

# MARGINAL QUALITY WATER FACT SHEET



## City of Watonga

SDWIS ID: OK2000602

County: Blaine

OCWP Basin: Central Region, Basin 51



### Existing Supplies

Groundwater.

### Population and Demand Projections

Projection	2020	2030	2040	2050	2060
Population	5,208	5,667	6,127	6,576	7,074
Demand (AFY)	1,137	1,237	1,337	1,436	1,544

Source: OCWP; AFY: acre-feet per year

### Future Water Shortages

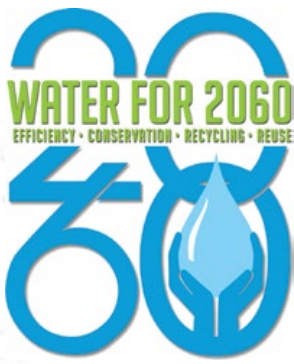
Basin 51 along the North Canadian River northwest of Oklahoma City was identified as one of the state's water supply "hot spots" in the 2012 Oklahoma Comprehensive Water Plan. Basin 51 has fully allocated surface water supplies, and groundwater is known to have water quality issues.

## Marginal Quality Water Use

Beneficial reuse of treated wastewater is increasingly being considered and implemented in communities across Oklahoma to reduce use of fresh water supplies. Water reuse was investigated in Basin 51 for Watonga, El Reno, and Yukon, each of which has a water reclamation facility that can produce water suitable for non-potable reuse. Other potential marginal quality uses in Basin 51 include potable or non-potable use of brackish groundwater or alluvial water with high nitrates, and use of purified recycled water to augment drinking water supplies.

### Reducing Fresh Water Use through Marginal Quality Water Use, Basin 51

With Phase 1 non-potable water reuse projects in	Utility's Avoided Fresh Water Use
Watonga	67 AFY
El Reno	76 AFY
Yukon	139 AFY



The attached figure illustrates the sites considered and the proposed Phase 1 reuse pipeline route. The table below summarizes demands for all sites and the site included in the initial project implementation phase (identified as Phase 1).

	All Potential Reuse Sites		Sites Served by Phase 1 Reuse Project	
	Annual Demand (AFY)	Peak Day Demand (mgd)	Annual Demand (AFY)	Peak Day Demand (mgd)
Category 2 Demands (requires treatment improvements)	48	0.46	0	0
Category 3 Demands (existing treatment)	67	0.66	67	0.66

Applying recycled water to the Watonga Ball Fields (in addition to the golf course) would require the addition of coagulation and filtration at the Water Reclamation Facility due to the elevated potential for public contact with recycled water at the Ball Fields, as defined in the ODEQ regulations.

Planning level costs for the Phase 1 pipeline include a 3 mile pipeline that would be used to convey recycled water north to the Phase 1 reuse site. Costs were developed based on the conceptually-identified route for the new pipeline segments and demands served along the existing pipeline, excluding costs for onsite piping, connections, and irrigation systems.

Instead of constructing the proposed reclaimed water transmission pipeline, or as an interim measure, Watonga has identified potential onsite uses for reclaimed water at its Water Reclamation Facility under Category 6 of the ODEQ water reuse regulations. In addition, there are numerous crop irrigation water uses in the immediate vicinity of the Water Reclamation Facility that could be potential candidates for agricultural water reuse.

Description	Costing Factors	Cost
Pipeline	10-inch diameter, 2.8 miles	\$ 1,230,000
Pump Station	120 hp	\$ 550,000
Reclaimed Water Storage	700,000 gallons	\$ 700,000
<b>Subtotal</b>		<b>\$ 2,480,000</b>
Engineering, Legal, & Admin.	20%	\$ 500,000
Contingency	30%	\$ 740,000
<b>Total Capital Cost</b>		<b>\$ 3,720,000</b>
<b>Estimated Annual Power</b>	<b>15,000 kWh</b>	<b>\$ 1,400</b>
<b>Note:</b> All costs in 2015 dollars. Sums may differ slightly from totals due to rounding.		

