

Tree Code – Excel Tool

User Manual

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Working with Excel

Before beginning to work with macro enabled spread sheets, and Excel in general, it is important to understand that Excel is very particular about how the data is presented. In many cases, there are underlying formulas and code that will require that certain information is provided in a specific way in order for them to function properly. To this end it is very important that the directions be followed literally at all times.

Excel has also provided a built in security system that prevents potentially harmful macros from being installed on your computer. In order to enable the use of macros in your workbook, you will need to

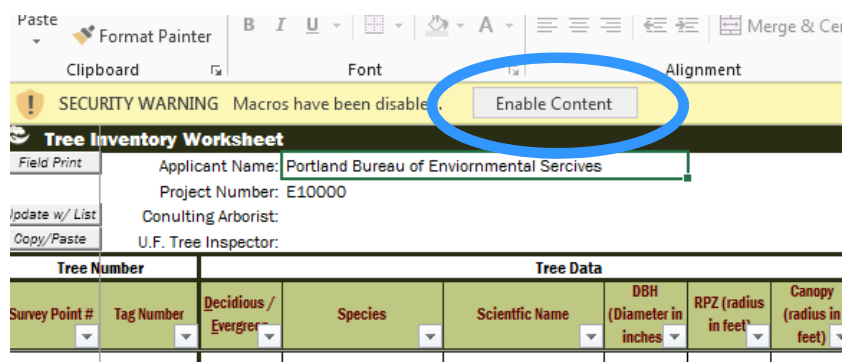


Figure 1

enable the macros every time a new file is opened. If there is a light yellow bar across just below the ribbon when you first open a file titled “Security Warning”, click on the “Enable Content” button to allow macros (see Figure 1).

The latest versions of Excel now have a feature that allows certain portions of a work sheet to be defined as a “Table”. This allows users to have easy access to sorting and filtering options that are limited only to the data

Deciduous / Evergreen	Species	Scientific Name	DBH (Diameter in inches)	RPZ (radius in feet)	Canopy (radius in feet)	In ROW?
D	Ash	Fraxinus Spp.	12"	12'	8'	In ROW
D	Black Locust	Robinia Pseudoacacia	6"	6'	10'	In ROW
D	Chestnut	Castanea Spp.	10"	10'	10'	In ROW
E	Bay Laurel	Laurus Nobilis	8"	8'	12'	In ROW

Figure 2

portion of the work sheet. Along the header row of each defined table, there is a small button with an upside down triangle (see Figure 2). Clicking on this button will open the sorting and filtering dialogue. Once a filter/sort has been applied the image will change to indicate that a sort/filter is active on that particular column. Due to an issue specifically with the way Excel functions, the sorting portion of these tables does not function correctly. At the top of the table is a button to sort the data. Use this feature to apply sorting. It is important

to note that this feature will not edit, delete or change any data, only which data is viewed and in what order.

One of the most common errors that is encountered when running the import or copy/paste macros is that the data is not actually on the clipboard. Excel will provide the error message in Figure 3. When this comes up, click “End”, and try again making sure the previous steps were properly done.

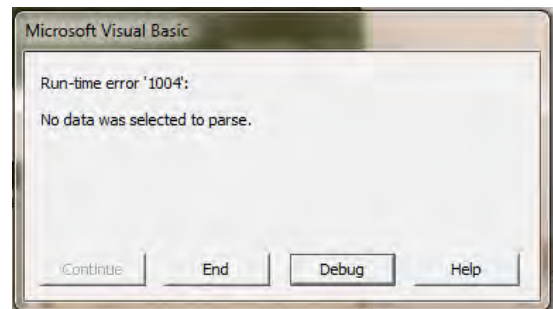


Figure 3

Finally, excel formulas are very literal when parsing data types and specific text. Many fields within the work book are set to use drop down boxes. When these appear, you are only allowed to add data from that list. Other fields are restricted to data types, for example you can only enter an integer in the point number field. When these occur an error message will pop up saying “The value you entered is not valid.” Click “OK” on the error message and select a valid value (using the escape key will also clear any changes you have made to a cell).

General Data Collection Procedures

The new tree code may require adjustments to established data collection procedures currently in place. To ensure that information is accurately presented for implementation into the Title 11 Tree Code, please be sure that the following items are included in your survey: (If you have any questions regarding CAD/Data Collect procedures please consult with the City Project Manager or assigned Tree Inspector responsible for your project.)

1. Always collect all trees DBH ≥ 6 ” (unless directed by the Project Manager or Urban Forestry Inspector) within the data collect area *and a 15’ buffer* around the data collect area should be collected.
2. All trees should be categorized as either Deciduous or Evergreen. Use either “D” or “E” when entering into excel.
3. CAD symbology should have different symbols for Deciduous and Evergreen with scaled RPZ values. Specific layering conventions may also be required based on type and size depending on the bureau.
4. Point numbers & tree tags should be provided in integer format or it will be rejected by Excel.

- Reasonable care should be taken to accurately represent tree sizes, and *must* be included in both the CAD and Excel deliverables.
- Tree Tags should be placed on each tree 6” or greater and referenced in both the CAD files and Tree Code – Excel Tool workbook. Tree Tags may not be required on all projects, consult the City Project Manager or Tree Inspector for direction as to where/if tags will be required.

“For Urban Forestry Use Only”

Both Urban Forestry and Project Managers have different responsibilities with respect to what data can/cannot be entered in specific fields. For example, project managers cannot approve the work proposed on a specific tree and the tree inspectors cannot alter the “Design Comments”.

If you require data to be changed in a locked cell, use the appropriate comments section to request that change.

Directions within this manual that are specific to Urban Forestry are flagged with a light green line on the right side of the text (see the paragraph below).

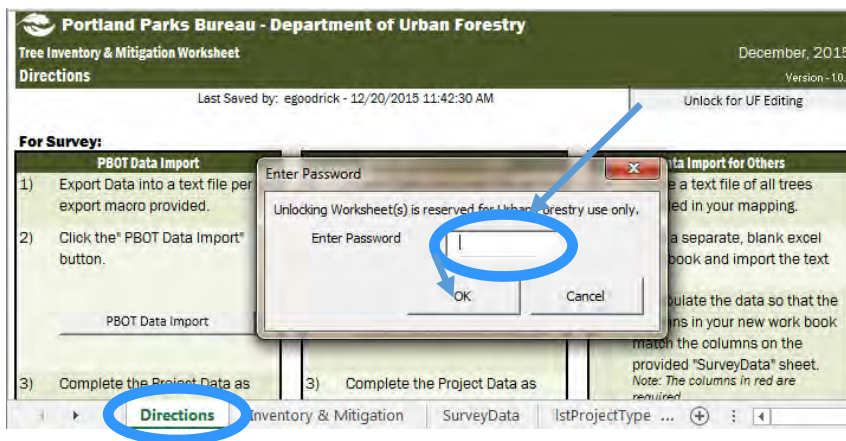


Figure 4

To unlock the workbook for Urban Forestry use, click the button on the “Directions” sheet labeled “Unlock for UF Editing” (see Figure 4). Enter the password and click ok. Once the workbook is closed, it will

revert to its locked state. There is no need to relock it when done editing.

