



What does it cost to plant and maintain a tree in hard and soft landscapes?

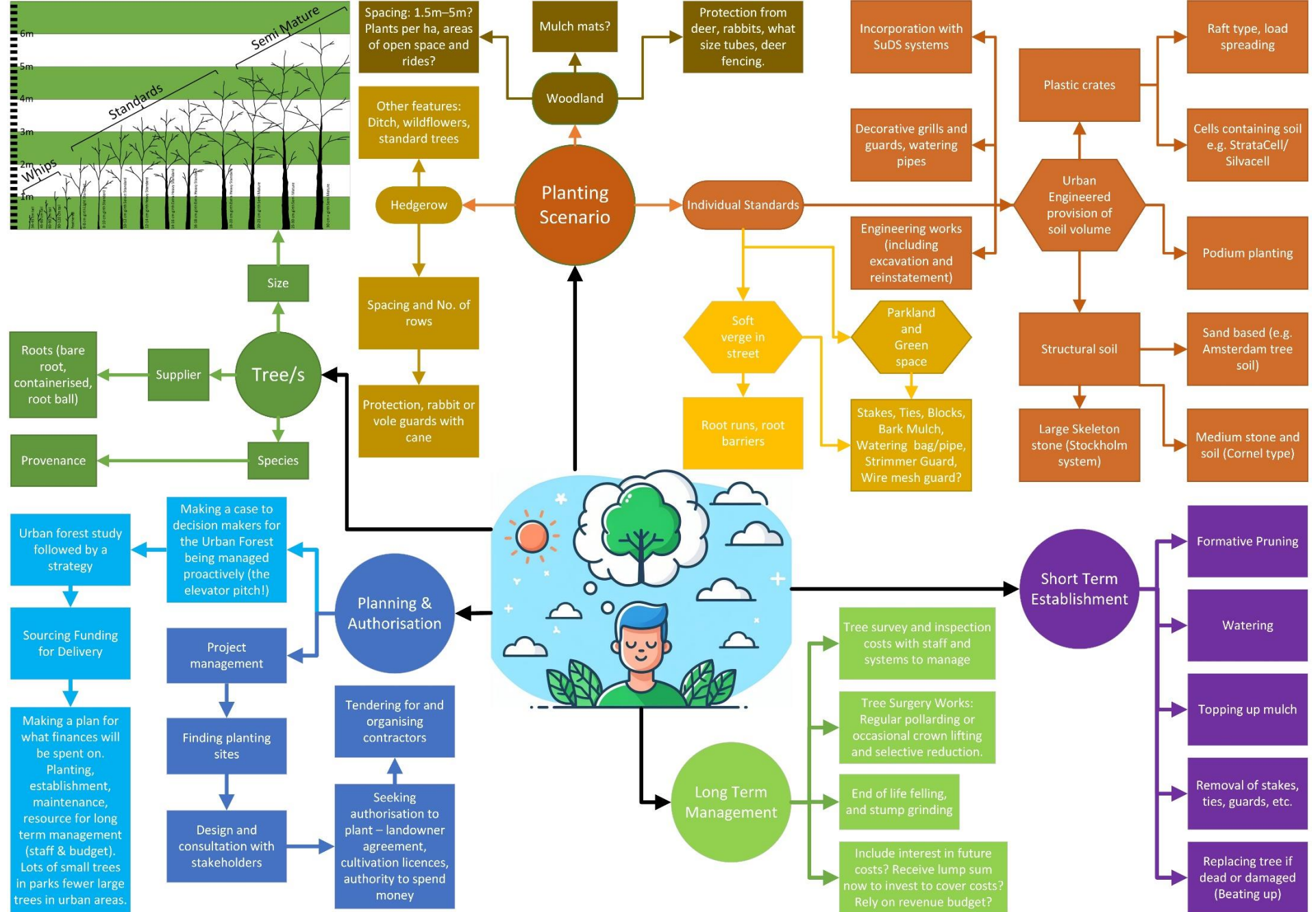
Philip Simpkin – Interim Ecology Team Leader
Buckinghamshire Council



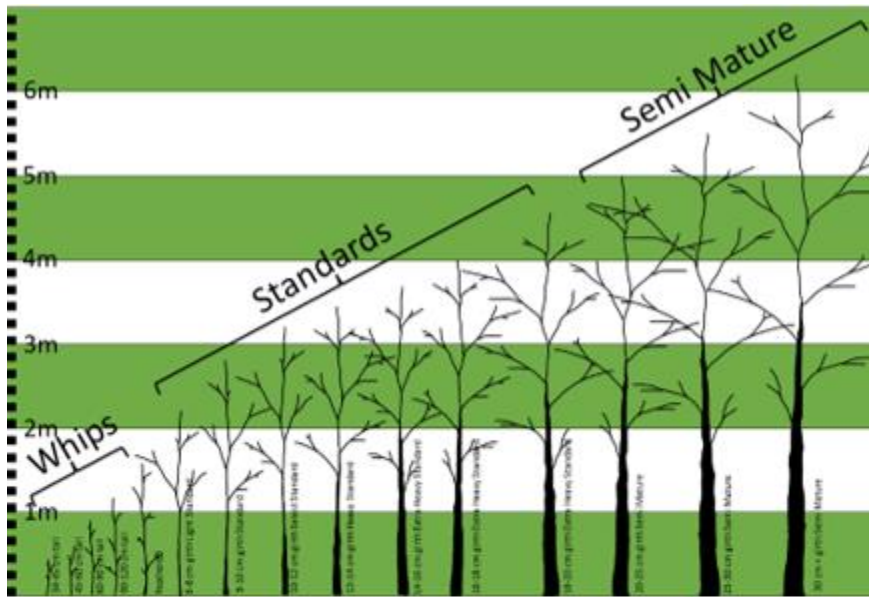
What nature does vs what we do....



