

# Irrigation Opportunities

*Helping to keep the bottom line green*

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Lightweight drilling tools produce straight, compacted holes for a variety of underground installations—without disturbing root zones. Photo courtesy Vermeer Manufacturing Company.



Installation of underground irrigation and utility systems provide arborists with an opportunity to expand their scope of services, potentially making the bottom line greener.

## Background

Irrigation systems can provide arborists an opportunity to see green in more ways than one. From keeping trees healthy to providing a viable source of income, underground irrigation systems are products that arborists should consider as potential services offered to their clients. Improved soil conditions for tree growth can be achieved using irrigation, and state-of-the-art technology has made the installation of these systems simpler and cost-effective. The arborist may consider offering irrigation installation services to their clients as part of their product offerings or working with qualified irrigation contractors to ensure that they are installed in a manner which provides proper moisture to trees, while eliminating potential damage to trees during the installation process. Additionally, consultation services may be offered to irrigation and landscape construction contractors related to tree protection during installation of these underground systems.

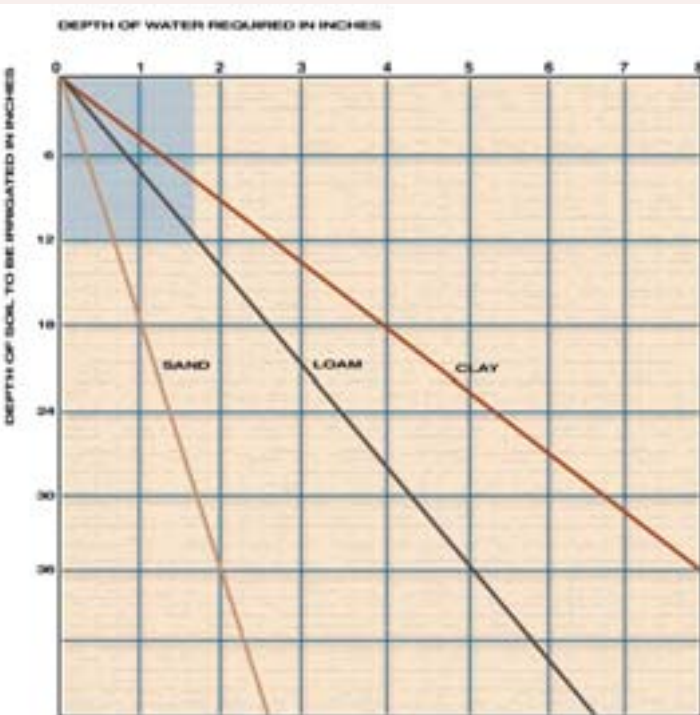
Irrigation of turfgrass and trees has enabled the establishment of landscapes that are healthier, sustainable and better able to withstand conditions resulting from severe drought, poorer soils and urban stresses. Using modern tools and techniques, it is often cost effective to include irrigation as a standard component of many landscapes. From residential turfgrass to downtown plaza shade trees, irrigation provides an opportunity to improve the likelihood that the landscape will remain growing, despite a lack of rainfall, drier soil

conditions or less than optimal root growth opportunities. For decades, golf course managers have demonstrated the usefulness of underground irrigation systems for keeping turfgrass growing throughout the season, and commercial and residential application of these irrigation tools has been used extensively to help keep lawns green since the 1960s. In today's landscape, the installation of irrigation systems has become highly technical, very profitable and a key component of managed landscapes. Not only are irrigation systems helping to keep turfgrass growing, they are being used more and more often to provide moisture to trees and shrubs. This has enabled the successful establishment of vegetation in areas that otherwise would provide marginal opportunities for plant growth.

## Benefit to trees

The increased use of underground irrigation systems, including the popular drip-irrigation method, has greatly expanded the variety of plant materials that are used in the landscape. Turfgrass, shrubs and trees can benefit through the use of a well-designed and operated irrigation system. Irrigation of trees is one component of a tree management plan that should be considered when developing a strategy for the care and maintenance of trees growing in any landscape. Since drought stresses are often cyclical in many regions, their occurrence should be planned for during the development of any tree management strategy, and irrigation systems should be considered as part of the management strategy. Likewise, irrigation of shrubs and planting beds should be considered when planning for the care and maintenance of a landscape.

