

Clearwater's Groundwater Replenishment Project

David W. Porter, P.E. – City of Clearwater
Robert S. Fahey, P.E. – City of Clearwater

City Council ~ August 15, 2016

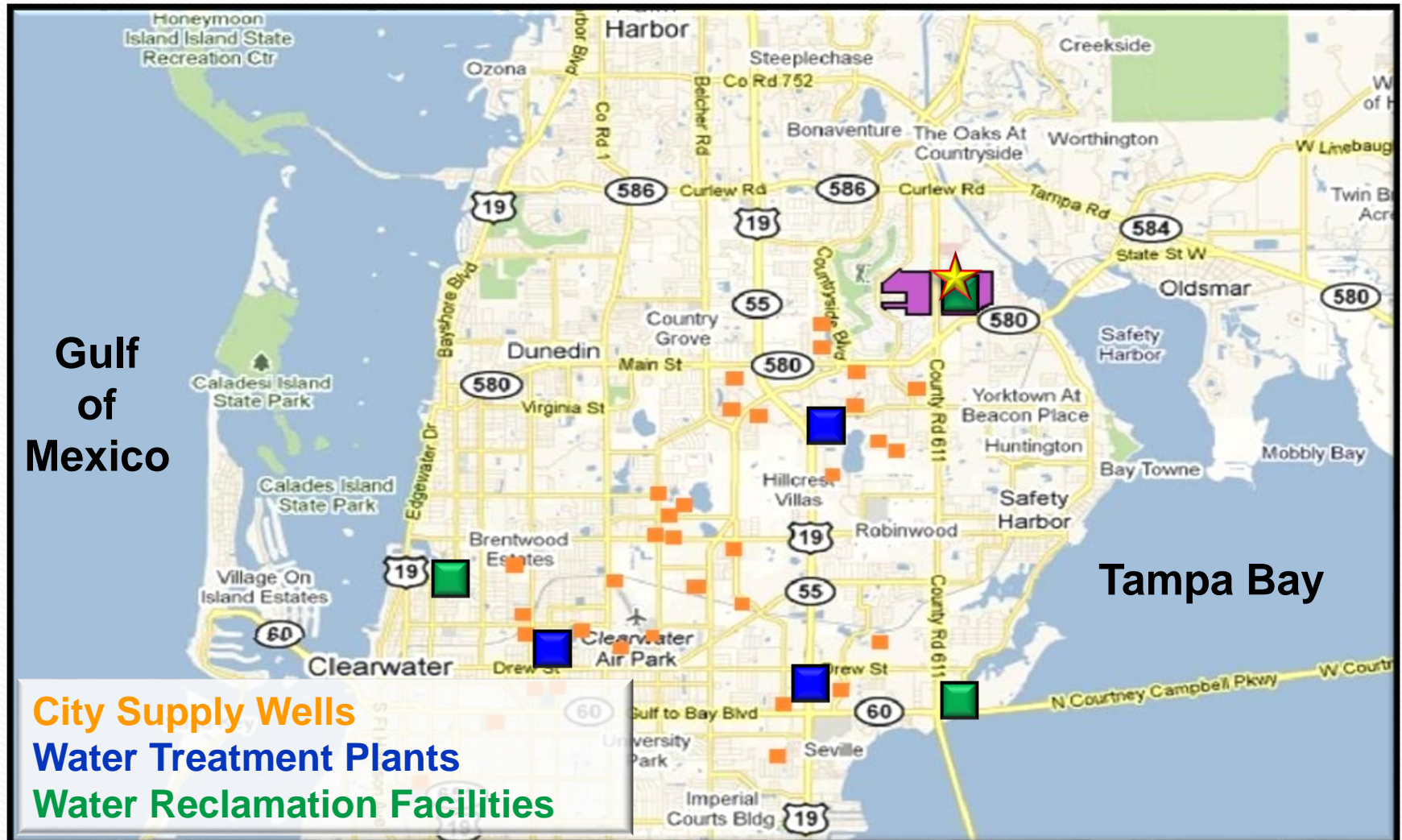


Project Statement

To construct a water purification plant at the existing Northeast Water Reclamation Facility, to supply 3 MGD of purified water to recharge lower Zone A of the Floridan Aquifer, to allow the city to reliably supply all the high-quality water demanded by our citizens, at a reasonable cost.

