A scenic landscape featuring a calm lake in the foreground, reflecting the surrounding environment. In the middle ground, there are dense green forests covering the slopes of mountains. The background shows more distant, hazy mountain ranges under a bright, clear sky where a sun or moon is visible, creating a soft glow. The overall color palette is dominated by greens, blues, and whites, giving it a serene and natural feel.

Trees and Soil
or
Why landscapers are
key for the urban forest



Landscape designer are key to urban trees! “green” landscapers will be busy.



What we will talk about today:

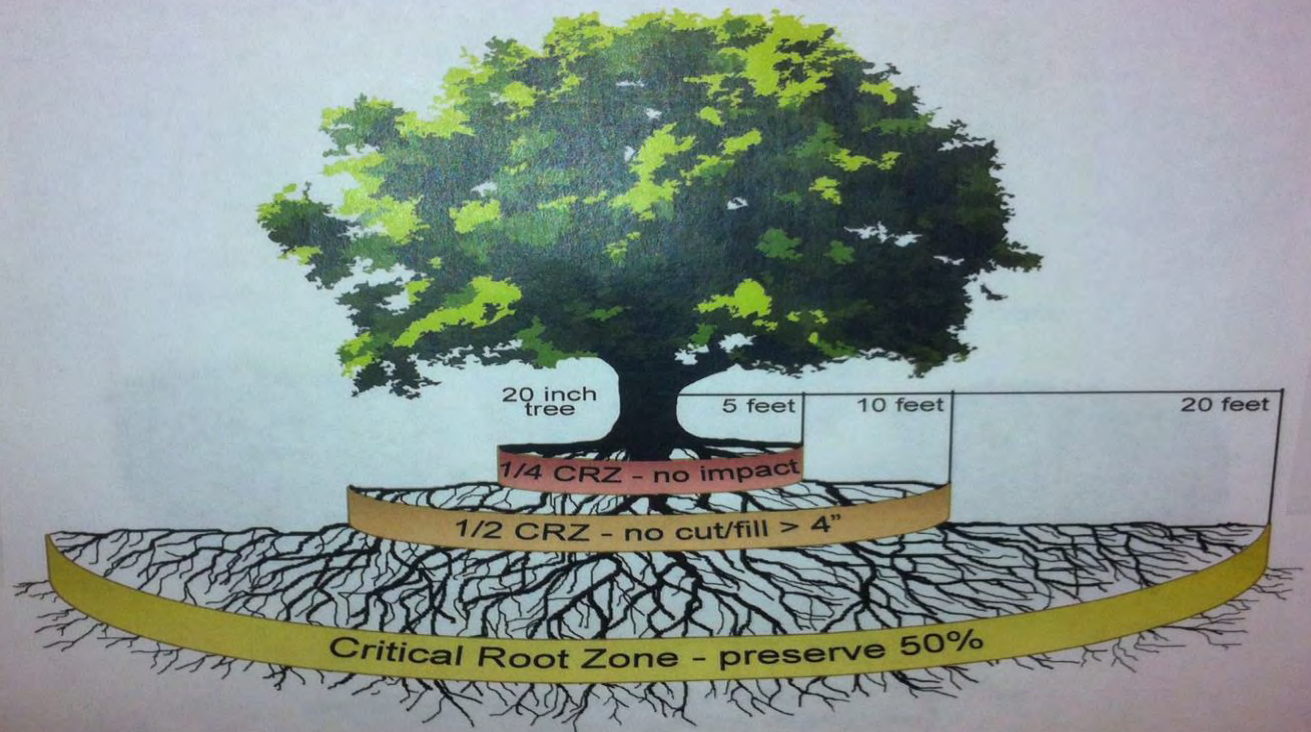
- Roots: where?
- Soil characteristics: basics
- Water and soil: basics
- Nutrients

Common Abiotic tree defects related to soil.

- Compaction
- Grade issues
- Root flares

CRZ ?!

The Critical Root Zone - Development Impact Zones



Root
location !!!



Root Depth?



