

Jacksonville Tree Commission

TASK FORCE ON URBAN TREE PLANTING BEST PRACTICES

June 23, 2025 10:00am - 1:00pm

**Ed Ball Building, 10th Floor, Conference Room 5
and Zoom Webinar**

Task Force Members:

Susan Fraser, Tree Commission Member, Chair
Nina Sickler Tree Commission Member, Vice-Chair
Curtis Hart, Tree Commission Member
William Burke, Tree Commission Member

Non-Member attendees:

Jeff Lucovsky, PDDS
Jonathan Johnston, Parks
Guy Parola, DIA
Nancy Powell, Scenic Jax
Lisa Grubba, Greenscape
Valerie Feinberg, Fuse Fellow, UFMP

Advisors:

Jonathan Colburn, Urban Forestry Manager
Justin Gearhart, City Arborist
Shannon MacGillis, Office of General Council

Staff:

Joe Rainey, Executive Assistant

AGENDA

Order of Agenda is Subject to Change

- 1. Call to Order – Chair**
- 2. Roll Call and Verification of Quorum – Chair** Submittal of Speaker's cards
- 3. Public Comment: (up to 3 minutes, allotted at discretion of Chair)**
- 4. Submittal of Speaker's Cards – Chair**
 - a.** A raised hand icon will be acknowledged by the Chair.
 - b.** For those attending in person, paper speakers' cards will be available.

5. Approval of Minutes of May 14, 2025 Task Force Meeting

a. Policy Positions Supported

- i. Plant for longevity and ultimate size in balance with site constraints
- ii. Natural Solutions First, Constraints' Mitigation Second
- iii. Preserve soil structure or mitigate for constraints.

6. Overview of Approach- 2025 Updates to Mitigation by Degree of Urbanization

- i. Modifications to Filing an Application for Planting in an Urban Environment
 - a. Establish minimum standards for Open Space/Cut Outs
 - a. Proposed Development Project
 - b. Existing Conditions Project
 - c. Existing ROW Median
 - d. Fast Growth Tree Option
 - b. Establish minimum standards for Minimum Planting Area
 - a. Proposed Development Project
 - b. Existing Conditions Project
 - c. Existing ROW Median
 - d. Fast Growth Tree Option
 - c. Requirement for Suitable Planting Environment
- ii. Limited Standards Alternative

7. Amendments to the Approved Tree Planting List

- a. Updates to reflect Canopy /Spread and Suitability as Street Trees

OLD BUSINESS:

8. Meeting Dates for 2025 TBD

9. ADJOURNMENT

Task Force on Urban Tree Planting Best Practices

Minutes

Monday May 21, 2025, – 11:00am-2:00pm

Via Zoom Platform & In Person

[Recording of Meeting can be obtained by sending request to Joe Rainey JRainey@coj.net]

Commissioners:

Nina Sickler, Director of Public Works
Susan Fraser, Chair (Council Appointee; 2022-0063-A)
William Burke, Tree Commission Member

Non-Member attendees:

Jeff Lucovsky, PDDS
Jonathan Johnston, Parks
Guy Parola, DIA
Nancy Powell, Scenic Jax
Lisa Grubba, Greenscape
Joe Anderson JEA
Paul Davis, Planning
Valerie Feinberg, Fuse Fellow, UFMP
Tracy Arpen, Greenscape

Advisors:

Justin Gearhart - City Arborist
Shannon MacGillis - Office of General Counsel

Staff: Joe Rainey - Executive Assistant Mowing and Landscape

1. Call to Order

Conducted by Chair

2. Roll Call and Verification of Quorum

Conducted by Chair

Commissioners present:

Susan Fraser - Chair
Nina Sickler - Director of Public Works
William Burke - Tree Commission Member

Quorum present (3, in person): Yes

3. Call for Public Speakers (online & card): Chris Kelcourse of Sunshine Compost: Offering resources of local companies for soil resources. Provided documentation of their products specs and a comparison to the city's current vendors product. **Burke:** relays qualifications and of soil mix would be a conversation for later. **Kelcourse:** She recommends STA certification of US compost council for vendors.

Action Items:

4. Submittal of speaker cards

5. Issue: The minutes from February 20, 2025, APPROVED

Motion: Approve, as presented.

Moved by: William Burke

Second: Nina Sickler

Vote: April 28, 2025 minutes approved, unanimous.

6. Overview of Approach- 2025 Updates to Mitigation by Degree of Urbanization

i. **Fraser:** Review of updated James Urban approach (2025) from James Urban (1992). Detail conclusions so far and discussion of what to do moving forward. Short term (20-25 years) plantings may be a solution to downtown tree projects with limitations vs no trees being planted due to constraints. How those smaller short term plantings definitions may be clarified is of concern. Further discussion is needed to best qualify the report as expanding issues are uncovered through the taskforce process. It is determined an extension of the taskforce is required.

ADJOURNMENT

END OF MEETING 1:27PM

Filing an Application for Planting in an Urban Environment

Apply the established standards based on the condition of the planting environment (area within the root zone of all planted trees) **at time of planting**. Multiple conclusions may apply based on location within a project boundary.

1. *Confirm Minimum Planting Area is Provided for each Proposed Tree*

To provide sufficient area to accommodate mature trunk volume, flare and surface roots, an open space without surface encroachment shall be provided around the trunk of the tree; when located in an area of surface treatment, the open space is provided in the form of a cut out within the surface treatment.

The Minimum Open Surface / Cut Out (OSCO) is provided for each tree location. No compaction is permitted within OSCO. If installed, tree grates must have an opening (symmetrical around the truck) equal to 50% of the minimum OSCO dimensions and the long term maintenance plan must provide for tree grate replacement at 5 years and 10 years if inspection warrants.

Small Tree	6' x 6' min. OSCO; min. 3 feet to impervious surface
Medium Tree	6' x 6' min. OSCO; min. 3 feet to impervious surface
Large Tree (not live oak)	8' x 8' min. OSCO; min. 4 feet to impervious surface
Large Tree (live oak)	12' x 12' OSCO; min. 6 feet to impervious surface

Tree Grates may be included in a Level 2 or Level 3 Application for installation within an OSCO provided the grate is required to meet minimum sidewalk width for the adjacent sidewalk as defined in Section 654, Ordinance Code and the LDPM Volume 2. Design Standards (see ***Exhibit A***).

2. *Soil Quantity Goal is met.*

The Tree Commission's Approved Tree List identifies each Approved Tree as small, medium or large. The planting area for each proposed tree shall meet the following standards.

Soil Quantity Goal:

Provide sufficient soil quantity to support the tree mass proposed.

Required Soil Volume

Small Tree:	300 cubic feet	Min. Planting Area: 150 sf - 100 sf Required Depth: 2' – 3' OSCO 6' x 6' min.; 8' x 8' prefer
Medium Tree:	1,200 cubic feet	Min. Planting Area: 480 sf - 300 sf Required Depth: 2.5' – 4' OSCO 6' x 6' min.; 8' x 8' prefer

Large Tree:	1,800 cubic feet	Min Planting Area:	600 sf – 450 sf
		Required Depth:	3’ – 4’
		OSCO	8’ x 8’ min.; 10’x10’ prefer
Live Oak:	1,800 cubic feet	Min. Planting Area	600 sf - 450 sf
		Required Depth	3’ – 4’
		OSCO	12’ x 12’ min.

