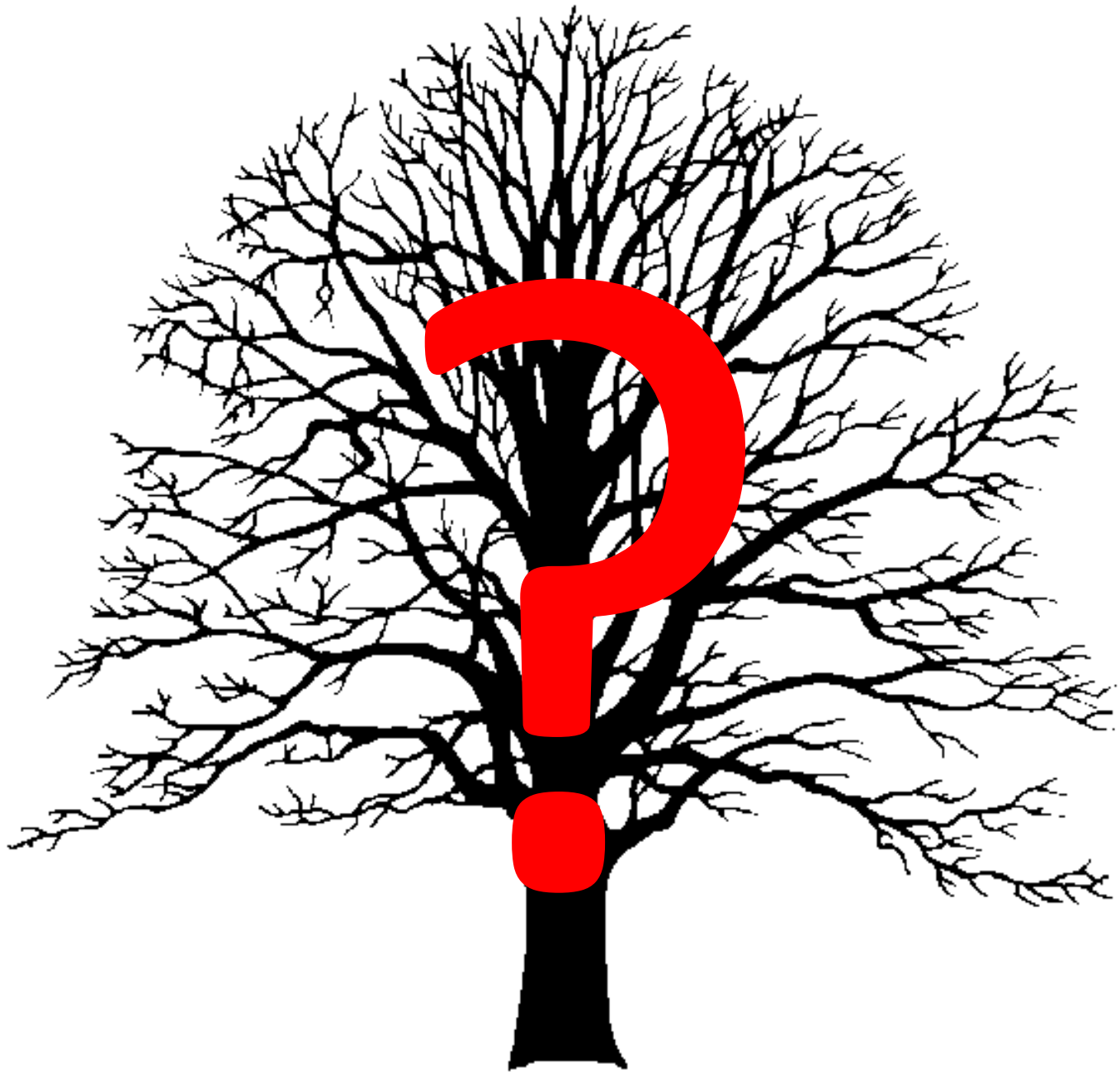


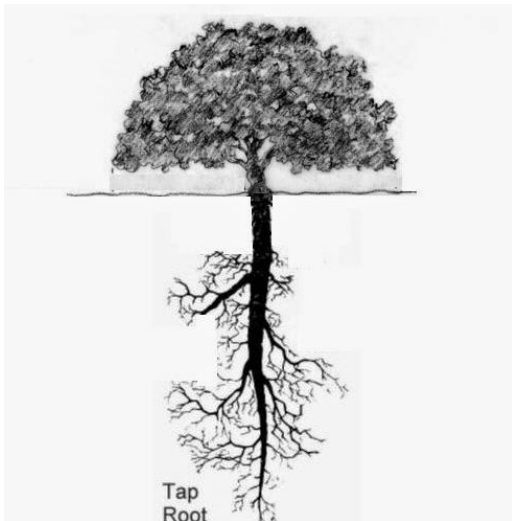
Working in Tree Protection Zones (TPZs): What to Look for as an Inspector



