TREE COMMISSION ACADEMY

# New Urban Forestry Management Tools

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# Ohio Division of Forestry
# Urban Forestry Assistance Program
# 1979-Today


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**Goal:** Provide tools to Ohio communities to develop & manage comprehensive tree care programs

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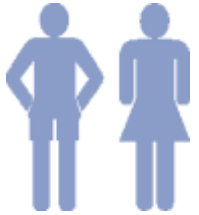
# Ohio Urban Forestry Program

## How We Help

Organizational Assistance

Technical Assistance





Best Practices Information

Grants

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# Applied Urban Forest Management

- Social Urban Forestry
- Theoretical Urban Forestry
  1. Removal
  2. Mature Tree Care/Pruning
  3. Planting

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# …Improve the Quality of Life of Ohio's Citizens

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# Planned Planting

## Master Planting Design

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# Master Planting Design

- Roadmap for the future
- Plan for the entire community…

  …regardless of what's there now

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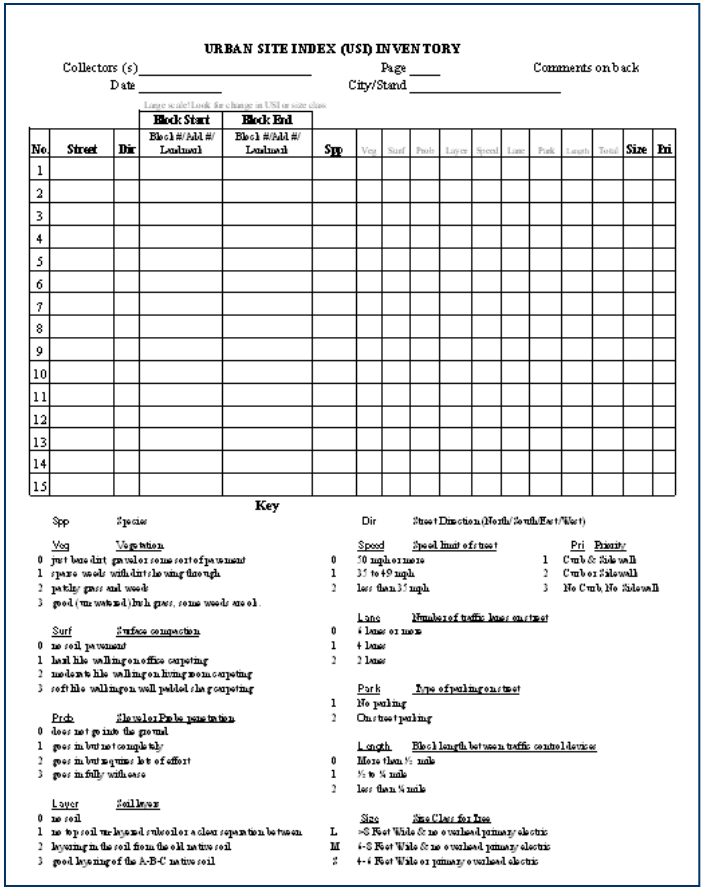
# Supply List

- Community Street Map
  - Labeled with street names
  - Labeled N/S/E/W
- USI Data Collection Sheet
- Pencil
- Colored Markers
- Computer with spreadsheet
- Tree list based on size & Urban Site Index



**URBAN SITE INDEX (USI) INVENTORY**

Collectors (s)_____ Page ____ Comments on back

Date _____ City/Stand _____

Large scale? Look for change in USI or size class

| No. | Street | Dir | Block: Start<br>Block #/Add #/<br>Landmark | Block: End<br>Block #/Add #/<br>Landmark | Spp | Veg | Surf | Prob | Layer | Speed | Lane | Park | Length | Total | Size | Pri |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | |

**Key**

Spp Species

Veg Vegetation
0 just bare dirt gravel or some sort of pavement
1 sparse weeds with dirt showing through
2 patchy grass and weeds
3 good (uncontained) lush grass, some weeds are ok

Surf Surface compaction
0 no soil pavement
1 hard like walking on office carpeting
2 moderate like walking on living room carpeting
3 soft like walking on well padded shag carpeting

Prob Slow or Probable penetration
0 does not go into the ground
1 goes in but not completely
2 goes in but requires lots of effort
3 goes in fully with ease

Layer Soil layer
0 no soil
1 no top soil or layered; rubble or a clear separation between
2 layering in the soil from the old native soil
3 good layering of the A-B-C native soil

Dir Street Direction (North/South/East/West)

Speed Speed limit of street
0 50 mph or more
1 35 to 45 mph
2 less than 35 mph

Lane Number of traffic lanes on street
0 4 lanes or more
1 4 lanes
2 2 lanes

Park Type of parking on street
1 No parking
2 On street parking

Length Block length between traffic control devices
0 More than ½ mile
1 ¼ to ½ mile
2 less than ¼ mile

Size Size Class for Tree
L >8 Feet Wide & no overhead primary electric
M 4-8 Feet Wide & no overhead primary electric
S 4-4 Feet Wide or primary overhead electric

