# Effluent Wastewater Use on Turf

## INTRODUCTION

Use of effluent wastewater for irrigation purposes is a possible alternative water source for many turf growers. Irrigation with effluent water is an old practice. It was used by the Greeks in Athens and was used on golf courses in San Francisco as early as 1932. Turf may be a suitable commodity to use effluent water since it absorbs large amounts of nitrogen and other nutrients found in reclaimed water. This reduces chances of groundwater contamination from effluent water use. Since turf is a perennial crop, a continuous supply is needed. Turf also is often located near metropolitan areas; therefore, conveyance costs could be reduced. Since turf is not a food crop, potential health problems arising from reclaimed water are minimized.

## LEVELS OF TREATED WATER

Effluent, reclaimed, or wastewater are terms used synonymously to describe water that has gone through one cycle of domestic use. Ideally, effluent or wastewater used for turf irrigation should principally come from a urban area without significant industrial input. This should guard against the possibility of excessive heavy metal content from industry. Treatment level of wastewater also should be at least *secondary*. *Primary* treatment begins with the preliminary operations such as screening and sedimentation that removes organic and inorganic solids. After screening and possible grinding of debris, dense materials such as sand and stones are allowed to settle in a grit chamber. This material is normally washed and also is used as landfill.

Undissolved suspended matter is then removed in a second settling tank or a primary clarifier. Settled material forms a mass of raw sludge which is concentrated and used as landfill.

Remaining liquid in the settling tank is called primary effluent and may be chlorinated to destroy bacteria and reduce odor before it used. Primary sedimentation removes approximately 60 to 70 percent of the suspended solids and 25 to 40 percent of the biochemical oxygen demand.

Non-chlorinated primary effluent water may be further treated to break down complex organic matter during *secondary treatment*. Up to 90 percent of organic matter is removed by secondary treatment. Water is then chlorinated and is the principal source of water for agricultural irrigation purposes.

*Advanced* or *tertiary* wastewater treatment involves using a charcoal bed for chemical coagulation and flocculation, sedimentation, filtration, or adsorption of compounds. This process can provide highly purified water and is similar to potable water treatment.

An alternative method to these conventional treatments of wastewater is land treatment. *Overland flow* and *rapid infiltration* are methods utilizing the soil surface and vegetative layer as a natural filter. During these processes, water is applied to land. The renovated water is collected either at the bottom of an overland land flow slope (overland flow) or from within the soil by a series of wells. It also is collected by permanent underdrains (rapid infiltration). Rapid infiltration requires less land to renovate wastewater compared to overland flow but requires a permeable soil, a series of wells or underground drainage tiles, and has a host of environmental regulations.

## CHARACTERISTICS OF EFFLUENT WATER

Effluent water has three major categories of characteristics that are modified during use: 1) biological composition; 2) organic composition; and, 3) dissolved inorganic salts. Although biological composition of effluent water is of great concern because of pathogenic bacteria and viruses, renovated waters are not released for irrigation without prior approval of the public health officials.

Secondary treated wastewater has been disinfected to a level of 23 total coliforms per 100 ml, so direct contact with effluent water should be avoided. Treated areas should also be allowed to dry before golf