



Maximize urban forest benefits through **best practices and better ordinances**

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Georgia Forestry
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Georgia  Tree
COUNCIL

**GEORGIA FORESTRY
COMMISSION**



An urban (or community) forest is...

“The sum of all woody and associated vegetation in and around dense human settlements, ranging from small communities in rural settings to metropolitan regions.”

Robert W. Miller

Community Trees Improve Public Health

Improved air quality

- Trees filter pollutants and produce oxygen, reducing respiratory issues.

Mental health

- Access to green spaces is linked to lower stress, anxiety, and depression.

Physical activity

- Forests encourage walking, hiking, and other outdoor activities.
- Blood pressure improvements.

Heat reduction

- Tree cover lowers temperatures, reducing heat-related illnesses & giving protection from the sun.



Community Trees Improve Neighborhoods

Higher residential property values

- Higher sale prices
- Quicker offers
- Aesthetics

Safer streets

- Reduced traffic speeds
- Lower crime rates

Gathering Places

- Childhood memories
- Trees create a sense of place



Community Trees Improve Environmental Health

Biodiversity conservation

- Trees are habitats for various species.

Carbon sequestration

- Trees take in CO₂, helping mitigate climate change.

Water regulation

- Trees improve water quality through filtration and reduce runoff.

Soil Health

- Tree roots stabilize soil and prevent erosion.



Community Trees Provide Social Benefits

Cultural Preservation

- Trees often hold cultural or historical significance for communities.

Community Engagement

- Local management fosters stewardship and collective responsibility.



Community Trees Lower Local Government Expenses & Increase Revenues

Reduced Infrastructure Costs

- Erosion Control
- Stormwater Management

Increased tax revenues

- Through increased home values
- Through more spending in retail areas



Community Trees Lower Local Government Expenses & Increase Revenues

► [According to the EPA](#), “mature trees provide significant stormwater quantity and rate control benefits through soil storage, interception, and evapotranspiration.

► A tree with a 25-foot canopy and associated soil can manage the 1-inch rainfall from 2,400 square feet of impervious surface.”



Community Trees Improve Downtown Areas

- Shoppers spend 9-12% more in business districts with high-quality tree canopy
 - Shoppers stay longer in treed areas
- Improved pedestrian experience
 - Cooler, more pleasant environments
 - Increased safety
- Trees enhance visual appeal, making downtowns more photogenic and event-friendly.



Assessing Tree Value

Tree Canopy Assessment Tools



OurTrees

Quick **tree canopy** and related information for your community within the continental US!

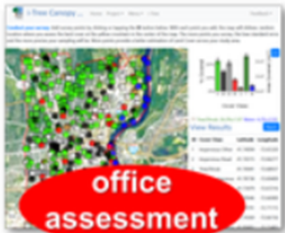
web browser or Android / Apple devices



i-Tree Landscape

US **tree canopy** and Census maps/data at your fingertips! Identify priority planting & protection areas for your local needs.

via your web browser; Learn [How to use it!](#)



i-Tree Canopy

From your chair, easily estimate land cover and **tree canopy** plus benefits using random point sampling on aerial imagery.

via your web browser; Learn [How to use it!](#)

Assessing Tree Value

Tools for Assessing Individual Trees



MyTree

Are you new to i-Tree? Start with our EASIEST tool! MyTree helps you quickly assess **individual trees** with a minimum of fuss.

web browser or Android / Apple devices; Learn [How to use it!](#)



i-Tree Design

A full-featured web tool with expanded building interactions and forecasting for estimating the benefits of **individual trees**.

via your web browser; Learn [How to use it!](#)



i-Tree Eco

Eco is our flagship tool that accommodates tree inventory IMPORT or field data evaluation to derive **individual tree** benefit estimates.

requires installation on a Windows PC; Learn [How to use it!](#)

Assessing Tree Value

Tree Group Characteristics

Initial Number of Trees

- 5 Chinese elm(*Ulmus parvifolia*) trees of 3 inches initial DBH.
- Planted 0-19 feet and southwest (225°) of buildings that were built post-1980 with heating and cooling.
- Trees are in excellent condition and planted in full sun.

5

- 5 Zelkova spp(*Zelkova*) trees of 3 inches initial DBH.
- Planted 0-19 feet and southwest (225°) of buildings that were built post-1980 with heating and cooling.
- Trees are in excellent condition and planted in full sun.

5

Assessing Tree Value

i-Tree Planting Report

i-Tree Benefits and Tree Growth Forecast

Location: Athens, GA

Total number of trees planted in this project: 10

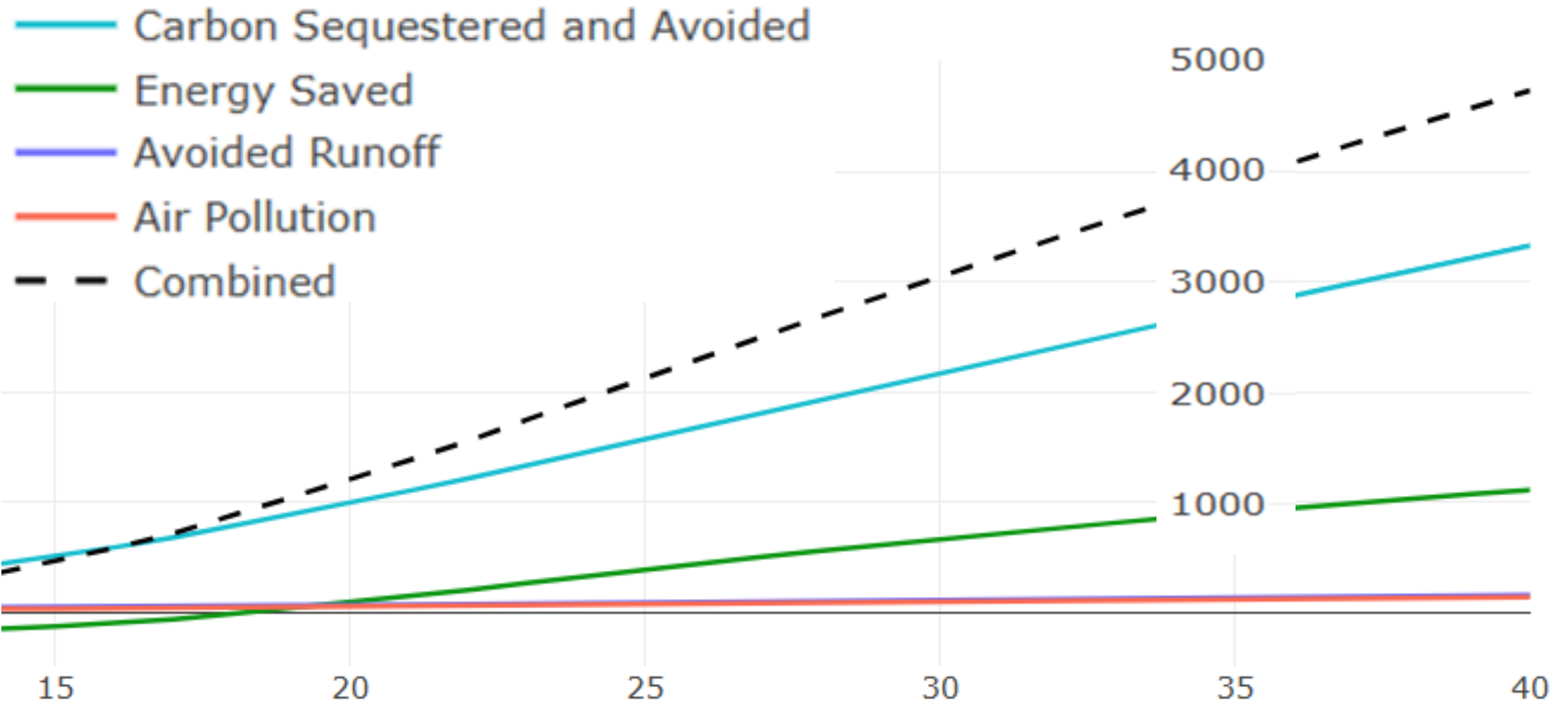
Electricity Emissions Factor: 1,285.95 pounds CO2 equivalent/MWh

Fuel Emissions Factor: 186.82 pounds CO2 equivalent/MMBtu

Lifetime: 40 years

Annual Tree Mortality: 3%

Assessing Cumulative Tree Value over 40 Years



Trees provide these
services

IF

they reach maturity and
endure

**The average street
tree has a life
expectancy of
19 to 28 years**

Roman, Lara A. "How many trees are enough? Tree death and the urban canopy." Scenario Journal. Scenario 04. 8p. (2014): 1-8.

