

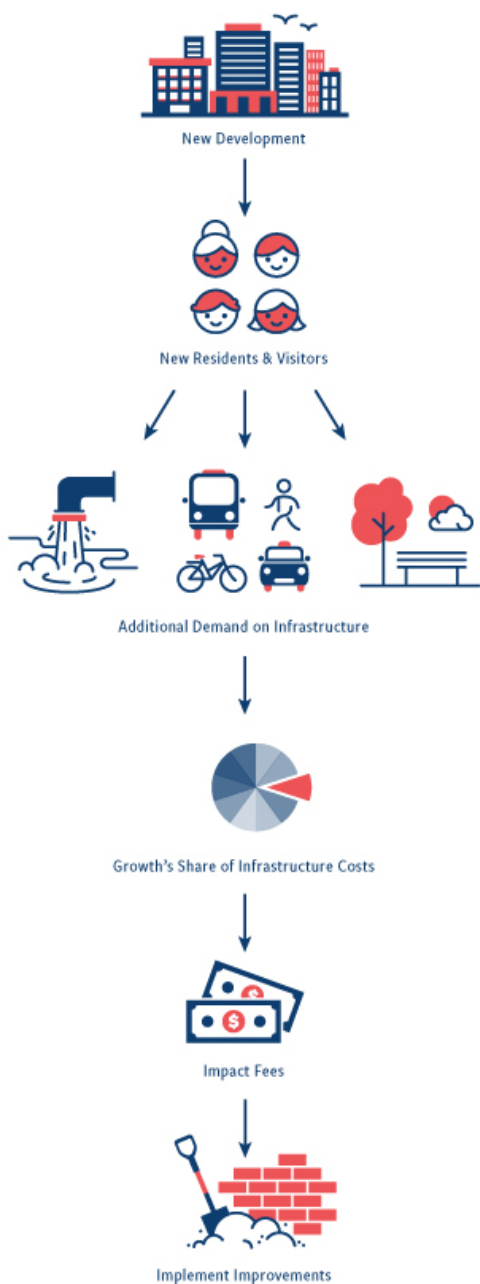


MEMORANDUM

PLANNING AND URBAN DEVELOPMENT DEPARTMENT

PLANNING DIVISION

To: Sean Dundon, Chair, and Members of the Portland Planning Board
From: Nell Donaldson, Senior Planner
Date: May 11, 2018
Re: Impact Fee Study Update
Meeting Date: May 17, 2018



I. INTRODUCTION

In late 2017, on the recommendation of the city's recently-adopted comprehensive plan, at the request of the City Manager, and with the support of the Council's Economic Development Committee, the city's Planning Division began an investigation into the "potential of a more robust framework for assessing development-related impacts" in the city (*Portland's Plan, 67*). The purpose of this exploration, as stated in *Portland's Plan*, is to "generate additional funding [for facilities and services], while also adding clarity and predictability to existing [review] procedures." This investigation began in earnest with staff research and engagement of a consultant with national experience in impact fee design. This Planning Board workshop will provide an introduction to this consultant, to the scope of work for the Impact Fee Study, and to an early memo to establish demographic and land use assumptions.

II. WHAT ARE IMPACT FEES?

Impact fees are charges paid by new development to fund the cost of providing municipal facilities to serve that development. This idea is premised on the concept that when development occurs, it can bring many benefits, but it also affects the existing infrastructure around it by adding more cars, bikes, and pedestrians to the streets, increasing sewer and stormwater flows into city systems, and infusing additional visitors into the city's parks and open spaces. In turn, this infrastructure requires additional investment. Acting on this logic, impact fees are widely used throughout the United States to assess the cost of new development's share of growth-related infrastructure projects. Impact fees have been used in some communities in the United States for the past 50+ years.

III. WHERE ARE IMPACT FEES?

Although impact fees are particularly common in states that have experienced rapid population growth in the west and south, they are found in the majority of states nationwide. Concord and Manchester, NH have impact fees, as does Burlington, VT. In Maine,

Figure 1: Impact fee process

Table 1: Maine Communities with Impact Fees

	Transportation	Sewer/Water	Open Space/Recreation	Fire/EMS	Schools
Brewer	●	●			
Brunswick		●	●		
Freeport	●				
Gorham		●	●		
Lewiston	●	●			
Pownal			●	●	
Saco		●	●	●	
Scarborough	●				●
Windham	●		●		
York		●			●

the legislature laid the foundation for impact fees with the Comprehensive Planning and Land Use Regulation Act of 1987. In the time since, communities across the state have developed impact fee ordinances (*Table 1*).

