STORM DRAINAGE INFRASTRUCTURE IMPROVEMENTS PLAN

The City of Phoenix charges a Storm Drainage Development Impact Fee (DIF) to help provide new storm drainage facilities. The Storm Drainage Impact Fee is based on the estimated cost of providing drainage improvements within the designated Storm Drainage Impact Fee Areas. The City of Phoenix retained Kimley-Horn and Associates, Inc. (KH) to complete a storm drainage impact fee study update in conjunction with the City's 2025 Infrastructure Financing Plan. KH was tasked with performing cost analysis of existing and proposed drainage facilities identified by the City of Phoenix within the Laveen, Estrella, and Paradise Ridge Impact Fee Service Areas (IFSA).

STORM DRAINAGE IMPACT FEE STUDY SCOPE

The scope of services provided for this study consisted of eight tasks. The project began with coordination between KH and the City of Phoenix to reach consensus regarding study assumptions and to consolidate and review relevant data (Task 1). Utilizing the data provided by the City, KH then catalogued and characterized existing and proposed drainage facilities within each of the three IFSAs (Task 2), documented the Equivalent Development Units (EDU) anticipated in the City's projected growth data (Task 3), and updated previously compiled project cost estimates of proposed drainage facilities to reach baseline market conditions in 2024 (Task 4). Task 4 also included escalation of previously built storm drainage infrastructure costs to current dollars and the calculations of the proposed impact fees for each IFSA. Data generated through the completion of Tasks 1 through 3 assisted KH in the development of storm drainage facility maps (Task 5) which were included in the draft and final letter reports prepared for The City (Tasks 6 & 7). KH assisted the City with the roll out of the proposed storm drainage impact fees to stakeholders and City officials. (Task 8).

DATA COLLECTION

General

To achieve the purposes of this project, data regarding the cost of existing and proposed drainage infrastructure, as well as the projected growth of development within each IFSA was required. KH obtained these data from the City of Phoenix. Data acquired included current cost information for projects in design, overall cost of completed projects, previously compiled cost estimates and updates, and City commissioned growth projection data.

Data Collection Results

In coordination with the City of Phoenix, KH conducted a comprehensive review of the following digital files:

- Existing Area Drainage Master Plans
- GIS shapefiles of IFSA Boundaries
- Relevant Final Drainage Reports
- City of Phoenix cost shares from previously completed drainage improvement projects
- Recent ADOT bid tabulations
- Projected EDU growth in each IFSA provided by City

- Past Infrastructure Financing Plans and supporting documentation
- Unit costs of recently completed and proposed projects in the conceptual or design phase
- Construction cost escalation rates from the Engineering News-Record (ENR) Construction Cost
- Index

STORM DRAINAGE IMPACT FEE AREAS

The Parks Impact Fee Areas are named in the following manner and can be viewed in the Impact Fee Service Area Maps, Page 9.

- Estrella
- Laveen
- Paradise Ridge

REGIONAL DRAINAGE FACILITIES

General

Prior to determining potential storm drainage impact fees, existing and proposed drainage facilities and their respective costs needed to be identified in each IFSA. Drainage facilities considered in the impact fee calculations are limited to those presented in the Flood Control District of Maricopa County (FCDMC) ADMPs and similar feasibility studies developed by the City. Additionally, drainage projects must have some or all components that provide a level of service (LOS) equal to 100-Year protection to be included in the storm drainage impact fee calculations. See **Storm Drainage Supplement Tables, Table 1** for detailed list of facilities and cost.

Existing Regional Drainage Facilities:

Estrella

The existing regional drainage facilities in the Estrella IFSA with 100-Year LOS are principally outlined in the Durango ADMP (Dibble & Associates, 2002). The Durango Regional Conveyance Channel (DRCC) was initially presented in the Durango ADMP, although its original design was altered and subsequently constructed in two blocks. In 2009, DRCC drainage facilities including detention basins, channel, culverts, and trunk lines east of 75th Avenue were constructed. Then in 2019, DRCC drainage facilities from 75th Avenue to 107th Avenue were completed. A breakdown of these projects is listed below.

