NOTICE OF POSTING
OF
INFRASTRUCTURE IMPROVEMNTS PLAN
FOR
WATER AND WASTEWATER
DEVELOPMENT
IMPACT FEES

ARS §9-463.05, as amended, requires that cities adopt new development impact fees for Necessary Public Services on or before August 1, 2014.

Under the statute, 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 Improvements Plan.

The Infrastructure Improvement Plan is a written document identifying growth driven water and wastewater infrastructure needs within a 10-yeqar planning period. These needs along with other considerations serve to establish the basis for projected development impact fees. Amendments have been made to some of the tables included in this draft of the Infrastructure Improvements Plan and are the corrected Infrastructure Improvements Plan are posted herewith.

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
480-312-5685
EnterpriseFinance@ScottsdaleAZ.Gov

City of Scottsdale

INFRASTRUCTURE IMPROVEMENT PLAN

WATER AND WASTEWATER

December 4, 2013

Water Resources Division

ATTACHMENT 1

Tables

Figures

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
FY	fiscal year
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
PV	Present Value
RCNLD	replacement cost new less depreciation
RWDS	Reclaimed Water Distribution System
SPI	Scottsdale-Phoenix Interceptor
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 217,000 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 280,000.

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, both of which are related to water.

- **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)

As required by the Arizona Revised Statutes (ARS) § 9-463.05(K), the City must replace its impact fees that were adopted prior to January 1, 2012. 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 Development Impact Fee Study on which the City's Impact Fees will be based. This IIP has been developed for a 10-year period, 2013 to 2023, and is planned to be updated every 5 years.

1.4 Prepared by Licensed Professionals

The Water Infrastructure Improvement Plan was prepared by licensed professionals from CH2M HILL. The Wastewater Infrastructure Improvement Plan was prepared by licensed professionals from Water Works Engineers.

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 is in the process of being updated; the current version is the *2008 Scottsdale Integrated Water Master Plan* (Carollo Engineers, 2008). 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's boundary with a few exceptions:

- EPCOR Water Arizona, Inc. 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 also serves about 200 customers near the boundary of the Town of Fountain Hills.
- The City serves about 1,400 customers outside the City's boundary north of Dynamite Blvd., generally between 56th Street and 68th Street.

There are also agreements with the Tonto Hills Domestic Water Improvement District and the Carefree Water Company to treat and deliver their CAP allocations outside the City's boundary; however, these customers are subject to the rates and charges 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 sub-divided into regions and further sub-divided 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) 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, and the CGTF 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.

FIGURE 2-1
Water Service Area

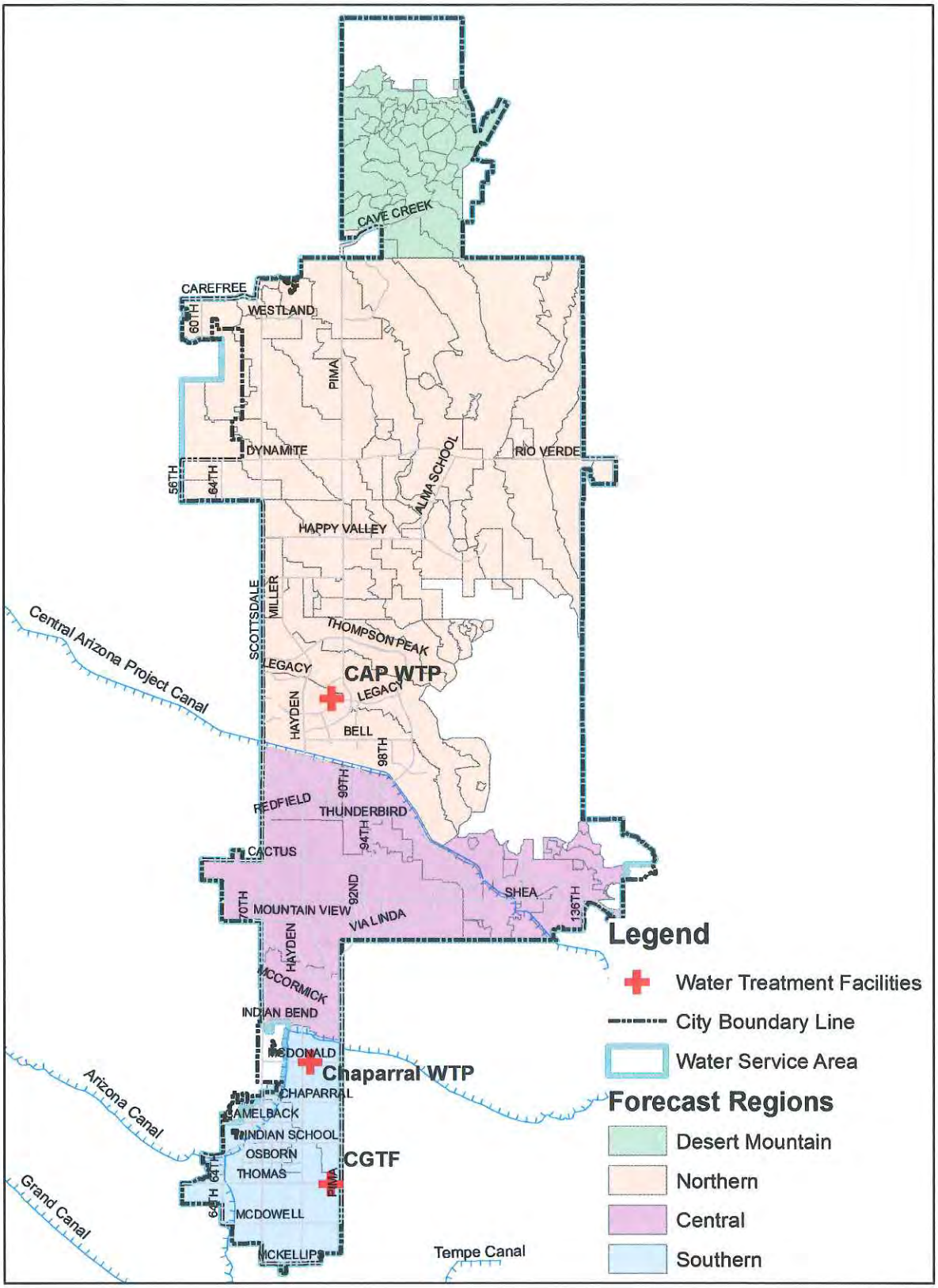


TABLE 2-1
Regions Served by Water Treatment Facilities

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

[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 peak 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.