Pri Priority
1 Curb & Sidewalk
2 Curb or Sidewalk
3 No Curb No Sidewalk

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# Master Planting Design Steps

- Site Evaluation
  - Urban Site Index
- Identify Streets with Same Site Constraints
- Assign Species by Site Type
- Break Sites into Planting Segments
- Assign Species Spacing
- Assign Species to Planting Segment

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# 1. Site Evaluation

- Simple
- Cheap
- Easy to understand
- Systematic

Urban Site Index

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# Right Tree in the Right Spot
# **Size**

Trees too large for their site are

- Expensive to maintain
- Low vigor
  - Disease/insect susceptible
- Short lived

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# Right Tree in the Right Spot
# **Size Rules**

Plant the largest tree that will fit in the site

Larger trees will be limited in most sites

Avoid planting small trees in large sites

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# Right Tree in the Right Spot
# **Size**

Our Urban Forest has a spectrum of site sizes

Large sites — Small sites

Large trees — Small trees

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# Right Tree in the Right Spot
# **Hardiness**

Trees planted in too harsh of a site are

- Expensive to maintain
- Low vigor
  - Disease/insect susceptible
- Short lived


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# Right Tree in the Right Spot
# **Hardiness Rules**

Plant the least hardy tree that will survive and thrive in the site

- Sensitive trees will be limited in most sites
- Avoid planting tough trees in good sites

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# Right Tree in the Right Spot
# **Hardiness**

Our Urban Forest has a spectrum of site qualities

Good sites — Bad sites

Sensitive trees — Tough trees


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# Right Tree in the Right Spot
# **Hardiness**

Be able to recognize the toughest sites

Understand the hardiness of the tree

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# Urban Site Index

- A rapid assessment process to quantify the severity/quality of street planting sites
- Based on easily obtained field observations
- Results in a numeric assessment: 0-20

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# Urban Site Index
# **8 Observations**

4 Soil Observations

- Scored 0-3

4 Street observations

- Scored 0-2

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# 4 Soil Observations

- Vegetation
- Surface compaction
- Probe penetration
- Soil development

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# Vegetation

**0** Bare dirt, gravel or some sort of pavement

**1** Sparse weeds with some dirt showing

**2** Patchy grass and weeds

**3** Lush grass some weed ok


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# Surface Compaction

**0** No soil, pavement

**1** Hard, like walking on office carpeting

**2** Some give, like walking on padded carpet

**3** Cushioned give, like walking on deep pile padding

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# Probe Penetration

**0** No soil, pavement

**1** Goes in, but not completely

**2** Goes in, but requires lots of effort

**3** Goes in fully with ease

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# Soil Development

**0** No soil, pavement

**1** No top soil, un-layered sub soil, or clear separation between top & subsoil

**2** Layering in soil from old native soil

**3** Good, deep topsoil with only the A horizon in the probe

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# 4 Street Observations

- Speed
- Lanes
- Parking
- Length between traffic control devices


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# Speed

**0** 50 mph or greater

**1** 35-45 mph

**2** Less than 35


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# Lanes

**0** 6 or more

**1** 3-5 lanes

**2** 2 lanes


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# Parking

1. No street parking
2. On street parking


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# Length Between Stop Signs/Lights

**0** More than ½ mile

**1** ½ to ¼ mile

**2** Less than ¼ mile


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# Urban Site Index Scores

# Totals = 0-20

Approximate rating

| | |
|---|---|
| No tree | **0-5** |
| Poor | **6-9** |
| Intermediate | **10-15** |
| Good | **16-20** |

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# Right Tree in the Right Spot
# **Hardiness**

Our Urban Forest has a spectrum of site qualities

Good Intermediate Poor Bad

20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Sensitive Tough

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# Urban Site Index

| Approximate rating | |
|---|---|
| No tree | 0-5 |
| Poor | 6-9 |
| Intermediate | 10-15 |
| Good | 16-20 |

1. Be able to recognize toughest sites

Next step

2. Understand the hardiness of the tree

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# Urban Site Index

## Approximate rating

| | | |
|---|---|---|
| No tree | **0-5** | Plastic trees |
| Poor | **6-9** | Honey locust |
| Moderate | **10-15** | Red maple |
| Good | **16-20** | Sugar Maple |

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# **Next Step:** Rate Trees

| Tree | USI |
|---|---|
| Honey Locust | 7 |
| Red maple | 12 |
| Sugar maple | 16 |

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# Tree Criteria

- Established in environment
- 8-20 inch DBH
  - Species dependent
- 20-50 years old

- 5 or more on a site
  - Fewer for unique species

USI: 15

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# Rating Database

**Honeylocust**

| Condition | USI |
|---|---|
| Dead | 1 |
| Dead | 2 |
| Dead | 3 |
| Dead | 4 |
| Poor | 5 |
| Fair | 6 |
| Good | 7 |
| Good | 8 |
| Good | 9 |
| Good | 10 |
| Good | 11 |
| Good | 12 |
| Good | 13 |
| Good | 14 |
| Good | 15 |
| Good | 16 |
| Good | 17 |
| Good | 18 |
| Good | 19 |
| Good | 20 |

