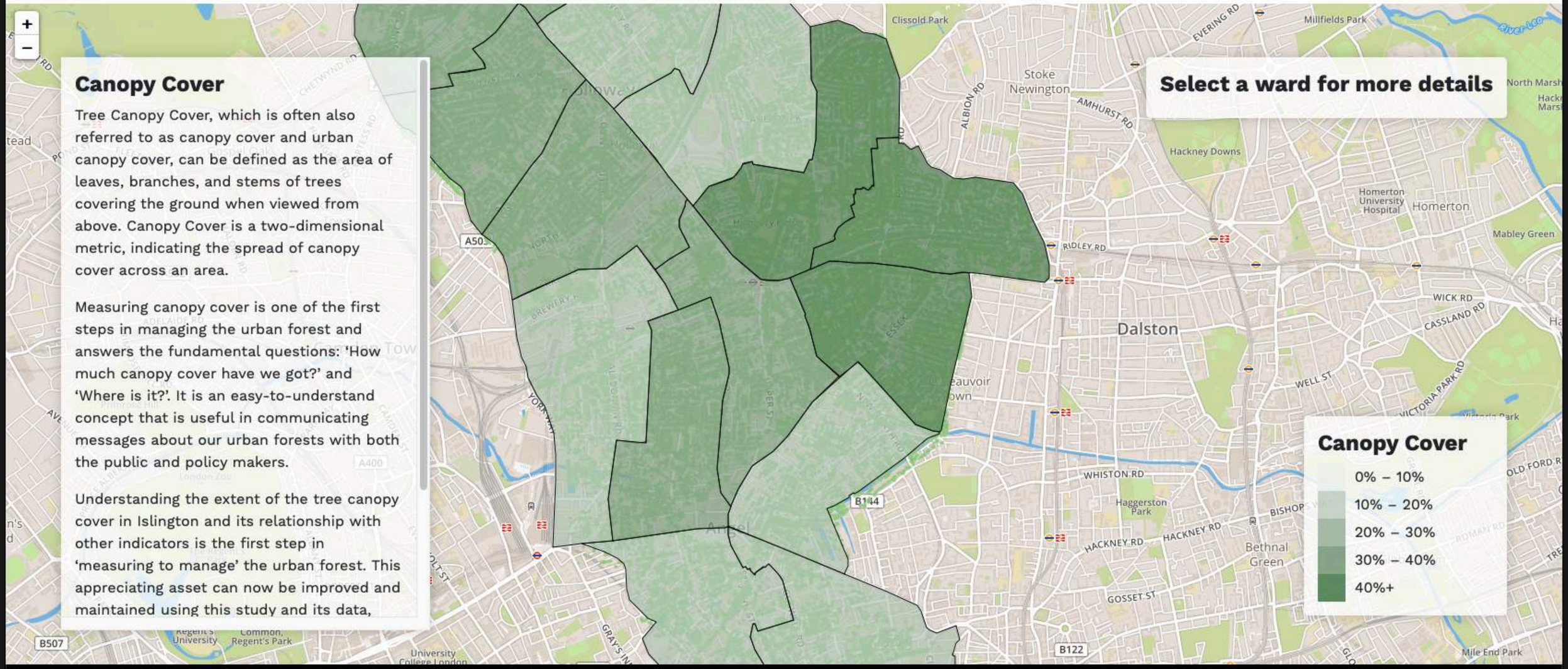
Canopy Cover

Tree Canopy Cover, which is often also referred to as canopy cover and urban canopy cover, can be defined as the area of leaves, branches, and stems of trees covering the ground when viewed from above. Canopy Cover is a two-dimensional metric, indicating the spread of canopy cover across an area.

Measuring canopy cover is one of the first steps in managing the urban forest and answers the fundamental questions: 'How much canopy cover have we got?' and 'Where is it?'. It is an easy-to-understand concept that is useful in communicating messages about our urban forests with both the public and policy makers.

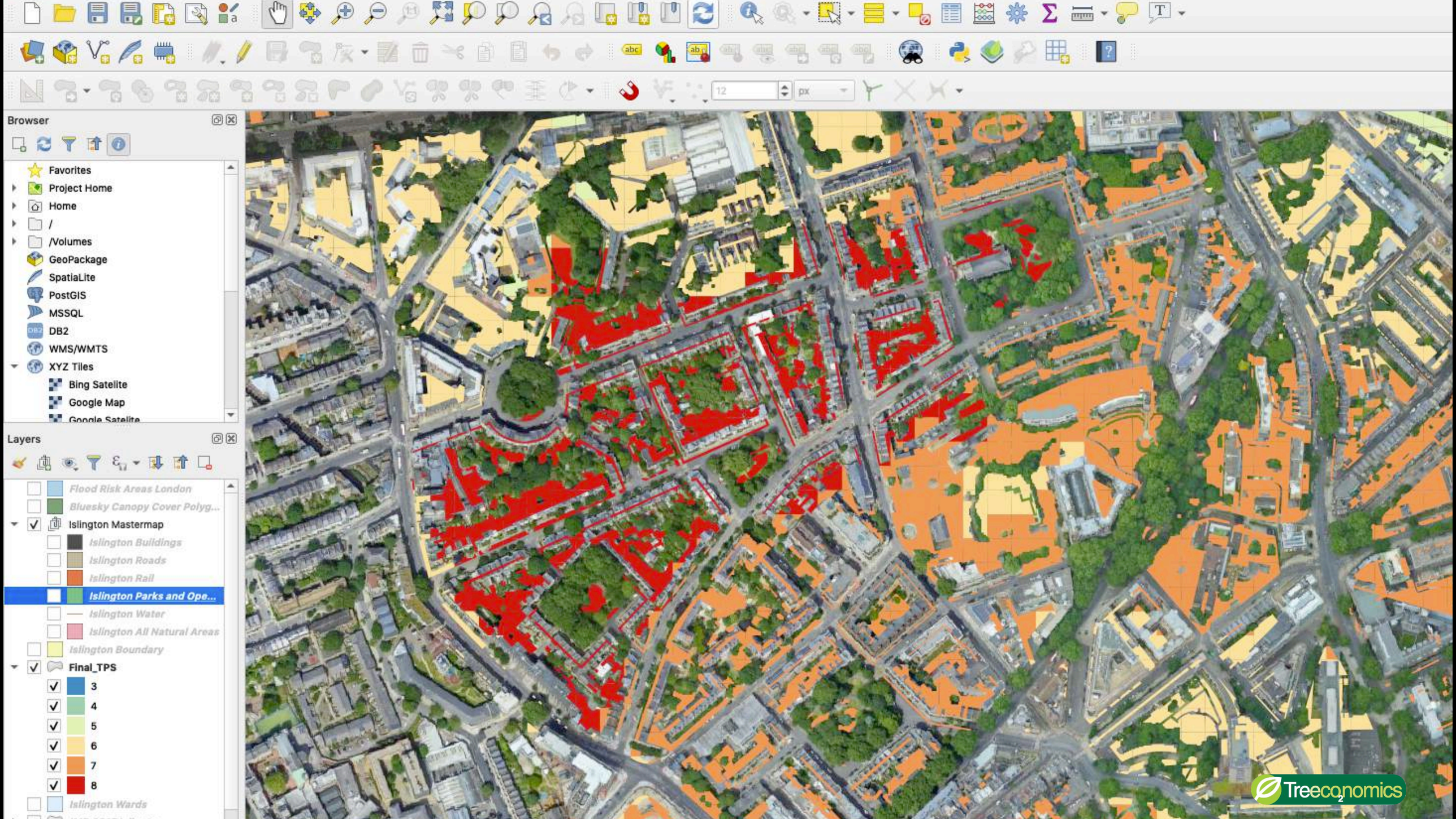
Understanding the extent of the tree canopy cover in Islington and its relationship with other indicators is the first step in 'measuring to manage' the urban forest. This appreciating asset can now be improved and maintained using this study and its data,

Select a ward for more details



Canopy Cover

- 0% – 10%
- 10% – 20%
- 20% – 30%
- 30% – 40%
- 40%+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SpatiaLite
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DB2
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XYZ Tiles
Bing Satelite
Google Map
Layers
Flood Risk Areas London
Bluesky Canopy Cover Polyg...
Islington Mastermap
Islington Buildings
Islington Roads
Islington Rail
Islington Parks and Ope...
Islington Water
Islington All Natural Areas
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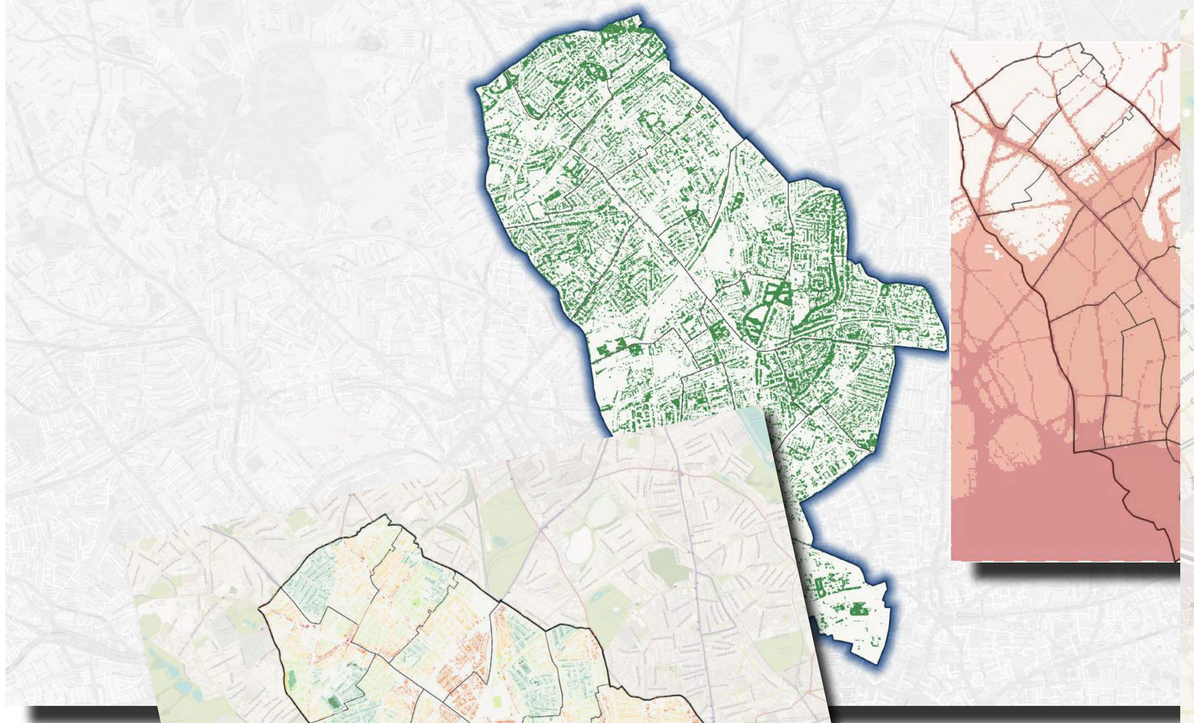
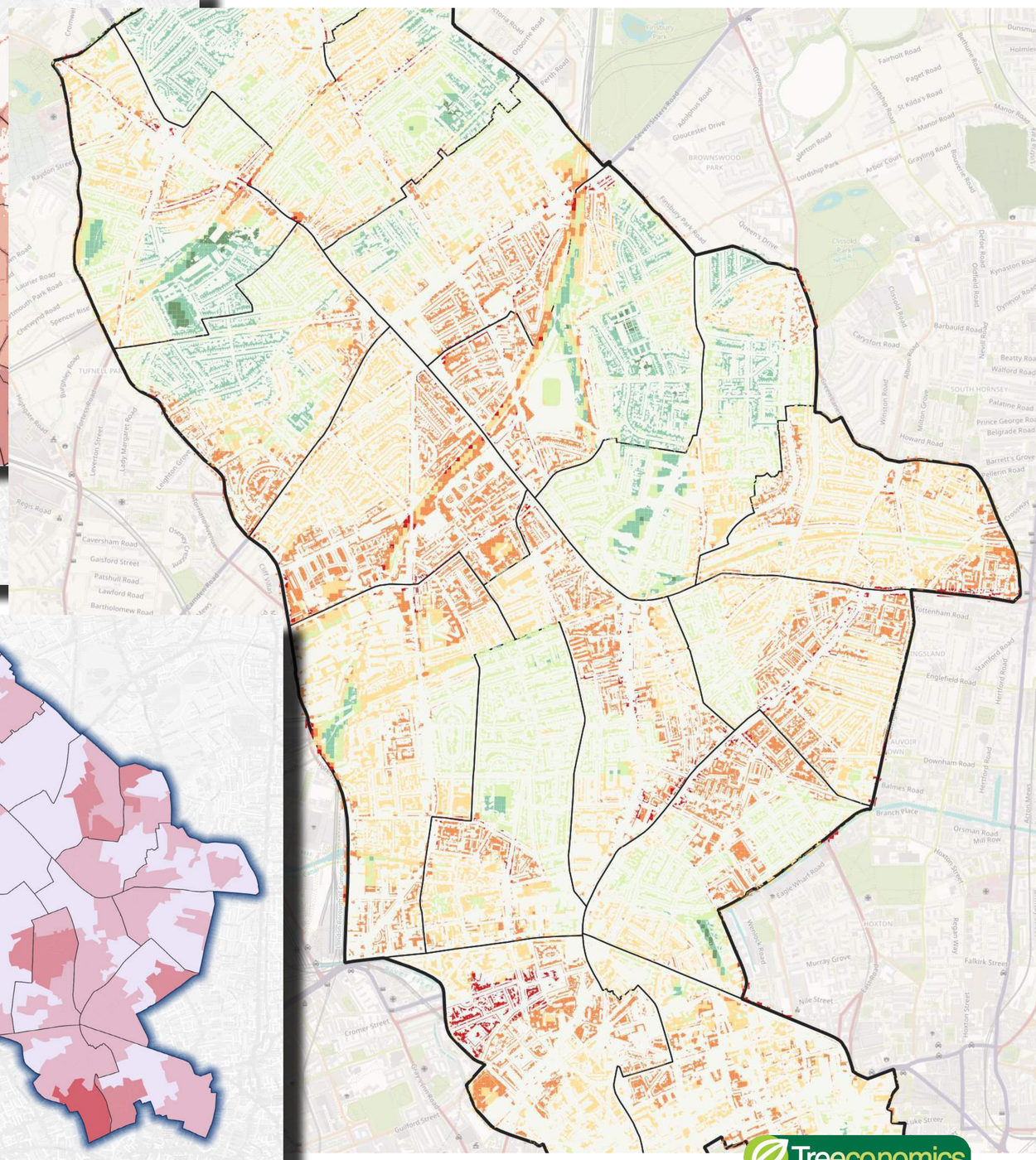
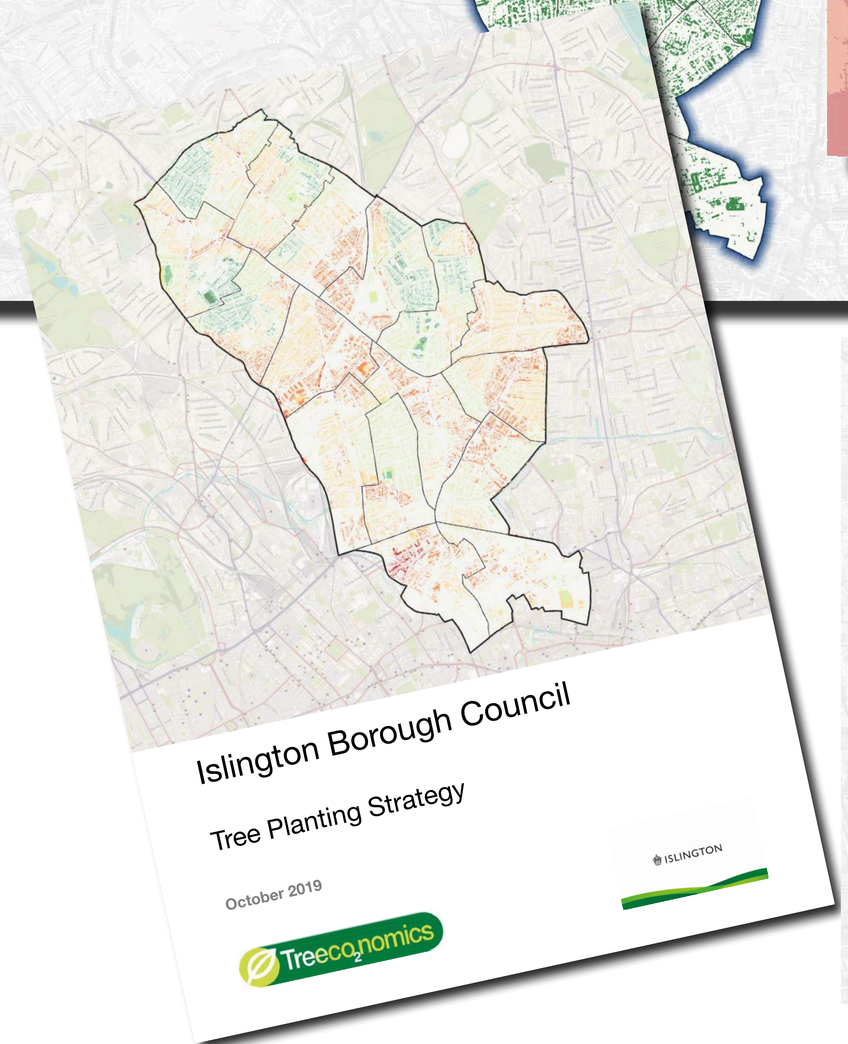
Islington Wards
Treeconomics