City Water Facilities

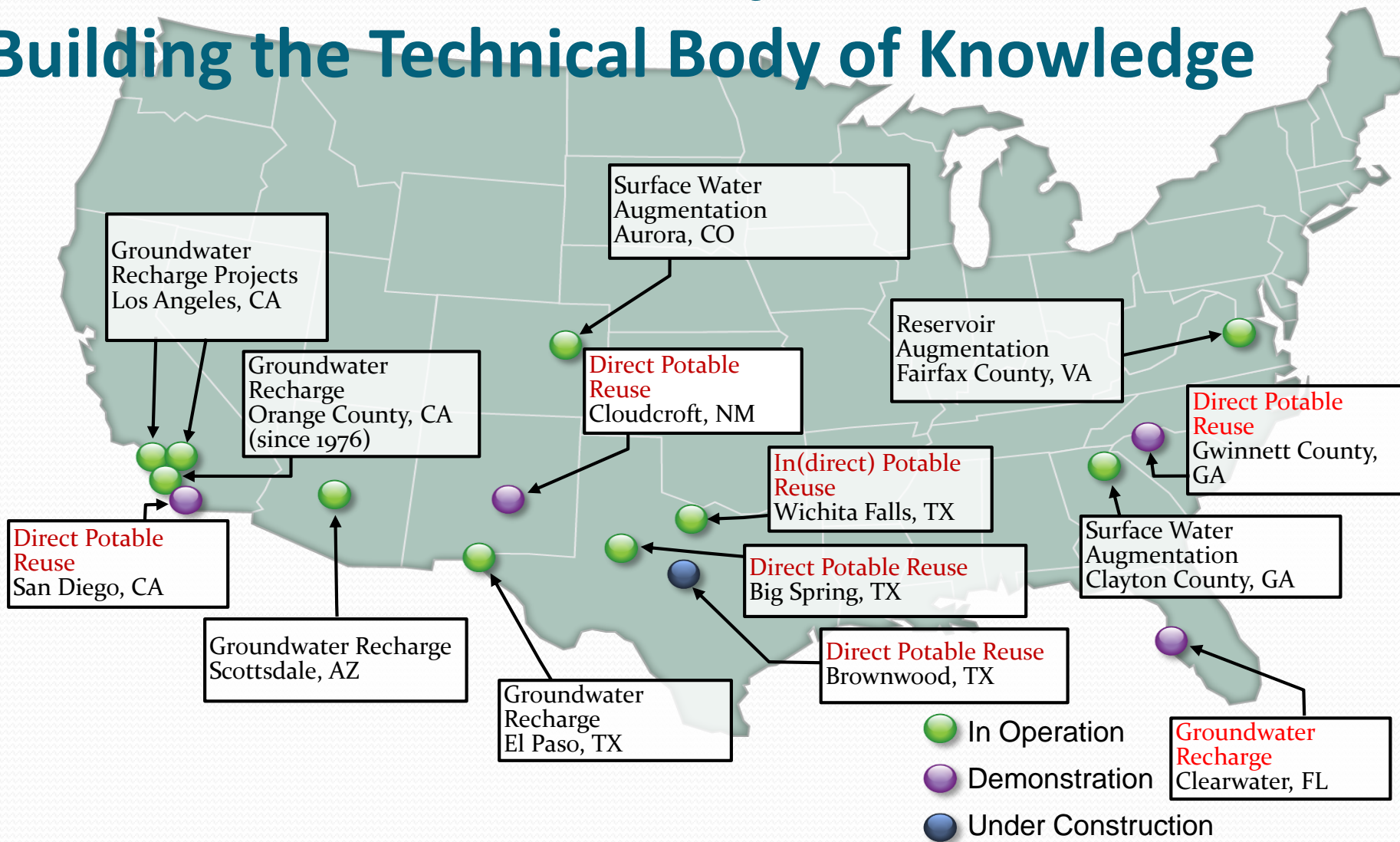
★ GWR Facility



Project Background

- Project History
 - Preliminary Feasibility Study - 2009
 - Feasibility Study - 2011
 - Pilot Sampling Protocol Approval – FDEP 2012
 - One Year Pilot (June 2013 – June 2014)
- Current Work
 - Preliminary Design – Advanced Water Purification Plant and Recharge Wells
 - Preliminary Design Report (**June 2016**)

