

Are You Up To Code?

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As state and municipal water efficiency laws become more widely adopted, irrigation professionals are now challenged to meet higher standards. With the demand and cost of water ever rising, these regulations will have a permanent impact on the work of landscape and irrigation professionals. The City of Santa Monica, a retail water agency in Southern California, has taken a leading role in addressing sustainable water practices by adopting ordinances that promote efficient water use throughout the city. The City's Water-Efficient Landscape and Irrigation Standards (WELIS) are municipal regulations based upon the Irrigation Association's Turf & Landscape Irrigation Best Management Practices and include irrigation design and installation criteria, inspections and auditing requirements, and system maintenance requirements. By following industry standards and the Irrigation Association's Turf & Landscape Irrigation Best Management Practices professionals can satisfy most state and municipal expectations and always be "up to code."

Since 1992, the City has had a "no water waste" ordinance to reduce outdoor water waste by prohibiting irrigation overspray and runoff, as well as prohibiting watering during the warmest times of the day. This law is actively enforced. The majority of landscapes in Santa Monica are designed, installed, and maintained by landscape professionals. Yet, these landscapes almost always have runoff and overspray and generally waste water. This is clear evidence that there is a lack of basic knowledge regarding irrigation best management practices and plant water needs within the landscape industry.

In order to address this issue, the City of Santa Monica took a two prong approach: provide free on-going education workshops for landscape professionals and codify landscape and irrigation best management practices. The goals of this approach are to increase the professional's ability to design, install and maintain beautiful and sustainable landscapes and save water.

In 2008, the City adopted the Green Building Ordinance (GBO) in Chapter 8.108.010 of the Santa Monica Municipal Code, which included landscape and irrigation requirements for public and private properties. In 2009, the City updated the GBO to conform to California's Model Water Efficient Landscape Ordinance. Landscapes and irrigation systems, installed according these Standards, will save on average ten to sixteen times the water as compared to using the State's landscape water budget (MAWA).

The City's Water-Efficient Landscape and Irrigation Standards (WELIS) section of the GBO has a number of different components. Much like the IA's Turf & Landscape Irrigation BMPs they address design, installation, maintenance and management. There is a plant material component, a mulch and amendment component, an irrigation component, a water feature component, and a maintenance component. These Standards are applicable to new construction, major remodels, and existing landscapes and irrigation systems for single family, multi-family, commercial projects, and public agencies.

The WELIS addresses the following critical factors for a successful and sustainable landscape: soil type, climate-appropriate plants, water-efficient irrigation, and permeability achieved by proper design, installation, and maintenance.

It is a common misconception that by merely limiting high water using plants, water conservation is achieved. We have seen climate appropriate landscapes irrigated with sprayheads and bubblers that cause runoff and end up wasting water because the irrigation device's application rates are much higher than the soil's infiltration rates, even though the plant's water requirements are low. Not to mention traditional overhead irrigation systems have poor distribution uniformity and thus tend to waste water.

To address these concerns, the WELIS requires pressure regulation for all irrigation devices. All spray irrigation must be located at least 24 inches from any impermeable hardscape, trees, fences or buildings. This will reduce runoff. This will also encourage the removal of overhead irrigation and the use of permeable pavers like decomposed granite, climate appropriate groundcovers irrigated with drip, or subsurface flow systems for turf, all of which reduce runoff and therefore lessen the impact of over-irrigation that erodes our streets and infrastructure.

Furthermore, the irrigation efficiency of systems must meet a certain requirement. All irrigation systems must be designed and installed in such a manner that a precipitation rate of 0.75 inches per hour is not exceeded in any portion of the landscape. Often soil infiltration rates are much slower than application or precipitation rates of most commonly used irrigation devices. The result of course, is runoff. In reality, this actually limits overhead irrigation to devices like multi-trajectory, multi-stream rotary nozzles, that have lower precipitation rates, less than 0.75 inches per hour. Drip irrigation devices like in-line emitters and on-line emitters with flow rates less than 2 gallons per hour meet this requirement, depending on the row spacing. Tree bubblers often have high application rates. Drip irrigation can be used for trees and/or a 'Root Watering System' can be used. This allows the tree to develop deep, strong roots, leading to less frequent watering. Trees must also be irrigated on a separate valve.

The WELIS also requires that all plants that are 1 gallon in size or larger, be irrigated with drip irrigation. Trees are an exception here. Drip irrigation is plant specific so the delivery of water is directly to the root zone, wasting less water.