IV. HOW ARE IMPACT FEES USED?

The use of impact fees varies widely, depending on state enabling legislation, but in all cases impact fees may only be used to construct, expand, or replace infrastructure required to serve new development. Many communities use impact fees to address growth-related capital costs associated with roads, parks, water, and sewer infrastructure. Fire and police-related impact fees are also fairly common, as are school impact fees. In Maine, impact fees may be used for transportation projects, public safety facilities, sewer and water systems, parks and open space, and school improvements. Impact fees may not be used to pay for operations or maintenance, and may not be used to address existing deficiencies in these systems.

V. HOW MUCH ARE IMPACT FEES?

Regardless of where impact fees are used, courts have established that there must be a rational nexus and rough proportionality between the type and scale of development and the fee imposed. Per guidance from the Maine State Planning Office, “the expansion of the facility and/or service must be necessary and must be caused by the development; the fees charged must be based on the costs of the new facility/service apportioned to the new development; and the fees must benefit those who pay” (*Maine State Planning Office, 4*). Given these standards, in order for impact fees to be charged, a community must conduct an analysis that identifies growth-related infrastructure costs and apportions those costs to projected development, often by development type, on a square foot, unit, or per trip basis. The resulting fees must be established through a council-adopted ordinance that meets a series of state requirements around the provision of language to address the relationship between fees and growth’s share of infrastructure costs, the treatment of revenues generated from impact fees, timely use of impact fees, and refunds (*Title 30-A MRSA §4354*).

As a product of the great variation in communities that have adopted impact fees, and the great variation in uses of impact fees, the amount of impact fees varies widely from state to state and community to community. A 2015 study of impact fees across the country by Duncan Associates, a national firm specializing in impact fee work, found that state-wide average non-utility (i.e. excluding water and wastewater) impact fees for single-family residential projects ranged from less than \$1,000 in Arkansas to almost \$25,000 in California (*Duncan Associates*). In New Hampshire, the study found total residential fees ranging from approximately \$3,000/3-br single-family home in Manchester to \$5,000 in Concord. In Burlington, the study estimated a \$5,000 fee for a 3-br single-family home. The same study found that fees across the country averaged approximately \$6,000 per KSF for retail uses, approximately \$4,000 per KSF for office uses, and approximately \$3,000 per KSF for industrial uses.

VI. HOW DOES THIS RELATE TO PORTLAND'S CURRENT ORDINANCE?

As the Planning Board is well aware, the City of Portland's existing site plan ordinance allows the city to require mitigation "so as to be consistent with City Council approved master plans and facilities plans and with off-premises infrastructure, including but not limited to sewer and stormwater, streets, trails, pedestrian and bicycle network, environmental management or other public facilities" (*City of Portland Land Use Code 14-526(C)1.a*). Further, the city's *Technical Manual* requires that developments that generate more than 100 passenger car equivalents obtain a Traffic Movement Permit (TMP) under the city's delegated review authority. The issuance of a TMP includes a "summary of findings and recommendations for improvements and other impact mitigation measures" (*City of Portland Technical Manual, 2*). Under these regulations, the city negotiates mitigation on a case-by-case basis predicated on an analysis of impacts identified through the site plan or subdivision review process.

As a product of this process, in some cases, developers make in-kind physical improvements, upgrading a traffic light or installing pedestrian signalheads and ramps at a nearby intersection. In other cases, developers are required to make financial infrastructure contributions proportionate to their impacts. These contributions are held in separate "infrastructure accounts" until they can be drawn down to pay for the improvement identified through the review process.

Because this process is conducted on a case-by-case basis, it is neither as systematic or predictable as many would prefer. Further, the system often penalizes the "last one in," whose development causes an intersection level of service to fail, rather than addressing the incremental impact of all prior developments. An impact fee framework for the City of Portland would establish a more predictable, transparent, and equitable way of assessing the impact of incremental growth on public facilities and services. An impact fee system would also provide the city with some measure of efficiency.

VII. IMPACT FEE STUDY SCOPE & SCHEDULE

In mid-2017, the City Council adopted *Portland's Plan 2030*, a new comprehensive plan designed to guide the city's growth and change over the next ten years. Among the plan's recommendations is a strong commitment to exploring new ways of funding our critical facilities and services, particularly as they are used by a growing number of residents, workers, and visitors. The plan anticipates future population and employment growth in the city and suggests an exploration of impact fees as a means of assessing capital costs associated with that growth.

In late 2017, the Economic Development Committee supported the initiation of an Impact Fee Study by the Department of Planning and Urban Development, in coordination with the Department of Public Works and the Parks, Recreation, and Facilities Department (*Attachment 1*). This fee exploration has been designed to assess the potential of impact fee systems for multi-modal transportation infrastructure, parks and open space, and wastewater infrastructure.

