



Reuse Texas Style: Status of Potable Reuse Initiatives in the Lone Star State



July 25, 2014

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Alan Plummer Associates, Inc.*

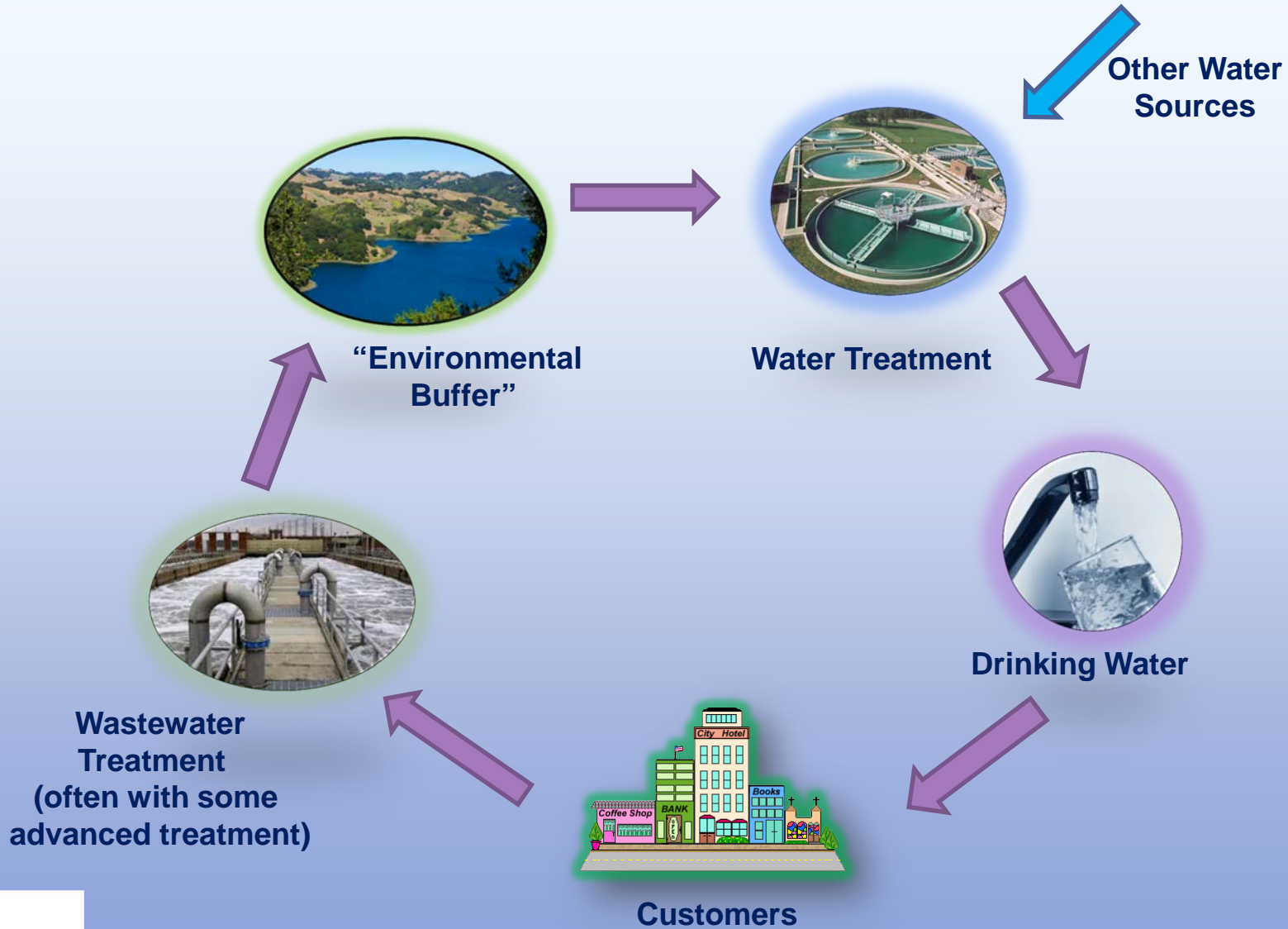


Acknowledgments

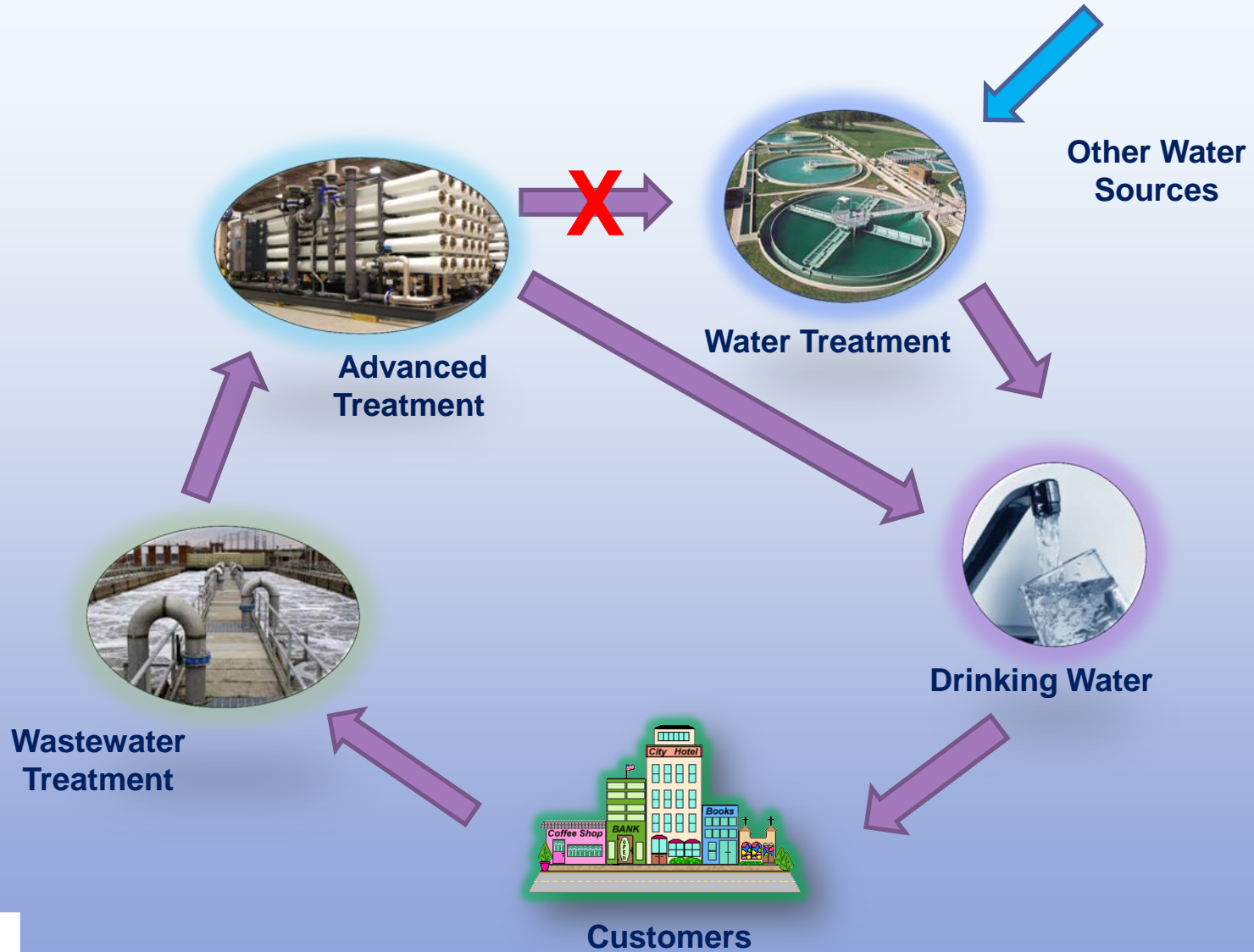
- City of Brownwood
 - David Harris, Director of Utilities
- City of Wichita Falls
 - Daniel Nix, Operations Manager
- El Paso Water Utilities
 - Irazema Rojas, Environmental Compliance Manager
- ARCADIS
- Freese and Nichols