Cost Considerations

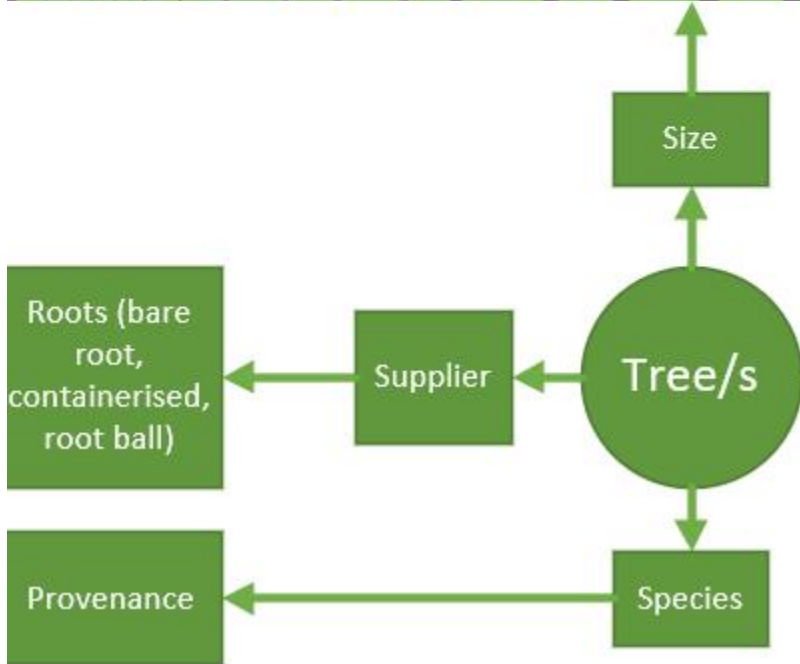


Tree Cost



The larger the tree – The higher the price + the greater costs will be for:

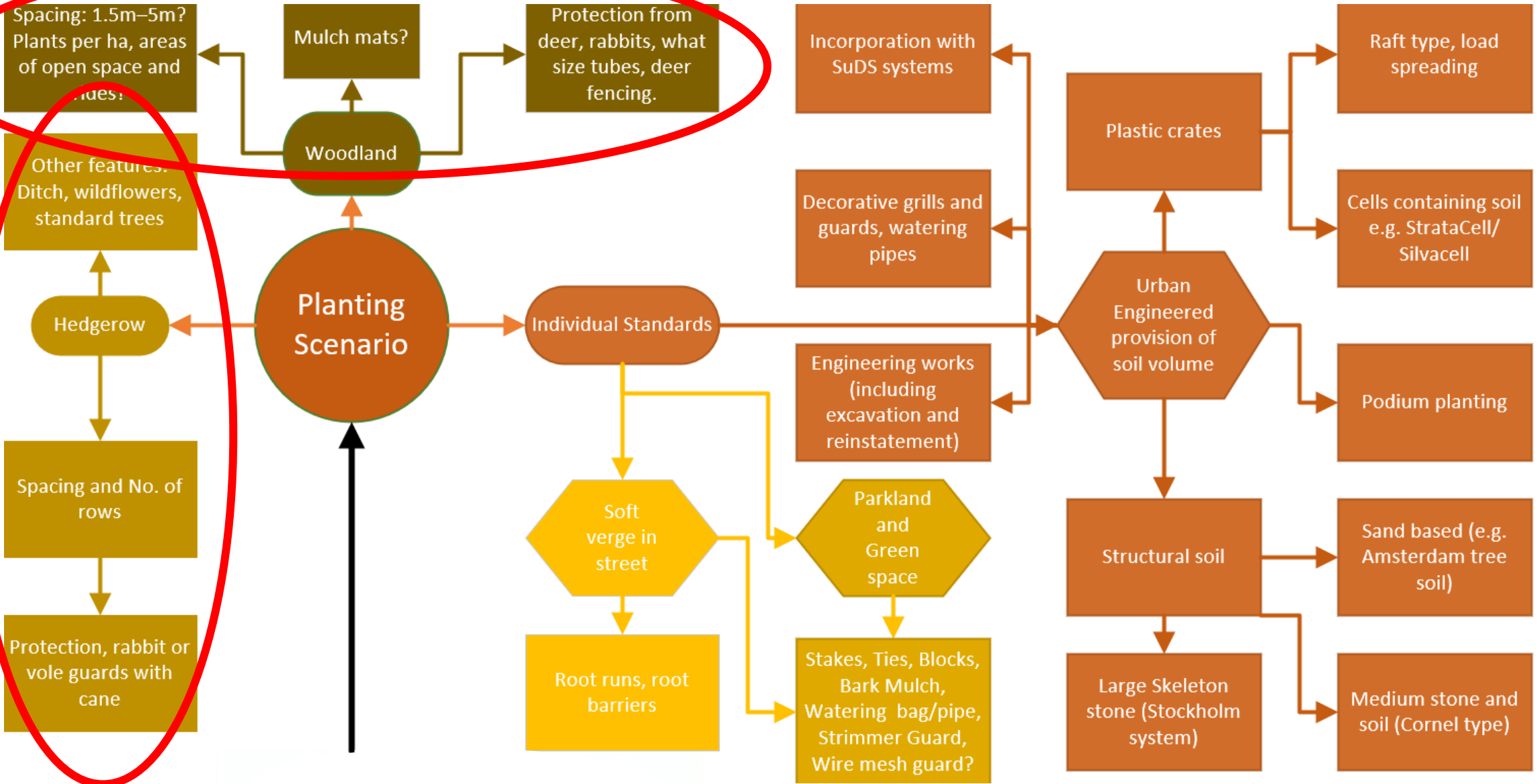
- Transporting it,
- Planting it,
- Replacing it,
- **Bare roots** are cheapest + are lighter to move and cheaper to transport and plant. But will be less resilient to poor handling so have higher death rates.
- **Root balls** are often next cheapest but may not have as good fine root system which increases death rates, they can often be heavy which increases transport and planting costs.
- **Containerised** trees are often most expensive but may have lower death rates. Weight increases cost and look out for a healthy root system.

