



Going Beyond Discharge

BRYCE CALLIES, PE

November 2023



It's an ongoing effort to remove emerging contaminants from a sensitive watershed.



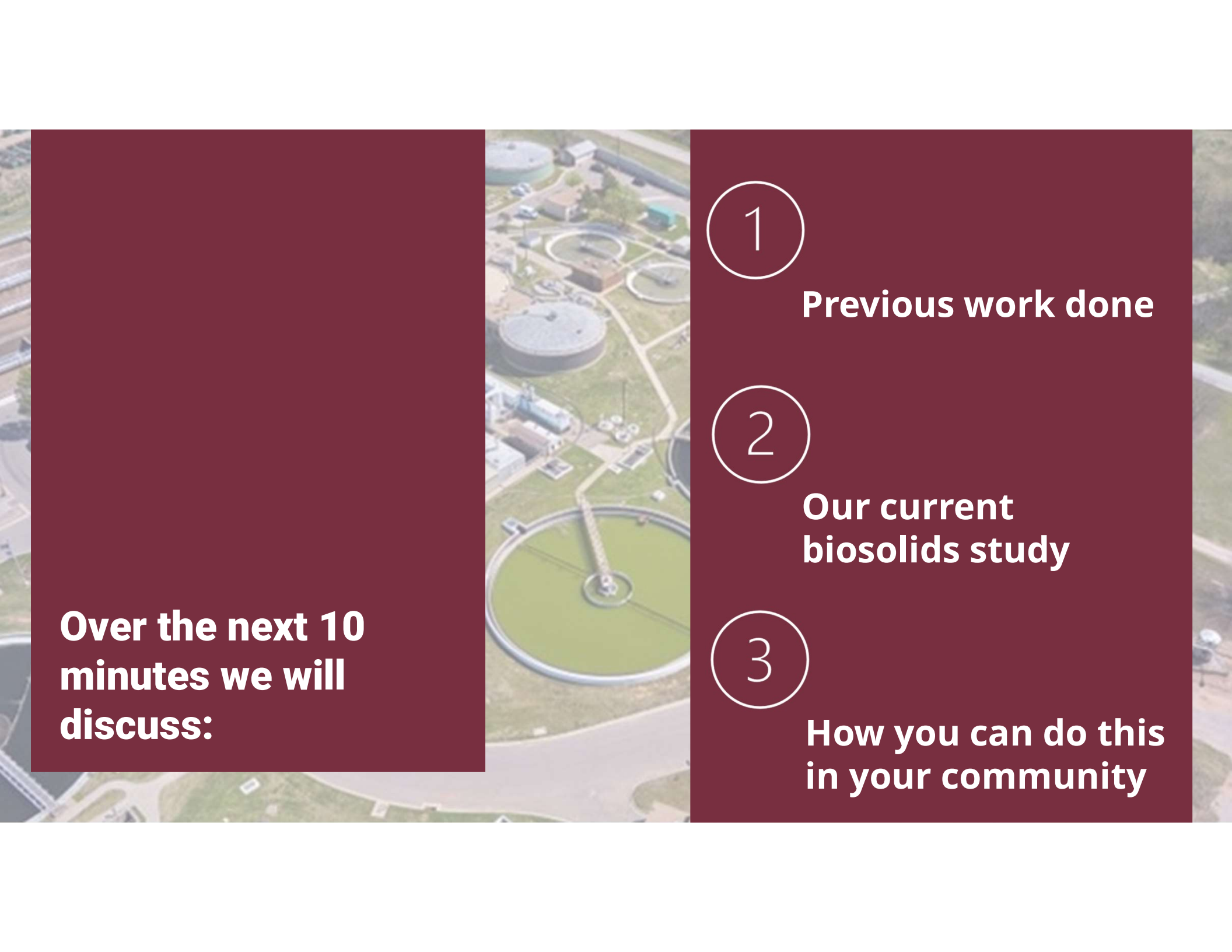
We began looking at the water column itself.



Now we are chasing CECs into the solids.

If your community applies solids, this will be applicable to you!





