

# Land Use Code Ordinance to Support Water Conservation

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**Abstract:** *In 2009, Fort Collins Utilities adopted amendments to its Land Use Code to support landscape water conservation for new commercial developments. An extensive review process of the landscape plan was completed to address xeriscape principles of plant selection, water requirements, sun exposure and soil amendments.*

*The irrigation plan review is the second step of the new process and needs to be designed with high-efficiency components to assure the most efficient performance of the landscape watering. Examples of the components, include a master valve, smart controllers and pressure-regulating heads. Once the irrigation plan is approved, periodic field inspections follow and an independent Certified Landscape Irrigation Auditor (CLIA) must performed catch can tests of selected turf zones before the project is complete.*

**Keywords:** Land Use Code, water conservation, landscape water, Fort Collins, sprinkler efficiency, sprinkler design review process, inspections

# Land Use Code Ordinance to Support Water Conservation

Fort Collins Utilities provides water, wastewater, stormwater and electric services to more than 150,000 residents. Faced with a drought in 1977, Utilities created a part-time position dedicated to water conservation, which moved into a full time position by 1990. During this time frame, Utilities established specific goals design to lower the water use of its customers through a variety of educational programs and advertising campaigns.

An educational campaign targeting outdoor water use was put into place to identify high demand and provide opportunities for efficiency improvements. Among the conservation opportunities were improved irrigation efficiency, landscape transformation and customer education. A sprinkler audit program was developed at this time to help educate homeowners on outdoor water use.

Free xeriscape classes and workshops also were developed to help the community understand the essentials for healthy plants in our arid conditions. Offering sprinkler rebates and creating standards for new landscapes were the next steps to improve efficiency and lower landscape water use. Combined, these programs and services helped Fort Collins balance a growing community with a limited water source.

## Landscape Standards

The first step to implement landscape standards was to assemble a team to identify the areas of the landscape that could be improved. These upgrades can be made through proper xeriscape principles and an irrigation system designed to eliminate water waste.

The team was led by Water Conservation Manager, Laurie D'Audney. Members included local landscape designers, irrigation contractors, City of Fort Collins Parks and Planning Departments. These amendments were presented to City Council and adopted into the City's land use Code.



Installing a sprinkler system

The following are the adopted amendments to the City's Land Use Code:

## Landscape Review

All landscape plans must be designed to incorporate water conservation materials and techniques through application of xeriscape landscaping principles. Xeriscape landscaping principles include:

- Design. Identify zones of different water requirements and groups plants together with similar water needs ;
- Appropriate Use of Turf. Limit high-irrigation turf and plantings to appropriate high-use areas with high visibility and functional needs;
- Low Water-Using Plants. Choose low-water demanding plants and turf where practicable;

- Irrigation. Design, operate and maintain an efficient irrigation system;
- Soil Preparation. Incorporate soil amendments before planting
  - Three cubic yards of amendment per 1,000 square feet
- Mulch. Add mulch to planting beds to a minimum depth of 3 inches;
- Maintenance. Provide regular and attentive maintenance.

Landscape plans submitted must include:

- Accurate and clear identification of all applicable hydrozones using the following categories:
  - High Hydrozone: 18 gallons/sq.ft./season
  - Moderate Hydrozone: 10 gallons/sq.ft./season
  - Low Hydrozone: 3 gallons/sq.ft./season
  - Very Low Hydrozone: 0 gallons/sq.ft./season
- A Water Budget Chart that shows the total annual water use, which shall not exceed 15 gallons /sq.ft. over the site; including all hydrozones used on the landscape plan.

## Irrigation Review

For any development provided water by the City, an irrigation plan must be submitted to and approved by the Utilities General Manager prior to the issuance of the building permit. The irrigation plan should incorporate the City of Fort Collins Irrigation System Standards for Water Conservation. In addition, the irrigation system must be inspected for compliance with the approved irrigation plan before the issuance of a Certificate of Occupancy.

The irrigation plan is reviewed by the Utilities' Certified Irrigation Designer (CID). The City of Fort Collins Irrigation System Standards for Water Conservation are as follows:

- The irrigation system shall be designed according to the hydrozones shown on the landscape plan.
- Each zone shall irrigate a landscape with similar site, soil conditions and plant material with similar water needs.
- Turf and non-turf areas shall be irrigated on separate zones.
- On steep grades, an irrigation method with a lower precipitation rate shall be used in order to minimize runoff.
- Drip, micro-sprays, sprayheads and rotors shall not be combined on the same zone.



**Inspecting a new landscape**

## Irrigation Equipment

The irrigation plan components are essential to achieve the optimal performance from the system while limiting water waste.

The irrigation plan requirements are as follows:

- A backflow prevention assembly shall be installed in accordance with local codes.
- A master shut-off valve shall be installed downstream of the backflow device to shut off water to the system when not operating.

- Irrigation controller(s) shall be “smart” controllers, using climate-based or soil moisture-based technology, selected from the Irrigation Association’s current Smart Water Application Technologies (SWAT) tested products list or other similarly tested product list.
- A rain sensor shall be installed on each irrigation controller and installed according to the manufacturer’s specifications.
- All sprayheads and rotors shall be equipped with check valves and pressure regulating stems.
- Remote control valves shall have flow control.
- Properties with single or combined point of connection flows of 200 gpm or greater, shall have a control system capable of providing real-time flow monitoring and the ability to shut down the system in the event of a high flow condition.

### **Irrigation Inspections**

After building permits have been approved and construction begins, periodic site inspections are performed to ensure installation follows the approved plan. These site visits are helpful in determining the number of zones necessary for catch can test audits and final inspections.

### **Performance Audit**

A sprinkler performance audit must be performed by a landscape irrigation auditor certified by the Irrigation Association (CLIA).

Other requirements of the field audit are:

- The auditor must be independent and not affiliated with the installation contractor.
- The audit shall include measurement of distribution uniformity (DU). Minimum acceptable distribution uniformities shall be sixty (60) percent for sprayhead zones and seventy (70) percent for rotor zones.
- The audit shall measure the operating pressure for one sprinkler on each zone to determine whether the zone meets the pressure requirements.
- Linking zones with similar heads nozzles and spacing can be done to gather an average value.
- A data input chart for the Smart Controller, including the precipitation rate from the audit, shall be posted at each irrigation controller.
- A copy of the sprinkler performance audit shall be submitted to and approved by the City before issuance of a certificate of occupancy (CO).



**Catch can test**

### **Final Submittals and Approval**

Submit “as-built” of the irrigation plan, noting any minor changes of the installation. Complete smart controller input chart, sprinkler performance audit and catch can data forms to Fort Collins Utilities. The City inspector (CID) approves the installation and submittal documents before issuing a final CO.

## **Six-Week Inspection**

Six weeks after the installation of new landscaping, the irrigation contractors are required to reset the smart controllers to the normal season watering schedule and remove the sod program from the controller. Fort Collins Utilities will inspect that the controller has been programmed for a normal watering schedule, the input chart has been posted and the weather station or rain sensor has been installed correctly and operating.

## **Conclusion**

Fort Collins Utilities provides water, wastewater, stormwater and electric services to more than 150,000 residents. In order to continue providing water to a growing community, a water conservation division was established. Aggressive goals were set to control water demand by generating a series of educational programs promoting water efficiency and landscape transformations.

Free landscape and irrigation workshops, a free sprinkler audit program and sprinkler rebates contribute to managing the water use through proper water requirements and component upgrades.

New commercial developments are required to follow a strict review process for landscape and irrigation system designs. These adopted amendments ensure that new developments limit water waste by improved irrigation design standards and new water saving technologies.