Land Use Assumptions, Infrastructure Improvements Plan, and Development Fee Report

Prepared for:
Tempe, Arizona

April 10, 2025

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EXECUTIVE SUMMARY

The City of Tempe, Arizona, contracted with TischlerBise to document land use assumptions, prepare the Infrastructure Improvements Plan (hereinafter referred to as the "IIP"), and update development fees pursuant to Arizona Revised Statutes ("ARS") § 9-463.05 (hereafter referred to as the "Enabling Legislation"). Municipalities in Arizona may assess development fees to offset infrastructure costs to a municipality for necessary public services. The development fees must be based on an Infrastructure Improvements Plan and Land Use Assumptions. The IIP for each type of infrastructure is in the middle section of this document. The proposed development fees are displayed in the Development Fee Report in the next section.

Development fees are one-time payments used to construct system improvements needed to accommodate new development. The fee represents future development's proportionate share of infrastructure costs. Development fees may be used for infrastructure improvements or debt service for growth related infrastructure. In contrast to general taxes, development fees may not be used for operations, maintenance, replacement, or correcting existing deficiencies. This update of Tempe's Infrastructure Improvements Plan and associated update to its development fees includes the following necessary public services:

1. Fire Facilities
2. Parks and Recreational Facilities
3. Police Facilities
4. Street Facilities

The Infrastructure Improvements Plan does not include necessary public services related to water and wastewater facilities, because Tempe has available capacity, and limited growth-related capital needs, to serve future development. Tempe will discontinue collection of water and wastewater development fees on the effective date of the proposed development fees outlined in the Development Fee Report. This plan includes all necessary elements required to be in full compliance with the Enabling Legislation.

ARIZONA DEVELOPMENT FEE ENABLING LEGISLATION

The Enabling Legislation governs how development fees are calculated for municipalities in Arizona.

Necessary Public Services

Under the requirements of the Enabling Legislation, development fees may only be used for construction, acquisition or expansion of public facilities that are necessary public services. "Necessary public service" means any of the following categories of facilities that have a life expectancy of three or more years and that are owned and operated on behalf of the municipality: water, wastewater, storm water, library, street, fire, police, and parks and recreational. Additionally, a necessary public service includes any facility that was financed before June 1, 2011, and that meets the following requirements:

1. Development fees were pledged to repay debt service obligations related to the construction of the facility.
2. After August 1, 2014, any development fees collected are used solely for the payment of principal and interest on the portion of the bonds, notes, or other debt service obligations issued before June 1, 2011, to finance construction of the facility.

Infrastructure Improvements Plan

Development fees must be calculated pursuant to an IIP. For each necessary public service that is the subject of a development fee, by law, the IIP shall include the following seven elements:

1. A description of the existing necessary public services in the service area and the costs to update, improve, expand, correct or replace those necessary public services to meet existing needs and usage and stricter safety, efficiency, environmental or regulatory standards, which shall be prepared by qualified professionals licensed in this state, as applicable.
2. An analysis of the total capacity, the level of current usage and commitments for usage of capacity of the existing necessary public services, which shall be prepared by qualified professionals licensed in this state, as applicable.
3. A description of all or the parts of the necessary public services or facility expansions and their costs necessitated by and attributable to development in the service area based on the approved Land Use Assumptions, including a forecast of the costs of infrastructure, improvements, real property, financing, engineering and architectural services, which shall be prepared by qualified professionals licensed in this state, as applicable.
4. A table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of necessary public services or facility expansions and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial, and industrial.
5. The total number of projected service units necessitated by and attributable to new development in the service area based on the approved Land Use Assumptions and calculated pursuant to generally accepted engineering and planning criteria.
6. The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years.
7. A forecast of revenues generated by new service units other than development fees, which shall include estimated state-shared revenue, highway users revenue, federal revenue, ad valorem property taxes, construction contracting or similar excise taxes and the capital recovery portion of utility fees attributable to development based on the approved Land Use Assumptions and a plan to include these contributions in determining the extent of the burden imposed by the development.

Qualified Professionals

The IIP must be developed by qualified professionals using generally accepted engineering and planning practices. A qualified professional is defined as "a professional engineer, surveyor, financial analyst or planner providing services within the scope of the person's license, education, or experience." TischlerBise is a fiscal, economic, and planning consulting firm specializing in the cost of growth services. Our services include development fees, fiscal impact analysis, infrastructure financing analyses, user fee/cost of service studies, capital improvement plans, and fiscal software. TischlerBise has prepared over 800 development fee studies over the past 30 years for local governments across the United States.

Conceptual Development Fee Calculation

In contrast to project-level improvements, development fees fund growth-related infrastructure that will benefit multiple development projects, or the entire service area (usually referred to as system improvements). The first step is to determine an appropriate demand indicator for the particular type of infrastructure. The demand indicator measures the number of service units for each unit of development. For example, an appropriate indicator of the demand for parks is population growth and the increase in population can be estimated from the average number of persons per housing unit. The second step in the development fee formula is to determine infrastructure improvement units per service unit, typically called level-of-service (LOS) standards. In keeping with the park example, a common LOS standard is improved park acres per thousand people. The third step in the development fee formula is the cost of various infrastructure units. To complete the park example, this part of the formula would establish a cost per acre for land acquisition and/ or park amenities.

Evaluation of Credits/Offsets

Regardless of the methodology, a consideration of credits/offsets is integral to the development of a legally defensible development fee. There are two types of credits/offsets that should be addressed in development fee studies and ordinances. The first is a revenue credit/offset due to possible double payment situations, which could occur when other revenues may contribute to the capital costs of infrastructure covered by the development fee. This type of credit/offset is integrated into the fee calculation, thus reducing the fee amount. The second is a site-specific credit or developer reimbursement for dedication of land or construction of system improvements. This type of credit is addressed in the administration and implementation of the development fee program. For ease of administration, TischlerBise normally recommends developer reimbursements for system improvements.

INTRODUCTION TO DEVELOPMENT FEES

Development fees are one-time payments used to fund capital improvements necessitated by future development. Development fees have been utilized by local governments in various forms for at least fifty years. Development fees do have limitations and should not be regarded as the total solution for infrastructure financing needs. Rather, they should be considered one component of a comprehensive portfolio to ensure adequate provision of public facilities with the goal of maintaining current levels of service in a community. Any community considering facility fees should note the following limitations:

1) Fees can only be used to finance capital infrastructure and cannot be used to finance ongoing operations and / or maintenance and rehabilitation costs.
2) Fees cannot be deposited in the General Fund. The funds must be accounted for separately in individual accounts and earmarked for the capital expenses for which they were collected.
3) Fees cannot be used to correct existing infrastructure deficiencies unless there is a funding plan in place to correct the deficiency for all current residents and businesses in the community.

REQUIRED FINDINGS

There are three reasonable relationship requirements for development fees that are closely related to "rational nexus" or "reasonable relationship" requirements enunciated by a number of state courts. Although the term "dual rational nexus" is often used to characterize the standard by which courts evaluate the validity of development fees under the U. S. Constitution, we prefer a more rigorous formulation that recognizes three elements: "impact or need," "benefit," and "proportionality." The dual rational nexus test explicitly addresses only the first two, although proportionality is reasonably implied, and was specifically mentioned by the U.S. Supreme Court in the *Dolan* case. The reasonable relationship language of the statute is considered less strict than the rational nexus standard used by many courts. Individual elements of the nexus standard are discussed further in the following paragraphs.

Demonstrating an Impact. All future development in a community creates additional demands on some, or all, public facilities provided by local government. If the supply of facilities is not increased to satisfy that additional demand, the quality or availability of public services for the entire community will deteriorate. Development fees may be used to recover the cost of development-related facilities, but only to the extent that the need for facilities is a consequence of development that is subject to the fees. The *Nollan* decision reinforced the principle that development exactions may be used only to mitigate conditions created by the developments upon which they are imposed. That principle clearly applies to development fees. In this study, the impact of development on improvement needs is analyzed in terms of quantifiable relationships between various types of development and the demand for specific facilities, based on applicable level-of-service standards.

Demonstrating a Benefit. A sufficient benefit relationship requires that development fee revenues be segregated from other funds and expended only on the facilities for which the fees were charged. Fees must be expended in a timely manner and the facilities funded by the fees must serve the development paying the fees. However, nothing in the U.S. Constitution or the State enabling Act authorizing development fees requires that facilities funded with fee revenues be available *exclusively* to development paying the fees. In other words, existing development may benefit from these improvements as well.

Procedures for the earmarking and expenditure of fee revenues are typically mandated by the State Enabling Legislation, as are procedures to ensure that the fees are expended expeditiously or refunded. All requirements are intended to ensure that developments benefit from the fees they are required to pay. Thus, an adequate showing of benefit must address procedural as well as substantive issues.

Demonstrating Proportionality. The requirement that exactions be proportional to the impacts of development was clearly stated by the U.S. Supreme Court in the *Dolan* case (although the relevance of that decision to development fees has been debated) and is logically necessary to establish a proper nexus. Proportionality is established through the procedures used to identify development-related facility costs, and in the methods used to calculate development fees for various types of facilities and categories of development. The demand for facilities is measured in terms of relevant and measurable attributes of development.

DEVELOPMENT FEE REPORT

Development fees for the necessary public services made necessary by new development must be based on the same level of service (LOS) provided to existing development in the service area. There are three basic methodologies used to calculate development fees. They examine the past, present, and future status of infrastructure. The objective of evaluating these different methodologies is to determine the best measure of the demand created by new development for additional infrastructure capacity. Each methodology has advantages and disadvantages in a particular situation and can be used simultaneously for different cost components.

Reduced to its simplest terms, the process of calculating development fees involves two main steps: (1) determining the cost of development-related capital improvements and (2) allocating those costs equitably to various types of development. In practice, though, the calculation of development fees can become quite complicated because of the many variables involved in defining the relationship between development and the need for facilities within the designated service area. The following paragraphs discuss basic methodologies for calculating development fees and how those methodologies can be applied.

- **Cost Recovery** (past improvements) - The rationale for recoupment, often called cost recovery, is that new development is paying for its share of the useful life and remaining capacity of facilities already built, or land already purchased, from which new growth will benefit. This methodology is often used for utility systems that must provide adequate capacity before new development can take place.

- **Incremental Expansion** (concurrent improvements) - The incremental expansion methodology documents current LOS standards for each type of public facility, using both quantitative and qualitative measures. This approach assumes there are no existing infrastructure deficiencies or surplus capacity in infrastructure. New development is only paying its proportionate share for growth-related infrastructure. Revenue will be used to expand or provide additional facilities, as needed, to accommodate new development. An incremental expansion cost method is best suited for public facilities that will be expanded in regular increments to keep pace with development.

- **Plan-Based** (future improvements) - The plan-based methodology allocates costs for a specified set of improvements to a specified amount of development. Improvements are typically identified in a long-range facility plan and development potential is identified by a land use plan. There are two basic options for determining the cost per demand unit: (1) total cost of a public facility can be divided by total demand units (average cost), or (2) the growth-share of the public facility cost can be divided by the net increase in demand units over the planning timeframe (marginal cost).

DEVELOPMENT FEE COMPONENTS

Shown below, Figure 1 summarizes service areas, methodologies, and infrastructure cost components for the proposed fees.

Figure 1: Proposed Development Fee Service Areas, Methodologies, and Cost Components

Necessary Public Services	Service Area	Cost Recovery	Incremental Expansion	Plan-Based	Cost Allocation
Fire	Citywide	N/A	Fire Apparatus	Fire Facilities, Development Fee Report	Population, Vehicle Trips
Parks and Recreation	Citywide	N/A	Park Amenities, Multi-Use Paths	Development Fee Report	Population, Jobs
Police	Citywide	N/A	Police Facilities, Police Vehicles	Development Fee Report	Population, Vehicle Trips
Street	Citywide	N/A	Bus Pullouts, Traffic Signals	Bike / Ped Improvements, Development Fee Report	Person Trips
	North	N/A	N/A	Street Improvements	Person Trips
	South	N/A	N/A	Street Improvements	Person Trips

Calculations throughout this report are based on an analysis conducted using Excel software. Most results are discussed in the report using two, three, and four decimal places, which represent rounded figures. However, the analysis itself uses figures carried to their ultimate decimal places; therefore, the sums and products generated in the analysis may not equal the sum or product if the reader replicates the calculation with the factors shown in the report (due to the rounding of figures shown, not in the analysis).

CURRENT DEVELOPMENT FEES

Current development fees are assessed per dwelling unit, based on unit size, for residential development and per 1,000 square feet of floor area for nonresidential development. Current development fees for water and wastewater are assessed by meter size and type.

Non-Utility Development Fees

Figure 2: Current Development Fees – North Street Service Area

Residential Fees per Unit					
Unit Size	Fire	Parks & Recreational	Police	Street (North)	Current Fees
900 or less	$196	$1,141	$253	$192	$1,782
901 to 1,400	$323	$1,879	$416	$306	$2,924
1,401 to 1,900	$414	$2,405	$533	$386	$3,738
1,901 or more	$481	$2,797	$619	$454	$4,351

Nonresidential Fees per 1,000 Square Feet					
Development Type	Fire	Parks & Recreational	Police	Street (North)	Current Fees
Industrial	$79	$218	$191	$215	$703
Commercial	$397	$313	$959	$1,078	$2,747
Office & Other Services	$155	$398	$375	$422	$1,350
Institutional	$205	$124	$495	$558	$1,382

Figure 3: Current Development Fees – South Street Service Area

Residential Fees per Unit					
Unit Size	Fire	Parks & Recreational	Police	Street (South)	Current Fees
900 or less	$196	$1,141	$253	$151	$1,741
901 to 1,400	$323	$1,879	$416	$241	$2,859
1,401 to 1,900	$414	$2,405	$533	$303	$3,655
1,901 or more	$481	$2,797	$619	$356	$4,253

Nonresidential Fees per 1,000 Square Feet					
Development Type	Fire	Parks & Recreational	Police	Street (South)	Current Fees
Industrial	$79	$218	$191	$169	$657
Commercial	$397	$313	$959	$847	$2,516
Office & Other Services	$155	$398	$375	$331	$1,259
Institutional	$205	$124	$495	$438	$1,262

Utility Development Fees

Figure 4: Current Development Fees

Meter Size	Capacity Ratio	Water	Wastewater	Current Fees
5/8"	1.0	$1,648	$1,329	$2,977
3/4"	1.5	$2,472	$1,994	$4,466
1"	2.5	$4,120	$3,323	$7,443
1.5"	5.0	$8,240	$6,645	$14,885
2"	8.0	$13,184	$10,632	$23,816
2" Turbine	14.0	$23,072	$18,606	$41,678
3" Compound	20.0	$32,960	$26,580	$59,540
3" Turbine	25.0	$41,200	$33,225	$74,425
4" Compound	40.0	$65,920	$53,160	$119,080
4" Turbine	50.0	$82,400	$66,450	$148,850
6" Compound	80.0	$131,840	$106,320	$238,160
6" Turbine	100.0	$164,800	$132,900	$297,700
8" Turbine	190.0	$313,120	$252,510	$565,630
10" Turbine	285.0	$469,680	$378,765	$848,445

PROPOSED DEVELOPMENT FEES

Proposed development fees will be assessed per dwelling unit, based on unit size, for residential development and per 1,000 square feet of floor area for nonresidential development. Proposed development fees for water and wastewater will be assessed by meter size and type.

The proposed fees represent the maximum allowable fees. Tempe may adopt fees that are less than the amounts shown; however, a reduction in development fee revenue will necessitate an increase in other revenues, a decrease in planned capital improvements, and/or a decrease in level-of-service standards. All costs in the Development Fee Report represent current dollars with no assumed inflation over time. If costs change significantly over time, development fees should be recalculated.

Non-Utility Development Fees

Figure 5: Proposed Development Fees – North Street Service Area

Residential Fees per Unit					
Unit Size	Fire	Parks & Recreational	Police	Street (North)	Proposed Fees
900 or less	$397	$1,719	$539	$272	$2,927
901 to 1,400	$589	$2,548	$798	$437	$4,372
1,401 to 1,900	$724	$3,131	$981	$551	$5,387
1,901 or more	$823	$3,561	$1,116	$638	$6,138

Nonresidential Fees per 1,000 Square Feet					
Development Type	Fire	Parks & Recreational	Police	Street (North)	Proposed Fees
Industrial	$116	$350	$368	$328	$1,162
Commercial	$581	$473	$1,839	$1,649	$4,542
Office & Other Services	$258	$727	$816	$731	$2,532
Institutional	$369	$232	$1,166	$1,044	$2,811

Figure 6: Proposed Development Fees – South Street Service Area

Residential Fees per Unit					
Unit Size	Fire	Parks & Recreational	Police	Street (South)	Proposed Fees
900 or less	$397	$1,719	$539	$258	$2,913
901 to 1,400	$589	$2,548	$798	$415	$4,350
1,401 to 1,900	$724	$3,131	$981	$523	$5,359
1,901 or more	$823	$3,561	$1,116	$606	$6,106

Nonresidential Fees per 1,000 Square Feet					
Development Type	Fire	Parks & Recreational	Police	Street (South)	Proposed Fees
Industrial	$116	$350	$368	$312	$1,146
Commercial	$581	$473	$1,839	$1,567	$4,460
Office & Other Services	$258	$727	$816	$695	$2,496
Institutional	$369	$232	$1,166	$992	$2,759

Utility Development Fees

The Infrastructure Improvements Plan does not include necessary public services related to water and wastewater facilities, because Tempe has available capacity, and limited growth-related capital needs, to serve future development. Tempe will discontinue collection of water and wastewater development fees on the effective date of the proposed development fees outlined in the Development Fee Report.

Figure 7: Proposed Development Fees

Meter Size	Capacity Ratio	Water	Wastewater	Proposed Fees
5/8"	1.0	$0	$0	$0
3/4"	1.5	$0	$0	$0
1"	2.5	$0	$0	$0
1.5"	5.0	$0	$0	$0
2"	8.0	$0	$0	$0
2" Turbine	14.0	$0	$0	$0
3" Compound	20.0	$0	$0	$0
3" Turbine	25.0	$0	$0	$0
4" Compound	40.0	$0	$0	$0
4" Turbine	50.0	$0	$0	$0
6" Compound	80.0	$0	$0	$0
6" Turbine	100.0	$0	$0	$0
8" Turbine	190.0	$0	$0	$0
10" Turbine	285.0	$0	$0	$0

DIFFERENCE BETWEEN PROPOSED AND CURRENT DEVELOPMENT FEES

Non-Utility Development Fees

The differences between the proposed and current development fees in the north street fee area are displayed below in Figure 8.

Figure 8: Difference Between Proposed and Current Development Fees – North Street Service Area

Residential Fees per Unit					
Unit Size	Fire	Parks & Recreational	Police	Street (North)	Difference
900 or less	$201	$578	$286	$80	$1,145
901 to 1,400	$266	$669	$382	$131	$1,448
1,401 to 1,900	$310	$726	$448	$165	$1,649
1,901 or more	$342	$764	$497	$184	$1,787

Nonresidential Fees per 1,000 Square Feet					
Development Type	Fire	Parks & Recreational	Police	Street (North)	Difference
Industrial	$37	$132	$177	$113	$459
Commercial	$184	$160	$880	$571	$1,795
Office & Other Services	$103	$329	$441	$309	$1,182
Institutional	$164	$108	$671	$486	$1,429

The differences between the proposed and current development fees in the south street fee area are displayed below in Figure 9.

Figure 9: Difference Between Proposed and Current Development Fees – South Street Service Area

Residential Fees per Unit					
Unit Size	Fire	Parks & Recreational	Police	Street (South)	Difference
900 or less	$201	$578	$286	$107	$1,172
901 to 1,400	$266	$669	$382	$174	$1,491
1,401 to 1,900	$310	$726	$448	$220	$1,704
1,901 or more	$342	$764	$497	$250	$1,853

Nonresidential Fees per 1,000 Square Feet					
Development Type	Fire	Parks & Recreational	Police	Street (South)	Difference
Industrial	$37	$132	$177	$143	$489
Commercial	$184	$160	$880	$720	$1,944
Office & Other Services	$103	$329	$441	$364	$1,237
Institutional	$164	$108	$671	$554	$1,497

Utility Development Fees

Tempe will discontinue collection of water and wastewater development fees on the effective date of the proposed development fees outlined in the Development Fee Report.

Figure 10: Difference Between Proposed and Current Development Fees

Meter Size	Capacity Ratio	Water	Wastewater	Difference
5/8"	1.0	($1,648)	($1,329)	($2,977)
3/4"	1.5	($2,472)	($1,994)	($4,466)
1"	2.5	($4,120)	($3,323)	($7,443)
1.5"	5.0	($8,240)	($6,645)	($14,885)
2"	8.0	($13,184)	($10,632)	($23,816)
2" Turbine	14.0	($23,072)	($18,606)	($41,678)
3" Compound	20.0	($32,960)	($26,580)	($59,540)
3" Turbine	25.0	($41,200)	($33,225)	($74,425)
4" Compound	40.0	($65,920)	($53,160)	($119,080)
4" Turbine	50.0	($82,400)	($66,450)	($148,850)
6" Compound	80.0	($131,840)	($106,320)	($238,160)
6" Turbine	100.0	($164,800)	($132,900)	($297,700)
8" Turbine	190.0	($313,120)	($252,510)	($565,630)
10" Turbine	285.0	($469,680)	($378,765)	($848,445)

LAND USE ASSUMPTIONS

Arizona's Development Fee Act requires the preparation of Land Use Assumptions, which are defined in Arizona Revised Statutes § 9-463.05(T)(6) as:

> *"projections of changes in land uses, densities, intensities and population for a specified service area over a period of at least ten years and pursuant to the General Plan of the municipality."*

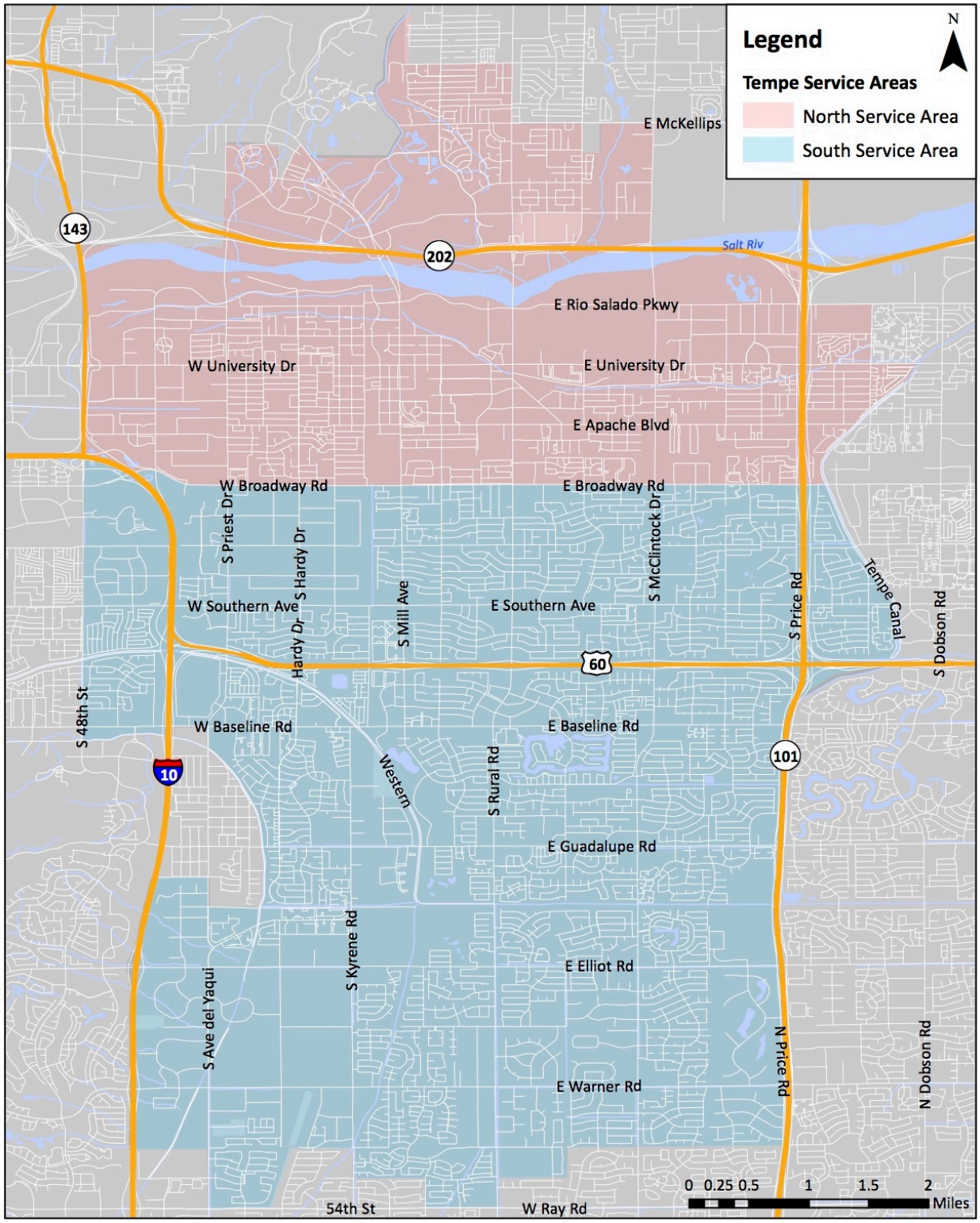
The estimates and projections of residential and nonresidential development in this *Land Use Assumptions* document are for all areas within Tempe. The current demographic estimates and future development projections will be used in the Infrastructure Improvements Plan (IIP) and in the calculation of development fees. Current demographic data estimates for 2024 are used in calculating levels of service (LOS) provided to existing development in Tempe. Arizona's Enabling Legislation requires fees to be updated at least every five years and limits the IIP to a maximum of 10 years.

The Infrastructure Improvements Plan and the Development Fee Report include multiple service areas. The service area for the Street Facilities IIP, split into a north service area and a south service area along Broadway Road, is shown in Figure L1. All other IIPs use a citywide service area.