Minimum planting areas may be combined to accommodate multiple trees; combined areas are eligible for a 25% reduction in the area required for an individual tree, however the minimum distance to impervious surface established for the OSCO cannot be reduced.

3. *Suitable Planting Environment is Provided.*

A Suitable Planting Environment requires the classification of NOT COMPACTED within each Required Soil Volume.

Assess the compaction within each Required Soil Volume at the tie of planting and apply the standards for the provision of a Suitable Planting Environment for each Project type:

- Existing Conditions Project
- Planting in a Public Right of Way
- Proposed Development Project
 - Not Compacted
 - Compacted without Surface Improvements
 - Compacted with Surface Improvements

A. Existing Conditions Project. Defined as a proposed Level 3 Project without associated development/construction or a Level 2 Project located within a Public Right of Way.

For a Level 3 Project, upon receipt of a Level 3 Project Scope Submittal, staff shall perform an initial site visit prior to the Project Scope Review Meeting to identify the Minimum Planting Area associated with each potential planting area as “COMPACTED”, “NOT COMPACTED” or “POTENTIALLY COMPACTED”. Staff may rely on visual inspection, history of the site, on-site testing results (penetrometer) or order a bulk density test (BDT) as required to make a final determination of “COMPACTED” or “NOT COMPACTED” for each Required Soil Volume. Staff shall identify each Required Soil Volume by number and note its classification in a table provided to the Applicant. Upon acceptance of the classification by the Applicant, the Planting Plan and Cost Estimate shall be based on the assigned classification; a classification of NOT COMPACTED shall be maintained by the Applicant/ Public Agency.

If a BDT is performed, a Bulk Density Score of 109 lb /cubic foot or above shall be classified as COMPACTED. Compacted of 85% or greater shall be classified as COMPACTED.

B. Tree Planting within a Public Right of Way. The following assumptions for Required Soil Volume within the public right of way may be applied; Staff may rebut the assumed classification with on-site testing or BDT.

- a. Required Soil Volume located within an existing median 10 feet in width or less (measured BOC to BOC) are assumed to be Compacted.
- b. Required Soil Volume located between the travel lane(s) and the right of way (Verge) is 8 feet in width or greater (exclusive of surface improvements - sidewalk, etc.) are assumed NOT COMPACTED; width less than 8 feet are assumed to be COMPACTED.

C. Proposed Development Project. Defined as tree planting proposed in conjunction with any development/construction within the proposed Level 2 or Level 3 Project. When applicable to a Level 2 Project, the Level 2 Project shall be subject to the Level 3 Application requirements.

The Level 3 Project Scope Submittal shall include a plan depicting the limits of construction within the Proposed Development Project (Limits of Construction Plan). Limit of construction includes but is not limited to areas for storage of equipment, laydown of materials or supplies, limits of work, construction access, construction parking and all areas that are or will be impervious. Areas within the project limits that have been previously developed or disturbed shall be included in the area identified as the limits of construction. Areas that are outside the limits of construction shall be delineated on the Limits of Construction Plan and protected as Soil Preservation Areas (SPAs).

To ensure maintenance of SPAs, the Applicant / Public Agency shall enforce the limit of construction through final inspection.

Individual Minimum Planting Areas are classified as COMPACTED if all or a portion is located within the construction limits.

The following design strategies shall be employed to limit designation of Required Soil Volumes as COMPACTED:

- a. For Required Soil Volumes located outside an SPA, if Tree Mitigation Funding is requested for the installation of a Pavement Support System (silvacell, etc.) the following design review is required to minimize planting within a Compacted Planting Environment that requires a PSS:
 - i. Tree locations have been strictly reviewed to minimize or eliminate the need for installation of a PSS. *Staff may recommend the relocation of trees to achieve minimum need for a PSS.*
 - ii. Tree sizes (small, medium or large) have been strictly reviewed to minimize the need for installation of a PSS. *Staff may recommend changes to tree size to reduce the volume of PSS.*
 - iii. Proposed paved areas have been located so as to minimize the need for installation of a PSS. *Staff may recommend reduction or relocation of proposed paved areas to reduce the area of PSS.*

To facilitate the design review, the Level 3 Application shall include, with the Conceptual Plan, a plan that overlays the location of each Minimum Planting Area with the Limits of Construction Plan (Compacted Environment Assessment Plan). Each Required Soil Volume shall be identified by number and a table classifying each as COMPACTED or NOT COMPACTED provided. Staff shall verify the classification identified in the Application and may rebut the Applicant's classification. The Level 2 or Level 3 Project may not receive Conceptual Plan approval prior to approval of the Compacted Environment Assessment Plan (CEAP). Based on the CEAP, the Concept Plan shall reflect mitigation required to provide a Suitable Planting Environment for each Required Soil Volume. The Rough Estimate of Improvements shall include the costs associated with the provision of mitigation proposed to achieve Suitable Planting Environments that is requested to be funded from Tree Mitigation Funds.

Planting Plans must clearly identify the limits of construction and SPAs. SPAs shall be protected from all encroachment in the same manner as required for tree protection areas in Section 656.1207, Ordinance Code. Location of fencing shall be depicted on approved plans and maintained by the Applicant /Public Agency as depicted through final inspection.

To ensure compliance with SPA protection requirements, Staff may perform inspections at any time after approval of the Level 3 Project by the Tree Commission and enforce the maintenance of fencing through final acceptance. If a CEI is retained for the project, inspections shall be assigned to the CEI professional retained for the project. Failure to maintain required fencing and encroachments within the SPA shall cause the project to be subject to additional review by the Tree Commission.

Staff will work with the Applicant and Public Agency to develop a Conceptual Plan that meets the project goals and minimizes the need for Pavement Support System investment from the Tree Mitigation Fund.

The Staff Report to the Tree Commission for the Concept Plan for the Level 3 Project shall identify actions taken to reduce the need for Pavement Support Systems.

b. The following standards shall apply to the Required Soil Volume based on the classification of each planting area depicted on the CEAP.

i. Required Soil Volume is NOT COMPACTED

If the soil volume available within each Required Soil Volume is NOT COMPACTED, planting is subject to the standards of **LDPM Section 601**. No mitigation is required to provide a Suitable Planting Environment.

ii. Required Soil Volume is COMPACTED

If all or a portion of the soil volume available within each Required Soil Volume is COMPACTED, mitigation of the Compacted Environment is required. The following standards shall apply **in addition to the LDPM requirements**; if a conflict exists between the standards herein and the LDPM, the following standards shall prevail.

1. Minimum Planting Area is provided as Open Space Cut Out

The area within each Required Soil Volume shall be remediated to NOT COMPACTED utilizing Soil Replacement. When native soil is present and the opportunity to employ Soil Profile Rebuilding (SPR) is available, Staff may require SPR during the Project Scope Review Meeting. Soil Replacement shall meet the specifications of LDPM Volume 4, Section 2.3 Topsoil, and Section 2.6 Soil Conditioning. *See Exhibit B.* Soil Profile Rebuilding, when required, shall meet the specifications in *Exhibit C.* Implementation of Soil Replacement or SPR as specified shall result in a Suitable Planting Environment.