Importing Survey Data

All surveyors who are working on Capital Improvement Projects and/or projects in City of Portland owned or managed properties will now be required to provide tree data in the form of the Tree Code – Excel Tool workbook. While macros are available to directly import

data from the City’s in house survey groups’ CAD software, outside consultants will also need to import the data manually per the directions under “For non-COP Surveyors”.

It should also be noted that for projects that include multiple sets of deliverables, a separate work book should be generated corresponding to each separate CAD file. The project managers will then be responsible for merging data from the new list.

For PBOT & Water Bureau Survey InRoads Data

In order to export survey data into the work book, it will be necessary to run two separate macros. A separate InRoads macro will be provided that will export survey data from CAD into a text file that is compatible with the import macros in Excel. This process will need to be done specifically from InRoads. The macros are not designed to operate from AutoCAD or other CAD software.

Run the appropriate InRoads macro then open the generated text file. Select all the data provided (ctrl +a) and copy (ctrl + c). Open a blank copy of the Tree Code – Excel Tool workbook, on the directions tab, click the appropriate button for import. (Note: PBOT and Water use different macros, so be sure to use the correct button!) Once this is done, you will need to enter the basic job information per the directions on page 8.

PBOT AutoCAD Data for BES

For PBOT Survey, when processing data in AutoCAD, create the text file in as you would normally at the end of the project and open it in a separate Excel workbook. Be sure the columns are lined up as below in **Error! Reference source not found..** Once this is done,

	A	B	C	D	E	F	G	H	I	J
1	PT #	NORTHING	EASTING	ELEV	DESC	ATTRIBUTE TBLE	TAG #	DBH	NOTES	
83	144083	658133.773	7628180.648	390.868	TRDM 11	TREE	424	11		
84	144084	658138.965	7628191.023	392.229	TRDM 8	TREE	427	8		
85	144085	658131.203	7628184.125	391.353	TREL 18	TREE	425	18	14/18"	
86	144086	658123.328	7628200.839	393.369	TREL 24	TREE	422	24		
87	144087	658119.513	7628197.337	392.300	TREL 16	TREE	423	16		
88	144088	658119.820	7628202.644	392.897	TREL 16	TREE	421	16		
89	144089	658111.188	7628182.429	389.863	EL					
90	144090	658140.342	7628180.001	390.845	EL					
91	144091	658111.485	7628183.292	389.676	EL					
92	144092	658125.640	7628186.121	391.036	EL					
93	144093	658174.843	7628177.755	392.244	EL					
94	144094	658174.957	7628198.065	394.730	EL					
95	144095	658165.116	7628201.586	394.105	EL					

Figure 5

select the entire worksheet and copy it to the clip-board. Return to the Tree Code workbook and press the “PBOT AutoCAD Data Import” button. As before, enter the job information per the directions on page 8.

Note: For all PBOT and Water Bureau import macros, it is not necessary to filter out the trees before importing. The Excel macro will identify these points and separate them based on the survey codes used.

For non-COP Surveyors

Since each survey firm will have different data collect procedures it is impossible to provide import macros for each group. A privately constructed macro can be created easily using the “Record Macro” tool on the developer tab of Excel. It should be done in its own work book to prevent errors with the existing macros in the Tree Code – Excel Tool work book. Help with designing macros is provided through Microsoft on <https://msdn.microsoft.com/library>, the City of Portland will not be able to provide support with the design of custom macros.

Export and Manipulate Data

Once the data collection is complete, the tree data will need to be exported into excel. Open a separate workbook and export a list of all trees with as much of the relevant data possible. At a minimum be sure to include: The surveyed point number corresponding to the CAD file, whether the tree is deciduous or evergreen and the DBH.

Once the data is imported into a blank workbook, arrange the column as follows:

Column A: Survey Point Number, as an integer.

Column B: Northing (y-axis)

Column C: Easting (x-axis)

Column D: Elevation

Column E: The data collect code used by field crews for entering tree data. A key should be provided to the project manager if their meanings are not self-evident.

Column F: Use “D” for deciduous trees, and “E” for evergreen. A “?” may be used if you are unsure (e.g. while a Palm Tree is not technically a tree, and therefore neither deciduous nor evergreen, it should be included in the tree spreadsheet.)

Column G: Common species name. (Note: Urban Forestry and/or a consulting arborist will review this data.)

Column H: Tag Number, as an integer.

Column I: DBH – Measure at 4.5ft from the ground in inches. Tree clumps should be measured as if bundled together.

Column J: Canopy Radius in feet. This value provides no design constraint and is unnecessary as the drip radius is now superseded by the root protection zone (RPZ).

Column K: RPZ radius in feet. This should *always* be equal to one foot per inch of DBH.

Column L: Notes. Please be sure to include clump details, or any special comments (e.g. Dead) in this column.

It should be noted that Excel will be looking at the column positions not any sort of labels, so they *must* be placed in this order. If specific information is not being provided leave the column blank.

Copy to Tree Code – Excel Tool and Format

Next, open a copy of the Tree Code – Excel Tool, and navigate to the “SurveyData” tab. Copy and paste you manipulated data into the existing spread sheet beginning in row 4. Move to the “Directions” tab and click on the “Other Data Import” button. Complete the sheet by entering the job data per the directions on page 8.

Survey Point #	Northing	Easting	Elevation	Survey Code	Deciduous / Evergreen	Species	Tag Number	DBH (Diameter in inches)	Canopy (radius in feet)	RPZ (radius in feet)	Note / Comment
A - Required	B	C	D	E	F - Required	G	H	I - Required	J	K	L
65237	699446.78	7667877.30	67.58	TRD	D	Oak	101	12	8	12	Clump of 4
10,048	678,317.47	7,663,513.75	254.70	1972.1	C		1000	15			3x6in
10,065	678,352.06	7,663,599.39	255.37	2612	D			26			
10,557	678,359.51	7,664,380.23	272.48	1962.1	D			7			
17,353	679,374.76	7,664,328.88	250.40	2048	E	Fir	50	20			
17,276	679,420.1	7,664,204.55	334.16	3616.5	E	Cedar	51	21			
17,395	679,701.1	7,664,186.77	332.36	3610	D	Cherry	52	28			
17,396	679,738.55	7,664,214.98	347.21	2818	D	Cherry	53	28			
17,273	679,469.19	7,664,204.55	334.16	3616.5	D	Hawthorne		36			
17,274	679,459.78	7,664,186.77	332.36	3610	D	Hawthorne		36			
16,624	679,270.27	7,664,588.18	417.09	3533	C		54	35			
16,627	679,340.37	7,664,565.59	415.75	3532	C		55	35			

Figure 6

For Projects w/o Survey Data

In the rare circumstance when survey data is not provided, a project manager can manually enter data into the “SurveyData” spread sheet. Type in the data directly per the directions provided under “Export and Manipulate Data” beginning on page 6. Give each tree a unique number and include that number in the “Survey Point #” column and referenced on a site sketch showing their locations.

Once the data is entered, click the “Other Data Import” button on the “Directions” sheet and proceed to enter the job information per the following section.

Entering Job Information

At the end of the import macro a dialogue box will open up requesting specific job information. Enter data into each field. The job number should be related to the City's WBS number as provided by the Project Manager (letter corresponding to the bureau followed by 5 additional letters or numbers). The project type field will automatically fill with a default value for each bureau, but can be changed per the directions on page 10.

