



# City of Astoria

## SYSTEM DEVELOPMENT CHARGE STUDY

DRAFT Report  
July 13, 2023

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# Section I. INTRODUCTION

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This section describes the project scope and policy context upon which the body of this report is based.

## I.A. PROJECT

The City of Astoria (City) is planning to impose system development charges (SDCs) to recover eligible infrastructure costs and provide partial funding for the capital needs of its water, sewer, stormwater, transportation, and parks systems. In 2022, the City contracted with FCS GROUP to provide the calculations of the City's first SDCs based on the planning documents the City had available at the time.

## I.B. POLICY

SDCs are enabled by state statute, authorized by local ordinance, and constrained by the United States Constitution.

### I.B.1. State Statute

Oregon Revised Statutes (ORS) 223.297 to 223.316 enable local governments to establish SDCs, which are one-time fees on development that are paid at the time of development or redevelopment that creates additional demand on the system for which it is charged. SDCs are intended to recover a fair share of the cost of existing and planned facilities that provide capacity to serve future users (i.e., growth).

ORS 223.299 defines two types of SDC:

- A reimbursement fee that is designed to recover “costs associated with capital improvements already constructed, or under construction when the fee is established, for which the local government determines that capacity exists”
- An improvement fee that is designed to recover “costs associated with capital improvements to be constructed”

ORS 223.304(1) states, in part, that a reimbursement fee must be based on “the value of unused capacity available to future system users or the cost of existing facilities” and must account for prior contributions by existing users and any gifted or grant-funded facilities. The calculation must “promote the objective of future system users contributing no more than an equitable share to the cost of existing facilities.” A reimbursement fee may be spent on any capital improvement related to the system for which it is being charged (whether cash-financed or debt-financed).

ORS 223.304(2) states, in part, that an improvement fee must be calculated to include only the cost of projected capital improvements needed to increase system capacity for future users. In other words, the cost of planned projects that correct existing deficiencies or that do not otherwise increase capacity for future users may not be included in the improvement fee calculation. An improvement fee may be spent only on capital improvements (or portions thereof) that increase the capacity of the system for which it is being charged (whether cash-financed or debt-financed).

In addition to the reimbursement and improvement fees, ORS 223.307(5) states, in part, that “system development charge revenues may be expended on the costs of complying” with state statutes concerning SDCs, including “the costs of developing system development charge methodologies and providing an annual accounting of system development charge expenditures.”

### I.B.2. Local Ordinance

The City is working to adopt ordinances that will authorize SDCs in accordance with this report.

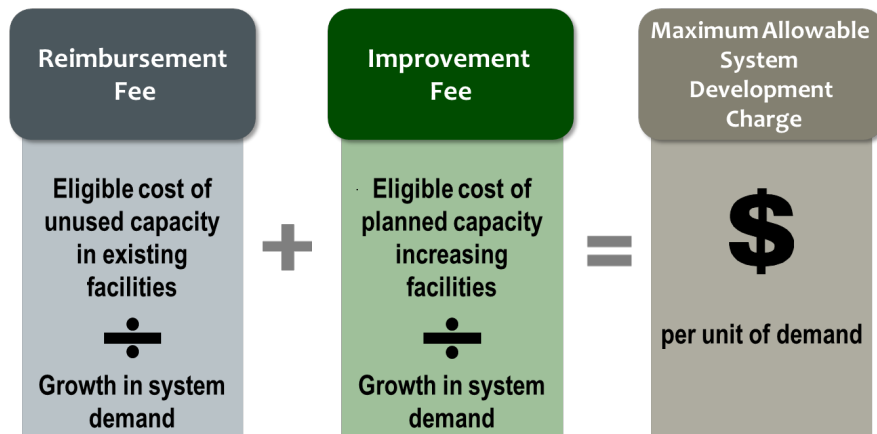
### I.B.3. United States Constitution

The United States Supreme Court has determined that SDCs, impact fees, or other exactions that comply with state and/or local law may still violate the United States Constitution if they are not proportionate to the impact of the development. The SDCs calculated in this report are designed to meet such constitutional and statutory requirements.

