

Dual Water System Development Fee Study

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City of Surprise, Arizona

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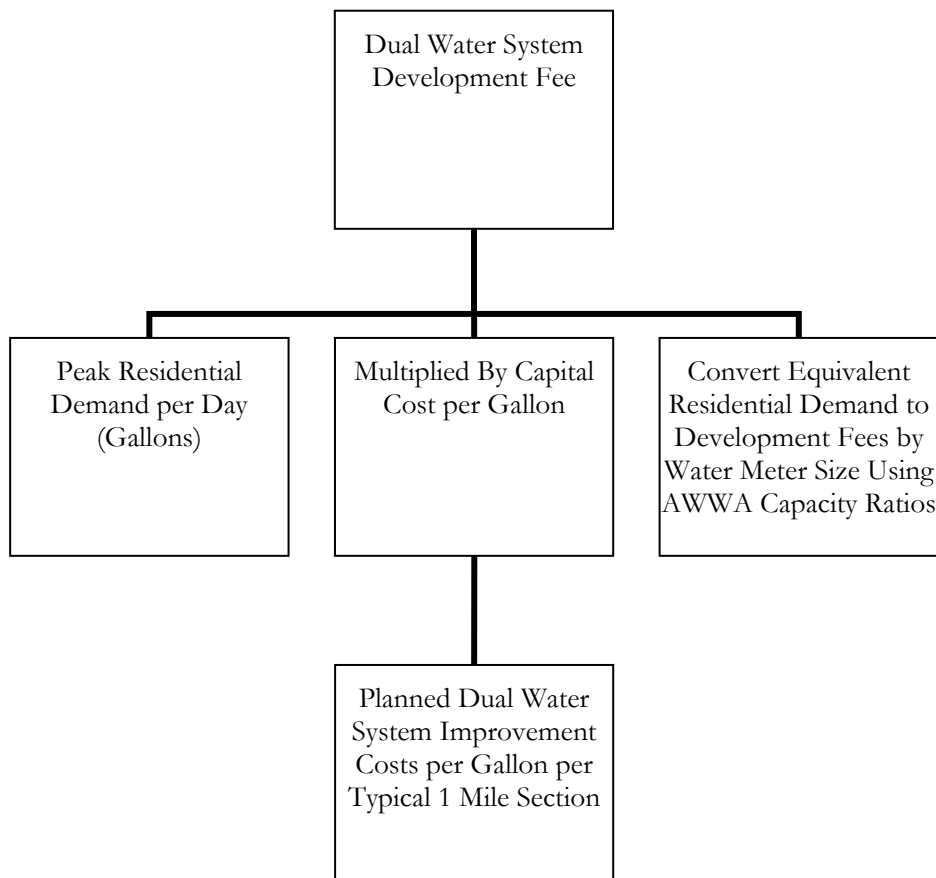
Dual Water System

METHODOLOGY

The City's Water Master Plan identifies several areas of the City where a dual reclaimed/irrigation water system is planned to be implemented *instead of* a water system that provides drinking water only. Development in these areas would pay the Reclaimed/Irrigation Water System Development Fee *instead of* the Water System Development Fee.

The Dual Water System Development Fee is derived from a plan-based methodology. Capital costs are based on system improvements necessary to provide water to a typical 1 mile section of land. As shown in Figure 2, the net capital cost per gallon of peak capacity is multiplied by the peak daily residential demand in Surprise. Fees for meters larger than 0.75 inches are derived from capacity ratios according to the size of the water meter needed by a new utility customer.

Figure 1: Dual Water System Development Fee Methodology Chart



PLANNED DUAL WATER SYSTEM PROJECTS PER TYPICAL 1 MILE SQUARE SECTION OF LAND

City staff estimates the peak daily demand of a 1 mile section of land to be 1,366,000 gallons of drinking water and 197,000 gallon of water for irrigation for all land uses; a total of 1,563,000 gallons per 1 square mile. The total cost per 1 square mile of the reclaimed/irrigation water system infrastructure which the City is responsible for providing is \$9,370,000 for drinking water and \$728,500 for irrigation; a total of \$10,098,500 per 1 mile section of land (see Figure 2 below). The cost per gallon for the drinking water infrastructure is \$6.46 ($\$10,098,500/1,563,000 \text{ gallons} = \6.46).

Figure 2: Planned Dual Water System Cost per Typical 1 Mile Section of Land

PEAK DRINKING WATER SYSTEM DEMAND

Residential	1,280,000 Gallons per day
Commercial	86,000 Gallons per day
TOTAL	1,366,000 Gallons per day

Assumptions:

1. Residential demand based on 607 gallons per DU per peak day.
2. Commercial demand is based on 2,000 gallons per acre per peak day.

PEAK IRRIGATION WATER SYSTEM DEMAND

Turf	176,000 Gallons per day
Low Water Use	21,000 Gallons per day
TOTAL	197,000 Gallons per day

Assumptions:

1. 55 acres of open space irrigation (40 acres turf and 15 acres of low water use landscape).
2. Turf demand is based on 4,400 gallon per acre per peak day, approximately 4.9 acre feet per acre per year (ADWR).
3. Low water use demand is based on 1,400 gallons per acre per peak day, approximately 1.5 acre feet per acre per year (ADWR).