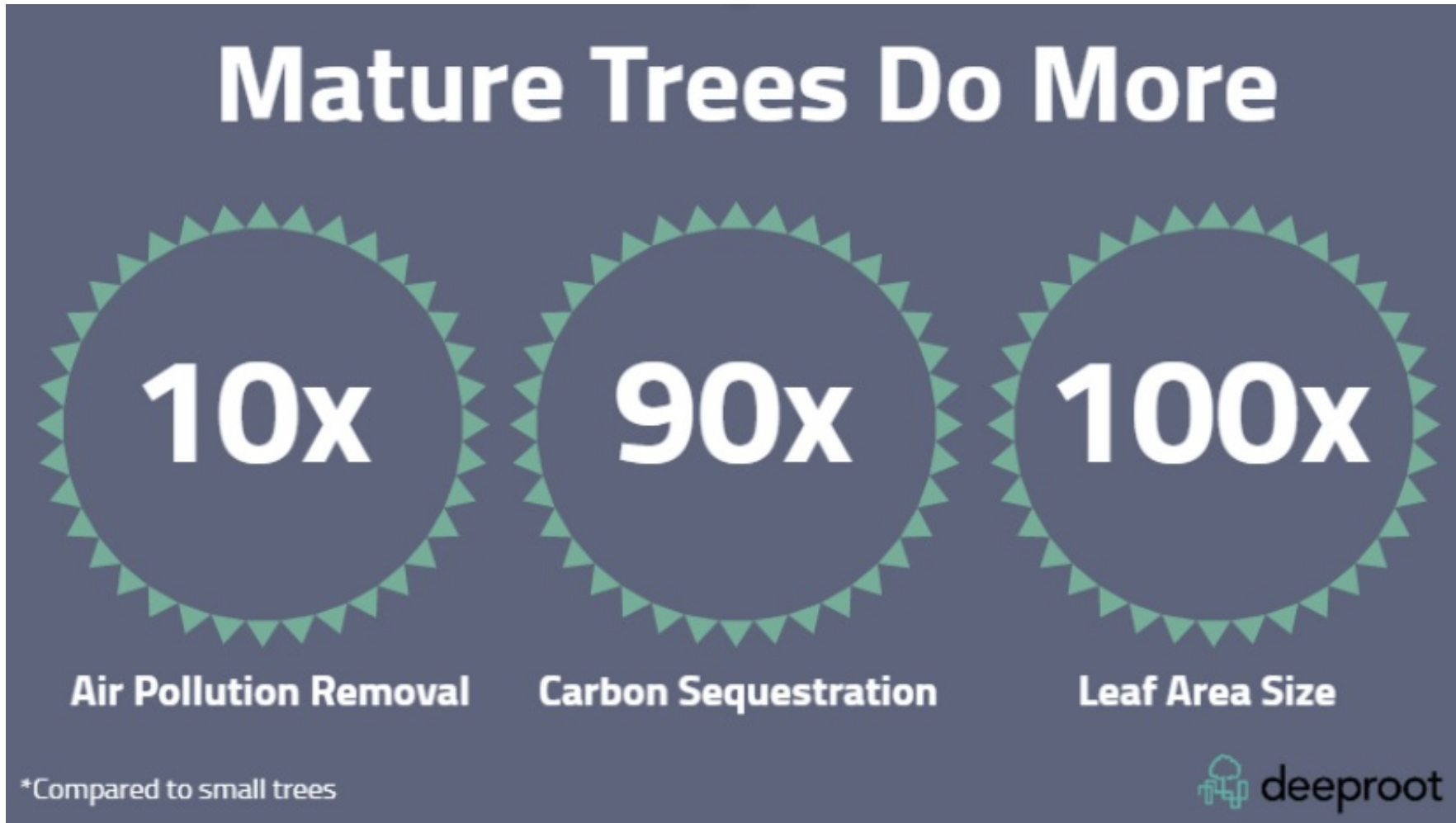


Median
urban tree mortality
is **50%**
at 9 to 11 years

- Hilbert, Deborah R., et al. "Urban tree mortality: A literature review." *Arboriculture & Urban Forestry*: 45 (5): 167-200. 45.5 (2019): 167-200.)



Mature Trees Provide more Benefits



DeepRoot Blog

Policy

News

Design ▾

Green infrastructure ▾

Research

Products ▾

Search ...



AUGUST 5, 2025

A Case for Trees as Municipal Assets

Introduction Why are streetlights and sidewalks considered municipal assets – but not trees? Most cities manage detailed inventories of their physical infrastructure, including streetlights, sidewalks, and



MARCH 16, 2023

Research: Silva Cell Suspended Pavement System Outperforms Structural Soil in Tree Growth



JANUARY 11, 2023

How Much Soil Do You Need to Grow a Big Tree

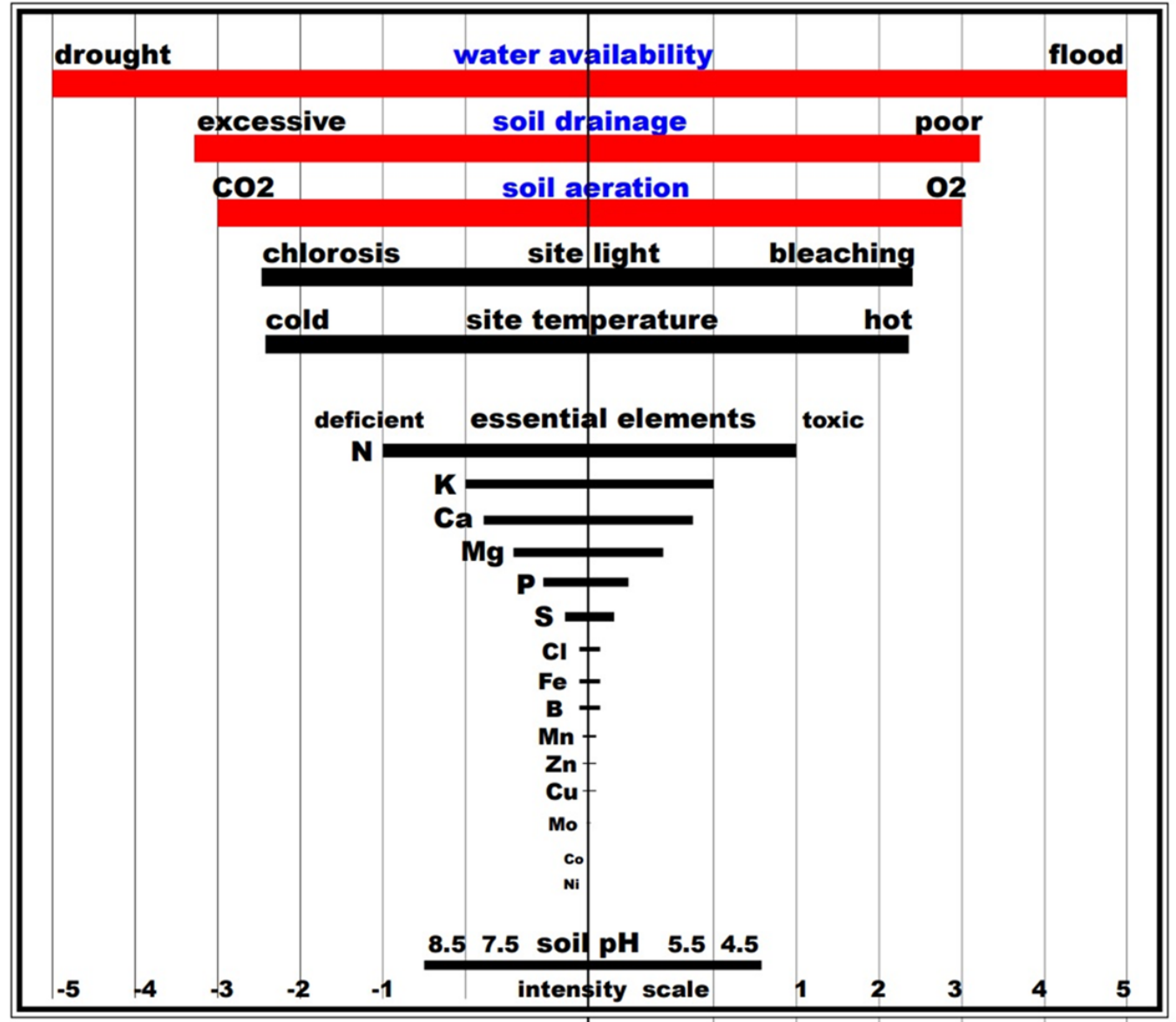
Introduction The question of how much soil is required to grow a big tree is a topic that has been debated among arborists and landscape architects for decades. While some argue that a deep, narrow hole is sufficient, others believe that a wider, shallower base is better for tree growth.

