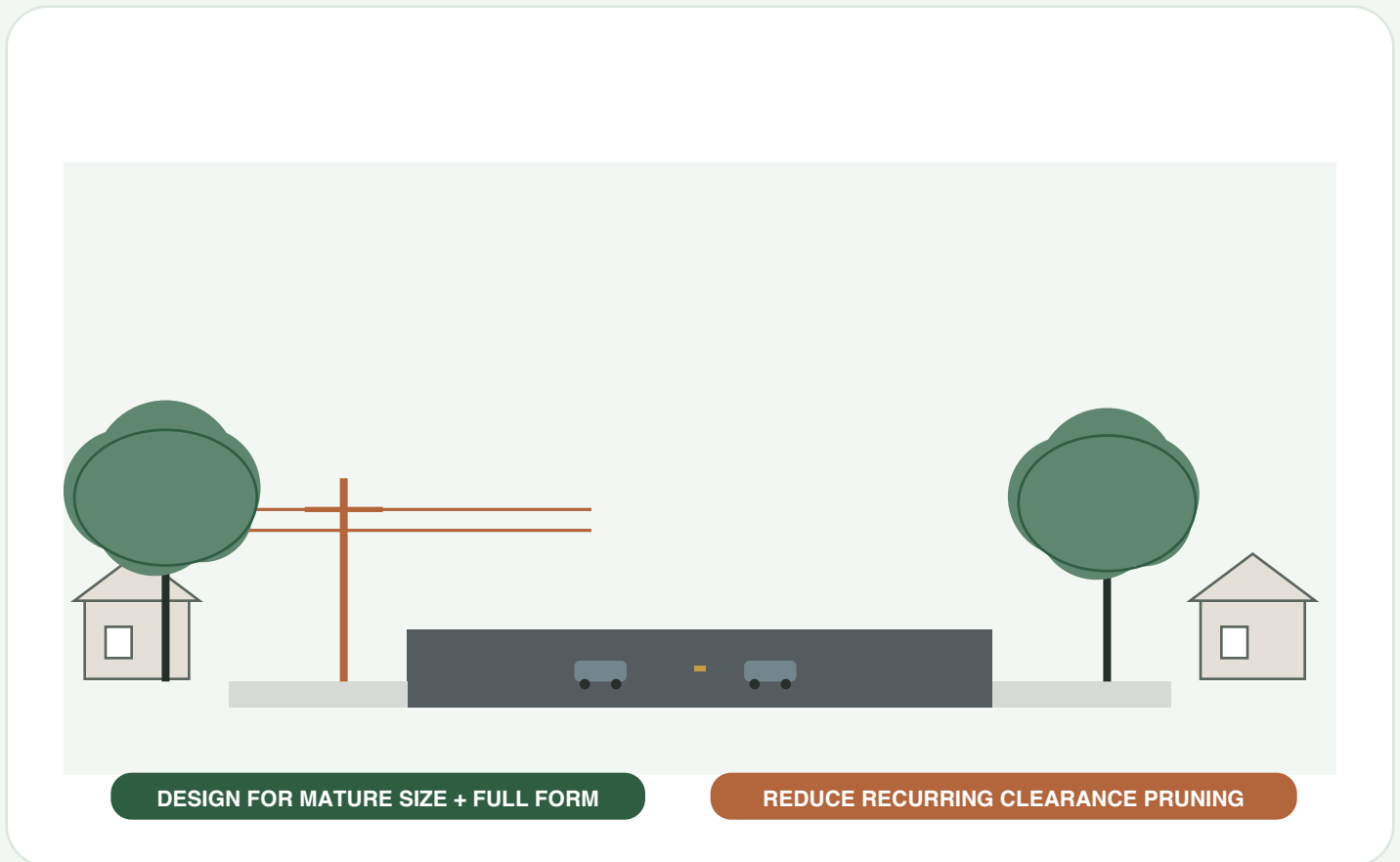


Street Tree Design Alternatives for Urban Roadways

A 10-page field tool for selecting planting locations and forms that reduce utility and infrastructure conflicts



Core premise. The source report treats street-tree planning as a design and life-cycle management problem: planting location, mature form, overhead utilities, soil/root space, surrounding pavement, and maintenance obligations should be resolved together - before a tree is installed.