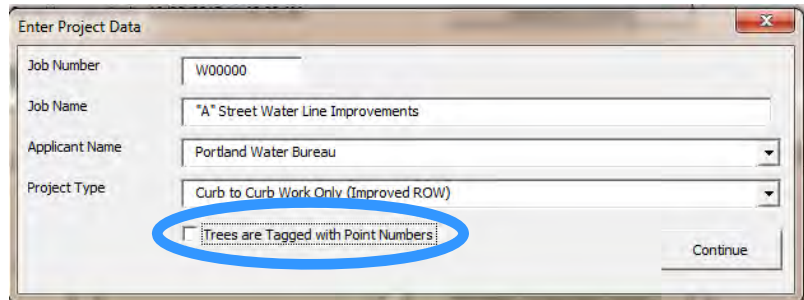


Figure 7

If the trees have been tagged with customizable tags with the surveyed point number on them, check the box on the bottom and the point numbers will be duplicated in the “Tag Number” column.

At this point the “Inventory & Mitigation” sheet will open. Check the list for accuracy, and complete any additional information known in the Job Information section on the Directions Tab (see page 8).

Saving: *.xlsm

When saving the workbook for delivery, be sure to save the file as a *.xlsm file. Other Excel file formats either disable the macro functionality, operate strangely or not at all. Delivering in the wrong file format may require that a new sheet be generated from scratch and may result in lost work on the part of the designers.

Whenever the workbook is saved, the “Last Saved by” field on the “Directions” tab will automatically update. This feature can be used to track who/when changes were last made to the excel file.

Receiving your Inventory Sheet

Project Managers and Designers will receive a copy of the Inventory Worksheet along with any data collect deliverables produced by a surveyor. If you have not received this sheet, please contact the surveyors who generated the base mapping and have them do so.

If your project contains multiple sets of deliverables with multiple tree spreadsheets, select one sheet to be the master copy and merge all subsequent sheets into one using the

directions provided for under “Adding Trees” on page 17. You should only have one workbook per project.

Flags:	Work Proposed	All Work Approved	Final Permit	Mitigation	Density	Fee In Lieu
	Incomplete	Incomplete	Incomplete	Not Met	Not Met	TBD

To be completed by Project Manager

Project Information						
WBS Number	E00000	CO #				
Job Name	Sewer Repair					
Project Manager						
Bureau	Portland Bureau of Environmental Services					
Phone		Fax				
Email						
Address	1120 SW 5th Ave				Suite	1000
	City	Portland	State	OR	Zip	97204

Project Type & Scope Summary						
Primary Project Type:	Curb to Curb Work Only (Improved ROW)					
Scoping						
Project Type	Scope	Trees Removed	Trees Preserved	Trees Unaffected	Total Trees	
Site Improvements - City Owned or Managed	N/A sq ft	0	0	0	0	
Curb to Curb Work Only (Improved ROW)	/ ft	0	0	0	11	
Street Improvements on Partially Improved or	N/A / ft	0	0	0	0	
Utility Work Only on Partially Improved or Unimproved	N/A / ft	0	0	0	0	
Work on Fully Improved Street	N/A / ft	0	0	0	0	
Sub Total	0	0	0	0	11	

Tree Inspector						
UF Tree Inspector						
Phone		Fax				
Email						

Consulting Arborist (if applicable)						
Name						
ISA Certification Number						
Company/Organization						
Address					Suite	
	City		State		Zip	
Phone		Fax				
Email						

Figure 8

Entering Job Information

Rather than needing to update the job information on multiple sheets, the Directions tab contains a section to centralize information regarding the project which will be duplicated as needed on the Inventory & Mitigation, Planting Plan and Permit sheets. Any changes to this information can only be made here and will be reflected automatically on any other sheets.

Flags:

At the top right of the directions sheet is a number of items marked as “Flags”. Each of these represent major milestones with respect to the completion of the project.

The first two must be marked as “Complete” before a permit can be generated.

Failing to meet the mitigation and density requirements will result in a fee in lieu of planting per the tree code.

Project Information, Tree Inspector & Consulting Arborist

Complete the information under the Project Information, Tree Inspector & Consulting Arborist sections as completely as possible. If the information changes, update as necessary.

Project Type & Line item Scoping

Selecting the correct project type will have the largest effect on the type and scope of mitigation and density requirements within your project.

For Surveyors, select the option which best fits your understanding of the project scope when completing the project data form (see page 8).

Primary Project Type

Project Managers in consultation with their Urban Forestry Inspector will make the final determination as to the project type(s) per the Admin Rule and Title 11 Tree Code. Select the primary project type in the drop down list on identified as the “Primary Project Type”.

The Excel Tool operates with 5 different options:

1. Site Improvements - City Owned or Managed Property
e.g. Environmental Work or Park Improvements
 - Mitigate trees DBH ≥ 6 ” between 2:1 and 5:1 depending on DBH.
 - Maintain Density at 25% of project area by canopy coverage.
2. Curb to Curb Work Only (Improved ROW)
e.g. Most sewer & water projects, paving, etc...
 - Mitigate trees DBH ≥ 6 ” at 2:1
 - No density requirements.
3. Street Improvements on Partially Improved or Unimproved Street/ROW
e.g. Curb & Sidewalk Installation, new street construction.
Choose the Greater of:
 - Mitigate trees DBH ≥ 6 ” at 2:1
 - Density at 1 tree per 25 linear feet of street.
4. Utility Work Only on Partially Improved or Unimproved Street/ROW
e.g. Utility work that does not fall under #2 above.
 - Mitigate trees DBH ≥ 6 ” on private property and DBH ≥ 12 ” in the ROW at 2:1
 - No density requirements.
5. Work on Fully Improved Street
e.g. Bioswales, Sidewalk Repair, etc...
 - Mitigate trees DBH ≥ 6 ” at 2:1
 - Density at 1 tree per 25 linear feet of street.

Scope

Once a primary project type has been selected, the scope column will open up with a blank (highlighted yellow) cell to enter the scope of the project. In this column either enter the square footage of the project (for site improvements) or the street linear footage (for other types) in this box.

Project with Multiple Project Types

For projects that have more than one project type, select the primary project type in the drop down as above. Then enter the scope of each individual type.

The inventory and mitigation sheet will assume that all trees are part of the Primary Project Type when first entered. You will need to adjust the individual trees that fall outside this section either line by line (per the directions under “Mitigation Requirements” on page13) or by point list per “Update from List” on page15).

Once this is completed, the spreadsheet will automatically calculate the different mitigation and density requirements for each project type.

Tree Inventory & Mitigation Sheet Overview

The majority of the work for managing these requirements will take place on the Inventory & Mitigation worksheet. This sheet will track existing trees, specific information about those trees, work to be done on each individual tree, serve as a forum for communication between project managers and urban forestry inspectors and manage the specific mitigation requirements for each tree.

