APPROVED 12/18/2024

WASTEWATER COLLECTION INFRASTRUCTURE IMPROVEMENTS PLAN

Wastewater Collection Impact Fee Methodology

The steps to calculate the Wastewater Collection Impact Fee can be summarized as follows:

- Determine the need for wastewater collection facilities necessary to serve new development anticipated during the period of 2025 – 35. The Land Use Assumptions used for the Wastewater Collection IIP provide a forecast of new development by land use type, location, and relative timing (see supplemental report: *Growth Projections and Land Use Assumptions 2024 Update*, Applied Economics, July 19, 2024).

- Land Use Assumptions are translated to wastewater demand (volume) to inform network capacity and specific facility size requirements. The Water Services Department retained Keen Independent Research to update wastewater demand estimates and calculate Equivalent Demand Units (EDUs) for 'planning' purposes (see supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024).

- The WSD Wastewater System Modeling Team uses the land use and wastewater demand forecasts to identify the collection facilities that are needed during the 10-year infrastructure planning horizon.

- Existing and planned wastewater collection facility costs are based on the current cost of construction, using generic infrastructure types and quantities (See supplemental report: *Water and Wastewater Unit Cost Study*, Carollo Engineers, June 2024).

- For each impact fee service area, the existing and planned wastewater collection facility cost, is divided by the total EDUs expected at the end of the 10-year infrastructure planning horizon. This method provides a hybrid 'buy-in, plus 10-year' plan-based cost per EDU.

- As an alternative to estimating available capacity in the existing wastewater collection system, the city calculates a 'buildout' cost per EDU, or the cost of all wastewater collection facilities divided by the total EDUs at buildout. This method controls for cost variability attributed to a specific planning horizon and serves as a check to avoid over-burdening one cohort of new development in favor of another. The lesser of the '10-year plan', the hybrid 'buy-in, plus 10-year' and the 'buildout' cost is selected as the wastewater collection capital cost per EDU.

- An analysis of the existing fund balance is performed to determine the amount, if any, that needs to be applied toward the 10-Year Plan. Any portion of the existing fund balance that is needed or reserved for current service deficiencies or earmarked in the city's approved CIP for an impact fee eligible facility that is not included in the proposed fee update, is not applied to the 10-Year Plan. Any fund balance that does not meet those criteria is divided by the 10-Year EDU to determine a fund balance adjustment (see supplemental report: *2025 Development Impact Fee Update, Fund Balance Adjustment Report, December 6, 2024*). If applicable, the fund balance adjustment is subtracted from the capital cost per EDU to calculate the gross impact fee per EDU.

- Alternative revenue offsets are calculated for sewer rate revenue that is applied toward facilities provided through the wastewater collection impact fee program. This includes water rate revenue to pay outstanding debt service. The offset per EDU is calculated by dividing existing and forecasted debt service by citywide EDUs to determine the average sewer rate revenue generated per EDU for repaying debt service. Arizona impact fee rules require cities to forecast the alternative revenue generated by new development over the 10-year infrastructure planning horizon. This is done by multiplying the water rate offset per EDU by the anticipated

10-year EDUs in each designated impact fee service area (see supplemental report: *2025 Development Impact Fee Update, Alternative Revenue Offsets Report*, December 6, 2024).

- The Sewer Development Occupational Fee (DOF) will be phased out in conjunction with adoption of the citywide Wastewater Treatment Impact Fee. As such, the offset previously applied for DOF charges will no longer be applicable.

- Total combined offsets per EDU are subtracted from the gross impact fee per EDU. The resulting 'net' impact fee per EDU is assessed to all new services connections within the designated impact fee service areas that will place demand on the city's wastewater collection systems.

LEVEL OF SERVICE (LOS)

Definitions of level of service associated with sewer services are difficult to summarize because of the numerous metrics used to evaluate potable wastewater treatment and collection. Once the city legally accepts the transfer of wastewater facilities from a developer, the city is obligated to meet all state and federal regulatory requirements and strives to always provide reliable and high-quality wastewater services to all customers. The city also endeavors to meet a wide range of standards that are not legally required, but which it seeks to attain. For example, the Water Services Department has the following types of objectives that must be considered as being part of the level of service for wastewater collection:

- **Collection.** The City collects all wastewater produced by customers that are connected to the City's wastewater system and transports it to treatment facilities using a network of lift stations and interceptors.

- **Capacity management.** The City ensures that the wastewater system does not generate surplus situations where wastewater levels exceed capacities and sewage is discharged through manholes into streets or washes, even during extreme storm events that result in massive inflow and infiltration situations.

