2018 Impact Fee Study

Prepared for:

City of Portland, Maine

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IMPACT FEE STUDY

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EXECUTIVE SUMMARY

Impact fees are one-time payments for new development's proportionate share of the capital cost of infrastructure. The following study addresses the City of Portland's Parks & Recreation, Transportation, and Wastewater facilities. Impact fees do have limitations and should not be regarded as the total solution for infrastructure funding. Rather, they are one component of a comprehensive funding strategy to ensure provision of adequate public facilities. Impact fees may only be used for capital improvements or debt service for growth-related infrastructure. They may not be used for operations, maintenance, replacement of infrastructure, or correcting existing deficiencies.

State of Maine Impact Fee Enabling Legislation

In 1987, impact fee enabling legislation was approved into Maine law when the Legislature enacted the Comprehensive Planning and Land Use Regulations Act of 1987. The statutory requirements for impact fees can be found in Title 30-A MRSA, Section 4354.

Additional Legal Guidelines

Both state and federal courts have recognized the imposition of impact fees on development 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 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 also must be "roughly proportional" to the burden created by development.

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, TischlerBise prefers 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 cover 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 likely 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 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 facilities is measured in terms of relevant and measurable attributes of development (e.g. persons per household).

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. The calculation of impact fees should also assume that they will 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.

Proposed Maximum Defensible Impact Fee Methodologies

The impact fees are based on the actual level of service for Parks & Recreation, Transportation, and Wastewater facilities. The Parks & Recreation components includes parks, trails, and recreational facilities. The Parks Impact Fee is calculated for residential, nonresidential, and hotel development. It has been determined that along with residents, workers and visitors to Portland increase the demand on park & recreational facilities, thus the impact from nonresidential land uses and hotels needs to be offset. The Transportation and Wastewater fees are allocated to all residential and nonresidential development. A summary of methodologies used in the analysis is provided in Figure 1.

Figure 1. Summary of Impact Fee Methodologies

Fee Category	Service Area	Incremental Expasion	Plan-Based	Cost Recovery	Cost Allocation
Parks and Recreation	Citywide	Parks, Trails, Recreation Facilities	N/A	N/A	Population
Transportation	Citywide	N/A	Multimodal Facilities and Signals	N/A	Person Trips
Wastewater	Citywide	N/A	Wastewater Distribution and Treatment Facilities	N/A	Meter Size

Maximum Defensible Impact Fees

Figure 2 provides a schedule of the maximum defensible impact fee for Parks & Recreation, Transportation, and Wastewater. The fees represent the highest defensible amount for each type of residential and nonresidential unit, which represents new growth's fair share of the cost for capital facilities. To differentiate between housing units, two housing types are included: Single Family/Two-family and Multifamily. Housing types have varying household sizes and, consequently, a varying demand on City infrastructure and services. Thus, it is important to differentiate between housing types and size. A streamlined approach is used for nonresidential developments. This approach has no size thresholds. As a result, developments of the same type are evaluated the same.

The City may adopt fees that are less than the amounts shown. However, a reduction in impact fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in levels of service.

Figure 2. Maximum Defensible Impact Fee

Development Type	Parks & Rec	Transportation	Wastewaster
Residential (per housing unit/per water meter)			
Single Family/Two-Family	$1,126	$2,159	$1,886
Multifamily	$752	$1,023	$1,886
Nonresidential (per 1,000 square feet/per water meter)			
Retail & Services	$534	$8,248	$4,715
Office	$677	$2,800	$4,715
Industrial	$363	$1,130	$4,715
Institutional	$645	$3,082	$4,715
Accommodation (per hotel room/per water meter)			
Hotel	$875	$2,404	$4,715

Note: a 5/8 inch meter is shown for residential development and a 1 inch meter is shown for nonresidential development, however, the wastewater fee will be assessed based on the development's meter size.

General Methods for Impact Fees

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

Cost Recovery Method (past improvements)

Although not used in City of Portland, the rationale for recoupment, or 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 Method (concurrent improvements)

The City of Portland Park and Recreation Impact Fee uses the incremental expansion method to document current level-of-service (LOS) standards for the infrastructure types included in the study, using both quantitative and qualitative measures. This approach assumes there are no existing deficiencies or surplus in infrastructure capacity. 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 Method (future improvements)

The Transportation and Wastewater Impact Fees use the plan-based method to allocate 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 service units (average cost), or 2) the growth-share of the public facility cost can be divided by the net increase in service units over the planning timeframe (marginal cost).

Evaluation of Possible Credits

Regardless of the methodology, a consideration of “credits” is integral to the development of a legally defensible impact fee methodology. There are two types of “credits” with specific characteristics, both of which should be addressed in impact fee studies and ordinances. The first is a 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 impact fee calculation, thus reducing the fee amount. The second is a site-specific credit or developer reimbursement for construction of system improvements. This type of credit is addressed in the administration and implementation of the impact fee program.

Please note, calculations throughout this report are based on an analysis conducted using MS Excel software. Results are discussed in the memo using one- and two-digit places (in most cases). Figures are typically either truncated or rounded. In some instances, 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).

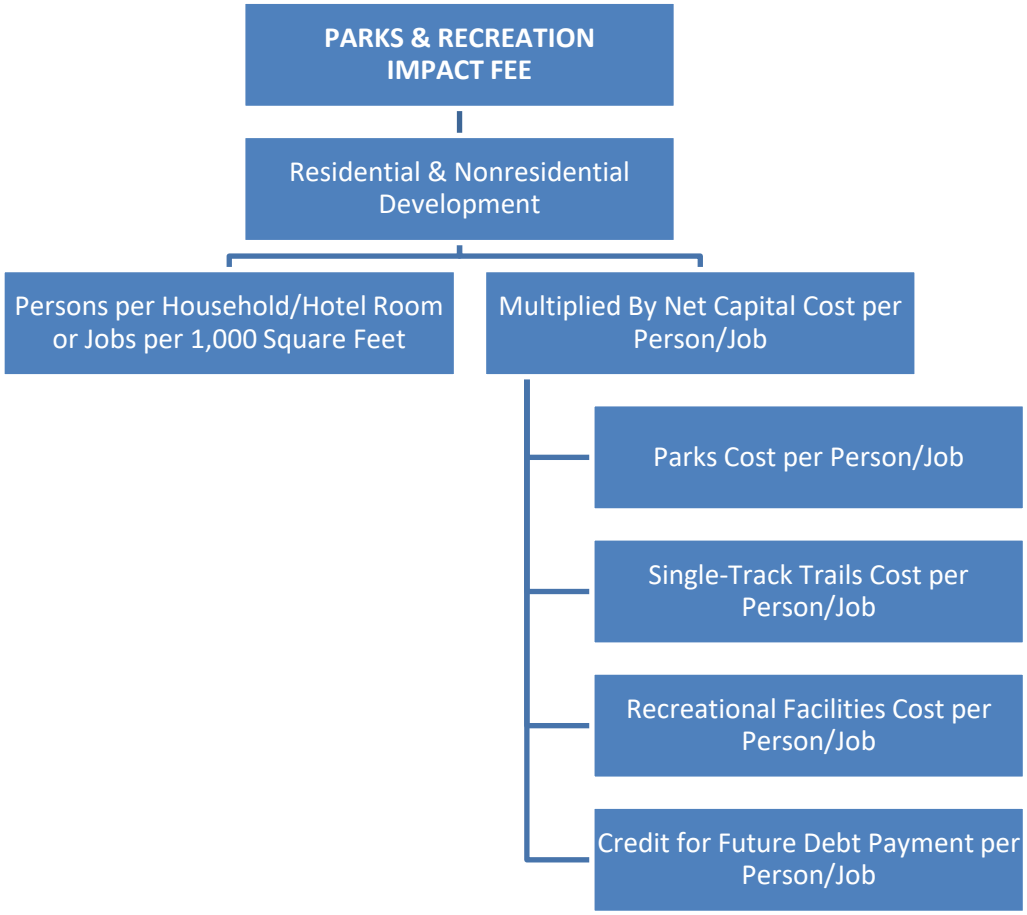
PARKS & RECREATION FACILITIES IMPACT FEE

The Parks & Recreation Impact Fee is based on the incremental expansion methodology. The impact fee methodology assumes the City will construct additional recreation improvements to serve future growth to maintain current levels of service incrementally over time. Parks and recreation capital improvements are allocated to residential, nonresidential, and hotel development. Furthermore, a credit is necessary to avoid double payments towards current debt obligations for park improvements. There are four components to the Parks & Recreation Impact Fee:

- Parks
- Single-Track Trails
- Recreational Facilities
- Credit for Future Debt Payments

Figure 3 diagrams the general methodology used to calculate the Parks & Recreation Impact Fee. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the impact fee components. The Parks & Recreation Impact Fee for residential development is derived from the product of persons per housing unit (by type of unit) multiplied by the net capital cost per person. The fee for nonresidential development is derived from the product of jobs per 1,000 square feet multiplied by the net capital cost per job. The fee for hotel development is derived from the product of persons per hotel room multiplied by the net capital cost per person. The boxes in the next level down indicate detail on the components included in the fee.

Figure 3. Parks & Recreation Impact Fee Methodology



Parks & Recreation Level of Service and Cost Factors

The Parks & Recreation Impact Fee is based on an inventory of existing citywide parks and current values of recreation improvements and land in the City's park system. The use of existing standards means there are no existing infrastructure deficiencies. New development is only paying its proportionate share for growth-related infrastructure. Facilities and costs have been provided by the City of Portland staff.

An important aspect when determining the demand on City facilities is the additional demand from seasonal and visitor populations. From the Maine Office of Tourism, the Greater Portland and Casco Bay region saw 5.4 million visitors in 2016. As a result, it is not just permanent residents that are having an impact on facilities. In response, City infrastructure and operating service levels are sized to accommodate not just permanent residents, but seasonal residents and visitors as well. **In this is analysis, peak population includes permanent residents, seasonal residents, and visitors (day and overnight visitors).** Further explain and calculations can be found in Appendix A.

To determine the demand on facilities from residential and nonresidential development, a days-of-impact proportionate share calculation is conducted. The proportionate share is based on cumulative impact days per year, with the peak population (residents and visitors) potentially impacting parks and recreation facilities 365 days per year and inflow commuters potentially impacting parks and recreation facilities 250 days per year (5 days per week multiplied by 50 weeks a year). Workers that live within the City are included in the peak population total.

Shown in Figure 4, residential and hotel development in the City accounts for 72 percent of the impact on park and recreational facilities. As a result of workers using park facilities, such as during break and lunch, nonresidential development accounts for 28 percent of the impact on facilities.

Figure 4. Impact Days Proportionate Share

		Cumulative Impact Days per Year			Cost Allocation for Parks	
Peak Population[1]	Inflow Commuters	Residential/ Hotel[2]	Nonresidential[3]	Total	Residential/ Hotel	Nonresidential
82,049	47,245	29,948,016	11,811,250	41,759,266	72%	28%

1. Includes permanent residents, seasonal residents, and visitors
2. Days per Year = 365
3. Days per Year = 250 (5 Days per Week x 50 Weeks per Year)

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

Current Inventory of Parkland and Improvements

Figure 5 lists the current inventory of parkland and park improvements in the City of Portland. There are 44.8 acres of neighborhood parks and 271.5 acres of destination parks. Every park is open to all the residents, workers, and seasonal and visitor populations. Included in the figure are average replacement costs for parkland and park improvements. This allows for a total replacement cost to be calculated.