- 75th Ave Storm Drain & Durango Regional Conveyance Channel (DRCC)
- DRCC 75th Ave to 107th Ave – Phases 1 & 2 Land Acquisition
- DRCC 75th Ave to 107th Ave – Phases 1 & 2 Design
- DRCC 75th Ave to 107th Ave – Phases 1 & 2 Construction

Laveen

The original Laveen ADMP Final Report (HDR, 2001) identified flood control infrastructure that has been constructed by the City of Phoenix and the FCDMC beginning in 1998. Currently, the Laveen Area Conveyance Channel is the largest existing drainage facility in Laveen and serves as a major outlet to the Salt River. The Laveen ADMSPU (JE Fuller, 2017) proposed additional infrastructure based on improved modeling software and included five Areas of Mitigation Interest (AoMI). The infrastructure proposed in the fourth AoMI, a storm drain along 27th Avenue and Olney Avenue, has been constructed. The remaining infrastructure proposed by the update has not been constructed and is included as proposed facilities in this study. A breakdown of existing drainage facilities in Laveen is listed below.

- Laveen Area Conveyance Channel
- 43rd Ave and Southern Ave Detention Basin
- 43rd Ave and Baseline Rd Detention Basin
- 43rd Ave Storm Drain
- 35th Ave and Dobbins Rd Basin and Storm Drain
- 27th Ave and South Mountain Basin
- 23rd Ave and Roeser Detention Basin / 27th Ave and Roeser Storm Drain
- Baseline Rd Storm Drain

Paradise Ridge

The Paradise Ridge IFSA currently has no existing regional drainage infrastructure with a 100-Year storm LOS.

PROPOSED REGIONAL DRAINAGE FACILITIES

Estrella

In the Estrella IFSA, the proposed regional facilities are the 47th Avenue Basin and Channel and the Sunland Channel identified in the original Durango ADMP (Dibble & Associates, 2002). The 47th Avenue Channel runs along the 47th Avenue alignment from the Salt River to approximately one-half mile north of Buckeye Rd. The project includes 10,200 ft of channel, five culverts, and a detention basin directly north of Buckeye Rd. The Sunland Channel is located both within the Estrella IFSA in the City of Phoenix and the City of Avondale, spanning from 99th Avenue to 120th Avenue, parallel to and a quarter mile north of Southern Avenue. The channel begins in the City of Phoenix at 99th Avenue and crosses into Avondale at 107th Avenue, where it converges with the DRCC at 120th Avenue. The project includes approximately 13,000 ft of channel and four culverts. The original Durango ADMP assumed all system costs for the Sunland Channel would be allocated to the FCDMC and the City of Phoenix. Maps in Appendix A show the location of the proposed regional flood control facilities within the Estrella IFSA.

Laveen

In the Laveen IFSA, the proposed 100-Year drainage facilities were identified in the Laveen ADMSPU (JE Fuller, 2017). The Laveen ADMSPU proposed drainage facilities based on five AoMIs. The first AoMI, Hidden Valley, consists of two large basins, storm drains, and an open channel. The City of Phoenix is not participating in the funding of this project, and therefore it was excluded from this study. The second AoMI, 51st Avenue and Sunrise Drive, was conceptually designed to mitigate storm runoff originating from the north facing side of Carver Mountain. This project utilizes a basin, channel, and storm drain to alleviate local flooding. AoMI #3, 35th Avenue and Dobbins Road, consists of a single culvert that crosses underneath the intersection of 35th Avenue and Dobbins Road. The fourth AoMI, 27th Avenue and Olney Avenue is currently under construction, and construction is anticipated to be completed in August of 2024. For this reason, this project was categorized as an existing drainage facility. The fifth AoMI presented in the Laveen ADMSPU is 19th Avenue and Dobbins Road. This project includes a new detention basin, culverts, and storm drain to mitigate the flooding issues in the area. The second, third, and fifth AoMI projects shown in the Laveen ADMSPU qualified as proposed projects in this study. Appendix A shows the location of the proposed ADMSPU and Feasibility Study facilities within the Laveen IFSA.

Paradise Ridge

In the Paradise Ridge IFSA, the proposed flood control facilities are currently being designed as part of the Paradise Ridge Drainage Improvement Project (Wood Patel, Ongoing). The project includes a channel, culverts, and a series of basins to convey the 100-Year storm runoff from Rawhide Wash as it discharges under Scottsdale Road approximately 2.5 miles north of SR 101L. The construction of these flood control facilities would revise the existing alluvial fan flood hazard area to be contained within the proposed improvements, benefitting future commercial and residential development north of SR 101L. Appendix A contains maps showing the location of the proposed drainage facilities in the Paradise Ridge IFSA.

