Water Reuse in Norman, Ok

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Norman, Oklahoma Population 2021
126,952
1894
1st Hand Dug Well
30’x30’x25’ deep

Lake T-Bird
Shared between 3 cities

OKC Connection

Dust Bowl

2005
Arsenic Rule
31 wells to 15 wells

Annual Precipitation History with 5-year Tendencies
Oklahoma Statewide: 1895-2020

Wetter periods
Drier periods
Annual precipitation value
Lowest Lake Level on December 19, 2006

1030.40 ft. 40% of lake used, Stage 3.

63 days over 100 degrees 2011
# A Quick Refresher: Portfolio 13 vs. Portfolio 14

## Norman Projects Annual Average Need of **29 MGD**

<table>
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<tr>
<th></th>
<th>Lake Thunderbird Allocation</th>
<th>Existing Groundwater Wells</th>
<th>New Groundwater Wells</th>
<th>Conservation &amp; Non-potable Reuse</th>
<th>Lake Thunderbird Augmentation</th>
<th>Regional Supplies via Oklahoma City</th>
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<tr>
<td><strong>P13 Regional OKC</strong></td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>13</td>
<td></td>
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<tr>
<td><strong>P14 Wells + TBird Aug.</strong></td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Values are 2060 Annual Avg. Use (mgd)
LAKE’S TOTAL USAGE

Norman 43.8%, MWC 40.4%, DC 15.8%

Acre-Feet

Fed Fisc Yrs

Conjunctive Yield

Firm Yield

New Firm Yield
Source of Water for Increasing Demand

P14: New Wells and Thunderbird Augmentation

Advanced treatment at WRF: Add biofiltration and ozone

Treat Lake Thunderbird water at WTP
Alternatives Considered

Alternative 1: Constructing a buried pipeline connection from the Atoka Pipeline in the vicinity of the existing blow-off valve near Franklin Road, to a discharge point in the existing Willow Branch Creek.
Reuse Pilot Project
NUA - Garver Engineers

- NUA $3,400,000
- $800,000 grant from Bureau of Reclamation Title XVI
- MUCT vs Aqua Nereda for P & N removal or BNR
- Disk Filters vs Super Sand Filters with addition of coagulant
- Ozone/Bio-filtration and UV/H2O2 for advanced treatment of CEC’s
Indirect Potable Reuse Pilot Project

CITIZENS ADVISORY COMMITTEE

MIDWEST CITY – DEL CITY – NORMAN

FLOYD EASON         PAUL STREETS
MIKE CANTRELL       STEVE CARANO
KATHERINE TRENT     PAT BYRNE
BRENDA BURKETT     JAMES CHAPPEL
NWRF Project Indirect Potable Reuse

1. The project will determine the possible technologies that will treat our effluent to reuse standards.
2. Phase 1 will determine if AquaNereda Granular Sludge or UTC Biological Treatment Process is better in removing phosphorus/nitrogen.
3. Both systems are removing Phosphorous and Nitrogen as expected.
4. Phase II is underway and we will determine removal rates of CEC's.
Phosphorous Pilot Goal  < 0.1 mg/L  
Nitrogen Pilot Goal  < 3.0 mg/L

• Modified University of Cape Town (mUCT)  
  o Influent Total Phosphorus – 14 mg/L  
  o Effluent Total Phosphorus – 0.13 mg/L  
  o Influent Total Nitrogen – 26 mg/L  
  o Effluent Total Nitrogen – 5 mg/L

• Aerobic Granular Sludge (AGS)  
  o Influent Total Phosphorus – 16 mg/L  
  o Effluent Total Phosphorus – < 0.1 mg/L  
  o Influent Total Nitrogen – 31 mg/L  
  o Effluent Total Nitrogen – 5 mg/L
Projects Benefitting NUA

OU Capstone Projects (Natural attenuation, UV sun and microbial soil, Creek capacity able to handle 5 MGD without causing additional erosion.

Freese and Nichols TMDL model recalibration

EPSCoR (Test Bed within the Little River Watershed)

BOR Wetlands Study for Lake Thunderbird

BOR Lake Model using Algorithms of Start and Stop for Augmentation Strategy

BOR Lake Prediction Tool for HAB - Carollo

BOR Backwash Well Water Cr6 Treatment

BOR Yield Study Application in Oct 2021

COMCD Smart Water Grant to follow Yield Study - Drought Contingency Plan
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