



Trees for Better Streets

**TREE CITY USA®
BULLETIN**

No. **45** Editor: Dr. James R. Fazio • \$3.00



In his classic book, “Great Streets,” Allan B. Jacobs wrote, “... for many people trees are the most important single characteristic of a good street.” Whether a busy commercial strip, a downtown area with skyscrapers, or a quiet residential cul de sac, trees can add both beauty and function. Trees make any street a better street, and because of this, they deserve the same status and care as other parts of the city infrastructure.

One day a group of business professionals met with the mayor of a small western city to discuss bringing in a new store. When they asked about landscaping requirements, he replied, “We don’t have any. We don’t want to burden you folks with something like that.” But, instead of currying favor with the delegation, the mayor was shocked at their response. “When we invest,” they informed the mayor, “we

Trees enhance streets of all kinds. They contribute to customer satisfaction in shopping areas, provide more pleasant and resalable living areas, and can even have a calming effect on traffic.

want to protect our investment and know that the guy next to us won’t put in a dumpy-looking place.” They located in a nearby town that had a landscape ordinance.

Trees — the dominant plant in any landscape — have a powerful effect on how any street looks, feels, and functions. Because of this, it is time to view trees not merely as decorations, but rather as valuable services not unlike water mains and streetlights. Some forward-thinking individuals call trees the city’s “green infrastructure.” It is a perspective deserving of wider adoption and one that can pay great dividends.

What Trees Do For Streets

Given a limited budget, the most effective expenditure of funds to improve a street would probably be on trees.

— Allen B. Jacobs, Chair, Department of City and Regional Planning, University of California, Berkeley, and author of the book *Great Streets*

Aside from the well-known benefits of street trees such as shade, beauty, wildlife habitat, and more pleasant living conditions, their contributions go much further – and they pay big dividends. Many studies and the use of computer models can now predict the return on investment for individual trees, trees on a street, or even the entire urban forest. For example, a Forest Service study of trees in the Northwest showed that the payback value of 100 trees would yield \$202,000 in measurable environmental services to the community after 40 years while accruing only \$84,000 in costs of ongoing care.



TREES ADD VALUE. According to the U.S. Forest Service, healthy trees can add up to 15 percent to the value of residential property. Real estate agents have also reported that homes with trees tend to sell faster than those without. Street trees benefit both the nearest homeowner and the entire community.



TREES PROVIDE A SENSE OF PLACE. They imprint on the mind, helping us sort out one place from another and attracting us back to favorite communities and neighborhoods.



Which street is likely to attract customers who linger and spend money while the other one makes people want to rush on by? Research is mounting that shows that **TREES ARE GOOD FOR BUSINESS.** For example, studies by Dr. Kathleen Wolf of the University of Washington found that customers are willing to pay over 12 percent more in shopping areas with trees. In San Jose, California, a study by the organization, Our City Forest, found a positive correlation between trees and success of commercial areas.





TREES HAVE A CALMING EFFECT ON PEOPLE AND TRAFFIC. After years of research, psychologist Dr. Frances Kuo has concluded that urban landscaping is “as necessary as streets, sewers, and electricity.” The reason is because of the calming behavioral effects she has found that trees have on people, including the possibility of reduced crime rates. “Heart rates improve and blood pressure goes down,” she adds. Other studies have shown that even the view of trees outside hospital windows can have a healing effect. They may also help reduce accidents and road rage by slowing traffic in residential areas, separating cars and walkways, and making streets more pedestrian friendly.



California health officials warn that serious skin cancer has doubled since 1973. They blame the increase on thinning of the earth’s ozone layer, nature’s “sunscreen in the sky.” They also report that 90 percent of all skin cancer is caused by sunlight and that 80 percent of a person’s sun exposure occurs during childhood but takes its toll later in life. Trees that shade sidewalks in the summertime when children play can **SERVE A PREVENTIVE ROLE** in this recent national health problem.



SHADED STREETS LOWER THE HEAT ISLAND EFFECT of large paved areas in summer. Currently, street and other urban trees contribute annual savings of \$2 billion, or about .5 percent of the energy use in the United States. More street trees would increase the savings! When University of Florida researchers compared two cities – one with more tree canopy than the other – they found that residents of the well-treed city spent an average of \$126 less per year on power bills.

TREES CLEAN THE AIR. Research by Dr. Greg McPherson of the U.S. Forest Service has found that a single large street tree not only provides the gift of oxygen, but also can annually absorb 10 pounds of air pollutants, including three pounds of dust and particles. It can eliminate 330 pounds of carbon dioxide through direct sequestration in its wood and the reduction of power plant emissions due to energy saving through cooling. One large tree can also help clean waterways by intercepting more than 700 gallons of rainfall, thereby reducing or slowing storm runoff.