The Impact Fee Study began in earnest with the hiring of TischlerBise, a consulting firm with national experience in impact fee design, in January of 2018. The study's first step is to compile the data, including population and employment growth projections, that will serve as the foundation for the impact fee analysis. In late April, Tischler developed a final draft memo summarizing demographic and development assumptions for the study (*Attachment 2*). This memo was based on data provided by the Department of Planning & Urban Development, the Department of Public Works, and the Department of Parks, Recreation, and Facilities, and includes discussion of population, development, employment, traffic, and wastewater usage trends in the city. This Planning Board workshop will provide an opportunity for TischlerBise to present the findings contained in this memo and field questions from the Planning Board about both the memo and the scope of the study more broadly.



Figure 2: Impact Fee Study timeline

The next phase of the study will involve the technical exercise of determining capital facility needs and desired service levels for each of the three fee types under consideration. The study will explore various standard methodologies for deriving fees on a per unit, per trip, or per square foot basis and identify the most appropriate methodology for each fee type. The last step of the study will analyze projected funding and cash flow to understand the likely revenue stream and capital expenditures associated with the fees and the preparation of draft and final impact fee reports. Ultimately, a draft impact fee ordinance, based on these reports, will be presented to the Planning Board and City Council. Throughout the process, staff will meet with Council committees, as well as an informal group of stakeholders to garner feedback on the Impact Fee Study. A project website has also been developed (<https://www.recodeportland.me/impact-fee-study/>).

VIII. NEXT STEPS

1. Staff to review Planning Board and public comment on the Impact Fee Study and the draft demographic and land use assumptions memo;
2. Staff to schedule a second workshop with the Planning Board to review subsequent work products and a draft impact fee ordinance.

IX. LIST OF REFERENCES

City of Portland, *Portland's Plan* (June 5, 2017)
City of Portland, *Technical Manual*
Duncan Associates, *National Impact Fee Survey: 2015* (November 11, 2015)
Maine State Planning Office, *Financing Infrastructure Through Impact Fees* (January 2003)

X. ATTACHMENTS

1. Impact Fee Memo to the Economic Development Committee (Jeff Levine, August 31, 2017)
2. Draft Demographic Data and Development Projections for Impact Fee Study (TischlerBise, April 23, 2018)

Portland, Maine



Yes. Life's good here.

Jeff Levine, AICP
Director, Planning & Urban Development Department

Memorandum

To: Economic Development Committee
From: Jeff Levine, Director, Planning & Urban Development
Date: August 31, 2017
Re: Impact Fees

One of the recommendations of the Comprehensive Plan is to look at a system of Impact Fees for the City as a way of both funding city infrastructure, and providing predictability for developers. This memo outlines what Impact Fees are, how they have been applied elsewhere, and a general approach to an Impact Fee system for Portland.

What Are Impact Fees?

Impact Fees are a systematic way of having new development pay for the infrastructure demands it creates. Cities that use Impact Fees choose certain types of infrastructure they feel needs to be improved and develop a baseline and needs assessment for each of them. Costs are developed for future needs and then assigned to new development as it comes in. When sufficient funds have been collected, the improvements are made. Often there is a feedback system in place – as improvements are made, a new needs assessment is conducted and the Impact Fee system is revised accordingly.

Impact fees can be a logical and fair way to address public impacts of new development. Developers are able to plug a mitigation cost into their pro forma and plan for it, rather than having to negotiate mitigation and deal with the uncertainty of that process. The City is able to devote energy into implementing these improvements, rather than into extensive negotiations with each developer based on their documented impacts. Neighbors and community groups will know what projects in their neighborhood are being funded and more confidence that they will be completed.

Commonly, impact fees are collected to mitigate impacts on transportation systems; parks & open space; schools; and stormwater/sewer systems. Costs are charged on either a square foot basis or on a per unit basis. For example, Concord, NH, has an impact fee for transportation improvements that charges \$2,110 per new single family home, \$1,449 per multifamily unit, and \$1.70 per square foot of office space. Concord also charges a per unit fee for recreational facilities and for schools.

It is critical that any impact fee system be based on solid data regarding current and future needs, as well as meeting tests established by the U.S. Supreme Court related to the fees having a *rational nexus* to the development (*Nollan v. California Coastal Commission*, 483 U.S. 825 (1987)) and have *rough proportionality* to the actual impact of the project (*Dolan v. City of Tigard*, 512 U.S. 374 (1994).)

