

Southern Center for Urban Forestry Research & Information

USDA Forest Service
320 Green Street
Athens, GA 30602-2044

Web Site www.urbanforestrysouth.usda.gov



Urban Forestry Resource List

Tree Canopy Ordinances

November 24, 2003

SUMMARY

Tree ordinances that are based on the mature canopy size are currently being developed and tested in the SE United States.

These canopy ordinances have several things in common with tree density unit ordinances:

- Ordinance requirements are triggered by a development activity (e.g. application for a Land Disturbance permit or an Erosion & Sedimentation permit),
- A pre-development tree inventory is required,
- Trees being conserved must be protected throughout the construction project,
- A mathematical calculation is required,
- On-site inspections are made by the local government,
- There is a maintenance requirement (not evident in the Chesapeake ordinance).

Although some of these ordinances are quite new, they are based on the long-term retention (or replacement) of tree canopy based on development zones. For example, in the Athens-Clarke County (Georgia) ordinance, mature tree canopy cover is between 40% and 50% for residential developments. Single family residential subdivisions are not required to have canopy cover, however they are required to plant street trees. Multi-family residential is required to have canopy cover, as well as street trees and parking lot trees.

Like any ordinance, the success of tree canopy ordinances depends on community acceptance, compliance and enforcement. In addition, to facilitate successful implementation, these ordinances depend on a detailed tree species list that identifies the expected canopy size at maturity, and the type of planting locations that are suitable for that species (e.g. street, parking lot, utility line).

The canopy characteristics outlined in the Athens-Clarke County Tree Species List (see [**Resources**](#) for a download URL) are thought to be conservative for trees under moderate care.

In Covington (Georgia), periodic monitoring of canopy cover with aerial photography will help evaluate the ordinance's success. Similar, periodic canopy analysis will be made with satellite imagery in Athens-Clarke County. Both of these monitoring activities are supported by a County/City aerial mapping, which is done every 3-4 years.

DISCUSSION

A canopy ordinance in Chesapeake, Virginia was implemented prior 1997. Canopy requirements include:

Zoning Classification	Mature Canopy
Non-residential Uses	10%
Multi-family residential uses	15%
Single family/duplex residential uses	20%

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The canopy requirement calculation (mature canopy %) is based on the size of the development site minus the area occupied by the building footprint(s). For example, a single-family residential use on a 10,000 SQFT lot with a 2,000 SQFT building footprint would require mature canopy of 20% x (10,000 – 2,000) or 1,600 SQFT of mature canopy. This canopy may be obtained by preserving existing trees or by planting.

A canopy credit is provided as an incentive to preserve individual or clusters of trees. For individual trees the credit is 2x the canopy area of each tree. In the example above, a single tree with a canopy of 800 SQFT would meet the 1,600 SQFT requirement (2 x 800 = 1,600). For trees in a cluster, the credit is 1.25x the combined canopy area. Consequently, a cluster of trees with a combined canopy of 1,280 SQFT would meet the requirement (1.25 x 1,280 = 1,600).

When trees are planted, the ordinance provides canopy credit of 400 SQFT for large trees and 200 SQFT for small trees (Species identified in the *Chesapeake Landscape Specifications Manual*). In the example above, 4 large trees would have to be planted. Since large maturing trees can have canopies that exceed 1,600 SQFT (22.6' crown radius), the canopy credit (400 SQFT is equivalent to a crown radius of 11.3') appears to take some of the following factors into account:

1. Expected, early mortality (immediately after any guarantee period),
2. Reduced life-cycle issues (because of tree health or owner preference for non-treed lawns),
3. Density of canopy because of tree condition,

In the Chesapeake ordinance, there is also a requirement for front yard trees in residential zones with fewer than 10 units per acre, and a maximum planting requirement of 11 large trees (22 small trees).

Other recently adopted tree ordinances based on tree canopy include the following:

Athens-Clarke County (A-CC), GA (in effect since January 2001)

This canopy ordinance affects some residential (single-family developments exempt), commercial and industrial development. It is implemented through the Zoning & Development Standards (Chapter 9-25).

For each applicable zone, the ordinance establishes the minimum percent of mature tree canopy. For example, for a residential zone (RM-2) the target tree canopy is 45%.

Developers can meet this requirement by conserving existing (healthy) trees or planting new trees.

Street trees are required (1 every 30 feet) and can count toward the mature canopy. Tree placement on streets is defined but flexible.

The tree requirement in parking lots is 1 tree (large maturing) per 7 parking spaces and can count toward the mature canopy requirement for the development.

There is a requirement to distribute canopy throughout the development.

This ordinance has been in effect for 3 years and is currently being evaluated (report expected by early 2004).