SUMMARY OF GROWTH INDICATORS

Key land use assumptions include projections of population, housing units, employment, and nonresidential floor area. TischlerBise projects development using data published by Maricopa Association of Governments (MAG) in *Socioeconomic Projections of Population and Employment by Municipal Planning Area, Jurisdiction, and Regional Analysis Zone (June 2023)*. Development projections are summarized in Figure L21 through Figure L23. These projections will be used to estimate fee revenue and to indicate the anticipated need for growth-related infrastructure. However, development fee methodologies are designed to reduce sensitivity to development projections in the determination of the proportionate share fee amounts. If actual development occurs at a slower rate than projected, fee revenue will decline, but so will the need for growth-related infrastructure. In contrast, if development occurs at a faster rate than anticipated, fee revenue will increase, but Tempe will also need to accelerate infrastructure improvements to keep pace with the actual rate of development. During the next 10 years, residential development projections indicate a population increase of 29,100 persons in 16,130 housing units, and nonresidential development projections indicate an employment increase of 30,148 jobs in approximately 15,871,000 square feet of floor area.

Figure L1: Street Development Fee Service Area



RESIDENTIAL DEVELOPMENT

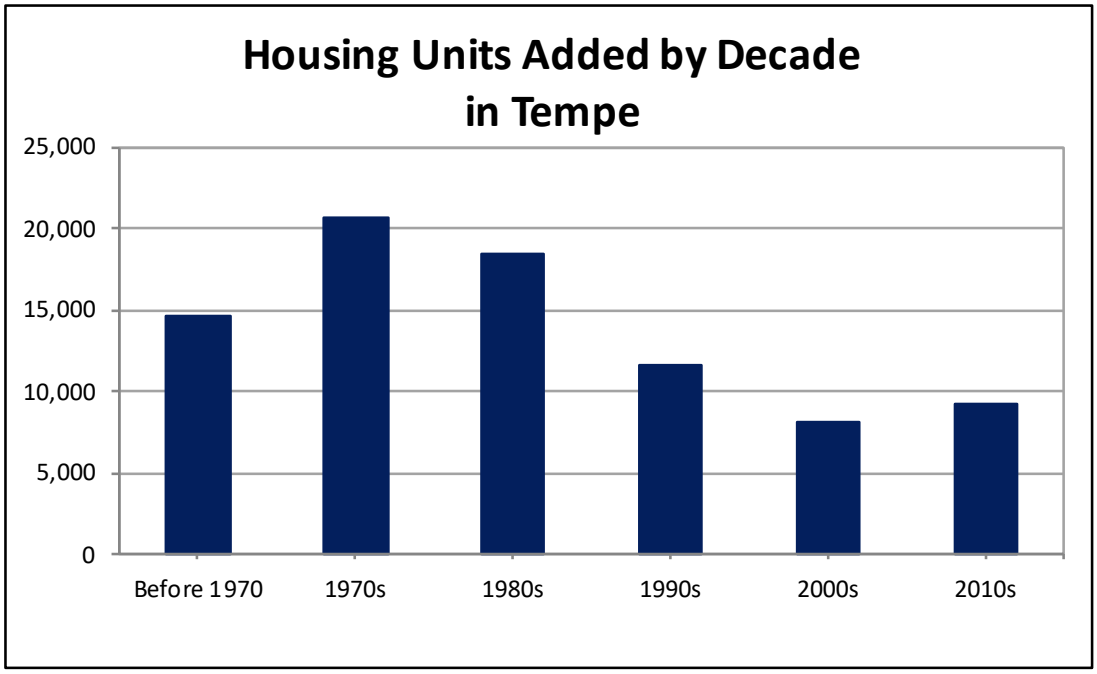
This section details current estimates and future projections of residential development including population and housing units.

Recent Residential Construction

Development fees require an analysis of current levels of service. For residential development, current levels of service are determined using estimates of population and housing units. Shown below, Figure L2 indicates the estimated number of housing units added by decade according to data obtained from the U.S. Census Bureau. In the previous decade, Tempe's housing stock grew by an average of 916 housing units per year.

Figure L2: Housing Units by Decade

Census 2010 Housing Units	73,462	Tempe's housing stock grew by an average of 916 housing units per year from 2010 to 2020.
Census 2020 Housing Units	82,626	
New Housing Units 2010 to 2020	9,164	



Source: U.S. Census Bureau, Census 2020 Summary File 1, Census 2010 Summary File 1, 2018-2022 5-Year American Community Survey (for 2000s and earlier, adjusted to yield total units in 2010).

Occupancy by Housing Type

According to the U.S. Census Bureau, a household is a housing unit occupied by year-round residents. Development fees often use per capita standards and persons per housing unit (PPHU) or persons per household (PPH) to derive proportionate share fee amounts. When PPHU is used in the fee calculations, infrastructure standards are derived using year-round population. When PPH is used in the fee calculations, the development fee methodology assumes a higher percentage of housing units will be occupied, thus requiring seasonal or peak population to be used when deriving infrastructure standards. TischlerBise recommends that development fees for residential development be imposed according to the number of persons per housing unit.

Occupancy calculations require data on population and the types of units by structure. The 2010 census did not obtain detailed information using a "long-form" questionnaire. Instead, the U.S. Census Bureau switched to a continuous monthly mailing of surveys, known as the American Community Survey (ACS), which has limitations due to sample-size constraints. For example, data on detached housing units are now combined with attached single units (commonly known as townhouses, which share a common sidewall, but are constructed on an individual parcel of land). For development fees in Tempe, detached units, attached units, and mobile home units are included in the "Single-Family" category. The "Multi-Family" residential category includes duplexes, all structures with two or more units on an individual parcel of land, recreational vehicles, and all other units.

Figure L3 below shows the occupancy estimates for Tempe based on 2018-2022 American Community Survey 5-Year Estimates. Single-family units averaged 2.34 persons per housing unit and multi-family units averaged 1.80 persons per housing unit. The estimates shown below are used only to calculate occupancy factors and may not match population and housing unit estimates shown throughout this report.

Figure L3: Occupancy by Housing Type

Housing Type	Persons	Households	Persons per Household	Housing Units	Persons per Housing Unit	Housing Mix	Vacancy Rate
Single-Family[1]	97,519	38,624	2.52	41,596	**2.34**	50.3%	7.14%
Multi-Family[2]	73,938	37,077	1.99	41,100	**1.80**	49.7%	9.79%
Total	171,457	75,701	2.26	82,696	**2.07**	100.0%	8.46%

Source: U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimates

1. Includes detached, attached (townhouse), and mobile home units.
2. Includes dwellings in structures with two or more units, RVs, and all other units.

Occupancy by Bedroom Range

Development fees must be proportionate to the demand for infrastructure. Averages per housing unit have a strong, positive correlation to the number of bedrooms, so TischlerBise recommends a fee schedule where larger units pay higher development fees. Benefits of the proposed methodology include 1) a proportionate assessment of infrastructure demand using local demographic data and 2) a progressive fee structure (i.e., smaller units pay less, and larger units pay more).

Custom tabulations of demographic data by bedroom range can be created from individual survey responses provided by the U.S. Census Bureau in files known as Public Use Microdata Samples (PUMS). PUMS files are only available for areas of at least 100,000 persons, and Tempe is in two Public Use Microdata Areas (AZ PUMAs 108 and 109).

Shown in Figure L4, cells with yellow shading indicate the unweighted survey results, which yield the unadjusted estimate of 2.15 persons per housing unit. Unadjusted persons per housing unit estimates are adjusted to match the control total for Tempe – 2.07 persons per housing unit (see Figure L3). Adjusted persons per housing unit estimates range from 1.20 persons per housing unit for units with zero to one bedroom up to 2.69 persons per housing unit for units with four or more bedrooms.

Figure L4: Occupancy by Bedroom Range

Bedroom Range	Persons[1]	Vehicles Available[1]	Housing Units[1]	Housing Mix	Unadjusted PPHU	Adjusted PPHU[2]	Unadjusted VPHU	Adjusted VPHU[2]
0-1	748	530	601	18%	1.24	1.20	0.88	0.80
2	1,661	1,158	865	25%	1.92	1.85	1.34	1.22
3	2,613	2,146	1,118	33%	2.34	2.25	1.92	1.75
4+	2,265	1,835	812	24%	2.79	2.69	2.26	2.06
Total	7,287	5,669	3,396	100%	2.15	2.07	1.67	1.52

National Averages According to ITE

ITE Code	AWVTE per Person	AWVTE per Vehicle	AWVTE per HU	Local Housing Mix
210 SFD	2.65	6.36	9.43	50%
220 Apt	1.86	5.10	6.74	50%
Weighted Avg	2.26	5.73	8.09	100%

Recommended AWVTE per Housing Unit

Bedroom Range	AWVTE per HU Based on Persons[3]	AWVTE per HU Based on Vehicles[4]	AWVTE per Housing Unit[5]
0-1	2.71	4.58	3.65
2	4.18	6.99	5.59
3	5.09	10.03	7.56
4+	6.08	11.80	8.94
Average	4.68	8.71	6.70

1. American Community Survey, Public Use Microdata Sample for AZ PUMAs 108 and 109 (2018-2022 5-Year unweighted data).
2. Adjusted multipliers are scaled to make the average PUMS values match control totals for Tempe, based on American Community Survey 2018-2022 5-Year Estimates.
3. Adjusted persons per housing unit multiplied by national weighted average trip rate per person.
4. Adjusted vehicles available per housing unit multiplied by national weighted average trip rate per vehicle.
5. Average trip rates based on persons and vehicles per housing unit.

Occupancy by Housing Size

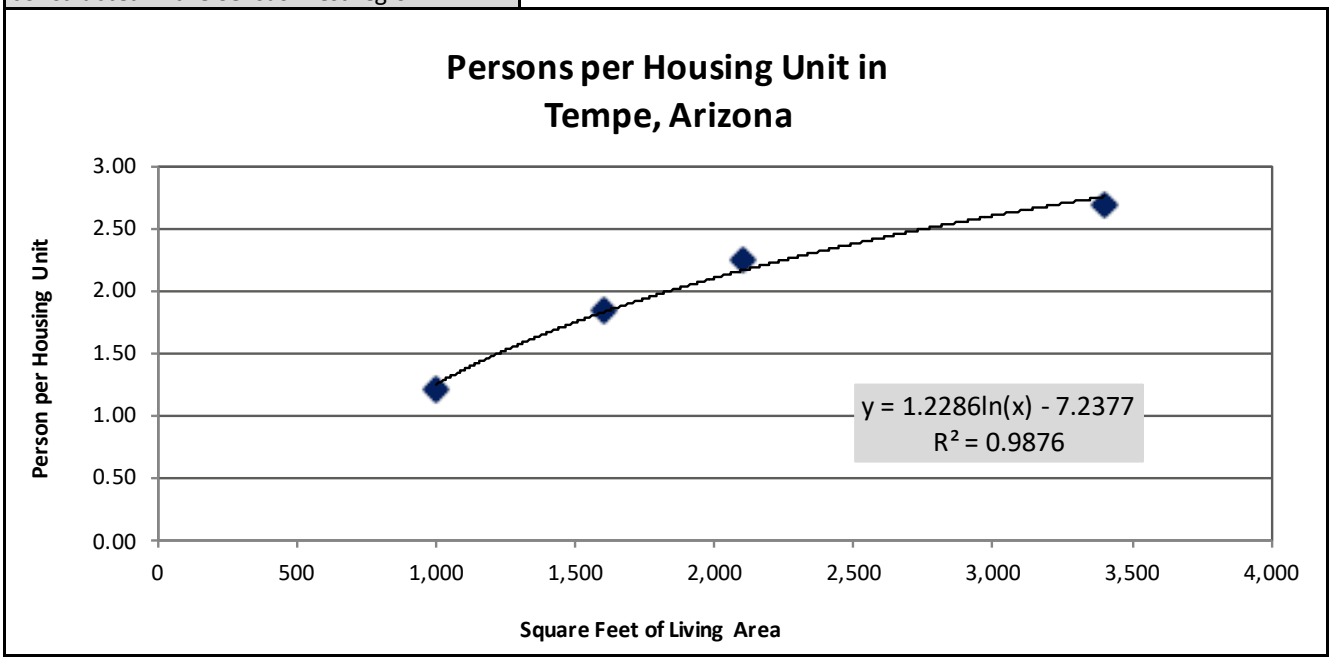
To estimate square feet of living area by bedroom range, TischlerBise uses 2022 U.S. Census Bureau data for housing units constructed in the west region. Based on 2022 estimates, living area ranges from 1,000 square feet for housing units with zero to one bedroom up to 3,400 square feet for housing units with four or more bedrooms.

Average square feet of living area and persons per housing unit by bedroom range are plotted in Figure L5 with a logarithmic trend line derived from U.S. Census Bureau estimates discussed in the previous paragraph and adjusted persons per housing unit estimates shown in Figure L4. Using the trend line formula shown in the figure, TischlerBise calculates the number of persons per housing unit, by living area, using intervals of 500 square feet. TischlerBise recommends a minimum development fee based on a unit size of 900 square feet and a maximum fee for units 1,901 square feet or more.

Figure L5: Occupancy by Housing Size

Average persons per housing unit derived from 2018-2022 ACS 5-Year PUMS data for the area that includes Tempe. Unit size for 0-1 bedroom from the 2022 U.S. Census Bureau average for all multi-family units constructed in the Census West region. Unit size for all other bedrooms from the 2022 U.S. Census Bureau average for single-family units constructed in the Census West region.

Actual Averages per Housing Unit			Fitted-Curve Values	
Bedrooms	Square Feet	Persons	Sq Ft Range	Persons
0-1	1,000	1.20	900 or less	1.12
2	1,600	1.85	901 to 1,400	1.66
3	2,100	2.25	1,401 to 1,900	2.04
4+	3,400	2.69	1,901 or more	2.32



Residential Estimates

For 2020, data published by Maricopa Association of Governments (MAG), includes 181,580 persons living in 82,626 housing units citywide. Using data published by MAG in *Socioeconomic Projections of Population and Employment by Municipal Planning Area, Jurisdiction, and Regional Analysis Zone (June 2023)*, Tempe's 2024 population includes 201,100 persons. Converting additional population to housing units using the occupancy factors shown in Figure L3 results in a 2024 housing unit estimate of 90,860 units. For this study, the analysis assumes the occupancy factors shown in Figure L3 will remain constant throughout the 10-year projection period.

Residential Projections

Population and housing unit projections are used to illustrate the possible future pace of service demands, revenues, and expenditures. To the extent these factors change, the projected need for infrastructure will also change. If development occurs at a more rapid rate than projected, the demand for infrastructure will increase at a corresponding rate. If development occurs at a slower rate than projected, the demand for infrastructure will also decrease.

TischlerBise projects residential development using population projections published by MAG in *Socioeconomic Projections of Population and Employment by Municipal Planning Area, Jurisdiction, and Regional Analysis Zone (June 2023)*. TischlerBise uses occupancy factors shown in Figure L3 to convert projected population to projected housing units.

Citywide Service Area

MAG projections include a citywide population of 201,100 persons in 2024 and 230,200 persons in 2034 – an increase of 29,100 persons over the next 10 years. TischlerBise converts annual population growth to annual housing unit growth using projected growth in households (single family vs. multi-family). For 2020 to 2030, MAG data projects new single-family households account for approximately one percent of new households and multi-family households account for approximately 99 percent of new households. For 2030 to 2040, MAG data projects new single-family households account for less than one percent of new households and multi-family households account for more than 99 percent of new households. Based on this analysis, 10-year projections include an increase of 16,130 housing units – 124 single-family units and 16,006 multi-family units.

Figure L6: Citywide Service Area

Tempe, Arizona	2024	2025	2026	2027	2028	2029	2034	10-Year
	Base Year	1	2	3	4	5	10	Increase
Population								
Total	**201,100**	**204,100**	**206,400**	**208,500**	**211,700**	**215,200**	**230,200**	**29,100**
Housing Units								
Single Family	41,639	41,655	41,668	41,680	41,697	41,716	41,763	124
Multi-Family	49,221	50,917	52,230	53,433	55,240	57,211	65,226	16,006
Total	**90,860**	**92,573**	**93,898**	**95,113**	**96,937**	**98,927**	**106,989**	**16,130**

Street Service Areas

The Street Facilities IIP includes two service areas. The north street service area includes development north of Broadway Road, and the south street service area includes development south of Broadway Road. TischlerBise allocates citywide population and housing units between the north street service area and the south street service area based on the proportionate share of population and housing units by traffic analysis zone (TAZ).

In the north service area, projected population growth over the next 10 years includes an additional 27,437 residents. TischlerBise converts annual population growth to annual housing unit growth using projected growth in households (single family vs. multi-family). Based on this analysis, 10-year projections include an increase of 15,214 housing units – 97 single-family units and 15,117 multi-family units.

Figure L7: North Street Service Area

North Street Service Area	2024 Base Year	2025 1	2026 2	2027 3	2028 4	2029 5	2034 10	10-Year Increase
Population								
Total	**92,955**	**95,745**	**97,883**	**99,835**	**102,811**	**106,066**	**120,392**	**27,437**
Housing Units								
Single Family	9,750	9,763	9,773	9,782	9,796	9,812	9,846	97
Multi-Family	33,903	35,485	36,709	37,831	39,515	41,354	49,020	15,117
Total	**43,653**	**45,248**	**46,482**	**47,613**	**49,312**	**51,165**	**58,867**	**15,214**

In the south service area, projected population growth over the next 10 years includes an additional 1,663 residents. TischlerBise converts annual population growth to annual housing unit growth using projected growth in households (single family vs. multi-family). Based on this analysis, 10-year projections include an increase of 916 housing units – 27 single-family units and 888 multi-family units.

Figure L8: South Street Service Area

South Street Service Area	2024 Base Year	2025 1	2026 2	2027 3	2028 4	2029 5	2034 10	10-Year Increase
Population								
Total	**108,145**	**108,355**	**108,517**	**108,665**	**108,889**	**109,134**	**109,808**	**1,663**
Housing Units								
Single Family	31,889	31,893	31,895	31,897	31,901	31,904	31,917	27
Multi-Family	15,318	15,432	15,521	15,602	15,724	15,858	16,206	888
Total	**47,207**	**47,325**	**47,416**	**47,500**	**47,625**	**47,762**	**48,123**	**916**

NONRESIDENTIAL DEVELOPMENT

This section details current estimates and future projections of nonresidential development including jobs and nonresidential floor area.

Nonresidential Demand Factors

TischlerBise uses the term jobs to refer to employment by place of work. In Figure L9, gray shading indicates the nonresidential development prototypes used to derive employment densities. For nonresidential development, TischlerBise uses data published in Trip Generation, Institute of Transportation Engineers, 11th Edition (2021). The prototype for industrial development is Light Industrial (ITE 110) with 637 square feet of floor area per employee. Institutional development uses Elementary School (ITE 520) with 960 square feet of floor area per employee. For office development, the proxy is General Office (ITE 710) with 307 square feet of floor area per employee. The prototype for commercial development is Shopping Center (ITE 820) with 471 square feet of floor area per employee.

Figure L9: Nonresidential Demand Units

ITE Code	Land Use / Size	Demand Unit	Wkdy Trip Ends Per Dmd Unit[1]	Wkdy Trip Ends Per Employee[1]	Employees Per Demand Unit	Square Feet Per Employee
110	Light Industrial	1,000 Sq Ft	4.87	3.10	1.57	637
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	4.75	2.51	1.89	528
150	Warehousing	1,000 Sq Ft	1.71	5.05	0.34	2,953
254	Assisted Living	bed	2.60	4.24	0.61	na
310	Hotel	room	7.99	14.34	0.56	na
520	Elementary School	1,000 Sq Ft	23.44	22.50	1.04	960
525	High School	student	1.94	21.95	0.09	na
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.77	3.77	2.86	350
620	Nursing Home	bed	3.06	3.31	0.92	na
710	General Office (avg size)	1,000 Sq Ft	10.84	3.33	3.26	307
720	Medical-Dental Office	1,000 Sq Ft	36.00	8.71	4.13	242
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.01	17.42	2.12	471

1. Trip Generation, Institute of Transportation Engineers, 11th Edition (2021).

Nonresidential Estimates

Data published by MAG in *Socioeconomic Projections of Population and Employment by Municipal Planning Area, Jurisdiction, and Regional Analysis Zone (June 2023)* includes a 2020 employment estimate of 170,077 jobs and a 2030 employment projection of 209,273 jobs. Using a straight-line allocation between 2020 and 2030, Tempe's 2024 employment estimate includes 185,755 jobs. MAG also provides data by nonresidential land use. Based on the allocation described previously, the 2024 employment estimate includes 38,365 industrial jobs, 28,774 commercial jobs, 93,174 jobs related to office and other services, and 25,443 institutional jobs. Applying the employment density factors shown in Figure L9 to employment estimates shown in Figure L10 results in a nonresidential floor area estimate of 91,004,951 square feet.

Figure L10: Nonresidential Estimates

Nonresidential Category	2024 Jobs[1]	Percent of Total Jobs	Square Feet per Job[2]	2024 Estimated Floor Area[3]
Industrial[4]	38,365	21%	637	24,421,253
Commercial[5]	28,774	15%	471	13,543,356
Office & Other Services[6]	93,174	50%	307	28,622,517
Institutional[7]	25,443	14%	960	24,417,825
Total	185,755	100%		91,004,951

1. TischlerBise calculation based on MAG 2023 Socioeconomic Projections.
2. Trip Generation, Institute of Transportation Engineers, 11th Edition (2021).
3. TischlerBise calculation (2024 jobs X square feet per job).
4. Includes MAG Industrial employment.
5. Includes MAG Retail employment.
6. Includes MAG Office employment.
7. Includes MAG Public and Other employment.

Nonresidential Projections

Employment and floor area projections are used to illustrate the possible future pace of service demands, revenues, and expenditures. To the extent these factors change, the projected need for infrastructure will also change. If development occurs at a more rapid rate than projected, the demand for infrastructure will increase at a corresponding rate. If development occurs at a slower rate than projected, the demand for infrastructure will also decrease.

TischlerBise projects nonresidential development using estimates for 2020 and employment projections for 2030 and 2040 published by MAG in *Socioeconomic Projections of Population and Employment by Municipal Planning Area, Jurisdiction, and Regional Analysis Zone (June 2023)*. TischlerBise uses employment density factors shown in Figure L10 to convert projected employment to projected nonresidential floor area.

Citywide Service Area

MAG projections include a 2020 employment estimate of 170,077 jobs, a 2030 employment projection of 209,273 jobs, and a 2040 employment projection of 225,849 jobs. TischlerBise uses a straight-line allocation of projected employment from 2020 to 2030 and from 2030 to 2040. Projected employment growth over the next 10 years includes 30,148 jobs. This includes 3,397 industrial jobs, 2,710 commercial jobs, 16,306 jobs related to office and other services, and 7,736 institutional jobs.

Applying the employment density factors shown in Figure L10 to the employment projections shown below provides the necessary conversion from jobs to nonresidential floor area. Over the next 10 years, nonresidential development includes approximately 15,871,000 square feet. This includes 2,162,000 square feet of industrial development (3,397 industrial jobs X 637 square feet per job), 1,275,000 square feet of commercial development (2,710 commercial jobs X 471 square feet per job), 5,009,000 square feet related to office and other services development (16,306 office and other services jobs X 307 square feet per job), and 7,424,000 square feet of institutional development (7,736 institutional jobs X 960 square feet per job).

Figure L11: Citywide Service Area

Tempe, Arizona	2024	2025	2026	2027	2028	2029	2034	10-Year
	Base Year	1	2	3	4	5	10	Increase
Employment								
Industrial	38,365	38,873	39,381	39,889	40,397	40,905	41,762	3,397
Commercial	28,774	29,067	29,360	29,653	29,947	30,240	31,483	2,710
Office & Other Services	93,174	95,410	97,646	99,883	102,119	104,356	109,479	16,306
Institutional	25,443	26,325	27,207	28,089	28,971	29,853	33,179	7,736
Total	**185,755**	**189,675**	**193,595**	**197,514**	**201,434**	**205,353**	**215,903**	**30,148**
Nonres. Sq. Ft. (x1,000)								
Industrial	24,421	24,745	25,068	25,391	25,715	26,038	26,584	2,162
Commercial	13,543	13,681	13,819	13,957	14,095	14,233	14,819	1,275
Office & Other Services	28,623	29,310	29,997	30,684	31,371	32,058	33,632	5,009
Institutional	24,418	25,264	26,111	26,957	27,804	28,650	31,842	7,424
Total	**91,005**	**93,000**	**94,995**	**96,989**	**98,984**	**100,979**	**106,876**	**15,871**

Street Service Areas

The Street Facilities IIP includes two service areas. The north street service area includes development north of Broadway Road, and the south street service area includes development south of Broadway Road. TischlerBise allocates citywide employment and nonresidential floor area between the north street service area and the south street service area based on the proportionate share of employment by traffic analysis zone (TAZ).

In the north service area, projected employment growth over the next 10 years includes an additional 20,262 jobs. TischlerBise converts annual employment growth to annual floor area growth using employment density factors shown in Figure L10. Based on these assumptions, the 10-year projections include an increase of approximately 11,353,000 square feet in the north service area.

Figure L12: North Street Service Area

North Street Service Area	2024 Base Year	2025 1	2026 2	2027 3	2028 4	2029 5	2034 10	10-Year Increase
Employment								
Industrial	14,886	15,230	15,574	15,918	16,261	16,605	16,889	2,003
Commercial	10,812	10,958	11,104	11,250	11,395	11,541	12,400	1,588
Office & Other Services	49,987	51,368	52,748	54,129	55,509	56,890	60,207	10,220
Institutional	16,544	17,242	17,940	18,638	19,335	20,033	22,995	6,451
Total	**92,230**	**94,798**	**97,365**	**99,933**	**102,501**	**105,069**	**112,491**	**20,262**
Nonres. Sq. Ft. (x1,000)								
Industrial	9,476	9,695	9,914	10,132	10,351	10,570	10,751	1,275
Commercial	5,089	5,158	5,226	5,295	5,364	5,432	5,837	747
Office & Other Services	15,356	15,780	16,204	16,628	17,052	17,476	18,495	3,140
Institutional	15,878	16,547	17,217	17,887	18,556	19,226	22,068	6,191
Total	**45,798**	**47,180**	**48,561**	**49,942**	**51,323**	**52,705**	**57,151**	**11,353**

For development in the south service area, projected employment growth over the next 10 years includes an additional 9,886 jobs. Applying the employment density factors shown in Figure L10 to projected employment shown below, the 10-year projections include an increase of approximately 4,518,000 square feet in the south service area.