2. Minimum Planting Area includes surface improvements (existing or proposed).

Structural Support for Surface Improvements is Not Necessary

The area within each Required Soil Volume shall be remediated to NOT COMPACTED utilizing Soil Replacement. When native soil is present and the opportunity to employ Soil Profile Rebuilding (SPR) is available, Staff may require SPR during the Project Scope Review Meeting. Soil Replacement shall meet the specifications of LDPM Volume 4, Section 2.3 Topsoil, and Section 2.6 Soil Conditioning. *See Exhibit B.* Soil Profile Rebuilding, when required, shall meet the specifications in *Exhibit C.*

To maintain the classification of NOT COMPACTED after remediation, installation of the surface improvements (outside the OSCO) is limited to concrete sidewalks/pavement that are installed without compaction above **85% or 109 lb. CF (BDT)** within the Minimum Planting Area. Implementation of Soil Replacement or SPR as specified and construction of the surface improvements without compaction shall result in a Suitable Planting Environment.

Structural Support for Surface Improvements is Necessary

This standard applies when structural support of a proposed surface improvement within a Minimum Surface Area is **required**.

To achieve a classification of NOT COMPACTED, installation of a Pavement Support System consistent with manufacturers specifications is required. Soil installed within the area of the PSS (the Required Soil Volume) shall meet the Soil Replacement Standards (Approved Soil Mix). Installation of a PSS and Approved Soil Mix will result in a Suitable Planting Environment.

Conceptual Plan Approval by the Tree Commission is required if the cost associated with installation of a PSS is requested to be funded from the Tree Mitigation Fund.

4. Drainage Goal is met.

Drainage Goal:

Drainage adequate to obtain root growth in the soil.

1. In the absence of hydric soils or vegetative indicators of a higher water table, the application of a depth of ≤ 3 feet to the calculation of the Minimum Planting Area is assumed to provide adequate drainage to obtain root growth in the soil. The application of a depth of > 3 feet to the calculation of the Minimum Planting Area may require additional testing to confirm the depth of the water table is lower than the depth applied to calculate the Minimum Planting Area. Test results that indicate a water table at or above 3 feet will require the calculation of the Minimum Planting Area for those locations to utilize a depth above the identified water table.
2. Plans and specifications require and specify positive site drainage away from planting areas.

5. Soil Quality Goal is met.

Soil Quality Goal:

In situ or imported soil is of sufficient quality to support tree growth and long term health.

1. Proposed Soil Replacement meets the adopted specifications for Soil Replacement. **See Exhibit B.**
2. If required, Proposed Soil Profile Rebuilding and specifications are consistent with adopted standards. **See Exhibit C.**
3. If imported soil/topsoil is proposed, soil analysis for imported soil/topsoil within each Required Soil Volume meets the adopted specifications for Soil Replacement. **See Exhibit B.**
4. Site History will be reviewed by Staff utilizing the City's GIS Ash Site and Brownfields Site Inventory. Based on historic site use, Staff may require additional soil testing or environmental assessment to address potential contamination that would adversely affect tree health.

6. Maintenance Goal is met

Maintenance Goal:

Support long-term health and viability of mature canopy spread.

Short-term maintenance. Planting funded from Tree Mitigation Funds is supported with short term maintenance under the applicable contract warranty period.

Long-term maintenance. Additional long term maintenance is required to support long term health and viability of the planted tree. This includes regular pruning, and ongoing insect and disease control.

The Application includes a binding post warranty period maintenance plan that addresses long-term maintenance, including but not limited to regular inspections, pruning and ongoing insect and disease control. If tree grates are installed, the long term maintenance plan must provide for tree grate replacement at the Applicant or Public Agency's expense and the long term maintenance plan will include the requirement for submittal of a report **to the Tree Commission upon each 5 year anniversary of the approval of the Level 3 Project** certifying compliance with the tree grate inspection and replacement requirement.

7. Vertical Clearance Goal is met

Vertical Clearance Goal:

Provide sufficient vertical setback for mature canopy spread.

1. Shade trees other than Live Oaks that are planted adjacent to a vertical structure of two stories or greater must be located a minimum of 12 feet from the vertical constraint (building façade).
2. Live Oaks must be located a minimum of 20 feet from the vertical constraint.
3. Trees other than shade trees that are planted adjacent to vertical structures of 2 stories or greater are located a minimum of 0.75 times the radius of the mature canopy of the tree as such is identified on the Tree Commission Approved Tree Planting List.

Urban Planting Standards

Minimum Planting Area is Provided for each Proposed Tree

Inconsistent with 656.1211 requirements for shade trees:

- Sufficient area is provided to accommodate mature trunk volume, flare and surface roots.

	min. distance to impervious	source	Proposed Development Project	Existing Conditions Project incl Existing ROW	Existing Right of Way Median
Small Tree	3 feet	J. Urban	6' x 6' min OSCO (36 SF)	6' x 6' min OSCO	10' x 10' OSCO
Medium Tree	4 feet	656.1211	6' x 6' min OSCO (36 SF)	6' x 6' min OSCO	10' x 10' OSCO
Large Tree					
Not Invasive Roots	4 feet	656.1211	8' x 8' min OSCO (64 SF)	6' x 6' min OSCO	10' x 10' OSCO
Invasive Roots Live Oak, Magnolia	6 feet	656.1211	12' x 12' OSCO (144 SF)	6' min to curb; min 150 SF OSCO	12' x 12' OSCO

Mitigation Strategies: Combine OSCO to accommodate multiple trees
Install tree grates to increase width of pedestrian path, subject to standards.

Consistent with 656.1211 requirements for shade trees:

- Sufficient area is provided to accommodate mature trunk volume, flare and surface roots.

	min. distance to impervious	source	Proposed Development Project	Existing Conditions Project incl Existing ROW	Existing Right of Way Median
Small Tree	3 feet	J. Urban	6' x 6' min OSCO (36 SF)	6' x 6' min OSCO	6' x 6' OSCO
Medium Tree	4 feet	656.1211	8' x 19' min OSCO (150 SF)	8' x 19' min OSCO	8' x 19' min OSCO
Large Tree					
Not Invasive Roots	4 feet	656.1211	8' x 19' min OSCO (150 SF)	8' x 19' min OSCO	8' x 19' min OSCO
Invasive Roots Live Oak, Magnolia	6 feet	656.1211	12' x 12.5 ' OSCO (150 SF)	6' min to curb; min 150 SF OSCO	12' x 12' OSCO

Recommended

- Sufficient area is provided to accommodate mature trunk volume, flare and surface roots.

	min. distance to impervious		Proposed Development Project	Existing Conditions Project incl Existing ROW	Existing Right of Way Median
Small Tree	3 feet		6' x 6' min OSCO (36 SF)	6' x 6' min OSCO	10' x 10' OSCO
Medium Tree	4 feet		8' x 8' min OSCO (64 SF)	8' x 8' min OSCO	10' x 10' OSCO
Large Tree					
Not Invasive Roots	4 feet		10' x 10' min OSCO (100 SF)	8' x 8' min OSCO	10' x 10' OSCO
Invasive Roots Live Oak, Magnolia	6 feet		12' x 12 ' OSCO (144 SF)	6' min to curb; min 150 SF OSCO	12' x 12' OSCO

Sec. 656.1211 (e) (3)(i) Shade Trees

To meet 656.1211 for med & large trees (shade), OSCO must be 8' x 19' (150 SF):
Shade trees: Shade trees shall be a species having an average mature crown spread of no less than 30 feet; provided, trees having an average mature crown spread of less than 30 feet may be grouped so as to create a total average mature crown spread of no less than 30 feet and used in lieu of a shade tree. Shade trees at the time of *planting* shall be a minimum of two inch caliper and ten feet high. Shade trees shall be *planted* in no less than 150 square feet of *planting area* , with a minimum dimension on any side of eight feet. Shade trees shall not be *planted* closer than four feet from any pavement edge or right-of-way line, as measured from center of trunk. Those species of trees whose roots are known to cause damage to pavement shall not be *planted* closer than six feet to such pavement.