Figure 5. Current Inventory of Parkland and Improvements

Park	Acres	Athletic Field	Baseball Field	Basketball Courts	Community Gardens	Dog Park Area	Multi-Purpose Field	Pickleball Courts	Picnic Tables	Playgrounds	Pools	Skate Park	Softball Fields	Splashpads	Tennis Courts	Volleyball
Neighborhood Parks																
Marada Adams Park	0.5									1.0						
Barrows Park/Sundial Park	0.5															
Bedford Park	0.5															
Belmeade Park	0.3								1.0							
Boyd Street Community Garden	1.8				1.0											
Clark Street Park	0.3									1.0						
Clark Street Community Garden	0.1				1.0											
City Acres Ballfield, Peaks Island	3.0		1.0													
Fessenden Park	0.5															
Fort Allen Park	5.0															
Fort Gorges	2.0															
Fort Sumner Park	1.3								3.0							
Fox Field	4.6	1.0		2.0					1.0	1.0						
Great Diamond Island Park	0.6									1.0						
Harbor View Memorial Park	4.8								1.0							
Heseltine Park	1.0								1.0	1.0						
Lincoln Park	2.0															
Longfellow Park	0.4															
Munjoy South	0.7			1.0						1.0						
Nason's Corner Park	2.6		1.0				1.0			1.0						
Oakleigh Park	1.3		1.0													
Peppermint Park	0.4									1.0				1.0		
Pleasant Street Park	0.7			1.0						1.0						
Post Office Park	0.2															
Quaker Park	0.8															
Stone Street Playground	0.2									1.0				1.0		
Stroudwater Park 1	0.8															
Stroudwater Park 2	1.0															
Stroudwater Playground	0.1									1.0						
Taylor Street Park	0.6			1.0						1.0						
Tommy's Park	0.2															
Trinity Park	0.1															
Trott Little John Park	4.5				1.0	1.0										
Tyng Tate Park	0.3			1.0						1.0						
Winslow Park	1.6															
Destination Parks																
Back Cove Park	34.0	1.0								1.0						
Deering Oaks Park	55.0		1.0	2.0			1.0	4.0	6.0	1.0				1.0	8.0	2.0
Dougherty Field	18.5	2.0	3.0		1.0					1.0	1.0	1.0	1.0	1.0		
Eastern Promenade Park	78.0		1.0	1.0	2.0				4.0	1.0			1.0		3.0	
Payson Park	48.0	1.0	2.0	1.0	1.0				3.0	1.0			2.0	1.0	4.0	
Riverton Trolley Park	19.0		1.0													
Western Promenade	19.0				1.0	1.0			2.0							
TOTAL	**316.3**	**5.0**	**11.0**	**10.0**	**8.0**	**2.0**	**2.0**	**4.0**	**22.0**	**18.0**	**1.0**	**1.0**	**4.0**	**5.0**	**15.0**	**2.0**
Average Replacement Cost	$59,172	$350,000	$175,000	$45,000	$30,000	$50,000	$175,000	$45,000	$750	$175,000	$2,000,000	$350,000	$175,000	$30,000	$45,000	$45,000
Total Replacement Cost	**$18,716,104**	**$1,750,000**	**$1,925,000**	**$450,000**	**$240,000**	**$100,000**	**$350,000**	**$180,000**	**$16,500**	**$3,150,000**	**$2,000,000**	**$350,000**	**$700,000**	**$150,000**	**$675,000**	**$90,000**

Source: City of Portland Parks and Recreation

Park Level of Service & Cost Analysis

To calculate the current level of service, the existing parkland acreage (316.3) is allocated to residential and nonresidential demand based on the percentage split of impact days. The residential park acres are divided by the current peak population of Portland (83,250) to calculate the level of service per person. The nonresidential park acres are divided by the current jobs in the City (67,270) to calculate the level of service per job. As a result, there are 2.74 parkland acres per 1,000 persons and 1.32 acres per 1,000 jobs.

Shown in Figure 6, the total value of park land is $18,716,104 and park improvements are valued at $12,126,500. The replacement costs are summed and divided by the acreage to find the cost per acre ($97,511). The cost per person and cost per job factors are calculated by applying the level of service factors to the total replacement cost per acre (i.e. 2.74 acres per 1,000 persons x $97,511 per acre = $267 per person, rounded).

Figure 6. Parks Level of Service & Cost Analysis

Land Replacement Cost	$18,716,104
Improvement Replacement Cost	$12,126,500
Total Replacement Cost	$30,842,604

Total Park Acres	316.3
Total Replacement Cost	$30,842,604
Replacement Cost per Park Acre	$97,511

Source: City of Portland Parks and Recreation; Assessor's Office

Residential Level-of-Service (LOS) Standard

Share of Impact Days	72%
Share of Park Acres	227.7
2018 Peak Population	83,250
LOS: Acre per 1,000 Persons	**2.74**

Nonresidential Level-of-Service (LOS) Standard

Share of Impact Days	28%
Share of Park Acres	88.6
2018 Jobs	67,270
LOS: Acre per 1,000 Jobs	**1.32**

Cost Analysis

Replacement Cost per Acre	$97,511
LOS: Acre per 1,000 Persons	2.74
Replacement Cost Per Capita	**$267**

Cost Analysis

Replacement Cost per Acre	$97,511
LOS: Acre per 1,000 Jobs	1.32
Replacement Cost Per Job	**$129**

Park Growth-Related Needs

To estimate the 10-year growth needs for parks, the current level of service (2.74 acres per 1,000 persons and 1.32 acres per 1,000 jobs) is applied to the population and job growth projected for the City of Portland. The City's peak population is projected to increase by 4,279 and the City's employment is projected to increase by 6,890 jobs over the next ten years (see Appendix A). Listed in Figure 7, there will need to be a total of 337.7 acres of parkland in the City to accommodate the growth, which results in a need of 20.8 new acres. By applying the average cost of improvements to parkland ($97,511 per acre), the total expenditure for the growth is calculated (20.8 acres x $97,511 = $2,028,299).

Figure 7. 10-Year Parkland Needs to Accommodate Growth

Type of Infrastructure	Level of Service			Demand Unit	Unit Cost / Acre
Parks	Residential	2.74	Acres	per 1,000 persons	$97,511
	Nonresidential	1.32		per 1,000 jobs	

Growth-Related Need for Park Improvements						
Year		Population	Jobs	Residential Acres	Nonresidential Acres	Total Acres
Base	2018	83,250	67,270	228.1	88.8	316.9
Year 1	2019	83,678	67,959	229.2	89.7	318.9
Year 2	2020	84,106	68,648	230.4	90.6	321.0
Year 3	2021	84,534	69,337	231.6	91.5	323.1
Year 4	2022	84,962	70,026	232.7	92.4	325.1
Year 5	2023	85,390	70,715	233.9	93.3	327.2
Year 6	2024	85,818	71,404	235.1	94.3	329.4
Year 7	2025	86,246	72,093	236.3	95.2	331.5
Year 8	2026	86,673	72,782	237.4	96.1	333.5
Year 9	2027	87,101	73,471	238.6	97.0	335.6
Year 10	2028	87,529	74,160	239.8	97.9	337.7
Ten-Year Increase		4,279	6,890	**11.7**	**9.1**	**20.8**
			Projected Expenditure	**$1,140,879**	**$887,350**	**$2,028,229**

Growth-Related Expenditure on Park Improvements	$2,028,229

Trail Inventory and Level of Service

There are two distinct trails in Portland: Multiuse and Single-track. Multiuse trails are wide, paved trails that allow for a variety of activities to occur simultaneously (i.e. walking, biking, skateboarding). Single-track trails are unpaved trails that are only used for walking. After consultation with City staff, multiuse trails are considered a multimodal transportation facility, so they are included in the Transportation Impact Fee and not the Parks and Recreation Fee.

To calculate the current level of service for single-track trails, the existing trail length (36.2 miles) is allocated to residential and nonresidential demand based on the percentage split of impact days. The residential trail miles are divided by the current peak population of Portland (83,250) to calculate the level of service per person. The nonresidential trail miles are divided by the current jobs in the City (67,270) to calculate the level of service per job. As a result, there are 0.31 trail miles per 1,000 persons and 0.15 miles per 1,000 jobs.

The average cost per mile ($15,000) has been provided by the City of Portland Parks and Recreation staff. The replacement cost per person and replacement cost per job factors are calculated by applying the level of service factors to the average replacement cost per mile. For example, the cost per person is $5 (0.31 miles per 1,000 persons x $15,000 per mile = $5 per person, rounded).

Figure 8. Trails Level of Service & Cost Analysis

Trail	Single-Track Trail (miles)
Citywide Passive Trails	36.2
Total	36.2

Source: City of Portland Parks and Recreation

Residential Level-of-Service (LOS) Standard

Share of Impact Days	72%
Share of Trail Miles	26.1
2018 Peak Population	83,250
LOS: Miles per 1,000 Persons	**0.31**

Nonresidential Level-of-Service (LOS) Standard

Share of Impact Days	28%
Share of Trail Miles	10.1
2018 Jobs	67,270
LOS: Miles per 1,000 Jobs	**0.15**

Cost Analysis

Costs per mile	$15,000
LOS: Miles per 1,000 Persons	0.31
Replacement Cost per Person	**$5**

Cost Analysis

Costs per mile	$15,000
LOS: Miles per 1,000 Jobs	0.15
Replacement Cost per Job	**$2**

Trail Growth-Related Needs

To estimate the 10-year growth needs for single-track trails, the current level of service (0.31 miles per 1,000 persons and 0.15 miles per 1,000 jobs) is applied to the population and employment growth projected for the City of Portland. The City's peak population is projected to increase by 4,279 and the City's employment is projected to increase by 6,890 jobs over the next ten years (see Appendix A). As shown Figure 9, an additional need of 2.3 miles of new single-track trails will be demanded by new development. By applying the average cost of trail improvements ($15,000 per mile) the total expenditure for the growth is calculated (2.3 miles x $15,000 per mile = $34,500).

Figure 9. 10-Year Single-track Trail Needs to Accommodate Growth

Type of Infrastructure	Level of Service			Demand Unit	Unit Cost / Mile
Trails	Residential	0.31	Miles	per 1,000 persons	$15,000
	Nonresidential	0.15		per 1,000 jobs	

Growth-Related Need for Trail Improvements						
Year		Population	Jobs	Residential Miles	Nonresidential Miles	Total Miles
Base	2018	83,250	67,270	25.8	10.1	35.9
Year 1	2019	83,678	67,959	25.9	10.2	36.1
Year 2	2020	84,106	68,648	26.0	10.3	36.3
Year 3	2021	84,534	69,337	26.2	10.4	36.6
Year 4	2022	84,962	70,026	26.3	10.5	36.8
Year 5	2023	85,390	70,715	26.4	10.6	37.0
Year 6	2024	85,818	71,404	26.6	10.7	37.3
Year 7	2025	86,246	72,093	26.7	10.8	37.5
Year 8	2026	86,673	72,782	26.8	10.9	37.7
Year 9	2027	87,101	73,471	27.0	11.0	38.0
Year 10	2028	87,529	74,160	27.1	11.1	38.2
Ten-Year Increase		4,279	6,890	**1.3**	**1.0**	**2.3**
			Projected Expenditure	**$19,500**	**$15,000**	**$34,500**

Growth-Related Expenditure on Trail Improvements	$34,500

Recreational Facilities Inventory and Level of Service

There are five recreational facilities in the City of Portland's Park and Recreation system included in the impact fee analysis. The facilities total 111,273 square feet.

To calculate the current level of service for recreational facilities, the existing floor area is allocated to residential and nonresidential demand based on the percentage split of impact days. The residential floor area is divided by the current peak population of Portland (83,250) to calculate the level of service per person. The nonresidential floor area is divided by the current jobs in the City (67,270) to calculate the level of service per job. As a result, there are 0.96 square feet per person and 0.46 square feet per jobs.

The average cost per square foot ($272) is calculated by dividing the total replacement cost of improvements by the total square feet of recreational facilities. The replacement cost per person and replacement cost per job factors are calculated by applying the level of service factor to the average replacement cost of per square foot (i.e. 0.96 square feet per person x $291 per square foot = $261 per person, rounded).

Figure 10. Recreational Facilities Level of Service & Cost Analysis

Recreational Facilities	Square Feet	Replacement Cost
East End Community Center	23,500	$5,875,000
Peaks Island Community Center	2,000	$550,000
Portland Ice Arena	29,273	$3,125,896
Reiche Community Center	25,000	$8,750,000
Riverton Community Center	31,500	$11,970,000
Total	**111,273**	**$30,270,896**

Source: City of Portland Parks and Recreation

Residential Level-of-Service (LOS) Standard

Share of Impact Days	72%
Share of Rec. Square Feet	80,117
2018 Peak Population	83,250
LOS: Square Feet per Person	**0.96**

Nonresidential Level-of-Service (LOS) Standard

Share of Impact Days	28%
Share of Rec. Square Feet	31,156
2018 Jobs	67,270
LOS: Miles per 1,000 Jobs	**0.46**

Cost Analysis

Costs per Square Foot	$272
LOS: Square Feet per Person	0.96
Replacement Cost per Person	**$261**

Cost Analysis

Costs per Square Foot	$272
LOS: Miles per 1,000 Jobs	0.46
Replacement Cost per Job	**$125**

Recreational Facility Growth-Related Needs

To estimate the 10-year growth needs for recreational facilities, the current level of service (0.96 square feet per person and 0.46 square feet per job) is applied to the population and employment growth projected for the City of Portland. The City's peak population is projected to increase by 4,279 and the City's employment is projected to increase by 6,890 jobs over the next ten years (see Appendix A). Listed in Figure 11, there will need to be a total of 118,141 square feet of recreational facilities in the City to accommodate the growth, which results in a need of 7,277 new square feet. By applying the average replacement cost for recreation facilities ($272 per square foot), the total expenditure for the growth is calculated (7,277 square feet x $272 = $1,979,344).

Figure 11. 10-Year Recreational Facilities Needs to Accommodate Growth

Type of Infrastructure	Level of Service			Demand Unit	Unit Cost / Sq. Ft.
Recreational Facilities	Residential	0.96	Square Feet	per person	$272
	Nonresidential	0.46		per jobs	

Growth-Related Need for Recreational Facility Improvements						
Year		Population	Jobs	Residential Square Feet	Nonresidential Square Feet	Total Square Feet
Base	2018	83,250	67,270	79,920	30,944	110,864
Year 1	2019	83,678	67,959	80,331	31,261	111,592
Year 2	2020	84,106	68,648	80,741	31,578	112,319
Year 3	2021	84,534	69,337	81,152	31,895	113,047
Year 4	2022	84,962	70,026	81,563	32,212	113,775
Year 5	2023	85,390	70,715	81,974	32,529	114,503
Year 6	2024	85,818	71,404	82,384	32,846	115,230
Year 7	2025	86,246	72,093	82,795	33,163	115,958
Year 8	2026	86,673	72,782	83,206	33,480	116,686
Year 9	2027	87,101	73,471	83,617	33,797	117,414
Year 10	2028	87,529	74,160	84,027	34,114	118,141
Ten-Year Increase		4,279	6,890	**4,107**	**3,170**	**7,277**
			Projected Expenditure	**$1,117,104**	**$862,240**	**$1,979,344**

Growth-Related Expenditure on Recreational Facility Improvements	$1,979,344

Parks & Recreation Credit

Currently, the City of Portland has existing debt obligations from past Parks and Recreation projects. The City of Portland's Finance Department delineated the purposes for each of the City's General Obligation Bonds and summed the future principal and interest payments for Parks and Recreation projects. In Figure 12, the Parks and Recreation annual share of payments to all the existing bonds is listed through 2028.

