

Part D

Guidelines for
Tree Canopy Coverage

1.0 INTRODUCTION

The Woodland and Wildlife Habitat Conservation Ordinance (WCO) provides for the protection and enhancement of existing woodlands and provides for the planting of tree and forest cover. However, there are sites that are exempt from meeting these requirements, and there are sites where it is not possible to meet the requirements on-site. These sites could benefit greatly from the strategic planting of trees to provide meaningful areas of tree canopy coverage as part of the overall design.

The planting of trees provides many benefits to communities. Trees reduce overall temperatures, especially where they are planted to shade hard surfaces, such as parking lots, roofs, and siding. Studies have shown that the net cooling effect of a young, healthy tree is equivalent to 10 room-size air conditioners operating 20 hours a day. They take in a gas that at high concentrations can be lethal to humans (carbon dioxide) and release oxygen. One acre of trees removes up to 2.6 tons of carbon dioxide per year. Preserving trees and providing tree canopies not only results in cleaner air but also in increased property values and reduced energy costs.

Tree canopies provide many other benefits too, the most important of which are intercepting rainwater so it can be absorbed more slowly and absorbing and transpiring excess rainwater. Studies have shown that tree canopies in urban settings provide millions of dollars worth of stormwater management benefits. The preservation and enhancement of tree canopy coverage is one of the tools being emphasized for the restoration of the Chesapeake Bay. In December 2003, the Chesapeake Executive Council signed a Riparian Forest Buffer Directive that included setting goals for tree canopies in urban areas in order to protect the Chesapeake Bay from the pollutants in urban runoff.

In order to ensure sustainable and livable communities for future generations, the 2005 General Plan set forest and tree cover goals for 2025 as follows:

Developed Tier:	26 percent (maintains the 2000 coverage percentage)
Developing Tier:	38 percent (a reduction from the 2000 figure of 41 percent)
Rural Tier:	60 percent (an increase from the 2000 figure of 59 percent)
Countywide	44 percent (a slight decrease from the 2000 figure of 45 percent)

In order to reach these goals, the Countywide Green Infrastructure Plan contains recommendations regarding needed changes to the associated ordinances. The addition of a tree canopy coverage requirement was not explored at that time, but it is an appropriate strategy to assist in reaching the 2025 tree and forest canopy coverage goals of the general plan.

For most development projects, the tree canopy coverage requirement will not result in additional tree planting because it will be met using the areas provided for woodland conservation. The types of projects that will benefit the most from this requirement are the sites that need the tree canopy the most: dense development and redevelopment projects where strategic tree planting can turn uninhabitable outdoor spaces into urban oases for relaxation and protection from the sun.

2.0 Overview of Tree Canopy Coverage

Tree canopy is defined in Subtitle 25 as follows:

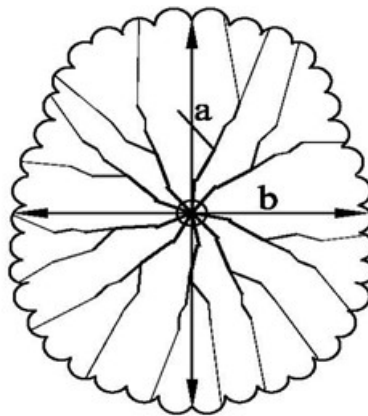
“Tree canopy: The land area under the dripline of an existing tree or group of trees or the amount of credit provided for planting trees of a certain species and certain size at time of planting in conformance with the worksheet provided in ‘The Technical Manual.’”

Tree canopy coverage is defined as:

“Tree canopy coverage: The combined area measured in square feet of the tree canopies of existing trees and trees planted in conformance with this Division and “The Technical Manual.” Tree canopy coverage requirements are measured using a percentage of the gross tract area.”

To visualize tree canopy coverage, imagine the amount of shade a tree will cast at noon on a sunny day when viewed from above. The shadow of the tree would then be measured in square footage to determine how much tree canopy is provided by that tree.

