

Planning & Design to Increase Canopy

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Topics

- Goals of Urban Forestry Program
- Design Applications
- Species Diversity
- Soils
- Respecting Base of Tree
- Pavement removal & canopy creation

TREES: Multi-Tasking Bio-Utility

- Air conditioner
- Water and Air Purifier
- Anger Management Program
- On-Site Marketer of Place

Planning for Trees

- Trees can have 60 - 100 year life cycle
- Must design for an expanding target

What other infrastructure:

- Improves in performance over time
- Accrues in value over time

SYRACUSE'S URBAN FOREST

Street Tree Population

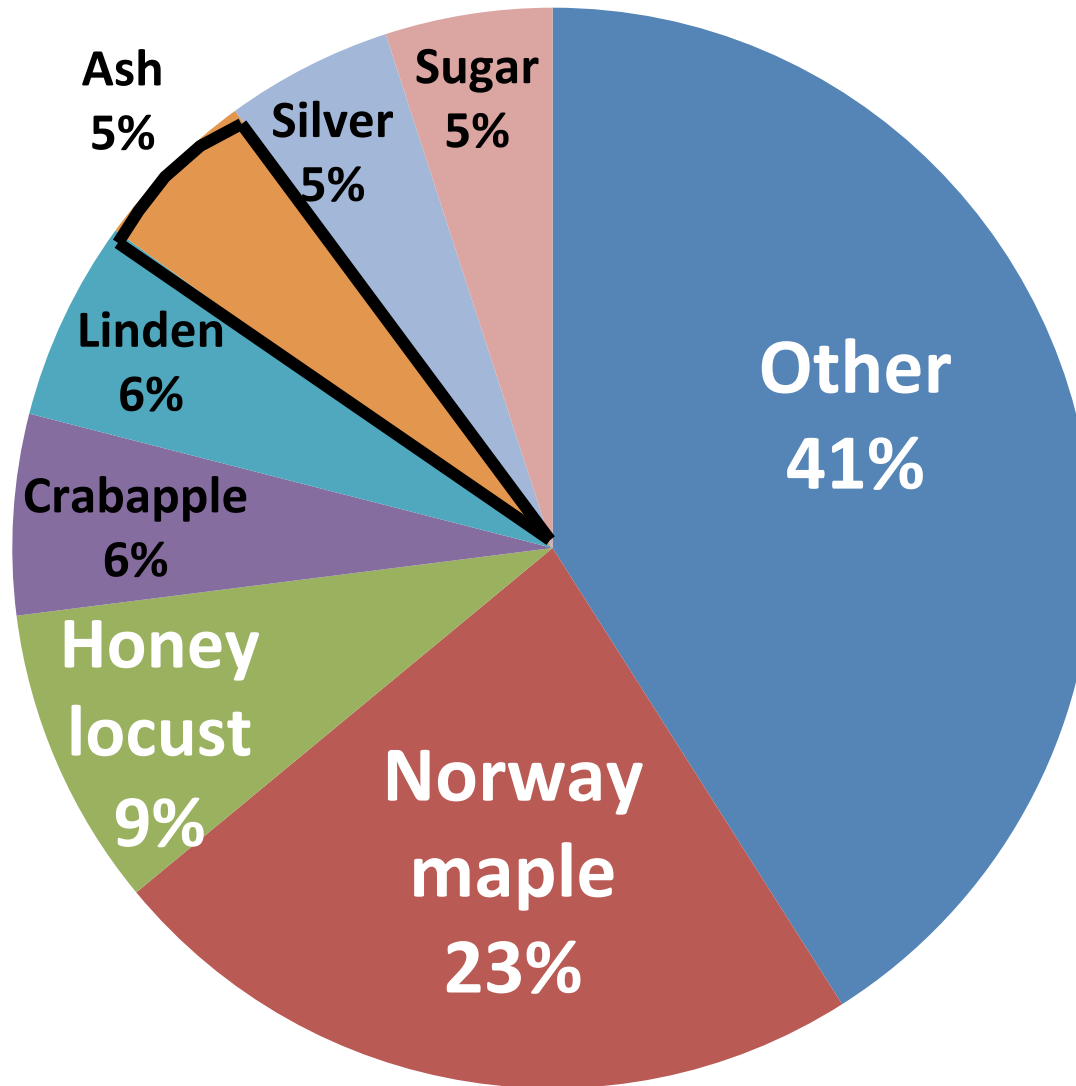
1951 = 49,000
1978 = 39,000
1999 = 32,000
2011 = 31,500