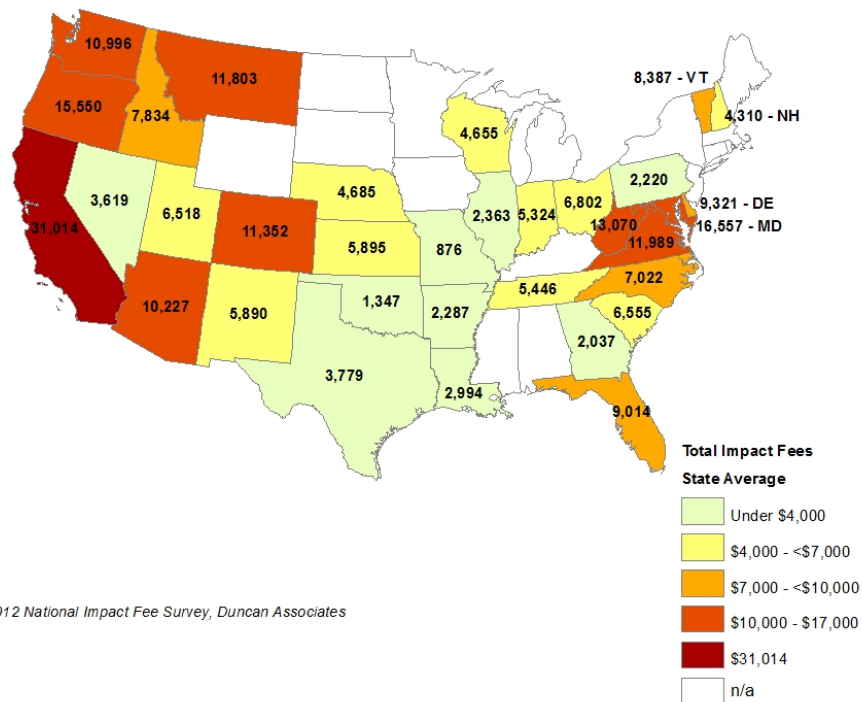
The American Planning Association has a policy guide on impact fees that provides a solid basis for thinking about their utility:

“Impact Fees, when based on a comprehensive plan and used in conjunction with a sound capital improvement plan, can be an effective tool for ensuring adequate infrastructure to accommodate growth where and when it is anticipated”

Where Are They Used Nationally?

Impact fees are used in a majority of states nationwide. A 2015 survey looked at 270 communities using impact fees as part of their development review process in 29 states and found the average impact fee for single family homes was \$11,868 and the average impact fee for office development was \$4,356/1000 square feet.¹

Average Single-Family Unit Impact Fees, 2012



Source: 2012 National Impact Fee Survey, Duncan Associates

¹ National Impact Fee Survey 2015, Clancy Mullen, Duncan Associates, Austin, TX

Impact fees are most common in Florida, Colorado, the southwest, and the far west. However, communities in Maine, New Hampshire and Vermont use Impact Fees. Municipalities in Massachusetts are not permitted to charge impact fees for development, except in very limited cases.

Only 10 states (including Maine) have specific state legislation authorizing the use of impact fees generally. In many other states, local governments have pursued impact fees, either through home rule authority or other mechanisms.

Some communities similar to Portland have well established impact fee systems, including Concord, NH; Manchester, NH; and Burlington, VT. Generally larger cities have not implemented impact fee systems, although Chicago has an impact fee system for parks and open spaces.

In Oakland, California, there is a proposed impact fee system that is a useful example for Portland, in that it is comprehensive in approach and does not tie the fees to specific improvements. Their zone approach is an interesting methodology for a densely-developed city.

What About in Maine?

Maine's legislature authorized the use of impact fees in 1987 as part of an overall update to the state's planning and land use laws. Title 30-A M.R.S. §4354 allows cities to pass an ordinance to require collection of impact fees for a variety of uses, including wastewater collection and treatment; solid waste facilities; fire protection; transportation; and parks and open space. While public education is not listed as an explicitly authorized purpose, it has been accepted as another authorized use for impact fees in Maine.

Several communities in Maine have adopted impact fees for a variety of uses. These include:

- York, where they collect impact fees for schools, water, and sewer infrastructure;
- Scarborough, where they collect impact fees for specific transportation improvements and for schools;
- Gorham, where they collect impact fees for water improvements; open space and recreation; and schools; and
- Saco, where they collect impact fees for wastewater improvements.

What Types of Impact Fees are Used?

As mentioned above, impact fees are used for a variety of public infrastructure needs. The most common fees are for:

- Schools
- Wastewater and Stormwater

- Water Supply
- Transportation Infrastructure
- Parks, Recreation and Open Space
- Libraries
- Public Safety

Fees were traditionally charged at a uniform level for each use. More recently there has been some stratification of fees. For example, some communities charge school impact fees for homes with three or more bedrooms only, or charge a lower fee for smaller units. Similarly, some impact fee systems charge less or nothing for developments utilizing existing infrastructure, such as in a traditional town center.