Figure L13: South Street Service Area

South Street Service Area	2024 Base Year	2025 1	2026 2	2027 3	2028 4	2029 5	2034 10	10-Year Increase
Employment								
Industrial	23,479	23,643	23,807	23,971	24,136	24,300	24,873	1,394
Commercial	17,962	18,109	18,256	18,404	18,551	18,699	19,083	1,122
Office & Other Services	43,187	44,043	44,898	45,754	46,610	47,466	49,272	6,085
Institutional	8,899	9,083	9,267	9,451	9,636	9,820	10,184	1,285
Total	**93,526**	**94,878**	**96,229**	**97,581**	**98,933**	**100,284**	**103,412**	**9,886**
Nonres. Sq. Ft. (x1,000)								
Industrial	14,945	15,050	15,154	15,259	15,364	15,468	15,833	888
Commercial	8,454	8,524	8,593	8,662	8,732	8,801	8,982	528
Office & Other Services	13,267	13,530	13,793	14,056	14,318	14,581	15,136	1,869
Institutional	8,540	8,717	8,894	9,071	9,247	9,424	9,773	1,233
Total	**45,207**	**45,820**	**46,434**	**47,047**	**47,661**	**48,275**	**49,725**	**4,518**

AVERAGE WEEKDAY VEHICLE TRIPS

Components used to calculate average weekday vehicle trips (AWVT) include average weekday vehicle trip generation rates, adjustments for commuting patterns, and adjustments for pass-by trips.

Residential Trip Generation Rates

As an alternative to simply using national average trip generation rates for residential development, published by the Institute of Transportation Engineers (ITE), TischlerBise calculates custom trip rates using local demographic data. Key inputs needed for the analysis, including average number of persons and vehicles available per housing unit, are available from American Community Survey (ACS) data.

Vehicle Trip Ends by Bedroom Range

TischlerBise recommends a fee schedule where larger units pay higher development fees than smaller units. Benefits of the proposed methodology include: 1) proportionate assessment of infrastructure demand using local demographic data, and 2) progressive fee structure (i.e., smaller units pay less, and larger units pay more).

TischlerBise creates custom tabulations of demographic data by bedroom range from individual survey responses provided by the U.S. Census Bureau in files known as Public Use Microdata Samples (PUMS). PUMS files are only available for areas of at least 100,000 persons, with Tempe in two Public Use Microdata Areas (AZ PUMAs 108 and 109). Shown in Figure L14, cells with yellow shading indicate the survey results, which yield the unadjusted number of persons and vehicles available per housing unit. Unadjusted vehicles per housing unit are adjusted to control totals in Tempe – 1.52 vehicles per unit.

Figure L14: Vehicle Trip Ends by Bedroom Range

Bedroom Range	Persons[1]	Vehicles Available[1]	Housing Units[1]	Housing Mix	Unadjusted PPHU	Adjusted PPHU[2]	Unadjusted VPHU	Adjusted VPHU[2]
0-1	748	530	601	18%	1.24	1.20	0.88	0.80
2	1,661	1,158	865	25%	1.92	1.85	1.34	1.22
3	2,613	2,146	1,118	33%	2.34	2.25	1.92	1.75
4+	2,265	1,835	812	24%	2.79	2.69	2.26	2.06
Total	7,287	5,669	3,396	100%	2.15	2.07	1.67	1.52

National Averages According to ITE

ITE Code	AWVTE per Person	AWVTE per Vehicle	AWVTE per HU	Local Housing Mix
210 SFD	2.65	6.36	9.43	50%
220 Apt	1.86	5.10	6.74	50%
Weighted Avg	2.26	5.73	8.09	100%

Recommended AWVTE per Housing Unit

Bedroom Range	AWVTE per HU Based on Persons[3]	AWVTE per HU Based on Vehicles[4]	AWVTE per Housing Unit[5]
0-1	2.71	4.58	3.65
2	4.18	6.99	5.59
3	5.09	10.03	7.56
4+	6.08	11.80	8.94
Average	4.68	8.71	6.70

1. American Community Survey, Public Use Microdata Sample for AZ PUMAs 108 and 109 (2018-2022 5-Year unweighted data).
2. Adjusted multipliers are scaled to make the average PUMS values match control totals for Tempe, based on American Community Survey 2018-2022 5-Year Estimates.
3. Adjusted persons per housing unit multiplied by national weighted average trip rate per person.
4. Adjusted vehicles available per housing unit multiplied by national weighted average trip rate per vehicle.
5. Average trip rates based on persons and vehicles per housing unit.

Vehicle Trip Ends by Housing Size

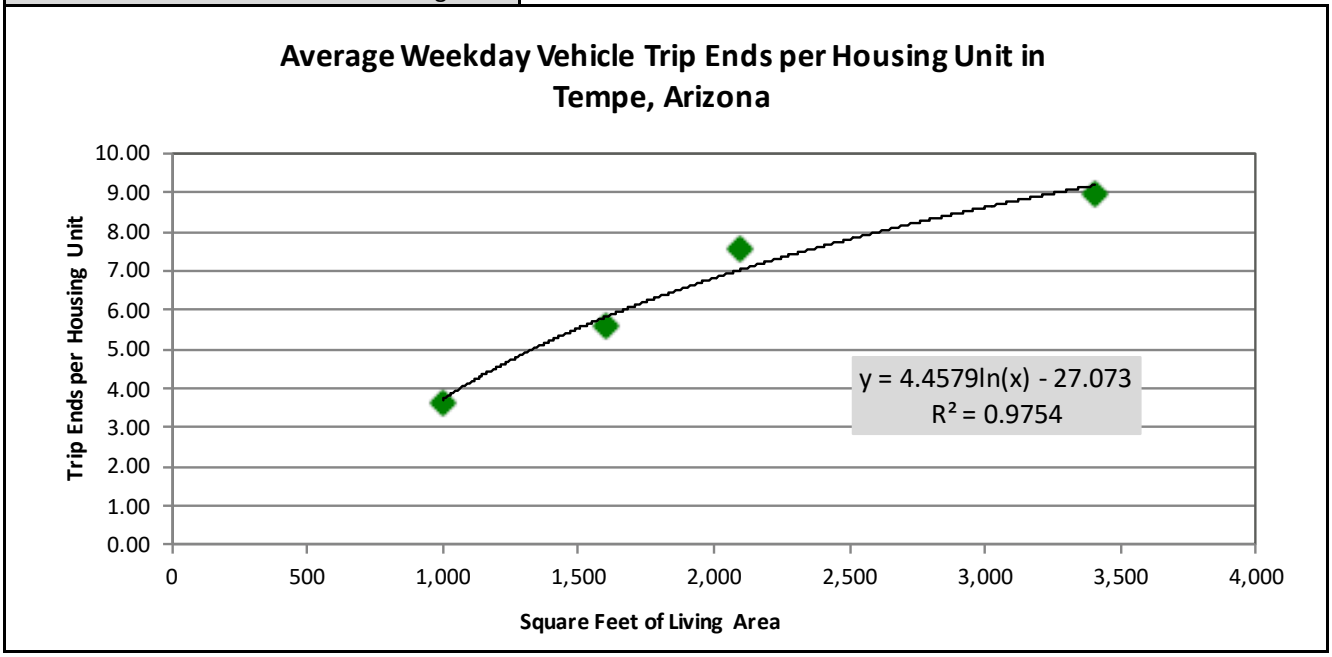
To derive average weekday vehicle trip ends by dwelling size, Tischler Bise uses 2022 U.S. Census Bureau data for housing units constructed in the west region. Based on 2022 estimates, living area ranges from 1,000 square feet for housing units with zero to one bedroom up to 3,400 square feet for housing units with four or more bedrooms. Citywide average floor area and weekday vehicle trip ends, by bedroom range, are plotted in Figure L15 with a logarithmic trend line. TischlerBise uses the trend line formula to derive estimated trip ends by housing unit size in increments of 500 square feet. TischlerBise recommends a minimum fee based on a unit size of 900 square feet and a maximum fee for units 1,901 square feet or larger. For the upper threshold, each dwelling averages 7.62 vehicle trip ends.

A medium-size residential unit in Tempe with 1,401 to 1,900 square feet has a fitted-curve value of 6.58 vehicle trip ends on an average weekday. A small unit of 900 square feet or less would pay 49 percent of the street fee paid by a medium-size unit. A large unit of 1,901 square feet or more would pay 116 percent of the street fee paid by a medium-size unit. With a "one-size-fits-all" approach, small units pay more than their proportionate share while large units pay less than their proportionate share. An average fee that does not vary by size makes small units less affordable and essentially subsidizes larger units.

Figure L15: Vehicle Trip Ends by Housing Size

Average weekday vehicle trips per housing unit derived from 2018-2022 ACS 5-Year PUMS data for the area that includes Tempe. Unit size for 0-1 bedroom from the 2022 U.S. Census Bureau average for all multi-family units constructed in the Census West region. Unit size for all other bedrooms from the 2022 U.S. Census Bureau average for single-family units constructed in the Census West region.

Actual Averages per Housing Unit			Fitted-Curve Values	
Bedrooms	Square Feet	Persons	Sq Ft Range	Persons
0-1	1,000	3.65	900 or less	3.25
2	1,600	5.59	901 to 1,400	5.22
3	2,100	7.56	1,401 to 1,900	6.58
4	3,400	8.94	1,901 or more	7.62



Nonresidential Trip Generation Rates

For nonresidential development, TischlerBise uses trip generation rates published in Trip Generation, Institute of Transportation Engineers, 11th Edition (2021). The prototype for industrial development is Light Industrial (ITE 110) which generates 4.87 average weekday vehicle trip ends per 1,000 square feet of floor area. Institutional development uses Elementary School (ITE 520) and generates 23.44 average weekday vehicle trip ends per 1,000 square feet of floor area. For office & other services development, the proxy is General Office (ITE 710), and it generates 10.84 average weekday vehicle trip ends per 1,000 square feet of floor area. The prototype for commercial development is Shopping Center (ITE 820) which generates 37.01 average weekday vehicle trips per 1,000 square feet of floor area.

Figure L16: Average Weekday Vehicle Trip Ends by Land Use

ITE Code	Land Use / Size	Demand Unit	Wkdy Trip Ends Per Dmd Unit[1]	Wkdy Trip Ends Per Employee[1]	Employees Per Demand Unit	Square Feet Per Employee
110	Light Industrial	1,000 Sq Ft	4.87	3.10	1.57	637
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	4.75	2.51	1.89	528
150	Warehousing	1,000 Sq Ft	1.71	5.05	0.34	2,953
254	Assisted Living	bed	2.60	4.24	0.61	na
310	Hotel	room	7.99	14.34	0.56	na
520	Elementary School	1,000 Sq Ft	23.44	22.50	1.04	960
525	High School	student	1.94	21.95	0.09	na
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.77	3.77	2.86	350
620	Nursing Home	bed	3.06	3.31	0.92	na
710	General Office (avg size)	1,000 Sq Ft	10.84	3.33	3.26	307
720	Medical-Dental Office	1,000 Sq Ft	36.00	8.71	4.13	242
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.01	17.42	2.12	471

1. Trip Generation, Institute of Transportation Engineers, 11th Edition (2021).

Trip Rate Adjustments

Trip generation rates require an adjustment factor to avoid double counting each trip at both the origin and destination points. Therefore, the basic trip adjustment factor is 50 percent. As discussed further in this section, the development fee methodology includes additional adjustments to make the fees proportionate to the infrastructure demand for each type of development.

Commuter Trip Adjustment

Residential development has a larger trip adjustment factor of 62 percent to account for commuters leaving Tempe for work. According to the 2009 National Household Travel Survey (see Table 30) weekday work trips are typically 31 percent of production trips (i.e., all out-bound trips, which are 50 percent of all trip ends). As shown in Figure L17, the U.S. Census Bureau's OnTheMap web application indicates 75 percent of resident workers traveled outside of Tempe for work in 2021. In combination, these factors (0.31 x 0.50 x 0.75 = 0.12) support the additional 12 percent allocation of trips to residential development.

Figure L17: Commuter Trip Adjustment

Trip Adjustment Factor for Commuters	
Residents Living and Working in Tempe	20,013
Residents Commuting Outside Tempe for Work	60,044
Employed Residents	80,057
Share of Employed Residents Commuting Outside Tempe for Work	75%
Base Production Trips[1]	50%
Additional Production Trips[1]	12%
Residential Trip Adjustment Factor	62%

Source: U.S. Census Bureau, OnTheMap Application (version 6.23.4) and LEHD Origin-Destination Employment Statistics, 2021.

1. According to the National Household Travel Survey (2009)*, published in December 2011 (see Table 30), home-based work trips are typically 30.99 percent of "production" trips, in other words, out-bound trips (which are 50 percent of all trip ends). Also, LED OnTheMap data from 2021 indicate that 75 percent of Tempe's workers travel outside the city for work. In combination, these factors (0.3099 x 0.50 x 0.75 = 0.12) account for 12 percent of additional production trips. The total adjustment factor for residential includes attraction trips (50 percent of trip ends) plus the journey-to-work commuting adjustment (12 percent of production trips) for a total of 62 percent.

*http://nhts.ornl.gov/publications.shtml ; Summary of Travel Trends - Table "Daily Travel Statistics by Weekday

Adjustment for Pass-By Trips

For commercial and institutional development, the trip adjustment factor is less than 50 percent because these types of development attract vehicles as they pass by on arterial and collector roads. For example, when someone stops at a convenience store on the way home from work, the convenience store is not the primary destination. For the average shopping center, ITE data indicate 34 percent of the vehicles that enter are passing by on their way to some other primary destination. The remaining 66 percent of attraction trips have the commercial site as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor is 66 percent multiplied by 50 percent, or approximately 33 percent of the trip ends.

Average Weekday Vehicle Trips

Shown below in Figure L18, multiplying average weekday vehicle trip ends and trip adjustment factors (discussed on the previous page) by Tempe's existing development units provides the average weekday vehicle trips generated by existing development. As shown below, existing development citywide generates 900,891 vehicle trips on an average weekday.

Figure L18: Average Weekday Vehicle Trips – Citywide Service Area

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	3.25	62%	16,080	32,401
2 Bedrooms	HU	Avg	5.22	62%	23,143	74,900
3 Bedrooms	HU	Avg	6.58	62%	29,912	122,029
4+ Bedrooms	HU	Avg	7.62	62%	21,725	102,638
Industrial	KSF	110	4.87	50%	24,421	59,466
Commercial	KSF	820	37.01	33%	13,543	165,409
Office & Other Services	KSF	710	10.84	50%	28,623	155,134
Institutional	KSF	520	23.44	33%	24,418	188,914
Total, Citywide						900,891

Shown below in Figure L19, existing development in the north street service area generates 450,788 vehicle trips on an average weekday.

Figure L19: Average Weekday Vehicle Trips – North Street Service Area

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	3.25	62%	7,725	15,567
2 Bedrooms	HU	Avg	5.22	62%	11,119	35,985
3 Bedrooms	HU	Avg	6.58	62%	14,371	58,628
4+ Bedrooms	HU	Avg	7.62	62%	10,438	49,311
Industrial	KSF	110	4.87	50%	9,476	23,074
Commercial	KSF	820	37.01	33%	5,089	62,155
Office & Other Services	KSF	710	10.84	50%	15,356	83,228
Institutional	KSF	520	23.44	33%	15,878	122,841
Total, North						450,788

Shown below in Figure L20, existing development in the south street service area generates 450,103 vehicle trips on an average weekday.

Figure L20: Average Weekday Vehicle Trips – South Street Service Area

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	3.25	62%	8,354	16,834
2 Bedrooms	HU	Avg	5.22	62%	12,024	38,915
3 Bedrooms	HU	Avg	6.58	62%	15,541	63,402
4+ Bedrooms	HU	Avg	7.62	62%	11,287	53,327
Industrial	KSF	110	4.87	50%	14,945	36,392
Commercial	KSF	820	37.01	33%	8,454	103,254
Office & Other Services	KSF	710	10.84	50%	13,267	71,906
Institutional	KSF	520	23.44	33%	8,540	66,074
Total, South						450,103

DEVELOPMENT PROJECTIONS

Citywide Service Area

Provided below is a summary of development projections used in the Development Fee Report. Base year estimates for 2024 are used in the fee calculations. Development projections are used to illustrate a possible future pace of demand for service units and cash flows resulting from revenues and expenditures associated with those demands. TischlerBise uses the projections shown below for all service areas except streets.

Figure L21: Projections Summary

Tempe, Arizona	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	10-Year
	Base Year	1	2	3	4	5	6	7	8	9	10	Increase
Population												
Total	**201,100**	**204,100**	**206,400**	**208,500**	**211,700**	**215,200**	**219,200**	**221,100**	**224,600**	**227,600**	**230,200**	**29,100**
Housing Units												
Single Family	41,639	41,655	41,668	41,680	41,697	41,716	41,737	41,742	41,750	41,757	41,763	124
Multi-Family	49,221	50,917	52,230	53,433	55,240	57,211	59,457	60,430	62,286	63,867	65,226	16,006
Total	**90,860**	**92,573**	**93,898**	**95,113**	**96,937**	**98,927**	**101,194**	**102,171**	**104,036**	**105,624**	**106,989**	**16,130**
Employment												
Industrial	38,365	38,873	39,381	39,889	40,397	40,905	41,413	41,500	41,588	41,675	41,762	3,397
Commercial	28,774	29,067	29,360	29,653	29,947	30,240	30,533	30,771	31,008	31,246	31,483	2,710
Office & Other Services	93,174	95,410	97,646	99,883	102,119	104,356	106,592	107,314	108,036	108,757	109,479	16,306
Institutional	25,443	26,325	27,207	28,089	28,971	29,853	30,735	31,346	31,957	32,568	33,179	7,736
Total	**185,755**	**189,675**	**193,595**	**197,514**	**201,434**	**205,353**	**209,273**	**210,931**	**212,588**	**214,246**	**215,903**	**30,148**
Nonres. Sq. Ft. (x1,000)												
Industrial	24,421	24,745	25,068	25,391	25,715	26,038	26,361	26,417	26,473	26,528	26,584	2,162
Commercial	13,543	13,681	13,819	13,957	14,095	14,233	14,371	14,483	14,595	14,707	14,819	1,275
Office & Other Services	28,623	29,310	29,997	30,684	31,371	32,058	32,745	32,966	33,188	33,410	33,632	5,009
Institutional	24,418	25,264	26,111	26,957	27,804	28,650	29,497	30,083	30,669	31,255	31,842	7,424
Total	**91,005**	**93,000**	**94,995**	**96,989**	**98,984**	**100,979**	**102,974**	**103,949**	**104,925**	**105,900**	**106,876**	**15,871**

Street Service Areas

North Street Service Area

TischlerBise uses the projections shown below for the north street service area.

Figure L22: Projections Summary

North Street Service Area	2024 Base Year	2025 1	2026 2	2027 3	2028 4	2029 5	2030 6	2031 7	2032 8	2033 9	2034 10	10-Year Increase
Population												
Total	**92,955**	**95,745**	**97,883**	**99,835**	**102,811**	**106,066**	**110,842**	**112,496**	**115,531**	**118,134**	**120,392**	**27,437**
Housing Units												
Single Family	9,750	9,763	9,773	9,782	9,796	9,812	9,834	9,836	9,840	9,843	9,846	97
Multi-Family	33,903	35,485	36,709	37,831	39,515	41,354	44,027	44,869	46,476	47,844	49,020	15,117
Total	**43,653**	**45,248**	**46,482**	**47,613**	**49,312**	**51,165**	**53,861**	**54,705**	**56,316**	**57,687**	**58,867**	**15,214**
Employment												
Industrial	14,886	15,230	15,574	15,918	16,261	16,605	16,949	16,934	16,919	16,904	16,889	2,003
Commercial	10,812	10,958	11,104	11,250	11,395	11,541	11,687	11,865	12,044	12,222	12,400	1,588
Office & Other Services	49,987	51,368	52,748	54,129	55,509	56,890	58,270	58,754	59,239	59,723	60,207	10,220
Institutional	16,544	17,242	17,940	18,638	19,335	20,033	20,731	21,297	21,863	22,429	22,995	6,451
Total	**92,230**	**94,798**	**97,365**	**99,933**	**102,501**	**105,069**	**107,637**	**108,851**	**110,064**	**111,278**	**112,491**	**20,262**
Nonres. Sq. Ft. (x1,000)												
Industrial	9,476	9,695	9,914	10,132	10,351	10,570	10,789	10,779	10,770	10,760	10,751	1,275
Commercial	5,089	5,158	5,226	5,295	5,364	5,432	5,501	5,585	5,669	5,753	5,837	747
Office & Other Services	15,356	15,780	16,204	16,628	17,052	17,476	17,900	18,049	18,198	18,347	18,495	3,140
Institutional	15,878	16,547	17,217	17,887	18,556	19,226	19,896	20,439	20,982	21,525	22,068	6,191
Total	**45,798**	**47,180**	**48,561**	**49,942**	**51,323**	**52,705**	**54,086**	**54,852**	**55,618**	**56,385**	**57,151**	**11,353**

South Street Service Area

TischlerBise uses the projections shown below for the south street service area.

Figure L23: Projections Summary

South Street Service Area	2024 Base Year	2025 1	2026 2	2027 3	2028 4	2029 5	2030 6	2031 7	2032 8	2033 9	2034 10	10-Year Increase
Population												
Total	**108,145**	**108,355**	**108,517**	**108,665**	**108,889**	**109,134**	**108,358**	**108,604**	**109,069**	**109,466**	**109,808**	**1,663**
Housing Units												
Single Family	31,889	31,893	31,895	31,897	31,901	31,904	31,904	31,906	31,910	31,914	31,917	27
Multi-Family	15,318	15,432	15,521	15,602	15,724	15,858	15,429	15,560	15,810	16,023	16,206	888
Total	**47,207**	**47,325**	**47,416**	**47,500**	**47,625**	**47,762**	**47,333**	**47,466**	**47,720**	**47,937**	**48,123**	**916**
Employment												
Industrial	23,479	23,643	23,807	23,971	24,136	24,300	24,464	24,566	24,669	24,771	24,873	1,394
Commercial	17,962	18,109	18,256	18,404	18,551	18,699	18,846	18,905	18,965	19,024	19,083	1,122
Office & Other Services	43,187	44,043	44,898	45,754	46,610	47,466	48,322	48,560	48,797	49,035	49,272	6,085
Institutional	8,899	9,083	9,267	9,451	9,636	9,820	10,004	10,049	10,094	10,139	10,184	1,285
Total	**93,526**	**94,878**	**96,229**	**97,581**	**98,933**	**100,284**	**101,636**	**102,080**	**102,524**	**102,968**	**103,412**	**9,886**
Nonres. Sq. Ft. (x1,000)												
Industrial	14,945	15,050	15,154	15,259	15,364	15,468	15,573	15,638	15,703	15,768	15,833	888
Commercial	8,454	8,524	8,593	8,662	8,732	8,801	8,871	8,898	8,926	8,954	8,982	528
Office & Other Services	13,267	13,530	13,793	14,056	14,318	14,581	14,844	14,917	14,990	15,063	15,136	1,869
Institutional	8,540	8,717	8,894	9,071	9,247	9,424	9,601	9,644	9,687	9,730	9,773	1,233
Total	**45,207**	**45,820**	**46,434**	**47,047**	**47,661**	**48,275**	**48,888**	**49,097**	**49,306**	**49,516**	**49,725**	**4,518**

AVERAGE WEEKDAY VEHICLE TRIP PROJECTIONS

Citywide Service Area

TischlerBise uses the projections shown below for fire and police fees.

Figure L24: Average Weekday Vehicle Trips Summary

Tempe, Arizona	Base	1	2	3	4	5	6	7	8	9	10	10-Year
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Increase
0-1 Bedroom Units	16,080	16,383	16,617	16,832	17,155	17,507	17,909	18,082	18,412	18,693	18,934	2,855
2 Bedroom Units	23,143	23,579	23,917	24,226	24,691	25,198	25,775	26,024	26,499	26,904	27,251	4,108
3 Bedroom Units	29,912	30,476	30,912	31,312	31,913	32,568	33,314	33,636	34,250	34,773	35,222	5,310
4+ Bedroom Units	21,725	22,135	22,452	22,742	23,178	23,654	24,196	24,430	24,876	25,255	25,582	3,857
Industrial KSF	24,421	24,745	25,068	25,391	25,715	26,038	26,361	26,417	26,473	26,528	26,584	2,162
Commercial KSF	13,543	13,681	13,819	13,957	14,095	14,233	14,371	14,483	14,595	14,707	14,819	1,275
Office & Other Services KSF	28,623	29,310	29,997	30,684	31,371	32,058	32,745	32,966	33,188	33,410	33,632	5,009
Institutional KSF	24,418	25,264	26,111	26,957	27,804	28,650	29,497	30,083	30,669	31,255	31,842	7,424
0-1 Bedroom Trips	32,401	33,012	33,484	33,917	34,568	35,277	36,086	36,434	37,099	37,666	38,152	5,752
2 Bedroom Trips	74,900	76,312	77,405	78,406	79,910	81,550	83,419	84,225	85,762	87,071	88,197	13,296
3 Bedroom Trips	122,029	124,330	126,110	127,741	130,191	132,864	135,908	137,221	139,726	141,858	143,692	21,663
4+ Bedroom Trips	102,638	104,573	106,070	107,442	109,502	111,750	114,311	115,415	117,522	119,316	120,858	18,220
Residential Trips	331,968	338,227	343,069	347,507	354,170	361,442	369,725	373,295	380,109	385,910	390,899	58,932
Industrial Trips	59,466	60,253	61,041	61,828	62,615	63,403	64,190	64,325	64,461	64,596	64,731	5,266
Commercial Trips	165,409	167,095	168,780	170,466	172,151	173,837	175,522	176,888	178,254	179,620	180,985	15,576
Office & Other Services Trips	155,134	158,858	162,581	166,305	170,028	173,752	177,476	178,677	179,879	181,081	182,283	27,149
Institutional Trips	188,914	195,463	202,012	208,561	215,110	221,659	228,207	232,743	237,279	241,815	246,351	57,437
Nonresidential Trips	568,923	581,668	594,414	607,159	619,905	632,650	645,395	652,634	659,873	667,112	674,351	105,428
Total Vehicle Trips	**900,891**	**919,895**	**937,483**	**954,666**	**974,075**	**994,091**	**1,015,120**	**1,025,929**	**1,039,982**	**1,053,022**	**1,065,250**	**164,359**

North Street Service Area

TischlerBise uses the projections shown below for the north street service area.