Source basis: David V. Bloniarz, *Street Trees, Overhead Utility Distribution, and Physical Infrastructure: Design Implications, Maintenance Costs and Proposed Alternatives*, Northeast Center for Urban & Community Forestry, USDA Forest Service.

Design the conflict out of the site

The report identifies a recurring pattern: a conventional tree planted in a constrained treebelt may eventually occupy the same space as overhead wires, sidewalks, curbs, road pavement, underground services, or buildings. The resulting maintenance is not just arboricultural - it is operational, financial, and visual.



OVERHEAD UTILITIES

Repeated line-clearance pruning can distort crown form, weaken the intended streetscape composition, and create a continuing maintenance obligation.



SURFACE INFRASTRUCTURE

Confined roots and trunk expansion can lift sidewalks, displace curbs, damage pavement, and create accessibility and liability concerns.



UNDERGROUND SERVICES

Roots and utility work can conflict in both directions: roots may intrude into older infrastructure, while excavation can damage tree root systems.



DESIGN + LIFE-CYCLE COST

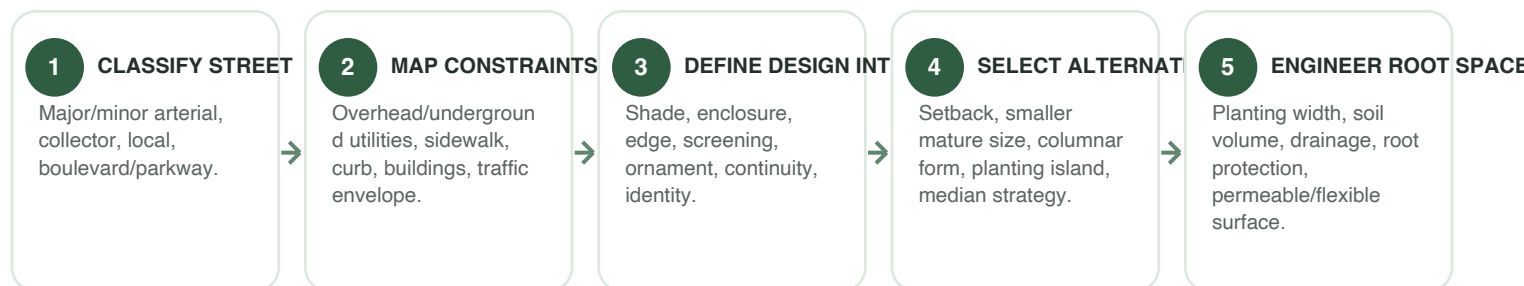
A tree that cannot reach its mature form may fail the original design intent while consuming pruning, repair, removal, and replacement resources.

The design objective is not simply to keep branches away from wires. It is to create a streetscape in which the selected tree can reach a useful mature form, remain compatible with public infrastructure, and be maintained predictably over its life.

Source report principle: street type, planting-strip width, utility location, physical infrastructure, design intent, and long-term maintenance should be evaluated together.

Choose the site strategy before the species

Use the sequence below during roadway reconstruction, replacement planting, or new capital projects. The report repeatedly emphasizes that the mature tree must be matched to the street type and to the available spatial envelope.



Four factor screen for species + placement

ENVIRONMENTAL

Soil, moisture, climate, exposure, rooting conditions.

CULTURAL / PHYSICAL

Utilities, structures, surface cover, traffic and spatial clearance.

SOCIAL / DESIGN

Aesthetic role, shade, enclosure, function, compatibility with the street.

