January 10, 2023

WORK SESSION AGENDA ITEM SUMMARY

City Council

STAFF

Katie Collins, Water Conservation Specialist
Danielle Reimanis, Water Conservation Specialist
Mariel Miller, Water Conservation Manager
Gretchen Stanford, Deputy Director, Utilities Customer Connections

SUBJECT FOR DISCUSSION

Land Use Code Changes to Address Xeriscape for New Developments and Soil Amendment for New and Existing Developments.

EXECUTIVE SUMMARY

The purpose of this item is to provide an overview of the current state of landscapes and irrigation in Fort Collins, and to present four code change opportunities that promote climate-appropriate landscapes and use of soil amendment.

GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

1. What general questions or feedback does Council have on the proposed direction? What additional information is needed?

2. Which of these Xeriscape and Soil Amendment opportunities does Council support moving forward? Which turf maximum option do you support, if any?

BACKGROUND / DISCUSSION

Current Fort Collins landscapes and water use

- Outdoor use accounts for 40% of all water use in Fort Collins. 60-70% of all water use during summer months is applied to Fort Collins landscapes. Annually, about 40,000 gallons of water are applied to the average residential landscape. Irrigation is required for landscapes in Fort Collins because the average annual precipitation of 9 gallons per square foot – most of which falls outside of the growing season – does not support the typical, high-water-demand landscape.
- Most maintained landscapes in Fort Collins contain Kentucky bluegrass, a plant that has historically been used, and sometimes required, for its aesthetic benefits and for high-use

settings, where it fares better than some alternative landscapes. However, most areas of bluegrass serve little to no function, other than aesthetics, especially on commercial properties and in residential front yards.
- There is a tradeoff between the benefits and the high water demands of bluegrass; it requires 18 gallons of water per square foot in a growing season to remain healthy, which means at least 9 more gallons per square foot than the average precipitation in Fort Collins. Projected climate change would increase bluegrass water demands even further.

What is Xeriscape?

The word xeriscape refers to principles for sustainable landscape design. The Seven Principles of Xeriscape are:

1. **Plan** with users and water in mind. Group plants with similar water requirements to avoid overwatering some and underwatering others.
2. **Improve the soil** to absorb water more quickly and support plant health.
3. **Irrigate efficiently** by using high-efficiency equipment and managing water appropriately to avoid overwatering.
4. **Use turf wisely** by locating it in areas where it will be used and considering low- or no-water alternatives that add function and aesthetic in the rest of the landscape.
5. **Select appropriate plants** that are well-adapted to our region and climate.
6. **Mulch** to reduce evaporation and control weeds.
7. **Maintain** the landscape by mitigating weed growth, checking the irrigation system regularly for needed repairs and pruning plants for health.

The word xeriscape has developed a bad reputation over the years. The word xeriscapes often evokes images of “zeroscapes,” landscaped areas devoid of life. It is important to note that xeriscape is not a specific look or plant palette, and it is not replacing living landscapes with rock. It is for these reasons that the terms water-wise, low-water, and Coloradoscape are often used interchangeably with xeriscape to describe resilient, climate-appropriate landscapes.

Why soil amendment?

As mentioned in the Seven Principles of Xeriscape, improving soil contributes to better outcomes in landscapes. Much of the soil in Fort Collins is clay, which is made up of small particles that easily compact, making it difficult for plant roots to absorb water. One way to increase the volume of water available to plants, mitigate compaction, and improve soil structure is to incorporate soil amendment. Improving soil structure also increases the rate at which water is absorbed, resulting in less runoff during irrigation events.

Current xeriscape and soil amendment support in Fort Collins

The City of Fort Collins supports sustainable landscapes through a variety of ways (more information about current offerings can be found in the Council memo dated March 28, 2022, titled “Xeriscape and Soil Amendment Council Priorities Update.”):

- Utilities’ Water Conservation Department programs, services and educational opportunities, including the Xeriscape Incentive Program (XIP)
- Soil amendment inspection program (Table 1)
- Gardens on Spring Creek

Table 1. Soil Amendment Certificates Issued Since 2017	
Type	**Count**
Soil Certificates	2,699
Temporary Soil Certificate	885

Why consider xeriscape and soil amendment code updates?

