

# Capital Improvement Plan and Impact Fee Report

Prepared for:  
**Portland, Tennessee**

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## EXECUTIVE SUMMARY

The City of Portland, Tennessee, retained TischlerBise to analyze the impacts of future development on capital facilities and to calculate impact fees based on that analysis. Through interviews and discussions with staff, TischlerBise developed the proposed impact fees discussed in this report. Impact fees are collected from new construction at the time a building permit is issued and used to construct system improvements needed to accommodate future development. An impact fee represents future development's proportionate share of capital facility needs. Impact fees do have limitations, and should not be regarded as the total solution for infrastructure funding needs. Rather, they are one component of a comprehensive portfolio to ensure provision of adequate public facilities needed to serve future development. In contrast to general taxes, impact fees may not be used for operations, maintenance, replacement of infrastructure, or correcting existing deficiencies.

The City of Portland has experienced steady residential and industrial growth in recent years, and this growth is expected to continue in the future. As a result, Portland must plan for future infrastructure improvements. This report includes the following infrastructure categories:

- Fire
- Parks
- Police

## TENNESSEE LEGAL FRAMEWORK

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While the State of Tennessee does not have specific authorizing legislation for impact fees, the State does grant the power for municipalities with a mayor-aldermanic charter to impose impact fees on new development. As a mayor-aldermanic charter city, the City of Portland may:

“Establish, open, relocate, vacate, alter, widen, extend, grade, improve, repair, construct, reconstruct, maintain, light, sprinkle and clean public highways, streets, boulevards, parkways, sidewalks, alleys, parks, public grounds, public facilities, libraries and squares, wharves, bridges, viaducts, subways, tunnels, sewers and drains within or without the corporate limits, regulate their use within the corporate limits, assess fees for the use of or impact upon such property and facilities, and take and appropriate property therefor under § 7-31-107 -- 7-31-111 and § 29-16-203, or any other manner provided by general laws.” (Tenn. Code Ann. § 6-2-201 (15))

## GENERAL LEGAL FRAMEWORK

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Both state and federal courts have recognized the imposition of impact fees as a legitimate form of land use regulation, provided the fees meet standards intended to protect against regulatory takings. Land use regulations, development exactions, and impact fees are subject to the Fifth Amendment prohibition on taking of private property for public use without just compensation. To comply with the Fifth Amendment, development regulations must be shown to substantially advance a legitimate governmental interest. In the case of impact fees, that interest is in the protection of public health, safety, and welfare by ensuring development is not detrimental to the quality of essential public services. The means to this end are also important, requiring both procedural and substantive due process. The process followed to receive community input (i.e. stakeholder meetings, work sessions, and public hearings) provides opportunities for comments and refinements to the impact fees.

There is little federal case law specifically dealing with impact fees, although other rulings on other types of exactions (e.g., land dedication requirements) are relevant. In one of the most important exaction cases, the U. S. Supreme Court found that a government agency imposing exactions on development must demonstrate an “essential nexus” between the exaction and the interest being protected (see *Nollan v. California Coastal Commission*, 1987). In a more recent case (*Dolan v. City of Tigard, OR*, 1994), the Court ruled that an exaction must also be “roughly proportional” to the burden created by development. However, the *Dolan* decision appeared to set a higher standard of review for mandatory dedications of land than for monetary exactions such as impact fees.

There are three reasonable relationship requirements for impact 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 impact fees under the U.S. Constitution, we prefer a more rigorous formulation that recognizes three elements: “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. Individual elements of the nexus standard are discussed further in the following paragraphs.

All new development in a community creates additional demands on some, or all, public facilities provided by local government. If the capacity of facilities is not increased to satisfy that additional demand, the quality or availability of public services for the entire community will deteriorate. Impact 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 impact fees. In this study, the impact of development on infrastructure needs is analyzed in terms of quantifiable relationships between various types of development and the demand for specific capital facilities, based on applicable level-of-service standards.

The requirement that exactions be proportional to the impacts of development was clearly stated by the U.S. Supreme Court in the *Dolan* case 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 impact fees for various types of facilities and categories of development. The demand for capital facilities is measured in terms of relevant and measurable attributes of development (e.g. a typical housing unit's average weekday vehicle trips).

A sufficient benefit relationship requires that impact fee revenues be segregated from other funds and expended only on the facilities for which the fees were charged. Impact 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 legislation requires that facilities funded with fee revenues be available *exclusively* to development paying the fees. In other words, benefit may extend to a general area including multiple real estate developments. Procedures for the earmarking and expenditure of fee revenues are discussed near the end of this study. All of these procedural as well as substantive issues are intended to ensure that new development benefits from the impact fees they are required to pay. The authority and procedures to implement impact fees is separate from and complementary to the authority to require improvements as part of subdivision or zoning review.

As documented in this report, the City of Portland has complied with applicable legal precedents. Impact fees are proportionate and reasonably related to the capital improvement demands of new development. Specific costs have been identified using local data and current dollars. With input from City staff, TischlerBise identified demand indicators for each type of infrastructure and calculated proportionate share factors to allocate costs by type of development. This report documents the formulas and input variables used to calculate the impact fees for each type of public facility. Impact fee methodologies also identify the extent to which new development is entitled to various types of credits to avoid potential double payment of growth-related capital costs.

## **GENERAL METHODOLOGIES**

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There are three general methodologies for calculating impact fees. The choice of a particular methodology depends primarily on the timing of infrastructure construction (past, concurrent, or future) and service characteristics of the facility type being addressed. 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 impact 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 impact 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 three basic methodologies for calculating impact fees and how those methodologies can be applied.

### **Cost Recovery (Past Improvements)**

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

### **Incremental Expansion (Concurrent Improvements)**

The incremental expansion methodology documents current level-of-service (LOS) standards for each type of public facility, using both quantitative and qualitative measures. This approach assumes there are no deficiencies or surplus capacity in existing infrastructure, and future development is paying only its proportionate share for growth-related infrastructure. Revenue will be used to expand or provide additional facilities, as needed, to accommodate future development. An incremental expansion cost methodology 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 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).

### CONCEPTUAL IMPACT FEE CALCULATION

In contrast to project-level improvements, impact fees fund growth-related infrastructure that will benefit multiple development projects, or the entire jurisdiction (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 demand units for each unit of development. For example, an appropriate indicator of the demand for park facilities is population growth, and the increase in population can be estimated from the average number of residents per housing unit. The second step in the impact fee formula is to determine infrastructure units per demand unit, typically called level-of-service (LOS) standards. In keeping with the parks example, a common LOS standard is park amenities per resident. The third step in the impact fee formula is the cost of various infrastructure units. To complete the parks example, this part of the formula would establish the cost for purchasing and/or constructing new park amenities.

### CREDITS

Regardless of the methodology, a consideration of credits is integral to the development of a legally defensible impact fee. There are two types of credits that should be addressed in impact fee studies and ordinances. The first is a revenue credit due to possible double payment situations, which could occur when other revenues may contribute to the capital costs of infrastructure covered by the impact fee. This type of credit 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.

### PROPOSED FEE METHODOLOGIES AND COST COMPONENTS

Shown below, Figure 1 summarizes the methodologies and cost allocation components used for each infrastructure category in Portland’s impact fee report. Parks costs were allocated to residential development, while Fire and Police costs were allocated to both residential and nonresidential development. Population was used as the cost allocation factor for residential development, while jobs and nonresidential vehicle trips were used as the cost allocation factors for nonresidential development.

**Figure 1: Proposed Fee Methodologies and Cost Components**

Infrastructure Category	Service Area	Cost Recovery	Incremental Expansion	Plan-Based	Cost Allocation
Fire	Portland	N/A	Fire Facilities, Fire Apparatus	Impact Fee Report	Population, Jobs
Parks	Portland	N/A	Park Improvements	Impact Fee Report	Population
Police	Portland	N/A	Police Facilities, Police Vehicles	Impact Fee Report	Population, Vehicle Trips

**IMPACT FEE SCHEDULE**

For residential development, proposed fees are assessed per housing unit by type of unit. The proposed residential fee categories include single family and multi-family. Single-family units include detached, attached (i.e. “townhouse”), and mobile home units. Multi-family units include duplexes, condominiums and apartments with two or more units. For nonresidential development, fees are assessed per 1,000 square feet of floor area, except hotel, which is assessed per room. The proposed fee schedule for nonresidential development is designed to provide a reasonable impact fee determination for six broad property classes – industrial, warehouse, commercial, office & other service, institutional, and hotel.

**Maximum Allowable Impact Fees**

Figure 2 summarizes the maximum allowable impact fees for future development in Portland. The amounts shown are based on the methodologies, levels of service, and costs for the capital improvements identified in this report. The fees represent the highest amount feasible for each type of applicable development, which represent future development’s fair share of the system improvement costs detailed in this report. Portland may adopt amounts that are lower than the maximum amounts shown; however, a reduction in fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in Portland’s level of service.

**Figure 2: Maximum Allowable Impact Fees**

Residential Development		Fees per Unit		
Development Type	Fire	Parks	Police	Total
Single Family	\$1,444	\$1,194	\$631	\$3,269
Multi-Family	\$864	\$715	\$377	\$1,956

Nonresidential Development		Fees per 1,000 Square Feet		
Development Type	Fire	Parks	Police	Total
Industrial	\$657	\$0	\$192	\$849
Warehouse	\$478	\$0	\$165	\$643
Commercial	\$967	\$0	\$1,218	\$2,185
Office & Other Service	\$1,225	\$0	\$476	\$1,702
Institutional	\$384	\$0	\$630	\$1,013
Hotel (per room)	\$241	\$0	\$409	\$649

A note on rounding: Calculations throughout this report are based on an analysis conducted using Excel software. Most results are discussed in the report using one, two, and three digit 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).

### Proposed Impact Fees

Portland’s Board of Aldermen plans to adopt impact fees equal to 38 percent of the maximum allowable impact fees shown in Figure 2. Shown below, Figure 3 includes the proposed impact fees.

