Tree costing tool

Hort Innovation

Introduction

The Tree Costing Tool is designed to assist users to conduct a comprehensive life cycle cost analysis of urban tree projects. These costs include the costs of sourcing plants, ground preparation, planting costs and other costs such as traffic control and installation of road barriers. It also includes future maintenance costs and the costs associated with tree mortality. All costs associated with planting and maintaining trees over the life of the project are covered in the life cycle costs.

The Tree Costing Tool provides a systematic and user-friendly approach to project cost evaluation based on project size and location requirements. For example, in some locations, there may be a need to cut concrete to plant a tree or to a need to involve traffic controllers during the planting process. To estimate the life cycle costs for a tree planting project, users work through the spreadsheet step by step to enter their project details.

After entering all the required values, the tool provides a results summary where the total costs of the whole project are summarised. Users have the option to analyse and compare three projects within the tool. The tool allows for costing projects based on desired number of trees or proposed planting area.

This tool is unique because different decisions that affect the cost and health of urban trees can be quantified through the life of the tree. For example, if a tree has a more rigorous proactive maintenance early in the tree life it will be cheaper over the life of the tree than one that is poorly maintained and needs lots of reactive maintenance.

Cost explanations

A list of costs captured in the Tree Costing Tool and their descriptions is provided in Table 1 .

Table 1. Costs covered by the Tree Costing Tool

Cost type	Description
Arborist tree health inspection	Average cost of tree health inspection report by an arborist
Arborist tree health inspection	Cost of a professional arborist tree health inspection
Concrete cutting	Cost associated with cutting through roads surface and kerbside concretes (exclude the soil digging costs)
GIS mapping and inventory assessment	Cost of a GIS mapping survey, this is a once off cost for recording tree locations
Guard rails	Cost of purchasing, delivering and installing any guard rails
Installation cost	Cost of installing a tree, excludes any machinery costs
Machine rate	Cost hiring machinery to facilitate tree installation
Maintenance	Cost of maintenance in the first year after planting, includes any formative pruning
Mulch cost	Cost of purchasing, delivering and spreading mulch around the tree
Seeding	Cost of purchasing and planting seeds
Soil cost	Cost of purchase and delivery of soil
Stakes and ties	Cost of purchasing and delivering stakes and ties to site
Strata cells/vault installation	Cost of purchase, delivery and installation of a Strata Vault per tree
Supply	Cost of purchasing and delivering the tree to the project site
Traffic control	Cost of controlling traffic during tree planting activities
Tree installation	Labour and equipment cost of digging a hole and planting a tree
Tree protection fencing	Cost purchasing and installing a protection fence
Tree removal	Cost of removing and disposing existing trees at the project site
Tubestock supply and planting	Cost of purchasing and planting tubestock
Tubestock tree guards / protection sleeve	Cost purchasing and delivery of tree guards or protection sleeve
Visual tree inspection	Cost of a rapid visual tree inspection
Watering	Cost of watering activity including cost of the water and watering activity

It is recommended that all users familiarise themselves with the accompanying project report and this user manual before using the Tree Costing Tool. If you are not clear on what the cost entails, please refer to the descriptions in Table 1 above.

There are four worksheets that allow users to enter their own data, these are: "Data Entry", "Dashboard 1", "Dashboard 2" and "Dashboard 3".

- "Data Entry" can be used when users would like to define their own range of costs for an activity/item based on their prior knowledge.
- "Dashboard 1" and "Dashboard 2" are for entering data for projects based on number of trees (e.g. planting 100 trees in 45L pots alongside an urban streets).
- "Dashboard 3" is for entering data for an area-based project (e.g. direct seeding or planting tubestock in 1 ha urban park)

1. "Data Entry" – use this worksheet to enter your own estimates for each of the cost types you have. It is advised that you enter three costs level: *Low*, *Most Likely* and *Highest* for a given tree pot size. Where:

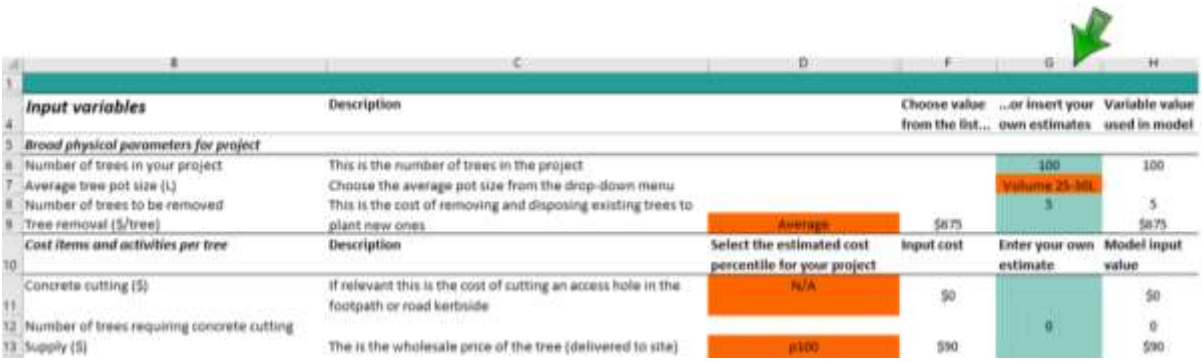
   Low = lowest price you expect to be charged,
   Most likely = the most likely price you expect to be charged, and
   Highest = the highest price you expect to be charged

In some instances, you may have a single quotation for the activity/item, in such a case then enter that value across the *Low*, *Most likely* and *Highest* price columns as shown for *Supply* in the screenshot below. Otherwise, enter your *Low*, *Most likely* and *Highest* price as shown for *Concrete cutting*.

	Volume 25-50L		
Item/Activity	**Low**	**Most likely**	**Highest**
Concrete cutting ($)	$1,000	$1,500	$1,800
Supply ($)	$150	$150	$150
Tree installation ($)			

2. Dashboard worksheets – alternatively, you can use the Dashboard worksheets to enter your quoted price or best price in column G. See screen shot below.

When using model inbuilt cost ranges or when you have entered your own cost estimates in the "Data Entry" worksheet, make sure Column G in the Dashboard worksheet is clear.



	B	C	D	F	G	H
4	***Input variables***	**Description**		**Choose value from the list...**	**...or insert your own estimates**	**Variable value used in model**
5	***Broad physical parameters for project***					
6	Number of trees in your project	This is the number of trees in the project			100	100
7	Average tree pot size (L)	Choose the average pot size from the drop-down menu			Volume 25-50L	
8	Number of trees to be removed	This is the cost of removing and disposing existing trees to plant new ones			5	5
9	Tree removal ($/tree)		Average	$675		$675
10	***Cost items and activities per tree***	**Description**	**Select the estimated cost percentile for your project**	**Input cost**	**Enter your own estimate**	**Model input value**
11	Concrete cutting ($)	If relevant this is the cost of cutting an access hole in the footpath or road kerbside	N/A	$0		$0
12	Number of trees requiring concrete cutting				0	0
13	Supply ($)	The is the wholesale price of the tree (delivered to site)	p100	$90		$90

Use the following legend as a guide in using the Dashboard.

