NOTICE OF POSTING

OF INFRASTRUCTURE IMPROVEMENTS PLAN FOR WATER AND WASTEWATER DEVELOPMENT IMPACT FEES

Under ARS §9-463.05, a Necessary Public Service is defined as any facility that has a life expectancy of 3 or more years and that are owned and operated by or on behalf of the city. A city desiring to assess a development impact fee to offset the cost of providing a Necessary Public Service must adopt a Land Use Assumption Report (separate posting) and Infrastructure Improvements Plan before adopting the Development Fee Report establishing any new development impact fees.

In the City of Scottsdale, the only Necessary Public Services for which development impact fees are collected are for Water and Wastewater Services.

Posted with this NOTICE is the City of Scottsdale's proposed Infrastructure Improvement Plan.

The Infrastructure Improvement Plan is a written document identifying growth driven water and wastewater infrastructure needs within a 10-year planning period. These needs along with other considerations serve to establish the basis for projected development impact fees.

The backup documents on which the Infrastructure Improvement Plan is based are available for review at The Administrative Offices of the Water Resources Department, 9379 E. San Salvador Dr., Scottsdale, Arizona
Contact Gina Kirklin, Enterprise and Finance Director
(480) 312-5685
EnterpriseFinance@ScottsdaleAZ.Gov

The Land Use Assumptions Report and the Infrastructure Improvements Plan and a notice of intent to modify development impact fees is scheduled for adoption at the City Council meeting
Tuesday, January 23, 2018 at 5:00 p.m.
3939 Drinkwater Blvd., Scottsdale, Arizona

City of Scottsdale

INFRASTRUCTURE AND IMPROVEMENT PLAN

WATER AND WASTEWATER

November 22, 2017

Water Resources Division

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Acronyms and Abbreviations

AACE	Association for the Advancement of Cost Engineering
AAD	Annual Average Day Wastewater Flow
ADWR	Arizona Department of Water Resources
ARS	Arizona Revised Statutes
AWT	Advance Water Treatment Facility
AWWA	American Water Works Association
CAP	Central Arizona Project
CGTF	Central Groundwater Treatment Facility
COS	City of Scottsdale
EDU	Equivalent Demand Unit
ENR	Engineering News Record
FAR	floor area ratio
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
IIP	Infrastructure Improvements Plan
LUA	Land Use Assumptions
mgd	million gallons per day
RCNLD	replacement cost new less depreciation
RWDS	Reclaimed Water Distribution System
SRO	Salt River Outfall
SROG	Sub-Regional Operating Group-91st Ave. Treatment Facility
SRP	Salt River Project
WDUA	Water Delivery and Use Agreement
WRF	Water Reclamation Facility
WTP	water treatment plant
WRMPU	Water Reuse Master Plan Update
WWTP	Wastewater Treatment Plant

CHAPTER 1. INTRODUCTION

1.1 Background

The City of Scottsdale (City or COS) has grown from a small community with a population of 2,000 in 1951, to a vibrant community of more than 238,000 persons encompassing an area of 185 square miles. Scottsdale is transitioning from a growth-oriented community to a mature City environment emphasizing economic development, revitalization, and sustainability. Based on current trends and land uses, Scottsdale's population in 2035 is estimated to approach 290,800.

1.2 Statement of Intent – Development of Impact Fees

One mechanism used by the City to fund the infrastructure needed to accommodate new growth is the assessment of development impact fees, which will hereinafter be called impact fees in this Infrastructure Improvement Plan. Impact fees are one-time payments that represent the “proportionate share” of infrastructure capital costs needed to accommodate new Equivalent Demand Units (EDUs). The City has 2 impact fees:

- **Water Impact Fees** provide funds for the cost of new or expanded facilities for the supply, transportation, treatment, purification, and distribution of water, and the pumping and storage infrastructure required by new EDUs within the City’s Service Area. Water Supply is an essential part of Water Services and a portion of the Water Impact Fee attributable to new EDUs for Water Supply pays only for acquiring, transporting, treating, and managing through recharge to and recovery from underground aquifers, new or renewable supplies of water required by new EDUs; and

- **Wastewater Impact Fees** pay for the cost of sewers, lift stations, reclamation plants, wastewater treatment plants and facilities for the collection, interception, treatment, transportation, and disposal of wastewater and any appurtenances for new or expanded facilities required by new EDUs.

1.3 Purpose of Infrastructure Improvement Plan (IIP)

The purpose of this document is to meet the requirements of an Infrastructure Improvement Plan (IIP) as defined in the subject ARS and to provide a basis for the Impact Fee Study on which the City’s Impact Fees will be based. This IIP has been developed for a 10-year period, 2017 to 2027, and is planned to be updated every 5 years.

1.4 Prepared by Licensed Professionals

The Infrastructure Improvement Plan was prepared by licensed professionals from CH2M HILL.

CHAPTER 2. WATER INFRASTRUCTURE PLAN

The category of Necessary Public Services covered by this Chapter 2 of the IIP includes water treatment, distribution, and water recharge. For the City of Scottsdale, the water system is treated herein as a single integrated system.

2.1 Water Service Area

The City's water master plan was recently updated; the current version is the *Water Master Plan Update* (CH2M HILL, 2015). As described in the master plan, Scottsdale's water service area is about 185 square miles as shown in Figure 2-1. It encompasses the area within the City limits, with two exceptions:

- EPCOR Water serves about 1,420 customers in the area west of the Arizona Canal between Jackrabbit Road and Indian Bend Road, which is about one square mile.
- EPCOR Water serves about 200 customers near the boundary of Town of Fountain Hills.

The City also serves about 1,400 customers outside the City limits in Maricopa County north of Dynamite Boulevard, generally between 56th Street and 68th Street. This area is built out.

In addition, the City has agreements with the Tonto Hills Domestic Water Improvement District and Carefree Water Company to treat and deliver their Central Arizona Project (CAP) allocations outside the City limits; however, these customers are subject to the rates, charges, and impact fees of their respective utilities.

The City's water treatment and distribution system is interconnected and is treated as one integrated system within the City's service area. Due to its size, the water service area is subdivided into regions and further subdivided into pressure zones to regulate the water pressure for customers across the City's many elevation ranges. The water system is also flexible in that water supplies from the north may be conveyed to the south, and vice versa. While there are many ways that the water system can be divided and sub-divided, ultimately the entire water system is managed and operated as a single system. This single service area approach is consistent with the implementation of the impact fees wherein the "system average cost" is used, which focuses on the total value and total demand placed on the water system. The City's primary water supplies include Colorado River water delivered via the Central Arizona Project (CAP) aqueduct, Salt River Project (SRP) water delivered via the Arizona Canal, and groundwater wells. Some of Scottsdale's groundwater supplies are used to conduct remediation activities at the Central Groundwater Treatment Facility (CGTF) and North Groundwater Treatment Facility (NGTF) in the Southern Region.

The water treatment facilities are capable of serving multiple regions in the City as shown in Table 2-1 since the water distribution systems are interconnected. Although the CAP Water Treatment Plant (WTP), the Chaparral WTP, the CGTF and the NGTF represent the primary drinking water supply sources, the City also has additional groundwater wells that are used to supplement supplies in various regions across the water system.

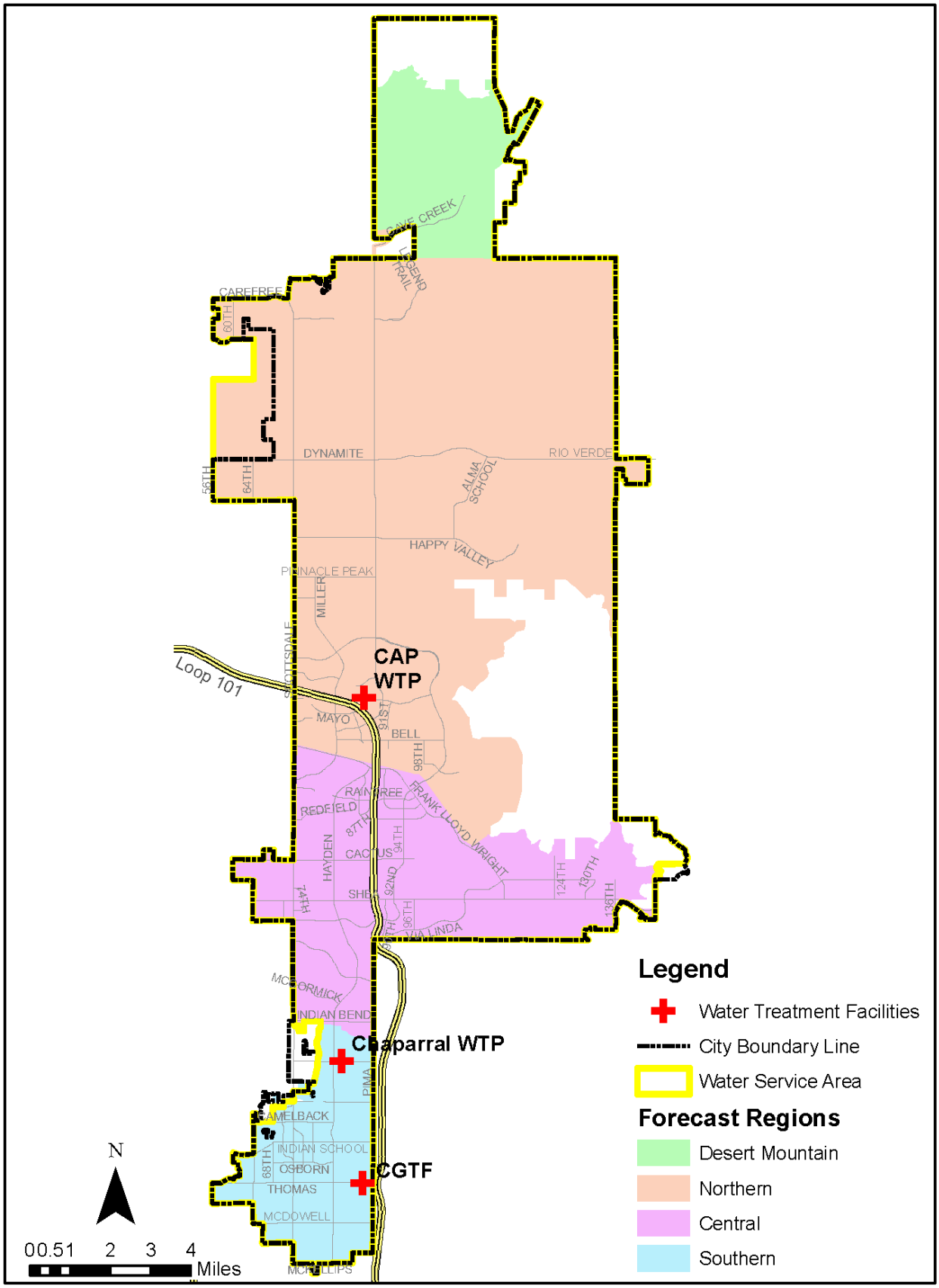
TABLE 2-1 Regions Served by Water Treatment Facilities