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 for varying land uses 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	160	16	Per Meter
	3" Turbine	220	22	Per Meter
	4" Compound	250	25	Per Meter
	4" Turbine	420	42	Per Meter
	6" Compound	500	50	Per Meter
	6" Turbine	865	86.5	Per Meter
	8" Compound	800	80	Per Meter

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

[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 2012 water meter records, Table 2-3 calculates the existing EDUs in the City's water service area.

TABLE 2-3
Existing EDUs

Meter Type	Meter Count	EDU Conversion	EDU
Single Family <=1"	76,684	1	76,684
Single Family = 1.5"	1,007	5	5,035
Single Family = 2"	279	8	2,232
Single Family = 3" Compound	3	16	48
Multi-Family <=1"	1,554	1	1,554

TABLE 2-3
Existing EDUs

Meter Type	Meter Count	EDU Conversion	EDU
Multi Family = 1.5"	733	5	3,665
Multi Family = 2"	1,544	8	12,352
Multi Family = 3" Compound	17	16	272
Multi Family = 3" Turbine	2	22	44
Multi Family = 4" Compound	16	25	400
Multi Family = 4" Turbine	1	42	42
Multi Family = 6" Compound	18	50	900
Multi Family = 6" Turbine	2	86.5	173
Multi Family = 8" Compound	4	80	320
Non-Residential <=1"	2,383	1	2,383
Non-Residential = 1.5"	1,548	5	7,740
Non-Residential = 2"	1,557	8	12,456
Non-Residential = 3" Compound	121	16	1,936
Non-Residential = 3" Turbine	12	22	264
Non-Residential = 4" Compound	58	25	1,450
Non-Residential = 4" Turbine	17	42	714
Non-Residential = 6" Compound	25	50	1,250
Non-Residential = 6" Turbine	10	86.5	865
Total	**87,595**		**132,779**

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 is highest. In 2012, the City's maximum day demand was 94.14 million gallons per day (mgd). This approach was used because water treatment facilities are rated and permitted based on maximum firm production capacity. Based on the number of existing EDUs, the existing level of service (meeting maximum day demand) per EDU is shown in the following calculation:

94,140,000 gallons per day (gpd) ÷ 132,779 EDUs = 709 gpd water per EDU

For purposes of calculations in the remainder of this IIP, the existing level of service per water EDU is expressed as 709 gpd per EDU.

2.4 Future Level of Service

The level of service provided to new customers as a part of new EDUs will be consistent with the existing level of service as described in Section 2-3. Any capital improvements proposed for the water system to accommodate new EDUs will be designed to accommodate 709 gpd per EDU of peak 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 3 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. Furthermore, the City must achieve long-term sustainable water supplies and compliance with the requirements of the Arizona Department of Water Resources (ADWR). To meet these requirements, the City has developed a water supply strategy that utilizes reuse effluent for ground water recharge and surface water provided through Salt River Project and Central Arizona Project water rights. This combination of recharge and surface water rights supplies ensures water availability for the City's two water treatment plants. Although surface water rights are an important source of water supply, the City does not plan to purchase additional water rights within the 10-year planning horizon. Due to the lack of water rights acquisition during the 10-year planning period, the City has elected not to include existing water rights available to serve new EDUs in this IIP or in the costs to be recovered through the Water Impact Fee.

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 2-4 (Treatment Facilities), 2-5 (Distribution System), and 2-6 (Recharge Facilities).

Table 2-4 shows the existing capacity of the Water Treatment Facilities and the net capacity available for new EDUs.

TABLE 2-4
Existing Capacity of Production Facilities

Facility	Capacity (mgd)
CAP WTP	70.00
Chaparral WTP	27.00
CGTF	12.30
Wells	50.90
Total	**160.20**
Less CGTF	(12.30)
Less Reserved Capacity	(0.40)
Total Eligible for New EDUs	**147.50**
Less Peak Day Demand	(94.14)
Capacity Available for New EDUs	**53.36**

The total eligible production capacity to serve new EDUs is the difference between the capacity of the production system, less the CGTF of 12.30 mgd, and reserved capacity of 0.40 mgd. The net capacity to serve new EDUs is 53.36.

Table 2-5 shows the existing capacity of the Water Distribution Facilities.

TABLE 2-5
Existing Capacity of Water Distribution Facilities

Facility	Capacity (mgd)
Current Pipe Capacity	147.90
Less Reserved Capacity	(0.40)
Total Eligible for New EDUs	**147.50**
Less Peak Day Demand	(94.14)
Capacity Available for New EDUs	**53.36**

The total eligible distribution system capacity to serve new EDUs is the difference between the capacity of the distribution system, less reserved capacity of 0.40 mgd. The net capacity available to serve new EDUs is 53.36 mgd.

Table 2-6 shows the existing capacity of the Recharge Facilities.

TABLE 2-6
Existing Capacity of the Recharge Facilities

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

The total eligible 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 existing maximum day demand of 94.14 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 amount of water recharged through the AWT facility during Fiscal Year 2013.

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 present value (PV) of the remaining annual interest payments on debt the City has issued in the past for facilities that benefit development. The PV of the remaining interest payments on the water system debt benefiting development is $41,884,279. The interest expense is recovered through the Water Impact Fee, and the Water 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 water system as shown in Tables 2-4, 2-5, and 2-6 and are allocated costs based on the portion of existing capacity in each component that is available to serve new EDUs.

TABLE 2-7
Plant Investment-Water System Buy-In

Plant Investment - Water System Buy-In	Total Value RCNLD 6/30/2013 a	Used by Existing EDUs b	Available for New EDUs c
Water Treatment Plants d	$ 437,796,296	$ 279,417,921	$ 158,378,375
Distribution System e	$ 254,218,106	$ 162,251,475	$ 91,966,632
Recharge Facilities f	$ 11,068,379	$ 4,788,099	$ 6,280,280
Total Water System	$ 703,082,781	$ 446,457,494	$ 256,625,287

[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 customers. The current demand, or level of service, for each component of the system is determined based on fiscal year 2013 water production 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 27.0 mgd Chaparral WTP, the 70.0 mgd CAP WTP, and 50.9 mgd of ground water well capacity. The CGTF is 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 2-4.

