LANDSCAPE TRAINING MANUAL FOR INSTALLATION TECHNICIANS

INSTALLATION
Introduction

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FOR INSTALLATION TECHNICIANS

As our population grows and becomes more urbanized, there is an increasing need for landscape professionals to create organized, useful and attractive outdoor spaces. Landscaped areas serve many uses by offering private places, expanded living areas, screens for undesirable views, food and herb sources, recreational space and even outdoor security. At the same time, these landscapes must also be designed to be functional and attractive for many years and to be maintained efficiently. In some areas, they must also meet specific requirements for water conservation and quality or other sustainability issues. Landscape construction that meets these standards requires professionals who have a variety of skills and knowledge in many areas including construction techniques, operation of specialized equipment, basic horticulture and soil science and other related disciplines.

This manual and supplemental web-based videos have been developed by landscape professionals – contractors who know and practice their trade on a daily basis. It was developed specifically to help industry technicians increase their knowledge in the fundamental aspects of landscape construction. In it, you will find a wealth of information about landscape installation techniques and concepts. The purpose of this training material is to offer:

- The highest quality employee training for landscape maintenance personnel – everyone from laborers to crew foreman.
- Study material for certification testing under the Landscape Industry Certified Exterior Technician program in the United States and Canada.
LANDSCAPE TRAINING MANUAL FOR INSTALLATION TECHNICIANS

The essential how-to resource for landscape installation written by experienced industry professionals!

“Being a properly trained technician increases your chances of getting and retaining a job. Today’s employers can’t afford mistakes made by their employees. Training helps reduce those mistakes and makes you a more valuable asset. This study manual is a great tool to enhance your skills in the landscape industry, and helps prepare you for the Landscape Industry Certified Technician-Exterior exam.”

Clifford D. Ruth, Landscape Industry Certified Manager & Technician
North Carolina Cooperative Extension Service-Henderson County
Hendersonville, North Carolina

“In our company, good training and certification have always been top priorities. The training manuals are an important back-up to the hands-on training that we do to prepare our employees for their jobs and for certification testing.”

Jesus “Chuy” Medrano, Landscape Industry Certified Technician
President, Cocal Landscape Services, Denver CO

“To be successful in any certification exam, the candidate needs to be prepared. This training manual really provides relevant information that will benefit even the most experienced technician. It’s a great tool to help people at all levels become more prepared for the certification program and to be a true landscape professional.”

David Iribarne, Landscape Industry Certified Technician
City of Petaluma, Petaluma, California
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INSTALLATION

NATIONAL ASSOCIATION OF LANDSCAPE PROFESSIONALS
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What You Will Learn

After reading this chapter, you will be able to:

- List at least six important factors to consider when planning a water feature.
- Describe why water management is important for water features.
- List and describe three common methods used to contain the water for water features.
- Name three power options available for outdoor lighting.
- Identify which power option(s) require an electrician.
- Identify some lighting issues that should be considered when planning outdoor lighting.
- Name at least one example of a specialty garden.

Preview

Water Features
- Planning a water feature
- Water containment
- Pumps
- Filters
- Electricity
- Runoff, drainage and overflow runoff
- Algae
- Plants and fish

Landscape Lighting
- Power options for outdoor lighting
- Lighting techniques
- Lighting design

Specialty Gardens
Overview

Specialty landscape features are welcome additions to outdoor environments. Water features, which provide the focal point of many landscapes, landscape lighting, which serves a practical function while contributing aesthetic qualities, and specialty gardens, which can serve numerous functions, are three specialty features covered in this chapter.

Water Features

People seem naturally drawn to water. Whether it is the soothing sound of water moving over rock, the cooling mist of a fountain on a hot summer day or the fascination of watching fish swim amidst flowering aquatic plants, water in the landscape always draws attention. Common water features include fountains, ponds, streams and waterfalls.

In spite of their captivating characteristics and increasing popularity, water features tend to be among the most problematic components of a constructed landscape. Because of its nature — a liquid, which may be flowing — water can be difficult to keep contained. Any flaw in the construction of a water feature will be readily apparent in the form of leakage.

Because of the many unique challenges and considerations that water features present to the landscape contractor, installing them may require the help of a specialist. This is especially true when a large or complex water feature is planned, or when special components, such as underwater lights, are desired.

Planning a water feature

When planning a water feature, there are many different factors for you to consider. Several of these factors are discussed in the following sections. These include:

- Water management
- Water containment
- Pumps
- Filters
- Electricity
- Runoff, drainage and overflow
- Algae
- Plants and fish

Water management

Although the appeal of water features may be high, it is beneficial to educate homeowners and commercial clients about higher water use and maintenance needs. Water consumption through evaporation accounts for a large amount of water loss. Evaporation rate depends on several factors, including temperature, humidity, sunlight (radiation) and wind speed. A pond may lose 1/4” – 1/2” (0.5 – 1.0 cm) in water level per day through evaporation. In arid regions, the daily drop in water level could be higher.
Is the pond leaking?