## Statewide Applicability

The demonstration of potential reuse systems in Basin 51 shows the value of using water quality that is suited to the type of water use. High quality drinking water is not needed for landscape irrigation; a lower quality, but still safe, reclaimed water supply is well-suited for irrigation. Communities across Oklahoma that have mechanical wastewater treatment facilities could implement similar water reuse projects. The WRF offers a centralized and drought-proof “supply” of water that can offset the need to use fresh water supplies. Additional treatment processes (i.e., coagulation and filtration) can be added to expand opportunities for non-potable water reuse to sites with high potential for human contact with recycled water, further extending the efficient use of available local supplies.



## Sites Considered and Location of Proposed Reuse Pipeline

### City of Watonga

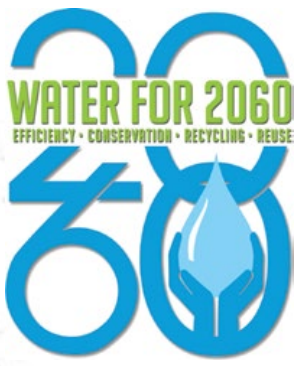


Potential Site	Served in Phase 1	ODEQ Reuse Category	Annual Demand (AFY)
Watonga Golf Club	Yes	3	67
Ball Fields	No <sup>1</sup>	2	48

**Note:**

1. Site is located in close proximity to Phase 1 pipeline alignment. To serve this site, treatment improvements are necessary. However, the Phase 1 pipeline was sized with sufficient capacity to serve this site.





# MARGINAL QUALITY WATER FACT SHEET



## City of El Reno

SDWIS ID: OK2000902

County: Canadian

OCWP Basin: Central Region, Basin 51



### Existing Supplies

Groundwater and purchase treated water from Oklahoma City.

### Population and Demand Projections

Projection	2020	2030	2040	2050	2060
Population	20,723	22,161	23,400	24,544	25,709
Demand (AFY)	4,586	4,883	5,156	5,408	5,665

Source: OCWP; AFY: acre-feet per year

### Future Water Shortages

Basin 51 along the North Canadian River northwest of Oklahoma City was identified as one of the state's water supply "hot spots" in the 2012 Oklahoma Comprehensive Water Plan. Basin 51 has fully allocated surface water supplies, and groundwater is known to have water quality issues.

## Marginal Quality Water Use

Beneficial reuse of treated wastewater is increasingly being considered and implemented in communities across Oklahoma to reduce use of fresh water supplies. Water reuse was investigated in Basin 51 for Watonga, El Reno, and Yukon, each of which has a water reclamation facility that can produce water suitable for non-potable reuse. Other potential marginal quality uses in Basin 51 include potable or non-potable use of brackish groundwater or alluvial water with high nitrates, and use of purified recycled water to augment drinking water supplies.

### Reducing Fresh Water Use through Marginal Quality Water Use, Basin 51

With Phase 1 non-potable water reuse projects in	Utility's Avoided Fresh Water Use
Watonga	67 AFY
El Reno	76 AFY
Yukon	139 AFY



The attached figure illustrates the sites considered and the proposed Phase 1 reuse pipeline route. The table below summarizes demands for all sites and those included in the initial project implementation phase (identified as Phase 1).

	All Potential Reuse Sites		Sites Served by Phase 1 Reuse Project	
	Annual Demand (AFY)	Peak Day Demand (mgd)	Annual Demand (AFY)	Peak Day Demand (mgd)
Category 2 Demands (requires treatment improvements)	65	0.6	0	0
Category 3 Demands (existing treatment)	163	1.6	76	0.74

Applying recycled water to Adams Park (in addition to Crimson Creek Park) would require the addition of coagulation and filtration at the Water Reclamation Facility due to the elevated potential for public contact with recycled water at the park, as defined in the ODEQ regulations. Significant additional demands could be met using available recycled water supplies by adding a spur pipeline to serve additional sites (El Reno Cemetery, Frank Knight Park, and Burton Park) on the east side of El Reno. Routing and costs for subsequent pipeline phases were not developed for this analysis.