- **Capacity standards.** The City complies with U.S. Environmental Protection Agency and Arizona Department of Environmental Quality standards regarding maximum sewer capacity use and associated system sampling and modeling requirements.

While there are many different parameters that dictate the specific sizes, quantities, and locations of various types of facilities needed in the city's two Wastewater Collection Impact Fee Service Areas, the assumptions used to establish the proportionate amount of infrastructure required to serve an EDU are summarized below. Additional detail can be found in supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024):

Table WWC.1 – Wastewater Demand Assumptions and Planning EDU Factors

Land Use	Gal/Unit/Day	EDU Factor
Single-Family	153	**1.00**
Multifamily	103	**0.67**
Retail	35	**0.59**
Office	19	**0.32**
Industrial	38	**0.65**
Public/Other	27	**0.47**

WASTEWATER COLLECTION IMPACT FEE SERVICE AREAS

(see supplemental report: Map #5, *Impact Fee Service Area Maps*, July 17, 2024 or as amended)

- Northern (Northwest, Northeast, Paradise Ridge)
- Estrella South

LAND USE ASSUMPTIONS

The following tables display the forecasted wastewater collection 'planning' EDUs for the required geographic areas and time periods.

Table Source Data and Calculation:

- Unit Counts are listed in the Land Use Assumptions Report and come from the Applied Economics study. They represent the amount of growth in housing units or 1,000 square feet of non-residential construction in an impact fee area (see supplemental report: *Growth Projections and Land Use Assumptions 2024 Update*, Applied Economics, August 21, 2024).

- The 'planning' EDU factors come from the Keen Independent study. EDU factors convert dwelling units and non-residential floor area to units equivalent to the average wastewater demand of a single family home (see supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024).

- The number of EDUs is calculated by multiplying development units (dwellings and non-residential floor area) from the Applied Economics' study by the 'planning' EDU Factors from the Keen Independent Research study.

Table WWC.2 – Northern Impact Fee Service Area, Equivalent Demand Units

	SF	MF	Retail	Office	Industrial	Public	Other	Total
Planning EDU Factor	*1.00*	*0.67*	*0.59*	*0.32*	*0.65*	*0.47*	*0.47*	
Estimate Year	31,056	9,995	3,536	1,029	3,650	1,620	1,936	52,822
10-Year Growth	18,974	7,930	1,135	1,798	5,013	383	483	35,716
End of Planning Horizon	50,030	17,925	4,671	2,827	8,663	2,003	2,419	88,538
Buildout	121,360	38,318	13,246	14,324	30,259	3,836	3,105	224,448

Table WWC.3 – Estrella South Impact Fee Service Area, Equivalent Demand Units

	SF	MF	Retail	Office	Industrial	Public	Other	Total
Planning EDU Factor	*1.00*	*0.67*	*0.59*	*0.32*	*0.65*	*0.47*	*0.47*	
Estimate Year	17,128	924	958	3	11,981	729	16	31,739
10-Year Growth	3,512	1,234	247	17	2,509	166	0	7,685
End of Planning Horizon	20,640	2,158	1,205	20	14,490	895	16	39,424
Buildout	22,551	2,445	1,447	20	16,613	1,059	26	44,161

WASTEWATER COLLECTION UNIT COST

Tables WWC.4 and WWC.5 provide the estimated current cost of construction for existing, ultimate 'build-out' and 10-year planned wastewater collection improvements that are included in the impact fee program for both service areas. The cost estimates shown are based on the Carollo Engineers' unit cost study. For a detailed breakdown of unit cost estimates, see supplemental report: *Water and Wastewater Unit Cost Study*, Carollo Engineers, June 2024.

Table WWC.4 – Northern Impact Fee Service Area, Existing and Planned Facility Cost

Type of Facility	Cost
Existing Sewers	$253,000,000
Existing Force Mains	$210,000,000
Existing Lift Stations	$29,000,000
Total Existing	**$492,000,000**
Build-Out Sewers	$231,000,000
Build-Out Force Mains	$332,200,000
Build-Out Lift Stations	$63,800,000
Total Ultimate*	**$627,000,000**
10-Yr Sewers	$85,000,000
10-Yr Force Mains	$113,000,000
10-YR Lift Stations	$5,000,000
Total 10-Yr	**$203,000,000**

Table WWC.5 – Estrella South Impact Fee Service Area, Existing and Planned Facility Cost