Minimum Planting Area is Provided for each Proposed Tree

Potential Existing Conditions Standard = max depth * min OSCO / twice max depth * min OSCO

Inconsistent with 656.361.6.3 requirements for soil volume:

- Provide sufficient soil quantity to support the tree mass proposed.

required depth		Sec. 656.361	Minimum Planting Area		
			Proposed Development Project*	Existing Conditions Project incl Existing ROW**	Existing Right of Way Median
Small Tree	2' - 3'	300 CF	300 CF (100 SF @ 3' depth)	108 CF / 216 CF	300 CF
Medium Tree	2.5' - 4'	1,200 CF	800 CF (200 SF @ 4' depth)	256 CF / 512 CF	800 CF
Large Tree					
Not Invasive Roots	3' - 4'	1,800 CF	1,000 CF (250 SF @ 4' depth)	400 CF / 800 CF	1,000 CF
Invasive Roots Live Oak, Magnolia	3' - 4'	1,800 CF	1,000 CF (250 SF @ 4' depth)	600 CF / 1,200 CF	1,000 CF

*Based on River's Edge and Park Street BRT projects (large trees).

**Based on potential Existing Conditions Standard = OSCO * depth / OSCO *2* depth

Consistent with 656.361.6.3 requirements for soil volume (allows 4' depth):

- Provide sufficient soil quantity to support the tree mass proposed.

required depth		Sec. 656.361	Minimum Planting Area		
			Proposed Development Project	Existing Conditions Project incl Existing ROW	Existing Right of Way Median
Small Tree	2' - 3'	300 CF	300 CF (100 SF @ 3' depth)	300 CF	300 CF
Medium Tree	2.5' - 4'	1,200 CF	1,200 CF (300 SF @ 4' depth)	1,200 CF	1,200 CF
Large Tree					
Not Invasive Roots	3' - 4'	1,800 CF	1,800 CF (450 SF @ 4' depth)	1,800 CF	1,800 CF
Invasive Roots Live Oak, Magnolia	3' - 4'	1,800 CF	1,800 CF (450 SF @ 4' depth)	1,800 CF	1,800 CF

Sec. 656.361.6.3 (B)(4)(j)

Required Tree to Soil Volume Ratio. Soil volume refers to the cubic feet of soil required for adequate root growth of a tree, generally based upon a three-foot depth. A healthy root system is one of the most critical factors enabling trees to withstand hurricane-force winds. In non-urban settings, the soil volume may be much larger due to the space available, and the lack of underground utilities and other obstructions. In an urban setting, the volumes are necessarily lessened due to the limited amount of space. The following are the minimums necessary for successful tree growth, along with other techniques such as utilization of structural soil, suspended sidewalks, root paths, and planting strips:

- 1
- Small trees: 300 cubic feet;
- 2
- Medium trees: 1200 cubic feet; and
- 3
- Large trees: 1800 cubic feet.

A 25 percent reduction is allowed in the volumes when the soil is shared between trees. See the following link for more information:
<http://hort.ufl.edu/woody/documents/EP309.pdf>.

Recommended

- Provide sufficient soil quantity to support the tree mass proposed.

required depth		Miniumum Planting Area			
		Sec. 656.361	Proposed Development Project*	Existing Conditions Project incl Existing ROW**	Existing Right of Way Median
Small Tree	2' - 3'	300 CF	300 CF (100 SF @ 3' depth)	300 CF	300 CF
Medium Tree	2.5' - 4'	1,200 CF	800 CF (200 SF @ 4' depth)	600 CF	600 CF
Large Tree					
Not Invasive Roots	3' - 4'	1,800 CF	1,000 CF (250 SF @ 4' depth	750 CF	750 CF
Invasive Roots Live Oak, Magnolia	3' - 4'	1,800 CF	1,000 CF (250 SF @ 4' depth)	1,000 CF	1,000 CF

*Based on River's Edge and Park Street BRT projects (large trees).

Urban Planting Standards

Minimum Planting Area is Provided for each Proposed Tree

Recommended

- Sufficient area is provided to accommodate mature trunk volume, flare and surface roots.

	min. distance to impervious		Proposed Development Project	Existing Conditions Project incl Existing ROW	Existing Right of Way Median
Small Tree	3 feet		6' x 6' min OSCO (36 SF)	6' x 6' min OSCO	10' x 10' OSCO
Medium Tree	3 feet		8' x 8' min OSCO (64 SF)	8' x 8' min OSCO	10' x 10' OSCO
Large Tree					
Not Invasive Roots	4 feet		10' x 10' min OSCO (100 SF)	8' x 8' min OSCO	10' x 10' OSCO
Invasive Roots Live Oak, Magnolia	6 feet		12' x 12 ' OSCO (144 SF)	6' min to curb; min 150 SF OSCO	12' x 12' OSCO

Recommended

- Provide sufficient soil quantity to support the tree mass proposed.

		Minimum Planting Area			
	required depth	Sec. 656.361	Proposed Development Project*	Existing Conditions Project incl Existing ROW**	Existing Right of Way Median
Small Tree	2' - 3'	300 CF	300 CF (100 SF @ 3' depth)	300 CF	300 CF
Medium Tree	2.5' - 4'	1,200 CF	800 CF (200 SF @ 4' depth)	600 CF	600 CF
Large Tree					
Not Invasive Roots	3' - 4'	1,800 CF	1,000 CF (250 SF @ 4' depth)	750 CF	750 CF
Invasive Roots Live Oak, Magnolia	3' - 4'	1,800 CF	1,000 CF (250 SF @ 4' depth)	1,000 CF	1,000 CF

*Based on River's Edge and Park Street BRT projects (large trees).

Urban Planting Standards

Suitable Planting Environment is Provided

- A classification of NOT Compacted is Achieved within the Required Soil Volume

1. The OSCO is sufficient in area to provide the Required Soil Volume without encroachment by surface improvements.
Test Required Soil Volume for compaction if site history indicates. If Required Soil Volume is:

<u>NOT COMPACTED</u>	Meet the standards of LDPM Section 601
<u>COMPACTED</u>	Mitigate compacted environment with Soil Replacement. Soil Profile Rebuilding may be appropriate.
<u>Existing ROW Median</u>	Replace Required Soil Volume is median is less than 10 ' in width or testing confirms compavcted environment.