Promote long-term growth
through practices that meet
basic needs for healthy trees

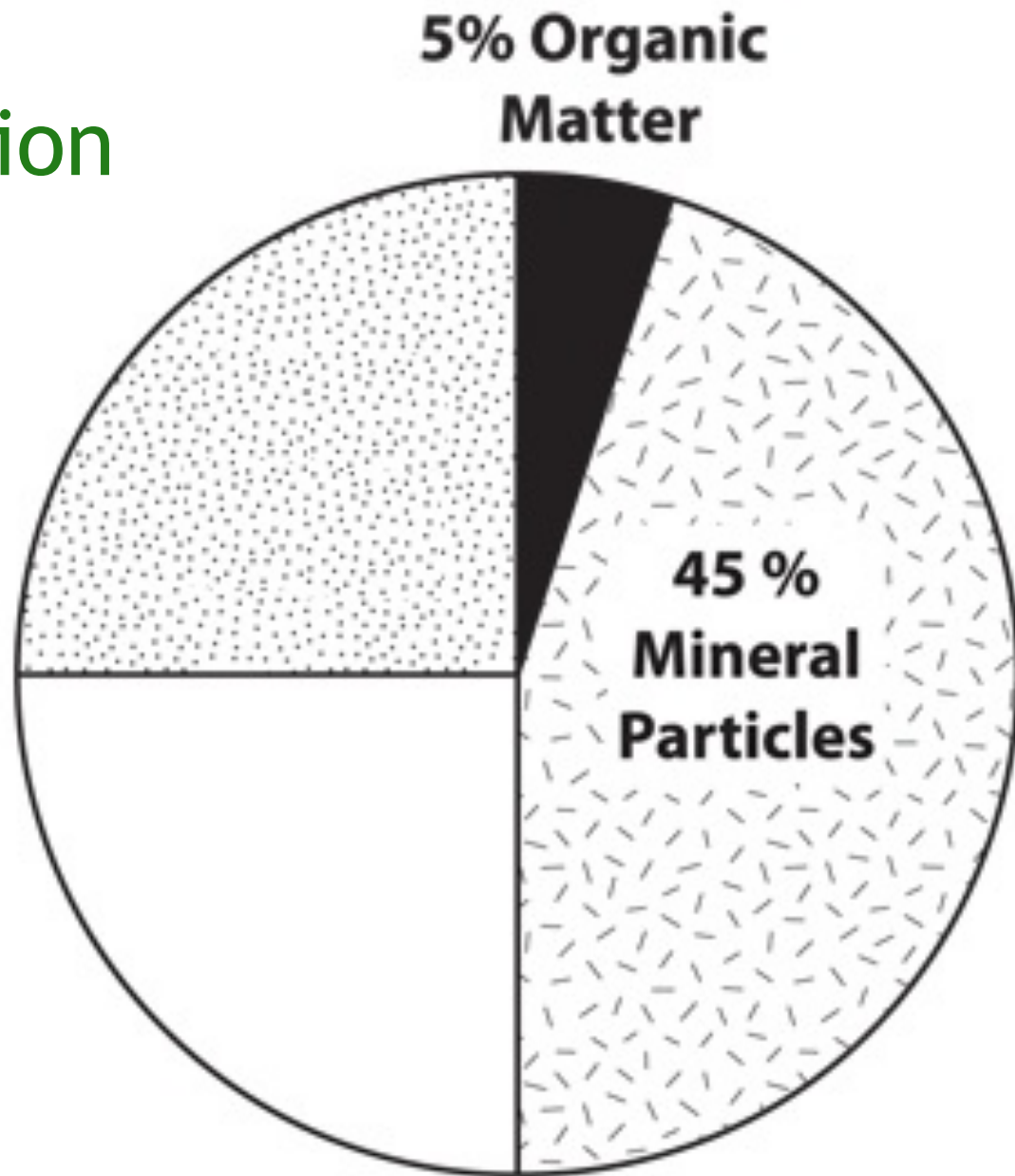
Occurrence Priority of Stress In Trees

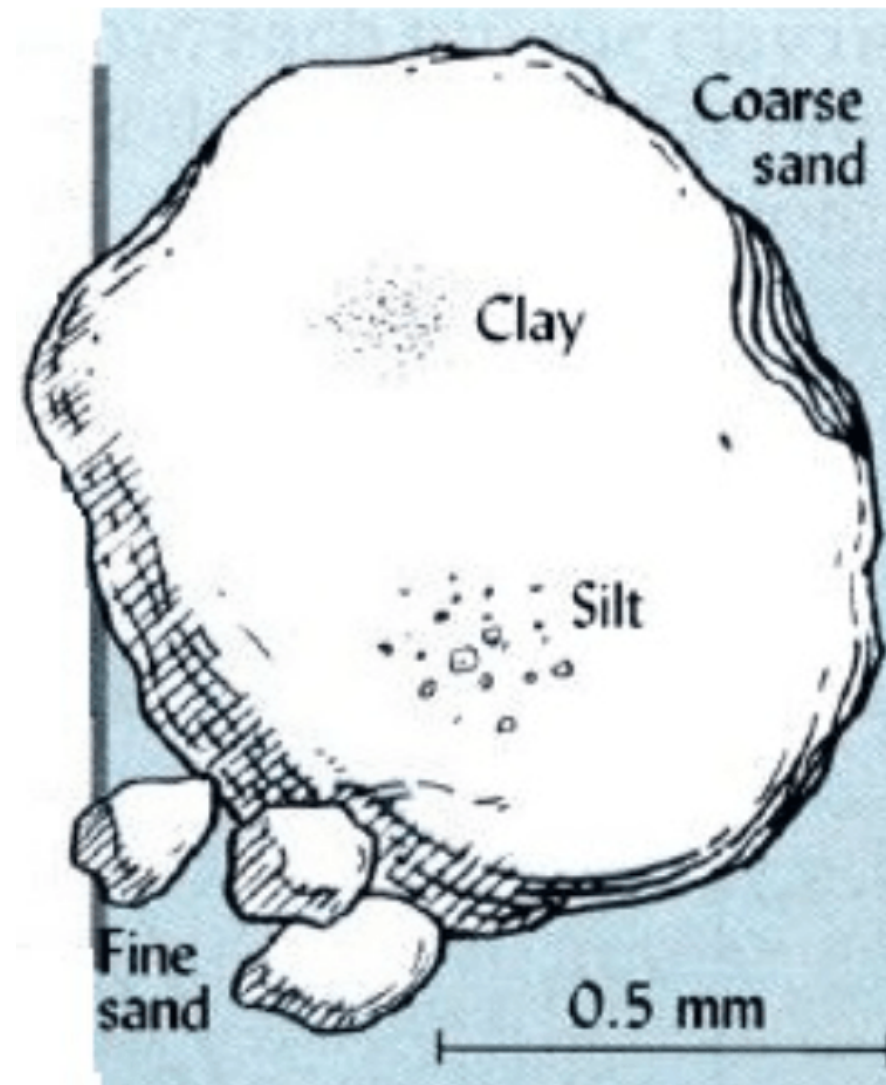
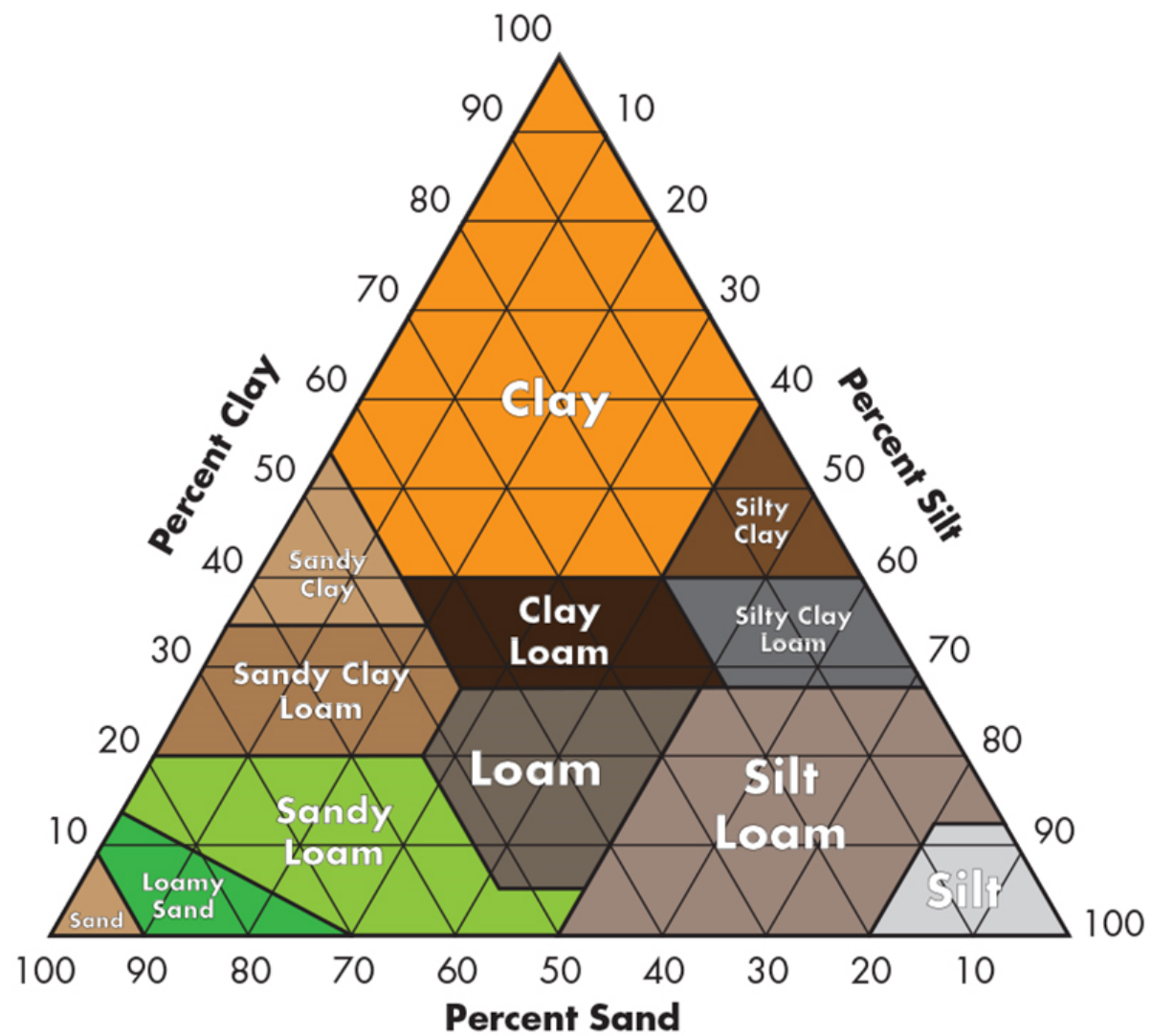
Longer & thicker bars =
greater tree impact