Over the next 10 minutes we will discuss:

1

Previous work done

2

Our current biosolids study

3

How you can do this in your community



Previous work done

**The Lake
Thunderbird
Watershed has
many sources of
CECs but no
sanitary
discharges
currently.**



We began looking at reuse to increase quantity of water in Lake Thunderbird while minimizing impacts.



The goal of our reuse project was to identify a treatment approach that did not produce brine.



Demonstrate the efficacy of biological nutrient removal (BNR) and tertiary treatment to achieve Safe Drinking Water Act standards



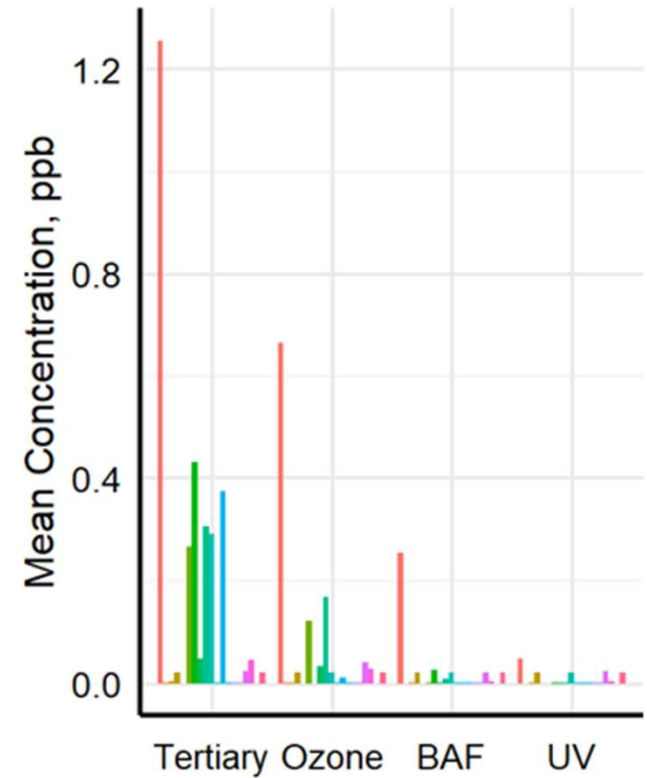
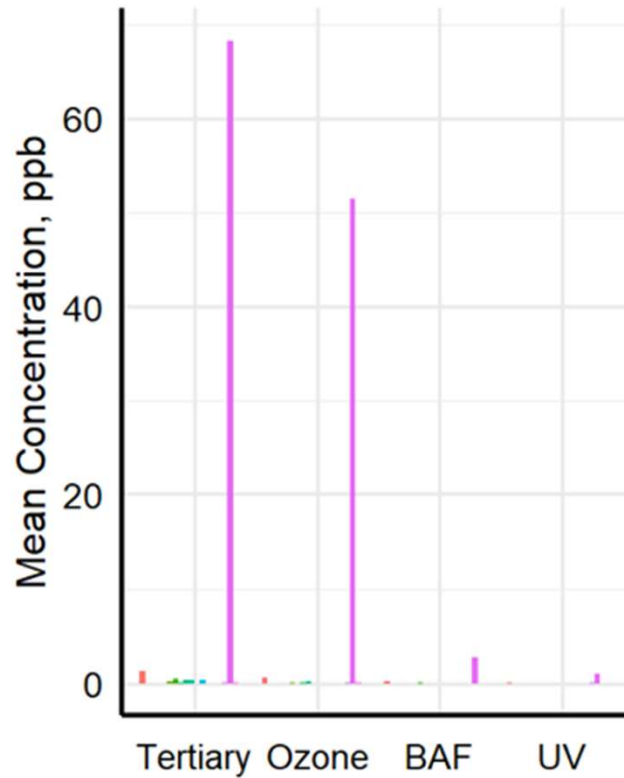
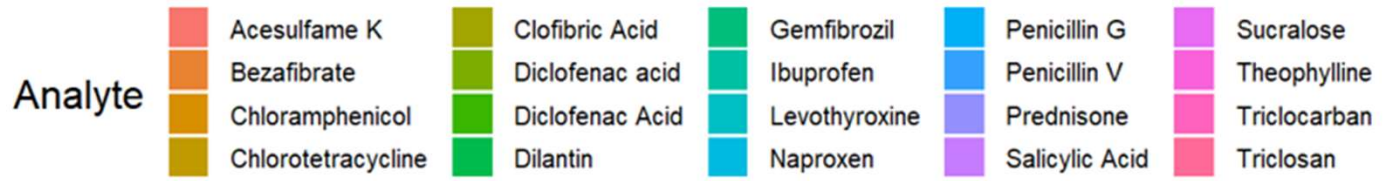
Removal of pathogens and personal care and pharmaceutical products (PPCPs) without the use of high-pressure membranes