The total annual payment schedule allocated to residential and nonresidential growth based on the impact days proportional share split. The payments are divided by the City's peak population and total employment to find the debt cost per person and job. To account for the time value of money, annual payments per capita are discounted using a net present value formula based on the applicable discount (interest) rate. This results in a credit of $60 per person and $28 per job, rounded.

Figure 12. Park and Recreation Debt per Person & per Job

Residential Credit

Fiscal Year	Payment	Projected Population	Payment/ Person
Base Year	$617,060	83,250	$7.41
2019	$715,720	83,678	$8.55
2020	$676,719	84,106	$8.05
2021	$628,339	84,534	$7.43
2022	$606,452	84,962	$7.14
2023	$554,947	85,390	$6.50
2024	$478,117	85,818	$5.57
2025	$461,771	86,246	$5.35
2026	$434,672	86,673	$5.02
2027	$386,672	87,101	$4.44
2028	$364,280	87,529	$4.16
Total	**$5,924,749**		**$69.62**
		Discount Rate	3.00%
		Credit per Person	**$60**

Source: City of Portland Finance Department

Nonresidential Credit

Fiscal Year	Payment	Projected Jobs	Payment/ Job
Base Year	$239,968	67,270	$3.57
2019	$278,336	67,959	$4.10
2020	$263,169	68,648	$3.83
2021	$244,354	69,337	$3.52
2022	$235,842	70,026	$3.37
2023	$215,813	70,715	$3.05
2024	$185,935	71,404	$2.60
2025	$179,578	72,093	$2.49
2026	$169,039	72,782	$2.32
2027	$150,372	73,471	$2.05
2028	$141,665	74,160	$1.91
Total	**$2,304,071**		**$32.81**
		Discount Rate	3.00%
		Credit per Job	**$28**

Source: City of Portland Finance Department

Parks & Recreation Impact Fee

Figure 13 shows the cost factors for each component of the City of Portland's Parks and Recreation Impact Fee. Impact fees for parks and recreation are based on household size for residential development (i.e., persons per housing unit), jobs per 1,000 square feet for nonresidential development, and persons per room for hotel development. The fee components are calculated per person and per job, so by multiplying the total cost per person by the household size, for example, calculates the maximum defensible fee for residential development.

The fees represent the highest amount defensible for residential and nonresidential development, which represents new growth's fair share of the cost for capital facilities. The City may adopt fees that are less than the amounts shown. However, a reduction in impact fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in levels of service.

Figure 13. Maximum Defensible Park & Recreation Impact Fee

Fee Component	Cost per Person	Cost per Job
Parks	$267	$129
Single-Track Trails	$5	$2
Rec. Facilities	$261	$125
Debt Service Credit	($60)	($28)
TOTAL	**$473**	**$228**

Residential (per housing unit)

Type of Unit	Persons per Household	Maximum Defensible Fee
Single Family/Two-Family	2.38	**$1,126**
Multifamily	1.59	**$752**

Nonresidential (per 1,000 square feet)

Type of Unit	Jobs per 1,000 Square Feet	Maximum Defensible Fee
Retail & Service	2.34	**$534**
Office	2.97	**$677**
Industrial	1.59	**$363**
Institutional	2.83	**$645**

Nonresidential (per room)

Type of Unit	Persons per Room	Maximum Defensible Fee
Hotel	1.85	**$875**

Revenue from Parks & Recreation Impact Fee

Revenue from the City's Parks & Recreation Impact Fee is estimated in Figure 14. There is projected to be an increase of 4,279 in peak population and 6,890 jobs in Portland by 2028. By multiplying the growth by the capital cost per person and per job, the projected revenue is calculated. In total, the impact fee will generate $3.6 million in revenue. The revenue covers 89 percent of the capital costs generated by projected growth in the City of Portland. Revenue from the fee is expected to not cover all growth-related costs since the credit lessens the fee by about 11 percent.

Figure 14. Estimated Revenue from Parks & Recreation Impact Fee

	Total Cost to Maintain LOS	Cost Attributable to Growth
Parks	$2,028,229	$2,028,229
Single-Track Trails	$34,500	$34,500
Rec Facilities	$1,979,344	$1,979,344
Total Expenditures	**$4,042,073**	**$4,042,073**

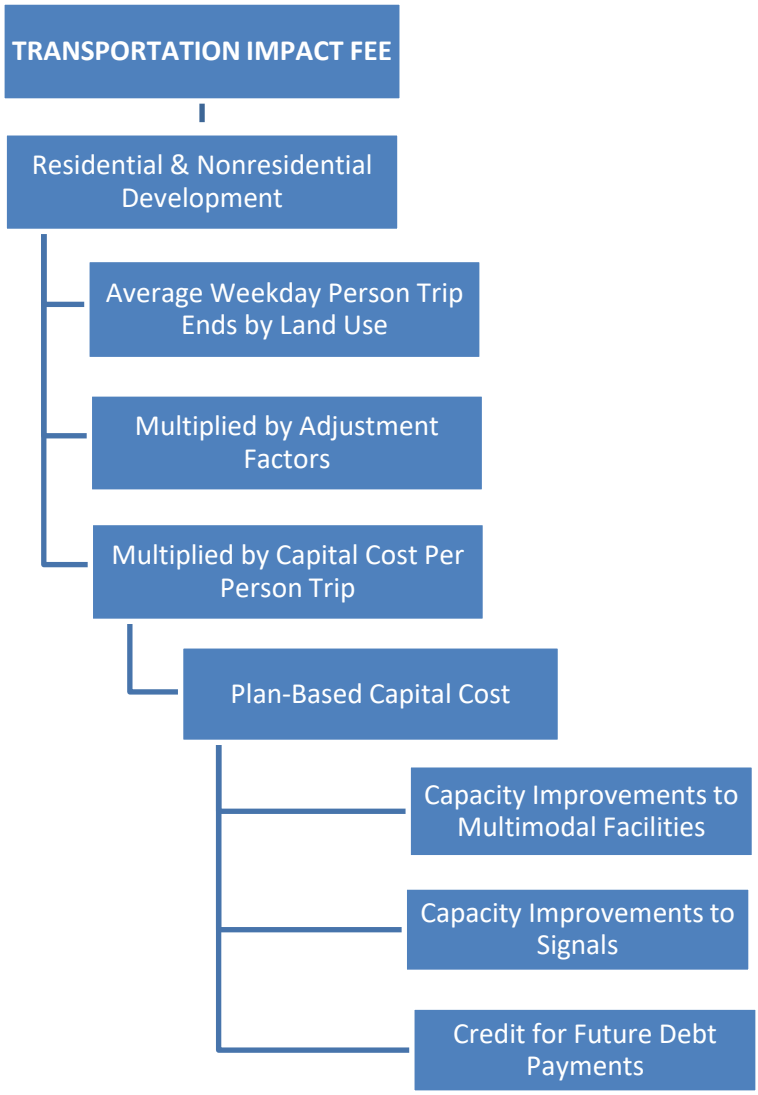
Projected Development Impact Fee Revenue

		Capital Cost per Person $473	Capital Cost per Job $228
Year		Population	Jobs
Base	2018	83,250	67,270
Year 1	2019	83,678	67,959
Year 2	2020	84,106	68,648
Year 3	2021	84,534	69,337
Year 4	2022	84,962	70,026
Year 5	2023	85,390	70,715
Year 6	2024	85,818	71,404
Year 7	2025	86,246	72,093
Year 8	2026	86,673	72,782
Year 9	2027	87,101	73,471
Year 10	2028	87,529	74,160
	Ten-Year Increase	4,279	6,890
	Projected Revenue =>	$2,023,810	$1,570,948
		Projected Revenue =>	**$3,594,757**
		Total Expenditures =>	**$4,042,073**
		General Fund's Share =>	**$447,316**

TRANSPORTATION FACILITIES IMPACT FEE

To calculate the City of Portland's Transportation Impact Fee, a ***plan-based methodology*** is used. The methodology for is shown in Figure 15. To calculate the impact amounts for residential and nonresidential development, trip generation rates by type of development are multiplied by the capital cost per person trip. The methodology includes trip adjustment factors for pass-by trips. The diagram reads like an outline, with lower levels providing a more detailed breakdown of the capital impact components. The capital cost of road improvements is based on three components: capacity improvements to multimodal facilities, improvements to signals, and a credit for future debt payments. Growth's share of future transportation projects needed within the next 10 years are allocated to the increase in person trips at the end of the 10-year planning horizon.

Figure 15. Transportation Capital Impact Methodology Chart



Person Trips

Portland is a relatively dense, urban community with residents and workers using varying modes to travel. In general, an impact fee study calculates future developments' impact on the City's transportation infrastructure. In suburban, greenfield communities that concentrate on roadway expansion to accommodate new vehicles, a development's impact is best estimated by calculating the new 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 Portland. This is also consistent with the capital improvements identified in the City's Capital Improvement Plan. As such, the multimodal approach will calculate the daily person trips generated by the varying development types in the study. To encompass the varying modes of travel used in Portland, the methodology includes persons per vehicle trip, transit trip, and non-motorized trips.

In the base year, residential land uses generate 223,734 person trips (30 percent) and nonresidential land uses generate 511,437 person trips (70 percent) in the City of Portland. Through 2028, there will be an increase of 47,721 daily person trips in Portland. The increase in daily person trips will be applied to growth's share of the capital cost for transportation facilities to calculate the capital cost per person trip factor. Further explanation and calculations can be found in Appendix A.

Transportation Level of Service and Cost Factors

Below, the City of Portland's capital cost per person trip for multimodal facilities and signals are calculated. Additionally, a credit for debt payments on past transportation projects is necessary.

Need for Multimodal Improvements and Facilities

The City of Portland has determined that additional growth-related improvements are necessary to accommodate future transportation demand. Listed in Figure 16, there are ten multimodal projects in the City's Capital Improvement Plan that have some element of growth-related costs. In the last two columns of the figure, future growth's percentage share and dollar amount of each project is shown. In total, new growth's share of multimodal capital improvements equals $7,265,000.

Found at the bottom of Figure 16, growth's cost is divided by the 10-year increase in person trips. This results in a capital cost per person trip of $152, rounded.

Figure 16. Growth-Related Multimodal Projects

Project	Readiness	Length of Project (linear feet)	Total City Cost	Growth's Share	Growth's Cost
W. Commercial Street Path	High	5,000	$750,000	50%	$375,000
Thames Street	High	1,200	$1,450,000	25%	$362,500
Franklin Street: I-295 to Somerset	High	700	$4,050,000	75%	$3,037,500
Congress Square Intersection Construction	High	650	$1,300,000	25%	$325,000
Marginal Way: Hanover to Plowman	High	5,600	$1,000,000	25%	$250,000
Kennebec Street Realignment at Forest Avenue	High	450	$500,000	50%	$250,000
Somerset Street	High	1,800	$1,500,000	50%	$750,000
Forest Avenue (Morrill's Corner Intersections)	High	1,600	$2,280,000	50%	$1,140,000
Brighton Avenue	High	13,000	$1,100,000	25%	$275,000
Washington Avenue Rehabilitation	High	1,500	$2,000,000	25%	$500,000
	TOTAL	31,500	$15,930,000		$7,265,000

Growth's Cost of Transportation Projects	$7,265,000
10-Year Increase in Average Daily Person Trips	47,721
Capital Cost per Trip	**$152**

Need for Signal Improvements and Facilities

Listed in Figure 17, there are two signal projects in the City's Capital Improvement Plan that have some element of growth-related costs. In the last two columns of the figure, future growth's percentage share and dollar amount of each project is shown. In total, new growth's share of signal capital improvements equals $8,031,250.

Found at the bottom of Figure 17, growth's cost is divided by the 10-year increase in person trips. This results in a capital cost per person trip of $168, rounded.

Figure 17. Growth-Related Signal Projects

Project	Readiness	Total Cost	Growth's Share	Growth's Cost
Modernize Signal Systems	High	$9,375,000	75%	$7,031,250
Arterial Street Crossings	High	$2,000,000	50%	$1,000,000
	TOTAL	$11,375,000		$8,031,250

Growth's Cost of Transportation Projects	$8,031,250
10-Year Increase in Average Daily Person Trips	47,721
Capital Cost per Trip	**$168**

Transportation Credit

Currently, the City of Portland has existing debt obligations from past transportation projects. In Figure 18, the City of Portland's Finance Department delineated the purposes for each of the City's General Obligation Bonds and summed the future principal and interest payments for transportation projects.

The total annual payment schedule is divided by the City's projected person trips to find the debt per person trip factor. To account for the time value of money, annual payments per trip are discounted using a net present value formula based on the applicable discount (interest) rate. This results in a credit of $41.00 per person trip, rounded.