Type of Facility	Cost
Existing Sewers	$167,693,113
Existing Force Mains	$18,200,000
Existing Lift Stations	$10,700,000
Total Existing	**$196,593,113**
Build-Out Sewers	$0
Build-Out Force Mains	$37,400,000
Build-Out Lift Stations	$5,400,000
Total Ultimate	**$42,800,000**
10-Yr Sewers	$0
10-Yr Force Mains	$37,400,000
10-YR Lift Stations	$5,400,000
Total 10-Yr	**$42,800,000**

HYBRID 'BUY-IN, PLUS 10-YEAR PLAN' COST PER EDU

Tables WWC.6 and WWC.7 provide the total infrastructure improvement plan cost per EDU using the 'buy-in, plus 10-year plan' method. Under this approach, the total cost of construction for all existing wastewater collection improvements, and the cost of planned improvements for the next 10 years is divided by the total EDUs (existing and 10-year forecast) at the end of the infrastructure planning horizon. These cost estimates are based on the Carollo unit cost study, but include an escalation adjustment of 3% over 4 years. The escalation adjustment is incorporated as a proxy for to convert the cost estimate to January 2028 dollars, or the approximate mid-point before the next IIP update.

Table WWC.6 – Northern Impact Fee Service Area, 'Buy-In, Plus 10-Year' Plan Cost per EDU

Type of Facility	Cost
Cost of Existing & 10-Yr Plan Sewers	$338,000,000
Cost of Existing & 10-Yr Plan Force Mains	$323,000,000
Cost of Existing & 10-Yr Plan Lift Stations	$34,000,000
Total Existing and 10-Yr Plan Facilities	**$695,000,000**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted 10-Yr Plan Facility Cost	**$782,222,500**
End of Planning Horizon EDUs	88,538
Cost per EDU	**$8,835**

Table WWC.7 – Estrella South Impact Fee Service Area, 'Buy-In, Plus 10-Year' Plan Cost per EDU

Type of Facility	Cost
Cost of Existing & 10-Yr Plan Sewers	$167,693,113
Cost of Existing & 10-Yr Plan Force Mains	$55,600,000
Cost of Existing & 10-Yr Plan Lift Stations	$16,100,000
Total Existing and 10-Yr Plan Facilities	**$239,393,113**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted 10-Yr Plan Facility Cost	**$269,436,948**
End of Planning Horizon EDUs	39,424
Cost per EDU	**$6,834**

ULTIMATE 'BUILDOUT PLAN' COST PER EDU

Tables WWC.8 and WWC.9 provide the total infrastructure improvement plan cost per EDU using the 'buildout plan' method. This approach divides the current construction cost (adjusted to 2028 dollars) of all wastewater collection improvements through buildout, by the total anticipated EDUs at buildout. If the cost per EDU over a 10-year planning period is greater than the buildout cost per EDU, that may indicate that development in the 10-year planning period is subject to a disproportionate share of system expansion. This may also reflect growth forecasts that require major upfront infrastructure investments, opposed to growth forecasts that can be supported by incremental expansion of existing networks.

Table WWC.8 – Northern Impact Fee Service Area, Ultimate 'Buildout' Plan Cost per EDU

Type of Facility	Cost
Cost of Ultimate Plan Sewers	$484,000,000
Cost of Ultimate Plan Force Mains	$542,200,000
Cost of Ultimate Plan Lift Stations	$92,800,000
Total Existing and 10-Yr Plan Facilities	**$1,119,000,000**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted Ultimate Plan Cost	**$1,259,434,500**
End of Planning Horizon EDU	*224,448*
Cost per EDU	**$5,611**

Table WWC.9 – Estrella South Impact Fee Service Area, Ultimate 'Buildout' Plan Cost per EDU

Type of Facility	Cost
Cost of Ultimate Plan Sewers	$167,693,113
Cost of Ultimate Plan Force Mains	$55,600,000
Cost of Ultimate Plan Lift Stations	$16,100,000
Total Existing and 10-Yr Plan Facilities	**$239,393,113**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted 10-Yr Plan Facility Cost	$269,436,948
End of Planning Horizon EDU	44,161
Cost per EDU	**$6,101**

POTENTIAL CAPITAL COST PER EDU

The potential wastewater collection capital cost per EDU is the lesser of the 'Buy-in Plus 10-Year Plan' cost per EDU and the 'Buildout Plan' cost per EDU. Using the 'Buildout Plan' as an alternative to estimating system capacity utilization.