Dr. Kim Coder, University of Georgia
Trees & Soil Compaction Stress: A Workbook
of Symptoms, Measures & Treatments

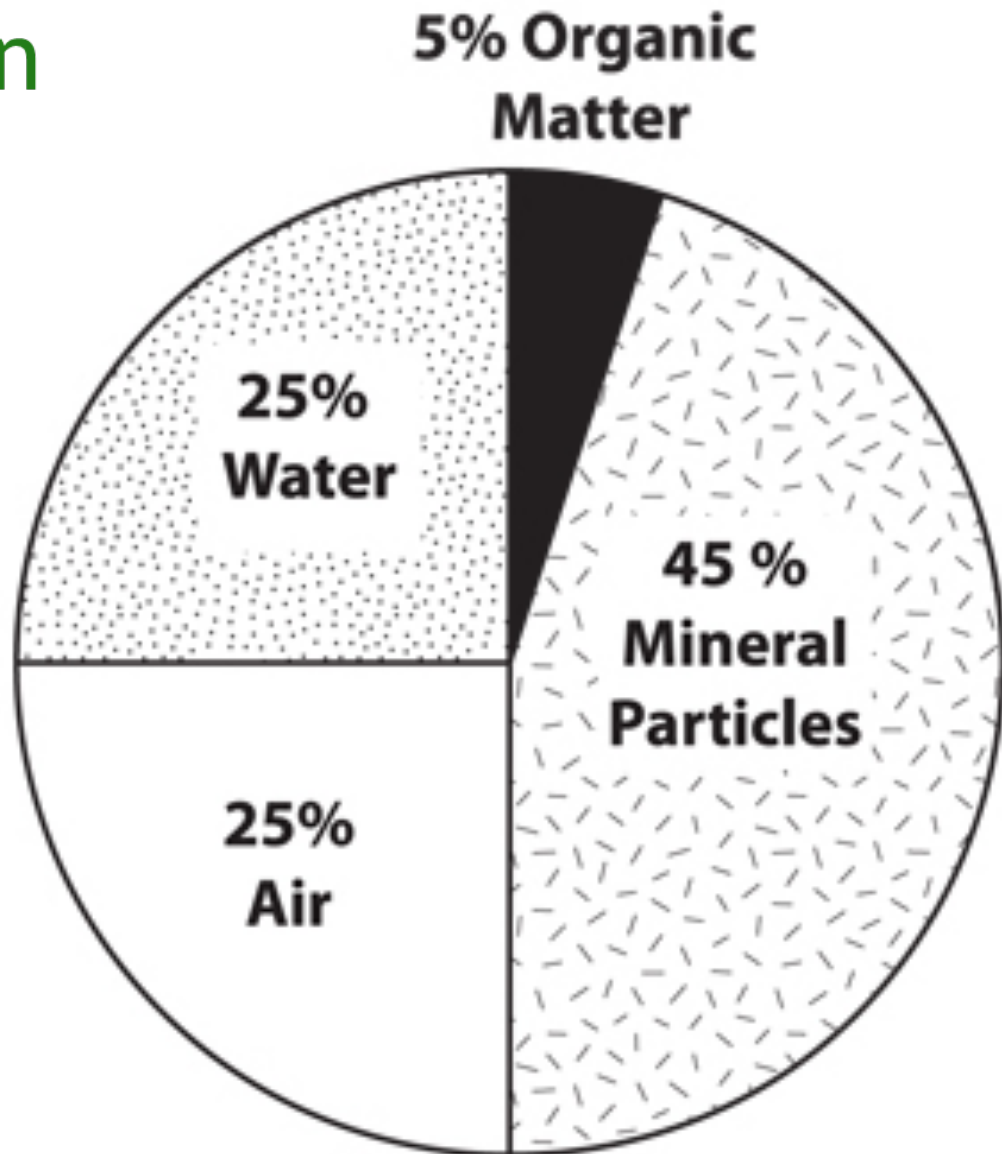


Ideal soil composition





Ideal soil composition



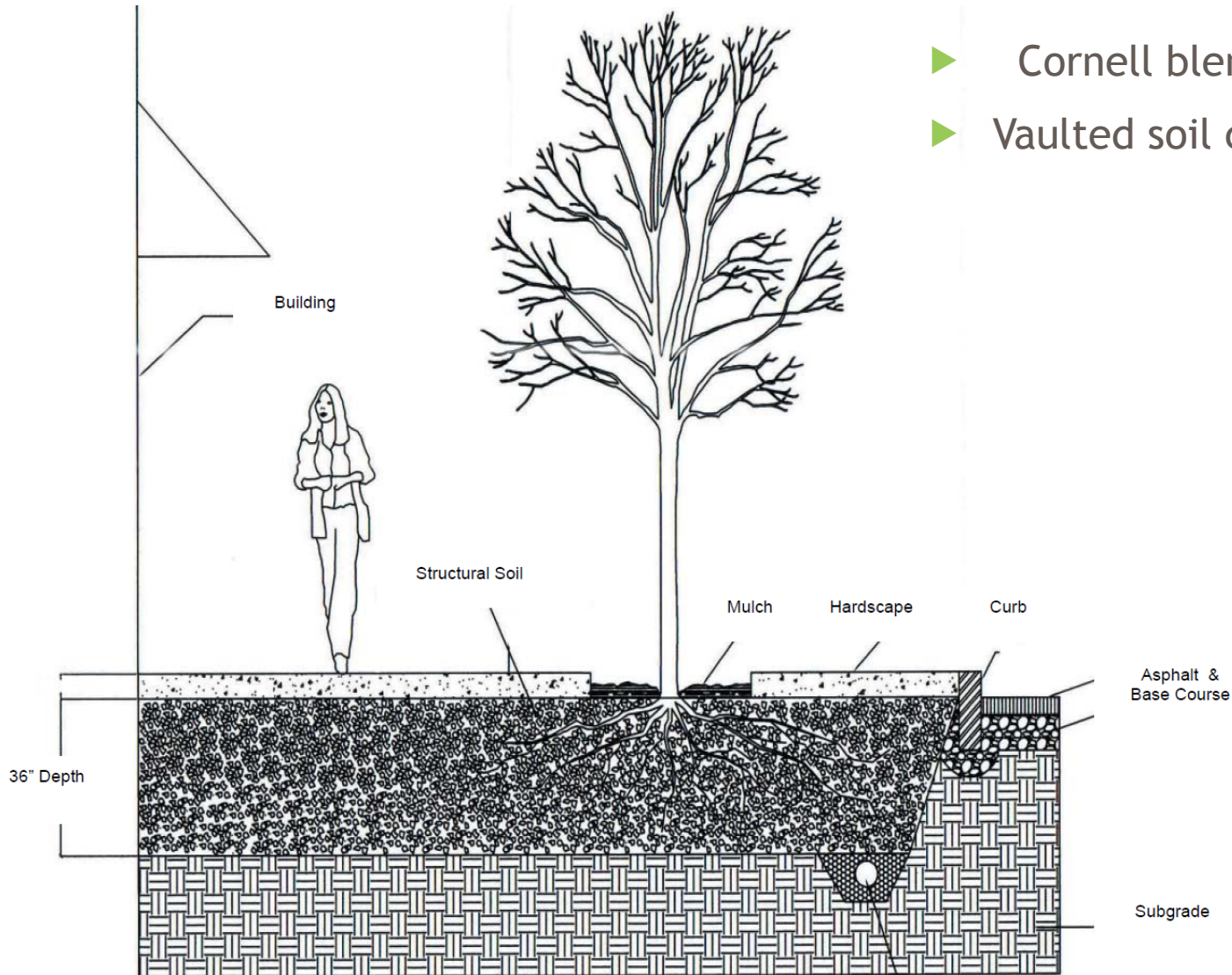
1ft³-3ft³ of healthy soil is needed
for every 1ft² of canopy



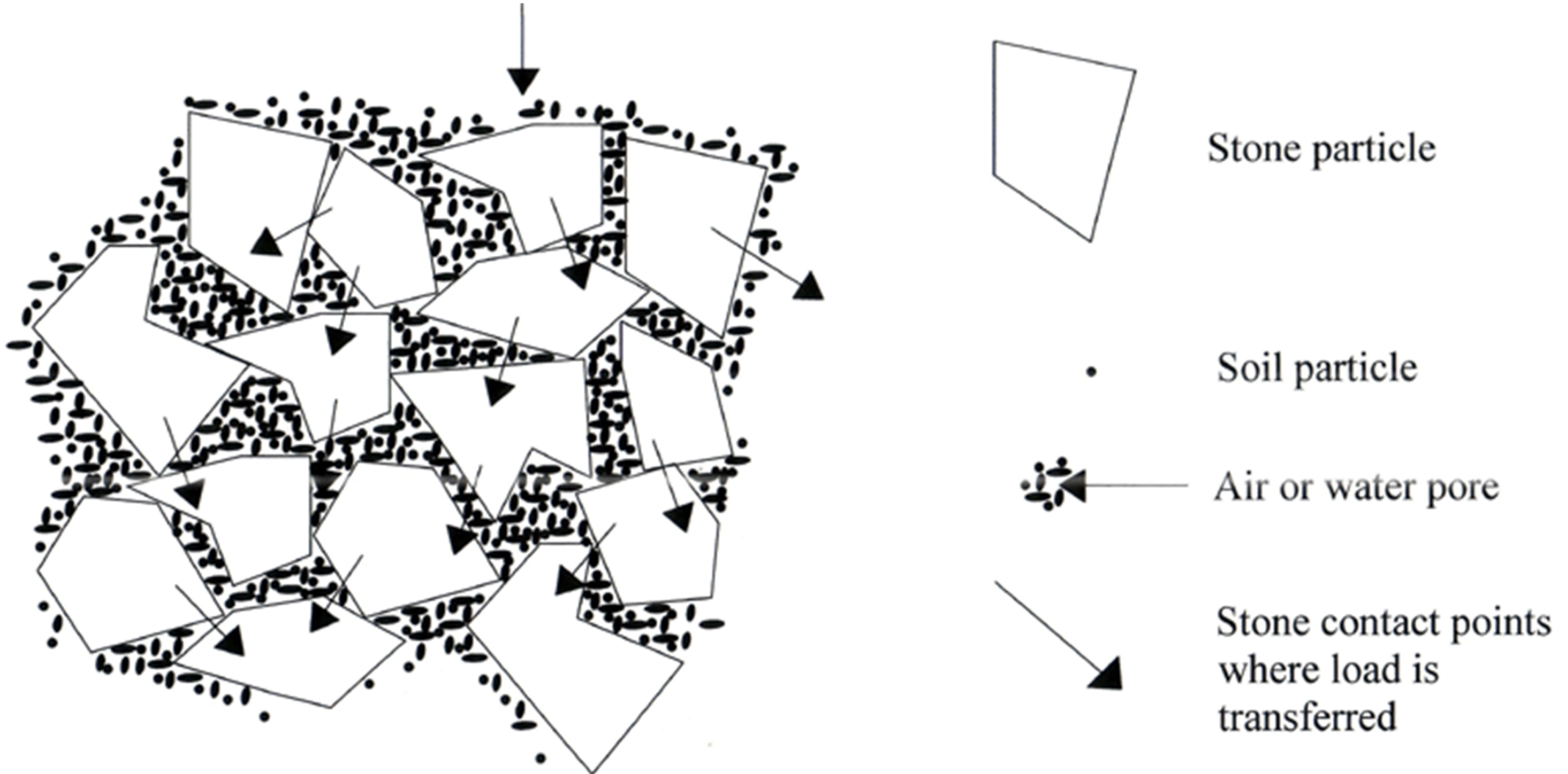
Graphic courtesy of Casey Trees, "Tree Space Design: Growing the Tree out of the Box"

Strategies to maintain healthy soil structure

- ▶ Cornell blend/ CU soil / "Structural Soils"