Summary of Costs

The proposed flood control facility costs for the Estrella, Laveen, and Paradise Ridge IFSA's are summarized in **Storm Drainage Supplement Tables, Table 2**. Overall costs incorporate land acquisition, construction, and contingency costs obtained from the original reports associated with each project. Unit costs were updated to account for current construction and material market prices. Updates to unit costs were determined by comparing recent construction costs, engineer's estimates for City of Phoenix projects (27th Avenue & Olney Avenue and 19th Avenue & Dobbins Road), and ADOT bid tabs. To account for future unit cost increases, a 3 percent price increase per year was applied to the 2024 market price. The City of Phoenix cost share was assumed to be 35 percent with the FCDMC covering the remaining cost.

DEVELOPMENT CHARACTERIZATION

General

The storm drainage impact fee is used to fund 100-Year LOS drainage infrastructure within IFSAs in the City of Phoenix's jurisdiction. The impact fee is applied to all new development and varies based on the IFSA. According to State law, developers are only required to contribute towards drainage infrastructure based on their proportionate share of new capacity. Therefore, the City developed methods of determining this fee based on the Equivalent Demand Units (EDUs) that a new development creates, and the current and future values of drainage infrastructure.

EDUs are categorized as either single family residential units or non single family residential units and are based on acreage. The non single family unit category consists of a variety of types of land use including multifamily residential, retail, office, industrial, public, and other development units. Single Family EDUs were estimated based on projected growth data as defined by total single family dwelling unit growth. Non single family EDUs were estimated by projected non single family growth in acres with four non single family EDUs per acre. These data were provided by the City for each IFSA.

The methodology used to calculate the impact fees in the Estrella and Laveen IFSAs was the "buy-in plus ten-year plan." The "buy in plus ten-year plan" method considers the total current value of existing drainage facilities, as well as the estimated cost of proposed facilities to be built within the next decade escalated to reflect Q1 2028 US Dollars (halfway through the five year planning horizon). The overall cost was then divided by the projected number of EDUs over the next decade. The "buildout cost per EDU" method was used as a check to ensure the "buy-in plus ten-year method" costs were not over estimating fees. This methodology similarly combines the value of past constructed drainage infrastructure and the value of all proposed facilities, and divides that by the projected build-out quantity of EDUs. This method is necessary as a check to ensure that the development occurring between 2025 and 2034 is not paying for a disproportionate share of drainage infrastructure costs. The lower of the two calculated fees was assumed to be the proposed storm drainage impact fee per IFSA.

The entirety of the Paradise Ridge IFSA is in the Federal Emergency Management Agency (FEMA) Zone AO floodplain of Rawhide Wash. The calculation of the Paradise Ridge proposed storm drainage impact fee uses a plan-based method in which costs are allocated equally on a per acre basis over all land that would be removed from the Zone AO FEMA Special Flood Hazard Area as a result of the proposed drainage infrastructure.

Estrella

Existing and Future Development - **Table 1** contains the number of EDUs in 2025 as well as 10-Year and buildout EDU projections for the Estrella IFSA. Based on these estimates, the number of current EDUs will grow 26 percent until buildout. **Table 2** shows the total City of Phoenix cost share for the current value of existing facilities and the value of proposed drainage infrastructure in 2028. Proposed project costs were escalated to Q1 2028 as the mid point in the five year planning horizon (FY 2025-FY 2030).

Table 1 – Existing and Projected EDUs in Estrella

	2025	2035	Buildout
Single Family Units	19,481	23,405	25,756
Non-Residential and Multifamily Acres	7,652	8,680	9,379
SF EDU Conversion Factor	1	1	1
Non-Residential and MF EDU Conversion Factor	4	4	4
SF EDU Total	19,481	23,405	25,756
Non-Residential and MF EDU Total	30,608	34,721	37,516
Total EDUs	50,089	58,126	63,272