Regular and consistent monitoring of water levels is required to detect water loss, determine the source of the loss (evaporation, leaks, etc.) and carry out the appropriate maintenance measure. Water loss due to high evaporation rates can incorrectly be attributed to a leak, which is why it is important to understand evaporation and evapotranspiration (ET) rates. Evapotranspiration is the combination of water transpired from plants and water evaporated from the plant surface (and soil for non-aquatic plants). Evaporation from the water surface of water features is a separate consideration from evapotranspiration.

A simple way to test for water loss from evaporation is to set a bucket full of water next to the pond and protect it from animals by placing a screen over the bucket. Compare the water loss in the bucket with the water loss in the pond. Of course, any water flowing into the pond will either need to be shut off or calculated into this comparison. The difference in water loss may indicate whether the pond has leaks that need to be corrected.

An important exception to this simple method is when the pond has a large area of emergent or aquatic vegetation. In this case, the evapotranspiration (ET) rate of the plants must be considered. For example, if aquatic plants cover one fourth of the pond and the ET rate is 1" (2 cm) per day, then the ET rate is contributing to 0.25" (0.5 cm) per day of water loss over the area of the entire pond. Although testing for evapotranspiration in plants may be more involved, it is much less involved than trying to reseal a pond that does not need to be resealed.

Water containment

The most widely used methods for containing water are plastic, concrete and rubber liners. Each has its advantages and disadvantages, as you will see below.

Plastic

Prefabricated plastic shells are available in many garden centers for creating small, simple water features. These are most commonly installed in residential landscapes.

**PRO**
- Inexpensive
- Requires little expertise to install

**CON**
- Small size
- Little design freedom
- Questionable endurance

Note: In regions where rainwater catchment is allowed, water can be conserved by collecting and storing rainwater for use in fountains or ponds. Check local regulations for restrictions on rainwater harvesting. Colorado, for example, has restrictions.
Concrete
Concrete provides a strong containment surface, but is labor intensive and relatively expensive. It is often recommended that concrete be used in combination with a liner (see below) to prevent leakage if concrete sustains damage, such as cracks.

**PRO**
- Produces a strong surface
- Not limited by shape or size
- Can be used to create a formal, geometric look
- Rocks can be permanently set in place

**CON**
- Expensive to install
- Requires specialized skills
- Labor intensive
- Can raise pH level of water
- Subject to cracking, especially where earth movement is common
- Difficult to repair
- Difficult to modify

Liners
Liners are durable and easy to work with. They are the preferred method for water containment in ponds, streams and waterfalls. Liners are commonly made of polyethylene, EPDM rubber (ethylene propylene diene monomer) or PVC (polyvinyl chloride).

**PRO**
- Inexpensive
- Require minimal expertise to install
- Conform to different shapes
- Provide a good water seal

**CON**
- Can bubble up from ground water or gases
- Can tear or puncture, so they require careful handling during installation and maintenance
- Some types can be harmful to fish

Pumps
Pumps must be carefully matched for each water feature by considering several aspects of the system, including:

- Size of the system
- Change in elevation
- Type of filtration
- Aeration requirements
- Demands of fountains or waterfalls

As a general rule, a pump should be able to circulate the total volume of water in the feature at least once per hour.

It is easy to see how water brings a cooling element to the landscape.
**Types of pumps**
Submersible pumps are installed underwater. Submersible pumps are typically used in residential landscapes. They are easy to hide, easy to maintain and generally less expensive to purchase than centrifugal pumps.

Centrifugal pumps are located in a dry location and water is piped in and out. Centrifugal pumps are often used in commercial landscapes. They have a greater pumping capacity and are less expensive to operate than submersible pumps.

**Filters**
Water features may require some type of filtration to maintain water quality. The type and size of a filtration system depends on the capacity of the pump in use and whether the system provides a habitat for plants or fish. Filters can be mechanical or biological. Mechanical filters trap materials suspended in the water, such as dead organic matter or uneaten fish food and fish waste. Biological filters promote the growth of beneficial bacteria that transform waste materials into a less harmful form.

**Electricity**
Electricity is needed to power pumps, lights, timers and other devices associated with water features. However, since electricity in a wet environment presents obvious hazards, always check local codes and hire a licensed electrician to install 110-volt electrical devices.

**Runoff, drainage and overflow runoff**

**Runoff**
Runoff from rain and irrigation can pose a potential problem for water features. Runoff can carry fertilizer and organic debris into the system, which can promote the growth of algae and kill fish. Raising the rim of the water feature slightly above ground level can prevent runoff from entering the system.

**Drainage**
Since most water features need to be drained periodically for maintenance or repair, a drain system of some type should be incorporated into its design. It is also important to consider where water will go once it leaves the system. Water should be directed to a location where it won’t flood, cause damage or enter neighboring property.

**Overflow**
Overflow is another possible occurrence to plan for, especially in systems where water is in transit — such as systems containing streams, fountains or waterfalls. In the event of a power outage that shuts down the pump, water will flow to the lowest part of the system. If the amount of water exceeds the storage capacity, the system will overflow. Overflow should be designed into the system in a similar way to drainage, so that excess water can escape without causing damage and be directed to an appropriate location.

The sound of falling water adds to the enjoyment of many water features.