Islington Borough Council

Tree Planting Strategy

October 2019

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ISLINGTON

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The Problem

Urban Forests are an overlooked and undervalued resource

2050

2018

Urban Population

67% of urban forests in the UK have no proactive management

Urban Forest Cover

Cities occupy only 3% of the Earths Surface but consume 70% of global energy and emit 75% of greenhouse gases – UN 2014

Tree cover is a critical element of the urban fabric providing multiple benefits to society at relatively little cost

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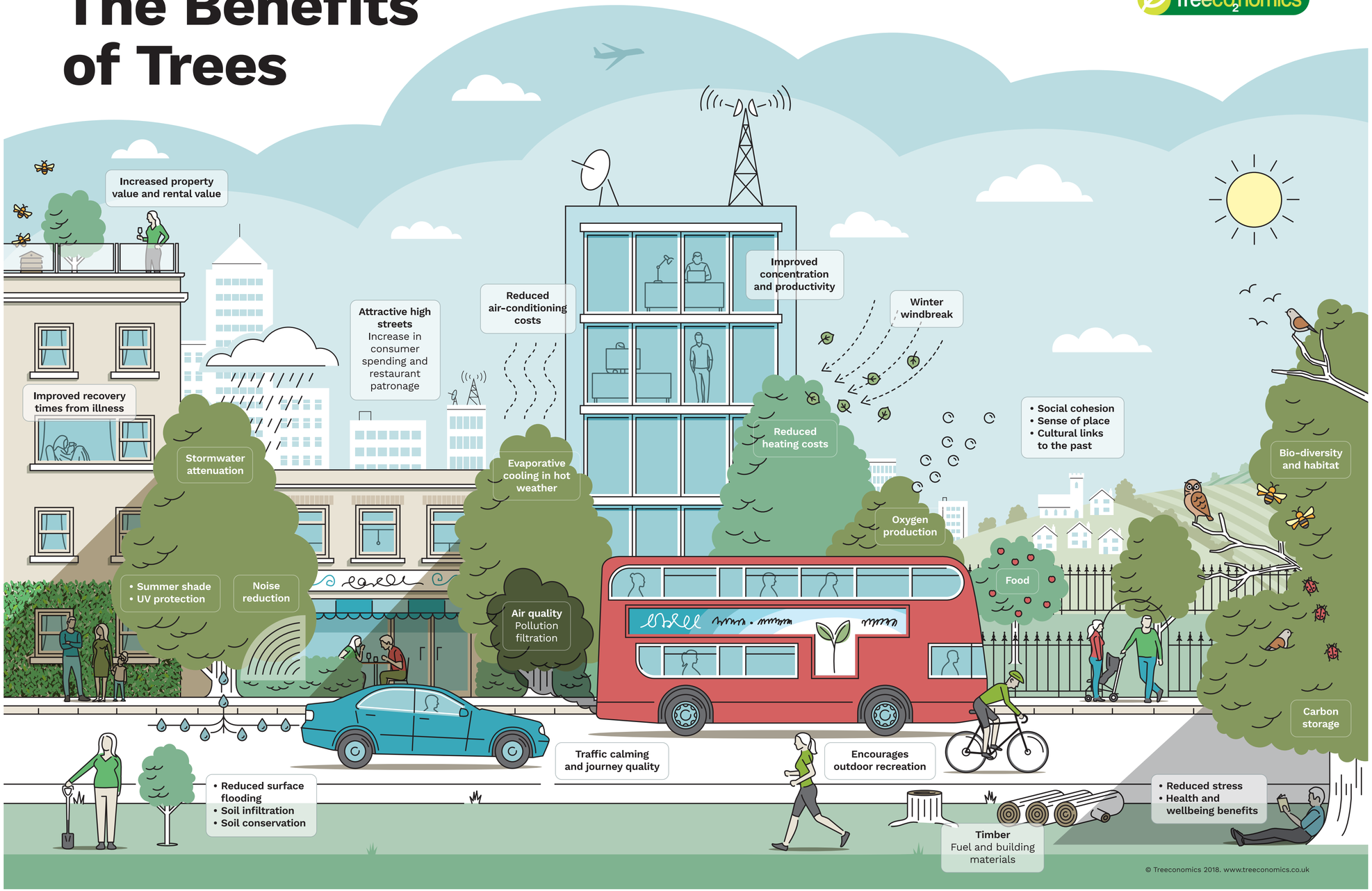
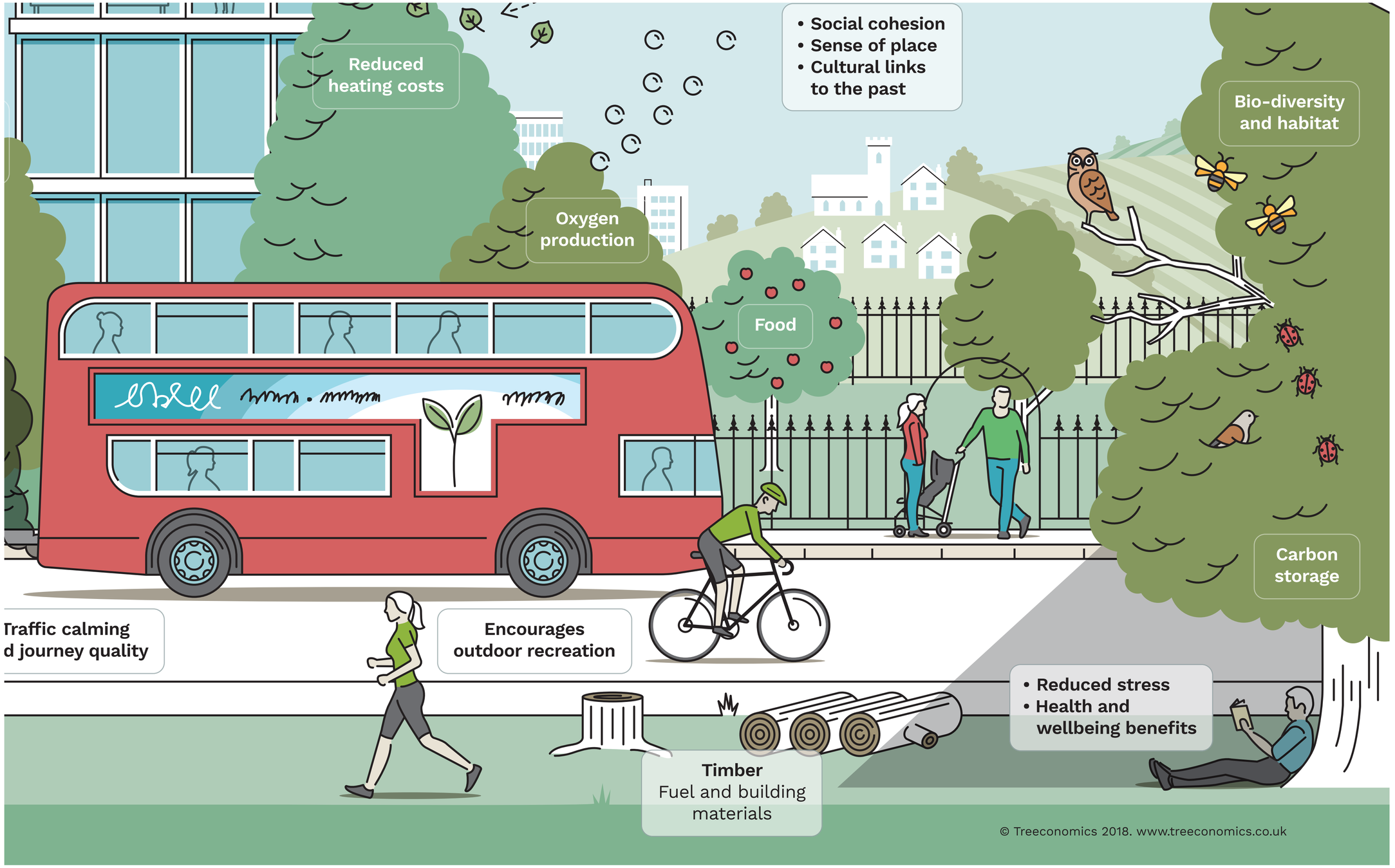
The Benefits of Trees

Treeco$_2$nomics





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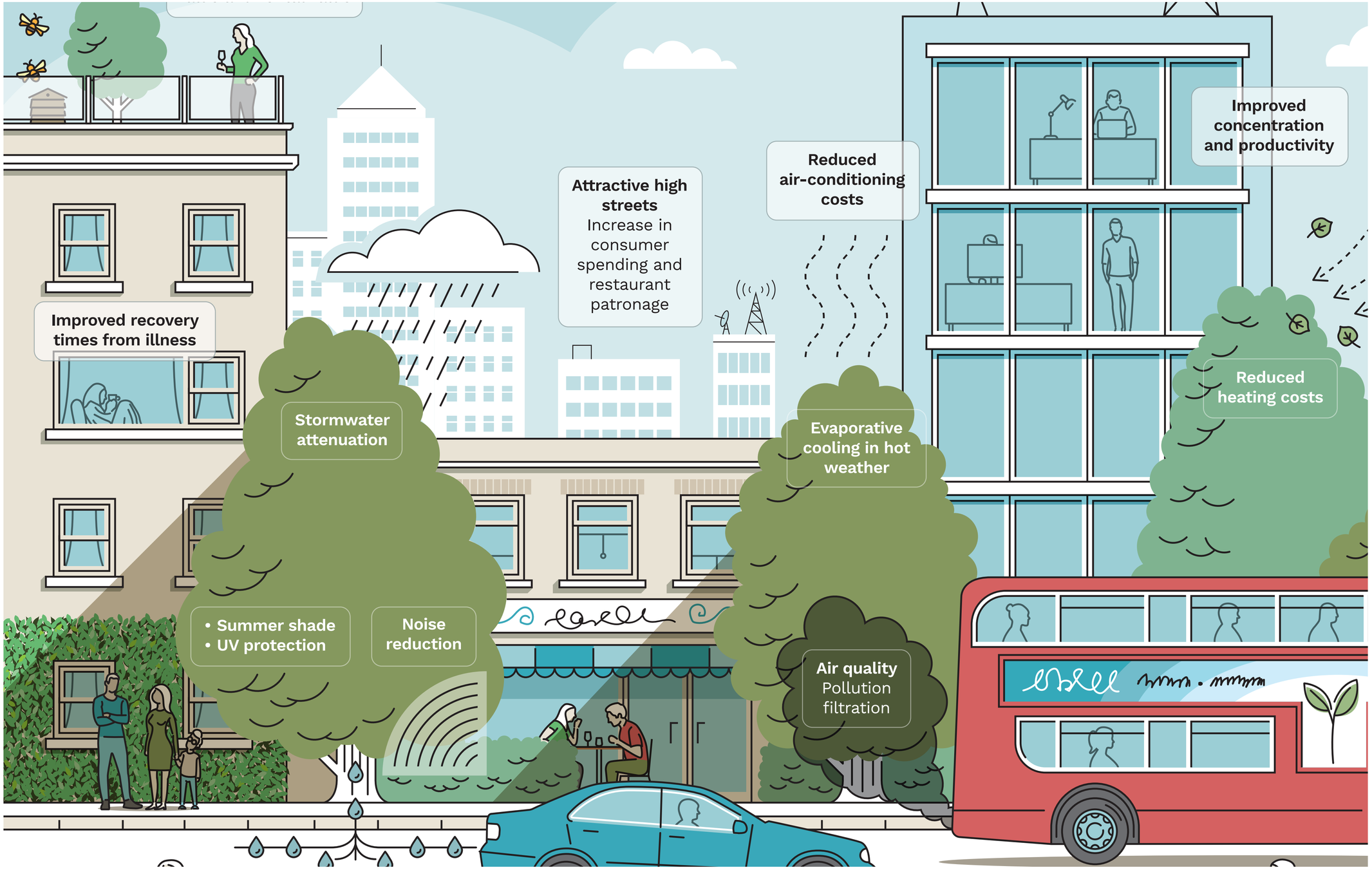

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The Problem. . . .