[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 2-5.

[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 2-6.

2.6 Grandfathered Capital Facilities

There are no grandfathered capital facilities in the City's water system. Grandfathered Capital Facilities are those facilities provided through financing or debt incurred before June 1, 2011 and for which an impact fee has been pledged towards repayment.

2.7 Future EDUs

2.7.1 Future Residential EDUs

A summary of the residential growth linearly interpolated from Table 4 in the LUA in the North, Central and South regions of the City through year 2023 is shown in Table 2-8.

TABLE 2-8
Future Residential EDUs

Growth through 2023	North	Central	South	Total
Rural Neighborhoods (dwelling units)	1,923	444	15	**2,382**
Suburban Neighborhoods (dwelling units)	3,062	1,097	25	**4,184**
Urban Neighborhoods [Multi-family] (dwelling units)	244	5,087	4,841	**10,172**
Total	**5,229**	**6,628**	**4,881**	**16,738**

Note: Refer to Appendix A for calculation methodology.

As described in Table 2-2, the EDU conversion for residential growth is 1 EDU per dwelling unit; therefore, 16,738 future EDUs for residential growth are expected in the next 10 years.

2.7.2 Future Non-Residential EDUs

Per Table 5 from the LUA, a summary of non-residential growth by various land use types linearly interpolated through 2023 is shown in Table 2-9.

TABLE 2-9
Future Non-Residential Growth

Growth through 2023	North	Central	South	Total
Commercial (square feet)	497,158	2,335,746	309,527	**3,142,431**
Employment (square feet)	776,617	3,367,966	1,399,664	**5,544,247**
Cultural/Institutional/Public (square feet)	203,119	620,849	256,378	**1,080,346**
Resorts/Tourism (square feet)	364,283	616,710	253,458	**1,234,451**
Total	**1,841,177**	**6,941,271**	**2,219,027**	**11,001,475**

Note: Refer to Appendix A for calculation methodology.

Translating the non-residential growth from square feet to EDUs included conversions using floor area ratios (FAR), maximum day demand by land use type from 2012 billing records and the maximum day water usage by EDU as calculated in Section 2.3. Details of these calculations are shown in Appendix A.

The future EDUs for non-residential land use types for the next 10 years are summarized in Table 2-10.

TABLE 2-10
Future Non-Residential EDUs

Non-Residential Land Use Type	North (EDU)	Central (EDU)	South (EDU)	Total (EDU)
Commercial	136	1,000	110	**1,246**
Employment	37	703	277	**1,017**
Cultural/Institutional/Public	84	127	47	**258**
Resorts/Tourism	144	1,412	460	**2,016**
Total	**401**	**3,242**	**894**	**4,537**

Note: Refer to Appendix A for calculation methodology

2.7.3 Existing and Future EDUs

The total EDUs that the water system will need to serve by 2023 includes the existing EDUs and the new EDUs as described above. The total EDUs are summarized in Table 2-11, where 21,375 new EDUs are expected in the next 10-years (16,738 + 4,537 = 21,375).

TABLE 2-11
Existing and Future EDUs

	EDUs
Existing EDUs	132,779
Future Residential EDUs	16,738
Future Non-Residential EDUs	4,537
Total	**154,054**

2.8 Required Capital Facilities

2.8.1 Water Production/Treatment

As noted in Table 2-4, there is excess production/treatment capacity of 53.36 mgd to serve new demand. With the addition of 21,275 EDUs and a level of service of 709 gpd/EDU, the new EDUs will require 15.1 mgd to meet maximum day demand. The available capacity exceeds the projected maximum day demand of the new EDUs; therefore, no projects to expand water production or treatment capacity are required during the 10-year planning period for this IIP.

2.8.2 Water Distribution Improvements

The City will eventually need to expand the water production and treatment capacity beyond the 10-year planning period of this IIP. 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 production and treatment capacity occurring beyond the 10-year

planning period for this IIP. To ensure the incremental costs of this additional distribution system capacity are not recovered from the new EDUs connecting during this current planning period, the capacity associated with the eventual 10 mgd expansion of the CAP WTP is not included in the planned water distribution system for this planning period.

Within the 10-year IIP planning period, the following growth related infrastructure is required.

- Wildcat Development
- State Land near Legend Trails
- East Dynamite
- Crossroads

This is shown in Figure 2-2, and their associated impacts are discussed in the following sections.

2.8.2.1 Wildcat Development

The Wildcat development includes facilities to serve growth in the Desert Mountain region of the City. These facilities include pipelines, a storage tank, two booster stations and several pressure reducing valve stations.

2.8.2.2 State Land near Legend Trails

The recently acquired State Land in the North region includes several thousand acres of land and is planned for a mix of both residential and non-residential development. The area planned for commercial uses north of Dynamite Boulevard is expected to develop during the 10-year IIP planning period. The required facilities include pipelines and pressure reducing valve stations.

