

# Treasure Valley Municipal Parks Planting Project Project Design Document – Year 4

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# INSTRUCTIONS

Project Operators must complete and submit this Project Design Document (PDD) to request credits after the third anniversary of the Credit Commencement Date. City Forest Credits then reviews this PDD as part of the validation process along with all other required project documents. An approved third-party verifier then does an independent check of all documents and compliance with the Protocol, known as verification. An updated PDD will need to be submitted for future verification at Year 6 and After Year 25.

Project Operators should enter data and supporting attachments starting on page 3 under Project Overview where you find "[Enter text here]" as thoroughly as possible and provide numbered attachments for maps and other documentation (ex: 1 – Regional Map). Keep all instructions in the document.

Below is a list of documents that are needed to complete a successful Year 4 Project Design Document:

For the Single Tree Planting Design:

- Carbon Quantification Year 4 Credit tool
- Tree Sampling Data
- Geocoded photos
- Project geospatial data, if there have been changes (KML file or shapefile)

## For the Cluster Planting Design

- Project Area imaging from any telemetry, imaging, or remote sensing service
- i-Tree Canopy report
- i-Tree Canopy source data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool

For the Area Reforestation Planting Design (previously Canopy Design):

- Either:
  - Project Area imaging from any telemetry, imaging, or remote sensing service
  - i-Tree Canopy report
  - o i-Tree Canopy source data
- Or:
- Tree plot sampling data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool
- Summary of approach to quantifying the local CO<sub>2</sub> index

# **PROJECT OVERVIEW**

Project Name: Treasure Valley Municipal Parks Planting
Project Number: 4
Project Type: Planting Project (under the Planting Protocol – version 9, dated February 7, 2021)
Project Start Date: June 9, 2021
Project Location: Boise, ID

**Project Operator Name:** Treasure Valley Canopy Network **Project Operator Contact Information:** Lance Davisson, 208-994-1135, director@tvcanopy.net

## **PROJECT AND PLANTING DESIGN UPDATES**

*Include information on changes to the project including tree survival, ownership, or other relevant updates.* 

The Treasure Valley Municipal Parks Planting Project is a partnership between the City of Boise and the Treasure Valley Canopy Network. This project planted 454 trees in 9 municipal parks throughout the Treasure Valley. This project used the single tree planting design.

There were no changes in ownership to the Project Site. The Project Site has been maintained and monitored by the City of Boise since the trees were planted.

Of the 167 trees sampled, trees a e died and a e not een epla ed and of these trees were replaced with the same species as originally planted.

# **CARBON QUANTIFICATION DOCUMENTATION (Section 12 and Appendix B)**

Describe and summarize the planting design, sampling, and appropriate quantification/measurement method for the project – Single Tree, Clustered, or Area Reforestation. Include the project's climate zone and method of data collection. Outline the estimated total number of credits to be issued to the project over 25 years as well as the amount to be issued upon successful validation and verification in Year 4. Attach the quantification tool and appropriate sampling tool.

List of quantification Tools by planting method (CFC to provide guidance and resources):

- 1) Single Tree single tree quantification tool
- 2) Clustered cluster quantification tool
- 3) Area Reforestation quantification with CO<sub>2</sub> calculated per acre

To ensure performance of the credits, Project Operators must commit to the following at Year 4, with additional requirements at Year 6 and after Year 25 based on the appropriate quantification method.

- 1) Single Tree
  - a. <u>Year 4:</u> Project Operators must generate a random sample of project tree sites using the Single Tree Quantification Tool. Project Operators must visit those sampled tree sites and collect data on whether the sample contains a live tree, standing dead tree, or no tree.

Provide geocoded photos or imaging of a minimum sample of 20% of the trees. The tracking file includes a column where each tree is assigned a unique serial number to help with tracking each coordinate and tree picture or image.

- *i.* Based on this data, the number and species of project trees is adjusted and a new CO<sub>2</sub> projected amount by after Year 25 is generated.
- 2) Clustered
  - a. <u>Year 4</u>: Project Operators provide images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres). Imaging from Google Earth with leaf-on may be used. Project Operators will calculate the percent of canopy cover from the Google Earth imaging. Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors. If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.
    - If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Clustered Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.
- 3) Area Reforestation (formerly Canopy planting design)
  - a. <u>Year 4</u>: Project Operators must either conduct a physical tree count using plots or use imaging to determine canopy coverage at Year 4.
    - If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.

## Overview

The Project Operator planted 454 trees as part of this carbon project. The most common species include honeylocust, crabapple, and littleleaf linden. The Project Operator used the single tree planting method in the original design and quantification.

## **Data Collection**

The City of Boise Forestry department collected survivorship data on the 167 randomly selected trees. CFC staff randomly selected the trees and City staff visited each tree, taking a geotagged photo and noting if the tree is alive, dead, missing, or replaced. Of the 167 trees sampled, 4 trees were dead and

have not been replaced. Three additional trees did die and have since been replaced. The overall tree mortality based on the sampling data is 2.4%. This is well below the 10% mortality deduction built into the original planting project.

Attachments: 2 TCVN Year 4\_Quantification and data collection 3 TCVN Year 4 Geotagged Photos

## **Carbon Quantification**

Total number of trees planted	454
Project area (acres), if applicable	NA
Total number of trees per acre, if applicable	NA
Credits attributed to the project (tCO2e)	664
Credits after mortality deduction (10% or insert observed mortality, if greater)	598
Contribution to Registry Reversal Pool Account (5%) (tCO2e)	30
Total credits to be issued to the Project Operator (tCO2e)	568
Total credits requested to be issued at Year 4	227

## **GHG** Assertion:

Project Operator asserts that the Project results in GHG emissions mitigation of 568 tons  $CO_2e$  over the 25-year Project Duration. Project Operator asserts that, per Protocol guidelines, 40% of the Project GHG emissions mitigation is issued at Year 4, or 227 tons  $CO_2e$ .

The updated Projected  $CO_2$  stored and credit issuance over 26 years is outlined below:

Single Tree Plantings	Projection at Initial Crediting	Updated Projection at Year 4
Total credits issued at Initial Crediting (10% CO2 (t))	57	57
Total credits to be issued at Year 4 (40% CO2 (t))	227	227
Total credits to be issued at Year 6 (30% CO2 (t))	170	170
Total credits to be issued at Year 26 (20% CO2 (t))	114	114
Total credits to be issued (tCO2e)	568	568

Attachment: 2 TCVN Year 4\_Quantification and data collection

## **CO-BENEFITS QUANTIFICATION DOCUMENTATION (Section 12 and Appendix A)**

Summarize co-benefit quantification and provide supporting documentation. If necessary, update the CFC-provided Co-Benefits Quantification spreadsheet to calculate updated rainfall interception, reduction of certain air compounds, and energy savings.

Ecosystem Services	Resource Units	Value
Rainfall Interception (m3/yr)	2,523.31	\$5,199.38
Air Quality (t/yr)	0.0600	\$1,445.61
Cooling – Electricity (kWh/yr)	84,571.85	\$9,861.08
Heating – Natural Gas (kBtu/yr)	390,109.87	\$4,854.67
Grand Total (\$/yr)		\$21,360.74

Attachment: 2 TCVN Year 4\_Quantification and data collection

# **ADDITIONALITY (Section 4)**

Complete and attach the Attestation of Additionality.

Additionality is demonstrated by Project Operators per the Protocol in the following ways and in the Attestation of Additionality. The Attestation of Additionality was not required to be signed in the Tree Planting Protocol Version 9, however Project Operator met the requirements and is submitting the Attestation with this Project Design Document update.

- Project trees are not required by law or ordinance to be planted (Protocol Section 2.2). See Attestation of Planting.
- The Project did not plant trees on sites that were forested and then cleared of trees within the prior ten years
- Project trees are additional based on a project specific baseline or the Performance Standard Baseline attached to this PDD.
- Project Operator has signed a Project Implementation Agreement with City Forest Credits for 25 years.
- The 25-year Project Duration commitment is additional to and longer than any commitment the Project Operator makes to non-carbon project tree plantings.
- Project Operator has signed the Attestation of Additionality.

