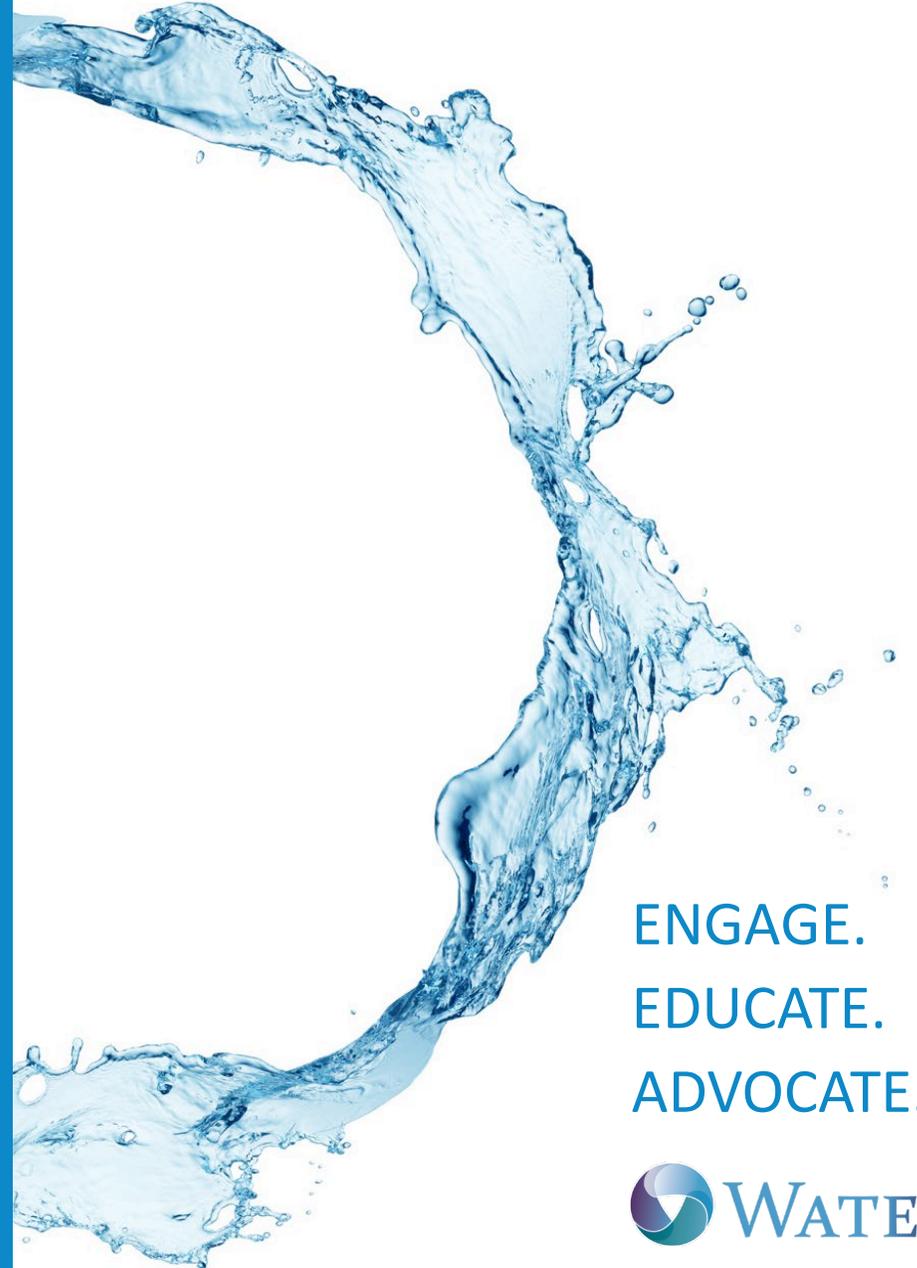




WATERREUSE TEXAS WEBCAST: OPERATOR PERSPECTIVES ON REUSE

FEBRUARY 21, 2024
11:00 ET | 8:00 PT

WATERREUSE ASSOCIATION WEBCAST SERIES



ENGAGE.
EDUCATE.
ADVOCATE.



A Few Notes Before We Start...

- Today's webcast is scheduled for 60 minutes.
- A PDF of this presentation will be shared afterwards via email
- Please type questions for the presenters into the Q&A box located at the bottom of your screen.
- There is one (1) Professional Development Hour (PDH) available for this webcast. Please email the PDH form to webcasts@watereuse.org



Upcoming WateReuse Texas Events

Save the date!
Abstract
submissions open
in March



The banner features a purple silhouette of Texas with a white water drop icon and the year '2024' inside. To the right, the text reads 'WateReuse Texas CONFERENCE' in purple, with 'AUSTIN, TEXAS | SEPT 9 - 11' below it. A purple arrow points to the website 'watereuse.org/Texas2024'. The hashtag '#WRTX2024' is displayed in white on a blue background at the bottom right.

Join us at **Texas Water** for a Reuse
Happy Hour on Wednesday April 10
Co-hosted by the WEAT Reuse Committee

We are still looking for a sponsor!
Asking \$250-\$500 to provide drinks
and appetizers for attendees

- WateReuse Symposium in Denver, CO– Texas Networking
If you're attending the Symposium, join WRTX for several Texas networking touchpoints on
March 12 and 13. For more information, email Noelle George ngeorge@watereuse.org.



Moderator:



Roland Gutierrez
San Antonio
Water Systems
(SAWS)

Today's Presenters



David Garza
City of McAllen
Public Utility



**Migdalia Orozco
Jackson**
Fort Worth Water



Hunter Adams
City of Wichita
Falls



**Angel
Bustamante, P.E.**
El Paso Water



David Garza
Director of Wastewater Systems
City of McAllen Public Utility



City of McAllen Overview

- **City of McAllen Golf Course (for over 20 years)**
- **Calpine-Valley generation power plant (for over 20 years)**
- **McAllen North and South WWTP**
- **City of McAllen Baseball/Park system**
- **The only residential subdivision allowed to use reclaimed water is Tres Lagos (this can change in the future)**



City of McAllen Overview

- **Purple pipe underground-Reclaimed transmission line- ~5miles of 16” and 782 ft of 24”**
- **Reclaimed distribution line- ~6 miles of 12” and ~8.5 miles of 8”**
- **Residential usage started in 2017**
- **Over 778 total accounts**
- **100-150 accounts growth per year**
- **In 2023 monthly average usage at Tres Lagos was 22,252,157 gallons, daily average was 733,897 gallons**



City of McAllen Overview

- **McAllen is testing for the chlorine residual out in the field**
- **Testing for E. coli**
- **Testing for total dissolved solids (TDS)**





Migdalia Orozco Jackson
Water Systems Superintendent
Fort Worth Water



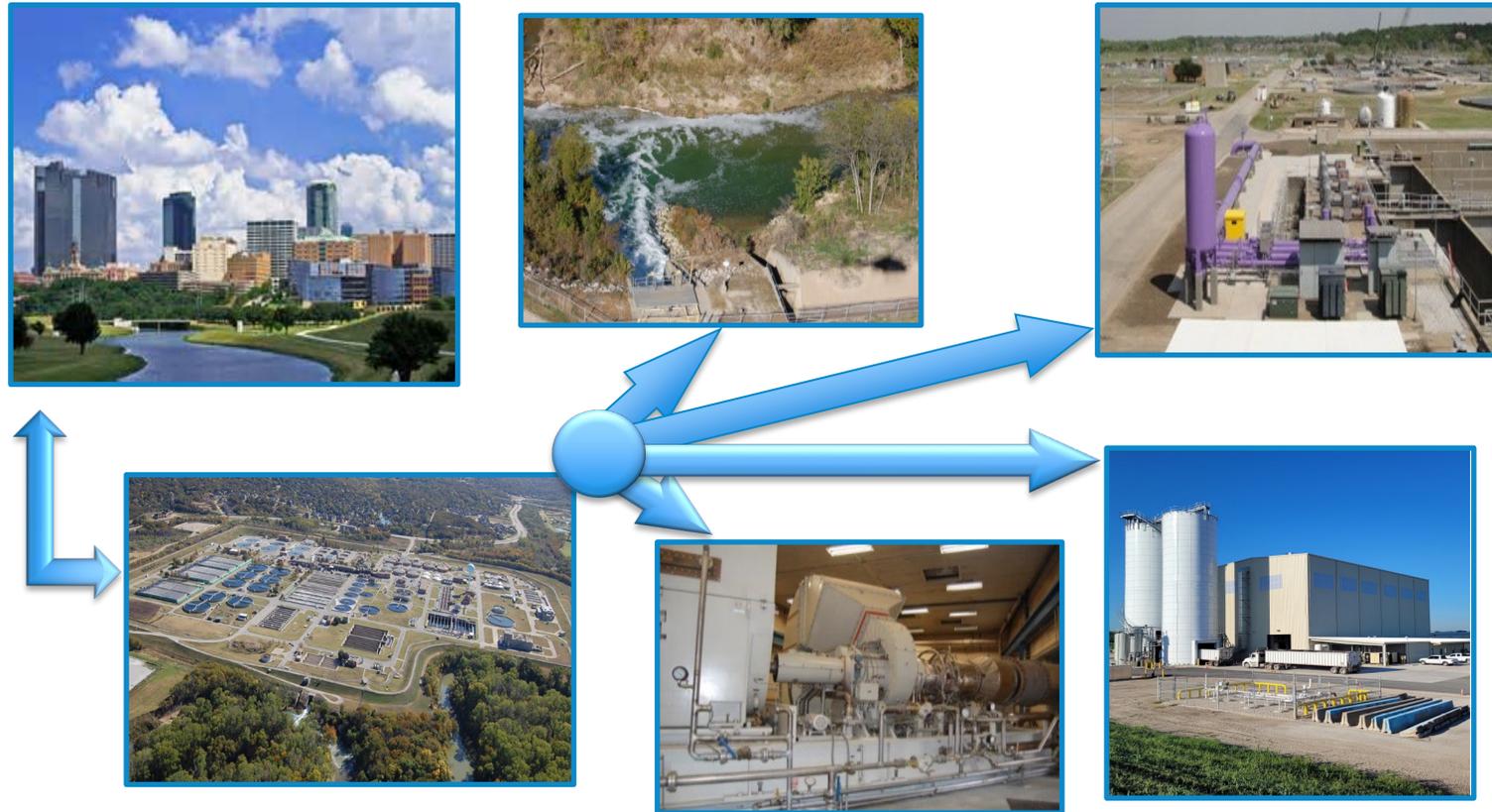
Fort Worth- Village Creek WRF



- **1955 Construction Started**
- **TODAY: 166 MGD (Permitted Capacity)**
- **Service Area: Tarrant County - Ft. Worth and 22 Customer Cities**
- **Population Equivalent - One Million**
- **>3400 Miles of Collection Lines**
- **Advanced Treatment**
Activated Sludge Process
Anaerobic Digesters



From Water To Wastewater To Resource Recovery



Reclaim System Overview

- **Source of water – Village Creek filtered effluent**
- **Disinfection method - UV System or Contact Basin**
- **Reclaimed Water Pump Station**
- **Chlorine injection after Pump Station**
- **Meter station for each customer**



UV Disinfection



- **TROJAN, HORIZONTAL**
- **ONE CHANNEL**
- **2 UV BANKS**
- **5 MODULES PER BANK**
- **8 LAMPS PER MODULE**
- **40 LAMPS PER BANK**
- **LAMP OUTPUT 130 UVC WATTS**
- **FLOW CAPACITY 6 MGD**