← Loss of elm
← Labor Day Storm
← Planting=Removals

Top 7 Street Trees = 60% of stems

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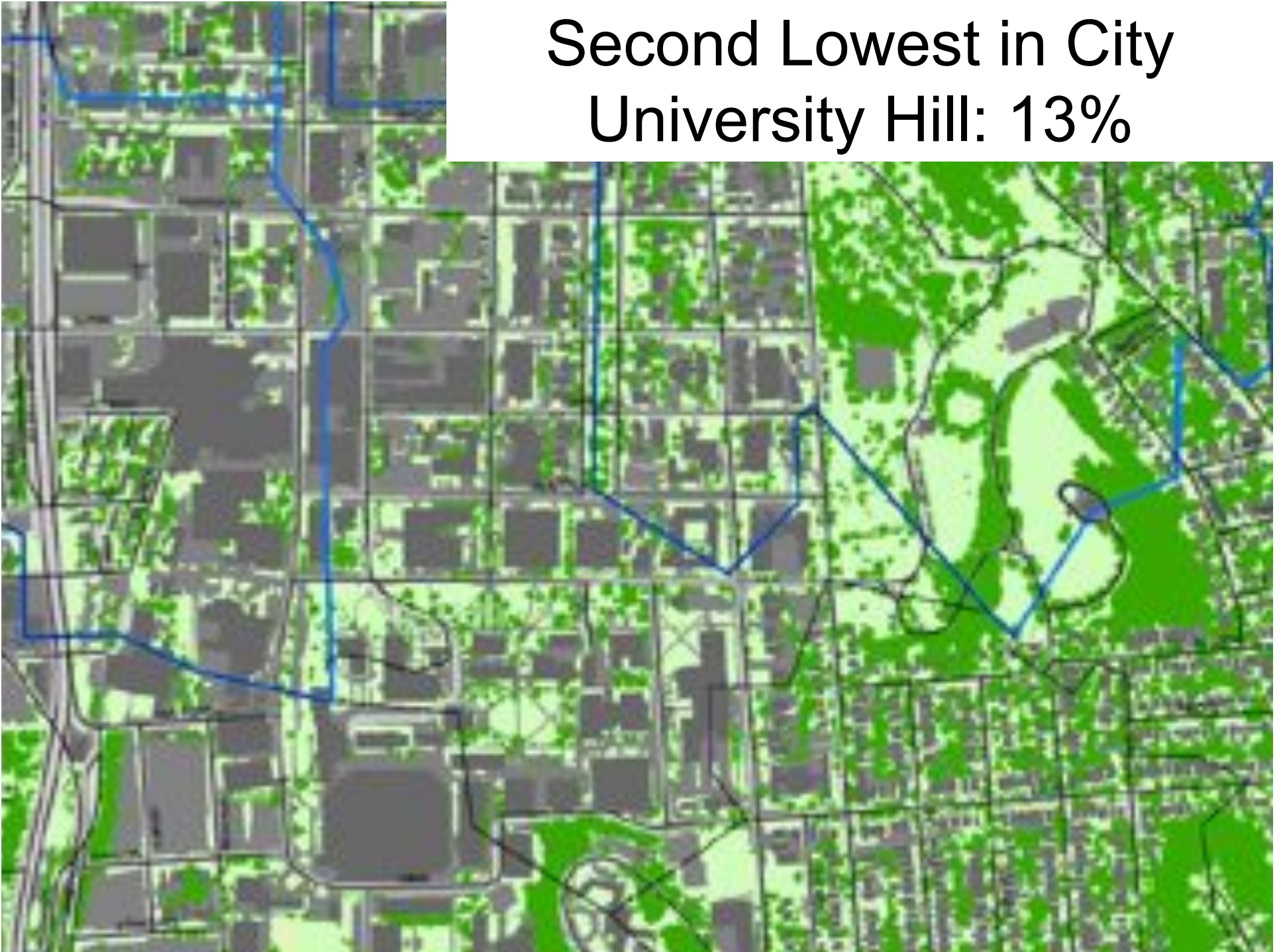
Canopy Cover 2010: 27%