ECONOMIC

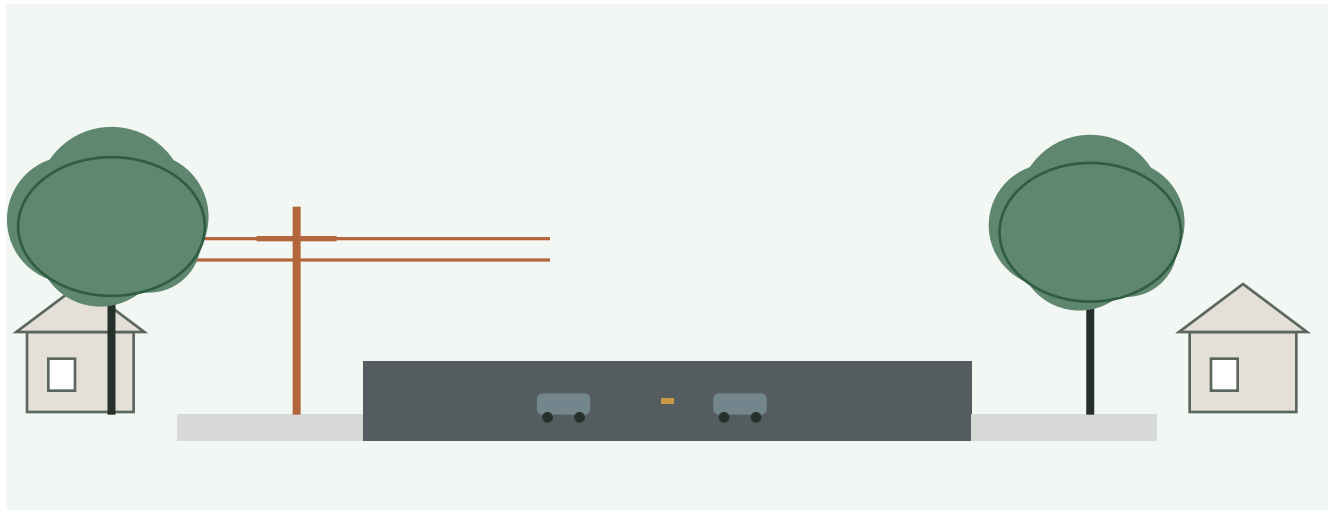
Establishment, routine maintenance, clearance pruning, repair, removal.

Valid outcome: no tree at the current location. Some sites will not support trees without compromising utilities, infrastructure, or design. Redesign the planting space, move the tree location, use another landscape element, or defer planting until the site can support it.

Do not use species selection as a substitute for inadequate space.

Setback planting - move the tree out of the conflict zone

Setback planting relocates the tree away from the immediate curb/utility corridor so a larger-canopy tree can mature with minimal line-clearance pruning. In the report, this strategy is illustrated across major arterial, minor arterial, collector, local, and boulevard street types.



SETBACK / ADJACENT PROPERTY

Best fit

Large-canopy design intent is important.

- Overhead utilities occupy the curbside planting strip.
- Adjacent public or private land can accommodate the tree.
- A continuous street edge or canopy is desired.
-