Figure 18. Transportation Debt per Person Trip

Fiscal Year	Payment	Projected Ave. Daily Person Trips	Payment/ Person Trip
Base Year	$3,751,763	735,171	$5.10
2019	$4,314,139	739,943	$5.83
2020	$4,060,134	744,715	$5.45
2021	$3,772,123	749,487	$5.03
2022	$3,633,359	754,260	$4.82
2023	$3,323,658	759,032	$4.38
2024	$2,916,044	763,804	$3.82
2025	$2,815,726	768,576	$3.66
2026	$2,591,944	773,348	$3.35
2027	$2,374,976	778,120	$3.05
2028	$2,147,023	782,892	$2.74
Total	**$35,700,889**		**$47.24**
		Discount Rate	3.00%
	Total Credit per Person Trip		**$41.00**

Transportation Impact Fee

Figure 19 shows the cost factors for each component of the City of Portland's Transportation Impact Fee. Impact fees for transportation projects are based on person trips per unit for residential development, person trips per 1,000 square feet for nonresidential development, and person trips per room for hotel development. The fee components are calculated per person trip, so by multiplying the total cost per person by the trip generation factor calculates the maximum defensible fee.

The fees represent the highest amount defensible for residential and nonresidential development, which represents new growth's fair share of the cost for capital facilities. The City may adopt fees that are less than the amounts shown. However, a reduction in impact fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in levels of service.

Figure 19. Maximum Defensible Transportation Impact Fee

Input Variables	Cost per Trip for Multimodal Projects =>		$152
	Cost per Trip for Signals =>		$168
	Debt Service Credit per Trip =>		($41)
	Capital Cost per Person Trip		**$279**
Development Type	**Avg Wkdy Person Trip Ends**	**Trip Rate Adjustment**	**Maximum Defensible Fee**
Residential (per housing unit)			
Single Family/Two-Family	13.34	58%	**$2,159**
Multifamily	6.32	58%	**$1,023**
Nonresidential (per 1,000 square feet of floor area)			
Retail & Service	77.80	38%	**$8,248**
Office	20.07	50%	**$2,800**
Industrial	8.10	50%	**$1,130**
Institutional	22.09	50%	**$3,082**
Nonresidential (per room)			
Hotel/Motel	17.23	50%	**$2,404**

Revenue from Transportation Impact Fee

Revenue from the City's Transportation Impact Fee is estimated in Figure 20. There is projected to be 2,870 new housing units and 2,773,000 square feet of nonresidential development in Portland by 2028. To find the revenue generated by residential and nonresidential development, the growth is multiplied by the corresponding impact fee. For example, future single family/two-family residential development is projected to generate $716,788 in revenue from the transportation impact fees (332 new housing units x $2,159 = $716,788). The revenue covers 87 percent of the capital costs generated by projected growth in the City of Portland. The revenue is expected to not cover all of growth's costs since the credit for future debt payments lessens the net capital cost per person trip by about 13 percent.

Note: revenue from hotel development is not estimated because of the difficulty of projecting new hotel rooms.

Figure 20. Estimated Revenue from Transportation Impact Fee

	Total Cost	Cost Attributable to Growth
Multimodal Projects	$15,930,000	$7,265,000
Signals	$11,375,000	$8,031,250
Total Expenditures	**$27,305,000**	**$15,296,250**

Projected Transportation Impact Fee Revenue

Year		Single Family/ Two-Family	Multifamily	Retail & Service	Office	Industrial	Institutional
		Housing Units	Housing Units	1,000 Sq. Ft.	1,000 Sq. Ft.	1,000 Sq. Ft.	1,000 Sq. Ft.
Base	2018	21,047	16,575	9,817	9,318	7,225	8,909
Year 1	2019	21,080	16,829	9,874	9,403	7,289	8,980
Year 2	2020	21,113	17,083	9,931	9,489	7,353	9,050
Year 3	2021	21,147	17,336	9,988	9,574	7,418	9,121
Year 4	2022	21,180	17,590	10,045	9,660	7,482	9,191
Year 5	2023	21,213	17,844	10,102	9,745	7,546	9,262
Year 6	2024	21,246	18,098	10,159	9,830	7,611	9,332
Year 7	2025	21,279	18,352	10,216	9,916	7,675	9,402
Year 8	2026	21,313	18,605	10,273	10,001	7,739	9,473
Year 9	2027	21,346	18,859	10,330	10,087	7,804	9,543
Year 10	2028	21,379	19,113	10,387	10,172	7,868	9,614
Ten-Year Increase		**332**	**2,538**	**571**	**854**	**643**	**704**
Transportation Impact Fee		$2,159	$1,023	$8,248	$2,800	$1,130	$3,082
Revenue Subtotal		**$716,788**	**$2,596,374**	**$4,709,608**	**$2,391,200**	**$726,590**	**$2,169,728**

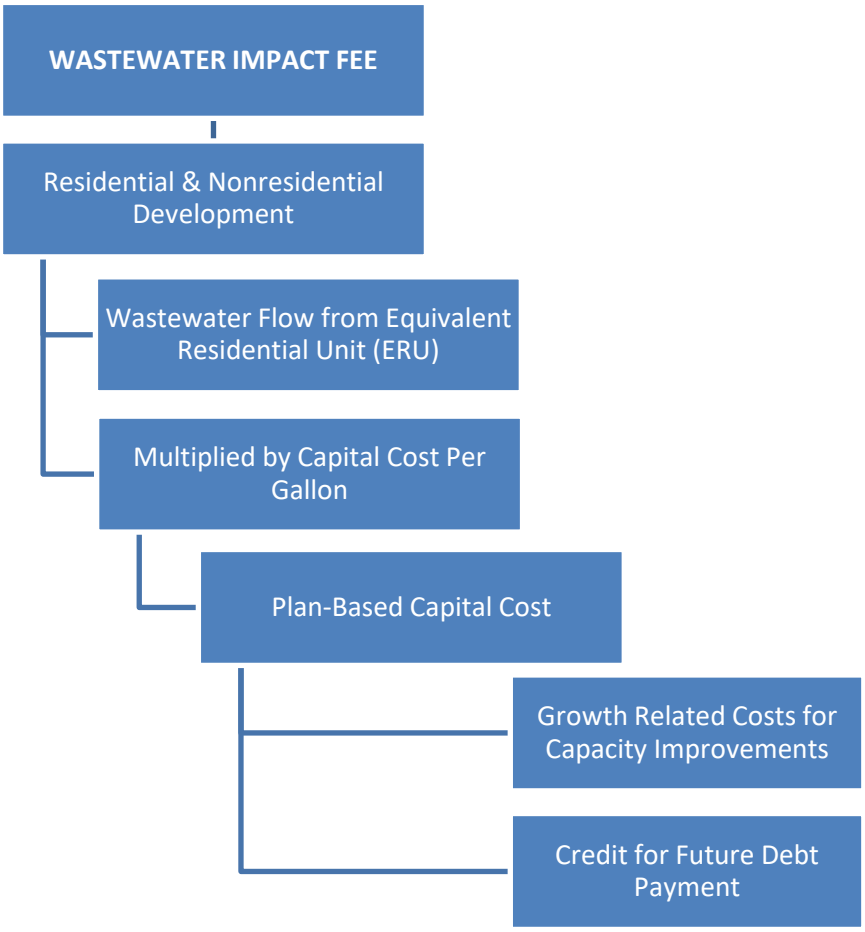
Source: TischlerBise analysis

Projected Revenue => $13,310,288
Total Expenditures => $15,296,250
General Fund's Share => $1,985,962

WASTEWATER FACILITIES IMPACT FEE

To calculate the City of Portland's Wastewater Impact Fee, a ***plan-based methodology*** is used. The methodology for the fee is shown in Figure 21. To calculate the impact amounts for residential and nonresidential development, the wastewater flow for an Equivalent Residential Unit (ERU) is calculated. The ERU is set to the average flow of a wastewater account with a water meter of 5/8 inches. The diagram reads like an outline, with lower levels providing a more detailed breakdown of the fee impact components. The capital cost of wastewater improvements is based future growth's share of capital projects in the City of Portland's Capital Improvement Plan (CIP). Growth's share of future wastewater projects needed within the next 10 years are allocated to the increase in wastewater flow at the end of the 10-year planning horizon.

Figure 21. Wastewater Capital Impact Methodology Chart



Wastewater Level of Service and Cost Factors

Water and sewer account data has been provided by the Portland Water District and the City's Public Works Department. With the database, residential, commercial, industrial, and institutional wastewater usage is calculated. Additionally, with account data, the wastewater usage of an Equivalent Residential Unit (ERU) is calculated as well. The ERU is the estimate of the daily average wastewater usage from a household with a water meter that is 5/8 inches. In the impact fee calculation, a capacity ratio factor is applied when calculating the wastewater usage and resulting impact fee for developments with larger meters.

Current Wastewater Usage

Shown in Figure 22, on average there is a total of 5.7 million gallons per day of wastewater flowing through the City's sewer system from these four development types. The majority of the wastewater flows from residential development, but commercial development creates a significant demand as well.

Figure 22. City of Portland's Daily Wastewater Usage

Development Type	Base Year (gals/day)	%
Residential	2,933,364	52%
Commercial	1,998,656	35%
Industrial	542,244	10%
Institutional	187,205	3%
Total	**5,661,470**	**100%**

Source: City of Portland Public Works Department

Equivalent Residential Unit (ERU)

The wastewater component of the impact fee study will use the average daily wastewater flow for residential units that have a 5/8-inch water meter to represent the Equivalent Residential Unit (ERU). To calculate the ERU, the wastewater account database is filtered by active residential accounts that use the City's sewer system. Additionally, the database is further limited by only year-round accounts. These accounts are occupied households that reside in Portland permanently. Year-round accounts are approximated by accounts that have activity every month. Illustrated in Figure 23, there is an average of 61 hundred cubic feet (HCF) of wastewater per year from a year-round, active residential account flowing into the City's sewer system. That equates to an average of 126 gallons per day, rounded.

Figure 23. Equivalent Residential Unit

Meter Size (inches)	Total Water (HCF)	Active Accounts	Annual Average per Account (HCF)	Annual Average (gallons)	Daily Average (gallons)
5/8	866,230	14,134	61	45,846	**126**

Source: City of Portland Public Works Department; TischlerBise analysis
Note: Provided data measured wastewater totals in hundred cubic feet (HCF), equal to 748.05 gallons

Need for Wastewater Improvements and Facilities

The City of Portland has determined that additional growth-related improvements are necessary to accommodate future wastewater flow. Listed in Figure 24, there are eight wastewater projects in the City's Capital Improvement Plan that have some element of growth-related costs. In the last two columns of the figure future growth's percentage share and dollar amount of each project is shown. In total, new growth's share of wastewater capital improvements and facilities equals $8,944,750.

Found at the bottom of Figure 24, growth's cost is divided by the 10-year increase in wastewater flow. This results in a capital cost per gallon of $22.19, rounded. Further explanation and calculations of the projected increase in wastewater flow can be found in Appendix A.

Figure 24. Growth-Related Wastewater Projects

Project Title	Total	Growth's Share	Growth's Cost
CSO - Close CSO #42	$2,000,000	10%	$200,000
CSO - Mackworth Street and Ocean Avenue Sewer Separation Project	$6,850,000	10%	$685,000
CSO - Dartmouth Street Sewer Separation Project	$2,520,000	10%	$252,000
CMOM - Inflow and Infiltration Program	$4,050,000	50%	$2,025,000
CMOM - Pump Station Rehabilitation	$3,350,000	25%	$837,500
Eastern Waterfront Sewer / Stormwater Extension & Outfall (Thames St)	$1,025,000	85%	$871,250
Franklin Street Storm Drain	$5,300,000	75%	$3,975,000
Warren Ave Storm Drain - 517 Warren Ave to 659 Warren Ave	$990,000	10%	$99,000
TOTAL	$26,085,000		$8,944,750

Growth's Cost of Wastewater Projects	$8,944,750
10-Year Increase in Wastewater Flow (gallons)	403,049
Capital Cost per Gallon	**$22.19**

Wastewater Credit

Currently, the City of Portland has existing debt obligations from past wastewater projects. In Figure 25, the City of Portland's Finance Department delineated the purposes for each of the City's General Obligation Bonds and summed the future principal and interest payments for wastewater projects.

The total annual payment schedule is divided by the City's projected wastewater flow to find the debt payment per gallon. To account for the time value of money, annual payments per gallon are discounted using a net present value formula based on the applicable discount (interest) rate. This results in a credit of $7.22 per gallon, rounded.

Figure 25. Wastewater Debt Payment per Gallon

Fiscal Year	Payment	Projected Wastewater Flow (gals)	Payment/ Gallon
Base Year	$4,984,702	5,661,470	$0.88
2019	$5,301,355	5,701,775	$0.93
2020	$5,185,898	5,742,080	$0.90
2021	$5,039,052	5,782,385	$0.87
2022	$4,943,283	5,822,690	$0.85
2023	$4,435,393	5,862,995	$0.76
2024	$4,084,329	5,903,299	$0.69
2025	$4,023,542	5,943,604	$0.68
2026	$3,924,669	5,983,909	$0.66
2027	$3,833,159	6,024,214	$0.64
2028	$3,671,719	6,064,519	$0.61
Total	**$49,427,101**		**$8.47**
		Discount Rate	3.00%
	Total Credit per Gallon		**$7.22**

Wastewater Impact Fee

Figure 26 shows the cost factors for each component of the Wastewater Impact Fee. The impact fee for wastewater is based on the total capital cost per gallon and the Equivalent Residential Unit (ERU). For meters that are larger than 5/8 inches, a capacity ratio is applied. The water capacity for each meter size is provided by the American Water Works Association, see Appendix C. The maximum defensible fee for a 5/8-inch meter is $1,886 ($14.97 per gallon x 126 gallons per day = $1,886, rounded).