Since 2016, Utilities has incentivized 390 residential and 25 commercial landscape retrofits that converted from bluegrass to xeriscape. (Table 2) While the volume of retrofits grows year over year, it is significantly easier and less wasteful to build water-wise landscapes from the start. New development standards must be addressed, especially scenarios where bluegrass is required. Addressing new developments and associated landscape standards with appropriate codes, while incentivizing existing developments to convert to water-wise is a best practice.

Table 2. Year to Date Xeriscape Incentive Program Results			
Property type	**Number of turf replacement project rebates issued**	**Total area converted from grass to xeriscape (square feet)**	**Estimated ongoing annual water savings (gallons)**
Residential (since 2016)	390 (94 in 2022)	462,899	2,777,394
Commercial (since 2020)	25	694,229	5,424,985

Challenges in the Colorado River Basin point to an increasingly water-scarce future. Without significant changes in landscaping code, outdoor water use is likely to increase over the coming decades as water users strive to maintain high-water landscapes in an increasingly hotter climate and longer growing season. Landscapes planned and installed with the changing climate in mind, such as those designed around the Seven Principles of Xeriscape, can be far more water efficient without compromising function and appearance. Landscapes built with resilience will not require resource-intensive landscape conversions to survive hotter, drier summers. Codes that reduce water use by promoting landscape best practices and limiting turfgrass will serve our community well into the future.

Not only do the proposed codes updates promote best practices, they also align with the following plans and objectives:

- Current City Council priorities 14 and 19
- City Plan – Neighborhood Livability and Environmental Health Principles
- City Strategic Objective Environmental Health 4.4 – Provide a resilient, reliable and high-quality water supply
- Water Efficiency Plan and development of that plan's forthcoming update (anticipated in 2024)
- Our Climate Future Big Move 3 with the goal of increasing resilience for climate change impacts

Four Code Opportunities

Four code opportunities to advance xeriscape and soil amendment are outlined below. Research that informed these choices included a best practice report developed by a consultant, conversations with other communities, a water savings analysis, and engagement with stakeholders and the public.

A public survey that was sent out in August 2022 to gauge perception of xeriscape and soil amendment topics in Fort Collins gathered 929 unique responses and over 5,800 comments. 21 local stakeholder

groups, including City departments, attended focused conversations with staff. More public engagement results are shared in the attachment.

In addition to having conversations with external stakeholders, the project team engaged several City departments in consideration of their goals. For example, trees, animals and humans rely on irrigated landscapes for health, habitat and recreation, so the team engaged in discussions with Forestry, Nature in the City, Parks and Park Planning to develop balanced proposals.

Each opportunity described below lists benefits, challenges and resource needs identified to date. Additional cost and water savings analyses are ongoing, including evaluation of the cost impact to housing, and will be presented to Council prior to first reading.

Opportunity 1. Less turf in new development and redevelopment	
Description	A proposal to limit turf on all new development and redevelopment projects on residential and commercial properties. Staff have put together three options for each property type for consideration. Regardless of options selected, staff proposes a 50% plant coverage requirement for the total landscape on a property. Options are detailed in Table 3.
Current state	- Commercial properties must meet an average of 15 gallons per square foot per year (gpsf) which limits the wall-to-wall installation of 18 gpsf turfgrass. - Residential properties do not have turf limitations or landscape standards.
Benefits	- Restricting the area of high-water turf types allowed on a property reduces landscape water requirement and increases resilience. - Reducing turf area while maintaining a plant coverage minimum requirement supports habitat, species diversity, nature connectivity and landscape cooling benefits. - Water savings potential varies from option to option. Refer to Table 3.
Challenges	- The maintenance requirements of non-turf landscapes are different and can be more expensive, time-intensive and skilled. - Initial installation of landscapes with less turf may be more costly. - Concerns about cost impact to affordable housing. - As more landscapes move to less turf, tree health and irrigation must be considered (See Opportunity 3. C. below) - Understanding if a 10,000 square foot limit provides enough space for large HOA common spaces.
Resource needs	- Landscape inspector staff to review landscape plans and installations. - More education opportunities and avenues to teach appropriate watering and care of landscapes with less turf.