The screenshot shows a Microsoft Excel spreadsheet titled "Tree Inventory Worksheet". The spreadsheet is organized into several main sections: "Tree Data", "Exception & Proposed Work Data", "Notes", and "Mitigation Requirements". The "Tree Data" section includes columns for Survey Point #, Tag Number, Deciduous / Evergreen, Species, Scientific Name, DBH (Circumference in ft), DBH (Circumference in in), Canopy Spread in ft, In ROW, Tree Condition, Comment, Work Proposed, Pruning, Net Linear Distance, and Status. The "Exception & Proposed Work Data" section includes columns for Clear Flag, Survey Point, Tree Number Comments, Designer Comments, Mitigation Strategy, and Mitigation (Hours in ft). The "Notes" section includes a column for Notes. The "Mitigation Requirements" section includes a column for Approval. The spreadsheet also includes a header section with fields for Applicant Name, Project Name, Project Number, Project Type, In Linear Feet, and In ROW ft.

Figure 9

Tree Number & Data

The first two sections of this sheet contain the basic information for each tree:

1. **Survey Point #:** This is the data collect point number obtained from the survey data. It will serve as the primary tree identification number for trees and should be referenced on drawings sent to Urban Forestry and will be used with the “Update from List” described on page15.
2. **Tag Number:** Tags placed on trees in the field will be referenced here. This is used solely for field identification only.
3. **Deciduous/Evergreen:** Using a D or C to identify the basic type of tree.
4. **Species & Scientific Name:** To be completed by Urban Forestry or a Consulting Arborist. Tree Species can effect mitigation requirements and should be completed as accurately as possible.

5. DBH & RPZ: These numbers will be entered by Survey. The RPZ is a fixed value at 24:1 and cannot be changed.
6. Canopy: Expressed similar to the RPZ. For the most part this is not a design parameter and is functionally replaced by the RPZ. Often this column will be left blank and is only included on this sheet for a reference.
7. In ROW?: Mitigation values will be effected based on the location of the tree as either being on private property or in the ROW. Default values will be entered based on the primary project type and will need to be edited either line by line or per the “Update from List” directions found on page15.

Urban Forestry and/or the Consulting Arborist will need to enter the tree species and verify DBH values. Only those personnel can edit these fields.

Exemption & Proposed Work Data

This section will identify the type of work to be done on each tree and the specifics of how each tree will need to be handled.

1. Tree Condition: Trees will default to a value of “Viable” and can only be changed by Urban Forestry or a consulting arborist. Trees identified as being dead, dying, dangerous or nuisance (species specific), will most likely be exempt from mitigation requirements.
2. Exempt: An exempt tree will not be counted against mitigation requirements if removed. This field is automatically calculated based on the tree size, condition and project type.
3. Work Proposed: Enter the type of work to be done on each tree per the following options:
 - a. Prescriptive Path - No Encroachment: Full fenced protection covering the entire RPZ.
 - b. Prescriptive Path – Encroached: Full fenced protection covering the majority of the RPZ (work to encroach on the RPZ, but tree will be preserved.)
 - c. Performance Path: Other type of tree protection, while tree is to be preserved.
 - d. Remove: Tree will be removed.
 - e. Unaffected: Tree was data collected, but not actually within the project limits. Do not use this in place of a performance path identification for trees that are far enough away not to need protection, but are close enough that they need accounted for in the plan. Trees marked in this way will not be included in density credit calculations.

Note: When delivering the completed list to Urban Forestry for review, this column should be completely filled out to the best of your ability. Particularly on larger projects, allowing the tree inspectors to know which trees will be effected by the project will be essential to keeping their costs down.

4. Pruning: Identify if a tree will need root and/or branch pruning.
5. Min Linear Distance: Work that will take place within this distance from the tree trunk, may require additional protection per the tree inspector and/or be removed. Value is placed for reference and is based on the RPZ value.
6. Sheet #: Please complete this column to reference the sheet number for each tree identified in the project. This can be updated individually or with the “Update from List” directions found on page15.
7. Flag: To facilitate easy sorting of items which need attention, use the “Flag” column to highlight a specific tree. Once checked the row will appear red. You can then use the “Clear Flags” button to remove flags from all rows.

Urban Forestry will need to enter the tree conditions manually for each tree. The default value for trees will be entered in as “Viable” once a species is selected. The exemption values can be overwritten using the drop down menu. However, it should be noted that once changed, the auto-calculation will not continue with subsequent changes (see page 22).

Notes

The Notes section is the primary location to include specific comments and/or requirements for each of the trees. This can also be used as a forum for communication between the Project Manager and Tree Inspector. If you need to change information that is locked, comments can be added here. Use the Flagging feature to draw attention to actions that need taking.

Mitigation Requirements

The next set of columns will be kept locked, but shows the effect of removing a specific tree based on its mitigation requirements. If mitigation is required for a specific tree this will be indicated as well as the number of trees required to replace it.

Once the work has been determined, urban forestry will mark the tree as approved. Once this is done, no further changes should be made on those trees without pressing the Flagging the row. A permit cannot be generated until all trees have been approved.

Both the mitigation columns are set with formulas that will determine the number of trees required for mitigation based on the size of each tree and the project type. These values can be overwritten as needed, but once done the formula will no longer automatically update (see page 22).

When the workbook is unlocked a button to “Approve All” will appear above the Approved column. This will allow you to check all work as approved at one time. Trees that do not have a “Work Proposed” option selected will be skipped (or changed to unapproved).

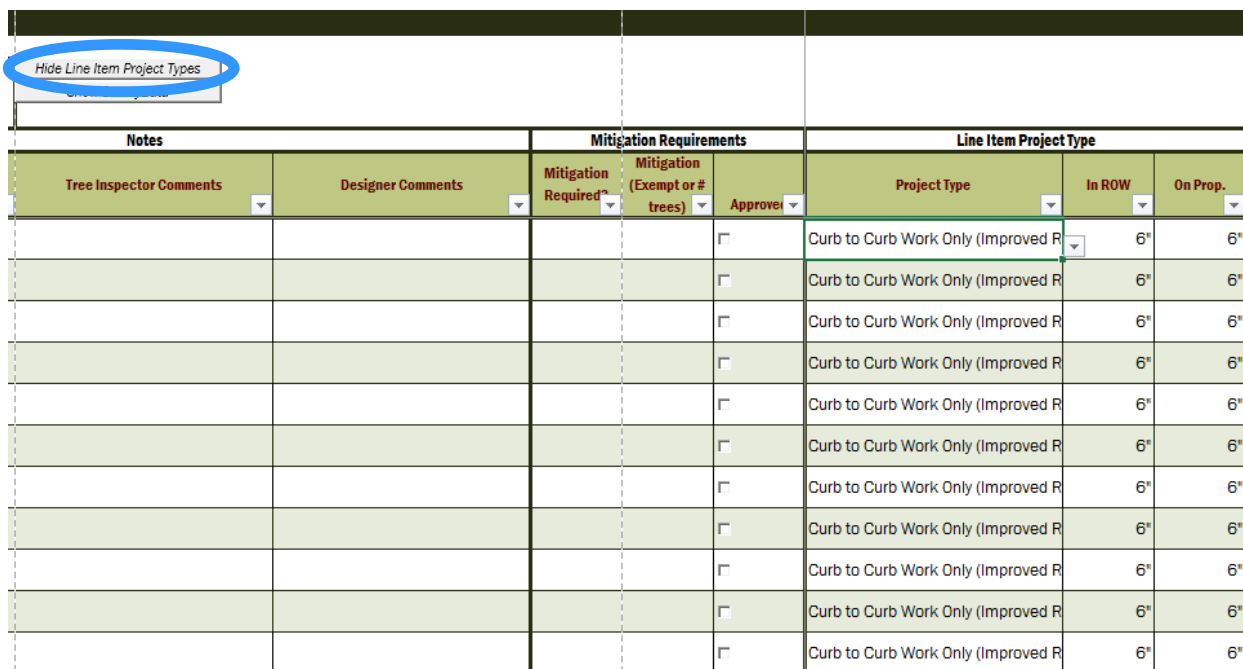
Approved trees will appear in green. Also once approved, the work proposed and pruning columns will be locked for those specific tree.