Root
Plate VS
Root ball

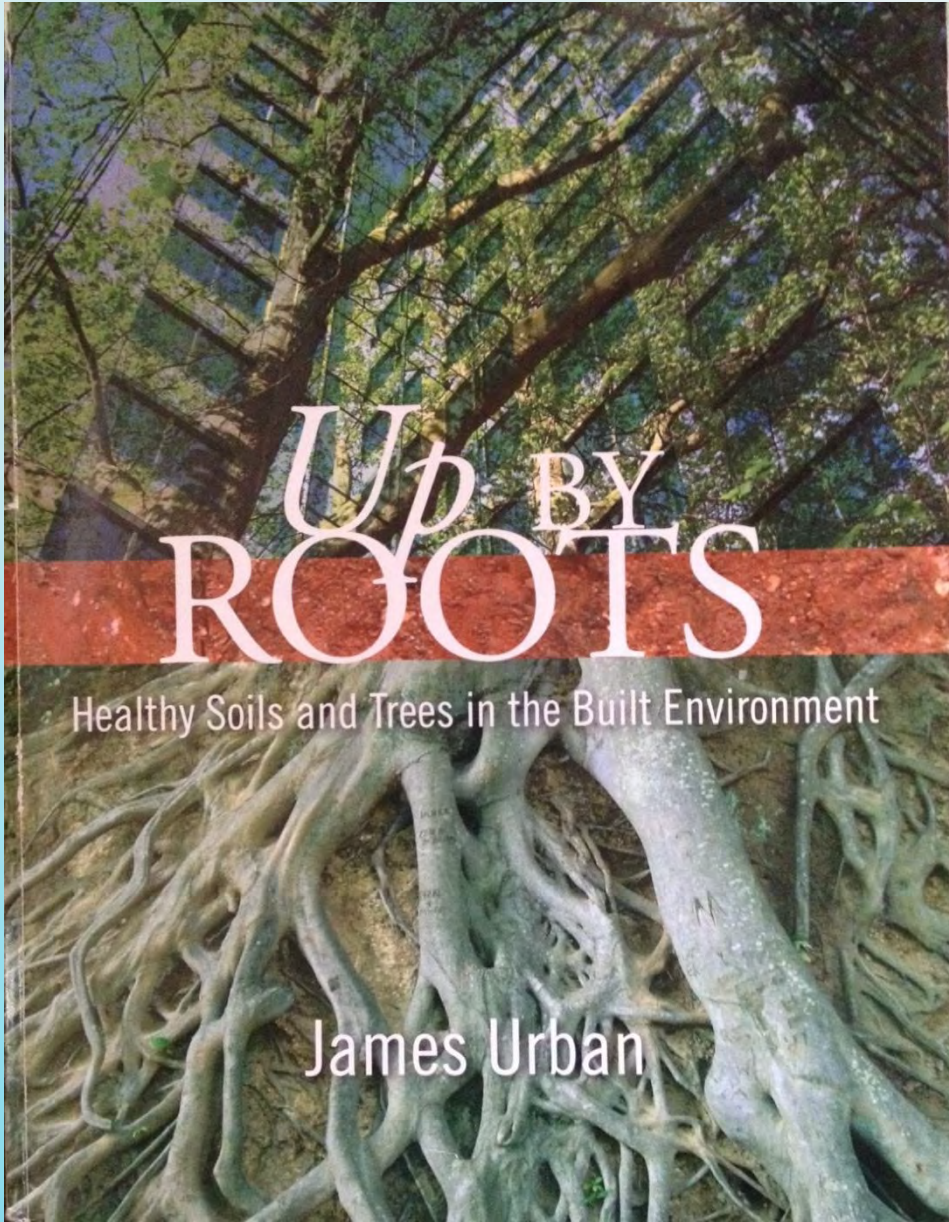








$\frac{1}{4}$ crz root mapping:
size and depth of roots.