Table 2 – Estrella Total Existing and Proposed Drainage Facility Costs

Project Name	Existing/Proposed Facility	Inflation Adjusted COP Cost Share
75th Ave Storm Drain and Durango Regional Conveyance Channel	Existing Facility	$18,387,000
DRCC 75th Ave to 107th Ave - Phases 1 & 2 Land Acquisition	Existing Facility	$2,575,500
DRCC 75th Ave to 107th Ave - Phases 1 & 2 Design	Existing Facility	$673,200
DRCC 75th Ave to 107th Ave - Phases 1 & 2 Construction	Existing Facility	$6,600,000
47th Avenue Basin and Inlet	Proposed Facility	$19,059,323
47th Avenue Channel	Proposed Facility	$15,065,396
Sunland Avenue Channel	Proposed Facility	$14,025,456
	Total Existing and Proposed Facility Costs	$76,385,876

Laveen

Existing and Future Development - **Table 3** shows the number of EDUs in 2025 as well as 10-Year and buildout EDU projections in the Laveen IFSA. Based on these estimates, the number of current EDUs will

grow 30 percent until buildout. **Table 4** shows the total City of Phoenix cost share for the current value of existing facilities and the value of proposed drainage infrastructure in Q1 2028.

Table 3 – Existing and Projected EDUs in Laveen

	2025	2035	Buildout
Single Family Units	29,286	33,526	34,211
Non-Residential and Multifamily Acres	2,967	3,557	4,838
SF EDU Conversion Factor	1	1	1
Non-Residential and MF EDU Conversion Factor	4	4	4
SF EDU Total	29,286	33,526	34,211
Non-Residential and MF EDU Total	11,867	14,227	19,352
Total EDUs	41,153	47,753	53,563

Table 4 – Laveen Total Existing and Proposed Drainage Facility Costs

Project Name	Existing/Proposed Facility	Inflation Adjusted COP Cost Share
23rd and Roeser Basin and Storm Drain	Existing Facility	$6,264,000
35th and Dobbins Basin and Storm Drain	Existing Facility	$14,196,000
43rd Ave Storm Drain - Baseline Rd to Salt River	Existing Facility	$0
43rd Ave and Baseline & 27th and South Mtn. Basins	Existing Facility	$2,595,600
Laveen Area Conveyance Channel and 43rd Ave and Southern Ave Detention Basin	Existing Facility	$22,620,000
Baseline Storm Drain	Existing Facility	$0
51st Ave & Sunrise Dr (AoMI#2)	Proposed Facility	$10,385,232
35th Ave & Dobbins Rd (AoMI#3)	Proposed Facility	$2,148,762
27th Ave & Olney Ave (AoMI#4)	Existing Facility	$4,619,333
19th Ave & Dobbins Rd (AoMI#5)	Proposed Facility	$12,198,211
Total Existing and Proposed Facility Costs		$75,027,137

Paradise Ridge

Existing and Future Development – **Table 5** shows the number of EDUs in 2025 as well as 10-Year and buildout EDU projections for the Paradise Ridge IFSA. Based on these estimates, the number of current EDUs will grow 373 percent until buildout. Single family unit developments are projected to increase the greatest from 2024 to buildout compared to other types of development in Paradise Ridge.

Table 5 – Existing and Projected EDUs in Paradise Ridge

	2025	2035	Buildout
Single Family Units	262	3,200	5,355
Non-Residential and Multifamily Acres	598	907	1,802
SF EDU Conversion Factor	1	1	1
Non-Residential and MF EDU Conversion Factor	4	4	4
SF EDU Total	262	3,200	5,355
Non-Residential and MF EDU Total	2,392	3,629	7,208
Total EDUs	2,654	6,829	12,563

POTENTIAL GROSS IMPACT FEE

Estrella

The Estrella proposed storm drainage impact fee was calculated using both the "buy in plus 10 year" and "buildout per EDU" methods. **Table 6** contains the results of these calculations. The lower of these two numbers is proposed as the storm drainage impact fee for Estrella.

Table 6 – Estrella Buy-In + 10 Year Plan Method / Buildout Cost Method

Total Existing and Proposed Facility Costs	$76,385,876
2035 Projected EDUs	58,126
Buy-In + 10 Year Method Cost Per EDU	$1,314
Projected Buildout EDUs	63,272
Buildout Cost Method Cost per EDU	$1,207
Lower Capital Cost of Both Methods	**$1,207**

Laveen

The Laveen proposed storm drainage impact fee was calculated using both the "buy in plus 10 year" and "buildout per EDU" methods. **Table 7** contains the results of these calculations. The lower of these two numbers is proposed as the storm drainage impact fee for Laveen.