Water Treatment Facility	Desert Mountain	Northern	Central	Southern
CAP WTP	X	X	X	X
Chaparral WTP [1]	X	X	X	X
CGTF			X	X
NGTF			X	X

[1] SRP water treated at the Chaparral WTP may be conveyed to regions other than the Southern region but must be tracked, so a balance is maintained per the Water Delivery and Use Agreement (WDUA).

The governing policies with respect to water rights are complex. For the purpose of this IIP, a high-level summary follows. The City's supplies of CAP water, typically treated at and distributed from the CAP WTP, may be delivered anywhere within the Scottsdale water service area. The SRP supply, which is treated at and distributed from the Chaparral WTP, is intended for use on lands within the SRP service area south of the Arizona Canal; however, during maximum day demand conditions this water supply may be used to supplement water needs at other locations in the City's service area. The Water Delivery and Use Agreement (WDUA) that the City has in place with SRP provides for a mechanism of water exchanges. Therefore, by tracking and accounting for deliveries of SRP water to areas of Scottsdale outside of the SRP service area, the City can replace this water in accordance with the agreement, resulting in an appropriate exchange of water.

FIGURE 2-1 Water Service Area



2.2 Land Use

The Land Use Assumptions (LUA), on which this IIP is based, are described and documented separately in an accompanying LUA Report. The LUA includes the City's current demographic estimates, and its projections for future development within the City's service area.

2.3 Existing Level of Service

In order to calculate impact fees, the usage of various customer types must be standardized into a measure of demand attributable to an individual unit of development termed a service unit. For the water category of Necessary Public Services, the service units are translated into an "Equivalent Demand Unit" (EDU), which is equivalent to the water demand of one detached single-family dwelling unit. To standardize the use of other customer types to a single-family dwelling unit, the City uses the ratio of the capacity of meter sizes.

Single-family dwelling units in the City have historically utilized the 5/8" water meter for typical residential water service as it meets the demands of a standard single-family unit. The 1" meter has the additional capability of supporting an increased increment of flow for fire suppression. To standardize its residential meter sizes, the City is adopting the 1" meter as the minimum meter size for a single-family unit. For this Water IIP, it is appropriate, however, to establish the 5/8" meter capacity (10 gpm) as the base rate of flow, with subsequent meter size EDU multipliers based on the potential flow rates of those larger meters in relation to this base flow rate. The City is, therefore, consolidating all meter sizes of 1" or less into a single meter class that is equivalent to one EDU. The meter capacities expressed in gallons per minute (gpm) by size and type based on standards from the American Water Works Association (AWWA) and ratios of EDUs are shown in Table 2-2 below.

TABLE 2-2 Equivalent Demand Unit Conversions

Land Use	Meter Size/Type	Meter Capacity (gpm)	EDU Multiplier	Unit
Single Family (up to 1" meter size)			1	Per Dwelling Unit
Multi Family (individually metered up to 1" meter size)			1	Per Dwelling Unit
All Other Land Uses or Additional Meters [a]	<=1"	10	1 [b]	Per Meter
	1 ½"	50	5	Per Meter
	2"	80	8	Per Meter
	3" Compound	175	17.5	Per Meter
	3" Turbine	220	22	Per Meter
	4" Compound	300	30	Per Meter
	4" Turbine	420	42	Per Meter
	6" Compound	675	67.5	Per Meter
	6" Turbine	865	86.5	Per Meter
	8" Compound	900	90	Per Meter

Note: Meter Capacities are the "Recommended Maximum Rate for Continuous Operations" as documented in AWWA standards C700, C701, and C702 (2015).

[a] In addition to all commercial meters, Single-Family meters greater than 1" and Multi Family meters greater than 1" are accounted for in this section.

[b] The City of Scottsdale has determined that a 1" meter is the minimum sized meter for a new service. A 5/8" or ¾" meter may be requested for outside irrigation of lawns and gardens only. This IIP will account for meter sizes equal to or less than 1" as being equivalent to one EDU.

Using the City's database of fiscal year ending June 2016 water meter records, Table 2-3 calculates the existing EDUs in the City's water service area.

TABLE 2-3 Existing Water EDUs

Meter Type	Meter Count	EDU conversion	EDU
Single Family <=1"	77,848	1	77,847
Single Family = 1.5"	876	5	4,380
Single Family = 2"	104	8	832
Single Family = 3" Compound	2	17.5	35
Single Family = 3" Turbine	1	22	22
Multi-Family <=1"	2,191	1	2,191
Multi Family = 1.5"	1,013	5	5,065
Multi Family = 2"	1,806	8	14,448
Multi Family = 3" Compound	6	17.5	105
Multi Family = 3" Turbine	20	22	440
Multi Family = 4" Compound	13	30	390
Multi Family = 4" Turbine	11	42	462
Multi Family = 6" Compound	12	67.5	810
Multi Family = 6" Turbine	11	86.5	952
Multi Family = 8" Compound	4	90	360
Residential Subtotal	***83,917***		***108,339***
Non-Residential <=1"	2,409	1	2,409
Non-Residential = 1.5"	1,524	5	7,620
Non-Residential = 2"	1,575	8	12,600
Non-Residential = 3" Compound	19	17.5	332.5
Non-Residential = 3" Turbine	116	22	2,552
Non-Residential = 4" Compound	7	30	210
Non-Residential = 4" Turbine	67	42	2,814
Non-Residential = 6" Compound	7	67.5	472.5
Non-Residential = 6" Turbine	28	86.5	2,422
Non-Residential Subtotal	***5,752***		***31,432***
Total	**89,669**		**139,771**

For purposes of this Water IIP assessment, the existing level of service of the water system is defined as meeting the peak or maximum day demand, which is the highest volume of water used by customers in a day during the year. In water systems, the maximum day demand typically occurs on a summer day when water usage for outdoor irrigation and other indoor uses are highest. The maximum day demand for the last several calendar years is shown in Table 2-4.

TABLE 2-4 Maximum Day Demand

Calendar Year	Maximum Day Demand (gallons per day)
2012	94,140,000
2013	94,918,000
2014	92,112,000
2015	94,860,000
Average	**94,007,500**

The average maximum day demand of the last several calendar years was 94,007,500 gallons per day (gpd). This average will be used to calculate the EDUs because water treatment facilities are rated and permitted based on maximum firm treatment/production capacity.

To conform to the projections in the LUA, the existing level of service for both residential and non-residential EDUs is calculated using each customer class's volumetric flow from the City's meter billing database for the last several fiscal years and the respective number of EDUs or employees[1]. A summary of the volumetric flow is shown in Table 2-5.

TABLE 2-5 Volumetric Flow Contribution by Customer Class

Fiscal Year	Residential Volume	Residential Percent Use	Non-Residential Volume	Non-Residential Percent Use
2013	17,528,337,880	79%	4,531,436,824	21%
2014	17,766,753,970	80%	4,568,354,758	20%
2015	16,494,010,280	79%	4,314,584,368	21%
2016	17,520,704,750	79%	4,525,719,673	21%
Average Use		**79%**		**21%**

Based on the number of existing residential EDUs, the existing residential level of service (meeting maximum day demand) per EDU is shown in the following calculation:

(94,007,500 gpd x 79.44%) ÷ 108,339 EDUs = 689.3 gpd water per EDU

Also, since the LUA projections for non-residential uses are in terms of employees, the non-residential level of service is expressed in these terms. As noted in the LUA, the estimated number of employees is currently 184,528 employees. Likewise, the existing non-residential level of service (meeting maximum day demand) per employee is shown in the following calculation:

(94,007,500 gpd x 20.56%) ÷ 184,528 employees = 104.8 gpd water per employee

For purposes of calculations in the remainder of this IIP chapter, the existing level of service per residential water EDU is expressed as 689.3 gpd per EDU, and the existing level of service per employee is expressed as 104.8 gpd per employee (the level of service ratio between residential and non-residential customers is used to calculate the number of non-residential EDUs and is 6.58). See Future Non-Residential EDUs in this chapter for more detail.

[1] The 2013 LUA presented non-residential EDUs based on forecasted commercial square footage. The current LUA presents a conversion from square footage to number of employees to represent non-residential growth.

2.4 Future Level of Service

The level of service provided to new customers will be consistent with the existing level of service as described above. Any capital improvements proposed for the water system to accommodate new EDUs or employees will be designed to accommodate 689.3 gpd per EDU and 104.8 gpd per employee of maximum day water demand.