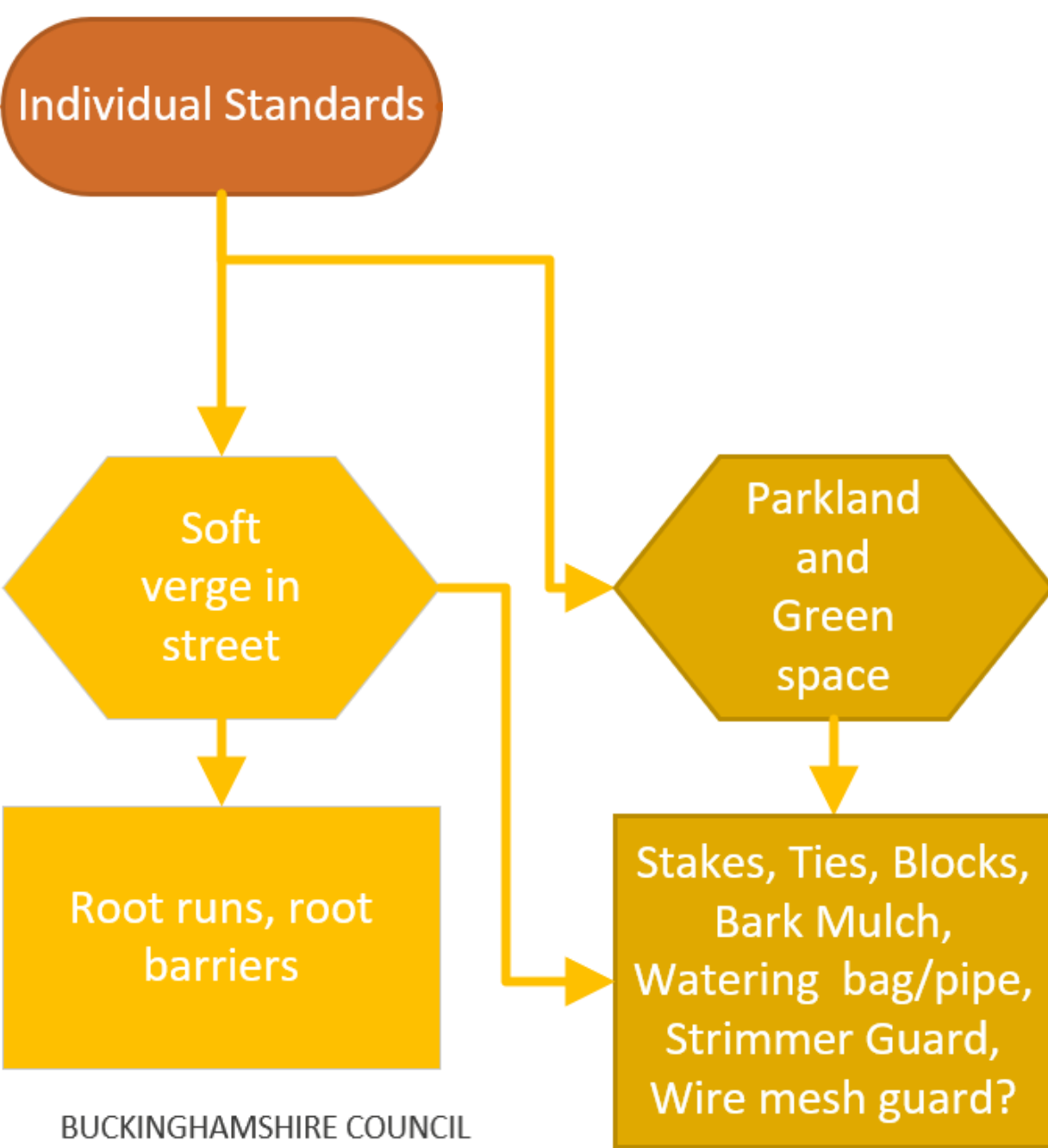


Some species are more expensive due to difficulty to grow or low supply (which fluctuates over time).

Local provenance may increase costs further due to supply.