Table 1. Average Fees by Land Use and Facility Type, 2015

Facility Type	Single-Family (Unit)	Multi-Family (Unit)	Retail (1,000 sf)	Office (1,000 sf)	Industrial (1,000 sf)
Roads	\$3,256	\$2,201	\$5,605	\$3,403	\$2,063
Water	\$4,038	\$1,387	\$647	\$606	\$627
Wastewater	\$3,694	\$1,777	\$663	\$640	\$642
Drainage	\$1,397	\$784	\$1,056	\$891	\$1,097
Parks	\$2,812	\$2,099	**	**	**
Library	\$403	\$314	**	**	**
Fire	\$472	\$347	\$388	\$339	\$211
Police	\$365	\$283	\$403	\$259	\$171
General Government	\$1,689	\$1,200	\$745	\$751	\$436
Schools	\$4,769	\$2,562	**	**	**
Total Non-Utility*	\$8,298	\$5,484	\$6,165	\$4,214	\$2,751
Total*	\$11,868	\$6,870	\$6,346	\$4,536	\$3,150

* Average of total fees charged by jurisdictions, not sum of average fees by facility type (non-utility excludes water and wastewater)

** rarely charged to nonresidential land uses, with the exception of school fees in California

Source: National Impact Fee Survey 2015, Clancy Mullen, Duncan Associates, Austin, TX

What Current City Policies and Ordinances are Similar to Impact Fees?

As part of the City’s site plan review process, and as delegated by the state to issue Traffic Movement Permits (TMP) for the Maine Department of Transportation, mitigation is currently negotiated on a case-by-case basis. Applicants submit a transportation study, stormwater analysis, and other documentation outlining their estimates of the impact of the development on City infrastructure. Sometimes these studies suggest mitigation proposals, and sometimes they find that no mitigation is required. City staff and consultants review these studies and offer a response. As part of the process, a mitigation package is approved as part of the site plan approval and TMP process.

Sometimes the mitigation involves a physical improvement, such as a new traffic light. Sometimes they involve an in-kind contribution to a future improvement. These contributions are held in discrete accounts in the City system until sufficient funds have been found to complete these improvements. These contributions have some similarity to impact fees but are not as comprehensive. As a result, the City may have half of the cost of a particular improvement in an account for some time, but does not have the funds needed to complete that improvement.

The current system, particularly for TMP's, is based on a "first past the threshold" trigger. In other words, until an intersection fails, developers are not asked to fund any improvements. Once the intersection fails, the cost of addressing that failure falls to the developer whose project created that last increment of impact. While that can both help and hurt the same development, it creates conflict and is not as fair as an impact fee system that would have been collecting funds from developers all along.

There is a limited form of impact fees in effect in Portland for projects that wish to reduce their parking requirement. This voluntary fee-in-lieu-of parking system in effect on the Peninsula in certain zones. That system, created in 2010, allows developers to pay a fee rather than provide some of their parking on-site. That fee goes into the Sustainable Transportation Fund and is used to fund transportation alternatives, such as transit improvements, bike parking, and sidewalks. While this ordinance has had some successes, it is very limited in scope. Similarly, the inclusionary zoning ordinance is based on a study that connects new housing development and affordable housing needs.

At present City mitigation efforts are limited to transportation, sewer and stormwater, and, very occasionally, school impacts. There is no systematic process for funding mitigation for the other categories listed above. As part of the 58 Fore Street TMP, staff negotiated a pilot impact fee system for transportation improvements. That methodology worked well, though it was isolated in that case to improvements specific to that geographic area.

What is the Process to Create an Impact Fee System?

While it is tempting to simply create an impact fee system and implement it, there are several important steps that must be taken to establish the public policy and legal framework for an effective program.

1. A city should first complete a Comprehensive Plan or comparable document that establishes the planning goal of an impact fee system and, as much as possible, sets city goals for infrastructure baselines. The recently approved Comprehensive Plan does much of this work, as do other studies completed in the past few years, such as the Trust for Public Land parks and open space study.
2. The City needs to determine in what areas impact fees will be pursued. Currently Portland only seeks mitigation for transportation and stormwater impacts in most cases. The more areas in which impact fees will be implemented, the more

- upfront work will be needed. The cost to developers will also be higher, but greater public benefit will be provided.
3. Those infrastructure baselines need to be refined and turned into a set of public improvements that will be needed based on expected development. The City's Capital Improvement Plan does a good job at outlining these improvements, but it is fiscally constrained based on the City's existing financial resources and bonding capacity. A more extensive list of needs, with estimated costs attached, will need to be developed. This can be very simple, as in the case of Scarborough where they simply sought to fund a few specific roadway projects, or more complicated. Alternatively, they can be comprehensive and address a number of impacts at once, as Oakland is doing. That would be our current recommendation.
 4. An impact fee study needs to be completed to link these costs and project new development. While it is tempting to skip the study phase, this study is especially important given U.S. Supreme Court rulings in *Nolan* and *Dolan* regarding establishing a rational nexus and rough proportionality for impact fee systems.
 5. The City needs to approve an impact fee ordinance with a fee schedule, and amend any other ordinances that may need changing to create such a system in accordance with 30-A M.R.S. §4354.
 6. Staff needs to be educated on the new system, and educate the development and neighborhood groups on it as well, to ensure that everyone is familiar with the new process.
 7. Staff needs to track the various accounts and complete the funded improvements when collections are sufficient.
 8. The list of projects and fee structure will need regular revisiting and updating. At a minimum, this should be completed every few years. Ideally this work would be ongoing as part of the CIP process.