**Figure 3: Proposed Impact Fees**

Residential Development		Fees per Unit		
Development Type	Fire	Parks	Police	Total
Single Family	\$549	\$454	\$240	\$1,242
Multi-Family	\$328	\$272	\$143	\$743

Nonresidential Development		Fees per 1,000 Square Feet		
Development Type	Fire	Parks	Police	Total
Industrial	\$249	\$0	\$73	\$323
Warehouse	\$182	\$0	\$63	\$244
Commercial	\$367	\$0	\$463	\$830
Office & Other Service	\$466	\$0	\$181	\$647
Institutional	\$146	\$0	\$239	\$385
Hotel (per room)	\$91	\$0	\$155	\$247

### Current Impact Fees

The current residential fee categories include single family and multi-family. For single family, current fees are assessed per housing unit by size of unit. For multi-family, current fees are assessed per housing unit. The current nonresidential fee category includes institutional development with fees assessed per 1,000 square feet of floor area. Portland does not assess impact fees to other nonresidential development.

**Figure 4: Current Impact Fees**

Residential Development		Fees per Unit		
Development Type	Fire	Parks	Police	Total
Single Family <1,500 sq. ft.	\$196	\$1,098	\$196	\$1,489
Single Family 1,501 to 2,999 sq. ft.	\$219	\$1,228	\$219	\$1,665
Single Family >3,000 sq. ft.	\$261	\$1,416	\$261	\$1,938
Multi-Family	\$162	\$907	\$162	\$1,231

Nonresidential Development		Fees per 1,000 Square Feet		
Development Type	Fire	Parks	Police	Total
Industrial	\$0	\$0	\$0	\$0
Commercial	\$0	\$0	\$0	\$0
Office & Other Service	\$0	\$0	\$0	\$0
Institutional	\$279	\$0	\$279	\$558
Hotel (per room)	\$0	\$0	\$0	\$0

### Difference Between Current and Proposed Impact Fees

The differences between current and proposed impact fees are displayed below in Figure 5. For single family, the difference is based on the current single family 1,501 to 2,999 square feet category. Amounts shown in red represent a decrease, and amounts shown in black represent an increase.

**Figure 5: Difference Between Current and Proposed Impact Fees**

Residential Development		Fees per Unit		
Development Type	Fire	Parks	Police	Total
Single Family	\$330	(\$774)	\$21	(\$423)
Multi-Family	\$166	(\$635)	(\$19)	(\$488)

Nonresidential Development		Fees per 1,000 Square Feet		
Development Type	Fire	Parks	Police	Total
Industrial	\$249	\$0	\$73	\$323
Warehouse	\$182	\$0	\$63	\$244
Commercial	\$367	\$0	\$463	\$830
Office & Other Service	\$466	\$0	\$181	\$647
Institutional	(\$133)	\$0	(\$40)	(\$173)
Hotel (per room)	\$91	\$0	\$155	\$247

## FIRE IMPACT FEES

### METHODOLOGY

The Fire impact fee includes components for fire facilities, fire apparatus, and the cost of preparing the Fire impact fee and related Impact Fee Report. Fire impact fees use the incremental expansion methodology for fire facilities and fire apparatus and the plan-based methodology for the Impact Fee Report. Costs are allocated to both residential and nonresidential development using different demand indicators for each type of development.

### SERVICE UNITS

Residential impact fees are calculated on a per capita basis, then converted to an appropriate amount for each type of housing unit based on the number of persons per housing unit (PPHU). As shown in Figure F1, the current PPHU factors are 2.74 persons per single-family unit and 1.64 persons per multi-family unit. These factors are based on the U.S. Census Bureau’s 2013-2017 American Community Survey 5-year estimates (further discussed in Appendix A).

Nonresidential impact fees are calculated on a per job basis, then converted to an appropriate amount for each type of nonresidential development based on the number of jobs per 1,000 square feet of floor area as reported by the Institute of Transportation Engineers. As shown below, the current employment factors per 1,000 square feet of floor area are 1.59 jobs for industrial, 1.16 jobs for warehouse, 2.34 jobs for commercial, 2.97 jobs for office and other service, 0.93 jobs for institutional, and 0.58 jobs per room for hotel. These factors are defined in *Trip Generation, 10<sup>th</sup> Edition*, published in 2017 by the Institute of Transportation Engineers (further discussed in Appendix A).

**Figure F1: Service Units**

Development Type	Persons per Housing Unit <sup>1</sup>
Single Family	2.74
Multi-Family	1.64

Development Type	Jobs per 1,000 Sq Ft <sup>1</sup>
Industrial	1.59
Warehouse	1.16
Commercial	2.34
Office & Other Service	2.97
Institutional	0.93
Hotel (per room)	0.58

1. See Land Use Assumptions

## PROPORTIONATE SHARE

TischlerBise recommends functional population to allocate the cost of fire infrastructure to residential and nonresidential development. Functional population is similar to what the U.S. Census Bureau calls "daytime population," by accounting for people living and working in a jurisdiction, but also considers commuting patterns and time spent at home and at nonresidential locations. OnTheMap is a web-based mapping and reporting application that shows where workers are employed and where they live. It describes geographic patterns of jobs by their employment locations and residential locations as well as the connections between the two locations. OnTheMap was developed through a unique partnership between the U.S. Census Bureau and its Local Employment Dynamics (LED) partner states.

Residents that do not work are assigned 20 hours per day to residential development and four hours per day to nonresidential development (annualized averages). Residents employed in Portland are assigned 14 hours to residential development and 10 hours to nonresidential development. Residents employed outside Portland are assigned 14 hours to residential development. Inflow commuters are assigned 10 hours to nonresidential development. Based on 2015 functional population data, the residential allocation is 69 percent, and the nonresidential allocation is 31 percent.

Figure F2: Functional Population

Demand Units in 2015					
<b>Residential</b>				Demand Hours/Day	Person Hours
Population	12,011				
Residents Not Working	6,242			20	124,848
Employed Residents	5,769				
Residents Employed in Portland	1,253			14	17,542
Residents Employed outside Portland	4,516			14	63,224
Residential Subtotal					205,614
<b>Residential Share</b>					<b>69%</b>
<b>Nonresidential</b>					
Residents Not Working	6,242			4	24,970
Jobs Located in Portland	6,872				
Residents Employed in Portland	1,253			10	12,530
Non-Resident Workers (Inflow Commuters)	5,619			10	56,190
Nonresidential Subtotal					93,690
<b>Nonresidential Share</b>					<b>31%</b>
Total					299,304

Source: U.S. Census Bureau, OnTheMap 6.1.1 Application and LEHD Origin-Destination Employment Statistics.

**FIRE FACILITIES – INCREMENTAL EXPANSION**

Portland plans to expand its current inventory of fire facilities to serve future development. As shown in Figure F3, Portland’s existing fire stations total 18,000 square feet. Functional population provides the proportionate share of demand for fire facilities from residential and nonresidential development. Portland’s existing level of service for residential development is 0.9577 square feet per person (18,000 square feet X 69 percent residential share / 12,968 persons). The nonresidential level of service is 0.7551 square feet per job (18,000 square feet X 31 percent nonresidential share / 7,390 jobs).

Based on estimates provided by Portland’s Fire Department, construction of an 8,600-square-foot fire station will cost \$2,408,000 – this results in a facility cost of \$280 per square foot. For fire facilities, the cost is \$268.16 per person (0.9577 square feet per person X \$280 per square foot) and \$211.43 per job (0.7551 square feet per job X \$280 per square foot).

**Figure F3: Fire Facilities Level of Service**

Description	Square Feet
Station 1	11,000
Station 2	7,000
<b>Total</b>	<b>18,000</b>

Cost Allocation Factors	
Planned Station Cost	\$2,408,000
Planned Station Square Feet	8,600
Cost per Square Foot	\$280

Level-of-Service (LOS) Standards	
Existing Square Feet	18,000
Residential	
Residential Share	69%
2019 Population	12,968
Square Feet per Person	0.9577
<b>Cost per Person</b>	<b>\$268.16</b>
Nonresidential	
Nonresidential Share	31%
2019 Jobs	7,390
Square Feet per Job	0.7551
<b>Cost per Job</b>	<b>\$211.43</b>

Source: Town of Portland, Tennessee

**FIRE APPARATUS – INCREMENTAL EXPANSION**

Portland plans to expand its current inventory of fire apparatus to serve future development. As shown in Figure F4, Portland’s existing fleet includes 8.0 fire apparatus with an average replacement cost of \$584,500 per apparatus. Functional population provides the proportionate share of demand for fire apparatus from residential and nonresidential development. Portland’s existing level of service for residential development is 0.0004 units per person (8.0 apparatus X 69 percent residential share / 12,968 persons). The nonresidential level of service is 0.0003 units per job (8.0 apparatus X 31 percent nonresidential share / 7,390 jobs).

Based on the total replacement cost of \$4,676,000 for Portland’s existing 8.0 apparatus, the average replacement cost is \$584,500 per unit. For fire apparatus, the cost is \$248.80 per person (0.0004 units per person X \$584,500 per unit) and \$196.16 per job (0.0003 units per job X \$584,500 per unit).

**Figure F4: Fire Apparatus Level of Service**

Description	Unit Cost
Engine 5	\$500,000
Engine 6	\$500,000
Brush 7	\$50,000
Ladder 2	\$1,300,000
Engine 2	\$500,000
Engine 11	\$500,000
Ladder 1	\$1,300,000
Mobile Air Trailer	\$26,000
<b>Total</b>	<b>\$4,676,000</b>

Cost Allocation Factors	
Cost per Unit	\$584,500

Level-of-Service (LOS) Standards	
Existing Units	8
Residential	
Residential Share	69%
2019 Population	12,968
Units per Person	0.0004
<b>Cost per Person</b>	<b>\$248.80</b>
Nonresidential	
Nonresidential Share	31%
2019 Jobs	7,390
Units per Job	0.0003
<b>Cost per Job</b>	<b>\$196.16</b>

Source: Town of Portland, Tennessee

**IMPACT FEE REPORT – PLAN-BASED**

The cost to prepare the Fire impact fees totals \$17,256, and Portland plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of new residential and nonresidential development shown in Appendix A, the cost is \$9.97 per person and \$5.07 per job.