Figure L25: Area Average Weekday Vehicle Trips Summary

North Street Service Area	Base	1	2	3	4	5	6	7	8	9	10	10-Year
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Increase
0-1 Bedroom Units	7,725	8,008	8,226	8,426	8,727	9,055	9,532	9,681	9,966	10,209	10,418	2,692
2 Bedroom Units	11,119	11,525	11,840	12,128	12,560	13,032	13,719	13,934	14,344	14,694	14,994	3,875
3 Bedroom Units	14,371	14,896	15,302	15,675	16,234	16,844	17,732	18,010	18,540	18,991	19,380	5,009
4+ Bedroom Units	10,438	10,819	11,114	11,385	11,791	12,234	12,878	13,080	13,465	13,793	14,075	3,638
Industrial KSF	9,476	9,695	9,914	10,132	10,351	10,570	10,789	10,779	10,770	10,760	10,751	1,275
Commercial KSF	5,089	5,158	5,226	5,295	5,364	5,432	5,501	5,585	5,669	5,753	5,837	747
Office & Other Services KSF	15,356	15,780	16,204	16,628	17,052	17,476	17,900	18,049	18,198	18,347	18,495	3,140
Institutional KSF	15,878	16,547	17,217	17,887	18,556	19,226	19,896	20,439	20,982	21,525	22,068	6,191
0-1 Bedroom Trips	15,567	16,135	16,576	16,979	17,585	18,246	19,207	19,508	20,082	20,571	20,992	5,425
2 Bedroom Trips	35,985	37,300	38,318	39,250	40,650	42,178	44,400	45,096	46,424	47,554	48,527	12,542
3 Bedroom Trips	58,628	60,770	62,428	63,947	66,228	68,717	72,338	73,472	75,635	77,477	79,061	20,433
4+ Bedroom Trips	49,311	51,113	52,508	53,785	55,704	57,798	60,843	61,796	63,616	65,165	66,497	17,186
Residential Trips	159,490	165,319	169,829	173,961	180,167	186,938	196,788	199,872	205,757	210,767	215,076	55,586
Industrial Trips	23,074	23,607	24,139	24,672	25,205	25,738	26,271	26,248	26,224	26,201	26,178	3,104
Commercial Trips	62,155	62,993	63,831	64,669	65,508	66,346	67,184	68,209	69,234	70,259	71,284	9,129
Office & Other Services Trips	83,228	85,527	87,825	90,124	92,422	94,721	97,020	97,826	98,632	99,439	100,245	17,017
Institutional Trips	122,841	128,022	133,203	138,384	143,565	148,747	153,928	158,130	162,333	166,535	170,738	47,897
Nonresidential Trips	291,298	300,148	308,999	317,850	326,701	335,551	344,402	350,413	356,423	362,434	368,445	77,147
Total Vehicle Trips	**450,788**	**465,467**	**478,828**	**491,811**	**506,868**	**522,490**	**541,190**	**550,285**	**562,180**	**573,201**	**583,521**	**132,733**

South Street Service Area

TischlerBise uses the projections shown below for the south street service area.

Figure L26: Area Average Weekday Vehicle Trips Summary

South Street Service Area	Base	1	2	3	4	5	6	7	8	9	10	10-Year
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Increase
0-1 Bedroom Units	8,354	8,375	8,391	8,406	8,428	8,453	8,377	8,400	8,445	8,484	8,516	162
2 Bedroom Units	12,024	12,054	12,077	12,099	12,131	12,165	12,056	12,090	12,155	12,210	12,257	233
3 Bedroom Units	15,541	15,580	15,610	15,637	15,679	15,724	15,583	15,626	15,710	15,781	15,843	301
4+ Bedroom Units	11,287	11,316	11,337	11,357	11,387	11,420	11,318	11,349	11,410	11,462	11,506	219
Industrial KSF	14,945	15,050	15,154	15,259	15,364	15,468	15,573	15,638	15,703	15,768	15,833	888
Commercial KSF	8,454	8,524	8,593	8,662	8,732	8,801	8,871	8,898	8,926	8,954	8,982	528
Office & Other Services KSF	13,267	13,530	13,793	14,056	14,318	14,581	14,844	14,917	14,990	15,063	15,136	1,869
Institutional KSF	8,540	8,717	8,894	9,071	9,247	9,424	9,601	9,644	9,687	9,730	9,773	1,233
0-1 Bedroom Trips	16,834	16,876	16,909	16,938	16,983	17,032	16,879	16,926	17,017	17,094	17,161	327
2 Bedroom Trips	38,915	39,012	39,087	39,156	39,260	39,372	39,019	39,129	39,338	39,517	39,670	755
3 Bedroom Trips	63,402	63,560	63,682	63,794	63,963	64,146	63,570	63,749	64,091	64,381	64,631	1,230
4+ Bedroom Trips	53,327	53,460	53,562	53,657	53,798	53,953	53,469	53,619	53,906	54,151	54,361	1,034
Residential Trips	172,477	172,908	173,240	173,545	174,004	174,503	172,937	173,423	174,352	175,143	175,823	3,346
Industrial Trips	36,392	36,647	36,901	37,156	37,410	37,665	37,919	38,078	38,236	38,395	38,553	2,161
Commercial Trips	103,254	104,101	104,949	105,796	106,643	107,491	108,338	108,679	109,020	109,361	109,702	6,448
Office & Other Services Trips	71,906	73,331	74,756	76,181	77,606	79,031	80,456	80,852	81,247	81,642	82,038	10,132
Institutional Trips	66,074	67,441	68,809	70,177	71,544	72,912	74,280	74,613	74,946	75,280	75,613	9,540
Nonresidential Trips	277,625	281,520	285,415	289,309	293,204	297,099	300,993	302,221	303,450	304,678	305,906	28,281
Total Vehicle Trips	**450,103**	**454,428**	**458,655**	**462,855**	**467,207**	**471,602**	**473,930**	**475,645**	**477,802**	**479,821**	**481,729**	**31,626**

FIRE FACILITIES

ARS § 9-463.05 (T)(7)(f) defines the eligible facilities and assets for the Fire Facilities IIP:

> *"Fire and police facilities, including all appurtenances, equipment and vehicles. Fire and police facilities do not include a facility or portion of a facility that is used to replace services that were once provided elsewhere in the municipality, vehicles and equipment used to provide administrative services, helicopters or airplanes or a facility that is used for training firefighters or officers from more than one station or substation."*

The Fire Facilities IIP includes components for fire facilities, fire apparatus, and the cost of preparing the Fire Facilities IIP and related development fee report. The incremental expansion methodology is used for fire apparatus. The plan-based methodology is used for fire facilities and the Development Fee Report.

SERVICE AREA

Tempe's Fire Department strives to provide a uniform response time within the city limits; therefore, there is a single service area for the Fire Facilities IIP.

PROPORTIONATE SHARE

ARS § 9-463.05 (B)(3) states that the development fee shall not exceed a proportionate share of the cost of necessary public services needed to accommodate future development. The Fire Facilities IIP and development fees will allocate fire infrastructure costs between residential and nonresidential development based on fire calls for service. Based on call data from the last three years provided by the Tempe Fire Department, residential development accounts for approximately 72 percent of fire calls and nonresidential development accounts for the remaining 28 percent.

Figure F1: Proportionate Share

Land Use	2021	2022	2023	Total
Residential	12,751	13,674	14,235	40,660
Nonresidential	4,170	5,633	5,777	15,580
Total	16,921	19,307	20,012	56,240

Land Use	2021	2022	2023	Total
Residential	75%	71%	71%	72%
Nonresidential	25%	29%	29%	28%
Total	100%	100%	100%	100%

Source: Tempe Fire Department

The proportionate share of costs attributable to residential development will be allocated to population and then converted to an appropriate amount by type of housing unit. Since nonresidential calls for service were unavailable by specific nonresidential use, TischlerBise recommends using vehicle trips as the demand indicator for nonresidential demand for fire services. Trip generation rates are used for nonresidential development because vehicle trips are highest for commercial development, such as a shopping center, and lowest for industrial development. Office and institutional trip rates fall between the other two categories. This ranking of trip rates is consistent with the relative demand for fire services from nonresidential development.

Ratio of Service Unit to Development Unit

ARS § 9-463.05(E)(4) requires:

> *"A table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of necessary public services or facility expansions and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial and industrial."*

Figure F2 displays the demand indicators for residential and nonresidential land uses. For residential development, the table displays the number of persons per housing unit by unit size. For nonresidential development, the table displays the number of vehicle trips per thousand square feet of floor area.

Figure F2: Ratio of Service Unit to Development Unit

Residential Development per Unit	
Unit Size	Persons per Housing Unit[1]
900 or less	1.12
901 to 1,400	1.66
1,401 to 1,900	2.04
1,901 or more	2.32

Nonresidential Development per 1,000 Sq Ft			
Development Type	Avg Weekday Veh Trip Ends[1]	Trip Rate Adjustment	Avg Weekday Vehicle Trips
Industrial	4.87	50%	2.44
Commercial	37.01	33%	12.21
Office & Other Services	10.84	50%	5.42
Institutional	23.44	33%	7.74

1. See Land Use Assumptions

Analysis of Capacity, Usage, and Costs of Existing Public Services

ARS § 9-463.05(E)(1) requires:

> *"A description of the existing necessary public services in the service area and the costs to upgrade, update, improve, expand, correct or replace those necessary public services to meet existing needs and usage and stricter safety, efficiency, environmental or regulatory standards, which shall be prepared by qualified professionals licensed in this state, as applicable."*

ARS § 9-463.05(E)(2) requires:

> *"An analysis of the total capacity, the level of current usage and commitments for usage of capacity of the existing necessary public services, which shall be prepared by qualified professionals licensed in this state, as applicable."*

Fire Facilities – Plan-Based

Existing Level of Service

Tempe currently provides 65,844 square feet of fire facilities to existing development. To allocate the proportionate share of demand for fire facilities to residential and nonresidential development, this analysis uses proportionate share factors shown in Figure F1. Tempe's current level of service for residential development is 0.2357 square feet per person (65,844 square feet X 72 percent residential share / 201,100 persons). The nonresidential level of service is 0.0324 square feet per vehicle trip (65,844 square feet X 28 percent nonresidential share / 568,923 trips).

Figure F3: Existing Level of Service

Description	Square Feet
Fire Station #1	10,597
Fire Station #2	6,385
Fire Station #3	8,300
Fire Station #4	5,000
Fire Station #5	7,200
Fire Station #6	17,662
Fire Station #7	10,700
Total	65,844

Level-of-Service (LOS) Standards	
Existing Square Feet	65,844
Residential	
Residential Share	72%
2024 Population	201,100
Square Feet per Person	0.2357
Nonresidential	
Nonresidential Share	28%
2024 Vehicle Trips	568,923
Square Feet per Vehicle Trip	0.0324

Source: Tempe Fire Department

Cost Factors

Tempe will use development fees for future development's proportionate share of debt related to Fire Station #7 and construction costs related to Fire Station #8.

Fire Station #7 includes 10,700 square feet, and Tempe used a combination of bond debt, development fees, and cash to fund construction equal to $6,239,045. The analysis includes unpaid bond debt equal to $3,038,933 and the associated floor area of 5,212 square feet.

Figure F4: Fire Station #7 Debt

Description	Square Feet	Cost	Cost per Sq Ft
Fire Station #7 (paid)	5,488	$3,200,111	$583
Fire Station #7 (unpaid)	**5,212**	**$3,038,933**	**$583**
Fire Station #7 (total)	10,700	$6,239,045	$583

Tempe plans to retire debt related to Fire Station #7 and to construct Fire Station #8 within the next 10 years. The unpaid portion of Fire Station #7 equals $3,038,933 and includes 5,212 square feet. Plans for Fire Station #8 include 30,000 square feet at a cost of $30,002,000. The analysis uses the weighted average cost based on the unpaid portion of Fire Station #7 and the planned cost of Fire Station #8. For fire facilities, the weighted average cost is $938 per square foot ($33,040,933 cost / 35,212 square feet).

Figure F5: Cost Factors

Description	Cost	Square Feet	Cost per Sq Ft
Fire Station #7 (unpaid)	$3,038,933	5,212	$583
Fire Station #8	$30,002,000	30,000	$1,000
Total	$33,040,933	35,212	$938

Source: Tempe Fire Department

Tempe will use development fees for future development's proportionate share of debt related to Fire Station #7 and construction costs related to Fire Station #8. The planned level of service of 95,844 square feet includes 65,844 square feet of existing facilities and 30,000 square feet of planned facilities (Fire Station #8). To allocate the proportionate share of demand for fire facilities to residential and nonresidential development, this analysis uses proportionate share factors shown in Figure F1. Tempe's planned level of service for residential development is 0.2998 square feet per person (95,844 square feet X 72 percent residential share / 230,200 persons). The planned nonresidential level of service is 0.0398 square feet per vehicle trip (95,844 square feet X 28 percent nonresidential share / 674,351 vehicle trips).

The analysis uses the weighted average cost of $938 per square foot ($33,040,933 cost / 35,212 square feet) based on the unpaid portion of Fire Station #7 and the planned cost of Fire Station #8. For fire facilities, the cost is $281.29 per person (0.2998 square feet per person X $938 per square foot) and $37.34 per vehicle trip (0.0398 square feet per vehicle trip X $938 per square foot).

Figure F6: Planned Level of Service

Cost Factors	
Cost per Square Foot	$938

Level-of-Service (LOS) Standards	
Existing Square Feet	65,844
Fire Station #7 (Unpaid)	(5,212)
Subtotal (Existing)	60,632
Planned Square Feet	30,000
Fire Station #7 (Unpaid)	5,212
Subtotal (Future)	35,212
Total Square Feet	95,844
Residential	
Residential Share	72%
2034 Population	230,200
Square Feet per Person	0.2998
Cost per Person	$281.29
Nonresidential	
Nonresidential Share	28%
2034 Vehicle Trips	674,351
Square Feet per Vehicle Trip	0.0398
Cost per Vehicle Trip	$37.34

Source: Tempe Fire Department

Fire Station #7 Debt Credit

The outstanding debt for Fire Station #7 totals $3,038,933. The analysis includes a credit for future principal payments on outstanding debt. A credit is necessary since future development will pay the development fee and may also contribute to future principal payments. A credit is not necessary for interest payments because development fee calculations exclude interest costs.

Annual principal payments are split between residential and nonresidential development using the proportionate share factors shown in Figure F1, and then divided by the residential or nonresidential service units. For example, the 2025 principal payment of $144,925 is multiplied by the 72 percent residential share, and then divided by the projected population of 204,100 persons for a payment of $0.51 per person. To account for the time value of money, annual payments per person are discounted using a net present value formula based on the bond interest rate of 3.4 percent. The total net present value of future principal payments is $7.35 per person and $0.98 per vehicle trip. This amount is subtracted from the gross cost per demand unit to derive a net capital cost per demand unit.

Figure F7: Fire Station #7 Debt Credit

Year	Principal[1]	Residential Share (72%)	Population	Per Person	Nonresidential Share (28%)	Vehicle Trips	Per Vehicle Trip
2024	$138,003	$99,362	201,100	$0.49	$38,641	568,923	$0.07
2025	$144,925	$104,346	204,100	$0.51	$40,579	581,668	$0.07
2026	$152,457	$109,769	206,400	$0.53	$42,688	594,414	$0.07
2027	$158,920	$114,423	208,500	$0.55	$44,498	607,159	$0.07
2028	$166,453	$119,846	211,700	$0.57	$46,607	619,905	$0.08
2029	$169,786	$122,246	215,200	$0.57	$47,540	632,650	$0.08
2030	$176,249	$126,900	219,200	$0.58	$49,350	645,395	$0.08
2031	$183,171	$131,883	221,100	$0.60	$51,288	652,634	$0.08
2032	$196,708	$141,630	224,600	$0.63	$55,078	659,873	$0.08
2033	$204,241	$147,054	227,600	$0.65	$57,188	667,112	$0.09
2034	$213,426	$153,667	230,200	$0.67	$59,759	674,351	$0.09
2035	$225,159	$162,114	233,000	$0.70	$63,045	681,590	$0.09
2036	$234,955	$169,168	235,200	$0.72	$65,787	688,829	$0.10
2037	$248,340	$178,805	237,100	$0.75	$69,535	696,068	$0.10
2038	$240,661	$173,276	239,400	$0.72	$67,385	703,307	$0.10
2039	$165,931	$119,470	243,300	$0.49	$46,461	710,545	$0.07
2040	$19,547	$14,073	246,200	$0.06	$5,473	717,784	$0.01
Total	$3,038,933	$2,188,032		$9.78	$850,901		$1.30

Discount Rate	3.4%
Net Present Value	$7.35

Discount Rate	3.4%
Net Present Value	$0.98

1. Fire Station #7 share of 2017, 2018, 2019, and 2020 General Obligation Bonds

Fire Station #8 Debt Credit

Tempe plans to issue debt for a portion of Fire Station #8 equal to $22,433,680. TischlerBise estimates equal annual principal payments on a bond issued in 2025. A credit is necessary since future development will pay the development fee and may also contribute to future principal payments. A credit is not necessary for interest payments because development fee calculations exclude interest costs.

Annual principal payments are split between residential and nonresidential development using the proportionate share factors shown in Figure F1, and then divided by the residential or nonresidential service units. For example, the 2025 total principal payment of $1,122,184 is multiplied by the 72 percent residential share, and then divided by the projected population of 204,100 persons for a payment of $3.96 per person. To account for the time value of money, annual payments per person are discounted using a net present value formula based on the anticipated bond interest rate of 4.0 percent. The total net present value of future principal payments is $46.80 per person and $6.23 per vehicle trip. This amount is subtracted from the gross cost per demand unit to derive a net capital cost per demand unit.

Figure F8: Fire Station #8 Debt Credit

Year	Principal[1]
2024	$0
2025	$1,122,184
2026	$1,122,184
2027	$1,122,184
2028	$1,122,184
2029	$1,122,184
2030	$1,122,184
2031	$1,122,184
2032	$1,122,184
2033	$1,122,184
2034	$1,122,184
2035	$1,122,184
2036	$1,122,184
2037	$1,122,184
2038	$1,122,184
2039	$1,122,184
2040	$1,122,184
2041	$1,122,184
2042	$1,122,184
2043	$1,122,184
2044	$1,122,184
Total	$22,443,680

Residential Share (72%)	Population	Per Person
$0	201,100	$0.00
$807,972	204,100	$3.96
$807,972	206,400	$3.91
$807,972	208,500	$3.88
$807,972	211,700	$3.82
$807,972	215,200	$3.75
$807,972	219,200	$3.69
$807,972	221,100	$3.65
$807,972	224,600	$3.60
$807,972	227,600	$3.55
$807,972	230,200	$3.51
$807,972	233,000	$3.47
$807,972	235,200	$3.44
$807,972	237,100	$3.41
$807,972	239,400	$3.37
$807,972	243,300	$3.32
$807,972	246,200	$3.28
$807,972	247,700	$3.26
$807,972	248,900	$3.25
$807,972	249,900	$3.23
$807,972	250,600	$3.22
$16,159,450		$70.57

Discount Rate	4.0%
Net Present Value	$46.80

Nonresidential Share (28%)	Vehicle Trips	Per Vehicle Trip
$0	568,923	$0.00
$314,212	581,668	$0.54
$314,212	594,414	$0.53
$314,212	607,159	$0.52
$314,212	619,905	$0.51
$314,212	632,650	$0.50
$314,212	645,395	$0.49
$314,212	652,634	$0.48
$314,212	659,873	$0.48
$314,212	667,112	$0.47
$314,212	674,351	$0.47
$314,212	681,590	$0.46
$314,212	688,829	$0.46
$314,212	696,068	$0.45
$314,212	703,307	$0.45
$314,212	710,545	$0.44
$314,212	717,784	$0.44
$314,212	722,089	$0.44
$314,212	726,393	$0.43
$314,212	730,697	$0.43
$314,212	735,001	$0.43
$6,284,230		$9.39

Discount Rate	4.0%
Net Present Value	$6.23

1. Fire Station #8 share of 2025 General Obligation Bonds

Fire Apparatus – Incremental Expansion

Tempe currently serves existing development with 35 fire apparatus, and Tempe plans to acquire additional fire apparatus to serve future development. The replacement cost of the existing fleet is $35,250,000. The analysis uses the weighted average cost of $1,007,143 per unit ($35,250,000 / 35 fire apparatus) as a proxy for future growth-related fire apparatus costs.

Figure F9: Existing Fire Apparatus

Description	Units	Unit Cost	Total Cost
Engines	8	$1,250,000	$10,000,000
Aerial Ladder	2	$2,200,000	$4,400,000
Hazardous Materials Truck	2	$1,400,000	$2,800,000
Heavy Rescue	1	$2,500,000	$2,500,000
Ladder Tender	2	$1,250,000	$2,500,000
Light & Air Support Truck	1	$1,000,000	$1,000,000
Technical Rescue Support	1	$1,100,000	$1,100,000
Command Vehicle	2	$150,000	$300,000
Low Acuity Unit	1	$225,000	$225,000
Fire Medical Rescue Boat	1	$250,000	$250,000
Ambulances	9	$450,000	$4,050,000
Rotational Pumper	3	$1,250,000	$3,750,000
Rotational Ladder	1	$2,200,000	$2,200,000
Rotational LA/MR/BC	1	$175,000	$175,000
Total	35	$1,007,143	$35,250,000

Source: Tempe Fire Department

To allocate the proportionate share of demand for fire apparatus to residential and nonresidential development, this analysis uses proportionate share factors shown in Figure F1. Tempe's existing level of service for residential development is 0.00013 units per person (35 units X 72 percent residential share / 201,100 persons). The nonresidential level of service is 0.00002 units per vehicle trip (35 units X 28 percent nonresidential share / 568,923 vehicle trips).

The weighted average cost of Tempe's existing fire apparatus is $1,007,143 per unit ($35,250,000 total cost / 35 units), and the analysis uses this cost as a proxy for future growth-related fire apparatus costs. Tempe may use development fees to expand its fire apparatus fleet. For fire apparatus, the cost is $126.21 per person (0.00013 units per person X $1,007,143 per unit) and $17.35 per vehicle trip (0.00002 units per vehicle trip X $1,007,143 per unit).

Figure F10: Existing Level of Service

Cost Factors	
Weighted Average per Unit	$1,007,143

Level-of-Service (LOS) Standards	
Existing Units	35
Residential	
Residential Share	72%
2024 Population	201,100
Units per Person	0.00013
Cost per Person	$126.21
Nonresidential	
Nonresidential Share	28%
2024 Vehicle Trips	568,923
Units per Vehicle Trip	0.00002
Cost per Vehicle Trip	$17.35

Source: Tempe Fire Department

Development Fee Report – Plan-Based

The cost to prepare the Fire Facilities IIP and related development fee report totals $29,000. Tempe plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of future development from the *Land Use Assumptions* document, the cost is $1.48 per person and $0.13 per vehicle trip.

Figure F11: Development Fee Report

Necessary Public Service	Cost	Proportionate Share		Service Unit	5-Year Change	Cost per Service Unit
Fire	$29,000	Residential	72%	Population	14,100	$1.48
		Nonresidential	28%	Vehicle Trips	63,727	$0.13
Parks and Recreational	$29,000	Residential	88%	Population	14,100	$1.81
		Nonresidential	12%	Jobs	19,598	$0.18
Police	$29,000	Residential	53%	Population	14,100	$1.09
		Nonresidential	47%	Vehicle Trips	63,727	$0.21
Street	$32,110	All Development	100%	Person Trips	147,102	$0.22
Total	$119,110					

PROJECTED DEMAND FOR SERVICES AND COSTS

ARS § 9-463.05(E)(5) requires:

> *"The total number of projected service units necessitated by and attributable to new development in the service area based on the approved land use assumptions and calculated pursuant to generally accepted engineering and planning criteria."*

ARS § 9-463.05(E)(6) requires:

> *"The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years."*

As shown in the *Land Use Assumptions* document, projected development during the next 10 years includes population growth of 29,100 persons and nonresidential vehicle trip growth of 105,428 vehicle trips. To reach the planned level of service, Tempe will construct 30,000 square feet of fire facilities over the next 10 years. To maintain the existing level of service, Tempe needs to expand the apparatus fleet by approximately 6.0 units over the next 10 years. The following pages include a more detailed projection of demand for services and costs for the Fire Facilities IIP.

Fire Facilities – Plan-Based

Tempe will use development fees to fund future development's proportionate share of costs associated with the existing Fire Station #7 and the planned Fire Station #8 during the next 10 years. Based on a projected population increase of 29,100 persons, future residential development demands approximately 8,723 square feet of fire facilities (29,100 additional persons X 0.2998 square feet per person). With projected nonresidential trip growth of 105,428 vehicle trips, future nonresidential development demands approximately 4,196 square feet of fire facilities (105,428 additional trips X 0.0398 square feet per vehicle trip). Future development demands approximately 12,919 square feet of fire facilities at a cost of $12,122,420 (12,919.0 square feet X $938 per square foot).

