Arizona Water Reuse Symposium

The City of Scottsdale's Water Reuse Program
30 Years of Success

Flagstaff, AZ
July 27th 2015

Presented by
Art Nunez, City of Scottsdale Water Reclamation Services Director

WateReuse Arizona

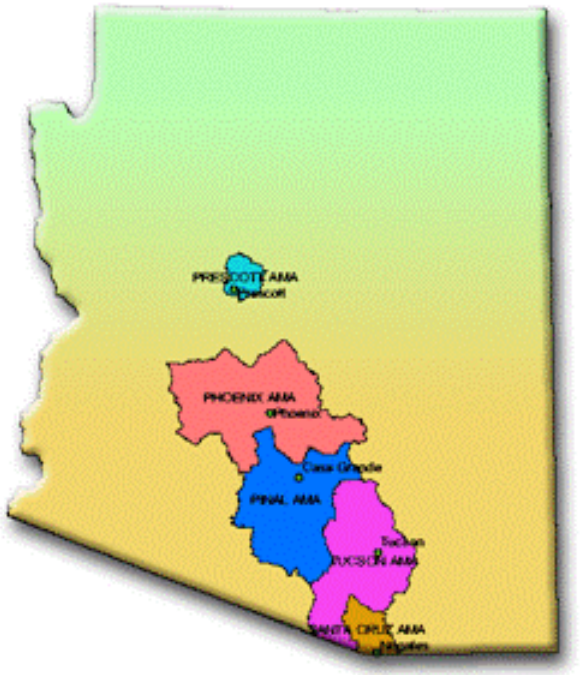
Scottsdale Water

Presentation Overview

- History & Background of Water Reuse in Scottsdale
- Early Water Reuse Applications
- Water Campus Concept & Development
- Water Campus Initial Operation
- Water Campus Expansions – Capacity & Technology
- The Future of Water Reuse in Scottsdale

History & Background

- 1970's - Discussion Surrounding Groundwater Pumping in AZ
- June 1980 - Historic Signing of Groundwater Management Act
- Establishes Active Management Areas (AMA's)
- Stringent Laws & Regulations on Groundwater Pumping within the AMA's



Active Management Areas

Impact to Scottsdale

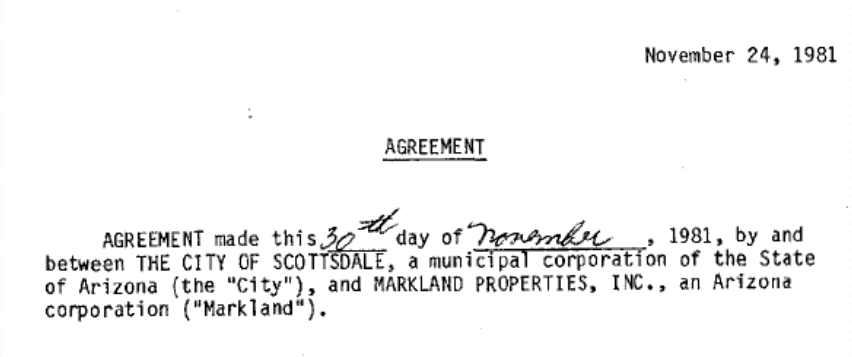
- Largely Dependent on Groundwater
- Development & Growth – Tourism and Golf
- 100% of Generated Wastewater Conveyed out of the City

Scottsdale Preparation

- Realized the Concern & Potential Impact in the 1970's
- Initiated our own Discussion & Planning
- 1980 City Requirement - New Golf Course Development to provide it's own Water Resources other than Groundwater or Potable Water for Irrigation

Gainey Ranch WRP

- Markland Property and City of Scottsdale sign agreement – 11/30/81
  - 27 hole Gainey Ranch Golf Course
  - 1.7 mgd WRP
  - Deeded to City
  - Take or Pay Agreement 399 mg per year