**Figure F5: Impact Fee Report Cost Allocation**

Fee Component	Cost	Proportionate Share		Service Unit	Change	Cost per Service Unit
Fire	\$17,256	Residential	69%	Population	1,194	\$9.97
		Nonresidential	31%	Jobs	1,056	\$5.07
Parks	\$15,898	Residential	100%	Population	1,194	\$13.31
		Nonresidential	0%	Jobs	1,056	\$0.00
Police	\$11,086	Residential	69%	Population	1,194	\$6.41
		Nonresidential	31%	Vehicle Trips	1,854	\$1.85
Total	\$44,240					

**PROJECTED DEMAND FOR GROWTH-RELATED FIRE INFRASTRUCTURE**

To accommodate projected development over the next ten years, Portland will construct additional fire facilities and purchase additional apparatus as development occurs. Figure F6 demonstrates growth-related demand for fire facilities, and Figure F7 demonstrates growth-related demand for fire apparatus.

**Fire Facilities**

Shown in Figure F6, Portland’s population is projected to increase by 2,388 persons by 2029, and employment is projected to increase by 2,111 jobs during the same period. Using the 2019 LOS, future residential development will demand 2,287 additional square feet of fire facilities (2,388 additional persons X 0.9577 square feet per person), and future nonresidential development will demand 1,594 additional square feet of fire facilities (2,111 additional jobs X 0.7551 square feet per job). Based on demand for approximately 3,882 square feet of new fire facilities and an average cost of \$280 per square foot, the growth-related expenditure on fire facilities is \$1,086,820.

**Figure F6: Growth-Related Demand for Fire Facilities**

Type of Infrastructure	Level of Service	Demand Unit	Cost per Sq Ft
Fire Facilities	0.9577 Square Feet	per Person	\$280
	0.7551 Square Feet	per Job	

Demand for Fire Facilities					
Year	Population	Jobs	Square Feet		
			Residential	Nonresidential	Total
2019	12,968	7,390	12,420.0	5,580.0	18,000.0
2020	13,207	7,601	12,648.7	5,739.4	18,388.1
2021	13,446	7,812	12,877.5	5,898.8	18,776.3
2022	13,685	8,023	13,106.2	6,058.3	19,164.4
2023	13,924	8,234	13,334.9	6,217.7	19,552.6
2024	14,162	8,445	13,563.7	6,377.1	19,940.7
2025	14,401	8,657	13,792.4	6,536.5	20,328.9
2026	14,640	8,868	14,021.1	6,695.9	20,717.0
2027	14,879	9,079	14,249.9	6,855.3	21,105.2
2028	15,118	9,290	14,478.6	7,014.8	21,493.3
2029	15,357	9,501	14,707.3	7,174.2	21,881.5
10-Yr Increase	2,388	2,111	2,287.3	1,594.2	3,881.5

Growth-Related Expenditures	\$640,452	\$446,368	\$1,086,820
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## Fire Apparatus

Shown in Figure F7, Portland’s population is projected to increase by 2,388 persons by 2029, and employment is projected to increase by 2,111 jobs during the same period. Using the 2019 LOS, future residential development will demand approximately 1.0 additional apparatus (2,388 additional persons X 0.0004 units per person), and future nonresidential development will demand approximately 0.7 additional apparatus (2,111 additional jobs X 0.0003 units per job). Based on demand for approximately 1.7 additional fire apparatus and an average cost of \$584,500 per unit, the growth-related expenditure on fire apparatus is \$1,008,327.

**Figure F7: Growth-Related Demand for Fire Apparatus**

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Fire Apparatus	0.0004 Units	per Person	\$584,500
	0.0003 Units	per Job	

Demand for Fire Apparatus					
Year	Population	Jobs	Units		
			Residential	Nonresidential	Total
2019	12,968	7,390	5.5	2.5	8.0
2020	13,207	7,601	5.6	2.6	8.2
2021	13,446	7,812	5.7	2.6	8.3
2022	13,685	8,023	5.8	2.7	8.5
2023	13,924	8,234	5.9	2.8	8.7
2024	14,162	8,445	6.0	2.8	8.9
2025	14,401	8,657	6.1	2.9	9.0
2026	14,640	8,868	6.2	3.0	9.2
2027	14,879	9,079	6.3	3.0	9.4
2028	15,118	9,290	6.4	3.1	9.6
2029	15,357	9,501	6.5	3.2	9.7
10-Yr Increase	2,388	2,111	1.0	0.7	1.7

<b>Growth-Related Expenditures</b>	<b>\$594,198</b>	<b>\$414,130</b>	<b>\$1,008,327</b>
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**MAXIMUM ALLOWABLE FIRE IMPACT FEES**

Infrastructure components and cost factors used to calculate Maximum Allowable Fire Impact Fees are summarized in the upper portion of Figure F8. Residential fees are calculated using a cost of \$526.93 per person and the average number of persons per housing unit. Nonresidential fees are calculated using a cost of \$412.65 per job and the average number of jobs per 1,000 square feet of floor area.

Maximum Allowable Fire Impact Fees for residential development are assessed according to the number of persons per housing unit. For a single-family unit, the fee of \$1,444 is calculated using a cost of \$526.93 per person multiplied by 2.74 persons per housing unit.

Maximum Allowable Fire Impact Fees for nonresidential development are assessed according to the number of jobs per 1,000 square feet of floor area. For industrial development, the fee of \$657 per 1,000 square feet of floor area is calculated using a cost of \$412.65 per job multiplied by 1.59 jobs per 1,000 square feet of floor area.

**Figure F8: Maximum Allowable Fire Impact Fees**

Fee Component	Cost per Person	Cost per Job
Fire Facilities	\$268.16	\$211.43
Fire Apparatus	\$248.80	\$196.16
Impact Fee Study	\$9.97	\$5.07
<b>Total</b>	<b>\$526.93</b>	<b>\$412.65</b>

Residential Development		Fees per Unit		
Development Type	Persons per Housing Unit <sup>1</sup>	Proposed Fees	Current Fees	Increase / Decrease
Single Family	2.74	\$1,444	\$219	\$1,225
Multi-Family	1.64	\$864	\$162	\$702

Nonresidential Development		Fees per 1,000 Square Feet		
Development Type	Jobs per 1,000 Sq Ft <sup>1</sup>	Proposed Fees	Current Fees	Increase / Decrease
Industrial	1.59	\$657	\$0	\$657
Warehouse	1.16	\$478	\$0	\$478
Commercial	2.34	\$967	\$0	\$967
Office & Other Service	2.97	\$1,225	\$0	\$1,225
Institutional	0.93	\$384	\$279	\$105
Hotel (per room)	0.58	\$241	\$0	\$241

1. See Land Use Assumptions

**PROJECTED FIRE IMPACT FEE REVENUE**

Revenue projections assume implementation of the Maximum Allowable Fire Impact Fees and that development over the next ten years is consistent with the development projections in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure F9, projected fee revenue equals \$2.11 million over the next ten years compared to projected expenditures of \$2.11 million.

**Figure F9: Projected Fire Impact Fee Revenue**

Fee Component	Growth Share	Existing Share	Total
Fire Facilities	\$1,086,820	\$0	\$1,086,820
Fire Apparatus	\$1,008,327	\$0	\$1,008,327
Impact Fee Study	\$17,256	\$0	\$17,256
<b>Total</b>	<b>\$2,112,403</b>	<b>\$0</b>	<b>\$2,112,403</b>

		Single Family \$1,444 per unit	Multi-Family \$864 per unit	Industrial \$657 per KSF	Commercial \$967 per KSF	Office & Other \$1,225 per KSF	Institutional \$384 per KSF
Year		Hsg Unit	Hsg Unit	KSF	KSF	KSF	KSF
Base	2019	4,650	545	3,321	299	406	211
Year 1	2020	4,731	555	3,421	307	416	216
Year 2	2021	4,812	565	3,521	314	426	221
Year 3	2022	4,894	574	3,621	322	436	226
Year 4	2023	4,975	584	3,721	329	446	231
Year 5	2024	5,057	593	3,821	337	456	236
Year 6	2025	5,138	603	3,921	344	466	241
Year 7	2026	5,220	612	4,021	352	476	246
Year 8	2027	5,301	622	4,121	359	486	251
Year 9	2028	5,383	631	4,221	367	496	256
Year 10	2029	5,464	641	4,321	374	506	261
10-Year Increase		814	96	1,000	75	100	50
Projected Revenue		\$1,164,767	\$81,790	\$652,536	\$72,076	\$121,785	\$19,061

Projected Fee Revenue	\$2,112,015
Total Expenditures	\$2,112,403

## PARKS IMPACT FEES

### METHODOLOGY

The Parks impact fee includes components for park improvements and the cost of preparing the Parks impact fee and related Impact Fee Report. Parks impact fees use the incremental expansion methodology for park improvements and the plan-based methodology for the Impact Fee Report. Costs are allocated only to residential development using different demand indicators for each type of development.

### SERVICE UNITS

Residential impact fees are calculated on a per capita basis, then converted to an appropriate amount for each type of housing unit based on the number of persons per housing unit (PPHU). As shown in Figure PR1, the current PPHU factors are 2.74 persons per single-family unit and 1.64 persons per multi-family unit. These factors are based on the U.S. Census Bureau's 2013-2017 American Community Survey 5-year estimates (further discussed in Appendix A).

Nonresidential impact fees are calculated on a per job basis, then converted to an appropriate amount for each type of nonresidential development based on the number of jobs per 1,000 square feet of floor area as reported by the Institute of Transportation Engineers. As shown below, the current employment factors per 1,000 square feet of floor area are 1.59 jobs for industrial, 1.16 jobs for warehouse, 2.34 jobs for commercial, 2.97 jobs for office and other service, 0.93 jobs for institutional, and 0.58 jobs per room for hotel. These factors are defined in *Trip Generation, 10<sup>th</sup> Edition*, published in 2017 by the Institute of Transportation Engineers (further discussed in Appendix A).

Figure PR1: Service Units

Development Type	Persons per Housing Unit <sup>1</sup>
Single Family	2.74
Multi-Family	1.64

Development Type	Jobs per 1,000 Sq Ft <sup>1</sup>
Industrial	1.59
Warehouse	1.16
Commercial	2.34
Office & Other Service	2.97
Institutional	0.93
Hotel (per room)	0.58

1. See Land Use Assumptions

### PROPORTIONATE SHARE

TischlerBise recommends allocating 100 percent of the cost of parks infrastructure to residential development since nonresidential development likely generates a negligible demand for parks infrastructure.