This ordinance requires a minimum amount of landscaped area, and a minimum amount of open (permeable) soil surface area for each tree, which is approximately 25% of the mature canopy area (1600 sq ft canopy, 400 sq ft open soil; 900 sq ft canopy, 225 sq ft open soil; 400 sq ft canopy, 100 sq ft open soil, and 150 sq ft canopy, 25 sq ft open soil).

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Covington, GA

The City Council passed this ordinance on October 6, 2003 with an effective date of October 11, 2003.

This ordinance is very similar to the Athens-Clarke County ordinance (Connie Head was involved with the development of both of these ordinances), but with apparent improvements:

- In addition to the points listed above for A-CC, there is a requirement that ½ of the required canopy be met with existing healthy trees (this is encouraged, not required in A-CC).
- The ordinance has a requirement for spatial uniformity of mature tree canopy.
- A separate bond or irrevocable letter of credit will be required for Tree Protection and Tree Establishment since the tree ordinance stands alone (i.e. not part of Zoning & Development ordinance as in A-CC).
- The ordinance applies to redevelopment and in these cases is triggered by an application for a building permit (An application for a Land Disturbance permit triggers this ordinance for new development).
- The County/City GIS department supported by County/City aerial mapping ever 3-4 years, will monitor canopy for Newton County, the City of Covington, each zone (within the City), and each development required to have canopy. The canopy cover analysis done for each development (tagged by parcel number) will monitor canopy into the future and evaluate the performance of the ordinance.
- This ordinance also requires a minimum amount of landscaped area, and a minimum amount of open (permeable) soil surface area for each tree, which is 40% of the mature canopy area (1600 sq ft canopy, 640 sq ft open soil; 900 sq ft canopy, 360 sq ft open soil; 400 sq ft canopy, 160 sq ft open soil, and 150 sq ft canopy, 60 sq ft open soil).

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HOW THEY WORK (AN EXAMPLE USING THE COVINGTON ORDINANCE)

Development Description

	Description	Comment
Zone:	RM-2 (Residential)	
Canopy Requirement:	45% of development	½ of this requirement (22.5% of the developed area) must be met by conserving existing, healthy trees.
Development Size:	63.5 acres	
Existing, Healthy Canopy:	36%	
Tree Species for Planting:	Large maturing trees (see A-CC Tree Species List)	
Mature Canopy Size:	1,600 ft ² /tree	
Lot Yield:	100	This information is not relevant for the calculation, but used to illustrate approximate post-construction spatial distribution.

Doing the Math

	Calculation	Comment
Canopy Requirement:	45% of 63.5 acres = 1,244,727 ft ²	½ of this requirement (22.5% of the developed area) must be met by conserving existing, healthy trees.
Conserved, Healthy Canopy:	691,515 ft ² which is >½ of the canopy requirement for the 63.5 acres development	622,363.5 acres (22.5%) of the development is the minimum conservation requirement.
Planted Canopy Requirement:	1,244,727 ft ² - 691,515 ft ² = 553,212 ft ²	
Tree Requirement:	553,212 ft ² ÷ 1,600 ft ² /tree ¹ = 346 trees ²	
Average Trees/Lot:	346 trees ÷ 100 lots = 3.5 trees/lot ³	

¹ A mix of species with different mature canopy sizes will make this calculation slightly more difficult.

² This total requirement can include street and parking lot trees when required.

³ While lot yield and tree planting per lot is not part of the canopy ordinance, this calculation can be used to make a comparison with other tree ordinances based on tree density units or a minimum tree/lot requirement. For the developer, this calculation can assist in meeting the spatial distribution requirement.

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RESOURCES

Chesapeake (Virginia)

- **Landscape Ordinance**

<http://livepublish.municode.com/19/lpext.dll/Infobase9/1/33cf/4611/473d?fn=altmain-nf.htm&f=templates&2.0>

Section 19-602: Tree preservation and canopy requirements.

- **Chesapeake Landscape Specifications Manual**

Athens-Clarke County (Georgia)

- **Zoning & Development Standards**

<http://livepublish.municode.com/1/lpext.dll?f=templates&fn=main-j.htm&vid=12400>

Title 9: Zoning, Article 1. Zoning, Chapter 9-25

- **Best Management Practices for Community Trees**

<http://www.athensclarkecounty.com/documents/index.htm>

Under Landscape Management (Department)

PDF download (1.5 MBYTES, 134 pages)

This is the entire (voluntary) BMPs for tree care that includes the A-CC Tree List with attributes.

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Connie was primarily involved in Athens in the development of the Tree Species List and canopy cover/soil amounts, and only peripherally involved in the development of the revised Site Design and Use Standards (Chapter 9-25). John Fregonese, a planning consultant from Portland, was the primary author of the development regulations.

City of Covington (Georgia)

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