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Courtesy: Tony Kirkham

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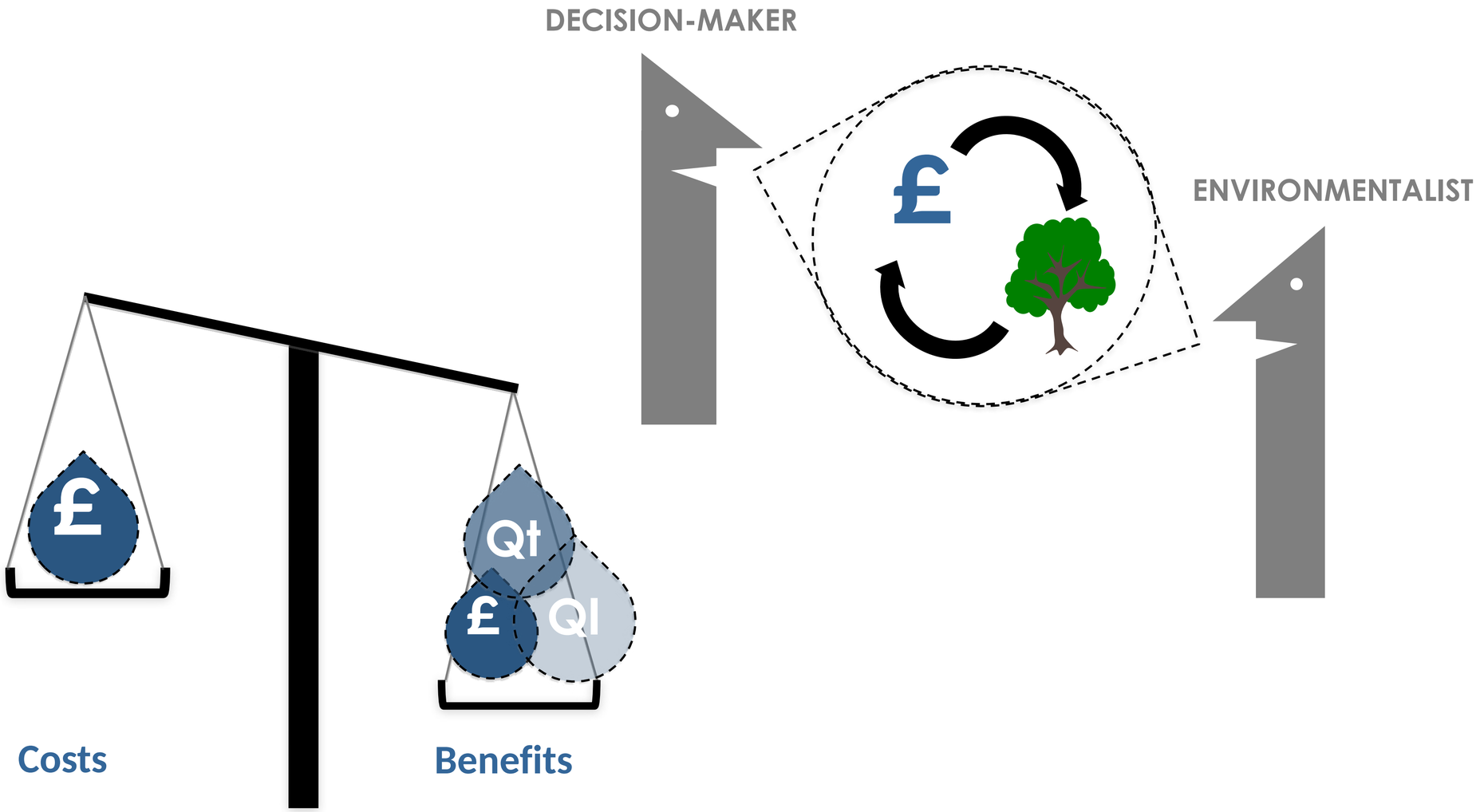
Natural asset valuation



STREET TREE COST BENEFIT ANALYSIS

BY GREENBLUE URBAN

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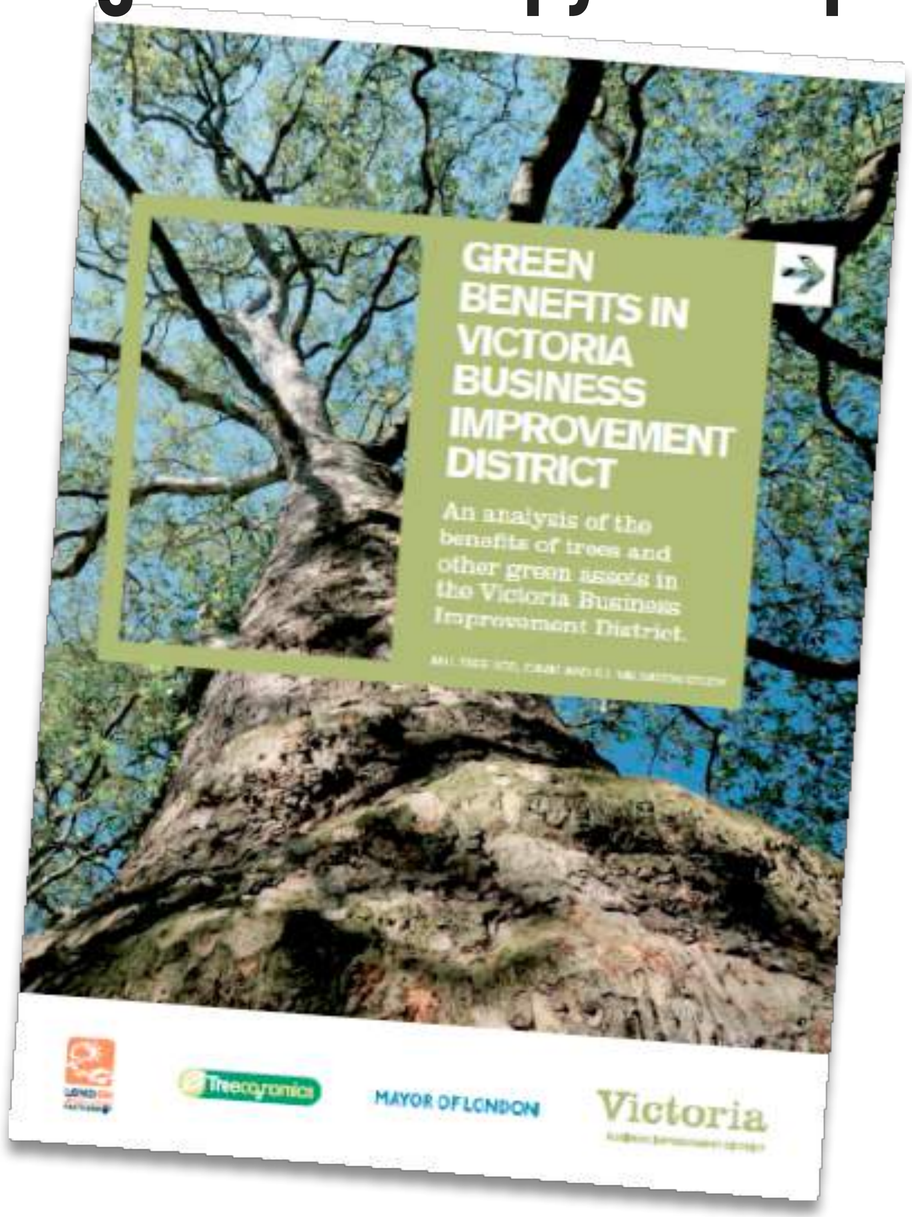
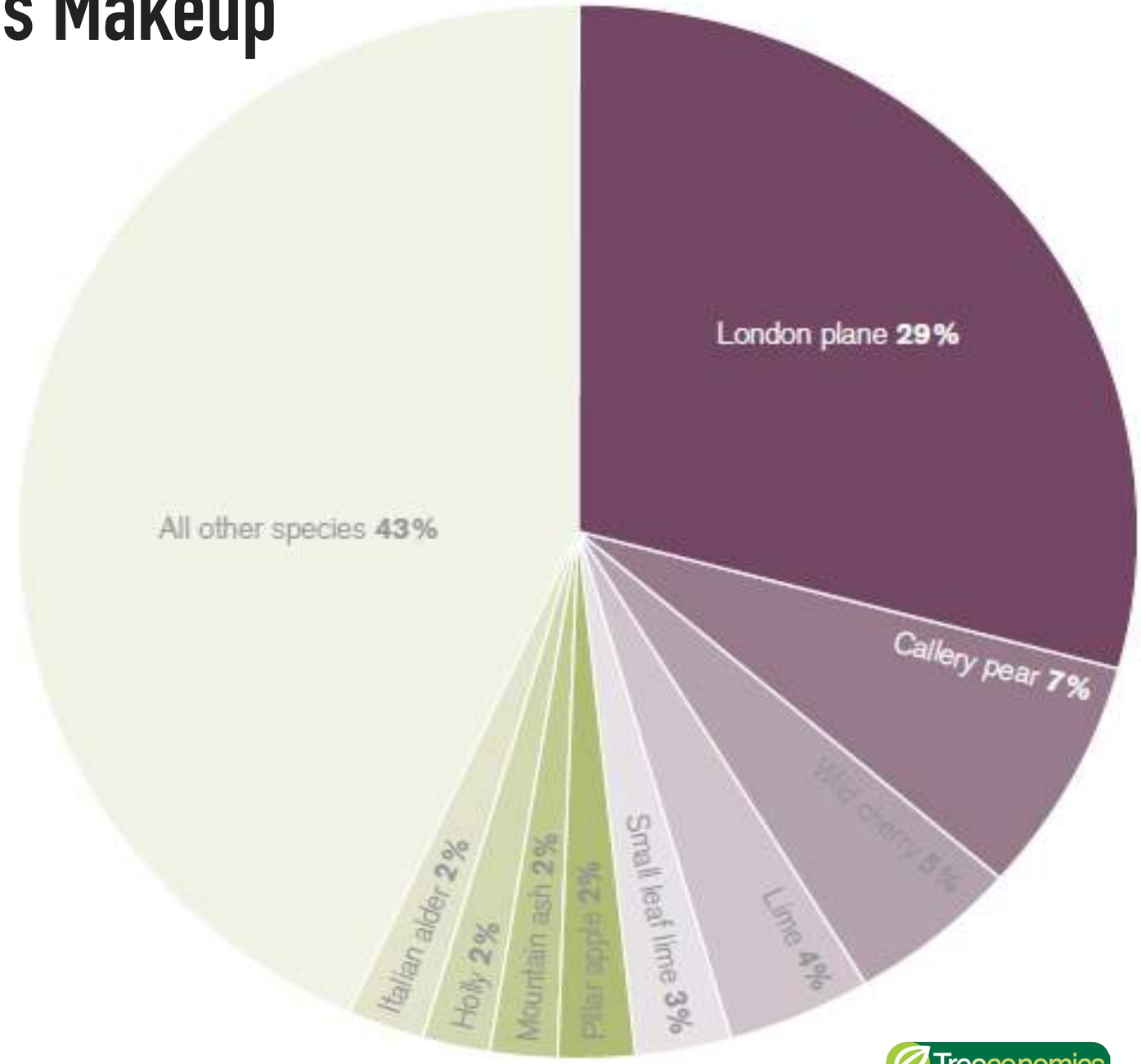
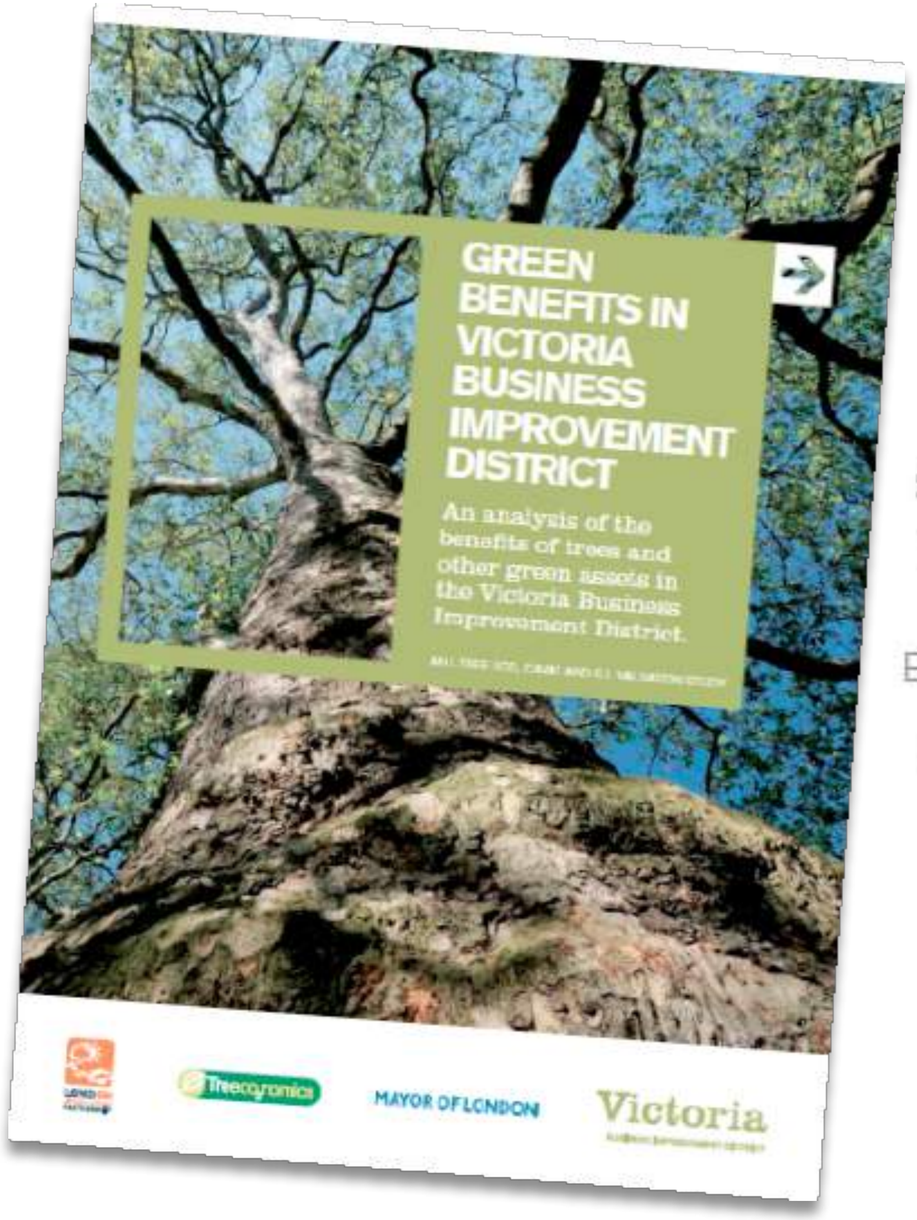
Long Term Canopy