## I.C. SDC BACKGROUND

In general, SDCs are calculated by adding a reimbursement fee component and an improvement fee component—both with potential adjustments. Each component is calculated by dividing the eligible cost by growth in units of demand. The unit of demand becomes the basis of the charge. **Exhibit 1.1** below provides an illustration of this calculation, and the following sections discuss each element of the calculation in detail.

**Exhibit 1.1: SDC Diagram**



### I.C.1. Growth in System Demand

The calculation of projected growth in system demand begins with defining the units by which current and future demand will be measured. A good unit of measurement allows an agency to quantify the incremental demand of development or redevelopment that creates additional demand for system facilities. A better unit of measurement allows an agency to distinguish different levels of demand added by different kinds of development or redevelopment.

Once a unit of measurement has been selected, using the best available data, the current level of demand is quantified, and a future level of demand is estimated. The difference between the current level and the future level is the growth in demand that will serve as the denominator in the SDC calculation. Generally, the future level of demand is measured at the end of the planning period of the relevant project list, to ensure a strong nexus between the projects to be built and the growth expected.

### I.C.2. Reimbursement Fee

The reimbursement fee is calculated as the eligible cost of unused capacity in existing facilities that will serve growth (called the reimbursement fee cost basis) divided by the growth in system demand. The eligible cost is determined by multiplying the percentage of the total capacity available for growth by the original cost of such facilities. Some care must be taken that the percentage of capacity available for growth used in a reimbursement fee calculation only represents that capacity that will be used by growth during the planning period and does not represent capacity that will be used after the planning period.

Additionally, some adjustments to the original cost must be made. If system facilities were paid for with grants or developer contributions, then the City did not incur the costs of those facilities and cannot fairly ask developers to reimburse the City for such costs. If system facilities were paid for with debt and the debt is still outstanding, then the City should subtract the remaining principal from the original cost to ensure that growth is not double paying for the same capacity; once in the SDCs, and again in the utility rates or property taxes that pay the debt service.

### I.C.3. Improvement Fee

The improvement fee is calculated as the eligible cost of planned capacity increasing facilities (called the improvement fee cost basis) divided by the growth in system demand. The eligible cost of such projects is the percentage that provides capacity for growth during the planning period multiplied by the cost of applicable projects. Again, care must be taken so that the percentage used to calculate the eligible cost refers only to capacity expected to be used by growth during the planning period.

Additionally, some adjustments to the project cost should be made. If a project is expected to have more outside funding (such as through grants) than the ineligible cost of the project, then the eligible cost should be reduced by the difference.

### I.C.4. Maximum Allowable SDC

The maximum allowable SDC is the improvement fee plus the reimbursement fee, plus an adjustment for administering the SDC program and complying with state law, as discussed in a previous section.

## Section II. WATER SDC

This section provides the detailed calculations of the maximum allowable water SDC.

### II.A. GROWTH

This section describes the growth in demand that will serve as the denominator in the SDC calculation, starting by defining the unit of measurement and then measuring the difference between current and future demand.

#### II.A.1. Unit of Measurement

For water SDCs, the meter size necessary for a development is broadly used as a measure of its potential water demand. To compare meters and calculate the total demand of the system, meters are often compared by their flow rates and measured by their meter capacity equivalents (MCEs). In this system, the smallest meter employed by the City is one MCE, and every larger meter is a larger number of MCEs based on their relative flow rates. Flow rates are most often based on the American Water Works Association (AWWA) flow rates assuming either a 5/8" or 3/4" base meter. As the City is only installing 3/4" meters, a 3/4" base for the MCE calculations was selected for the water SDC calculation.

#### II.A.2. Growth in Demand

The City had 6,062 MCEs as of October 2022 based on its meter report. According to the 2021 Water System Master Plan, the peak season maximum day demand in million gallons per day (MGD) is expected to be 5.23 MGD in 2023 and increase to 5.79 MGD by 2040, the end of the planning period. If MCEs grow at the same rate as demand, there will be 6,708 MCEs in 2040, which means there will be a growth of 646 MCEs. The growth share, or the percentage of MCEs in 2040 that will arrive between 2023 and 2040, is thus calculated to be 9.63 percent.