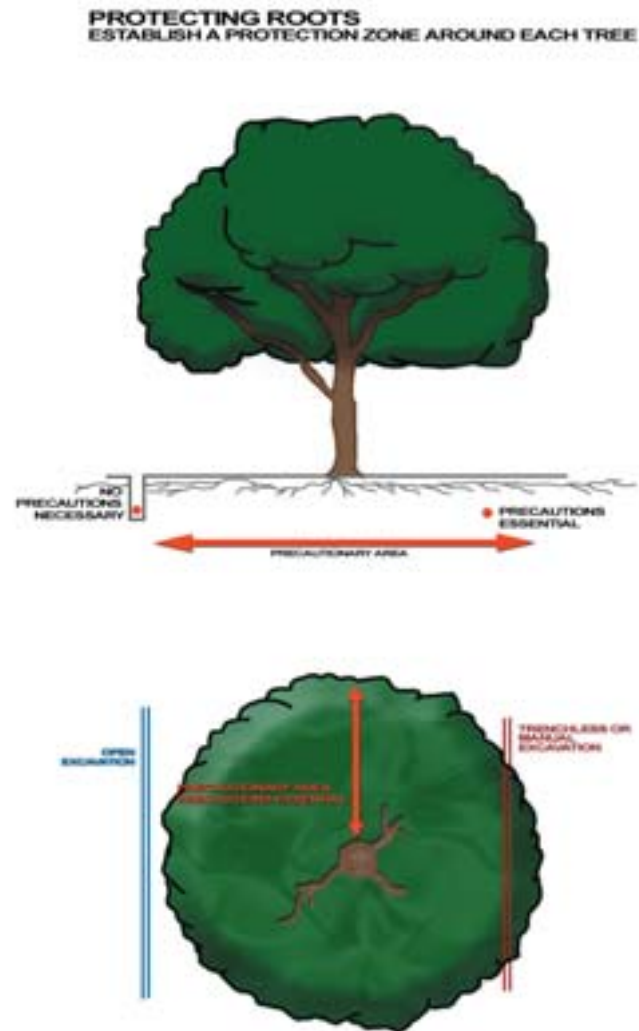
Lack of moisture is one of the most severe problems that affects trees growing in a landscape. Trees growing in urban conditions are often more susceptible to this damage due to reduced soil volumes, poorer soil structure and desiccation. However, trees in any landscape need adequate moisture to survive, and underground irrigation systems often provide the opportunity for survival. Irrigation of trees can provide benefits that lead to healthier trees, which are more able to withstand other stresses, such as insect and disease infestations. Reducing drought stress through the proper use of an irrigation system can greatly enhance the likelihood of new trees reaching maturity, and can provide older trees with a consistent source of moisture – even during drought.



**FIGURE 1.** Surface inches of water required to wet soils of given depths assuming no run-off. In this case, it takes over 1.5 inches of water to irrigate soil to a 12-inch depth.

## Damage to trees

While underground irrigation systems can provide a useful benefit, often the installation and improper use of these systems leads to serious tree health issues. Root damage and over-watering are the most common



**FIGURE 2.** Installation of underground irrigation and utility systems can affect tree roots. Establishment of tree protection zones around trees helps reduce potential impact to the roots. (Adapted from “The Landscape Below Ground II, Neeley and Watson, Editors. Pages 114-124. International Society of Arboriculture, 1998.)

problems associated with underground systems.

◆ **Root damage**

A serious issue affecting trees during irrigation and underground utility installation is the severing of tree roots as a result of trenching near a tree, which often severs the roots. Research has shown that tree roots can travel a distance away from the trunk that is over 2 1/2 times the height of the tree, and that more than 85 percent of the root growth occurs within 18 inches of the soil surface. Oftentimes these roots are severely damaged (or cut entirely) during the installation of underground piping.

In many cases trenching, vibratory plowing or earth-sawing operations make vertical cuts through the soil to depths that can range to over 20 inches, cutting many tree roots growing in their path. The damage to trees is not readily apparent, but generally

begins to appear within weeks or months of the damage. Dieback, decline and mortality often occur, but the severing of roots during the irrigation installation process is not faulted, since most of the problem took place underground, out of sight of the property owner or contractor.

Arborists can provide advice to irrigation contractors to minimize damage to trees during installation, resulting in a potential revenue source for arborists. Also, the arborist can work with a property owner to develop a tree protection plan that will minimize potential impacts to the root zones of their trees during installation. Finally, arborists may consider offering installation as part of their scope of services. In this way, irrigation will be part of the overall plant health care program, potential damage during installation will be greatly reduced, and the potential for increased profit will be established.

◆ **Over-watering**

Another serious problem affecting trees as a result of irrigation systems is over-watering and soil saturation. Many times an irrigation system is installed and then programmed for “automatic” operation. This often causes over-watering of the root zone of trees, resulting in reduced oxygen saturation or shallow root growth. Since many irrigation systems are designed and installed primarily to water turfgrass, the effect on nearby trees is not considered. This results in watering practices that are detrimental to healthy tree root growth. Additionally, over-watering can result in shallow root growth, producing less healthy trees that are more prone to wind throw and reliance on artificial watering.