2.5 Existing Capacity of Capital Facilities

The purpose of this section is to document the existing capacity of the capital facilities in the water service area, the utilization of those capital facilities by existing EDUs, and the available excess capacity of those capital facilities to serve new EDUs, including any existing or planned commitments or agreements for the usage of such capacity. This section additionally identifies those changes or upgrades that are required to achieve or maintain the planned Level of Service to existing EDUs. The capital facilities that provide water within the service area comprise three components, including water treatment, water distribution, and water recharge.

While the water distribution system consists of a network of individual components, all of which have a unique capacity, many of these components have been designed to accommodate both current and new EDUs beyond the 10-year planning period. Hence, the collective capacity of the treatment facilities can be used as a measure of the capacity of the entire water distribution system.

The City must maintain long-term sustainable water supplies in compliance with the requirements of the Assured Water Supply which is regulated by the Arizona Department of Water Resources (ADWR). The City's water supply strategy utilizes surface water provided through Salt River Project and Central Arizona Project, and treated wastewater. to supply the untreated water to the City's two water treatment plants. The city recharges both treated wastewater (reclaimed water) and surface water in order to earn Long Term Storage Credits to offset groundwater pumping. The City does not plan to purchase additional water rights within the 10-year planning horizon, and currently does not collect fees on existing water rights available to serve new EDUs in this IIP. The three components of the water system have a unique capacity. Additionally, when determining the available capacity of each component, it is necessary to exclude any capacity that has been reserved to meet contractual agreements or any facilities or portions of facilities that are not eligible to serve new EDUs as is described in Chapter 6 of this IIP.

The existing capacity of the three components of the water system that are eligible to serve new EDUs and are recovered through the water impact fee is summarized in Tables 2-6 (Treatment Facilities), 2-7 (Distribution System), and 2-8 (Recharge Facilities).

Table 2-6 shows the existing capacity of the Water Treatment Facilities and the net capacity available for new EDUs.

TABLE 2-6 Existing Capacity of Water Treatment Facilities

Facility	Capacity (mgd)
CAP WTP	70.00
Chaparral WTP	27.00
CGTF	12.30
NGTF	3.58
Wells[a]	50.90
Total Capacity	**163.78**
Less CGTF and NGTF	(15.88)
Less Reserved Capacity	(0.37)
Total Eligible (unused capacity) for New EDUs	**147.53**
Less Maximum Day Demand	(94.01)
Capacity Available for New EDUs	**53.52**

[a]Net capacity to be replaced by CAP WTP expansion.

The total eligible treatment capacity to serve new EDUs is the difference between the capacity of the treatment system, less the CGTF and NGTF of 15.88 mgd, and reserved capacity of 0.37 mgd. The net capacity to serve new EDUs is 53.52 mgd.

Table 2-7 shows the existing capacity of the Water Distribution Facilities.

TABLE 2-7 Existing Capacity of Water Distribution System

Facility	Capacity (mgd)
Current Pipe Capacity	147.90
Less Reserved Capacity	(0.37)
Total Eligible (unused capacity) for New EDUs	**147.53**
Less Maximum Day Demand	(94.01)
Capacity Available for New EDUs	**53.52**

The total eligible distribution system capacity to serve new EDUs is the difference between the capacity of the distribution system, less reserved capacity of 0.37 mgd. The net capacity available to serve new EDUs is 53.52 mgd.

Table 2-8 shows the existing capacity of the Recharge Facilities.

TABLE 2-8 Existing Capacity of Water Recharge Facilities

Facility	Capacity (mgd)
Current AWT Capacity	20.00
Less Reserved Capacity	(6.50)
Total Eligible (unused capacity) for New EDUs	**13.50**
Less Current Demand (active recharge)	(5.84)
Capacity Available for New EDUs	**7.66**

The total eligible recharge capacity to serve new EDUs is the difference between the capacity of the Advanced Water Treatment Facility (AWT), less reserved capacity of 6.50 mgd. The net capacity available to serve new EDUs is 7.66 mgd.

The total eligible capacity to serve new EDUs for each component of the water system is the difference between the net available for use, less the reserved capacity. For the water treatment and distribution system, capacity available for new EDUs is the difference between the net available for use, less reserved capacity, less the average maximum day demand of the last several calendar years of 94.01 mgd, since the water system must be capable of continuing to meet the highest demands from existing EDUs. For water recharge, the capacity available for new EDUs is the difference between the net available for use, less reserved capacity, less the current demand, which is the average daily winter AWT recharge, for the last several calendar years; recharge is typically only conducted during the winter months.

2.5.1 Buy-In to Existing Water System

The buy-in value of the existing water system represents the replacement cost new less depreciation (RCNLD) of each component of the water system. This RCNLD is determined by escalating depreciated facility asset values based on the Engineering News Record (ENR) construction cost index. Again, the value of any assets that are reserved, were contributed by developers, or other parties, or have contractual restrictions, are excluded from the buy-in value of facilities eligible to serve new EDUs. In addition to the RCNLD of the water facilities eligible to serve new EDUs, the buy-in component also includes the remaining annual interest payments on debt the City has issued in the past for facilities that benefit development. The remaining interest payments on the water system debt benefiting development totals $40,407,423. The interest expense is recovered through the assessed Water Impact Fee, and the subsequent Water Impact Fee and Water Supply Fee revenues may be used to service the debt the City has issued to fund facilities that benefit development. Table 2-9 summarizes the buy-in to the existing water system.

New connections are required to buy-in to each component of the existing water system as shown in Tables 2-6, 2-7, and 2-8 and are allocated costs based on the portion of existing capacity in each component that is available to serve new EDUs.

TABLE 2-9 Buy-In to Existing Water System

Plant Investment – Water System Buy-In	Total Value RCNLD 6/30/17[a]	Used by Existing EDUs[b]	Available for New EDUs[c]
Water Treatment Plants[d]	$496,520,154	$316,387,300	$180,132,854
Distribution System[e]	$252,952,560	$161,183,744	$91,768,816
Recharge Facilities[f]	$10,430,104	$4,511,986	$5,918,118

TABLE 2-9 Buy-In to Existing Water System

Plant Investment – Water System Buy-In	Total Value RCNLD 6/30/17[a]	Used by Existing EDUs[b]	Available for New EDUs[c]
Total Water System	**$759,902,817**	**$482,083,030**	**$277,819,788**

[a] Represents the total RCNLD value of those facilities eligible to serve new EDUs. The facilities eligible to serve new EDUs do not represent the entirety of the City's water system facilities nor the replacement value of all system assets owned by the City as the values of certain facilities are excluded from the total replacement costs eligible to serve new EDUs. Those facilities excluded from the facilities eligible to serve new EDUs include facilities contributed by developers or other parties, replacements benefiting existing EDUs, and facilities or portions of facilities that will not benefit new development.

[b] Represents the portion of the total RCNLD value for each component of the City's water system that is either reserved or associated with meeting current demands of existing EDUs. The current demand, or level of service, for each component of the system is determined based on four-year average water treatment and customer use data.

[c] Represents the portion of the total RCNLD value for each component of the City's water system that is available to meet anticipated demands of new EDUs. The available capacity in each component of the system is determined by deducting reserved capacity and existing customer demands from the total capacity of the facilities eligible to serve new EDUs.

[d] Water Treatment Plants includes the 70.0 mgd CAP WTP, the 27.0 mgd Chaparral WTP, and 50.9 mgd of ground water well capacity. The CGTF and NGTF are excluded from the water treatment plants component since this facility is not eligible to serve new EDUs. The total capacity of the facilities eligible to serve new EDUs in the water treatment plants component is adjusted to reflect reserve capacities. For more information on existing capacity eligible to serve new EDUs, see Table 2-6.

[e] Distribution System includes pumping facilities, transmission structures, distribution reservoirs, and distribution mains eligible to serve new EDUs. Any Distribution System facilities contributed by developers or other parties have been excluded from the total value eligible to serve new EDUs. These facilities provide total capacity eligible to serve new EDUs equal to the current treatment capacity. For more information on existing capacity eligible to serve new EDUs, see Table 2-7.

[f] Recharge Facilities includes the Advanced Water Treatment (AWT) Facility which treats effluent from the Water Campus Reclamation Facility and recharges a portion of that effluent into the aquifer. This recharged water represents a water supply as it can be withdrawn from the aquifer and treated to meet potable water demands by existing and new EDUs. The total recharge capacity eligible to serve new EDUs is 13.5 mgd of the total 20.0 mgd of AWT capacity, since 6.5 mgd is reserved for the Reclaimed Water Distribution System (RWDS) which supplies reclaimed water to local golf courses. For more information on the existing capacity eligible to serve new EDUs see Table 2-8.

2.6 Grandfathered Capital Facilities

There are no grandfathered capital facilities in the City's water system.

2.7 Future EDUs

2.7.1 Future Residential EDUs

A summary of the residential growth from the LUA in the North, Central and South regions of the City and within the water service area outside the City boundary through fiscal year 2027 is shown in Table 2-10.

TABLE 2-10 Future Residential EDUs

Sub-area	Residential (dwelling units)
North	5,316
Central	3,668
South	4,389
Total	**13,373**

As described in Table 2-2, the EDU conversion for residential growth is 1 EDU per dwelling unit; therefore, 13,373 future EDUs for residential growth are expected in the next 10 years.

2.7.2 Future Non-Residential EDUs

The level of service ratio between residential and non-residential customers is used to calculate the number of non-residential EDUs as shown in the following calculation:

689.3 gpd/EDU ÷ 104.8 gpd/employee = 6.58 employees/EDU

Per the LUA, a summary of non-residential growth by number of employees along with the conversion to EDUs is shown in Table 2-11.