Enter a value

Choose value from a drop-down list

Step-by-step instructions for using the Tree Costing Tool

Dashboard 1 and 2

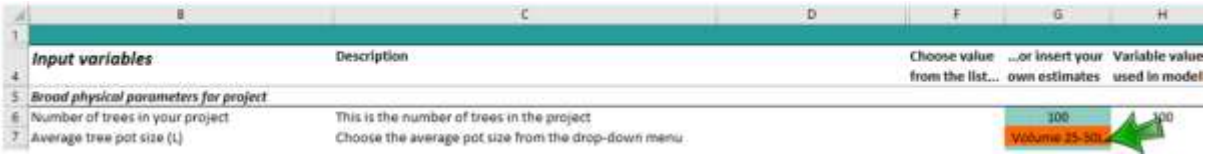
It is suggested that users carefully follow the following step-by-step instructions on how to estimate the life cycle costs of planting trees with a specified tree pot size. Users have the option to just estimate costs for one project using "Dashboard 1" or to enter costs for a second project using "Dashboard 2". Entering details for two projects allows for subsequent comparison of the two projects in the results summary worksheet.

Step 1: Entering the number of trees for your project

Question 1. Go to "Dashboard 1", enter the number of trees for your proposed project in the Question 1 row under Column G.

Step 2: Selecting the plant pot size

Question 2. Use the drop-down menu to select your desired plant pot size (25-50L, 75-100L and 250L)



Step 3: Cost of removing any pre-project trees

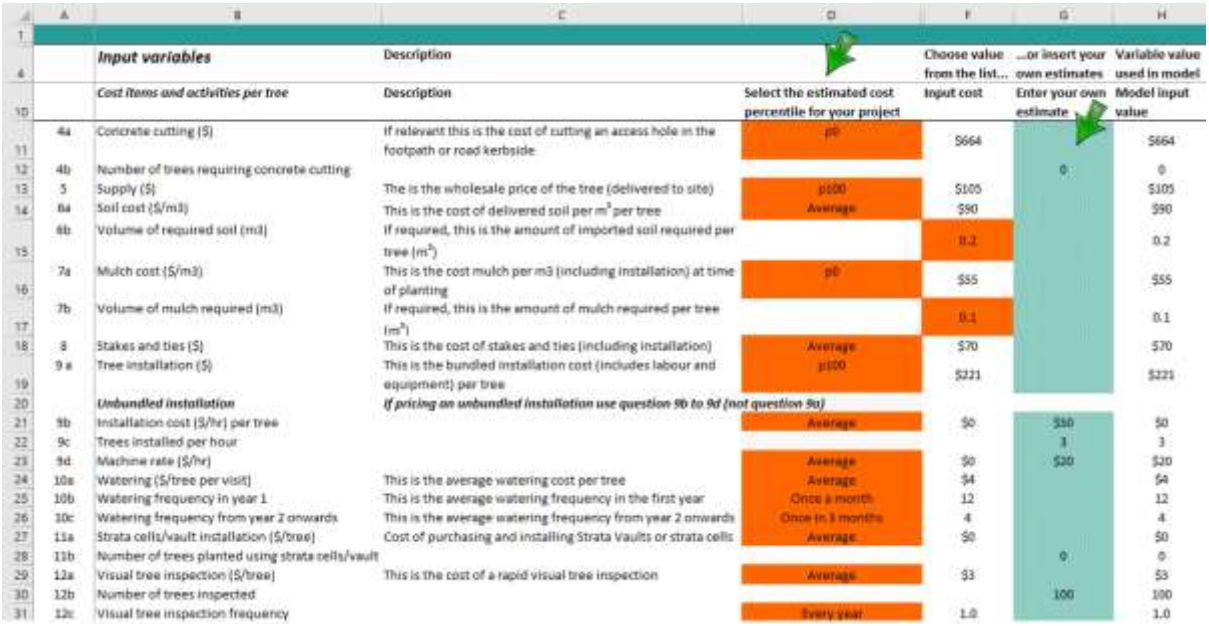
Question 3a. Where it is relevant, enter the number of trees to be removed prior to planting project trees at a given site under Column G.

Question 3b. Select a tree removal cost ($ per tree) using the drop-down menu under Column D, alternatively enter you preferred tree removal cost under Column G.

When using model inbuilt costs range or when you have entered your own cost estimates in the "Data Entry" worksheet, make sure Column G in the Dashboard worksheet is clear for that row.

Step 4: Selecting or entering your cost for various tree planting inputs/activities

Questions 4 to 12. Enter your project cost values using the drop-down menu or using Column G.



		Input variables	Description		Choose value from the list...	...or insert your own estimates	Variable value used in model
		Cost items and activities per tree	Description	Select the estimated cost percentile for your project	Input cost	Enter your own estimate	Model input value
11	4a	Concrete cutting ($)	If relevant this is the cost of cutting an access hole in the footpath or road kerbside	p0	$664		$664
12	4b	Number of trees requiring concrete cutting				0	0
13	5	Supply ($)	The is the wholesale price of the tree (delivered to site)	p100	$105		$105
14	6a	Soil cost ($/m3)	This is the cost of delivered soil per m^3 per tree	Average	$90		$90
15	6b	Volume of required soil (m3)	If required, this is the amount of imported soil required per tree (m^3)		0.2		0.2
16	7a	Mulch cost ($/m3)	This is the cost mulch per m3 (including installation) at time of planting	p0	$55		$55
17	7b	Volume of mulch required (m3)	If required, this is the amount of mulch required per tree (m^3)		0.1		0.1
18	8	Stakes and ties ($)	This is the cost of stakes and ties (including installation)	Average	$70		$70
19	9a	Tree installation ($)	This is the bundled installation cost (includes labour and equipment) per tree	p100	$221		$221
20		Unbundled installation	If pricing an unbundled installation use question 9b to 9d (not question 9a)				
21	9b	Installation cost ($/hr) per tree		Average	$0	$50	$0
22	9c	Trees installed per hour				3	3
23	9d	Machine rate ($/hr)		Average	$0	$20	$20
24	10a	Watering ($/tree per visit)	This is the average watering cost per tree	Average	$4		$4
25	10b	Watering frequency in year 1	This is the average watering frequency in the first year	Once a month	12		12
26	10c	Watering frequency from year 2 onwards	This is the average watering frequency from year 2 onwards	Once in 3 months	4		4
27	11a	Strata cells/vault installation ($/tree)	Cost of purchasing and installing Strata Vaults or strata cells	Average	$0		$0
28	11b	Number of trees planted using strata cells/vault				0	0
29	12a	Visual tree inspection ($/tree)	This is the cost of a rapid visual tree inspection	Average	$3		$3
30	12b	Number of trees inspected				100	100
31	12c	Visual tree inspection frequency		Every year	1.0		1.0

For *Questions 4 to 12* (Input costs related questions) – the base price is the national average price. However, you have an option to choose a higher or a lower price depending on your understanding of your project and associated projects costs. There are three options for lower than average prices. These are the lowest price (**p0**), the 5th percentile (**p5**) and the 25th percentile (**p25**). Similarly, there are three higher than average prices, the 75th percentile (**p75**), the 95th percentile (**p95**) and the highest price (**p100**). If a given cost is not applicable select "**N/A"** in the drop-down menu.