November 24, 1981

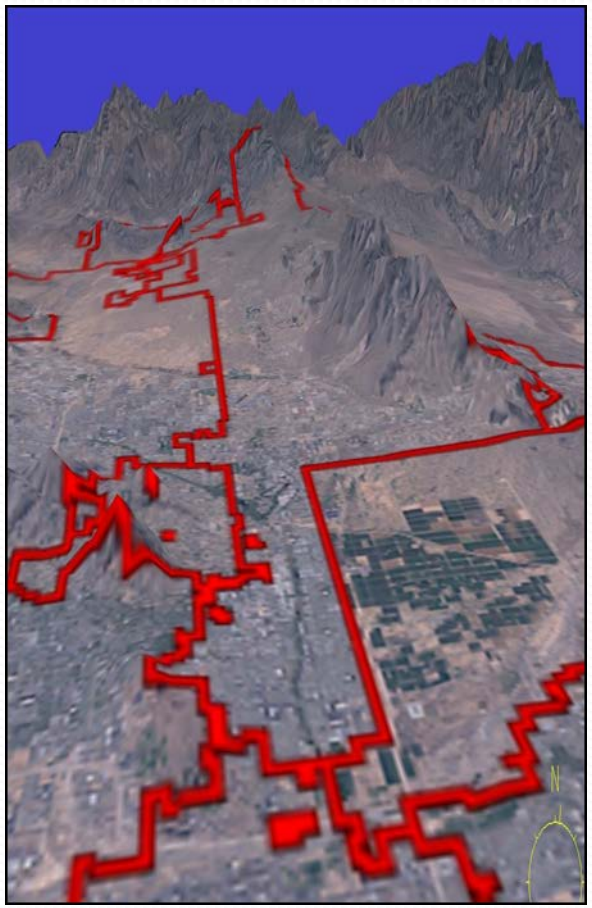
AGREEMENT

AGREEMENT made this 30th day of November, 1981, by and between THE CITY OF SCOTTSDALE, a municipal corporation of the State of Arizona (the "City"), and MARKLAND PROPERTIES, INC., an Arizona corporation ("Markland").

Gainey Ranch WRP

- December 1984
- Two Upgrades
- Original Agreement
- Effluent Sales Cover all O&M Expenses
- Met Irrigation Needs for over 30 years

Scottsdale's Tremendous Growth



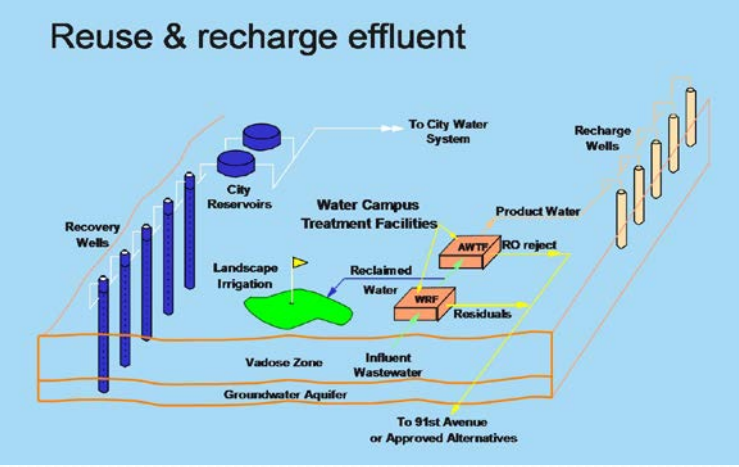
- 1980's – plans for growth into the 1990's
- Concern with sewer conveyance system capacity
- Golf industry leading the way

Master Planning Efforts

- Capture our own water resource – wastewater
- Partnership with developers
- Establish a plan to reuse our effluent and replenish the aquifer
- Reuse and Recharge Concept
- Water Campus Concept - Born in the late 1980's

Water Campus Concept

- Reclaimed Water Distribution System
  - City builds a non-potable distribution system
  - Developers purchase capacity
  - Rate structure keeps City whole