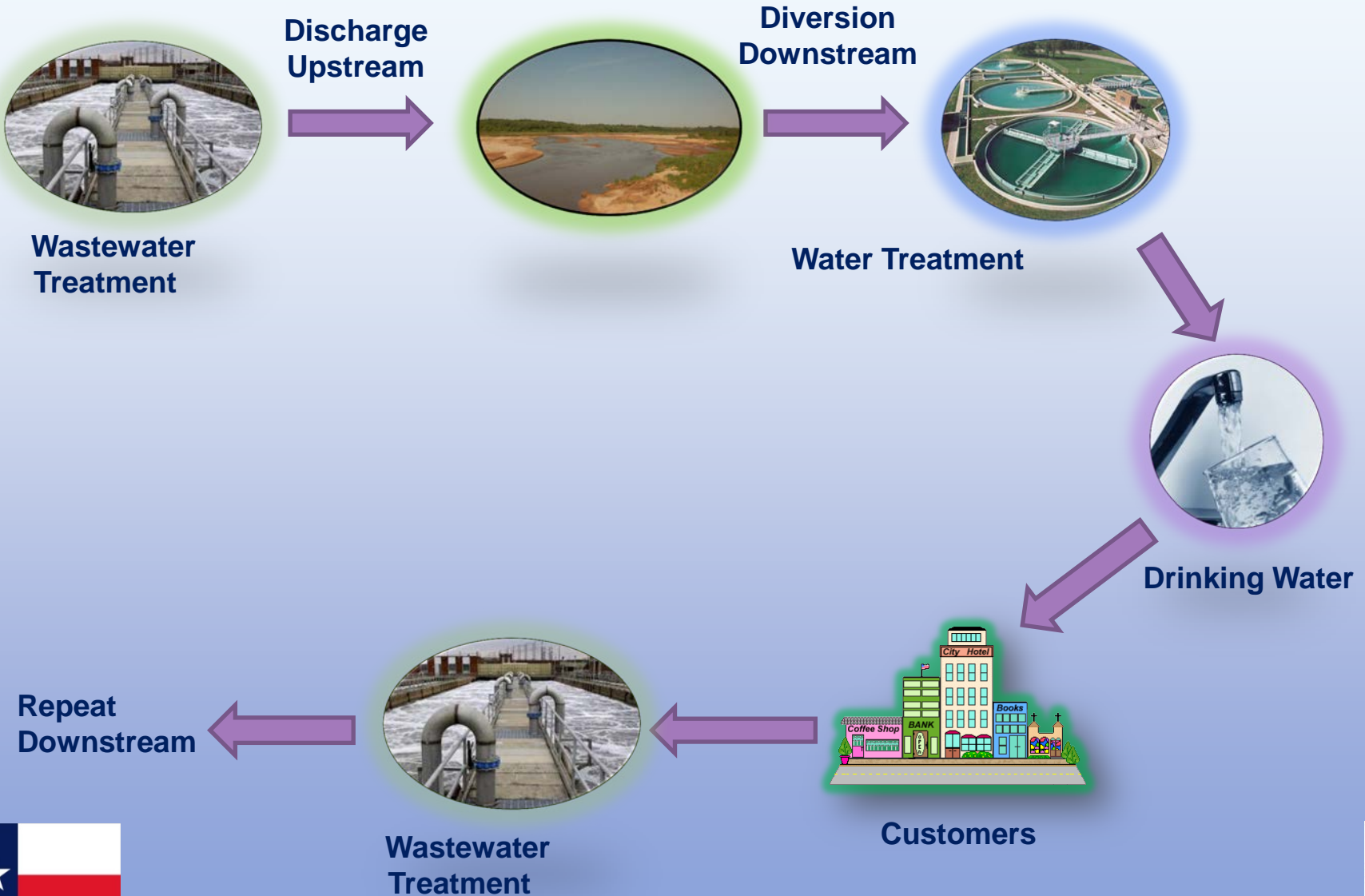
Indirect Potable Reuse (IPR)



Direct Potable Reuse (DPR)