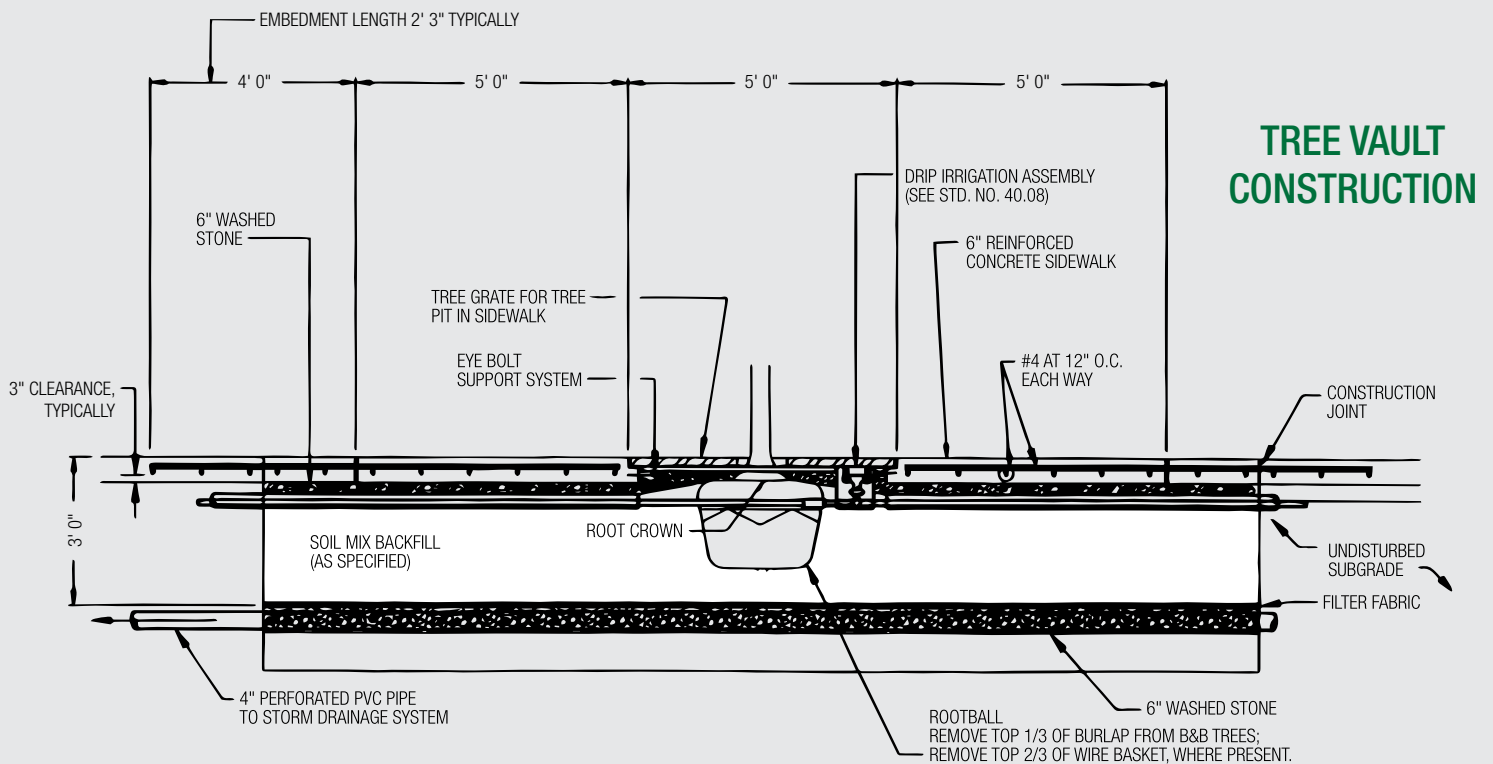
How to Help Street Trees Survive

Inner city trees sometimes live only seven or eight years before succumbing to the harsh conditions of their environment. Trees farther from city centers live longer, but a study by American Forests shows that the average lifespan for all urban trees is only 32 years. Community officials can accept this short life cycle and replace trees like potted plants, or they can provide growing conditions that extend the serviceable life of street trees. When they choose the latter, tax dollars are saved and trees are allowed to mature and provide their full spectrum of benefits to the community.

MAKE ROOM FOR ROOTS

Trees in urban areas or in the main street of small towns are often planted in tiny spits about 4' by 4' square. These are sarcastically and correctly called 'tree coffins' by arborists because there is simply not enough soil available to sustain a healthy street tree.