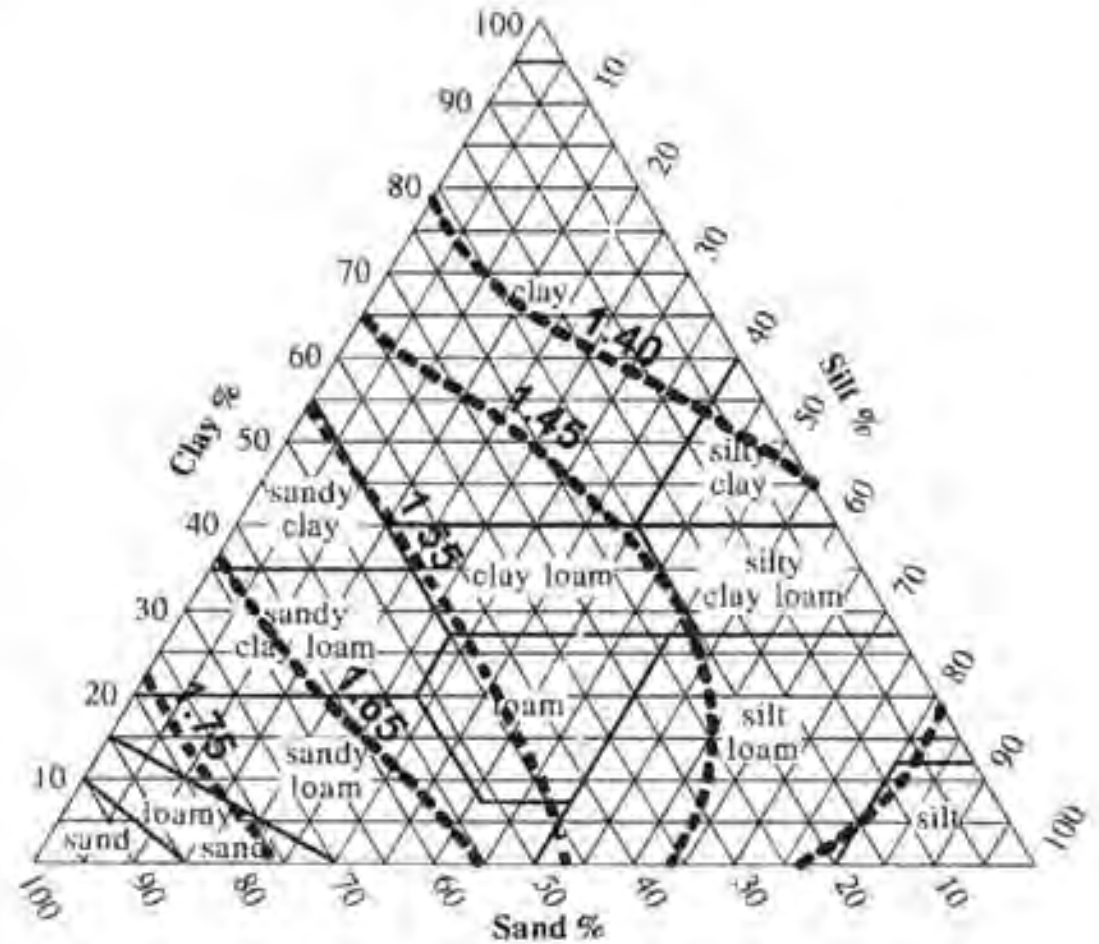
Up BY
ROOTS

Healthy Soils and Trees in the Built Environment

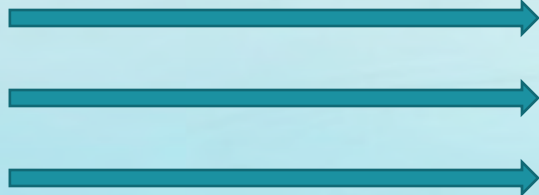
James Urban

Soil properties:

- **Texture:** particle sizes. Clay-silt-sand-Gravel
- **Structure:** bonding of particles. Clay peds are strong. Sandy peds are weak.
- **Density:** degree to which particles are packed together. Bulk density is the measure of compaction of a soil.
- **Water movement:** speed at which water moves in response to capillarity and gravity.
- **Nutrient holding capacity:** clay holds better than sand.
- **Temperature:** 75F is ideal. Nitrification slows above 85 and roots are damaged at 95 and above.
- Organic activity: **rhyzosphere**, the last frontier.



Water: how much ?

- 1sqft requires 1.2 gal to saturate 12” depth and is 1” of rainfall.
- A 20” tree 
 - 1440 sqft CRZ
 - 1728 gal.
 - 2160 cuft soil

With a 3/4” hose, at 9gal/min, that is 3h 10 min !

Spray irrigation soaks about 2-3 inches depth en encourages shallow tree roots. Trees become dependant on the turf schedule.

Newsflash

- Water does not stand still, it is impacted by gravity
- Trees do not depend on rain falling on their root zone only, they also obtain large amounts of water from run off
- Alterations in grade and channeling modifies drainage and average annual available water on site
- Conclusion:

Retain some of the storm water by all means necessary, including soil quality and quantity :

Erosion Control

The need for thinking outside the pipe!