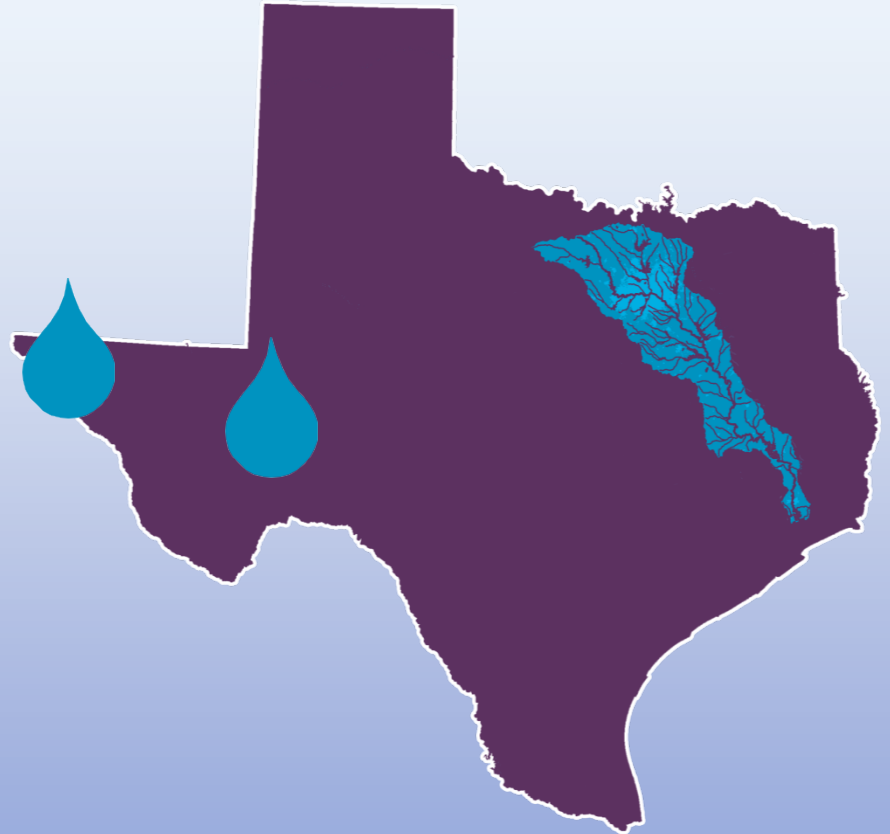


“De Facto” Reuse

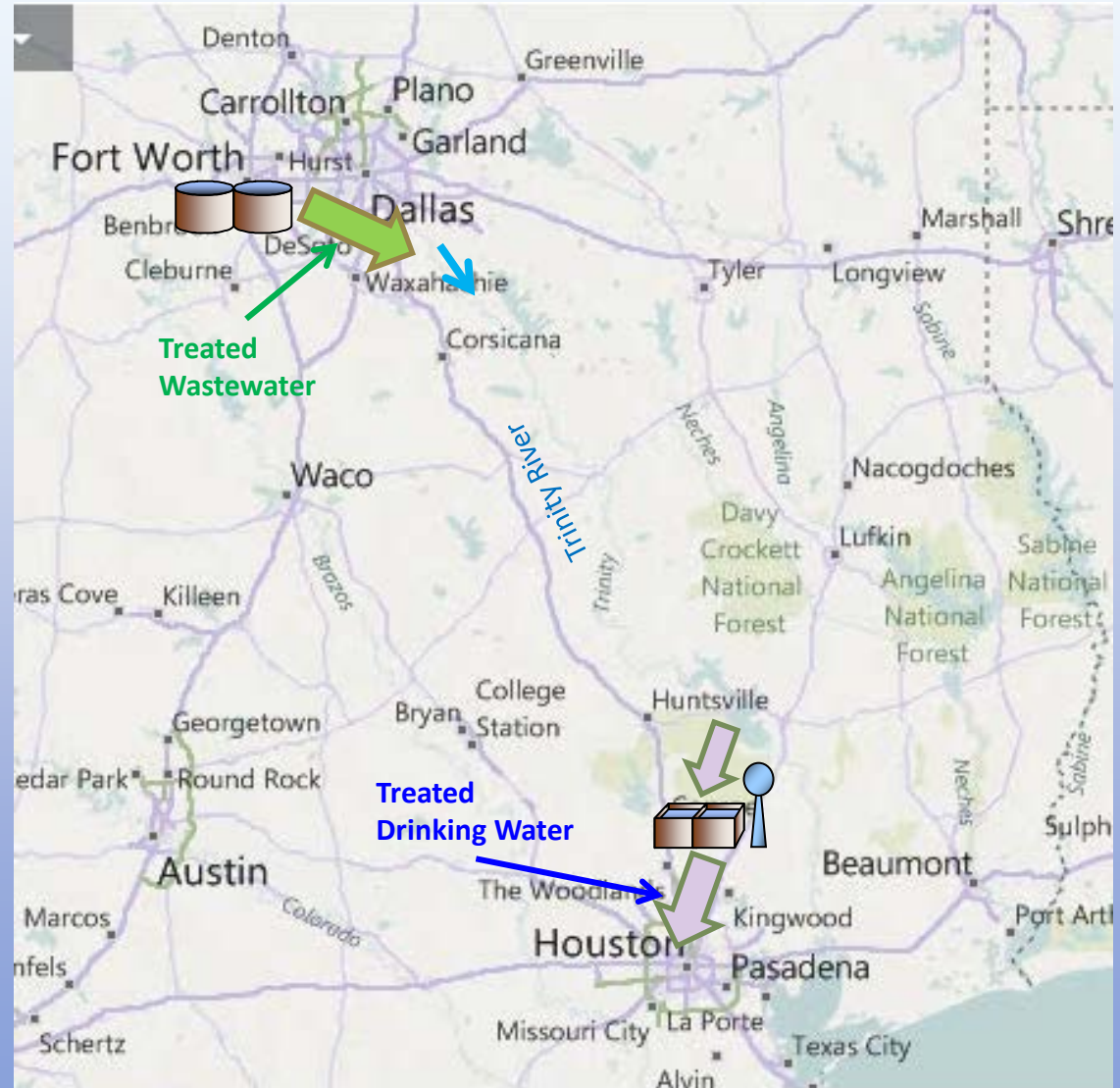


Major Texas Potable Reuse Projects

- Trinity River Basin projects
- El Paso
- Colorado River Municipal Water District



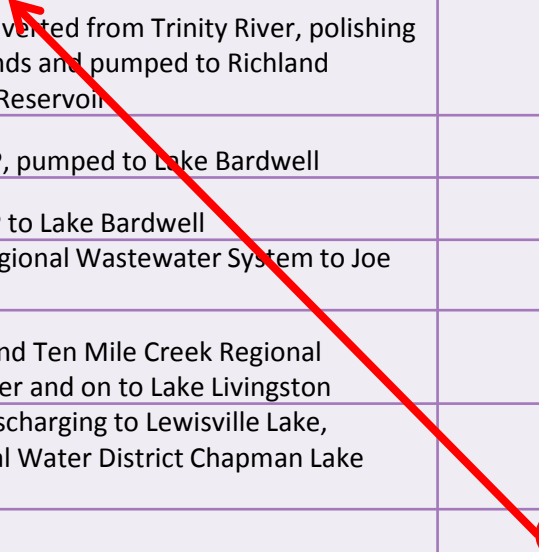
Unplanned indirect potable reuse in the Trinity River basin