Line Item Project Type

The first of two sets of hidden columns is the Line Item Project Type. To view this information, click on the “Show Line Item Project Types” button on the right side of the header data. The value for this field will default to the Primary Project Type selected on the Directions tab (see page 8). For projects with multiple project types, trees that fall within the secondary types will need to be changed in this column. Failure to do so, may result in inappropriate mitigation and density calculations.

The regulated tree sizes are fixed based on the requirements in the tree code. These can be changed by Urban Forestry only.

Once this is complete, you can hide these columns if desired by clicking on the “Hide Line Item Project Types” button.



Notes		Mitigation Requirements			Line Item Project Type		
Tree Inspector Comments	Designer Comments	Mitigation Required	Mitigation (Exempt or # trees)	Approved	Project Type	In ROW	On Prop.
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"
				<input type="checkbox"/>	Curb to Curb Work Only (Improved R	6"	6"

Figure 10

Tree Inventory & Mitigation Sheet Tools

A number of additional tools exist on the main Inventory & Mitigation worksheet and on the Directions tab to facilitate easy manipulation and viewing of data.

Field Print/Office Print

Printing the Inventory & Mitigation worksheet “as-is” will result in an unwieldy printout. This can be simplified by pressing the “Field Print” (see Figure 7) button on the top left corner of the header data. Doing will reformat the page to allow printing of only the basic tree information and make field inspections easier. To revert to the normal view, press the “Office Print” button in the same location.

Once done, go to print the file and manually change the page orientation to landscape.

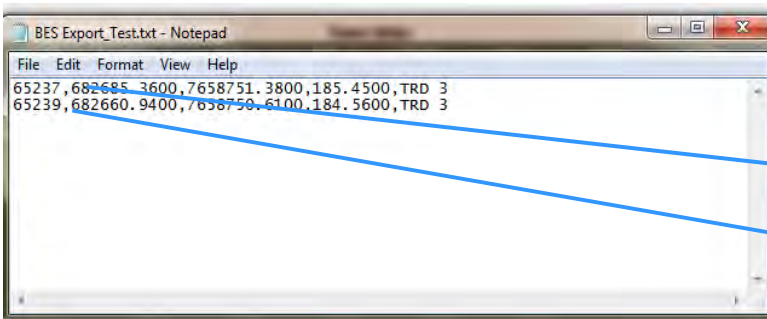
Tree Number		Tree Data			Exemption & Proposed Work Data		Surveyor Notes
Survey Point #	Tag Number	Deciduous	DBH (Diameter in Inches)	In ROW?	Tree Condition	Work Proposed	Surveyor Notes
65,237	#500	D	12"	In ROW	Dead		Dead
65,238	#501	D	14"	In ROW		Performance Path	ump 4x6"
65,239	#502	D	10"	In ROW			
65,718	#503	E	8"	In ROW			
65,915	#504	D	22"	In ROW			
66,001	#505	D	60"	In ROW			
66,002	#506	D	29"	In ROW			
66,003	#507	D	38"	In ROW			
66,004	#508	E	46"	In ROW			
66,005	#509	D	30"	In ROW			
66,006	#510	E	37"	In ROW			

Figure 11

Update from List

Tree information can also be updated in groups using the “Update w/ List” button found on the Inventory & Mitigation tab.

1. From your CAD software select and export a list of trees that only includes the trees you wish to update in a comma delineated text file. Be sure that the list has the Survey Point number in the first column. Any other columns are irrelevant and will be ignored. The code will look for matching point numbers and apply the requested changes accordingly.



Tree Number		Deciduous	Species
Survey Point #	Tag Number	Evergre	
65,237	#500	D	Ash
65,238		D	Black Locust
65,239		D	Chestnut
65,718		E	Bay Laurel
65,915		D	Birch
66,001		D	Black Locust

Figure 12

2. Open the exported list in a text editor, select all (ctrl+a) and copy (ctrl +c).
3. Return to your excel workbook and press the "Update w/ List" Button.
4. This will open a dialogue box (see Figure 14) that will allow you to select the change you would like to make to the trees identified on your list.

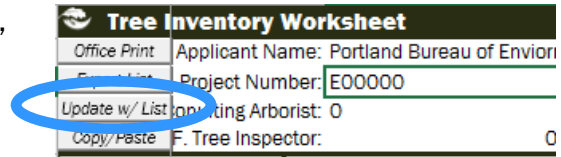


Figure 13

- a. When you select an update option, a text box will open to allow you to select the value you to be entered. You can only update one field at a time.
- b. Checking the "Flag Updated Columns" will apply the Flag option (see page 12) on the spreadsheet.
- c. Checking the "Invert Selection" box will apply the requested changes to all trees not on the list.
- d. As an alternative, you can update the entire list, or all visible records (with an applied filter), by checking the box in the upper right column without the use of a text file.

Note: All changes are permanent and cannot be undone using the undo button.