Planting Scenario

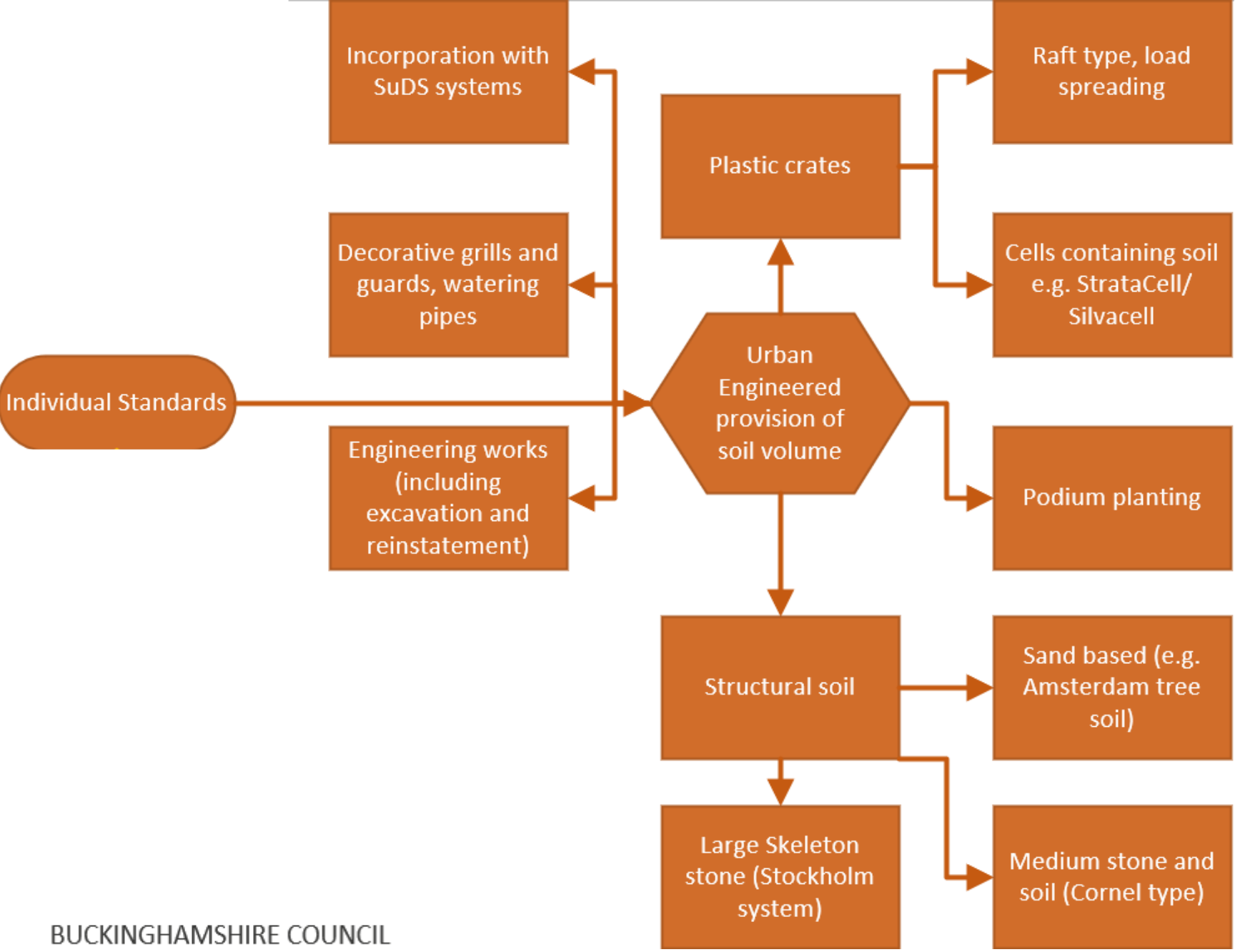




Planting trees in soft landscapes is relatively straight forward.

The range of products used are relatively straight forward and low cost and although there are different configurations they can be used in. They make up a small percentage of the total planting cost.

In a verge there are likely to be more constraints which can add to the total cost. Identifying and avoiding utilities and protecting surfaces with root barriers may be necessary. Creating root runs to adjoining areas of green space may be worthwhile to extend the available usable soil volume. Although it may not be done frequently in practice.