Attachment: 4 TCVN Year 4\_CFC Planting Attestation of Additionality

## **ADDITIONAL INFORMATION**

*Include additional information on changes to monitoring and reporting plans since the Initial Credit Planting Design Document was submitted.* 

No changes.

# SIGNATURE

Signed on March 11th in 202 , by Lance Davisson, for Treasure Valley Canopy Network.

Lance Davisson

Signature

Lance Davisson
Printed Name

<u>208-994-1135</u> Phone

\_\_\_\_director@tvcanopy.net\_\_\_\_\_ Email

# ATTACHMENTS

For the Single Tree Planting Design:

- 1 Carbon Quantification Year 4 Credit tool
- 2 Tree Sampling Data
- 3 Geocoded photos
- 4 Project geospatial data (KML file or shapefile)

For the Cluster Planting Design

- 1 Project Area imaging from any telemetry, imaging, or remote sensing service
- 2 i-Tree Canopy report
- 3 i-Tree Canopy source data
- 4 Project geospatial data (KML file or shapefile)
- 5 Carbon Quantification Year 4 Credit tool

## For the Area Reforestation Planting Design (previously Canopy Design):

- Either:
  - 1 Project Area imaging from any telemetry, imaging, or remote sensing service
  - 2 i-Tree Canopy report
  - 3 i-Tree Canopy source data
- Or:
  - 1 Tree plot sampling data
- 2 Project geospatial data (KML file or shapefile)
- 3 Carbon Quantification Year 4 Credit tool
- 4 Summary of approach to quantifying the local CO<sub>2</sub> index

Attachments

Single Tree

Carbon Quantification Year 4 Credit Tool – Single Tree & Sampling Data

Planting Attestation of Additionality

Geocoded Photos

Carbon Quantification Year 4 Credit Tool & Sampling Data – Single Tree

Directions

1) In Table 1 record the number of sites planted for each tree species.
2) if species are not listed, add them to the bottom of Table 1.

Table 1. Planting List		Tree-Type	No. Sites
Scientific Name	Common Name	Abbreviation	Planted
Tilia americana	American basswood	BDL	
Tilia americana	American basswood	BDL	
Castanea dentata	American chestnut	BDL	
Ulmus americana	American elm	BDL	
Ulmus americana	American elm	BDL	
llex opaca	American holly	BES	
Carpinus caroliniana Sorbus americana	American hornbeam American mountain ash	BDM BDS	-
Cotinus obovatus	American mountain asn American smoketree	BDS	
Platanus occidentalis	American sycamore	BDL	
Phellodendron amurense	Amur corktree	BDM	
Maackia amurensis	Amur maackia	BDM	
Acer ginnala	Amur maple	BDS	
Prunus armeniaca	apricot	BDS	
Fraxinus species	ash	BDL	
Cedrus atlantica	Atlas cedar	CEL	
Pinus nigra	Austrian pine	CEL	3
Taxodium distichum	bald cypress	BDL	
Taxodium distichum	bald cypress	BDL	
Populus balsamifera	balsam poplar	BDL	
Rosa banksiae	banksian rose; Lady Bank's rose	BDS	
Tilia species	basswood	BDL	
Fagus species	beech	BDL	
Populus grandidentata	bigtooth aspen	BDL	-
Acer grandidentatum	bigtooth maple	BDM	-
Betula species	birch black ash	BDM	-
Fraxinus nigra Populus trichocarpa	black ash black cottonwood	BDL BDL	
Populus tricnocarpa Robinia pseudoacacia	black locust	BDL	
Robinia pseudoacacia	black locust	BDL	
Acer nigrum	black maple	BDL	
Quercus velutina	black oak	BDL	
Quercus velutina	black oak	BDL	
Populus nigra	black poplar	BDL	
Picea mariana	black spruce	CEL	
luglans nigra	black walnut	BDL	
Salix nigra	black willow	BDM	
Salix nigra	black willow	BDM	_
Viburnum prunifolium	blackhaw	BDS	-
Quercus marilandica	blackjack oak	BDM	-
Prunus blireiana Fraxinus quadrangulata	Blierana plum blue ash	BDS BDL	
Picea pungens	blue spruce	CEL	2
Acer negundo	boxelder	BDL	2
Broadleaf Deciduous Large Other	broadleaf deciduous large	BDL	
Broadleaf Deciduous Medium Other		BDM	
Broadleaf Deciduous Small Other	broadleaf deciduous small	BDS	
Rhamnus species	buckthorn	BDS	
Quercus macrocarpa	bur oak	BDL	
Quercus macrocarpa	bur oak	BDL	
Sabal palmetto	cabbage palmetto	PEM	
Quercus kelloggii	California black oak	BDL	
Washingtonia filifera	California palm	PES	
Pyrus calleryana	Callery pear	BDM	
Populus x canadensis Gleditsia caspica	Carolina poplar Caspian locust	BDL BDM	
Fraxinus oxycarpa	Caucasian ash	BDM	
Cedrus species	cedar	CEL	-
Vitex agnus-castus	chaste tree	BDS	-
Prunus cerasifera	cherry plum	BDS	
Ulmus parvifolia	Chinese elm	BDL	
Ulmus parvifolia	Chinese elm	BDL	
Picea asperata	Chinese spruce	CEL	
Quercus muehlenbergii	chinkapin oak	BDL	
Quercus muehlenbergii	chinkapin oak	BDL	
Prunus virginiana	common chokecherry	BDS	3
Ptelea trifoliata	common hoptree	BDS	
Pyrus communis	common pear	BDM	_
Diospyros virginiana	common persimmon	BDM	
Conifer Evergreen Large Other	conifer evergreen large other	CEL	
Conifer Evergreen Medium Other	conifer evergreen medium other	CEM CES	
Conifer Evergreen Small Other	conifer evergreen small other	BDS	
Salix matsudana Salix matsudana	corkscrew willow corkscrew willow	BDS	
Populus species	cottonwood	BDS	
Populus species Pinus coulteri	Coulter pine	CEL	
Malus species	crabapple	BDS	5
Magnolia acuminata	cucumber tree	BDL	
Cupressus species	cypress	CEL	
Cedrus deodara	deodar cedar	CEL	
Cornus species	dogwood	BDS	
Pseudotsuga menziesii	Douglas fir	CEL	
Amelanchier arborea	downy serviceberry	BDM	
Populus deltoides	eastern cottonwood	BDL	
Tsuga canadensis	eastern hemlock	CEL	
Tsuga canadensis	eastern hemlock	CEL	
luniperus virginiana	eastern red cedar	CEM	
Cercis canadensis	eastern redbud	BDS	_
Pinus strobus	eastern white pine	CEL	-
JImus species	elm	BDL	
	elm	BDL	
	Engelmann engune	CEL	
Ulmus species Picea engelmannii Ulmus procera	Engelmann spruce English elm	CEL BDL	

Table 2. Summary of Planting Sites

Tree-Type Abbreviation	No. Sites Planted
BDL	184
BDM	59
BDS	90
BEL	0
BEM	0
BES	0
CEL	105
CEM	16
CES	0
Total Sites Planted	454
	BDM           BDS           BEL           BEM           BES           CEL           CEM           CES