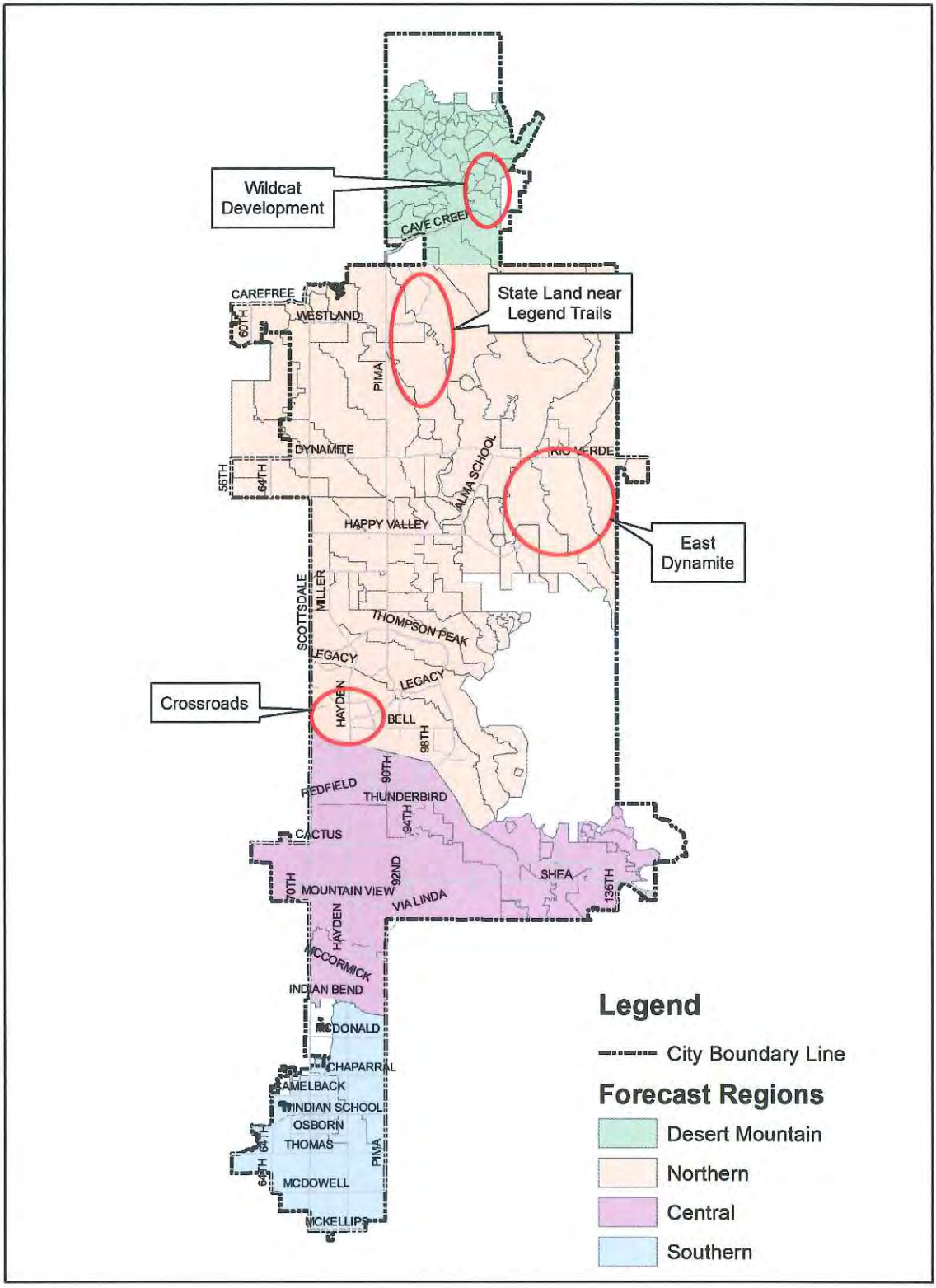
2.8.2.3 East Dynamite

The East Dynamite area in the North region includes extension of a pipeline to serve both existing and new EDUs. Based on the ratio of total land area served versus vacant land planned to develop to serve growth, about 60% of the pipeline extension is required to serve new EDUs.

2.8.2.4 Crossroads

The Crossroads area in the North region requires pipelines and a pressure reducing valve station to serve new EDUs near the Loop 101 west of Hayden Road.

FIGURE 2-2
Growth 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 an 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 500 acre-feet per year available from the sale of Planet Ranch, but it 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.)

The City's available water supply exceeds the future 2025 demand projections and additional acquisitions of new water resources are not needed; however, additional activities 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 implementation in the year 2017 at a cost of $3,200,000.

As a part of the Water Impact Fee, there will be established a Water Supply fund account 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 accounts, one to be used for Water Service and one to be used for Water Supply. Water Service will receive approximately seventy-seven percent (77%) of the Water Impact Fee and Water Supply will receive approximately twenty-three percent (23%) of the Water Impact Fee. However, the final percentages will be determined once the Impact Fee Report is completed

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 Table 2-12.

TABLE 2-12
Water Distribution Cost Estimates

Facility	Quantity	Unit Cost	Cost for Existing EDUs	Cost for New EDUs	Total Cost
Wildcat Development			**$0**	**$14,446,300**	**$14,446,300**
Booster Pump Station 1	1,400 gpm	N/A	$0	$2,200,000	$2,200,000
Booster Pump Station 2	1,666 gpm (+ 1,500 gpm fire pump)	N/A	$0	$3,400,000	$3,400,000
Storage Tanks	Two tanks each 0.5 MG	N/A	$0	$1,600,000	$1,600,000
Pressure Reducing Valve Station	9	$100,000	$0	$900,000	$900,000
6" Pipeline	7,300 feet	$155/foot	$0	$1,131,500	$1,131,500
8" Pipeline	10,700 feet	$172/foot	$0	$1,840,400	$1,840,400
12" Pipeline	15,200 feet	$222/foot	$0	$3,374,400	$3,374,400
State Land near Legend Trails			**$0**	**$5,475,500**	**$5,475,500**
Pressure Reducing Valve Station	3	$137,500	$0	$412,500	$412,500
8" Pipeline	11,500 feet	$172/foot	$0	$1,978,000	$1,978,000
12" Pipeline	10,500 feet	$222/foot	$0	$2,331,000	$2,331,000
16" Pipeline	2,600 feet	$290/foot	$0	$754,000	$754,000
East Dynamite			**$1,218,000**	**$1,827,000**	**$3,045,000**
16" Pipeline	10,500 feet	$290/foot	$1,218,000	$1,827,000	$3,045,000
Crossroads			**$0**	**$4,606,700**	**$4,606,700**
Pressure Reducing Valve Station	1	$137,500	$0	$137,500	$137,500
12" Pipeline	13,600 feet	$222/foot	$0	$3,019,200	$3,019,200
16" Pipeline	5,000 feet	$290/foot	$0	$1,450,000	$1,450,000
Total			**$1,218,000**	**$26,355,500**	**$27,573,500**

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.

2.11 Water System Summary

Table 2-13 below summarizes the buy-in and necessary water system improvements to serve new EDUs in the 10-year planning period of this IIP.

TABLE 2-13
Water System Cost Summary

	Estimated Cost
Treatment Buy-In	$437,796,296
Distribution Buy-In	$254,218,106
Supply Buy-In	$ 11,068,379
Distribution Cost for New EDUs	$26,355,500
Supply Costs for New EDUs	$3,200,000
Total	**$732,638,281**

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.