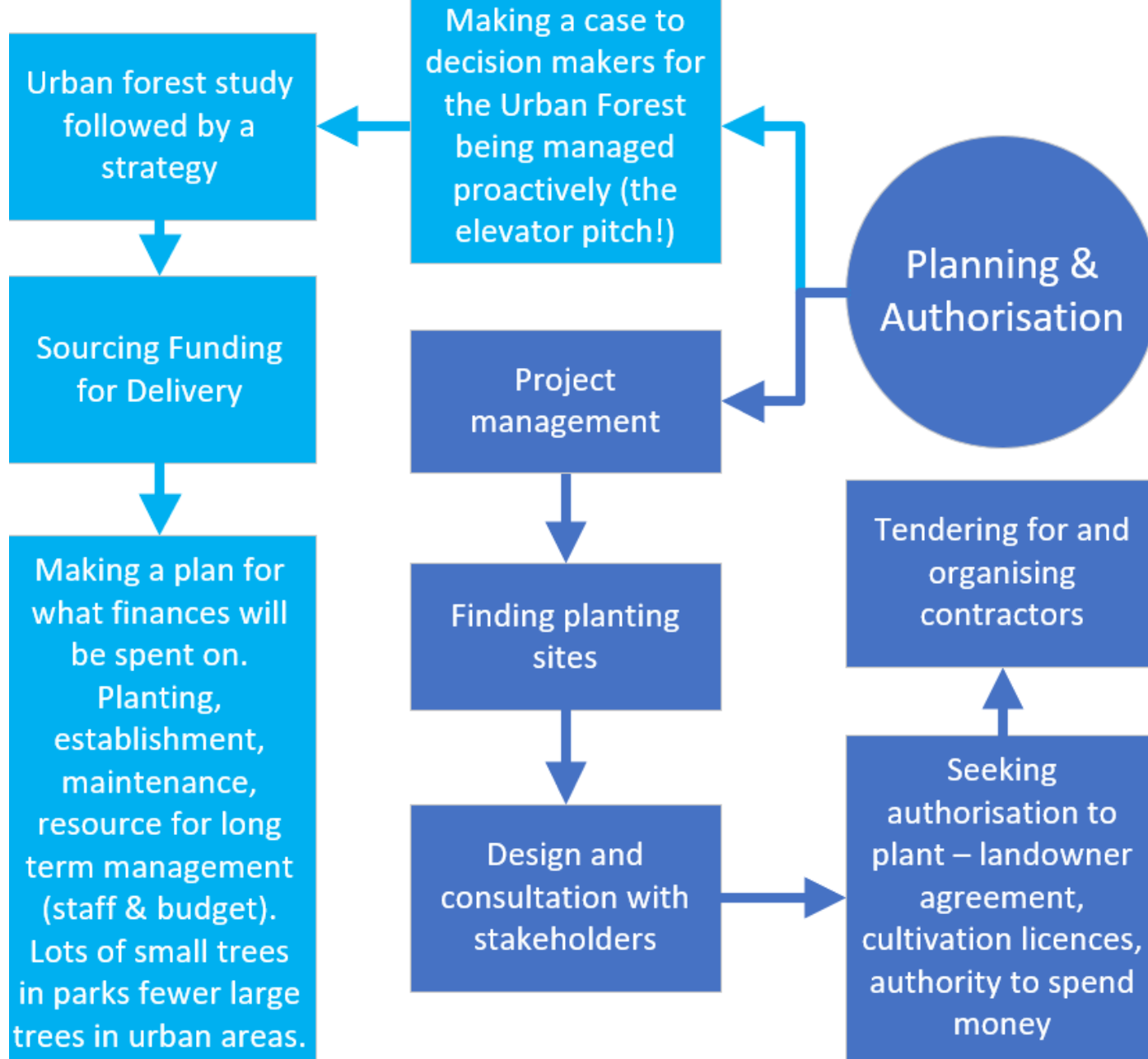


Planting trees in hard landscapes often requires involvement of engineered solutions to ensure that a tree has sufficient soil volume to survive.

Costs are much higher, because it is expensive to dig a hole in an urban environment, and then what goes into the hole can be expensive too.

The ornamental grills, guards and surface finishes are often also expensive to purchase and install.

Planning & Authorising

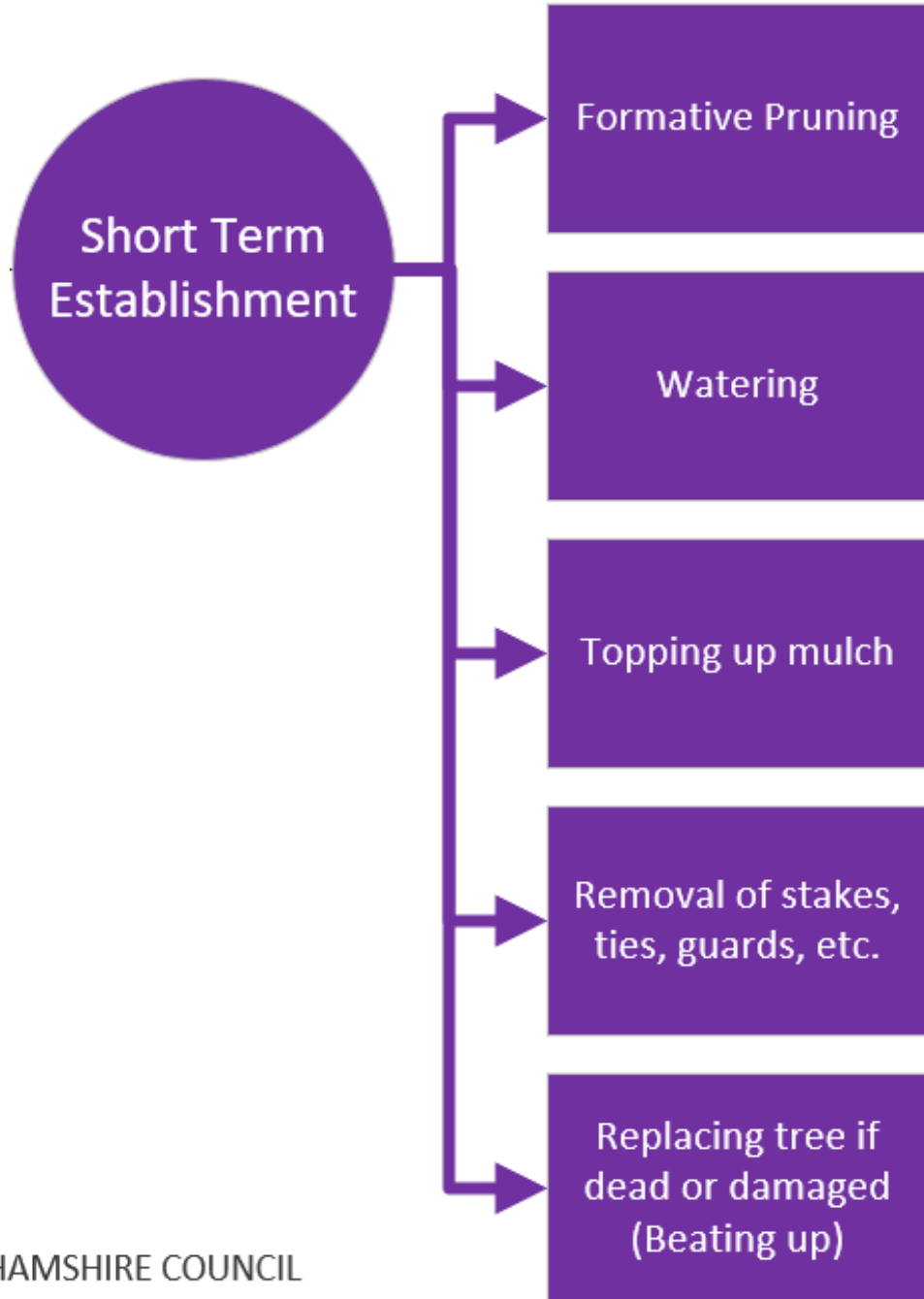


Prior to planting, a lot of work goes on behind the scenes.