**PARK IMPROVEMENTS – INCREMENTAL EXPANSION**

Portland plans to expand its current inventory of 938 park improvements to serve future development. The analysis allocates 100 percent of demand for park improvements to residential development. Portland’s existing level of service for residential development is 0.0723 improvements per person (938 improvements X 100 percent residential share / 12,968 persons). The nonresidential level of service is 0.0000 improvements per job (938 improvements X zero percent nonresidential share / 7,390 jobs).

Based on the total replacement cost of \$5,480,000 for Portland’s existing 938 park improvements, the average replacement cost is \$5,842 per improvement. For park improvements, the cost is \$422.57 per person (0.0723 improvements per person X \$5,842 per improvement) and \$0.00 per job (0.0000 improvements per job X \$5,842 per improvement).

**Figure PR2: Park Improvements Level of Service**

Description	Improvements	Unit Cost	Replacement Cost
Soccer Fields	7	\$100,000	\$700,000
Football Fields	1	\$120,000	\$120,000
Baseball Fields	5	\$100,000	\$500,000
Softball Fields	3	\$200,000	\$600,000
Basketball Courts	2	\$15,000	\$30,000
Picnic Shelters	4	\$15,000	\$60,000
Playgrounds	4	\$50,000	\$200,000
Tennis Courts	2	\$100,000	\$200,000
Restrooms	8	\$200,000	\$1,600,000
Concession Stands	1	\$700,000	\$700,000
Skate Park	1	\$50,000	\$50,000
Parking Spaces	900	\$800	\$720,000
<b>Total</b>	<b>938</b>	<b>\$5,842</b>	<b>\$5,480,000</b>

Cost Allocation Factors	
Cost per Improvement	\$5,842

Level-of-Service (LOS) Standards	
Existing Improvements	938
Residential	
Residential Share	100%
2019 Population	12,968
Improvements per Person	0.0723
Cost per Person	\$422.57
Nonresidential	
Nonresidential Share	0%
2019 Jobs	7,390
Improvements per Job	0.0000
Cost per Job	\$0.00

Source: Town of Portland, Tennessee

**IMPACT FEE REPORT – PLAN-BASED**

The cost to prepare the Parks impact fees totals \$15,898, and Portland plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of new residential and nonresidential development shown in Appendix A, the cost is \$13.31 per person and \$0.00 per job.

**Figure PR3: Impact Fee Report Cost Allocation**

Fee Component	Cost	Proportionate Share		Service Unit	Change	Cost per Service Unit
Fire	\$17,256	Residential	69%	Population	1,194	\$9.97
		Nonresidential	31%	Jobs	1,056	\$5.07
Parks	\$15,898	Residential	100%	Population	1,194	\$13.31
		Nonresidential	0%	Jobs	1,056	\$0.00
Police	\$11,086	Residential	69%	Population	1,194	\$6.41
		Nonresidential	31%	Vehicle Trips	1,854	\$1.85
Total	\$44,240					

**PROJECTED DEMAND FOR GROWTH-RELATED PARKS INFRASTRUCTURE**

To accommodate projected development over the next ten years, Portland will construct additional park improvements as development occurs. Figure PR4 demonstrates growth-related demand for park improvements. Portland’s population is projected to increase by 2,388 persons by 2029, and employment is projected to increase by 2,111 jobs during the same period. Using the 2019 LOS, future residential development will demand approximately 173 additional park improvements (2,388 additional persons X 0.0723 improvements per person), and future nonresidential development will demand no additional park improvements (2,111 additional jobs X 0.000 improvements per job). Based on demand for approximately 173 park improvements and an average cost of \$5,842 per improvement, the growth-related expenditure on park improvements is \$1,009,225.

**Figure PR4: Growth-Related Demand for Park Improvements**

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Park Improvements	0.0723 Improvements	per Person	\$5,842
	0.0000 Improvements	per Job	

Demand for Park Improvements					
Year	Population	Jobs	Improvements		
			Residential	Nonresidential	Total
2019	12,968	7,390	938.0	0.0	938.0
2020	13,207	7,601	955.3	0.0	955.3
2021	13,446	7,812	972.5	0.0	972.5
2022	13,685	8,023	989.8	0.0	989.8
2023	13,924	8,234	1,007.1	0.0	1,007.1
2024	14,162	8,445	1,024.4	0.0	1,024.4
2025	14,401	8,657	1,041.6	0.0	1,041.6
2026	14,640	8,868	1,058.9	0.0	1,058.9
2027	14,879	9,079	1,076.2	0.0	1,076.2
2028	15,118	9,290	1,093.5	0.0	1,093.5
2029	15,357	9,501	1,110.7	0.0	1,110.7
10-Yr Increase	2,388	2,111	172.7	0.0	172.7

Growth-Related Expenditures	\$1,009,225	\$0	\$1,009,225
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**MAXIMUM ALLOWABLE PARKS IMPACT FEES**

Infrastructure components and cost factors used to calculate Maximum Allowable Parks Impact Fees are summarized in the upper portion of Figure PR5. Residential fees are calculated using a cost of \$435.88 per person and the average number of persons per housing unit. Nonresidential fees are calculated using a cost of \$0.00 per job and the average number of jobs per 1,000 square feet of floor area.

Maximum Allowable Parks Impact Fees for residential development are assessed according to the number of persons per housing unit. For a single-family unit, the fee of \$1,194 is calculated using a cost of \$435.88 per person multiplied by 2.74 persons per housing unit.

Maximum Allowable Parks Impact Fees for nonresidential development are assessed according to the number of jobs per 1,000 square feet of floor area. For industrial development, the fee of \$0 per 1,000 square feet of floor area is calculated using a cost of \$0.00 per job multiplied by 1.59 jobs per 1,000 square feet of floor area.

**Figure PR5: Maximum Allowable Parks Impact Fees**

Fee Component	Cost per Person	Cost per Job
Park Improvements	\$422.57	\$0.00
Impact Fee Study	\$13.31	\$0.00
<b>Total</b>	<b>\$435.88</b>	<b>\$0.00</b>

Residential Development	Fees per Unit			
Development Type	Persons per Housing Unit <sup>1</sup>	Proposed Fees	Current Fees	Increase / Decrease
Single Family	2.74	\$1,194	\$1,228	(\$34)
Multi-Family	1.64	\$715	\$907	(\$192)

Nonresidential Development	Fees per 1,000 Square Feet			
Development Type	Jobs per 1,000 Sq Ft <sup>1</sup>	Proposed Fees	Current Fees	Increase / Decrease
Industrial	1.59	\$0	\$0	\$0
Warehouse	1.16	\$0	\$0	\$0
Commercial	2.34	\$0	\$0	\$0
Office & Other Service	2.97	\$0	\$0	\$0
Institutional	0.93	\$0	\$0	\$0
Hotel (per room)	0.58	\$0	\$0	\$0

1. See Land Use Assumptions

**PROJECTED PARKS IMPACT FEE REVENUE**

Revenue projections assume implementation of the Maximum Allowable Parks Impact Fees and that development over the next ten years is consistent with the development projections in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure PR6, projected fee revenue equals \$1.03 million over the next ten years compared to projected expenditures of \$1.03 million.

**Figure PR6: Projected Parks Impact Fee Revenue**

Fee Component	Growth Share	Existing Share	Total
Park Improvements	\$1,009,225	\$0	\$1,009,225
Impact Fee Study	\$15,898	\$0	\$15,898
<b>Total</b>	<b>\$1,025,123</b>	<b>\$0</b>	<b>\$1,025,123</b>

		Single Family \$1,194 per unit	Multi-Family \$715 per unit	Industrial \$0 per KSF	Commercial \$0 per KSF	Office & Other \$0 per KSF	Institutional \$0 per KSF
Year		Hsg Unit	Hsg Unit	KSF	KSF	KSF	KSF
Base	2019	4,650	545	3,321	299	406	211
Year 1	2020	4,731	555	3,421	307	416	216
Year 2	2021	4,812	565	3,521	314	426	221
Year 3	2022	4,894	574	3,621	322	436	226
Year 4	2023	4,975	584	3,721	329	446	231
Year 5	2024	5,057	593	3,821	337	456	236
Year 6	2025	5,138	603	3,921	344	466	241
Year 7	2026	5,220	612	4,021	352	476	246
Year 8	2027	5,301	622	4,121	359	486	251
Year 9	2028	5,383	631	4,221	367	496	256
Year 10	2029	5,464	641	4,321	374	506	261
10-Year Increase		814	96	1,000	75	100	50
Projected Revenue		\$957,862	\$67,261	\$0	\$0	\$0	\$0

Projected Fee Revenue	\$1,025,123
Total Expenditures	\$1,025,123

## POLICE IMPACT FEES

### METHODOLOGY

The Police impact fee includes components for police facilities, police vehicles, and the cost of preparing the Police impact fee and related Impact Fee Report. Police impact fees use the incremental expansion methodology for police facilities and police vehicles and the plan-based methodology for the Impact Fee Report. Costs are allocated to both residential and nonresidential development using different demand indicators for each type of development.

### SERVICE UNITS

Residential impact fees are calculated on a per capita basis, then converted to an appropriate amount for each type of housing unit based on the number of persons per housing unit (PPHU). As shown in Figure P1, the current PPHU factors are 2.74 persons per single-family unit and 1.64 persons per multi-family unit. These factors are based on the U.S. Census Bureau’s 2013-2017 American Community Survey 5-year estimates (further discussed in Appendix A).

Nonresidential impact fees are calculated on a per vehicle trip basis, then converted to an appropriate amount for each type of nonresidential development based on the number of vehicle trip ends generated per 1,000 square feet of floor area, and a trip rate adjustment factor, as reported by the Institute of Transportation Engineers. A trip end represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). Trip ends for nonresidential development are calculated per thousand square feet, and require an adjustment factor to avoid double counting each trip at both the origin and destination points. As shown below, the current vehicle trip generation factors per 1,000 square feet of floor area are 1.97 trips for industrial, 1.69 trips for warehouse, 12.46 trips for commercial, 4.87 trips for office and other service, 6.44 trips for institutional, and 4.18 trips per room for hotel. These factors are defined in *Trip Generation, 10<sup>th</sup> Edition*, published in 2017 by the Institute of Transportation Engineers (further discussed in Appendix A).