For black hills-densata spruce

For common chokecherry and common-canada red chokecherry

For crabapply, tschonoskii crabapple, and crabapple-spring snow

For serviceberry

For elm-prospector

Quercus robur Iuglans regia				
	English oak English walnut	BDL BDL		
Alnus glutinosa	European alder	BDL		
raxinus excelsior	European ash	BDL		
Fagus sylvatica	European beech	BDL	1	
Carpinus betulus	European hornbeam	BDM	6	
arix decidua	European larch	BDL		
orbus aucuparia	European mountain ash	BDM		
orbus aucuparia	European mountain ash	BDM		
Betula pendula	European white birch	BDM		
Abies species	fir	CEL		
Forreya taxifolia Fraxinus ornus	Florida torreya flowering ash	CES BDM		
Cornus florida	flowering dogwood	BDS		
Prunus triloba	flowering plum	BDS		
Sequoiadendron giganteum	giant sequoia	CEL	10	For dawn redwood
Ginkgo biloba	ginkgo	BDL		
aburnum x watereri	golden chain tree	BDS		
Coelreuteria paniculata	goldenrain tree	BDM		
raxinus pennsylvanica	green ash	BDL		
Crataegus viridis	green hawthorn	BDM		
Eucommia ulmoides	hardy rubber tree	BDL		
Crataegus species	hawthorn	BDS	5	For crusader-cruzam hawthorn and suksdorf's hawthorn
orylus species	hazelnut	BDS BDM		
Acer campestre Carya species	hedge maple hickory	BDIM		
inus wallichiana	Himalayan pine	CEM		
ileditsia triacanthos	honeylocust	BDL	54	For honeylocust and shademaster honeylocust
lesculus hippocastanum	horsechestnut	BDL	54	
Inus cordata	Italian alder	BDM	1	
bies homolepis	Japanese fir	CEL		
ophora japonica	Japanese pagoda tree	BDM	9	
ophora japonica	Japanese pagoda tree	BDM		
tyrax japonicus	Japanese snowbell	BDS		
yringa reticulata	Japanese tree lilac	BDM		
Syringa reticulata	Japanese tree lilac	BDS	l	
Telkova serrata	Japanese zelkova	BDL		
uniperus species	juniper	CEM		
Cercidiphyllum japonicum Gymnocladus dioicus	katsura tree Kentucky coffeetree	BDM BDL		
Pinus attenuata	knobcone pine	CEL	4	
Quercus glandulifera	Konara oak	BDM		
Pyrus fauriei	Korean sun pear	BDS		
Prunus serrulata	Kwanzan cherry	BDS		
Quercus laurifolia	laurel oak	BDL		
Cupressocyparis leylandii	Leyland cypress	CEL	1	
Syringa species	lilac	BDS		
Pterostyrax corymbosa	little Epaulette tree	BDS		
Tilia cordata	littleleaf linden	BDM	35	For american linden, american-redmond linden, littleleaf linden, and littleleaf-greenspir
Tilia cordata	littleleaf linden	BDM		
Quercus virginiana	live oak	BDL		
Quercus virginiana	live oak	BEL		
Platanus acerifolia	London planetree	BDL BDM	10	For london planetree and london-bloodgood planetree
Magnolia species Fraxinus mandshurica	magnolia Manchurian ash	BDIM		
Abies holophylla	Manchurian fir	CEL		
Acer species	maple	BDL	21	For maple, crimson sunset maple, and pacific sunset maple
Washingtonia robusta	Mexican fan palm	PEM	1	
Albizia julibrissin	mimosa	BDM		
Catalpa speciosa	northern catalpa	BDL		
Celtis occidentalis	northern hackberry	BDL	3	For hackberry
Quercus rubra	northern red oak	BDL		
Quercus rubra	northern red oak	BDL	21	
Thuja occidentalis	northern white cedar	CEL		
Thuja occidentalis	northern white cedar	CEL	-	For New York, advances have a set to be a set of the second set of
Acer platanoides	Norway maple	BDM	3	For Norway-crimson king maple and norwegian sunset maple
Picea abies	Norway spruce			
Duercus species		CEL	3	
	oak	BDL	3	
Aesculus glabra	oak Ohio buckeye	BDL BDL	3	
Aesculus glabra Crataegus monogyna	oak Ohio buckeye oneseed hawthorn	BDL BDL BDS	3	
Aesculus glabra Crataegus monogyna Picea orientalis	oak Ohio buckeye oneseed hawthorn Oriental spruce	BDL BDL BDS CEL	3	
Aesculus glabra Crataegus monogyna Picea orientalis Quercus aliena	oak Ohio buckeye oneseed hawthorn Oriental spruce Oriental white oak	BDL BDL BDS CEL BDL	3	
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kesculus glabra Tataegus monogyna Tataegus monogyna Dicea orientalis Quercus aliena Dicher species Petula papyrifera Aetu griseum Malus pumila Trunus persica	oak Ohio buckeye oneseed hawthorn Oriental spruce Oriental white oak other species paper birch paperbark maple paradise apple	BDL BDL BDS CEL BDL BDM BDM BDL BDS BDM		
Aesculus glabra Crataegus monogyna Neea orientalis Quercus aliena Dither species Betula papyrifera Aeter griseum Molus pumila Prunus persica Quercus palustris Quercus palustris	oak Ohio buckeye oneseed hawthorn Oriental spruce Oriental white oak other species paper birch paperbark maple paradise apple peach	BDL           BDL           BDS           CEL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDS           BDL           BDL           BDL           BDS           BDL           BDL		
Aesculus glabra Irataegus manogyna Ireca orientalis Dither species Betula papyrifera Acer griseum Malus pumila "ununs persica Duercus palustris Quercus palustris Quercus palustris	oak Ohio buckeye oneseed hawthorn Oriental spruce Oriental white oak other species paper birch paperbark maple paradise apple peach pin oak pin oak pin e	BDL           BDL           BDS           CEL           BDM           BDS           BDM           BDS           BDL           BDS           BDL           BDL           BDS           BDL           BDL           BDL           BDS           BDL           BDL           CEL		For bosnian pine and limber pine
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Vesculus glabra iratacgus monogyna Vicea orientalis Quercus aliena Dither species Vicea la paynifero Vestula paynifero Valus prunila Vinus persica Quercus palustris Vinus species Vinus species Vinus species Vinus ponterosa Quercus palueta	oak Ohio buckeye oneseed hawthorn Oriental spruce Oriental white oak other species paper birch paperbark maple paradise apple peach pin oak pin oak pin oak pine pinyon pine plum pond pine ponderosa pine post oak	BDL           BDL           BDS           CEL           BDM           BDL           BDS           BDL           BDS           BDL           BDS           BDL           BDS           BDL           BDS           BDL           BDS           BDL           CEL           BDL           CEL           BDL		For bosnian pine and limber pine
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lesculus glabra rataegus monogyna rataegus monogyna ricea orientalis Uuerus aliena Ather species tetula papyrifera Acter griseum Adus pumila runus persica Uuerus palustris Uuerus palustris Uuerus palustris Tunus species rinus gocies runus species runus species runus species runus species runus species Adus iansis Leer turonatum Topulus tremuloides Leer rubram Topus turo atum Acurs rubra Letula nigra uniperus scopulorum	oak Ohio buckeye Ohio buckeye Oriental spruce Oriental white oak other species paper birch paperbark maple peach pin oak pin oak pine pond pine pond pine post oak portige purpleblow maple quaking aspen red maple red maple Red wuberry Fiver birch Rocky Mountain juniper	BDL           BDL           BDS           BDM           BDM           BDM           BDS           BDL           BDS           BDL           BDS           BDL           CEL           CEL           CES           BDS           CEL           CEL           CEL           BDS           BDS           BDS           BDS           BDL           BDS           BDL           BDS           BDL           BDS           BDL	3 	
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lesculus glabra rataegus monogyna rataegus monogyna rataegus monogyna ricea orientalis Juercus aliena Sther species telula papyrifera Lecer griseum Adus pumilo Trunus persica Juercus palustris Duercus palustris Duercus palustris Trunus persica Juercus palustris Duercus palustris Trunus persica Juercus palustris Trunus persica Juercus secolis Trunus exertina Trunus tellata duercus stellata duercus stellata duercus stellata duercus stellata duerus stellata duerus stellata duerus stellata duerus stellata duerus stellata duerus stellata dues in sis Leer trunctum Adrus rubra tetula nigra uniperus scopulorum alia graciistylo assafras aibidum erenoa repens	oak Ohio buckeye Ohio buckeye Oneseed hawthorn Oriental spruce Oriental spruce paper birch paper birch paradise apple paradise apple peach pin oak pin oak pin oak pine ponderosa pine post oak porterabapple purgleblow maple quaking aspen red maple red maple red maple red mulberry Kussian olive Sargent cherry Sassafras Saw palmetto	BDL           BDL           BDS           BDM           BDL           BDS           BDL           BDL           BDL           BDL           BDL           CEL           CEL           CEL           CEL           CEL           BDS           BDL           BDS           BDL           BDS           CEL           CEL           CEL           DDL           BDS           BDS           BDS           BDL           BDS           BDL           BDL           BDL           BDL           BDL           BDL           BDS           BDL           BDL           BDS           BDS           BDL		