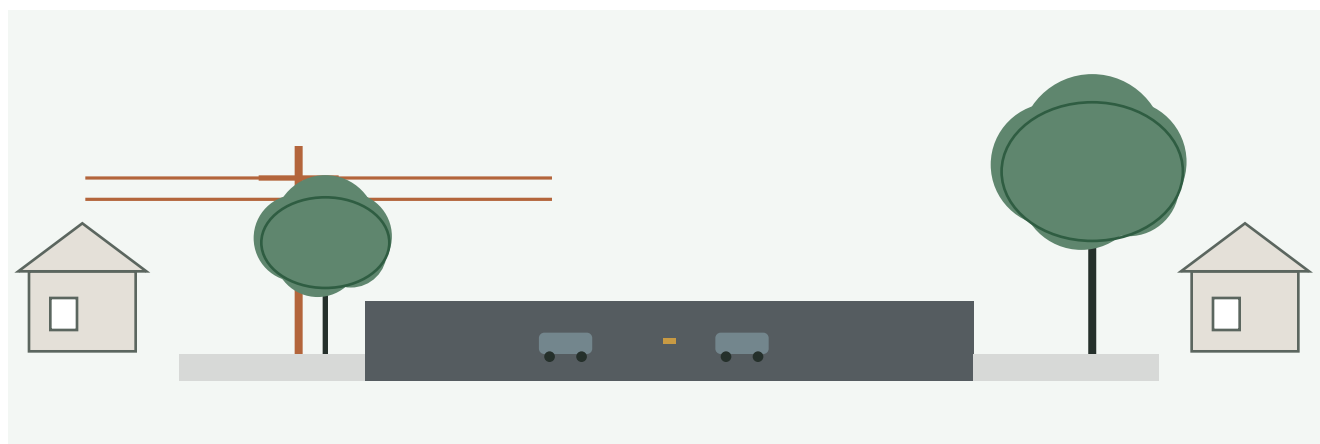
Implementation checks

Secure owner permission/easement where planting is outside the right-of-way.

- Preserve sight lines, frontage access, and building clearance.
- Coordinate future utility excavation and tree maintenance access.
- Confirm current local/state legal authority; the source report uses a Massachusetts private-property model.

Use smaller-maturing trees beneath overhead lines

Where trees must remain in the curbside planting strip, the report recommends choosing species whose ultimate mature height and crown spread remain compatible with the overhead utility envelope. The design goal is a tree that reaches its intended mature form without routine directional pruning.



SMALLER MATURE TREE UNDER WIRES

FULL CANOPY WHERE CLEARANCE EXISTS

Design rules

Specify by mature dimensions, not nursery height.

- Match branching habit to line position and clearance envelope.
- Retain the street's intended rhythm, edge, and visual continuity.
- Use proven street-tolerant plant material suited to the site.
-

Avoid

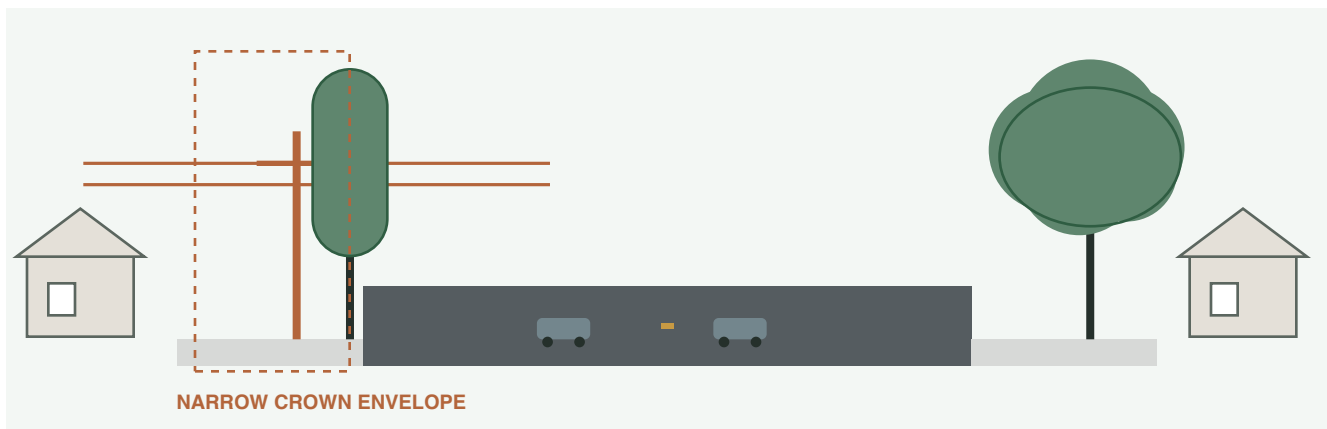
Using a large shade tree simply because it is available.