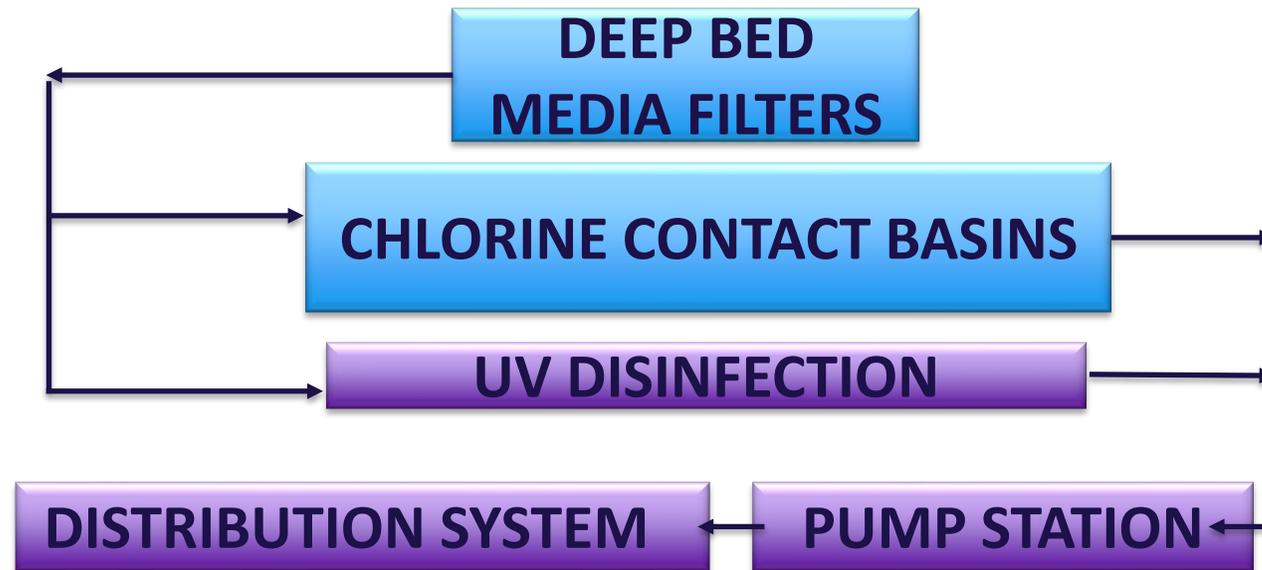
Reclaimed Water Pump Station



- Three 200 hp pumps
- Total Capacity 12 MGD



Production Overview



Fort Worth Reuse Customers



Wholesale Customers

City of Arlington

City of Euless

DFW Airport

Retail Customers

Waterchase Golf Course

Texas 9 (3 Strand Golf
Academy)

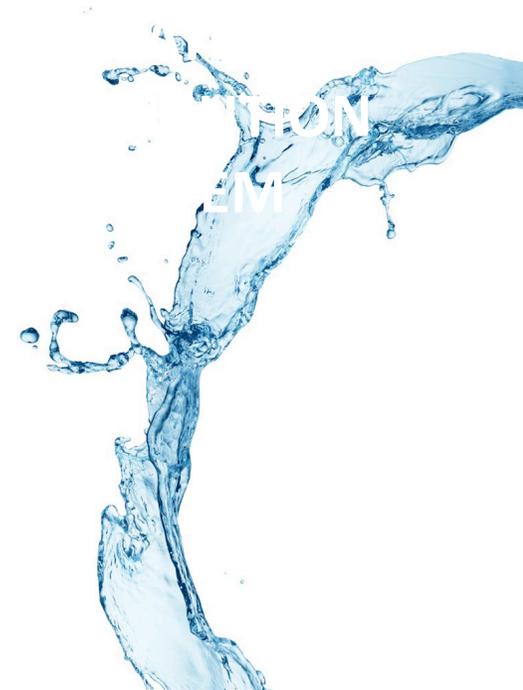
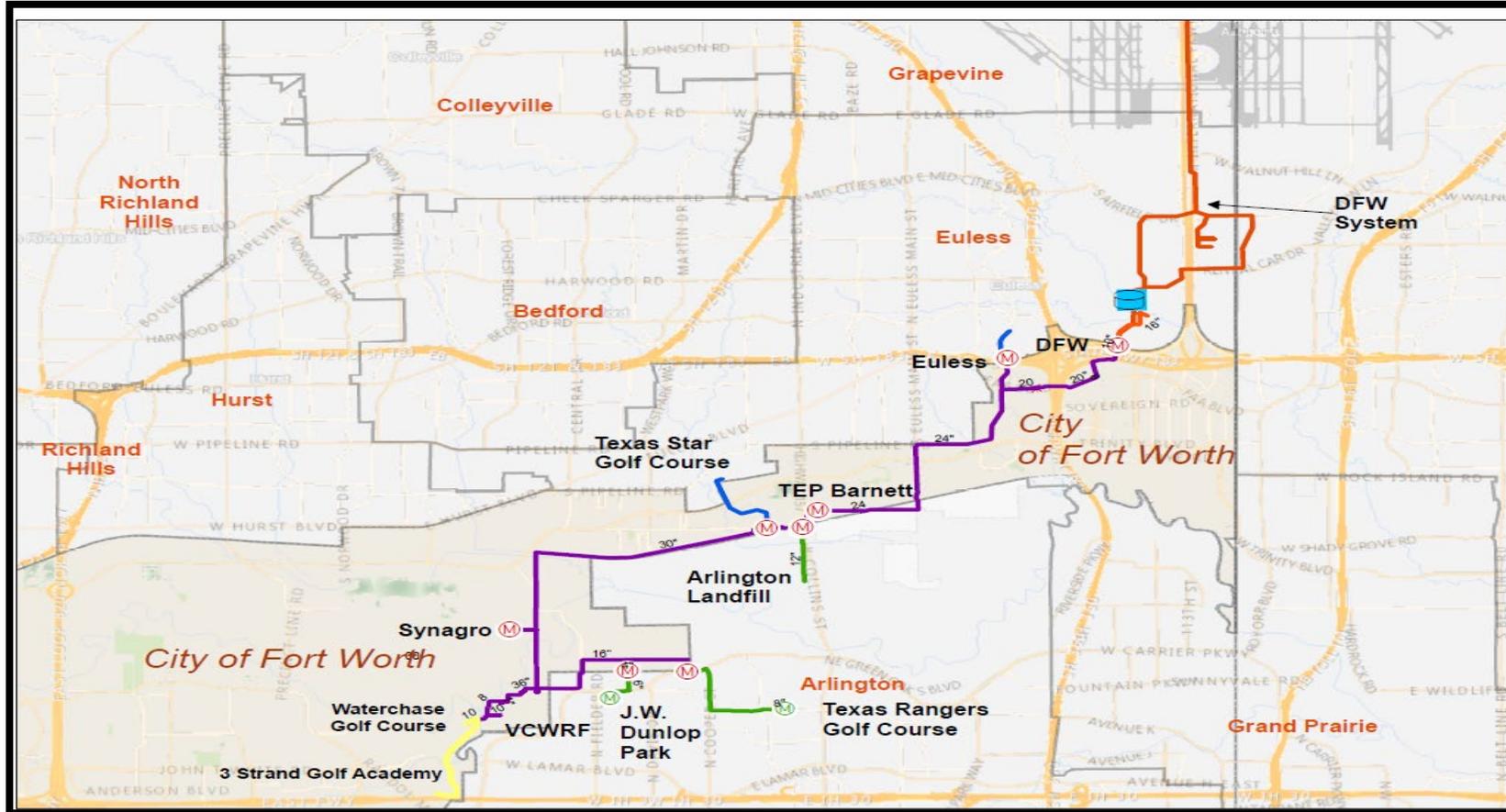
TP Barnett