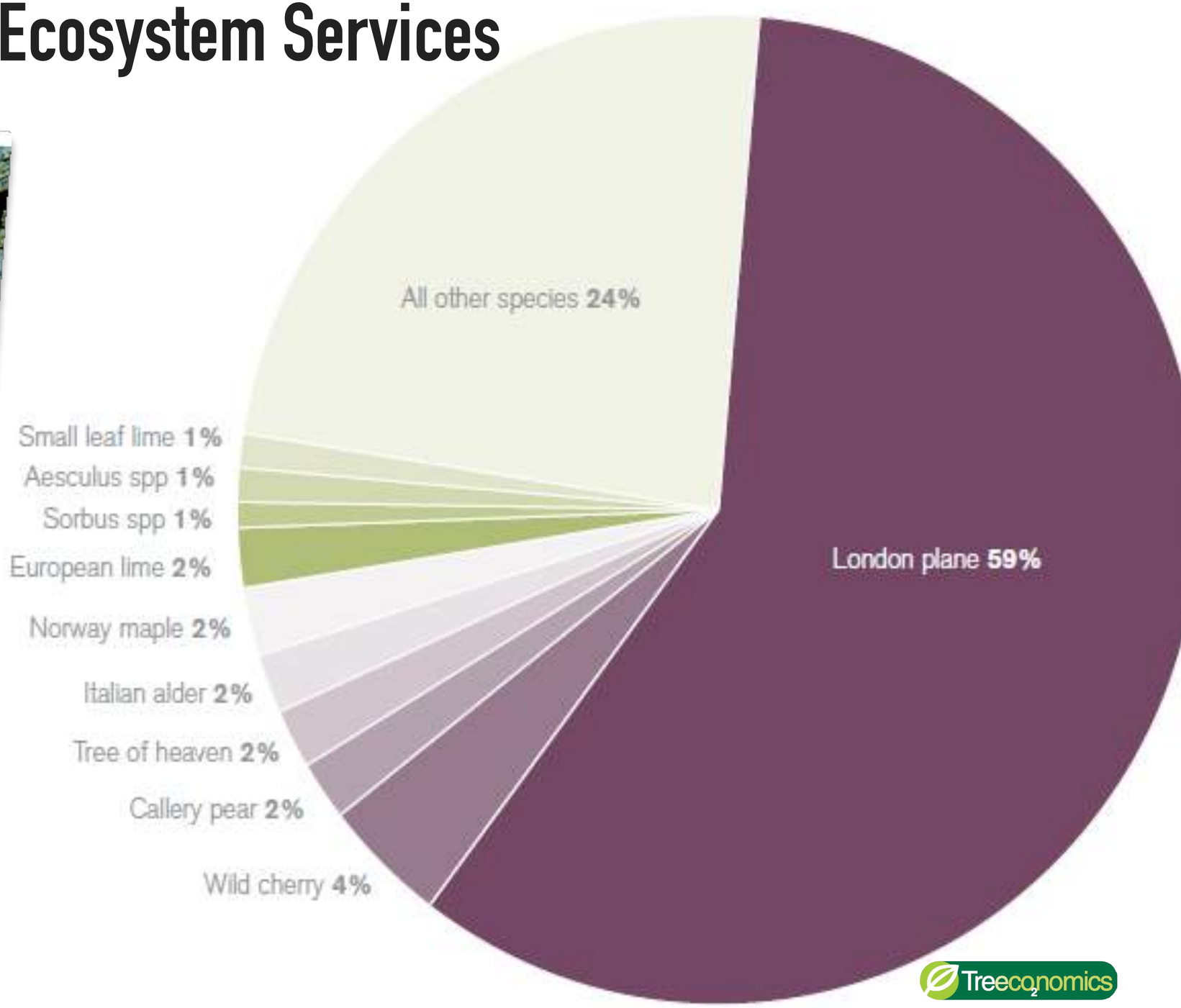
Long Term Canopy and Species Makeup





Long Term Canopy and Ecosystem Services



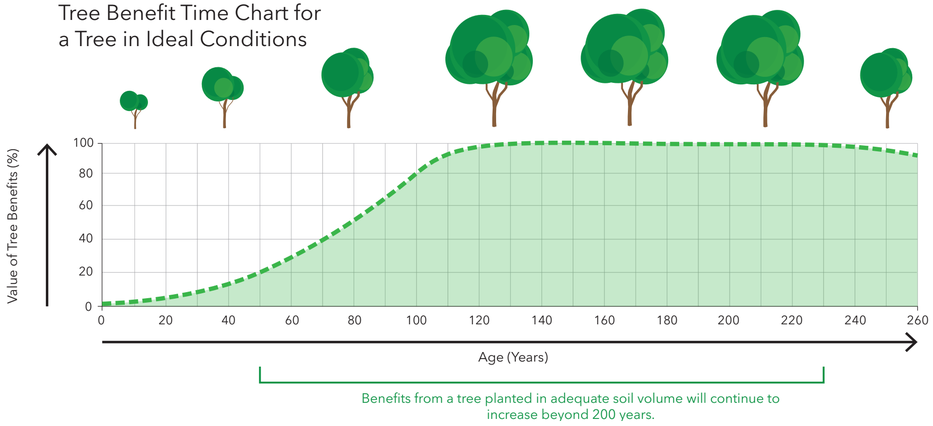



R.W. KENNARD
IRON WHARF

04. Cost Effectiveness

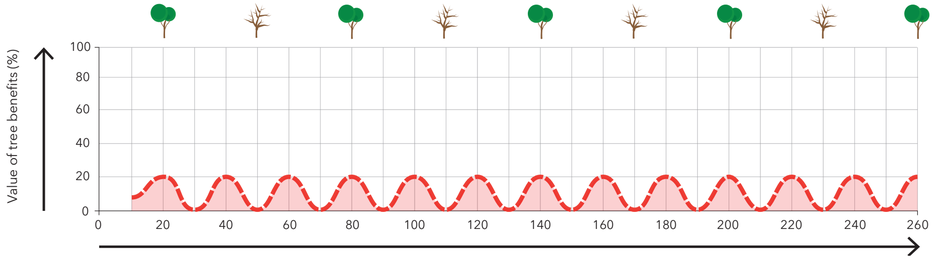
Standard street trees planted without an appropriate volume of uncompacted soil are **not cost-effective** despite initial installation costs being cheaper. This is because the breakeven point on cost vs benefits is never reached.

Tree Benefit Time Chart for a Tree in Ideal Conditions



01.

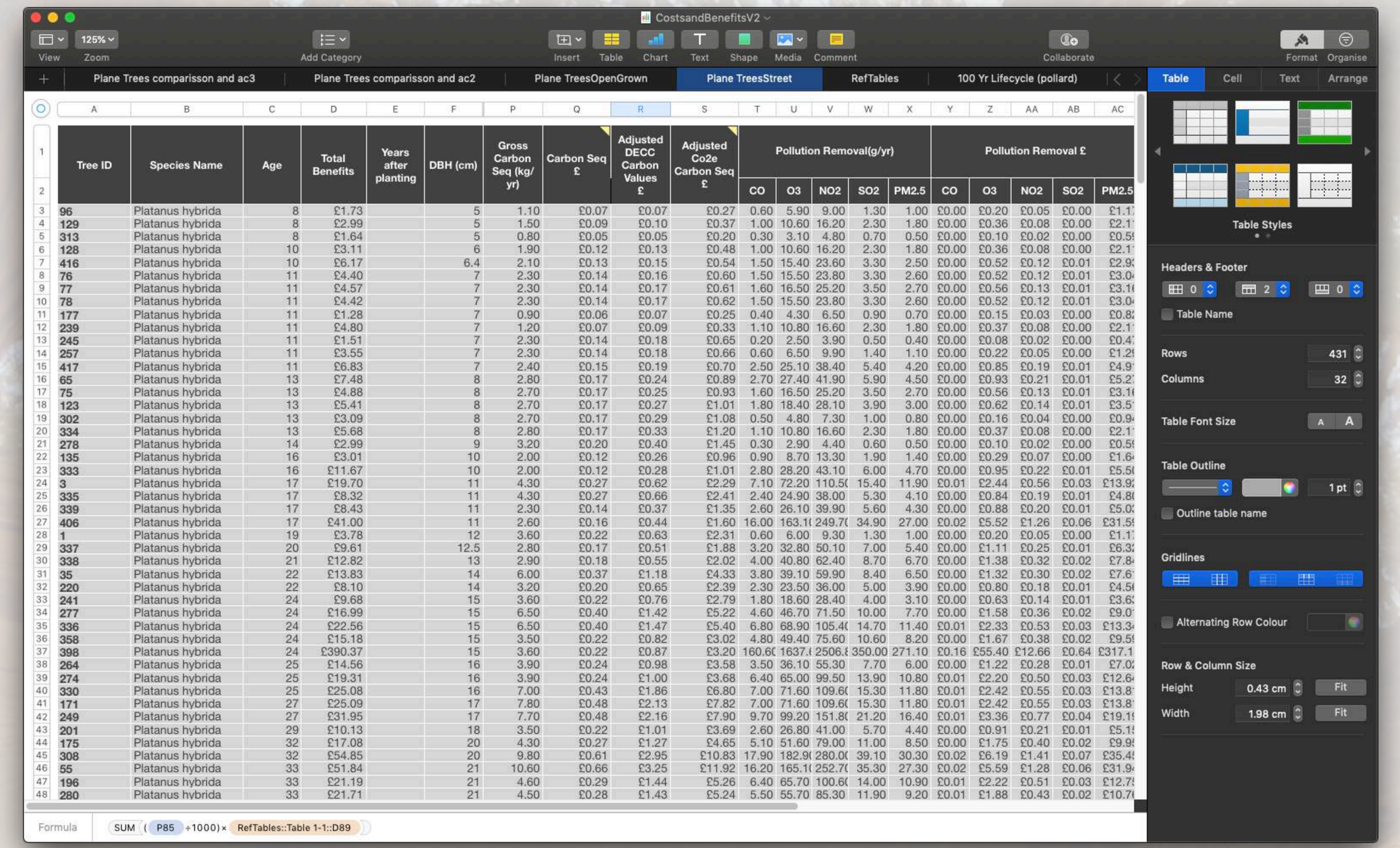
Trees are the largest, and longest living things on earth – when planted well, and maintained. Most street trees do not attain their species potential simply because the long term requirements are not calculated at planting stage. As you can see from the above graphic, originally formulated by Jeremy Barrell of Barrell Tree Consultancy, the real cost benefits start to increase after about 50 years, and continue to increase for another 150 years! Much of urban development does not look ahead more than 75 years, so well planted trees can shape our cities for decades and even centuries to come!



02.

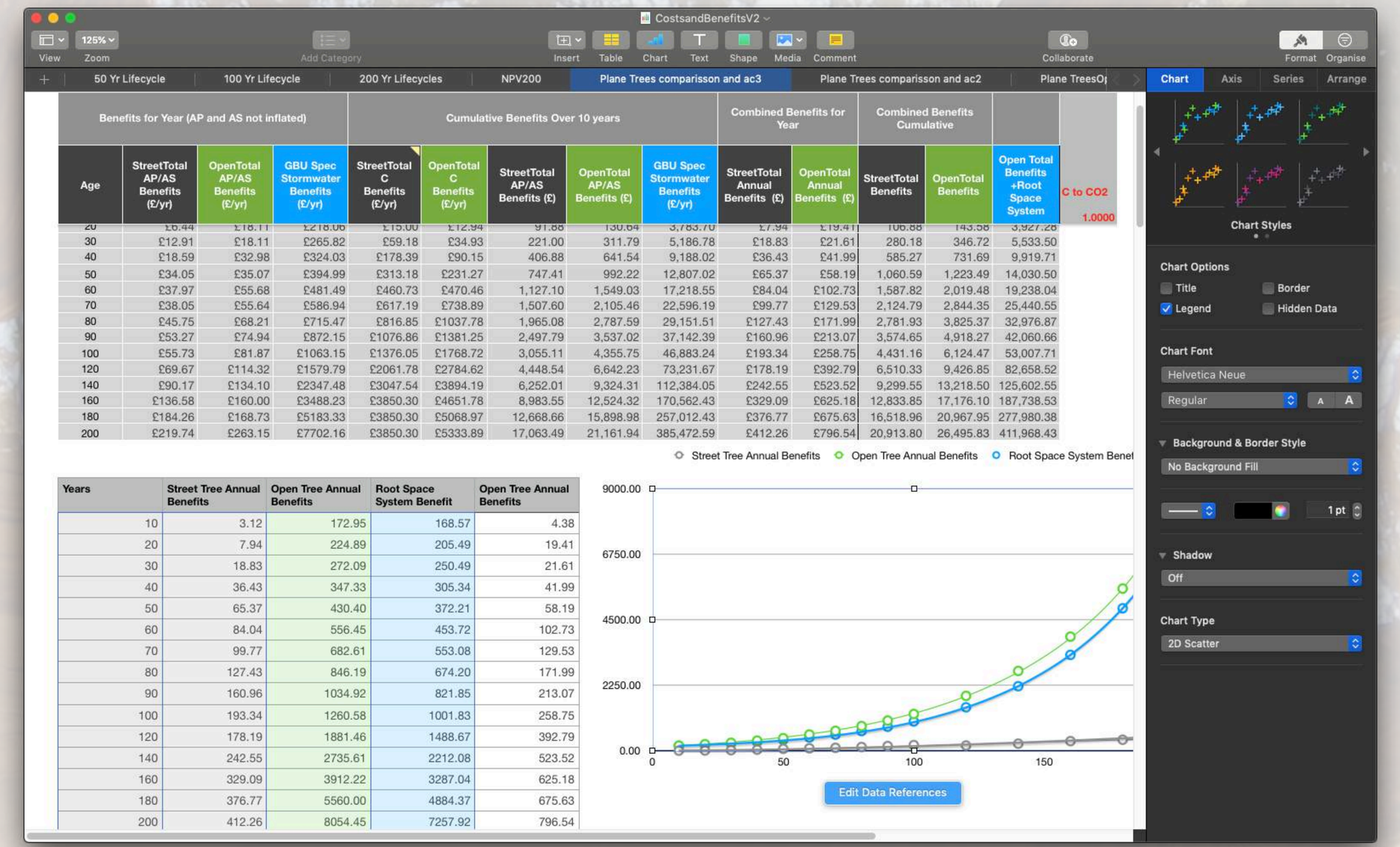
This image shows how regular replanting of trees which fail before they have achieved 10 years of age is not only a total waste of resources, but never provide the multiple and needed benefits to our urban communities. Realistically, they will not give us more than 20% of their potential values – so better to plant one tree well, than 5 trees poorly!