What are our Next Steps?

With the approval of the Comprehensive Plan, the policy basis is in place for next steps. The planned rewrite of Chapter 14 into an updated Unified Development Code is compatible with replacing the current process with a more systematic impact fee system.

Our next step is to complete the nexus study that will document the rationale for the amount of the Impact Fees. Staff has completed a Request for Proposals for a consultant to complete that study with the \$25,000 appropriated in the FY18 budget for this purpose. Planning has been working with Public Works; Economic Development; Parks, Recreation & Facilities, and other departments to prepare for this work. We hope to have a consultant selected in September and the nexus study completed this calendar year. We will then submit a proposed ordinance for Planning Board and City Council review.

MEMORANDUM

TO: Helen Donaldson, City of Portland, Planning and Urban Development

FROM: Carson Bise, AICP, TischlerBise
Colin McAweeney, TischlerBise

DATE: April 23, 2018

RE: **DRAFT** Demographic Data and Development Projections for Impact Fee Study

As part of our Work Scope, TischlerBise has prepared documentation on demographic data and development projections that will be used in the Impact Fee Study for Transportation, Parks and Open Space, and Wastewater. The data estimates and projections are used in the study's calculations and to illustrate the possible future pace of service demands on the City's infrastructure. Furthermore, the memo demonstrates the history of development and base year development levels in Portland. The base year assumptions are used in the impact fee calculations to determine current levels of service.

The factors provide assumptions for the final impact fee model and, once finalized, this memo will become part of the final report and/or model documentation.

This memo includes discussion and findings on:

- Household/ Housing Unit Population
- Current population and housing unit estimates
- Residential projections
- Current employment and nonresidential floor area estimates
- Nonresidential projections
- Current and projected daily vehicle trips
- Current and projected wastewater flows

Note: calculations throughout this technical memo are based on an analysis conducted using Excel software. Results are discussed in the memo using one-and two-digit places (in most cases), which represent rounded figures. However, the analysis itself uses figures carried to their ultimate decimal places; therefore, the sums and products generated in the analysis may not equal the sum or product if the reader replicates the calculation with the factors shown in the report (due to the rounding of figures shown, not in the analysis).

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 units include single family detached, single family attached, duplexes, and mobile homes. Multifamily units include structures with more than 2 units. Figure 1 shows the US Census, American Community Survey 2016 5-Year Estimates data for the City of Portland. Single 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 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 1. Persons per Household

Type of Structure	Persons	Households	Persons per Household	Housing Units	Persons per Housing Unit	Housing Mix	Vacancy Rate
Single 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, duplexes, 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 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 2, the household population and group quarters are considered the City’s permanent population and in 2016 it is estimated that the permanent population was 66,627.

Figure 2. Permanent Population, 2016

Type of Structure	Persons	%
Single 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

Furthermore, in the recently published *Portland’s Plan 2030* several population growth scenarios are played out. The comprehensive plan indicates that a medium-level growth scenario would result in a 2030 population of 71,374. As a result, 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 3 illustrates the growth in permanent population. In the base year, 2018, there is estimated to be 67,305 permanent residents in Portland.

Figure 3. Base Year Permanent Population

	5-Year Increments							Total Increase
	2016	2017	Base Year 2018	2019	2020	2025	2030	
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 & Visitors

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 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 4. Seasonal Population, 2016

Type of Structure	Vacant Units	Persons per Household	Seasonal Population
Single 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, duplexes, and mobile home units.

[2] Includes structures with more than 2 units.

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 5. 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 6, 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 spike to 185 percent of the annual average. This 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 6. 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 Multiplier	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 7. 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, Figure 8. Over the past 5 years there has been an increase of 1,435 housing units in Portland and, on average, there has been 33 single 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 8. Permitted Housing Units

	2013	2014	2015	2016	2017	Total	Average
Single 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 9. In total, 56 percent of the housing in the City of Portland is single family and 44 percent multifamily. Consistent with the City’s Land Use Code, single family units include single family detached, single family attached, duplexes, and mobile homes. Multifamily units include structures with 3 or more units.

Figure 9. Base Year Housing Stock (Housing Units)

Housing Type	Base Year 2018	%
Single 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 10, 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 1 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 8). 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 10. 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	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 11. 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	2,478	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 11 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 Institutional and Office accounting for the highest percentages, Figure 12.