There are two options for including your **tree installation** cost.

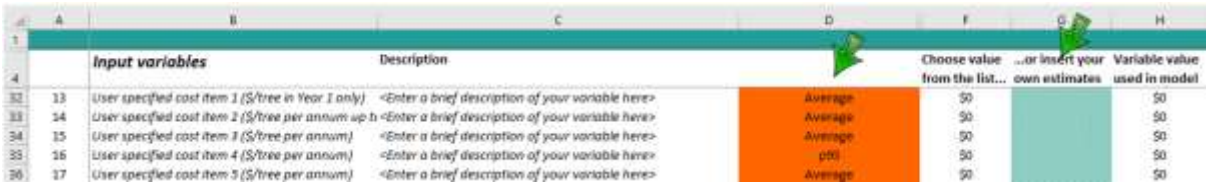
1. If you have a quote that includes the labour and machine, the enter your quoted/estimated price per tree under *Question 9a*, alternatively,
2. If you have separate installation and machinery hire costs per tree, then use *Question 9b* to *Question 9d*.

Step 5: Selecting or entering your own specified cost items

Questions 13 to 17. If there is cost item you would like to include in the model but that item is not already included in the model use the "Data Entry" worksheet to include that item. Make sure that you include an average annual value.

Please note the following uses for question 13 to 17:

- For Question 13, please enter a Year 1 once-off cost item and value.
- For Question 14, please enter a Year 1 and 2 cost item and value.
- For Questions 15 to 17, enter an annual item with a cost value for every year from year 1 to the end of the appraisal period.



		Input variables	Description		Choose value from the list...	...or insert your own estimates	Variable value used in model
32	13	User specified cost item 1 ($/tree in Year 1 only)	<Enter a brief description of your variable here>	Average	$0		$0
33	14	User specified cost item 2 ($/tree per annum up t	<Enter a brief description of your variable here>	Average	$0		$0
34	15	User specified cost item 3 ($/tree per annum)	<Enter a brief description of your variable here>	Average	$0		$0
35	16	User specified cost item 4 ($/tree per annum)	<Enter a brief description of your variable here>	ptil	$0		$0
36	17	User specified cost item 5 ($/tree per annum)	<Enter a brief description of your variable here>	Average	$0		$0

Step 6: Selecting or entering your related project costs

For Question 18 and 19 select your relevant cost amount or use the Column G to enter your preferred total cost estimate.

For Question 18a, select your relevant cost amount or use the Column G to enter your preferred total cost estimate and then enter the number of guard rails required.

		Input variables	Description		Choose value from the list...	...or insert your own estimates	Variable value used in model
38		Related project costs					
39	18	Tree protection fencing ($)	Cost of purchasing, delivery and installation of tree protection fences	Average	$250		$250
40	19	Traffic control cost ($)	If required, this is the cost of temporary traffic control (necessary in busy streets)	Average	$0		$0
41	20a	Guard rails ($)	Costs of purchasing, delivery and installation of permanent guard rails	Average	$224		$224
42	20b	Number of guard rails required					0

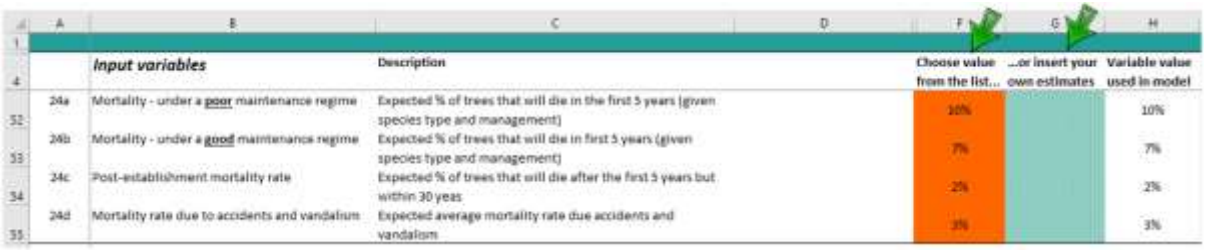
Step 7: Selecting or entering your inspections and ongoing maintenance costs

Question 21 to 23. Delect your relevant values or use the Column G to enter your preferred values.

		Input variables	Description		Choose value from the list...	...or insert your own estimates	Variable value used in model
43		Inspections and ongoing maintenance					
44	21a	Maintenance in year 1 ($/tree)	This is the full intensive maintenance cost for the first 12 months	Average	$133		$133
45	21b	Maintenance in year 2 ($/tree)	This is the ongoing maintenance cost	Average	$35		$35
46	21c	Maintenance in year 3 and onwards (annual $/tree)		Average	$26		$26
47	22a	Arborist tree health inspection ($/tree)	This is an on-going tree health inspection cost	Average	$250		$250
48	22b	Estimated annual number of trees for arborist inspection					2
49	22c	Arborist tree health inspection (frequency)	This is the frequency of tree inspection	Every year	1.0		1.0
50	23	GIS mapping and inventory assessment ($)	This is a once-off GIS mapping activity	Average	$2.4		$2.4

Step 8: Selecting or entering your estimated mortality rates

Question 24. Select your estimated mortality rates using the drop-down menus in Column F or Enter the values in Column G.



	Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
24a	Mortality - under a poor maintenance regime	Expected % of trees that will die in the first 5 years (given species type and management)	10%		10%
24b	Mortality - under a good maintenance regime	Expected % of trees that will die in first 5 years (given species type and management)	7%		7%
24c	Post-establishment mortality rate	Expected % of trees that will die after the first 5 years but within 30 yeas	2%		2%
24d	Mortality rate due to accidents and vandalism	Expected average mortality rate due accidents and vandalism	3%		3%

Step 9: Selecting your discount rate and inflation rate values

Question 25a. Select your preferred discount rate. This should be informed by your state treasury department. As a start we recommend a 7% discount rate which is the preferred discount for the Office of Best Practice and Regulation and for Infrastructure Australia.[1]

Question 25b. Select an inflation rate, we currently recommend 2.5%, based on the Reserve Bank of Australia inflation target of 2-3%.[2]

	Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
	Financial				
25a	Discount rate	This is the rate at which future costs are converted to current costs	7.00%		7.00%
25b	Inflation rate	This is the expected real inflation rate	2.50%		2.50%

Step 10: Selecting project appraisal period

Question 25c. Select your preferred appraisal period using the drop-down menu. The model allows for six different appraisal periods ranging from a 5 years' to 50 years' appraisal period.

	Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
25c	Appraisal period	This is the desired project appraisal period in years	30		30

[1] See, Infrastructure Australia (www.infrastructureaustralia.gov.au/publications/assessment-framework-initiatives-and-projects), Office of Best Practice and Regulation (https://www.pmc.gov.au/resource-centre/regulation/cost-benefit-analysis-guidance-note)

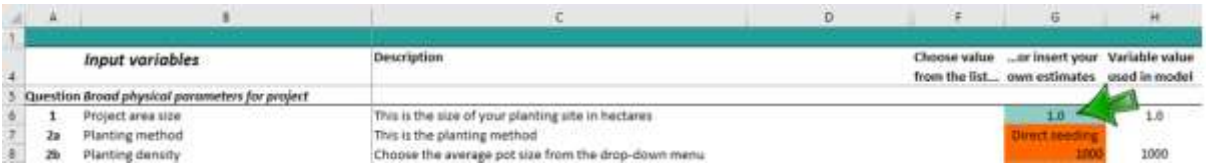
[2] Reserve Bank of Australia (https://www.rba.gov.au/inflation/inflation-target.html)

Dashboard 3

Users should use "Dashboard 3" to estimate tree planting costs for area-based projects that rely on either direct seeding or tubestock.

Step 1: Entering your project planting area

Question 1. Go to "Dashboard 3", enter the area (in hectares) for your proposed project in Column G.



Step 2: Selecting the planting method and tree density

Question 2. Use the drop-down menu to select your planting method and tree density

Step 3: Cost of removing any pre-project trees

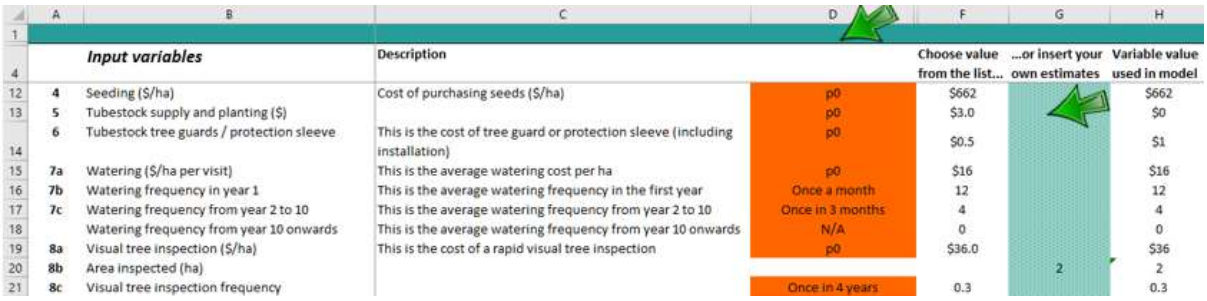
Question 3a. Where it is relevant, enter the number of trees to be removed prior to planting project trees at a given site under Column G.

Question 3b. Select a tree removal cost ($ per tree) using the drop-down menu under Column D, alternatively enter you preferred cost under Column G.

When using model inbuilt costs range or when you have entered your own cost estimates in the "Data Entry" worksheet, make sure Column G in the Dashboard worksheet is clear for that row.

Step 4: Selecting or entering your cost for various tree planting inputs/activities

Questions 4 to 8.Select the most appropriate cost from the drop-down menu in column D, alternatively enter you own best estimate in Cell G11.



		Input variables	Description		Choose value from the list...	...or insert your own estimates	Variable value used in model
12	4	Seeding ($/ha)	Cost of purchasing seeds ($/ha)	p0	$662		$662
13	5	Tubestock supply and planting ($)		p0	$3.0		$0
14	6	Tubestock tree guards / protection sleeve	This is the cost of tree guard or protection sleeve (including installation)	p0	$0.5		$1
15	7a	Watering ($/ha per visit)	This is the average watering cost per ha	p0	$16		$16
16	7b	Watering frequency in year 1	This is the average watering frequency in the first year	Once a month	12		12
17	7c	Watering frequency from year 2 to 10	This is the average watering frequency from year 2 to 10	Once in 3 months	4		4
18		Watering frequency from year 10 onwards	This is the average watering frequency from year 10 onwards	N/A	0		0
19	8a	Visual tree inspection ($/ha)	This is the cost of a rapid visual tree inspection	p0	$36.0		$36
20	8b	Area inspected (ha)				2	2
21	8c	Visual tree inspection frequency		Once in 4 years	0.3		0.3

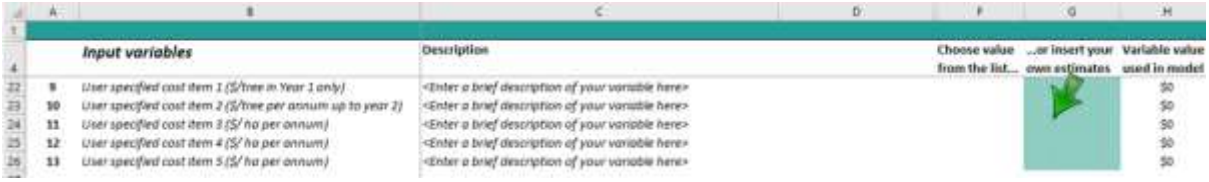
For *Questions 4 to 8* (Input costs related questions) - the base price is the national average price. However, you have an option to choose a higher or a lower price depending on your understanding of your project and associated projects costs. There are three options for lower than average prices. These are the lowest price (**p0**), the 5th percentile (**p5**) and the 25th percentile (**p25**). Similarly, there are three higher than average prices, the 75th percentile (**p75**), the 95th percentile (**p95**) and the highest price (**p100**). If a given cost is not applicable select "**N/A"** in the drop-down menu.

Step 5: Entering your own specified cost items

Questions 9 to 13. If there is cost item you would like to include in the model but that item is not already included in the model use the “Data Entry” worksheet to include that item. Make sure that you include an average annual value.