Vesculus glabra           irataegus monogyna           irataegus monogyna           ireca orientalis           Quercus allena           Diter species           Betula papyrifera           Leer gristeum           Adus pumila           Yannus persica           Yannus persica           Yunus species           Yunus stellata           Adeus tremuloides           Kcer rubrum           Adorus rubra           Verus sargendum           Yarubay sangutifolia           Yunus sargentii           Yarubay sangutifolia           Yunus sargentii           Yunus sargentii           Yunus sargentii           Yunus sargentii           Yunus sargentii	oak Ohio buckeye Ohio buckeye Oriental spruce Oriental spruce Oriental spruce Driental spruce other species paper birch paperbark maple paradise apple peach pin oak pin oak pine plum pond pine ponderosa pine post oak prairie crabapple purpleblow maple quaking aspen red mulberry river birch Rocky Mountain juniper tosegold pussy willow Russian olive Sargent cherry Sassafras Saw palmetto Saw tools	BDL           BDL           BDS           BDL           BDM           BDL           BDM           BDL           BDS           BDL           BDS           BDL           BDS           BDL           BDS           BDL           CEL           CES           BDS           BDL           BDS           BDL           BDS           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDS           BDS           BDS           BDS           BDS           BDS           BDS           BDS           BDM           BDL           BDS           BDM           BDL           BDS           BDM           BDM		
Vesculus glabra         Tataegus monogyna         Tataegus monogyna         Tataegus monogyna         Tataegus monogyna         Ucera orientalis         Quercus aliena         Other species         Etula papyrifera         Varuns persica         Quercus palustris         Quercus palustris         Quercus palustris         Quercus palustris         Quercus solustris         Quercus soluto         Marus tubra         Acer truncatum         Opulus tremuloides         Keer ruburd         Marus subra         Betala nigra         Bilaraegalos angustifolio         Trunus sargenti         Sassafras albidum         Vareus sargenti         Quercus acutissima         Quercus acutissima         Quercus acutissima	oak Ohio buckeye Ohio buckeye Oriental spruce Oriental spruce Oriental spruce oriental spruce paperbark maple paradise apple paradise apple peach pin oak pin oak pin oak pine pond pine pond pine post oak paratire post oak praine crabapple red maple red maple red maple red maple red maple red maple Sargent cherry Sassafras Saw palmetto Sawtopthoak Sargent cherry Savatopthoak Sargent cherry Savatopthoak Sargent cherry Savatopthoak S	BDL           BDL           BDS           BDM           BDL           BDM           BDL           BDL           CEL           BDL           CEL           BDS           BDL           BDL           CEL           CEL           CEL           CEL           CEL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDL           BDS           BDS           BDS           BDS           BDS           BDS           BDL           PES           BDM           BDL           BDM           BDL           BDM		
Vesculus glabra           irataegus monogyna           irea areintalis           Uzerus allena           Duerus allena           Diter species           Betula papyrifera           Leer gristeum           Adulss pumila           Tranus persica           Duerus palustris           Duerus palustris           Duerus palustris           Dinus edulis           Tranus species           Dinus sodiorsa           Duerus stellata           Det rotuntum           Valer scopularum           Valer scopularum           Valer scopularum           Valer scopularum           Valera scopularum	oak Ohio buckeye Ohio buckeye Oneseed hawthorn Oriental spruce Oriental spruce paperbark maple paradise apple peach pin oak pine pino ak pine pond pine pond pine pond pine porderosa pine post oak prairie crabapple purpleblow maple quaking aspen red maple red maple red maple Red mulberry river birch Rocky Mountain juniper rosegold pussy willow Russian olive Sargent cherry Sassafras Saw panetto Sawtoth oak Scarlet oak Scotch pine	BDL           BDL           BDS           BDM           BDL           BDN           BDL           BDS           BDL           BDL           BDL           BDS           BDL           BDL		
Vesculus glabra           Zrataegus monogyna           Zrataegus monogyna           Vecea orientalis           Quercus allena           Diter species           Betula papyrifera           Adulus pumila           Tranus persica           Quercus palustris           Quercus seclis           Tranus persica           Vinus species           Vinus ponderosa           Quercus sellata           Aduls ioensis           Exer truncutum           Vorus scapulorum           Adiag gracilityla           Gueraus scapulorum           Aliag gracilityla           Quercus autifisima           Quercus autifisima           Quercus cuctisima           Quercus cuctisima           Quercus cuctisima           Quercus cuctisima           Quercus cuctisima           Querus cuctisima           Querus	oak Ohio buckeye Ohio buckeye Oriental spruce Oriental spruce Oriental spruce Oriental spruce other species paper birch paperbark maple paradise apple peach pin oak pine pin oak pine pin oak pine ponderosa pine post oak prairie crabapple purpleblow maple quaking aspen red maple red maple red maple red maple Roscy Mountaln juniper rosegold pussy willow Russian oliwe Sargent cherry sassafras Saw palmetto Sawtooth oak Scotch pine Scota, pine Sawtooth oak Scotch pine Scota,	BDL           BDL           BDS           BDL           BDM           BDL           BDM           BDL           BDS           BDL           BDS           BDL           CEL           BDS           BDL           BDS           BDL           CEL           CEL           CEL           BDS           BDL           BDS           BDL           BDL           BDL           CEM           BDS           BDL           BDL           BDL           PES           BDM           BDL           CEM           CEM           CEM           CEM		
Aesculus glabra Crataegus monogyna Crataegus monogyna Crataegus monogyna Crataegus monogyna Dether species Betula papyrifera Aeer griseum Malus pumila Trunus persica Quercus palustris Quercus palustris Quercus palustris Quercus palustris Quercus dulis Trunus species Pinus secotina Pinus secotina Pinus secotina Quercus stellota Malus ioensis Acer truncatum Quercus stellota Martus ioensis Acer truncatum Quercus stellota Martus Construito Sasafras albidum Elaeagnus argentii Elaeagnus acutissima Quercus scopilolus Elaeagnus cautissima Quercus scopilolus Elaeagnus cautissima Quercus scopilolus Elaeagnus quertina Elaeagnus acutissima Quercus cocinea Pinus sylvestris Picea omorika Quercus Martuna Hitto acutian Construita Picea omorika Duercus Acutandii	oak Ohio buckeye Ohio buckeye Oriental spruce Oriental spruce oriental white oak other species paper birch paradise apple peach pin oak pin oak pine pinyon pine pond gradie pond gradie port gradie purpleblow maple quaking aspen red maple red maple red maple red maple red maple red maple says on the set of t	BDL           BDL           BDS           BDM           BDL           BDM           BDL           BDS           BDL           CEL           BDS           BDL           CEM           BDL           CEM           BDL		
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Tilia tomentosa	silver linden	BDM	
Acer saccharinum	silver maple	BDL	
Ulmus rubra	slippery elm	BDL	
Cotinus coggygria	smoke tree	BDS	
Crataegus laevigata	smooth hawthorn	BDS	
Catalpa bignonioides	southern catalpa	BDM	
Quercus falcata	southern red oak	BDL	
Picea species	spruce	CEL	1
Pinus glabra	spruce pine	CEL	
Rhus typhina	staghorn sumac	BDS	
Acer saccharum	sugar maple	BDL	3
Rhus species	sumac	BDS	
Rhus species	sumac	BDS	
Quercus michauxii	swamp chestnut oak	BDL	
Quercus bicolor	swamp white oak	BDL	5
Pinus mugo	sweet mountain pine	CES	
Liquidambar styraciflua	sweetgum	BDL	7
Pinus cembra	Swiss stone pine	CEL	
Acer pseudoplatanus	sycamore maple	BDL	
Sapium sebiferum	tallowtree	BDM	
Ailanthus altissima	tree of heaven	BDM	
Liriodendron tulipifera	tulip tree	BDL	24
Nyssa sylvatica	Tupelo tree	BDM	
Corylus colurna	Turkish hazelnut	BDL	
Sciadopitys verticillata	umbrella pine	CEM	
Shrub	unknown shrub	BDS	
Unknown	unknown tree	BDM	
Viburnum species	viburnum	BDS	
Crataegus phaenopyrum	Washington hawthorn	BDM	
Quercus nigra	water oak	BEL	
Thuja plicata	western red cedar	CEL	
Thuja plicata	western red cedar	CEL	
Pinus monticola	western white pine	CEL	
Fraxinus americana	white ash	BDL	5
Abies concolor	white fir	CEL	-
Morus alba	white mulberry	BDM	
Quercus alba	white oak	BDL	
Populus alba	white poplar	BDL	
Picea glauca	white spruce	CEL	23
Salix species	willow	BDL	8
Salix species	willow	BDL	0
Quercus phellos	willow oak	BDL	
Quercus phellos	willow oak	BDL	
Ulmus alata	winged elm	BDL	
Salix x pendulina Wenderoth	Wisconsin weeping willow	BDL	
Ulmus glabra	Wych elm	BDL	
Cladrastis lutea	yellowwood	BDM	
Yucca species	yucca	PES	
Pinus flexilis 'Vanderwolf's'	Vanderwolf Pine	CEM	3
			-