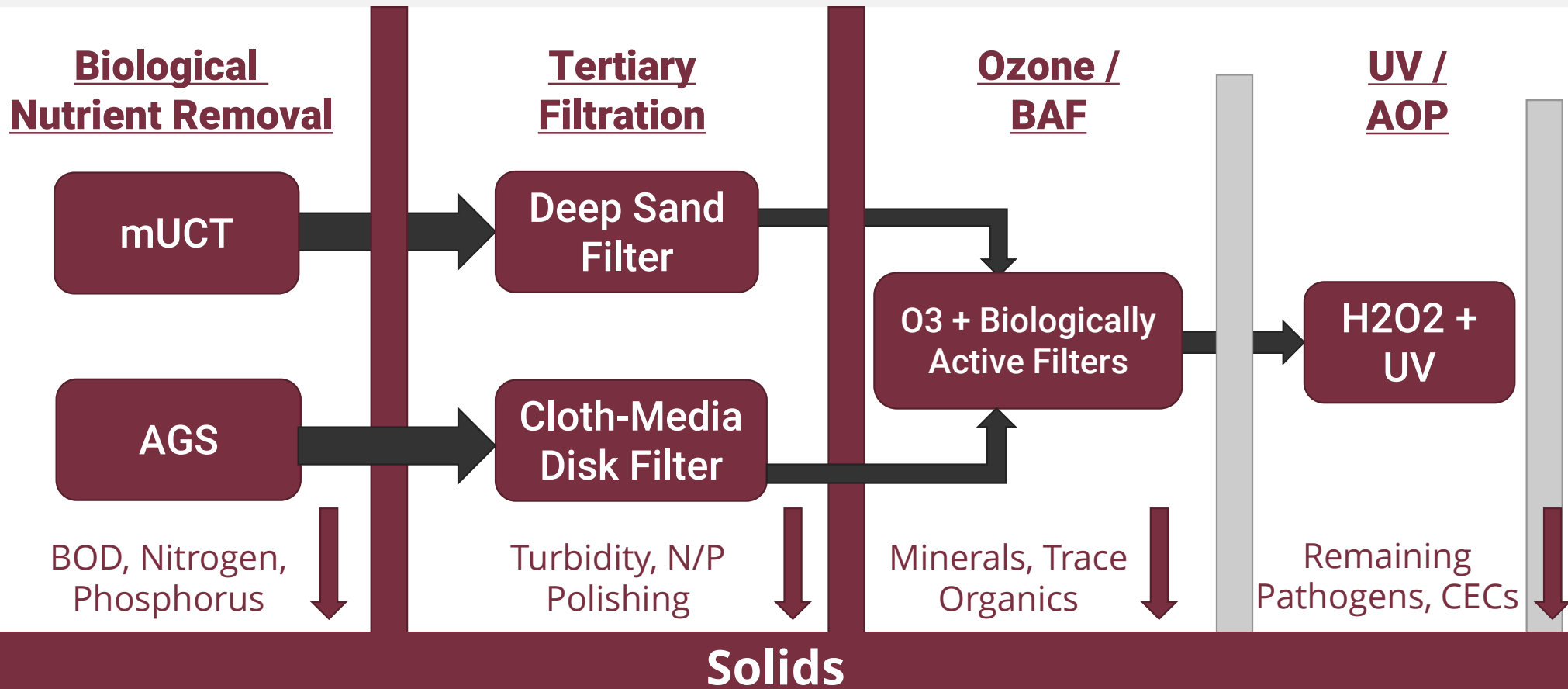
The IPR technologies we piloted involved advanced biological treatment.