Working from the concept



Tree ID	Species Name	Age	Total Benefits	Years after planting	DBH (cm)	Gross Carbon Seq (kg/yr)	Carbon Seq £	Adjusted DECC Carbon Values £	Adjusted Co2e Carbon Seq £	Pollution Removal(g/yr)					Pollution Removal £				
										CO	O3	NO2	SO2	PM2.5	CO	O3	NO2	SO2	PM2.5
96	Platanus hybrida	8	£1.73		5	1.10	£0.07	£0.07	£0.27	0.60	5.90	9.00	1.30	1.00	£0.00	£0.20	£0.05	£0.00	£1.1
129	Platanus hybrida	8	£2.99		5	1.50	£0.09	£0.10	£0.37	1.00	10.60	16.20	2.30	1.80	£0.00	£0.36	£0.08	£0.00	£2.1
313	Platanus hybrida	8	£1.64		5	0.80	£0.05	£0.05	£0.20	0.30	3.10	4.80	0.70	0.50	£0.00	£0.10	£0.02	£0.00	£0.5
128	Platanus hybrida	10	£3.11		6	1.90	£0.12	£0.13	£0.48	1.00	10.60	16.20	2.30	1.80	£0.00	£0.36	£0.08	£0.00	£2.1
416	Platanus hybrida	10	£6.17		6.4	2.10	£0.13	£0.15	£0.54	1.50	15.40	23.60	3.30	2.50	£0.00	£0.52	£0.12	£0.01	£2.9
76	Platanus hybrida	11	£4.40		7	2.30	£0.14	£0.16	£0.60	1.50	15.50	23.80	3.30	2.60	£0.00	£0.52	£0.12	£0.01	£3.0
77	Platanus hybrida	11	£4.57		7	2.30	£0.14	£0.17	£0.61	1.60	16.50	25.20	3.50	2.70	£0.00	£0.56	£0.13	£0.01	£3.1
78	Platanus hybrida	11	£4.42		7	2.30	£0.14	£0.17	£0.62	1.50	15.50	23.80	3.30	2.60	£0.00	£0.52	£0.12	£0.01	£3.0
177	Platanus hybrida	11	£1.28		7	0.90	£0.06	£0.07	£0.25	0.40	4.30	6.50	0.90	0.70	£0.00	£0.15	£0.03	£0.00	£0.8
239	Platanus hybrida	11	£4.80		7	1.20	£0.07	£0.09	£0.33	1.10	10.80	16.60	2.30	1.80	£0.00	£0.37	£0.08	£0.00	£2.1
245	Platanus hybrida	11	£1.51		7	2.30	£0.14	£0.18	£0.65	0.20	2.50	3.90	0.50	0.40	£0.00	£0.08	£0.02	£0.00	£0.4
257	Platanus hybrida	11	£3.55		7	2.30	£0.14	£0.18	£0.66	0.60	6.50	9.90	1.40	1.10	£0.00	£0.22	£0.05	£0.00	£1.2
417	Platanus hybrida	11	£6.83		7	2.40	£0.15	£0.19	£0.70	2.50	25.10	38.40	5.40	4.20	£0.00	£0.85	£0.19	£0.01	£4.9
65	Platanus hybrida	13	£7.48		8	2.80	£0.17	£0.24	£0.89	2.70	27.40	41.90	5.90	4.50	£0.00	£0.93	£0.21	£0.01	£5.2
75	Platanus hybrida	13	£4.88		8	2.70	£0.17	£0.25	£0.93	1.60	16.50	25.20	3.50	2.70	£0.00	£0.56	£0.13	£0.01	£3.1
123	Platanus hybrida	13	£5.41		8	2.70	£0.17	£0.27	£1.01	1.80	18.40	28.10	3.90	3.00	£0.00	£0.62	£0.14	£0.01	£3.5
302	Platanus hybrida	13	£3.09		8	2.70	£0.17	£0.29	£1.08	0.50	4.80	7.30	1.00	0.80	£0.00	£0.16	£0.04	£0.00	£0.9
334	Platanus hybrida	13	£5.68		8	2.80	£0.17	£0.33	£1.20	1.10	10.80	16.60	2.30	1.80	£0.00	£0.37	£0.08	£0.00	£2.1
278	Platanus hybrida	14	£2.99		9	3.20	£0.20	£0.40	£1.45	0.30	2.90	4.40	0.60	0.50	£0.00	£0.10	£0.02	£0.00	£0.5
135	Platanus hybrida	16	£3.01		10	2.00	£0.12	£0.26	£0.96	0.90	8.70	13.30	1.90	1.40	£0.00	£0.29	£0.07	£0.00	£1.6
333	Platanus hybrida	16	£11.67		10	2.00	£0.12	£0.28	£1.01	2.80	28.20	43.10	6.00	4.70	£0.00	£0.95	£0.22	£0.01	£5.5
3	Platanus hybrida	17	£19.70		11	4.30	£0.27	£0.62	£2.29	7.10	72.20	110.5	15.40	11.90	£0.01	£2.44	£0.56	£0.03	£13.9
335	Platanus hybrida	17	£8.32		11	4.30	£0.27	£0.66	£2.41	2.40	24.90	38.00	5.30	4.10	£0.00	£0.84	£0.19	£0.01	£4.8
339	Platanus hybrida	17	£8.43		11	2.30	£0.14	£0.37	£1.35	2.60	26.10	39.90	5.60	4.30	£0.00	£0.88	£0.20	£0.01	£5.0
406	Platanus hybrida	17	£41.00		11	2.60	£0.16	£0.44	£1.60	16.00	163.1	249.7	34.90	27.00	£0.02	£5.52	£1.26	£0.06	£31.5
1	Platanus hybrida	19	£3.78		12	3.60	£0.22	£0.63	£2.31	0.60	6.00	9.30	1.30	1.00	£0.00	£0.20	£0.05	£0.00	£1.1
337	Platanus hybrida	20	£9.61		12.5	2.80	£0.17	£0.51	£1.88	3.20	32.80	50.10	7.00	5.40	£0.00	£1.11	£0.25	£0.01	£6.3
338	Platanus hybrida	21	£12.82		13	2.90	£0.18	£0.55	£2.02	4.00	40.80	62.40	8.70	6.70	£0.00	£1.38	£0.32	£0.02	£7.8
35	Platanus hybrida	22	£13.83		14	6.00	£0.37	£1.18	£4.33	3.80	39.10	59.90	8.40	6.50	£0.00	£1.32	£0.30	£0.02	£7.6
220	Platanus hybrida	22	£8.10		14	3.20	£0.20	£0.65	£2.39	2.30	23.50	36.00	5.00	3.90	£0.00	£0.80	£0.18	£0.01	£4.5
241	Platanus hybrida	24	£9.68		15	3.60	£0.22	£0.76	£2.79	1.80	18.60	28.40	4.00	3.10	£0.00	£0.63	£0.14	£0.01	£3.6
277	Platanus hybrida	24	£16.99		15	6.50	£0.40	£1.42	£5.22	4.60	46.70	71.50	10.00	7.70	£0.00	£1.58	£0.36	£0.02	£9.0
336	Platanus hybrida	24	£22.56		15	6.50	£0.40	£1.47	£5.40	6.80	68.90	105.4	14.70	11.40	£0.01	£2.33	£0.53	£0.03	£13.3
358	Platanus hybrida	24	£15.18		15	3.50	£0.22	£0.82	£3.02	4.80	49.40	75.60	10.60	8.20	£0.00	£1.67	£0.38	£0.02	£9.5
398	Platanus hybrida	24	£390.37		15	3.60	£0.22	£0.87	£3.20	160.6	1637.4	2506.8	350.00	271.10	£0.16	£55.40	£12.66	£0.64	£317.1
264	Platanus hybrida	25	£14.56		16	3.90	£0.24	£0.98	£3.58	3.50	36.10	55.30	7.70	6.00	£0.00	£1.22	£0.28	£0.01	£7.0
274	Platanus hybrida	25	£19.31		16	3.90	£0.24	£1.00	£3.68	6.40	65.00	99.50	13.90	10.80	£0.01	£2.20	£0.50	£0.03	£12.6
330	Platanus hybrida	25	£25.08		16	7.00	£0.43	£1.86	£6.80	7.00	71.60	109.6	15.30	11.80	£0.01	£2.42	£0.55	£0.03	£13.8
171	Platanus hybrida	27	£25.09		17	7.80	£0.48	£2.13	£7.82	7.00	71.60	109.6	15.30	11.80	£0.01	£2.42	£0.55	£0.03	£13.8
249	Platanus hybrida	27	£31.95		17	7.70	£0.48	£2.16	£7.90	9.70	99.20	151.8	21.20	16.40	£0.01	£3.36	£0.77	£0.04	£19.1
201	Platanus hybrida	29	£10.13		18	3.50	£0.22	£1.01	£3.69	2.60	26.80	41.00	5.70	4.40	£0.00	£0.91	£0.21	£0.01	£5.1
175	Platanus hybrida	32	£17.08		20	4.30	£0.27	£1.27	£4.65	5.10	51.60	79.00	11.00	8.50	£0.00	£1.75	£0.40	£0.02	£9.9
308	Platanus hybrida	32	£54.85		20	9.80	£0.61	£2.95	£10.83	17.90	182.9	280.0	39.10	30.30	£0.02	£6.19	£1.41	£0.07	£35.4
55	Platanus hybrida	33	£51.84		21	10.60	£0.66	£3.25	£11.92	16.20	165.1	252.7	35.30	27.30	£0.02	£5.59	£1.28	£0.06	£31.9
196	Platanus hybrida	33	£21.19		21	4.60	£0.29	£1.44	£5.26	6.40	65.70	100.6	14.00	10.90	£0.01	£2.22	£0.51	£0.03	£12.7
280	Platanus hybrida	33	£21.71		21	4.50	£0.28	£1.43	£5.24	5.50	55.70	85.30	11.90	9.20	£0.01	£1.88	£0.43	£0.02	£10.7

Working from the concept

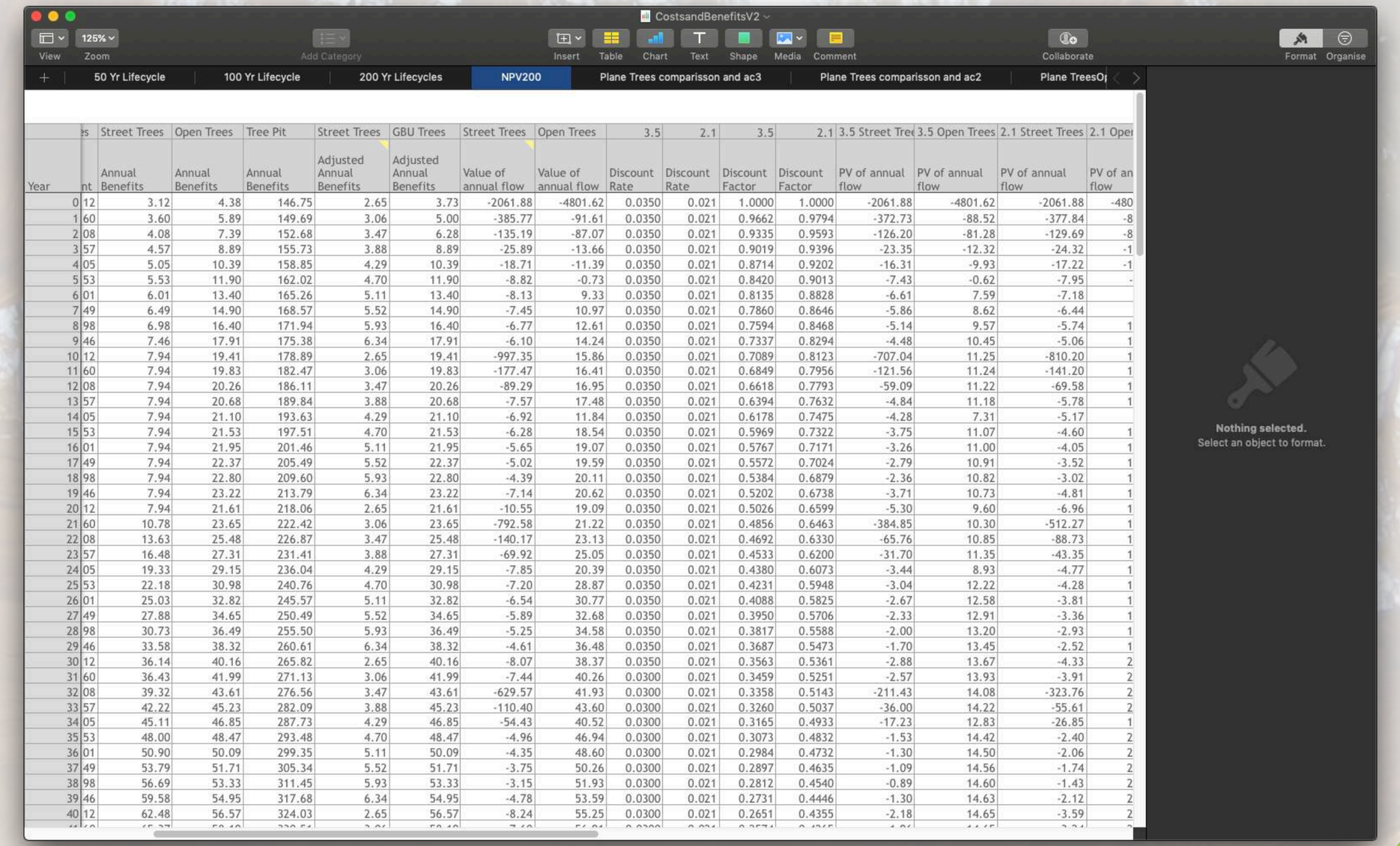


Benefits for Year (AP and AS not inflated)				Cumulative Benefits Over 10 years					Combined Benefits for Year		Combined Benefits Cumulative			
Age	StreetTotal AP/AS Benefits (£/yr)	OpenTotal AP/AS Benefits (£/yr)	GBU Spec Stormwater Benefits (£/yr)	StreetTotal C Benefits (£/yr)	OpenTotal C Benefits (£/yr)	StreetTotal AP/AS Benefits (£)	OpenTotal AP/AS Benefits (£)	GBU Spec Stormwater Benefits (£/yr)	StreetTotal Annual Benefits (£)	OpenTotal Annual Benefits (£)	StreetTotal Benefits	OpenTotal Benefits	Open Total Benefits +Root Space System	C to CO2
														1.0000
20	£6.44	£18.11	£218.06	£15.00	£12.94	91.88	130.64	3,783.70	£7.94	£19.41	106.88	143.58	3,927.28	
30	£12.91	£18.11	£265.82	£59.18	£34.93	221.00	311.79	5,186.78	£18.83	£21.61	280.18	346.72	5,533.50	
40	£18.59	£32.98	£324.03	£178.39	£90.15	406.88	641.54	9,188.02	£36.43	£41.99	585.27	731.69	9,919.71	
50	£34.05	£35.07	£394.99	£313.18	£231.27	747.41	992.22	12,807.02	£65.37	£58.19	1,060.59	1,223.49	14,030.50	
60	£37.97	£55.68	£481.49	£460.73	£470.46	1,127.10	1,549.03	17,218.55	£84.04	£102.73	1,587.82	2,019.48	19,238.04	
70	£38.05	£55.64	£586.94	£617.19	£738.89	1,507.60	2,105.46	22,596.19	£99.77	£129.53	2,124.79	2,844.35	25,440.55	
80	£45.75	£68.21	£715.47	£816.85	£1037.78	1,965.08	2,787.59	29,151.51	£127.43	£171.99	2,781.93	3,825.37	32,976.87	
90	£53.27	£74.94	£872.15	£1076.86	£1381.25	2,497.79	3,537.02	37,142.39	£160.96	£213.07	3,574.65	4,918.27	42,060.66	
100	£55.73	£81.87	£1063.15	£1376.05	£1768.72	3,055.11	4,355.75	46,883.24	£193.34	£258.75	4,431.16	6,124.47	53,007.71	
120	£69.67	£114.32	£1579.79	£2061.78	£2784.62	4,448.54	6,642.23	73,231.67	£178.19	£392.79	6,510.33	9,426.85	82,658.52	
140	£90.17	£134.10	£2347.48	£3047.54	£3894.19	6,252.01	9,324.31	112,384.05	£242.55	£523.52	9,299.55	13,218.50	125,602.55	
160	£136.58	£160.00	£3488.23	£3850.30	£4651.78	8,983.55	12,524.32	170,562.43	£329.09	£625.18	12,833.85	17,176.10	187,738.53	
180	£184.26	£168.73	£5183.33	£3850.30	£5068.97	12,668.66	15,898.98	257,012.43	£376.77	£675.63	16,518.96	20,967.95	277,980.38	
200	£219.74	£263.15	£7702.16	£3850.30	£5333.89	17,063.49	21,161.94	385,472.59	£412.26	£796.54	20,913.80	26,495.83	411,968.43	