Westcott 39%

Near Westside 19%



Second Lowest in City
University Hill: 13%





← GOAL →

Increase CANOPY

Trees and Save The Rain

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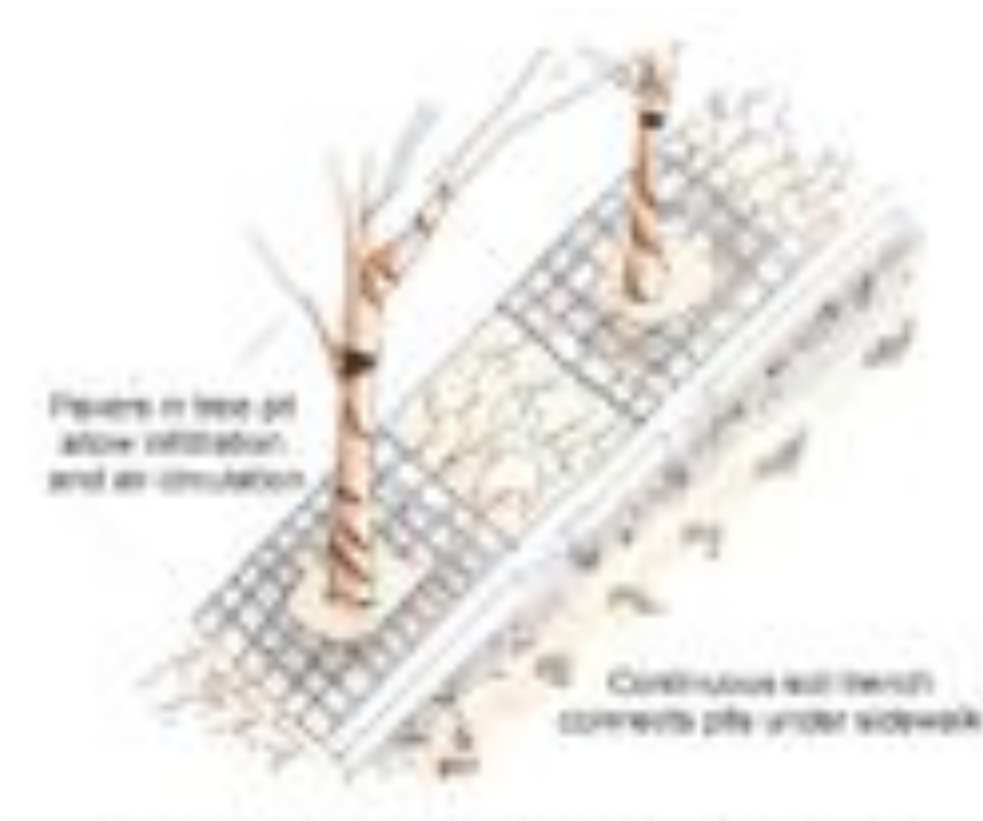
Four applications:

1. Tree pit
2. Tree trench
3. Parkways and Green Streets
4. Residential street tree planting

Porous Pavement

- Do not use next to trees unless material supporting porous pavement allows root growth underneath
 - Structural soils, silva cell, etc.

Tree Pit



- Hardscape on 4 sides
- Structural soil or soil under pavement
- Compaction resistant soil with low OM
- Cover opening with materials that break away cleanly

Silva Cell and Structural Soil



Tree Trench



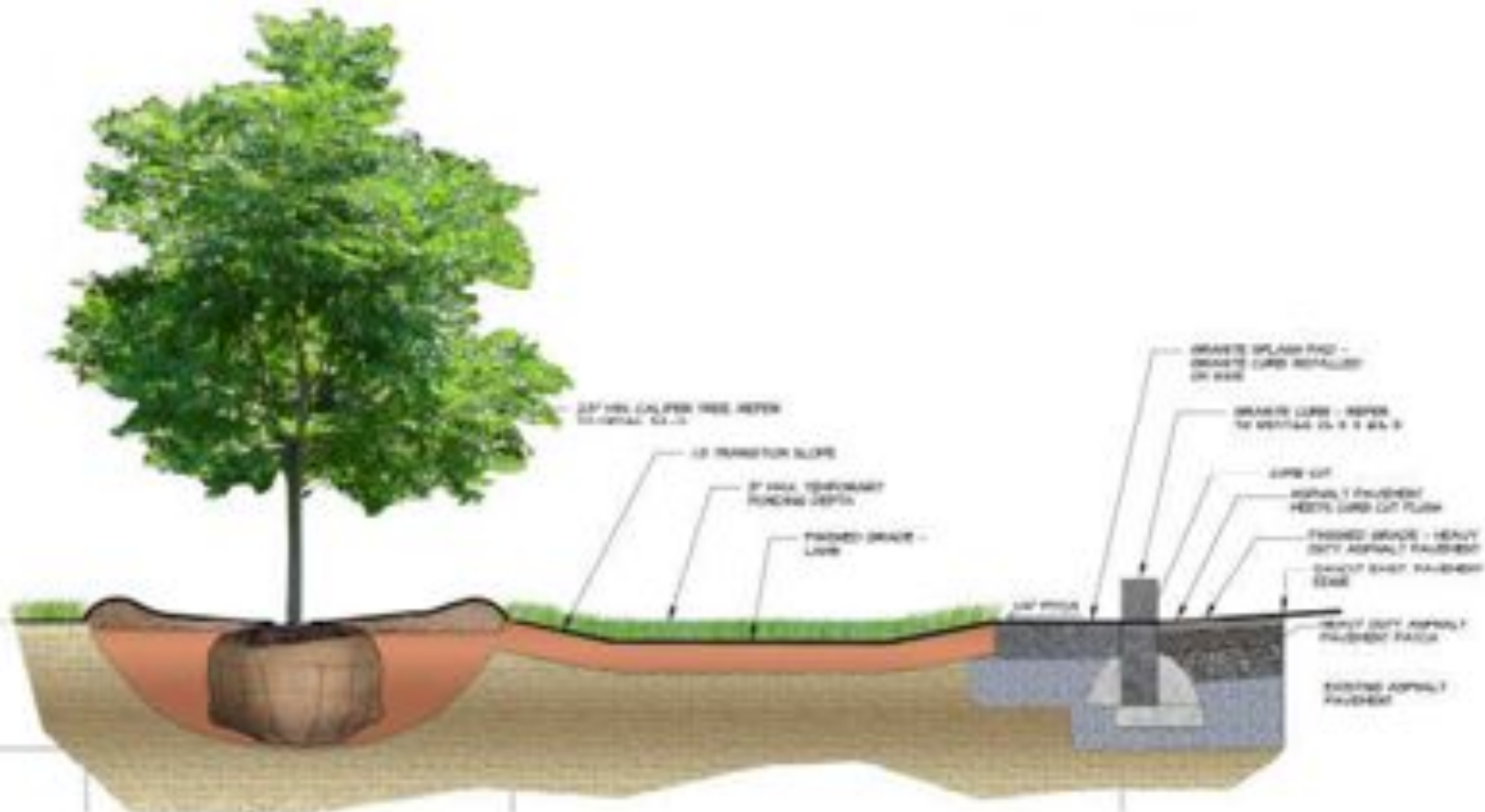
- 2 sides of hard scape
- Open, continuous soil trench
- Compaction resistant soil, low OM