Internal Customer

Synagro



Type I Reclaimed Water Distribution System



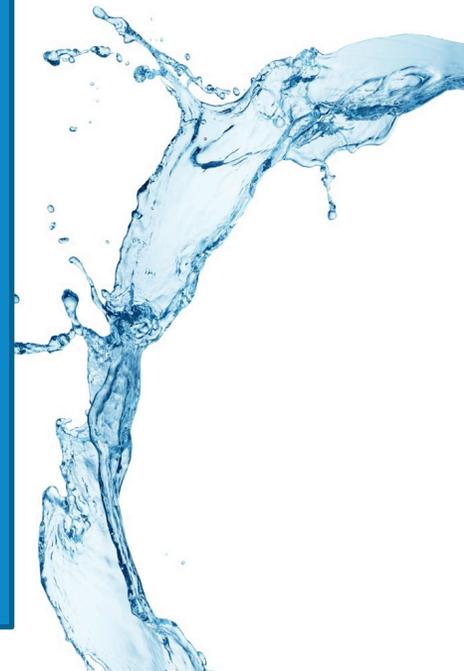
Reclaim I Permit

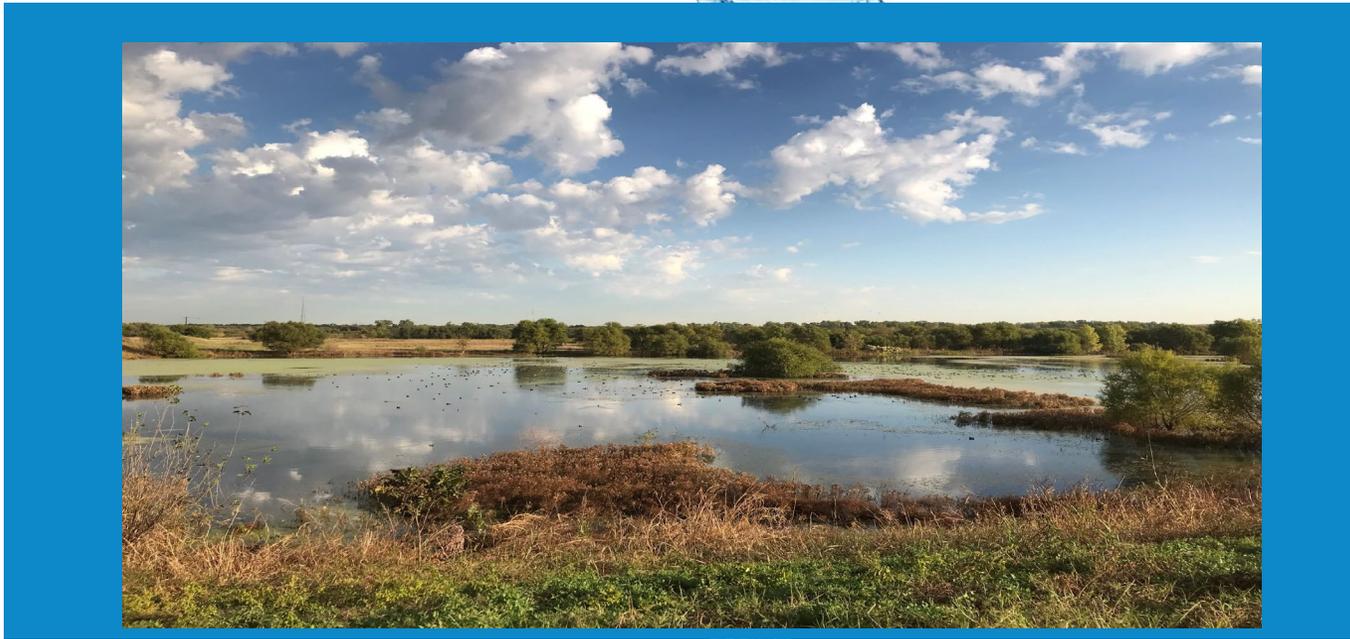
30 days average Parameters

CBOD5	5.0mg/L
Turbidity	3.0 NTU
Fecal Coliform	20CFU/100mL

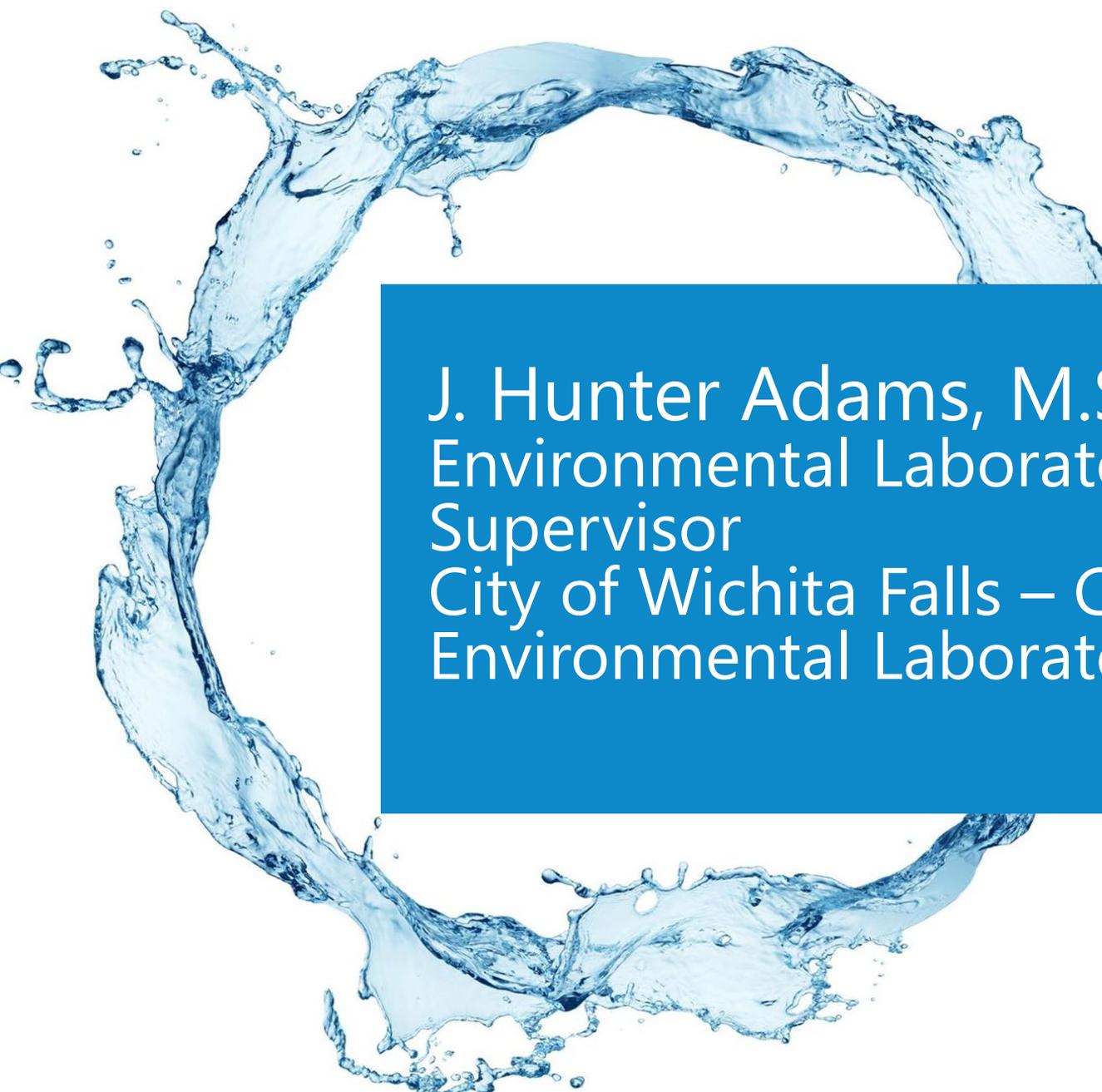
2023 VCWRF Results

CBOD5	2.1mg/L
Turbidity	0.8 NTU
Fecal Coliform	1.1CFU/100mL





Reclaimed Water
Supports The
Environment

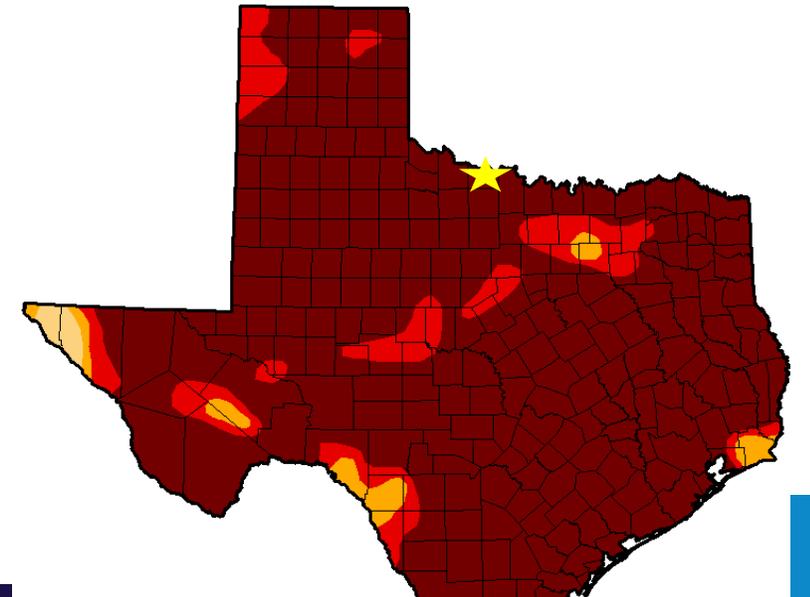
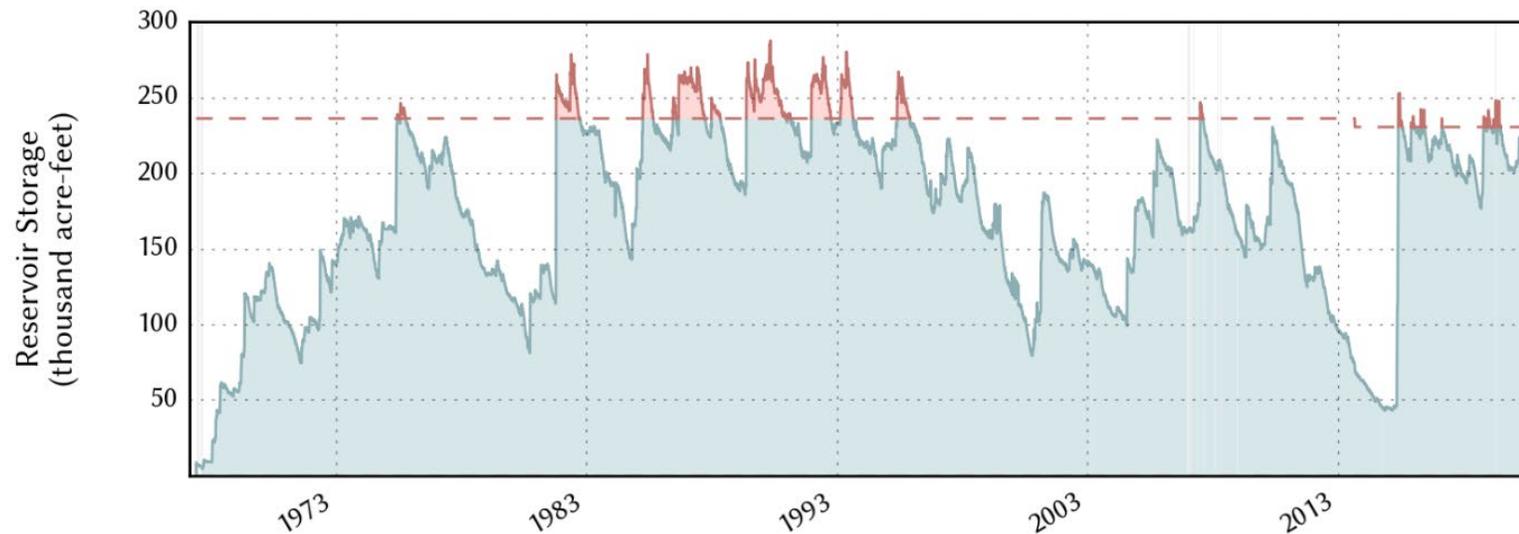
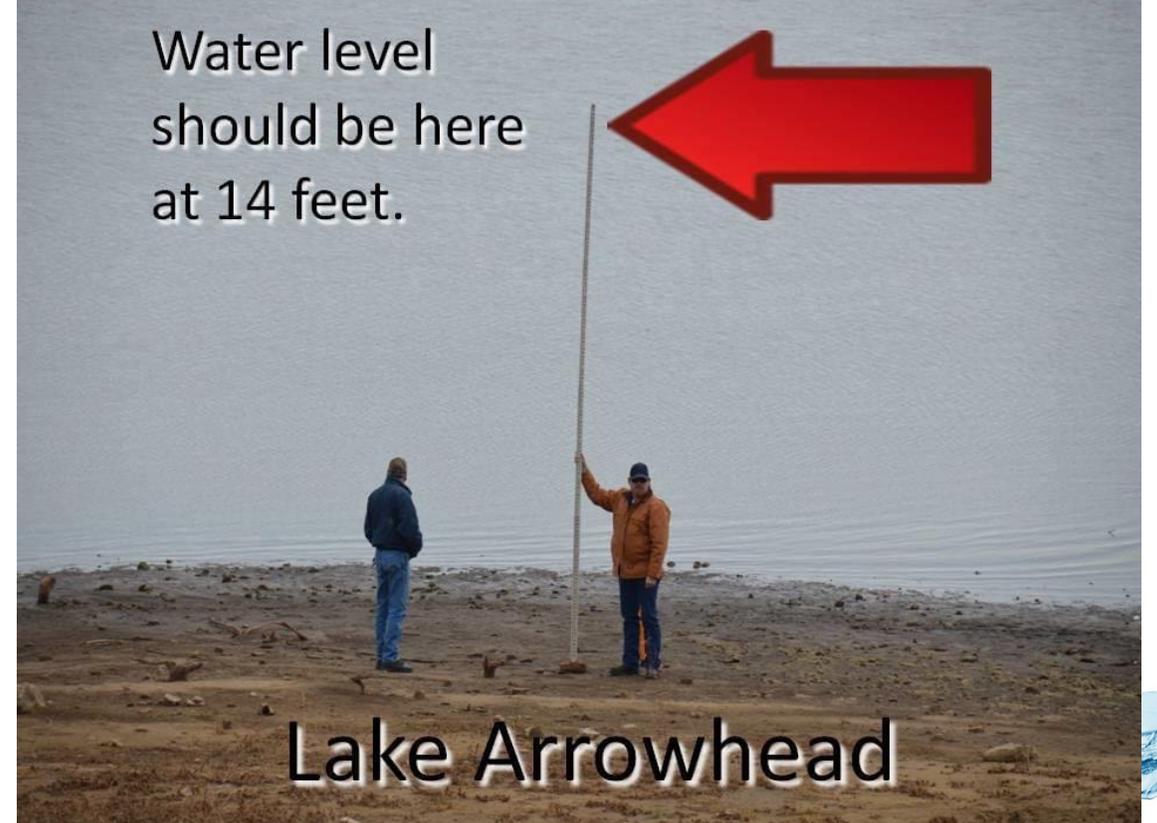


J. Hunter Adams, M.S.
Environmental Laboratory
Supervisor
City of Wichita Falls – Cypress
Environmental Laboratory



Why Direct Potable Reuse?