For white ash and white-autumn purple ash

For willow, weeping willow, and weeping or peking-pendula willow

For Limber-Vanderwolfs Pyramid Pine

454

Table 3. Sar	nple Size Calculator	
Description		Value
1)	Margin of Error (15% required)	15%
2)	Confidence level (95% required)	95%
3)	Total number of project sites	454
4)	Mean stored CO <sub>2</sub> per tree (kg)	765
5)	Standard deviation of stored CO <sub>2</sub> (kg)	725
6)	Expected proportion of tree survival (75% required)	75%
	Calculated sample size	167

Use the Sample Size Calculator that we provide to determine the number of sites to sample. We use the term "site" instead of "tree" because some planted trees may no longer be present in the sites where they were planted.

#### Directions

Directions	
	<ol> <li>Margin of error, the default value of 15% is used.</li> </ol>
	<ol><li>Confidence level, the default value of 95% is used.</li></ol>
	<ol><li>The total number of original sites is automatically filled in from the Planting List tab.</li></ol>
	4) Mean stored $CO_2$ for all tree types 25 years after planting is automatically filled in from Table 4 below.
	<ol> <li>Standard deviation of the average CO<sub>2</sub> stored for all tree types 25 years after planting is automatically filled in from the Table 4.</li> </ol>
	<ol> <li>Expected proportion of tree survival – for sampling purposes we conservatively estimate that 75% of</li> </ol>

the planted trees are expected to survive. This value is used as the default in the Sample Size Calculator.

Age	BDL	BDM	BDS	BEL	BEM	BES	CEL	CEM	CES	Avg.	Std. Dev
5	22	70	20	148	50	13	1	11	15		
10	331	203	99	505	169	60	15	53	33		
15	939	432	239	1,200	396	150	76	133	60		
20	1,725	769	429	2,336	765	288	219	256	98		
25	2,587	1,224	659	3,985	1,318	478	472	422	148	765	725
30	3,452	1,797	913	6,178	2,099	725	857	629	211		
35	4,275	2,481	1,177	8,893	3,160	1,031	1,390	876	288		
40	5,037	3,260	1,437	12,051	4,555	1,400	2,083	1,157	380		

Directions	
At the time of data collection soon after planting, record the fo	lowing information:
-Date of data collection.	
<ul> <li>Names of the crew that collected that data.</li> </ul>	
At the time of data collection soon after planting record the fol	lowing information on each tree:
-Date planted	
dead or missing trees, the tree id#s will all be the same a	ee that was planted at the site. When each tree has just been planted, and there are not any s the site#s. As trees get replaced, the list of tree id#s will increase. In the example below, site# 1 originally tree #1 is now tree #4. If tree #4 is the next one at the project that gets replaced, that
-Site Id#, a unique number assigned to each spot a tree is	planted at.
-Species name (botanical name)	
-Latitude and Longitude (or x and y coordinates) of wher	e each tree is located. These data are used to accurately locate the site for remeasurement.
-Image#1, the unique number for the first image of this s	ite.
-Image#2, the unique number for the second image of the	is site taken at 90 degrees to the first.
To request Forward Credits, draw a random sample and record	these additional data on each tree site sampled.
-If the tree is alive, record if it is the original one planted	(original) or a replacement (replace#1, replace#2).
-Record if the tree is dead (standing) or missing (vacant s	ite).
-Date removed, the date when the tree was removed.	
-Date replaced, the date when the replacement tree was	planted.
-Notes, information concerning tree status, health, etc.	
During subsequent field sampling sessions you may find it help each tree.	ful to take a copy of your original data sheets along for reference when attempting to locate

Data Collection Dates: Crew: Standing Live (Orig/Replace Date Date Tree ID # Image #1 Image #2 Dead or Notes Species #1/Replace #2) Removed Replaced Vacant Site FRAN-TR-P-80139 Chokecherry, Common ive FRAN-TR-P-80144 Oak, Northern Red Live FRAN-TR-P-80147 Chokecherry, Common Live FRAN-TR-P-80152 Maple, Crimson Sunset Live FRAN-TR-P-80155 Crabapple-Spring Snow Y Live FRAN-TR-P-80156 Crabapple-Spring Snow Live FRAN-TR-P-80157 Maple, Red Live FRAN-TR-P-80161 Pear, Callery or Flowering Live FRAN-TR-P-80162 Maple, Crimson Sunset Live FRAN-TR-P-80163 Crabapple-Spring Snow Live FRAN-TR-P-80164 Maple, Crimson Sunset Live MARI-TR-P-81254 inden, American-Redmond Replaced #1 - same species MARI-TR-P-81255 Linden, American-Redmond Live PIGR-TR-P-82057 Maple, Pacific Sunset Live Y PIGR-TR-P-82058 Linden, Littleleaf Live PIGR-TR-P-82059 Linden, Littleleaf Live PIGR-TR-P-82063 Honeylocust Live PIGR-TR-P-82064 Linden, Littleleaf Live PIGR-TR-P-82068 Honeylocust dead Х PIGR-TR-P-82071 Live Honeylocust PIGR-TR-P-82073 Honeylocust Live PIGR-TR-P-82074 Honeylocust Live PIGR-TR-P-82081 Spruce, Colorado or Blue Live PIGR-TR-P-82092 Chokecherry, Common-Canad Live PIGR-TR-P-82093 Chokecherry, Common-Canada Live PIGR-TR-P-82097 Chokecherry, Common-Canada Live PIGR-TR-P-82100 Honeylocust х Live BEQU-TR-P-82106 Oak, Northern Red Live BEQU-TR-P-82107 Oak, Northern Red Live BEQU-TR-P-82108 Oak, Northern Red Live BEQU-TR-P-82112 Serviceberry Х Live BEQU-TR-P-82114 Hawthorn, Suksdorf's Live BEQU-TR-P-82118 Hawthorn, Crusader-Cruzam Live BEQU-TR-P-82119 Willow, Weeping or Peking-Pe Live BEQU-TR-P-82121 Planetree, London-Bloodgood Live BEQU-TR-P-82125 Honeylocust, Shademaster Live BEQU-TR-P-82126 Honeylocust, Shademaster х Live BEQU-TR-P-82127 Honeylocust, Shademaster Live BEQU-TR-P-82128 Honeylocust, Shademaster Live BEOU-TR-P-82130 Honeylocust, Shademaster Live BEQU-TR-P-82133 Pagodatree, Japanese Live BEQU-TR-P-82136 Pagodatree, Japanese Live BEQU-TR-P-82142 Tuliptree Live BEQU-TR-P-82147 Birch Clump, Heritage River-C Live BEQU-TR-P-82148 Birch Clump, Heritage River-C ive MAGN-TR-P-82246 Crabapple ive MAGN-TR-P-82247 Crabapple Y Live MAGN-TR-P-82248 Crabapple v Live MAGN-TR-P-82251 Crabapple Live MAGN-TR-P-82252 Crabapple Live