Parkways & Green Streets

Otisco Street Green Corridor



1. Rehab or replace soil in tree lawn
2. Upgrade sidewalks and Curbs
3. Plant trees



Pass Arboretum



Pass Arboretum



Residential Street Tree Program

- 8,500 trees by 2018
- 4,500 by contract
- 4,000 via Community
- FU Maintenance
 - Watering
 - Weed-Free Mulch Ring
 - Pruning

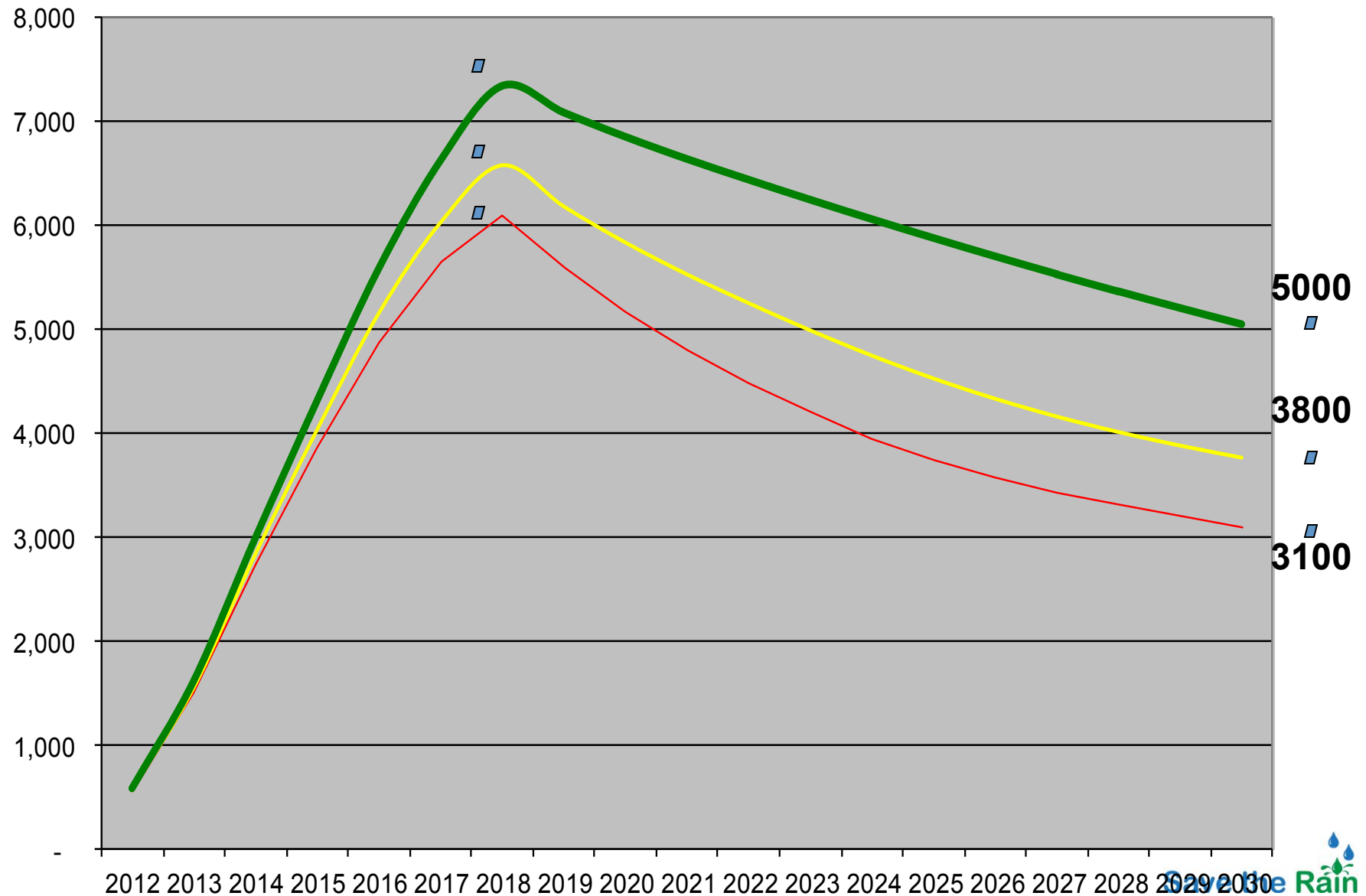
2011	400
2012	900
2013	1,250
2014	1,250
2015	1,250
2016	1,250
2017	1,150
2018	1,050