Figure 12. 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 13. The breakdown by industry in Figure 12 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 13. 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
Institution	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 14, there is a total of 35.3 million square feet of nonresidential floor area in Portland 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 14. 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: City of Portland GIS data

Furthermore, an analysis of inflow/outflow of employment is available through OnTheMap. Shown in Figure 15, 72.5 percent of the jobs in the City of Portland are filled by those living outside of the city.

Figure 15. Inflow/Outflow of Employment

	Jobs (2015)	%
Residents Working in Portland	17,958	27.5%
Non-Residents Working in Portland	47,245	72.5%
Total Employment in Portland	65,203	100.0%

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

NONRESIDENTIAL FLOOR AREA AND EMPLOYMENT 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 16).

Figure 16. 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	Emp Per Dmd Unit	Sq Ft Per Emp
110	Light Industrial	1,000 Sq Ft	4.96	3.05	1.63	615
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	3.93	2.47	1.59	628
150	Warehousing	1,000 Sq Ft	1.74	5.05	0.34	2,902
254	Assisted Living	bed	2.60	4.24	0.61	na
320	Motel	room	3.35	25.17	0.13	na
520	Elementary School	1,000 Sq Ft	19.52	21.00	0.93	1,076
530	High School	1,000 Sq Ft	14.07	22.25	0.63	1,581
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.72	3.79	2.83	354
620	Nursing Home	1,000 Sq Ft	6.64	2.91	2.28	438
710	General Office (avg size)	1,000 Sq Ft	9.74	3.28	2.97	337
760	Research & Dev Center	1,000 Sq Ft	11.26	3.29	3.42	292
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.75	16.11	2.34	427

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

Found in Figure 17, job growth over the next ten years is projected to follow the PACTS’ annual percentage increase forecast. In total, 6,890 new jobs are projected. 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 17. Employment and Nonresidential Floor Area Projections

Industry	Base Year												Total Increase
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
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
Institution	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	5,572	5,629	5,686	5,743	5,801	5,858	5,915	5,972	6,029	6,086	6,143		571
Office	8,342	8,428	8,513	8,599	8,684	8,769	8,855	8,940	9,026	9,111	9,197		854
Industrial	6,280	6,344	6,409	6,473	6,537	6,602	6,666	6,730	6,795	6,859	6,923		643
Institution	6,876	6,946	7,017	7,087	7,158	7,228	7,299	7,369	7,439	7,510	7,580		704
Total	27,070	27,348	27,625	27,902	28,179	28,457	28,734	29,011	29,288	29,566	29,843		2,773

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

VEHICLE TRIP GENERATION

Residential Trips

A customized trip rate is calculated for the single family and multifamily units in the City of Portland. In Figure 18, the most recent data from the American Community Survey is inputted into equations provided by the Institute of Transportation Engineers (ITE) to calculate the trip ends per housing unit factor. A single family unit is estimated to take 7.6 trip ends on an average weekday and a multifamily unit is estimated to take 3.6 trip ends on an average weekday.

Figure 18. Customized Residential Trip End Rates

	Vehicles Available (1)	Households (2)			Vehicles per Household by Tenure
		Single Family	Multifamily Units	Total HHs	
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	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 $EXP(0.89 * LN(\text{persons}) + 1.72)$. 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 $(2.29 * \text{persons}) - 81.02$.
- (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 $EXP(0.99 * LN(\text{vehicles}) + 1.93)$. 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 $(3.94 * \text{vehicles}) + 293.58$ (ITE 2012).
- (6) Housing units from Table B25024, American Community Survey, 2012-2016.

Residential Vehicle Trips Adjustment Factors

A vehicle trip end is the out-bound or in-bound leg of a vehicle trip. As a result, a standard 50 percent adjustment is applied to trip ends to calculate a vehicle trip. However, other adjustments are necessary as well.

Figure 19 calculates the adjustment for Portland residents that commute outside of the city to work. According to the National Household Travel Survey (2009), home-based work trips are typically 31 percent of “production” trips, 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 ($0.31 \times 0.50 \times 0.49 = 0.08$). 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 19. 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%
Residential Trip Adjustment Factor	58%

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

Additionally, Portland has viable alternatives to a vehicle for commuting, so a factor needs to be included for residents that choose not to drive to work. According to Fort Hill Infrastructure's *City of Portland Parking Study for Downtown, The Old Port, and The Eastern Waterfront*, 16.9 percent of commuters throughout the city chose either to use transit, bicycle, or walk to work (Figure 20). The study found an even higher percentage of alternative commuting within the downtown. When calculating vehicle trips, the factor of 16.9 percent is applied to the trip end factors for housing units.