Weather based irrigation controllers or WBICs that are SWAT approved and listed are required by the WELIS. These controllers use measured weather conditions from either on-site or off-site weather stations as well as historical evapotranspiration rate information, species factors, and landscape site information, to calculate the irrigation needs of each zone. Soil moisture sensors could also be used in conjunction with these devices.

The installer of the irrigation system is also required to test the irrigation system. The City encourages the installers to follow CLIA guidelines for auditing, although there is a lack of clearly defined drip irrigation procedures that the City hopes will be addressed by the industry and industry educational institutions.

The WELIS does require Distribution Uniformity or Emission Uniformity calculations for each irrigation zone. A minimum of 71% is required for sprayheads, 80% for drip irrigation. For overhead irrigation systems, proper sprinkler spacing, head-to-head coverage, and reliable pressure throughout the system are essential for even uniformity.

Cross-Connection or Point of Connection equipment must be properly installed. Backflow prevention is a particular concern for public health and safety. Proper installation of an anti-siphon valve may seem perfunctory considering the design requirements of such a device. However, we have seen improper installation of these devices by "experienced professionals." As a result, these devices are closely inspected at every job site.

Check valves or anti-drain valves must also be included in any project wherever the elevation dictates it. Low head drainage is an unnecessary result of a poorly designed irrigation system and can be prevented with the installation of a check valve in, at or near the lowest head. Low head drainage wastes water.

The WELIS spell out very detailed requirements for installing irrigation systems. Specific kinds of irrigation parts like valve assemblies, filters, and pressure regulators are required. Also certain irrigation devices are prohibited by the guidelines. Of note, multi-outlet drip emitters are prohibited due to their problematic nature, as well as ¼ drips tubing, unless that tubing is being used for container plantings. There are also specifications for pipe selection and burial depth.

Fully detailed Landscape and Irrigation Plans and a Hydrozone Matrix are required for new construction and major remodel projects. The hydrozone matrix is a fill-in spreadsheet used to describe the hydrozones for the entire landscape. Included for each zone is the following: the square footage, percentage of total landscaped area, plant type, hydrozone basis, hydrozone description, exposure or micro-climate, irrigation method, irrigation devices (including manufacturer / model / number), zone pressure, precipitation rates, zone gallons per minute, and controller station number. You can insert this matrix on either plan sheet or on a separate sheet. These plans are reviewed by the Planning Department with consultation from Watershed Management Staff.

There is a website to help professionals develop these plans. Professionals can visit www.sustainablem.org/landscape for a list of sample plans for download. Also on this website there are downloadable lists of high water using plants, lawn alternative information, lists of acceptable watering devices, charts for calculating precipitation rates, watering schedules, a hydraulic calculator and even a list of sustainable landscape professionals that have attended our workshops.

Once plans have been approved, two inspections are required. One is an open trench inspection and a final inspection. Each inspection ensures the approved plants and parts are installed properly.

The maintenance requirements of the WELIS ensure that changes made to an existing irrigation system are in compliance with these standards. Any upgrade to an existing irrigation system must follow specific requirements to ensure the optimal performance of the irrigation system. For example, all new or replaced sprinklers nozzles on heads on the same valve must have matched precipitation rates that do not exceed 0.75 inches per hour. And our Code Compliance Division is involved in making sure landscape and irrigation requirements are strictly enforced throughout the city.

In summary, a professional could meet our City's code by adhering to both industry standards and the Irrigation Association's Turf & Landscape Irrigation Best Management Practices, a series of guidelines that should be common practice and not the result of environmental regulation. If most water in the urban environment is wasted as a result of outdoor irrigation in the landscape, the prevalence of this kind of regulation will increase. And as stated in the Irrigation Association's Turf & Landscape Irrigation Best Management Practices IA, "The landscape and irrigation industry must demonstrate the ability to irrigate efficiently. The landscape industry is the most visible user of water in an urban setting... The failure to demonstrate efficient irrigation could set the stage for serious consequences to the landscape industry. A drought or perceived water shortage could provide all the impetus necessary for onerous mandates determining when and how much to irrigate as well as the type of plants a landscape can have. The ability to irrigate efficiently will help the landscape industry control its destiny." In the end, the Green Building Ordinance's Water-Efficient Landscape and Irrigation Standards will help bring about better water resource management, smarter irrigation designs, and landscapes that blend harmoniously within the local environment without causing excessive and unneeded strain on our valuable resources.