Years	Street Tree Annual Benefits	Open Tree Annual Benefits	Root Space System Benefit	Open Tree Annual Benefits
10	3.12	172.95	168.57	4.38
20	7.94	224.89	205.49	19.41
30	18.83	272.09	250.49	21.61
40	36.43	347.33	305.34	41.99
50	65.37	430.40	372.21	58.19
60	84.04	556.45	453.72	102.73
70	99.77	682.61	553.08	129.53
80	127.43	846.19	674.20	171.99
90	160.96	1034.92	821.85	213.07
100	193.34	1260.58	1001.83	258.75
120	178.19	1881.46	1488.67	392.79
140	242.55	2735.61	2212.08	523.52
160	329.09	3912.22	3287.04	625.18
180	376.77	5560.00	4884.37	675.63
200	412.26	8054.45	7257.92	796.54

Treeconomics

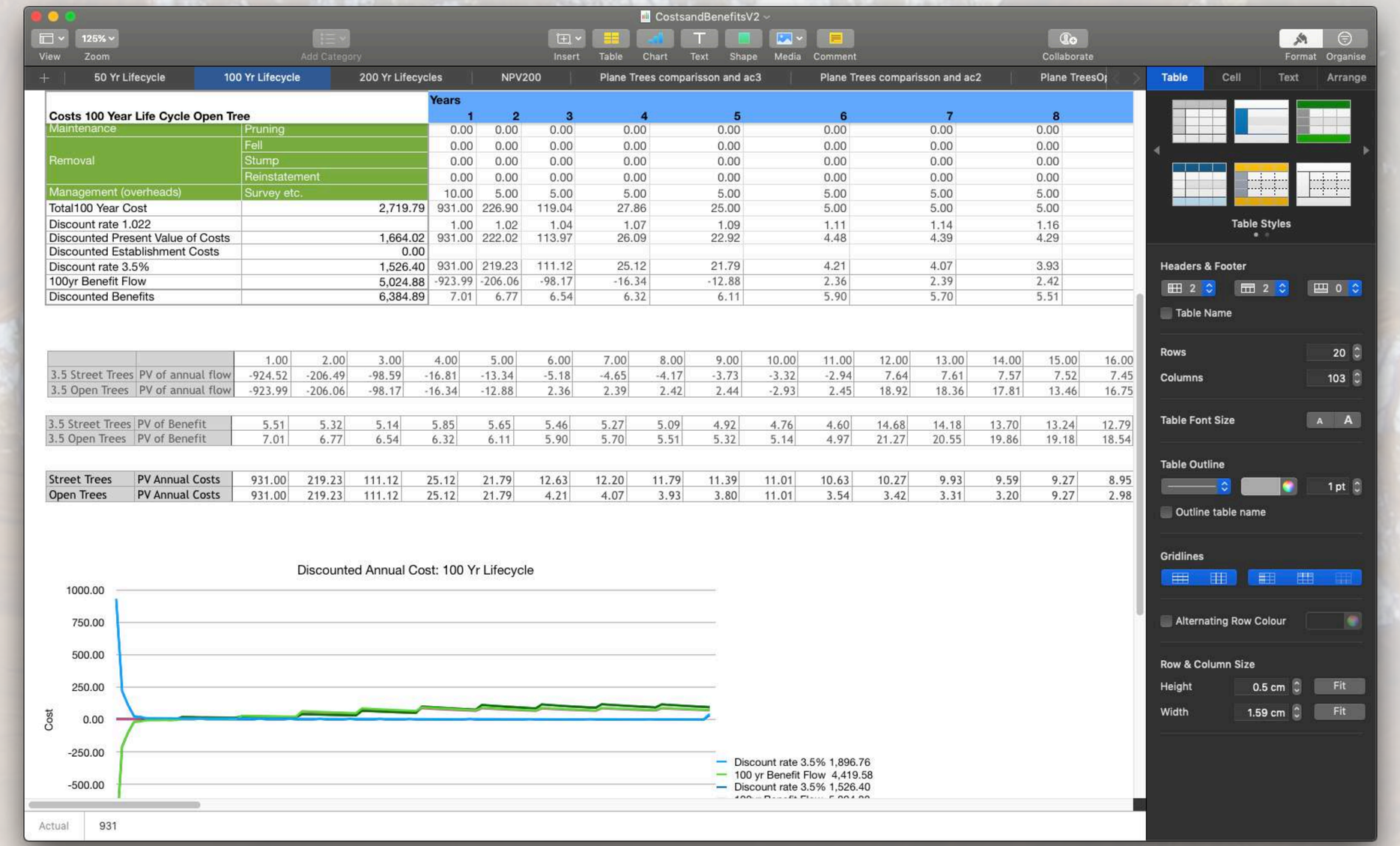
Working from the concept



Year	nt	Street Trees Annual Benefits	Open Trees Annual Benefits	Tree Pit Annual Benefits	Street Trees Adjusted Annual Benefits	GBU Trees Adjusted Annual Benefits	Street Trees Value of annual flow	Open Trees Value of annual flow	3.5 Discount Rate	2.1 Discount Rate	3.5 Discount Factor	2.1 Discount Factor	3.5 Street Tree PV of annual flow	3.5 Open Trees PV of annual flow	2.1 Street Trees PV of annual flow	2.1 Oper PV of an flow
0	12	3.12	4.38	146.75	2.65	3.73	-2061.88	-4801.62	0.0350	0.021	1.0000	1.0000	-2061.88	-4801.62	-2061.88	-480
1	60	3.60	5.89	149.69	3.06	5.00	-385.77	-91.61	0.0350	0.021	0.9662	0.9794	-372.73	-88.52	-377.84	-8
2	08	4.08	7.39	152.68	3.47	6.28	-135.19	-87.07	0.0350	0.021	0.9335	0.9593	-126.20	-81.28	-129.69	-8
3	57	4.57	8.89	155.73	3.88	8.89	-25.89	-13.66	0.0350	0.021	0.9019	0.9396	-23.35	-12.32	-24.32	-1
4	05	5.05	10.39	158.85	4.29	10.39	-18.71	-11.39	0.0350	0.021	0.8714	0.9202	-16.31	-9.93	-17.22	-1
5	53	5.53	11.90	162.02	4.70	11.90	-8.82	-0.73	0.0350	0.021	0.8420	0.9013	-7.43	-0.62	-7.95	-
6	01	6.01	13.40	165.26	5.11	13.40	-8.13	9.33	0.0350	0.021	0.8135	0.8828	-6.61	7.59	-7.18	
7	49	6.49	14.90	168.57	5.52	14.90	-7.45	10.97	0.0350	0.021	0.7860	0.8646	-5.86	8.62	-6.44	
8	98	6.98	16.40	171.94	5.93	16.40	-6.77	12.61	0.0350	0.021	0.7594	0.8468	-5.14	9.57	-5.74	1
9	46	7.46	17.91	175.38	6.34	17.91	-6.10	14.24	0.0350	0.021	0.7337	0.8294	-4.48	10.45	-5.06	1
10	12	7.94	19.41	178.89	2.65	19.41	-997.35	15.86	0.0350	0.021	0.7089	0.8123	-707.04	11.25	-810.20	1
11	60	7.94	19.83	182.47	3.06	19.83	-177.47	16.41	0.0350	0.021	0.6849	0.7956	-121.56	11.24	-141.20	1
12	08	7.94	20.26	186.11	3.47	20.26	-89.29	16.95	0.0350	0.021	0.6618	0.7793	-59.09	11.22	-69.58	1
13	57	7.94	20.68	189.84	3.88	20.68	-7.57	17.48	0.0350	0.021	0.6394	0.7632	-4.84	11.18	-5.78	1
14	05	7.94	21.10	193.63	4.29	21.10	-6.92	11.84	0.0350	0.021	0.6178	0.7475	-4.28	7.31	-5.17	
15	53	7.94	21.53	197.51	4.70	21.53	-6.28	18.54	0.0350	0.021	0.5969	0.7322	-3.75	11.07	-4.60	1
16	01	7.94	21.95	201.46	5.11	21.95	-5.65	19.07	0.0350	0.021	0.5767	0.7171	-3.26	11.00	-4.05	1
17	49	7.94	22.37	205.49	5.52	22.37	-5.02	19.59	0.0350	0.021	0.5572	0.7024	-2.79	10.91	-3.52	1
18	98	7.94	22.80	209.60	5.93	22.80	-4.39	20.11	0.0350	0.021	0.5384	0.6879	-2.36	10.82	-3.02	1
19	46	7.94	23.22	213.79	6.34	23.22	-7.14	20.62	0.0350	0.021	0.5202	0.6738	-3.71	10.73	-4.81	1
20	12	7.94	21.61	218.06	2.65	21.61	-10.55	19.09	0.0350	0.021	0.5026	0.6599	-5.30	9.60	-6.96	1
21	60	10.78	23.65	222.42	3.06	23.65	-792.58	21.22	0.0350	0.021	0.4856	0.6463	-384.85	10.30	-512.27	1
22	08	13.63	25.48	226.87	3.47	25.48	-140.17	23.13	0.0350	0.021	0.4692	0.6330	-65.76	10.85	-88.73	1
23	57	16.48	27.31	231.41	3.88	27.31	-69.92	25.05	0.0350	0.021	0.4533	0.6200	-31.70	11.35	-43.35	1
24	05	19.33	29.15	236.04	4.29	29.15	-7.85	20.39	0.0350	0.021	0.4380	0.6073	-3.44	8.93	-4.77	1
25	53	22.18	30.98	240.76	4.70	30.98	-7.20	28.87	0.0350	0.021	0.4231	0.5948	-3.04	12.22	-4.28	1
26	01	25.03	32.82	245.57	5.11	32.82	-6.54	30.77	0.0350	0.021	0.4088	0.5825	-2.67	12.58	-3.81	1
27	49	27.88	34.65	250.49	5.52	34.65	-5.89	32.68	0.0350	0.021	0.3950	0.5706	-2.33	12.91	-3.36	1
28	98	30.73	36.49	255.50	5.93	36.49	-5.25	34.58	0.0350	0.021	0.3817	0.5588	-2.00	13.20	-2.93	1
29	46	33.58	38.32	260.61	6.34	38.32	-4.61	36.48	0.0350	0.021	0.3687	0.5473	-1.70	13.45	-2.52	1
30	12	36.14	40.16	265.82	2.65	40.16	-8.07	38.37	0.0350	0.021	0.3563	0.5361	-2.88	13.67	-4.33	2
31	60	36.43	41.99	271.13	3.06	41.99	-7.44	40.26	0.0300	0.021	0.3459	0.5251	-2.57	13.93	-3.91	2
32	08	39.32	43.61	276.56	3.47	43.61	-629.57	41.93	0.0300	0.021	0.3358	0.5143	-211.43	14.08	-323.76	2
33	57	42.22	45.23	282.09	3.88	45.23	-110.40	43.60	0.0300	0.021	0.3260	0.5037	-36.00	14.22	-55.61	2
34	05	45.11	46.85	287.73	4.29	46.85	-54.43	40.52	0.0300	0.021	0.3165	0.4933	-17.23	12.83	-26.85	1
35	53	48.00	48.47	293.48	4.70	48.47	-4.96	46.94	0.0300	0.021	0.3073	0.4832	-1.53	14.42	-2.40	2
36	01	50.90	50.09	299.35	5.11	50.09	-4.35	48.60	0.0300	0.021	0.2984	0.4732	-1.30	14.50	-2.06	2
37	49	53.79	51.71	305.34	5.52	51.71	-3.75	50.26	0.0300	0.021	0.2897	0.4635	-1.09	14.56	-1.74	2
38	98	56.69	53.33	311.45	5.93	53.33	-3.15	51.93	0.0300	0.021	0.2812	0.4540	-0.89	14.60	-1.43	2
39	46	59.58	54.95	317.68	6.34	54.95	-4.78	53.59	0.0300	0.021	0.2731	0.4446	-1.30	14.63	-2.12	2
40	12	62.48	56.57	324.03	2.65	56.57	-8.24	55.25	0.0300	0.021	0.2651	0.4355	-2.18	14.65	-3.59	2

Treeconomics

Working from the concept



Costs 100 Year Life Cycle Open Tree			Years 1	2	3	4	5	6	7	8
Maintenance	Pruning		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Removal	Fell		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Stump		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Reinstatement		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Management (overheads)	Survey etc.		10.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Total100 Year Cost		2,719.79	931.00	226.90	119.04	27.86	25.00	5.00	5.00	5.00
Discount rate 1.022			1.00	1.02	1.04	1.07	1.09	1.11	1.14	1.16
Discounted Present Value of Costs		1,664.02	931.00	222.02	113.97	26.09	22.92	4.48	4.39	4.29
Discounted Establishment Costs		0.00								
Discount rate 3.5%		1,526.40	931.00	219.23	111.12	25.12	21.79	4.21	4.07	3.93
100yr Benefit Flow		5,024.88	-923.99	-206.06	-98.17	-16.34	-12.88	2.36	2.39	2.42
Discounted Benefits		6,384.89	7.01	6.77	6.54	6.32	6.11	5.90	5.70	5.51

		1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00
3.5 Street Trees	PV of annual flow	-924.52	-206.49	-98.59	-16.81	-13.34	-5.18	-4.65	-4.17	-3.73	-3.32	-2.94	7.64	7.61	7.57	7.52	7.45
3.5 Open Trees	PV of annual flow	-923.99	-206.06	-98.17	-16.34	-12.88	2.36	2.39	2.42	2.44	-2.93	2.45	18.92	18.36	17.81	13.46	16.75

3.5 Street Trees	PV of Benefit	5.51	5.32	5.14	5.85	5.65	5.46	5.27	5.09	4.92	4.76	4.60	14.68	14.18	13.70	13.24	12.79
3.5 Open Trees	PV of Benefit	7.01	6.77	6.54	6.32	6.11	5.90	5.70	5.51	5.32	5.14	4.97	21.27	20.55	19.86	19.18	18.54

Street Trees	PV Annual Costs	931.00	219.23	111.12	25.12	21.79	12.63	12.20	11.79	11.39	11.01	10.63	10.27	9.93	9.59	9.27	8.95
Open Trees	PV Annual Costs	931.00	219.23	111.12	25.12	21.79	4.21	4.07	3.93	3.80	11.01	3.54	3.42	3.31	3.20	9.27	2.98

Treeconomics

50 Year Scenario

Cost Profile for Urban Trees

Table 1 (below) illustrates the total lifecycle cost and benefits for a tree over a 50 year time horizon. At the end of 50 years, a standard street tree will have cost £11,902 ($16,078 USD). However, a tree planted with a RSS will have generated a surplus benefit of £2,700 ($3,647 USD).

