

# Utilizing IPR with the Potential to Move to DPR

February 23, 2023



# Current Reuse in Castle Rock

Non-Potable Reuse  
Gray Water  
Indirect Potable Reuse



*First Gray Water Systems hit Castle Rock in 2021/2022*

# Reuse as a Supply

## Legally Reuseable to Extinction (60-90%)

- Nontributary nonrenewable groundwater
- Imported renewable water

## Legally One Time Use (10-40%)

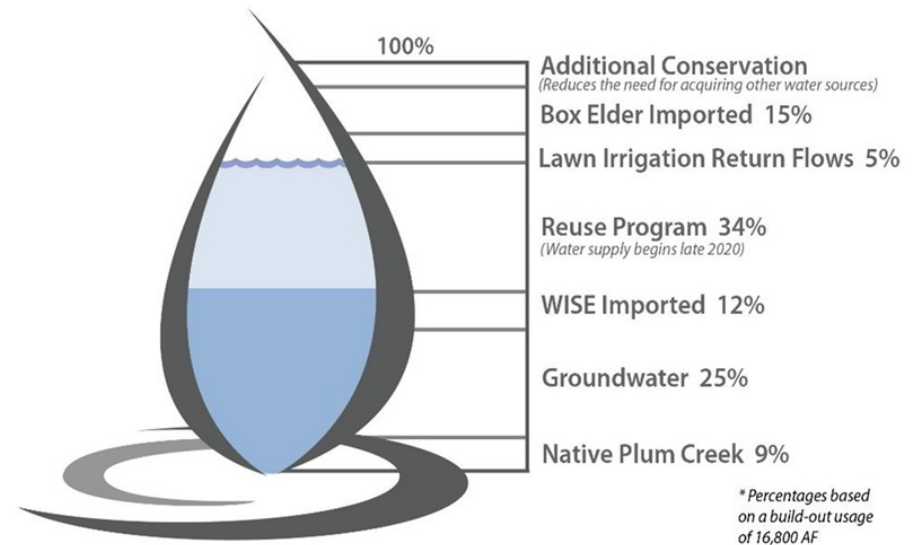
- Plum Creek Water Rights
- Chatfield Reservoir (South Platte)

## Physically Reusable

- Indoor use
- Some lawn irrigation return flows

## Physically Not Reusable

- Most outdoor irrigation



# Reducing Outdoor Irrigation

**ColoradoScape** is a natural landscape, comprised of low to very-low water-use-plant material, which blends in with the native Castle Rock landscape. This landscaping utilizes a combination of hardscape and plant materials, providing a variety of colors, textures, sizes, shapes, and seasonal interest.



## **2022 ColoradoScape Ordinance** Residential

- ✓ No turf grass in front yards
- ✓ <500 square feet of turf grass in backyards

## Non Residential

- ✓ No non-functional turf grass

## **2023 Water Efficiency Master Plan Goal**

30% replacement of existing non-functional turf with Coloradoscape





# Potable Reuse System

## Planning for Reuse

## Plum Creek Water Purification Facility *with Advanced Treatment*



Plum Creek Water Purification Facility is being expanded to include Advanced Treatment processes, which are denoted in blue. While treatment already meets local, state and federal regulations for safe drinking water regardless of sources, the Advanced Treatment processes provide added redundancies, focus on removal of contaminants of emerging concern (CECs), and address new standards being established by reuse systems throughout Colorado and the U.S.



Traditional and reuse treatment systems include physical, chemical and biological processes for a comprehensive treatment for purity in drinking water. These processes are designed to remove Giardia, Cryptosporidium, viruses, suspended solids, bacteria, algae, fungi and CECs such as pharmaceuticals and personal care products.

### Raw Water Blending Tank

Water from several sources are blended

- Local Plum Creek
- Reuse water
- Groundwater

### Aerators

Aeration removes dissolved gases and oxidizes dissolved metals such as iron and manganese

### Flocculation - Sedimentation

Chemicals are added to promote coagulation of the suspended particles. These clumps or 'floc' travel to sedimentation basins where the floc settles to the bottom and is removed.

### Biologically Active Carbon Filtration

Water passes through several filters in which the biological media removes organics, turbidity, particles, pathogens, some CECs and dissolved manganese.