Table 3. Turf limit options for residential, commercial properties						
	Description – maximum percentage, area limit	Estimated annual water need, front yard only	Gallons per square foot (gpsf)	Estimated total outdoor water use / % total household water use	Annual outdoor water cost savings to the customer	Estimated annual water savings in million gallons (MG) at GMA buildout*
Residential new development – front yard turf limitations including parkway area	Existing	18,000 gal	18	42,200 / 51%	-	0
	Option A 50% max. turf	12,500 gal	12.5	36,700 / 47%	$17	49 MG
	Option B 30% max. turf	10,600 gal	11	34,800 / 46%	$23	67 MG
	Option C no turf	7,750 gal	8	31,950 / 44%	$32	92 MG
Residential assumptions and considerations: - Front yard area approximately 1,000 sq ft. Average annual household use 83,000 gal. - Developers to provide typical design options for front yard landscaping (“typicals”), requiring that one option has zero turf. - Front yards would require 50% plant coverage at maturity. - *9,000 infill and greenfield homes estimated at full GMA buildout, assumes similar front yard size continues.						
	Description – maximum percentage, area limit	Estimated range annual water need	Gallons per square foot, range depending on property size (gpsf)	% savings compared to existing	Annual outdoor water cost savings to the customer	Estimated annual water savings in million gallons (MG) at GMA buildout*
Commercial new development and major redevelopment	Existing 60% max. turf	21,000 – 950,000 gal/year	15	0%	$0	0
	Option A 60% max turf 10,000 sf limit	21,000 – 720,000 gal/year	11 - 15	22%	$0 - $643	29 MG
	Option B 30% max turf 10,000 sf limit	14,500 – 560,000 gal/year	9 - 10	40%	$20 - $1,100	53 MG
	Option C 15% max turf 10,000 sf limit	12,000 – 555,000 gal/year	9	42%	$30 - $1,300	55 MG

Commercial assumptions and considerations: - Landscape area per dwelling unit based on average existing small, medium and large property sizes. - 20% of property is landscaped/irrigated - *21,000 infill and greenfield multi-family dwelling units estimated at full GMA buildout; assumes similar landscape size continues. - Average cost savings to the customer assumes tap sizes suitable for small, medium and large properties. Based on Utilities 2022 water rates.

Opportunity 2. Allow synthetic turf in some scenarios (Staff had not originally intended to look at synthetic turf as an option. In response to the question "Do you think artificial turf should be allowed in Fort Collins?", 615 out of 862 responses answered "yes, to some degree," which prompted staff exploration of the topic.)	
Description	A proposal to allow synthetic turf in certain scenarios on residential and commercial projects by applying for an exception or permit subject to review and design specifications. Installations of synthetic turf would require dedicated irrigation to trees.
Current state	According to Land Use Code Section 3.2.1, artificial plants, including synthetic turf, are not allowed in landscapes within City limits. A few commercial exceptions have been approved for areas with year-round heavy foot traffic.
Benefits	- Provides owners an opportunity for synthetic turf to be considered - Encourages smart installation of synthetic turf and gives the city an opportunity to review for high quality installations - Considers the health of trees - Potential for water savings
Challenges	- Loss of habitat compared to live plant material - Loss of species diversity - Turf sports fields have an average lifespan of eight years and have limited options for recyclability. Installations that receive less traffic than sports fields likely have a longer lifespan. - Some research to suggest microplastic pollution - Contributes to heat island; surface temperatures can reach 20-50 degrees Fahrenheit higher than natural grass. - Enforcement of the process and of properties out of compliance - Need for sanitation and cooling of synthetic turf requires some water use.
Resource needs	- Staff time for design review, code enforcement - Development of design specifications to ensure recyclable, high-quality products are installed
Water savings potential	Unknown how much water is needed for synthetic turf. The Synthetic Turf Council suggests maintaining an irrigation system for sanitation and cooling purposes.