Figure D-1. Calculating Tree Canopy Area for Single Tree



**Calculating Tree Canopy Area
(for single tree)**

**a=75 feet
b=65 feet**

$a \times b = \text{square footage of tree canopy}$

To meet the requirements for tree canopy coverage, the existing and proposed amounts of tree canopy coverage must be measured.

To be eligible to meet the tree canopy coverage requirements, planting areas must be designed to provide the maximum allowable rooting zone.

Trees should be planted in appropriate locations based on each species' cultural tolerances to be eligible to meet the tree canopy coverage requirements. For example, a dogwood planted in a parking lot island in full sun would not be eligible to meet the requirements because dogwoods prefer partial to full shade in order to thrive. In another example, if an evergreen tree, such as a white pine, is proposed to be planted in a narrow space between a fence and a parking lot curb, it could not be given credit because, due to its low branching and wide form, it will outgrow the available area quickly.

3.0 Applicability of the Tree Canopy Requirements

The tree canopy requirements contained in the WCO apply to all types of applications that require a tree conservation plan or letter of exemption; in other words, all applications requiring a grading permit.

Existing woodlands and landscape and street trees may be counted toward meeting the tree canopy coverage requirement. While the woodland conservation requirements may be met on-site or off-site, the tree canopy coverage requirement must be met on-site, unless a variance has been approved to either allow a reduction in the requirement or to allow the meeting of the requirement through some other method. All woodlands and landscape trees may be counted toward meeting the tree canopy coverage requirements even if they are used to meet the requirements of the WCO or the Landscape Manual.

If the only application to be submitted is a grading permit, then the tree canopy coverage notes must be placed on the grading plan. Refer to the scenarios in Appendix D for more information regarding how each type of application is to be handled.

Table D-1. Tree Canopy Requirements by Zone

Zone	Minimum Tree Canopy Coverage*
R-O-S, O-S, R-A	Exempt
R-E, R-L, V-L	20%
R-S, R-R, R-80, R-55, R-35, R-20, R-T, R-30, R-30C, R-18, R-18C, R-10, R-10A, R-H, R-U, R-M, R-M-H, V-M	15%
C-A, C-O, C-S-C, C-1, C-C, C-G, C-2, C-W, C-M, C-H, C-R-C, I-1, I-2, I-3, I-4, E-I-A, L-A-C, M-X-C, M-U-I, M-U-TC, M-X-T, M-A-C, U-L-I	10%

*Percentage of gross tract area

4.0 Tree Canopy Coverage Calculation Methodology

4.1 STEP 1: CALCULATING THE AMOUNT REQUIRED

To calculate the requirement for a site, the gross tract area is multiplied by the percentage required based on the zone as shown in Table D-1. For a 2.55-acre site in the R-R Zone, the requirement would be calculated as follows:

2.55-acre site (gross tract area) x 15% = 0.38 acres or 16,662 square feet of tree canopy coverage required

4.2 STEP 2: MEASURING THE WOODLANDS AND TREE COVER TO BE PRESERVED

The proper method for calculating the amount of tree coverage provided depends on the types of vegetation to be used to meet the requirement. Any of the following methods can be used alone or in combination to meet the requirement for a particular site.

Woodland conservation: If the site is providing sufficient woodland conservation on-site to also meet the tree canopy coverage requirement, the following notation shall be placed below the woodland conservation worksheet on the tree conservation plan:

Note: The tree canopy coverage requirement on this site has been met using woodland conservation on-site as follows:

Tree canopy coverage required: 0.38 acres or 16,553 square feet (2.55 acres x 15%)

Total tree canopy coverage provided using woodland conservation: 0.91 acres (the 0.91-acre figure will be shown on the "Total Woodland Conservation Provided" line on the woodland conservation worksheet).