- ▶ Vaulted soil cells/silva cells



Loading or Compaction Effort



Structural Soil

80% volume of CU Soil is
rock aggregate.



Vaulted Soil Cells



Vaulted Soil Cells



How can we ensure roots receive more water?

- ▶ Irrigation
- ▶ Slot drain or slot channel
- ▶ Pervious paver
- ▶ Porous pavement



Pervious Pavers



Porous Pavement

- ▶ ¼" to 3/8" rubber granules
- ▶ Crushed stone aggregate
- ▶ Water curing binder

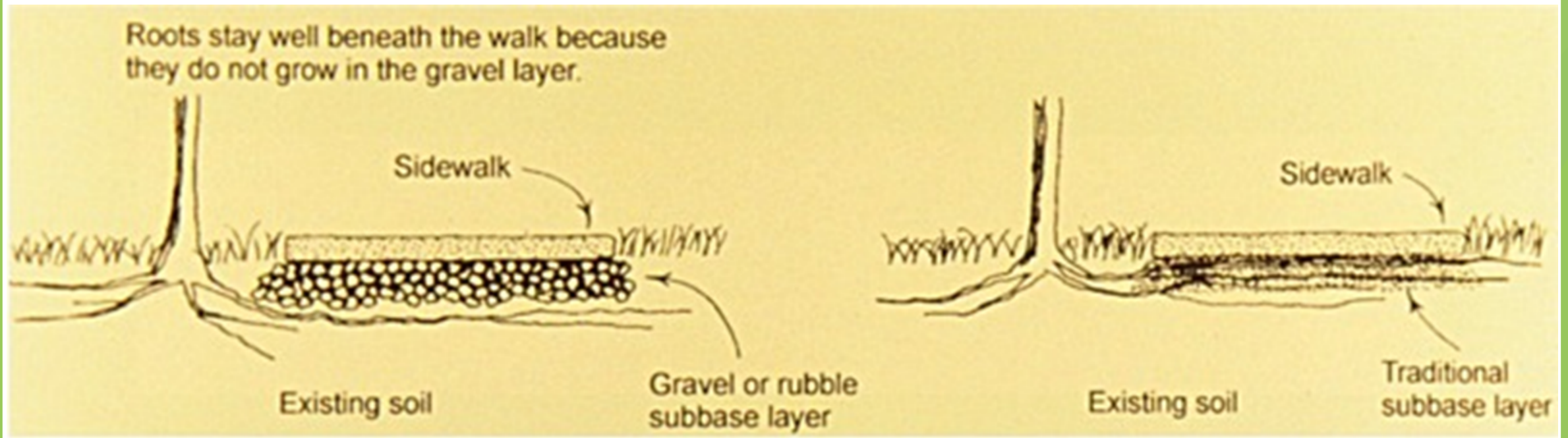




Water plays a role in
sidewalk and tree
conflict

Roots grow where water is available...