The fees represent the highest amount defensible for each meter size, which represents new growth's fair share of the cost for capital facilities. The City may adopt fees that are less than the amounts shown. However, a reduction in impact fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in levels of service.

Figure 26. Maximum Defensible Wastewater Impact Fee

Growth Capital Cost per Gallon =>	$22.19
Debt Service Credit per Gallon =>	($7.22)
Capital Cost per Gallon of Capacity =>	**$14.97**
Max Daily Gallons per ERU =>	**126**

Meter Size (inches)	Capacity Ratio	Maximum Defensible Fee
All Development (per meter)		
5/8	1.00	**$1,886**
3/4	1.50	**$2,829**
1	2.50	**$4,715**
1.5	5.00	**$9,430**
2	8.00	**$15,088**
3	16.00	**$30,176**
6	50.00	**$94,300**
8	80.00	**$150,880**

Source: American Water Works Association, Principles of Water Rates, Fees, and Charges, M1, 7th ed., 2017; TischlerBise analysis

Revenue from Wastewater Impact Fee

Revenue from the City's Wastewater Impact Fee is estimated in Figure 27. There is projected to be 4,279 new residents and 6,890 new jobs in Portland by 2028. To find the revenue generated by residential and nonresidential development, the growth is multiplied by the average daily wastewater flow per person or job and the capital cost per gallon. For example, future residential development is projected to generate $2,254,793 in wastewater impact fees (4,279 new residents x 35.2 wastewater gallons x $14.97 = $2,254,793). The revenue covers 72 percent of the capital costs generated by projected growth in the City of Portland. The revenue is not expected to cover all growth-related costs since the credit for future debt payments lessens the net capital cost per gallon by about 30 percent.

Figure 27. Estimated Revenue from Wastewater Impact Fee

	Total Cost	Cost Attributable to Growth
Wastewater Facilities	$26,085,000	$8,944,750
Total Expenditures	**$26,085,000**	**$8,944,750**

Projected Wastewater Impact Fee Revenue

		Residential	Nonresidential
Year		**Population**	**Jobs**
Base	2018	83,250	67,270
Year 1	2019	83,678	67,959
Year 2	2020	84,106	68,648
Year 3	2021	84,534	69,337
Year 4	2022	84,962	70,026
Year 5	2023	85,390	70,715
Year 6	2024	85,818	71,404
Year 7	2025	86,246	72,093
Year 8	2026	86,673	72,782
Year 9	2027	87,101	73,471
Year 10	2028	87,529	74,160
Ten-Year Increase		**4,279**	**6,890**
Water Demand, per Pop./Job		35.2	40.6
Cost per Gallon		$14.97	$14.97
Revenue Subtotal		**$2,254,793**	**$4,187,618**

Source: TischlerBise analysis

Projected Revenue =>	**$6,442,411**
Total Expenditures =>	**$8,944,750**
General Fund's Share =>	**$2,502,339**

IMPLEMENTATION AND ADMINISTRATION

Impact fees should be periodically evaluated and updated to reflect recent data. City of Portland will continue to adjust for inflation. If cost estimates or demand indicators change significantly, the City should redo the fee calculations.

Credits and Reimbursements

A general requirement that is common to impact fee methodologies is the evaluation of credits. A credit has been included in this fee study to avoid potential double payment situations arising from one-time impact fees plus on-going payment of other revenues that may also fund growth-related capital improvements.

Policies and procedures related to site-specific credits should be addressed in the resolution or ordinance that establishes the impact fees. The impact fee calculations are based on the systemwide impact of growth. As such, project-level improvements, required as part of the development approval process, are not eligible for credits against impact fees. However, if a developer constructs a systemwide improvement that is included in the fee calculations, it will be necessary to either reimburse the developer or provide a credit against the fees due from that particular development.

Service Area

An impact fee service area is a region in which a defined set of improvements provide benefit to an identifiable amount of new development. Within a service area, all new development of a type (single family, commercial, etc.) is assessed at the same impact fee rate. Land use assumptions and impact fees are each defined in terms of this geography, so that capital facility demand, projects needed to meet that demand, and capital facility cost are all quantified in the same terms. Impact fee revenue collected within a service area is required to be spent within that service area.

Implementation of a large number of small service areas is problematic. Administration is complicated and, because funds collected within the service area must be spent within that area multiple service areas, may make it impossible to accumulate sufficient revenue to fund any projects within the time allowed.

As part of our analysis of the City of Portland and the type of facilities and improvements included in the impact fee calculation, TischlerBise has determined that a citywide service area is appropriate.

APPENDIX A: LAND USE ASSUMPTIONS

Population and Housing Characteristics

Impact fees often use per capita standards and persons per housing unit or persons per household to derive proportionate share fee amounts. Housing types have varying household sizes and, consequently, a varying demand on City infrastructure and services. Thus, it is important to differentiate between housing types and size.

When persons per housing unit (PPHU) is used in the fee calculations, infrastructure standards are derived using year-round population. In contrast, when persons per household (PPHH) is used in the fee calculations, the fee methodology assumes all housing units will be occupied, thus requiring seasonal or peak population to be used when deriving infrastructure standards. From the Maine Office of Tourism, the Greater Portland and Casco Bay region saw 5.4 million visitors in 2016. As a result, it is not just permanent residents occupying housing units in Portland. In response, City infrastructure and operating service levels are sized to accommodate not just permanent residents, but seasonal residents, seasonal workers, and visitors as well. Thus, TischlerBise recommends that fees for residential development in the City of Portland be imposed according to the persons per household (PPHH).

Persons per household (PPHH) will be held constant over the projection period since the study represents a "snapshot approach" of current levels of service and costs. Based on household characteristics, TischlerBise recommends using two housing unit categories for the impact fee study: (1) Single Family and (2) Multifamily. "Single family/Two-family" units include single family detached, single family attached, two-family, and mobile homes, as defined in the City's land use code. Multifamily units include structures with more than 2 units. Figure 28 shows the US Census, American Community Survey 2016 5-Year Estimates data for the City of Portland. Single family/two-family units have a household size of 2.38 persons per unit and multifamily units have a household size of 1.59 persons per unit.

Additionally, single family/two-family units have a vacancy rate of 9.8 percent and are 70 percent of the housing stock in Portland. Multifamily units have a vacancy rate of 9.4 percent and are 30 percent of the housing stock in Portland.

Figure 28. Persons per Household

Type of Structure	Persons	House-holds	Persons per Household	Housing Units	Persons per Housing Unit	Housing Mix	Vacancy Rate
Single Family/Two-Family Unit[1]	50,010	21,052	**2.38**	23,338	2.14	69.8%	9.8%
Multifamily Unit[2]	14,542	9,149	**1.59**	10,098	1.44	30.2%	9.4%
Total	64,552	30,201	**2.14**	33,436	1.93		9.7%

Source: TischlerBise analysis; U.S. Census Bureau, 2012-2016 American Community Survey, 5-Year Estimates

[1] Includes detached, attached, two-family, and mobile home units.

[2] Includes structures with more than 2 units.

Base Year Population and Housing Units

Permanent Residents

Along with the population estimate for residents in single family/two-family and multifamily units, the American Community Survey provides population estimates for those residing in group quarters (i.e. student housing and military residents). Found in Figure 29, the household population and group quarters are considered the City's permanent population. In 2016 it is estimated that the permanent population was 66,627.

Figure 29. Permanent Population, 2016

Type of Structure	Persons	%
Single Family/Two-Family Unit	50,010	75.1%
Multifamily Unit	14,542	21.8%
Group Quarters	2,075	3.1%
Total	**66,627**	**100.0%**

Source: U.S. Census Bureau, 2012-2016 American Community Survey, 5-Year Estimates

In the recently published *Portland's Plan 2030,* several population growth scenarios, modeled by the Greater Portland Council of Governments (GPCOG), are played out. The comprehensive plan shows that a medium-level growth scenario would result in a 2030 population of 71,374. Using this projection for the impact fee study, by 2030 the City of Portland is forecasted to have a permanent population of 71,374. To estimate the City's population in the interim years, a straight-line approach is used. Figure 30 illustrates the growth in permanent population. In the base year, 2018, there is estimated to be 67,305 permanent residents in Portland.

Figure 30. Base Year Permanent Population

	2016	2017	Base Year 2018	2019	2020	2025	2030	Total Increase
Permanent Population	66,627	66,966	67,305	67,644	67,983	69,679	71,374	**4,747**
Percent Increase		0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	**7.1%**

Source: U.S. Census Bureau, 2012-2016 American Community Survey, 5-Year Estimates; City of Portland Planning Department; TischlerBise analysis

Seasonal Residents

As mentioned, the impact fee study will be using a peak population of Portland because of the large tourism industry. It is assumed that City infrastructure and services are sized to serve a peak population not just the permanent population. In this case, two additional populations need to be calculated: seasonal and visitor. The seasonal population includes residents who have second homes in Portland and

the seasonal labor influx during peak tourism months. The visitor population includes overnight and day visitors.

To calculate the seasonal population, the study assumes full occupancy of the housing units in the city. From the US Census data, in 2016, there were 2,286 vacant single family/two-family homes and 949 vacant multifamily homes. The seasonal population is calculated by multiplying the units by the corresponding the persons per household factor (PPHH). In 2016, there was a seasonal population of 6,950.

Figure 31. Seasonal Population, 2016

Type of Structure	Vacant Units	Persons per Household	Seasonal Population
Single Family/Two-Family Unit[1]	2,286	2.38	**5,441**
Multifamily Unit[2]	949	1.59	**1,509**
Total	**3,235**	**2.15**	**6,950**

Source: TischlerBise analysis; U.S. Census Bureau, 2012-2016 American Community Survey, 5-Year Estimates
[1] Includes detached, attached, two-family, and mobile home units.
[2] Includes structures with more than 2 units.

Seasonal Visitors

The visitor population for Portland is found by first analyzing the state and regional totals. In 2016, there were 41.2 million visitors to Maine. The majority of the visitors came in the summer, resulting in the average daily number of visitors in the summer being 185 percent of the annual average.

Figure 32. State of Maine Visitor Totals, 2016

Season	Total Visitors	Average Daily Visitors	Percent of Annual Ave.
Winter	5,615,670	46,156	41%
Summer	25,328,066	208,176	**185%**
Fall	10,230,660	84,088	75%
Total	41,174,396	112,807	100%

Source: Maine Office of Tourism, *2016 Calendar Year Annual Report*

According to the Maine Office of Tourism (MOT), there were 5,360,000 visitors (overnight and day visitors) to the Greater Portland and Casco Bay Region in 2016. Results of the MOT's visitor survey indicate that the Portland's Waterfront was the top attraction for 33 percent of overnight visitors and for 30 percent of day visitors. The study will use a conservative method and use these percentages to allocate the regional visitor total to the City of Portland.

In Figure 33 the City of Portland's daily peak visitor population is calculated. The estimated total of overnight visitors to Portland is 745,800. The estimated total of day visitors to Portland is 930,000. As a result, the total annual visitors to the City of Portland is 1,675,800, or an average of 4,591 per day. Found above, during the summer statewide, the visitor population spikes to 185 percent of the annual average. This factor is applied to the City's average to calculate the daily peak season visitor total. As a result, in 2016, it is estimated that the City of Portland's daily peak season visitor population was 8,473.

Figure 33. City of Portland Peak Season Visitor Population, 2016

Overnight Visitors to Region	2,260,000
City's Proportion of Region	33%
Overnight Visitors to Portland	**745,800**
Day Visitors to Region	3,100,000
City's Proportion of Region	30%
Day Visitors to Portland	**930,000**
Total Annual Visitors to Portland	**1,675,800**
Average Daily Visitors	4,591
Peak Season Multipler	185%
Daily Peak Season Visitor Total	**8,473**

Source: Maine Office of Tourism, 2016; TischlerBise Analysis

The study assumes that the visitor population will have a positive relationship and follow the permanent population's growth. From 2016 to 2018 there is a 1.02 percent increase in permanent population in Portland; this is applied to the visitor population to calculate the base year total. It is assumed that during the peak seasonal period the City's seasonal population (seasonal residents and workers) occupies the vacant housing units. As a result, the seasonal population is calculated based on housing growth, described in the next section of the report. In 2018, it is estimated that the peak population for the City of Portland is 83,250.

Figure 34. Base Year Peak Population

	2016	2017	Base Year 2018
Peak Population			
Permanent	66,627	66,966	**67,305**
Seasonal	6,950	7,168	**7,386**
Visitor	8,473	8,516	**8,559**
Total	82,049	82,650	**83,250**

Source: TischleBise analysis

Base Year Housing Stock

To understand the housing growth in the City of Portland, the building permit data from the last five years is collected in Figure 35. Over the past 5 years there has been an increase of 1,435 housing units in Portland and, on average, there have been 33 single family/two-family and 254 multifamily housing units constructed annually. It is assumed this trend will continue and the averages are used to project housing development in the City of Portland.