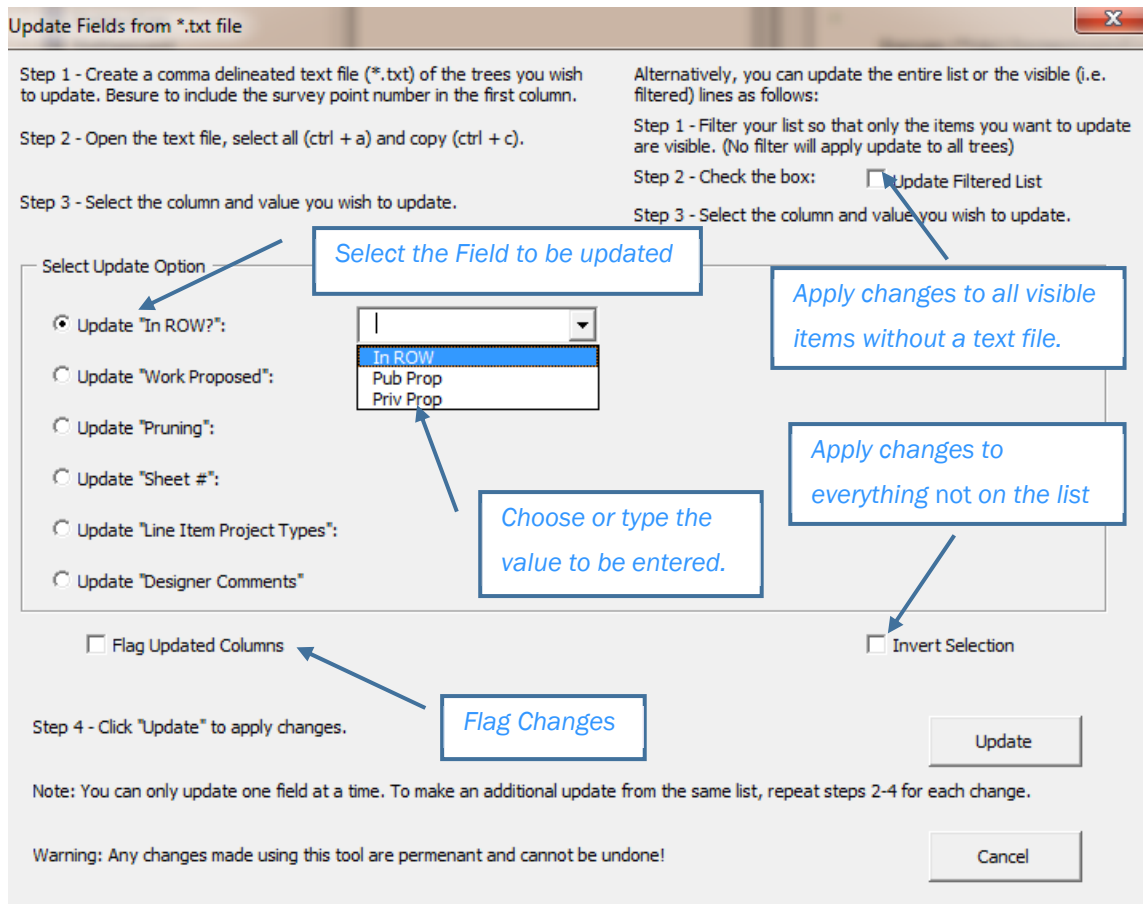


Figure 14

Adding Trees

Many times, projects will generate multiple worksheets. Accurate permits and mitigation/density calculations require that each project have only one work book. If your project has multiple worksheets you will need to combine those worksheets into a single file.

Merge Separate Worksheets

When you are presented with multiple workbooks, you will need to merge the files using the “Copy/Paste” tool located on the Inventory & Mitigation tab. First select one worksheet to be the master worksheet. If you have started identifying trees, proposed work, etc... on one sheet, use that one.

Go to the list of trees to be exported (i.e. the second sheet) and click on the “Copy/Paste” button. The dialogue box will ask if you are copying or pasting. Select copy. Return to the master sheet, click the same button and select “Paste”

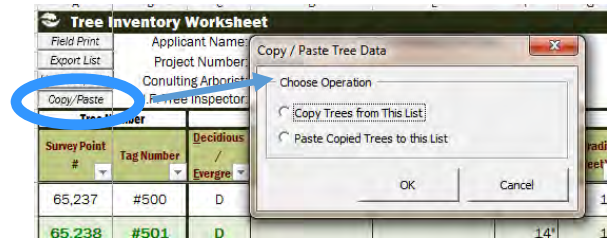


Figure 15

Once completed, the added trees will appear on the bottom of tree inventory list with the “Flag” check box checked.

Note: Any work done (e.g. Proposed Work, Pruning, etc...) will not be exported with the copy & paste routine. Be sure to merge your data into the master copy before starting work.

Add a Tree
You can also add a single tree to the file without creating a separate worksheet. To do so, go to the directions tab in the “For Project Managers” section, select the add a tree button.

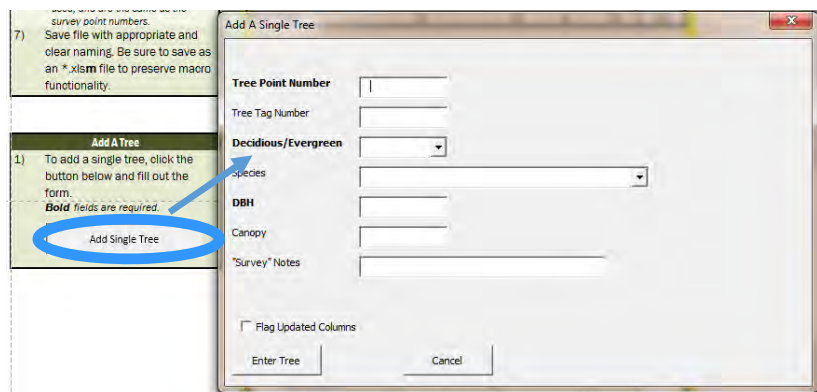


Figure 16

Complete the form as required. Bold fields are required. (Tree Numbers and sizes must be entered as integers.

Export List

Tree Data can also be exported from the tree list in a format that can be utilized by CAD software. Use the “Export List” button located on the Directions Tab as well as the Inventory & Mitigation Sheet.

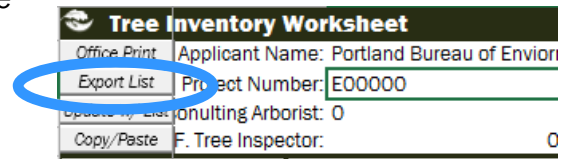


Figure 17

This button will open a separate workbook with the data for each tree (listed by survey point number) in a format that can easily be converted into a text file and imported into CAD software. The specific format was designed to be implemented using BES drawing standards for AutoCAD. You can manipulate the data as you see fit to match your own format and use this information to fill labels on drawings. Missing data will appear as a blank column.

Note: There is no link between the data in the exported file and the Inventory & Mitigation worksheet. Any changes made to the exported data will also need to be entered into the Tree Code workbook to be final.

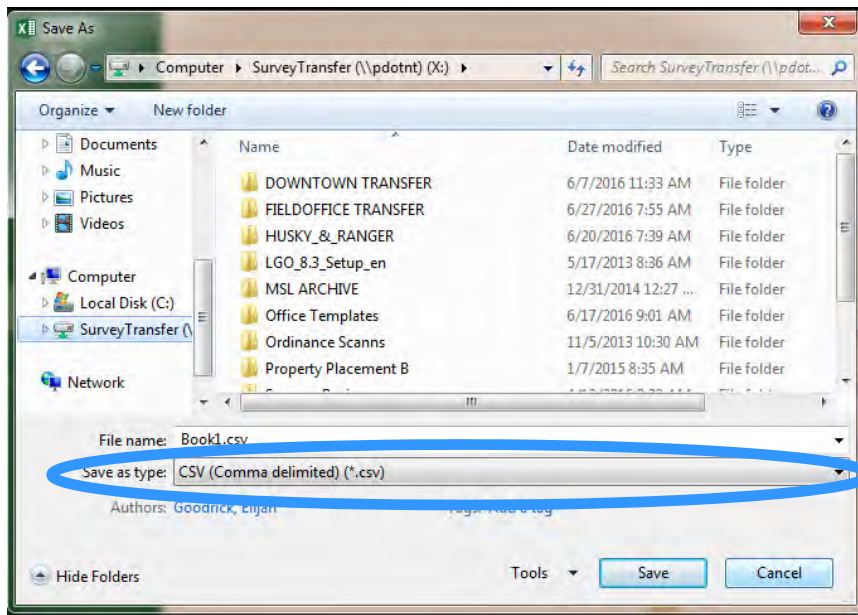


Figure 18

To save this as a *.txt file. Go to the Save As menu and select “CSV (Comma delimited) (*.csv)”. Close the export sheet (ignore all errors) and manually change the file extension to “txt”. Reopen in notepad. The final text file will contain headings that match the data being presented in each column.