Please note the following uses for question 9 to 13:

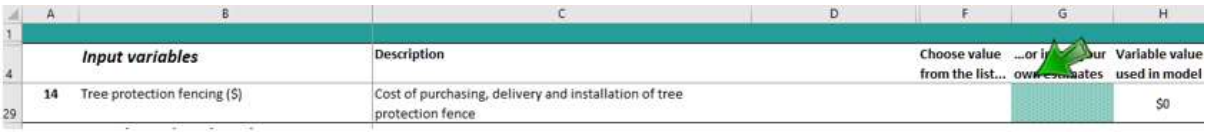
- For Question 9, please enter a Year 1 once-off cost item and value.
- For Question 10, please enter a Year 1 and 2 cost item and value.
- For Questions 11 to 13, enter an annual item with a cost value for every year from year 1 to the end of the appraisal period.



		Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
22	9	User specified cost item 1 ($/tree in Year 1 only)	<Enter a brief description of your variable here>			$0
23	10	User specified cost item 2 ($/tree per annum up to year 2)	<Enter a brief description of your variable here>			$0
24	11	User specified cost item 3 ($/ha per annum)	<Enter a brief description of your variable here>			$0
25	12	User specified cost item 4 ($/ha per annum)	<Enter a brief description of your variable here>			$0
26	13	User specified cost item 5 ($/ha per annum)	<Enter a brief description of your variable here>			$0

Step 6: Selecting or entering your related project costs

For Question 14 Use the Column G to enter your preferred total cost estimate.

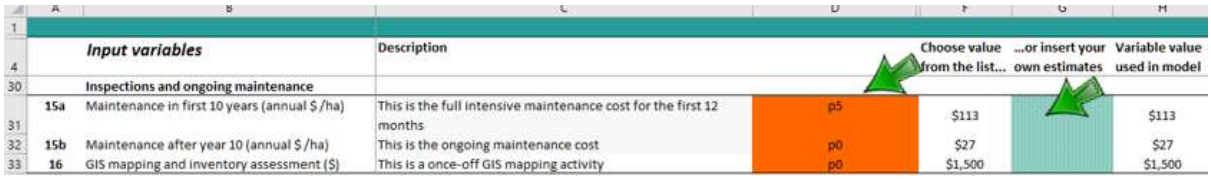


		Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
29	14	Tree protection fencing ($)	Cost of purchasing, delivery and installation of tree protection fence			$0

Step 7: Selecting or entering your inspections and ongoing maintenance costs

For Question 15 select your relevant annual maintenance costs per ha or use the Column G to enter your preferred values.

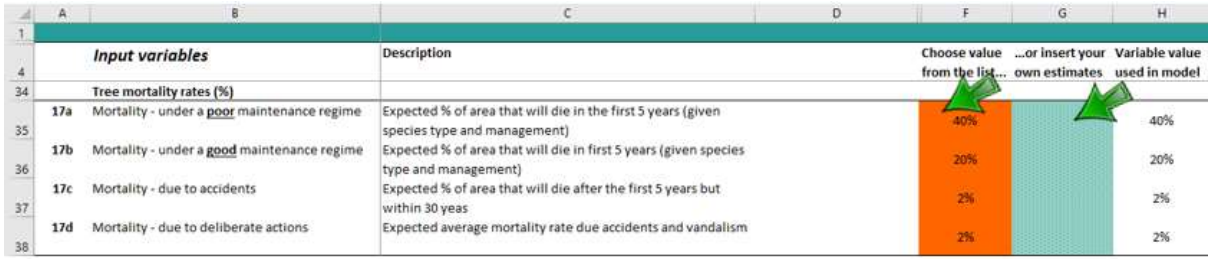
For Question 16 select your relevant GIS and inventory assessment costs or use the Column G to enter your preferred values.



		Input variables	Description		Choose value from the list...	...or insert your own estimates	Variable value used in model
30		Inspections and ongoing maintenance					
31	15a	Maintenance in first 10 years (annual $ /ha)	This is the full intensive maintenance cost for the first 12 months	p5	$113		$113
32	15b	Maintenance after year 10 (annual $ /ha)	This is the ongoing maintenance cost	p0	$27		$27
33	16	GIS mapping and inventory assessment ($)	This is a once-off GIS mapping activity	p0	$1,500		$1,500

Step 8: Selecting or entering your estimated mortality rates

Question 17. Select your estimated mortality rates using the drop-down menus in Column F or Enter the values in Column G.

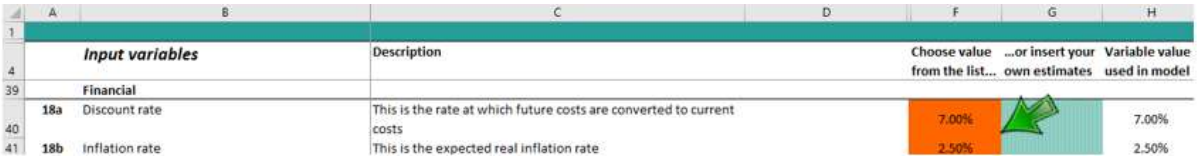


		Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
34		Tree mortality rates (%)				
35	17a	Mortality - under a poor maintenance regime	Expected % of area that will die in the first 5 years (given species type and management)	40%		40%
36	17b	Mortality - under a good maintenance regime	Expected % of area that will die in first 5 years (given species type and management)	20%		20%
37	17c	Mortality - due to accidents	Expected % of area that will die after the first 5 years but within 30 yeas	2%		2%
38	17d	Mortality - due to deliberate actions	Expected average mortality rate due accidents and vandalism	2%		2%

Step 9: Selecting your discount rate and inflation rate values

Question 18a. Select your preferred discount rate. This should be informed by your state treasury department. As a start we recommend a 7% discount rate which is the preferred discount for the Office of Best Practice and Regulation and for Infrastructure Australia.[3]

Question 18b. Select an inflation rate, we currently recommend 2.5%, based on the Reserve Bank of Australia inflation target of 2-3%.[4]



		Input variables	Description	Choose value from the list...	...or insert your own estimates	Variable value used in model
39		Financial				
40	18a	Discount rate	This is the rate at which future costs are converted to current costs	7.00%		7.00%
41	18b	Inflation rate	This is the expected real inflation rate	2.50%		2.50%

[3] See, Infrastructure Australia (www.infrastructureaustralia.gov.au/publications/assessment-framework-initiatives-and-projects), Office of Best Practice and Regulation (https://www.pmc.gov.au/resource-centre/regulation/cost-benefit-analysis-guidance-note)

[4] Reserve Bank of Australia (https://www.rba.gov.au/inflation/inflation-target.html)

Step 10: Selecting project appraisal period

Question 18c. Select your preferred appraisal period using the drop-down menu. The model allows for six different appraisal periods ranging from a 5 years' to 50 years' appraisal period.