USI=7

**Red Maple**

| Condition | USI |
|---|---|
| Dead | 1 |
| Dead | 2 |
| Dead | 3 |
| Dead | 4 |
| Dead | 5 |
| Dead | 6 |
| Dead | 7 |
| Dead | 8 |
| Dead | 9 |
| Fair | 10 |
| Poor | 11 |
| Good | 12 |
| Good | 13 |
| Good | 14 |
| Good | 15 |
| Good | 16 |
| Good | 17 |
| Good | 18 |
| Good | 19 |
| Good | 20 |

USI=12

**Sugar Maple**

| Condition | USI |
|---|---|
| Dead | 1 |
| Dead | 2 |
| Dead | 3 |
| Dead | 4 |
| Dead | 5 |
| Dead | 6 |
| Dead | 7 |
| Dead | 8 |
| Dead | 9 |
| Dead | 10 |
| Dead | 11 |
| Dead | 12 |
| Dead | 13 |
| Poor | 14 |
| Fair | 15 |
| Good | 16 |
| Good | 17 |
| Good | 18 |
| Good | 19 |
| Good | 20 |

USI=16

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# Urban Site Index
# **Field Findings in Ohio**

## Sugar maple

| USI | Condition |
|---|---|
| 13 | Poor |
| 15 | Fair |
| 16 | Good |
| 18 | Good |
| 18 | Good |
| 19 | Good |

USI = 16

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# Urban Site Index
# **Field Findings in Ohio**

## Littleleaf Linden

| USI | Condition |
|---|---|
| 10 | Fair |
| 11 | Good |
| 12 | Good |
| 12 | Good |
| 15 | Good |

USI =11

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# Urban Site Index
# **Field Findings in Ohio**

**Honeylocust**

| USI | Condition |
|---|---|
| 9 | Good |
| 12 | Good |
| 12 | Good |
| 13 | Good |
| 14 | Good |
| 14 | Good |
| 14 | Good |
| 15 | Good |
| 16 | Good |

USI = 9

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# Urban Site Index
# **Field Findings in Ohio**

## Red Maple

| USI | Condition |
|---|---|
| 11 | Good |
| 12 | Good |
| 14 | Fair |
| 14 | Fair |
| 15 | Good |

USI = 12

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# Urban Site Index
# **Field Findings in Ohio**

Northeast Ohio

**Red Maple**

| USI | Condition |
|---|---|
| 11 | Good |
| 12 | Good |
| 15 | Good |

Northwest Ohio

**Red Maple**

| USI | Condition |
|---|---|
| 14 | Fair |
| 14 | Fair |

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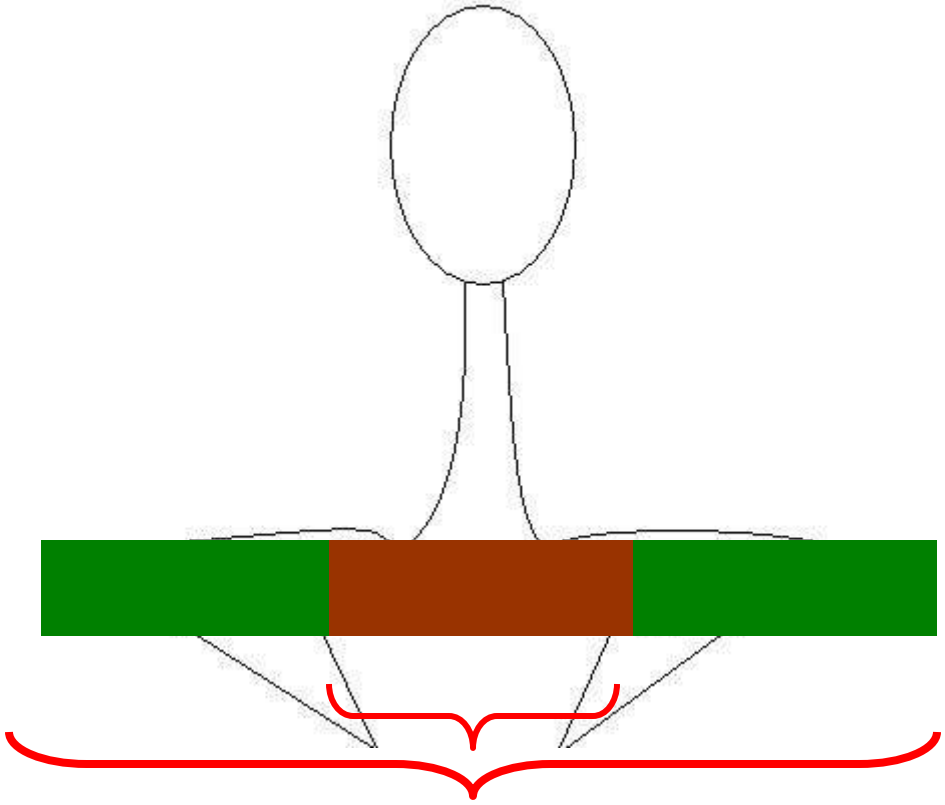
# Urban Site Index
# **Limitations**