Water wise design: 100% of 2" rainfall controlled on site.



Earth and rock works for waterwise design







Check dams and cedar mulch trail



Herb and bulb Garden check dam



Dry stack edging
as mini check-
dam





Last note on water:

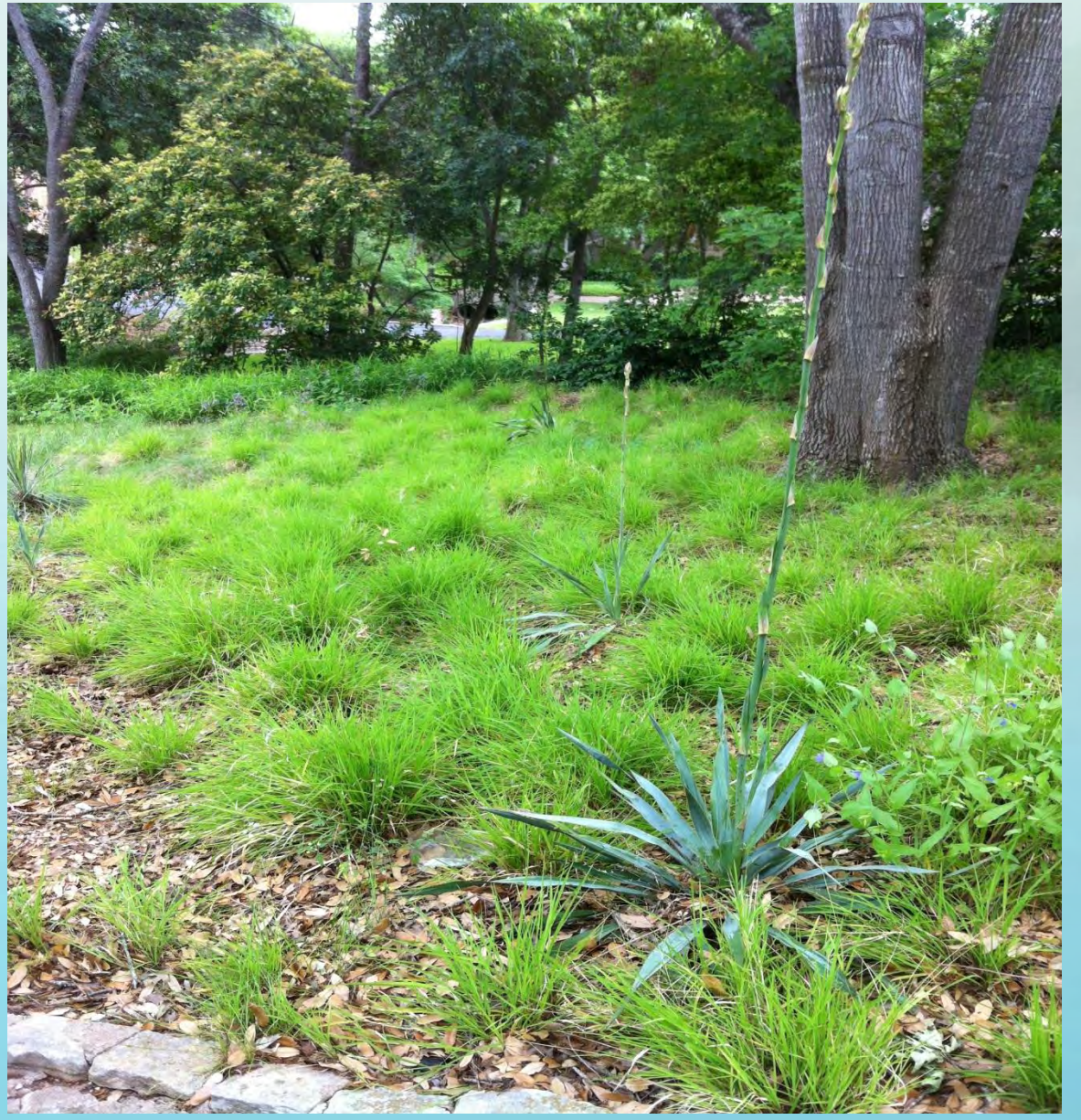
- Remember CRZ and soil volume
- Mulch can shed water....
- Mulch needs to be “fluffy” not watershedding

Organic Matter

!!!









Compaction:

the process of
killing soil and
loosing water.