U.S. Potable Reuse Projects are Building the Technical Body of Knowledge

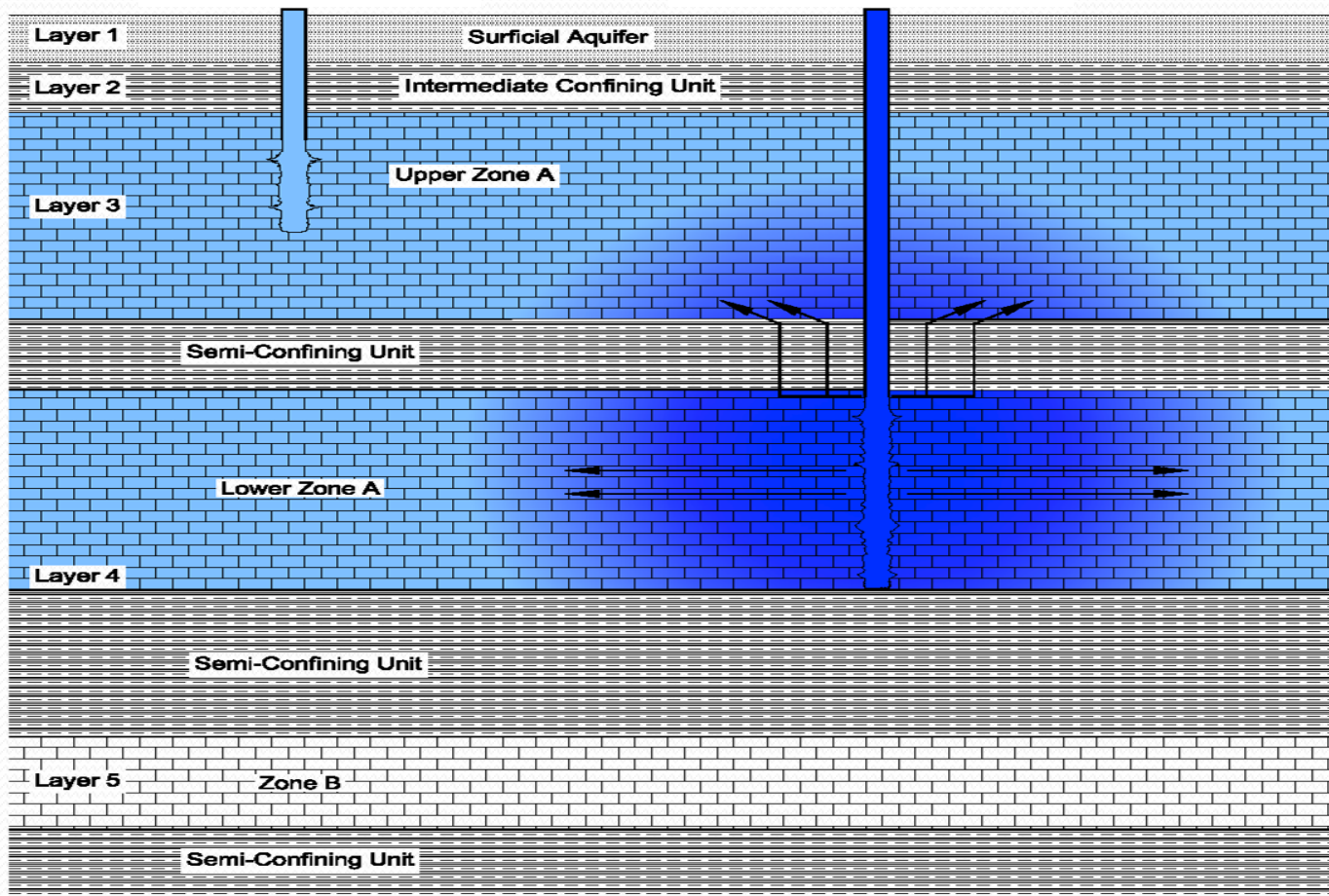


Recharge Wells

Inject into Lower Zone A of the Floridan Aquifer

Supply Well

Recharge Well



Upper Zone A

Lower Zone A

Zone B

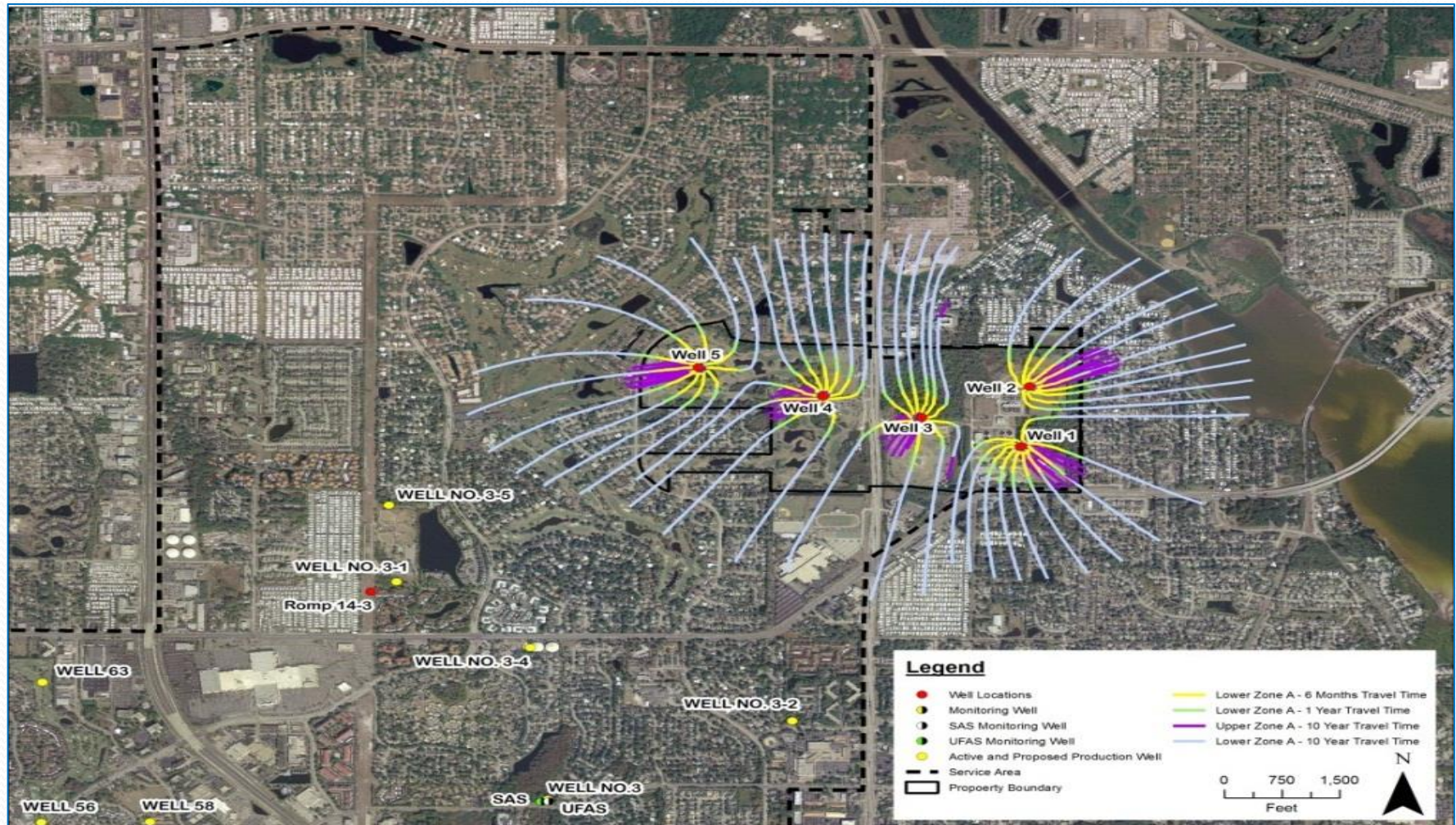
NOT TO SCALE

Legend

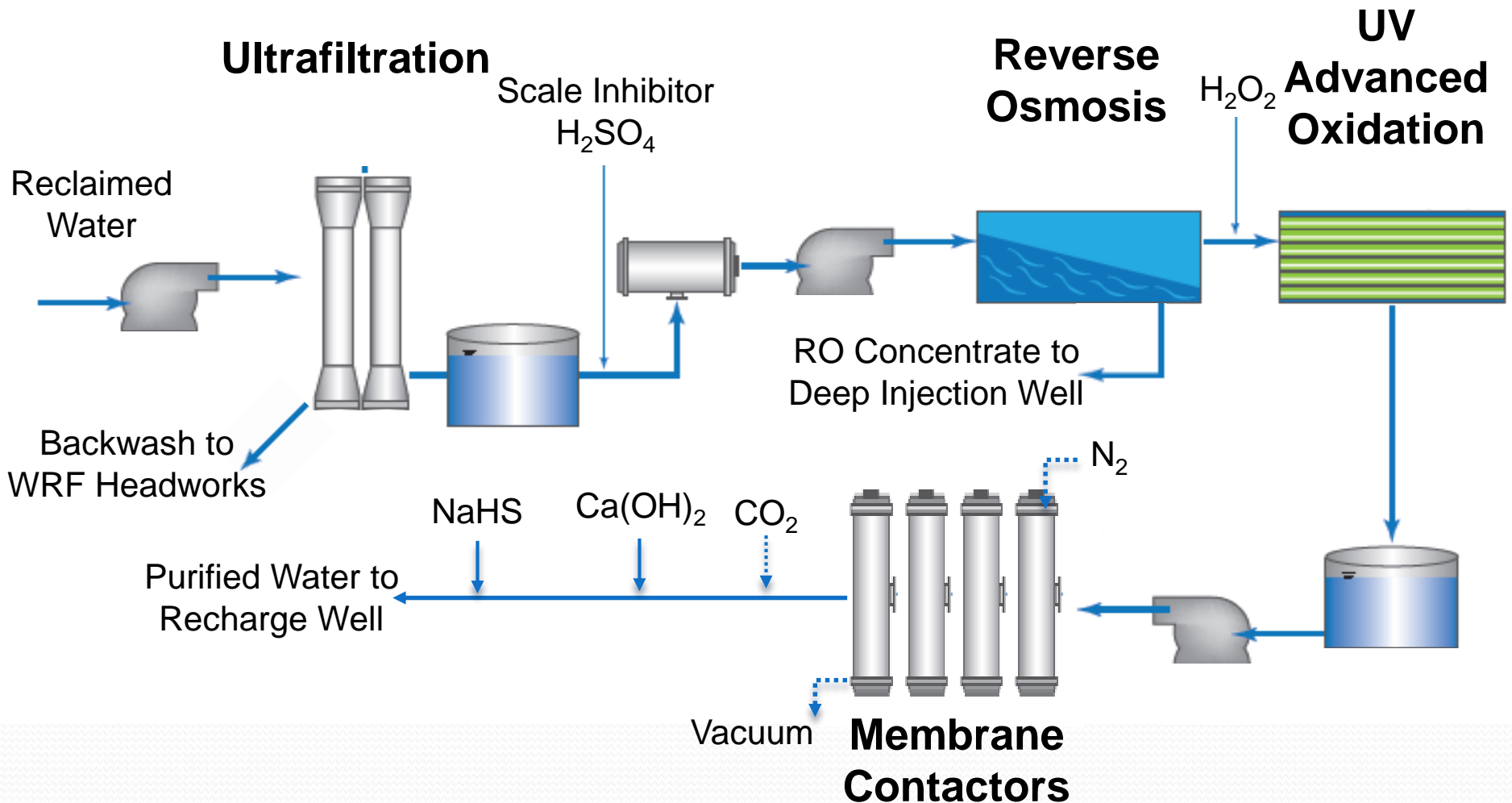
— Approximate Modeled Particle Tracks

Expected Migration of Water

10 Years from Injection