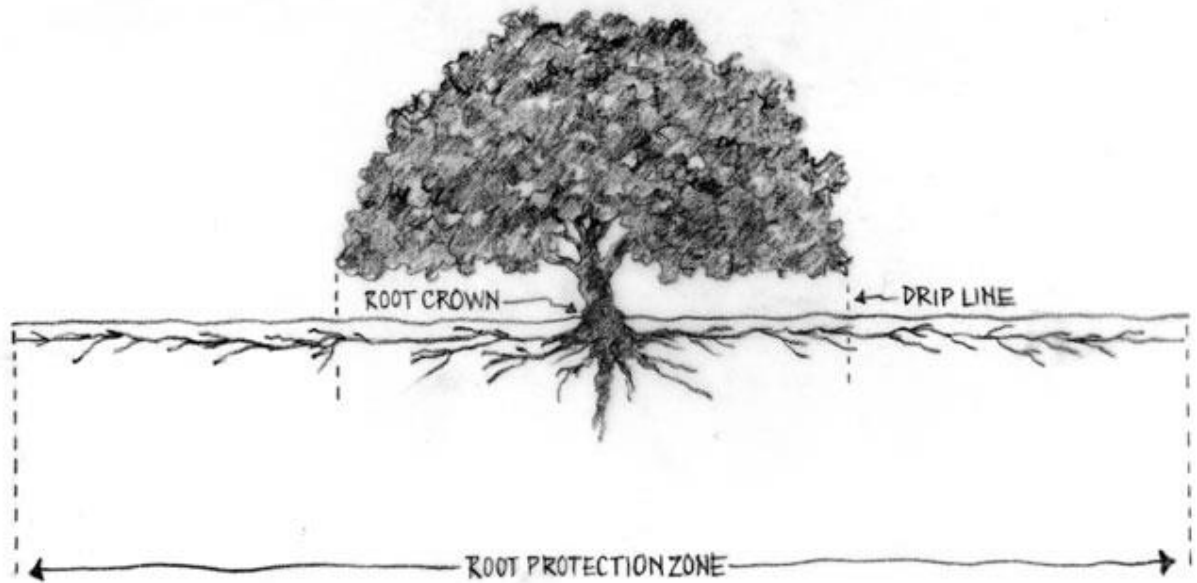
October 6, 2016
Presented by:
Sarah Davis, Stormwater Technician
Kathy Davis, Urban Forestry Technician



The Myth...



The Reality...



"That tree's got a tap root that goes straight to China!" - Contractor


Typical Missouri Soil Profile



Benefits of Trees

Trees reduce crime.
Tree lined streets encourage active lifestyles.
Increased canopy cover in urban areas reduces peak ozone levels.
Trees reduce the cost to cool your home and business.
Springfield's street trees provide over \$1 million in benefits annually.
Trees increase your business profits.
Trees reduce ADD symptoms in children.
Trees reduce domestic violence.
Wood products production in Missouri supports 42,000 jobs.
Missouri's forests store over five million tons of carbon.
Trees reduce stormwater runoff.
A view of trees increases enthusiasm.
A view of trees reduces frustration.
Street tree benefits in Missouri contribute over \$148 million annually.
Trees protect us from ultraviolet radiation.
Trees remove pollutants from the air.
A view of trees reduces illness.
Trees provide cleaner water for drinking, recreation and wildlife.
Trees reduce noise pollution.
A view of trees will increase test scores.
Trees store additional carbon each year.
A view of trees will increase self esteem in young girls.
Trees encourage socializing with your neighbors.
Trees reduce winter heating costs.
Tree lined roads reduce road rage.
Trees increase concentration in children and adults.
Springfield's street trees intercept 50 million gallons of rainwater annually.
Trees reduce the cost to clean our drinking water.
Trees increase property values.
Trees increase your attention span.



A large, ancient oak tree with a massive, gnarled trunk and sprawling branches, set against a bright sunburst in a forest.

“Trees outstrip most people in the extent and depth of their work for the public good.”