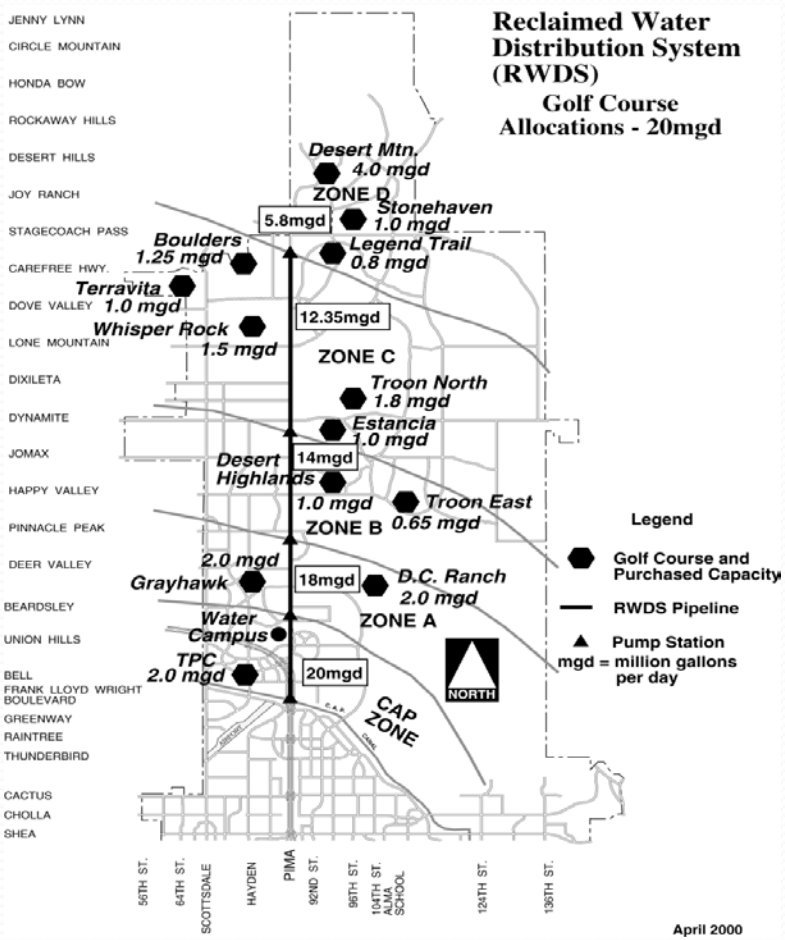
- Water Reclamation Plant & Advanced Water Treatment Facility
  - Construct treatment works capable of meeting golf course irrigation demand
  - Construct advanced treatment works capable of meeting groundwater quality requirements for recharge

Reclaimed Water Distribution System (RWDS)

- Developer purchased CAP Water Rights - turning them over to the City in exchange for RWDS capacity
- Establish a rate structure covering O&M cost and replacement and reserve fund
- Design a 20 mgd system – expected to meet demand for 20 golf courses
- Desert Mountain signs initial Agreement in 1991
- Expectations are 10 year's to sell 100% capacity
- Capacity sold in 18 months

RWDS System

- 14 miles of pipe
- 5 pump stations
- Irrigation for
  - 23 golf courses
  - City owned sports complex (soccer fields)
- Delivery of raw CAP begins in 1993
- Delivery of effluent begins in 1998



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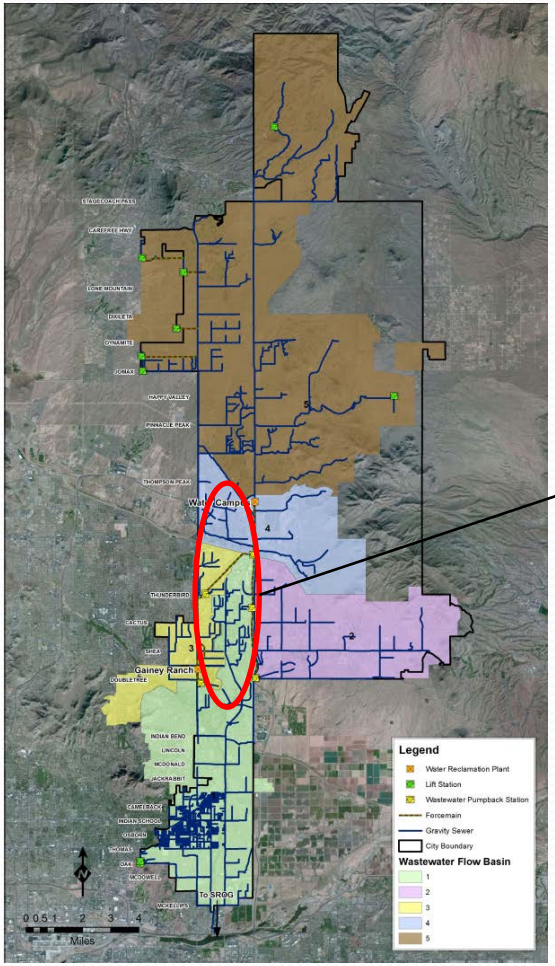
SCOTTSDALE WATER