### Microfiltration Membranes

Water is pushed through a membrane that is less than 0.1 microns (one-tenth thousandth of a millimeter). This step removes particles such as bacteria, viruses and other micro-organisms.

### Ozonation

The oxidation process changes organic compounds and CECs into biodegradable compounds which are more easily 'adsorbed' by the granular activated carbon.

### Granular Activated Carbon

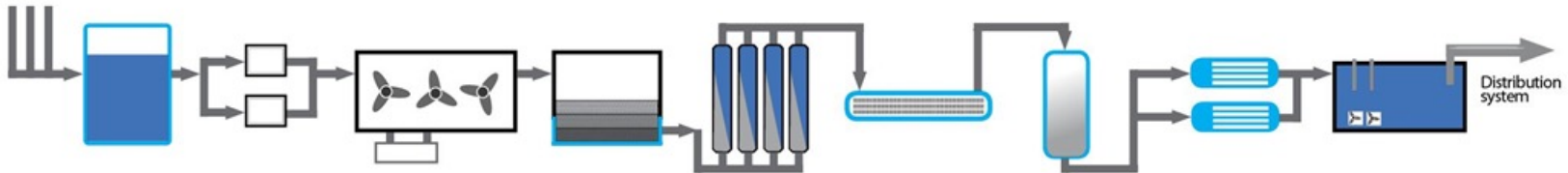
Dissolved organic compounds and CECs are adsorbed by the activated carbon and removed from the water.

### UV Disinfection

UV disinfection is a physical process that neutralizes any potentially remaining micro-organisms as they pass by ultraviolet lamps.

### Chlorine Contact

Chloramines are a combination of chlorine and ammonia which provide disinfection protection as water flows through the distribution system and into homes and businesses.



The process diagram is a representation only.

# Indirect Potable Reuse (IPR)

## Performance to Date

- ~1,000 acre feet since February 2021
- Averaged ~15% of total supply in 2022

## Next Steps

- Expansion of system
- Pump back from Chatfield

## Challenges

- Salt
- PFAS



*Granular Activated Carbon Filters at Plum Creek Water Purification Facility*



# Direct Potable Reuse (DPR)

## Passing of Regulations

- Stakeholder Process
- Excellent Work by State
- Multi Year Process

## Summary of New Regulations

- Potential Benefits for Castle Rock
- Salt Challenge
- Additional Challenges for Castle Rock

## Next Steps for Castle Rock

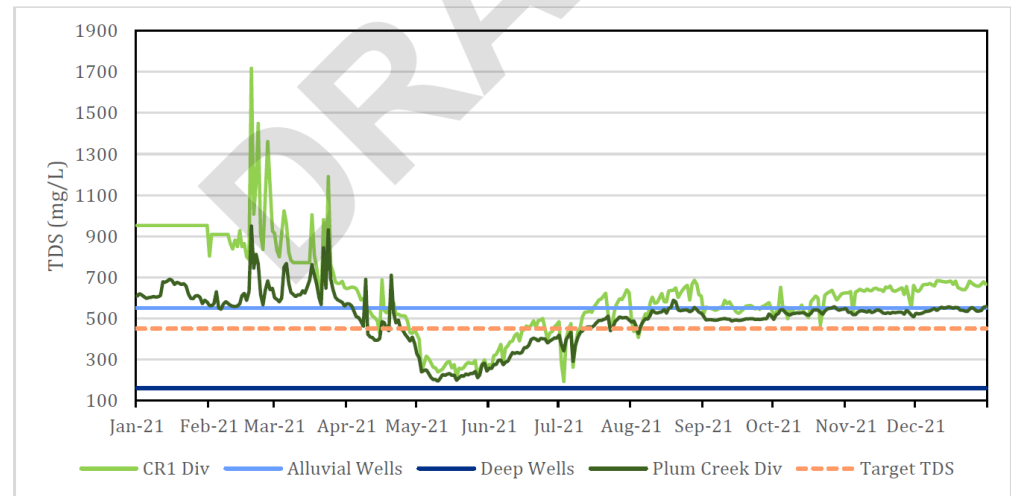


Figure 4 Source Water TDS Concentrations at PCWPF



# Thanks

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*Ultraviolet Radiation at Plum Creek Water Purification Facility*