**Figure P1: Service Units**

Development Type	Persons per Housing Unit <sup>1</sup>
Single Family	2.74
Multi-Family	1.64

Development Type	Avg Wkdy Veh Trip Ends <sup>1</sup>	Trip Rate Adjustment	Average Weekday Vehicle Trips
Industrial	3.93	50%	1.97
Warehouse	3.37	50%	1.69
Commercial	37.75	33%	12.46
Office & Other Service	9.74	50%	4.87
Institutional	19.52	33%	6.44
Hotel (per room)	8.36	50%	4.18

1. See Land Use Assumptions

**PROPORTIONATE SHARE**

TischlerBise recommends functional population to allocate the cost of police infrastructure to residential and nonresidential development. Functional population is similar to what the U.S. Census Bureau calls "daytime population," by accounting for people living and working in a jurisdiction, but also considers commuting patterns and time spent at home and at nonresidential locations. OnTheMap is a web-based mapping and reporting application that shows where workers are employed and where they live. It describes geographic patterns of jobs by their employment locations and residential locations as well as the connections between the two locations. OnTheMap was developed through a unique partnership between the U.S. Census Bureau and its Local Employment Dynamics (LED) partner states.

Residents that do not work are assigned 20 hours per day to residential development and four hours per day to nonresidential development (annualized averages). Residents employed in Portland are assigned 14 hours to residential development and 10 hours to nonresidential development. Residents employed outside Portland are assigned 14 hours to residential development. Inflow commuters are assigned 10 hours to nonresidential development. Based on 2015 functional population data, the residential allocation is 69 percent, and the nonresidential allocation is 31 percent.

**Figure P2: Functional Population**

Demand Units in 2015				
<b>Residential</b>				
Population	12,011		Demand Hours/Day	Person Hours
Residents Not Working	6,242		20	124,848
Employed Residents	5,769			
Residents Employed in Portland	1,253		14	17,542
Residents Employed outside Portland	4,516		14	63,224
			Residential Subtotal	205,614
			<b>Residential Share</b>	<b>69%</b>
<b>Nonresidential</b>				
Residents Not Working	6,242		4	24,970
Jobs Located in Portland	6,872			
Residents Employed in Portland	1,253		10	12,530
Non-Resident Workers (Inflow Commuters)	5,619		10	56,190
			Nonresidential Subtotal	93,690
			<b>Nonresidential Share</b>	<b>31%</b>
			Total	299,304

Source: U.S. Census Bureau, OnTheMap 6.1.1 Application and LEHD Origin-Destination Employment Statistics.

**POLICE FACILITIES – INCREMENTAL EXPANSION**

Portland plans to expand its current inventory of police facilities to serve future development. As shown in Figure P3, Portland’s existing police facilities total 12,000 square feet. Functional population provides the proportionate share of demand for police facilities from residential and nonresidential development. Portland’s existing level of service for residential development is 0.6385 square feet per person (12,000 square feet X 69 percent residential share / 12,968 persons). The nonresidential level of service is 0.2738 square feet per vehicle trip (12,000 square feet X 31 percent nonresidential share / 13,589 vehicle trips).

Based on estimates provided by Portland’s Police Department, construction of an 8,000-square-foot police station expansion will cost \$1,800,000 – this results in a facility cost of \$225 per square foot. For police facilities, the cost is \$143.66 per person (0.6385 square feet per person X \$225 per square foot) and \$61.60 per vehicle trip (0.2738 square feet per vehicle trip X \$225 per square foot).

**Figure P3: Police Facilities Level of Service**

Description	Square Feet
Police Station	12,000

Cost Allocation Factors	
Facility Expansion Cost	\$1,800,000
Facility Expansion Square Feet	8,000
Cost per Square Foot	\$225

Level-of-Service (LOS) Standards	
Existing Square Feet	12,000
Residential	
Residential Share	69%
2019 Population	12,968
Square Feet per Person	0.6385
Cost per Person	\$143.66
Nonresidential	
Nonresidential Share	31%
2019 Vehicle Trips	13,589
Square Feet per Vehicle Trip	0.2738
Cost per Vehicle Trip	\$61.60

Source: Town of Portland, Tennessee

**POLICE VEHICLES – INCREMENTAL EXPANSION**

Portland plans to expand its current inventory of police vehicles to serve future development. As shown in Figure P4, Portland’s existing fleet includes 35 police vehicles with an average replacement cost of \$43,000 per vehicle. Functional population provides the proportionate share of demand for police vehicles from residential and nonresidential development. Portland’s existing level of service for residential development is 0.0019 units per person (35 police vehicles X 69 percent residential share / 12,968 persons). The nonresidential level of service is 0.0008 units per vehicle trip (35 police vehicles X 31 percent nonresidential share / 13,589 vehicle trips).

Based on estimates from Portland’s Police Department, the average cost is \$43,000 per unit. For police vehicles, the cost is \$80.08 per person (0.0019 units per person X \$43,000 per unit) and \$34.33 per vehicle trip (0.0008 units per vehicle trip X \$43,000 per unit).

**Figure P4: Police Vehicles Level of Service**

Description	Units
Patrol Vehicles	35

Cost Allocation Factors	
Cost per Unit	\$43,000

Level-of-Service (LOS) Standards	
Existing Units	35
Residential	
Residential Share	69%
2019 Population	12,968
Units per Person	0.0019
Cost per Person	\$80.08
Nonresidential	
Nonresidential Share	31%
2019 Vehicle Trips	13,589
Units per Vehicle Trip	0.0008
Cost per Vehicle Trip	\$34.33

Source: Town of Portland, Tennessee

**IMPACT FEE REPORT – PLAN-BASED**

The cost to prepare the Police impact fees totals \$11,086, and Portland plans to update its report every five years. Based on this cost, proportionate share, and five-year projections of new residential and nonresidential development shown in Appendix A, the cost is \$6.41 per person and \$1.85 per vehicle trip.

**Figure P5: Impact Fee Report Cost Allocation**

Fee Component	Cost	Proportionate Share		Service Unit	Change	Cost per Service Unit
Fire	\$17,256	Residential	69%	Population	1,194	\$9.97
		Nonresidential	31%	Jobs	1,056	\$5.07
Parks	\$15,898	Residential	100%	Population	1,194	\$13.31
		Nonresidential	0%	Jobs	1,056	\$0.00
Police	\$11,086	Residential	69%	Population	1,194	\$6.41
		Nonresidential	31%	Vehicle Trips	1,854	\$1.85
Total	\$44,240					

**PROJECTED DEMAND FOR GROWTH-RELATED POLICE INFRASTRUCTURE**

To accommodate projected development over the next ten years, Portland will construct additional police facilities and purchase additional police vehicles as development occurs. Figure P6 demonstrates growth-related demand for police facilities, and Figure P7 demonstrates growth-related demand for police vehicles.

**Police Facilities**

Shown in Figure P6, Portland’s population is projected to increase by 2,388 persons by 2029, and nonresidential vehicle trips are projected to increase by 3,708 vehicle trips during the same period. Using the 2019 LOS, future residential development will demand 1,525 additional square feet of police facilities (2,388 additional persons X 0.6385 square feet per person), and future nonresidential development will demand 1,015 additional square feet of police facilities (2,111 additional vehicle trips X 0.2738 square feet per vehicle trip). Based on demand for approximately 2,540 square feet of new police facilities and an average cost of \$225 per square foot, the growth-related expenditure on police facilities is \$571,520.

**Figure P6: Growth-Related Demand for Police Facilities**

Type of Infrastructure	Level of Service	Demand Unit	Cost per Sq Ft
Police Facilities	0.6385 Square Feet	per Person	\$225
	0.2738 Square Feet	per Vehicle Trip	

Demand for Police Facilities					
Year	Population	Vehicle Trips	Square Feet		
			Residential	Nonresidential	Total
2019	12,968	13,589	8,280	3,720	12,000
2020	13,207	13,959	8,432	3,822	12,254
2021	13,446	14,330	8,585	3,923	12,508
2022	13,685	14,701	8,737	4,025	12,762
2023	13,924	15,072	8,890	4,126	13,016
2024	14,162	15,443	9,042	4,228	13,270
2025	14,401	15,814	9,195	4,329	13,524
2026	14,640	16,185	9,347	4,431	13,778
2027	14,879	16,555	9,500	4,532	14,032
2028	15,118	16,926	9,652	4,634	14,286
2029	15,357	17,297	9,805	4,735	14,540
10-Yr Increase	2,388	3,708	1,525	1,015	2,540

<b>Growth-Related Expenditures</b>	<b>\$343,100</b>	<b>\$228,421</b>	<b>\$571,520</b>
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**Police Vehicles**

Shown in Figure P7, Portland’s population is projected to increase by 2,388 persons by 2029, and vehicle trips are projected to increase by 3,708 vehicle trips during the same period. Using the 2019 LOS, future residential development will demand approximately 4.4 additional police vehicles (2,388 additional persons X 0.0019 units per person), and future nonresidential development will demand approximately 3.0 additional police vehicles (2,111 additional vehicle trips X 0.0008 units per vehicle trip). Based on demand for approximately 7.4 additional police vehicles and an average cost of \$43,000 per unit, the growth-related expenditure on police vehicles is \$318,570.

**Figure P7: Growth-Related Demand for Police Vehicles**

Type of Infrastructure	Level of Service	Demand Unit	Cost per Unit
Police Vehicles	0.0019 Units	per Person	\$43,000
	0.0008 Units	per Vehicle Trip	

Demand for Police Vehicles					
Year	Population	Vehicle Trips	Units		
			Residential	Nonresidential	Total
2019	12,968	13,589	24.2	10.9	35.0
2020	13,207	13,959	24.6	11.1	35.7
2021	13,446	14,330	25.0	11.4	36.5
2022	13,685	14,701	25.5	11.7	37.2
2023	13,924	15,072	25.9	12.0	38.0
2024	14,162	15,443	26.4	12.3	38.7
2025	14,401	15,814	26.8	12.6	39.4
2026	14,640	16,185	27.3	12.9	40.2
2027	14,879	16,555	27.7	13.2	40.9
2028	15,118	16,926	28.2	13.5	41.7
2029	15,357	17,297	28.6	13.8	42.4
10-Yr Increase	2,388	3,708	4.4	3.0	7.4

Growth-Related Expenditures	\$191,246	\$127,323	\$318,570
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**MAXIMUM ALLOWABLE POLICE IMPACT FEES**

Infrastructure components and cost factors used to calculate Maximum Allowable Police Impact Fees are summarized in the upper portion of Figure P8. Residential fees are calculated using a cost of \$230.14 per person and the average number of persons per housing unit. Nonresidential fees are calculated using a cost of \$97.78 per vehicle trip and the average number of vehicle trips per 1,000 square feet of floor area.