~Sara Ebenreck, *American Forests*

500px

500px.com/photo/57651890

Angela Oak Tree, Charleston, South Carolina



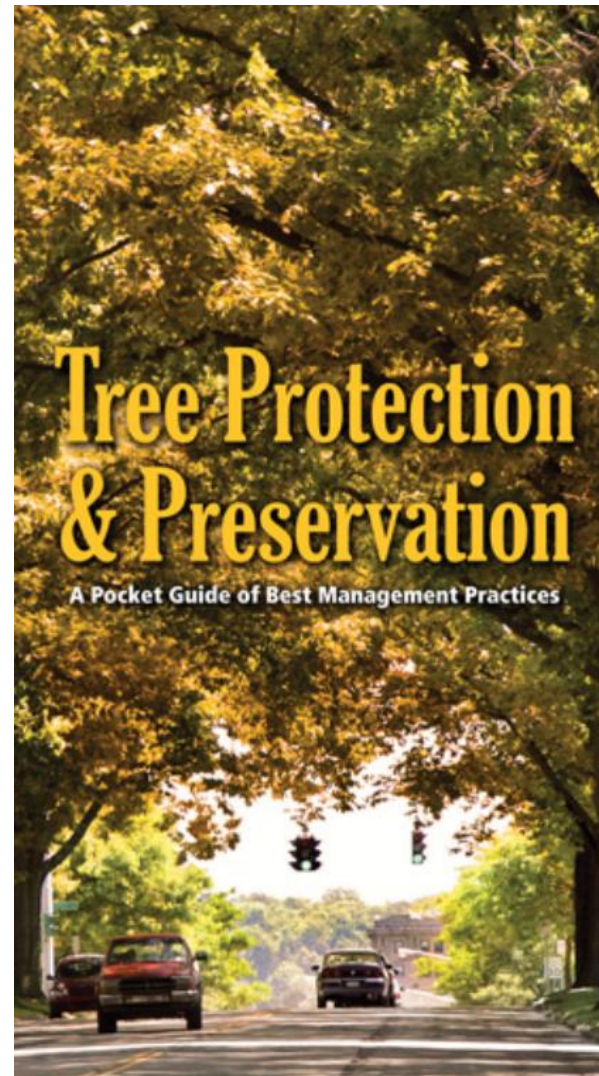
They make a good lunch spot...

American Public Works Association: Grounds and Urban Forestry

- <http://www2.apwa.net/bookstore/category.asp?Category=GF>

Who should use this guide?

- Public works manager,
- Engineer,
- Inspector,
- Builder or land developer,
- Heavy equipment operator,
- Utility employee,
- Landscape architect,
- Landscape maintenance contractor or employee,
- Planner,
- Tree care service contractor or employee,
- Construction contractor or employee
- Government official or staff member



What are the benefits of protecting trees during development?

- Decreased liability from damaged trees and tree parts
- Reduced long term maintenance and replacement costs
- Preservation of larger trees and greater canopy cover
- Positive feedback from citizens, businesses, media and overall good public relations
- Protection of native plants which may be unavailable and difficult to establish
- Healthier trees, forest ecosystem, and environment
- **Prevents erosion on construction sites!**



Tree
Protection
Zone
**DO NOT
ENTER**
Call 864-1010
To Report Violations


Prevents Erosion on Construction Sites



Channel stabilization on Construction Sites



Prevents Erosion on Construction Sites



BEFORE

AFTER



3 step process to tree preservation:

1. Communicate
2. Investigate
3. Integrate





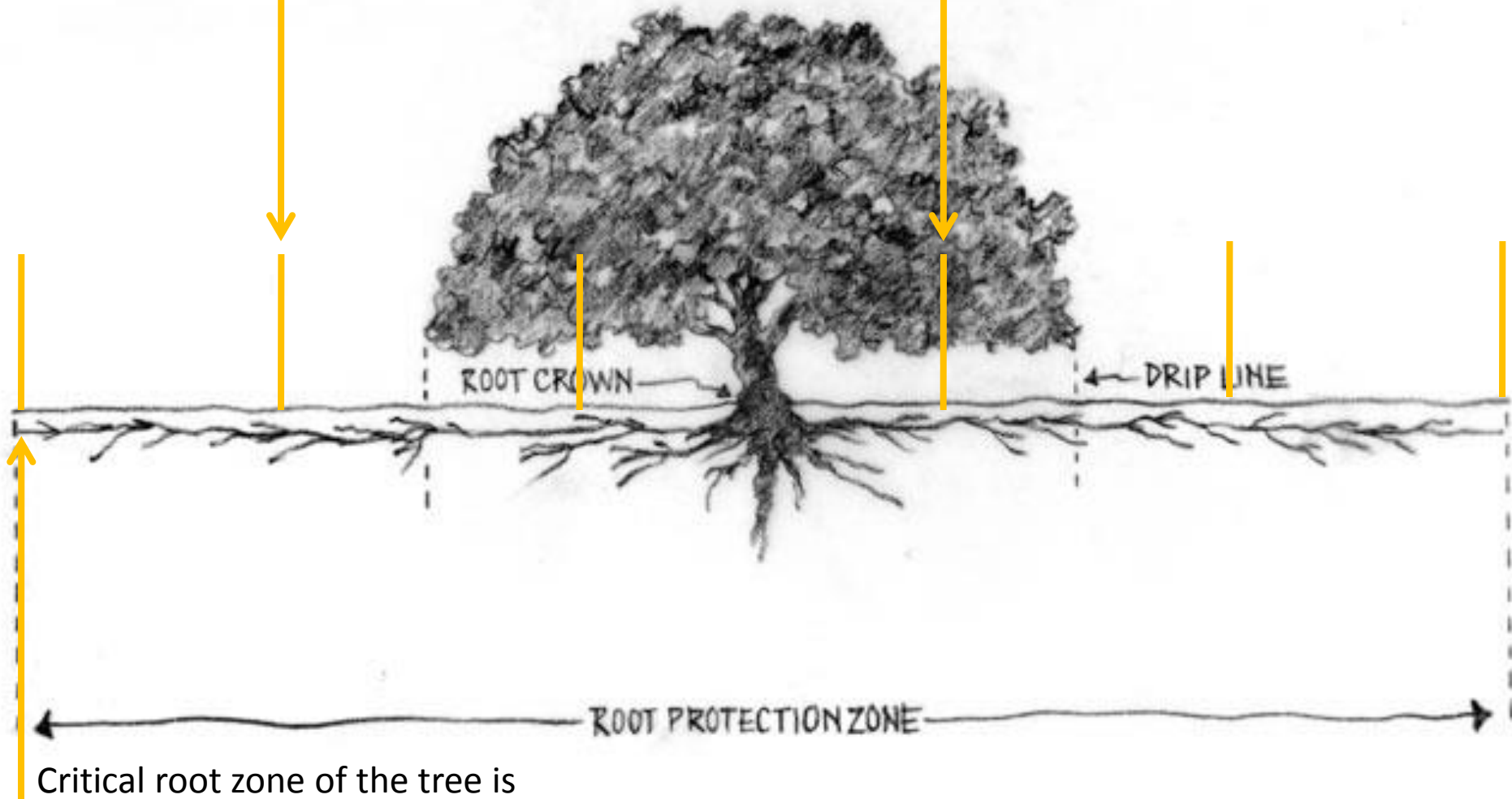
“I find your lack of tree preservation
disturbing...”

What is a tree protection zone (TPZ)?