The building process



Compaction by vibrating roller





Not supposed to be able to hold soil like that.



Instant Soil Rejuvenation in Root Zones



Radial Trenching



Soil: Dig it!

This is how you look after airspading.
And having removed the ppe's of course.





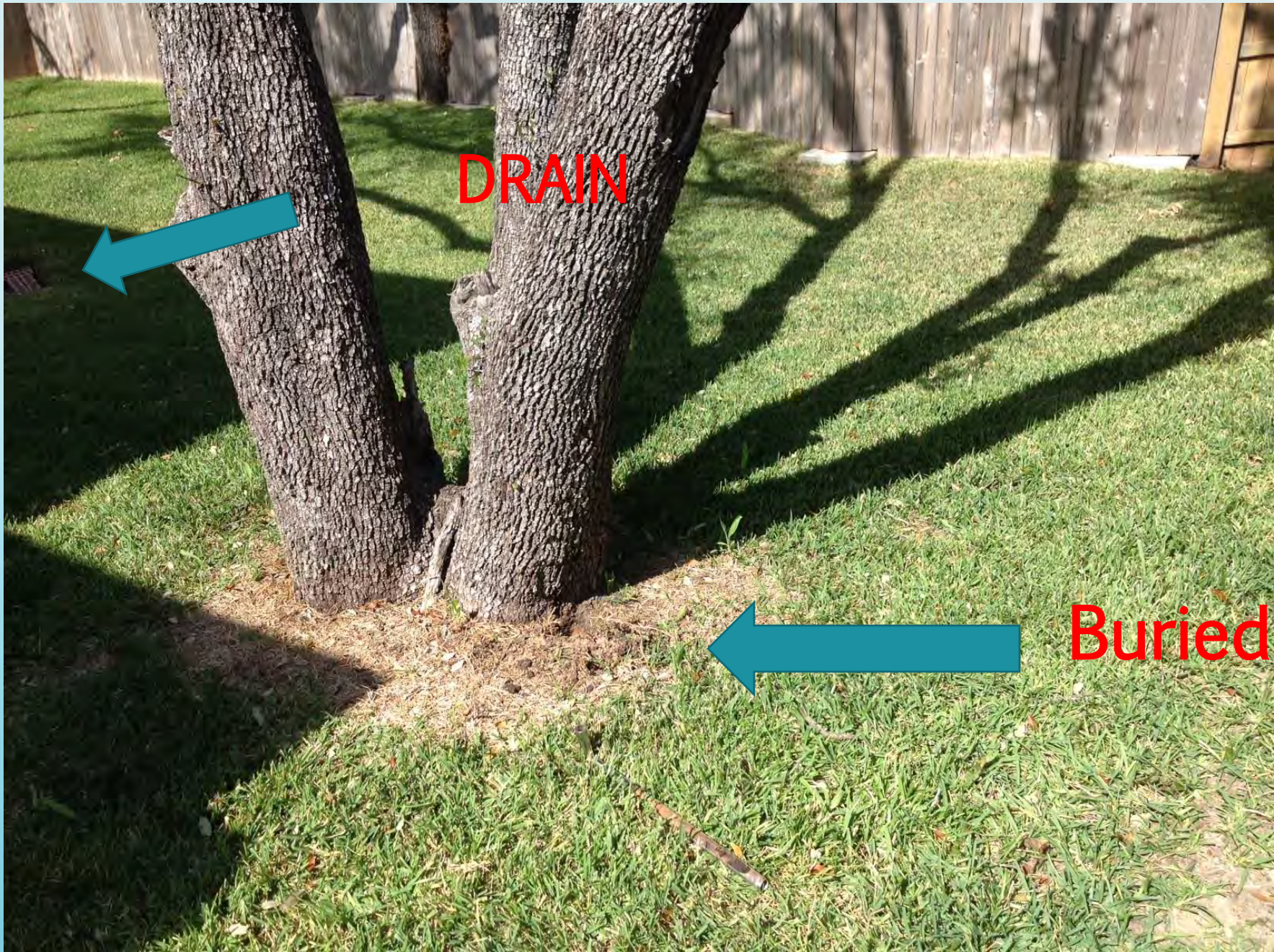
Grade issues



Graded below the root profile at start of project: tree declined rapidly.

2 years after
Construction





DRAIN

Buried root flare





Mass of small roots
over root flare



The holy Root Crown



Fibrous and small diameter roots over root flare. How much can I remove?