TABLE 2-11 Future Non-Residential Growth

Sub-area	Non-Residential (employees)	Non-Residential EDUs
North	3,183	484
Central	14,265	2,168
South	7,311	1,111
Total	**24,759**	**3,763**

2.7.3 Existing and Future EDUs

The total EDUs and employees that the water system will need to serve by fiscal year 2027 includes the existing residential EDUs and the new residential EDUs along with the existing employees and new employees as described above. The total EDUs are summarized in Table 2-12.

TABLE 2-12 Existing and Future EDUs

	Residential EDUs	Non-residential EDUs	Total
Existing	108,339	31,432	139,771
Future	13,373	3,763	17,136
Total	**121,712**	**35,195**	**156,907**

2.8 Required Capital Facilities

2.8.1 Water Treatment/Production

As noted in Table 2-6, there is excess treatment/production capacity of 53.52 mgd to serve new demand. With the addition of 13,373 residential EDUs and a level of service of 689.3 gpd/residential EDU, the new

residential EDUs will require 9.2 mgd to meet maximum day demand. The addition of 24,762 employees and a level of service of 104.8 gpd/employee will require 2.6 mgd to meet maximum day demand. The new capacity required for new growth totals 12.0 mgd.

Due to this growth, the CAP WTP is planned for a 20 mgd expansion totaling $30,000,000 during the 10-year planning period for this IIP. The plant's 70-mgd capacity is sufficient to meet the average demands of the system throughout the planning period. However, additional groundwater would need to be supplied to meet peak demands in the summer. Expanding the CAP WTP, would close the gap, reduce the reliance on additional groundwater supplies and maintain safe yield as required by state regulations after 2025.

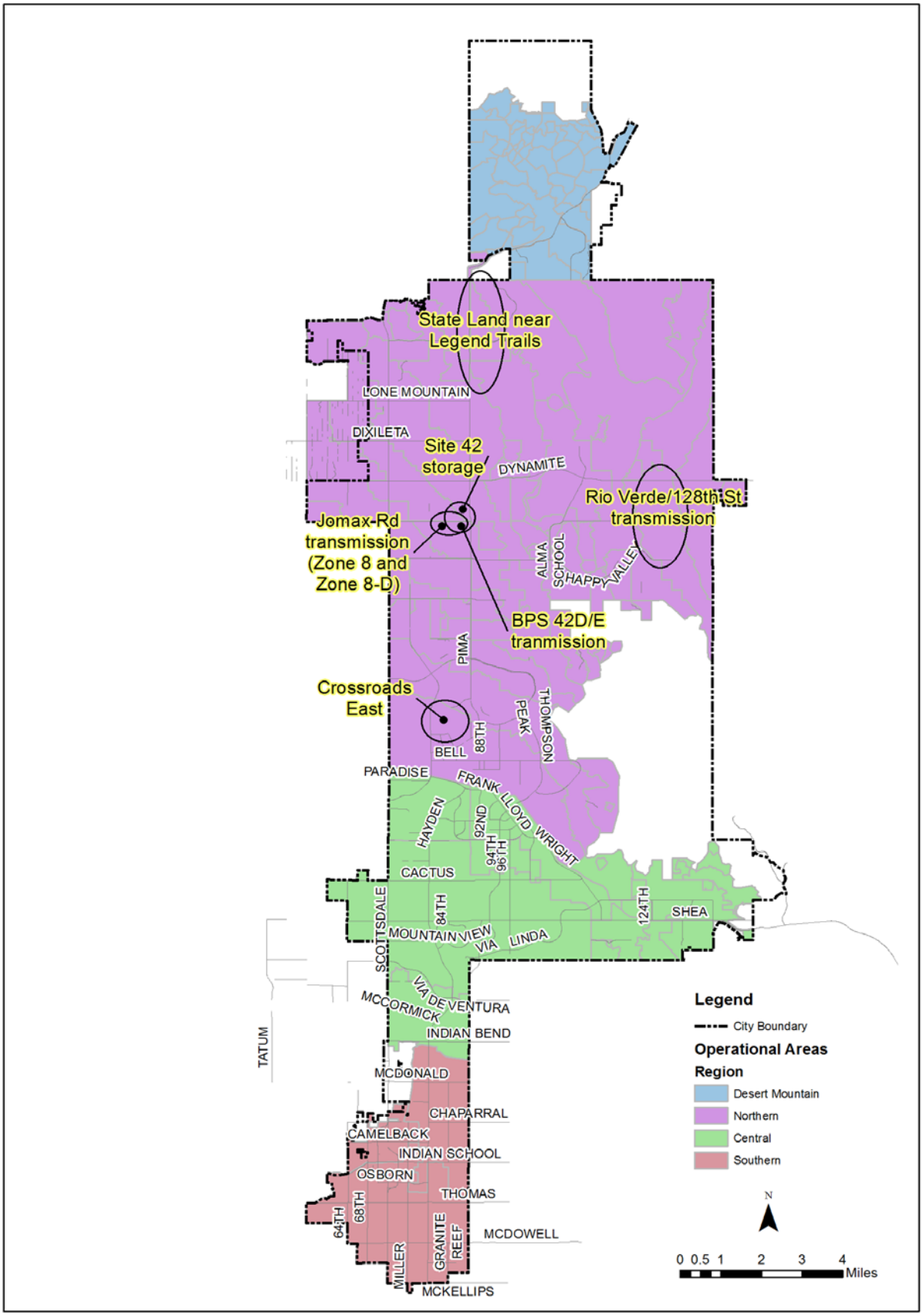
2.8.2 Water Distribution Improvements

Since the additional capacity will be required to serve development beyond the current growth areas, the City plans to size the infrastructure to support the increment of treatment and production capacity occurring beyond the 10-year planning period for this IIP. The City published an "*Infrastructure Improvement Plan: Water and Wastewater*" in December 2013 (2013 IIP) that specified several growth-related water distribution projects.[2] These projects will be constructed during this current IIP period and are included in this IIP. Details regarding these projects are available in the 2013 IIP posted on the City's website and because the projects are still under construction, or will be under construction, they are summarized in Table 2-14 below.

In addition to the projects identified in the 2013 IIP, the following 2017 IIP growth-related infrastructure is required within this 10-year IIP planning period as shown in Figure 2-2 and summarized in Table 2-14 below.

[2] Water Resources Division, City of Scottsdale, AZ. *Infrastructure Improvement Plan: Water and Wastewater.* December 4, 2013. http://www.scottsdaleaz.gov/Assets/ScottsdaleAZ/Water/Rates+and+Fees/IIP2013.pdf

FIGURE 2-2 Areas requiring Water System Improvements



2.9 Water Supply

As previously discussed, the City of Scottsdale derives its water supply from a combination of sources including two different surface water suppliers in addition to the use of local groundwater. Other water supply management strategies are also implemented within the Scottsdale water utility operations, which include effluent reuse and groundwater recharge. These assist the City in achieving long-term sustainable supplies and compliance with the requirements of the Arizona Department of Water Resources (ADWR). Scottsdale has a management objective to consistently maintain its status with ADWR as an Assured Water Supply Provider in accordance with state statutes. The most recent review of Scottsdale's Assured Water Supply status by ADWR occurred on June 24, 2013. ADWR reviewed relevant information relating to: the use of CAP supplies; the use of SRP supplies; hydrologic information for the proposed groundwater supply utilization; water demands; and, overall consistency with the ADWR Management Plan. As a product of this standard review, ADWR issued its findings in a formal Decision and Order and notified Scottsdale of its approval of the City's Designation of Assured Water Supply.

The City's Designation of Assured Water Supply from ADWR, as of June 24, 2013 provides the following:

- The annual estimated water demand in 2025 (which is current demand, committed demand and 2025 projected demand) is 130,977 acre feet per year. (An acre-foot of water is, one square acre of water, 1-foot deep or 325,851 gallons).
- ADWR has determined that the total volume of available water supply is 140,791.74 acre-feet per year. (It should be noted that this available supply is based on the legal guidelines associated with an Assured Water Supply approved by ADWR and does not necessarily reflect the fact that water management strategies are needed to produce the necessary supply at the right time to meet system demands. The City has an additional 50,000 acre-feet of Horseshoe Lake water credits, with a maximum use of 500 acre-feet per year. This supply is not yet a part of the City's Assured Water Supply and is not anticipated to be used during this 10-year planning period.

To meet additional demands, identified in the 2017 IIP, a new well north of Loop 101 near Hayden is planned that requires blending at the Water Campus at a cost of $3,950,000. Also, additional activities, identified in the 2013 IIP related to the recharge of a portion of Scottsdale's available renewable supply of reclaimed wastewater are planned. Eight (8) additional reclaimed water vadose zone recharge wells are planned for in 2020 at a cost of $3,200,000. These projects are summarized in Tables 2-13 and 2-14.

TABLE 2-13 Water Supply Cost Estimates from 2013 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
Vadose Zone Recharge Wells	Recharge of a portion of renewable reclaimed water	$0	$3,200,000	$3,200,000

TABLE 2-14 Water Supply Cost Estimates from 2017 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
New Well	New well North of Loop 101 near Hayden	$0	$3,950,000	$3,950,000

As a part of the Water Impact Fee, there will be established a Water Supply fund to be used to acquire, transport, treat and manage through recharge to and recovery from underground aquifers, new and renewable supplies of water. The Water Impact Fee will be charged as one fee, but will be accounted for in two (2) separate fund, one to be used for Water Service and one to be used for Water Supply. Water Service will receive approximately seventy-seven percent (78%) of the Water Impact Fee and Water Supply will receive approximately twenty-three percent (22%) of the Fee.