Factors Affecting Mortality

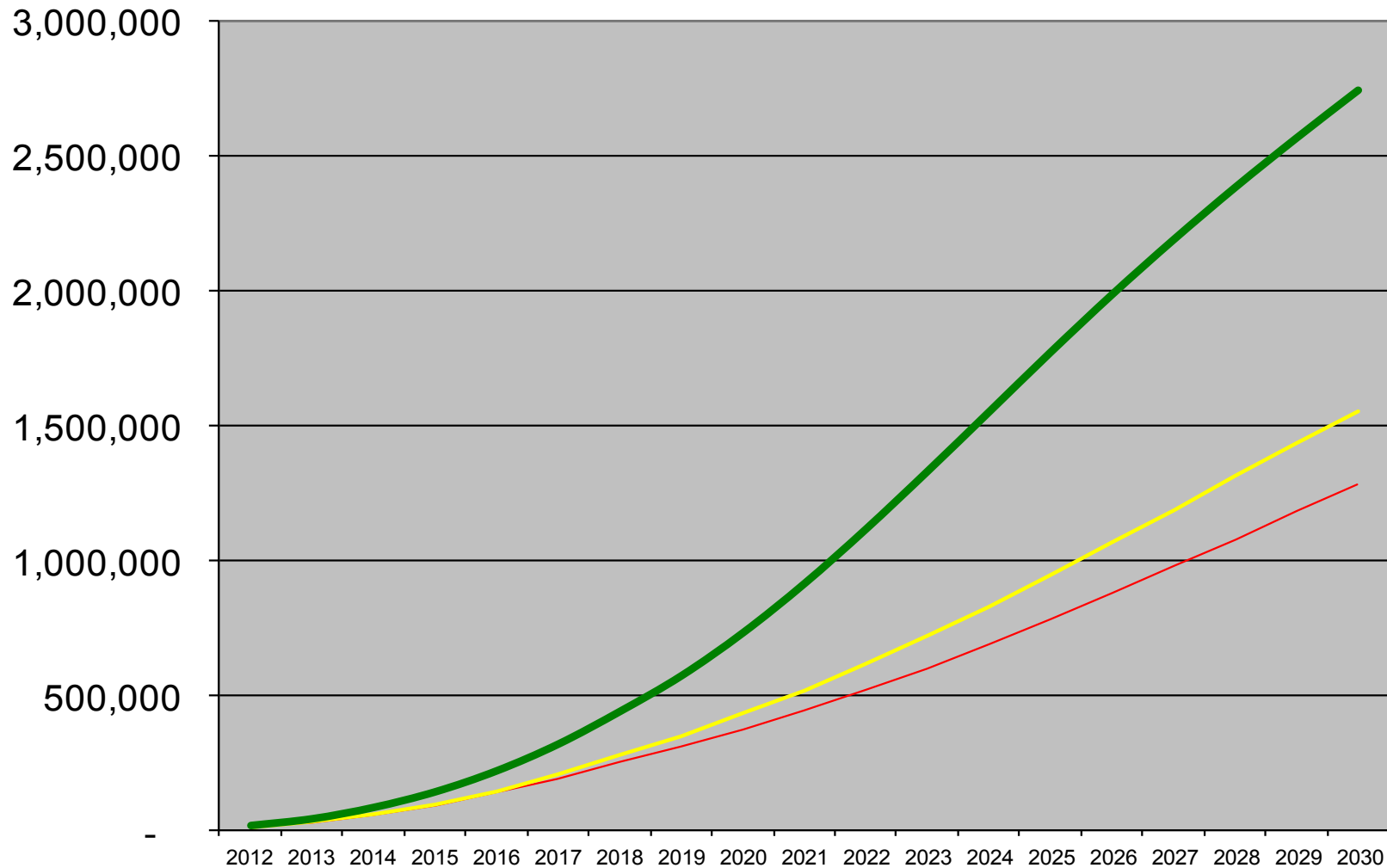
RATE	FACTORS
HIGH 7–9%	No community; poor contractor monitoring; untrained volunteers; poor stock quality; poor site selection
MED 5–7%	Community involved; good contractor monitoring; trained volunteers; high quality sites and stock
LOW 3–5%	Community involved; good contractor monitoring; trained volunteers; high quality sites and stock; <u>After-care</u>