INFRASTRUCTURE PER TYPICAL 1 MILE SECTION OF LAND

<i>Drinking Water System</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Cost</i>	<i>Total Cost</i>
Production Well Construction	2	Lump Sum	\$650,000	\$1,300,000
Production Well Design and CMI	2	Lump Sum	\$65,000	\$130,000
Well Site Construction	2	Lump Sum	\$900,000	\$1,800,000
Well Site Design and CMI	2	Lump Sum	\$90,000	\$180,000
Well Site Land	1	Acre	\$100,000	\$100,000
Water Supply Facility Construction	1,366,000	MGD	\$2.40	\$3,278,400
Water Supply Facility Design and CMI	1.00	Lump Sum	\$327,800	\$327,800
Water Supply Facility Land	4.00	Acres	\$100,000	\$400,000
Arsenic Treatment	1,366,000	Gallons	\$0.70	\$956,200
Well Transmission Main (12 inch)	5,280	Feet	\$100	\$528,000
Well Transmission Main Design and CMI	1	Lump Sum	\$52,800	\$52,800
Well Transmission Main Oversize	5,280	Feet	\$30	\$158,400
Distribution Main Oversize	5,280	Feet	\$30	\$158,400
DRINKING WATER SUBTOTAL				\$9,370,000

<i>Irrigation Water System</i>	<i>Quantity</i>	<i>Units</i>	<i>Unit Cost</i>	<i>Total Cost</i>
Water Supply Facility Construction	197,000	MGD	\$2.40	\$472,800
Water Supply Facility Design and CMI	1.00	Lump Sum	\$47,300	\$47,300
Water Supply Facility Land	0.50	Acres	\$100,000	\$50,000
Irrigation Transmission Main Oversize	5,280	Feet	\$30	\$158,400
IRRIGATION SUBTOTAL				\$728,500

TOTAL COST PER SQUARE MILE	\$10,098,500
PEAK GALLONS PER DAY PER SQUARE MILE	1,563,000
Cost per Peak Gallon	\$6.46

Source: City of Surprise, Water Services.

Assumptions:

1. Production well construction costs are based on the SPA 2 Asante Wells 1-4.
2. Production well design and CMI costs are based on 10% of construction costs.
3. Well construction is based on recent City projects (Marley Park #1).
4. Well site design and CMI is based on 10% of costs.
5. Well site land is based on two 150 ft by 150 ft well sites.
6. WSF construction costs are based on MVRWSF Phase 2.
7. WSF design and CMI costs are based on 10% of construction costs.
8. WSF land is based on 4 acres per site (based on ARWSF and Rancho Gabriella WSF).
9. Arsenic treatment costs are based on recent City projects (Sierra Verde and ARSWF).
10. Well transmission main minimum standard is 12-inch for each well.
11. Well transmission main design and CMI based on 10% of construction costs.

DUAL WATER SYSTEM DEVELOPMENT FEE

Figure 3 provides a summary of the variables used to calculate the Dual Water System Development Fee. Future revenue credits have been considered to avoid potential double payment for capital facilities and no such credit is needed for this fee category. Developers may be eligible for site-specific credits or reimbursements only if they provide system improvements that have been included in the Dual Water System Development Fee calculation schedule. Specific policies and procedures related to site-specific credits for system improvements are addressed in the ordinance that establishes the City’s fees. Project improvements normally required as part of the development approval process are not eligible for credits against development fees.

Figure 3: Dual Water System Development Fee Cost Summary

<i>Dual Water System Component Cost Summary</i>	<i>Standards</i>
Peak Gallons Water per Residential Connection per Day	607
Cost per Peak Gallon For 1 Square Mile of Dual Water System Infrastructure	\$6.46
Development Fee Study Cost per Gallon	\$0.002
Net Capital Cost per Gallon of Peak Capacity	\$6.463

A capacity ratio by meter size was used to convert the residential equivalent fee for a 0.75-inch meter into a proportionate fee for larger meter sizes. The capacity ratios by meter size are from the American Water Works Association (AWWA). For a one-inch meter, Surprise will use a conservative, typical-service ratio (see AWWA Manual 1, page 24). For all other meter sizes, Surprise will use ratios that assume 33% of maximum capacity, indexed to 0.75” meter (see AWWA Manual 6). If a large-scale development submits an independent engineering analysis, the Dual Water System Development Fee may be based on the net capital cost per gallon of peak capacity and the peak daily demand for the particular development

Figure 4: Dual Water System Development Fee

<i>Development Fees</i>			
<u>All Development</u>			
<i>Meter Size (inches)</i>	<i>Type</i>	<i>Capacity Ratio</i>	<i>Per Meter</i>
0.75	Displacement	1.0	\$3,923
1.00	Displacement	1.3	\$4,993
1.50	Displacement	3.3	\$12,950
2.00	Displacement	5.3	\$20,705
3.00	Compound	10.7	\$41,846
3.00	Turbine	12.0	\$46,932
4.00	Compound	17.0	\$66,656
4.00	Turbine	20.5	\$80,405
6.00	Compound	33.0	\$129,498
6.00	Turbine	41.2	\$161,646
8.00	Compound	53.3	\$209,231
8.00	Turbine	60.2	\$236,030