	A	B	C	D	F	G	H
1							
4		***Input variables***	**Description**		**Choose value from the list...**	**...or insert your own estimates**	**Variable value used in model**
42	**18c**	Appraisal period	This is the desired project appraisal period in years		30		30.00
43							

Project Models

Models 1 and 2

The information entered in either the Dashboard 1 or 2 or the "Data Entry" worksheets is the input data for "Model 1" and "Model 2" worksheets. These "Model" worksheets present the discounted and undiscounted cashflows, and the life cycle costs in present value terms. The structure of the model worksheets is presented in the figure below, where rows marked:

- **A -** provide a summary of tree establishment costs,
- **B** - are the flow of annual tree inspection and maintenance cost,
- **C** - are any additional cost items which were included by the user and were not already covered in A and B
- **D** - are the flow of mortality costs,
- **E -** are the estimated present value of costs associated with establishment, maintenance and net mortality costs, and
- **F -** are the annual cashflow amounts adjusted for inflation

"Model" worksheets only provide the cashflows and users are not required to enter any information on this worksheets**.**

Cost item		Year 1	Year 2	Year 3	Year 4	Year 5
Establishment costs						
Concrete cutting ($)	$	-				
Supply ($)	$	10,512				
Tree installation ($)	$	22,105				
Unbundled installation	$	-				
Mulch cost ($/m3)	$	549				
Stakes and ties ($)	$	7,020				
Tree removal	$	3,949				
Soil cost ($/m3)	$	1,790				
Tree protection fencing ($)	$	250				
Traffic control cost ($)	$	-				
Guard rails	$	-				
StrataVault or Strata cells ($)	$	-				
Total establishment costs	**$**	**46,175**	**$ -**	**$ -**	**$ -**	**$ -**
Inspections and maintenance costs						
Watering costs in year 1 ($)	$	4,800				
Watering costs year 2 onwards ($)			$ 1,600	$ 1,600	$ 1,600	$ 1,600
Maintenance in year 1 ($)	$	13,299				
Maintenance in year 2 ($)			$ 3,510			
Maintenance in year 3 to 30 (annual $)				$ 2,633	$ 2,633	$ 2,633
Arborist tree health inspection ($)	$	500	$ 500	$ 500	$ 500	$ 500
Visual tree inspection ($)	$	300	$ 300	$ 300	$ 300	$ 300
GIS mapping and inventory assessment ($)	$	240				
Additional use specified cost items						
User specified cost item 1 ($/tree in Year 1 only)	$	-				
User specified cost item 2 ($/tree per annum up to year 2)	$	-	$ -			
User specified cost item 3 ($/tree per annum)	$	-	$ -	$ -	$ -	$ -
User specified cost item 4 ($/tree per annum)	$	-	$ -	$ -	$ -	$ -
User specified cost item 5 ($/tree per annum)	$	-	$ -	$ -	$ -	$ -
Total maintenance costs	$	19,139	$ 5,910	$ 5,033	$ 5,033	$ 5,033
Cost of mortality						
Mortality - under a poor maintenance regime			$ 4,198	$ 3,778	$ 3,400	$ 3,060
Mortality - under a good maintenance regime			$ 2,938	$ 2,733	$ 2,541	$ 2,363
Avoided mortality costs associated with good maintenance			$ 1,259	$ 1,045	$ 859	$ 697
Post-establishment mortality rate						
Mortality rate due to accidents and vandalism			$ 1,259	$ 1,259	$ 1,259	$ 1,259
Net cost of mortality	$	-	$ 4,198	$ 3,992	$ 3,801	$ 3,623
Total cost, undiscounted	**$**	**38,278**	**$ 10,108**	**$ 9,024**	**$ 8,833**	**$ 8,655**
Life cycle costs (present value)	**PV costs**		**PV costs**			
		$	**%**			
Establishment	$	78,466	34.8%			
Inspections and maintenance	$	81,746	36.3%			
Net mortality	$	65,195	28.9%			
Total life cycle costs	$	225,407	100.0%			
Option 1 - Cashflow (adjusted for inflation)		0	1	2	3	4
Cashflow budget data						
		Year 1	Year 2	Year 3	Year 4	Year 5
Concrete cutting ($)	$	-	$ -	$ -	$ -	$ -
Supply ($)	$	10,512	$ -	$ -	$ -	$ -
Tree installation ($)	$	22,105	$ -	$ -	$ -	$ -
Unbundled installation	$	-	$ -	$ -	$ -	$ -
Mulch cost ($/m3)	$	549	$ -	$ -	$ -	$ -
Stakes and ties ($)	$	7,020	$ -	$ -	$ -	$ -
Tree removal	$	3,949	$ -	$ -	$ -	$ -
Soil cost ($/m3)	$	1,790	$ -	$ -	$ -	$ -
Tree protection fencing ($)	$	250	$ -	$ -	$ -	$ -
Traffic control cost ($)	$	-	$ -	$ -	$ -	$ -
Guard rails	$	-	$ -	$ -	$ -	$ -
StrataVault or Strata cells ($)	$	-	$ -	$ -	$ -	$ -
Watering costs	$	4,800	$ 1,640	$ 1,681	$ 1,723	$ 1,766
Maintenance	$	13,299	$ 3,598	$ 2,766	$ 2,835	$ 2,906
Arborist tree health inspection ($)	$	500.00	$ 512.50	$ 525.31	$ 538.45	$ 551.91
Visual tree inspection ($)	$	300.00	$ 307.50	$ 315.19	$ 323.07	$ 331.14
GIS mapping and inventory assessment ($)	$	240.00	$ -	$ -	$ -	$ -
User specified cost item 1 ($/tree in Year 1 only)	$	-	$ -	$ -	$ -	$ -
User specified cost item 2 ($/tree per annum up to year 2)	$	-	$ -	$ -	$ -	$ -
User specified cost item 3 ($/tree per annum)	$	-	$ -	$ -	$ -	$ -
User specified cost item 4 ($/tree per annum)	$	-	$ -	$ -	$ -	$ -
User specified cost item 5 ($/tree per annum)	$	-	$ -	$ -	$ -	$ -

Model 3

The information entered in either the Dashboard 3 or the "Data Entry" worksheets is the input data for "Model 3" worksheet. This worksheet presents the discounted and undiscounted cashflows, and the life cycle costs in present value terms. The structure of the model worksheets is presented in the figure below, where rows marked:

- **A -** provide a summary of tree establishment costs,
- **B** - are the flow of annual tree inspection and maintenance cost,
- **C** - are any additional cost items which were included by the user and were not already covered in A and B
- **D** - are the flow of mortality costs,
- **E -** are the estimated present value of costs associated with establishment, maintenance and net mortality costs, and
- **F -** are the annual cashflow amounts adjusted for inflation