J. Bond. 2005. Davey Resource Group. “Urban Tree Canopy Cover Inclusion in State Implementation Plans”

Projected Tree Mortality to 2030



Projected Canopy Creation to 2030



6.3% Capture Via Green Infrastructure

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Reduce 250 MG/yr of CSO by 2018



Tree Planting Program Goals

Basin	Tree Planting Goal	Assumed CSO Reduction (MG/yr)	Estimated Cost	Estimated Cost per Gallon
Clinton	3,500	5.0	1,400,000	\$0.028
Midland	2,000	2.8	800,000	\$0.028
Harbor Brook	3,000	4.3	1,200,000	\$0.028
TOTAL	8,500	12.0	3,400,000	\$0.028

314 ft² canopy/tree (20') = 1,440 gallon reduction

\$400 per tree

Species Diversity and Scale

- Neighborhood scale reforestation
- Diversity at what level?
- Species List impacted by:
 - Stock type
 - Season of planting
 - Soil qualities

Use of Natives

Natives first unless:

1. Not adaptable to urban soil
2. Not at expense of stem diversity

Greatest urban tree disasters have been natives attacked by exotics

Species and Stock Type

- 1.5" Bare-Root
 - Community Planting– Parks, Streets
- 1" bare-root, container–spring & fall
 - Wealthier neighborhoods, lawns
- 2" B&B Spring and Fall
 - Largest stock
 - Neighborhoods rentals, main blvds.

Using Smaller Stock

- Lower unit cost
- Easier to transplant
- Rapid establishment
- Increases species list
- Need right sites



Save the Rain

How to Diversify Palette

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CONDITION OF PLANTING SITES WITH NO OVERHEAD UTILITIES

Strip Width	Good	Fair	Poor
5 to 8'	118	188	24
8 to 11	434	482	96
11+	47	-	-
	598	670	120



Proven performers
go here

Diversity
starts here

Design Considerations

Where are Trees Doing Well?



Where are Trees Doing Well?



Where are Trees Doing Well?



Soils

Urban Soils

- Poor drainage, shallow profile
- High pH
- Limited rooting volume

Construction Practices

- Post WWII: Tanks and Dozers
 - Where has all the soil gone?
- Residential Tree Lawn Soil
 - Stood the test of time
- Preserving and Protecting Soil
 - Stay off or stock pile healthy soils

THIS IS NOT TREE PROTECTION



THIS IS TREE PROTECTION



Soil Re-Use

Soils excavated from:

- Tree lawns
- Footprints of Pre-WWII Buildings
- Parks
- 20,000+ cubic feet of soil will be generated from Street Tree planting

Can be used for Pavement Removal Projects

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Well?

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Respect the Base of the Tree

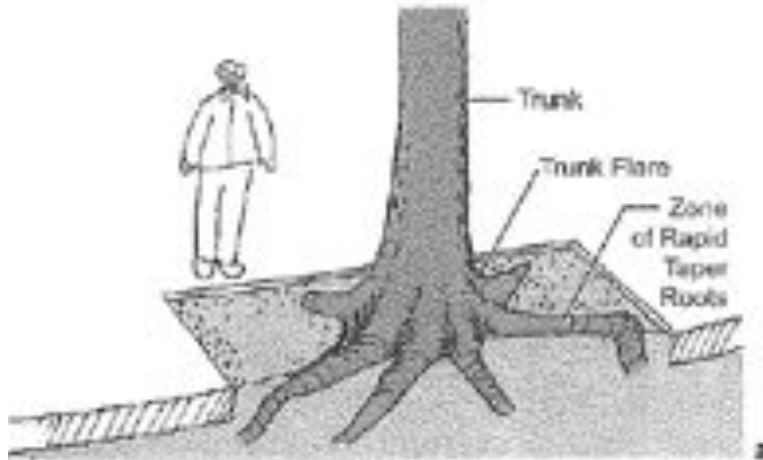
- Plan for Tree at Maturity
- Max. Tree Opening & Min. Pavement
- Linear and Uniform Patterns are Limiting