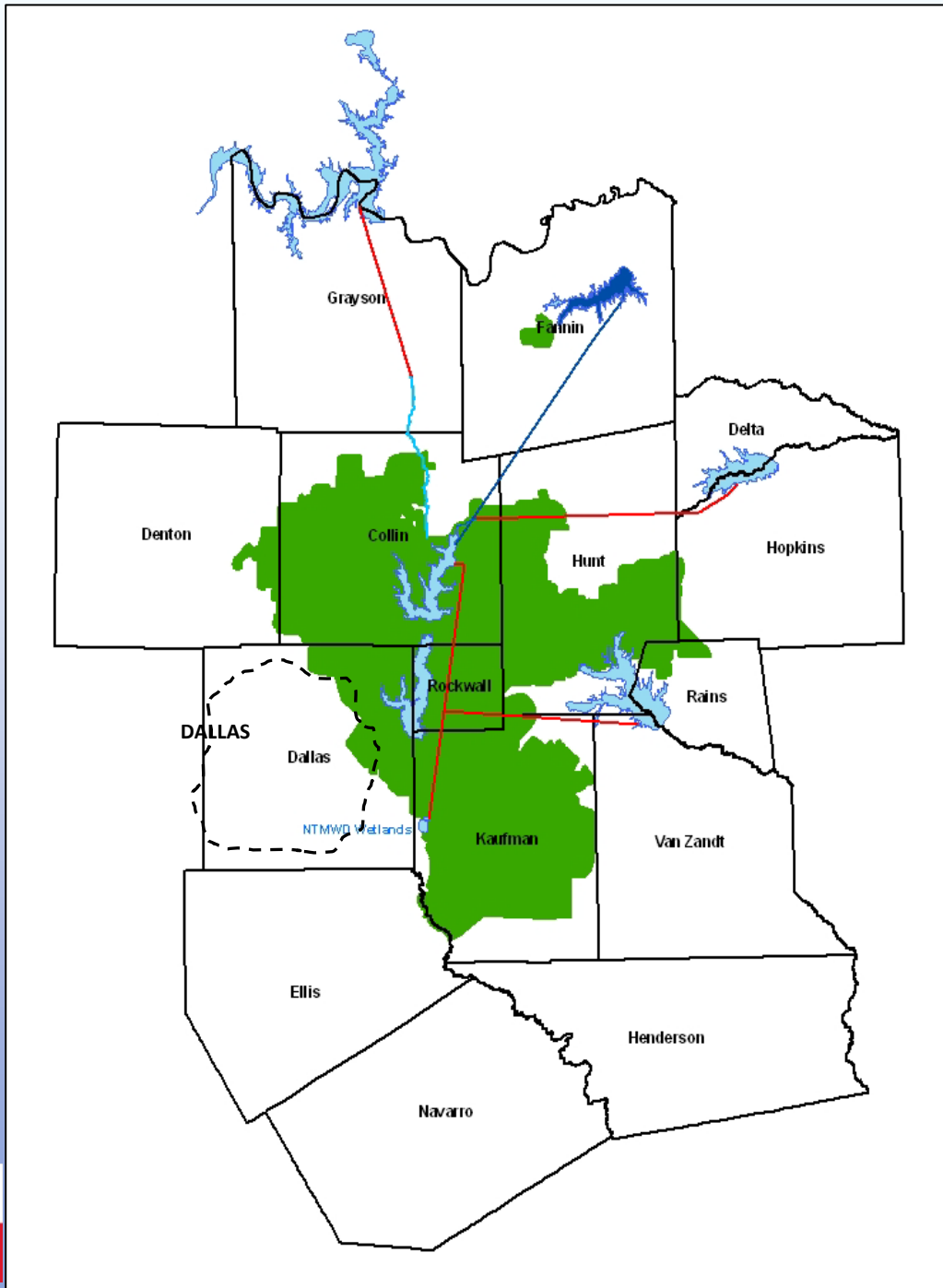


DFW/Houston-Area Reuse Water Rights

ENTITY	DESCRIPTION	DIVERSION RIGHT (ACRE- FEET/YEAR)
City of Dallas	Return flows from Dallas Central and Southside Wastewater Treatment Plants (WWTPs), pumped to Lake Ray Hubbard	150,000
City of Dallas	Return flows from Dallas Central and Southside WWTPs, Flower Mound WWTP, Lewisville WWTP, pumped to Lewisville Lake	97,200
City of Irving	Return flows from Trinity River Authority's Central Regional Wastewater System, originating from City of Irving Chapman Lake supply	31,600
City of Houston	Return flows from Houston WWTPs	580,923
North Texas Municipal Water District	Return flows from Wilson Creek WWTP into Lavon Lake	71,832
North Texas Municipal Water District	Return flows from multiple WWTPs, diverted from East Fork Trinity River polishing treatment through constructed wetland and pumped to Lavon Lake	157,393
Tarrant Regional Water District	Return flows from multiple WWTPs, diverted from Trinity River, polishing treatment through constructed wetlands and pumped to Richland Chambers Reservoir and Cedar Creek Reservoir	195,818
Trinity River Authority	Return flows from City of Ennis WWTP, pumped to Lake Bardwell	3,696
Trinity River Authority	Return flows from Waxahachie WWTP to Lake Bardwell	5,129
Trinity River Authority	Return flows from Mountain Creek Regional Wastewater System to Joe Pool Lake	4,368
Trinity River Authority	Return flows from Central, Red Oak, and Ten Mile Creek Regional Wastewater Systems to the Trinity River and on to Lake Livingston	246,219
Upper Trinity Regional Water District	Return flows from multiple WWTPs discharging to Lewisville Lake, originating from Upper Trinity Regional Water District Chapman Lake supply	9,664
TOTAL		1,553,892

1,553,892 AFY








Lake Inflow

NTMWD East Fork Raw Water Supply Project

Lake Tawakoni Inflow

-  Major WWTPs
-  Diversion Point
-  Raw Water Transfer





Come to the 29th Annual WaterReuse Symposium in
September and take a tour!



El Paso Water Utilities- Hueco Bolson Recharge Project

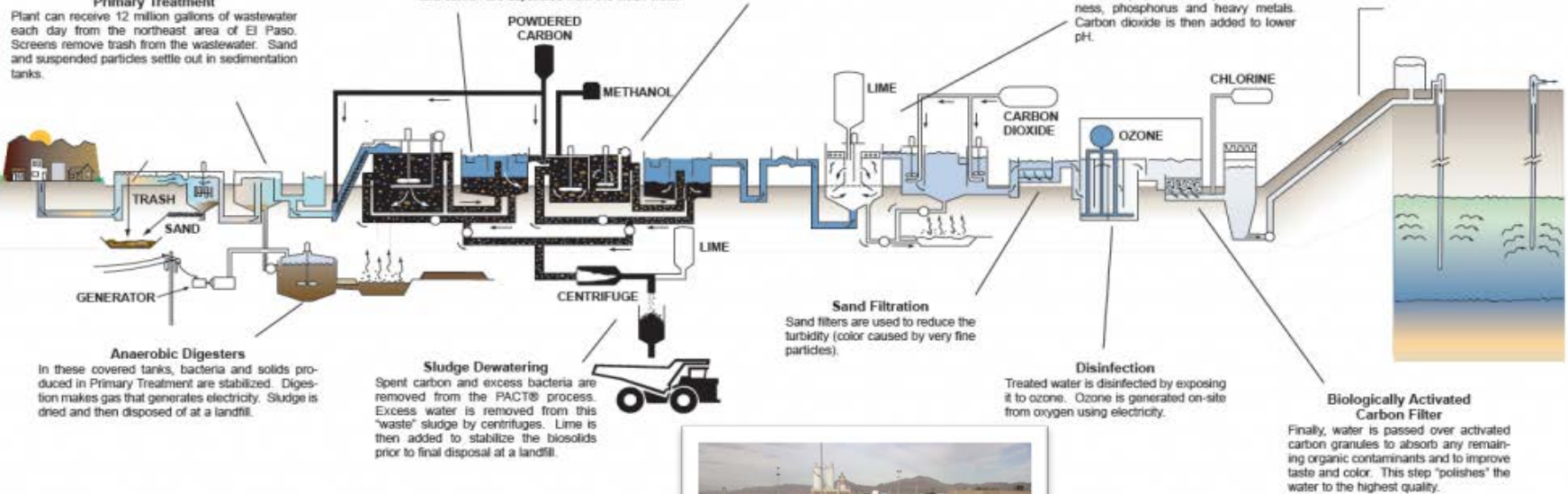
FRED HERVEY WATER RECLAMATION PLANT TREATMENT PROCESS

Primary Treatment
Plant can receive 12 million gallons of wastewater each day from the northeast area of El Paso. Screens remove trash from the wastewater. Sand and suspended particles settle out in sedimentation tanks.

PACT® Process
Wastewater is aerated so that bacteria can feed on some pollutants and others are absorbed on powdered activated carbon. This process removes dissolved pollutants, ammonia, even minute concentrations of organic contaminants. Then, in a clarifier, bacteria and carbon are separated from the clean water.

Lime Treatment
Lime is added to the treated water to raise the pH, kill viruses, remove hardness, phosphorus and heavy metals. Carbon dioxide is then added to lower pH.

Storage and Recharge
The clean, treated water (effluent) is pumped to storage basins where it is analyzed for purity. A complete battery of tests is performed. Having passed the tests, the water is pumped into the groundwater aquifer. Over a two-year period, the water travels to one of El Paso's potable water wells to become part of the potable water supply. Water is also sold to various reuse customers.