Maximum Allowable Police Impact Fees for residential development are assessed according to the number of persons per housing unit. For a single-family unit, the fee of \$631 is calculated using a cost of \$230.14 per person multiplied by 2.74 persons per housing unit.

Maximum Allowable Police Impact Fees for nonresidential development are assessed according to the number of vehicle trips per 1,000 square feet of floor area. For industrial development, the fee of \$192 per 1,000 square feet of floor area is calculated using a cost of \$97.78 per vehicle trip multiplied by 1.97 vehicle trips per 1,000 square feet of floor area.

**Figure P8: Maximum Allowable Police Impact Fees**

Fee Component	Cost per Person	Cost per Trip
Police Facilities	\$143.66	\$61.60
Police Vehicles	\$80.08	\$34.33
Impact Fee Study	\$6.41	\$1.85
<b>Total</b>	<b>\$230.14</b>	<b>\$97.78</b>

Residential Development		Fees per Unit		
Development Type	Persons per Housing Unit <sup>1</sup>	Proposed Fees	Current Fees	Increase / Decrease
Single Family	2.74	\$631	\$219	\$412
Multi-Family	1.64	\$377	\$162	\$215

Nonresidential Development		Fees per 1,000 Square Feet		
Development Type	Average Wkdy Vehicle Trips <sup>1</sup>	Proposed Fees	Current Fees	Increase / Decrease
Industrial	1.97	\$192	\$0	\$192
Warehouse	1.69	\$165	\$0	\$165
Commercial	12.46	\$1,218	\$0	\$1,218
Office & Other Service	4.87	\$476	\$0	\$476
Institutional	6.44	\$630	\$279	\$351
Hotel (per room)	4.18	\$409	\$0	\$409

1. See Land Use Assumptions

**PROJECTED POLICE IMPACT FEE REVENUE**

Revenue projections assume implementation of the Maximum Allowable Police Impact Fees and that development over the next ten years is consistent with the development projections in Appendix A. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue. As shown in Figure P9, projected fee revenue equals \$0.90 million over the next ten years compared to projected expenditures of \$0.90 million.

**Figure P9: Projected Police Impact Fee Revenue**

Fee Component	Growth Share	Existing Share	Total
Police Facilities	\$571,520	\$0	\$571,520
Police Vehicles	\$318,570	\$0	\$318,570
Impact Fee Study	\$11,086	\$0	\$11,086
<b>Total</b>	<b>\$901,175</b>	<b>\$0</b>	<b>\$901,175</b>

		Single Family \$631 per unit	Multi-Family \$377 per unit	Industrial \$192 per KSF	Commercial \$1,218 per KSF	Office & Other \$476 per KSF	Institutional \$630 per KSF
Year		Hsg Unit	Hsg Unit	KSF	KSF	KSF	KSF
Base	2019	4,650	545	3,321	299	406	211
Year 1	2020	4,731	555	3,421	307	416	216
Year 2	2021	4,812	565	3,521	314	426	221
Year 3	2022	4,894	574	3,621	322	436	226
Year 4	2023	4,975	584	3,721	329	446	231
Year 5	2024	5,057	593	3,821	337	456	236
Year 6	2025	5,138	603	3,921	344	466	241
Year 7	2026	5,220	612	4,021	352	476	246
Year 8	2027	5,301	622	4,121	359	486	251
Year 9	2028	5,383	631	4,221	367	496	256
Year 10	2029	5,464	641	4,321	374	506	261
10-Year Increase		814	96	1,000	75	100	50
Projected Revenue		\$506,433	\$35,562	\$190,322	\$90,494	\$47,169	\$31,195

Projected Fee Revenue	\$901,175
Total Expenditures	\$901,175

## APPENDIX A: LAND USE ASSUMPTIONS

TischlerBise prepared current demographic estimates and future development projections for both residential and nonresidential development that will be used in the calculation of the impact fees. Current demographic data estimates for 2019 are used in calculating levels of service (LOS) provided to existing development in the City of Portland. Although long-range projections are necessary for planning infrastructure systems, a shorter time frame of five to ten years is critical for the impact fee analysis. The estimates and projections of residential and nonresidential development in this document are for areas within the boundaries of the City of Portland, Tennessee.

### SUMMARY OF GROWTH INDICATORS

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Key land use assumptions for the City of Portland Impact Fee Report are population, housing units, and employment projections. Based on discussions with staff, TischlerBise projects housing unit growth using recent building permit data. TischlerBise derives population estimates by converting annual housing unit growth to population using persons per housing unit factors. For nonresidential development, the base year employment estimate is calculated based on 2015 estimates from the U.S. Census Bureau's OnTheMap web application. The nonresidential floor area projections use recent construction trends, and employment projections are based on average square feet per job multipliers. The projections contained in this document provide the foundation for the Development Impact Fee Study.

Development projections and growth rates are summarized in Figure A11. These projections will be used to estimate impact fee revenue and to indicate the anticipated need for growth-related infrastructure. However, impact fee methodologies are designed to reduce sensitivity to development projections in the determination of the proportionate share fee amounts. If actual development does not meet development projections, fee revenue will decline, but so will the need for growth-related infrastructure. In contrast, if development exceeds development projections, fee revenue will increase, but Portland will also need to accelerate infrastructure improvements to keep pace with the actual rate of development.

## RESIDENTIAL DEVELOPMENT

Current estimates and future projections of residential development are detailed in this section including population and housing units by type.

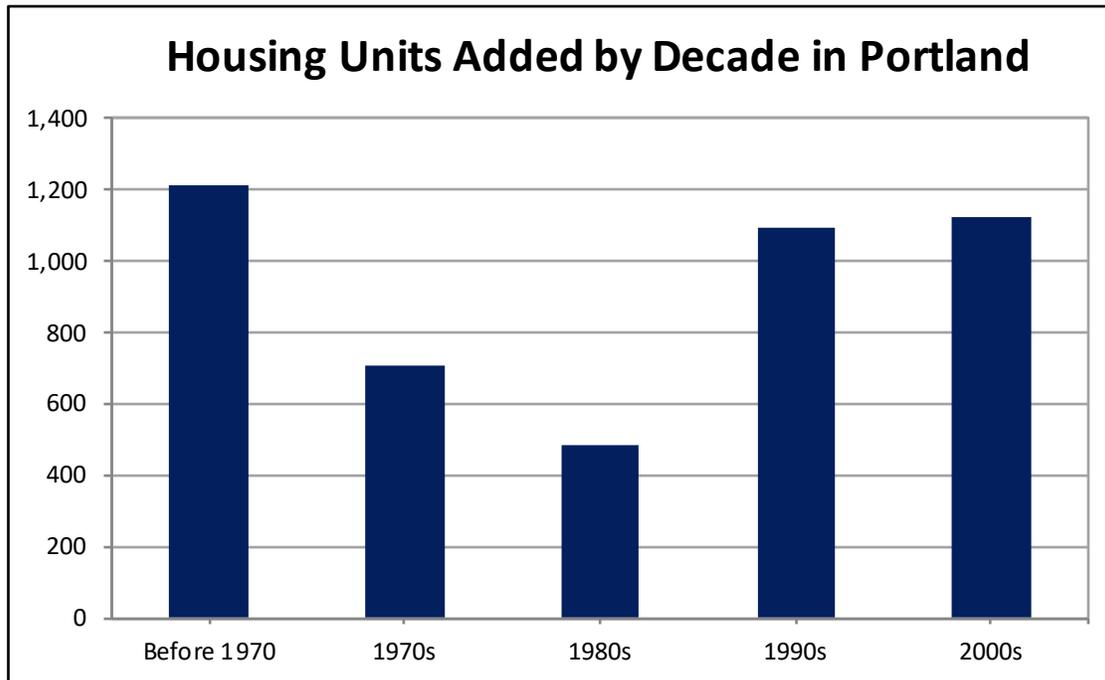
### Recent Residential Construction

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 A1 indicates the estimated number of housing units added by decade according to data obtained from the U.S. Census Bureau. Portland experienced strong growth in the 1990s and 2000s. From 2000 to 2010, Portland's housing inventory increased by an average of 112 units per year.

Figure A1: Housing Units by Decade

Census 2010 Housing Units	4,624
Census 2000 Housing Units	3,502
New Housing Units 2000 to 2010	1,122

Portland added an average of 112 housing units per year from 2000 to 2010.



Source: U.S. Census Bureau, Census 2010 Summary File 1, Census 2000 Summary File 1, 2013-2017 5-Year American Community Survey (for 1990s and earlier, adjusted to yield total units in 2000).

## Occupancy Characteristics

According to the U.S. Census Bureau, a household is a housing unit occupied by year-round residents. Development impact 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 Portland impose development impact fees for residential development according to the number of year-round residents per housing unit. This methodology assumes some portion of the housing stock will be vacant during the course of a year. According to the U.S. Census Bureau American Community Survey, Portland’s housing unit vacancy rate was 9.0 percent in 2017.

PPHU 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). For development fees in Portland, detached stick-built units and attached units (commonly known as townhouses, which share a common sidewall, but are constructed on an individual parcel of land) are included in the “Single-Family Units” category. The second residential category includes duplexes and all other structures with two or more units on an individual parcel of land. This category is referred to as “Multi-Family Units.” (Note: housing unit estimates from ACS will not equal decennial census counts of units. These data are used only to derive the custom PPHU factors for each type of unit).

Figure A2 below shows the 2013-2017 ACS 5-Year Estimates for Portland. Single-family units averaged 2.74 persons per housing unit (11,436 persons / 4,172 housing units), and multi-family units averaged 1.64 persons per housing unit (806 persons / 490 housing units). In 2017, Portland’s housing stock averaged 2.63 persons per housing unit.