Cost item	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Establishment costs								
Direct seeding ($/ha)	$ 662							
Tubestock supply and planting ($)	$ -							
Tubestock tree guards / protection sleeve	$ 500							
Watering in year 1 ($)	$ 192							
Watering from year 2 to 10 ($)		64	64	64	64	64	64	64
Watering from year 10 onwards ($)								
Tree removal ($)	$							
Tree protection fencing ($)	$ -							
User specified cost item 1 ($/ year)	$ -							
User specified cost item 2 ($/ year)	$ -							
Total establishment costs	**$ 1,354**	**$ 64**	**$ 64**	**$ 64**	**$ 64**	**$ 64**	64	**$ 64**
Inspections and maintenance costs								
Maintenance in first 10 years ($)	$	$ 113	$ 113	$ 113	$ 113	$ 113	$ 113	$ 113
Maintenance after year 10 ($)								
GIS mapping and inventory assessment ($)	$ 1,500							
Visual tree inspection ($)	$ 18	$ 18	$ 18	$ 18	$ 18	$ 18	$ 18	$ 18
User specified cost item 3 ($/ year)	$							
User specified cost item 4 ($/ year)	$							
User specified cost item 5 ($/ year)	$ -							
Total maintenance costs	**$ 1,631**	**$ 131**	**$ 131**	**$ 131**	**$ 131**	**$ 131**	**$ 131**	**$ 131**
Cost of mortality								
Mortality - under a **poor** maintenance regime	$ 542	$ 325	$ 195	$ 117	$ 70	$ 42	$ 25	$ 15
Mortality - under a **good** maintenance regime	$	$ 162	$ 97	$ 58	$ 35	$ 21	$ 13	$ 8
Avoided mortality costs associated with good maintenance	$	$ 162	$ 97	$ 58	$ 35	$ 21	$ 13	$ 8
Mortality - due to accidents	$ 27	$ 27	$ 27	$ 27	$ 27	$ 27	$ 27	$ 27
Mortality - due to deliberate actions	$ 27	$ 27	$ 27	$ 27	$ 27	$ 27	$ 27	$ 27
Net cost of mortality	$ 325	$ 217	$ 152	$ 113	$ 89	$ 75	$ 67	$ 62
Total cost, undiscounted	**$ 2,004**	**$ 412**	**$ 347**	**$ 308**	**$ 284**	**$ 270**	**$ 262**	**$ 257**
Life cycle costs (present value)	**PV costs $**	**PV costs %**						
Establishment	$1	50%						
Inspections and maintenance	$1	42%						
Net mortality	$332	9%						
Total life cycle costs	$ 3,897	100%						
Option 3 - Cashflow (adjusted for inflation)	0	1	2	3	4	5	6	7
Cashflow budget data								
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Direct seeding ($/ha)	$	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tubestock supply and planting ($)	$	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tubestock tree guards / protection sleeve	$ 500	$ -	$ -	$ -	$ -	$ -	$ -	$ -

A

B

C

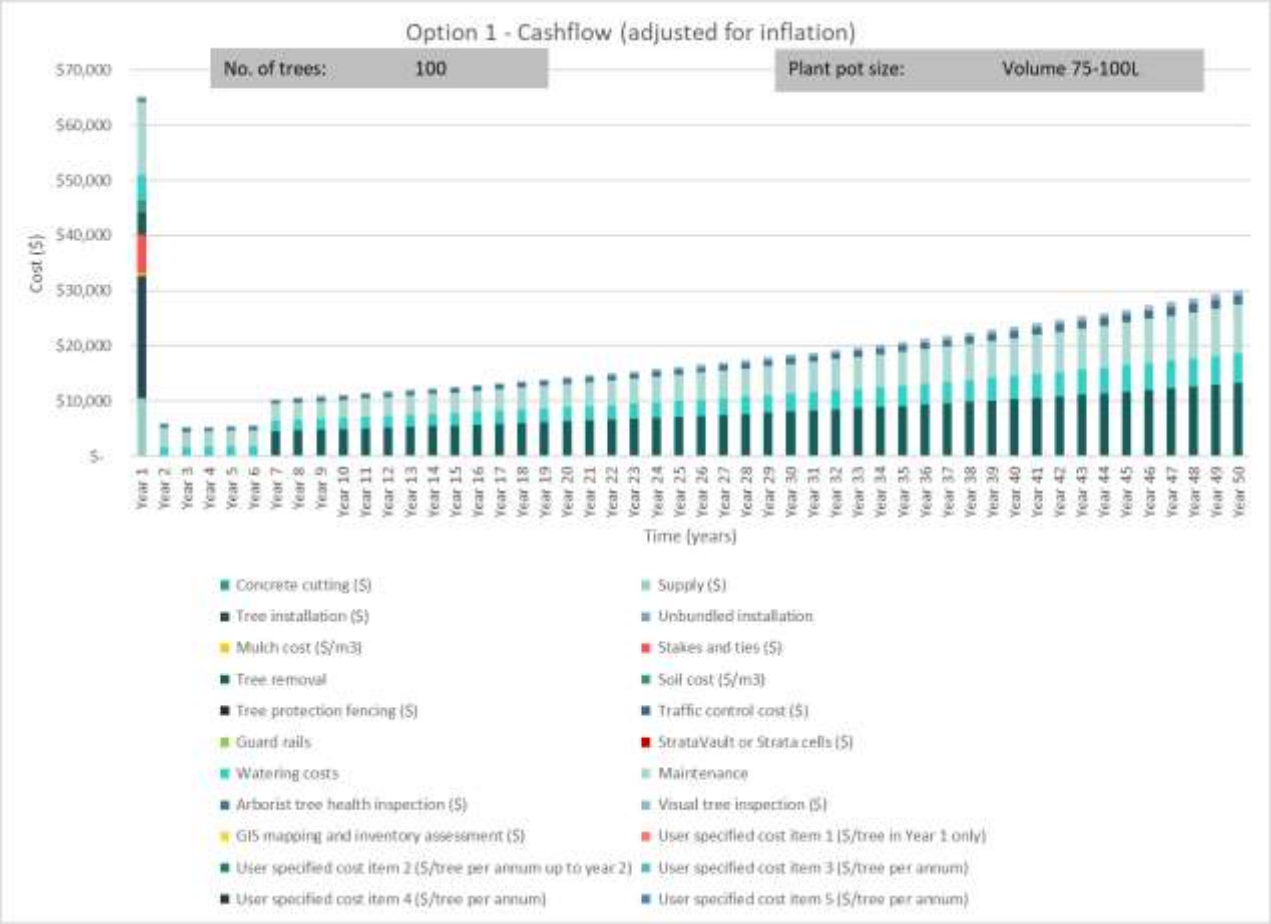
D

E

F

Project Cashflow

The "Cashflow" worksheets provide a summary of the undiscounted but inflation adjusted cashflows. This is based on data from the model worksheets. This chart summarises the cashflow and provides input details (number of trees and plant pot size or area and planting method).