2.10 Cost Estimates

Cost estimates were developed in accordance with the guidelines of AACE (Association for the Advancement of Cost Engineering) International for a Class 5 estimate. It should be noted that these costs do not include financing costs, interest, the time value of money, or inflation. The Class 5 estimates for the projects described above are summarized in Tables 2-15 and 2-16.

TABLE 2-15 Water Distribution Cost Estimates from 2013 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
Wildcat development	6 miles of pipelines, a storage tank, two booster stations and several pressure reducing valve stations east of Boulder View Drive	$0	$14,446,300	$14,446,300
State Land	4.5 miles of pipelines and pressure reducing valve stations east of Pima Road between Dynamite and Ashler Hills	$0	$5,475,500	$5,475,500
East Dynamite	2 miles of pipeline east of 114th Street near Dynamite	$1,218,000	$1,827,000	$3,045,000
Crossroads East	3.5 miles of pipeline and pressure reducing valve stations west of Hayden Road and north of Princess Blvd.	$0	$4,606,700	$4,606,700
Total		**$1,218,000**	**$26,355,500**	**$27,573,500**

TABLE 2-16 Water Distribution Cost Estimates for 2017 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
State Land near Legend Trails	3 miles of transmission pipeline northeast of Pima Road	$0	$7,284,000	$7,284,000
Site 42 reservoir storage expansion	New 1.5 MG tank and associated yard piping northwest of Jomax and Pima Roads	$0	$2,920,000	$2,920,000
Rio Verde/128th Street transmission	BPS upgrade, over 2.5 miles of transmission pipeline east of Alma School Road	$0	$5,155,700	$5,155,700
Zone 8-D Jomax Road transmission	over half a mile of transmission pipeline along Jomax west of Pima Road	$0	$927,000	$927,000
Zone 8 Jomax Road transmission	about half a mile of transmission pipeline along Jomax west of Pima Road	$0	$725,000	$725,000
BPS 42D/E transmission capacity upgrade	PRV station and less than half a mile of transmission pipeline along Jomax west of Pima Road	$0	$950,000	$950,000

TABLE 2-16 Water Distribution Cost Estimates for 2017 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
Crossroads East	BPS upgrade and nearly 1 mile of transmission pipeline east of Hayden Road north of Loop 101	$0	$4,550,000	$4,550,000
Total		**$0**	**$22,511,700**	**$22,511,700**

2.11 Water System Summary

Table 2-17 below summarizes the buy-in and necessary water system improvements to serve new EDUs in the 10-year planning period of this IIP.

TABLE 2-17 Water System Cost Summary

	Estimated Cost
Buy-In	$759,902,817
2017 IIP Water Treatment	$30,000,000
2013 IIP Water Distribution Infrastructure	$26,355,500
2017 IIP Water Distribution Infrastructure	$22,511,700
2017 IIP Water Supply	$7,150,000
Total	**$845,920,017**

These costs do not include changes or upgrades to serve existing capital facilities in order to meet stricter safety, efficiency, upgrading, updating, expanding, correcting, replacing, environmental, or regulatory requirements for water services provided to existing EDUs.

CHAPTER 3. WASTEWATER INFRASTRUCTURE PLAN

3.1 Wastewater System

The category of Necessary Public Services covered by this Chapter 3 of the IIP includes wastewater collection, conveyance, treatment and reclamation. For the City of Scottsdale, the wastewater system is integral with the reclaimed water system and these elements are treated herein as a single integrated system.

3.2 Wastewater Service Area

The City of Scottsdale provides sewer service to an area that largely coincides with the City boundary. While there are many ways that such a system can be divided and subdivided (i.e. tributary areas of selected points in the collection and conveyance system) ultimately the entire wastewater system is managed and operated as a single service area. This single service area approach is consistent with the implementation of the impact fees wherein a "system average cost" is used, which focuses on the total value and total demand placed on the wastewater system.

This single service area approach is not to be confused with the various ways that a system can be analyzed. For example, the 2012 Water Reuse Master Plan Update (WRMPU) presents the sewer collection system divided into five basins associated with tributary areas at key points in the collections system (i.e. selected pumpback and metering stations). While these divisions are convenient for flow monitoring and model development, the operation of any one of these wastewater system components affects many others and therefore cannot reasonably be isolated into a separate service area.

It should be noted that in addition to wastewater flows that are generated within Scottsdale, the City has entered into agreements with neighboring communities to transport and/or treat portions of wastewater originating in those communities. Some Phoenix wastewater flows enter the Scottsdale collection system through a metering station and pass through the Scottsdale collection system to the Sub-Regional Operating Group (SROG) system per an existing contract. Some of these Phoenix flows can be pumped to the Water Campus for treatment. Paradise Valley flows enter through connections along the border with Scottsdale. Flows from the Black Mountain Sewer Company and a small area in the Town of Fountain Hills (13 parcels) enter Scottsdale interceptors. There is a small area within the City limits on the east side at approximately Cactus Road which has sewer flows that enter the Fountain Hills Sanitary District facilities. Some areas in the City currently use septic systems and therefore do not contribute wastewater flows.

Figure 3-1 shows the entire wastewater service area, and three treatment facilities. A pumpback system is used to balance the wastewater flows that are sent to the SROG, Water Campus, or Gainey Ranch Water Reclamation Facility (WRF) for treatment. The three treatment systems and pumpback system include:

- Water Campus Water Reclamation Plant (WRP) and Advanced Water Treatment Facility (AWT) – can receive and treat wastewater from Basins 2 through 5.

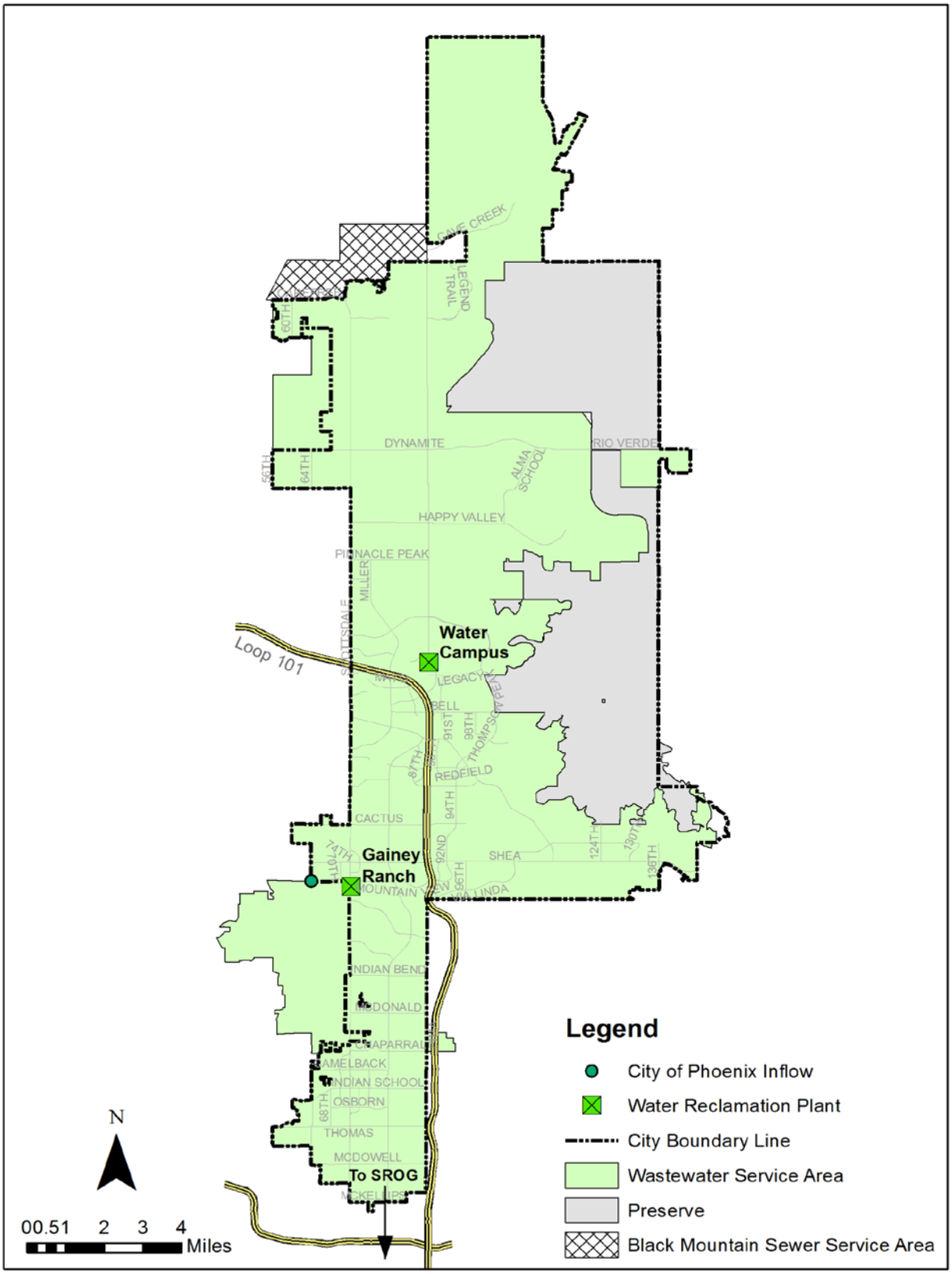
- SROG WWTP – The SROG WWTP is jointly owned by the Cities of Scottsdale, Phoenix, Mesa, Glendale and Tempe. For Scottsdale, the SROG WWTP can receive wastewater from basins 1 through 4, treats the solids streams, and concentrate flows generated by the Water Campus WRP, the AWT, and Gainey Ranch WRF respectively.