- Assuming frequent pruning will permanently solve a spatial mismatch.
- Selecting a small tree that does not achieve the functional or aesthetic intent.
- Ignoring root-space limitations because the crown is small.
-

Use this alternative when location is fixed. If the site can be moved, setback planting generally preserves more options for large-canopy benefits.

Use columnar or fastigate forms in narrow corridors

The report identifies columnar/fastigate trees as a way to preserve height, texture, and vertical streetscape structure where lateral crown spread is constrained. The method can be used on major/minor arterials, collectors, and local streets.



Why it works

Reduces lateral encroachment into wires and traffic space.

- Maintains a stronger vertical element than many low-growing species.
- Can reinforce formal street rhythm and spatial order.
- May preserve canopy function where width - not height - is the dominant constraint.
-

Watch-outs

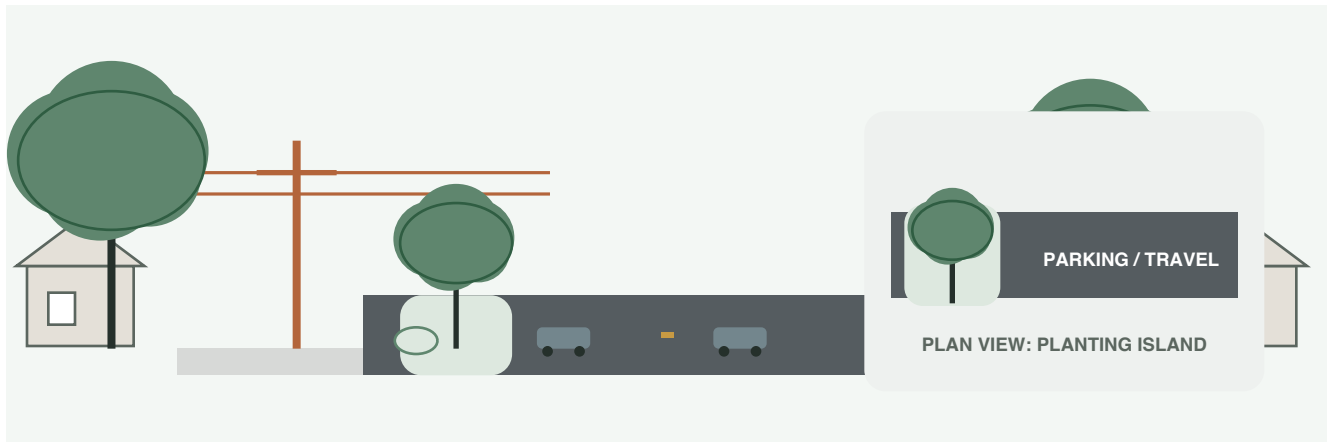
Confirm the exact mature width and branching habit of the cultivar.

- Do not assume every narrow form is appropriate beneath conductors.
- Check structural performance, pest susceptibility, and local hardiness.
- Maintain adequate root/soil volume despite the narrower crown.
-

Design test: Does the narrower form still deliver the intended shade, enclosure, screening, or identity? If not, use setback planting instead.

Create new planting space in the parking lane or street edge

For arterial streets with parking lanes, the report proposes converting selected paved segments into planting islands. This moves trees away from the traditional utility strip, increases planting volume, and can be combined with setback planting.



Potential benefits

Creates rooting space where none existed.