MAGN-TR-P-82254 MAGN-TR-P-82258						
	Maple, Red	Х	Live			
MAGN-111-02230	Spruce, White	X	Live			
					-	
MAGN-TR-P-82259	Sweetgum	X	Live			
MAGN-TR-P-82270	Spruce, White	X	Live			
MAGN-TR-P-82271	Planetree, London	Х	Live			
MAGN-TR-P-82279	Maple, Crimson Sunset	Х	Live			
MAGN-TR-P-82280	Maple, Crimson Sunset	Х	Live			
MAGN-TR-P-82281	Maple, Crimson Sunset	X	Live			
MAGN-TR-P-82282	Pine, Scotch or Scots	Х	Live			
MAGN-TR-P-82288	Sweetgum	X	Live			
MAGN-TR-P-82292	Linden, Littleleaf	Х	Replaced #1 - same s	pecies		
MAGN-TR-P-82294	Oak, Northern Red	Х	Live			
MAGN-TR-P-82295	Spruce, White	Х	Live			
MAGN-TR-P-82298	Birch Clump, Heritage River-Ci	X	Live			
MAGN-TR-P-82301	Birch Clump, Heritage River-Cl	X	Live			
MAGN-TR-P-82303	Pine, Austrian	X	Live			
MAGN-TR-P-82306	Pine, Austrian	Х	Live			
MAGN-TR-P-82307	Pine, Austrian	Х	Live			
MAGN-TR-P-82310	Spruce, Norway	Х	Live			
MAGN-TR-P-82314	Oak, Northern Red	х	Live			
		x				
MAGN-TR-P-82315	Pagodatree, Japanese		Live			
MAGN-TR-P-82317	Chokecherry, Common-Canada	Х	Live			
MAGN-TR-P-82320	Linden, Littleleaf	Х	Live			
MAGN-TR-P-82325	Tuliptree	Х	Live			
MAGN-TR-P-82327	Pine, Austrian	Х	Live			
MAGN-TR-P-82330	Chokecherry, Common-Canada	х	Live			
MAGN-TR-P-82335	Crabapple	X	Live			
	Oak, Northern Red	×				
MAGN-TR-P-82337			Live			
MAGN-TR-P-82338	Redwood, Dawn	X	Live			
MAGN-TR-P-82339	Linden, Littleleaf	Х	Live			
MAGN-TR-P-82343	Spruce, White	Х	Live			
MAGN-TR-P-82345	Sweetgum	Х	Live			
MAGN-TR-P-82358	Linden, Littleleaf	X	Live			
MAGN-TR-P-82356 MAGN-TR-P-82360		x				
	Ash, White-Autumn Purple	X	Live			
MAGN-TR-P-82361	Ash, White-Autumn Purple			vacant		
MAGN-TR-P-82364	Pagodatree, Japanese	Х	Live			
MAGN-TR-P-82366	Spruce, White	Х	Live			
MAGN-TR-P-82370	Crabapple	Х	Live			
MAGN-TR-P-82371	Crabapple	X	Live			
HYHI-TR-P-82480	Honeylocust	Х	Live			
HYHI-TR-P-82481	Honeylocust	X	Live			
HYHI-TR-P-82483	Linden, Littleleaf	Х	Live			
HYHI-TR-P-82484	Linden, Littleleaf	Х	Live			
HYHI-TR-P-82489	Linden, Littleleaf	Х	Live			
HYHI-TR-P-82490	Linden, Littleleaf	Х	Live			
HYHI-TR-P-82491	Honeylocust	X	Live			
HYHI-TR-P-82492	Honeylocust	Х	Live			
HIHO-TR-P-82972	Hackberry	Х	Live			
HIHO-TR-P-82976	Honeylocust, Shademaster	Х	Live			
HIHO-TR-P-82978	Honeylocust, Shademaster	Х	Live			
HIHO-TR-P-82979	Linden, Littleleaf-Greenspire			vacant		
HIHO-TR-P-82980	Linden, Littleleaf-Greenspire	Х	Live			
	Spruce, Colorado or Blue		Livo			
MARI-TR-P-82984	Spruce, Colorado or Blue	x	Live			
MARI-TR-P-82984 MARI-TR-P-82990	Pine, Austrian	x x	Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991	Pine, Austrian Spruce, White	X X X	Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997	Pine, Austrian Spruce, White Pine, Austrian	x x x x x	Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991	Pine, Austrian Spruce, White	X X X	Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997	Pine, Austrian Spruce, White Pine, Austrian	x x x x x	Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar	x x x x x	Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red	x x x x x x x x x x	Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82097 MARI-TR-P-83004 MARI-TR-P-83007 MARI-TR-P-83007 MARI-TR-P-83008	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82997 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83009 MARI-TR-P-83009	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83008 MARI-TR-P-83009 MARI-TR-P-83009 MARI-TR-P-83010	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83000 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83008 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83016	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83000 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83008 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83016	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83008 MARI-TR-P-83008 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83016 MARI-TR-P-83013	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83005 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83011 MARI-TR-P-83018 MARI-TR-P-83018 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83026	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83007 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83016 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83023 MARI-TR-P-83029	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83018 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83026 MARI-TR-P-83026 MARI-TR-P-83050	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Sotch or Scots	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83010 MARI-TR-P-83016 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83028 MARI-TR-P-83049 MARI-TR-P-83058	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Scotch or Scots Willow, Weeping	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83005 MARI-TR-P-83008 MARI-TR-P-83008 MARI-TR-P-83010 MARI-TR-P-83010 MARI-TR-P-83018 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83026 MARI-TR-P-83050 MARI-TR-P-83050 MARI-TR-P-83052	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Socth or Socts Willow, Weeping Pine, Austrian	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83010 MARI-TR-P-83016 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83028 MARI-TR-P-83049 MARI-TR-P-83058	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Scotch or Scots Willow, Weeping	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82997 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83005 MARI-TR-P-83008 MARI-TR-P-83008 MARI-TR-P-83010 MARI-TR-P-83010 MARI-TR-P-83018 MARI-TR-P-83018 MARI-TR-P-83023 MARI-TR-P-83026 MARI-TR-P-83050 MARI-TR-P-83050 MARI-TR-P-83052	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Socth or Socts Willow, Weeping Pine, Austrian	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82997 MARI-TR-P-82997 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83018 MARI-TR-P-83018 MARI-TR-P-83020 MARI-TR-P-83050 MARI-TR-P-83050 MARI-TR-P-83062 MARI-TR-P-83062 MARI-TR-P-83062 MARI-TR-P-83066	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Sucth or Scots Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian	x x x x x x x x x x x x x x x x x x x	Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83000 MARI-TR-P-83010 MARI-TR-P-83010 MARI-TR-P-83016 MARI-TR-P-83016 MARI-TR-P-83026 MARI-TR-P-83050 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83058	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Scotch or Scots Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian Linden, Littleleaf	x x x x x x x x x x x x x x x x x x x	Live			
MARI-TR-P-82984           MARI-TR-P-82990           MARI-TR-P-82991           MARI-TR-P-82997           MARI-TR-P-83004           MARI-TR-P-83005           MARI-TR-P-83005           MARI-TR-P-83008           MARI-TR-P-83009           MARI-TR-P-83010           MARI-TR-P-83010           MARI-TR-P-83011           MARI-TR-P-83016           MARI-TR-P-83018           MARI-TR-P-83023           MARI-TR-P-83026           MARI-TR-P-83058           MARI-TR-P-83058           MARI-TR-P-83058           MARI-TR-P-83058           MARI-TR-P-83062           MARI-TR-P-83106           MARI-TR-P-83108           MARI-TR-P-83108	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian Pine, Austrian Linden, Littleleaf Linden, Littleleaf Pine, Limber	x x x x x x x x x x x x x x x x x x x	Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83007 MARI-TR-P-83009 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83011 MARI-TR-P-83018 MARI-TR-P-83026 MARI-TR-P-83026 MARI-TR-P-83026 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83063 MARI-TR-P-83106 MARI-TR-P-83108 MARI-TR-P-83112 MARI-TR-P-83117	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Scotch or Scots Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian Linden, Littleleaf Linden, Littleleaf Birch Clump, Heritage River-Co	x x x x x x x x x x x x x x x x x x x	Live			