- **#57 Stone subbase** should be used under sidewalks
- ***Do not*** use Granulated Aggregate Base (GAB)



How do cities or counties
ensure that best practices are
used?



Policies and Laws
that support
long-term
healthy tree growth

Policies are
guidelines that
express intent
(should, not must or shall)

Example: The city's policy is
to conserve the current
canopy
while providing for its
longevity.



Policies that accomplish that goal

- ▶ full-time arborist on staff
- ▶ Structured soil use
- ▶ Tree inventories (with budget)
- ▶ Tree board or volunteers
- ▶ Dedicated budget to ongoing inventory
- ▶ Local best practices manual
- ▶ Tree City, USA certification
- ▶ Arbor Day events

Intent Statements in Tree Ordinances Reflect Policy

- ▶ Reasons for having the ordinance
- ▶ Based on community goals

1.1.4. Tree Preservation (Alpharetta)

To maintain and promote the public health, safety, and welfare, the city has established city-wide regulations governing the conservation, planting, and replacement of trees.

Trees contribute to the community's quality of life, improve the visual quality of the city, assist with rainwater interception and infiltration, and increase property values.

Decatur, 9.1.1 Intent

A. The purposes of these regulations are to encourage the conservation of existing tree canopy and provide minimum requirements for the protection, maintenance, renewal, and increase of tree canopy cover across the City. The City believes that trees are an essential part of the community's infrastructure and recognizes that they provide measurable and valuable services and benefits to our community.

Decatur, 9.1.1 Intent (cont.)

These services and benefits include:

- ▶ Improved health of Decatur's citizens and visitors
- ▶ Improved air quality
- ▶ Improved water quality
- ▶ Improved soil quality
- ▶ Storm water control
- ▶ Energy conservation
- ▶ Increased property values
- ▶ Habitat for desirable wildlife
- ▶ Noise and glare buffering
- ▶ Privacy screening
- ▶ Increased community aesthetics and quality of life
- ▶ Increased shade for active living activities like walking, and biking
- ▶ Mitigating the urban heat island effect
- ▶ Implementing the City's sustainability goals, including resilience, climate change mitigation and adaptation

Encourage compliance when not mandatory

Sec. 10-37 Application of article to private property.

- ▶ The provisions of this article shall not apply to private property;
- ▶ however, in addition to landscaping requirements imposed by chapter 121, Zoning, developers and owners of private property are strongly encouraged to promote, develop, and protect the existing urban forest within the City of Greensboro and to use the administrative guidelines in the landscaping of their properties. (Greensboro)

Policies are guidelines that express overall intent

Laws carry out those policies

(must or shall, not should)

- ▶ Tree ordinances can encourage mature trees!
- ▶ Tree board/tree council/tree committee
- ▶ Tree bank/tree fund

158.66 Tree Trust Fund

The tree conservation commission shall establish a tree trust fund for the protection, maintenance, and regeneration of the trees and other forest resources of Atlanta.

9.1.7. Tree Bank

Decatur

- ▶ There is hereby established a Tree Bank that shall receive payments made by property owners in lieu of planting additional tree canopy cover, as approved by the City Arborist, in addition to forfeited bonds and forfeited escrow funds. Funds in the Tree Bank shall be administered by the City Manager.

Tree ordinances can encourage mature trees!

- ▶ OSSA (Open Soil Surface Area) requirements
- ▶ Injury to tree (intentional or not)
- ▶ Community Tree Benefit Loss penalty (based on the eco-value of tree) (Decatur)
- ▶ Construction protection standards
- ▶ Site checks
- ▶ Enforcement system
- ▶ Civil citation or criminal
- ▶ Who enforces—Codes? City attorney? Tree board?
- ▶ Fees/fines/assessments/recompense
- ▶ Appeal procedure

SUMMONS

NOTICE TO APPEAR

(NAME OF AGENCY AND JURISDICTION)
Date of Violation: ____/____/____ Time: ____:____ (Traffic) (Misdemeanor) (Felony)
Name (Print, Middle, Last) Address City State ZIP Code
Case No. (Owner's Responsibility) (Veh. Code, § 40001)
Driver Lic. No. State Class Age Birth Date Sex (Adverse (Phone No.))
Veh. Lic. No. (or VIN) Eyes Height Weight Race Other Description
To of Veh. Make Model Body Style Color
Evidence of Financial Responsibility
Registered Owner or Lessee Address City State ZIP Code
Commercial Violation (Veh. Code, § 40001) Code and Section Description (Blocking Required) Mechanism or Infraction (Code)
Speed Approx. P.P. Asian Spd. Veh. Lic. Safe Radar Continuation From Seized
Location of Violation(s) City/County of Occurrence
Comments (Weather, Road & Traffic Conditions) (Accident)
I declare under penalty of perjury under the laws of the State of California the foregoing is true and correct.
Arresting or Citing Officer
Name of Arresting Officer (if different from Citing Officer) Serial No. In Date Off
WITHOUT ADMITTING GUILT, I PROMISE TO APPEAR AT THE TIME AND PLACE
X Signature Serial No. In Date Off
WHEN: ON OR BEFORE THIS DATE: ____/____/____
WHAT TO DO: FOLLOW THE INSTRUCTIONS ON THE REVERSE
WHERE: (Address of court) (Courtroom or District Courtroom) (Courtroom No.)
Time: ____:____ (AM) (PM)
Time: ____:____ (AM) (PM)
To be notified
You may arrange with the clerk to appear at a night session of the court.
FPO Barcode
Defendant's Signature

Tree ordinances can encourage mature trees!

Criteria for designation. Landmark trees shall be healthy trees that meet one or more of the following criteria:

- ▶ Age greater than 50 years as determined by planting records or the written opinion of an arborist, the Athens-Clarke County Arborist, or the community forester.
- ▶ Large canopy trees greater than 36 inches dbh, medium canopy trees greater than 24 inches dbh, and small canopy trees greater than 12 inches dbh.
- ▶ National, state, or Athens-Clarke County champion trees.
- ▶ Unique or rare species.

Landmark
trees

Specimen
trees

Historical
trees

Protected
trees

Champion
trees

Tree ordinances can encourage mature trees! (cont.)

Criteria for designation. Landmark trees shall be healthy trees that meet one or more of the following criteria:

- ▶ Association with a documented historic event, person, or community landmark.
- ▶ Trees planted for Arbor Day celebrations and other community-wide public celebrations.
- ▶ Trees planted in honor or memory of an individual or an event.
- ▶ Trees belonging to a significant cross-property or neighborhood-wide planting that affect the greater landscape beyond the property on which they grow.

Landmark
trees

Specimen
trees

Historical
trees

Protected
trees

Champion
trees



Tree ordinances can encourage mature trees!

- ▶ Permits for removals of healthy trees
- ▶ Replacement trees must be maintained for 3 years (Sandy Springs)
- ▶ Replacement ratios:
 - ▶ Tree density unit (trees per acre or basal area)
 - ▶ Canopy coverage
 - ▶ Total DBH inches
 - ▶ Formula (species, dbh, condition) Example at ncpc.gov

Tree ordinances can encourage mature trees!

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Example at ncpc.gov



Tree Canopy Replacement Requirements

Decatur

- ▶ All trees planted to meet tree canopy replacement requirements shall be 2.5" caliper or larger and shall meet ANSI Z60.1 Standards for Nursery Stock, and all planting shall be done in accordance with current ANSI A300 Standards for Tree Care Operations, ANSI Z133 Safety Standards, industry best management practices, as well as the Administrative Standards that accompany this Section.