2. Minimum Planting Area includes existing or proposed surface improvements.

<u>Existing Improvements</u>	Assume Required Soil Volume is Compacted. Apply Existing Project standards. Remove existing improvements within Minimum Planting Area(s) and mitigate compacted environment with Soil Replacement. Install support for surface improvements as required if surface improvements are reconstructed/ replaced in a manner that creates a compacted environment within the Required Soil Volume.
<u>Proposed Improvements</u>	Design the surface improvements to limit compaction within Required Soil Volume. Group tree planting areas, combine Minimum Planting Areas, utilize tree grates, raised planters and locate trees strategically to provide largest OSCO (bump outs, planting within adjacent parking). When compaction within the Required Soil Volume is not avoided, mitigate compacted environment created through Soil Replacement. Install support for surface improvements as required if surface improvements are constructed in a manner that creates a compacted environment within the Required Soil Volume.

Potential Cost to Provide Support for Surface Improvements outside OSCO

Design choices that result in a larger OSCO (combine planting areas/ adjust geometry to achieve OSCO area, use of tree grates) significantly improves the health of the tree and reduces the cost to provide the Required Soil Volume.

Recommended Proposed Development Standard

	Min. Soil Volume	planting area	Potential Remediation of Compacted Environment	OSCO	Support for Surface Improvements (CF)		SS Cost (\$19/CF)
Small Tree	300 CF	3' Depth	Min Planting Area 10 x 10	6' x 6' OSCO	192		\$3,648
Medium Tree	800 CF	3' Depth	Min Planting Area 16' x 16 '	8' x 8' OSCO	576		\$10,944
		4' Depth	Min Planting Area 14' x 14'	8' x 8' OSCO	528		\$10,032
Large, Not Invasive	1,000 CF	3' Depth	Min Planting Area 18' x 18'	10' x 10' OSCO	672		\$12,768
		4' Depth	Min Planting Area 16' x 16'	10' x 10' OSCO	624		\$11,856
Large, Invasive	1,000 CF	3' Depth	Min Planting Area 18' x 18'	12' x 12' OSCO	540		\$10,260
		4' Depth	Min Planting Area 16' x 16'	12' x 12' OSCO	448		\$8,512

Recommended Existing Conditions Standard

	Min. Soil Volume	planting area	Potential Remediation of Compacted Environment	OSCO	Support for Surface Improvements (CF)		SS Cost (\$19/CF)
Small Tree	300 CF	3' Depth	Min Planting Area 10' x 10'	6' x 6' OSCO	192		\$3,648
Medium Tree	600 CF	3' Depth	Min Planting Area 14' x 14'	8' x 8' OSCO	396		\$7,524
		4' Depth	Min Planting Area 12' x 12'	8' x 8' OSCO	320		\$6,080
Large, Not Invasive	750 CF	3' Depth	Min Planting Area 16' x 16'	10' x 10' OSCO	468		\$8,892
		4' Depth	Min Planting Area 13.7' x 13.7'	10' x 10' OSCO	352		\$6,688
Large, Invasive	1,000 CF	3' Depth	Min Planting Area 18' x 18'	12' x 12' OSCO	540		\$10,260
		4' Depth	MinPlanting Area 16' x 16'	12' x 12' OSCO	448		\$8,512

Provide OSCO at twice the area

Not Compact (sf)	If OSCO is 2x (sf)		SS Area (sf)	SS Cost (\$19/CF)
100	72	8.5'x 8.5'	84	\$1,596
256	128	11' x 11'	384	\$7,296
196	128	11' x 11'	272	\$5,168
324	200	14' x 14'	372	\$7,068
256	200	14' x 14'	224	\$4,256
324	288	17' x 17'	108	\$2,052
256	288	17' x 17'	0	\$0

Provide OSCO at twice the area

Not Compact (sf)	If OSCO is 2x (sf)		SS Area (sf)	SS Cost (\$19/CF)
100	72	8.5'x 8.5'	84	\$1,596
196	128	11' x 11'	204	\$3,876
144	128	11' x 11'	64	\$1,216
256	200	14' x 14'	168	\$3,192
188	200	14' x 14'	0	\$0
324	288	17' x 17'	108	\$2,052
256	288	17' x 17'	0	\$0



Design Standards for Planting in Increasingly Urbanized Sites

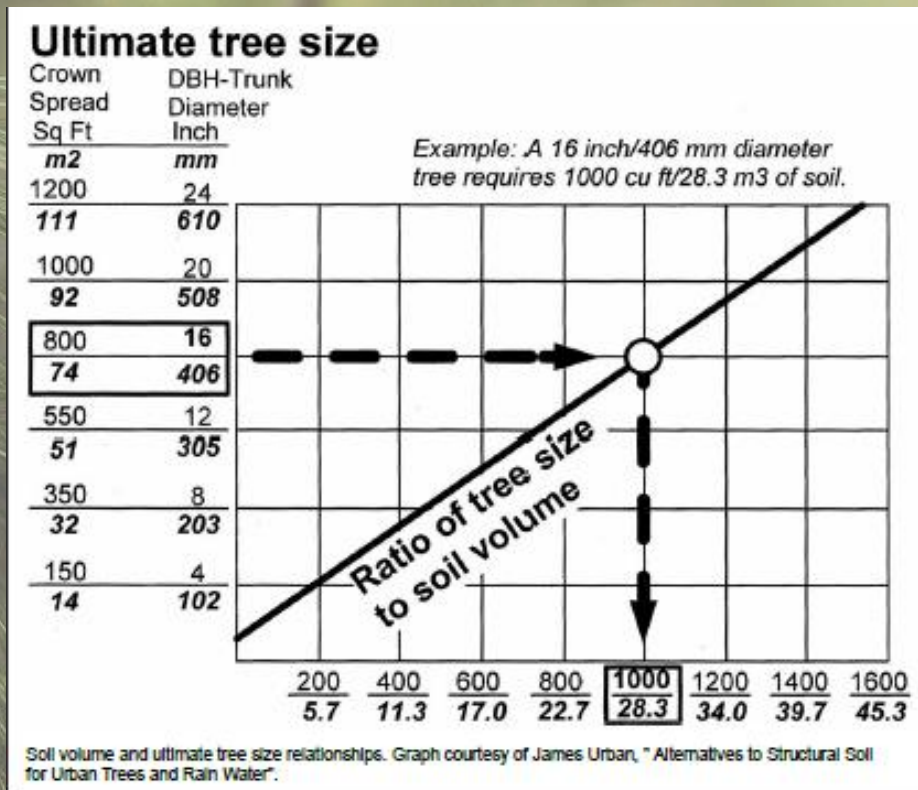
Results from a Tree Commission-directed subcommittee.