Making the case for planting, doing the strategic thinking and sourcing the funding is probably more than should be included in a tree planting cost model. But it essential and shouldn't be forgotten.

All the work which is directly linked to the planting of trees should be factored into the overall costs.

Establishment



Post planting the following three to five years can dramatically impact upon not only its survival, but also the long-term health of the tree.

If establishment is scrimped upon, the whole reason for planting can be jeopardised.

Long Term Management



Tree survey and inspection costs with staff and systems to manage

Tree Surgery Works: Regular pollarding or occasional crown lifting and selective reduction.

End of life felling, and stump grinding

Include interest in future costs? Receive lump sum now to invest to cover costs? Rely on revenue budget?

The long-term costs of trees can vary substantially. A London Plane on a busy road which is pollarded can be very costly to manage.

Conversely, an Oak in a remote corner of a park may need almost no works through its life other than the occasional walk over survey.

Planting Cost Model v1

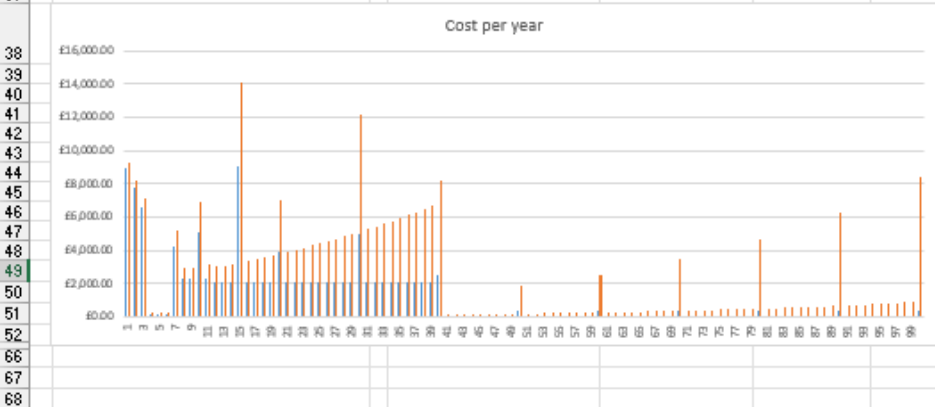
I have created a spreadsheet model which can may have several possible uses. It may be useful to:

- Get a very rough estimate for how much it might cost to plant an individual tree, hedge or woodland using the costs it contains.
- Populate the Look Up Tables with known costs to calculate more precise project costs.
- As a thinking aid when considering the cost implications for different choices relating to tree planting.

	A	B	C	D	E	F	G	H
1								
2		Introduction		Select the latest date for inflation:	Oct 2023			
3		There are three planting cost models contained within this workbook:						Establishment & Maintenance
4		Standard:						
5		This is best used for estimating the cost of relatively small numbers of trees. It includes multiple options which enables scenarios as diverse as planting trees in green spaces with a stake and a tie. To planting trees in hard landscapes and making provision for large volumes of uncompacted soil volume to be provided.						All three models include options to enable the calculation of the establishment costs as well as longer term maintenance.
6		Woodland:						
7		This enables the estimating of costs for woodland planting with various options relating to spacing, protection and areas of open space.						
8		Hedge						
9		This enables the estimating of costs associated with planting hedgerows. This can include the planting of wildflowers with it, the creation of a ditch and a bank and the inclusion of standard trees to name a few options.						
10		Look Up Tables						
11		The Look up tables sheet includes the options which can be selected in each of the models. Importantly it contains all of the baseline cost information. Some of this is a couple of years old. The model deals with this by allowing the addition of inflation to the costs, it also contains an option for the user to enter their own cost information and then select this instead of the suggested costs.						
12		Size & Age						
13		This sheet is purely used to estimate the size a tree will be within a given time to enable the estimation of future maintenance costs.						
14								
15		KEY						
16		Enter value						
17		Drop-down menu						
18		Calculation result						
19		Automatic lookup						
20		Result						
21		Operator						
22		Multiplier (informed assumption)						
23		Rate (use suggested or own)						
24								
25								

