CHAPTER 5
Tree Watering

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This chapter describes the best ways to water trees, and how often to water them.

5.1 Watering Basics

No absolute rule exists that will tell you precisely how often to water trees. Watering frequency will be influenced by the type of tree, weather conditions, soil type, root competition from other plants, and how well the tree is established.

A basic goal of this the *Forestry Master Plan* is to plant trees which are compatible with the natural watercycles of this dry Southern California valley. Most of the trees on the recommended list will survive on normal rainfall once they are established.

Proper tree irrigation creates a root zone that will be moist enough to encourage growth of new roots but not so wet that air is excluded from the soil pore space, which hampers growth. In addition, proper irrigation should encourage deep root penetration that can sustain a tree in dry periods. This also keeps the tree from developing shallow roots which can crack pavement. Infrequent, slowly applied, deep watering is the best way to accomplish these goals. Frequent light sprinklings or surface irrigation, such as turf watering, will discourage deep rooting. A new 15-gallon tree will need to have the soil moistened to a depth of at least 12", and a mature tree to a depth of at least 24" with each irrigation.

Newly installed trees can easily have their root balls dry out, even when the surrounding soil is very wet. Care must be taken to make sure that water is getting to the root ball by making the watering basin of a newly installed tree the same size as the root ball.

As a general rule, clay soils, which are typical in Thousand Oaks, absorb water very slowly. But since clay soils retain water longer, water less frequently than you would in a sandy soil. Let the soil dry between waterlogs as this allows the soil to take in air as water drains out. Table 7 explains how soil texture affects water infiltration.

The use of a mulch around the tree is recommended to slow the evaporation of water. A 4" layer of shredded bark or bark chips will help retain moisture and discourage weed growth. Most standards call for a 2" minimum layer, but recent studies show that a 4" layer is 5 times more effective in retaining moisture and discouraging weed growth. In tree wells and narrow planting strips where there might not be enough room for the full 4" depth, install as deep a layer as possible without spilling over. *Note*: mulch should never be placed against the trunk of the tree or root flare.

INFILTRATION RATES	
SOIL TEXTURE	INFILTRATION RATE (INCHES/HOUR)
Sand	1-10
Sandy loam	0.5 to 3
Loam	0.3 to 0.8
Clay loam	0.1 to 0.6
Clay	0.01 to 0

TABLE 7

Using a soil probe to determine the soil moisture content in the root zone is the most effective way to schedule watering. If the soil is wet enough to make a solid, firm ball, the tree should not be watered.

According to the infiltration rate chart, it will take water from 20 to 120 hours to wet a clay loam soil to a depth of one foot (the most important variable is the slope of the soil). Thus the use of watering basins around young trees is very important in order to retain water in place long enough to be absorbed. It is also important to begin irrigating in the spring before the soil has dried out, in order to make use of the reservoir of water from the winter rains. It requires much less irrigating to replace the water lost through a week of evapotranspiration than it does to totally recharge the planting area reservoir.

5.2 Watering Frequency Guidelines

These guidelines assume average weather conditions and rainfall.

For the first 2 to 3 weeks after planting:

- New trees may require water every 2-4 days, especially in hot weather. In winter, container-grown evergreens need water at least once a month.

First year:

- Fall and spring: once weekly
- Summer: twice weekly

Second year:

- Fall and spring: twice monthly
- Summer: once weekly

Third year:

- Once a month during the dry season

Fourth year and after:

- Two waterlogs during the entire dry season, if needed.
- Drought tolerant trees often do not need any further irrigation.
- In times of drought, a normal watering program may not be possible, even if the regular program has been a careful, conserving one. It will be most important in these times to give a deep watering at the beginning of the dry season. Established drought-tolerant trees should be able to survive the dry season with just one watering.

SOIL MOISTURE	
AMOUNT OF MOISTURE	FEEL OR APPEARANCE OF SOIL
Close to 0% field capacity. Little or no moisture available	Sandy loam: dry, loose; flows through fingers Clay foam: Somewhat crumbly; will hold together with pressure
50-75%. Enough available moisture.	Sandy loam: Tends to ball under pressure but will seldom hold together. Clay loam: Forms a ball; somewhat plastic; may stick slightly with pressure
75%. Plenty of available moisture.	Sandy loam: Forms weak ball; breaks easily. Clay loam: Forms a ball, very pliable; may be

TABLE 8

5.3 Methods of Irrigation

By hand with a hose: Care should be taken to water long enough to soak the root ball deeply. Flow through the hose should be gentle enough that it does not destroy the watering basin or compact the soil. A mulch helps prevent compaction.