- Long term measurement
- Fits tree into environments they can succeed in
- Does not account for poor planting practices



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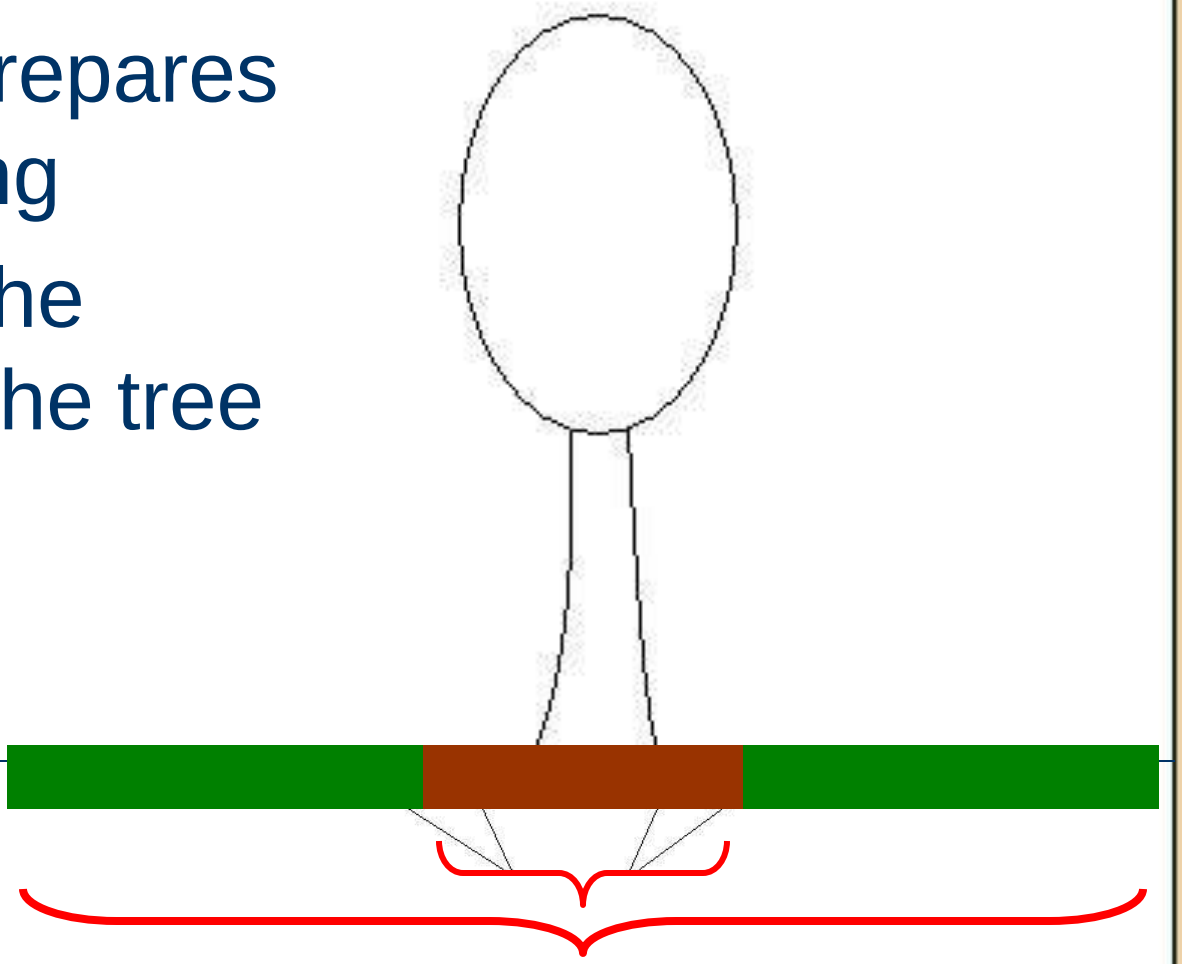
# Urban Site Index vs. Site Prep.

- *The Recipe* prepares site for planting
- USI looks at the environment the tree will grow into