Colorado River Municipal Water District at Big Spring Project

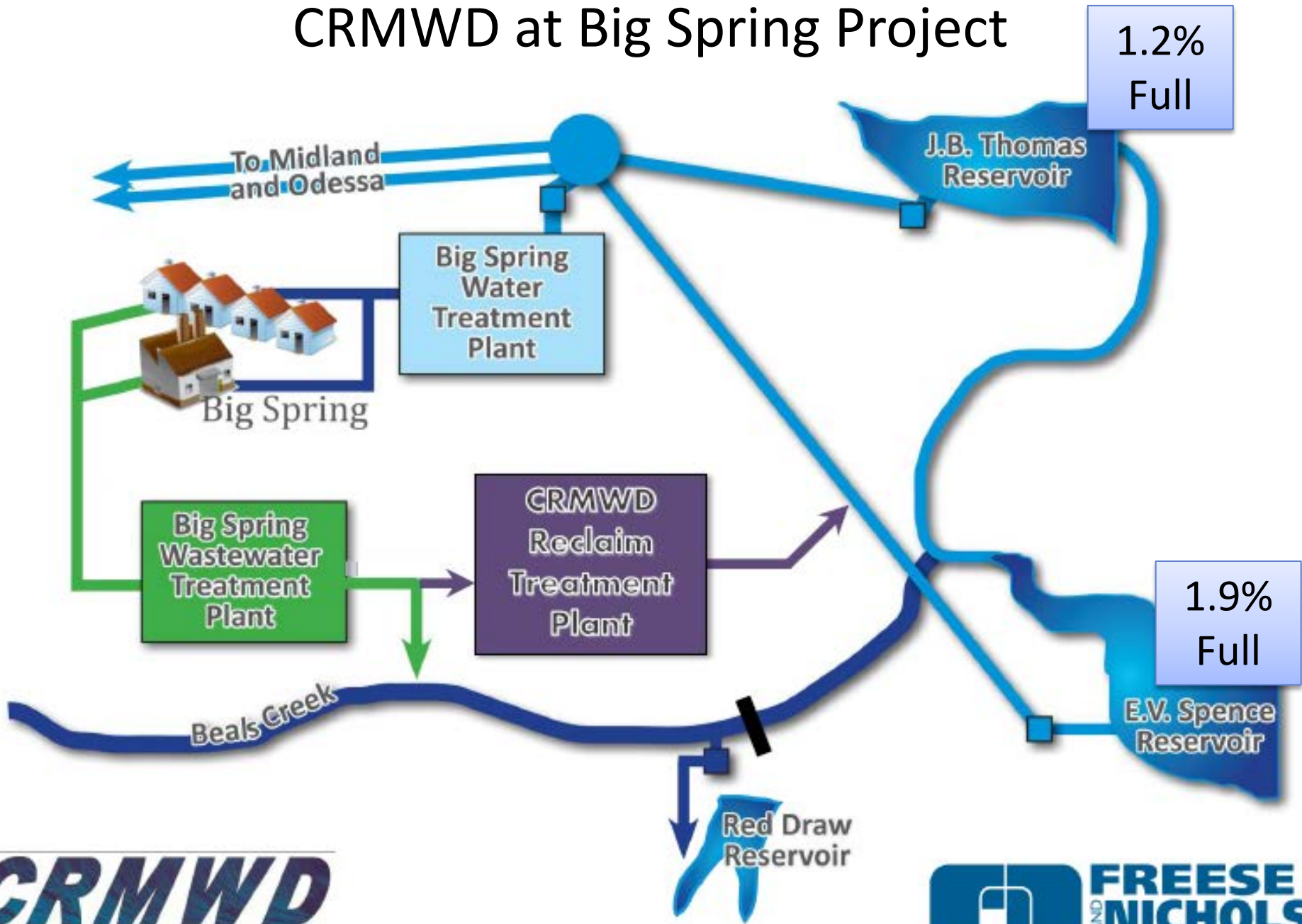


TourTexas.com

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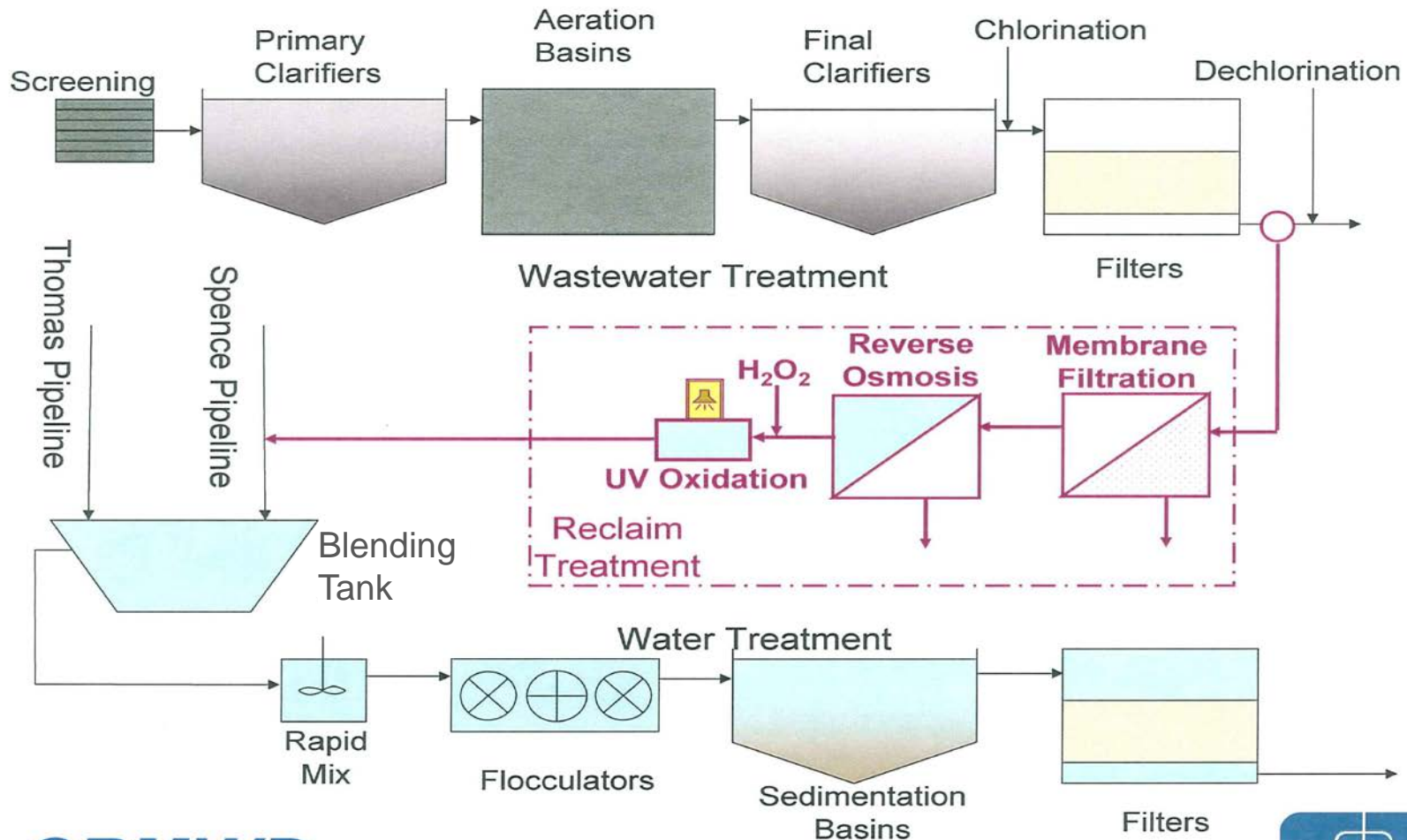
CRMWD at Big Spring Project



1.2%
Full

1.9%
Full

CRMWD at Big Spring Treatment Process






CRMWD

Raw Water Delivered to 5 Drinking Water Plants




Other DPR Projects In Process

Brownwood Takes Next Step in Water Reuse Plan

Tuesday, 10 January 2012 22:27 | Written by Ray Tipton |   

[Local News](#)



The Brownwood City Council took a big step on Tuesday to move forward with a plan to treat and reuse the city's wastewater to help extend the life of the city's water supply. The council unanimously approved entering into a professional services agreement with Hearn Engineering for a preliminary design of a new water treatment facility.

The proposed facility would treat water after it has already been treated by the city's wastewater treatment plant and re-circulate it back into Brownwood's water system instead of releasing it as is done currently. The cost of the engineering study will be \$230,000.

Some concern was expressed about an increase in future water rates to pay for the estimated \$6-\$8 million treatment facility, and city officials share the concern, but also have a greater concern for the future scarcity of water due to current drought conditions. "What we understand is that we have half of water left in the lake. This project starting today will take us one year to be completely about the cost. I can assure you that the cost more as time goes by. The 2012

THE TEXAS TRIBUNE

Water-Reuse Ideas Go Forward, Despite 'Toilet to Tap' Concerns

Wichita Falls



By ALDREY WHITE
Published February 2013


The Cypress Water Treatment Plant in Wichita Falls

From sewer water to drinking water


New PSB head proposes 'drought proof idea'


Story | [Comments](#) | [Image \(3\)](#)

[Previous](#) | [Next](#)

Print | Font Size: 

Posted: Sunday, April 28, 2013 6:00 pm | Updated: 10:20 pm, Sun Apr 28, 2013.

By David Crowder El Paso Inc. staff writer |  0 comments



Astronauts in space have been recycling their toilet water for decades – treating toilet water to a standard that makes it perfectly good, purified drinking water. Now, one head of El Paso Water Utilities wants the city to go where few others have gone before: cleaning toilet water for what experts call "direct potable reuse."

This fall, the utility's new president and CEO, John Balliew, plans to ask the Public Service Board to approve the first phase of a water reuse project that would turn 10-million gallons of sewage effluent a day into purified drinking water.

The water could then be put directly back into city water lines.