Figure 20. Alternative Mode of Commuting

	Transit	Bicycling	Walking	Total
Alternative Commuting	3.1%	1.6%	12.2%	16.9%

Source: *City of Portland Parking Study*, Fort Hill Infrastructure, 2017

Nonresidential Trips

Vehicle trip generation for nonresidential land uses are calculated by using ITE's average daily trip end rates and adjustment factors 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 21 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 21. 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	Emp Per Dmd Unit	Sq Ft Per Emp
110	Light Industrial	1,000 Sq Ft	4.96	3.05	1.63	615
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	3.93	2.47	1.59	628
150	Warehousing	1,000 Sq Ft	1.74	5.05	0.34	2,902
254	Assisted Living	bed	2.60	4.24	0.61	na
320	Motel	room	3.35	25.17	0.13	na
520	Elementary School	1,000 Sq Ft	19.52	21.00	0.93	1,076
530	High School	1,000 Sq Ft	14.07	22.25	0.63	1,581
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.72	3.79	2.83	354
620	Nursing Home	1,000 Sq Ft	6.64	2.91	2.28	438
710	General Office (avg size)	1,000 Sq Ft	9.74	3.28	2.97	337
760	Research & Dev Center	1,000 Sq Ft	11.26	3.29	3.42	292
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.75	16.11	2.34	427

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

To calculate vehicle trips, the standard 50 percent adjustment is applied to Office, Industrial, and Institutional. A lower vehicle trip adjustment factor is used for Retail because this type of development attracts vehicles as they pass-by on arterial and collector roads. For example, when someone stops at a convenience store on their way home from work, the convenience store is not their primary destination. In Figure 22, the Institute for Transportation Engineers’ land use code, daily vehicle trip ends, trip adjustment factor, and alternative commuting factor is listed for each land use.

Figure 22. Daily Vehicle Trip Factors

Land Use	ITE Codes	Vehicle Trip Ends	Adjustment Factor	Alternative Commuting
Residential (per housing unit)				
Single Family	210	7.60	58%	16.9%
Multifamily	220	3.60	58%	16.9%
Nonresidential (per 1,000 square feet)				
Retail	820	37.75	38%	-
Office	710	9.74	50%	-
Industrial	140	3.93	50%	-
Institutional	610	10.72	50%	-

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017); City of Portland Parking Study, Fort Hill Infrastructure

VEHICLE TRIP PROJECTION

The base year vehicle trip totals and vehicle trip projections are calculated by combining the vehicle trip end factors, the trip adjustment factor, and the residential and nonresidential assumptions for housing stock and floor area. Found in Figure 23, in the base year, residential land uses generate 105,856 vehicle trips (38 percent) and nonresidential land uses generate 169,755 vehicle trips (62 percent) in the City of Portland. Through 2028, there will be an increase of 23,007 daily vehicle trips in Portland with Retail, Multifamily, and Office development being the three largest contributors to the increase.

Figure 23. Total Daily Vehicle Trip Projections

	Base Year 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total Increase
Residential Trips												
Single Family	77,096	77,218	77,339	77,461	77,583	77,704	77,826	77,947	78,069	78,191	78,312	1,216
Multifamily	28,760	29,200	29,640	30,081	30,521	30,962	31,402	31,842	32,283	32,723	33,164	4,404
Subtotal	105,856	106,418	106,980	107,542	108,104	108,666	109,228	109,790	110,352	110,914	111,476	5,620
Nonresidential Trips												
Retail	79,934	80,752	81,571	82,390	83,209	84,027	84,846	85,665	86,483	87,302	88,121	8,187
Office	40,626	41,043	41,459	41,875	42,291	42,707	43,123	43,539	43,955	44,371	44,788	4,161
Industrial	12,340	12,467	12,593	12,719	12,846	12,972	13,099	13,225	13,351	13,478	13,604	1,264
Institutional	36,855	37,233	37,610	37,988	38,365	38,743	39,120	39,498	39,875	40,252	40,630	3,775
Subtotal	169,755	171,494	173,233	174,971	176,710	178,449	180,188	181,926	183,665	185,404	187,142	17,387
Grand Total Trips	275,611	277,912	280,213	282,513	284,814	287,115	289,415	291,716	294,017	296,318	298,618	23,007

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

BASE YEAR WASTEWATER USAGE

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 calculate, 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 24, 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 24. 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 25, 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 25. 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, it is assumed that the average consumptions will stay consistent. 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 floor area for the respective industry. Over the next ten years, a total increase of 500,000 gallons per day is projected. Residential and Commercial land uses accounting for the majority of the increase.

Figure 26. Wastewater Projections, Million Gallons Per Day (MGD)

Development Type	Base Year											Total
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	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	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.16	2.18	2.20	0.20
Industrial	0.54	0.55	0.55	0.56	0.56	0.57	0.58	0.58	0.59	0.59	0.60	0.06
Institutional	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.20	0.20	0.21	0.02
Total	5.66	5.71	5.76	5.81	5.86	5.91	5.96	6.01	6.06	6.11	6.16	0.50

Source: City of Portland Public Works Department; TischlerBise analysis