This represents a much more cost-effective, longer lasting and beneficial way to plant trees. However, the real cost of not planting trees properly is never having a tree with a mature crown that can deliver maximum benefits to society.

Table 1: Cost Profile

	01		02	
Item	**Street Tree - 50yrs**	**Notes**	**Tree with RSS - 50yrs**	**Notes**
Installation Costs	-£8,634.00 (-$11,665.75)	Tree replaced 4 times over the study period[1]	-£4,946.00 (-$6,679.99)	GBU planting spec[2]
Total Accumulated Benefits after 50yr period	£139.50 ($188.41)	Air pollution filtration, carbon sequestered and stormwater attenuated from the tree canopy	£8,123.00 ($10,970.80)	Air pollution filtration, carbon sequestered and stormwater attenuated from both the tree canopy and RSS
Total Maintenance	-£1,667.00 (-$2,252.17)	15% Failure Insurance (Yrs1-3), Inspection, leaf clearing and formative pruning	-£405.00 (-$547.17)	Inspection, leaf clearing, formative pruning
Removal Costs	-£1,740.00 (-$2,350.80)	End of life felling (3 times) and stump grinding	£0.00 ($0.00)	Still growing at 50 years
Net Life Cycle Cost	-£11,901.50 (-$16,078.99)		£2,772.00 ($3,743.63)	

01.
Costs include supply, delivery, installation, tree guard and tree grille, warranty, traffic management and watering. Materials such as tree grille and guard were considered reusable in subsequent tree replacement.

02.
Includes below-ground anchoring, sturdier metal guard, watering tube, aeration system, 25m³ (885 ft³) load-bearing cellular system complete with soil, root director, twin walled load bearing geonet and a surface opening with tree grate or permeable rubber surround.

Project Name
3 Miami Central

Location
Miami, Florida

Project Type
Streetscape

Treeconomics

Table 1: Cost Profile

	01		02	
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Removal Costs	-£1,740.00 (-$2,350.80)	End of life felling (3 times) and stump grinding	£0.00 ($0.00)	Still growing at 50 years
Net Life Cycle Cost	-£11,901.50 (-$16,078.99)		£2,772.00 ($3,743.63)	

Treeconomics

Breakeven Point

A common argument for not planting a tree with a RSS is that it costs more than for a tree in a traditional tree pit. If the costs for the initial year of installation are taken in isolation, then this is indeed true. However, this short-sighted approach will become a significant cost in a very short number of years, as table 1 illustrates.

Accumulated costs vs benefits are illustrated in fig 1 and 2 in order to find the point at which the benefits outweigh the costs, the 'breakeven' point.

The results are interesting. A standard street tree will never breakeven despite the lower initial establishment costs on account of the tree needing periodic replacement. However, the tree with a RSS will break even in year 32.

In reality the breakeven point could be much earlier but as yet it is not possible to quantify and value all the benefits from urban trees.

Fig 1: Breakeven points for standard tree (GBP + USD)

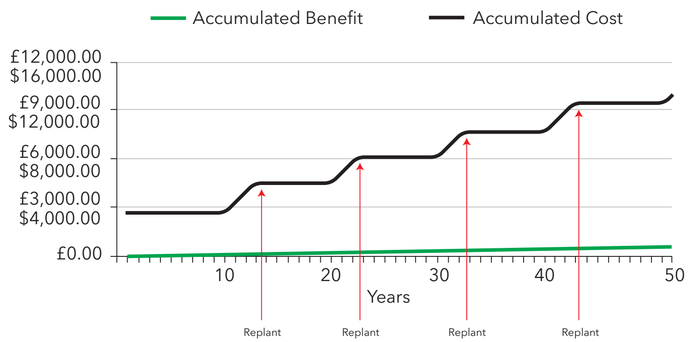


Fig 2: Breakeven points for a tree with RSS (GBP + USD)

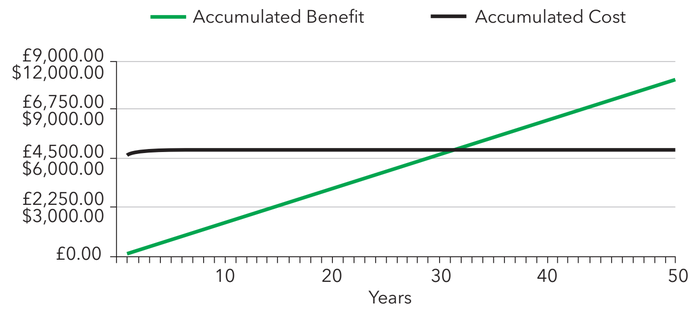


Fig 1: Breakeven points for standard tree (GBP + USD)

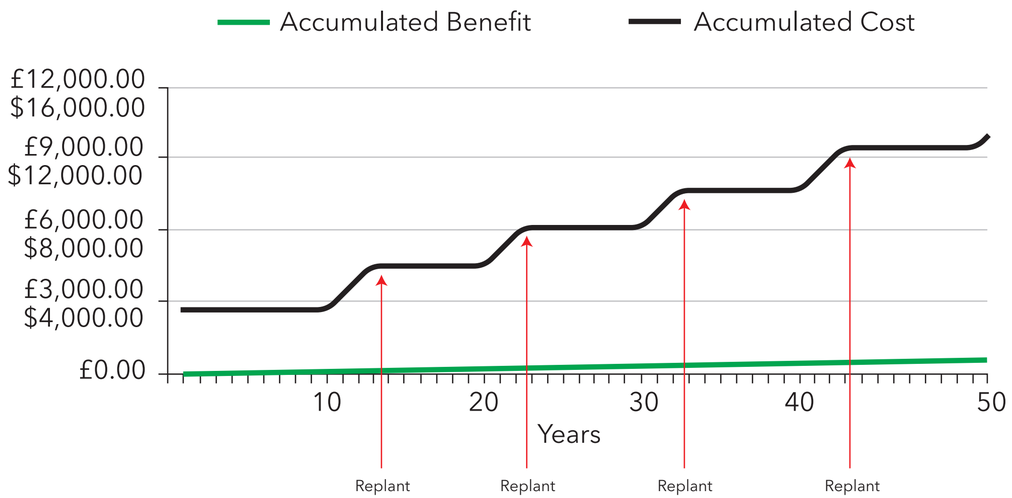
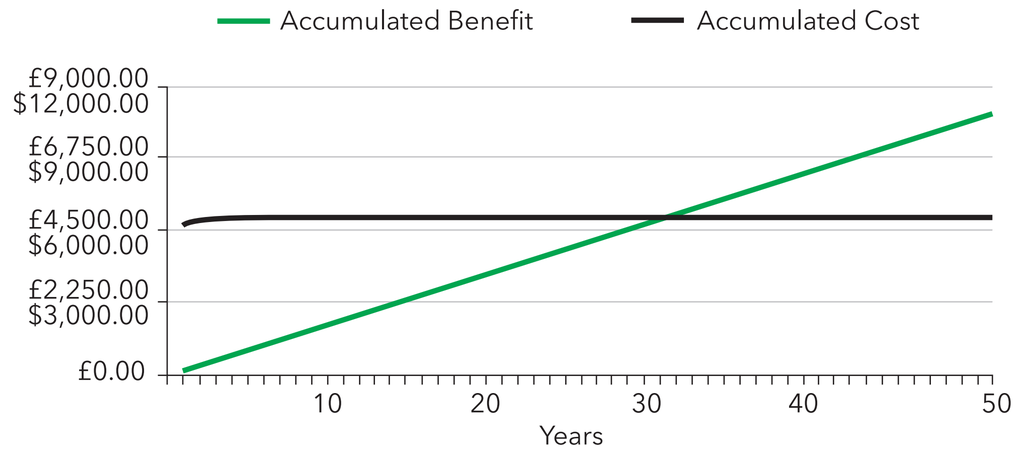
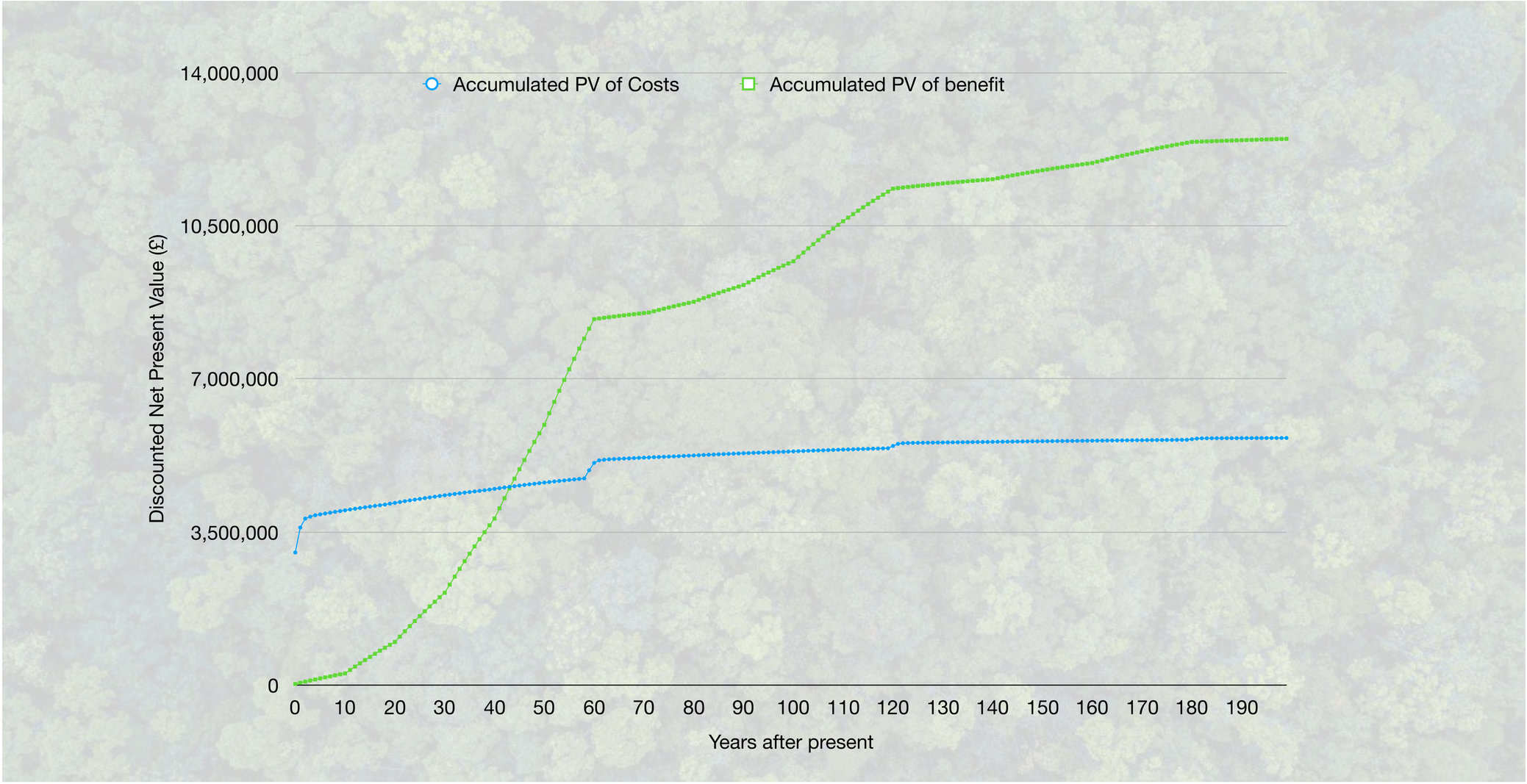


Fig 2: Breakeven points for a tree with RSS (GBP + USD)