City's standard for fencing, 10 feet
off the dripline

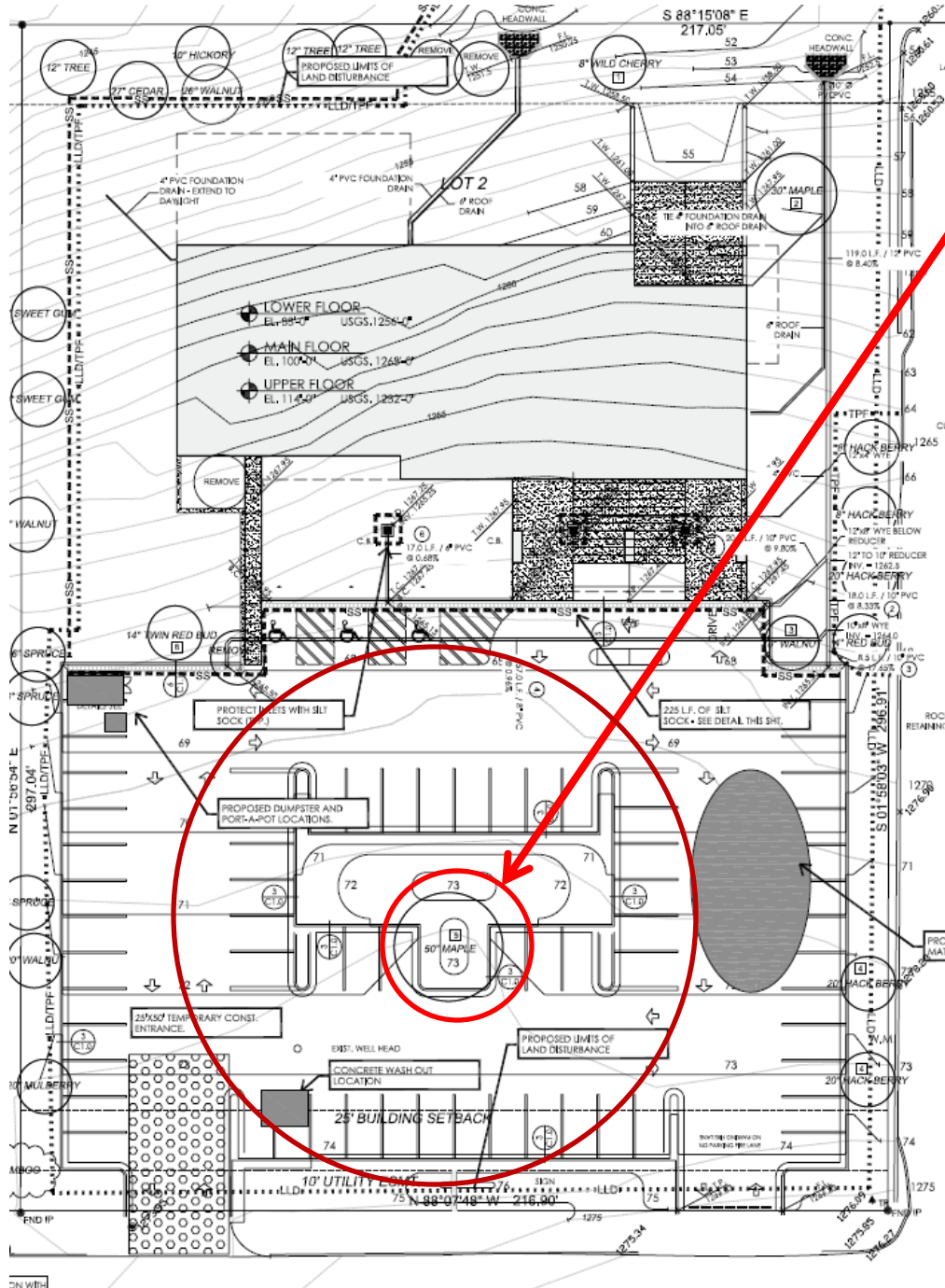
Structural root zone is
where large anchor
roots exist



Critical root zone of the tree is
estimated as 1.5x the diameter of the
tree trunk in radial feet.

Choosing a Good Candidate:



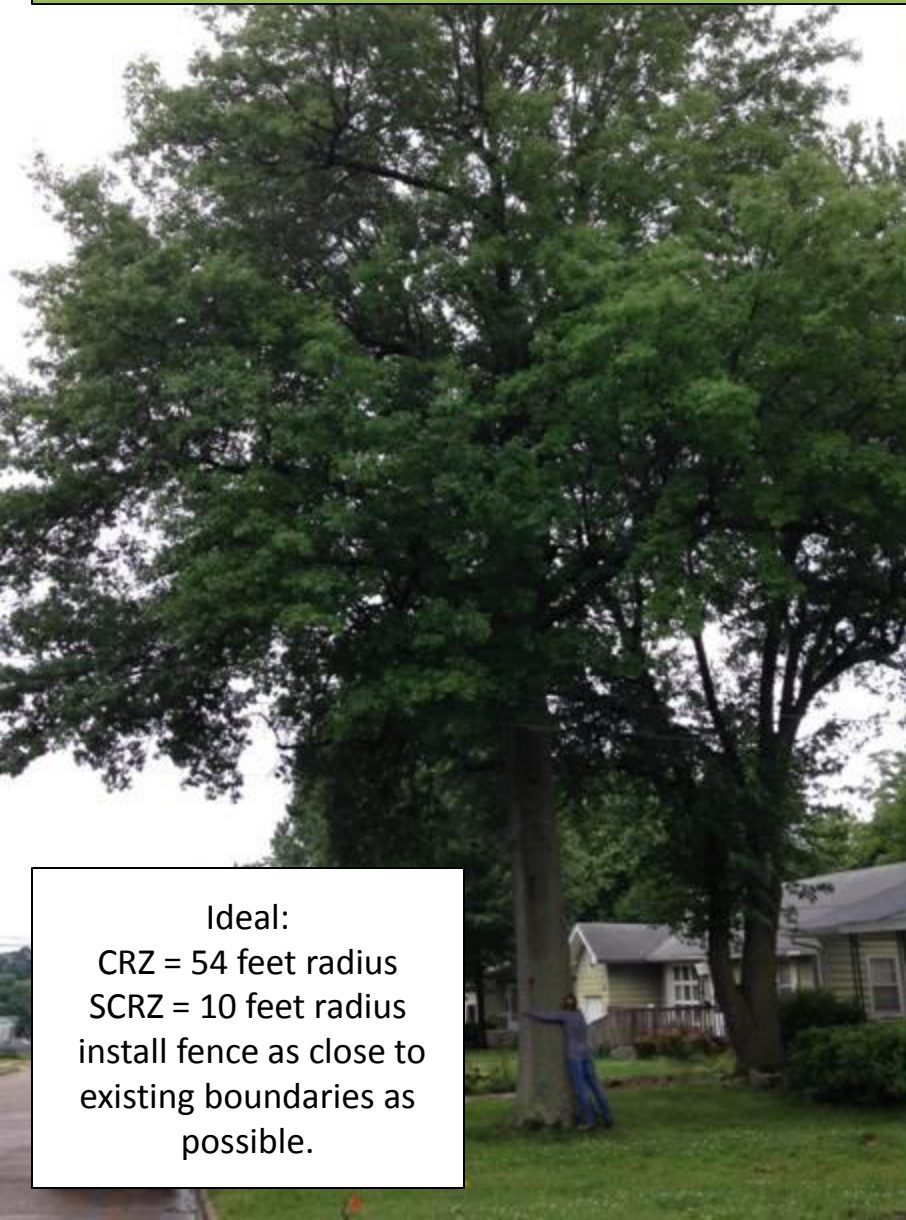


Tree retention
Vs.
Tree preservation
Vs.
“Saving a tree”

Investigate design
options:

- Move sidewalks
- Adjust parking and/or parking material (paver blocks, rubberized asphalt, etc)
- Discuss boring for utilities

Chester's TPZ fencing



Ideal:
CRZ = 54 feet radius
SCRZ = 10 feet radius
install fence as close to
existing boundaries as
possible.



Fencing installed :
15 feet off trunk on N and S sides
25 feet off trunk on E and W Sides

Fremont Elementary School



Encroachment in Chester's TPZ, grading on north side.



Consider the Alternatives!



Encroachment in Chester's TPZ, new approach off street



Call Kathy: 417-633-3934

Call Sarah: 417-380-2817

What to do when you encounter roots:

1. Measure diameter and document
2. For roots 1" in diameter or greater, flush cut with a hand saw



Prevent soil compaction



Prevent soil compaction

B
E
F
O
R
E



A
F
T
E
R

When subcontractors go rogue



Don't Trench Under Trees!! (Please!)



?
SS

Consider the Alternatives!



Silence is NOT golden...When working around trees



Utility installation can affect tree stability and because it's often never discussed and easily hidden, it can pose a real liability and safety hazard.

Excavation for sidewalk



Field Adjustment: Sidewalk
moved to back of curb.





Minimize the effects of grade change



A



B

It may be possible to preserve trees when the grade must be lowered (A) or raised (B) by creating islands or pits.

Consider the Alternatives!



Sidewalk moved to
back of curb

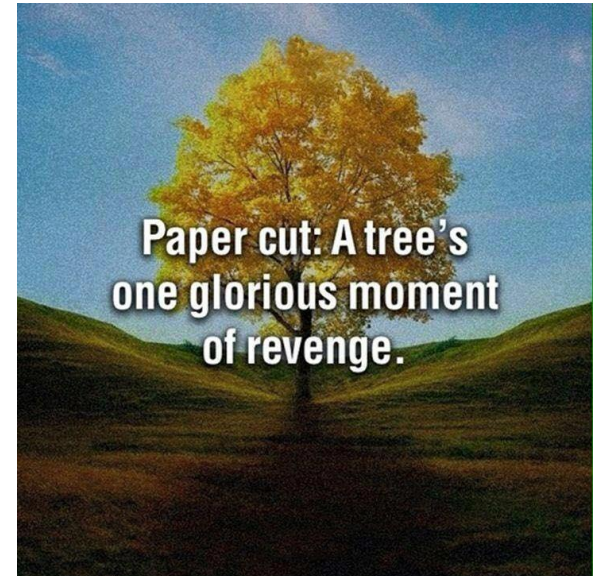
Concrete curb back

Consider the Alternatives!