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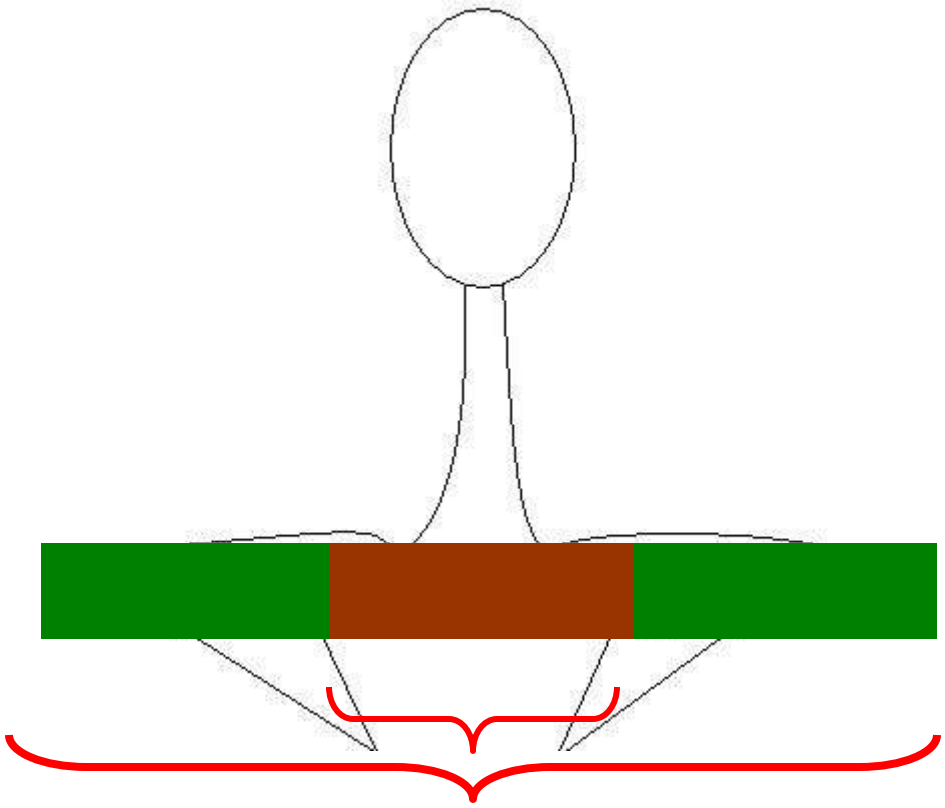
# Urban Site Index vs. Site Prep.

- Site prep allows newly planted tree to recover from transplant shock
- USI fits tree into environments they can succeed in



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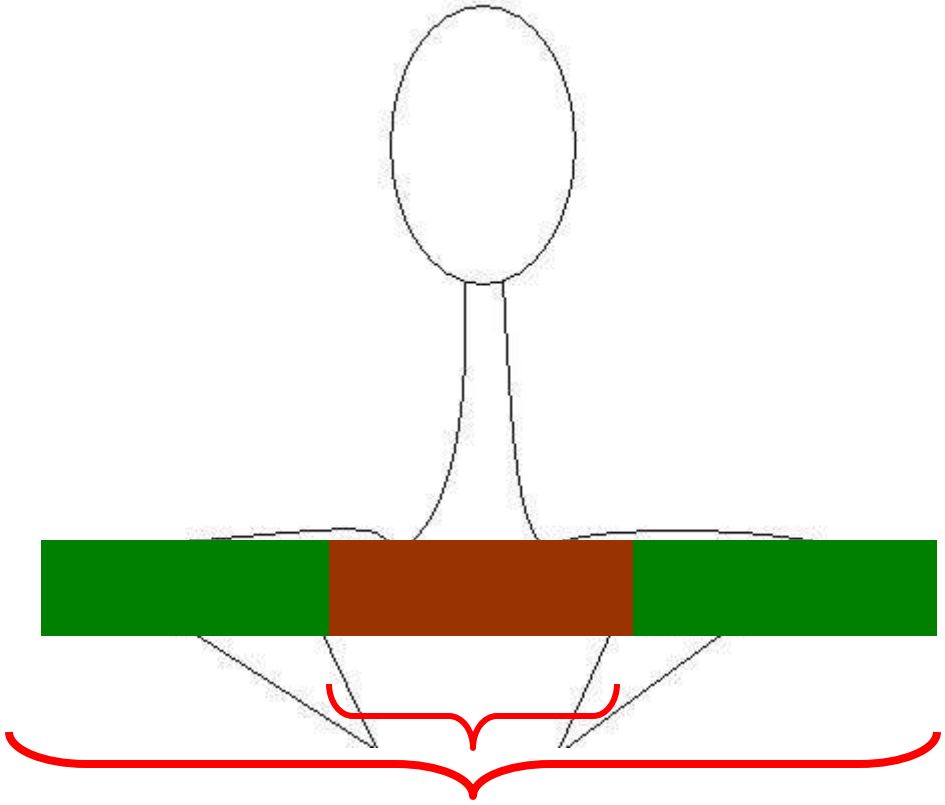
# Urban Site Index vs. Site Prep.

- One does not preclude the other
- You must do both



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# 2. Identify Streets/Blocks with Same Site Constraints

Example

Main Street

- Poor: Blocks North 100-300 = 4 ft treelawn
- Poor: Blocks North 400-600 = 8 ft treelawn

Elm Street

- Poor: Blocks East 100-200 = 8 ft treelawn
- Poor: Blocks East 300-500 = 4 ft treelawn

**Begin Getting a Picture of your Town**

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# Site Evaluation Categories
## Create Color Key

| Good Quality Site 16-20 | Intermediate Quality Site 10-15 | Poor Quality Site 6-9 | No Tree 0-5 |
|---|---|---|---|
| Large Tree | Large Tree | Large Tree | |
| Medium Tree | Medium Tree | Medium Tree | |
| Small Tree | Small Tree | Small Tree | |