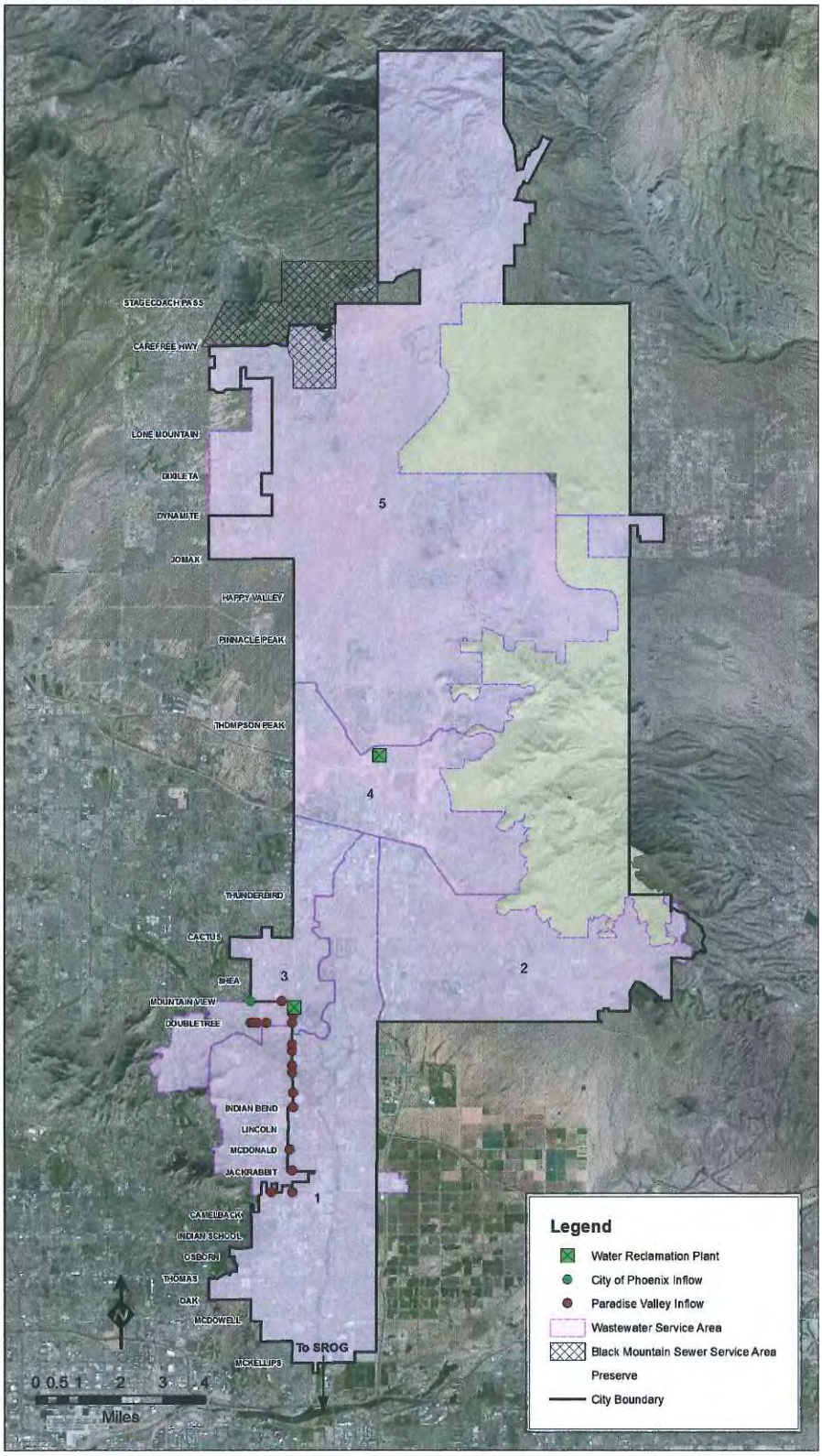
This single service area approach is not to be confused with the various ways that a system can be analyzed. For example, the 2012 Water Reuse Master Plan Update (WRMPU) presents the sewer collection system divided into five basins associated with tributary areas at key points in the collections system (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 (up to 10 mgd) enter the Scottsdale collection system through metering stations designated as PV01 and PV02 and "pass through" the Scottsdale collection system to the Sub-Regional Operating Group (SROG) system per an existing contract exchange agreement. Some of these Phoenix flows can be pumped to the Water Campus for treatment and "traded" with flows from other areas of Scottsdale's collection system. Paradise Valley flows of up to 1.3 mgd enter through 13-metered 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.

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 91st Avenue WWTP (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 and Advanced Water Treatment Facility (AWT) – can receive and treat wastewater from Basins 2 through 5.
- 91st Avenue WWTP – The 91st Avenue WWTP is jointly owned by the Cities of Scottsdale, Phoenix, Mesa, Glendale and Tempe. For Scottsdale, the 91st Avenue WWTP can receive wastewater from basins 1 through 4, treats the solids streams, and concentrate flows generated by the Water Campus Water Reclamation Plant (WRP), the AWT, and Gainey Ranch WRF respectively.

FIGURE 3-1
Wastewater Service Area



- 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. Currently, there are no known changes or upgrades that are required to existing treatment facilities to meet stricter safety, efficiency, environmental or regulatory requirements to serve existing EDUs. Improvements to existing collection system infrastructure to meet both current and future EDUs have been identified in Section 3.8.

3.3 Land Use

Land use assumptions, on which this IIP is based, are described and documented separately in a Land Use Assumptions (LUA) Report. The LUA report includes the City's current demographic estimates, and its projections for future development of land uses within the City's Wastewater 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 Section 2.0, water meter size will be used to determine the existing wastewater EDU level of service. As described in Section 2.3 the use of other customer types are 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 2-2.