Completed Worksheet

Once complete the worksheet will look something like this:

The screenshot shows a complex spreadsheet titled 'Tree Inventory Worksheet'. It contains multiple tabs and a large data grid. The grid has columns for 'Tree Number', 'Tag Number', 'Condition/Designation', 'Species', 'Scientific Name', 'DBH (inches)', 'HT (feet)', 'Crown Spread (feet)', 'Health', 'Tree Condition', 'Status', 'Work Proposed', 'Priority', 'Mitigation Credits', 'Status', 'Date', 'Mitigation Requirements', 'Mitigation Priority', and 'Notes'. The data rows list various trees with their respective attributes.

Figure 19

Also, the “Project Type & Scope Summary” and the “Tree Summary and Density/Mitigation Calculations” tables on the “Directions” tab will continuously update as changes are made and show the potential mitigation requirements and Fee In Lieu as you work.

Project Type & Scope Summary						
Primary Project Type: Work on Fully Improved Street						
Scoping						
Project Type	Scope	Trees Removed	Trees Preserved	Trees Unaffected	Total Trees	
Site Improvements - City Owned or Managed	N/A sq ft	0	0	0	0	
Curb to Curb Work Only (Improved ROW)	50 / ft	0	3	1	4	
Street Improvements on Partially Improved or Utility Work Only on Partially Improved or Unimproved	N/A / ft	0	0	0	0	
Work on Fully Improved Street	150 / ft	3	3	1	7	
Sub Total	200	3	6	2	11	

Tree Summary and Density/Mitigation Calculations					
			Base Caliper Size: ¹ 2.5"		
	Removed	Preserved	Unaffected		
Tree Totals:					
In Project:	3	6	2		
Non-Exempt:	1	0	1		
Exempt:	2	0	1		
Mitigation:		Credit	Required Planting	Planted	Remaining
			2	0	2
Density:					
Canopy by Area: ²	None	0	0	0	0
# of Trees by Linear Foot	3	3	0	0	3
Fee In Lieu: ⁴ \$					3,750

Figure 20

Planting Plan

At any point in the process, you can start the development of the planting plan. To create the planting plan worksheet, click on the “Create Planting Plan” button on the Directions tab.

The intention of this form is to track the planting being done on the project primarily to utilize in ensuring the proper number of trees are planted. However, considerations have been made to allow for more

For Project Managers:

Create Planting Plan

1) Once the Inventory & Mitigation sheet is roughly complete:
Click the "Create Planting Plan" button to generate the "Planting Plan" worksheet.

Create Planting Plan

Figure 21

detailed listing of planted trees including design point numbers, stationing information and coordinates. The table can be cut and pasted into plan sets or bid books as desired.

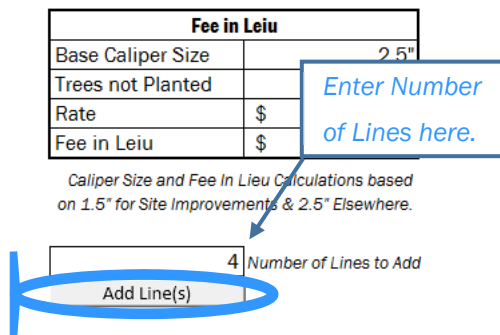


Figure 22

located to the right under the fee in lieu calculations. Enter the number of lines you wish to add and press the “Add Lines” button.

Header

Similar to the “Inventory & Mitigation” sheet, the header data on the planting plan sheet is controlled by the data entered on the “Directions” tab. To update this information, do so on the “Directions” tab.

The header also shows some basic summary data on the left indicating the number of trees in the project, removed, preserved and planted. There is also a duplication of the Mitigation & Density requirements Met/Not Met flags. These fields will update automatically as changes are made to either the “Inventory & Mitigation” or “Planting Plan” sheets.

Total Trees in Project:	9	Estimated Met/Not Met Summary	
Total Trees Removed:	6	Mitigation Requirements:	Not Met
Total Trees Preserved:	3	Density Requirements:	Not Met
Total Trees Planted:	0		

Figure 23

Tree Data

The Tree Data section contains basic information about the type and quantity of trees to be planted. The quantity of tree and species will be required to be entered in order for mitigation and density requirements to be met.

1. Design Point #: If you desire to list the trees individually by point number, you can include the point number information for the tree. This field is optional.
2. Qty.: The number of trees to be planted.
3. Caliper Size: This field will automatically populate based on the project type: 2½” for street work and 1½” for site improvements. Change this as needed for projects with multiple project types.

4. Common Name & Scientific Name: Indicates the species of tree to be planted. The scientific name will automatically populate if the tree is on the drop down menu.
5. Canopy Size: This will also auto-populate based on the canopy size at maturity. Not all trees have this information, and Urban Forestry can update/change these as needed. This value will be used in calculating the Area Density requirements for “Site Improvement” project types only.
6. To the right, there is an additional column for Block Face or Sheet Number to be used as needed.

Credit

The two columns under “Mitigation” allow you to identify whether you would like to apply the credit for the planting to the mitigation or density requirements.

1. Planting Location: Choose either Job Site for trees planted on the actual job site or Watershed for trees planted off location. Please note that trees planted off location can only be used to meet mitigation requirements.
2. Density / Mitigation Credit: Select “Mitigation” to apply credit to the mitigation requirements, “L.F.” to apply it to linear footage (street project types) density requirements or “Area” to apply to Site Improvement density requirements.

Mitigation & Density

The three columns under “Mitigation & Density” show the value of credit being given for each of the trees being planted.

Stationing & Coordinates

If you are listing trees individually, you can press the “Unhide Stationing Data” and/or “Unhide Northing/Easting” to open columns to enter either stationing information or coordinates for the trees listed.

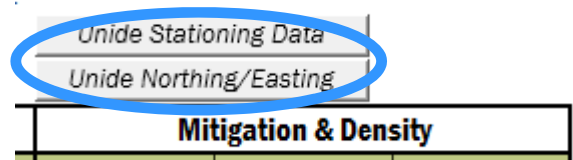


Figure 24

Density & Mitigation Requirements Summary

To the right side of the planting plan table is a series of tables that duplicate the mitigation, density & planting summary data found on the “Directions” tab for easy reference.

The table shows if a specific type of mitigation or density planting is required, the credit received for preserving trees, the number (or canopy area) of trees needed to be planted, how many trees planned for each category and the deficit.

It should be noted that if the “Work Proposed” column in the “Inventory & Mitigation” sheet has not been completely filled in, the planting requirements may not be fully accounted for. A warning text will appear below this table if this is the case.

Mitigation & Density Requirements Summary			
	Mitigation	L.F. Street Density	25% Site Density
Required	Yes	Yes	No
Credit for Preserved		3	N/A
Planting Required	2	3	N/A
Planted	2	2	N/A
Needed	0	1	N/A

Planting Requirements may be inaccurate if "Work Proposed" column is not completely filled out on the "Inventory & Mitigation" worksheet.

Fee in Lieu	
Base Caliper Size	2.5"
Trees not Planted	1
Rate	\$ 300 per inch
Fee in Lieu	\$ 750

Warning Text

Caliper Size and Fee In Lieu Calculations based on 1.5" for Site Improvements & 2.5" Elsewhere.