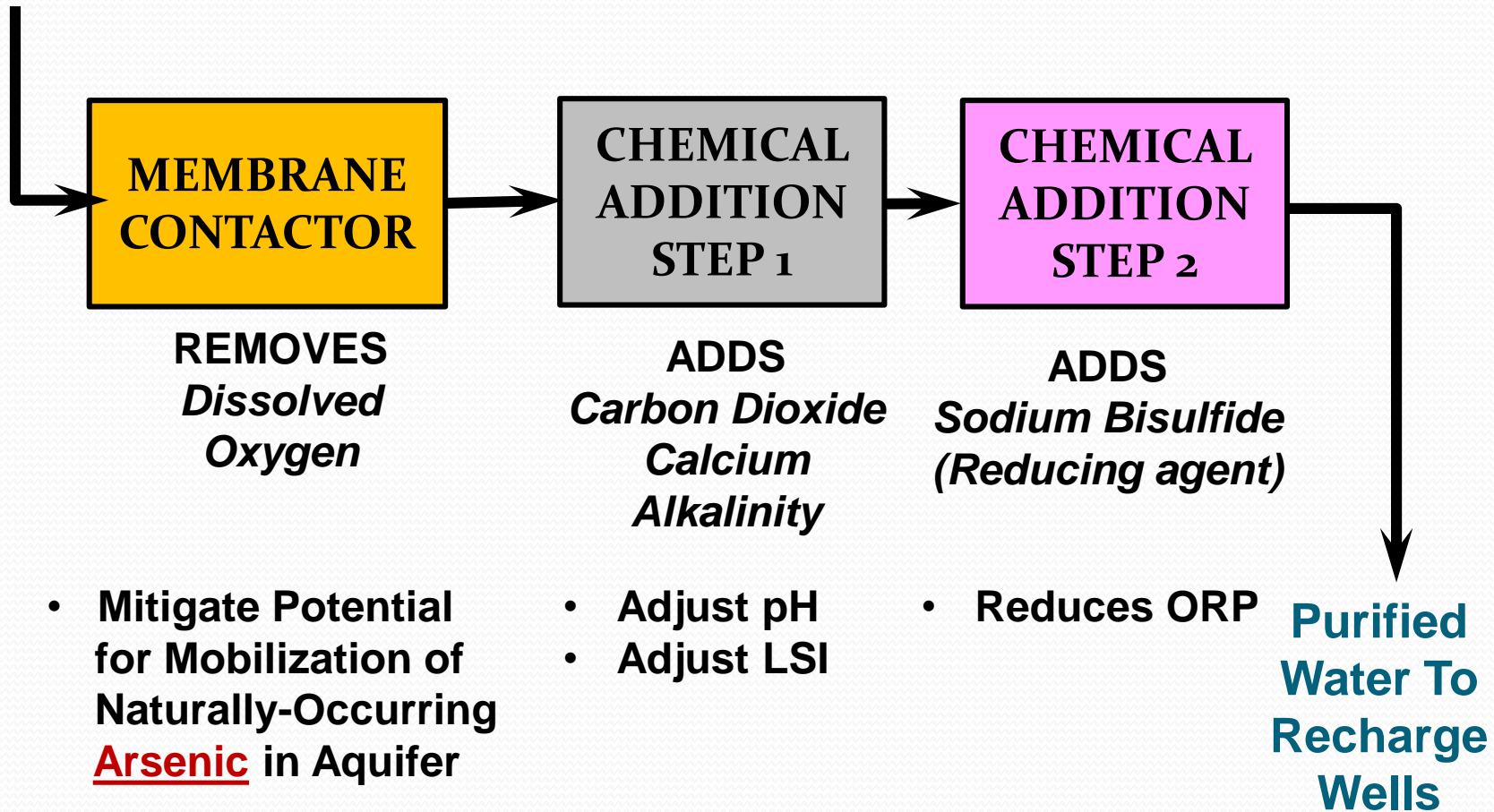


Full Advanced Treatment with Post-Treatment for Groundwater Recharge



Post-Treatment Steps

Water Purification Process



Clearwater Pilot Testing Process

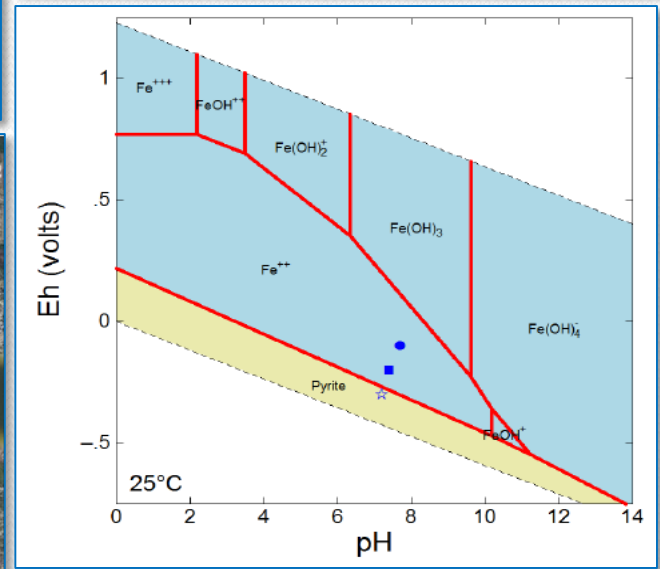
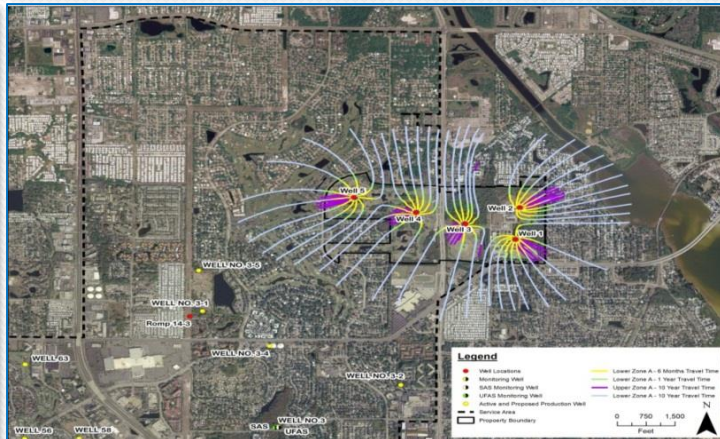
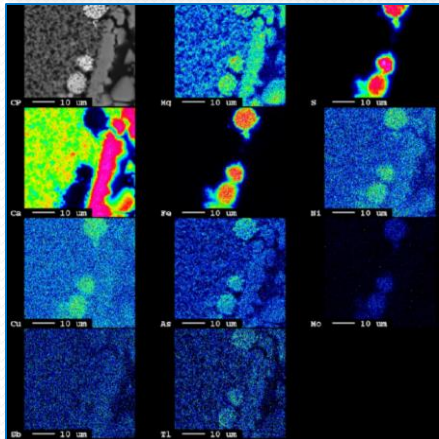
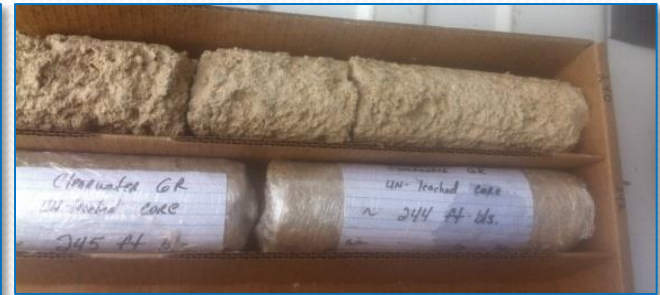
- Full purification and post-treatment process demonstrated at pilot scale
- Duration - 12 months (FDEP, Chapter 62-610)