Figure 35. Permitted Housing Units

Housing Type	2013	2014	2015	2016	2017	Total	Average
Single Family/Two-Family	26	53	23	38	26	166	**33**
Multifamily	168	97	187	611	206	1,269	**254**
Total	194	150	210	649	232	1,435	**287**

Source: City of Portland Planning Department

By examining parcel data provided by the City with a GIS (Geographic Information System) software, the base year housing stock is estimated in Figure 36. In total, 56 percent of the housing in the City of Portland is single family/two-family and 44 percent multifamily. Consistent with the City's land use code, single family units include single family detached, single family attached, two-families, and mobile homes. Multifamily units include structures with 3 or more units.

Figure 36. Base Year Housing Stock (Housing Units)

Housing Type	Base Year 2018	%
Single Family/Two-Family	21,047	56%
Multifamily	16,575	44%
Total	**37,622**	**100%**

Source: City of Portland GIS Data

Population and Housing Unit Projections

Illustrated in Figure 37, by using the projections from *Portland's Plan 2030* for permanent population, a growth of 3,391 residents is projected by 2028. The seasonal population is assumed to grow with housing development. The vacancy rates found in Figure 28 are assumed to hold through the projection period and the seasonal population is found by combining the estimated vacant units with the corresponding PPHH factor. Lastly, to project the daily peak visitor population growth, the annual percent increase in permanent population is applied. Overall, there is a peak population increase of 4,279. Of the total population in 2028, 81 percent is permanent, 9 percent is seasonal, and 10 percent is visitor population.

To project the housing unit growth in Portland, the five-year annual average of building permits is used (see Figure 35). Over the ten-year projection period, the housing stock in the city is estimated to increase by 2,870 units (88 percent multifamily units).

Figure 37. City of Portland Annual Residential Development Projections

	Base Year 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total Increase
Peak Population														
Permanent	67,305	67,644	67,983	68,322	68,661	69,001	69,340	69,679	70,018	70,357	70,696	71,035	71,374	**3,391**
Seasonal	7,386	7,432	7,478	7,523	7,569	7,615	7,660	7,706	7,752	7,797	7,843	7,889	7,934	**457**
Visitor	8,559	8,602	8,645	8,688	8,731	8,775	8,818	8,861	8,904	8,947	8,990	9,033	9,076	**431**
Total	83,250	83,678	84,106	84,534	84,962	85,390	85,818	86,246	86,673	87,101	87,529	87,957	88,385	**4,279**
Housing Unit														
Single Family/Two-Family	21,047	21,080	21,113	21,147	21,180	21,213	21,246	21,279	21,313	21,346	21,379	21,412	21,445	**332**
Multifamily	16,575	16,829	17,083	17,336	17,590	17,844	18,098	18,352	18,605	18,859	19,113	19,367	19,621	**2,538**
Total	37,622	37,909	38,196	38,483	38,770	39,057	39,344	39,631	39,918	40,205	40,492	40,779	41,066	**2,870**

Source: Portland's Plan 2030; TischlerBise analysis

Current Employment and Nonresidential Floor Area

The impact fee study will include nonresidential development as well. According to the U.S. Census Bureau's web application, OnTheMap, there were 65,203 jobs in Portland in 2015. The education, health care, and social assistance services accounted for the largest percentage of the total (26.2 percent).

Figure 38. Employment by Industry Sector, 2015

Industry Sector	Employment	%
Agriculture, forestry, fishing and hunting, and mining	18	0.0%
Utilities	395	0.6%
Construction	2,015	3.1%
Manufacturing	2,714	4.2%
Wholesale trade	2478	3.8%
Retail trade	5,302	8.1%
Transportation and warehousing, and utilities	2,065	3.2%
Information	1,529	2.3%
Finance and insurance, and real estate and rental and leasing	8,114	12.4%
Professional, scientific, mgmt. , admin., and waste mgmt. services	11,893	18.2%
Educational services, and health care and social assistance	17,057	26.2%
Arts, entertainment, recreation, accommodation, and food services	7,354	11.3%
Other services, except public administration	2,475	3.8%
Public administration	1,794	2.8%
Total	**65,203**	**100.0%**

Source: U.S. Census Bureau, OnTheMap 2015

The fourteen industry sectors in Figure 38 have been compiled into four industries: retail, office, industrial, and institutional. The City of Portland's employment is pretty well dispersed between the industries, with the institutional and office industries accounting for the highest percentages of employment, Figure 39.

Figure 39. Employment by Industry, 2015

Industry	Jobs	%
Retail	12,656	19%
Office	24,011	37%
Industrial	9,685	15%
Institutional	18,851	29%
Total	**65,203**	**100%**

Source: U.S. Census Bureau, OnTheMap 2015

Since the breakdown is for 2015, a projection is necessary to estimate the job totals for the base year. To estimate the current employment in the City of Portland, employment projections from Portland Area Comprehensive Transportation System (PACTS) are used. Based on employment projections at the Traffic Analysis Zone (TAZ) level, PACTS forecast an employment increase of 27.5 percent from 2014 to 2040. The annual percent increase of the PACTS projection is used to calculate the employment growth in Figure 40.

The breakdown by industry in Figure 39 is then applied to total increase to calculate the growth in each industry. In the base year, it is estimated that there are 67,270 jobs in Portland.

Figure 40. Base Year Employment

	2015	2016	2017	Base Year 2018
Employment				
Retail	12,656	12,790	12,923	13,057
Office	24,011	24,265	24,518	24,772
Industrial	9,685	9,787	9,890	9,992
Institutional	18,851	19,050	19,249	19,449
Total	**65,203**	**65,892**	**66,581**	**67,270**

Source: Portland Area Comprehensive Transportation System (PACTS); TischlerBise analysis

Base year nonresidential floor area for the retail, office, industrial, and institutional industry sectors are calculated with GIS parcel data provided by City staff. In Figure 41, there is a total of 35.3 million square feet of nonresidential floor area in Portland in 2018, with all sectors accounting for at least 20 percent. Additionally, the figure lists the City's land use categories used to determine the floor area of each industry.

Figure 41. Base Year Nonresidential Floor Area

Industry	Nonresidential Sq. Ft.	%	Land Use Categories
Retail	9,816,540	28%	Multiuse Commercial, Retail & Personal Services
Office	9,317,766	26%	Office & Business Services, Communications, Commercial Condos
Industrial	7,224,665	20%	Manufacturing & Constr., Multiuse Ind., Transport., Warehouse, Wholesale
Institutional	8,909,498	25%	Charitable, Government, Scientific Inst., Religious, Other Exempt by Law
Total	**35,268,468**	**100%**	

Source: Portland Area Comprehensive Transportation System (PACTS); City of Portland GIS data

Employment and Nonresidential Floor Area Projections

To project nonresidential floor area, square feet per employee factors from the Institute for Transportation Engineer's Trip Generation (2017) are used. To estimate the factor for retail, the shopping center factor is used, for office the general office factor is used, for industrial the manufacturing factor is used, and for institutional the hospital factor is used (Figure 42).

Figure 42. Institute of Transportation Engineers Nonresidential Land Use Factors

ITE Code	Land Use	Demand Unit	Emp Per Dmd Unit	Sq Ft Per Emp
110	Light Industrial	1,000 Sq Ft	1.63	615
130	Industrial Park	1,000 Sq Ft	1.16	864
140	Manufacturing	1,000 Sq Ft	1.59	628
150	Warehousing	1,000 Sq Ft	0.34	2,902
254	Assisted Living	bed	0.61	na
320	Motel	room	0.13	na
520	Elementary School	1,000 Sq Ft	0.93	1,076
530	High School	1,000 Sq Ft	0.63	1,581
540	Community College	student	0.08	na
550	University/College	student	0.18	na
565	Day Care	student	0.19	na
610	Hospital	1,000 Sq Ft	2.83	354
620	Nursing Home	1,000 Sq Ft	2.28	438
710	General Office (avg size)	1,000 Sq Ft	2.97	337
760	Research & Dev Center	1,000 Sq Ft	3.42	292
770	Business Park	1,000 Sq Ft	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	2.34	427

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017)

Found in Figure 43, job growth over the next ten years is projected to follow PACTS' annual percentage increase forecast. In total, 6,890 new jobs are projected by 2028. Each industry sector is projected to have an increase over 1,000 jobs, with office topping the four with an increase of 2,537 jobs.

To project floor area, the square foot per job factors are applied to the corresponding job totals. Over the next ten years, it is projected that there will be a growth of 2.8 million nonresidential square feet in the City of Portland. The office and institutional industries are projected to have the largest increases in floor area, both over 700,000 square feet.

Figure 43. Employment and Nonresidential Floor Area Projections

Industry	Base Year 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total Increase
Employment												
Retail	13,057	13,191	13,325	13,458	13,592	13,726	13,860	13,993	14,127	14,261	14,395	**1,337**
Office	24,772	25,026	25,280	25,533	25,787	26,041	26,295	26,548	26,802	27,056	27,309	**2,537**
Industrial	9,992	10,094	10,197	10,299	10,401	10,504	10,606	10,708	10,811	10,913	11,015	**1,023**
Institutional	19,449	19,648	19,847	20,046	20,245	20,445	20,644	20,843	21,042	21,241	21,441	**1,992**
Total	67,270	67,959	68,648	69,337	70,026	70,715	71,404	72,093	72,782	73,471	74,160	**6,890**
Nonresidential Floor Area (1,000 sq. ft.)												
Retail	9,817	9,874	9,931	9,988	10,045	10,102	10,159	10,216	10,273	10,330	10,387	**571**
Office	9,318	9,403	9,489	9,574	9,660	9,745	9,830	9,916	10,001	10,087	10,172	**854**
Industrial	7,225	7,289	7,353	7,418	7,482	7,546	7,611	7,675	7,739	7,804	7,868	**643**
Institutional	8,909	8,980	9,050	9,121	9,191	9,262	9,332	9,402	9,473	9,543	9,614	**704**
Total	35,268	35,546	35,823	36,100	36,378	36,655	36,932	37,209	37,487	37,764	38,041	**2,773**

Source: Portland Area Comprehensive Transportation System (PACTS); City of Portland; TischlerBise analysis

Person Trip Generation

Portland is a unique community with residents and workers using varying modes to travel. In general, an impact fee study calculates future developments' impact on the City's transportation infrastructure. In suburban, greenfield communities that concentrate on roadway expansion to accommodate new vehicles, a development's impact is best estimated by calculating the new 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 Portland. This is also consistent with the capital improvements identified in the City's Capital Improvement Plan. As such, the multimodal approach will calculate the daily person trips generated by the varying development types in the study. To encompass the varying modes of travel used in Portland, the methodology includes persons per vehicle trip, transit trip, and non-motorized trips.

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 (2017):

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 trip and bike trips. The Trip Generation Handbook outlines the general approach to calculating person trips (further detail of methodology used is described in following sections):

1. **Estimate vehicle trips generated by development type.**
    a. This study uses the vehicle trip rates found in ITE's Trip Generation Manual (2017).
2. **Determine mode share and vehicle occupancy.**
    a. Trip survey data from the National Household Transportation Survey (2017) is used to calculate needed factors.
3. **Convert vehicle trips to person trips.**
    a. This conversion calculates the total person trips by combining the vehicle trip mode share and vehicle occupancy.
4. **Calculate the estimated person trips by mode.**
    a. The mode share split is applied to the total person trip rate to calculate the specific person trip rate for vehicle, transit, and non-motorized trips per land use.

Residential Vehicle Trips

A customized vehicle trip rate is calculated for the single family and multifamily units in the City of Portland. In Figure 44, the most recent data from the American Community Survey is inputted into equations provided by the ITE to calculate the vehicle trip ends per housing unit factor. A single family/two-family unit is estimated to generate 7.6 trip ends on an average weekday and a multifamily unit is estimated to generate 3.6 trip ends on an average weekday.

Figure 44. Customized Residential Vehicle Trip End Rates

		Households (2)			Vehicles per
	Vehicles Available (1)	Single Family/ Two-Family	Multifamily Units	Total HHs	Household by Tenure
Owner-occupied	23,000	12,312	680	12,992	1.77
Renter-occupied	17,976	8,740	8,469	17,209	1.04
TOTAL	**40,976**	**21,052**	**9,149**	**30,201**	**1.36**
Housing Units (6) =>		23,338	10,098	33,436	
Persons per Housing Unit =>		2.14	1.44	1.93	

	Persons (3)	Trip Ends (4)	Vehicles by Type of Housing	Trip Ends (5)	Average Trip Ends	**Trip Ends per Housing Unit**
Single Family/Two-Family	50,010	154,055	30,926	202,330	178,192	**7.60**
Multifamily	14,542	33,220	10,050	39,892	36,556	**3.60**
TOTAL	**64,552**	**187,275**	**40,976**	**242,222**	**214,748**	**6.40**

(1) Vehicles available by tenure from Table B25046, 2012-2016 American Community Survey 5-Year Estimates.
(2) Households by tenure and units in structure from Table B25032, American Community Survey, 2012-2016.
(3) Persons by units in structure from Table B25033, American Community Survey, 2012-2016.
(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 286 and the equation result multiplied by 286. For multifamily 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 485 and the equation result multiplied by 485. For multifamily housing (ITE 220), the fitted curve equation is (3.94*vehicles)+293.58 (ITE 2012).
(6) Housing units from Table B25024, American Community Survey, 2012-2016.