**Figure A2: Persons per Housing Unit**

Housing Type	Persons	Households	Persons per Household	Housing Units	Persons per Housing Unit	Housing Mix	Vacancy Rate
Single-Family Units <sup>1</sup>	11,436	3,831	2.99	4,172	<b>2.74</b>	89.5%	8.20%
Multi-Family Units <sup>2</sup>	806	410	1.97	490	<b>1.64</b>	10.5%	16.30%
Total	12,242	4,241	2.89	4,662	<b>2.63</b>	100.0%	9.00%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates, Tables B25024, B25032, B25033.

1. Includes detached, attached (i.e. townhouses), and mobile home units.

2. Includes dwellings in structures with two or more units.

**Population and Housing Unit Estimates**

To accurately determine current population and housing units, TischlerBise uses 2010 Census estimates and recent building permit data. According to the 2010 Census, Portland’s 2010 population was 11,467 persons and there were 4,624 housing units. Since 2010, Portland issued 480 building permits for new residential development – this results in a 2018 estimate of 5,104 housing units. Applying the citywide persons per housing unit estimate to the additional housing units results in a population increase of 1,262 persons (2.63 PPHU X 480 additional housing units). This results in a 2018 population of 12,729 persons.

**Population and Housing Unit Projections**

This analysis projects housing units based on the three-year average of 91 residential building permits per year (87 in 2016, 104 in 2017, and 82 in 2018). Converting housing unit projections to population projections using 2.63 persons per housing unit results in a 2019 (base year) estimate of 5,195 housing units and 12,968 persons.

The housing units are distributed by type based on the housing mix detailed in Figure A2. Therefore, 89.5 percent of new units will be single-family units and 10.5 percent of new units will be multi-family units. For this study, it is assumed that the persons per housing unit ratio will remain constant. TischlerBise projects a 10-year increase of 910 housing units, or an average of 91 housing units annually, and a corresponding 10-year increase of 2,388 persons, or an average of 234 persons annually.

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.

**Figure A3: Residential Development Projections**

	2018	2019	2024	2029	10-Year Increase
		Base Year	5	10	
<b>Population</b>	<b>12,729</b>	<b>12,968</b>	<b>14,162</b>	<b>15,357</b>	<b>2,388</b>
<b>Housing Units</b>	<b>5,104</b>	<b>5,195</b>	<b>5,650</b>	<b>6,105</b>	<b>910</b>

## NONRESIDENTIAL DEVELOPMENT

Current estimates and future projections of nonresidential development are detailed in this section including jobs and nonresidential floor area.

### Building Area Ratios

TischlerBise uses 2017 Institute of Transportation Engineers (ITE) data as a proxy for future nonresidential floor area. The prototype for industrial development is Manufacturing (ITE 140) with an average of 628 square feet per employee, commercial development uses Shopping Center (ITE 820) and averages 427 square feet per job, office development uses General Office (ITE 710) that averages 337 square feet per job, and institutional development uses Elementary School (ITE 520) with an average of 1,076 square feet per job. TischlerBise applies these building area ratios to employment estimates, discussed next, to estimate nonresidential floor area.

**Figure A4: The Institute of Transportation Engineers, Employee and Building Area Ratios**

ITE Code	Land Use / Size	Demand Unit	Wkdy Trip Ends Per Dmd Unit <sup>1</sup>	Wkdy Trip Ends Per Employee <sup>1</sup>	Emp Per Dmd Unit	Sq Ft Per Emp
110	Light Industrial	1,000 Sq Ft	4.96	3.05	1.63	615
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	3.93	2.47	1.59	628
150	Warehousing	1,000 Sq Ft	1.74	5.05	0.34	2,902
254	Assisted Living	bed	2.60	4.24	0.61	na
310	Hotel	room	8.36	14.34	0.58	na
520	Elementary School	1,000 Sq Ft	19.52	21.00	0.93	1,076
530	High School	1,000 Sq Ft	14.07	22.25	0.63	1,581
540	Community College	student	1.15	14.61	0.08	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.72	3.79	2.83	354
620	Nursing Home	bed	3.06	2.91	1.05	na
710	General Office (average size)	1,000 Sq Ft	9.74	3.28	2.97	337
715	Single Tenant Office	1,000 Sq Ft	11.25	3.77	2.98	335
720	Medical-Dental Office	1,000 Sq Ft	34.80	8.70	4.00	250
730	Government Office	1,000 Sq Ft	22.59	7.45	3.03	330
750	Office Park	1,000 Sq Ft	11.07	3.54	3.13	320
820	Shopping Center (average size)	1,000 Sq Ft	37.75	16.11	2.34	427

1. Trip Generation, Institute of Transportation Engineers, 10th Edition (2017).

**Employment and Nonresidential Floor Area Estimates (2015)**

In addition to data on residential development, the calculation of impact fees requires data on employment and nonresidential square footage in Portland. TischlerBise uses the term “jobs” to refer to employment by place of work. Shown below in Figure A5, the U.S. Census Bureau’s OnTheMap Application and LEHD Origin-Destination Employment Statistics include an estimate of 6,872 jobs in 2015 – the most recent year available. Employment estimates are organized into four categories: Industrial, Commercial, Office & Other Service, and Institutional. Applying the building area ratios shown in Figure A4 to the 2015 employment estimates results in a nonresidential floor area estimate of approximately 3.94 million square feet in 2015.

**Figure A5: 2015 Estimated Employment and Nonresidential Floor Area**

Nonresidential Category	2015 Jobs <sup>1</sup>	Percent of Total Jobs	Square Feet per Job <sup>2</sup>	2015 Estimated Floor Area <sup>3</sup>	Jobs per 1,000 Sq. Ft. <sup>2</sup>
Industrial <sup>4</sup>	4,918	72%	628	3,088,504	1.59
Commercial <sup>5</sup>	652	9%	427	278,404	2.34
Office & Other Service <sup>6</sup>	1,120	16%	337	377,440	2.97
Institutional <sup>7</sup>	182	3%	1,076	195,799	0.93
<b>Total</b>	<b>6,872</b>	<b>100%</b>		<b>3,940,147</b>	<b>1.74</b>

1. U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (2015).
2. Trip Generation, Institute of Transportation Engineers, 10th Edition (2017).
3. TischlerBise calculation (2015 jobs X square feet per job).
4. Major sectors are Manufacturing and Wholesale Trade.
5. Major sectors are Retail, Accommodation and Food Services.
6. Major sector is Administration & Support.
7. Major sector is Public Administration.

### Employment and Nonresidential Floor Area Estimates (2019)

TischlerBise uses a four-step process to calculate base year employment and nonresidential floor area estimates. First, 2015 employment (6,872 jobs) is divided by 2015 housing units (4,831 housing units) resulting in a ratio of 1.42 jobs per housing unit. Second, the 2015 jobs per housing unit ratio is applied to the 2019 housing unit projection (5,195 housing units) to project citywide employment of 7,390 jobs. Third, jobs are allocated, by type, based on the 2015 share of total jobs: 72 percent Industrial, 9 percent Commercial, 16 percent Office & Other Service, and 3 percent Institutional. The final step applies the ITE building area ratios shown in Figure A4 to the 2019 employment estimate in order to estimate total floor area. Shown below in Figure A5, 2019 employment estimates of 7,390 jobs result in approximately 4.24 million square feet of nonresidential floor area.

**Figure A6: 2019 Estimated Employment and Nonresidential Floor Area**

Nonresidential Category	2019 Jobs <sup>1</sup>	Percent of Total Jobs	Square Feet per Job <sup>2</sup>	2019 Estimated Floor Area <sup>3</sup>	Jobs per 1,000 Sq. Ft. <sup>2</sup>
Industrial <sup>4</sup>	5,289	72%	628	3,321,213	1.59
Commercial <sup>5</sup>	701	9%	427	299,381	2.34
Office & Other Service <sup>6</sup>	1,204	16%	337	405,879	2.97
Institutional <sup>7</sup>	196	3%	1,076	210,552	0.93
<b>Total</b>	<b>7,390</b>	<b>100%</b>		<b>4,237,024</b>	<b>1.74</b>

1. TischlerBise calculation based on 2015 jobs per housing unit estimates.
2. Trip Generation, Institute of Transportation Engineers, 10th Edition (2017).
3. TischlerBise calculation (2015 jobs X square feet per job).
4. Major sectors are Manufacturing and Wholesale Trade.
5. Major sectors are Retail, Accommodation and Food Services.
6. Major sector is Administration & Support.
7. Major sector is Public Administration.

**Employment and Nonresidential Floor Area Projections**

The analysis uses recent development trends in Portland to project future employment growth and nonresidential floor area. Based on discussions with staff, ten-year nonresidential floor area projections include an additional 1.0 million square feet of industrial development, 75,000 square feet of commercial development, 100,000 square feet of office and other service development, and 50,000 square feet of institutional development. To project employment, TischlerBise applies the jobs per 1,000 square feet multipliers shown in Figure A6 to the projected nonresidential floor area. This results in 1,592 additional industrial jobs (1.59 jobs per 1,000 square feet X (1,000,000 square feet / 1,000)), 176 additional commercial jobs (2.34 jobs per 1,000 square feet X (75,000 square feet / 1,000)), 297 additional office and other service jobs (2.97 jobs per 1,000 square feet X (100,000 square feet / 1,000)), and 46 additional institutional jobs (0.93 jobs per 1,000 square feet X (50,000 square feet / 1,000)). 2029 employment projections equal 9,501 jobs – an increase of 2,111 jobs over the ten-year projection timeline.

**Figure A7: Nonresidential Development Projections**

	2019	2024	2029	10-Year
	Base Year	5	10	Increase
<b>Employment</b>				
Industrial	5,289	6,085	6,881	1,592
Commercial	701	789	877	176
Office & Other Service	1,204	1,353	1,501	297
Institutional	196	219	242	46
<b>Total Employment</b>	<b>7,390</b>	<b>8,445</b>	<b>9,501</b>	<b>2,111</b>
<b>Nonres. Floor Area (x1,000)</b>				
Industrial	3,321	3,821	4,321	1,000
Commercial	299	337	374	75
Office & Other Service	406	456	506	100
Institutional	211	236	261	50
<b>Total Nonres. Floor Area</b>	<b>4,237</b>	<b>4,850</b>	<b>5,462</b>	<b>1,225</b>

## AVERAGE WEEKDAY VEHICLE TRIPS

Average Weekday Vehicle Trips are used as a measure of demand by land use. Vehicle trips are estimated using average weekday vehicle trip ends from the reference book, *Trip Generation, 10<sup>th</sup> Edition*, published by the ITE in 2017. A vehicle trip end represents a vehicle entering or exiting a development (as if a traffic counter were placed across a driveway).