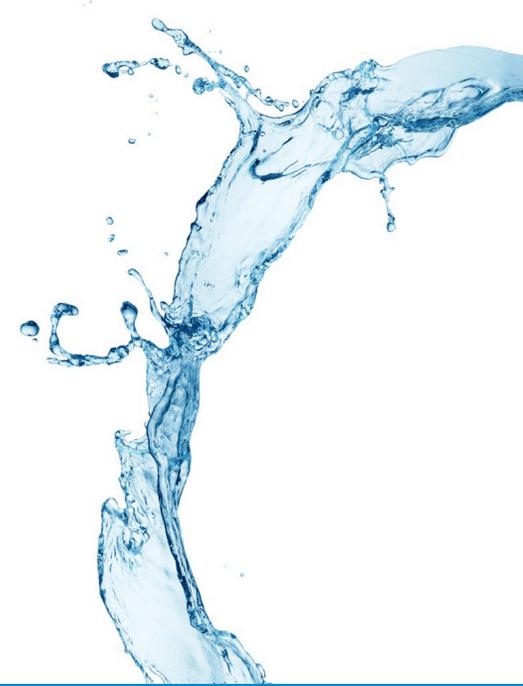
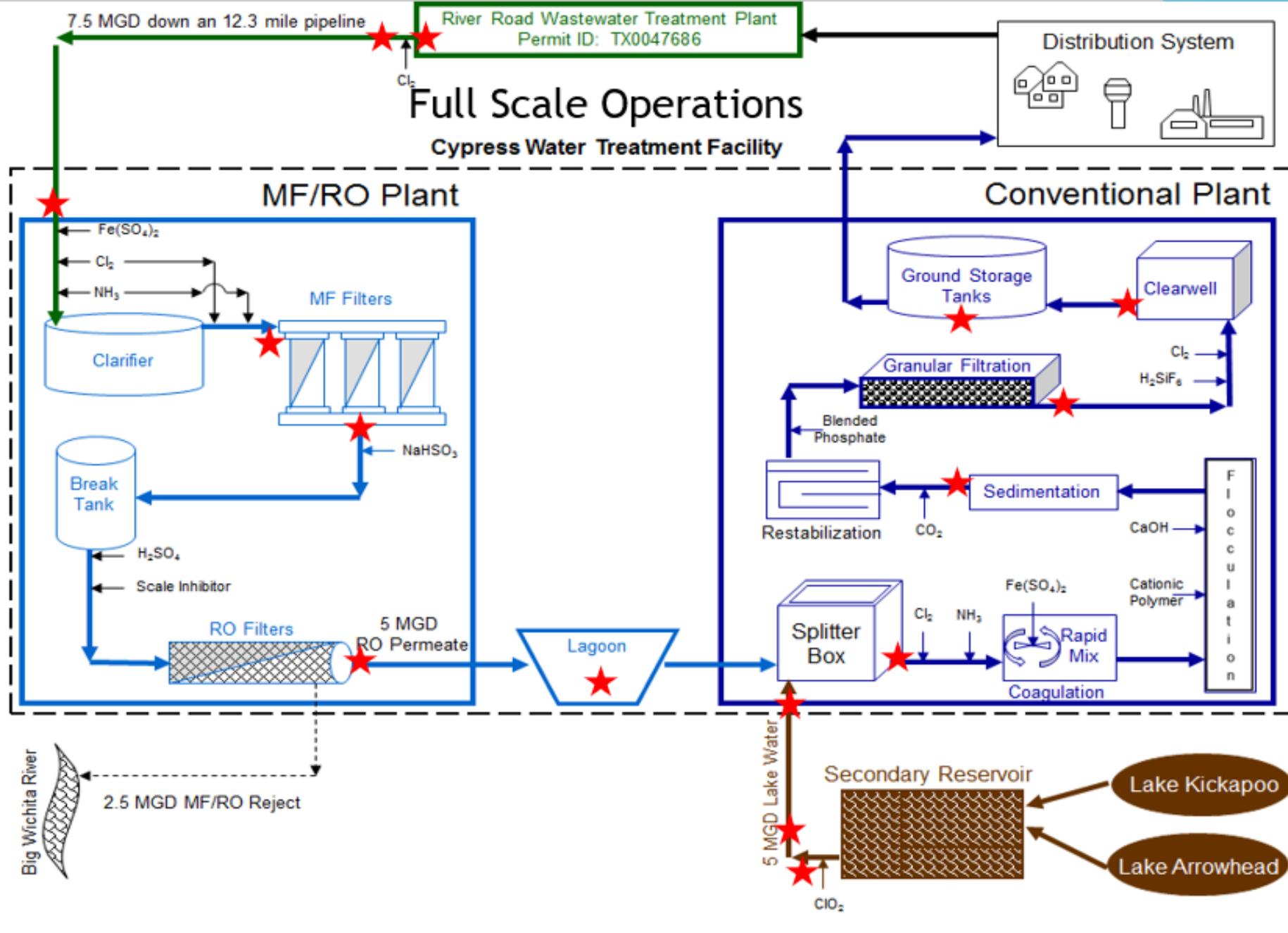
- Extended Drought - Emergency
 - 2011 – May 2015
- Lake Arrowhead – 19.0%
- Lake Kickapoo – 26.4%
- Combined Lake Levels – 21.0%



The Plan - DPR

- TCEQ expedited permitting
 - Approved exemptions to treatment rules
- FSO began July 9, 2014
- 7.5 MGD effluent from River Rd WWTP
- MFRO Cypress WTP - Blend 1:1
 - 5 MGD RO permeate
 - 5 MGD raw lake water
- Treat blend in a conventional treatment plant
- Develop long-term strategy - IPR





DPR Results (July 9, 2014-July 21, 2015)

Microbial Detections

	Wastewater Effluent	Microfilters	RO	POE	Standards Compliance
Virus	0	0	0	0	✓
Giardia	62.65	0	0	0	✓
Cryptosporidium	4.35	0	0	0	✓
E coli	100,000+	0	0	0	✓

Primary and Secondary Standards

	MCL (mg/L)	FSV Average	FSO Average	FSO Max	Standards Compliance
Nitrate	10.0	0.66	0.85	3.26	✓
TTHM	0.080	0.0142	0.0289	0.0344	✓



DPR Results (July 9, 2014-July 21, 2015)

Primary and Secondary Standards

	MCL (mg/L)	FSV Max	FSO Max	Standards Compliance
Aluminum	0.05	0.0260	0.0190	✓
Antimony	0.006	ND	0.0003	✓
Arsenic	0.010	0.0013	0.0008	✓
Barium	2.0	0.0210	0.0459	✓
Chloride	250	120	88	✓
Chlorite	1.0	0.32	0.46	✓
Chromium	0.1	ND	0.0007	✓
Copper	1.3	1.3	0.1470	✓
Cyanide	0.2	ND	0.147	✓
Fluoride	4.0	0.7	0.568	✓
Iron	0.3	0.02	0.134	✓

	MCL (mg/L)	FSV Max	FSO Max	Standards Compliance
Manganese	0.05	ND	0.003	✓
Nitrate	10.0	2.08	3.26	✓
Nitrite	1.0	0.02	0.09	✓
Sulfate	250	30	33	✓
TDS	500	462	271	✓
Zinc	5.0	ND	0.025	✓
Gross Alpha/Beta	15.0	10.1	9.2	✓
Uranium	0.03	0.0007	0.0013	✓
Turbidity	0.3	0.267	0.27	✓
TTHM	0.080	0.0167	0.0344	✓
HAA5	0.060	0.0093	0.0152	✓
LSI	+	0.17	0.39	✓



DPR Success

- 100% compliance with Primary and Secondary Drinking Water Standards
- 100% compliance with microbial log removals
- Viable and reliable supply
- Public acceptance
- Zero customer complaints
- > 2 billion gallons reclaimed in 12 months
- Public health was protected



The Transition - DPR to IPR

- Entire approval process required
 - Design, modeling, application, permitting, approval
- \$6 million of an 12.3 mile 32" HDPE DPR pipe repurposed for IPR
- 5.5 miles of additional 36" ductile iron pipeline added
- Outfall 3,000 ft into Lake Arrowhead
- Baseline testing for Lake Arrowhead and wastewater effluent



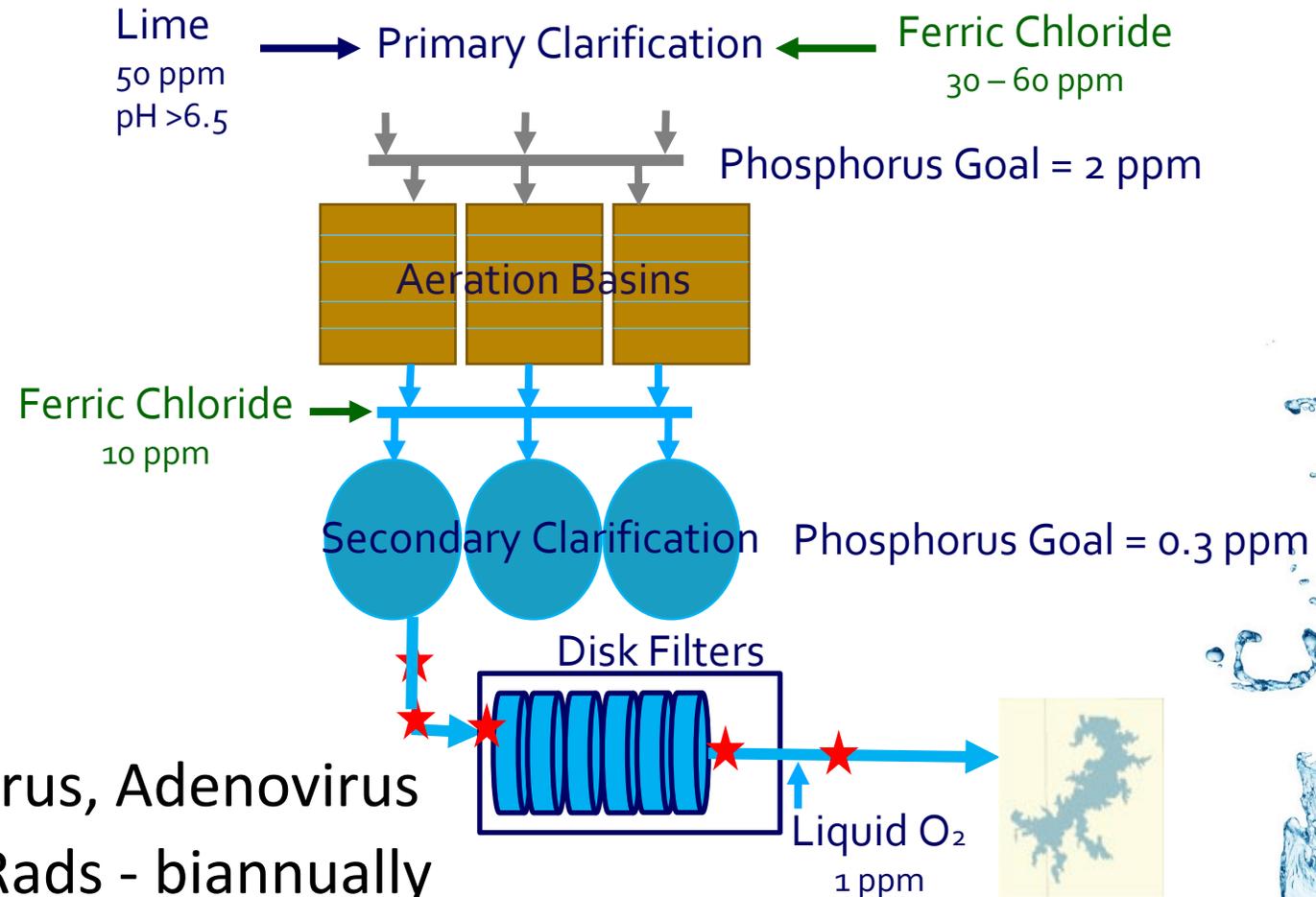
IPR – Permanent Reuse

- Plant improvements/additions
 - New SCADA system
 - Lime
 - Phosphorus removal
 - Additional alkalinity
 - Ferric chloride
 - Phosphorus removal
 - Disc filter
 - Phosphorus polishing
 - Protozoan barrier
 - Liquid oxygen
- FSO began January 2018
- ~ 8 MGD RRWWTP effluent returned to watershed
 - Lake Arrowhead instead of Lake Texoma