- Gainey Ranch WRF – is a reclamation plant that is operated to provide effluent to an adjacent golf course.

- Pumpback systems (east and west) – convey wastewater flows from Basins 2, 3 and 4 to the Water Campus WRP.

The wastewater flow projections were developed based on the relevant land use assumptions described in the LUA and established City standards related to the conveyance and treatment of wastewater.

FIGURE 3-1 Wastewater Service Area



3.3 Land Use

The Land Use Assumptions (LUA), on which this IIP is based, are described and documented separately in an accompanying LUA Report. The LUA includes the City's current demographic estimates, and its projections for future development within the City's service area.

3.4 Existing Level of Service

In order to calculate impact fees, the usage of various customer types must be standardized into a measure of demand attributable to an individual unit of development termed a service unit. For the wastewater category of Necessary Public Services, the service units are translated into an "Equivalent Demand Unit" (EDU), which is equivalent to the wastewater flow from one detached single-family dwelling unit. Based on the approach that overall water usage is a reasonable predictor of wastewater production, and to be consistent with Chapter 2 (Water IIP), water meter size will be used to determine the existing wastewater EDU level of service. As described in the Water IIP, the use of other customer types is related to a single-family dwelling unit via a ratio of meter sizes. Single-family dwelling units in the City typically have a 1" or less meter size. The meter capacities by size and type are listed in Table 3-1.

Using the City's database of fiscal year ending June 2016 meter records, Table 3-1 shows the calculations of the EDUs in the City's wastewater service area. It is important to note the meter counts featured in this table represent those properties that are provided sewer service by the City, and do not necessarily correlate to water meter counts. For example, some water customers have septic systems and certain sewer customers are supplied water from a different water service provider.

TABLE 3-1 Existing Wastewater EDUs

Meter Type	Meter Count	EDU conversion	EDU
Single Family <=1"	72,003	1	72,003.0
Single Family = 1.5"	615	5	3,075.0
Single Family = 2"	59	8	472.0
Single Family = 3" Compound	1	17.5	17.5
Single Family = 4" Compound	1	30	30.0
Single Family = 6" Compound	1	67.5	67.5
Multi-Family <=1"	1,657	1	1,657.0
Multi Family = 1.5"	653	5	3,265.0
Multi Family = 2"	1,280	8	10,240.0
Multi Family = 3" Compound	5	17.5	87.5
Multi Family = 3" Turbine	20	22	440.0
Multi Family = 4" Compound	15	30	450.0
Multi Family = 4" Turbine	11	42	462.0
Multi Family = 6" Compound	15	67.5	1,012.5
Multi Family = 6" Turbine	11	86.5	951.5
Multi Family = 8" Compound	4	90	360.0
Residential Subtotal	***76,351***		***94,591***
Non-Residential <=1"	1,619	1	1,619.0
Non-Residential = 1.5"	1,152	5	5,760.0

TABLE 3-1 Existing Wastewater EDUs

Meter Type	Meter Count	EDU conversion	EDU
Non-Residential = 2"	1,277	8	10,216.0
Non-Residential = 3" Compound	20	17.5	350.0
Non-Residential = 3" Turbine	100	22	2,200.0
Non-Residential = 4" Compound	7	30	210.0
Non-Residential = 4" Turbine	45	42	1,890.0
Non-Residential = 6" Compound	11	67.5	742.5
Non-Residential = 6" Turbine	20	86.5	1,730.0
Non-Residential Subtotal	***2,632***		***24,718***
Total	**78,983**		**119,308**

For the purposes of this Wastewater IIP assessment, the existing level of service is defined as the annual average day (AAD) wastewater flow. AAD flows are used since wastewater treatment facilities are rated and permitted on AAD flow conditions. The AAD for the last several calendar years is shown in Table 3-2.

TABLE 3-2 Annual Average Wastewater Flow

Calendar Year	Annual Average Day (gallons per day)
2012	21,800,000
2013	21,628,000
2014	21,234,000
2015	20,976,000
Average	**21,409,500**

The average of the City's AAD wastewater flow (Basins 1-5 + Paradise Valley flows + Residuals) for the last several calendar years was estimated to be 21.4 mgd. This average will be used to calculate the EDUs.

To conform to the projections in the LUA, the existing level of service for both residential and non-residential EDUs is calculated using each customer's class of volumetric flow from the City's meter billing database for the last several fiscal years and the respective number of EDUs or employees. Volumetric flow ratios were presented in the previous chapter in Table 2-5.

Based on the number of existing residential EDUs, the existing residential level of service (meeting annual average day demand) per wastewater EDU is shown in the following calculation:

(21,409,500 gpd x 79.44%) ÷ 94,590.5 EDUs = 179.8 gpd wastewater per EDU

Also, since the LUA projections for non-residential uses are in terms of employees, the non-residential level of service is expressed in these terms. As noted in the LUA, the estimated number of employees is currently 184,528 employees. Likewise, the existing non-residential level of service for wastewater per employee is shown in the following calculation:

(21,409,500 gpd x 20.56%) ÷ 184,528 employees = 23.9 gpd wastewater per employee

For purposes of calculations in the remainder of this IIP chapter, the existing wastewater level of service per residential wastewater EDU is expressed as 179.8 gpd per EDU, and the existing level of service per employee is expressed as 23.9 gpd per employee, (the level of service ratio between residential and non-residential customers is used to calculate the number of non-residential EDUs and is 7.54). See Future Non-Residential EDUs in this chapter for more detail.

It should be noted that while the basis for enumerating the level of service is calculated based on AAD wastewater flow, the infrastructure needed to convey and treat the wastewater considers both maximum dry and wet weather flows.

3.5 Future Level of Service

The level of service provided to new customers will be consistent with the existing level of service as described above. Any capital improvements proposed for the wastewater system to accommodate new EDUs or employees will be designed to accommodate 179.8 gpd per EDU and 23.9 gpd per employee of AAD wastewater flow.

3.6 Existing Capacity of Capital Facilities

The purpose of this section is to document the existing capacity of the capital facilities in the wastewater service area, the utilization of those capital facilities by existing EDUs, and the available excess capacity of those capital facilities to serve new EDUs, including any existing or planned commitments or agreements for the usage of such capacity. This section additionally identifies those changes or upgrades that are required to achieve or maintain the planned level of service to existing EDUs. The capital facilities that provide wastewater within the service area comprise two components, including wastewater treatment and wastewater collection.

While the wastewater collection system consists of a network of individual components, all of which have a unique capacity, many of these components have been designed to accommodate both current and new EDUs beyond the 10-year planning period. Hence, the collective capacity of the wastewater treatment facilities can be used as a measure of the capacity of the entire wastewater distribution system.

The existing capacity of the treatment and collection systems are the two components of the wastewater system that are eligible to serve new EDUs, and are recovered through the wastewater impact fee, summarized in Table 3-3.

TABLE 3-3 Existing Wastewater Treatment and Collection Facilities

Facility	Capacity (mgd)
Gainey Ranch WRF[a]	1.67
Water Campus[b]	20.00
SROG (Scottsdale Safe Capacity Ownership)	20.25
Total	**41.92**
Less Gainey Ranch WRF	(1.67)
Less Reserved Capacity	(0.74)
Total Eligible (unused capacity) for New EDUs	**39.51**
Less Annual Average Day Flow	(21.41)
Capacity Available for New EDUs	**18.10**

[a] Gainey Ranch WRF will not provide capacity to new EDUs.
[b] Water Campus includes both the WRP and the AWT facility.

The available treatment and collection capacity to serve new EDUs is the difference between the net available for use and the current flow. The capacity available for use to serve new EDUs is 18.10 mgd.

3.7 Wastewater Collection

3.7.1 Buy-In to Existing Collection System

The buy-in value of the existing wastewater system represents the replacement cost new less depreciation (RCNLD) of both components of the wastewater system. This RCNLD is determined by escalating depreciated facility asset values based on the Engineering News Record (ENR) construction cost index. Again, the value of any assets that are reserved, were contributed by developers or other parties, or have contractual restrictions, are excluded from the buy-in value of facilities eligible to serve new EDUs. In addition to the RCNLD of the wastewater facilities eligible to serve new EDUs, the buy-in component also includes the remaining annual interest payments on debt the City has issued in the past for facilities that benefit development. The remaining interest payments on the wastewater system debt benefiting development totals $37,938,881. The interest expense is recovered through the assessed Wastewater Impact Fee, and the subsequent Wastewater Impact Fee revenues may be used to service the debt the City has issued to fund facilities that benefit development.

New connections are required to buy-in to each component of the existing wastewater system as shown in Table 3-4, and are allocated costs based on the portion of existing capacity in each component that is available to serve new EDUs.

TABLE 3-4 Buy-In to Existing Wastewater System

Plant Investment – Wastewater System Buy-In	Total Value RCNLD 6/30/17[a]	Used by Existing EDUs[b]	Available for New EDUs[c]
Wastewater Treatment Plants[d]	$284,797,327	$154,324,687	$130,472,640
Wastewater Collection System[e]	$106,491,015	$57,704,869	$48,786,146

TABLE 3-4 Buy-In to Existing Wastewater System

Plant Investment – Wastewater System Buy-In	Total Value RCNLD 6/30/17[a]	Used by Existing EDUs[b]	Available for New EDUs[c]
Total Wastewater System	**$391,288,342**	**$212,029,556**	**$179,258,786**

[a] Represents the total RCNLD value of those facilities eligible to serve new EDUs. The facilities eligible to serve new EDUs do not represent the entirety of the City's wastewater system facilities or the replacement value of all system assets owned by the City as the values of certain facilities are excluded from the total replacement costs eligible to serve new EDUs. Those facilities excluded from the facilities eligible to serve new EDUs include facilities contributed by developers or other parties, replacements benefiting existing EDUs, and facilities or portions of facilities that will not benefit new development.