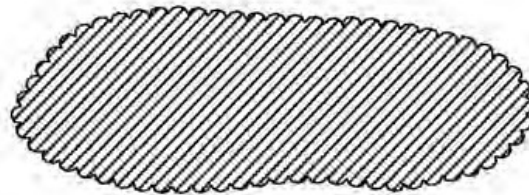
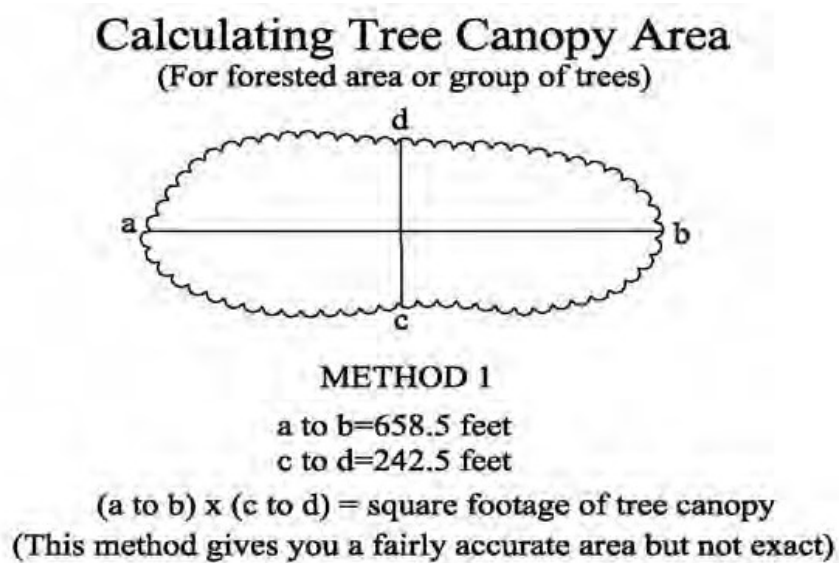
Existing wooded areas or large trees: For existing wooded areas or trees larger than 6 inches in diameter measured 12 inches above the ground, the existing tree canopy coverage is used (see Figure D-2). For example, a 10-inch diameter tree might provide an area of canopy coverage that is 400 square feet in area, based on aerial photo observations or ground measurements. Tree canopies for existing woodlands and trees are measured from the edges of the outermost branches.

In this case, the plan must be marked to note which woodland areas or large trees are being preserved to be counted toward meeting the requirements, and a tree canopy coverage worksheet must be added. If the information cannot be displayed legibly on the tree conservation plan, then a separate sheet illustrating how the tree canopy coverage requirements are being met must be added. The tree canopy coverage worksheet should be placed on this separate sheet if one is provided.

Areas proposed for afforestation/reforestation: These areas are measured based on their square footage. The amount credited toward meeting the requirement is the same as the area afforested or reforested. In this case, the plan must be marked to note which afforestation/reforestation areas are being planted to be counted toward meeting the requirements. If this is the sole method being used, a note on the plan is sufficient. If landscape trees are used in combination, then a tree canopy coverage worksheet must be included on the associated plan.

Landscape trees: Trees smaller than 6 inches in diameter, 12 inches above the ground, are measured using their potential future canopy coverage in ten years, according to the chart shown in the worksheet provided in Appendix D.

Figure D-2. Calculating Tree Canopy Area for Group of Trees



Calculated in AutoCAD₁, where the existing tree line is created using a polyline. Use "Area" command and specify "Object". Pick polylined treeline.

BEST METHOD FOR ACCURACY

1. Or planimeter may be used

4.3 STEP 3: CALCULATING THE AMOUNT PROVIDED

As noted above, if existing woodlands are used exclusively. Then, all that is needed on the plans is a note under the woodland conservation worksheet.

If woodlands are used and proposed landscape trees are used to meet the tree canopy coverage requirement, then a tree canopy worksheet must be provided on the associated plan.

If proposed landscape trees are used exclusively to meet the tree canopy coverage requirement and there is no TCP2 to show the calculations, then a tree canopy worksheet must be provided on the associated plan.

When calculating the amount provided, the acreages of the woodlands and landscape trees used to meet the requirement are added, and the amount provided must at least equal the amount required.