### Trip Rate Adjustments

To calculate road 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 below, the development impact 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 Portland 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 A8, the U.S. Census Bureau's OnTheMap web application indicates that 78 percent of resident workers traveled outside of Portland for work in 2015. In combination, these factors ( $0.31 \times 0.50 \times 0.78 = 0.12$ ) support the additional 12 percent allocation of trips to residential development.

Figure A8: Commuter Trip Adjustment

Trip Adjustment Factor for Commuters <sup>1</sup>	
Employed Residents	5,769
Residents Living and Working in Portland	1,253
Residents Commuting Outside Portland for Work	4,516
Percent Commuting out of Portland	78%
Additional Production Trips <sup>2</sup>	12%
Residential Trip Adjustment Factor	62%

1. U.S. Census Bureau, OnTheMap Application (version 6.1.1) and LEHD Origin-Destination Employment Statistics, 2015.

2. 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 2015 indicate that 78 percent of Portland's workers travel outside the city for work. In combination, these factors ( $0.3099 \times 0.50 \times 0.78 = 0.12$ ) 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 vs. Weekend"

## 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.

## Estimated Residential Vehicle Trip Rates

As an alternative to simply using the national average trip generation rate for residential development, the ITE publishes regression curve formulas that may be used to derive custom trip generation rates, using local demographic data. Key independent variables needed for the analysis (i.e. vehicles available, housing units, households, and persons) are available from American Community Survey data. Shown in Figure A9, custom trip generation rates for Portland vary slightly from the national averages. For example, single-family residential development is expected to generate 9.74 average weekday vehicle trip ends per dwelling – compared to the national average of 9.44 (ITE 210). Multi-family residential development is expected to generate 4.59 average weekday vehicle trip ends per dwelling, which is lower than the national average of 5.44 (ITE 221).

Figure A9: Average Weekday Vehicle Trip Ends by Housing Type

		Households by Structure Type <sup>2</sup>					
Tenure by Units in Structure	Vehicles Available <sup>1</sup>	Single-Family	Multi-Family	Total	Vehicles per HH by Tenure		
Owner-Occupied	6,126	2,874	0	2,874	2.13		
Renter-Occupied	2,063	957	410	1,367	1.51		
Total	8,189	3,831	410	4,241	1.93		

Units in Structure	Persons in Households <sup>3</sup>	Trip Ends <sup>4</sup>	Vehicles by Type of Unit	Trip Ends <sup>5</sup>	Average Trip Ends	Housing Units <sup>6</sup>	Trip Ends per Unit	
							Portland	ITE <sup>7</sup>
Single-Family	11,436	31,937	7,570	49,332	40,635	4,172	9.74	9.44
Multi-Family	806	1,765	619	2,731	2,248	490	4.59	5.44
Total	12,242	33,702	8,189	52,064	42,883	4,662	9.20	

1. Vehicles available by tenure from Table B25046, American Community Survey, 2013-2017 5-Year Estimates.

2. Households by tenure and units in structure from Table B25032, American Community Survey, 2013-2017 5-Year Estimates.

3. Total population in households from Table B25033, American Community Survey, 2013-2017 5-Year Estimates.

4. Vehicle trips ends based on persons using formulas from Trip Generation (ITE 2017). For single-family housing (ITE 210), the fitted curve equation is  $EXP(0.89 * LN(persons) + 1.72)$ . To approximate the average population of the ITE studies, persons were divided by 21 and the equation result multiplied by 21. For multi-family housing (ITE 221), the fitted curve equation is  $(2.29 * persons) - 81.02$ .

5. Vehicle trip ends based on vehicles available using formulas from Trip Generation (ITE 2017). For single-family housing (ITE 210), the fitted curve equation is  $EXP(0.99 * LN(vehicles) + 1.93)$ . To approximate the average number of vehicles in the ITE studies, vehicles available were divided by 29 and the equation result multiplied by 29. For multi-family housing (ITE 221), the fitted curve equation is  $(3.94 * vehicles) + 293.58$ .

6. Housing units from Table B25024, American Community Survey, 2013-2017 5-Year Estimates.

7. Trip Generation, Institute of Transportation Engineers, 10th Edition (2017).

## Functional Population

TischlerBise recommends functional population to allocate the cost of certain facilities to residential and nonresidential development. As shown in Figure A10, functional population accounts for people living and working in a jurisdiction. OnTheMap is a web-based mapping and reporting application that shows where workers are employed and where they live. It describes geographic patterns of jobs by their employment locations and residential locations as well as the connections between the two locations. OnTheMap was developed through a unique partnership between the U.S. Census Bureau and its Local Employment Dynamics (LED) partner states.

Residents who do not work are assigned 20 hours per day to residential development and four hours per day to nonresidential development (annualized averages). Residents who work in Portland are assigned 14 hours to residential development and 10 hours to nonresidential development. Residents who work outside Portland are assigned 14 hours to residential development. Inflow commuters are assigned 10 hours to nonresidential development. Based on 2015 functional population data for Portland, residential development accounts for 69 percent of functional population while nonresidential development accounts for the remaining 31 percent.

**Figure A10: Functional Population**

Demand Units in 2015				
			Demand Hours/Day	Person Hours
<b>Residential</b>				
Population	12,011			
Residents Not Working	6,242		20	124,848
Employed Residents	5,769			
Residents Employed in Portland	1,253		14	17,542
Residents Employed outside Portland	4,516		14	63,224
Residential Subtotal				205,614
<b>Residential Share</b>				<b>69%</b>
<b>Nonresidential</b>				
Residents Not Working	6,242		4	24,970
Jobs Located in Portland	6,872			
Residents Employed in Portland	1,253		10	12,530
Non-Resident Workers (Inflow Commuters)	5,619		10	56,190
Nonresidential Subtotal				93,690
<b>Nonresidential Share</b>				<b>31%</b>
Total				299,304

Source: U.S. Census Bureau, OnTheMap 6.1.1 Application and LEHD Origin-Destination Employment Statistics.

## DEVELOPMENT PROJECTIONS

Provided below is a summary of cumulative development projections used in the Impact Fee Report. Base year estimates for 2019 are used in the impact 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.

**Figure A11: Development Projections Summary**

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-Year
	Base Year	1	2	3	4	5	6	7	8	9	10	Increase
<b>Population</b>	<b>12,968</b>	<b>13,207</b>	<b>13,446</b>	<b>13,685</b>	<b>13,924</b>	<b>14,162</b>	<b>14,401</b>	<b>14,640</b>	<b>14,879</b>	<b>15,118</b>	<b>15,357</b>	<b>2,388</b>
<b>Housing Units</b>	<b>5,195</b>	<b>5,286</b>	<b>5,377</b>	<b>5,468</b>	<b>5,559</b>	<b>5,650</b>	<b>5,741</b>	<b>5,832</b>	<b>5,923</b>	<b>6,014</b>	<b>6,105</b>	<b>910</b>
<b>Employment</b>												
Industrial	5,289	5,448	5,607	5,766	5,925	6,085	6,244	6,403	6,562	6,722	6,881	1,592
Commercial	701	719	736	754	771	789	807	824	842	859	877	176
Office & Other Service	1,204	1,234	1,264	1,293	1,323	1,353	1,382	1,412	1,442	1,471	1,501	297
Institutional	196	200	205	210	214	219	224	228	233	238	242	46
<b>Total Employment</b>	<b>7,390</b>	<b>7,601</b>	<b>7,812</b>	<b>8,023</b>	<b>8,234</b>	<b>8,445</b>	<b>8,657</b>	<b>8,868</b>	<b>9,079</b>	<b>9,290</b>	<b>9,501</b>	<b>2,111</b>
<b>Nonres. Floor Area (x1,000)</b>												
Industrial	3,321	3,421	3,521	3,621	3,721	3,821	3,921	4,021	4,121	4,221	4,321	1,000
Commercial	299	307	314	322	329	337	344	352	359	367	374	75
Office & Other Service	406	416	426	436	446	456	466	476	486	496	506	100
Institutional	211	216	221	226	231	236	241	246	251	256	261	50
<b>Total Nonres. Floor Area</b>	<b>4,237</b>	<b>4,360</b>	<b>4,482</b>	<b>4,605</b>	<b>4,727</b>	<b>4,850</b>	<b>4,972</b>	<b>5,095</b>	<b>5,217</b>	<b>5,340</b>	<b>5,462</b>	<b>1,225</b>

## APPENDIX B: LAND USE DEFINITIONS

### RESIDENTIAL DEVELOPMENT

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

#### Single-Family Unit:

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 Unit:

1. **2+ units (duplexes and apartments)** are 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.”
2. **Boat, RV, Van, Etc.** 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

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The proposed general nonresidential development categories (defined below) can be used for all new nonresidential construction in Portland. 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 / Retail* includes shopping centers, supermarkets, pharmacies, restaurants, bars, nightclubs, automobile dealerships, and movie theaters.

**Hotel:** A hotel is a place of lodging that provides sleeping accommodations and may provide supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room), and/or other retail and service shops.

**Industrial:** Establishments primarily engaged in the production or transportation of goods. By way of example, *Industrial* includes manufacturing plants, printers, material testing, trucking companies, utility substations, power generation facilities, and telecommunications buildings.

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

**Office & Other Service:** Establishments providing management, administrative, professional, or business services; personal and health care services. By way of example, *Office and Other Services* includes banks, business offices, assisted living facilities, nursing homes, hospitals, medical offices, and veterinarian clinics.

**Warehouse:** Establishments that are primarily engaged in the storage, wholesale, and distribution of manufactured products, supplies, and/or equipment, excluding bulk storage of materials that are flammable or explosive or that present hazards or conditions commonly recognized as offensive.