Respect the Base of the Tree

- Poor drainage and limited rooting volume creates conflicts



Respect the Base of the Tree



Respect the Base of the Tree



- Balancing need for large trunk opening with traffic flow

Respect the Base of the Tree



Respect the Base of the Tree



Eventually
roots fill in
space

Respect the Base of the Tree

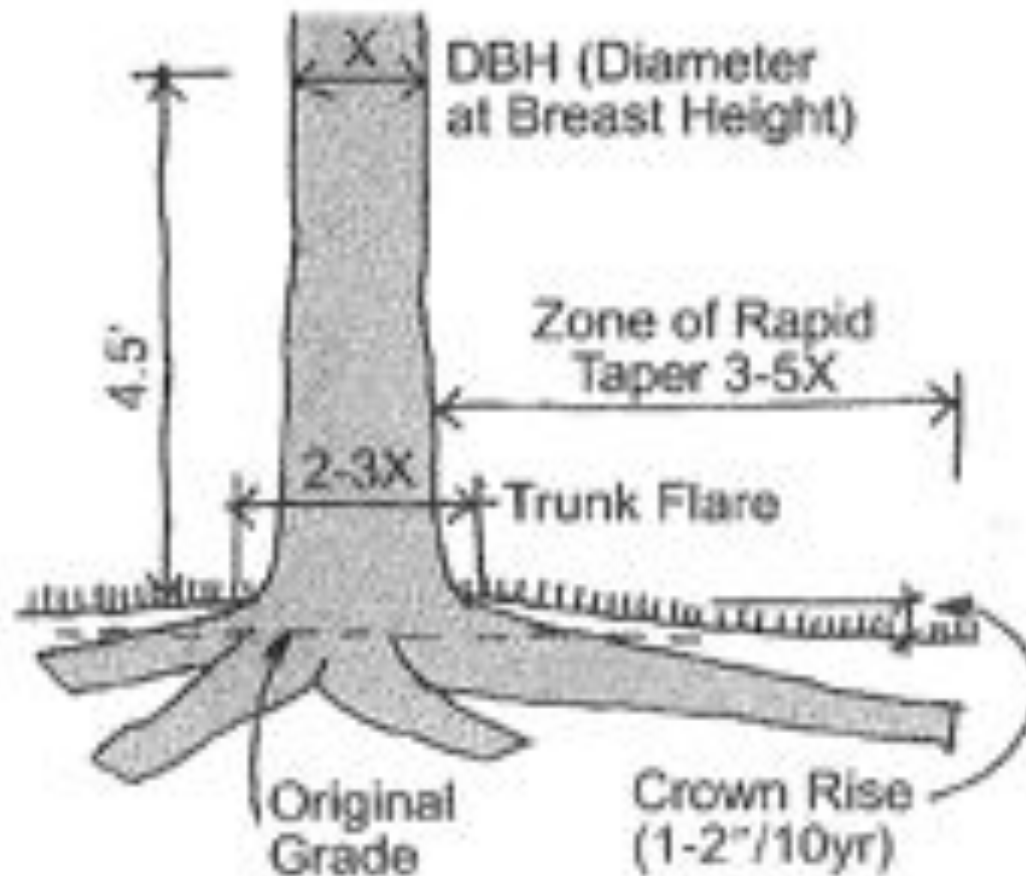


Figure 2.5.11. Dimensional relationships of the base of mature trees.

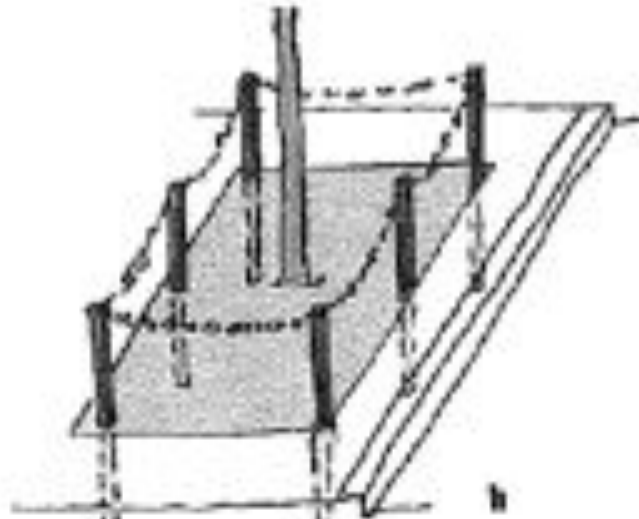
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Respect the Base of the Tree

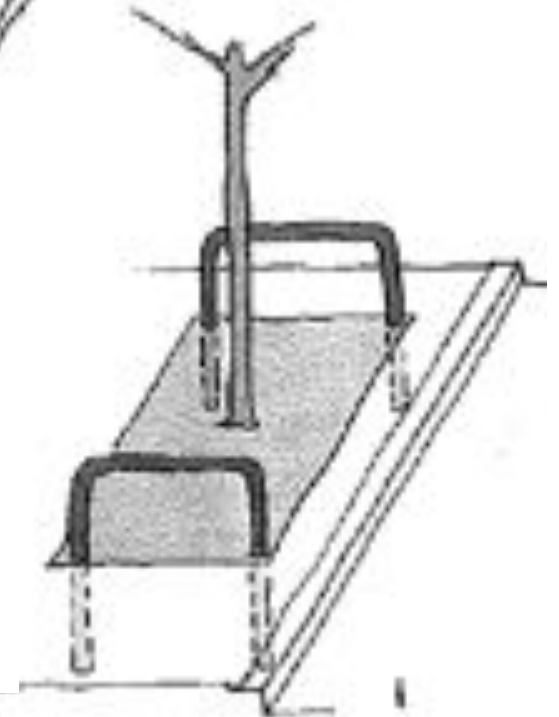


Low fence with ground cover. Tripping hazard issues never surfaced.