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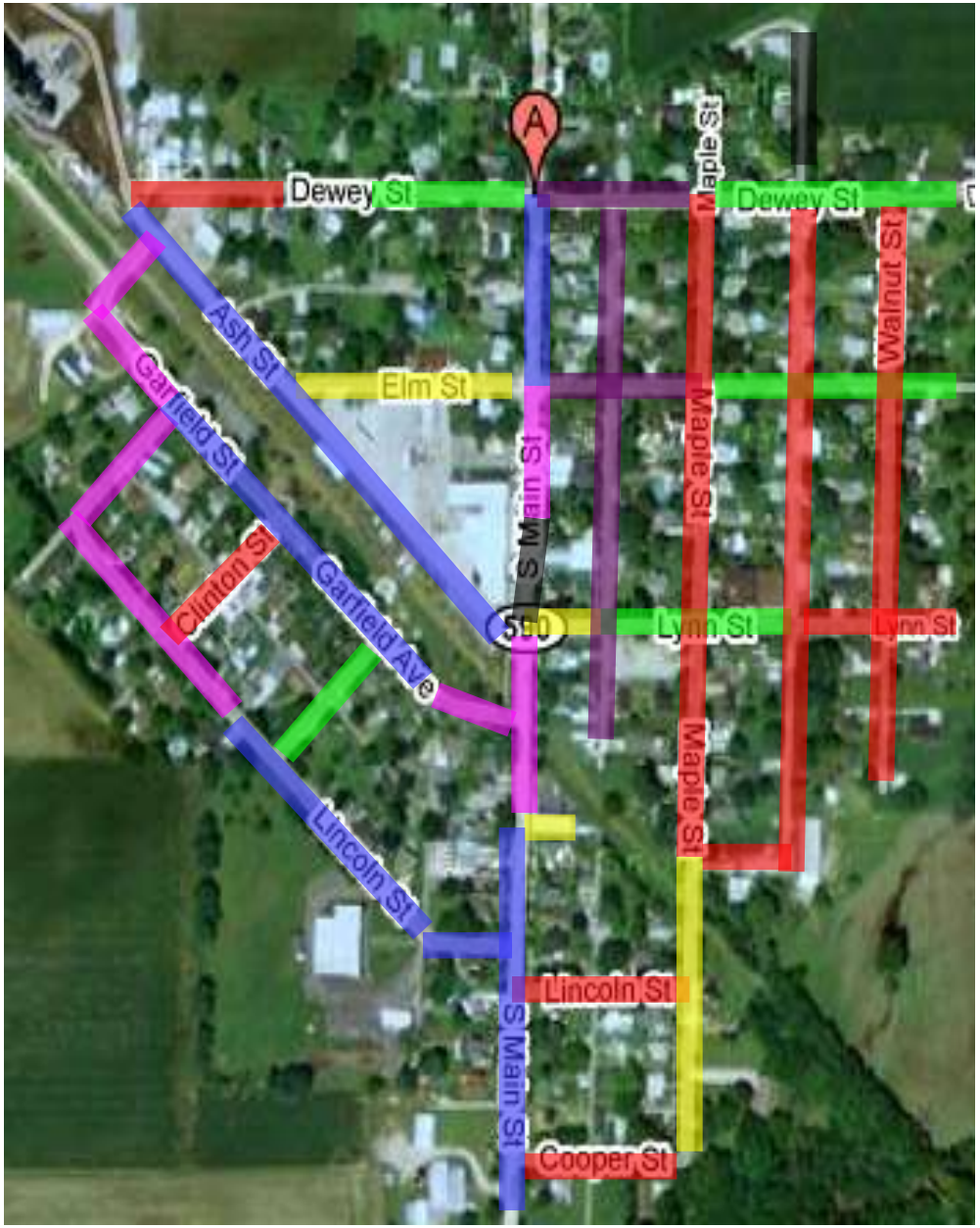
- Good
  - Large
- Good
  - Small
- Intermediate
  - Large
- Intermediate
  - Medium
- Intermediate
  - Small
- Poor
  - Large
- None

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# 3. Assign Tree Species To Sites

## Utilize Tree List

- Good Site: Large Species
  - Wide Treelawns
  - Low/No Road Salt
  - Good Soils
  - USI 16-20

- Tree Selection
  - Large-growing Species
  - Match Complimentary Small/Medium Species
    - Overhead utility
    - Narrowed treelawn

***Push the Envelope to increase diversity***

Incorporate trees that are historically absent along streets

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# **Community Tree List**
## Good Quality/Large Site

| Large Tree | Medium Tree | Small Tree |
|---|---|---|
| Tulip poplar, *Liriodendron tulipifera Magnoliaceae* | Umbrella magnolia, *Magnolia tripetala Magnoliaceae* | Saucer magnolia *Magnolia* x *soulangiana Magnoliaceae* |
| Sugar or Black Maple, *Acer saccharum* or *nigrum Aceraceae* | Striped maple, *Acer pennsylvanicum Aceraceae* | Pagoda or Flowering dogwood, *Cornus alternifolia* or *florida Cornaceae* |
| Red Maple, *Acer rubrum Aceraceae* | Sycamore maple, *Acer pseudoplatanus Aceraceae* | Fringetree, *Chionanthus virginicus Oleaceae* |

