MILWAUKIE URBAN FOREST
Growing Trees
Growing Community

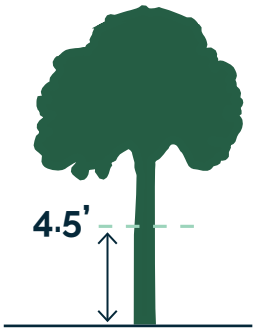
How to Measure Tree Diameter Factsheet

2022

Diameter at breast height, or DBH, is the standard for measuring trees. DBH refers to the tree diameter measured at 4.5 feet above the ground.

Measuring Single Trunk Trees on Level Ground

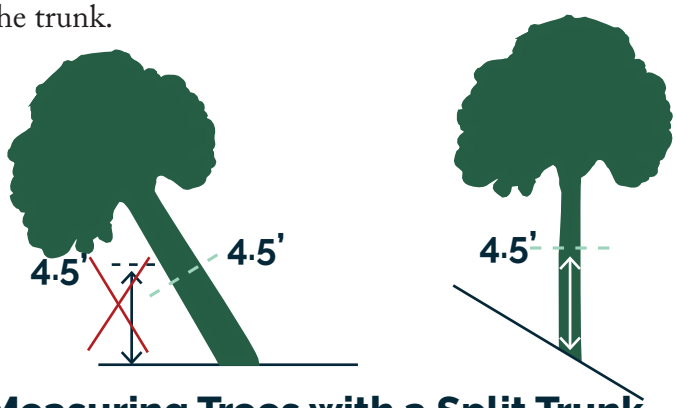
DBH can be measured quickly with a specially calibrated diameter tape, often referred to as a d-tape, that displays the diameter measurement when wrapped around the circumference of a tree. **Simply wrap the d-tape around the tree at 4.5 feet above the ground. One side of the tape automatically converts the circumference to tree diameter. This is the side labeled "diameter equivalents of circumference."** The other side of the tape does not convert the measurement. You will need to divide the value by π (~3.14) if using this side to convert to diameter. If you don't have access to a d-tape, you can find the diameter of the tree using a string, a measuring tape, a thumbtack, and a calculator.



1. With the measuring tape, measure 4.5 feet up the trunk of the tree from the ground. Use a thumbtack to mark the height on the tree.
2. Wrap your string around the tree trunk at 4.5 feet. Make sure the string is straight and tight around the trunk, and mark or cut the circumference on the string.
3. Measure the length of string to get the circumference of the tree.
4. Convert the circumference measurement to diameter by dividing the circumference by π (~3.14).

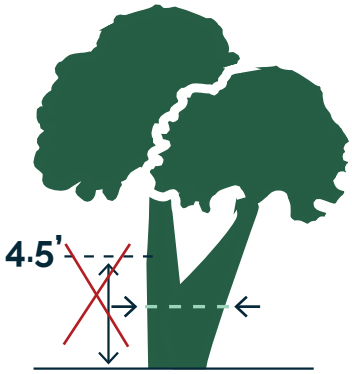
Measuring Trees at an Angle or on a Slope

When the trunk is at an angle or is on a slope, the trunk is measured at right angles to the trunk 4.5 feet along the center of the trunk axis, so the height is the average of the shortest and the longest sides of the trunk.



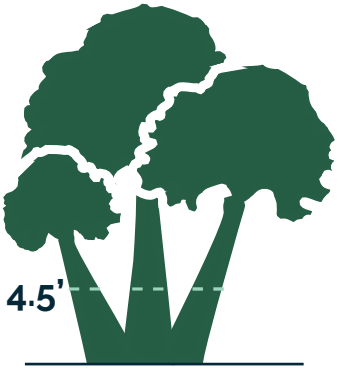
Measuring Trees with a Split Trunk

When the trunk branches or splits less than 4.5 feet from the ground, measure the smallest circumference below the lowest branch. If the tree has a branch or a bump at 4.5 feet, it is better to measure the diameter slightly below or above the branch/bump.



Measuring Multi-stemmed Trees

For multi-stemmed trees, the size is determined by measuring all the trunks, and then adding the total diameter of the largest trunk to one-half the diameter of each additional trunk. A multi-stemmed tree has trunks that are connected above the ground and does not include individual trees growing close together or from a common rootstock that do not have trunks connected above the ground.



CITY OF MILWAUKIE

How to Measure Tree Crown Area

Tree crown area is the measurement in square feet that is taken to determine the area of a tree's crown. The crown is defined as the area of the tree that includes branches, stems, leaves, and reproductive structures. The formula used to calculate area is $A = \pi r^2$.

Many trees have an irregular shaped crown. To account for this, crown spread is measured from branchtip to branchtip (dripline) in two directions and then averaged. The first measurement is taken where the crown is the widest. The second is taken at 90 degrees to the first, again where the crown is widest. These measurements can be taken on the ground with measuring tape. That value is r (radius). Square that value and multiply by π (~3.14) to get the crown area.

Example 1

A tree's crown spread is 20' and 25' in two directions.

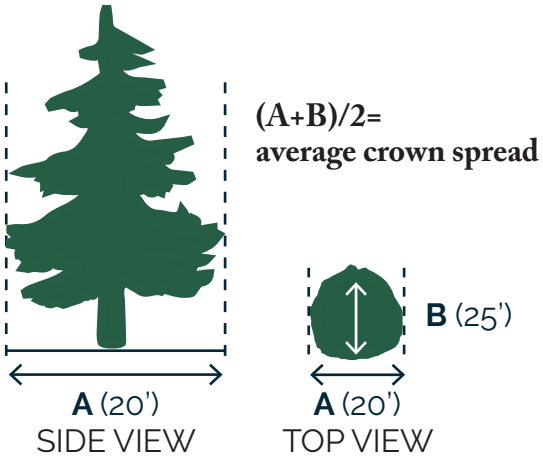
20 + 25 = 45

45 ÷ 2 = 22.5 **this is the average crown diameter**

22.5 ÷ 2 = 11.25 **this is the average crown radius (r)**

11.25 x 11.25 = 126.56 **this is the radius squared (r^2)**

126.56 x π = ~398 ft^2 **this is the crown area of the tree (πr^2)**



Example 2

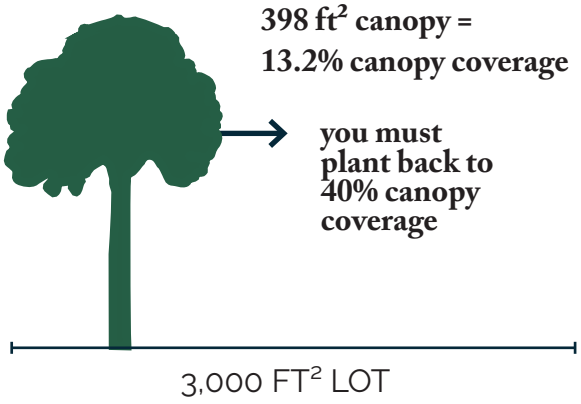
You have a 3,000 ft^2 lot with one tree that has 398 ft^2 of canopy coverage. To meet the tree planting standard in the development tree code, you must plant back to 40% site canopy coverage. Existing site tree canopy or future canopy at maturity with new plantings may be used.

398 ÷ 3000 = .132 x 100 = 13.2 % **this is the current site canopy coverage**

A 26.8% canopy increase needed to reach 40%

26.8 ÷ 100 = .268

.268 x 3000 = **804 ft^2 of additional tree canopy is needed to meet 40% planting standard**



FOR QUESTIONS OR MORE INFORMATION, CONTACT:

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