

URBAN ISLANDS

Street trees that share a common soil volume will live longer □ A typical urban street is a hazardous place to live if you are a tree. Indeed, it is estimated that New York City street trees live for only three to 15 years. Not only are replacement costs high, but, perhaps more important, these trees never have the opportunity to achieve the

expected amenity in the urban landscape.

Grouped plantings, known as "urban vegetation islands," offer designers a new way of approaching street landscapes while overcoming some of the ambient hazards that shorten the lives of street trees. In an urban vegetation island, a group of trees shares a common soil volume that is open to air and water but is surrounded by pavement. Large planters also fall into this category, but the exciting prospect for those of us working in the urban environment is the opportunity to use vegetation islands directly at the street level, instead of replicating tree pits ad infinitum in a quest for symmetrical uniformity. As often as not, the uniformity envisioned in these typical streetscape designs is never realized; the trees usually succumb to environmental stresses commonly found in our cities. Inappropriate tree species, soil conditions, ambient environmental conditions and mechanical damage are only a few of the considerations that undermine the design intent of equally

spaced and uniformly growing trees.

One of the most common problems in typical street-tree plantings is inadequate rooting space. Tree roots are commonly containerized even when they are in the ground, due to compacted soil, curbs or underground obstacles that limit needed water, nutrients and oxygen. Often there is only a small opening in the pavement allowing for water and oxygen movement into the rooting zone. Urban vegetation islands feature a large open soil volume in which water and oxygen can move more freely and within which roots have more space to grow.

Trees are planted much closer together in an island planting than would be typical of a conventional street tree planting. In fact, spacing is not as important as the volume and type of soil. Island plantings resemble how trees grow in a forest: however close together they may be, there is a very large volume of soil for roots to explore.

It is difficult to say exactly how much soil volume is necessary for a tree to reach its envisioned design size. Research within Cornell's Urban Horticulture Institute is currently tackling this problem. Some of our best estimates to date are the following: for a 25-foot tree, a volume of 15 cubic yards—where the depth of soil equaled no less than three feet and no more than four feet—would support its water needs in a geographical region with a mean annual precipitation of 36 inches (for example, in Ithaca, New York). The greater the rainfall during the growing season, the less soil volume is necessary to store water. (This estimate is based on a soil made of 66 percent loam, 25 percent perlite and 10 percent peat. If one were to use a soil that drained faster, the overall volume would have to be increased. Conversely, a soil mix with less perlite would be slower draining, and less volume may be required.)

Close spacing allows trees to mesh canopies together, creating a single large mass and also sheltering part of each tree so that it is not exposed to sun and heat from all directions, as would be more typical of a boulevard planting. Research carried out on the streets of New York City by Cornell's Urban Horticulture Institute found that the aerial environment directly surrounding iso-

Honey locust (*Gleditsia triacanthos*) grouping in sidewalk on the north side of Saint Patrick's Cathedral

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lated street trees can be as much as 20° F hotter and 30 percent drier than a comparable measurement taken in a sheltered park site. Grouped trees in open soil tend to shade each other, creating higher humidity and buffering one another from strong winds.

The open soil in an urban vegetation island should be protected so that it cannot be walked upon. A 12-inch raised lip or barrier planting around the island has been used successfully to keep pedestrians out. This has the advantage of eliminating soil compaction, which can impede root growth and water drainage. Mulches can also be applied to eliminate weed growth and preserve precious soil moisture. If de-icing salt is a problem in your area, a raised lip can also act as a barrier to saltwater runoff. Because a vegetation island will probably be excavated in the course of installation, it is also possible to bring in good soil if the ambient urban soil is inadequate for plant growth.

Another important benefit of the urban island concept is a broadening of the types of trees that can be planted. While we tend to think of street trees as having the perfunctory "lollipop" shape, trees in islands may be multistemmed, asymmetric or lower branching, may have an understory, or may even be allowed to sucker, thus creating an impenetrable thicket without interfering with the pedestrian environment. This freedom allows the designer to choose from a greater range of species, including those commonly considered too irregular for street use but that, when massed, have a pleasant appearance. Some of these so-called weed trees, such as *Ailanthus altissima* (tree of heaven), *Maclura pomifera* (Osage orange), *Elaeagnus angustifolia* (Russian olive), and *Aesculus parvifolia* (Bottlebrush buckeye), may be better able to withstand urban stresses. Such species as *Corylus colurna* (Turkish filbert), *Maackia amurensis* (Amur maackia), *Koelreuteria paniculata* (golden rain tree) and *Tilia tomentosa* (silver linden) are quite tolerant of adverse conditions such as drought and high soil pH. Commonly planted trees such as red and sugar maples generally do very poorly in urban sites.

Design Considerations

Perhaps the most significant impact of an urban vegetation island is the visual mass that it imposes. The sheer biomass of an island planting makes a dramatic statement even in the first season of planting.

One of the more important qualities of island plantings in city centers is the appropriateness of scale when juxtaposed with large architectural masses. Island composition allows the designer to create an incident that is highly memorable and visible, even on an overscaled and visually complex

urban street. Islands can be used to draw attention or give hierarchy to the vast array of street furnishings and infrastructure, or to clarify a significant entry or address.

When considering street tree plantings, available space is perhaps the single most important issue. In many cities, the complex network of underground utilities, subway vents, building access and cellarways often limits the ability to install equally spaced, matched sets of trees. On some streets, trees may be limited to isolated zones where soil space and an overhead area for canopy expansion is possible. In these instances, the vegetation island concept offers an opportunity for several species to be installed. As researchers survey dense urban centers, it becomes clear that these isolated zones for preferred planting are becoming the norm rather than the exception.

Other areas custom-made for island plantings are those left-over fragments of landscape at complex street intersections or excessively wide street medians. In many cases, these otherwise insignificant pieces of turf become eyesores and maintenance headaches. These lost pieces of the urban fabric can be brought alive by island plantings, which can become living screens, foils or a positive distraction in an otherwise wasted landscape.

Urban islands are not a panacea. They may catch litter, expose large areas of open soil requiring a ground-cover planting or mulch and may need more pruning and ini-

Island planting near Harvard Square, Cambridge, Massachusetts



tial care in species selection than standard street-tree plantings. While they may not fit every design intention, urban vegetation islands nevertheless offer the opportunity for more complex, healthier and longer-lived plant materials than we commonly encounter on our urban streets. ■

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