[b] Represents the portion of the total RCNLD value for each component of the City's wastewater system that is either reserved or associated with meeting current demands of existing EDUs. The current demand, or level of service, for each component of the system is determined based on four-year average wastewater effluent and customer data.

[c] Represents the portion of the total RCNLD value for each component of the City's wastewater system that is available to meet anticipated demands of new EDUs. The available capacity in each component of the system is determined by deducting reserved capacity and existing customer demands from the total capacity of the facilities eligible to serve new EDUs.

[d] Wastewater Treatment Plants includes the 20.0 mgd Water Campus Reclamation Facility and Scottsdale's 20.25 mgd of capacity ownership in the City of Phoenix run Wastewater Treatment Plant through the SROG agreement. Since it benefits wastewater disposal at the Water Campus, 85% of the costs of the AWT are included in wastewater treatment plants. The 1.67 of mgd at the Gainey Ranch Water Reclamation Facility is excluded from the wastewater treatment plants' components since this facility is not eligible to serve new EDUs. The total capacity of the facilities eligible to serve new EDUs in the wastewater treatment plants components is adjusted to reflect reserved capacities. For more information on existing capacity eligible to serve new EDUs, see Table 3-3.

[e] Wastewater Collection System includes wastewater conveyance infrastructure such as lift stations, gravity sewers and force mains. Any Wastewater Collection System facilities contributed by developers or other parties have been excluded from the total value eligible to serve new EDUs. These facilities provide total capacity eligible to serve new EDUs of 18.10 which is equal to the current treatment capacity. This similar capacity is because the existing Wastewater Collection System has been sized to meet existing and future demands. For more information on existing capacity eligible to serve new EDUs, see Table 3-3.

3.8 Grandfathered Capital Facilities

There are no grandfathered capital facilities identified at this time.

3.9 Future EDUs

3.9.1 Future Residential EDUs

A summary of the residential growth from the LUA in the North, Central and South regions of the City and within the wastewater service area outside the City boundary through fiscal year 2027 is shown in Table 3-5.

TABLE 3-5 Future Residential EDUs

Sub-area	Residential (dwelling units)
North	5,316
Central	3,668
South	4,388
Total	**13,372**

As described previously, the EDU conversion for residential growth is 1 EDU per dwelling unit; therefore, 13,372 future wastewater EDUs for residential growth are expected in the next 10 years.

3.9.2 Future Non-Residential EDUs

The level of service ratio between residential and non-residential customers is used to calculate the number of non-residential wastewater EDUs as shown in the following calculation:

179.8 gpd/EDU ÷ 23.86 gpd/employee = 7.54 employees/EDU

Per the LUA, a summary of non-residential growth by number of employees along with the conversion to EDUs is shown in Table 3-6.

TABLE 3-6 Future Non-Residential EDUs

Sub-area	Non-Residential (employees)	Non-Residential EDUs
North	3,183	422
Central	14,265	1,892
South	7,311	970
Total	**24,759**	**3,284**

3.10 Existing and Future EDUs

The total EDUs and employees that the wastewater system will need to serve by fiscal year 2027 includes the existing residential EDUs and the new residential EDUs along with the existing employees and new employees as described above. The total EDUs are summarized in Table 3-7.

TABLE 3-7 Existing and Future EDUs

	Residential EDUs	Non-residential EDUs	Total
Existing	94,591	24,718	119,308
Future	13,373	3,284	16,657
Total	**107,964**	**28,001**	**135,965**

3.11 Required Capital Facilities

3.12 Wastewater Treatment System

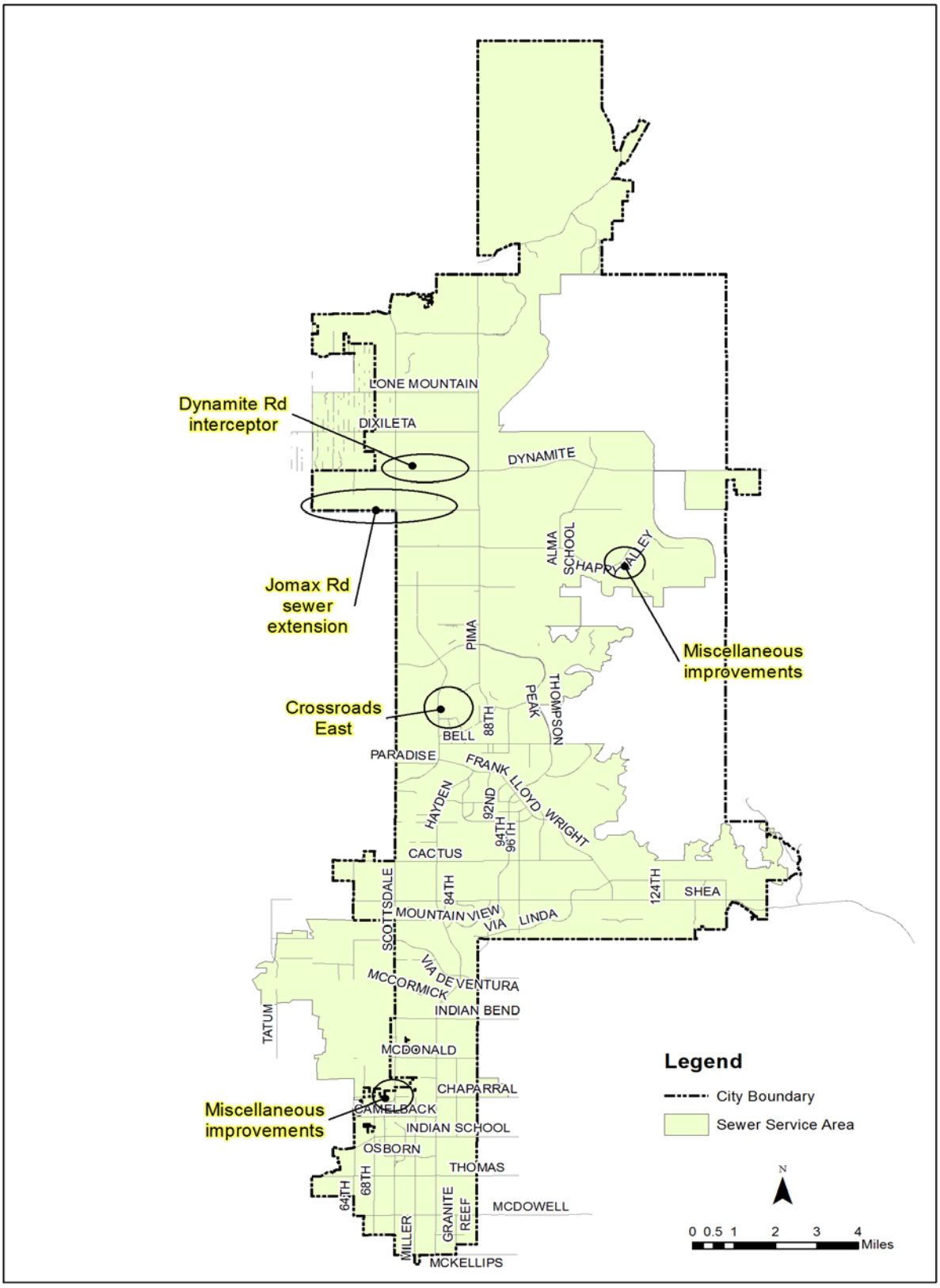
There are no planned capacity expansions to the Gainey Ranch WRF, Water Campus or Scottsdale's ownership in the SROG WWTP to meet existing or future flows through the 2027 planning period. The excess capacity in these facilities to accommodate new EDUs was described in a previous section.

3.13 Wastewater Collection System

In general, the existing collection and pump back system is capable of meeting the current level of service for existing and new EDUs. As previously noted, the City published a 2013 IIP that specified several growth-related wastewater collection projects. Details regarding these projects are available in the 2013 IIP posted on the City's website and because the projects are still under construction, or will be under construction, they are summarized in Table 3-8 below.

In addition to the projects in the 2013 IIP, the following 2017 IIP growth-related infrastructure is required within this 10-year planning period as shown in Figure 3-2 and summarized in Table 3-9 below.

FIGURE 3-2 Areas requiring Wastewater System Improvements



3.14 Cost Estimates

Cost estimates were developed in accordance with the guidelines of AACE (Association for the Advancement of Cost Engineering) International for a Class 5 estimate. It should be noted that these costs do not include financing costs, interest, the time value of money, or inflation. The Class 5 estimates for the projects described above are summarized in Tables 3-8 and 3-9.