Nonresidential Vehicle Trips

Vehicle trip generation for nonresidential land uses are calculated by using ITE's average daily trip end rates found in their recently published 10th edition of Trip Generation. To estimate the trip generation in Portland, the weekday trip end per 1,000 square feet factors highlighted in Figure 45 are used. To estimate the trip generation for retail the shopping center factor is used, for office the general office factor is used, for industrial the manufacturing factor is used, and for institutional the hospital factor is used.

Figure 45. Institute of Transportation Engineers Nonresidential Land Use Factors

ITE Code	Land Use	Demand Unit	Wkdy Trip Ends Per Dmd Unit	Wkdy Trip Ends Per Employee
110	Light Industrial	1,000 Sq Ft	4.96	3.05
130	Industrial Park	1,000 Sq Ft	3.37	2.91
140	Manufacturing	1,000 Sq Ft	3.93	2.47
150	Warehousing	1,000 Sq Ft	1.74	5.05
254	Assisted Living	bed	2.60	4.24
320	Motel	room	3.35	25.17
520	Elementary School	1,000 Sq Ft	19.52	21.00
530	High School	1,000 Sq Ft	14.07	22.25
540	Community College	student	1.15	14.61
550	University/College	student	1.56	8.89
565	Day Care	student	4.09	21.38
610	Hospital	1,000 Sq Ft	10.72	3.79
620	Nursing Home	1,000 Sq Ft	6.64	2.91
710	General Office (avg size)	1,000 Sq Ft	9.74	3.28
760	Research & Dev Center	1,000 Sq Ft	11.26	3.29
770	Business Park	1,000 Sq Ft	12.44	4.04
820	Shopping Center (avg size)	1,000 Sq Ft	37.75	16.11

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017)

Mode Share and Vehicle Occupancy

Data from the National Household Travel Survey (NHTS) is used to approximate the percentage split of total person trips by transportation modes in the City of Portland. NHTS has been conducting stratified, random surveys for nearly 50 years with the aim to understand the modes and purposes of travel in the US. For this study, the most recent survey, 2017, is refined to create a database of survey responses that is both from similar cities to Portland and statistically significant. Initially, the national database of responses is refined by location and population, the results are limited to New England metropolitan statistical areas (ME, NH, VT, CT, MA, RI) with less than 1 million residents. The City of Portland is within the Portland-South Portland-Biddeford, Maine metropolitan statistical area that had a population of 523,874 in 2016 (US Census American Community Survey, 2016). The database is further filtered to only include responses from urban areas and urban clusters. Lastly, only responses for trips on weekdays are included. As a result, there are 2,656 NHTS responses in the database that are used to approximate the mode splits and vehicle occupancy.

Data from NHTS indicates the purpose of a trip which allows for the mode share and vehicle occupancy to be calculated for residential and nonresidential land uses separately. It is assumed that trips for residential and nonresidential purposes have different characteristics, so by calculating separately the analysis results in more accurate trip factors. There are 1,447 survey responses that are attributed to

residential and 1,209 responses attributed to nonresidential land uses. Both databases are well within a 95 percent confidence level with a confidence interval (margin of error) of less than 3.[1]

The transportation mode split for residential purpose trips is listed in Figure 46. Of the 1,447 total trips, 86 percent are by vehicle, 1 percent transit, and 13 percent non-motorized. Additionally, during the vehicle trips there were 1,877 passengers, resulting in an average vehicle occupancy of 1.51 passengers per vehicle trip.

Figure 46. Residential Purpose Person Trips by Mode

Mode	Trips	%
Vehicle	1,246	86%
Transit	18	1%
Non-Motorized	183	13%
Total	**1,447**	**100%**

Source: National Household Travel Survey, 2017; TischlerBise analysis

The transportation mode split for nonresidential purpose trips is listed in Figure 47. Of the 1,209 total trips, 82 percent are by vehicle, 2 percent transit, and 16 percent non-motorized. Additionally, during the vehicle trips there were 1,669 passengers, resulting in an average vehicle occupancy of 1.69 passengers per vehicle trip.

Figure 47. Nonresidential Purpose Person Trips by Mode

Mode	Trips	%
Vehicle	989	82%
Transit	22	2%
Non-Motorized	198	16%
Total	**1,209**	**100%**

Source: National Household Travel Survey, 2017; TischlerBise analysis

[1] A confidence level expresses the certainty that the true mean of the population falls within the confidence interval, the margin of error of the results.

Vehicle Trip Ends to Find Total 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 (2017):

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)

By inputting the vehicle trip rate, vehicle occupancy, and vehicle mode share factors found in earlier sections, the daily person trip rate for each land use is found. For example, the daily vehicle trip rate for a single family/two-family housing unit is 7.60 (Figure 44), the vehicle occupancy is 1.51, and the vehicle mode share is 86 percent (Figure 46). By inputting these factors into the formula, a daily person trip end rate of 13.34 is calculated ([7.60 vehicle trips x 1.51 occupancy rate] / [86% vehicle mode share] = 13.34). Figure 48 lists the calculated daily person trip end rate for each land use.

Figure 48. Daily Person Trip End Rate by Land Use

Development Type	Daily Vehicle Trip Ends	Vehicle Occupancy Rate	Vehicle Mode Share	Daily Person Trip Ends
Single Family/Two-Family	7.60	1.51	86%	**13.34**
Multifamily	3.60	1.51	86%	**6.32**
Retail	37.75	1.69	82%	**77.80**
Office	9.74	1.69	82%	**20.07**
Industrial	3.93	1.69	82%	**8.10**
Institutional	10.72	1.69	82%	**22.09**

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017); National Household Travel Survey data, 2017; TischlerBise analysis

Residential Trips Adjustment Factors

A person trip end is the out-bound or in-bound leg of a trip. As a result, so to not double count trips, a standard 50 percent adjustment 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.

However, an additional adjustment is necessary to capture residents' work bound trips that are outside of the City. The trip adjustment factor includes two components. According to the NHTS (2009), home-based work trips are typically 31 percent of out-bound trips (which are 50 percent of all trip ends). Also, utilizing the most recent data from the Census Bureau's web application "OnTheMap", 49 percent of the City of Portland's workers travel outside the city for work. In combination, these factors account for 8 percent of additional production trips (0.50 x .31 x 0.49 = 0.08). Shown in Figure 49, the total adjustment factor for residential housing units includes attraction trips (50 percent of trip ends) plus the journey-to-work commuting adjustment (8 percent of production trips) for a total of 58 percent.

Figure 49. Trip Adjustment Factor for Commuters out of the City

Employed Portland Residents (2015)	35,405
Portland Residents Working in the City (2015)	17,958
Portland Residents Commuting Outside of the City for Work	17,447
Percent Commuting out of the City	49%
Additional Production Trips	**8%**

Standard Trip Adjustment Factor	**50%**
Residential Trip Adjustment Factor	**58%**

Source: U.S. Census, OnTheMap Application, 2015

To calculate nonresidential trips, the standard 50 percent adjustment is applied to office, industrial, and institutional. A lower trip adjustment factor is used for retail uses because this type of development attracts person trips while they pass-by. Pass-by trips do not generate further traffic as it is only a stop on a trip for ultimately a different purpose. For example, when someone stops at a convenience store on their way home from work, the convenience store is not their primary destination.

Person Trips by Mode

In Figure 50, the trip adjustment factor and mode share are applied to the person trip end rate of each land use to calculate the person trips. For example, for single family/two-family housing units the trip adjustment factor is 58 percent and the vehicle mode share is 86 percent, resulting in a daily person trip rate of 6.66 for the vehicle mode (13.34 person trip ends x 0.58 trip adjustment factor x 0.86 vehicle mode share = 6.66 person trips).

Figure 50. Person Trips by Mode

Development Type	Person Trip Ends	Trip Adjustment Factor	Person Trips/Unit			
			Total	Vehicle	Transit	Non-motorized
Single Family/Two-Family	13.34	58%	7.74	6.66	0.08	1.01
Multifamily	6.32	58%	3.67	3.16	0.04	0.48
Retail	77.80	38%	29.56	24.24	0.59	4.73
Office	20.07	50%	10.04	8.23	0.20	1.61
Industrial	8.10	50%	4.05	3.32	0.08	0.65
Institutional	22.09	50%	11.05	9.06	0.23	1.76

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017); National Household Travel Survey data, 2017; TischlerBise analysis

Note: Trip rates are shown per housing unit for residential land uses and per 1,000 square feet of floor area for nonresidential land uses, except Hotel is shown per hotel room.

Person Trip Projections

The base year person trip totals and trip projections are calculated by combining the person trip factors and the residential and nonresidential assumptions for housing stock and floor area. Found in Figure 51, in the base year, residential land uses generate 223,734 person trips (30 percent) and nonresidential land uses generate 511,437 person trips (70 percent) in the City of Portland. Through 2028, there will be an increase of 47,721 daily person trips in Portland with retail, multifamily, and office development being the three largest contributors to the increase.

In the base year, 83 percent of the person trips are by vehicle, 2 percent is by transit, and 15 percent is by non-motorized modes. The majority of the person trip increase over the 10-year projection period is from vehicles as well.

Figure 51. Total Daily Person Trip Projections

	Base Year 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total Increase
Residential Person Trips												
Single Family/Two-Family	162,904	163,161	163,418	163,675	163,932	164,189	164,446	164,703	164,960	165,216	165,473	**2,570**
Multifamily	60,830	61,762	62,693	63,625	64,556	65,487	66,419	67,350	68,282	69,213	70,145	**9,314**
Subtotal	223,734	224,922	226,111	227,299	228,488	229,676	230,865	232,053	233,241	234,430	235,618	**11,884**
Nonresidential Person Trips												
Retail	290,177	291,864	293,551	295,238	296,925	298,612	300,299	301,987	303,674	305,361	307,048	**16,871**
Office	93,550	94,408	95,266	96,124	96,982	97,840	98,698	99,555	100,413	101,271	102,129	**8,579**
Industrial	29,260	29,520	29,781	30,041	30,302	30,562	30,823	31,083	31,344	31,604	31,865	**2,605**
Institutional	98,450	99,228	100,006	100,785	101,563	102,341	103,119	103,897	104,676	105,454	106,232	**7,782**
Subtotal	511,437	515,021	518,604	522,188	525,772	529,356	532,939	536,523	540,107	543,690	547,274	**35,837**
Grand Total Person Trips	735,171	739,943	744,715	749,487	754,260	759,032	763,804	768,576	773,348	778,120	782,892	**47,721**
Person Trips by Transportation Mode												
Total Vehicle Person Trips	611,790	615,750	619,711	623,672	627,632	631,593	635,554	639,514	643,475	647,436	651,396	**39,607**
Total Transit Person Trips	12,466	12,550	12,633	12,717	12,800	12,884	12,967	13,051	13,135	13,218	13,302	**836**
Total Non-Motorized Trips	110,915	111,643	112,371	113,099	113,827	114,555	115,283	116,011	116,738	117,466	118,194	**7,279**
Grand Total Person Trips	735,171	739,943	744,715	749,487	754,260	759,032	763,804	768,576	773,348	778,120	782,892	**47,721**

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017); National Household Travel Survey data, 2017; TischlerBise analysis

Base Year Wastewater Usage

Water and sewer account data has been provided by the Portland Water District (PWD) and the City's Department of Public Works. Within the database, residential, commercial, industrial, and institutional wastewater usage is calculated. Additionally, with account data, the wastewater usage of an Equivalent Residential Unit (ERU) is calculated as well. The ERU is the estimate of the daily average wastewater usage from a household with a water meter that is 5/8 inches. In the impact fee calculation, a capacity ratio factor is applied when calculating the wastewater usage and resulting impact fee for developments with larger meters.

Base Year Estimates

Shown in Figure 52, on average there is a total of 5.7 million gallons per day of wastewater flowing through the City's sewer system from these four development types. The majority of the wastewater flows from residential development, but commercial development creates a significant demand as well.

Figure 52. City of Portland Daily Wastewater Usage, 2018

Development Type	Base Year (gals/day)	%
Residential	2,933,364	52%
Commercial	1,998,656	35%
Industrial	542,244	10%
Institutional	187,205	3%
Total	**5,661,470**	**100%**

Source: City of Portland Public Works Department

Equivalent Residential Unit

The wastewater component of the impact fee study will use the wastewater flow calculated for residential units that have a water meter of 5/8 inches to represent the Equivalent Residential Unit (ERU). To calculate the ERU, the wastewater account database is filtered by active residential accounts that use the City's sewer system. Additionally, the database is further limited by only year-round accounts. These accounts are occupied households that reside in Portland permanently. Year-round accounts are approximated by accounts that have activity every month. Illustrated in Figure 53, there is an average of 61 hundred cubic feet (HCF) of wastewater per year from a year-round active residential account flowing into the City's sewer system. That equates to an average of 126 gallons per day, rounded.

