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 – 34. 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 12, 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 costs, less the amount of any uncommitted existing fund balances, 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 system capacity utilization, 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 'buy-in, plus 10-year' and 'buildout' cost per EDU is selected as the potential wastewater collection gross impact fee.

- Finally, offsets must be calculated and applied for alternative revenue sources that are applied toward facilities provided through the wastewater collection impact fee program. This includes sewer rate revenue that will be used to pay outstanding debt service obligation. The offset per EDU is calculated by dividing the outstanding debt service by citywide EDUs. 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 offset per EDU by the anticipated 10-year EDUs in each designated impact fee service area (see supplemental report: *2025 Development Impact Fee Update, Draft Alternative Revenue Offsets Report*, Draft July 18, 2024, or as amended).

- 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	**0.23**
Office	19	**0.12**
Industrial	38	**0.25**
Public	27	**0.18**
Other/Institutional	39	**0.26**

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, July 12, 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*	*0.23*	*0.12*	*0.25*	*0.18*	*0.26*	
Estimate Year	30,310	9,322	1,332	364	1,359	620	1,037	44,344
10-Year Growth	16,974	7,842	441	599	1,223	147	236	27,462
End of Planning Horizon	47,284	17,164	1,773	963	2,582	767	1,273	71,806
End of Forecast Horizon	84,634	31,197	3,052	3,542	6,051	1,273	1,610	131,359
Buildout	121,360	38,318	5,164	5,371	11,638	1,469	1,718	185,038

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*	*0.23*	*0.12*	*0.25*	*0.18*	*0.26*	
Estimate Year	16,661	733	365	0	4,372	274	9	22,414
10-Year Growth	3,655	1,329	95	7	1,070	63	0	6,219
End of Planning Horizon	20,316	2,062	460	7	5,442	337	9	28,633
End of Forecast Horizon	22,550	2,445	564	7	6,380	405	9	32,360
Buildout	22,551	2,445	564	7	6,390	405	15	32,377

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	$35,000,000
Total Existing	**$498,000,000**
Build-Out Sewers	$231,000,000
Build-Out Force Mains	$332,200,000
Build-Out Lift Stations	$58,300,000
Total Ultimate	**$621,500,000**
10-Yr Sewers	$85,000,000
10-Yr Force Mains	$113,000,000
10-YR Lift Stations	$0
Total 10-Yr Plan	**$198,000,000**

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

Type of Facility	Cost
Existing Sewers	$168,000,000
Existing Force Mains	$18,000,000
Existing Lift Stations	$11,000,000
Total Existing	**$197,000,000**
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 Plan	**$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	$35,000,000
Total Existing and 10-Yr Plan Facilities	**$696,000,000**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted Buy-In + 10-Yr Plan Cost	**$783,348,000**
End of Planning Horizon EDUs	*71,806*
Cost per EDU	**$10,909**

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	$168,000,000
Cost of Existing & 10-Yr Plan Force Mains	$55,400,000
Cost of Existing & 10-Yr Plan Lift Stations	$16,400,000
Total Existing and 10-Yr Plan Facilities	**$239,800,000**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted Buy-In + 10-Yr Plan Cost	**$269,894,900**
End of Planning Horizon EDUs	*28,633*
Cost per EDU	**$9,426**

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	$93,300,000
Total Existing and 10-Yr Plan Facilities	**$1,119,500,000**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted Ultimate Plan Cost	**$1,259,997,250**
End of Planning Horizon EDU	*185,038*
Cost per EDU	**$6,809**

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

Type of Facility	Cost
Cost of Ultimate Plan Sewers	$168,000,000
Cost of Ultimate Plan Force Mains	$55,400,000
Cost of Ultimate Plan Lift Stations	$16,400,000
Total Existing and 10-Yr Plan Facilities	**$239,800,000**
Escalation Factor (4 yrs @ 3%)	*1.1255*
Adjusted Ultimate Plan Cost	**$269,894,900**
End of Planning Horizon EDU	*32,377*
Cost per EDU	**$8,336**

POTENTIAL GROSS IMPACT FEE

The potential gross wastewater collection impact fee 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 Gross Impact Fee per EDU

Wastewater Plan-Based Fee Method	Cost per EDU
Buy-In + 10-Year Plan	$10,909
Ultimate 'Buildout' Plan	$6,809
Maximum Gross WW Collection Impact Fee	**$6,809**

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

Wastewater Plan-Based Fee Method	Cost per EDU
Buy-In + 10-Year Plan	$9,426
Ultimate 'Buildout' Plan	$8,336
Maximum Gross WW Collection Impact Fee	**$8,336**

Since the potential gross impact fee per EDU under the 'Buildout Plan' method would result in revenue that exceeds total 10-Year Plan Cost, and there is no outstanding debt attributed to wastewater collection improvements in the Estrella South Impact Fee Service Area, it is necessary to adjust the cost per EDU not to exceed the total 10-Year Plan Cost. In other words, the potential gross impact fee will be the Total 10-Year Plan Cost, divided by the 10-Year EDUs as shown in Table WT.15 below.