Opportunity 3. Additional irrigation standards and residential equipment efficiency	
Description	Four irrigation standards are packaged within this opportunity: A. Restricted daytime overhead watering between the hours of 10 a.m. and 6 p.m. Temporary daytime watering may be allowed in some scenarios, such as sod and seed establishment, with a permit. B. Drip irrigation only in areas less than six feet wide. This guideline would require an update to City of Fort Collins Streetscape Standards. C. Require dedicated automatic irrigation to trees. D. Extend high-efficiency equipment and design standards to all property types, including residential.
Current state	- Restricted daytime watering is a tool in the Water Shortage Action Plan (A.). - Streetscape Standards call out turf grass as an option for parkway plantings (B.). - Code requires high-efficiency irrigation equipment on commercial new and redevelopment, but not on residential development (D.).
Benefits	- Due to lower temperatures, less evapotranspiration happens overnight, so more water is absorbed and stored in soil and plants (A.) - Requiring drip irrigation in place of overheard irrigation on narrow strips reduces the overspray that ends up on sidewalks and streets due to overhead irrigation. Water savings are likely given the efficiency of drip irrigation and the likelihood that plant material other than high-water turf will be planted in those areas (B.). - Irrigation to trees is a safety net for trees in times of water shortage (C.). - Local projects that upgraded irrigation from basic to efficient equipment have shown significant water reduction, some close to 30% (D.)
Challenges	- Large properties may not have enough time overnight to water all irrigation zones. Exceptions may need to be considered (A.). - Finding low-maintenance parkway options that aren't grass (B.). - Cost difference for equipment (C., D.)
Resource needs	- Staffing for design review, code enforcement, delivering educational resources for efficient watering practices

Opportunity 4. Increase flexibility in soil amendment policy	
Description	A proposal to update code related to soil amendment to allow for: exceptions based on locations not suited for soil amendment or disturbance (i.e. riparian areas); temporary waivers for reasons related to planting times, schedules and availability of labor; flexibility to adjust amendment amounts based on soil test results; and alternatives to tilling. Staff also proposes to establish a minimum area threshold for notarized soil amendment certificates.
Current state	- Requires tilling or mixing three cubic yards of amendment per 1,000 square feet. - Regardless of property type or project size, a notarized soil certificate is required.
Benefits	- In general, proper soil preparation prior to planting promotes deeper root growth, reduces the need for frequent irrigation events, and increases the rate water is absorbed into the soil. - Added flexibility in the code reduces burden for customers and Utilities staff and allows for better planting and soil health practices.

	- Adopting a minimum area threshold removes a barrier by which few owners abide and releases staff from enforcement on small-scale projects.
Challenges	- Perception that increases in flexibility will result in poor landscape installations.
Resource needs	- Soil amendment education campaign for homeowners and landscape contractors. - Soil test and test result resources.
Additional note	900 responses to questions about soil amendment show City and community values align around soil health and soil amendment. 71% stated that they sometimes or always use soil amendment regardless of whether they knew about the city's soil amendment ordinance.

Additional considerations

A shift in culture around landscapes and outdoor water use is critical to reduce water use in Fort Collins. This work will not be successful without cooperation from the community. Adoption and enforcement of code is unlikely to have an impact if the behavior of water users remains the same. Codes may serve to define efficient design and equipment but even the most efficient irrigation system can be scheduled to apply too much water. Staff is committed to the continuous development, implementation and evaluation of water efficiency programs and campaigns that educate residents and businesses on efficient practices and behavior change and message the importance of a conservation ethic.

NEXT STEPS

- **Identify and develop resources needed for success.** For these changes to be successful, staff and the community need to be prepared. Educational resources and campaigns, cross-departmental collaboration and exploring additional incentive opportunities for customers are just a few of the many resource needs.

- **Align with Land Use Code, Water Efficiency Plan, and Urban Forest Strategic Plan updates.** Major updates of these guiding documents calls for close collaboration with staff to guarantee alignment.

- **Code development and adoption.** With feedback from Council, Boards and Commissions, stakeholders, and the public, the project team will continue to hone these opportunities and the associated costs and water savings. First reading of an ordinance to updated codes for new development can be anticipated in Q3 2023.

- **Continue to support and promote the conversion of existing landscapes to xeriscape.**

    - Minimize barriers to participation in XIP where feasible, which could include reviewing the minor amendment process, streetscape standards, program applications, agreements and other program requirements.
    - Work with City staff to identify funding sources and other opportunities on City-owned facilities and lands to expand xeriscape.

ATTACHMENTS

1. Council Memo, March 2022
2. Public Engagement
3. Soil Amendment Map
4. Presentation