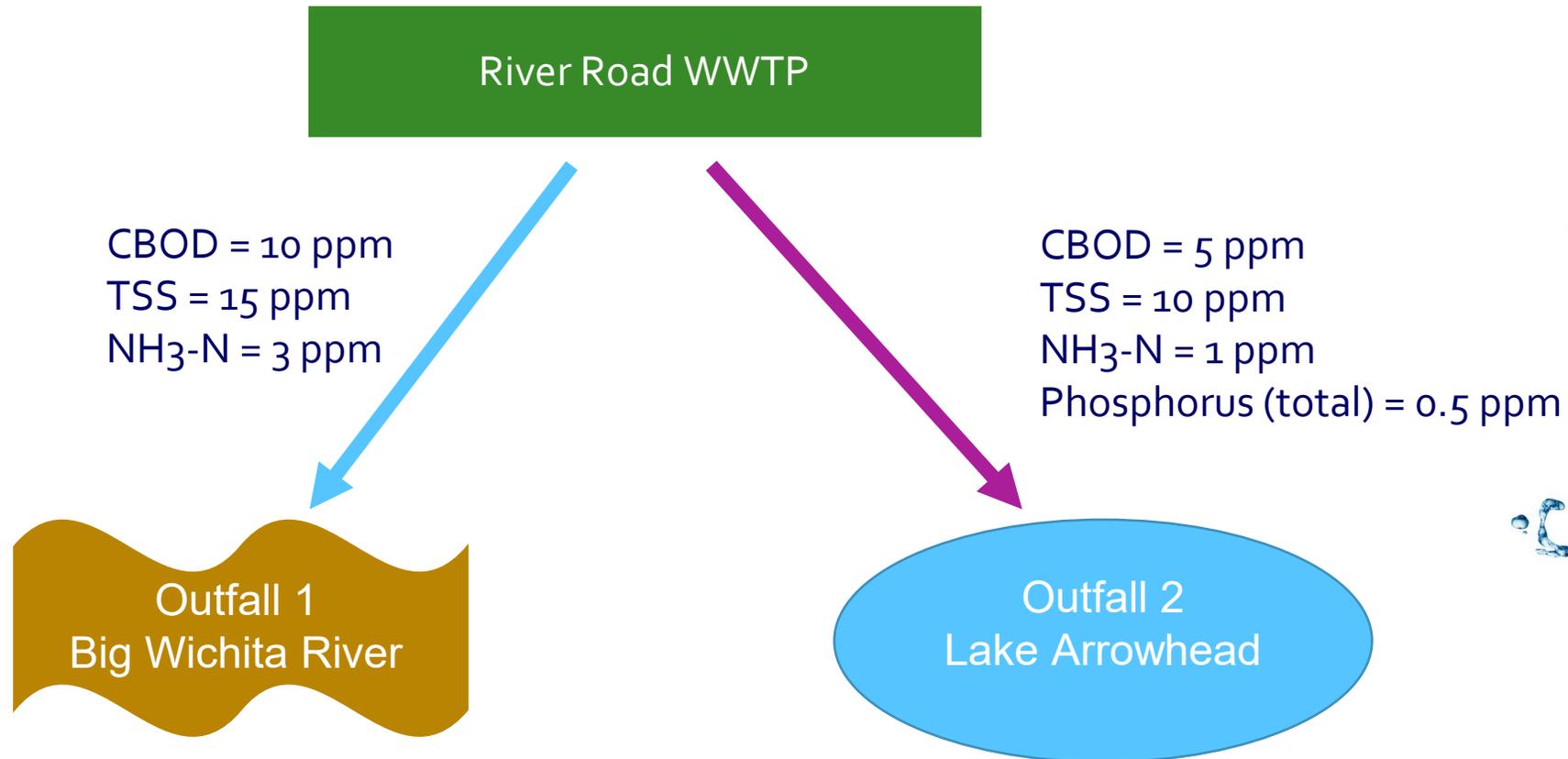


Wastewater Effluent Monitoring

- Wet chemistry
- Anions/Cations
- Metals
- TTHMs
- HAA₅
- *E. coli*
- *Crypto/Giardia*
- Coliphage
- Enterovirus, Norovirus, Adenovirus
- SOCs, VOCs, IOCs, Rads - biannually