With a water truck: One unit with a one or two person crew can efficiently irrigate many trees. This is the most cost-effective method, since most trees will need only infrequent irrigation once established. A watering truck typically provides water to sidewalk cutouts, and community trees where there is no existing irrigation (no meter). It is to be noted that a watering truck is limited to using water from within the designated landscape assessment district to water the material that is within that district.

Automatic irrigation: Hard pipe bubblers connected to a weather based, smart irrigation controller. Hard pipe bubblers are municipal friendly considering that they are easy to work on, can be inspected easily, deliver a sufficient amount of water in minimal time, and do not cause overspray.

It is necessary to change the location and number of emitters as the trees mature, so that water continues to get to the feeder roots around the driplines of the trees. As a tree grows, emitters should be placed so that, at a minimum, an area between the dripline and 3 ft. toward the trunk from the dripline is irrigated (if the tree continues to need irrigation).

5.4 Irrigation Repair

Any irrigation system needs to be monitored to make sure it is operating properly. The most obvious and important sign is plant material that looks unhealthy. Too much or too little water should be one of the first things considered when this occurs.

"Automatic" systems are not maintenance free, and need care in terms of programming to fit weather conditions, and monitoring to see that the system is working properly. This is particularly important since most systems are programmed to run in very early morning. This means that the system will go on when no one is there to see how it's functioning. Periodic "early bird" inspections are needed to check the functioning of the systems. In systems which cover a large area, such as in parks, it may be helpful to use a clock which can be controlled by a remote control device. Inspections, adjustments, and repairs can be made without having to travel back and forth from the clock to the area being worked on.

The irrigation systems should be monitored for problems with sprinkler heads, which are commonly of three kinds. Either the riser has been broken off and needs to be replaced, or the sprinkler is blocked by foliage which needs to be pruned away from the head, or the head has be come clogged and needs to be removed and cleaned out. Sometimes a head only needs to be adjusted to get better coverage, but it may be that the adjustment is needed because of partial clogging, so this should be checked.

Frequent clogging may be a sign of a small break in the pipe. A broken pipe can cause large amounts of water to be wasted. Usually the problem will be obvious, with a telltale area of standing water and mud. When a sprinkler head needs to be replaced, if the identical head is not available it is important that the replacement has a similar precipitation rate and radius of throw. Manufacturer's catalogues will have this information. Another common problem is a stuck valve, which can prevent the water from shutting off at the end of a cycle. This can waste a large amount of water in a short time if not reported, as well as overwatering the plants. Most valve manufacturers sell replacement kits for the innards of the valve. Valves should always be installed with a union connection to the pipe, so they can be more easily removed and replaced.

When a valve doesn't open, or doesn't close, it can sometimes take some troubleshooting to determine if the problem is caused by a valve or controller. Most controller problems are not fixable in the field, since most modem controllers are solid-state computerized models. The clock will need to be replaced or fixed at the factory. Care must be taken if automatic controllers are used, that if power failures interrupt the programs, the clocks are reprogrammed. Most controllers have battery backups, but the batteries must be replaced every year.

When valves, controllers, heads, and other equipment need to be replaced, it is important that the quality of the replacement parts be at least equal to the original parts. If poor-quality parts have been used originally, the quality should be upgraded when the parts are replaced.

When irrigation repair is needed, often the repair crew will need to refer to the as-built drawings in order to locate various components of the system. It is important that accurate as-built plans are filed with the city when an irrigation system is constructed.

5.5 Watering During Drought

Signs of Drought Stress:

- Wilting of leaves and shoots
- Less deep green leaves
- Smaller than normal leaves
- Early leaf drop and thinning canopy
- Browning of leaf edges

Steps to Improve a Tree's Drought Tolerance

- Remove turf (lawn/grass) from under the dripline as turf competes for soil moisture.
- Remove any impervious surfaces as they impair the movement or water, nutrients and air into the soil.
- Decompact the soil within the dripline using a garden fork, air tool or auger. This adds holes that create air circulation within the soil.

- Install four inches of organic mulch under the dripline, improving root growth and soil condition, reducing weeds and the need for water by conserving moisture.
- Do not remove or turn off turf irrigation that is also watering a tree. Slowly reduce the amount of irrigation or replace it with another watering method.
- Monitor and adjust to save water by measuring soil moisture. Provide soil moisture to 18-24” beneath as much of the dripline as possible. A soil probe used one to two hours after watering should be able to penetrate into the soil to a depth of 12” fairly easily. The soil should feel slightly damp and be darker in color.
- Continue to monitor the tree’s health, consider increasing the frequency and/or watering volume if it continues to show signs of drought stress.