Woodland Planting Cost Model

KEY										
Enter value	Drop-down	Calculation	Automatic lookup	Result	Operator					
Woodland Planting Cost Model										
Spacing										
X dimension (m)	Y dimension (m)	Plants per ha	Open Space %	Plants per ha (including open space)	Area to be planted (ha)	Total no of trees				
20	20	2500	20%	2000	2.83	5660				
Pre Planting										
Who	Baseline mins/site	Mins (ha or plant)	Variable mins	Total mins	Include?:					
Land manager	300	Per ha	60	169.8	469.8	£220.57	Yes	£220.57		
Design, permissions, licences	1200	Per ha	180	509.4	1709.4	£802.56	Yes	£802.56		
Management planning	300	Per ha	120	339.6	639.6	£300.29	Yes	£300.29		
Marking Out	Woodland Planting contract	Per plant	1	5660	5840	£2,944.85	Yes	£2,944.85		
Total					Pre Plant Total	£4,268.28				
Bulk Discount										
5000-24999	50% Discount									
Labour										
Root stock	BareRoot									
Size (Height or Stem Girth)	60-90									
Tree price point	Medium									
Per Tree Cost					£2.31	£13,068.74				
Labour per tree per size					£1.94	Yes	£10,959.69			
Protection										
Typical Protection (inc labour)	60cm cane, 45cm spiral									
Mulch (Lose or Mulch mat & pegs)	Type	Size	Diameter (cm)	Depth (cm)	Volume (m3)					
Mulch (inc labour)	Woven polypropylene	0.5m x 0.5m	100	10	0.078539816	£0.78	Yes	£4,415.11		
Fencing										
Number	Amount	As a whole (m)	Compartment/site	Total (m)						
1		28300	1	28300						
Area (m ²)					673					
Perimeter (m)					740					
Perimeter Fence + Shape Variability	10%					74	(m)	£18.28	Yes	£13,532.64
Line clearance required	10%					74	(m)	£6.09	Yes	£451.09
Gates (per compartment & total)					2	(each)	£365.65	Yes	£731.30	
Ground Preparation										
Ripping per ha					£152.35	Yes	£431.16			
Spraying per ha					£18.28	Yes	£51.74			
Planting Total						£50,859.37				



Woodland Establishment & Management		Totals for selected year range		Year		Who			
A	B	A	B	1	A	B	2		
Select % to be replaced	-	£7,208.53	Woodland Planting contrac	15%	£3,604.26	10%	£2,402.84		
Spray Weeding	Enter the decimal of a minute / t	£5,137.35	Woodland Planting contrac	0.3	2	£1,712.45	0.3	2	£1,712.45
Hand tool weeding	Enter the decimal of a minute / t	£10,274.71	Woodland Planting contrac	0.6	2	£3,424.90	0.6	2	£3,424.90
Removing Guards	Enter the decimal of a minute / t	£2,854.09	Woodland Planting contrac	0		£0.00	0		£0.00
Management/Monitoring	Enter the decimal of a minute / t	£2,004.68	Site manager/ranger	90	2	£182.24	90	2	£182.24
Mowing Rider/Openspace	Enter the decimal of a minute / t	£1,457.95	Site manager/ranger	240	1	£48.60	240	1	£48.60
Copicing and edge scalloping	Enter % of planted area	£5,831.78	Site manager/ranger	0%	0	£0.00	0%	0	£0.00
Squirrel Trapping per trap per year	No. / ha	£47,600.44	Site manager/ranger	0		£0.00	0		£0.00
Formative pruning	Enter minutes / tree	£9,112.16	Site manager/ranger	0		£0.00	0		£0.00
Thinning or felling	Enter % of planted area	£777.57	Site manager/ranger	0%	1	£0.00	0%	1	£0.00
Total from Year:		1							
Total to Year:		30							
Establish + Manage Total		£92,259.26		With interest at 3%: *****					
Plant + Establish + Manage T		£143,118.63		*****					
Including interest at:	3.00%	Establish + Manage Total (i		£143,776.23					
Plant + Establish + Manage (i		£194,635.60		*****					

Hedgerow Planting Cost Model

A	B	C	D	E	F	G	H	I	J	
1				KEY						
2	Hedge Planting Cost Model			Enter value	Drop-down menu	Calculation	Automatic lookup	Result	Operator	
3										
4										
5			Plants per metre	No. of plants in project	Bulk Discount					
6	Length of Hedge (m)	100	6	600	500-999	30% Discount				
7	Pre Planting	Who	Baseline mins/site	Mins/ m	Variable mins	Total mins		Include ?:		
8	Feasibility study	Woodland Planting contractor	60	0.2	20	80	£40.34	Yes	£40.34	
9	Design, permissions, licences	Woodland Planting contractor	30	0.2	20	50	£25.21	Yes	£25.21	
10	Management planning	Woodland Planting contractor	20	0.2	20	40	£20.17	Yes	£20.17	
11	Marking Out	Woodland Planting contractor	30	0.2	20	50	£25.21	Yes	£25.21	
12	Total					220	Pre Plant Total		£110.94	
13	Hedge Plant Cost									
14	Root stock	BareRoot								
15	Tree price point	Low								
16	Size (Height or Stem Girth)	60-90					£1.62		£969.78	
17	Protection									
18	Typical Protection (inc labour)	90cm cane, 60cm spiral					£0.68	Yes	£406.23	
19	Mulch (Loose or Mulch mat & pegs)	Type	Size	Width (m)	Depth (m)	Volume (m3)				
20	Mulch (inc labour)	Bark mulch	1m x 1m		1	0.1	0.1	£8.68	Yes	£867.81
21	Labour									
22	Labour per hedge plant per size						£1.94	Yes	£1,161.80	
23	Line clearance	Percentage of total length	10%	Length requiring clearance:	10		£6.09	No	£0.00	
24	Spraying out line of vegetation per m						£0.12	Yes	£12.19	
25	Fencing									
26	Ratio of fencing to hedge		2							
27	Fencing type	4 strands barbed					£21.06	No	£0.00	
28	Ditch and bank									
29	Ditch and bank cost (small, medium, large)	Medium (90cm deep ditch + 90cm high bank 1.8m wide)					£4.88	No	£0.00	
30	Wildflowers									
31	Wildflower seed and sowing (40 kg/ha or 4g/m)						£0.49	Yes	£48.75	
32	Standard Trees									
33	No of trees per 100m length		2							
34	Total No. Standard Trees in project		2	Bulk discount 1-4						
35	Root stock	BareRoot								
36	Tree price point	Medium								
37	Size (Height or Stem Girth)	8-10cm					£57.14	Yes	£114.28	
38	Staking specification									
39	Stake length (m)	1.5		No. of stakes						
40	Stake Diameter	75mm	£3.78		1	£3.78				
41	Cross bar size	None					£0.00			
42	Cushion/block	Rubber block 50x45x25		No. buckles or tie length (m)			£0.71			
43	Buckle/tie type	Rubber 25mm	£1.63		1	£1.63	£6.09	Yes	£12.18	
44	Labour									
45	Labour per standard tree per size						£11.12	Yes	£22.25	
46										
47										
48										
49	Management									
50	Beating up % Year 2	15%					£0.53	Yes	£53.29	
51	Beating up % Year 3	10%					£0.36	Yes	£35.53	
52	Beating up % Year 4	5%					£0.18	Yes	£17.78	
53		Times per year		No. years						
54	Hand tool weeding	1	3	Low			£1.49	Yes	£148.50	
55	Spot Herbicide	1	3	Medium			£0.59	Yes	£59.40	
56	Creation Cost						£3.14		£314.48	
57										
58	Flail cutting per metre	Every 'X' years	2	High			£0.57	Yes	£57.20	
59	Copicing per metre	At year 'X'	25	Medium			£8.05	Yes	£605.00	
60	Hedgelaying per metre	At year 'X'	25	Medium			£22.55	Yes	£2,255.00	
61	Management Cost						£29.17		£2,917.20	
62										
63	Total cost per metre						£32.32		£3,231.68	