Using the City's database of 2012 water meter records which also includes sewer flows for selected months, 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 (2012) Wastewater EDUs

Meter Type	Meter Count	EDU Conversion	EDU
Single Family <=1"	70,589	1	70,589
Single Family = 1.5"	566	5	2,830
Single Family = 2"	48	8	384
Single Family = 3" Compound	2	16	32
Multi-Family <=1"	1,257	1	1,257
Multi-Family = 1.5"	568	5	2,840

TABLE 3-1
Existing (2012) Wastewater EDUs

Meter Type	Meter Count	EDU Conversion	EDU
Multi-Family = 2"	1,163	8	9,304
Multi-Family = 3" Compound	15	16	240
Multi-Family = 3" Turbine	2	22	44
Multi-Family = 4" Compound	15	25	375
Multi-Family = 4" Turbine	1	42	42
Multi-Family = 6" Compound	17	50	850
Multi-Family = 6" Turbine	2	86.5	173
Multi-Family = 8" Compound	4	80	320
Non-Residential <=1"	1,586	1	1,586
Non-Residential = 1.5"	1,160	5	5,800
Non-Residential = 2"	1,198	8	9,584
Non-Residential = 3" Compound	118	16	1,888
Non-Residential = 3" Turbine	1	22	22
Non-Residential = 4" Compound	47	25	1,175
Non-Residential = 4" Turbine	5	42	210
Non-Residential = 6" Compound	24	50	1,200
Non-Residential = 6" Turbine	4	86.5	346
Total	**78,392**		**111,091**

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.

In 2013, the City's AAD wastewater flow (Basins 1-5 + Paradise Valley flows + Residuals) was estimated to be 21.8 mgd. Based upon the number of wastewater EDUs, the existing level of service per wastewater EDU is shown in the following calculation:

21,800,000 gallons per day (gpd) ÷ 111,091 EDUs = 196 gpd wastewater per EDU

For the purposes of calculation in the remainder of this Chapter, the level of service for existing wastewater EDUs is expressed as 196 gpd per EDU.

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 for future wastewater customers will be consistent with the current level of service as described in Section 3.4. Any capital improvements for the wastewater system to

accommodate new EDUs will be designed to accommodate 196 gpd per EDU 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 elements 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 capacities of the Treatment and Collection System are the 2 components of the wastewater system that are eligible to serve new EDUs, and are recovered through the Wastewater Impact Fees, and the net capacity available for new EDUs are summarized in Table 3-2.

TABLE 3-2
Existing Wastewater Treatment and Collection System Capacity

Facility	Total Capacity, mgd
Gainey Ranch WRF [a]	1.67
Water Campus [b]	20.00
SROG (Scottsdale Safe Capacity Ownership)	20.25
Total	**41.92**
Gainey Ranch WRF [a]	(1.67)
Average day demand	(20.13)
Reserved Capacity	(0.25)
Available for New EDUs	**19.87**

[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 capacity to serve new EDUs is the difference between the net available for use and existing annual average day demand of 20.13 mgd, since the wastewater system must meet the annual average day demands from existing EDUs. The net capacity available for use to serve new EDUs is 19.87 mgd.

The available treatment capacities to serve new EDUs is the difference between the net available for use and the current flow since the wastewater system must be capable of

continuing to meet the demands of the existing customers. The capacity available for use to serve new EDUs is 19.87 mgd as shown in Table 3-2. As can be seen, in aggregate, the existing treatment facilities have available capacity to serve new EDUs. However, individual components within the service area may require expansions or improvements and/or new facilities constructed to accommodate these flows, as documented in the following sections.

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 Present Value (PV) of the remaining annual interest payments on debt the City has issued in the past for facilities that benefit development. The PV of the remaining interest payments on the wastewater system debt benefiting development is $55,700,908. The interest expense is recovered through the Wastewater Impact Fee, and the Wastewater Impact Fee revenues may be used to service the debt the City has issued to fund facilities that benefit development. New EDUs are required to buy-in to each component of the existing wastewater system as shown in Table 3-3, and are allocated costs based on the portion of existing capacity in each component that is available to serve new EDUs.

TABLE 3-3
Buy-In to Existing Wastewater System

Plant Investment - Wastewater System Buy-In	Total Value RCNLD 6/30/2013 a	Used by Existing EDUs b	Available for New EDUs c
Wastewater Treatment Plants d	$ 300,323,601	$ 151,137,852	$ 149,185,749
Wastewater Collection System e	$ 106,855,883	$ 53,775,223	$ 53,080,660
Total Wastewater System	$ 407,179,484	$ 204,913,075	$ 202,266,409

[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 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 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 fiscal year 2013 wastewater effluent 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's 91st Avenue Wastewater

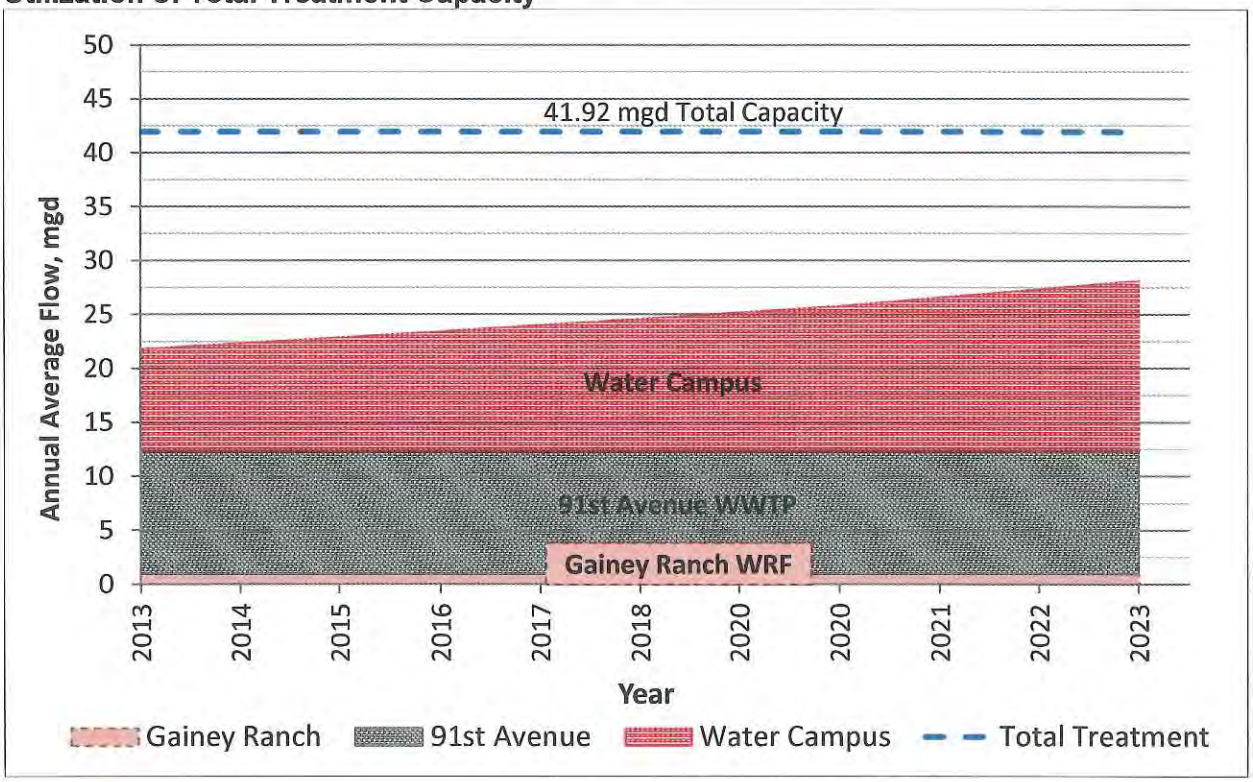
Treatment Plant through the SROG agreement. Since it benefits wastewater disposal at the Water Campus, 85% of the costs of the AWT are included in Wastewater Treatment Plants. The 1.67 of mgd at the Gainey Ranch Water Reclamation Facility is excluded from the Wastewater Treatment Plants' components since 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 3-2.

