Arlington's

TREE DESIGN GUIDELINES

https://tinyurl.com/ArlingtonTreeDesignGuide

NEED FOR STANDARDS

- Public works projects are designed by architects and engineers with tree planting as a component
- Rarely are arborists, especially municipal arborists, consulted to provide input
- Tree related details are often considered too late in the design process when change is difficult, resulting in poor tree planting even with arborist input

NEED FOR STANDARDS

- Some COA projects involved landscape architects
- There was rarely input from the City Forester or maintenance personnel
- This disconnect prevents process improvement

NEED FOR STANDARDS

- Tree preservation during street reconstruction projects was also an issue
- A Utah State University webinar in September 2018 discussed Seattle's new manual for addressing tree and sidewalk issues
- https://www.seattle.gov/Documents/Departments/SDOT/Trees/TreeSidewalksOperationsPlan_final215.pdf

POLL QUESTION 1

- Where do you work?
  - Private sector
  - Non-profit
  - Municipality
  - State

POLL QUESTION 2

- Which category best describes your work?
  - Design
  - Construction
  - Maintenance
  - Regulation

  - Everything?

EARLY PROCESS

- The Forestry and Beautification Division of Parks wanted to develop some standard or guidance concerning tree planting design and provide mitigation options for existing trees
- We had a draft document based on the most common issues encountered for new planting projects but had to determine how to implement standards

DESIGN CRITERIA MANUAL

- Arlington's Design Criteria Manual is a city council approved document to instruct engineering projects in the City of Arlington
- Input is provided by:
  - Public Works and Transportation
  - Water Utilities
  - Planning and Development Services
  - Parks and Recreation
  - Fire Department

DCM GUIDELINES

- In addition to the council approved manual (i.e. required for plan submittal) there are guidelines ranging from SWPPP to Streetlights

- Some aspects of the guidelines are included in the DCM as required components while the guidelines themselves attempt to provide all the information a project engineer or designer will need

TREE DESIGN GUIDELINES

Design Criteria Manual
Published May 2019
Updated May 2020

WRITING THE GUIDELINES

- Initially our document focused on existing trees and how other departments, such as Public Works, could better protect trees
- This example is a compilation of many sources into a simple graphic representation

A Visual Guide to Tree Root Disturbance
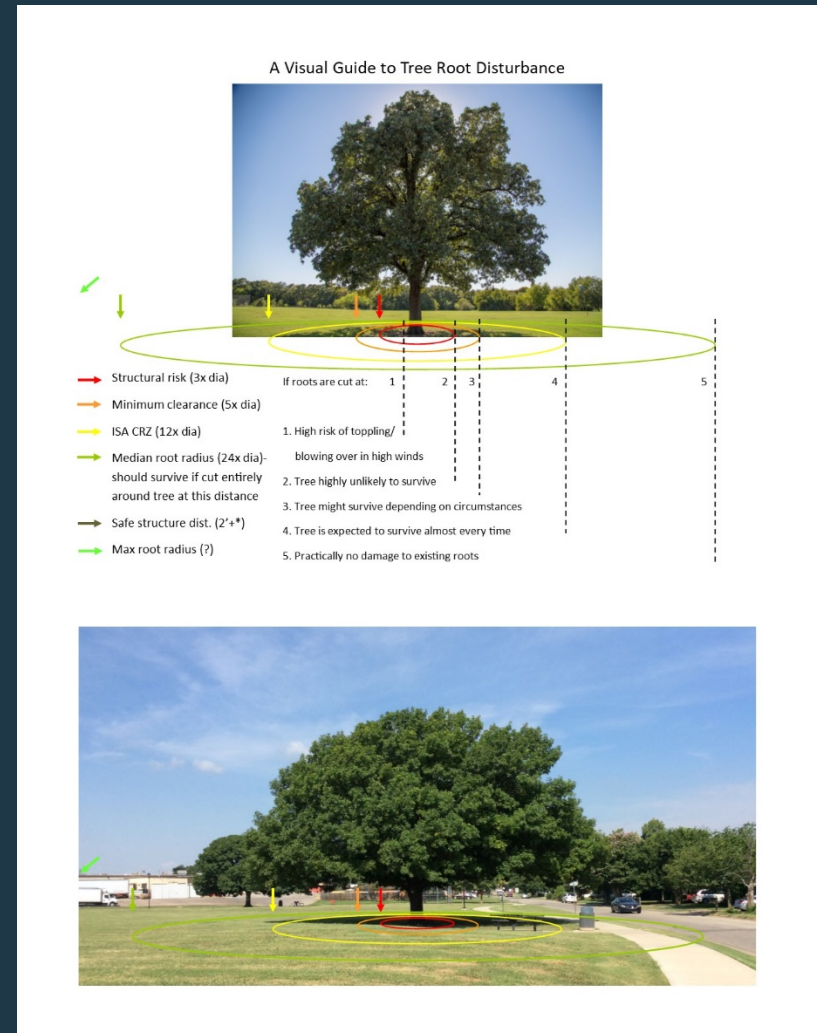
TREE DAMAGE AND PRESERVATION