Project Results

The “Results Summary” worksheet provides a summary of the tree costing exercise. The summary provides the tree planting project details such as the proposed number of trees, size of trees purchased for planting, aggregated costs and the life cycle costs for the whole project and per tree basis or per ha basis for a tubestock or direct seeding project.

Summary of results - whole project

Option 1	
Number of trees	100
Pot size (L)	75-100L
Appraisal period (years)	30

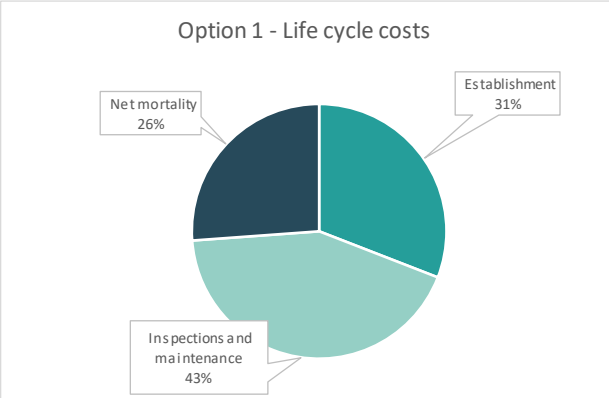
Aggregated costs	Cost ($)
Establishment cost (undiscounted)	$26,503
Average annual maintenance costs	$5,516
Average annual net mortality costs	$4,411

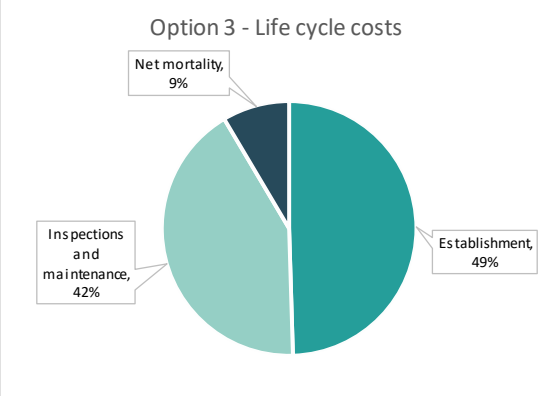
Life cycle costs (total project)	Cost ($)	Proportion (%)
Establishment	$58,794	30.9%
Inspections and maintenance	$81,746	43.0%
Net mortality	$49,775	26.2%
Total life cycle costs	$190,315	100.0%

Option 3 Tubestock or direct seeding	
Area (ha)	1.0
Planting type	Direct seeding
Appraisal period (years)	30

Aggregated costs	Cost ($)
Establishment cost (undiscounted)	$1,930
Average annual maintenance costs	$76
Average annual net mortality costs	$68

Life cycle costs (total project)	Cost ($)	Proportion (%)
Establishment	$1,930	49.5%
Inspections and maintenance	$1,635	42.0%
Net mortality	$332	8.5%
Total life cycle costs	$3,897	100.0%





Summary of results - average cost per tree or hectare

Option 1	
Aggregated costs	**Cost ($)**
Establishment cost (undiscounted)	$265
Average annual maintenance costs	$55
Average annual net mortality costs	$44
Appraisal period (years)	30
Life cycle costs (total project)	**Cost ($)**
Establishment	$588
Inspections and maintenance	$817
Net mortality	$498
Total life cycle costs	$1,903

Option 3	
Aggregated costs	**Cost ($)**
Establishment cost (undiscounted)	$1,930
Average annual maintenance costs	$76
Average annual net mortality costs	$68
Appraisal period (years)	30
Life cycle costs (total project)	**Cost ($)**
Establishment	$1,930
Inspections and maintenance	$1,635
Net mortality	$332
Total life cycle costs	$3,897

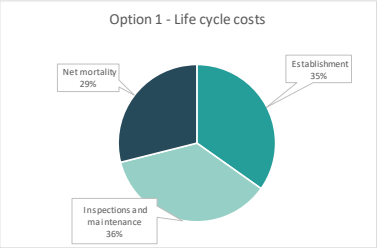
If you have entered details for two projects using "Dashboard 1" and "Dashboard 2" then you can compare *Option 1*, *Option 2* and/or Option 3 for your tree planting project. See figure below for results when two projects are compared.

Summary of results - whole project

Option 1	
Number of trees	100
Pot size (L)	75-100L
Appraisal period (years)	30

Aggregated costs	Cost ($)
Establishment cost (undiscounted)	$46,175
Average annual maintenance costs	$5,516
Average annual net mortality costs	$5,492

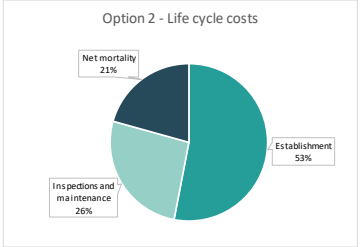
Life cycle costs (total project)	Cost ($)	Proportion (%)
Establishment	$78,466	34.8%
Inspections and maintenance	$81,746	36.3%
Net mortality	$65,195	28.9%
Total life cycle costs	$225,407	100.0%



Option 2	
Number of trees	10
Pot size (L)	250L
Appraisal period (years)	30

Aggregated costs	Cost ($)
Establishment cost (undiscounted)	$21,615
Average annual maintenance costs	$939
Average annual net mortality costs	$912

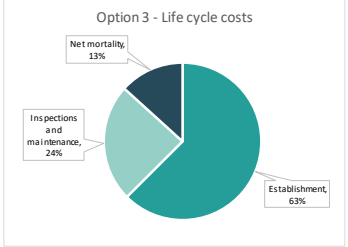
Life cycle costs (total project)	Cost ($)	Proportion (%)
Establishment	$27,355	53.0%
Inspections and maintenance	$13,568	26.3%
Net mortality	$10,667	20.7%
Total life cycle costs	$51,590	100.0%



Option 3 Tubestock or direct seeding	
Area (ha)	1
Planting type	Tubestock
Appraisal period (years)	30
Tubestock density	1000

Aggregated costs	Cost ($)
Establishment cost (undiscounted)	$2,134
Average annual maintenance costs	$40
Average annual net mortality costs	$92

Life cycle costs (total project)	Cost ($)	Proportion (%)
Establishment	$2,134	62.5%
Inspections and maintenance	$827	24.2%
Net mortality	$453	13.3%
Total life cycle costs	$51,590	100.0%



Cumulative costs

The cumulative costs worksheets provide the cumulative costs at a project and at an individual tree or ha.