The total cost of fire facilities equals $33,040,933. This includes the unpaid share of debt for Fire Station #7 equal to $3,038,933 and the planned cost of Fire Station #8 equal to $30,002,000. Tempe will fund existing development's share of $20,918,513 ($33,040,933 total cost - $12,122,420 growth-related cost) with non-development fee revenue.

Figure F12: Projected Demand

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Fire Facilities	0.2998 Square Feet	per Person	$938
	0.0398 Square Feet	per Vehicle Trip	

Demand for Fire Facilities					
Year	Population	Vehicle Trips	Square Feet		
			Residential	Nonresidential	Total
2024	201,100	568,923	60,284.3	22,640.7	82,925.0
2025	204,100	581,668	61,183.6	23,148.0	84,331.6
2026	206,400	594,414	61,873.1	23,655.2	85,528.3
2027	208,500	607,159	62,502.6	24,162.4	86,665.0
2028	211,700	619,905	63,461.9	24,669.6	88,131.5
2029	215,200	632,650	64,511.1	25,176.8	89,687.9
2030	219,200	645,395	65,710.2	25,684.0	91,394.2
2031	221,100	652,634	66,279.7	25,972.1	92,251.8
2032	224,600	659,873	67,329.0	26,260.2	93,589.1
2033	227,600	667,112	68,228.3	26,548.2	94,776.5
2034	230,200	674,351	69,007.7	26,836.3	95,844.0
Increase	29,100	105,428	8,723.4	4,195.6	12,919.0
Growth-Related Expenditures			$8,185,528	$3,936,892	$12,122,420
Non-Growth Expenditures			$15,603,944	$5,314,570	$20,918,513
Total Expenditures			$23,789,472	$9,251,461	$33,040,933

Fire Apparatus – Incremental Expansion

Tempe plans to maintain its level of service for fire apparatus over the next 10 years. Based on a projected population increase of 29,100 persons, future residential development demands approximately 3.6 fire apparatus (29,100 persons X 0.00013 units per person). With projected nonresidential vehicle trip growth of 105,428 vehicle trips, future nonresidential development demands approximately 1.8 fire apparatus (105,428 vehicle trips X 0.00002 units per trip). Future development demands approximately 5.5 fire apparatus at a cost of $5,501,610 (5.5 units X $1,007,143 per unit). Tempe may use development fees to expand its fire apparatus fleet.

Figure F13: Projected Demand

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Fire Apparatus	0.00013 Units	per Person	$1,007,143
	0.00002 Units	per Vehicle Trip	

Demand for Fire Apparatus					
Year	Population	Vehicle Trips	Units		
			Residential	Nonresidential	Total
2024	201,100	568,923	25.2	9.8	35.0
2025	204,100	581,668	25.6	10.0	35.6
2026	206,400	594,414	25.9	10.2	36.1
2027	208,500	607,159	26.1	10.5	36.6
2028	211,700	619,905	26.5	10.7	37.2
2029	215,200	632,650	27.0	10.9	37.9
2030	219,200	645,395	27.5	11.1	38.6
2031	221,100	652,634	27.7	11.2	38.9
2032	224,600	659,873	28.1	11.4	39.5
2033	227,600	667,112	28.5	11.5	40.0
2034	230,200	674,351	28.8	11.6	40.5
Increase	29,100	105,428	3.6	1.8	5.5
Growth-Related Expenditures			$3,672,591	$1,829,020	$5,501,610

FIRE FACILITIES DEVELOPMENT FEES

Revenue Credit/Offset

A revenue credit/offset is not necessary for development fees, because Tempe's construction transaction privilege tax rate equals the amount of the transaction privilege tax rate imposed on the majority of other transaction privilege tax classifications. Appendix A contains the forecast of revenues required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)).

Fire Facilities Development Fees

Figure F14 includes infrastructure components and cost factors for fire facilities development fees. The cost per service unit is $354.83 per person and $47.61 per trip.

Fire facilities development fees for residential development are assessed per housing unit, based on unit size, and vary proportionately according to the number of persons per housing unit. For a residential unit with 1,200 square feet, the fee of $589 is calculated using a cost of $354.83 per person multiplied by 1.66 persons per housing unit.

Fire facilities development fees for nonresidential development are assessed per 1,000 square feet and vary proportionately according to the number of vehicle trips. For industrial development, the fee of $116 per 1,000 square feet is calculated using a cost of $47.61 per vehicle trip multiplied by 2.44 vehicle trips per 1,000 square feet.

Figure F14: Fire Facilities Development Fees

Fee Component	Cost per Person	Cost per Trip
Fire Facilities	$281.29	$37.34
Fire Apparatus	$126.21	$17.35
Fire Station #7 Debt Credit	($7.35)	($0.98)
Fire Station #8 Debt Credit	($46.80)	($6.23)
Development Fee Report	$1.48	$0.13
Total	$354.83	$47.61

Residential Fees per Unit				
Unit Size	Persons per Housing Unit[1]	Proposed Fees	Current Fees	Difference
900 or less	1.12	$397	$196	$201
901 to 1,400	1.66	$589	$323	$266
1,401 to 1,900	2.04	$724	$414	$310
1,901 or more	2.32	$823	$481	$342

Nonresidential Fees per 1,000 Square Feet				
Development Type	AWVT per 1,000 Sq Ft[1]	Proposed Fees	Current Fees	Difference
Industrial	2.44	$116	$79	$37
Commercial	12.21	$581	$397	$184
Office & Other Services	5.42	$258	$155	$103
Institutional	7.74	$369	$205	$164

1. See Land Use Assumptions

Fire Facilities Development Fee Revenue

Appendix A contains the forecast of revenues required by Arizona's enabling legislation (ARS § 9-463.05(E)(7)). In accordance with state law, this report includes an IIP for fire facilities needed to accommodate future development. Projected fee revenue shown in Figure F15 is based on the development projections in the *Land Use Assumptions* document and the updated fire facilities development fees. If development occurs at a more rapid rate than projected, the demand for infrastructure will increase and development fee revenue will increase at a corresponding rate. If development occurs at a slower rate than projected, the demand for infrastructure will also decrease, along with development fee revenue. Projected development fee revenue equals $14,496,304 and projected expenditures equal $36,235,645. Since Tempe will assess residential development fees based on unit size, and the analysis projects residential development fee revenue based on a residential unit with 1,200 square feet (average size residential unit), actual development fee revenue will vary based on the actual mix of future residential units. Existing development's share of costs related to fire facilities will be funded with revenues other than development fees.

Figure F15: Fire Facilities Development Fee Revenue

Fee Component	Growth Share	Existing Share	Total
Fire Facilities	$12,122,420	$20,918,513	$33,040,933
Fire Apparatus	$5,501,610	$0	$5,501,610
Fire Station #7 Debt Credit	($317,204)	$0	($317,204)
Fire Station #8 Debt Credit	($2,018,695)	$0	($2,018,695)
Development Fee Report	$29,000	$0	$29,000
Total	$15,317,132	$20,918,513	$36,235,645

		Residential $589 per unit	Industrial $116 per 1,000 sq ft	Commercial $581 per 1,000 sq ft	Office & Other $258 per 1,000 sq ft	Institutional $369 per 1,000 sq ft
Year		Hsg Unit	KSF	KSF	KSF	KSF
Base	2024	90,860	24,421	13,543	28,623	24,418
Year 1	2025	92,573	24,745	13,681	29,310	25,264
Year 2	2026	93,898	25,068	13,819	29,997	26,111
Year 3	2027	95,113	25,391	13,957	30,684	26,957
Year 4	2028	96,937	25,715	14,095	31,371	27,804
Year 5	2029	98,927	26,038	14,233	32,058	28,650
Year 6	2030	101,194	26,361	14,371	32,745	29,497
Year 7	2031	102,171	26,417	14,483	32,966	30,083
Year 8	2032	104,036	26,473	14,595	33,188	30,669
Year 9	2033	105,624	26,528	14,707	33,410	31,255
Year 10	2034	106,989	26,584	14,819	33,632	31,842
10-Year Increase		16,130	2,162	1,275	5,009	7,424
Projected Revenue		$9,480,845	$251,040	$740,463	$1,291,447	$2,732,510

Projected Fee Revenue	$14,496,304
Total Expenditures	$36,235,645

PARKS AND RECREATIONAL FACILITIES IIP

ARS § 9-463.05 (T)(7)(g) defines the facilities and assets that can be included in the Parks and Recreational Facilities IIP:

> *"Neighborhood parks and recreational facilities on real property up to thirty acres in area, or parks and recreational facilities larger than thirty acres if the facilities provide a direct benefit to the development. Park and recreational facilities do not include vehicles, equipment or that portion of any facility that is used for amusement parks, aquariums, aquatic centers, auditoriums, arenas, arts and cultural facilities, bandstand and orchestra facilities, bathhouses, boathouses, clubhouses, community centers greater than three thousand square feet in floor area, environmental education centers, equestrian facilities, golf course facilities, greenhouses, lakes, museums, theme parks, water reclamation or riparian areas, wetlands, zoo facilities or similar recreational facilities, but may include swimming pools."*

The Parks and Recreational Facilities IIP includes components for park amenities, multi-use paths, and the cost of preparing the Parks and Recreational Facilities IIP and related Development Fee Report. The incremental expansion methodology is used for park amenities and multi-use paths. The plan-based methodology is used for the Development Fee Report.

SERVICE AREA

Tempe provides a uniform level of service within the city limits; therefore, there is a single service area for the Parks and Recreational Facilities IIP.

PROPORTIONATE SHARE

ARS § 9-463.05 (B)(3) states that the development fee shall not exceed a proportionate share of the cost of necessary public services needed to accommodate future development. The Parks and Recreational Facilities IIP and development fees allocate the cost of necessary public services between residential and nonresidential development based on functional population. The Arizona Office of Economic Opportunity estimates Tempe's 2021 population equal to 181,548 persons. Based on 2021 estimates from the U.S. Census Bureau's OnTheMap web application, 213,627 inflow commuters traveled to Tempe for work in 2021. The proportionate share is based on cumulative impact hours to parks and recreational facilities of 4,380 hours per year per resident and 500 hours per year per inflow commuter. For parks and recreational facilities, residential development generates 88 percent of demand and nonresidential development generates the remaining 12 percent of demand.

Figure PR1: Proportionate Share

Development Type	Service Unit	Impact Hours per Year	Cumulative Impact Hours per Year	Proportionate Share
Residential	181,548 residents[1]	4,380	795,180,240	88%
Nonresidential	213,627 inflow commuters[2]	500	106,813,500	12%
Total			901,993,740	100%

1. Arizona Office of Economic Opportunity, 2021

2. U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics, Version 6.23.4, 2021

Residential Impact: 12 hours per day X 365 days per year

Nonresidential Impact: 2 hours per day X 5 days per week X 50 weeks per year

Ratio of Service Unit to Development Unit

ARS § 9-463.05(E)(4) requires:

> *"A table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of necessary public services or facility expansions and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial and industrial."*

Figure PR2 displays the demand indicators for residential and nonresidential land uses. For residential development, the table displays the number of persons per housing unit by unit size. For nonresidential development, the table displays the number of employees per thousand square feet of floor area.

Figure PR2: Ratio of Service Unit to Development Unit

Residential Development per Unit	
Unit Size	Persons per Housing Unit[1]
900 or less	1.12
901 to 1,400	1.66
1,401 to 1,900	2.04
1,901 or more	2.32

Nonresidential Development per 1,000 Sq Ft	
Development Type	Jobs per 1,000 Sq Ft[1]
Industrial	1.57
Commercial	2.12
Office & Other Services	3.26
Institutional	1.04

1. See Land Use Assumptions

Analysis of Capacity, Usage, and Costs of Existing Public Services

ARS § 9-463.05(E)(1) requires:

> *"A description of the existing necessary public services in the service area and the costs to upgrade, update, improve, expand, correct or replace those necessary public services to meet existing needs and usage and stricter safety, efficiency, environmental or regulatory standards, which shall be prepared by qualified professionals licensed in this state, as applicable."*

ARS § 9-463.05(E)(2) requires:

> *"An analysis of the total capacity, the level of current usage and commitments for usage of capacity of the existing necessary public services, which shall be prepared by qualified professionals licensed in this state, as applicable."*

Park Amenities – Incremental Expansion

Tempe currently provides 3,727.5 park amenities in its existing parks and plans to construct additional park amenities to serve future development. Based on costs provided by Tempe's Parks and Recreation Department, the total cost of Tempe's existing park amenities is $237,581,250. The analysis uses the weighted average cost of $63,737 per unit ($237,581,250 / 3,727.5 park amenities) as a proxy for future growth-related park amenities costs.

Figure PR3: Existing Inventory

Description	Units	Unit Cost	Total Cost
Baseball Fields w/Lights	25.0	$1,500,000	$37,500,000
Basketball Courts w/Lights	41.5	$350,000	$14,525,000
Batting cages	10.0	$7,500	$75,000
BMX/Bike Track	1.0	$1,500,000	$1,500,000
Bocce Ball	1.0	$43,750	$43,750
Climbing Wall Feature	2.0	$10,000	$20,000
Community Garden	3.0	$75,000	$225,000
Concessions	3.0	$300,000	$900,000
Disc Golf	1.0	$75,000	$75,000
Dog Park	6.0	$350,000	$2,100,000
Handball/Raquetball	24.0	$68,750	$1,650,000
Horseshoes	16.0	$6,250	$100,000
Marked Parking Spots	3,263.0	$10,000	$32,630,000
Parcourse/Fitness Stations	14.0	$125,000	$1,750,000
Pickleball (outdoor)	13.0	$350,000	$4,550,000
Picnic/Ramada Facilities (large)	39.0	$93,750	$3,656,250
Picnic/Ramada Facilities (small)	53.0	$56,250	$2,981,250
Playground	44.0	$900,000	$39,600,000
Restrooms	43.0	$500,000	$21,500,000
Skate Park	4.0	$1,500,000	$6,000,000
Soccer Fields w/Lights	23.0	$1,200,000	$27,600,000
Soccer Fields w/o Lights	18.0	$500,000	$9,000,000
Splash Play	4.0	$2,000,000	$8,000,000
Tennis Courts	51.0	$350,000	$17,850,000
Volleyball (sand)	25.0	$150,000	$3,750,000
Total	3,727.5	$63,737	$237,581,250

Source: Tempe Parks and Recreation Department

To allocate the proportionate share of demand for park amenities to residential and nonresidential development, this analysis uses the proportionate share factors shown in Figure PR1. Tempe's existing level of service for residential development is 0.01634 units per person (3,727.5 units X 88 percent residential share / 201,100 persons). For nonresidential development, the existing level of service is 0.00238 units per job (3,727.5 units X 12 percent nonresidential share / 185,755 jobs).

The weighted average cost of Tempe's existing park amenities is $63,737 per unit ($237,581,250 / 3,727.5 park amenities), and the analysis uses this cost as a proxy for future growth-related park amenities costs. Tempe may use development fees to construct additional park amenities in existing or future parks. For park amenities, the cost is $1,041.51 per person (0.01634 units per person X $63,737 per unit) and $151.46 per job (0.00238 units per job X $63,737 per unit).

Figure PR4: Existing Level of Service

Cost Factors	
Weighted Average per Unit	$63,737

Level-of-Service (LOS) Standards	
Existing Units	3,727.5
Residential	
Residential Share	88%
2024 Population	201,100
Units per Person	0.01634
Cost per Person	$1,041.51
Nonresidential	
Nonresidential Share	12%
2024 Jobs	185,755
Units per Job	0.00238
Cost per Job	$151.46

Source: Tempe Parks and Recreation Department

Multi-Use Paths – Incremental Expansion

Tempe currently provides 42.0 miles of multi-use paths in existing parks and plans to construct additional multi-use paths to serve future development. To allocate the proportionate share of demand for multi-use paths to residential and nonresidential development, this analysis uses proportionate share factors shown in Figure PR1. Tempe's existing level of service for residential development is 0.00018 miles per person (42.0 miles X 88 percent residential share / 201,100 persons). The nonresidential level of service is 0.00003 miles job (42.0 miles X 12 percent nonresidential share / 185,755 jobs).

Tempe's Parks and Recreation Department provided a construction cost of $2,670,000 per mile, and the analysis uses this cost as a proxy for future growth-related multi-use path costs to serve future development. For multi-use paths, the cost is $491.60 per person (0.00018 miles per person X $2,670,000 per mile) and $71.49 per job (0.00003 miles per job X $2,670,000 per mile).

Figure PR5: Existing Level of Service

Cost Factors	
Cost per Mile	$2,670,000

Level-of-Service (LOS) Standards	
Existing Multi-Use Paths (miles)	42.0
Residential	
Residential Share	88%
2024 Population	201,100
Miles per Person	0.00018
Cost per Person	$491.60
Nonresidential	
Nonresidential Share	12%
2024 Jobs	185,755
Miles per Job	0.00003
Cost per Job	$71.49

Source: Tempe Parks and Recreation Department

Development Fee Report – Plan-Based

The cost to prepare the Parks and Recreational Facilities IIP and development fees totals $29,000. Tempe plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of new development from the *Land Use Assumptions* document, the cost is $1.81 per person and $0.18 per job.

Figure PR6: Development Fee Report

Necessary Public Service	Cost	Proportionate Share		Service Unit	5-Year Change	Cost per Service Unit
Fire	$29,000	Residential	72%	Population	14,100	$1.48
		Nonresidential	28%	Vehicle Trips	63,727	$0.13
Parks and Recreational	$29,000	Residential	88%	Population	14,100	$1.81
		Nonresidential	12%	Jobs	19,598	$0.18
Police	$29,000	Residential	53%	Population	14,100	$1.09
		Nonresidential	47%	Vehicle Trips	63,727	$0.21
Street	$32,110	All Development	100%	Person Trips	147,102	$0.22
Total	$119,110					

Projected Demand for Services and Costs

ARS § 9-463.05(E)(5) requires:

> *"The total number of projected service units necessitated by and attributable to new development in the service area based on the approved land use assumptions and calculated pursuant to generally accepted engineering and planning criteria."*

ARS § 9-463.05(E)(6) requires:

> *"The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years."*

As shown in the *Land Use Assumptions* document, projected development during the next 10 years includes population growth of 29,100 persons and employment growth includes 30,148 jobs. To maintain the existing levels of service, Tempe needs to construct approximately 547 park amenities and approximately 6.2 miles of multi-use paths over the next 10 years. The following pages include a more detailed projection of demand for services and costs for the Parks and Recreational Facilities IIP.

Park Amenities – Incremental Expansion

Tempe plans to maintain its existing level of service for park amenities over the next 10 years. Based on a projected population increase of 29,100 persons, future residential development demands an additional 475.5 park amenities (29,100 additional persons X 0.01634 units per person). With projected employment growth of 30,148 jobs, future nonresidential development demands an additional 71.6 park amenities (30,148 additional jobs X 0.00238 units per job). Future development demands 547.2 additional park amenities at a cost of $34,874,018 (547.2 units X $63,737 per unit). Tempe may use development fees to construct additional park amenities.

Figure PR7: Projected Demand

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Park Amenities	0.01634 Units	per Person	$63,737
	0.00238 Units	per Job	

Demand for Park Amenities					
Year	Population	Jobs	Units		
			Residential	Nonresidential	Total
2024	201,100	185,755	3,286.1	441.4	3,727.5
2025	204,100	189,675	3,335.1	450.7	3,785.8
2026	206,400	193,595	3,372.7	460.0	3,832.7
2027	208,500	197,514	3,407.0	469.4	3,876.4
2028	211,700	201,434	3,459.3	478.7	3,938.0
2029	215,200	205,353	3,516.5	488.0	4,004.5
2030	219,200	209,273	3,581.9	497.3	4,079.1
2031	221,100	210,931	3,612.9	501.2	4,114.1
2032	224,600	212,588	3,670.1	505.2	4,175.3
2033	227,600	214,246	3,719.1	509.1	4,228.2
2034	230,200	215,903	3,761.6	513.0	4,274.7
10-Yr Increase	29,100	30,148	475.5	71.6	547.2
Growth-Related Expenditures			$30,307,851	$4,566,168	$34,874,018

Multi-Use Paths – Incremental Expansion

Tempe plans to maintain its level of service for multi-use paths over the next 10 years. Based on a projected population increase of 29,100 persons, future residential development demands approximately 5.4 miles of multi-use paths (29,100 additional persons X 0.00018 miles per person). With projected employment growth of 30,148 jobs, future nonresidential development demands approximately 0.8 miles of multi-use paths (30,148 additional jobs X 0.00003 miles per job). Future development demands approximately 6.2 miles of multi-use paths at a cost of $16,460,779 (6.2 miles X $2,670,000 per mile). Tempe may use development fees to construct additional multi-use paths.

Figure PR8: Projected Demand

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Multi-Use Paths	0.00018 Miles	per Person	$2,670,000
	0.00003 Miles	per Job	

Demand for Multi-Use Paths					
Year	Population	Jobs	Miles		
			Residential	Nonresidential	Total
2023	201,100	185,755	37.0	5.0	42.0
2024	204,100	189,675	37.6	5.1	42.7
2025	206,400	193,595	38.0	5.2	43.2
2026	208,500	197,514	38.4	5.3	43.7
2027	211,700	201,434	39.0	5.4	44.4
2028	215,200	205,353	39.6	5.5	45.1
2029	219,200	209,273	40.4	5.6	46.0
2030	221,100	210,931	40.7	5.6	46.4
2031	224,600	212,588	41.4	5.7	47.0
2032	227,600	214,246	41.9	5.7	47.6
2033	230,200	215,903	42.4	5.8	48.2
10-Yr Increase	29,100	30,148	5.4	0.8	6.2
Growth-Related Expenditures			$14,305,516	$2,155,263	$16,460,779

PARKS AND RECREATIONAL FACILITIES DEVELOPMENT FEES

Revenue Credit/Offset

A revenue credit/offset is not necessary for development fees, because Tempe's construction transaction privilege tax rate equals the amount of the transaction privilege tax rate imposed on the majority of other transaction privilege tax classifications. Appendix A contains the forecast of revenues required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)).

Parks and Recreational Facilities Development Fees

Figure PR9 includes infrastructure components and cost factors for parks and recreational facilities development fees. The cost per service unit is $1,534.92 per person and $223.13 per job.

Parks and recreational facilities development fees for residential development are assessed per housing unit, based on unit size, and vary proportionately according to the number of persons per housing unit. For a residential unit with 1,200 square feet, the fee of $2,548 is calculated using a cost of $1,534.92 per person multiplied by a demand unit of 1.66 persons per housing unit.

Parks and recreational facilities development fees for nonresidential development are assessed per 1,000 square feet and vary proportionately according to the number of jobs. For industrial development, the fee of $350 per 1,000 square feet is calculated using a cost of $223.13 per job multiplied by 1.57 jobs per 1,000 square feet.

Figure PR9: Parks and Recreational Facilities Development Fees

Fee Component	Cost per Person	Cost per Job
Park Amenities	$1,041.51	$151.46
Multi-Use Paths	$491.60	$71.49
Development Fee Report	$1.81	$0.18
Total	$1,534.92	$223.13

Residential Fees per Unit				
Unit Size	Persons per Housing Unit[1]	Proposed Fees	Current Fees	Difference
900 or less	1.12	$1,719	$1,141	$578
901 to 1,400	1.66	$2,548	$1,879	$669
1,401 to 1,900	2.04	$3,131	$2,405	$726
1,901 or more	2.32	$3,561	$2,797	$764

Nonresidential Fees per 1,000 Square Feet				
Development Type	Jobs per 1,000 Sq Ft[1]	Proposed Fees	Current Fees	Difference
Industrial	1.57	$350	$218	$132
Commercial	2.12	$473	$313	$160
Office & Other Services	3.26	$727	$398	$329
Institutional	1.04	$232	$124	$108

1. See Land Use Assumptions

PARKS AND RECREATIONAL FACILITIES DEVELOPMENT FEE REVENUE

Appendix A contains the forecast of revenues required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)). In accordance with state law, this report includes an IIP for parks and recreational facilities needed to accommodate new development. Projected fee revenue shown in Figure PR10 is based on the development projections in the *Land Use Assumptions* document and the updated development fees for parks and recreational facilities shown in Figure PR9. If development occurs at a more rapid rate than projected, the demand for infrastructure will increase and development fee revenue will increase at a corresponding rate. If development occurs at a slower rate than projected, the demand for infrastructure will also decrease, along with development fee revenue. Projected development fee revenue equals $47,823,254 and projected expenditures equal $51,363,797. Since Tempe will assess residential development fees based on unit size, and the analysis projects residential development fee revenue based on a residential unit with 1,200 square feet (average size residential unit), actual development fee revenue will vary based on the actual mix of future residential units.

Figure PR10: Parks and Recreational Facilities Development Fee Revenue

Fee Component	Growth Share	Existing Share	Total
Park Amenities	$34,874,018	$0	$34,874,018
Multi-Use Paths	$16,460,779	$0	$16,460,779
Development Fee Report	$29,000	$0	$29,000
Total	$51,363,797	$0	$51,363,797

Year		Residential $2,548 per unit	Industrial $350 per 1,000 sq ft	Commercial $473 per 1,000 sq ft	Office & Other $727 per 1,000 sq ft	Institutional $232 per 1,000 sq ft
		Hsg Unit	KSF	KSF	KSF	KSF
Base	2024	90,860	24,421	13,543	28,623	24,418
Year 1	2025	92,573	24,745	13,681	29,310	25,264
Year 2	2026	93,898	25,068	13,819	29,997	26,111
Year 3	2027	95,113	25,391	13,957	30,684	26,957
Year 4	2028	96,937	25,715	14,095	31,371	27,804
Year 5	2029	98,927	26,038	14,233	32,058	28,650
Year 6	2030	101,194	26,361	14,371	32,745	29,497
Year 7	2031	102,171	26,417	14,483	32,966	30,083
Year 8	2032	104,036	26,473	14,595	33,188	30,669
Year 9	2033	105,624	26,528	14,707	33,410	31,255
Year 10	2034	106,989	26,584	14,819	33,632	31,842
10-Year Increase		16,130	2,162	1,275	5,009	7,424
Projected Revenue		$41,099,240	$756,871	$603,247	$3,641,549	$1,722,347

Projected Fee Revenue	$47,823,254
Total Expenditures	$51,363,797

POLICE FACILITIES IIP

ARS § 9-463.05 (T)(7)(f) defines the eligible facilities and assets for the Police Facilities IIP:

> *"Fire and police facilities, including all appurtenances, equipment and vehicles. Fire and police facilities do not include a facility or portion of a facility that is used to replace services that were once provided elsewhere in the municipality, vehicles and equipment used to provide administrative services, helicopters or airplanes or a facility that is used for training firefighters or officers from more than one station or substation."*

The Police Facilities IIP includes components for police facilities, police vehicles, and the cost of preparing the Police Facilities IIP and related Development Fee Report. The incremental expansion methodology, based on the current level of service, is used for police facilities and police vehicles. The plan-based methodology is used for the Development Fee Report.