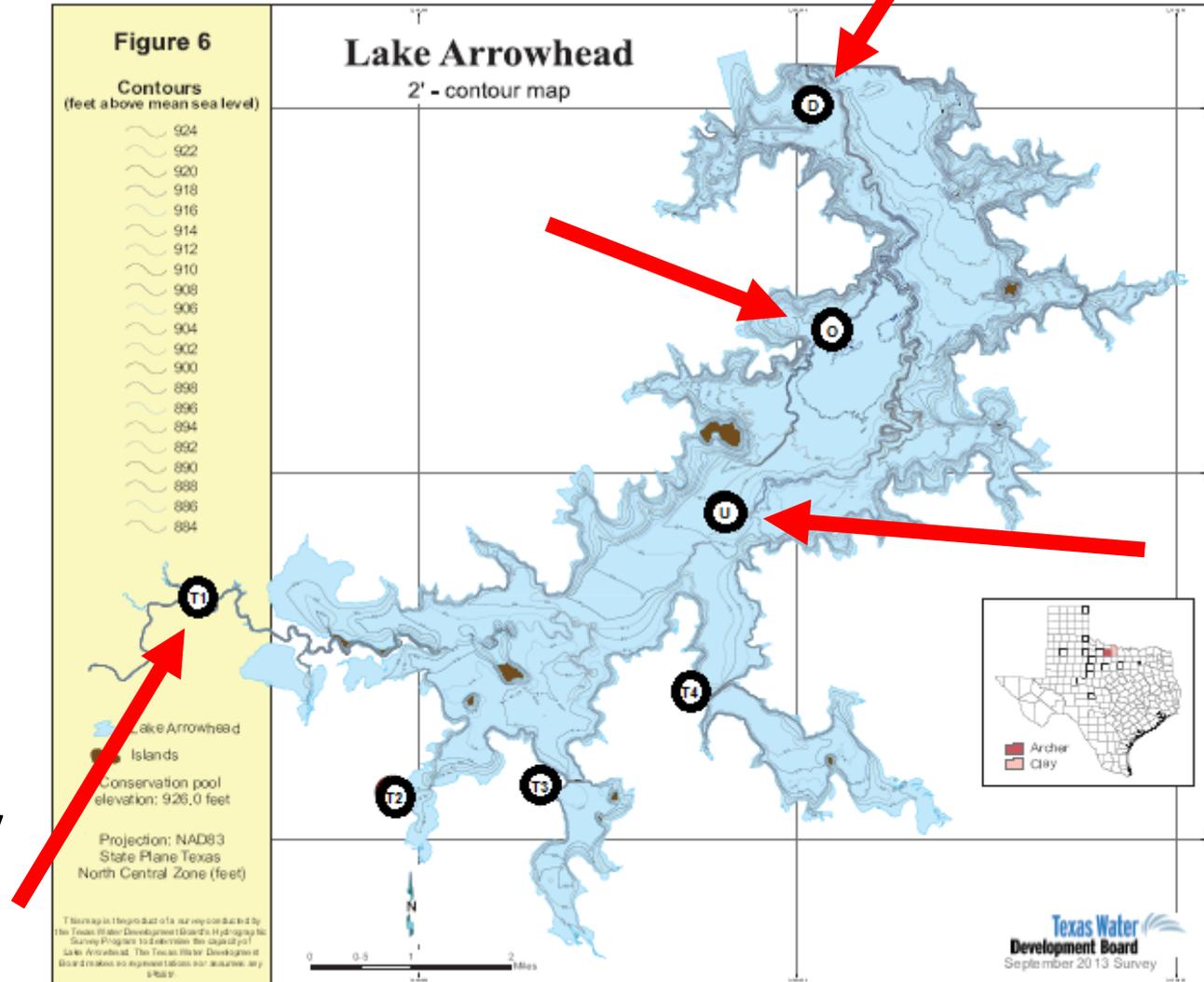


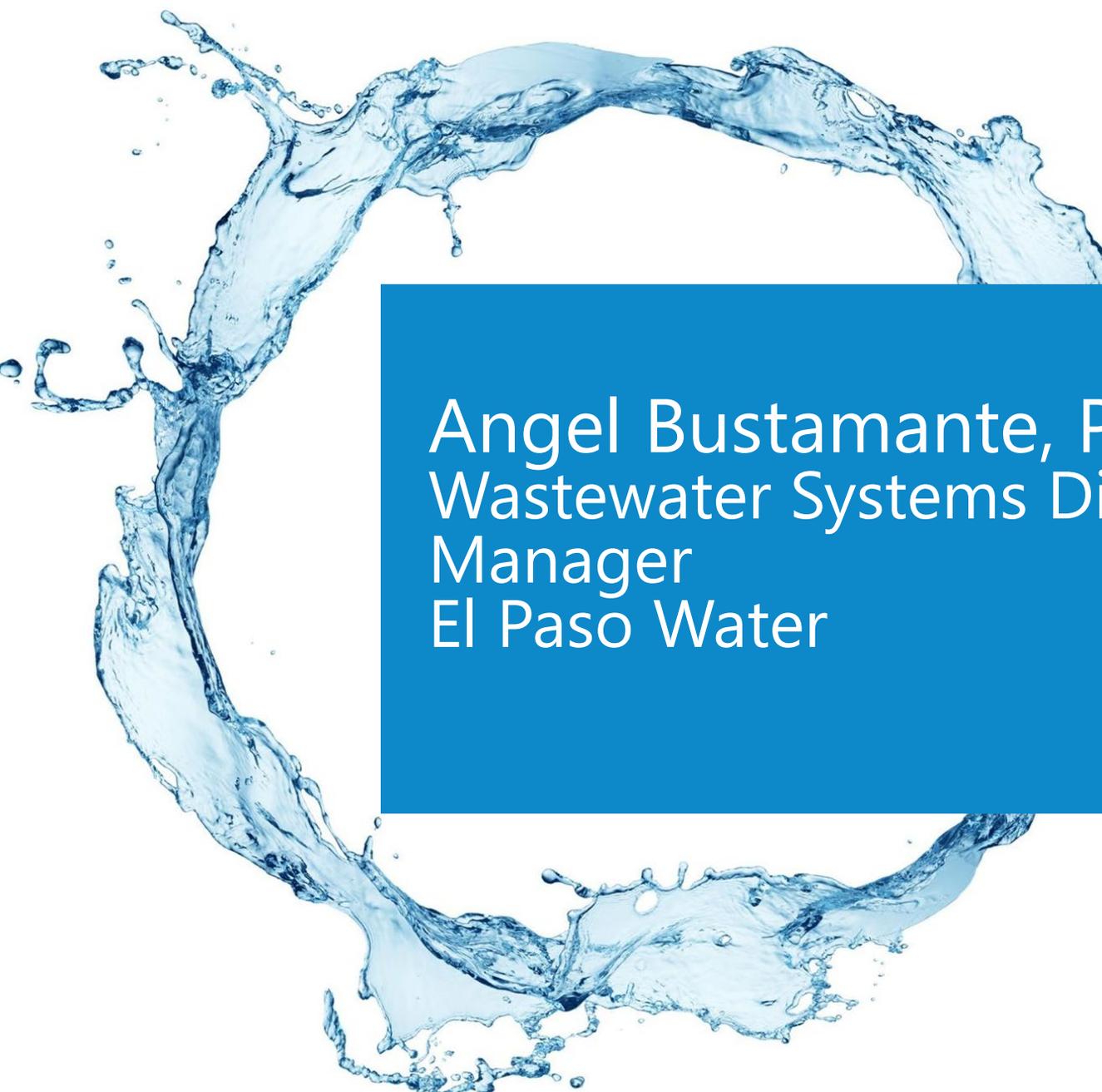
Environmental Buffer – Lake Arrowhead



Reservoir Monitoring – Lake Arrowhead

- Wet chemistry
- Anions/Cations
- Metals
- TTHMs
- HAA₅
- *E. coli*
- *Crypto/Giardia*
- Enterovirus, Norovirus, Adenovirus
- Coliphage
- SOCs, VOCs, IOCs, Rads - biannually
- Benthic sediment - annually





Angel Bustamante, P.E.
Wastewater Systems Division
Manager
El Paso Water

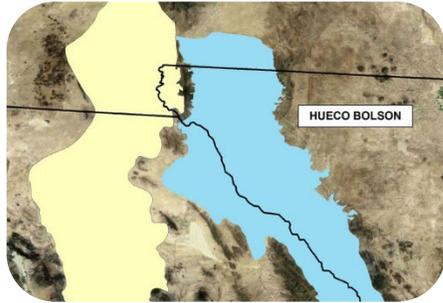


El Paso and Water Information

- Estimated population in El Paso County is over 860,000
- Approximately 232,000 water service connections
- Average rainfall is 9 to 11 inches per year
- River water allotment is weather dependent
- Wastewater system includes 2400 miles of pipeline and 70 lift stations
- 3 CAS plants
- 1 IPR plant



El Paso Water Already has a Diverse Supply Portfolio



Groundwater



Surface Water



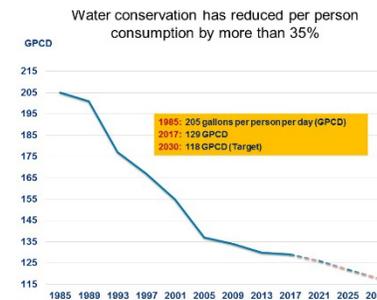
Desalination



Non-Potable Reuse



Indirect Potable Reuse



Conservation



The DPR Operator



What are the challenges?

- Wastewater system – don't spill
- Wastewater plant – meet permit
- Water system – transporting water to customer
- Water distribution – meeting primary standards and uninterrupted service



What do the operators care about?

- Wastewater – meeting discharge permit
- Drinking water – Primary Drinking Water Standards – MCL or treatment technique



Source Water Characterization

Raw Surface Water

Turbidity pH TOC Salinity



Primary Clarified Effluent

TSS BOD NH4



Treatment Differences

WW: Biological – no control on Q

DW: Chemical



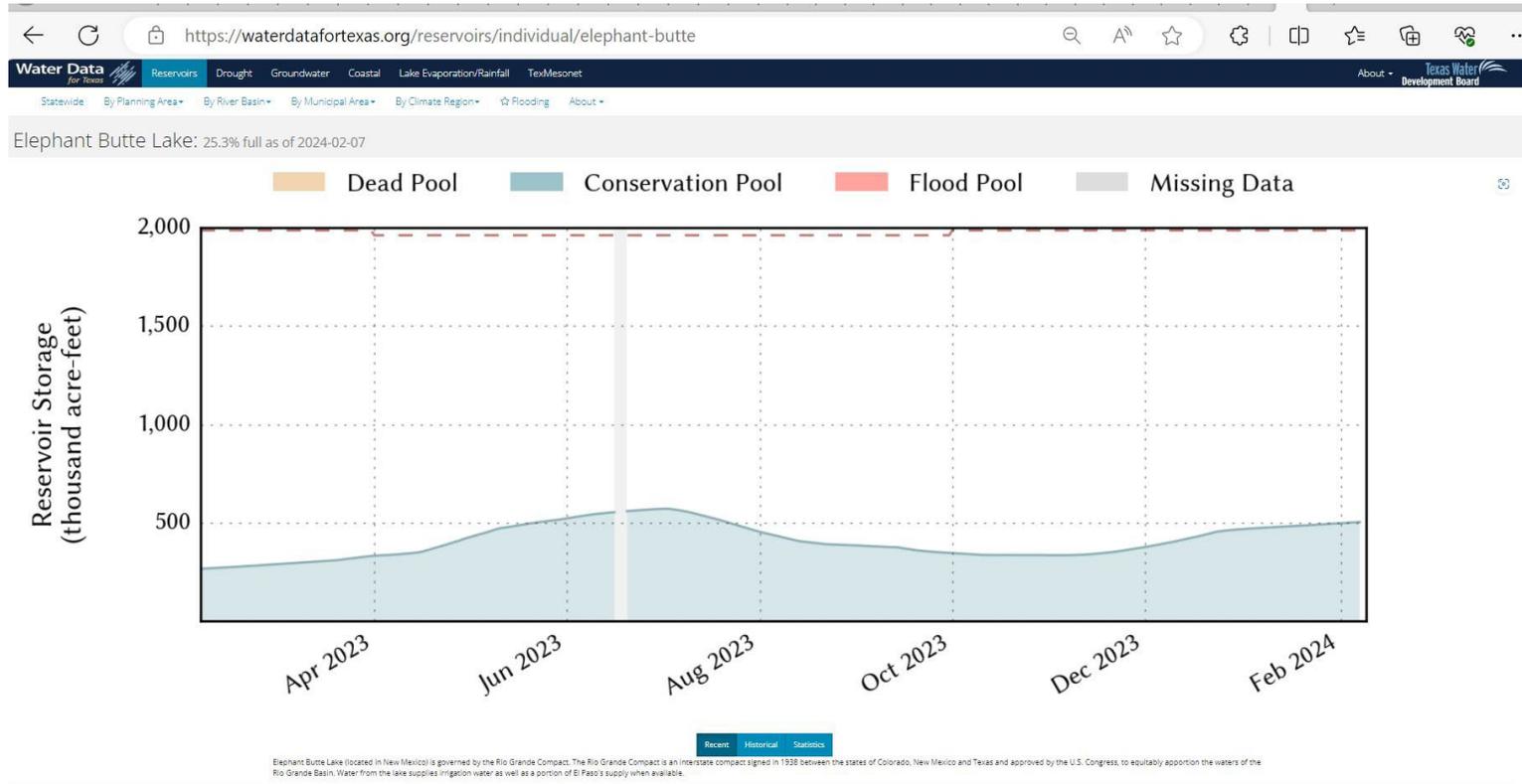
Final Effluent - plant washout, plant upset E Coli