Cost Benefit Analysis – Elephant Park, London

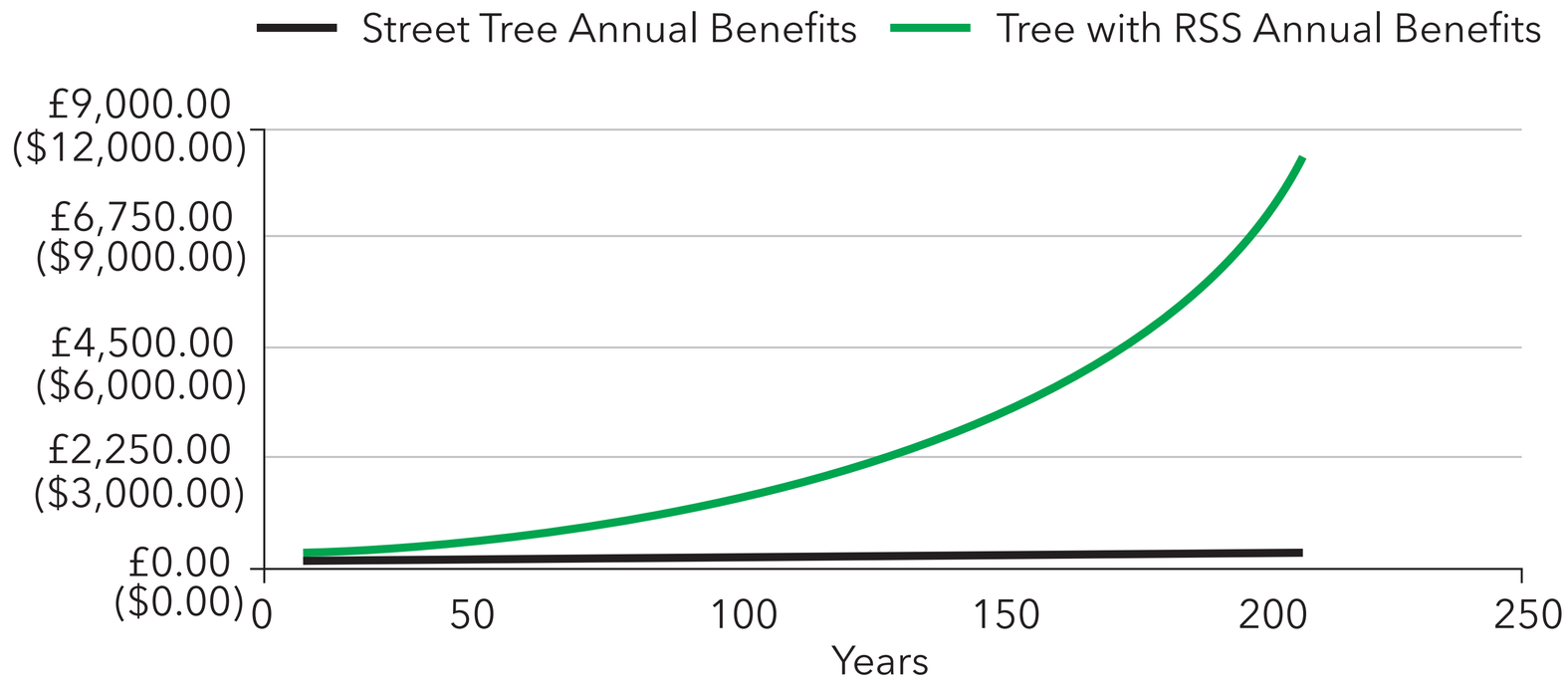


Accumulated net present value of costs and benefits

Treeconomics

Retaining Existing Trees

Fig 5: 200 year benefits (GBP + USD)



highways england | i-Tree Design | Home | Menu | i-Tree

i-Tree Design v6.0

A30+MP+22/0+EB+(0800A30/124,+L1,+324)

Start Over
Save Progress
About

Get started:

1. Draw Project Areas ?
2. Place Trees ?

Describe your tree:

- Tree species: (8b zone) Oak, Holm
- Tree diameter: 30 Centimeters
  or circumference: 94.2
- Tree count: 100
- Tree condition: Excellent
- Tree exposure to sunlight: Full sun

To place a tree:

- Drag this icon to the location on the map where you would like to place your tree.
- Repeat to place additional trees.
- Hover over any tree you have placed on the map to display its benefits.

Model the tree(s) future crown growth over time:

Model Crown Growth

3. Estimate Benefits ?

YOUR TREES
YOUR PROJ AREAS

Lat: 50.13080
Lng: -5.50770

highways england

i-Tree Design v6.0
Tree Benefit Report - 01/11/2019
A1+MP+19/3+SB+(5090A1/318,+L1,+148)
Trees Evaluated: 80

Tree Life Benefits (2019-2119) - Over the next 100 years, based on forecasted tree growth, i-Tree Design projects total benefits worth £76,220:

- £25,283 of stormwater runoff savings by intercepting 31,295,430 liters of rainfall
- £47,698 of air quality improvement savings by absorbing and intercepting pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulate matter; reducing energy production needs; and lowering air temperature
- £3,239 of savings by reducing 185,631 kilograms of atmospheric carbon dioxide through CO_2 sequestration and decreased energy production needs and emissions

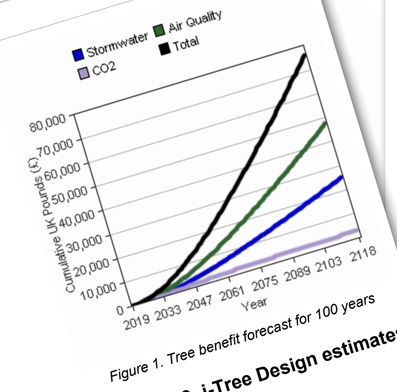


Figure 1. Tree benefit forecast for 100 years

Current Year - For 2019, i-Tree Design estimates annual tree benefits of £64.60:

- £13.40 of stormwater runoff savings by intercepting 16,649 liters of rainfall
- £33.00 of air quality improvement savings
- £18.20 of carbon dioxide reduction savings

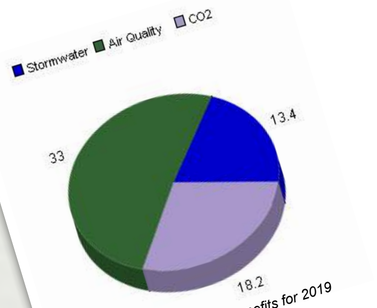


Figure 2. Annual tree benefits for 2019

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1 of 3

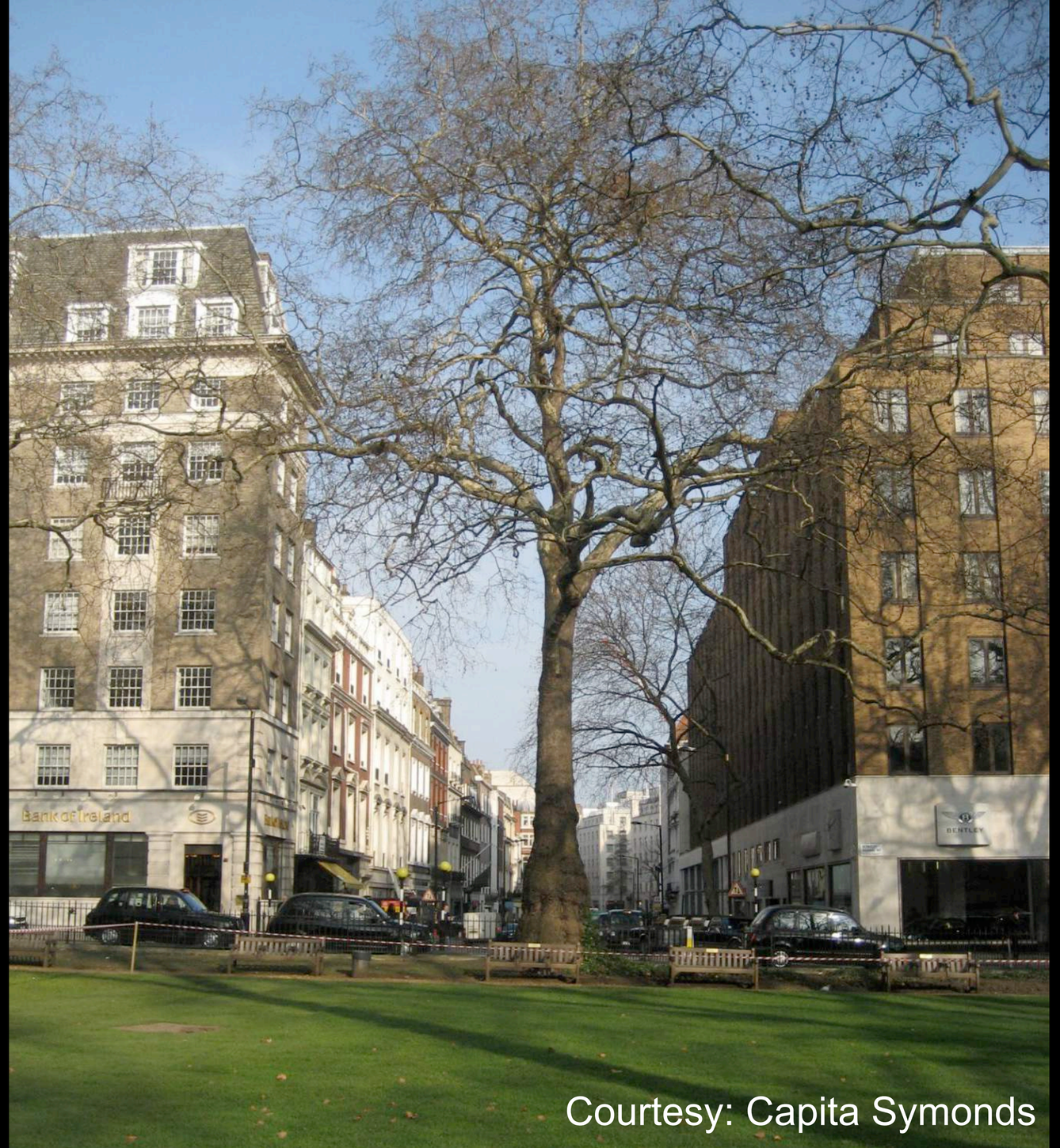
highways england

i-Tree Design v6.0
Tree Benefit Report - 12/21/2018
A38+MP+55/4+WB+(1100A38/454,+L2,+1450)
Trees Evaluated: 5621

Individual Tree Benefits

Tree	Count	DBH (cm)	Condition	Benefits			
				Current Year (2018)	Cumulative 30 years	Cumulative 60 years	Cumulative 100 years
1. English Oak	1686	2	Excellent	£455.22	£745,835.82	£2,295,759	£4,646,211
2. Silver Birch	1686	2	Excellent	£354.06	£729,886.26	£2,937,299	£6,698,748
3. Common Beech	562	2	Excellent	£146.12	£88,037.30	£324,948	£705,782
4. Hazel	281	2	Excellent	£67.44	£44,670.57	£183,990	£430,987
5. Hawthorn	281	2	Excellent	£89.92	£19,268.17	£52,435	£102,172
6. Field Maple	281	2	Excellent	£47.77	£19,776.78	£54,152	£101,809
7. Holly	169	2	Excellent	£67.60	£17,293.77	£78,465	£169,629
8. Crab Apple	169	2	Excellent	£45.63	£34,210.67	£131,567	£304,732
9. Wild Cherry	281	2	Excellent	£95.54	£43,695.50	£129,465	£253,768
10. Grey Willow	169	2	Excellent	£45.63	£18,458.18	£40,868	£70,747
11. Elder	56	2	Excellent	£3.92	£117.60	£235	£392
Total (Tree Count: 5621)				**£1,418.85**	**£1,761,250.62**	**£6,229,182**	**£13,484,977**

DBH: "diameter at breast height" is the standard measurement of tree trunk width at 4.5 feet (1.5 meters) above the ground.



Courtesy: Capita Symonds

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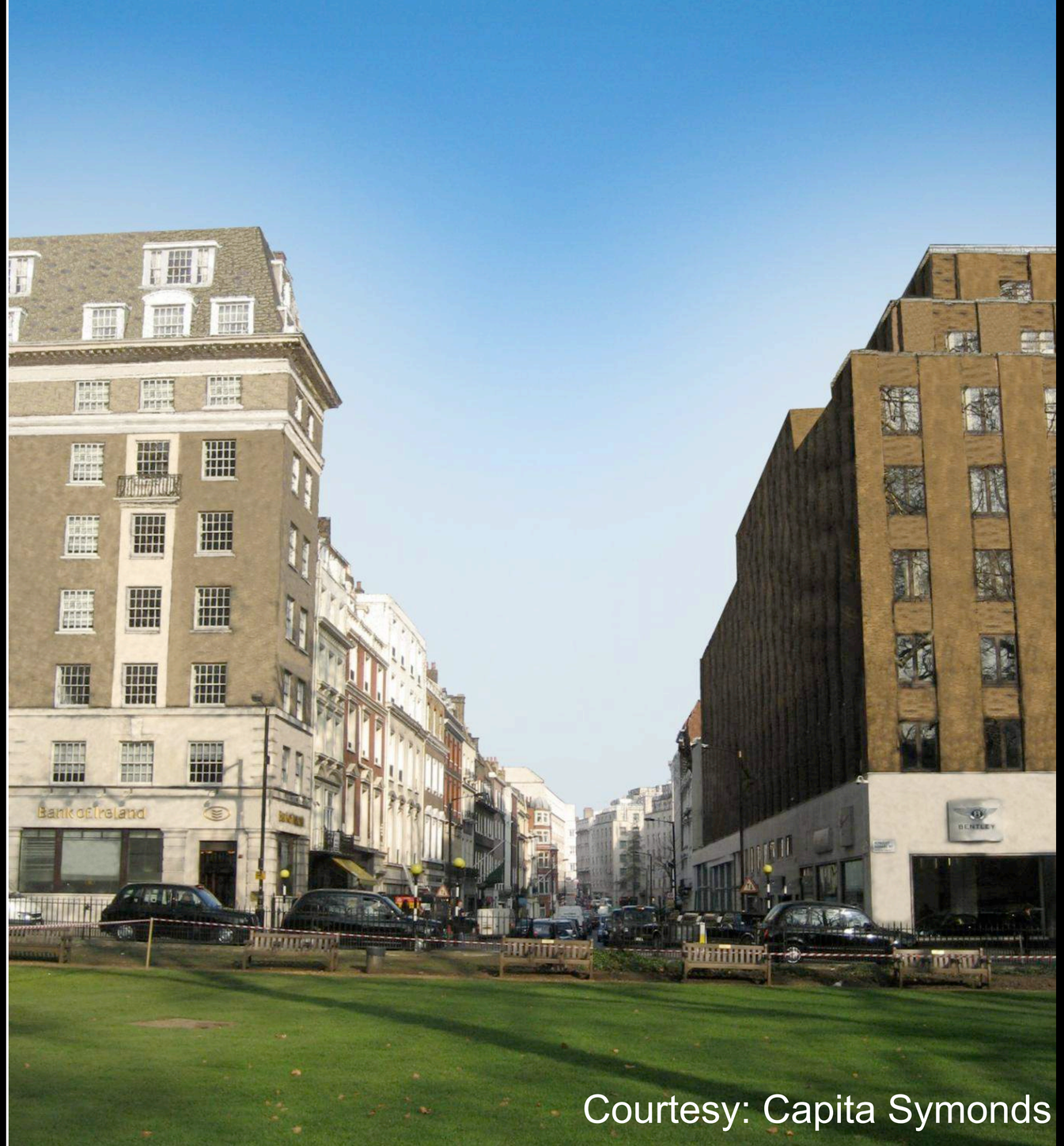

Courtesy: Capita Symonds

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What is Value?

- What is value? Wherein does it lie?
- Value is the current worth of future expectations
- There is no single objective ledger of value
- People create and judge value

Thank You

Courtesy: Natalia Rak

Booking now open

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— 18-19 NOVEMBER 2020 —