In residential areas, the answer to this problem is wide tree lawns, ideally 8' between curb and sidewalks. Where these do not exist, planting on the lawn side of the sidewalk can provide room for roots and still let the tree shade the street. In more crowded commercial areas, root vaults may be the answer.



Vaults for tree root growth can be provided under sidewalks. Vault size depends on the placement of underground utilities and other obstacles, but the linear dimension can range from 20 feet or less to as much as the entire block. Longer vaults are shared by more than one tree. Walls of the vault can accommodate fire hydrants, light poles, manholes, and other hardscape features. Where soil conditions warrant, they can also be underlain with drainage pipes. Each vault is covered with reinforced sidewalk slabs built to hold emergency vehicles or meet other city codes. A good soil mix is placed inside the vaults with the end result being street trees that live longer, healthier lives.

OTHER OPTIONS

In lieu of soil-filled vaults beneath the pavement, two products are available that support surface materials while at the same time providing room for root growth. Direct links to both are found at arborday.org/bulletins:

- CU-Structural Soil®
- Silva Cells

ROOTS NEED AIR AND WATER, TOO

Where underground space is available but vaults are not possible, a less expensive method of providing a suitable growing environment for roots is the use of structural soil.

Engineered standards require soil beneath streets and sidewalks to be compacted to a specific degree suitable to bear the weight of a paved surface and foot or vehicular traffic. Compacted soil removes the natural air spaces that in normal soil allow air and water to infiltrate. Without these passageways, or lifelines to water and oxygen, root growth is not possible. Structural soil is an invention that meets both engineering needs and provides a growing environment for roots. For example, many years of research and testing went into a patented soil mix developed at Cornell University and appropriately named CU-Structural Soil®. The mix consists of angular crushed stone or gravel (.75" – 1.5" diameter), a prescribed recipe of soil made up of sand, silt, and clay, and an ounce of dry powder hydrogel per 210 pounds of stone. When this mix is compacted, it is able to meet engineering standards for compaction but still provide a friendly growing medium for roots. It is a happy compromise.

For additional information about CU-Structural Soil® and a list of contractors who are licensed to ensure quality in mixing and installing the soil, contact the Urban Horticulture Institute at Cornell University at 607-255-4586 or Amereq, Inc. at 800-832-8788.



Concrete and asphalt do not always reign supreme. As seen in this Italian village, street pavement itself can lend an aesthetic touch while at the same time allowing air and water to infiltrate to tree roots.

LET TREES BE THEMSELVES, NATURALLY

When trees must be pruned to prevent a conflict between utility lines and branches, not only is the beauty of the tree compromised, but so is its health. Even the most careful utility pruning creates wounds and opens the crown to sun scald and invasion by decay-causing fungi. The solution is simple. When planting near overhead utilities, select species with crowns that stay underneath energized wires when mature.



Topping is never a good option for the treatment of street trees – or any tree. Not only is the tree rendered unattractive, its truncated limbs will quickly sprout a flush of new limbs that are weakly attached and prone to becoming dangerous. Increasingly, topping is becoming an illegal practice in American communities.



Trees that grow into power lines are sometimes disfigured when utility workers prune to provide safe clearance. This problem can be easily prevented. Beneath wires, plant only low-maturing trees. Within 50 feet of wires or poles, plant trees that reach no higher than 40 feet at maturity.

More Design Considerations

Spacing and arrangement of trees can help make streets more beautiful and their trees more functional.

INTERLOCKING CROWNS

There is a danger that we are dwarfing our community forests. In new areas where underground or alley utilities allow, streets will have more character – and more shade – if large trees with strong wood are planted instead of over-planting with low-growing flowering trees.



Interlocking crowns lend memorable character to a neighborhood. They also provide cool shade, safe passageways for squirrels, and a delightful play of ever-changing light on streets and sidewalks.

TREES IN THE STREET

Planting spaces that jut into the street are a means of creating a place for trees where it may not otherwise exist. The result is a more pleasant environment with the practical side benefits of shade and a calming effect on traffic.



A secondary street with no tree lawns or existing space for trees can sometimes be altered to make room for trees. The resulting benefits should more than compensate for the small number of lost parking spaces.

DOUBLE DUTY

Where space allows, a street can provide a more verdant feeling if trees are planted on both sides of a sidewalk and spacing is staggered.



OTHER CONSIDERATIONS

There is nothing sacred about exact spacing. While this may help unify a neighborhood or meet design needs in some cases, in others, it is helpful to break the uniformity to accommodate street lights, store fronts, or other features. Similarly, some streets may be enhanced with groups of plantings instead of rows, and with a variety of species that lends variation in size and colors. In all cases, the rule of thumb to provide for healthy diversity is that no species should make up more than about 10 percent of the trees in a community.