Table WWC.12 – Estrella South Impact Fee Service Area, Adjusted Potential Gross Fee

Adjusted 10 Year Plan Cost	**$48,171,400**
10-Year Growth EDUs	*6,219*
Cost per EDU	**$7,746**

FUND BALANCE ADJUSTMENT

The potential net fee per EDU is calculated by subtracting any offset amounts from the potential gross fees from Tables WT.10 and WT.11. For a detailed breakdown of water transmission offsets, see supplemental report: *2025 Development Impact Fee Update, Draft Alternative Revenue Offsets Report*, Draft July 18, 2024, or as amended.

Table WWC.13 – Water Transmission Fund Balance Adjustment

Impact Fee Service Area	Fund Balance ($MM)[1]	10-Yr EDU	Adj Amount ($/EDU)
Northern	8.6	27,462	**313**
Estrella S.	3.4	6,219	**554**

1) Fund Balance is 50% of the Northern and Estrella S. fund balances as of 6-30-2024. This value will be updated to reflect future collections, FY 2025/26 CIP, and other relevant information.

POTENTIAL NET IMPACT FEE

The potential net fee per EDU is calculated by subtracting any offset amounts from the potential gross fees from Tables WWC.10 and WWC.11. For a detailed breakdown of wastewater collection offsets, see supplemental report: *2025 Development Impact Fee Update, Draft Alternative Revenue Offsets Report*, Draft July 18, 2024, or as amended.

Table WWC.14 – Wastewater Collection, Potential Net Impact Fee per EDU

Water Transmission Impact Fee Service Area	*($ per EDU)* Gross Fee	Fund Balance	Debt Offset	DOF Offset[1]	Net Fee
Northern	$6,809	313	$2	$0	$6,494
Estrella South	$7,746	554	$2	$0	$7,190

1) DOF Offset of $0 is subject to Council approval of eliminating the DOF. If the DOF remains in place the offset amount will be updated accordingly.

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 (interest and principal) incurred to fund the construction of projects that serve new development. It is anticipated that 100% of impact fee revenue will be used toward new projects that serve new development, and no funding will be used to repay debt. It should be noted that A.R.S. 9-463.05 (and impact fee common law) also prohibit impact fee revenues from being spent on operations, maintenance, repair, rehabilitation, environmental or other non-capital expenditures.

For the purpose of this analysis, the following assumptions have been made:

- All forecasted EDUs will be developed in the ten-year planning period 2025-2034, and that all EDUs will pay net fees that are consistent with single family dwellings.
- All future wastewater collection facilities will be built within the ten-year planning period 2025-2034.

A summary of the planned improvements and costs for the ten-year planning period 2025-2034 for the impact fee service areas are shown in the following tables. The tables provide a summary of planned facilities that are eligible to be funded with wastewater collection impact fee collections, as calculated within this Chapter.

Table WWC.15 – Northern Area Wastewater Collection Planned Improvements

Type of Facility	Quantify		Size		Cost
10-Yr Sewers	17	miles	15 - 36	in.	
10-Yr Force Mains	14	miles	24	in.	
10-YR Lift Stations	0	ea.	-	MGD	
Total Future (10-Yr)					**$198,000,000**
Escalation Factor (4 yrs @ 3%)					*1.1255*
Total 10-Year Plan Cost					$222,849,000
Anticipated 10-Year Impact Fee Revenue					($178,338,228)
Anticipated Alternative Revenue					($54,924)
Fund Balance					($8,599,982)
Borrowing Requirement for Future Development					$35,855,866

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

Type of Facility	Quantify		Size		Cost
10-Yr Sewers	0	miles	-	in.	
10-Yr Force Mains	6	miles	18	in.	
10-YR Lift Stations	1	ea.	6.0	MGD	
Total Future (10-Yr)					**$42,800,000**
Escalation Factor (4 yrs @ 3%)					*1.1255*
Total 10-Year Plan Cost					$48,171,400
Anticipated 10-Year Impact Fee Revenue					($44,714,610)
Anticipated Alternative Revenue					($12,438)
Fund Balance					($3,444,707)
Borrowing Requirement for Future Development					**($355)**