Activities which can damage trees:

- Trenching
- Significant grade changes
- Grading/grubbing
- Soil compaction
- Soil contamination from wash-out
- Root cutting and tearing
- Use of tree for fencing
- Signs posted on trees
- Trunk wounds from equipment
- Vehicles/equipment parked under trees
- Material stored under trees
- Excessive heat injury from equipment exhaust









<http://www.bing.com/videos/search?q=michael+scott+no+god+no&view=detail&mid=94E52F73AA51F2F1884F94E52F73AA51F2F1884F&FORM=VIRE1>







Should Chester be retained?



Root cuts
13 feet off
trunk

Root cuts
15 feet off
trunk

Recall that the SCRZ = 10 feet

Root cuts 5 feet
off trunk

Structural stability & risk to “targets”

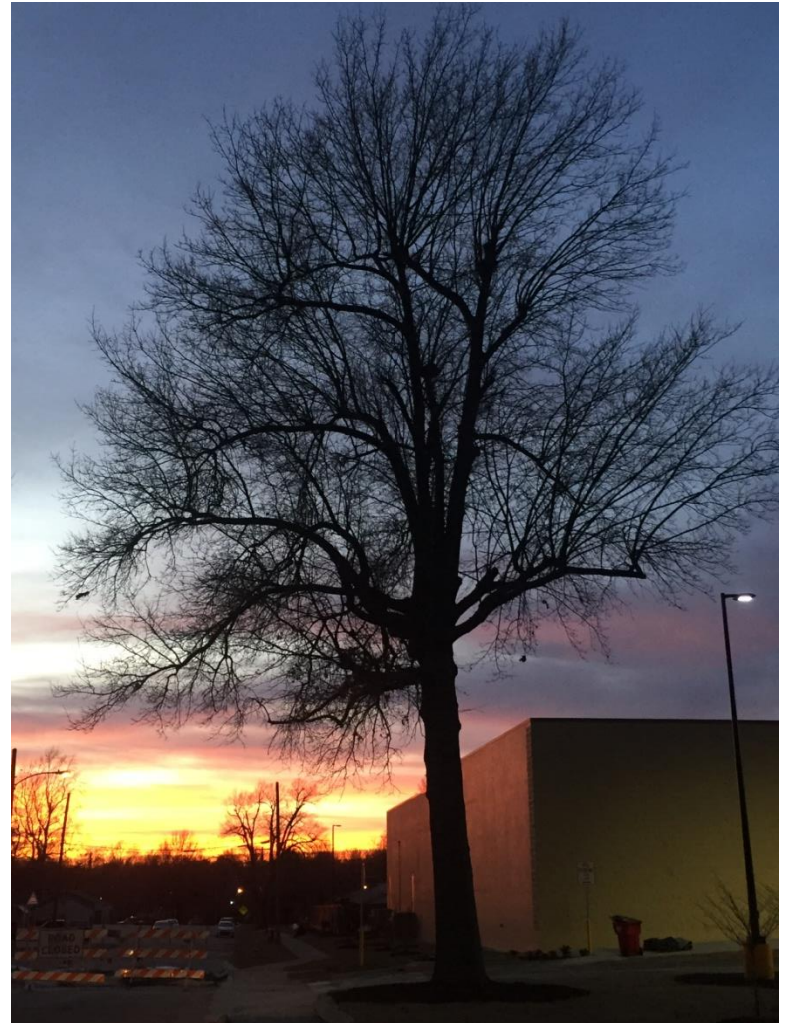
- City standards' would not have allowed retention of Chester.
- Root cuts on 3 sides.
- APWA Guidebook, page 29: “If more than 50% of a tree's root system will be cut or destroyed and/or the SCRZ can not be protected, it is recommended that the tree be removed for safety reasons.”

Tree and Growing Site Description: 33" DBH (Diameter at Breast height) Pin Oak (*Quercus palustris*, approximately 50' tall. Crown spread is approximately a 25' radius and over half the tree height is live crown. (See attached 4 photos at end of report.) Bole of the tree appears sound with no damage to the lower trunk. No cracks or fungal material were evident. Old pruning wounds approx. 15' up the bole show substantial callus growth as the tree is compartmentalizing the wounds. A few broken tips with multiple young terminal shoots were noticed in the crown of the tree, most likely damage sustained in the 2007 Winter Ice Storm event. The root flare of the tree was evident with main supporting roots traveling downward at a steep angle and in a radial fashion. No surface roots were apparent, suggesting good root development in a well drained soil with adequate micro and macro pores.