SOME STREET TREE GUIDELINES

Fully stocked streets = approx. 200 trees/mile

Spacing: Distance apart should be equal to or slightly less than the expected diameter of the crowns at maturity. Generally:

- Small trees (25' – 30' tall when mature), approx. 15' – 25' apart
- Medium trees (30' – 50' tall when mature), approx. 25' – 35' apart
- Large trees (more than 50' tall when mature), approx. 40' – 50' apart (For large trees, consider closer initial spacing with later thinning to more appropriate spacing, or the use of cultivars with compact crowns that would allow closing spacing.)

Overall canopy cover recommended by American Forests = 40% minimum

Central business district	15%
Urban residential district	25%
Suburban	50%

Communities will have trees that make streets better only if it is the will of the people. Tree boards, professionals in the green industry, and any citizen interested in trees must speak up to place street trees on par with other parts of the city's infrastructure. There is often opposition to this concept and to street trees in general. Some perennial arguments are:

- Shade can create icy spots, large trunks can hide muggers, and flickering shadows can make jaywalkers difficult to see.
- Trees create messes that require work to clean up.
- Trees may hide signs and businesses, and merchants believe customers will not know their establishment is there.

Inflexible rules can also be the enemy of using trees to improve streets. Spacing standards that do not allow compromise are an example. Another is the common line-of-sight guideline prohibiting trees from within, for example, 40 feet of a corner or on medians. Proper species selection, placement, and pruning can render trees safe near crosswalks, in medians, and at corners in many situations. This then prevents large gaps in the canopy and can actually contribute to safety by calming traffic.

Finally, when street trees are valued in a community, they should be made part of the budget for every capital improvement project. Financial support for regular maintenance is also essential. A Tree City USA award is the best evidence of a community that cares.

THE MILWAUKEE EXAMPLE

Milwaukee is a community that values its street trees and invests in them accordingly. The city has professional management staff, but just as importantly, it has the support of elected officials and city administrators to use landscaping to make Milwaukee's 122 miles of streets among the most attractive in the nation.

To meet its responsibilities, the Forestry Division maintains its own nursery that contains about 20,000 trees grown to a sturdy 2" caliper. It trains its tree workers carefully and regularly – and provides financial incentives to reduce turnover. Importantly, the city prunes its young street trees on a regular three-year cycle and its older ones every six years. It also works closely with the city engineering department and contractors so trees are considered during the planning phase of repair or reconstruction work. Inspectors then go on-site during the active work phase to enforce tree protective measures and issue fines when necessary. Milwaukee has been a Tree City USA since 1979.



Milwaukee Director of Operations Preston Cole is responsible for about 200,000 public trees. His city's policies reflect a will of the people that places a high premium on using trees for better streets.

Milwaukee, Wisconsin



Great Ideas from Great Books

There is magic to great streets. We are attracted to the best of them not because we have to be there but because we want to be there. The best are as joyful as they are utilitarian.

— Allan B. Jacobs in *Great Streets*

Information about *Great Streets* and other publications that can help transform your streets into more beautiful and practical places can be found by visiting arborday.org/bulletins.

INTERPRETATION CAN ADD INTEREST

The classic definition of environmental interpretation was suggested by Freeman Tilden in his classic book on the subject, *Interpreting Our Heritage*. Tilden wrote that interpretation is “an educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience and by illustrative media.” Interpretation, whether done in signs or oral presentations, must also be interesting enough to attract the attention of lay visitors, must be relevant to their interests and experiences, and clear enough to understand and – ideally – excite even more interest.

There is a place for interpretation along our streets and in our parks. Tough, vandal-resistant materials make it practical in almost all settings, and there are usually skilled interpreters who can create the messages. Signs can be used to preserve historical information on-site or to introduce lay people to trees and other aspects of nature. They can add to the experience of visiting a particular street or park, and in some cases, can be an important component in promoting tourism.



Strolling visitors stop to read a historical sign in Idaho Falls' Greenbelt Park. Interpretive signs along a street or in parks add interest as well as provide information to visitors.

Tree City USA Bulletin © 2015 Arbor Day Foundation. Published by the Arbor Day Foundation; James R. Fazio, editor; Carrie Benes, graphic designer. Technical reviewers for this issue: Don McSween, City Arborist, Charlotte, NC, and Dr. Nina Bussuk, Cornell University, Ithaca, NY.

PHOTOS COURTESY OF: iStock.com/SWKrullImaging (page 2), Dan Burden (Glating, Jackson, Kercher and Anglin) (page 3), Cincinnati Park Board (page 4), and James R. Fazio (page 5 and 8).

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