MARI-TR-P-82984           MARI-TR-P-82990           MARI-TR-P-82991           MARI-TR-P-82997           MARI-TR-P-82997           MARI-TR-P-82097           MARI-TR-P-83004           MARI-TR-P-83005           MARI-TR-P-83006           MARI-TR-P-83007           MARI-TR-P-83008           MARI-TR-P-83009           MARI-TR-P-83010           MARI-TR-P-83011           MARI-TR-P-83018           MARI-TR-P-83018           MARI-TR-P-83018           MARI-TR-P-83026           MARI-TR-P-83050           MARI-TR-P-83050           MARI-TR-P-83062           MARI-TR-P-83016           MARI-TR-P-83106           MARI-TR-P-83112           MARI-TR-P-83112           MARI-TR-P-83118	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Sotch or Scots Willow, Weeping Pine, Sucth or Scots Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian Linden, Littleleaf Linden, Littleleaf Pine, Limber Birch Clump, Heritage River-Ct Planetree, London	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
MARI-TR-P-82984 MARI-TR-P-82990 MARI-TR-P-82991 MARI-TR-P-83004 MARI-TR-P-83005 MARI-TR-P-83007 MARI-TR-P-83007 MARI-TR-P-83009 MARI-TR-P-83009 MARI-TR-P-83010 MARI-TR-P-83011 MARI-TR-P-83011 MARI-TR-P-83018 MARI-TR-P-83026 MARI-TR-P-83026 MARI-TR-P-83026 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83058 MARI-TR-P-83063 MARI-TR-P-83106 MARI-TR-P-83108 MARI-TR-P-83112 MARI-TR-P-83117	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Scotch or Scots Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian Linden, Littleleaf Linden, Littleleaf Birch Clump, Heritage River-Co	x x x x x x x x x x x x x x x x x x x	Live			
MARI-TR-P-82984           MARI-TR-P-82990           MARI-TR-P-82991           MARI-TR-P-82997           MARI-TR-P-82997           MARI-TR-P-82097           MARI-TR-P-83004           MARI-TR-P-83005           MARI-TR-P-83006           MARI-TR-P-83007           MARI-TR-P-83008           MARI-TR-P-83009           MARI-TR-P-83010           MARI-TR-P-83011           MARI-TR-P-83018           MARI-TR-P-83018           MARI-TR-P-83018           MARI-TR-P-83026           MARI-TR-P-83050           MARI-TR-P-83050           MARI-TR-P-83062           MARI-TR-P-83016           MARI-TR-P-83106           MARI-TR-P-83112           MARI-TR-P-83112           MARI-TR-P-83118	Pine, Austrian Spruce, White Pine, Austrian Maple, Sugar Oak, Northern Red Maple, Norway-Crimson King Pine, Austrian Pine, Austrian Spruce, White Crabapple Crabapple Redwood, Dawn Oak, Swamp White Willow, Weeping Pine, Sotch or Scots Willow, Weeping Pine, Sucth or Scots Willow, Weeping Pine, Austrian Pine, Austrian Pine, Austrian Linden, Littleleaf Linden, Littleleaf Pine, Limber Birch Clump, Heritage River-Ct Planetree, London	x x x x x x x x x x x x x x x x x x x	Live Live Live Live Live Live Live Live			
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MARI-TR-P-83142         Oak, Swamp White         X         Live         Image: Constraint of the state							
MARI-RP-83143         Redwood, Dawn         X         Live         Image: Charapple Spring Snow         X         Live         Image:							
CHBW-TR-P.83555         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83556         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83557         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83560         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83560         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83567         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83567         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83572         Crabaple-Spring Snow         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83582         Tuliptree         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83582         Tuliptree         X         Live         Image: Charaphe Spring Snow         X           CHBW-TR-P.83583         Tuliptree         X         Live							
CHBW-TR-P43556         Crabapple-Spring Snow         X         Live         Image: Constraint of the state of the s							
CHBW-TR-P-83557         Crabapple-Spring Snow         X         Live         Image: Cheb Pressure of the system							
CHBW-TR-P-83559     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83560     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83572     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83576     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83576     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83576     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83578     Tuilptree     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83583     Tuilptree     X     Live     Image: Chapple-Spring Snow       CHBW-TR-P-83584     Tuilptree     X     Live     Image: Chapple-Spring Snow       GOWL-TR-P-83584     Tuilptree     X     Live     Image: Chapple-Spring Snow       BOWL-TR-P-83599     Hornbeam, European     X     Live     Image: Chapple-Spring Snow       BOWL-TR-P-83605     Hornbeam, European     X     Live     Image: Chapple-Spring Snow       BOWL-TR-P-83606     Crabapple-Spring Snow     X     Live     Image: Chapple-Spring Snow       BOWL-TR-P-83608     Chokecherry, Common-Canade     X     Live     Image							
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BOWL-TR-P-83601       Honeylocust, Shademaster       X       Replaced 1-same species       Image: Control of the system of the syst							
BOWL-TR-P-83605     Hornbeam, European     X     Live     Image: Crabapple-Spring Snow     Image: Crabapple-Spring Snow     Image: Crabapple-Spring Snow     Image: Cr							
BOWL-TR-P-83606     Crabapple-Spring Snow     X     Live     M       BOWL-TR-P-83608     Chokecherry, Common-Canad     X     Live     M       BOWL-TR-P-83608     Chokecherry, Common-Canad     X     Live     M       BOWL-TR-P-83612     Pine, Soctch or Scots     X     Live     M       BOWL-TR-P-83614     Linden, American     X     Live     M       BOWL-TR-P-83615     Linden, American     X     Live     M       BOWL-TR-P-83616     Linden, American     X     Live     M       BOWL-TR-P-83616     Linden, American     X     Live     M       BOWL-TR-P-83616     Londen, American     X     Live     M       BOWL-TR-P-83616     Londen, American     X     Live     M       BOWL-TR-P-83616     Linden, American     X     Live     M       BOWL-TR-P-83617     Oak, Northern Red     X     Live     M       BOWL-TR-P-83628     Oak, Northern Red     M     M     M					cies		
BOWL-TR-P-83608       Chokecherry, Common-Canada       X       Live       Image: Chokecherry, Common-Canada       X       Image: Chokecherry, Common-Canada       X       Live       Image: Chokecherry, Common-Canada       X       Image: Chokecherry, Common-Ca							
BOWL-TR-P-83612     Pine, Scotch or Scots     X     Live     Image: Constraint of the state of	BOWL-TR-P-83606			Live			
BOWL-TR-P-83614     Linden, American     X     Live     Image: Constraint of the state of the s	BOWL-TR-P-83608	Chokecherry, Common-Canada	Х	Live			
BOWL-TR-P-83614     Linden, American     X     Live     Image: Constraint of the state of the s	BOWL-TR-P-83612			Live			
BOWL-TR-P-83615         Linden, American         X         Live         M         M           BOWL-TR-P-83616         Linden, American         X         Live         M         M           BOWL-TR-P-83617         Oak, Northern Red         X         Live         M         M           BOWL-TR-P-83617         Oak, Northern Red         X         Live         M         M           BOWL-TR-P-83628         Oak, Northern Red         Vacant         M         M         M							
BOWL-TR-P-83616         Linden, American         X         Live         Image: Constraint of the system of the							
BOWL-TR-P-83617         Oak, Northern Red         X         Live         Image: Constraint of the state of the stat							
BOWL-TR-P-83628 Oak, Northern Red Oak Orthogram Control Oak Northern Red O							
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#### Directions