- Places the trunk/crown outside the primary overhead-wire corridor.
- Breaks up long paved parking edges and adds visual rhythm.
- Allows combined planting: curbside island + larger setback tree.
-

Trade-offs to resolve

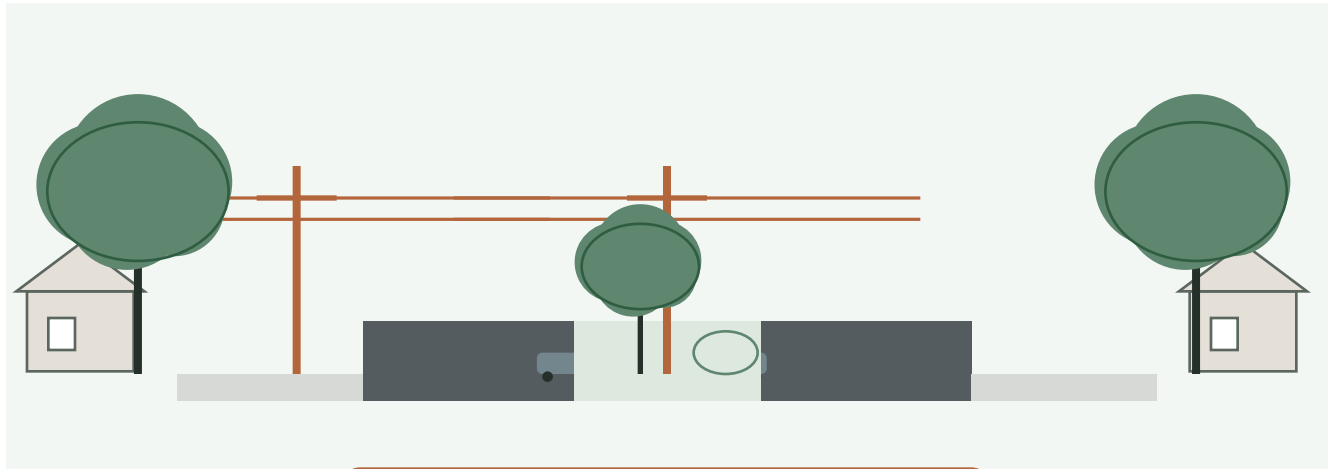
Loss or reconfiguration of parking spaces.

- Drainage, snow storage, curb geometry, and sight-distance needs.
- Protection from vehicle strikes and compaction.
- Coordination with complete-street, ADA, transit, and emergency access requirements.
-

Best suited to capital reconstruction or corridor retrofit projects where curb lines and pavement can be redesigned.

Use median and boulevard planting strategically

Boulevards and parkways offer additional planting zones, but utility alignment can still determine what succeeds. Where overhead lines occupy a median, the report illustrates smaller trees and shrub groupings in the utility corridor while retaining larger trees in locations with clear overhead space.



SMALL TREES / SHRUBS IN UTILITY MEDIAN

- UTILITY ALONG ONE EDGE**

Use smaller trees near the line and preserve larger canopy elsewhere.
- UTILITY IN CENTER MEDIAN**

Use low/medium plant forms that remain outside required clearance.
- LARGE CANOPY AT OUTER EDGES**

Use setback or unconstrained locations to retain enclosure and shade.
- MIXED PLANTING**

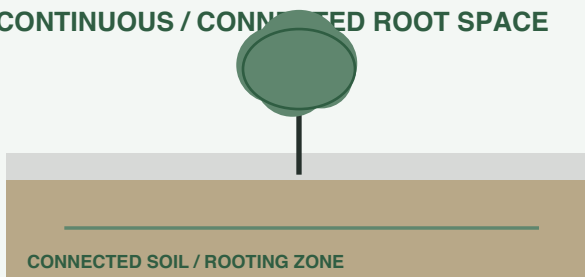
Combine trees and shrubs to preserve visual continuity without forcing large trees into the line corridor.

Key principle: preserve the boulevard's spatial order by distributing plant forms according to utility clearance, rather than pruning every tree to fit the same constrained envelope.