Recommendations: My suggestion is to retain this tree. Although root damage has occurred to the Pin Oak during construction, the tree appears to be in overall good health. The full extent of root damage is unknown, but it is my opinion that less than 50% of the root system has been impacted during construction activities. With time and no further negative site alterations the tree should be able to compartmentalize damage to afflicted roots and regrow of any lost structure. Restrict any unnecessary heavy equipment use within the TPZ. Do not stack or store construction/building materials within the TPZ. When re-establishing soil grade where utility line trenching has occurred (to south of tree), consider use of either hand laborers or excavator parked on the street to spread soil. If use of heavy machinery within the TPZ is unavoidable, consider tracked equipment instead of wheeled machinery to reduce ground compaction. Attempt to regain the original soil grade the tree grew in prior to construction.

Assessment

- Tree Re-evaluation – Post Construction
- Monitoring, Irrigation and Maintenance
- Assess effectiveness of tree preservation measures used:
What worked?
What didn't?
What to do differently next time?



Some die-back



Post-construction visit, April 2016

James Place - Before



James Place - After



A large, mature tree with a dense canopy of leaves in shades of yellow and green, suggesting autumn. The tree's trunk is thick and dark. A horizontal green banner with a black border is superimposed over the middle of the image, containing the text "Remediation of construction damage". Below the banner, the lower branches of the tree and a ground covered in fallen yellow leaves are visible.

Remediation of construction damage

Techniques include:

- Watering
- Fertilization
- Vertical mulching
- Tree growth regulators



New trees



During
construction



Post-construction

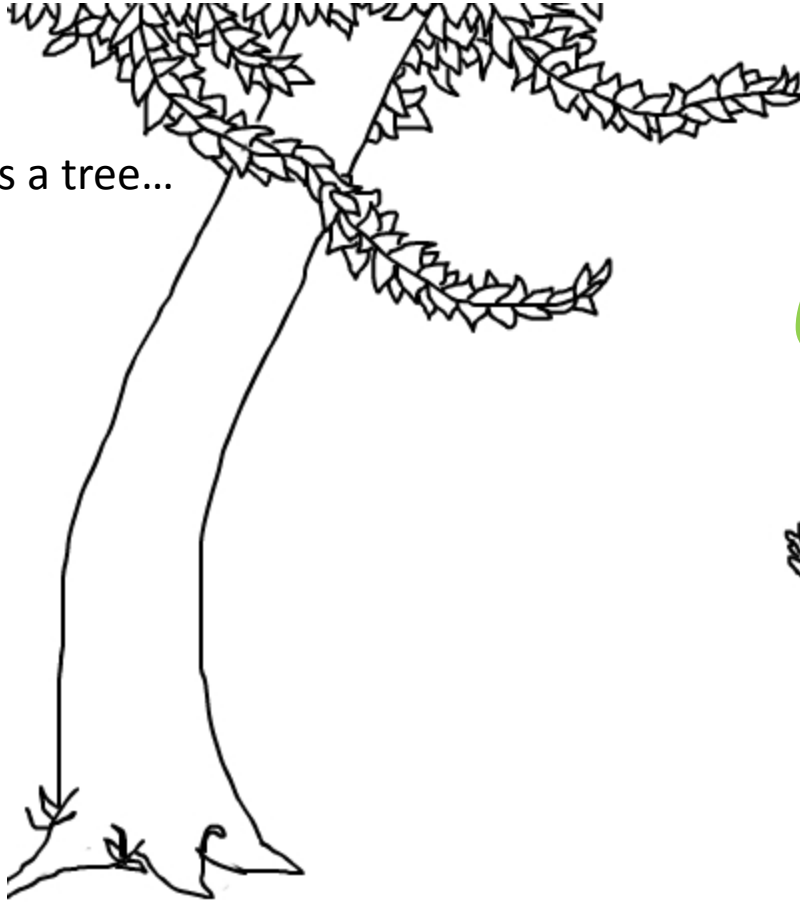
New trees



In Summary:

- Trees are just as much an important part of our community's infrastructure as sidewalks, roads and other utilities.
- Consider alternatives, both in design and in the field.
- Communicate with stakeholders before encroaching in a TPZ and when you observe damage.
- Incorporate inspection of TPZ on your job-site.
- Document damage because it can be useful in the future.
- Don't be afraid of tree preservation! IT'S NOT AS SCARY AS IT SOUNDS!

Once there was a tree...



Questions?



And the **girl** loved the tree... very much.
And the tree was happy.

Shel Silverstein

In honor of "Chester"