Bollard with chain

Pipe wicket design effective enough to direct pedestrian away from tree – bike rack too.

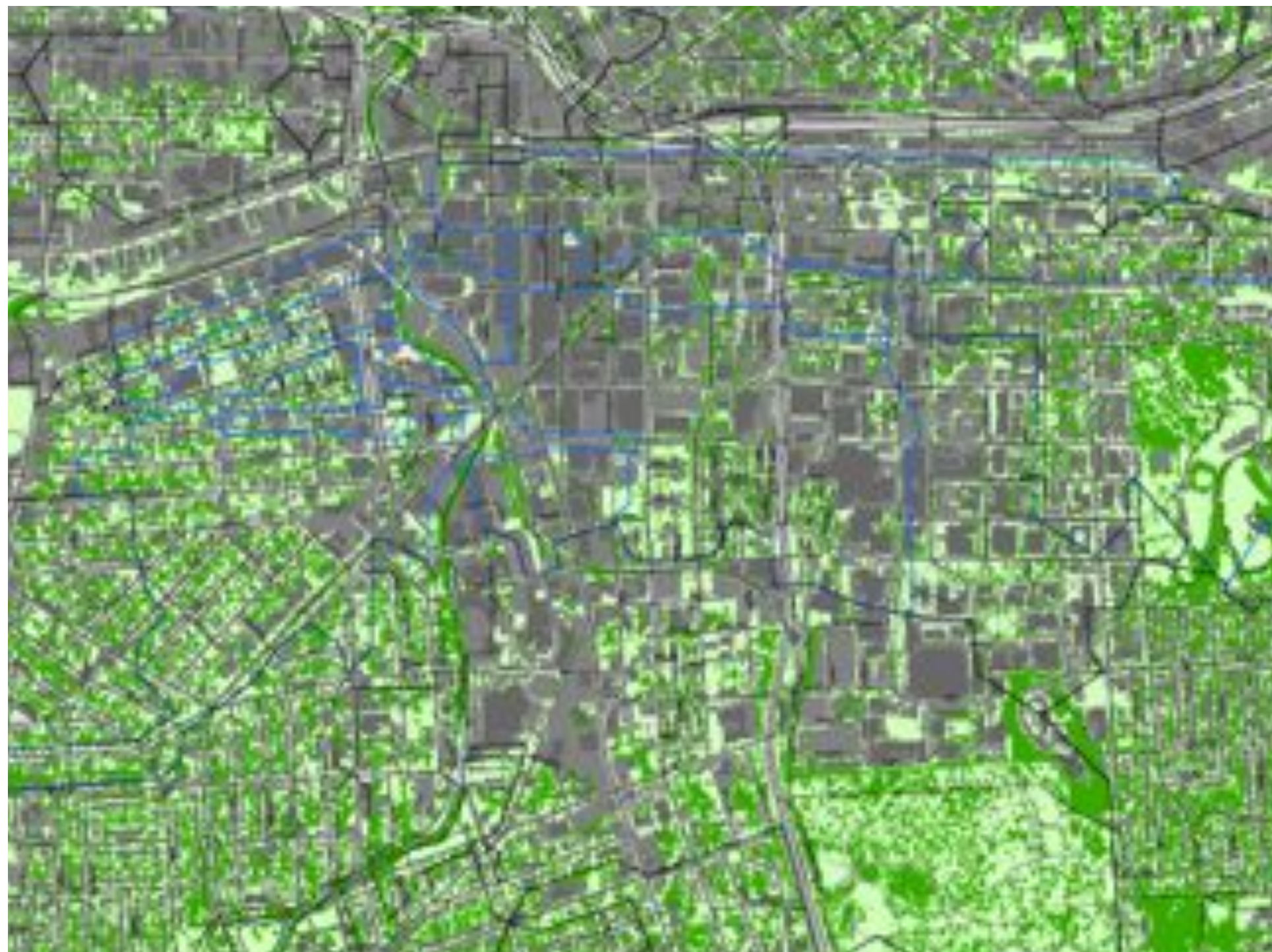


Respect the Base of the Tree

Separating rooting space of trees and ground covers



Permanent shrub planting will become difficult to maintain over time



Rooting Volume Targets

Big trees need places for roots to grow

Properly designed soils are critical

Compaction resistant, low OM

Rooting Volume Targets

estimated crown spread =
10 feet diameter



Soil Volume = 120 cubic feet

estimated crown spread =
21 feet diameter



Soil Volume = 500 cubic feet

estimated crown spread =
30 feet diameter



Soil Volume = 1000 cubic feet

Increasing Canopy in DC



Impervious Surface Removal & Green Median Renovation

- 1) Tree Box Expansions
- 2) Tree Box Creation
- 3) Continuous Planting Strip Creation
- 4) Large Area Greening
- 5) Green Median Creation

DC Examples

Hanover Place



DC Examples

Adams Morgan



DC Examples

Continuous Planting Strips



DC Examples



DC Examples



DC Examples



DC Examples



The End