Table 7 – Estrella Buy-In + 10 Year Plan Method / Buildout Cost Method

Total Existing and Proposed Facility Costs	$75,027,137
2035 Projected EDUs	47,753
Buy-In + 10 Year Method Cost Per EDU	$1,571
Projected Buildout EDUs	53,563
Buildout Cost Method Cost per EDU	$1,401
Lower Capital Cost of Both Methods	**$1,401**

Paradise Ridge

Table 8 shows the total City of Phoenix cost share of proposed drainage infrastructure in Paradise Ridge, the total acres of FEMA Zone AO floodplain that can be removed, and the cost per acre of Zone AO floodplain removed. Single family development will pay on a per-unit basis, whereas all other developments will pay impact fees based on acreage. Therefore, the gross impact fee per EDU for each

single-family unit is $3,094, while the gross impact fee for every acre of non single-family development is $12,375. **Table 9** shows the gross impact fee charged for each category of development.

Table 8 – Paradise Ridge Potential Capital Cost Calculation

Description	Amount
Paradise Ridge Drainage Improvements Cost	$38,075,664
Total Acres (AO Floodplain of Rawhide Wash)	3,077
Cost per Acre	$12,375
Cost per EDU	**$3,094**

Table 9 – Paradise Ridge Capital Cost per EDU

IFSA	Unit Type	Service Unit	EDU Factor	Gross Fee/Unit
Paradise Ridge	Single-Family	Dwelling	1	$3,094
	All other uses	1 acre	4	$12,375

Summary of Potential Gross Impact Fees

Table 10 provides a summary of gross impact fees for all Storm Drainage Impact Fee Areas. The calculation for the fund balance adjustment can be found in the City of Phoenix 2025 Development Impact Fee Update Fund Balance Adjustment Report.

Table 10 – Summary of Gross Impact Fee per EDU

Impact Fee Area	Potential Capital Cost (per EDU)	Fund Balance Adjustment	Potential Gross Impact Fee (per EDU)
Estrella	$1,207	$0	**$1,207**
Laveen	$1,401	$0	**$1,401**
Paradise Ridge	$3,094	$0	**$3,094**

POTENTIAL NET IMPACT FEE

The potential net fee per EDU is calculated by subtracting any offset amounts from the potential gross fee from Table 10. There are no offsets for the Storm Drainage Impact Fee. The calculation for the offsets can be found in the City of Phoenix 2025 Development Impact Fee Update Alternative Revenue Offsets Report.

Table 11 – Summary of Potential Net Impact Fee per EDU

Impact Fee Area	Potential Gross Park Impact Fee (per EDU)	Alternative Revenue (per EDU)	Potential Net Fee (per EDU)
Estrella	$1,207	**$0**	$1,207
Laveen	$1,401	**$0**	$1,401
Paradise Ridge	$3,094	**$0**	$3,094

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.

The City is prohibited from spending impact fee funds on operations, maintenance, repairs, or replacement.

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 by the Storm Drainage impact fee collections, as calculated within this Chapter.

Table 12 – Estrella Impact Fee Area (Storm Drainage), Planned Improvements and Costs, 2025-2034

Project Name	COP Cost Share
47th Ave Basin and Inlet	$19,059,323
47th Ave Channel	$15,065,396
Sunland Channel	$14,025,456
Total Proposed Facility Costs	$48,150,176
Total Estimated Revenue	**$9,895,926**
IFSA Fund Balance	$9,613,367
Borrowing Requirement	**$28,640,883**

Table 13 – Laveen Impact Fee Area (Storm Drainage), Planned Improvements and Costs, 2025-2034

Project Name	COP Cost Share
51st Ave & Sunrise Dr (AoMI#2)	$10,385,232
35th Ave & Dobbins Rd (AoMI#3)	$2,148,762
19th Ave & Dobbins RD (AoMI #5)	$12,198,211
Total Proposed Facility Costs	$24,732,204
Total Estimated Revenue	**$10,775,794**
IFSA Fund Balance	$4,602,563
Borrowing Requirement	**$9,353,847**

Table 14 – Paradise Ridge Impact Fee Area (Storm Drainage), Planned Improvements and Costs, 2025-2034

Project Name	COP Cost Share
Paradise Ridge Drainage Improvements	$38,075,664
Total Proposed Facility Costs	$38,075,664
Total Estimated Revenue	**$20,204,307**
IFSA Fund Balance	$0
Borrowing Requirement	**$17,871,356**