Raised beds...choking
roots and water
shedding

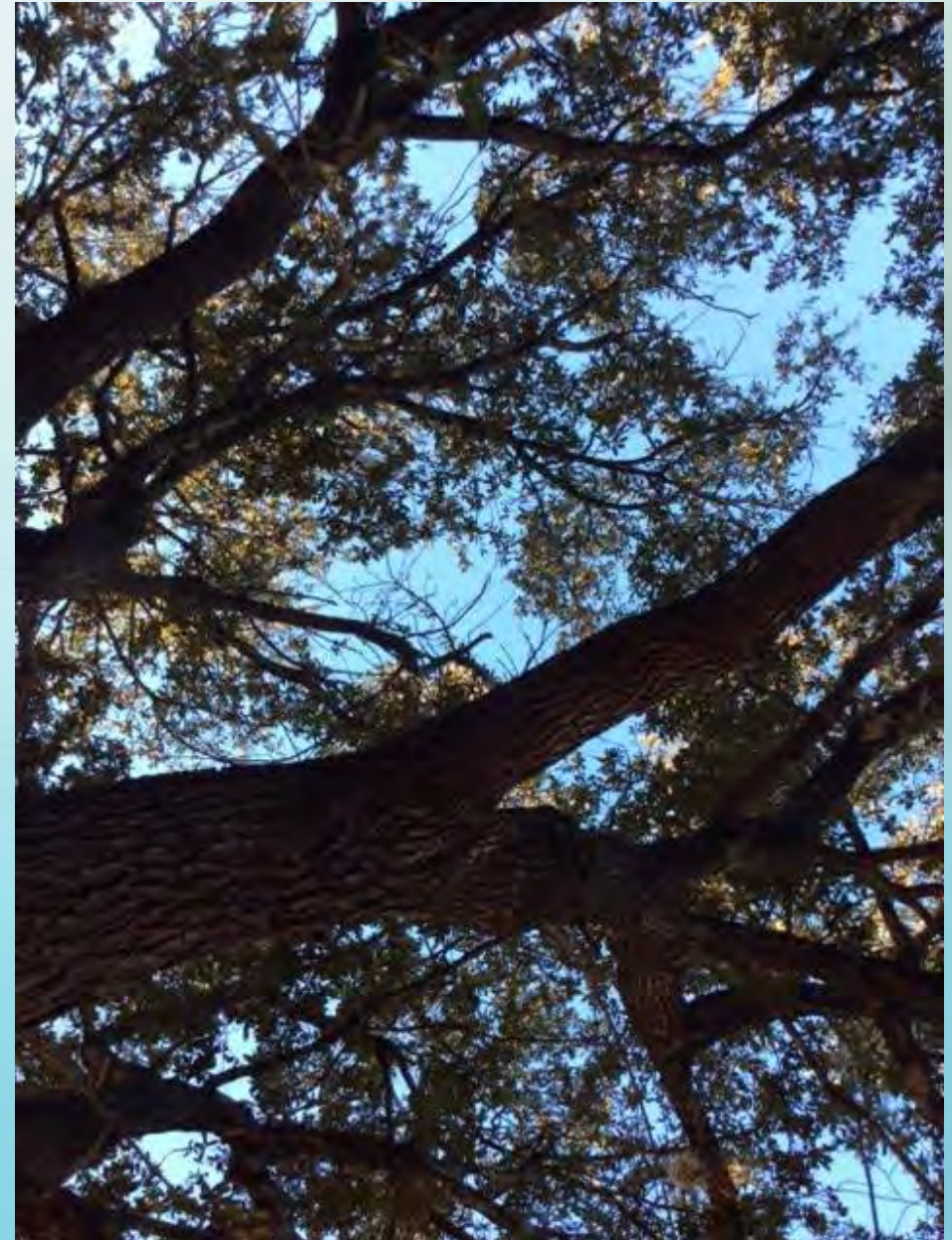








Canopy density contrast. See next slide for diagnosis



Choking root



Tree well



GANODERMA
basal rot:
Infection from
drought stress or
root damage in a
3 ft radius
around the base



Phytophthora “Plant Killer”: cambium rot disease

Slow kill. Infection favored by long term moisture on the root flare or by general loss of vigor



Flux on a Cedar Elm.





Limit turf,
and soil
will follow





share it for awareness