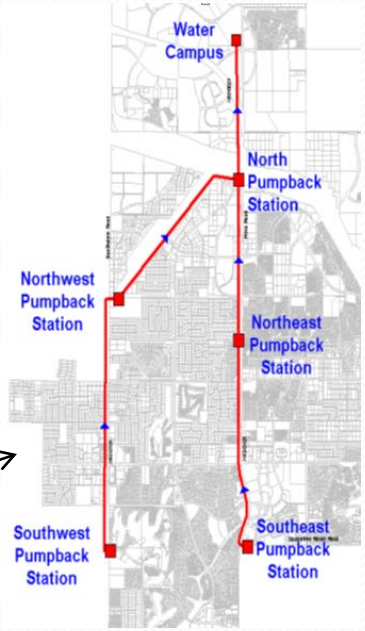
Water Campus Requirement

- Design a facility to meet two primary needs
  - Irrigation demand – varying from 0 to 20 mgd
  - Ground water recharge – when not providing water for irrigation
- System to convey wastewater to the site
- Water Reclamation Plant (WRP)
- Advanced Water Treatment Plant (AWT)

Pumpback System

- Roughly 15 miles of force main
- 5 large pump stations





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Scottsdale Water

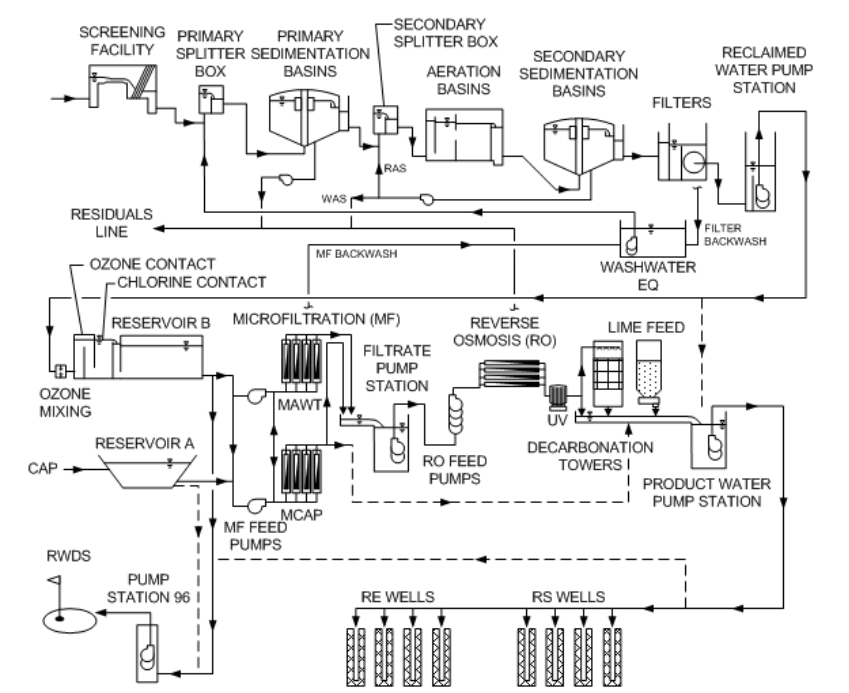
Design Concept

- Water Reclamation Plant
  - Phased approach to 20 mgd
  - State Regulatory Parameters – somewhat in flux
  - California Title 22
  - NDeN / Tertiary Treatment
  - Odor control
  - Aesthetically pleasing
- Advance Water Treatment Plant (AWT)
  - Meet Water Quality Requirements
  - State Regulatory Parameters – somewhat in flux
  - Implement Technology that supports public acceptance
  - Best available technology and processes

Water Reclamation Plant Design

- 8 MGD Initial Capacity
- 2.5 Peaking Factor – Day
- Site Planning - 24 mgd
- Conventional treatment processes
  - Preliminary
  - Primary
  - Secondary - NDeN
  - Tertiary – deep bed monomedia
  - Disinfection – gaseous cl2
  - 8 mg Storage
  - No solids handling

AWT Plant Design



- Research & Piloting Effort
- 6 MGD Initial Capacity
- Site Planning 20 MGD
- Microfiltration
- Reverse Osmosis
- Permeate Stabilization
- Vadose Zone Recharge Wells