Figure 25

Fee in Lieu Calculations

Below this, a calculation of the fee in lieu of planting is given for any trees not planted.

Urban Forestry Overrides

All the calculations contained in the various spread sheets are based on a literal interpretation of the Title 11 Tree Code. However, special circumstances may occur where those values are not appropriate, or are calculated on assumptions that are not valid in a particular circumstance. With the worksheet unlocked (per directions on page 4), you can override many of the automated calculations. However, if you do so, those formulas that generate the calculated values will be gone.

If this is done accidentally, you can undo the action (ctrl + z) immediately afterwards.

Any changes to the mitigation requirements presented on the Planting Plan sheet must be made on the Directions sheet.

Restoring Formulas

If it becomes necessary to restore those formulas, you will need to enter the following text *verbatim* into the field needing restored.

Tree Summary & Density/Mitigation Formulas

- Mitigation, Required Planting: =SUM(Y20,Y22,Y25,Y26,Y28)
- Mitigation, Remaining: =IFERROR(IF(P55-N55>0,0,N55-P55),"N/A")

- Canopy by Area, Credit: =IF(W20<=0,"None",W20)
- Canopy by Area, Required Planting: =IF(X20<=0,0,X20)
- Canopy by Area, Remaining: =IFERROR(IF(P58-N58>0,0,N58-P58),"N/A")
- # of Trees by Linear Foot, Credit: =IF(SUM(N22:N29)<=0,"None",SUM(W28,IF(X25>Y25,W24,0)))
- # of Trees by Linear Foot, Required Planting: =SUM(X28,X25)
- # of Trees by Linear Foot, Remaining: =IFERROR(IF(P59-N59>0,0,N59-P59),"N/A")
- Fee In Lieu: =IFERROR(300*(SUM(ABS(R55)*2.5,ABS(R59)*2.5,ABS(ROUNDUP(R58/500,0))*1.5)), "TBD")

Restoring Inventory & Mitigation Formulas

- Tree Condition: =IFERROR(IF(ISNUMBER(SEARCH("DEAD",[@Work Proposed])),1),"Dead",IF(VLOOKUP([@Species],tblTrees,7,TRUE),"Nuisance","Viable"))
- Exempt: =IFERROR(IF(VLOOKUP([@[In ROW?]],tblTreeConditions,2,TRUE),"Yes",IF([@[In ROW?]]="In ROW",IF([@[DBH (Diameter in inches)]]>=[@[In ROW]],"No","Yes"),IF([@[DBH (Diameter in inches)]]>=[@[On Prop.]],"No","Yes"))), "")
- Mitigation Required: =IF([@[Work Proposed]]="" , "", IF(AND([@[Exempt?]]="No",VLOOKUP([@[Work Proposed]],tblProposeWork,2,FALSE)), "Yes", "No"))
- Mitigation (Exempt or # Trees): =IFERROR(IF(OR([@[Mitigation Required?]]="No", [@[Mitigation Required?]]=""), "", IF(VLOOKUP([@[Project Type]],tblProjectTypes,8,FALSE), IF([@[RPZ (radius in feet)]]>25,6, IF([@[RPZ (radius in feet)]]>20,5, IF([@[RPZ (radius in feet)]]>12,3,2))), 2)), "")

Heritage Trees

If the site contains heritage trees, use the comments section of the “Inventory & Mitigation” worksheet to identify which trees are registered as heritage trees.

Tree Summary and Density/Mitigation Calculations			
	Removed	Preserved	Unaffected
Tree Totals:			
In Project:	3	5	2
Non-Exempt:	0	0	0
Exempt:	3		2
Heritage Trees On Site: 2			
Mitigation:	Credit	Required	Remaining
		0	2
Density:			
Canopy by Area:	None	0	0
# of Trees by Linear Foot	3	3	2
			1
Fee In Lieu:			\$ 750

Figure 26

A count of the heritage trees on site can be entered on the directions tab in the Tree Summary and Density/Mitigation Calculations field. Once entered the count of Heritage trees will be represented on the final permit.

Work Flow Process – Communicating With Urban Forestry

The following is being offered as a general guideline for the process of working through the permitting process.

Initial Phases of Permit Application

At the beginning of any project (before requesting survey data), you should contact Urban Forestry to discuss the scope of your project and the specific requirements to be made. Urban forestry can be contacted at 503-823-TREE or trees@portlandoregon.gov. More information regarding the permitting process can be found on www.portlandoregon.gov/trees.

Requesting Survey Data

Both the PBOT and Water Bureau survey groups have copies of the Tree Code – Excel Tool on hand. Please be sure to request a completed tree table with your survey request as part of the deliverables package.

When working with consultant surveyors, direct them to the urban forestry webpage to download a current copy of the Tree Code – Excel Tool and these directions. *Do not maintain a copy of these files on your desktop or network.*

If you are working on a small project without survey data, work with your tree inspector to develop a spread sheet and planting plan per the directions on page 7.

If you request additional data, be sure to request a separate spread sheet with only the new trees on it. Once you receive it, merge the new data into your master data per the directions on page 17.

Emailing and Saving your Workbook

Before beginning a conversation with urban forestry regarding approval of the work to be done, be sure to complete the “Work Proposed” section to the best of your ability. At the very least, trees that are definitely outside the project scope should be identified.

Be sure to keep a master copy of your workbook. Saving the file with a date in the file name will help track versions when being emailed back and forth.

Use the Tree Inspector & Designer comments section to communicate information regarding specific trees.

If there is any question regarding who last worked with your spread sheet, the information below the header on the Directions tab indicates who last saved the file.

Final Permit

Once all the work has been approved and you are satisfied with the planting plan, request your final permit from your tree inspector. Be sure to update any project information before requesting your permit.

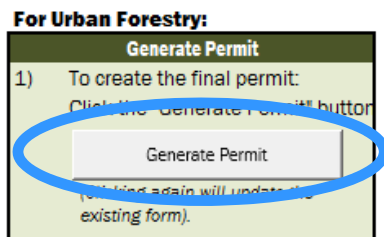


Figure 27

Generating the Permit

Once requested, a final permit can be generated by unlocking the sheet (see page 4) and pressing the “Generate Permit” button located on the bottom left corner of the directions tab.

The project information, tree summary data and fee in lieu, will be automatically be copied from the information presented on the directions tab. Please be sure this information is up to date and accurate.

Any missing information will be highlighted in yellow and will need to be entered manually.

Unlike other pages, the information on the permit will *not* automatically update if changes are made to the spread sheet. If you need to update the sheet, re-generate the permit as above. A warning box will appear when you do so to verify your intention to update the data.

Once done, print and sign the permit and deliver to the project manager.

Support & Technical Assistance

If you have any questions about how to use this tool, feel free to call Elijah Goodrick at 503-823-7152.

To report a bug or other issue with the macros, or to suggest further improvements you may email those to Elijah Goodrick at elijah.goodrick@portlandoregon.gov. Please note that any further enhancements may require that your group provide a cost center object.

For assistance regarding interpretation of the rules associated with the tree code, please direct those to your assigned tree inspector or consult the information available on www.portlandoregon.gov/trees.