SERVICE AREA

Tempe's Police Department strives to provide a uniform response time within the city limits; therefore, there is a single service area for the Police Facilities IIP.

PROPORTIONATE SHARE

ARS § 9-463.05 (B)(3) states that the development fee shall not exceed a proportionate share of the cost of necessary public services needed to accommodate future development. The Police Facilities IIP and development fees will allocate the cost of police infrastructure between residential and nonresidential development using functional population. Based on 2021 U.S. Census Bureau OnTheMap data, residential development accounts for approximately 53 percent of functional population and nonresidential development accounts for the remaining 47 percent.

Figure P1: Functional Population

Demand Units in 2021					
Residential				Demand Hours/Day	Person Hours
Total Population	181,548				
Residents Not Working		101,491		20	2,029,820
Employed Residents		80,057			
Employed in Tempe			20,013	14	280,182
Employed outside Tempe			60,044	14	840,616
				Residential Subtotal	3,150,618
				Residential Share	**53%**
Nonresidential					
Non-working Residents		101,491		4	405,964
Jobs Located in Tempe		233,640			
Residents Employed in Tempe			20,013	10	200,130
Non-Resident Workers (inflow commuters)			213,627	10	2,136,270
				Nonresidential Subtotal	2,742,364
				Nonresidential Share	**47%**
				Total	5,892,982

Source: Arizona Office of Economic Opportunity (population), U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics, Version 6.23.4 (employment).

The proportionate share of costs attributable to residential development will be allocated to population and then converted to an appropriate amount by housing unit size. TischlerBise recommends using vehicle trips as the demand indicator for nonresidential demand for police services. Trip generation rates are used for nonresidential development because vehicle trips are highest for commercial development, such as a shopping center, and lowest for industrial development. Office and institutional trip rates fall between the other two categories. This ranking of trip rates is consistent with the relative demand for police services from nonresidential development.

Ratio of Service Unit to Development Unit

ARS § 9-463.05(E)(4) requires:

> *"A table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of necessary public services or facility expansions and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial and industrial."*

Figure P2 displays the demand indicators for residential and nonresidential land uses. For residential development, the table displays the number of persons per housing unit by unit size. For nonresidential development, the table displays the number of vehicle trips per thousand square feet of floor area.

Figure P2: Ratio of Service Unit to Development Unit

Residential Development per Unit	
Unit Size	Persons per Housing Unit[1]
900 or less	1.12
901 to 1,400	1.66
1,401 to 1,900	2.04
1,901 or more	2.32

Nonresidential Development per 1,000 Sq Ft			
Development Type	Avg Weekday Veh Trip Ends[1]	Trip Rate Adjustment	Avg Weekday Vehicle Trips
Industrial	4.87	50%	2.44
Commercial	37.01	33%	12.21
Office & Other Services	10.84	50%	5.42
Institutional	23.44	33%	7.74

1. See Land Use Assumptions

Analysis of Capacity, Usage, and Costs of Existing Public Services

ARS § 9-463.05(E)(1) requires:

> *"A description of the existing necessary public services in the service area and the costs to upgrade, update, improve, expand, correct or replace those necessary public services to meet existing needs and usage and stricter safety, efficiency, environmental or regulatory standards, which shall be prepared by qualified professionals licensed in this state, as applicable."*

ARS § 9-463.05(E)(2) requires:

> *"An analysis of the total capacity, the level of current usage and commitments for usage of capacity of the existing necessary public services, which shall be prepared by qualified professionals licensed in this state, as applicable."*

Police Facilities – Incremental Expansion

Tempe currently provides 158,823 square feet of police facilities to existing development. Tempe plans to construct additional police facilities to serve future development. To allocate the proportionate share of demand for police facilities to residential and nonresidential development, this analysis uses functional population outlined in Figure P1. Tempe's existing level of service for residential development is 0.4186 square feet per person (158,823 square feet X 53 percent residential share / 201,100 persons). The nonresidential level of service is 0.1312 square feet per vehicle trip (158,823 square feet X 47 percent nonresidential share / 568,923 vehicle trips).

Tempe's Finance Department provided a construction cost estimate of $1,000 per square foot for police facilities, and the analysis uses this cost as a proxy for future growth-related police facilities costs needed to serve future development. For police facilities, the cost is $418.58 per person (0.4186 square feet per person X $1,000 per square foot) and $131.21 per vehicle trip (0.1312 square feet per vehicle trip X $1,000 per square foot).

Figure P3: Existing Level of Service

Description	Square Feet
120 E 5th St (Headquarters)	49,231
1855 E Apache Blvd	80,276
8201 S Hardy Dr (South Substation)	25,716
10 W Guadalupe (Kiwanis Substation)	3,100
31 E 5th Street (City Hall Bike Unit)	500
Total	158,823

Cost Factors	
Cost per Square Foot	$1,000

Level-of-Service (LOS) Standards	
Existing Square Feet	158,823
Residential	
Residential Share	53%
2024 Population	201,100
Square Feet per Person	0.4186
Cost per Person	$418.58
Nonresidential	
Nonresidential Share	47%
2024 Vehicle Trips	568,923
Square Feet per Vehicle Trip	0.1312
Cost per Vehicle Trip	$131.21

Source: Tempe Police Department

Police Vehicles – Incremental Expansion

Tempe has 247 police vehicles with a total cost of $23,248,000, and Tempe plans to acquire additional police vehicles to serve future development. To allocate the proportionate share of demand for police vehicles to residential and nonresidential development, this analysis uses functional population outlined in Figure P1. Tempe's existing level of service for residential development is 0.0007 units per person (247 units X 53 percent residential share / 201,100 persons). The nonresidential level of service is 0.0002 units per vehicle trip (247 units X 47 percent nonresidential share / 568,923 vehicle trips).

The weighted average cost of Tempe's existing fleet of police vehicles is $94,121 per unit ($23,248,000 total cost / 247 units), and the analysis uses this cost as a proxy for future growth-related police vehicles. Tempe may use development fees to expand its police vehicle fleet. For police vehicles, the cost is $61.27 per person (0.0007 units per person X $94,121 per unit) and $19.21 per vehicle trip (0.0002 units per vehicle trip X $94,121 per unit).

Figure P4: Existing Level of Service

Description	Units	Unit Cost	Total Cost
Marked Vehicle	131	$96,000	$12,576,000
Unmarked Vehicle	116	$92,000	$10,672,000
Total	247	$94,121	$23,248,000

Cost Factors	
Weighted Average per Unit	$94,121

Level-of-Service (LOS) Standards	
Existing Units	247
Residential	
Residential Share	53%
2024 Population	201,100
Units per Person	0.0007
Cost per Person	$61.27
Nonresidential	
Nonresidential Share	47%
2024 Vehicle Trips	568,923
Units per Vehicle Trip	0.0002
Cost per Vehicle Trip	$19.21

Source: Tempe Police Department

Development Fee Report – Plan-Based

The cost to prepare the Police Facilities IIP and related Development Fee Report totals $29,000. Tempe plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of new residential and nonresidential development from the *Land Use Assumptions* document, the cost is $1.09 per person and $0.21 per vehicle trip.

Figure P5: Development Fee Report

Necessary Public Service	Cost	Proportionate Share		Service Unit	5-Year Change	Cost per Service Unit
Fire	$29,000	Residential	72%	Population	14,100	$1.48
		Nonresidential	28%	Vehicle Trips	63,727	$0.13
Parks and Recreational	$29,000	Residential	88%	Population	14,100	$1.81
		Nonresidential	12%	Jobs	19,598	$0.18
Police	$29,000	Residential	53%	Population	14,100	$1.09
		Nonresidential	47%	Vehicle Trips	63,727	$0.21
Street	$32,110	All Development	100%	Person Trips	147,102	$0.22
Total	$119,110					

Projected Demand for Services and Costs

ARS § 9-463.05(E)(5) requires:

> *"The total number of projected service units necessitated by and attributable to new development in the service area based on the approved land use assumptions and calculated pursuant to generally accepted engineering and planning criteria."*

ARS § 9-463.05(E)(6) requires:

> *"The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years."*

As shown in the *Land Use Assumptions* document, projected development during the next 10 years includes population growth of 29,100 persons and nonresidential vehicle trip growth of 105,428 vehicle trips. To maintain the existing levels of service, Tempe needs to construct approximately 26,014 square feet of police facilities and acquire approximately 41 police vehicles over the next 10 years. The following pages include a more detailed projection of demand for services and costs for the Police Facilities IIP.

Police Facilities – Incremental Expansion

Tempe plans to maintain its existing level of service for police facilities over the next 10 years. Based on a projected population increase of 29,100 persons, future residential development demands approximately 12,181 square feet of police facilities (29,100 additional persons X 0.4186 square feet per person). With projected nonresidential vehicle trip growth of 105,428 vehicle trips, future nonresidential development demands approximately 13,833 square feet of police facilities (105,428 additional vehicle trips X 0.1312 square feet per vehicle trip). Future development demands approximately 26,014 square feet of police facilities at a cost of $26,013,518 (26,013.5 square feet X $1,000 per square foot).

Figure P6: Projected Demand

Type of Infrastructure	Level of Service	Demand Unit	Cost per Sq Ft
Police Facilities	0.4186 Square Feet	per Person	$1,000
	0.1312 Square Feet	per Vehicle Trip	

Demand for Police Facilities					
Year	Population	Vehicle Trips	Square Feet		
			Residential	Nonresidential	Total
2024	201,100	568,923	84,176.2	74,646.8	158,823.0
2025	204,100	581,668	85,431.9	76,319.1	161,751.0
2026	206,400	594,414	86,394.7	77,991.4	164,386.0
2027	208,500	607,159	87,273.7	79,663.7	166,937.3
2028	211,700	619,905	88,613.1	81,335.9	169,949.1
2029	215,200	632,650	90,078.2	83,008.2	173,086.4
2030	219,200	645,395	91,752.5	84,680.5	176,433.0
2031	221,100	652,634	92,547.8	85,630.3	178,178.1
2032	224,600	659,873	94,012.8	86,580.1	180,592.9
2033	227,600	667,112	95,268.5	87,529.9	182,798.4
2034	230,200	674,351	96,356.8	88,479.7	184,836.5
10-Yr Increase	29,100	105,428	12,180.6	13,832.9	26,013.5
Growth-Related Expenditures			$12,180,642	$13,832,876	$26,013,518

Police Vehicles – Incremental Expansion

Tempe plans to maintain its existing level of service for police vehicles over the next 10 years. Based on a projected population increase of 29,100 persons, future residential development demands an additional 18.9 units (29,100 additional persons X 0.0007 units per person). With projected nonresidential vehicle trip growth of 105,428 vehicle trips, future nonresidential development demands an additional 21.5 units (105,428 additional vehicle trips X 0.0002 units per vehicle trip). Future development demands 40.5 police vehicles at a cost of $3,807,775 (40.5 units X $94,121 per unit). Tempe may use development fees to expand its police vehicle fleet.

Figure P7: Projected Demand

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Police Vehicles	0.0007 Units	per Person	$94,121
	0.0002 Units	per Vehicle Trip	

Demand for Police Vehicles					
Year	Population	Vehicle Trips	Units		
			Residential	Nonresidential	Total
2024	201,100	568,923	130.9	116.1	247.0
2025	204,100	581,668	132.9	118.7	251.6
2026	206,400	594,414	134.4	121.3	255.7
2027	208,500	607,159	135.7	123.9	259.6
2028	211,700	619,905	137.8	126.5	264.3
2029	215,200	632,650	140.1	129.1	269.2
2030	219,200	645,395	142.7	131.7	274.4
2031	221,100	652,634	143.9	133.2	277.1
2032	224,600	659,873	146.2	134.6	280.9
2033	227,600	667,112	148.2	136.1	284.3
2034	230,200	674,351	149.9	137.6	287.5
10-Yr Increase	29,100	105,428	18.9	21.5	40.5
Growth-Related Expenditures			$1,782,963	$2,024,812	$3,807,775

Police Facilities Development Fees

Revenue Credit/Offset

A revenue credit/offset is not necessary for development fees, because Tempe's construction transaction privilege tax rate equals the amount of the transaction privilege tax rate imposed on the majority of other transaction privilege tax classifications. Appendix A contains the forecast of revenues required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)).

Police Facilities Development Fees

Figure P8 includes infrastructure components and cost factors for police facilities development fees. The cost per service unit is $480.94 per person and $150.63 per vehicle trip.

Police facilities development fees for residential development are assessed per housing unit, based on unit size, and vary proportionately according to the number of persons per housing unit. For a residential unit with 1,200 square feet, the fee of $798 is calculated using a cost of $480.94 per person multiplied by a demand unit of 1.66 persons per housing unit.

Police facilities development fees for nonresidential development are assessed per 1,000 square feet and vary proportionately according to the number of vehicle trips. For industrial development, the fee of $368 per 1,000 square feet is calculated using a cost of $150.63 per vehicle trip multiplied by 2.44 vehicle trips per 1,000 square feet.

Figure P8: Police Facilities Development Fees

Fee Component	Cost per Person	Cost per Trip
Police Facilities	$418.58	$131.21
Police Vehicles	$61.27	$19.21
Development Fee Report	$1.09	$0.21
Total	$480.94	$150.63

Residential Fees per Unit				
Unit Size	Persons per Housing Unit[1]	Proposed Fees	Current Fees	Difference
900 or less	1.12	$539	$253	$286
901 to 1,400	1.66	$798	$416	$382
1,401 to 1,900	2.04	$981	$533	$448
1,901 or more	2.32	$1,116	$619	$497

Nonresidential Fees per 1,000 Square Feet				
Development Type	AWVT per 1,000 Sq Ft[1]	Proposed Fees	Current Fees	Difference
Industrial	2.44	$368	$191	$177
Commercial	12.21	$1,839	$959	$880
Office & Other Services	5.42	$816	$375	$441
Institutional	7.74	$1,166	$495	$671

1. See Land Use Assumptions

POLICE FACILITIES DEVELOPMENT FEE REVENUE

Appendix A contains revenue forecasts required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)). Projected fee revenue shown in Figure P9 is based on the development projections in the *Land Use Assumptions* document and the updated police facilities development fees. If development occurs faster than projected, the demand for infrastructure will increase along with development fee revenue. If development occurs slower than projected, the demand for infrastructure will decrease and development fee revenue will decrease at a similar rate. Projected development fee revenue equals $28,739,150 and projected expenditures equal $29,850,293. Since Tempe will assess residential development fees based on unit size, and the analysis projects residential development fee revenue based on a residential unit with 1,200 square feet (average size residential unit), actual development fee revenue will vary based on the actual mix of future residential units.

Figure P9: Police Facilities Development Fee Revenue

Fee Component	Growth Share	Existing Share	Total
Police Facilities	$26,013,518	$0	$26,013,518
Police Vehicles	$3,807,775	$0	$3,807,775
Development Fee Report	$29,000	$0	$29,000
Total	$29,850,293	$0	$29,850,293

		Residential $798 per unit	Industrial $368 per 1,000 sq ft	Commercial $1,839 per 1,000 sq ft	Office & Other $816 per 1,000 sq ft	Institutional $1,166 per 1,000 sq ft
Year		Hsg Unit	KSF	KSF	KSF	KSF
Base	2024	90,860	24,421	13,543	28,623	24,418
Year 1	2025	92,573	24,745	13,681	29,310	25,264
Year 2	2026	93,898	25,068	13,819	29,997	26,111
Year 3	2027	95,113	25,391	13,957	30,684	26,957
Year 4	2028	96,937	25,715	14,095	31,371	27,804
Year 5	2029	98,927	26,038	14,233	32,058	28,650
Year 6	2030	101,194	26,361	14,371	32,745	29,497
Year 7	2031	102,171	26,417	14,483	32,966	30,083
Year 8	2032	104,036	26,473	14,595	33,188	30,669
Year 9	2033	105,624	26,528	14,707	33,410	31,255
Year 10	2034	106,989	26,584	14,819	33,632	31,842
10-Year Increase		16,130	2,162	1,275	5,009	7,424
Projected Revenue		$12,862,688	$794,515	$2,344,139	$4,087,636	$8,650,172

Projected Fee Revenue	$28,739,150
Total Expenditures	$29,850,293

STREET FACILITIES IIP

ARS § 9-463.05 (T)(7)(e) defines the eligible facilities and assets for the Street Facilities IIP:

> *"Street facilities located in the service area, including arterial or collector streets or roads that have been designated on an officially adopted plan of the municipality, traffic signals and rights-of-way and improvements thereon."*

The Street Facilities IIP includes components for street improvements, bike / pedestrian improvements, bus pullouts, traffic signals, and the cost of preparing the Street Facilities IIP and related Development Fee Report. The incremental expansion methodology is used for bus pullouts and traffic signals. The plan-based methodology is used for street improvements, bike / pedestrian improvements, and the Development Fee Report.

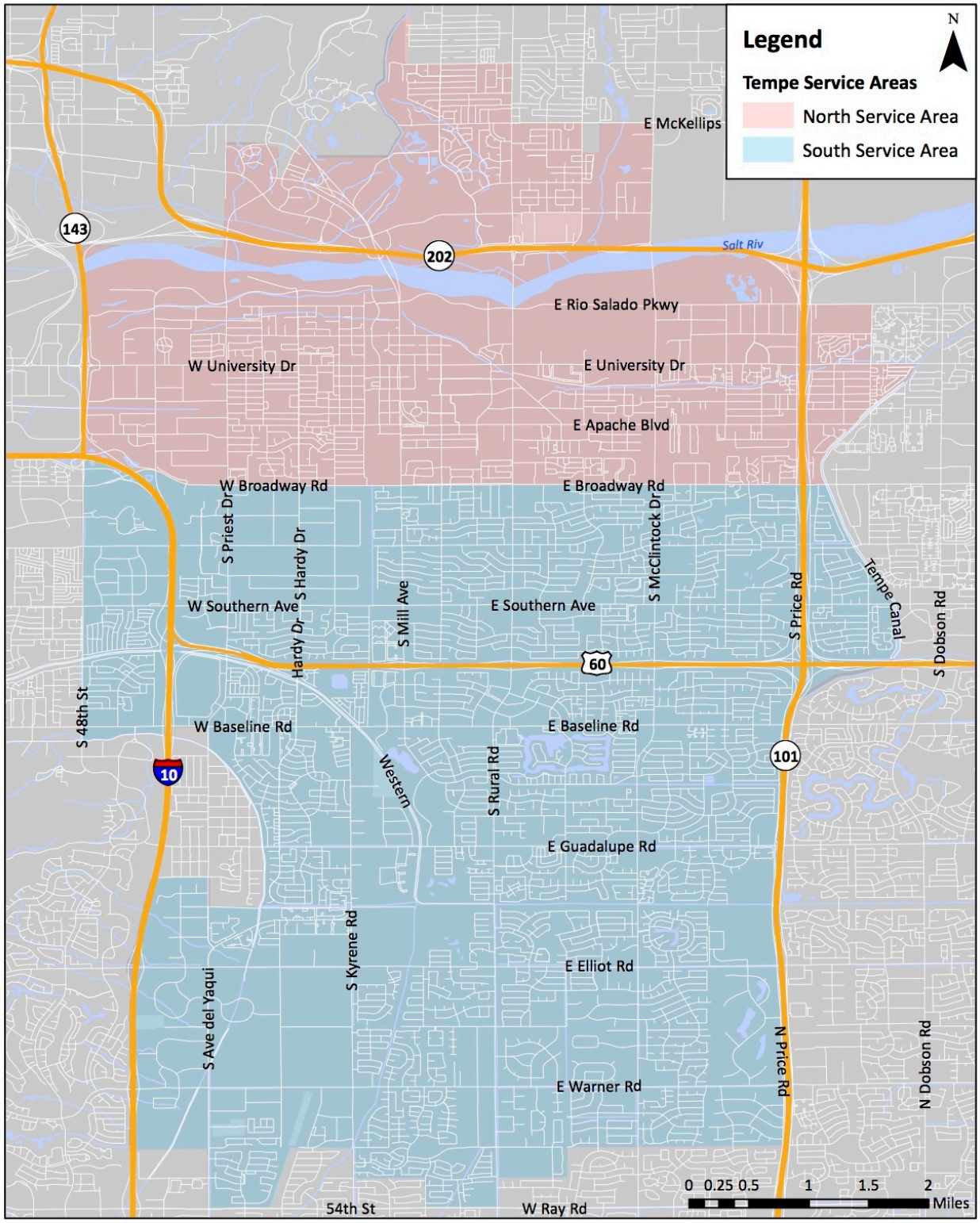
PROPORTIONATE SHARE

ARS § 9-463.05 (B)(3) states that the development fee shall not exceed a proportionate share of the cost of necessary public services needed to accommodate future development. The Street Facilities IIP and development fees will allocate the cost of necessary public services between residential and nonresidential development based on trip generation rates and trip adjustment factors.

SERVICE AREA

As shown in Figure S1, there are two service areas for the Street Facilities IIP. The north service area includes areas north of Broadway Road and the south service area includes areas south of Broadway Road.

Figure S1: Street Development Fee Service Area



RATIO OF SERVICE UNIT TO DEVELOPMENT UNIT

ARS § 9-463.05(E)(4) requires:

> *"A table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of necessary public services or facility expansions and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial and industrial."*

The analysis uses person trips as the demand units for street facilities development fees. Components used to calculate person trips include average weekday vehicle trip generation rates, trip adjustment factors, mode share, and vehicle occupancy.

Residential Trip Generation Rates

As an alternative to simply using national average trip generation rates for residential development, published by the Institute of Transportation Engineers (ITE), TischlerBise calculates custom trip rates using local demographic data. Key inputs needed for the analysis, including average number of persons and vehicles available per housing unit, are available from American Community Survey (ACS) data.

Vehicle Trip Ends by Bedroom Range

TischlerBise recommends a fee schedule where larger units pay higher development fees than smaller units. Benefits of the proposed methodology include: 1) proportionate assessment of infrastructure demand using local demographic data, and 2) progressive fee structure (i.e., smaller units pay less, and larger units pay more).

TischlerBise creates custom tabulations of demographic data by bedroom range from individual survey responses provided by the U.S. Census Bureau in files known as Public Use Microdata Samples (PUMS). PUMS files are only available for areas of at least 100,000 persons, with Tempe in two Public Use Microdata Areas (AZ PUMAs 108 and 109). Shown in Figure S2, cells with yellow shading indicate the survey results, which yield the unadjusted number of persons and vehicles available per housing unit. Unadjusted vehicles per housing unit are adjusted to control totals in Tempe – 1.52 vehicles per unit.

Figure S2: Vehicle Trip Ends by Bedroom Range

Bedroom Range	Persons[1]	Vehicles Available[1]	Housing Units[1]	Housing Mix	Unadjusted PPHU	Adjusted PPHU[2]	Unadjusted VPHU	Adjusted VPHU[2]
0-1	748	530	601	18%	1.24	1.20	0.88	0.80
2	1,661	1,158	865	25%	1.92	1.85	1.34	1.22
3	2,613	2,146	1,118	33%	2.34	2.25	1.92	1.75
4+	2,265	1,835	812	24%	2.79	2.69	2.26	2.06
Total	7,287	5,669	3,396	100%	2.15	2.07	1.67	1.52

National Averages According to ITE

ITE Code	AWVTE per Person	AWVTE per Vehicle	AWVTE per HU	Local Housing Mix
210 SFD	2.65	6.36	9.43	50%
220 Apt	1.86	5.10	6.74	50%
Weighted Avg	2.26	5.73	8.09	100%

Recommended AWVTE per Housing Unit

Bedroom Range	AWVTE per HU Based on Persons[3]	AWVTE per HU Based on Vehicles[4]	AWVTE per Housing Unit[5]
0-1	2.71	4.58	3.65
2	4.18	6.99	5.59
3	5.09	10.03	7.56
4+	6.08	11.80	8.94
Average	4.68	8.71	6.70

1. American Community Survey, Public Use Microdata Sample for AZ PUMAs 108 and 109 (2018-2022 5-Year unweighted data).
2. Adjusted multipliers are scaled to make the average PUMS values match control totals for Tempe, based on American Community Survey 2018-2022 5-Year Estimates.
3. Adjusted persons per housing unit multiplied by national weighted average trip rate per person.
4. Adjusted vehicles available per housing unit multiplied by national weighted average trip rate per vehicle.
5. Average trip rates based on persons and vehicles per housing unit.