	Component	Duration (mos)	Flow Rate
Full Scale	Granular Aerobic Sludge	12	>200,000 gpd
	Conventional BNR	12	>200,000 gpd
Pilot Scale	Ceramic Membrane UF	3	<50 gpm
	Denitrification Filter	8	<50 gpm
	Ozone/Biofiltration	5	<50 gpm
	Lab UV Biodosimetry	2	<50 gpm
	UV Pilot Reactor	2	<50 gpm

The results were a reduction in CECs in the effluent.



We didn't destroy all of them so where did they go?





Our biosolids study

Currently, Norman is handling solids in a very standard way.



Norman has expressed interest in upgrading its solids handling process.

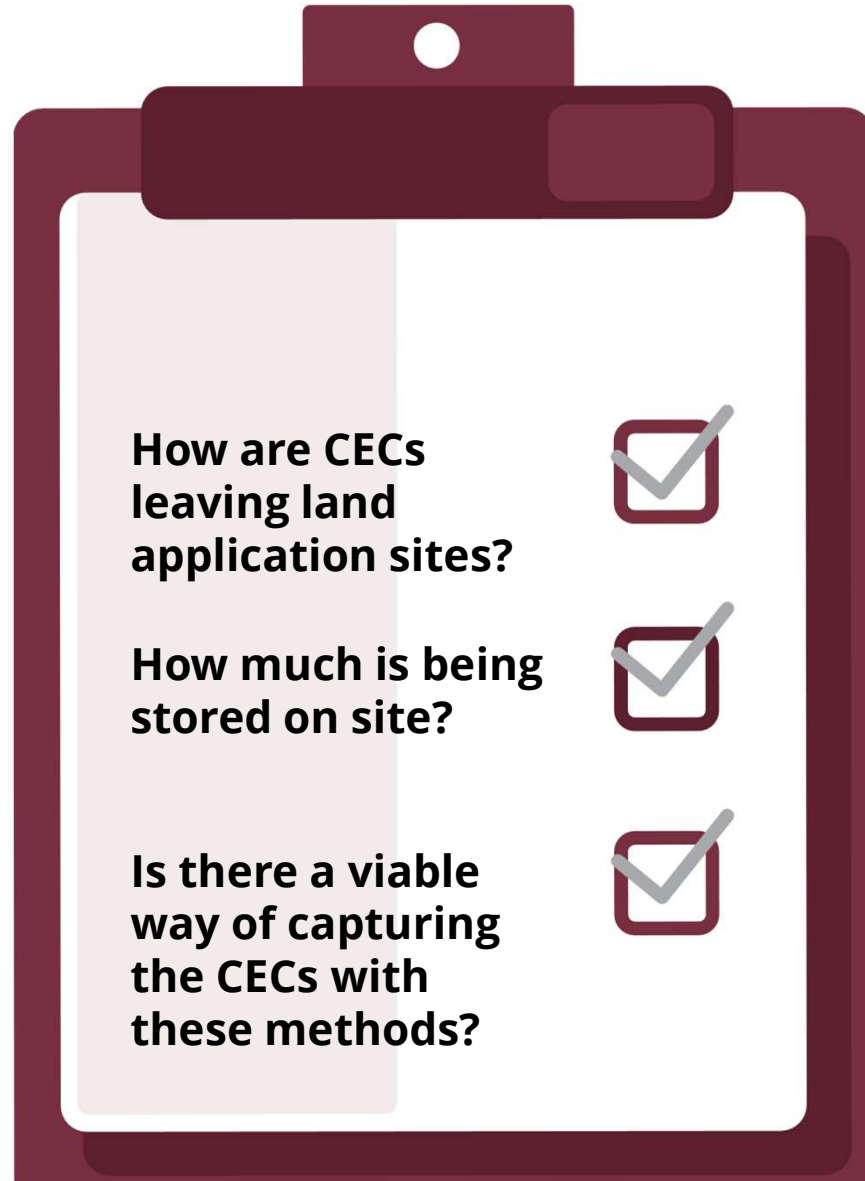


Considered co-composting with nearby yard waste facility

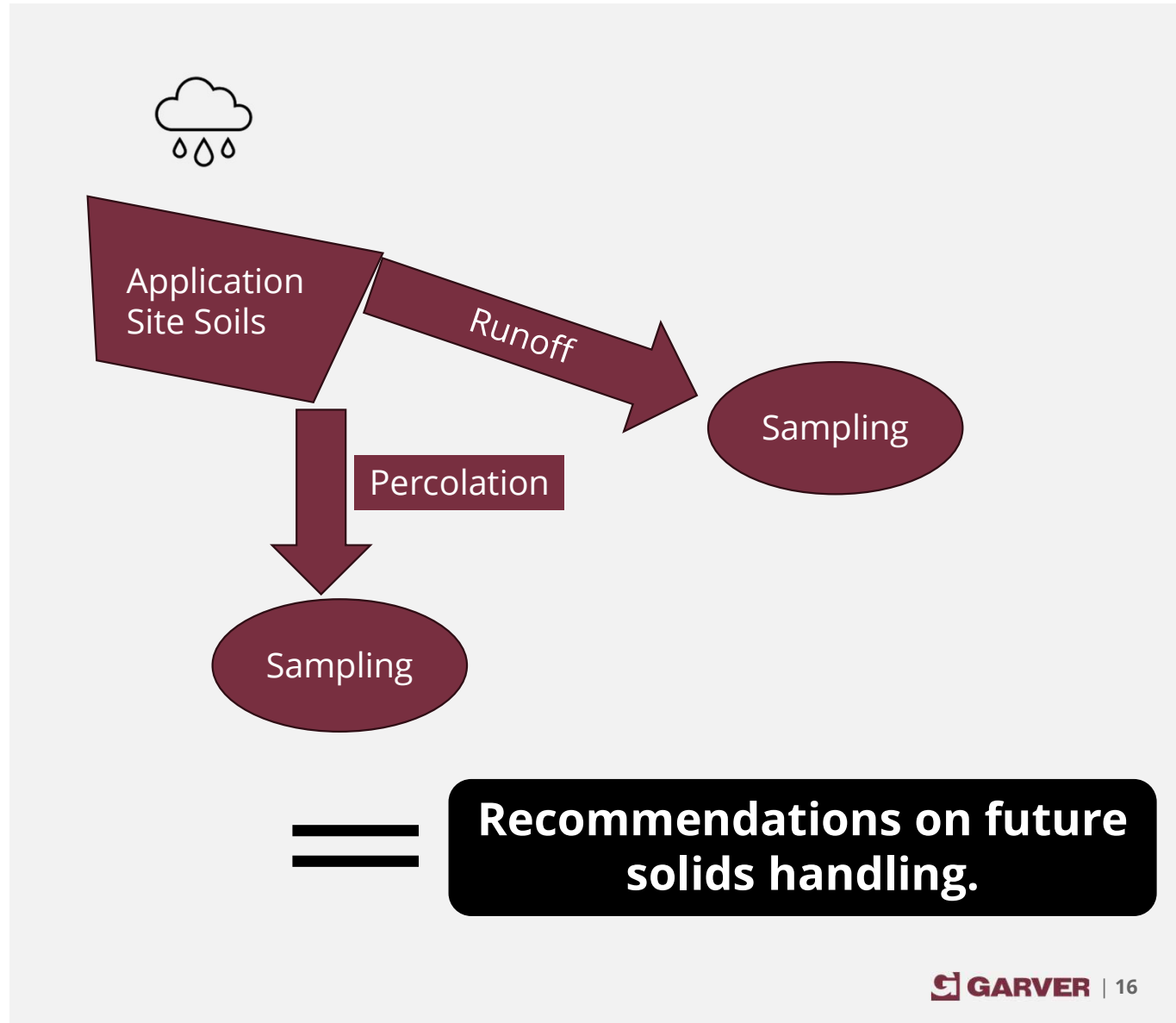


Considered increasing treatment to a Class A sludge

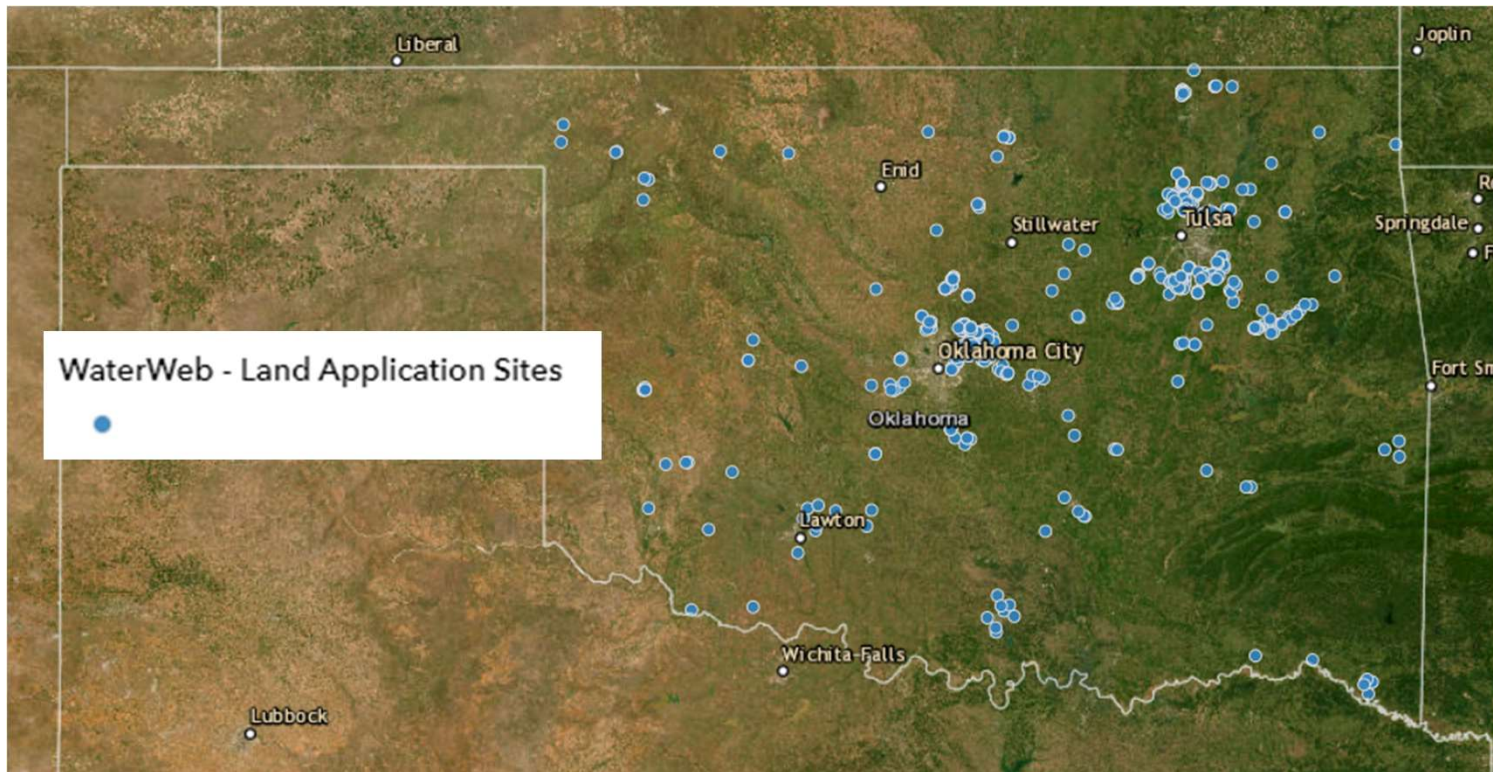
Our project focuses on using advanced solids handling processes to remove or store these CECs.



We will take additional samples in the treatment plant and operate a land application mesocosm.



This is only one WWTP in the US and these CECs are persistent and common.





**How you can do this
in your community**

The key to getting these projects on the ground is open lines of communication.



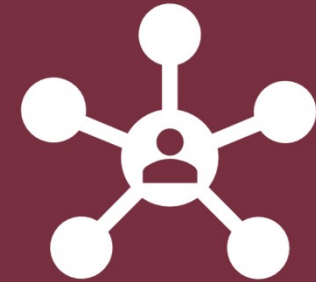
In conclusion, we have demand and too many hurdles, so we need to make these things happen.



Involving engineers and other service providers



Involving communities



Opening lines of communication



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