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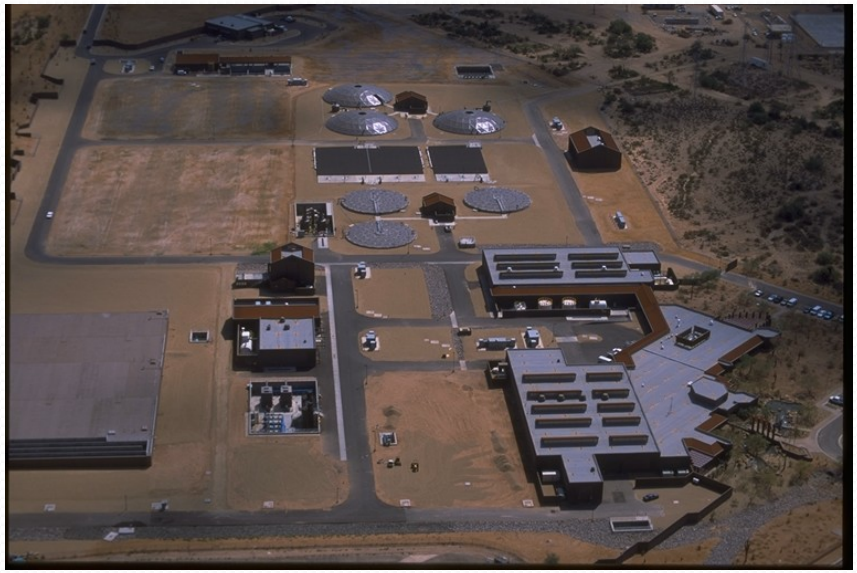
Scottsdale Water

Water Campus Overview

- Initial Design – 8 mgd WRP & 6 mgd AWT
- Construction started April 1997
- C/O adding additional 4 mgd capacity before completion of phase I



Initial Construction

- 3 Largest CIP Projects
- Accelerated Project
- 300+ Contractors onsite
- 18 months from start of construction to treating wastewater

Start Up - WRP & AWT

- WRP Start Up
  - 10/14/1998 @ 2:34 a.m.
  - Low flow challenges
  - Low ww strength
  - Temporary piping
  - 100% compliant
- AWT Start Up
  - May 1999
  - Uniqueness of MF/RO
  - Vadose Zone Well challenges
    - Orifice plates

Expansions

Capacity and Technology

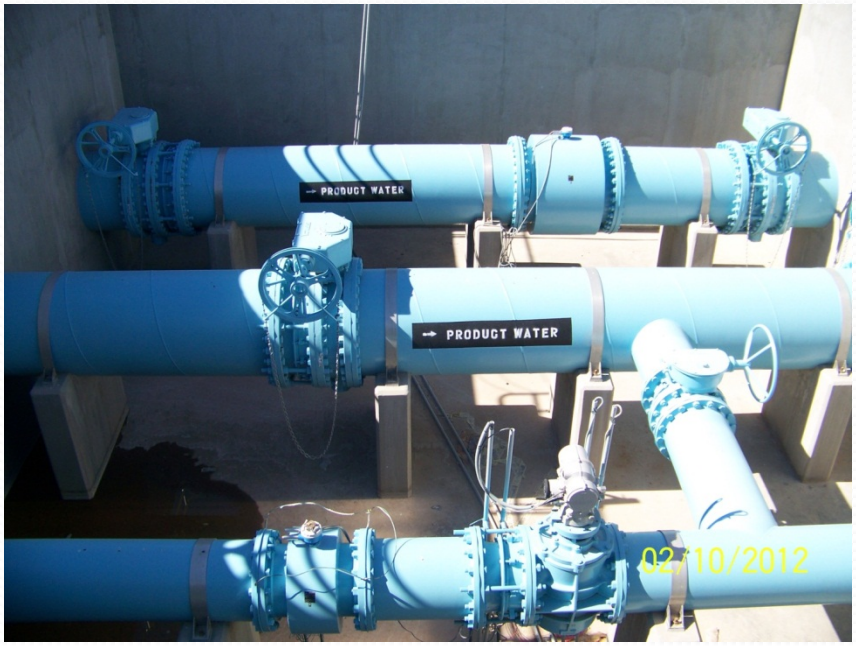
- WRP & AWT Phase II
- AWT Phase III
- WRP Phase III
- Onsite Influent Pump Station
- Filter Complex Upgrade
- AWT Phase IV
  - OSHG
  - Ozone

Water Campus 2015

- 23.6 mgd WRP
- 20.0 mgd AWT
- Center of Scottsdale Water Resources
- Leader in Water Reuse
- Implementing latest in Technology