- 25,000+ tests
200+ constituents
- Consistently produced purified water that met or surpassed all drinking water quality standards



Testing and Modeling

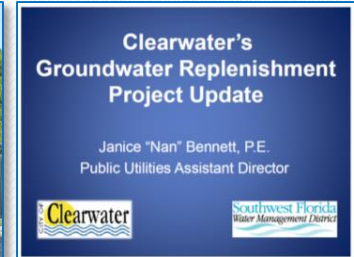
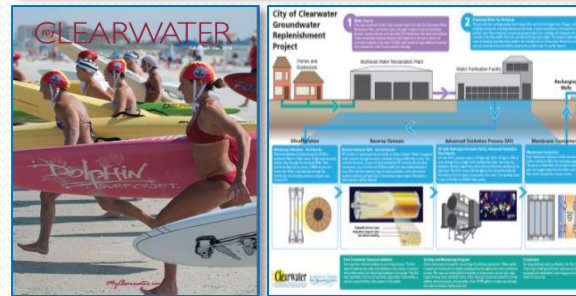
To Understand Injected Water Movement

Rock Core Testing | Aquifer Recharge Testing | Hydrogeochemical Modeling



Public Outreach Program

- Council & Elected Officials
- Environmental Advisory Board
- Printed Communications for Utility Customers
- Homeowners Association Meetings
- Community Groups & Service Clubs
- Professional Society Meetings & Conferences
- USF Graduate Seminar
- Pilot Plant Tours



Acknowledgments



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- **Robert Fahey, PE, Utilities Engineering Manager**
- **Lan-Anh Nguyen PE, Project Manager**
- **Heather Parsons, Public Information Coordinator**



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- **Don Ellison, PG, Senior Professional Geologist**
- **Mary Margaret Hull, Lead Communications Coordinator**



- **Emilie Moore, PE, Project Manager**
- **Dave MacNevin, PE, PhD, Process Engineer**
- **Jarrett Kinslow, PE, Senior Process Engineer**
- **Jennifer Roque, EI, Field Engineer**



- **David Wiley, PG, Vice President**
- **Jeff Trommer, PG, Project Manager**
- **Stuart Norton, PhD, IndeWater**

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