Photo by Melody Parra

Rio Grande

The nearly dry Rio Grande near Mount Cristo Rey. The historic river drought means the city and local farmers will not barely a



City of Wichita Falls

City of Wichita Falls Source Water Lake Levels

as of July 21, 2014

Lake Arrowhead

22.3%

Lake Kickapoo

32.1 %

Little Wichita River

Lake Kemp

26.7%

Combined Lake Capacity



Normal (> 60%)

Watch (60% - 50%)

Warning (50% - 40%)

Emergency (40% - 30%)
Disaster (< 30%)

Catastrophe (< 25%)

Current City of Wichita Falls
Drought Status:

Stage Five: **CATASTROPHE**



Wichita Falls Emergency DPR Project



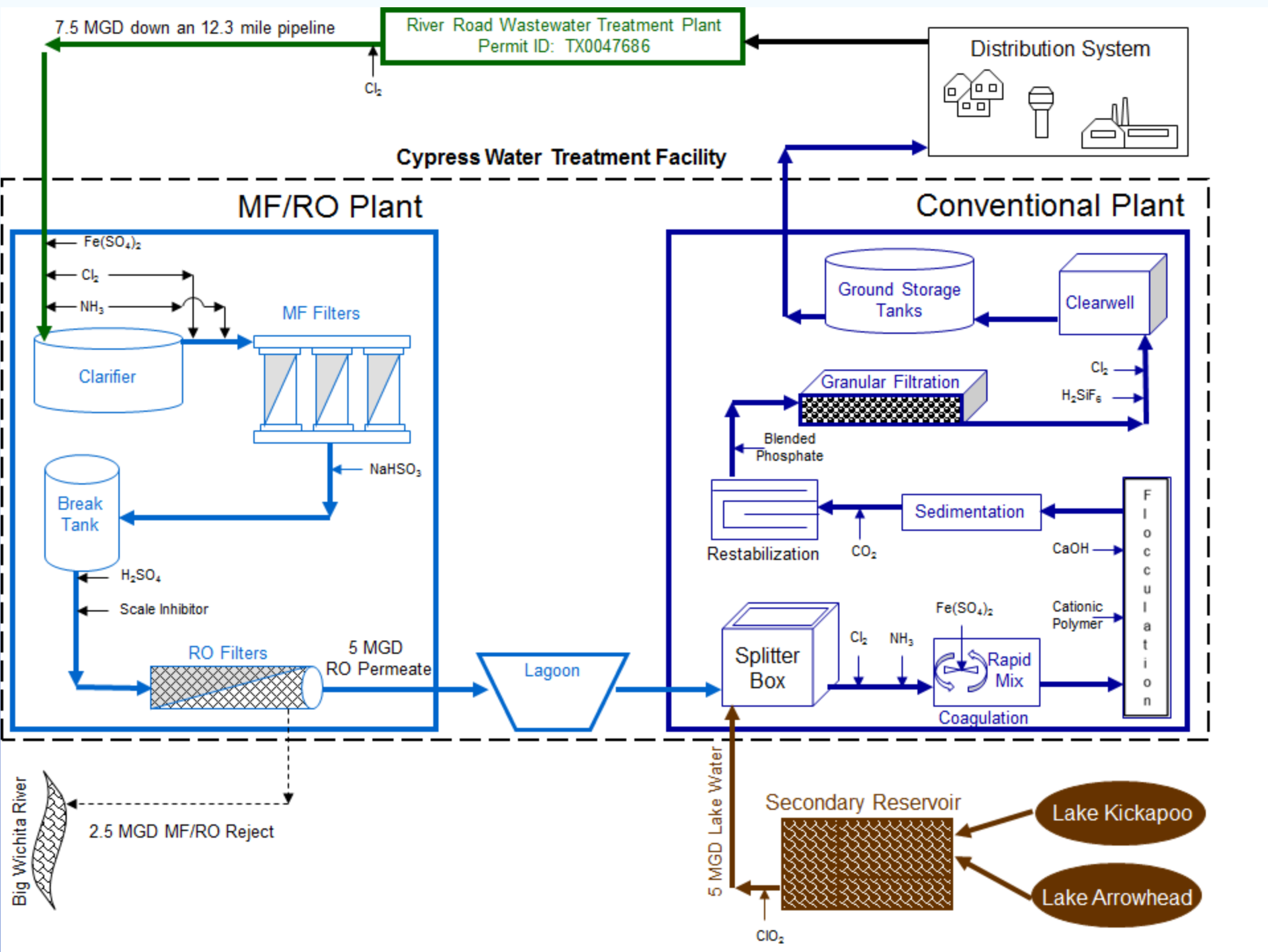
WTP to WTP laid



WTP to WTP laid

Source: www.timesrecordnews.com/photos/galleries/2014/feb/04/inside-look-water-reuse-project/12132/#section_header's





Wichita Falls- Project Status

- TCEQ approval for construction
- Completed first round of testing in April; TCEQ required additional testing
- Second round of testing completed in June; approved by TCEQ
- Started up in July 2014
- 6 month approval from TCEQ- must add UV if operated longer



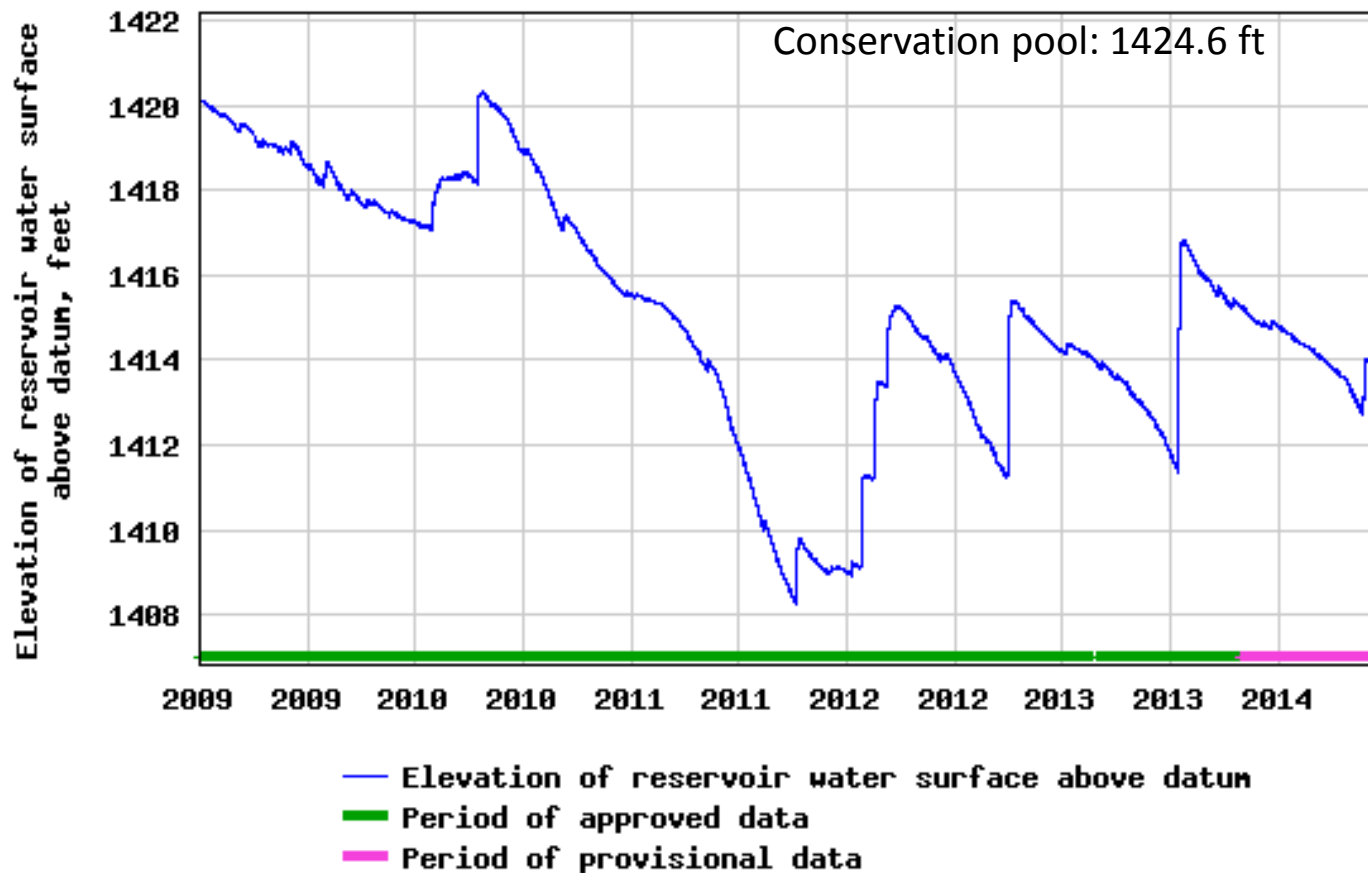
Source: www.timesrecordnews.com/photos/galleries/2014/feb/04/inside-look-water-reuse-project/12132/#section_headery's