- Seattle's Tree and Sidewalk Operation Plan provided many of the details for existing tree protection and mitigation of sidewalk damage
- We tailored our information to Arlington's needs and made sure it was organized for the most common tree issues

TREE DAMAGE AND PRESERVATION

- Preservation is presented after design in the document, but it was the basis of much of the recommendations for new tree planting

NEW TREE DESIGN

- We realized many of the preservation issues could be avoided by better design at the start
- The document focused heavily on how to ideally plant new trees as part of city projects
- Details concerning tree planting came from research and our experiences as we couldn't find a fully compiled tree design document

TREE INSTALLATION GUIDELINES

- We identified five key topics to address:
  - Maintenance and conflicts
  - Tree pits
  - Soil
  - Spacing and crown width
  - Species selection

DESIGN PRINCIPLES

- Intended to convey our view on the maintenance and care needed for trees
- Emphasize that maintenance needs will be impacted by the design choices
- This section was also intended to stress that trees and plants grow
- As such there needs to be careful consideration of the long-term impacts

TREE PITS

- Tree pits are popular and necessary in highly urbanized landscapes
- Nevertheless, trees need soil volume to survive
- Cover materials and protection also need to be considered
- Recessed pits can be used to help control stormwater runoff

SOIL

- North Texas soils are diverse
- In Arlington the soil changes dramatically from east to west along the ecoregion boundary
- Tree performance differs dramatically between the two ecoregions and needs to be considered
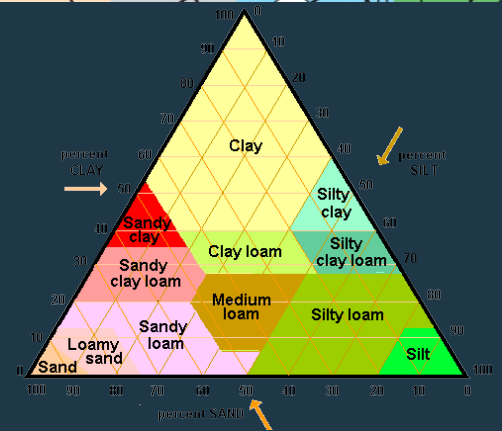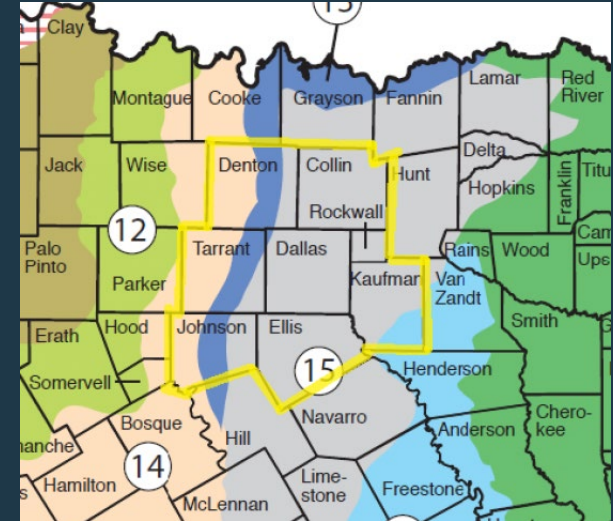
SPACING

- Overcrowding is common in many older tree plantings
- May be acceptable in cases of high expected mortality
- However, if survival is high, crowded trees need to be removed prematurely
- Trees are also planted too close to buildings, lights, and intersections for their full size