However, it is possible for trees and turfgrass irrigation regimes to coexist successfully. Proper watering for good turfgrass growth can complement

healthy tree root growth. Deeper and less frequent watering can encourage healthier root growth for both turfgrass and trees (See Figure 1). Arborists can provide a valuable resource to homeowners, property managers and public land managers with regard to the planning, selection, installation and operation of an irrigation system, whether it is used for tree or turfgrass management.

◆ Utility considerations

In addition to providing assistance with planning and installation, arborists can bring some of the same expertise to underground utility operations, including providing consultation and installation services to electric distribution companies, telecommunication providers, commercial electricians and homeowners. The same principles of tree protection and preservation can and should be applied to any underground utility installation operation. Use of new tools and technology, combined with simple tree preservation principles will lead to healthier trees that can coexist with nearby underground utility systems. It takes good strategic planning and guided implementation – both of which

can be provided by an arborist.

## Opportunities for profit

Arborists and tree care firms may consider underground irrigation and utility construction as significant opportunities for profit and growth. Equipment, staff and organizational infrastructure are often in place already, making a venture into this profitable marketplace sensible. A variety of opportunities are available, ranging from offering complete tree and turfgrass irrigation installations to offering consulting services to landscape contractors, irrigation firms, utilities or property owners and managers. An arborist or tree care firm may see this arena as a product offering that will increase revenue, expand marketability and provide a mechanism for keeping crews active during slower seasonal periods.

◆ Traditional installation operations

Today, technology has made the tools and equipment necessary to install these systems less complicated and more affordable. Vibratory plows, walk behind and track trenchers, horizontal directional drilling units and earth saws make the job of installation simpler and more affordable. However, these tools also

present a serious threat to trees and their survival. Damage to tree roots is likely to occur if careful consideration is not given to the layout of an underground system. Once tree roots are severed or damaged, tree mortality often follows. (See Figure 2). Equipment operators and installation specialists often have no idea that they are damaging a tree, since they are trenching or sawing away from the trunk. Tree protection zones are rarely established, since installation contractors are completely unaware of the issue facing tree roots during trenching or sawing operations. This is where arborists have the opportunity to make a significant difference.

Work with contractors, homeowners or property managers to ensure trees are not damaged during underground installations. Whether it be working as a consultant to installation specialists or offering irrigation and utility construction as part of operations, consideration should be given to the important role arborists can play in ensuring the survivability of trees during underground installations. Today's availability of affordable, simple-to-operate equipment should be considered when determining the scale of your firm's involvement.

◆ Trenchless technology

One of the most useful and tree friendly techniques for installing irrigation or other utility piping in the vicinity of trees is horizontal directional drilling. This "trenchless technology" involves specialized equipment that uses a boring head to tunnel under the root zone of a tree, limiting any potential impact to the tree's underground life support system. Since most tree root growth occurs in the top 18 inches of soil, directional drilling is used to pull piping or conduit at depths which, in most cases, are safely below the root zone.

There are several sources of directional drilling equipment, and a variety of models available, depending on the specific application. Units range in size from self-contained, small footprint-sized units, to larger systems that are used for long-distance utility and telecommunication installations. Small, easy-to-manuever units are extremely versatile and can be



**Directional underground drilling can be used to install piping, conduit and other utilities safely below the root zone of most trees. Photo courtesy Vermeer Manufacturing Company.**



used for a variety of applications related to irrigation and utility installations. The role of the arborist is key to ensuring that healthy trees remain long after the construction of irrigation systems or utility networks is completed.

## Tree protection and preservation plans

Another important area is the development of tree protection and preservation plans. Without planning for

the protection of trees growing in the vicinity, damage is likely to occur. Layout, installation and the operational plan of an underground irrigation system should be reviewed by a tree care professional. Likewise, the installation of underground utility infrastructure requires that an arborist examine the proposed layout and installation specifications. These reviews provide the opportunity to protect trees, ensure their healthy growth and can add to profits.

An underdeveloped market exists for

consulting services to landscape contractors and irrigation installation firms. Nurturing relationships with these firms leads to a steady source of revenue, while providing the opportunity to inform and educate their staff on sound arboricultural and tree preservation practices. Working with these firms to protect trees during all phases of landscape construction operations, not limited to irrigation or utility installation, often results from the initial consultation. Landscape and irrigation firms are looking for ways to improve their professional marketability with clients, and offering tree protection and preservation plans is one way that they can do this.

## Keeping it green

Helping to protect trees ensures healthy growth and limits the potential impacts due to underground activities. This is a key role that is best filled by arborists.

The development of profitable niche markets related to underground irrigation and utility construction – including installation, consulting or design layout review – can provide a valuable source of revenue and earnings. Thoughtful consideration of the potential services that can be offered related to underground construction should be undertaken by any firm that is considering expansion or growth into new arenas. Careful fiscal analysis will lead to a determination as to the best avenue for entering this marketplace. Keeping trees healthy may lead to increased profitability and marketplace presence, helping a firm to see green in more ways than one.

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