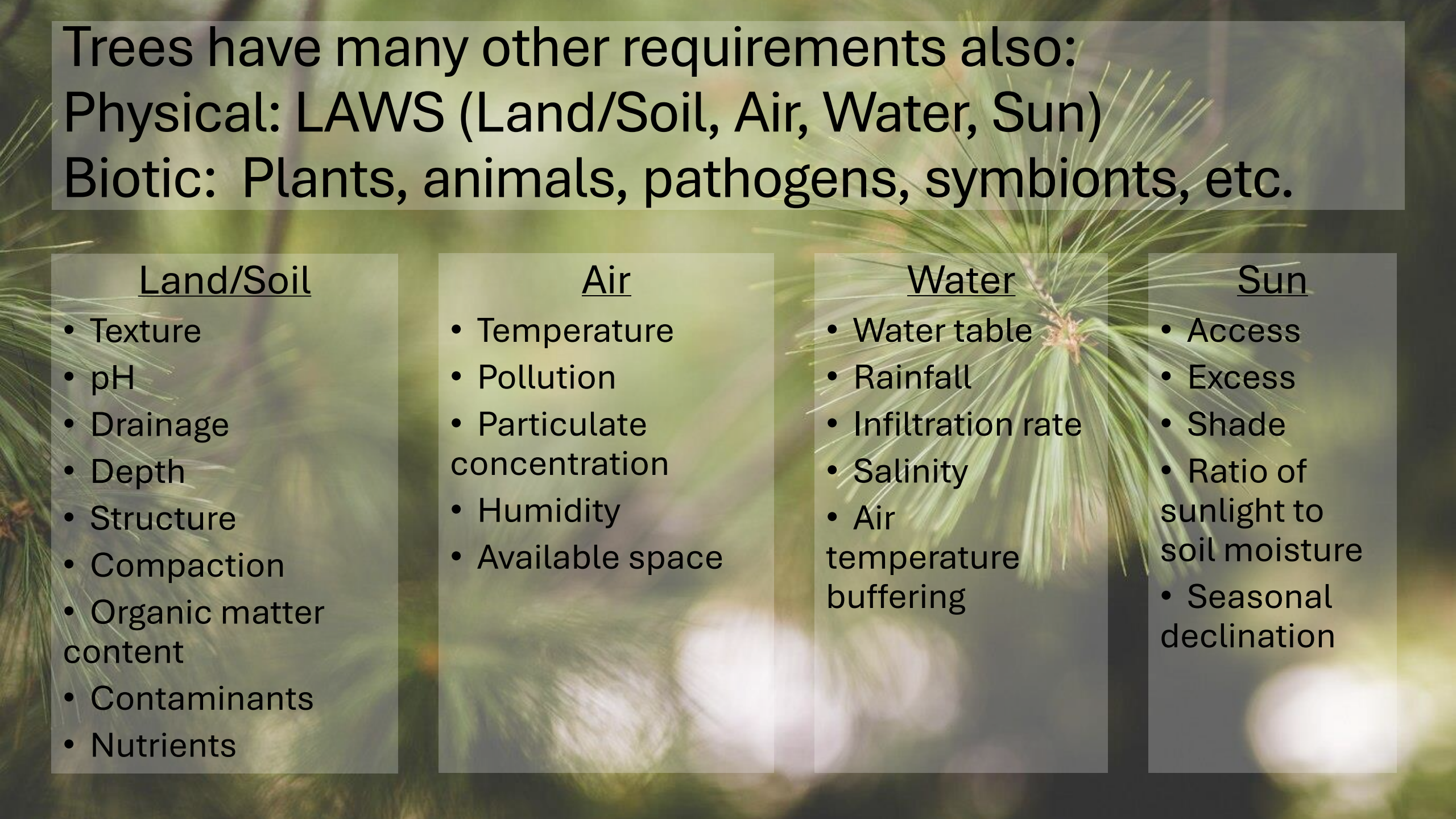
Right Tree

Right Place



Trees require access to 1.) large volumes of 2.) uncompacted soil





Trees have many other requirements also:

Physical: LAWS (Land/Soil, Air, Water, Sun)

Biotic: Plants, animals, pathogens, symbionts, etc.

Land/Soil

- Texture
- pH
- Drainage
- Depth
- Structure
- Compaction
- Organic matter content
- Contaminants
- Nutrients

Air

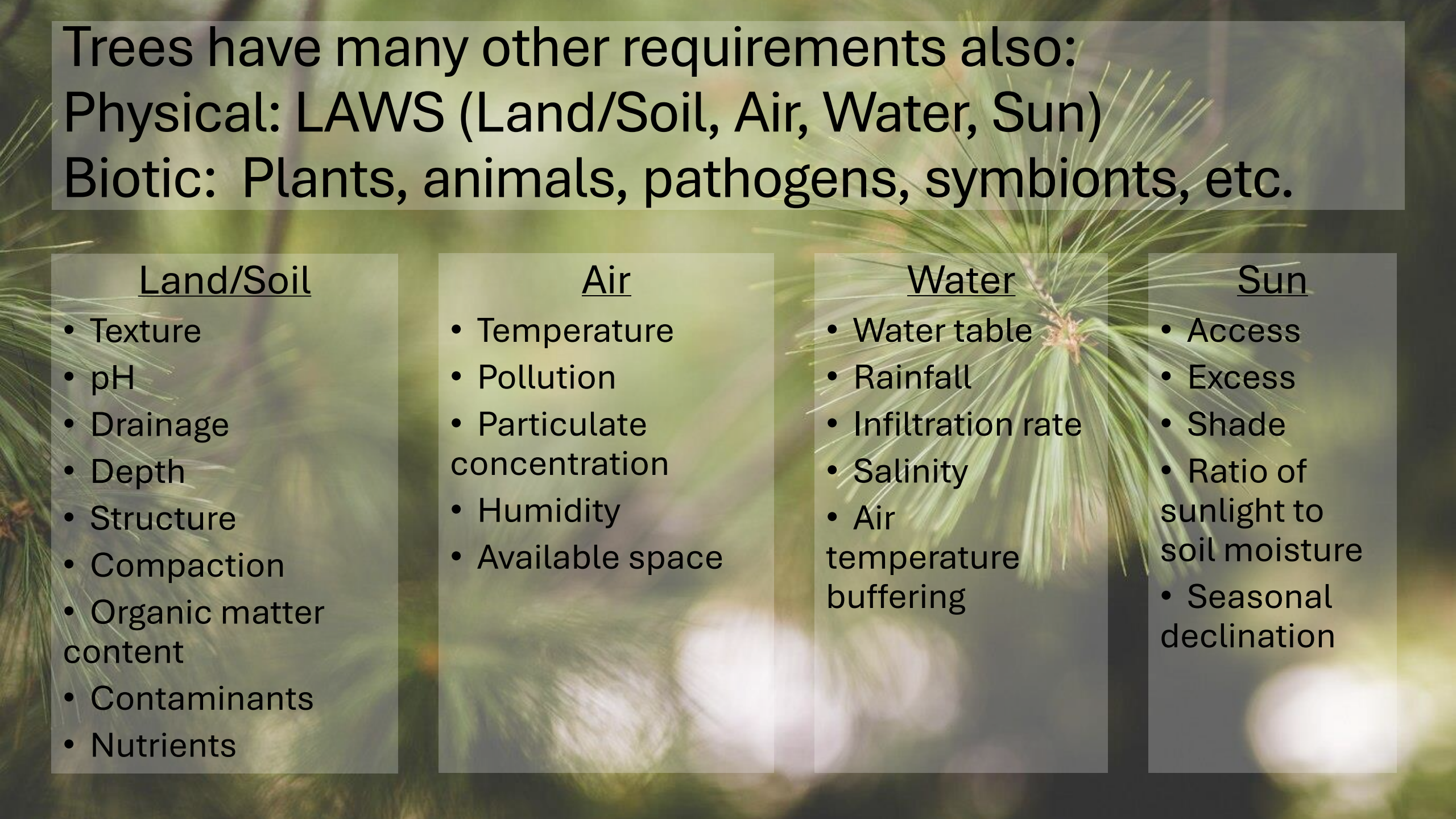
- Temperature
- Pollution
- Particulate concentration
- Humidity
- Available space