Partnerships

- RWDS Users
  - 23 golf courses & 13 ownerships
  - Primary customers
- Concern over salinity
  - Water Quality Study
  - Amended agreements
  - Purchased AWT capacity
  - Three levels of water quality
  - New Rate Structure
- Eff/RO/CAP blend
  - Since April 1, 2012
  - <125 mg/l sodium continuously



Supporting Research

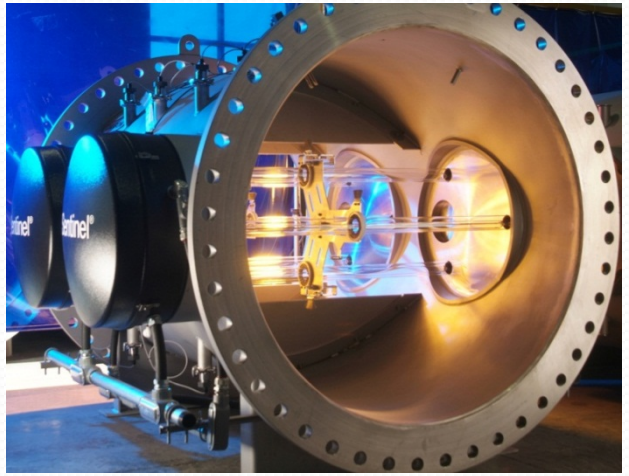
- Advanced treatment technologies on one site
  - Extremely rare
  - Varying water qualities
  - Participate in numerous research projects
    - in-kind services
    - SCADA & water quality lab data
    - pilot location
    - providing real world experience
  - Supporting technology advancement with universities to local elementary schools

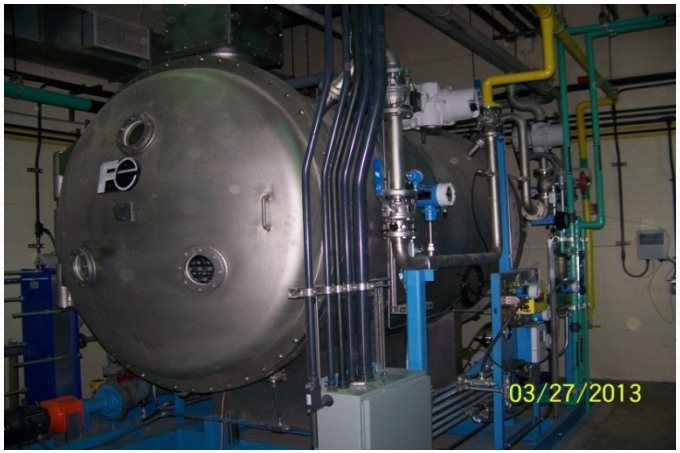
Public Outreach

- Public information firm
- Initial 3-day Open House
  - Officials & Dignitaries
  - Media
  - Public – 500+
- Regulatory agency workshop – March 2000
  - ADEQ, ADWR, Maricopa County (5 permits)
- Numerous Tours
  - Provided cameras
- 9/11/2001 – Impact
  - Limited sharing of information
  - Tightened security
  - Restructured Tours
    - Documented
    - Approval process
    - Restricted areas
- Recent years increased outreach
  - Water Resources PIO
  - Tours increased substantially
  - New Marketing effort
  - Increased visibility

Challenges

- New Technology & Processes
  - Not much history
  - Procurement issues
    - Sole source
    - Tied to manufacturer
    - Service agreements
  - Beta version
    - New developments and versions
- Staffing
  - Experience
  - Training
  - Retaining staff
    - Become very marketable





17 Years of Successful Operation

- Achieved Safe Yield
- Reduced Reliance on Groundwater for Potable Uses
- Met Regulatory Requirements
- Recharged in Excess of 46,000 AF effluent
- Recharged in Excess of 25,000 AF of surface water
- Met irrigation needs of 23 golf courses
- Implemented the latest in new treatment technologies

Future

- New or Modified Reuse Opportunities
  - Master Planning Efforts
  - Capturing additional wastewater resources
  - New customers or recharge application for Gainey WRP
- Optimizing existing systems
  - RO Concentrate reduction
  - Sodium reduction in wastewater – positive impact to operation
- Effective Utility Management
  - Address challenges – staffing
  - Assist with optimizing
  - Clarify procurement challenges

Conclusion

City of Scottsdale a leader in water reuse in 1985

-30 years later-

The City of Scottsdale is still at the fore front of water reuse and considered one of the leaders in the industry not only nationally but around the world.

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SCOTTSDALE WATER