Vehicle Trip Ends by Housing Size

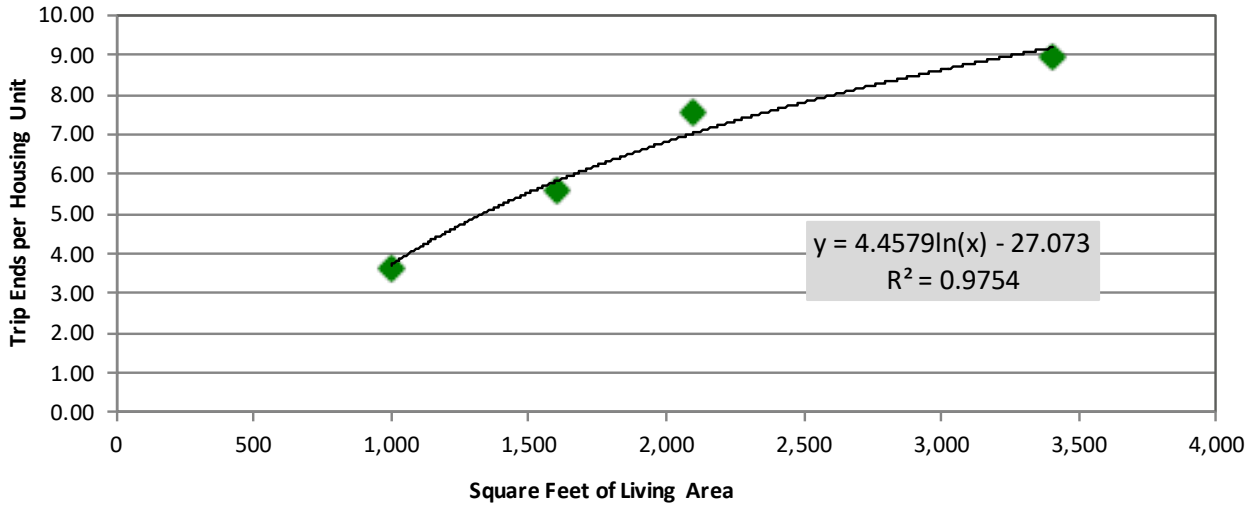
To derive average weekday vehicle trip ends by dwelling size, Tischler Bise uses 2022 U.S. Census Bureau data for housing units constructed in the west region. Based on 2022 estimates, living area ranges from 1,000 square feet for housing units with zero to one bedroom up to 3,400 square feet for housing units with four or more bedrooms. Citywide average floor area and weekday vehicle trip ends, by bedroom range, are plotted in Figure S3 with a logarithmic trend line. TischlerBise uses the trend line formula to derive estimated trip ends by housing unit size in increments of 500 square feet. TischlerBise recommends a minimum fee based on a unit size of 900 square feet and a maximum fee for units 1,901 square feet or larger. For the upper threshold, each dwelling averages 7.62 vehicle trip ends.

A medium-size residential unit in Tempe with 1,401 to 1,900 square feet has a fitted-curve value of 6.58 vehicle trip ends on an average weekday. A small unit of 900 square feet or less would pay 49 percent of the street fee paid by a medium-size unit. A large unit of 1,901 square feet or more would pay 116 percent of the street fee paid by a medium-size unit. With a "one-size-fits-all" approach, small units pay more than their proportionate share while large units pay less than their proportionate share. An average fee that does not vary by size makes small units less affordable and essentially subsidizes larger units.

Figure S3: Vehicle Trip Ends by Housing Size

Average weekday vehicle trips per housing unit derived from 2018-2022 ACS 5-Year PUMS data for the area that includes Tempe. Unit size for 0-1 bedroom from the 2022 U.S. Census Bureau average for all multi-family units constructed in the Census West region. Unit size for all other bedrooms from the 2022 U.S. Census Bureau average for single-family units constructed in the Census West region.

Actual Averages per Housing Unit			Fitted-Curve Values	
Bedrooms	Square Feet	Persons	Sq Ft Range	Persons
0-1	1,000	3.65	900 or less	3.25
2	1,600	5.59	901 to 1,400	5.22
3	2,100	7.56	1,401 to 1,900	6.58
4	3,400	8.94	1,901 or more	7.62



Nonresidential Trip Generation Rates

For nonresidential development, TischlerBise uses trip generation rates published in Trip Generation, Institute of Transportation Engineers, 11th Edition (2021). The prototype for industrial development is Light Industrial (ITE 110) which generates 4.87 average weekday vehicle trip ends per 1,000 square feet of floor area. Institutional development uses Elementary School (ITE 520) and generates 23.44 average weekday vehicle trip ends per 1,000 square feet of floor area. For office & other services development, the proxy is General Office (ITE 710), and it generates 10.84 average weekday vehicle trip ends per 1,000 square feet of floor area. The prototype for commercial development is Shopping Center (ITE 820) which generates 37.01 average weekday vehicle trips per 1,000 square feet of floor area.

Figure S4: Average Weekday Vehicle Trip Ends by Land Use

ITE Code	Land Use / Size	Demand Unit	Wkdy Trip Ends Per Dmd Unit[1]	Wkdy Trip Ends Per Employee[1]	Employees Per Demand Unit	Square Feet Per Employee
110	Light Industrial	1,000 Sq Ft	4.87	3.10	1.57	637
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	4.75	2.51	1.89	528
150	Warehousing	1,000 Sq Ft	1.71	5.05	0.34	2,953
254	Assisted Living	bed	2.60	4.24	0.61	na
310	Hotel	room	7.99	14.34	0.56	na
520	Elementary School	1,000 Sq Ft	23.44	22.50	1.04	960
525	High School	student	1.94	21.95	0.09	na
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.77	3.77	2.86	350
620	Nursing Home	bed	3.06	3.31	0.92	na
710	General Office (avg size)	1,000 Sq Ft	10.84	3.33	3.26	307
720	Medical-Dental Office	1,000 Sq Ft	36.00	8.71	4.13	242
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.01	17.42	2.12	471

1. Trip Generation, Institute of Transportation Engineers, 11th Edition (2021).

Trip Rate Adjustments

To calculate street facilities development fees, trip generation rates require an adjustment factor to avoid double counting each trip at both the origin and destination points. Therefore, the basic trip adjustment factor is 50 percent. As discussed further in this section, the development fee methodology includes additional adjustments to make the fees proportionate to the infrastructure demand for particular types of development.

Commuter Trip Adjustment

Residential development has a larger trip adjustment factor of 62 percent to account for commuters leaving Tempe for work. According to the 2009 National Household Travel Survey (see Table 30) weekday work trips are typically 31 percent of production trips (i.e., all out-bound trips, which are 50 percent of all trip ends). As shown in Figure S5, the U.S. Census Bureau's OnTheMap web application indicates 75 percent of resident workers traveled outside of Tempe for work in 2021. In combination, these factors (0.31 x 0.50 x 0.75 = 0.12) support the additional 12 percent allocation of trips to residential development.

Figure S5: Commuter Trip Adjustment

Trip Adjustment Factor for Commuters	
Residents Living and Working in Tempe	20,013
Residents Commuting Outside Tempe for Work	60,044
Employed Residents	80,057
Share of Employed Residents Commuting Outside Tempe for Work	75%
Base Production Trips[1]	50%
Additional Production Trips[1]	12%
Residential Trip Adjustment Factor	62%

Source: U.S. Census Bureau, OnTheMap Application (version 6.23.4) and LEHD Origin-Destination Employment Statistics, 2021.

1. According to the National Household Travel Survey (2009)*, published in December 2011 (see Table 30), home-based work trips are typically 30.99 percent of "production" trips, in other words, out-bound trips (which are 50 percent of all trip ends). Also, LED OnTheMap data from 2021 indicate that 75 percent of Tempe's workers travel outside the city for work. In combination, these factors (0.3099 x 0.50 x 0.75 = 0.12) account for 12 percent of additional production trips. The total adjustment factor for residential includes attraction trips (50 percent of trip ends) plus the journey-to-work commuting adjustment (12 percent of production trips) for a total of 62 percent.

*http://nhts.ornl.gov/publications.shtml ; Summary of Travel Trends - Table "Daily Travel Statistics by Weekday

Adjustment for Pass-By Trips

For commercial and institutional development, the trip adjustment factor is less than 50 percent because these types of development attract vehicles as they pass by on arterial and collector roads. For example, when someone stops at a convenience store on the way home from work, the convenience store is not the primary destination. For the average shopping center, ITE data indicate 34 percent of the vehicles that enter are passing by on their way to some other primary destination. The remaining 66 percent of attraction trips have the commercial site as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor is 66 percent multiplied by 50 percent, or approximately 33 percent of the trip ends.

Average Weekday Vehicle Trips

Shown below in Figure S6, multiplying average weekday vehicle trip ends and trip adjustment factors (discussed on the previous page) by Tempe's existing development units provides the average weekday vehicle trips generated by existing development. As shown below, Tempe's existing citywide development generates 900,891 vehicle trips on an average weekday.

Figure S6: Average Weekday Vehicle Trips by Land Use – Citywide

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	3.25	62%	16,080	32,401
2 Bedrooms	HU	Avg	5.22	62%	23,143	74,900
3 Bedrooms	HU	Avg	6.58	62%	29,912	122,029
4+ Bedrooms	HU	Avg	7.62	62%	21,725	102,638
Industrial	KSF	110	4.87	50%	24,421	59,466
Commercial	KSF	820	37.01	33%	13,543	165,409
Office & Other Services	KSF	710	10.84	50%	28,623	155,134
Institutional	KSF	520	23.44	33%	24,418	188,914
Total, Citywide						900,891

Shown below in Figure S7, Tempe's existing development in the north service area generates 450,788 vehicle trips on an average weekday.

Figure S7: Average Weekday Vehicle Trips by Land Use – North

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	3.25	62%	7,725	15,567
2 Bedrooms	HU	Avg	5.22	62%	11,119	35,985
3 Bedrooms	HU	Avg	6.58	62%	14,371	58,628
4+ Bedrooms	HU	Avg	7.62	62%	10,438	49,311
Industrial	KSF	110	4.87	50%	9,476	23,074
Commercial	KSF	820	37.01	33%	5,089	62,155
Office & Other Services	KSF	710	10.84	50%	15,356	83,228
Institutional	KSF	520	23.44	33%	15,878	122,841
Total, North						450,788

Shown below in Figure S8, Tempe's existing development in the south service area generates 450,103 vehicle trips on an average weekday.

Figure S8: Average Weekday Vehicle Trips by Land Use – South

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	3.25	62%	8,354	16,834
2 Bedrooms	HU	Avg	5.22	62%	12,024	38,915
3 Bedrooms	HU	Avg	6.58	62%	15,541	63,402
4+ Bedrooms	HU	Avg	7.62	62%	11,287	53,327
Industrial	KSF	110	4.87	50%	14,945	36,392
Commercial	KSF	820	37.01	33%	8,454	103,254
Office & Other Services	KSF	710	10.84	50%	13,267	71,906
Institutional	KSF	520	23.44	33%	8,540	66,074
Total, South						450,103

PERSON TRIPS

Tempe is a unique community with residents and workers using varying modes of travel. In general, a development fee study calculates future development's impact on infrastructure. In suburban, greenfield communities that concentrate on roadway expansion to accommodate additional vehicles, a development's impact is best estimated by calculating the additional vehicle trips or vehicle miles traveled (VMT) generated by the development. However, based on the urban environment and residents' travel behaviors, a multimodal approach is necessary for the City of Tempe. This is also consistent with the capital improvements identified in Tempe's Capital Improvement Plan and Tempe's desire to serve all modes of travel. As such, the multimodal approach calculates person trips generated by the varying development types in the study.

PERSON TRIP METHODOLOGY

According to the Institute of Transportation Engineers (ITE), there are several elements necessary to calculate person trips. The following equation is provided in the ITE's Trip Generation Handbook (2021):

Person trips = [(vehicle occupancy) x (vehicle trips)] + transit trips + walk trips + bike trips

To create a more streamlined approach, this study uses "non-motorized trips" as the sum of walk and bike trips. The Trip Generation Handbook outlines the general approach to calculating person trips:

1. **Estimate vehicle trip ends generated by development type.** This study uses the vehicle trip rates found in Figure S3 for residential development and Figure S4 for nonresidential development.
2. **Determine mode share and vehicle occupancy.** This study uses mode share and vehicle occupancy provided by Maricopa Association of Governments (MAG) in the 2024 Updated SE Data Scenario Runs.
3. **Convert vehicle trips to person trips.** This conversion calculates the total person trips by combining the vehicle trip mode share and vehicle occupancy.

Mode Share and Vehicle Occupancy

Vehicle trip estimates, by mode, from the Maricopa Association of Governments (MAG) 2024 Updated SE Data Scenario Runs provide mode share and vehicle occupancy data used in this analysis. There were 1,757,393 total trips in Tempe. Of these trips, 86.8 percent were vehicle trips, 4.3 percent were transit trips, and 8.9 percent were non-motorized trips (bike, walk, other). Additionally, the vehicle trips had an average vehicle occupancy of 1.37 passengers per vehicle trip.

Calculation of Person Trip Ends

The total person trip end rate for each land use can be calculated using the vehicle trip end rate, vehicle occupancy rate, and vehicle mode share. The following formula to calculate vehicle trip ends is provided in the ITE's Trip Generation Handbook (2021):

Vehicle trip ends = [(person trip ends x (vehicle mode share)]/(vehicle occupancy)

This is rearranged to calculate total person trips:

Person trip ends = [(vehicle trip ends) x (vehicle occupancy)]/(vehicle mode share)

To calculate average weekday person trip ends for each land use, the analysis inputs vehicle trip ends, vehicle occupancy, and vehicle mode share factors found in earlier sections. For example, a 1,200-square-foot housing unit generates 5.22 average weekday vehicle trip ends, has a vehicle occupancy rate is 1.37, and the vehicle mode share is 86.8 percent. Based on these factors, a 1,200-square-foot housing unit generates 8.24 average weekday person trip ends ([5.22 vehicle trip ends X 1.37 occupancy rate] / 86.8 percent vehicle mode share). Figure S9 includes average weekday person trip ends for each land use.

Figure S9: Average Weekday Person Trip Ends by Land Use

Development Type	Avg Weekday Veh Trip Ends[1]	Vehicle Occupancy[2]	Vehicle Mode Share[2]	Avg Wkdy Person Trip Ends
Residential Development per Unit				
900 or less	3.25	1.37	86.8%	5.13
901 to 1,400	5.22	1.37	86.8%	8.24
1,401 to 1,900	6.58	1.37	86.8%	10.39
1,901 or more	7.62	1.37	86.8%	12.03
Nonresidential Development per 1,000 Sq Ft				
Industrial	4.87	1.37	86.8%	7.69
Commercial	37.01	1.37	86.8%	58.41
Office & Other Services	10.84	1.37	86.8%	17.11
Institutional	23.44	1.37	86.8%	37.00

1. See Land Use Assumptions.
2. Maricopa Association of Governments, 2024 Updated SE Data Scenario Runs.

Trips Adjustment Factors

A person trip end is the out-bound or in-bound leg of a trip. To prevent double counting trips, a standard adjustment of 50 percent is applied to trip ends to calculate a person trip. For example, the out-bound trip from a person's home to work is attributed to the housing unit and the trip from work back home is attributed to the employer.

Residential development has a larger trip adjustment factor of 62 percent to account for commuters leaving Tempe for work. According to the 2009 National Household Travel Survey (see Table 30) weekday work trips are typically 31 percent of production trips (i.e., all out-bound trips, which are 50 percent of all trip ends). As shown in Figure S5, the U.S. Census Bureau's OnTheMap web application indicates 75 percent of resident workers traveled outside of Tempe for work in 2021. In combination, these factors (0.31 x 0.50 x 0.75 = 0.12) support the additional 12 percent allocation of trips to residential development.

For nonresidential development the basic trip adjustment factor of 50 percent is applied to industrial and office categories. For commercial and institutional development, the trip adjustment factor is less than 50 percent because these types of development attract vehicles as they pass by on arterial and collector roads. For example, when someone stops at a convenience store on the way home from work, the convenience store is not the primary destination. For the average shopping center, ITE data indicate 34 percent of the vehicles that enter are passing by on their way to some other primary destination. The remaining 66 percent of attraction trips have the commercial site as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor is 66 percent multiplied by 50 percent, or approximately 33 percent of the trip ends.

Person Trips by Mode

Shown below in Figure S10, the calculation of person trips includes average weekday person trip ends generated by each land use and the related trip adjustment factor. For example, a 1,200-square-foot housing unit generates 8.24 person trip ends and has a trip adjustment factor of 62 percent, resulting in a trip generation rate of 5.11 person trips per unit. The development fee analysis outlined in this report uses the person trip totals, by type of development, shaded in gray.

Figure S10: Person Trips by Mode

Development Type	Avg Wkdy Person Trip Ends	Trip Adjustment[1]	Avg Weekday Person Trips
Residential Development per Unit			
900 or less	5.13	62%	3.18
901 to 1,400	8.24	62%	5.11
1,401 to 1,900	10.39	62%	6.44
1,901 or more	12.03	62%	7.46
Nonresidential Development per 1,000 Sq Ft			
Industrial	7.69	50%	3.84
Commercial	58.41	33%	19.28
Office & Other Services	17.11	50%	8.55
Institutional	37.00	33%	12.21

1. See Land Use Assumptions.

PROJECTED DEMAND FOR SERVICES AND COSTS

ARS § 9-463.05(E)(5) requires:

> *"The total number of projected service units necessitated by and attributable to new development in the service area based on the approved land use assumptions and calculated pursuant to generally accepted engineering and planning criteria."*

ARS § 9-463.05(E)(6) requires:

> *"The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years."*

North Service Area Travel Demand

As shown in the *Land Use Assumptions* document, 10-year projected growth in the north service area includes 15,214 housing units and 11,353,000 square feet of nonresidential floor area. Based on the trip generation factors discussed in the previous section, projected development generates an additional 209,498 person trips over the next 10 years.

Figure S11: Projected Travel Demand

Development Type	Dev Unit	ITE Code	Avg Wkday PTE	Trip Adjustment	2024 Dev Units	2024 Person Trips
0-1 Bedrooms	HU	Avg	5.13	62%	7,725	24,569
2 Bedrooms	HU	Avg	8.24	62%	11,119	56,796
3 Bedrooms	HU	Avg	10.39	62%	14,371	92,534
4+ Bedrooms	HU	Avg	12.03	62%	10,438	77,830
Industrial	KSF	110	7.69	50%	9,476	36,418
Commercial	KSF	820	58.41	33%	5,089	98,102
Office & Other Services	KSF	710	17.11	50%	15,356	131,363
Institutional	KSF	520	37.00	33%	15,878	193,884
Total, North Street Service Area						711,497

North Street Service Area	Base 2024	1 2025	2 2026	3 2027	4 2028	5 2029	10 2034	10-Year Increase
0-1 Bedroom Units	7,725	8,008	8,226	8,426	8,727	9,055	10,418	2,692
2 Bedroom Units	11,119	11,525	11,840	12,128	12,560	13,032	14,994	3,875
3 Bedroom Units	14,371	14,896	15,302	15,675	16,234	16,844	19,380	5,009
4+ Bedroom Units	10,438	10,819	11,114	11,385	11,791	12,234	14,075	3,638
Industrial KSF	9,476	9,695	9,914	10,132	10,351	10,570	10,751	1,275
Commercial KSF	5,089	5,158	5,226	5,295	5,364	5,432	5,837	747
Office & Other Services KSF	15,356	15,780	16,204	16,628	17,052	17,476	18,495	3,140
Institutional KSF	15,878	16,547	17,217	17,887	18,556	19,226	22,068	6,191
0-1 Bedroom Trips	24,569	25,467	26,162	26,799	27,755	28,798	33,132	8,563
2 Bedroom Trips	56,796	58,872	60,478	61,950	64,160	66,571	76,591	19,795
3 Bedroom Trips	92,534	95,916	98,532	100,930	104,531	108,459	124,785	32,250
4+ Bedroom Trips	77,830	80,674	82,875	84,891	87,920	91,224	104,955	27,126
Residential Person Trips	251,730	260,930	268,047	274,570	284,365	295,052	339,464	87,734
Industrial Trips	36,418	37,259	38,100	38,941	39,782	40,623	41,318	4,900
Commercial Trips	98,102	99,425	100,748	102,070	103,393	104,716	112,510	14,408
Office & Other Services Trips	131,363	134,991	138,618	142,246	145,874	149,502	158,221	26,858
Institutional Trips	193,884	202,062	210,240	218,417	226,595	234,773	269,483	75,598
Nonresidential Person Trips	459,767	473,737	487,706	501,675	515,645	529,614	581,531	121,764
Total Person Trips	**711,497**	**734,666**	**755,753**	**776,245**	**800,010**	**824,667**	**920,995**	**209,498**

South Service Area Travel Demand

As shown in the *Land Use Assumptions* document, 10-year projected growth in the south service area includes 916 housing units and 4,518,000 square feet of nonresidential floor area. Based on the trip generation factors discussed in the previous section, projected development generates an additional 49,917 person trips over the next 10 years.

Figure S12: Projected Travel Demand

Development Type	Dev Unit	ITE Code	Avg Wkday VTE	Trip Adjustment	2024 Dev Units	2024 Veh Trips
0-1 Bedrooms	HU	Avg	5.13	62%	8,354	26,570
2 Bedrooms	HU	Avg	8.24	62%	12,024	61,421
3 Bedrooms	HU	Avg	10.39	62%	15,541	100,069
4+ Bedrooms	HU	Avg	12.03	62%	11,287	84,167
Industrial	KSF	110	7.69	50%	14,945	57,439
Commercial	KSF	820	58.41	33%	8,454	162,970
Office & Other Services	KSF	710	17.11	50%	13,267	113,492
Institutional	KSF	520	37.00	33%	8,540	104,287
Total, South Street Service Area						710,416

South Street Service Area	Base	1	2	3	4	5	10	10-Year
	2024	2025	2026	2027	2028	2029	2034	Increase
0-1 Bedroom Units	8,354	8,375	8,391	8,406	8,428	8,453	8,516	162
2 Bedroom Units	12,024	12,054	12,077	12,099	12,131	12,165	12,257	233
3 Bedroom Units	15,541	15,580	15,610	15,637	15,679	15,724	15,843	301
4+ Bedroom Units	11,287	11,316	11,337	11,357	11,387	11,420	11,506	219
Industrial KSF	14,945	15,050	15,154	15,259	15,364	15,468	15,833	888
Commercial KSF	8,454	8,524	8,593	8,662	8,732	8,801	8,982	528
Office & Other Services KSF	13,267	13,530	13,793	14,056	14,318	14,581	15,136	1,869
Institutional KSF	8,540	8,717	8,894	9,071	9,247	9,424	9,773	1,233
0-1 Bedroom Trips	26,570	26,636	26,688	26,735	26,805	26,882	27,085	515
2 Bedroom Trips	61,421	61,575	61,693	61,802	61,965	62,143	62,613	1,191
3 Bedroom Trips	100,069	100,319	100,512	100,689	100,955	101,245	102,010	1,941
4+ Bedroom Trips	84,167	84,377	84,540	84,689	84,912	85,156	85,800	1,633
Residential Person Trips	272,228	272,907	273,433	273,914	274,637	275,426	277,509	5,281
Industrial Trips	57,439	57,841	58,243	58,644	59,046	59,448	60,851	3,411
Commercial Trips	162,970	164,308	165,645	166,982	168,320	169,657	173,147	10,177
Office & Other Services Trips	113,492	115,741	117,990	120,239	122,489	124,738	129,484	15,992
Institutional Trips	104,287	106,445	108,604	110,763	112,921	115,080	119,343	15,057
Nonresidential Person Trips	438,188	444,335	450,482	456,629	462,776	468,923	482,824	44,637
Total Person Trips	**710,416**	**717,242**	**723,914**	**730,543**	**737,413**	**744,348**	**760,333**	**49,917**

Citywide Travel Demand

As shown in the *Land Use Assumptions* document, 10-year projected growth citywide includes 16,130 housing units and 15,871,000 square feet of nonresidential floor area. Based on the trip generation factors discussed in the previous section, projected development generates an additional 259,415 person trips over the next 10 years. Shown below in Figure S13, Tempe needs to construct approximately 18 bus pullouts and 46 traffic signals to maintain the existing LOS over the next 10 years.

Figure S13: Projected Travel Demand

Development Type	Dev Unit	ITE Code	Avg Wkday PTE	Trip Adjustment	2024 Dev Units	2024 Person Trips
0-1 Bedrooms	HU	Avg	5.13	62%	16,080	51,139
2 Bedrooms	HU	Avg	8.24	62%	23,143	118,218
3 Bedrooms	HU	Avg	10.39	62%	29,912	192,604
4+ Bedrooms	HU	Avg	12.03	62%	21,725	161,997
Industrial	KSF	110	7.69	50%	24,421	93,857
Commercial	KSF	820	58.41	33%	13,543	261,072
Office & Other Services	KSF	710	17.11	50%	28,623	244,854
Institutional	KSF	520	37.00	33%	24,418	298,171
Total, Citywide						1,421,913

Tempe, Arizona	Base	1	2	3	4	5	10	10-Year
	2024	2025	2026	2027	2028	2029	2034	Increase
0-1 Bedroom Units	16,080	16,383	16,617	16,832	17,155	17,507	18,934	2,855
2 Bedroom Units	23,143	23,579	23,917	24,226	24,691	25,198	27,251	4,108
3 Bedroom Units	29,912	30,476	30,912	31,312	31,913	32,568	35,222	5,310
4+ Bedroom Units	21,725	22,135	22,452	22,742	23,178	23,654	25,582	3,857
Industrial KSF	24,421	24,745	25,068	25,391	25,715	26,038	26,584	2,162
Commercial KSF	13,543	13,681	13,819	13,957	14,095	14,233	14,819	1,275
Office & Other Services KSF	28,623	29,310	29,997	30,684	31,371	32,058	33,632	5,009
Institutional KSF	24,418	25,264	26,111	26,957	27,804	28,650	31,842	7,424
0-1 Bedroom Trips	51,139	52,103	52,849	53,533	54,560	55,680	60,218	9,078
2 Bedroom Trips	118,218	120,447	122,171	123,752	126,125	128,714	139,204	20,986
3 Bedroom Trips	192,604	196,235	199,045	201,619	205,485	209,704	226,795	34,191
4+ Bedroom Trips	161,997	165,052	167,415	169,580	172,832	176,380	190,755	28,758
Residential Person Trips	523,958	533,837	541,480	548,484	559,002	570,478	616,972	93,014
Industrial Trips	93,857	95,100	96,343	97,586	98,828	100,071	102,168	8,311
Commercial Trips	261,072	263,732	266,392	269,053	271,713	274,373	285,657	24,585
Office & Other Services Trips	244,854	250,732	256,609	262,486	268,363	274,240	287,705	42,850
Institutional Trips	298,171	308,507	318,844	329,180	339,516	349,853	388,826	90,655
Nonresidential Person Trips	897,955	918,071	938,188	958,304	978,421	998,537	1,064,356	166,401
Total Person Trips	**1,421,913**	**1,451,908**	**1,479,668**	**1,506,788**	**1,537,423**	**1,569,015**	**1,681,328**	**259,415**
Bus Pullouts (Total)	100.0	102.1	104.1	106.0	108.1	110.3	118.2	18.24
Traffic Signals (Total)	250.0	255.3	260.2	264.9	270.3	275.9	295.6	45.61

Street Improvements – Plan-Based

North Service Area

Shown below, Figure S14 includes planned street improvements located within the north service area. Tempe provided the total cost for each project and identified any other funding sources, including development fees collected for current IIP projects, leaving an eligible cost of $10,299,030. During the 2020 development fee update, Tempe hired CivTech to conduct a traffic study within the north service area to determine the growth share of specific street improvements. CivTech's analysis shows the University Dr and College Ave Pedestrian and Bicycle Grade Separation project has a growth share of 35 percent. The Roundabout at College Ave and McKellips Rd project has a growth share of 15 percent to account for new development's remaining five-year share of costs. TischlerBise developed the remaining growth shares based on discussions with Tempe staff.