Water

- Water table
- Rainfall
- Infiltration rate
- Salinity
- Air temperature buffering

Sun

- Access
- Excess
- Shade
- Ratio of sunlight to soil moisture
- Seasonal declination



Trees have many other requirements also:

Physical: LAWS (Land/Soil, Air, Water, Sun)

Biotic: Plants, animals, pathogens, symbionts, etc.

Plants

- Canopy competition
- Endocrine-based communication
- Shared soil

Animals/insects

- Seed dispersal
- Seed activation in the gut
- Pollination
- Beavers

Pathogens

- Organisms that attack or parasitize
- Ecological imbalances (e.g. fertilizer) that result in pathogenic behavior
- Soil pathogens from previous planted tree

Symbionts

- Mycorrhizal relationships
- Chemically influenced guards



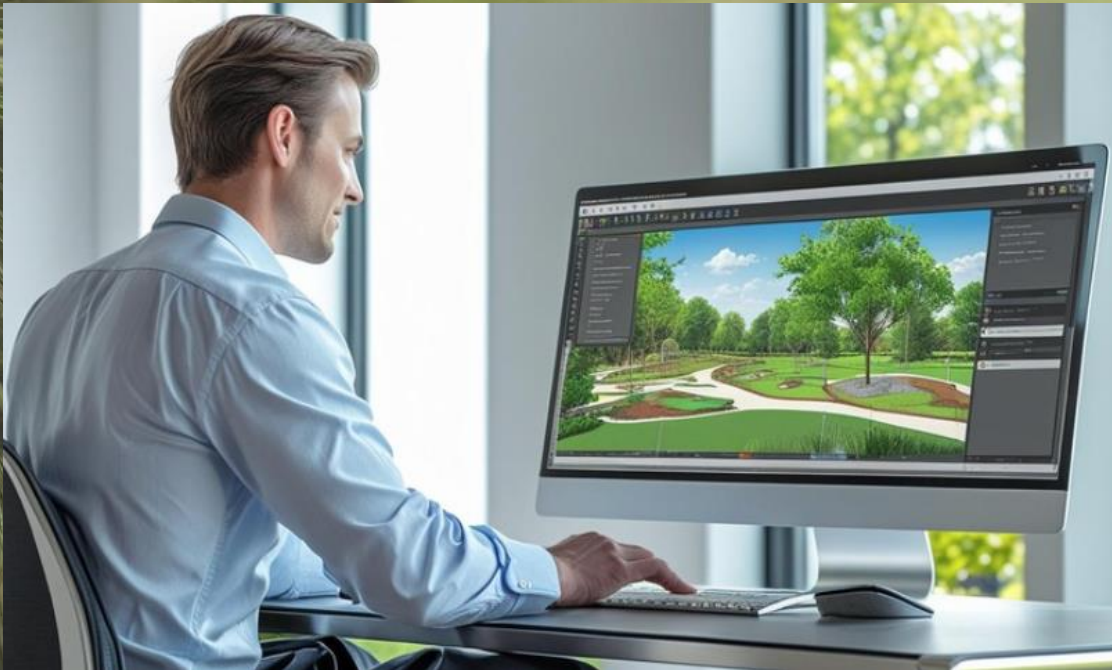
Soil Volume + Soil Compaction + hundreds of variables =
Complexity

VS

Standards

Standards

Planning

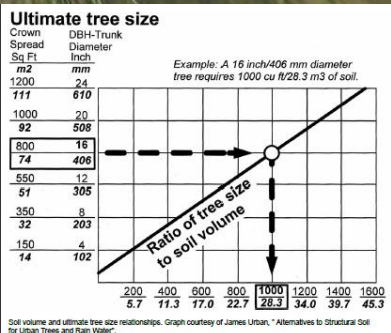


Construction

What if someone wants to plant a tree in a bed that is too small?

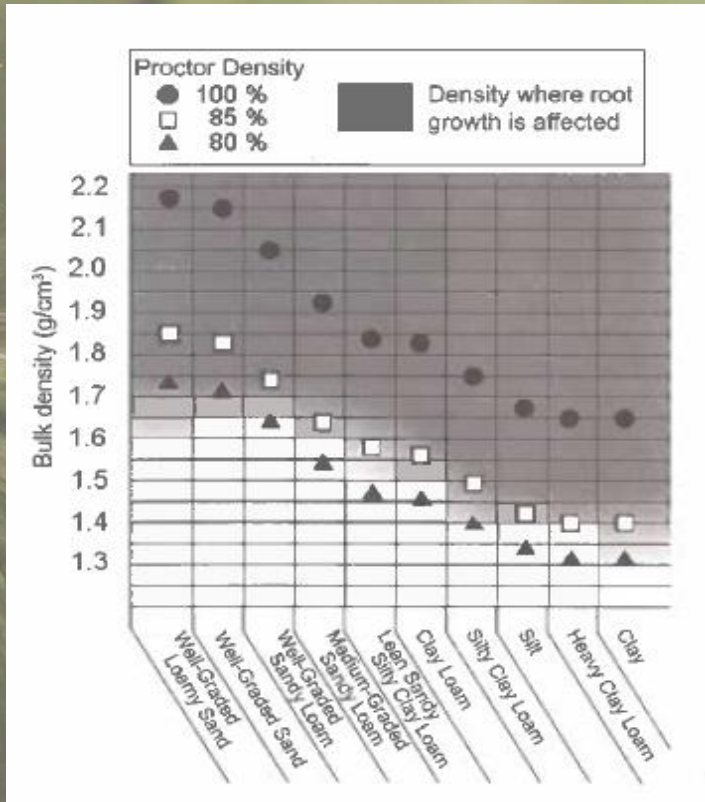
Minimum Soil Volume Standard

Tree no.	Species	Lifespan (years)	Ultimate tree size		Minimum Required Soil Volume (ft ³)	Minimum Proposed Soil Volume (ft ³)	Proposed meets or exceeds required (Y/N)	Cutout radius (ft)	Overhead space
			DBH (inches)	Crown area (ft ²)					
1	southern live oak	10-300	8-130	350-20,000	460-7500			1-15	
2	tupelo	10-100	8-36	350-1600	460-2300			1-5	
3	native fringe tree	10-25	4-10	150-450	200-600			0.5-1.5	
4	palm spp	30-500	16-24	200-500	64-250			1.5-3	
5	American sycamore	10-75	8-60	350-3000	450-3800			1-7	



Minimum Soil Compaction Standard:

Soils need to be less than 75-85% compacted for roots to grow through, which is different from the 95%-99% compaction levels associated with load-bearing construction.