Protect roots, soil, pavement, and utilities

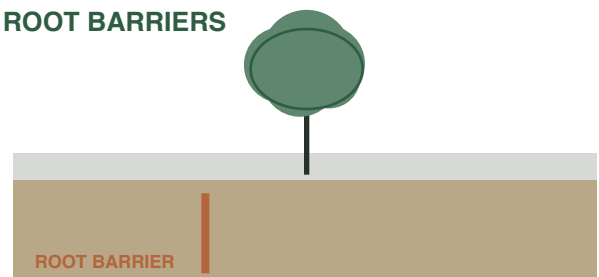
The report stresses that better placement must be paired with planting details suited to urban streets. It discusses continuous pits, drainage, planting wells, root barriers, permeable/flexible paving, and vault/container systems as tools for increasing survivability and protecting infrastructure.

CONTINUOUS / CONNECTED ROOT SPACE



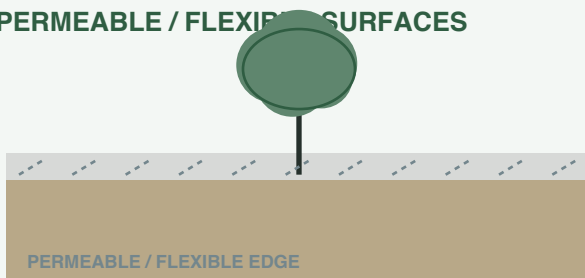
Connect planting areas where possible so roots can occupy a larger soil volume rather than isolated pits.

ROOT BARRIERS



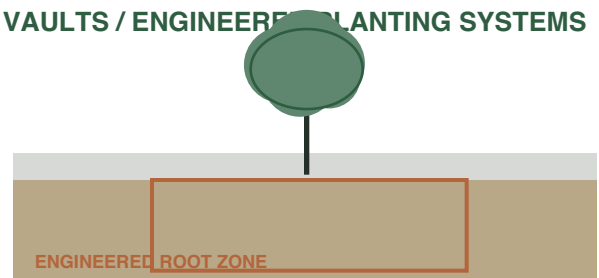
Use barriers to direct root growth away from sidewalk, curb, or other vulnerable infrastructure.

PERMEABLE / FLEXIBLE SURFACES



Use paving approaches that improve permeability and tolerate some root expansion near the tree.

VAULTS / ENGINEERED PLANTING SYSTEMS



Where underground infrastructure is dense, use designed soil/root zones that separate tree roots from utilities and resist compaction.

Design to the mature tree, not the opening in the pavement. Planting-strip width and available rooting volume should be treated as core selection criteria, not as afterthoughts.

Match the alternative to the street and the constraint

The original report applies the same design logic across a range of street types. Use this matrix as a scoping tool, then verify dimensions, utilities, legal authority, traffic function, and species suitability at the project site.

Street type	Setback	Smaller mature size	Columnar	Parking-lane island	Median / mixed planting
Major arterial	CORE	CORE	OPTION	CORE	--
Minor arterial	CORE	CORE	OPTION	CORE	--
Collector	CORE	CORE	OPTION	OPTION*	--
Local	CORE	CORE	OPTION	OPTION*	--
Boulevard / parkway	CORE	CORE	OPTION	OPTION*	CORE

*Not a primary recommendation in the source report for these street types; consider only where parking/curb geometry allows a purposeful redesign.

Six questions before approving the planting plan

- 1. What is the mature crown and trunk envelope - and where are the wires?
- 2. Is the tree being used to create shade, enclosure, edge, screening, or ornament?
- 3. Can the planting location be moved before the species is downsized?
- 4. Is there enough rooting space to avoid predictable curb/sidewalk damage?
- 5. What recurring pruning, repair, removal, or access obligations will this choice create?
- 6. Who must approve, maintain, and protect the tree over its establishment and mature life?

Contemporary-use note added for this brief. The original report includes a historical species list and legal references from its publication era. For current municipal specifications, use the report's site-selection logic but separately verify current invasive-species restrictions, pests/diseases, climate suitability, nursery availability, utility standards, and state/local law.