Standard Tree Planting Cost Model

1	A	B	C	D	E	F	G	H	I	J
2		Standard Tree Planting Cost Model			KEY					
3					Enter value	Drop-down menu	Calculation	Automatic lookup	Result	Operator
4										
5		No. of trees in project		1						
6		Bulk Discount	1-4	0%						
7				Soil Volume						
8		Future Tree Size (For soil volume (m³) and maintance costs)	Medium	10						
9		Growth Rate (For maintance costs)	Medium							
10		Pre Planting	Who	Baseline mins/site	Mins/ plant	Variable mins	Total mins			Include?:
11		Feasibility study	Tree Officer	60	240	240	300	£130.79	Yes	£130.79
12		Design, permissions, licences	Landscape Architect	30	240	240	270	£126.76	Yes	£126.76
13		Management planning	Project Manager	20	120	120	140	£65.73	Yes	£65.73
14		Marking Out	Urban tree planting contractor	30	120	120	150	£104.28	Yes	£104.28
15		Total					860			£427.57
16										
17		Root stock	Containerised							
18		Size (Height or Stem Girth)	14-16cm							
19		Product price point	Bark mulch					User Defined	Model Tree Cost	
20		Purchase Cost Per Tree						£0.00	£422.46	Model £422.46
21		Labour						User Defined	Model Labour Cost	
22		Labour per tree per size						£0.00	£111.24	Model £111.24
23										
24		Mulch (Lose or Mulch mat & pegs)	Type	Size	Bark mulch dimensions		Volume (m3)			
25		Mulch (inc labour)	Bark mulch	1m x 1m	Diameter (cm)	Depth (cm)				
26		Staking specification								
27		Stake length (m)	1.5		No. of stakes					
28		Stake Diameter	100mm	£5.64	2		£11.27			
29		Cross bar size	0.9 x 75mm x 25mm				£1.22			
30		Cushion/block	Rubber block 90x75x44		No. buckles or tye length (m)		£2.99			
31		Buckle/tye type	Rubber 25mm	£1.63	1		£1.63		Staking system cost/ tree	
32									£17.10	Yes £17.10
33		Underground anchoring								
34		Type and size	Tree anchor 7.5m - 12.5m height	£140.17					£140.17	No £0.00
35										
36		Watering								
37		System	Gator Bag	£21.94					£21.94	Yes £21.94
38		Tag	Water Me Tag	£0.61					£0.61	Yes £0.61
39										
40		Tree Guard								
41		Type	Basic 3 hoop 1.9m high, 25cm diameter, painted	£272.80					£272.80	No £0.00
42										
43		Tree Grille								
44		Type	1.2m grille and frame	£405.57					£405.57	No £0.00
45										
46		Root Director								
47		Size	Root director 140cm x 45cm	£331.46					£331.46	No £0.00
48										
49		Mycorrhizal fungi		£62.44					£62.44	No £0.00

Example Scenarios
 Click the buttons below to see example planting and maintenance costs.
 Adjust individual specifications to amend the costs.

Tree in soft verge or parkland / green space

Tree in Crate system

Tree in skelaton structural soil

Variables

- Efficiency - Watering and maintenance – 10 trees all together in a park will be much more efficient to look after than 10 trees spread across a district.
- Bulk discounts – with many things needed for tree planting, the more you buy the cheaper they are. This is especially true for smaller bare rooted trees.
- Regional Variation – The cost of labour can vary considerably across the country, and different suppliers will charge different amounts.
- There can be large difference between contractors, this can depend upon how busy they are.
- Others....

Conclusion

- When tree planting fails, it's never what was planned or hoped for.
- Better understanding of the costs can lead to better planning.
- Well planned for trees are more likely to become a reality.
- Well understood costs can lead to a better case being made for an adequate budget.



Thank You

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