2.9.2. Minimum Tree Density Requirements

Alpharetta

- ▶ A minimum of one overstory tree must be provided on-site for every 400 square feet of a site not covered by buildings.
- ▶ The required overstory tree must have a minimum 4-inch caliper.
- ▶ The required number of overstory trees may be achieved by counting existing trees to be preserved, planting new trees according to the standards of this Section, or some combination of the two.
- ▶ All sites shall comply with the applicable street tree requirements in the adjacent street.



Tree ordinances can encourage mature trees!

- ▶ Tree species lists
- ▶ Islands in parking lots

Sec. 158-3. - Planting of Lombardy Poplar or Silver Maple trees prohibited

Atlanta

It shall be unlawful and shall constitute a nuisance per se for any persons to set out or plant Lombardy poplar or silver maple trees on the sidewalks or along the streets or in or upon property of any kind owned or controlled by the city. Such trees shall be deemed a nuisance, and the director, bureau of parks and recreation is authorized and directed to cut down and remove any trees planted in violation of this section.

Tree ordinances can encourage mature trees!

- ▶ Tree species lists
- ▶ Islands in parking lots

Sec. 18-19. Planting trees; species prohibited; substitution of other species. Columbus

It shall be unlawful for any person to plant or cause to be planted in or on any of the streets, avenues, alleys, lanes, sidewalks or cemeteries of the city any chinaberry, mulberry or sycamore trees, provided, any fine imposed hereunder may be remitted by the recorder when the person so fined shall remove the trees so planted and substitute therefor an oak or elm tree or any other tree not prohibited by this section, within the period to be named by the recorder.

Planted and...Conserved

Conserved

- Mature trees provide more ecosystem services
- By area, by trunk or by inches
- Natural planting arrangement
- Potentially native, likely successional
- Harder to do in-town or on redevelopment
- Replanting requirements might be more strict
- Critical Root Zone
- Where does the stormwater need to go?

Planted

- Easier to plant new than retain (development friendly)
- Choice in planting (native, hardy, ornamental)
- Can spread – streets, plazas, parking lots
- Avoid utilities
- Consider tree banking opportunities
- Often unnatural looking
- Time to maturity, service delivery

Practices, Policies, and Laws for Tree Longevity

ACC Code Sec 8-7-15 (j)

Tree canopy cover in parking areas. A minimum of one tree per seven parking spaces is required. Parking areas shall be shaded by parking lot canopy trees as listed in the *Athens-Clarke County Tree Species List*. Tree canopy cover and trees planted in parking areas shall conform to the following minimum requirements.

Ratio, recommended list, location, 2" DBH, parking islands, distance, size...

Parking lot trees done right

By Ordinance

- ▶ Space Space Space (7' in islands, 10' around edges)
- ▶ 1 tree per 7 spaces

Considerations & BMPs

- ▶ Hardiness (Heat and vehicles)
- ▶ Stormwater reception
- ▶ Allowing multiple plantings when space and symbiosis exist

Concepts & Ideas

- ▶ Shade
- ▶ Speed and safety
- ▶ Consider allowing solar to swap for parking lot trees?

Practices, Policies, and Laws for Tree Longevity

ACC Code Sec 8-7-15 (k)

Streetscape trees. Trees shall be required as part of the streetscape on all street frontages in accordance with [sections 9-14A-12](#), [9-15-2](#), [9-25-8](#), and [9-26-6](#). Tree establishment shall be done in accordance with the technical standards set forth in [section 8-7-19](#). Tree canopy cover along streets must meet the following minimum requirements.

Ratio, Recommended list, within 10',
2" DBH, utilities, distribution, size...



Street trees done right

In the verge vs. on private property

By Ordinance

- ▶ 1/30' of frontage
- ▶ Large canopy trees

Considerations & BMPs

- ▶ Hardiness (Heat and vehicles)
- ▶ Distribution (spread, but variable is OK)
- ▶ Allow existing trees to remain

Concepts & Ideas

- ▶ Avoid Utilities
- ▶ Speed and safety
- ▶ In the Verge or on Private Prop.

Street trees done right



In the Verge

On Private Property

Pros

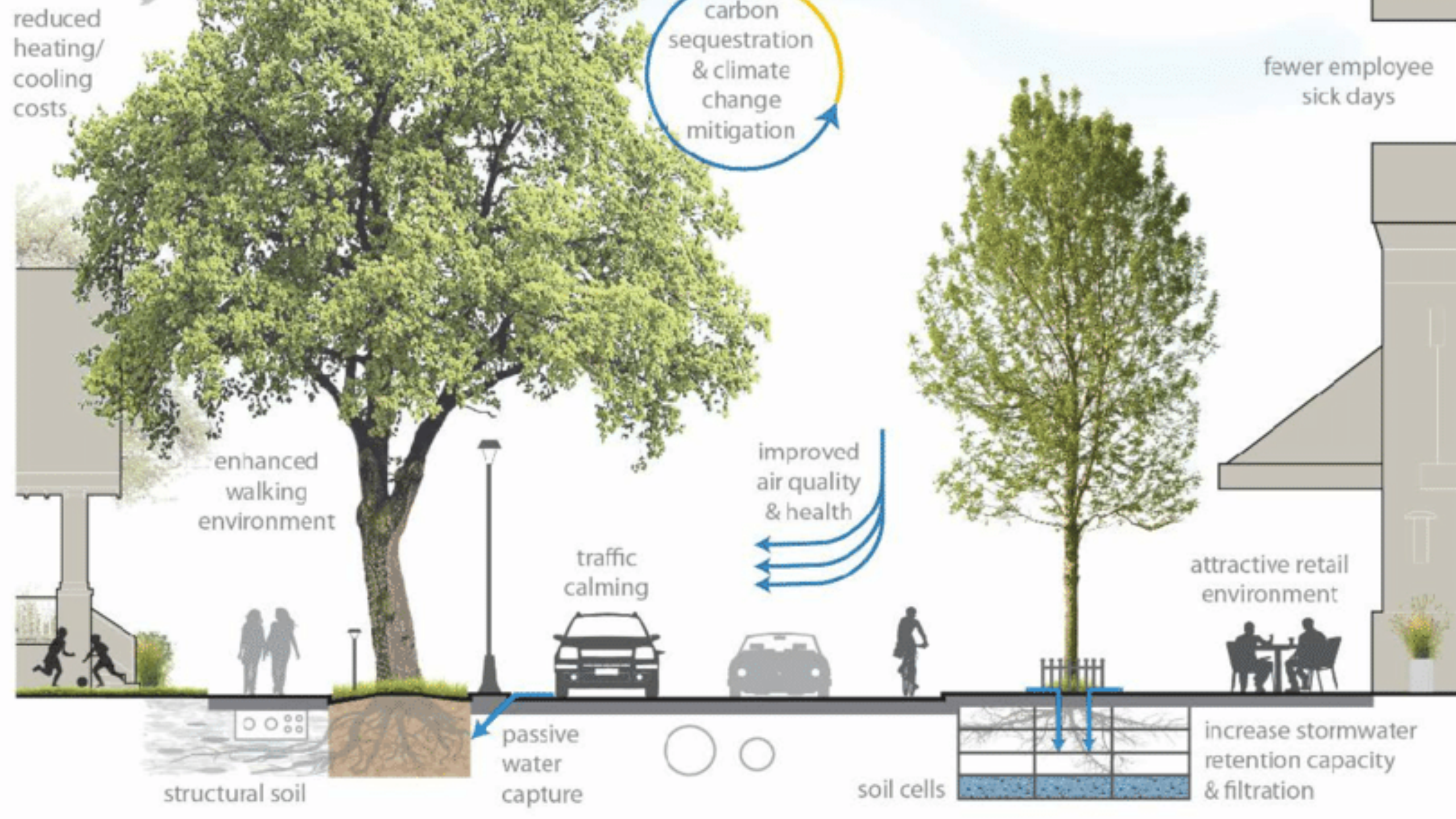
- Added pedestrian safety
- Natural calming of traffic
- Separation from buildings
- Additional shade for pedestrians

- Maintenance is property owner's responsibility
- Utility separation
- More space for growth

Cons

- Maintenance is municipal responsibility & in ROW
- Utility conflict
- SPACE x2
- Sidewalk pop