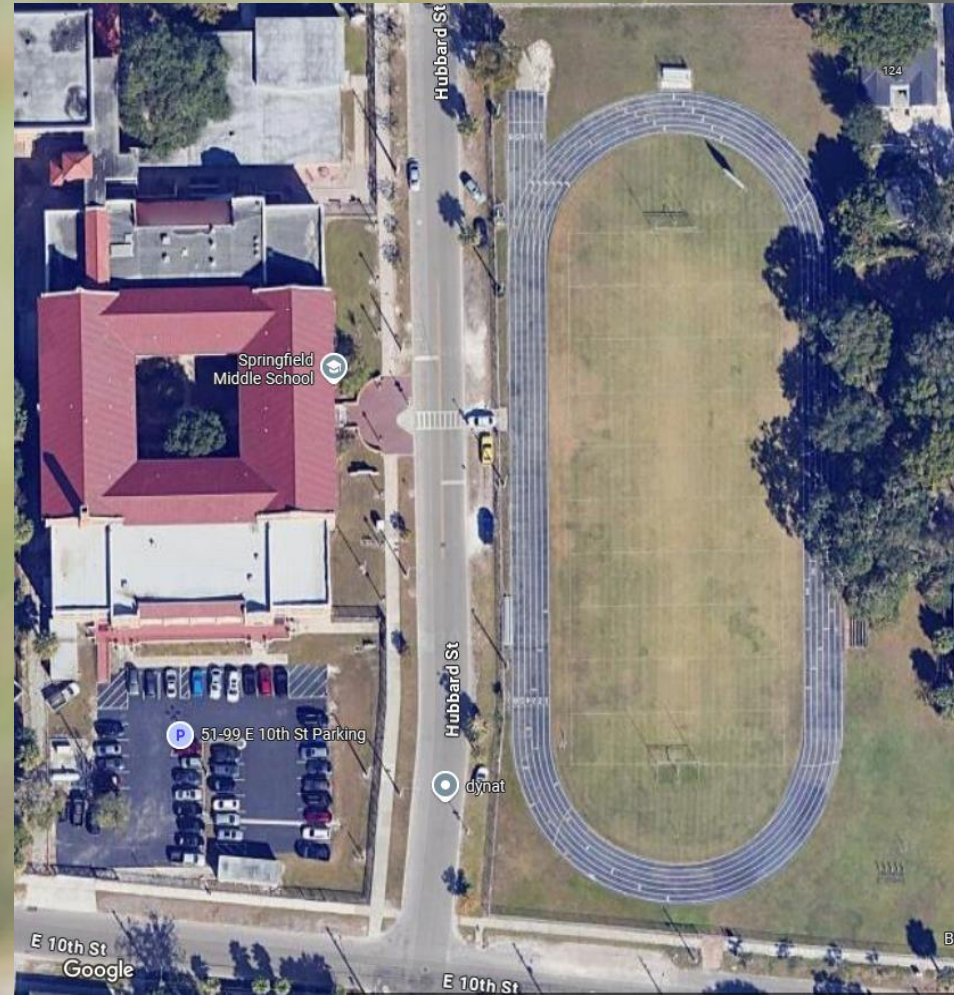


Urban J. 2008. Up by Roots. International Society of Arboriculture. p. 32



Minimum Soil Compaction Standard:

- Soils need to be less than 75-85% compacted for roots to grow through, which is different from the 95%-99% compaction levels associated with load-bearing construction.
- Compaction is either visited upon a site, or designed as part of a load-bearing system. Either is usually straightforward to identify.



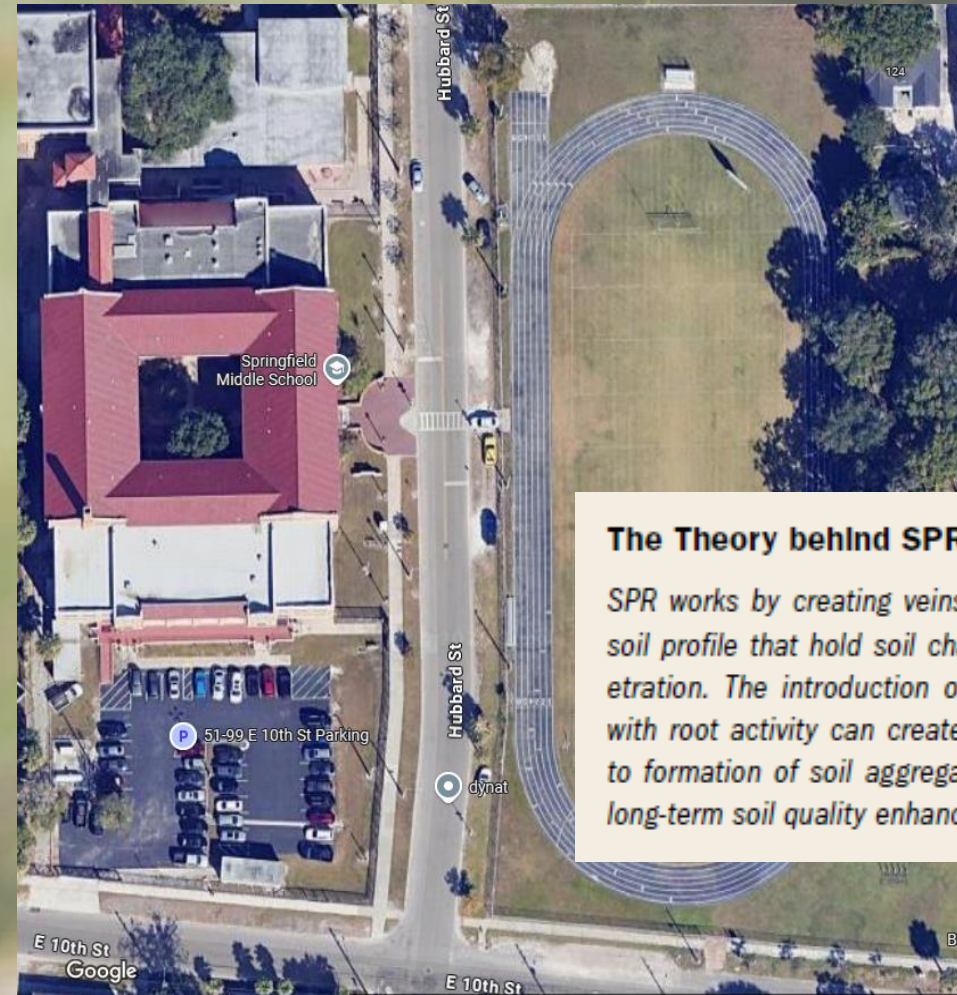
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- City staff should be enabled to identify compaction and specify mitigation.



The Theory behind SPR

SPR works by creating veins of compost deep in the soil profile that hold soil channels open for root penetration. The introduction of organic matter coupled with root activity can create conditions that will lead to formation of soil aggregates over time—leading to long-term soil quality enhancement.

*Soil left open because recompaction is unlikely

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