Finished Water – no pathogens, pleasant

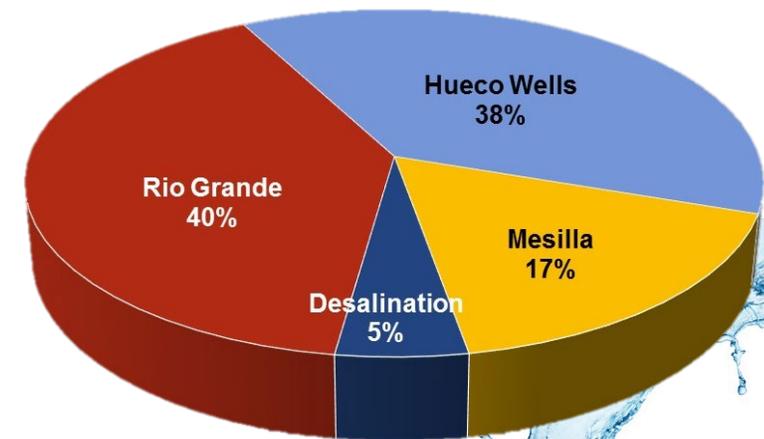


EPWater's surface water supply is variable



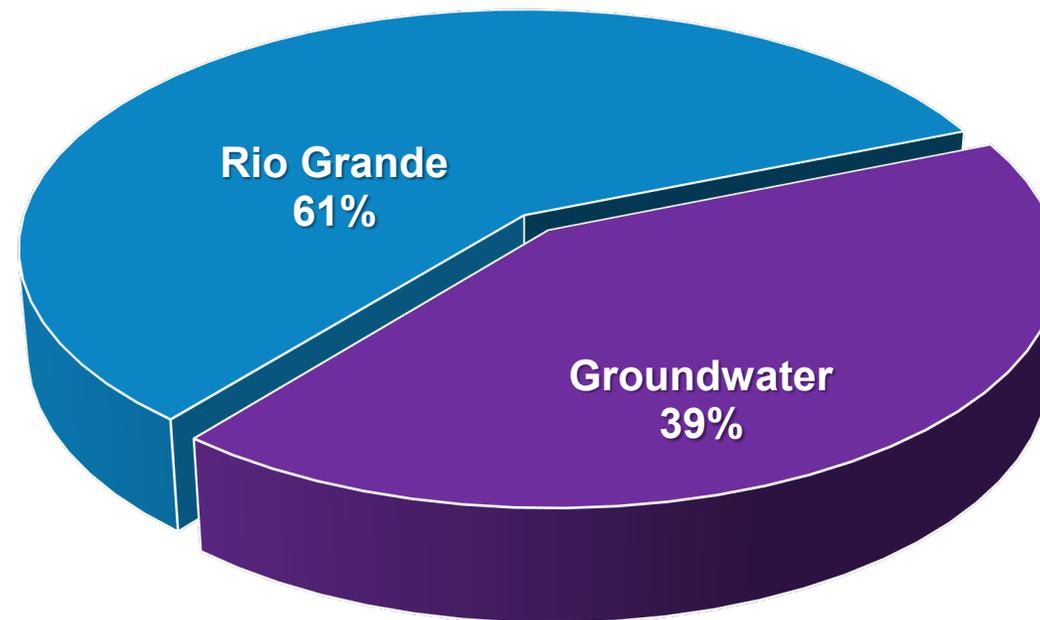
25.3% full as of 02/07/24

Sources in an Average Non-Drought Year

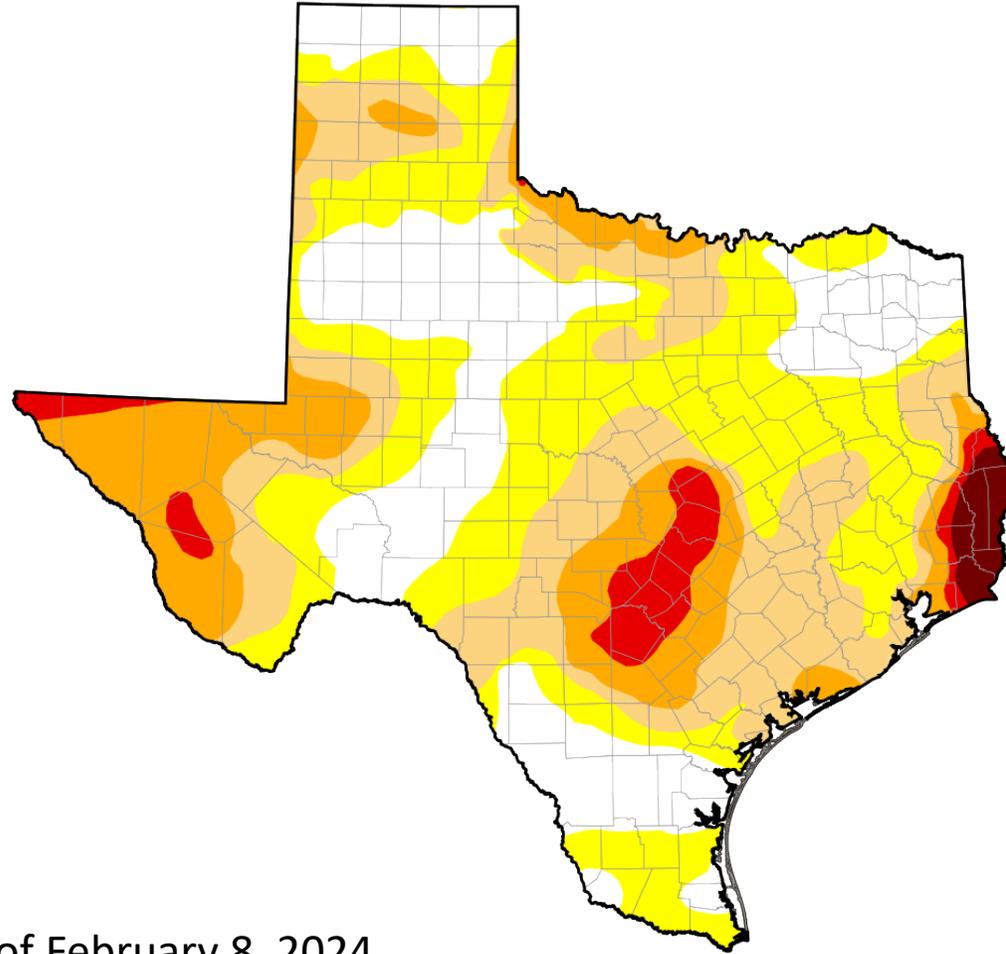


How much is surface water?

**2023 Summer Months
(June, July, August)**

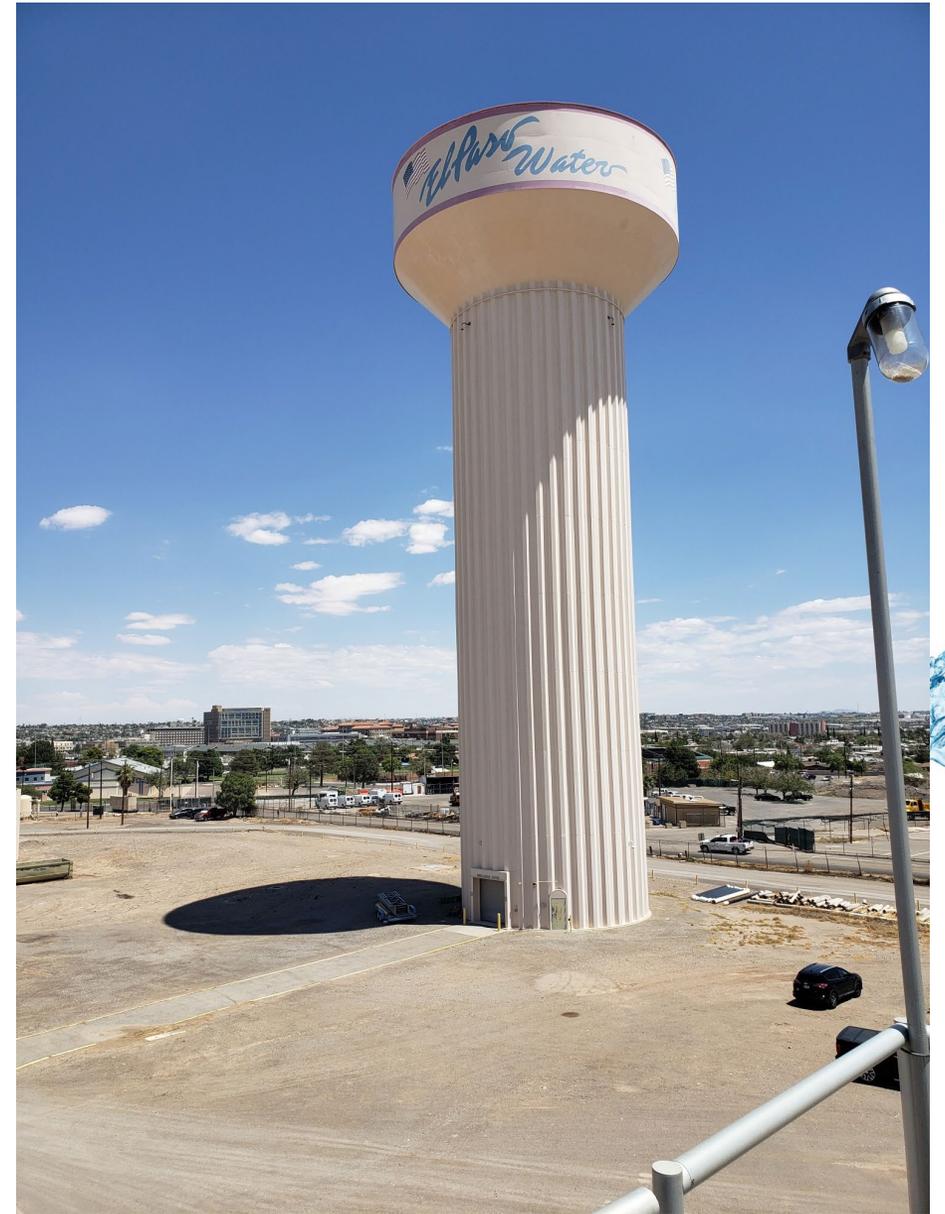


How about Texas?