City of Brownwood

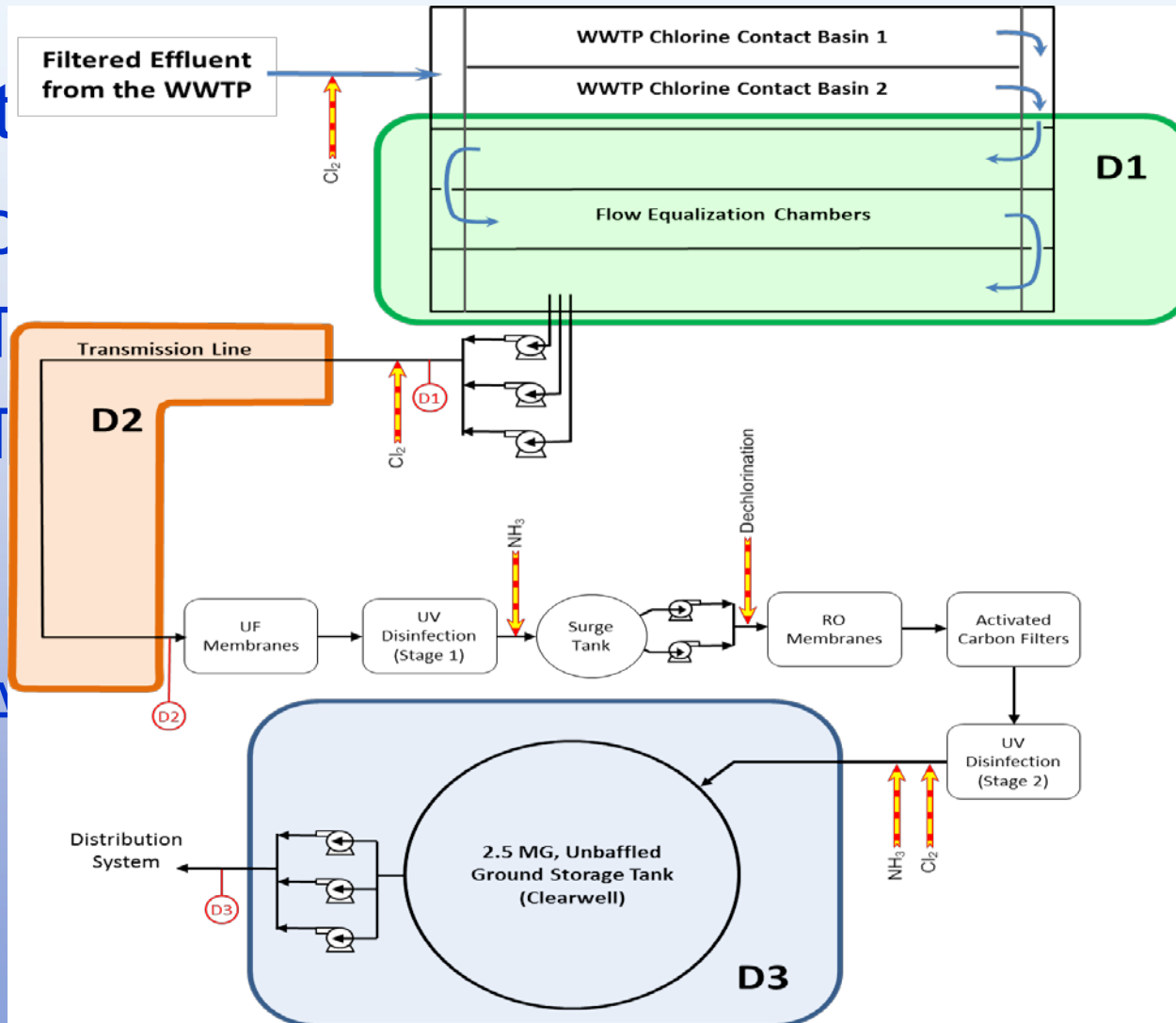


USGS 08143000 Lk Brownwood nr Brownwood, TX



City of Brownwood – Proposed System (1.5 MGD)