Planning level costs for the Phase 1 pipeline include a short (0.63-mile) new line to convey flows to El Reno’s existing 4.4-mile pipeline, which would be used to convey recycled water westerly to Phase 1 reuse sites. Costs were developed based on the conceptually-identified route for the new pipeline, excluding costs for rehabilitating the existing pipeline, onsite piping, connections, and irrigation systems.

Description	Costing Factors	Cost
Pipeline	12-inch diameter, 0.6 miles	\$ 340,000
Pump Station	120 hp	\$ 550,000
Reclaimed Water Storage	800,000 gallons	\$ 800,000
<b>Subtotal</b>		<b>\$ 1,690,000</b>
Engineering, Legal, & Admin.	20%	\$ 340,000
Contingency	30%	\$ 510,000
<b>Total Capital Cost</b>		<b>\$ 2,540,000</b>
<b>Estimated Annual Power</b>	<b>15,000 kWh</b>	<b>\$ 1,400</b>

Note:  
All costs in 2015 dollars. Sums may differ slightly from totals due to rounding.

## Statewide Applicability

The demonstration of potential reuse systems in Basin 51 shows the value of using water quality that is suited to the type of water use. High quality drinking water is not needed for landscape irrigation; a lower quality, but still safe, reclaimed water supply is well-suited for irrigation. Communities across Oklahoma that have mechanical wastewater treatment facilities could implement similar water reuse projects. The WRF offers a centralized and drought-proof “supply” of water that can offset the need to use fresh water supplies. Additional treatment processes (i.e., coagulation and filtration) can be added to expand opportunities for non-potable water reuse to sites with high potential for human contact with recycled water, further extending the efficient use of available local supplies.



## Sites Considered and Location of Proposed Reuse Pipeline

### City of El Reno

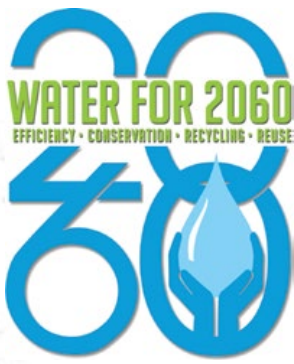


Potential Site	Served in Phase 1	ODEQ Reuse Category	Annual Demand (AFY)
El Reno Cemetery	No	3	81
Frank Knight Park	No	3	6.8
Burton Park	No	2	6.5
Crimson Creek Golf Club	Yes	3	76
Adams Park	No <sup>1</sup>	2	58

**Note:**

1. Site is located in close proximity to Phase 1 pipeline alignment. To serve this site, treatment improvements are necessary. However, the Phase 1 pipeline was sized with sufficient capacity to serve this site.





# MARGINAL QUALITY WATER FACT SHEET



## City of Yukon

SDWIS ID: OK2000910

County: Canadian

OCWP Basin: Central Region, Basin 51



### Existing Supplies

Groundwater and purchase treated water from Oklahoma City.

### Population and Demand Projections

Projection	2020	2030	2040	2050	2060
Population	23,833	25,478	26,910	28,222	29,561
Demand (AFY)	3,882	4,150	4,383	4,597	4,815

Source: OCWP; AFY: acre-feet per year

### Future Water Shortages

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## Marginal Quality Water Use

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### Reducing Fresh Water Use through Marginal Quality Water Use, Basin 51

With Phase 1 non-potable water reuse projects in	Utility's Avoided Fresh Water Use
Watonga	67 AFY
El Reno	76 AFY
Yukon	139 AFY



The attached figure illustrates the sites considered and the proposed Phase 1 reuse pipeline route. The table below summarizes demands for all sites and those included in the initial project implementation phase (identified as Phase 1).