Figure 53. Equivalent Residential Unit

Meter Size (inches)	Total Water (HCF)	Active Accounts	Annual Average per Account (HCF)	Annual Average (gallons)	Daily Average (gallons)
5/8	866,230	14,134	61	45,846	**126**

Source: City of Portland Public Works Department; TischlerBise analysis
Note: Provided data measured wastewater totals in hundred cubic feet (HCF), equal to 748.05 gallons

Wastewater Projections

To project wastewater flows, is it assumed that the average consumptions will stay constant. As a result, the wastewater from residential accounts will increase at the same rate as the projected housing units and wastewater from nonresidential accounts will increase at the same rate as the projected growth in floor area for the respective industry. Over the next ten years, a total increase of 400,000 gallons per day is projected. Residential and commercial land uses account for the majority of the projected increase.

Figure 54. Wastewater Projections, Million Gallons Per Day (MGD)

Development Type	Base Year 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total Increase
Residential	2.93	2.96	2.98	3.00	3.02	3.05	3.07	3.09	3.11	3.13	3.16	**0.22**
Commercial	2.00	2.01	2.02	2.03	2.05	2.06	2.07	2.08	2.09	2.10	2.11	**0.12**
Industrial	0.54	0.55	0.55	0.56	0.56	0.57	0.57	0.58	0.58	0.59	0.59	**0.05**
Institutional	0.19	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	**0.01**
Total	5.66	5.70	5.74	5.78	5.82	5.86	5.90	5.94	5.98	6.02	6.06	**0.40**

Source: City of Portland Public Works Department; TischlerBise analysis

APPENDIX B: AFFORDABLE HOUSING ANALYSIS

This chapter estimates the effects of imposing the proposed impact fees on the affordability of housing in the City of Portland. The analysis will examine the current household income and housing expenses that burden an average household in the City. Next, the maximum defensible impact fees will be included in the cost burden analysis to identify the effect the fees will have on affordable housing in the City.

For this analysis, affordable housing is defined in as housing to families whose incomes do not exceed 80 percent of the median income of the City. The analysis uses the US Housing and Urban Development's (HUD) criteria that housing should be 30 percent or less of a household's income. The cost of housing is "moderately burdensome" if its cost burden is over 30 percent and "severely burdensome" if the ratio is over 50 percent.

Proposed Impact Fees

The impact fees found in Figure 55 are new development's fair share of the cost to provide additional parks & recreation, transportation, and wastewater facilities. The City may adopt fees that are less than the amounts shown. However, a reduction in impact fee revenue will necessitate an increase in other revenues, a decrease in planned capital expenditures, and/or a decrease in levels of service. The housing affordability analysis will assume a conservative condition for assessing the effect of the impact fee on affordable housing in the City of Portland (i.e. the maximum defensible impact fee amount). If the City were to choose a lower impact fee amount, the results presented in this report would improve.

Figure 55. Maximum Defensible Impact Fees

Development Type	Parks & Rec	Transportation	Wastewater	Total
Residential (per housing unit/per water meter)				
Single Family/Two-Family	$1,126	$2,159	$1,886	**$5,171**
Multifamily	$752	$1,023	$1,886	**$3,661**

Note: a 5/8 inch meter is shown for residential development, however, the wastewater fee will be assessed based on the development's meter size.

Housing Stock

Listed in Figure 56, there are a total of 33,436 housing units in the City of Portland. Of the total, 90 percent are occupied. Additionally, the majority (70 percent) of the housing in the City is single family/two-family units.

Figure 56. Housing Stock Characteristics

Type of Structure	Persons	House-holds	Persons per Household	Housing Units	Persons per Housing Unit	Housing Mix	Vacancy Rate
Single Family/Two-Family Unit[1]	50,010	21,052	**2.38**	23,338	2.14	69.8%	9.8%
Multifamily Unit[2]	14,542	9,149	**1.59**	10,098	1.44	30.2%	9.4%
Total	64,552	30,201	**2.14**	33,436	1.93		9.7%

Source: TischlerBise analysis; U.S. Census Bureau, 2012-2016 American Community Survey, 5-Year Estimates
[1] Includes detached, attached, two-family, and mobile home units.
[2] Includes structures with more than 2 units.

Household Income

The purchasing power of Portland residents to secure housing is represented by personal income. Personal income includes all wages, tips, and bonuses from employment, as well as retirement income earned from a pension plan or retirement account. In the analysis, household income represents all residents living in the housing unit, no matter relationship. From the US Census Bureau American Community Survey, in 2016 the median annual household income for the City was $65,571. By using the US Bureau of Labor Statistics' CPI Calculator, the current household income is estimated at $68,560. The annual income for a household making 80 percent of the City's median is $54,848, or $4,571 per month.

Figure 57. Median Household Income

Median Annual Household Income (2016)	Median Annual Household Income (2018)	Household Income Factor	80% of Median Annual Income	Monthly Income
$65,571	$68,560	80%	$54,848	**$4,571**

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates; U.S. Bureau of Labor Statistics CPI Calculator

Cost of Homeownership

The analysis uses ten categories to calculate the baseline cost of homeownership in the City: purchase price; mortgage payment; property tax; stormwater management fee; water; sewer; gas; electricity; telephone, cable and internet; and homeowners insurance. The following section details the costs included.

Purchase Price

The median home value is used to estimate the purchase price of a home. The American Community Survey estimates that the median value of a home in the City in 2016 was $248,000 (US Census Bureau, 2012-2016 American Community Survey 5-Year Estimates). With the US Bureau of Labor Statistics' CPI Calculator, the current home value is estimated to be $259,306.

Mortgage Payment

A conventional, fixed-rate 30-year mortgage is assumed to estimate monthly costs of principle and interest on a home loan. The down payment for a loan is assumed to be 20 percent of the purchase price ($259,306 x 20% = $51,861). The loan amount for the mortgage is determined by subtracting the down payment from the purchase price ($251,617 - $51,861 = $207,445). An interest rate of 4.35 percent is assumed for the home purchase based on a survey of competitive interest rates in Portland (www.bankrate.com). The monthly mortgage payment is $1,033.

Property Tax

To calculate annual property tax, homes in the City that are assessed a property tax millage rate of 0.0225. The assessed value of a home in Portland is found by reducing the market rate (purchase price) by the Local Declared Ratio (89%) and the Maine Homestead Exemption Program ($17,800). Thus, in this analysis the assessed value of an average home in Portland is $212,982 ($259,306 x 89% - $17,800 = $212,982). As a result, the annual property tax for the average valued home is $4,788 ($212,982 x 0.0225 = $4,788).

Stormwater Service Charge

In the City of Portland, the stormwater service charge to operate and maintain the stormwater management system is $12.60 per month for a housing unit. It is assumed that the average single family unit has between 1,800 and 2,880 square feet of impervious area.

Water Utility

By using data provided by the City of Portland and the Portland Water District, the average household uses 126 gallons of water per day or 512 cubic feet per month. Based on the water rates for a residential unit, the average water usage results in a monthly charge of $19.09.

Wastewater Utility

By using data provided by the City of Portland and the Portland Water District, the average household generates 126 gallons of wastewater per day or 512 cubic feet per month. Based on the wastewater rates for a residential unit, the average wastewater generation results in a monthly charge of $21.98.

Electricity Utility

By using data from the Central Maine Power company, the average household generates 552 kilowatts of electricity per month. Based on the electricity rates for a residential unit, the average electricity usage results in a monthly charge of $45.30.

Gas Utility

By using data from the Governor's Energy Office and Unitil company, the average household uses 62.5 therms of gas per month (annualized average). Based on the gas rates for a residential unit, the average usage results in a monthly charge of $54.43.

Telephone, Cable, and Internet Utilities

Comcast Xfinity is a provider of telephone, cable, and internet in the City of Portland. From their website, the three services costs $80.00 per month (www.xfinity.com).

Homeowner's Insurance

Homeowner's insurance provides protection for the home and is generally required when a home has a mortgage. The average cost for homeowner's insurance in the City is estimated to be $820 per year (www.insurance.com).

Monthly Payment

By compiling the month obligations, it is estimated that the monthly cost for homeownership is $1,733. At the end of this chapter the monthly costs are listed in Figure A6.

Cost of Renting

The cost of renting a home in the City of Portland is estimated with data provided by the US Census Bureau. In 2016, the median gross rent (including all utilities and rental insurance) in the City was estimated to be $969. With the US Bureau of Labor Statistics' CPI Calculator, the current cost of renting is estimated to be $1,013.

Cost Burden Analysis

The cost burden for affordable housing is measured as the ratio between monthly payments for housing (including property tax, fee, utilities, and insurance) and monthly gross household income. An analysis was conducted for residents that purchase a home and residents that rent a home. A cost burden ratio of 30 percent is used as the threshold to determine housing affordability in the City of Portland.

Scenario 1: Baseline Conditions

Figure 58 summarizes the cost burden analysis for residents purchasing or renting a median valued home without the maximum defensible impact fees included. Based on the results, the cost burden for owner-occupied housing is above the threshold to be considered affordable for households whose income is 80 percent of the City's median income. The renter-occupied housing cost burden is below the limit of affordability for households whose income is 80 percent of the median income.

Figure 58. Scenario 1: Cost Burden Analysis without Proposed Impact Fee

Condition	Monthly Income	Monthly Cost	Cost Burden
Owner-Occupied	$4,571	$1,733	**37.9%**
Renter-Occupied	$4,571	$1,013	**22.2%**

Scenario 2: Baseline Condition + Proposed Impact Fee

In the second scenario, the maximum defensible impact fees are included into the cost burden analysis to identify the effects the fee has on housing affordability. Since the impact fees are based on housing type, the owner-occupied housing unit will be assessed the fee for single family/two-family units ($5,171) and the renter-occupied housing unit will be assessed the fee for multifamily units ($3,661).

The analysis takes a conservative approach and assumes the purchase price of the median home is raised by the increase in the impact fee. This ultimately increases the household's mortgage payment and property tax, see Figure 60. For renter-occupied housing units, the analysis assumes that the impact fee increase will be recouped by the landlord through an increase in monthly rent. The fee will be recouped over 30 years, thus increasing the monthly rent by $10.

Figure 59 lists the monthly costs with the impact fees for owners and renters. The cost burden ratio for owner-occupied homes increases by 0.7 percentage points and for renter-occupied homes the cost burden ratio increases by 0.2 percentage points. Even with the increase, the cost burden for renter-occupied homes is still considered affordable for households who earn 80 percent of the median income.

Figure 59. Scenario 2: Cost Burden Analysis with Proposed Impact Fee

Condition	Monthly Income	Monthly Cost	Cost Burden
Owner-Occupied	$4,571	$1,763	**38.6%**
Renter-Occupied	$4,571	$1,023	**22.4%**

Impact Fee Effect on Affordable Housing

Condition	Change
Owner-Occupied	**0.7%**
Renter-Occupied	**0.2%**

Conclusion

This chapter estimates the effect on affordability of housing from imposing the maximum defensible impact fees. To calculate the effect, a household that earns 80 percent of the median income should have a cost burden ratio of 30 percent or less for housing. Currently, the cost burden of an owner-occupied home (single family/two-family) is above the threshold, thus considered moderately burdensome. The cost burden of a renter-occupied home (multifamily) is below the threshold, thus considered affordable. **This analysis has concluded that the maximum defensible impact fees would only have a marginal effect on housing affordability in Portland. Additionally, with the impact fees, renter-occupied units are still well below the 30 percent threshold.**

As noted, this analysis takes a conservative approach by assuming that the impact fees are absorbed entirely by the home occupants. However, in some cases, impact fees result in land values to decrease placing the burden on land owners and not on the future home owners or renters.

Figure 60. Cost of Homeownership

	Monthly Payment Calculation	
	Scenario 1	**Scenario 2**
Cost of Living Components	**Baseline Condition**	**Baseline Condition + Impact Fee**
Purchase Price	$259,306	$264,477
Down Payment	$51,861	$52,895
Loan Amount	$207,445	$211,582
Loan Length (Years)	30	30
Loan Length (Months)	360	360
Yearly Interest Rate	4.35%	4.35%
Monthly Interest Rate	0.36%	0.36%
Monthly Payment	$1,033	$1,053
Property Tax - City (per month)	$399	$408
Stormwater Fee	$13	$13
Water, Sewer, Gas & Electric Utilities	$141	$141
Telephone, Cable & Internet Utilities	$80	$80
Homeowners Insurance	$68	$68
Monthly Cost	**$1,733**	**$1,763**

APPENDIX C: LAND USE ASSUMPTIONS

In determining the Wastewater Impact Fee for meters that are larger than the standard meter size for a single family home, 5/8 inches, a capacity ratio is calculated and then applied to the impact fee of a single family home. For example, the water flow capacity for the standard meter size serving a single family home is 20 gallons per minute (gpm). The water flow capacity for a 1.5-inch meter is 100 gpm. The capacity ratio is calculated by dividing the larger meter's capacity by the standard meter's capacity (100/20 = 5.00). To calculate the corresponding fee, the ratio is applied to the proposed impact fee for the 5/8 meter. The meter capacities shown in Figure 61 are from the American Water Works Association.

Figure 61. Water Meter Capacity Ratios

Meter Size (inches)	Meter Capacity	Capacity Ratio
5/8	20	1.00
3/4	30	1.50
1	50	2.50
1 1/2	100	5.00
2	160	8.00
3	320	16.00
6	1,000	50.00
8	1,600	80.00

Capacity ratios are based on meter capacity standards published by American Water Works Association, *Principles of Water Rates, Fees, and Charges, M1,* 7th ed., 2017