- Pedestrian exposure
- Need for building setback



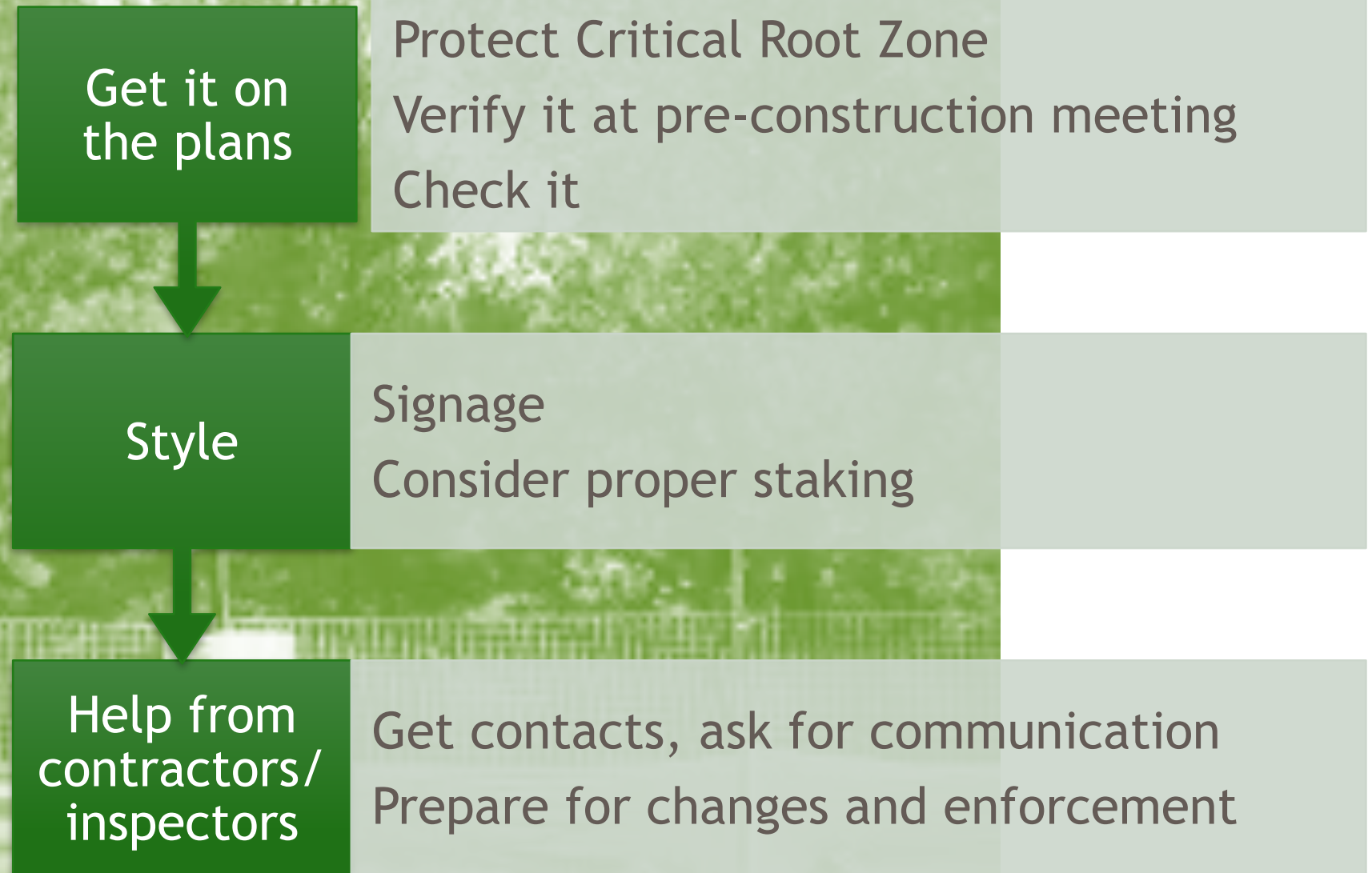
Practices, Policies, and Laws for Tree Longevity

ACC Code Sec 8-7-19 (h)

Tree protection standards. Athens-Clarke County trees or trees on private property conserved and planted to meet tree canopy cover requirements shall be actively protected during development, based on ANSI and ISA BMPs, and passively throughout their life in accordance with the requirements for protected trees set forth in [section 8-7-16](#).

Prohibited Activities (storage & parking)
Limited Activities (clearing & trenching)

Construction Protection Done Right



Practices, Policies, and Laws for Tree Longevity

ACC Code Sec 8-7-15 (k)

Site preparation standards. The soil around a planted tree shall meet the following standards

- a. The soil within the open soil surface area shall be well aerated to a depth of eight inches, except that in tree planting islands surrounded by pavement it shall be well aerated to a depth of 18 inches

Very small - 25 sq ft
Small - 100 sq ft
Medium - 225 sq ft
Large - 400 sq ft

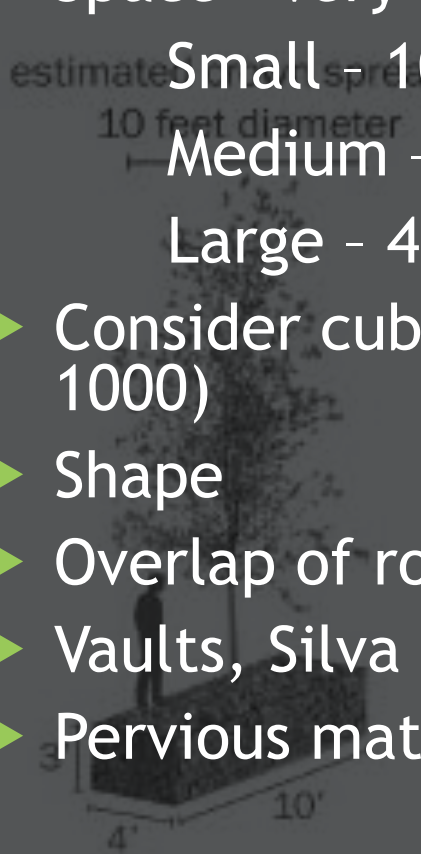
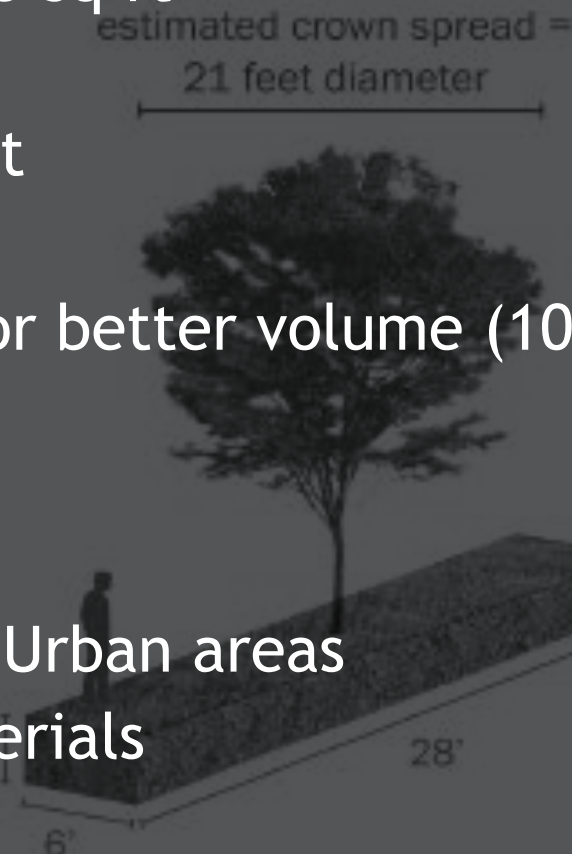
Open Soil Surface Area done right

- ▶ Space Very small - 25 sq ft
- Small - 100 sq ft
- Medium - 225 sq ft
- Large - 400 sq ft
- ▶ Consider cubic feet for better volume (100 - 300 / 450 - 600 / 1000)
- ▶ Shape
- ▶ Overlap of roots
- ▶ Vaults, Silva Cells for Urban areas
- ▶ Pervious matting materials

Soil Volume = 120 cubic feet

Soil Volume = 500 cubic feet

Soil Volume = 1000 cubic feet



Maximize urban forest benefits through...

- Understanding plant needs...and utilizing practices that provide them
- Implementing policies and laws that support long-term tree growth
- Development codes that balance the needs of trees, municipalities, and development and are flexible
- Utilizing the expertise of urban foresters and ISA-certified arborists





Thanks!

Resources

- ▶ Municode
 - ▶ [Library.municode.com/ga](https://library.municode.com/ga)
- ▶ ITree suite of tools (design, inventory, and ecosystem value)
- ▶ Replacement ratios: www.ncpc.gov/docs/publications/Tree_Preservation_and_Replacement_Resource_Guide_2020.pdf
- ▶ Deeproot.com
- ▶ gatrees.org/urban-community-forestry/