	All Potential Reuse Sites		Sites Served by Phase 1 Reuse Project	
	Annual Demand (AFY)	Peak Day Demand (mgd)	Annual Demand (AFY)	Peak Day Demand (mgd)
Category 2 Demands (requires treatment improvements)	580	2.9	0	0
Category 3 Demands (existing treatment)	188	0.9	139	0.7

Applying recycled water to the Category 2 sites along the proposed Phase 1 pipeline route (Lakeview Elementary School, Yukon Middle School, Myers Elementary School, Ranchwood, Hillcrest, Dickenson parks, and the future 250-acre Yukon Athletic Complex park) would require the addition of coagulation and filtration at the Water Reclamation Facility due to the elevated potential for public contact with recycled water at these sites, as defined in the ODEQ regulations. Meeting all potential demands would require alternating irrigation days between sites to maintain demand at or below available supply flows.

Planning level costs for the Phase 1 pipeline include a 4.3 mile pipeline that would be used to convey recycled water south then west to the Phase 1 reuse sites. Costs were developed based on the conceptually-identified route for the new pipeline and demands served along the existing pipeline, excluding costs for onsite piping, connections, and irrigation systems.

Description	Costing Factors	Cost
Pipeline	18-inch diameter, 4.3 miles	\$ 3,480,000
Pump Station	60 hp	\$ 280,000
Reclaimed Water Storage	500,000 gallons	\$ 500,000
<b>Subtotal</b>		<b>\$ 4,460,000</b>
Engineering, Legal, & Admin.	20%	\$ 890,000
Contingency	30%	\$ 1,340,000
<b>Total Capital Cost</b>		<b>\$ 6,690,000</b>
<b>Estimated Annual Power Cost</b>	<b>8,000 kWh</b>	<b>\$ 700</b>

Note:

All costs in 2015 dollars. Sums may differ slightly from totals due to rounding.

## Statewide Applicability

The demonstration of potential reuse systems in Basin 51 shows the value of using water quality that is suited to the type of water use. High quality drinking water is not needed for landscape irrigation; a lower quality, but still safe, reclaimed water supply is well-suited for irrigation. Communities across Oklahoma that have mechanical wastewater treatment facilities could implement similar water reuse projects. The WRF offers a centralized and drought-proof “supply” of water that can offset the need to use fresh water supplies. Additional treatment processes (i.e., coagulation and filtration) can be added to expand opportunities for non-potable water reuse to sites with high potential for human contact with recycled water, further extending the efficient use of available local supplies.





# Sites Considered and Location of Proposed Reuse Pipeline

## City of Yukon

Potential Site	Served in Phase 1	ODEQ Reuse Category	Annual Demand (AFY)
Proposed 250 Acre Park	No	2	118.3
Chisholm Trail Park	Yes	3	50.9
Yukon Cemetery	Yes	3	37.3
FFA Barn	Yes	3	36.6
Shedeck Elementary School	No	3	21.3
Greenbelt	Yes	3	8.8
Kimbell Park	No	3	8.1
Central Elementary School	No	3	7.7
City Park	No	3	6.4
Sunrise Park	No	3	3.5
Bledsoe Park	Yes	3	2.8
St John Nepomuk Catholic School	Yes	3	2.4
Skyview Elementary School	No	3	2.1
School Administrative Offices	No	3	0.3
School Maintenance Department	No	3	0.1
Yukon High School	No	2	102
Taylor Park	No	2	101
Southwest Covenant Schools	No	2	64.3
City Park	No	2	36.7
Lakeview Elementary School	No <sup>1</sup>	2	32.9
Yukon Middle School	No <sup>1</sup>	2	20.1
Cornwell Soccer Fields	No	2	18.1
Independence Elementary School	No	2	15
Welch Park	No	2	12.5
Ranchwood Park	No <sup>1</sup>	2	12
Freedom Trail Park	No	2	11.1
Ranchwood Elementary School	No	2	6.9
Myer's Elementary School	No <sup>1</sup>	2	6.8
Sunrise Park	No	2	6.2
Hillcrest Park	No <sup>1</sup>	2	6.1
Dickenson Park	No <sup>1</sup>	2	5.8
Parkland Elementary School	No	2	4.3

**Note:**

1. Site is located in close proximity to Phase 1 pipeline alignment. To serve this site, treatment improvements are necessary. However, the Phase 1 pipeline was sized with sufficient capacity to serve this site.