[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 20.05 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 3-2.

3.8 New EDU's

As noted previously, the entire wastewater system is operated as a single integrated service area and the division of flows to the various treatment plants can change from day to day and month to month based on system demands and operational needs. For the purposes of the Wastewater Improvement Plan, the aggregate of all planning level flows will be used to determine the new EDUs. The flow projections by facility are shown in Figure 3-2 relative to the total treatment capacity.

FIGURE 3-2
Utilization of Total Treatment Capacity



The system wide wastewater flows are 20.8 mgd for 2013 and 28.3 mgd in 2023. Using the growth in flow and the defined level of service of 196 gpd per EDU, the total growth in EDUs in the Scottsdale Wastewater Service Area are shown in Table 3-4.

TABLE 3-4
Total Scottsdale EDUs Based on Flow

Year	Growth in Flow, mgd	Flow per EDU, gal/day	Total EDU Increase
Growth from 2013 to 2023	6.3	196	32,110

3.9 Grandfathered Capital Facilities

There are no grandfathered capital facilities identified at this time. Grandfathered Capital Facilities are those facilities provided through financing or debt incurred before June 1, 2011 and for which an impact fee has been pledged towards payment.

3.10 Required Capital Facilities

3.10.1 Wastewater Treatment

There are no planned capacity expansions to the Gainey Ranch WRF, Water Campus or Scottsdale's ownership in the 91st Avenue WWTP to meet existing or future flows through the 2023 planning period. The excess capacity in these facilities to accommodate new EDUs, is described in the following section.

3.10.2 Collection System for New EDUs

In general, the existing collection and pump back system is capable of meeting the current level of service for existing and new EDUs, but a number of improvements have been identified as presented in Table 3-5. Some of these improvements include both a portion to serve existing EDUs and a portion to accommodate new EDUs. The allocation of costs between existing and new EDUs is based on the average flow condition.

TABLE 3-5
Collection System Capital Facilities

	Project Location	Total Length (Feet)	Pipe Diameter	Pipe Diameter	(%)		Cost
1	N 78th St from E Chaparral Rd to E Coolidge St; E Coolidge St from N 78th St to N Hayden Rd	2,510	8 in	12 in	Existing	85.5%	$487,569
					Growth	14.5%	$82,431
2	West to East	5,993	8 in	10 in,	Existing	89.0%	$1,178,405

TABLE 3-5
Collection System Capital Facilities

	Project Location	Total Length (Feet)	Pipe Diameter	Pipe Diameter	(%)		Cost
	interceptor in Earll/Avalon alley, under Paiute Park and east in Earll/Avalon			12 in	Growth	11.0%	$145,595
3	N 68th St from E Highland Ave to E Camelback Rd	1,313	8 in	12 in	Existing	82.2%	$245,651
					Growth	17.8%	$53,349
4	N 68th St from north of E Roma St to E Monterosa St	1,879	10 in	15 in	Existing	67.7%	$339,955
					Growth	32.3%	$162,045
5	E McCormick Pkwy and N Scottsdale Rd; N 73rd Pl and E Northern Ave	811	8 in	12 in	Existing	86.9%	$160,707
					Growth	13.1%	$24,293
6	N 128th St from E Shea Blvd to E Desert Cove Ave	794	8 in	12 in	Existing	82.8%	$149,908
					Growth	17.2%	$31,092
7	E Redfield Rd from N Frank Lloyd Wright to N 96th St	1,093	10 in	12 in	Existing	85.0%	$211,682
					Growth	15.0%	$37,318
8	E Cactus Rd from N Frank Lloyd Wright Blvd to N 104th St	4,558	8 in	12 in	Existing	78.6%	$813,431
					Growth	21.4%	$221,569
9	N 104th St from E Cactus Rd to E Cholla Dr	2,673	8 in	10 in	Existing	78.8%	$448,994
					Growth	21.2%	$121,006
10	E Via Linda from Loop 101 NB going west	493	21 in	30 in	Existing	0%	$0
					Growth	100%	262,000
11	Crossroads East Lift Station	-	-	1.61 mgd	Existing	0%	$0
					Growth	100%	$2,300,000
12	Crossroads Force Mains	5,520	-	10 in	Existing	0%	$0
					Growth	100%	$1,530,000
Total					**Existing**	-	**$4,036,301**
					Growth	-	**$4,970,698**

3.11 Cost Estimates

Table 3-6 provides a summary of all the costs for the wastewater category of Necessary Public Services. It should be noted that these costs do not include financing costs, interest, the time value of money, or inflation.