Using the information you provide and background data, the tool calculates the amount of Credits that could be issued at years 1 (10%), 3 (40%), and 5 (30%) after planting. A mortality deductions (% loss) is applied to account for anticipated tree losses (Cell D6). A 5% buffer pool deduction is applied that will go into a program-wide pool to insure against catastrophic loss of trees. This tool is used to determine credits issued after planting (Intial Crediting). A different tool is used for credit issuance in Years 4 and 6. The tool in those years requires calculation of a sample and collection of data on tree status in the sample sites.

Mortality Deduction (%):	10%
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Table 3. Credits are based on 10%, 40%, and 30% at Years 1, 3, and 5 after planting, respectively, of the projected CO<sub>2</sub> stored by live trees 25-years after planting. These values account for anticipated tree losses and the 5% buffer pool deduction.

							40%	30%	20%	
	No. Sites Planted	No. Live Trees	Mortality Deduction (%)	25-yr CO₂ stored (kg/tree)	Tot. 25-yr CO <sub>2</sub> stored w/ losses and 5% deduction (t)	10% CO <sub>2</sub> (t)	40% CO <sub>2</sub> (t)	30% CO <sub>2</sub> (t)	20% CO <sub>2</sub> (t)	
BDL	184	166	0.10	2,587.18	407.0	40.70	162.81	122.10	81.40	I
BDM	59	53	0.10	1,224.19	61.8	6.18	24.70	18.53	12.35	4
BDS	90	81	0.10	658.91	50.7	5.07	20.28	15.21	10.14	
BEL	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00	i i
BEM	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00	
BES	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00	
CEL	105	95	0.10	472.49	42.4	4.24	16.97	12.73	8.48	
CEM	16	14	0.10	421.75	5.8	0.58	2.31	1.73	1.15	4
CES	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00	
	454	409	0.10		567.7	56.77	227.06	170.30	113.53	I
										sumche
				Credits issued	568	57	227	170	114	5

In Table 4 the tool infers the amount of  $CO_2$  stored after 25 years from the sample to the population of live trees. Values in column H account for anticipated tree losses and the 5% buffer pool deduction.

Tree-Type	No. Sites Planted	Mortality Deduction (%)	Total Live Trees After Mortality	25-yr CO <sub>2</sub> stored (kg/tree)	CO <sub>2</sub> Tot No Deductions (t)	Grand Total CO <sub>2</sub> w/ Deductions (t)
Brdlf Decid Large (>50 ft)	184	0.10	166	2,587.18	476.0	407.0
Brdlf Decid Med (30-50 ft)	59	0.10	53	1,224.19	72.2	61.8
Brdlf Decid Small (<30 ft)	90	0.10	81	658.91	59.3	50.7
Brdlf Evgrn Large (>50 ft)	0	0.10	0	0.00	0.0	0.0
Brdlf Evgrn Med (30-50 ft)	0	0.10	0	0.00	0.0	0.0
Brdlf Evgrn Small (<30 ft)	0	0.10	0	0.00	0.0	0.0
Conif Evgrn Large (>50 ft)	105	0.10	95	472.49	49.6	42.4
Conif Evgrn Med (30-50 ft)	16	0.10	14	421.75	6.7	5.8
Conif Evgrn Small (<30 ft)	0	0.10	0	0.00	0.0	0.0
	454		409		663.9	567.7

### Table 4. Grand Total CO<sub>2</sub> Stored after 25 years (all live trees, includes tree losses and buffer pool deduction)

## Directions

In Table 5, enter the low and high price of  $CO_2$  in \$ per tonne (t).

This table incorporates error estimates of  $\pm 15\%$  to the high and low estimates of the total CO<sub>2</sub> (t) stored by the live tree population after 25 years. For planning purposes only, it calculates dollar values.

## Table 5. CO<sub>2</sub> value

	CO <sub>2</sub> \$ per tonne
Low	\$19.00
High	\$34.00

Table 6. Summary of CO<sub>2</sub> stored after 25 years (all live trees, includes tree losses)

Tree-Type	Total CO <sub>2</sub> (t) at 25 years	Low \$ value	High \$ value	
Brdlf Decid	519.5	\$9,870.00	\$17,662.10	
Brdlf Evgrn	0.0	\$0.00	\$0.00	
Conif Evgrn	48.2	\$915.56	\$1,638.37	
Total	567.7	\$10,785.55	\$19,300.47	
	CO <sub>2</sub> (t)	Total \$	Total \$	
Grand Total CO <sub>2</sub>				
(t) at 25 years:	567.7	\$10,785.55	\$19,300.47	
High Est. with				
Error:	652.8	\$12,403.39	\$22,195.54	
Low Est. with				
Error:	482.5	\$9,167.72	\$9,167.72	
± 15% error = ± 10%	6 formulaic ± 3% san	npling		
± 2% measurement	:			

Using the information you provide and background data, the tool provides estimates of co-benefits after 25 years in Resource Units per year and \$ per year.

	Resource Units	Resource		
Ecosystem Services	Totals	Unit/site	Total \$	\$/site
Rainfall Interception (m3/yr)	2,523.31	5.56	\$5,199.38	\$11.452
CO <sub>2</sub> Avoided (t, \$20/t/yr)	2.43	0.01	\$48.57	\$0.107
Air Quality (t/yr)				
03	0.1172	0.0003	\$1,293.28	\$2.849
NOx	0.0126	0.0000	\$353.95	\$0.780
PM10	0.0500	0.0001	\$1,037.52	\$2.285
Net VOCs	-0.1198	-0.0003	-\$1,239.13	-\$2.729
Air Quality Total	0.0600	0.0001	\$1,445.61	\$3.18
Energy (kWh/yr & kBtu/yr)				
Cooling - Electricity	84,571.85	186.28	\$9,861.08	\$21.72
Heating - Natural Gas	390,109.87	859.27	\$4,854.67	\$10.69
Energy Total (\$/yr)			\$14,715.75	\$32.41
Grand Total (\$/yr)			\$21,409.31	\$47.16

### Table 7. Co-Benefits <u>PER YEAR</u> after 25 years (all live trees, includes tree losses)

\$535,232.87

Planting Attestation of Additionality



# Treasure Valley Municipal Parks Planting Project Attestation of Additionality

I am the Executive Director of the Treasure Valley Canopy Network and make this attestation regarding additionality from this tree planting project, Treasure Valley Municipal Parks Planting Project.

- Project Description
  - o The Project that is the subject of this attestation is described more fully in both our Application and our Project Design Document (PDD), both of which are incorporated into this attestation.
- Legal Requirements Test (Protocol Section 1.8)
  - o Project trees are not required by law or ordinance to be planted (except for replacement trees planted in place of removed trees for specific reasons).
- The Project did not plant trees on sites that were converted out of a forest use or that were cleared of healthy, non-invasive trees and then planted with project trees (Protocol Section 1.9)
- Project-Specific Baseline or Performance Standard Baseline
- o Project trees are additional based on a project specific baseline. See PDD; or
- Project Implementation Agreement for Project Duration
  - o Treasure Valley Canopy Network has signed a Project Implementation Agreement with City Forest Credits for 26 years.
- The 26-year Project Duration commitment is additional to and longer than any commitment Treasure Valley Canopy Network makes to non-carbon project tree plantings.
- Financial Additionality
  - A successful afforestation carbon project goes beyond tree planting to ensure survival of the trees to a healthy maturity at 26 years after the Project start date. These Project Trees are at risk during all stages of this project. The Project Operator has no guaranteed source of long-term maintenance funding outside of the carbon revenues.
  - o The revenue from the sale of carbon credits will play a material role in the successful and durable storage of Project Trees' carbon stock by providing funding that will help ensure the establishment and long-term health of Project Trees.
- Prior Consideration: Treasure Valley Canopy Network investigated the opportunity to partner with City Forest Credits (CFC) in 2017/2018 following completion of the Treasure Valley Carbon Assessment in partnership with The Nature Conservancy in Idaho. As an early adopter in the CFC Program, we have learned a lot and there have been plenty of changes, but several years ago when our project was verified and we sold credits through the national sale, our investment finally paid off! We see this project with the City of Boise as a pilot to continue to learn and investigate the feasibility of growing this program throughout our service area in Idaho.

- In addition, many of the activities undertaken as part of the carbon project are beyond the Project Operator's common practice, including:
  - o Project design (species and planting selection) to maximize carbon storage
  - o Care through establishment phase (up to/through Year 3)
  - o Long-term maintenance
  - o Long-term monitoring and growth assessment
  - o Acceptance of reversal obligations
  - o Long-term legal commitment to the project

Signed on March 11th in 2025, by Lance Davisson, for Treasure Valley Canopy Network.

Lance Davisson

Signature

Lance Davisson Printed Name

208-994-1135

Phone

\_\_\_\_\_director@tvcanopy.net Email

# **Geocoded Photos**

Can be provided in a zipped file by request.