SPECIES SELECTION

- Diversity in a tree population protects against significant losses from insect and disease threats
- Proper species selection considers the soil, site conditions, and nearby structures to ensure planted trees provide long-term impact
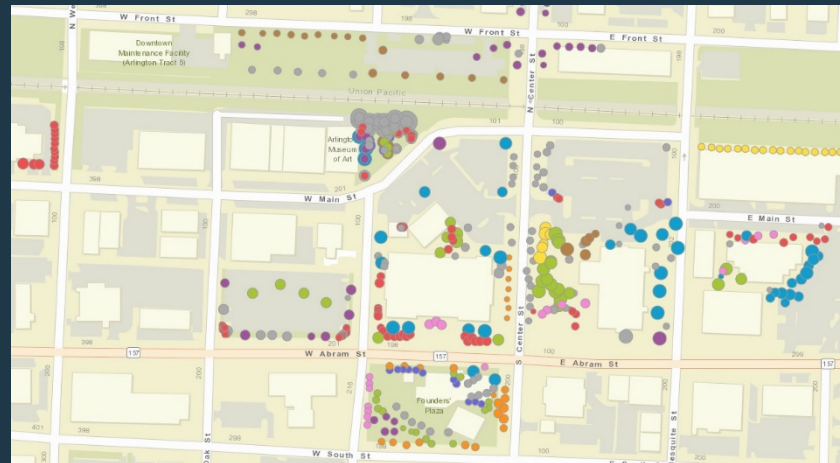
SPECIES SELECTION

- We updated our approved tree list for city projects with a new format to better clarify performance
- Within the Approved species we categorized each as Highly Recommended, Recommended, and Acceptable
- We provided each species expected height, width, growth rate, and lifespan
- We also determined if species were tolerant of drought, flooding, and/or clay soils
- This works hand in hand with our guidelines

https://tinyurl.com/arlingtonforestry

FINDINGS

- Concrete facts and figures seem to be well received and easier to follow
- Designers I've spoken with are willing to adjust when they have the information
- Compromises are sometimes necessary to provide for the best long-term tree, such as reducing the number of trees planted

Table 3. Minimum distances for tree planting on medians and right-of-ways. Distance opposite turning vehicle is clearance needed from the stop bar to the closest tree in front of a turning vehicle (see Figure 8 below). This distance is intended to provide NHTSA recommended sight-lines for left-turning vehicles. This distance may not be suitable in all cases. Distance from median end is minimum distance from intersection to tree if there is no turn lane opposite (see Figure 9 below).

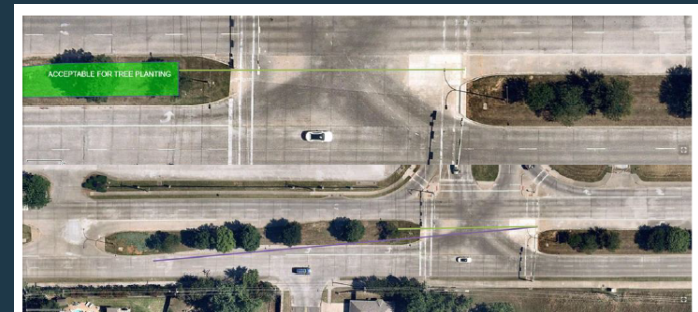| SPEED LIMIT (MPH)	NHTSA SAFE VISIBILITY	DISTANCE OPPOSITE TURNING VEHICLE	MINIMUM DISTANCE FROM MEDIAN END
30	335'	123'	15'
40	445'	163'	40'
50	555'	203'	130'
60	665'	245'	200'

Figure 8. Example of safe distance for tree planting at an intersection with an opposite turn lane. For this 40-mph roadway, distance from the first tree to the opposite stop bar (green line) should be at least 163'. In most cases this will provide the NHTSA recommended visibility (purple line). Please note that light poles or other obstacles may require additional clearance.

FINAL THOUGHTS

- This was a multiple year process
- The guidelines we provided are for an ideal situation from a tree perspective
- They are still guidelines and merely provide the necessary information, it is up to the designers to implement the best strategy
- Having guidelines is useful with or without arborist plan review
- How useful is not yet known

Jeremy Priest, Certified Arborist- TX-4264A
Forester
Arlington Parks and Recreation Department
817-575-8310 • Fax 214-801-5762
1924 W Randol Mill Rd • Arlington, TX 76012

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