TABLE 3-6
Wastewater System Cost Summary

	Estimated Cost
Treatment Buy-In	$300,323,601
Collection Buy-In	$106,855,883
Collection Costs for New EDUs	$4,970,698
Total	**$412,150,182**

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		0.240	0.161	
Tonto Hills	0.032		0.030	0.002	
McDowell Mountain Golf Club			0.370		
Reclaimed Water Distribution System		15.000	8.500		6.500
Impact Fees Collected For Recent Projects				0.001	
Total Reserved Capacity	**0.666**	**15.000**	**9.141**	**0.396**	**6.500**

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

The following developments have paid impact fees for water service reserving a total capacity of 0.001 mgd.

Archstone @ DC Ranch
Broadstone @ Lincoln
Jefferson@ One Scottsdale
Portales
Skysong Apartments
LIV North

Wastewater Service

Wastewater Reserved Capacity [a]

Contract Name	Purchased Wastewater Capacity (mgd)	Current Production (mgd)	Unused Wastewater Capacity (mgd)
Black Mountain Sewer	0.401	0.400	0.001
Paradise Valley	1.000	0.750	0.250
Impact Fees Collected For Recent Projects			0.001
Total Reserved Capacity	**1.401**	**1.150**	**0.252**

[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.

The following developments have paid impact fees for wastewater service reserving a total capacity of 0.001 mgd.

Archstone @ DC Ranch
Broadstone @ Lincoln
Jefferson@ One Scottsdale
Portales
Skysong Apartments
LIV North

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 2014 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, the present value (PV) of 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 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 PV for these future payments in 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 **$4,070.77**

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)	$ 2.923
Water Distribution (gpd)	$ 1.906
Water Recharge (gpd)	$ 1.448
Interest Expense (gpd)	$ 0.308
Total Cost of Capacity (gpd)	$ 6.584
Less: Debt Principal Offset	$ (0.843)
Net Cost of Capacity (gpd)	$ 5.742
Peak Demand Factor	709
Water Impact Fee Per EDU	**$ 4,070.77**

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 PV of 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 PV 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 **$2,272.08**

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)	$ 7.500
Wastewater Collection (gpd)	$ 2.795
Interest Expense (gpd)	$ 1.673
Total Cost of Capacity (gpd)	$ 11.968
Less: Debt Principal Offset	$ (0.376)
Net Cost of Capacity (gpd)	$ 11.592
Wastewater Demand Factor	196
Wastewater Impact Fee Per EDU	**$ 2,272.08**

Information on the calculation of the Water and Wastewater Impact Fees per EDU will be made available in the 2014 Development Impact Fee Report, scheduled for public hearing in January, 2014.

The Water and Wastewater 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)

Appendix A To Water IIP

Method of EDU Calculations & Future Non-Residential EDU Calculations

Method of Calculations for Future Residential and Non-Residential EDUs (Tables 2-7 and 2-8) as Taken from the Land Use Assumptions Report:

(For purposes of this Example-only Rural Neighborhood

North (Elliott D. Pollack & Co.) Table 4 is used.)

2263 dwelling units (year 2025) -1414 dwelling units (year 2020) = 849 dwelling units

849 dwelling units÷ 5 years = 169 dwelling units/year

169 dwelling units/year X 3 years (2020 to 2023) = 509 dwelling units

1414 dwelling units + 509 dwelling units = 1923 dwelling units (for year 2023)

Future Non-Residential EDU Calculations

Floor area ratios (FAR) were calculated using acreage and square footage forecasts from the Development Forecast discussed in the LUA. The FAR was derived in 5 year increments from the Development Forecast, and then was linearly interpolated to arrive at a FAR for year 2023 as shown in Table A-1. Table A-1 is used to convert square feet to acres. To convert from square feet to acres, divide square feet by 43,560 square feet/acre, then divide by FAR.

TABLE A-1
Floor Area Ratios

Region/Land Use Type	2023
North	
Commercial	0.15
Employment	0.17
Cult/Inst/Public	0.11
Hotel/Resort	0.08
Central	
Commercial	0.20
Employment	0.31
Cult/Inst/Public	0.15
Hotel/Resort	0.10
South	
Commercial	0.27

TABLE A-1
Floor Area Ratios

Region/Land Use Type	2023
Employment	0.49
Cult/Inst/Public	0.19
Hotel/Resort	0.17

The resulting calculation of non-residential acreage using the non-residential square footage forecast in the Water IIP and Table A-1 is shown in below in Table A-2.

TABLE A-2
Non-Residential Acres

(acres)	North	Central	South	Total
Commercial	78.2	264.4	26.1	368.7
Employment	102.3	251.8	65.3	419.4
Cult/Inst/Public	43.1	95.2	30.6	168.9
Resorts/Tourism	109.3	138.8	34.5	282.7
Total				**1,239.7**

Demand factors or maximum day water use for each non-residential land use type were derived from the City's 2012 billing records. Each billing record was correlated to its land use type using Geographic Information System (GIS) software. These records were aggregated by land use type in each region using GIS automated functions to derive a maximum day demand for each land use. These maximum day demands expressed as gpm per acre are shown in Table A-3 below.

TABLE A-3
Demand Factors

	Northern (gpm/acre)	Central (gpm/acre)	Southern (gpm/acre)
Commercial	0.86	1.86	2.06
Employment	0.18	1.37	2.09
Cultural/Institutional/Public	0.96	0.66	0.75
Resorts/Tourism	0.65	5.01	6.55

Next, to calculate the maximum day water use for the non-residential land use types, the acreage projections from Table A-2 are multiplied by the maximum day demand factors in Table A-3. The results of these calculations are shown in Table A-4.

TABLE A-4
Water Use based on Demand Factors

	North (gpm)	Central (gpm)	South (gpm)	Total (gpm)
Commercial	66.8	492.5	54.0	613.3
Employment	18.0	346.1	136.3	500.4
Cult/Inst/Public	41.2	62.5	23.0	126.7
Resorts/Tourism	70.9	695.2	226.4	992.5
Total				**2,232.9**

Lastly, the future non-residential EDUs, shown in Table A-5, are calculated by dividing the maximum day water use from Table A-4 by the level of service of 709 gpd/EDU. Note that gpm from Table A-4 must first be converted to gpd before dividing by the level of service to maintain consistent units.

TABLE A-5
Future EDUs

	North	Central	South	Total
Commercial	136	1,000	110	1,246
Employment	37	703	277	1,017
Cult/Inst/Public	89	127	47	258
Resorts/Tourism	144	1,412	460	2,016
Total	401	3,242	894	**4,537**