TABLE 3-8 Wastewater Collection Cost Estimates from 2013 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
N 78th Street/E Coolidge St	About half a mile gravity sewer	$487,569	$82,431	$570,000
Earll/Avalon alley	One mile gravity sewer	$1,178,405	$145,595	$1,324,000
N 68th St, Highland to Camelback	About a quarter of a mile gravity sewer	$245,651	$53,349	$299,000
N 68th St, E Roma to E Monterosa	Less than half a mile gravity sewer	$339,955	$162,045	$502,000
E McCormick Pkwy/N Scottsdale Rd	About 800 feet gravity sewer	$160,707	$24,293	$185,000
N 128th St, E Shea to E Desert Cove	About 800 feet gravity sewer	$149,908	$31,092	$181,000
E Redfield Rd, N Frank Lloyd Wright to N 96th St	About a quarter of a mile gravity sewer	$211,682	$37,318	$249,000
E Cactus Rd, N Frank Lloyd Wright to N 104th St	Nearly one mile of gravity sewer	$813,431	$221,569	$1,035,000
N 104th St, E Cactus to E Cholla	About half a mile of gravity sewer	$448,994	$121,006	$570,000
E Via Linda, Loop 101 WB to west	About 500 feet of gravity sewer	$0	$262,000	$262,000
Crossroads East lift station	New lift stations	$0	$2,300,000	$2,300,000
Crossroads force main	About one mile of force main	$0	$1,530,000	$1,530,000
Total		**$4,036,302**	**$4,970,698**	**$9,007,000**

TABLE 3-9 Wastewater Collection Cost Estimates for 2017 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
Dynamite Road sewer interceptor	About one and a half miles of gravity sewer along Dynamite Road west of Pima Road	$0	$1,857,000	$1,857,000
Jomax Road sewer extension	New lift station, about half a mile of force main along 56th Street north of Jomax, and about three	$0	$4,399,000	$4,399,000

TABLE 3-9 Wastewater Collection Cost Estimates for 2017 IIP

Project	Description	Cost for Existing EDUs	Cost for New EDUs	Total Cost
	and a half miles of gravity sewer west of 64th Street along Jomax Road with a few extensions to the north of Jomax			
Crossroads East gravity sewer	Less than half a mile of gravity sewer east of Hayden Road	$0	$582,000	$582,000
Miscellaneous wastewater system improvements	Upgrade lift station 52 (Sereno Canyon), about 300 feet of gravity sewer east of Happy Valley Road to serve the lift station, and a new gravity sewer along Chaparral Road west of Scottsdale Road	$0	$766,000	$766,000
Total		**$0**	**$7,604,000**	**$7,604,000**

3.15 Wastewater System Summary

Table 3-10 below summarizes the buy-in and necessary wastewater system improvements to serve new EDUs in the 10-year planning period of this IIP.

TABLE 3-10 Wastewater System Cost Summary

	Estimated Cost
Buy-In	$391,288,342
2017 IIP Wastewater Treatment	$0
2013 IIP Wastewater Collection Infrastructure	$4,970,698
2017 IIP Wastewater Collection Infrastructure	$7,604,000
Total	**$403,861,942**

These costs do not include changes or upgrades to serve existing capital facilities in order to meet stricter safety, efficiency, upgrading, updating, expanding, correcting, replacing, environmental, or regulatory requirements for wastewater services provided to existing EDUs.

CHAPTER 4. FORECAST REVENUES FROM TAXES, FEES, ASSESSMENTS

There are no revenues from taxes, fees, assessments, state-shared revenue, highway user revenue, federal revenue, ad valorem property taxes, construction contracting or similar taxes, or any portion of utility fees attributable to development, or other sources that will be available to fund new or expanded Capital Facilities. The portion of transaction privilege taxes on utility fees is used exclusively for rehabilitation and maintenance of existing Capital Facilities.

CHAPTER 5. CALCULATE REQUIRED OFFSETS

As stated in Chapter 4, there are no funds available from Offsets to help fund new or expanded capital facilities.

CHAPTER 6. RESERVED CAPACITY

Set forth below is a list of the Water and Wastewater Services that have reserved capacity in either the City's water or wastewater treatment capacity and for which impact fees have been paid.

Water Service

Water Reserved Capacity [a]					
Contract Name	**Purchased Water Production & Distribution Capacity (mgd)**	**Purchased Recharge Capacity (mgd)**	**Current Production (mgd)**	**Unused Water Capacity (mgd)**	**Unused Recharge Capacity (mgd)**
Berneil Water Company	0.233		0.001	0.232	
Carefree Water Company	0.401		0.265	0.136	
Tonto Hills	0.032		0.027	0.005	
McDowell Mountain Golf Club			0.351		
Reclaimed Water Distribution System		20.000	13.50		6.500
Impact Fees Collected For Recent Projects				0.000	
Total Reserved Capacity	**0.666**	**20.000**	**14.144**	**0.373**	**6.500**

[a] Wheeling or transportation agreements where capacities have not been purchased are not shown in the above tables.

Wastewater Service

Wastewater Reserved Capacity [a]			
Contract Name	**Purchased Wastewater Capacity (mgd)**	**Current Production (mgd)**	**Unused Wastewater Capacity (mgd)**
Black Mountain Sewer	0.401	0.230	0.171
Paradise Valley	1.030	0.460	0.570
Impact Fees Collected For Recent Projects			0.000
Total Reserved Capacity	**1.431**	**0.690**	**0.741**

[a] Wheeling or transportation agreements where capacities have not been purchased are not shown in the above tables.

Fountain Hills Sanitary Sewer District: City has a reciprocal treatment agreement for a small number of residential units within each other's boundaries.

City of Phoenix: City has a reciprocal treatment agreement of up to 10 mgd to the 91st Ave. Treatment Plant.

CHAPTER 7. CALCULATE SYSTEM AVERAGE COST PER EDU

The purpose of this Section is to document the current estimated calculation of the Water and Wastewater Impact Fees per EDU based on the system average cost of existing facilities eligible to serve new EDUs and planned capital costs benefiting new EDUs. The final fee amounts will not be determined until the 2017 Development Impact Fee Report is completed.

7.1 Water Impact Fee Average Cost Per EDU

The Water Impact Fee is calculated based on a combination of the System Buy-In Approach which focuses on the value of existing facilities that have capacity available to serve new customers, and the Marginal-Incremental Approach which focuses on planned cost of additional facilities to serve new customers. Both approaches are most often used in developing utility impact fees and are recognized in the industry as cost justified by the American Water Works Association (AWWA).

Under the combined approach, the Buy-In value for each component of the water system discussed in Section 2.5.1 is added to the planned capital costs of the Required Capital Facilities to serve new EDUs for each component of the water system as discussed in Section 2.7. The total combined costs for the existing facilities eligible to serve new EDUs and the planned capital costs of the Required Capital Facilities are divided by the total capacity eligible to serve new EDUs. Since the three components of the water system have different capacities eligible to serve new EDUs, a unit cost per gallon per day (gpd) is determined for each component. In addition to these unit costs, expense on debt issued to finance facilities benefiting new EDUs is also determined on a unit cost per gallon per day.

Finally, an offset for principal payments on debt associated with existing water facilities is provided to ensure new customers are not double charged for those capital costs through the impact fee and through their monthly utility bills. Since these debt principal payments will be recovered through user rates and charges, the value for these future payments are determined on a unit cost per gpd, and offset from the total unit cost per gpd. The net cost of capacity per gpd is then multiplied by the 709-gpd peak day water demand factor to arrive at the currently estimated system average cost per EDU of **$3,915**

Table 7-1 shows the system average cost per EDU for the Water Impact Fee.

TABLE 7-1 Water impact fee

Water Impact Fee	Unit Cost
Water Treatment (gpd)	$3.14
Water Distribution (gpd)	$1.80
Water Recharge (gpd)	$1.07
Interest Expense (gpd)	$1.58
Total Cost of Capacity (gpd)	**$7.59**
Less: Debt Principal Offset	($1.91)
Net Cost of Capacity (gpd)	**$5.68**
Maximum Day Demand Factor	689.3
Water Impact Fee Per EDU	**$ 3,915**

7.2 Wastewater Impact Fee Average Cost Per EDU

The Wastewater Impact Fee is calculated based on a combination of the System Buy-In Approach which focuses on the value of existing facilities that have capacity available to serve new EDUs, and the Marginal-Incremental Approach which focuses on planned cost of additional facilities to serve new customers. Both approaches are most often used in developing utility impact fees and are recognized in the industry as cost justified by the Water Environmental Federation (WEF).

Under the combined approach, the Buy-In value for each component of the wastewater system discussed in Section 3.5.1 is added to the planned capital costs of the Required Capital Facilities to serve new EDUs for each component of the wastewater system as discussed in Section 3.8. The total combined costs for the existing facilities eligible to serve new EDUs and the planned capital costs of the Required Capital Facilities are divided by the total capacity eligible to serve new EDUs. A unit cost per gpd is determined for each component of the wastewater system. In addition to these unit costs, the interest expense on debt issued to finance facilities benefiting new EDUs is also determined on a unit cost per gallon per day.

Finally, an offset for principal payments on debt associated with existing wastewater facilities is provided to ensure new customers are not double charged for those capital costs through the impact fee and through their monthly utility bills. Since these debt principal payments will be recovered through user rates and charges, the value for these future payments is determined on a unit cost per gpd, and offset from the total unit cost per gpd. The net cost of capacity per gpd is then multiplied by the 196-gpd average day wastewater demand factor to arrive at the currently estimated system average cost per EDU of **$2,609.**

Table 7-2 shows the currently estimated system average cost per EDU for the Wastewater Impact Fee.

TABLE 7-2 Wastewater Impact fee

Wastewater Impact Fee	Unit Cost
Wastewater Treatment (gpd)	$7.21
Wastewater Collection (gpd)	$3.01
Interest Expense (gpd)	$5.73
Total Cost of Capacity (gpd)	**$15.95**
Less: Debt Principal Offset	($1.44)
Net Cost of Capacity (gpd)	**$14.51**
Wastewater Demand Factor	179.8
Wastewater Impact Fee Per EDU	**$ 2,609**

Information on the calculation of the Water and Wastewater Development Impact Fees per EDU will be made available in the 2017 Development Impact Fee Report, scheduled for public hearing in May 22, 2018.

The Water and Wastewater Development Impact Fees provided in this Chapter 7 of the IIP are current estimates of what it is believed those fees will be. However, they are subject to change depending upon the results of the public hearing on the LUA and this IIP, the final conclusions reached as a part of the Development Impact Fee Report, and the public hearing on that Fee Report.

(End of Infrastructure Improvement Plan)