Source: TWDB – drought map as of February 8, 2024

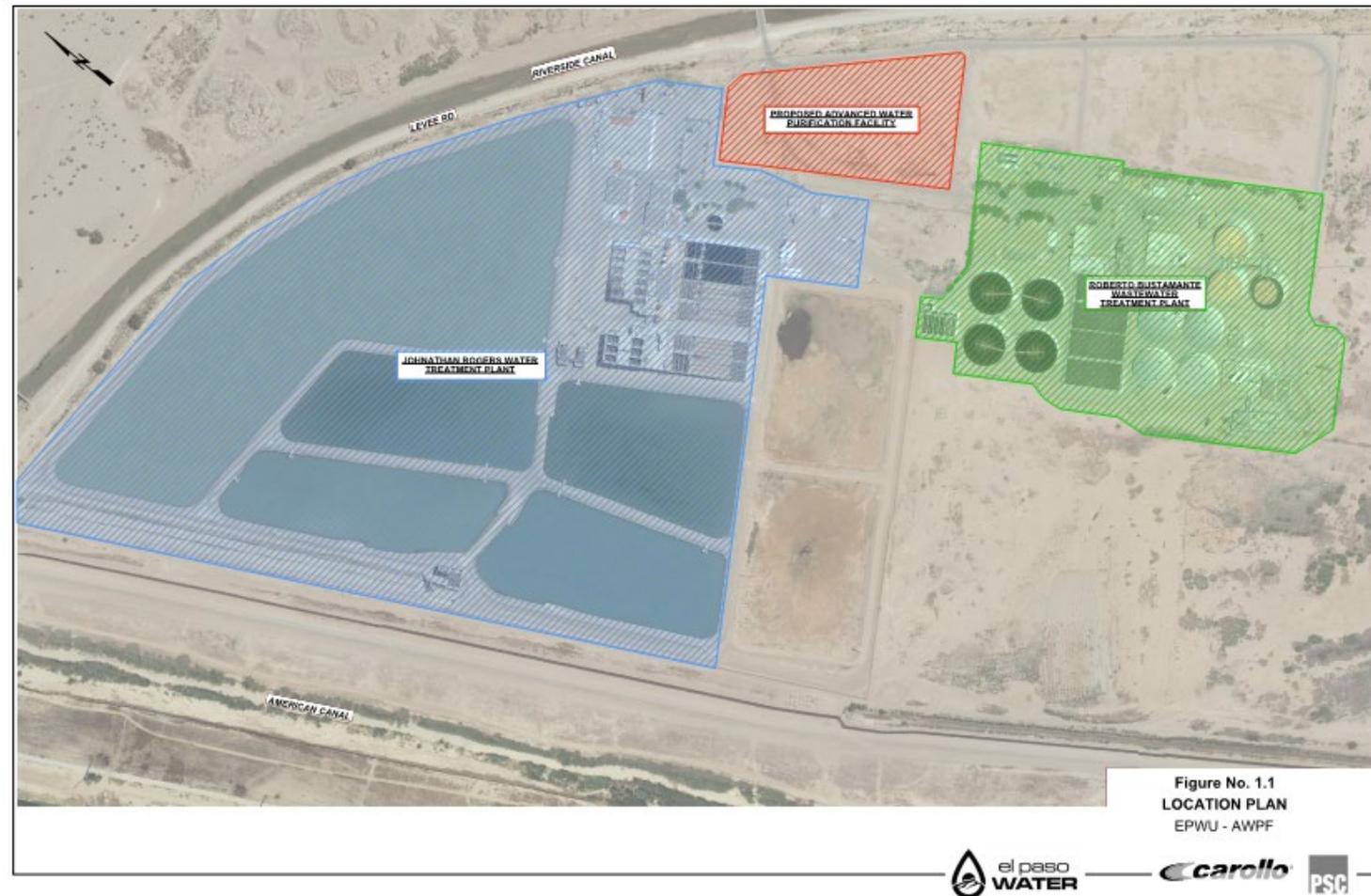
Nonpotable Reuse since 1963



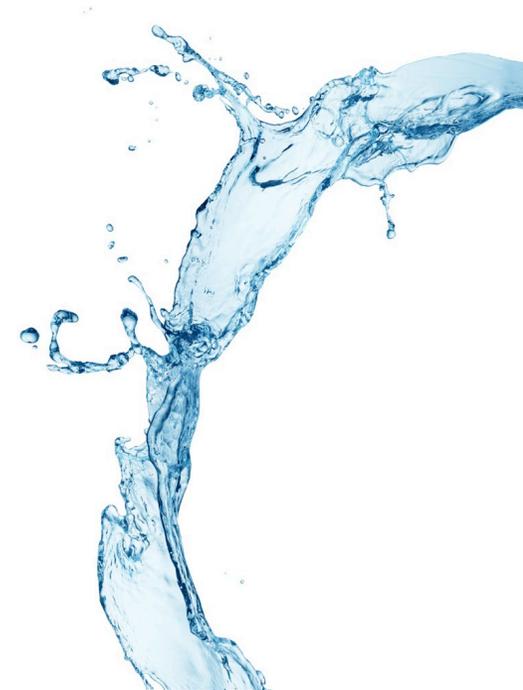
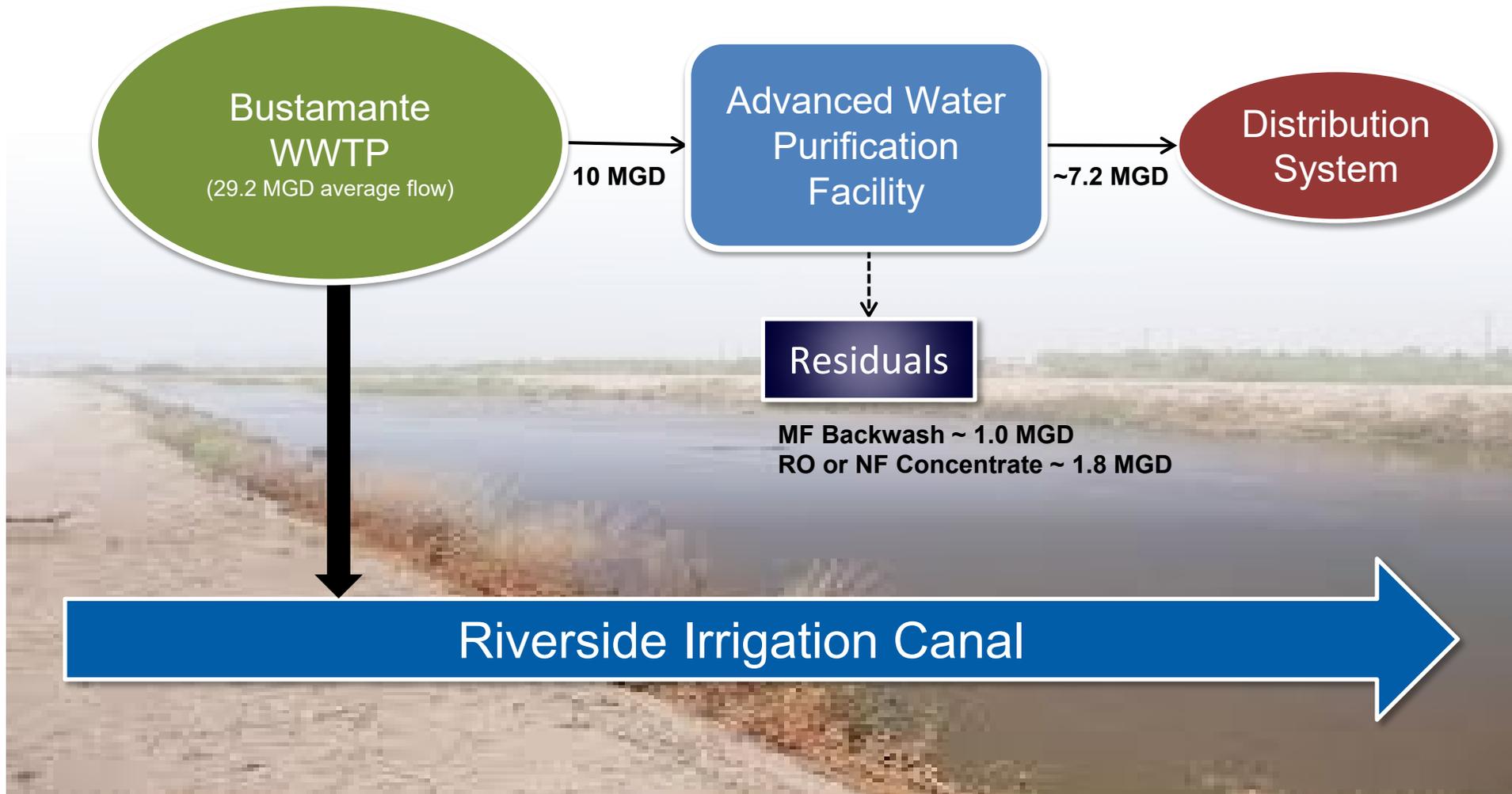
Indirect Potable Plant – Fred Hervey Water Reclamation Plant



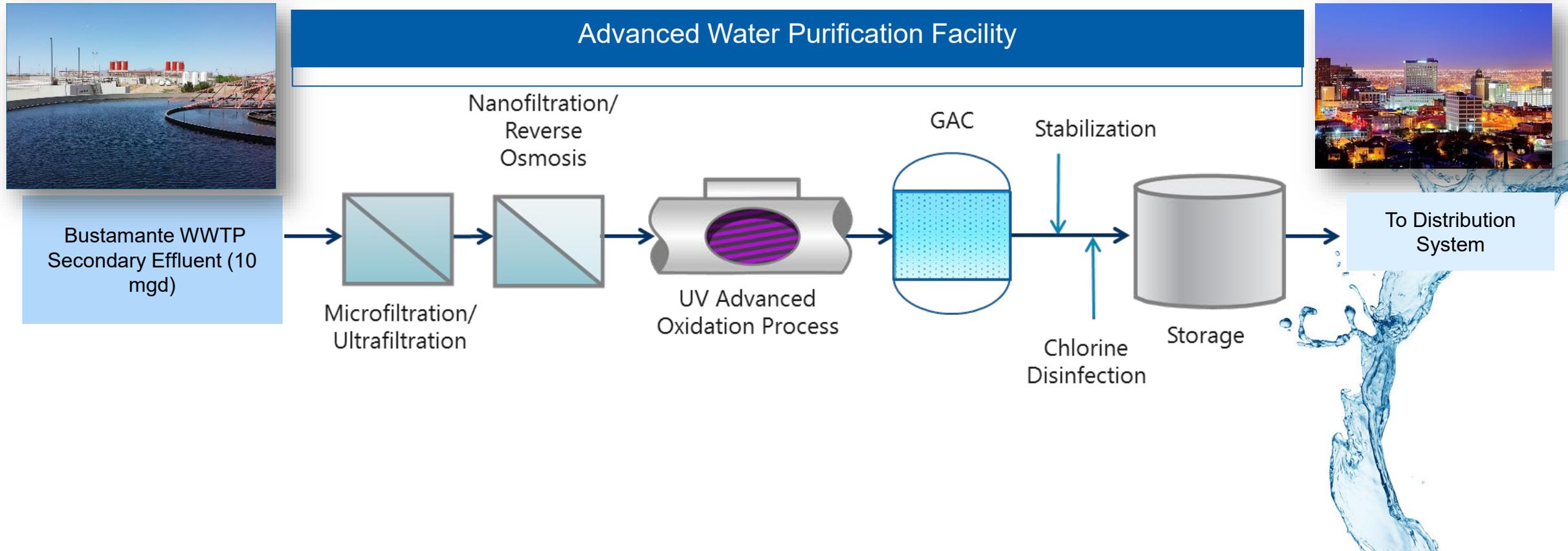
Potable reuse concepts using Bustamante Water Resource Recovery Plant and Jonathan Rogers Water Plant



Concept: Advanced Water Purification Facility



Advanced Water Purification Facility (AWPF) Process Schematic



Augmentation with Blend

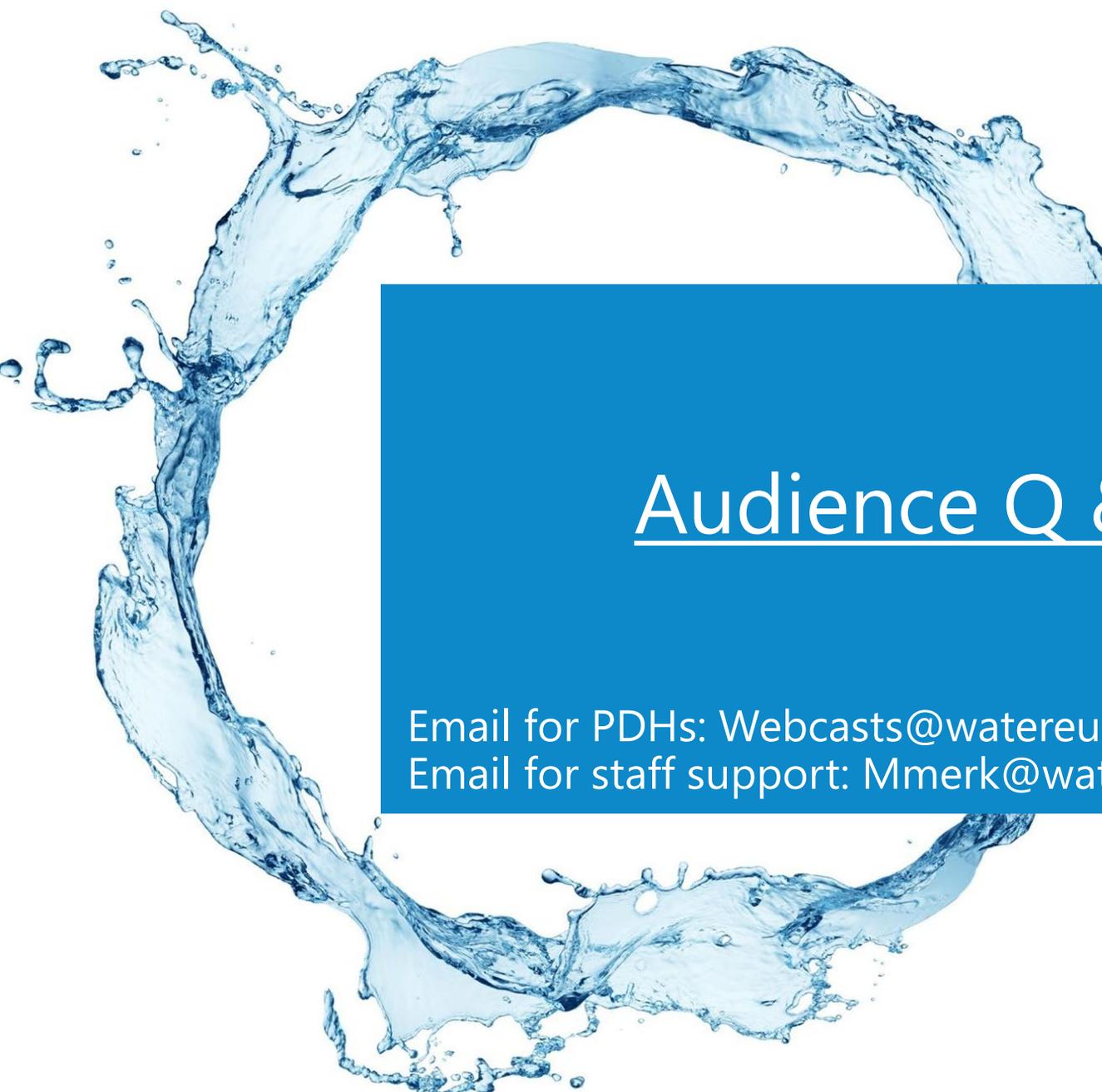


- Used to provide stabilization of advanced water stream
- Need to check Pb and Cu
- No red water
- 50/50 orthophosphate blend



A large, dynamic splash of clear blue water, captured in mid-air, forming a wide, shallow arc across the top and sides of the slide. The water droplets are clearly visible, creating a sense of movement and freshness.

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Audience Q & A

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