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# 4. Break Into Planting Segments

If not done in the field

- Sets of 7-11 trees per side
  - Odd numbers
  - No less than one block
- Look for natural breaks
  - Stop lights/Intersections/Dead Ends
  - Site constraint change
  - Some will be more difficult

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- Good
  - Large
- Good
  - Small
- Intermediate
  - Large
- Intermediate
  - Medium
- Intermediate
  - Small
- Poor
  - Large
- None


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# 5. Assign Species Spacing

6 Segments between Species

4 Segments between Genus

2 Segments between Family

- Breaks up similar trees
- Tests diversity
- Only use cultivar if it has a bearing on site constraint
  - i.e. an upright cultivar near a car dealership

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# Separation

## 2 Segments

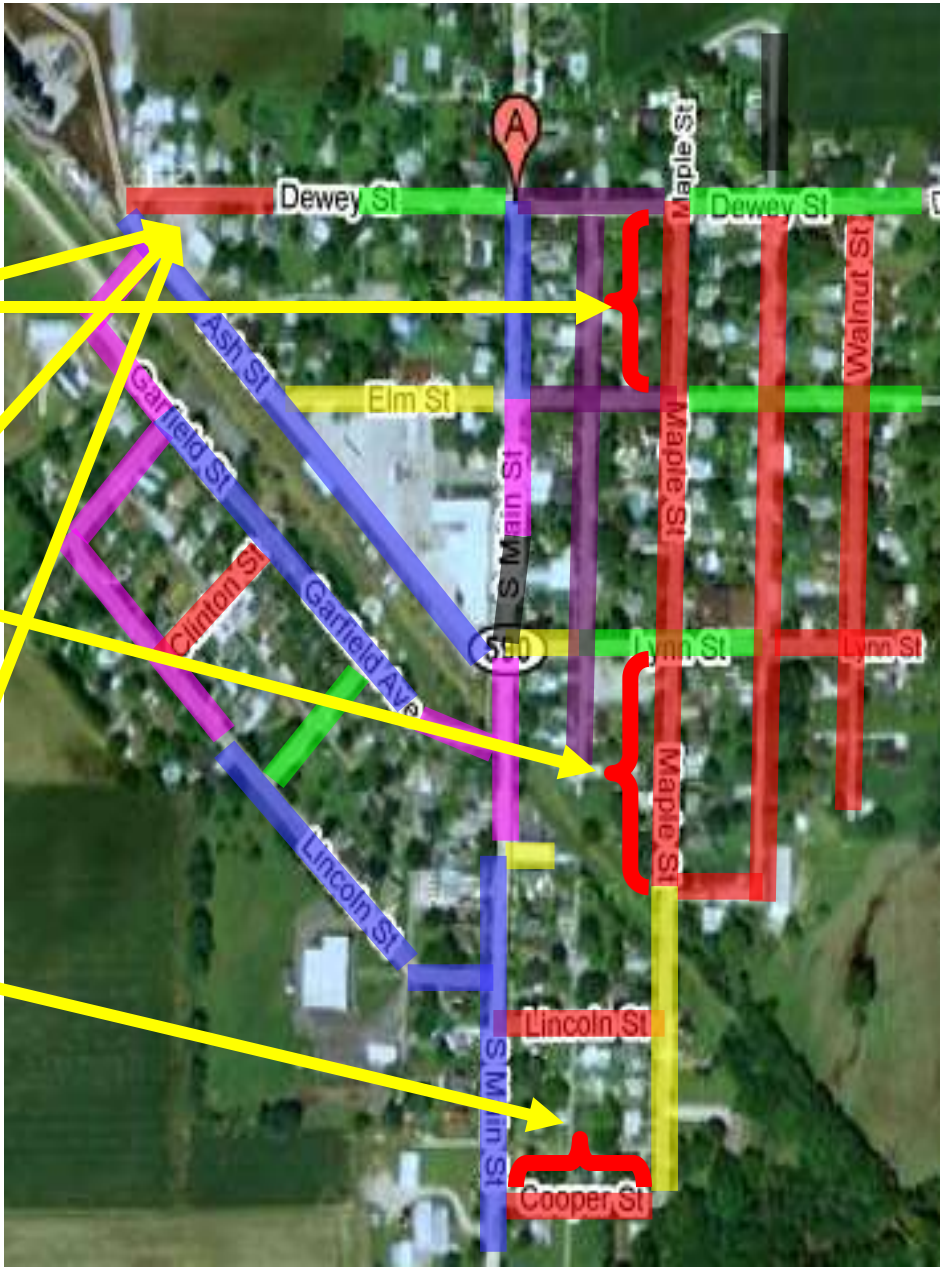
Same Family

## 4 Segments

Same Genus

## 6 Segments

Same Species

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# 6. Assign Species Per Segment