Table WWC.10 – Northern Impact Fee Service Area, Potential Capital Cost per EDU

Wastewater Plan-Based Fee Method	Cost per EDU
Buy-In + 10-Year Plan	$8,835
Ultimate 'Buildout' Plan	$5,611
Potential Capital Cost per EDU	**$5,611**

Table WWC.11 – Estrella South Impact Fee Service Area, Potential Capital Cost per EDU

Wastewater Plan-Based Fee Method	Cost per EDU
Buy-In + 10-Year Plan	$6,834
Ultimate 'Buildout' Plan	$6,101
Potential Capital Cost per EDU	**$6,101**

FUND BALANCE ADJUSTMENT AND GROSS FEE PER EDU

The potential capital cost per EDU from Tables WWC.10 and WWC.11 is adjusted by the qualifying fund balance to determine the Gross Fee per EDU. The fund balance adjustment calculation can be found in supplemental Report: *2025 Development Impact Fee Update, Fund Balance Adjustment Report*, December, 6 2024.

Table WWC.12 – Wastewater Collection, Potential Gross Impact Fee per EDU

Wastewater Collection Impact Fee Service Area	*($ per EDU)* Capital Cost	Fund Balance	Gross Fee
Northern	5,611	241	**5,370**
Estrella South	6,101	449	**5,652**

POTENTIAL NET IMPACT FEE

The potential net fee per EDU is calculated by subtracting any offset amounts from the potential gross fees from Table WWC.12. For a detailed breakdown of wastewater collection offsets, see supplemental report: *2025 Development Impact Fee Update, Alternative Revenue Offsets Report*, December 6, 2024.

Table WWC.13 – Wastewater Collection, Potential Net Impact Fee per EDU

Wastewater Collection Impact Fee Service Area	*($ per EDU)* Gross Fee	Debt Offset	Net Fee
Northern	5,370	243	**5,127**
Estrella South	5,652	243	**5,409**

WASTEWATER COLLECTION IMPACT FEE ASSESSMENTS

The Wastewater Collection fee schedule for single-family, multifamily, and non-residential uses is shown below. Wastewater Collection fees for residential uses are assessed per dwelling unit. All other uses are assessed by water meter size.

Table WT.14 – Wastewater Collection, Net Impact Fee Schedule

Meter Type	EDU Factor	Northern Assessment	Estrella South Assessment
MFR (per DU)	0.67	3,435	3,624
SFR (per DU ≤ 1" meter)	1.00	5,127	5,409
SFR (per DU 1.5" meter)	2.18	11,177	11,792
3/4-Inch (per meter)	1.31	6,691	7,059
1-Inch (per meter)	2.25	11,536	12,170
1 1/2-Inch (per meter)	4.91	25,148	26,531
2-Inch (per meter)	6.55	33,569	35,415
3-Inch (per meter)	20.45	104,860	110,628
4-Inch (per meter)	36.00	184,572	194,724
6-Inch (per meter)	57.26	293,585	309,733
8-Inch (per meter)	114.55	587,285	619,587
10- or 12-Inch (per meter)	225.00	1,153,575	1,217,025

SUMMARY OF PLANNED IMPROVEMENTS

A.R.S. 9-463.05 requires that impact fees collected must be spent on either 1) new projects that serve new development, or 2) to repay debt incurred to fund the construction of projects that serve new development.

A summary of planned improvements and anticipated funding for each wastewater collection service area is shown in the following tables. The planned improvements listed below are eligible to be funded with wastewater collection impact fee collections, as calculated within this IIP.

Table WWC.15 – Northern Area Wastewater Collection Planned Improvements

Type of Facility	Quantify		Size		Amount
10-Yr Sewers	17	miles	15 - 36	inch	
10-Yr Force Mains	14	miles	24	inch	
10-YR Lift Stations	0	each	-	MGD	
Combined 10-Year Plan Cost					**$203,000,000**
Escalation Factor (4 yrs @ 3%)					*1.1255*
Total 10-Year Plan Cost					**$228,476,500**
Anticipated 10-Year Impact Fee Revenue					*$183,115,932*
Anticipated Alternative Revenue					*$8,678,988*
Available Service Area Fund Balance					*$8,601,633*
Borrowing Requirement for Future Development					**$28,079,947**

Table WWC.16 – Estrella South Area Wastewater Collection Planned Improvements

Type of Facility	Quantify		Size		Amount
10-Yr Sewers	0	miles	-	inch	
10-Yr Force Mains	6	miles	18	Inch	
10-YR Lift Stations	1	each	6.0	MGD	
Combined 10-Year Plan Cost					**$42,800,000**
Escalation Factor (4 yrs @ 3%)					*1.1255*
Total 10-Year Plan Cost					**$48,171,400**
Anticipated 10-Year Impact Fee Revenue					*$41,576,974*
Anticipated Alternative Revenue					*$1,867,455*
Available Service Area Fund Balance					*$3,451,866*
Borrowing Requirement for Future Development					**$1,275,105**