Applying the growth share for each project to the eligible cost for each project results in a growth cost of $4,214,451. Dividing the growth cost by the person trip increase results in a cost of $25.48 per person trip. This component of the fee will be charged in the north service area.

Figure S14: Street Improvements – North Service Area

		Funding Source					
Description	Total Cost	Grant	Dev. Agreement	G.O. Bond	Dev. Fee	Total Funding	Eligible Cost
Roundabout at College Ave and McKellips Rd[1]	$1,485,000	$0	$0	$1,217,250	$267,750	$1,485,000	$1,485,000
University Dr and College Ave Ped/Bike Grade Separation[1]	$10,413,571	$5,969,748	$1,300,958	$1,212,528	$1,930,337	$10,413,571	$3,142,865
Loop 202 & Scottsdale Rd On-Ramp Expansion	$1,010,000	$0	$0	$1,010,000	$0	$1,010,000	$1,010,000
Dorsey Ln Connection at Rio Salado Pkwy	$1,242,000	$0	$0	$1,242,000	$0	$1,242,000	$1,242,000
Future Fiber Network Expansion	$2,081,165	$0	$0	$2,081,165	$0	$2,081,165	$2,081,165
Veterans Way & 6th St Turn Lane	$2,676,000	$0	$1,338,000	$1,338,000	$0	$2,676,000	$1,338,000
Total, North Street Service Area	$18,907,736	$5,969,748	$2,638,958	$8,100,943	$2,198,087	$18,907,736	$10,299,030

Source: Tempe FY 2024/25 - FY 2028/29 Capital Improvements Program

1. Carryover project from 2020 IIP

Description	Eligible Cost	Growth Share	Growth Cost	Person Trips	Cost per Trip
Roundabout at College Ave and McKellips Rd[1]	$1,485,000	15%	$219,780	113,170	$1.94
University Dr and College Ave Ped/Bike Grade Separation[1]	$3,142,865	35%	$1,100,003	113,170	$9.72
Loop 202 & Scottsdale Rd On-Ramp Expansion	$1,010,000	50%	$505,000	209,498	$2.41
Dorsey Ln Connection at Rio Salado Pkwy	$1,242,000	100%	$1,242,000	209,498	$5.93
Future Fiber Network Expansion	$2,081,165	23%	$478,668	209,498	$2.28
Veterans Way & 6th St Turn Lane	$1,338,000	50%	$669,000	209,498	$3.19
Total, North Street Service Area	$10,299,030	41%	$4,214,451		**$25.48**

Source: Tempe FY 2024/25 - FY 2028/29 Capital Improvements Program

1. Carryover project from 2020 IIP

South Service Area

Shown below, Figure S15 includes planned street improvements located within the south service area. Tempe provided the total cost for the project and identified any other funding sources, including development fees collected for current IIP projects, leaving an eligible cost of $2,322,500. TischlerBise developed the growth share of 31 percent based on discussions with Tempe staff.

Applying the growth share to the eligible cost results in a total growth cost of $719,975. Dividing the growth cost by the five-year person trip increase results in a cost of $21.22 per person trip ($719,975 growth cost / 33,933 person trip increase). This component of the fee will be charged in the south service area.

Figure S15: Street Improvements – South Service Area

		Funding Source					
Description	Total Cost	Grant	Dev. Agreement	G.O. Bond	Dev. Fee	Total Funding	Eligible Cost
Rural Rd & Baseline Rd Intersection Improvements[1]	$2,322,500	$0	$0	$1,995,937	$326,563	$2,322,500	$2,322,500
Total, South Street Service Area	$2,322,500	$0	$0	$1,995,937	$326,563	$2,322,500	$2,322,500

Source: Tempe FY 2024/25 - FY 2028/29 Capital Improvements Program

1. Carryover project from 2020 IIP

Description	Eligible Cost	Growth Share	Growth Cost	Person Trips	Cost per Trip
Rural Rd & Baseline Rd Intersection Improvements[1]	$2,322,500	31%	$719,975	33,933	$21.22
Total, South Street Service Area	$2,322,500	31%	$719,975		**$21.22**

Source: Tempe FY 2024/25 - FY 2028/29 Capital Improvements Program

1. Carryover project from 2020 IIP

Bike and Pedestrian Improvements – Plan-Based

Shown below, Figure S16 includes planned bike and pedestrian improvements located throughout Tempe. Tempe provided the total cost and identified any other funding sources leaving an eligible cost of $2,992,050. All improvements use a growth share of 15 percent – equal to future development's share of total person trips citywide in 2034.

Applying the growth share to the eligible cost results in a growth cost of $448,808. Dividing the growth cost by the 10-year person trip increase results in a cost of $1.73 per person trip ($448,808 growth cost / 259,415 person trip increase). This component of the fee will be charged citywide.

Figure S16: Bike and Pedestrian Improvements

		Funding Source					
Description	Total Cost	Transit Tax	Grant	Cap. Proj. Fund	Dev. Fee	Total Funding	Eligible Cost
8th St Multi-Use Path (Creamery Branch Rail Path)	$4,836,259	$156,000	$4,001,297	$678,962	$0	$4,836,259	$678,962
Grand Canal Multi-Use Path Connection & Extension Project	$4,824,216	$304,173	$3,995,000	$525,043	$0	$4,824,216	$525,043
Kyrene Rd/Roosevelt Rd/Farmer Ave Bike/Ped Improvement	$7,810,739	$838,311	$6,315,065	$621,609	$35,754	$7,810,739	$657,363
Scottsdale Rd Bicycle & Pedestrian Improvement Project	$7,368,295	$337,000	$5,900,613	$1,130,682	$0	$7,368,295	$1,130,682
Total	$24,839,509	$1,635,484	$20,211,975	$2,956,296	$35,754	$24,839,509	$2,992,050

Source: Tempe FY 2024/25 - FY 2028/29 Capital Improvements Program

Description	Eligible Cost	Growth Share	Growth Cost	Person Trips	Cost per Trip
8th St Multi-Use Path (Creamery Branch Rail Path)	$678,962	15%	$101,844	259,415	$0.39
Grand Canal Multi-Use Path Connection & Extension Project	$525,043	15%	$78,756	259,415	$0.30
Kyrene Rd/Roosevelt Rd/Farmer Ave Bike/Ped Improvement	$657,363	15%	$98,604	259,415	$0.38
Scottsdale Rd Bicycle & Pedestrian Improvement Project	$1,130,682	15%	$169,602	259,415	$0.65
Total	$2,992,050	15%	$448,808		**$1.73**

Source: Tempe FY 2024/25 - FY 2028/29 Capital Improvements Program

Bus Pullouts – Incremental Expansion

Based on the 2024 estimate of 100 bus pullouts and 1,421,913 person trips, the existing level of service is 0.703 bus pullouts per 10,000 person trips (100 bus pullouts / (1,421,913 person trips / 10,000)). Tempe plans to maintain the existing level of service by constructing additional bus pullouts to serve future development during the next 10 years. Tempe provided a construction cost of $230,000 for a new bus pullout, and the analysis uses this cost as a proxy for future growth-related bus pullouts. For bus pullouts, the cost is $16.18 per person trip (100 bus pullouts / 1,421,913 person trips X $230,000 per bus pullout).

Figure S17: Bus Pullouts

Cost Factors	
Cost per Bus Pullout	$230,000

Level-of-Service (LOS) Standards	
Existing Bus Pullouts	100.0
2024 Person Trips	1,421,913
Bus Pullouts per 10,000 Person Trips	0.703
Cost per Person Trip	$16.18

Source: Tempe Public Works Department

Traffic Signals – Incremental Expansion

Tempe plans to construct additional traffic signals to serve future development. Tempe currently provides 250 traffic signals citywide to serve 1,421,913 person trips, and this results in an existing level of service of 1.758 traffic signals per 10,000 person trips. As shown in Figure S13, Tempe needs to construct approximately 46 traffic signals to maintain the existing level of service. Based on discussions with Tempe staff, Tempe is likely to construct 15 traffic signals within the next 10 years. The analysis includes an adjustment of 32.9 percent (15 traffic signals / 45.61 growth-related demand for traffic signals).

The adjusted level of service is 0.578 traffic signals per 10,000 person trips ((250 traffic signals X 32.9 percent adjustment) / (1,421,913 person trips / 10,000)). Tempe plans to maintain the adjusted level of service by constructing additional traffic signals to serve future development during the next 10 years.

Tempe provided a construction cost of $725,000 for a new traffic signal, and the analysis uses this cost as a proxy for future growth-related traffic signals. For traffic signals, the cost is $41.92 per person trip (82.2 adjusted traffic signals / 1,421,913 person trips X $725,000 per traffic signal).

Figure S18: Traffic Signals

Cost Factors	
Cost per Traffic Signal	$725,000

Level-of-Service (LOS) Standards	
Existing Traffic Signals	250.0
Adjustment	32.9%
Adjusted Traffic Signals	82.2
2024 Person Trips	1,421,913
Traffic Signals per 10,000 Person Trips	0.578
Cost per Person Trip	$41.92

Source: Tempe Public Works Department

Development Fee Report – Plan-Based

The cost to prepare the Street Facilities IIP and development fees totals $32,110. Tempe plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of new residential and nonresidential development from the *Land Use Assumptions* document, the cost is $0.22 per person trip.

Figure S19: Development Fee Report

Necessary Public Service	Cost	Proportionate Share		Service Unit	5-Year Change	Cost per Service Unit
Fire	$29,000	Residential	72%	Population	14,100	$1.48
		Nonresidential	28%	Vehicle Trips	63,727	$0.13
Parks and Recreational	$29,000	Residential	88%	Population	14,100	$1.81
		Nonresidential	12%	Jobs	19,598	$0.18
Police	$29,000	Residential	53%	Population	14,100	$1.09
		Nonresidential	47%	Vehicle Trips	63,727	$0.21
Street	$32,110	All Development	100%	Person Trips	147,102	$0.22
Total	$119,110					

STREET FACILITIES DEVELOPMENT FEES

Revenue Credit/Offset

A revenue credit/offset is not necessary for development fees, because Tempe's construction transaction privilege tax rate equals the amount of the transaction privilege tax rate imposed on the majority of other transaction privilege tax classifications. Appendix A contains the forecast of revenues required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)).

Street Facilities Development Fees

North Service Area

Figure S20 includes infrastructure components and cost factors for street facilities development fees in the north service area. The cost per service unit is $85.53 per person trip.

Street facilities development fees for residential development are assessed per housing unit, based on unit size, and vary proportionately according to the number of person trips per housing unit. For a residential unit with 1,200 square feet, the fee of $437 is calculated using a cost of $85.53 per person trip multiplied by a demand unit of 5.11 person trips per housing unit.

Street facilities development fees for nonresidential development are assessed per 1,000 square feet and vary proportionately according to the number of person trips. For industrial development, the fee of $328 per 1,000 square feet is calculated using a cost of $85.53 per person trip multiplied by 3.84 person trips per 1,000 square feet.

Figure S20: Street Facilities Development Fees

Fee Component	Cost per Trip
Street Improvements	$25.48
Bike / Ped Improvements	$1.73
Bus Pullouts	$16.18
Traffic Signals	$41.92
Development Fee Report	$0.22
Total	$85.53

Residential Fees per Unit				
Unit Size	Avg Weekday Person Trips[1]	Proposed Fees	Current Fees	Difference
900 or less	3.18	$272	$192	$80
901 to 1,400	5.11	$437	$306	$131
1,401 to 1,900	6.44	$551	$386	$165
1,901 or more	7.46	$638	$454	$184

Nonresidential Fees per 1,000 Square Feet				
Development Type	Avg Weekday Person Trips[1]	Proposed Fees	Current Fees	Difference
Industrial	3.84	$328	$215	$113
Commercial	19.28	$1,649	$1,078	$571
Office & Other Services	8.55	$731	$422	$309
Institutional	12.21	$1,044	$558	$486

1. See Land Use Assumptions

South Service Area

Figure S21 includes infrastructure components and cost factors for street facilities development fees in the south service area. The cost per service unit is $81.27 per person trip.

Street facilities development fees for residential development are assessed per housing unit, based on unit size, and vary proportionately according to the number of person trips per housing unit. For a residential unit with 1,200 square feet, the fee of $415 is calculated using a cost of $81.27 per person trip multiplied by a demand unit of 5.11 person trips per housing unit.

Street facilities development fees for nonresidential development are assessed per 1,000 square feet and vary proportionately according to the number of person trips. For industrial development, the fee of $312 per 1,000 square feet is calculated using a cost of $81.27 per person trip multiplied by 3.84 person trips per 1,000 square feet.

Figure S21: Street Facilities Development Fees

Fee Component	Cost per Trip
Street Improvements	$21.22
Bike / Ped Improvements	$1.73
Bus Pullouts	$16.18
Traffic Signals	$41.92
Development Fee Report	$0.22
Total	$81.27

Residential Fees per Unit				
Unit Size	Avg Weekday Person Trips[1]	Proposed Fees	Current Fees	Difference
900 or less	3.18	$258	$151	$107
901 to 1,400	5.11	$415	$241	$174
1,401 to 1,900	6.44	$523	$303	$220
1,901 or more	7.46	$606	$356	$250

Nonresidential Fees per 1,000 Square Feet				
Development Type	Avg Weekday Person Trips[1]	Proposed Fees	Current Fees	Difference
Industrial	3.84	$312	$169	$143
Commercial	19.28	$1,567	$847	$720
Office & Other Services	8.55	$695	$331	$364
Institutional	12.21	$992	$438	$554

1. See Land Use Assumptions

STREET FACILITIES DEVELOPMENT FEE REVENUE

Appendix A contains revenue forecasts required by Arizona's Enabling Legislation (ARS § 9-463.05(E)(7)).

North Service Area

Projected fee revenue shown in Figure S22 is based on the development projections in the *Land Use Assumptions* document and the updated street facilities development fees in the north service area. If development occurs faster than projected, the demand for infrastructure will increase along with development fee revenue. If development occurs slower than projected, the demand for infrastructure will decrease and development fee revenue will decrease at a similar rate. Projected development fee revenue equals $15,977,274 and projected expenditures equal $43,670,626. Since Tempe will assess residential development fees based on unit size, and the analysis projects residential development fee revenue based on a residential unit with 1,200 square feet (average size residential unit), actual development fee revenue will vary based on the actual mix of future residential units. Tempe will fund existing development's share of costs with non-development fee revenues.

Figure S22: Street Facilities Development Fee Revenue

Fee Component	Growth Share	Existing Share	Total
Street Improvements	$4,214,451	$14,693,285	$18,907,736
Bike / Ped Improvements	$362,447	$12,204,622	$12,567,069
Bus Pullouts	$3,388,711	$0	$3,388,711
Traffic Signals	$8,782,407	$0	$8,782,407
Development Fee Report	$24,703	$0	$24,703
Total	$16,772,719	$26,897,907	$43,670,626

Year		Residential $437 per unit	Industrial $328 per 1,000 sq ft	Commercial $1,649 per 1,000 sq ft	Office & Other $731 per 1,000 sq ft	Institutional $1,044 per 1,000 sq ft
		Hsg Unit	KSF	KSF	KSF	KSF
Base	2024	43,653	9,476	5,089	15,356	15,878
Year 1	2025	45,248	9,695	5,158	15,780	16,547
Year 2	2026	46,482	9,914	5,226	16,204	17,217
Year 3	2027	47,613	10,132	5,295	16,628	17,887
Year 4	2028	49,312	10,351	5,364	17,052	18,556
Year 5	2029	51,165	10,570	5,432	17,476	19,226
Year 6	2030	53,861	10,789	5,501	17,900	19,896
Year 7	2031	54,705	10,779	5,585	18,049	20,439
Year 8	2032	56,316	10,770	5,669	18,198	20,982
Year 9	2033	57,687	10,760	5,753	18,347	21,525
Year 10	2034	58,867	10,751	5,837	18,495	22,068
10-Year Increase		15,214	1,275	747	3,140	6,191
Projected Revenue		$6,181,712	$410,458	$1,139,916	$2,192,368	$6,052,819

Projected Fee Revenue	$15,977,274
Total Expenditures	$43,670,626

South Service Area

Projected fee revenue shown in Figure S23 is based on the development projections in the *Land Use Assumptions* document and the updated street facilities development fees in the north service area. If development occurs faster than projected, the demand for infrastructure will increase along with development fee revenue. If development occurs slower than projected, the demand for infrastructure will decrease and development fee revenue will decrease at a similar rate. Projected development fee revenue equals $3,669,358 and projected expenditures equal $17,502,372. Since Tempe will assess residential development fees based on unit size, and the analysis projects residential development fee revenue based on a residential unit with 1,200 square feet (average size residential unit), actual development fee revenue will vary based on the actual mix of future residential units. Tempe will fund existing development's share of costs with non-development fee revenues.

Figure S23: Street Facilities Development Fee Revenue

Fee Component	Growth Share	Existing Share	Total
Street Improvements	$719,975	$1,602,525	$2,322,500
Bike / Ped Improvements	$86,361	$12,186,080	$12,272,440
Bus Pullouts	$807,432	$0	$807,432
Traffic Signals	$2,092,593	$0	$2,092,593
Development Fee Report	$7,407	$0	$7,407
Total	$3,713,767	$13,788,605	$17,502,372

Year		Residential $241 per unit	Industrial $312 per 1,000 sq ft	Commercial $1,567 per 1,000 sq ft	Office & Other $695 per 1,000 sq ft	Institutional $992 per 1,000 sq ft
		Hsg Unit	KSF	KSF	KSF	KSF
Base	2024	47,207	14,945	8,454	13,267	8,540
Year 1	2025	47,325	15,050	8,524	13,530	8,717
Year 2	2026	47,416	15,154	8,593	13,793	8,894
Year 3	2027	47,500	15,259	8,662	14,056	9,071
Year 4	2028	47,625	15,364	8,732	14,318	9,247
Year 5	2029	47,762	15,468	8,801	14,581	9,424
Year 6	2030	47,333	15,573	8,871	14,844	9,601
Year 7	2031	47,466	15,638	8,898	14,917	9,644
Year 8	2032	47,720	15,703	8,926	14,990	9,687
Year 9	2033	47,937	15,768	8,954	15,063	9,730
Year 10	2034	48,123	15,833	8,982	15,136	9,773
10-Year Increase		916	888	528	1,869	1,233
Projected Revenue		$340,699	$246,935	$752,345	$1,197,255	$1,132,123

Projected Fee Revenue	$3,669,358
Total Expenditures	$17,502,372

APPENDIX A: FORECAST OF REVENUES OTHER THAN FEES

ARS § 9-463.05(E)(7) requires:

> *"A forecast of revenues generated by new service units other than development fees, which shall include estimated state-shared revenue, highway users revenue, federal revenue, ad valorem property taxes, construction contracting or similar excise taxes and the capital recovery portion of utility fees attributable to development based on the approved land use assumptions, and a plan to include these contributions in determining the extent of the burden imposed by the development as required in subsection B, paragraph 12 of this section."*

ARS § 9-463.05(B)(12) states,

> *"The municipality shall forecast the contribution to be made in the future in cash or by taxes, fees, assessments or other sources of revenue derived from the property owner towards the capital costs of the necessary public service covered by the development fee and shall include these contributions in determining the extent of the burden imposed by the development. Beginning August 1, 2014, for purposes of calculating the required offset to development fees pursuant to this subsection, if a municipality imposes a construction contracting or similar excise tax rate in excess of the percentage amount of the transaction privilege tax rate imposed on the majority of other transaction privilege tax classifications, the entire excess portion of the construction contracting or similar excise tax shall be treated as a contribution to the capital costs of necessary public services provided to development for which development fees are assessed, unless the excess portion was already taken into account for such purpose pursuant to this subsection."*

REVENUE PROJECTIONS

Tempe does not have a higher-than-normal construction excise tax rate; therefore, the required offset described above is not applicable. Shown in Figure A1, Tempe provided the required forecast of non-development fee revenue from identified sources that can be attributed to future development over a period of five years. Tempe directs the revenues shown below to non-development fee eligible capital needs including maintenance, repair, and replacement.

Figure A1: Revenue Projections

Source	FY2024-25	FY2025-26	FY2026-27	FY2027-28	FY2028-29
Intergovernmental	$79,194,360	$78,210,763	$81,809,305	$85,487,276	$89,515,732
Secondary Property Tax Levies	$40,060,989	$41,976,304	$43,515,442	$45,109,192	$46,761,155
Privilege Use Tax	$149,599,423	$149,554,122	$156,265,420	$162,972,936	$170,678,329
Total	$268,854,772	$269,741,189	$281,590,166	$293,569,404	$306,955,216

Source: Tempe Financial Services Department, FY2024-25 Long-Range Financial Forecast

APPENDIX B: PROFESSIONAL SERVICES

As stated in Arizona's development fee enabling legislation, "a municipality may assess development fees to offset costs to the municipality associated with providing necessary public services to a development, including the costs of infrastructure, improvements, real property, engineering and architectural services, financing and professional services required for the preparation or revision of a development fee pursuant to this section, including the relevant portion of the infrastructure improvements plan" (see ARS § 9-463.05.A). Because development fees must be updated at least every five years, the cost of professional services is allocated to the projected increase in service units, over five years (see Figure B1). Qualified professionals must develop the IIP, using generally accepted engineering and planning practices. A qualified professional is defined as "a professional engineer, surveyor, financial analyst or planner providing services within the scope of the person's license, education or experience".

Figure B1: Cost of Professional Services

Necessary Public Service	Cost	Proportionate Share		Service Unit	5-Year Change	Cost per Service Unit
Fire	$29,000	Residential	72%	Population	14,100	$1.48
		Nonresidential	28%	Vehicle Trips	63,727	$0.13
Parks and Recreational	$29,000	Residential	88%	Population	14,100	$1.81
		Nonresidential	12%	Jobs	19,598	$0.18
Police	$29,000	Residential	53%	Population	14,100	$1.09
		Nonresidential	47%	Vehicle Trips	63,727	$0.21
Street	$32,110	All Development	100%	Person Trips	147,102	$0.22
Total	$119,110					

APPENDIX C: LAND USE DEFINITIONS

RESIDENTIAL DEVELOPMENT

As discussed below, residential development categories are based on data from the U.S. Census Bureau, American Community Survey. Development fees will be assessed to all new residential units. One-time development fees are determined by site capacity (i.e., number of residential units).

Single Family:

1. Single-family detached is a one-unit structure detached from any other house, that is, with open space on all four sides. Such structures are considered detached even if they have an adjoining shed or garage. A one-family house that contains a business is considered detached as long as the building has open space on all four sides.
2. Single-family attached (townhouse) is a one-unit structure that has one or more walls extending from ground to roof separating it from adjoining structures. In row houses (sometimes called townhouses), double houses, or houses attached to nonresidential structures, each house is a separate, attached structure if the dividing or common wall goes from ground to roof.
3. Mobile home includes both occupied and vacant mobile homes, to which no permanent rooms have been added. Mobile homes used only for business purposes or for extra sleeping space and mobile homes for sale on a dealer's lot, at the factory, or in storage are not counted in the housing inventory.

Multi-Family:

3. Includes units in structures containing two or more housing units, further categorized as units in structures with "2, 3 or 4, 5 to 9, 10 to 19, 20 to 49, and 50 or more apartments."
1. Includes any living quarters occupied as a housing unit that does not fit the other categories (e.g., houseboats, railroad cars, campers, and vans). Recreational vehicles, boats, vans, railroad cars, and the like are included only if they are occupied as a current place of residence.

NONRESIDENTIAL DEVELOPMENT

The proposed general nonresidential development categories (defined below) can be used for all new construction. Nonresidential development categories represent general groups of land uses that share similar average weekday vehicle trip generation rates and employment densities (i.e., jobs per thousand square feet of floor area).

Commercial: Establishments primarily selling merchandise, eating/drinking places, and entertainment uses. By way of example, commercial includes shopping centers, supermarkets, pharmacies, restaurants, bars, nightclubs, automobile dealerships, and movie theaters.

Industrial: Establishments primarily engaged in the production, transportation, or storage of goods. By way of example, industrial includes manufacturing plants, distribution warehouses, trucking companies, utility substations, power generation facilities, and telecommunications buildings.

Institutional: Public and quasi-public buildings providing educational, social assistance, or religious services. By way of example, institutional includes schools, universities, churches, daycare facilities, and government buildings.

Office and Other Services: Establishments providing management, administrative, professional, or business services; personal and health care services; and lodging facilities. By way of example, Office and Other services includes banks, business offices; hotels and motels; assisted-living facilities, nursing homes and hospitals.