Select from your tree list for that site type

| Large Tree | Medium Tree | Small Tree |
|---|---|---|
| Tulip poplar, *Liriodendron tulipifera Magnoliaceae* | Umbrella magnolia, *Magnolia tripetala Magnoliaceae* | Saucer magnolia *Magnolia* x *soulangiana Magnoliaceae* |
| Sugar or Black Maple, *Acer saccharum* or *nigrum Aceraceae* | Striped maple, *Acer pennsylvanicum Aceraceae* | Pagoda or Flowering dogwood, *Cornus alternifolia* or *florida Cornaceae* |
| Red Maple, *Acer rubrum Aceraceae* | Sycamore maple, *Acer pseudoplatanus Aceraceae* | Fringetree, *Chionanthus virginicus Oleaceae* |

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# Large Space Intermediate Site

## 2 Segments

Same Family

*Ulmaceae*

*Celtis/Ulmus/Zelkova*

## 4 Segments

Same Genus

*Ulmus*

*americana & parvifolia*

## 6 Segments

Same Species

*Ulmus parvifolia*


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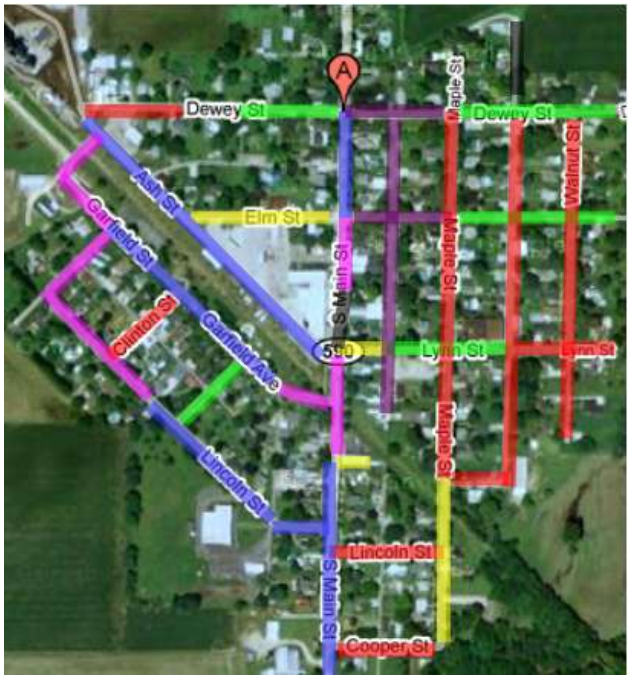
# Benefits of Master Planting Design

- Long-Range Planning
- Buy-in from Leadership
- Buy-in from Residents
- Planning with Nurseries
- USI Truthing
- Insect/Disease/Weather Monitoring

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# What's Next?

## Evaluate Process

- Are we measuring the right things?
- Are we assigning the right values?
- Community successes & challenges
- Cooberating research

## Tree Species USI Data

- New species & selections
- Multiple repetitions to increase confidence
- Identify regional differences

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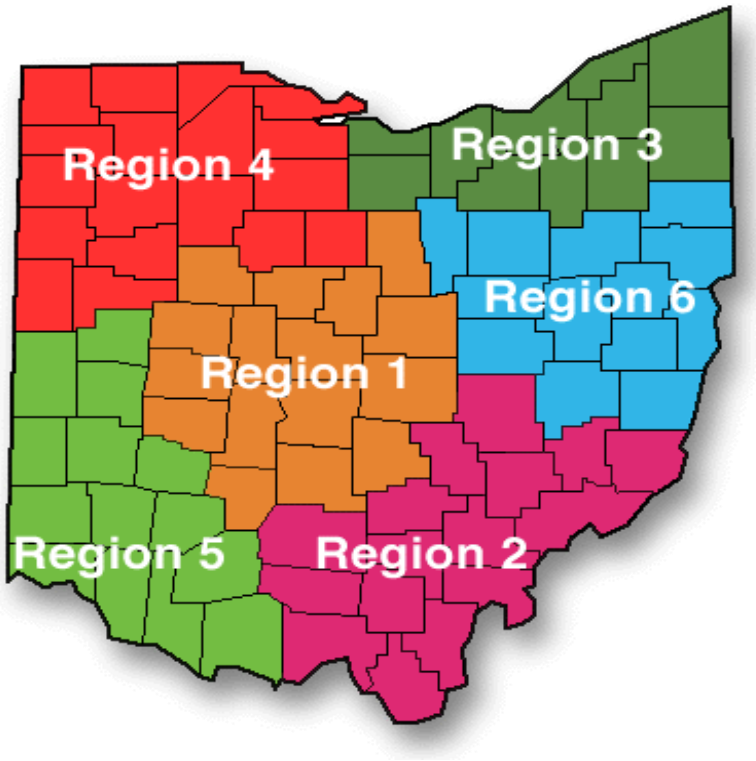
# Long-Term Hopes & Dreams

- State-wide/Regional USI Database
  - USI minimums
- Municipal reference
- Management tool

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# Special Thanks

- NE & Western Ohio Communities
- Tree Commission Academy
- ODNR Regional Urban Foresters
  - Alan Siewert
- Drew Todd, Ohio Division of Forestry

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# Thank You Indiana!

Questions

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