- Est
- Proc

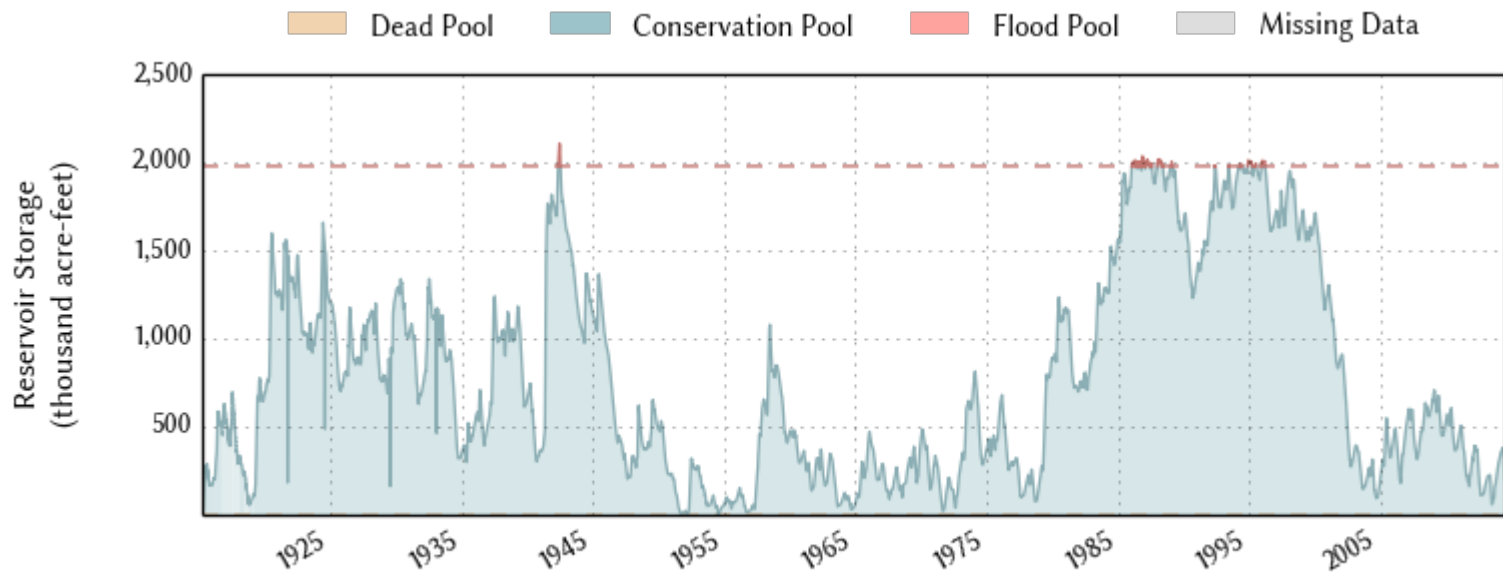


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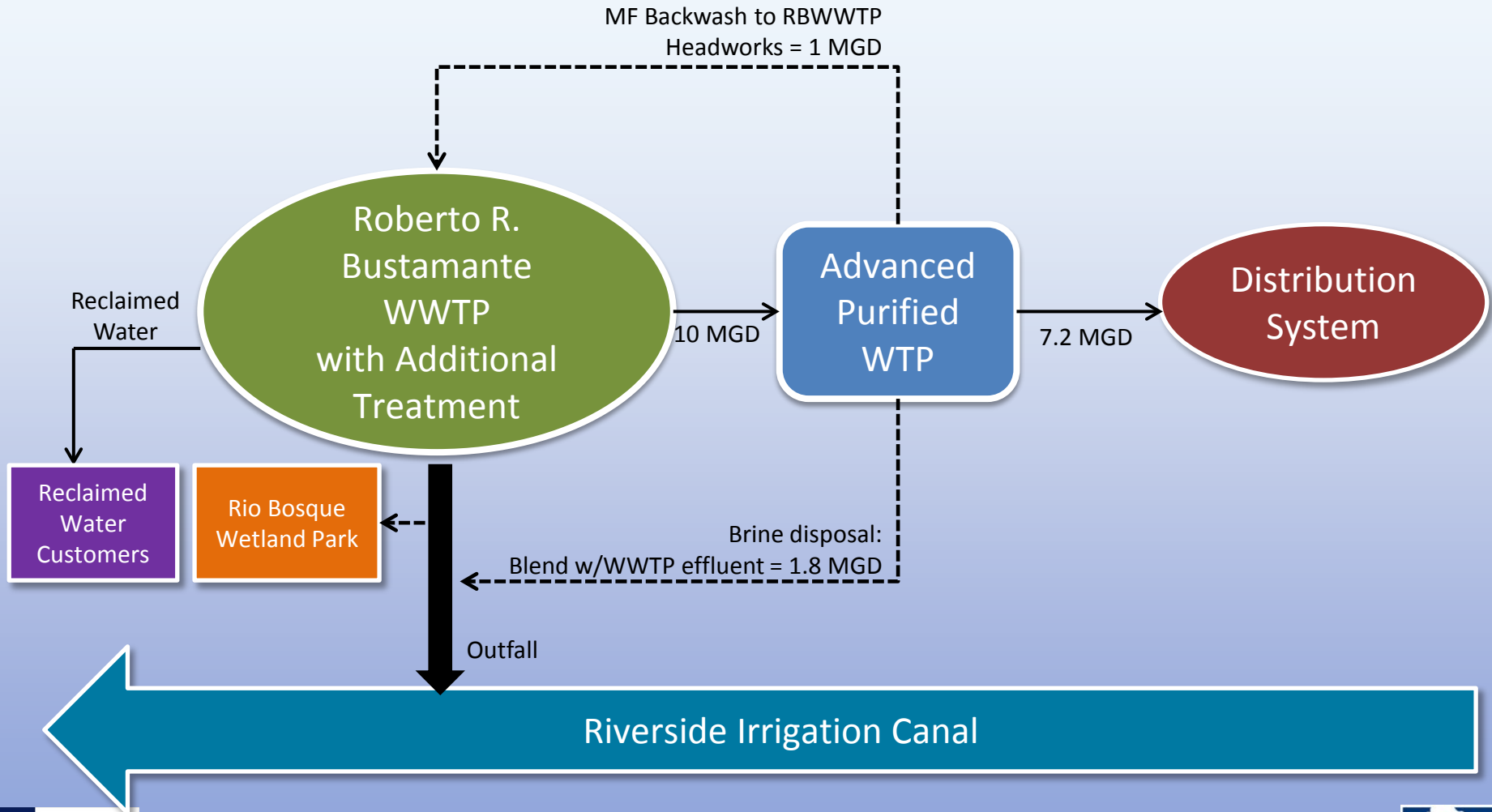


El Paso Water Utilities

Elephant Butte Reservoir
9.9% Full as of July 8, 2014

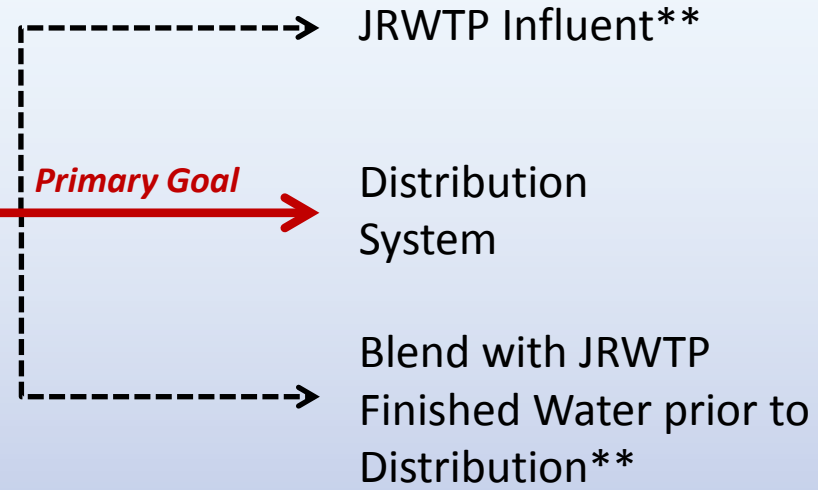
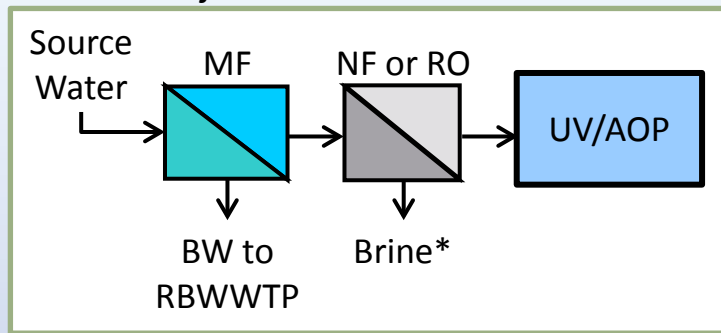


Advanced Purified WTP Concept



Advanced Purified WTP Concept

Advanced Purified WTP



MF	NF or RO	UV-AOP	
●	●	○	Particulates
○	●	○	TOC
○	◐	○	Nutrients
○	●	○	TDS (Hardness)
○	●	○	TDS (Chloride)
○	●	●	Microconstituents
◐	◐	●	Pathogens
◐	◐	●	Viruses

* Options for NF or RO brine management include blending with RBWWTP effluent discharge to Riverside Canal/Drain.

**Purified water conveyance options for operational flexibility.



EPWU- Project Status

- Initiating public outreach efforts
- Target startup in 2017



Texas Water Development Board DPR Research Initiatives



- “Evaluating the Potential for Direct Potable Reuse in Texas”
 - Develop resource document for DPR implementation
- “Testing Water Quality in a Municipal Wastewater Effluent Treated to Drinking Water Standards”
 - Testing at CRMWD DPR facility
 - Develop monitoring guidelines for DPR



Evaluating the Potential for DPR in Texas- Project Goals



- Develop a resource document for DPR that can be used by
 - Utilities
 - Agencies
 - Consultants
- Provide information that is technically sound and promotes safe and practical implementation of DPR in Texas



Project Team

- APAI- Lead Consultant
 - Nellor Environmental Associates, Inc.
 - Separation Processes, Inc.
 - Soller Environmental, Inc.
 - Trussell Technologies
 - EOA, Inc.
 - Lloyd Gosselink
 - Dr. Shane Snyder (Univ. of Arizona)
 - Dr. Jörg Drewes (Technical University of Munich)
 - Dr. George Tchobanoglous (UC Davis)
 - Dr. Desmond Lawler (UT Austin)
 - Dr. Steve Duranceau (Univ. of Central Florida)



Project Stakeholders

- City of College Station/
Brazos Valley GCD
- El Paso Water Utilities
- City of Houston
- City of Irving
- City of Lewisville
- City of Lubbock
- San Antonio Water
System
- Upper Trinity Water
Quality Compact
 - City of Dallas
 - City of Fort Worth
 - North Texas MWD
 - Trinity River Authority
- WaterReuse Texas



Primary Tasks

- Review relevance of contaminants of concern (COCs) in Texas
- Define water quality performance goals
- Source control evaluation
- Evaluation of treatment technologies
- Quantitative Relative Risk Assessment (QRRRA)
- Review importance of environmental buffers



Primary Tasks

- Develop sample pilot protocols
- Regulatory/legal summary
- Prepare resource document

Scheduled Completion- February 2015



Other Ongoing DPR Initiatives

- Multiple research projects
 - Alternative treatment schemes
 - Blending and storage needs
 - Treatment operations and reliability
 - Monitoring strategies
 - Quality assurance
 - Public education and communication
 - Operator training curriculum
- WateReuse Association national guidelines
- International initiatives- Australia, WHO, others



Come to Dallas in September to hear more!



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• SEPTEMBER 7-10, 2014 •

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...because water is precious