These calculations are summarized in **Exhibit 2.1** below. The growth of 646 MCEs will be the denominator for the water SDC calculation, and the growth share of 9.63 percent will be useful when calculating the eligibility of selected projects on the project list, as it represents growth's proportionate share of projects that are expected to benefit existing and future users equally.

**Exhibit 2.1 – Growth in MCEs for the Water SDC**

	2020	2023	2040	Growth (2023-2040)	Growth Share
Peak Season Maximum Day Demand (MGD)	5.14	5.23	5.79	0.56	9.63%
Total MCEs		6,062	6,708	646	9.63%

*Source: 2021 Water System Master Plan, Table ES 1 (maximum day demand projections); previous tables (total*

## II.B. IMPROVEMENT FEE

An improvement fee is the eligible cost of planned projects per unit of growth that such projects will serve. Since we have already calculated growth (denominator) above, we will focus here on the improvement fee cost basis (numerator).

### II.B.1. Eligibility

A project's eligible cost is the product of its total cost and its eligibility percentage. The eligibility percentage represents the portion of the project that creates capacity for future users. Where possible, specific details about a project can provide an eligibility percentage. Such specific details were available for some of the projects on the project list. However, when this is not possible, projects can still be sorted into three broad categories.

The first category is for projects that do not provide capacity for future users. Such projects may be purely replacement projects, or they may be solving a deficiency in the water system. Projects in this category are zero percent eligible. The second category is for projects that are purely for future users, such as when new pipe is laid to provide for a new development. These projects are 100 percent eligible. Finally, projects that provide capacity that will be roughly equally shared between current and future users are eligible at the growth share percentage discussed in the previous section, or 9.63 percent.

### II.B.2. Improvement Fee Cost Basis

Projects in the improvement fee cost basis were taken from the City's 2021 Water Master Plan. Each project was sorted into one of the three categories discussed above based on the descriptions provided in the master plan and discussions with staff; or, where details were available, a more specific eligibility percentage was assigned. **Exhibit 2.2** below shows all the projects in the water system improvement fee cost basis. The eligibility for each project is shown in the SDC Eligibility column, and the SDC Eligible Costs column shows that full amount of the improvement fee cost basis is \$2,077,780.

**Exhibit 2.2 – Water SDC Improvement Fee Cost Basis**

#	Category	Asset	Priority	Timeline	SDC-Eligible		
					2023 Cost	SDC Eligibility	Cost
1	Headworks	Clearwell Tank	High	2023-2027	\$ 804,352	100.00%	\$ 804,352
2	Distribution System	Pipes	High	2023-2027	804,352	9.63%	77,430
3	Distribution System	Pipes	High	2023-2027	229,815	0.00%	-
4	Distribution System	Water Meters	High	2023-2027	1,723,612	0.00%	-
5	Distribution System	Pipes	High	2023-2027	919,260	0.00%	-
6	Headworks	Chlorine System	Medium	2027-2031	298,759	0.00%	-
7	Distribution System	Pipes	Medium	2027-2031	114,907	9.63%	11,061
8	Distribution System	Pipes	Medium	2027-2031	804,352	56.52%	454,634
9	Distribution System	Pipes	Medium	2027-2031	229,815	0.00%	-
10	Distribution System	Pipes	Medium	2027-2031	344,722	100.00%	344,722
11	Distribution System	Pipes	Medium	2027-2031	229,815	56.52%	129,895
12	Distribution System	Pipes	Medium	2027-2031	229,815	0.00%	-
13	Watershed	Culvert	Medium	2027-2031	402,176	0.00%	-
14	Watershed	Diversion Structures	Low	2031-2040	114,907	0.00%	-
15	Reservoir #3	Master Meters	Low	2031-2040	114,907	9.63%	11,061
16	Reservoir #2	Master Meters	Low	2031-2040	114,907	9.63%	11,061
17	Distribution System	Pipes	Low	2031-2040	459,630	9.63%	44,246
18	Distribution System	Pipes	Low	2031-2040	344,722	9.63%	33,184
19	Distribution System	Pipes	Low	2031-2040	80,435	37.50%	30,163
20	Distribution System	Pipes	Low	2031-2040	114,907	100.00%	114,907
21	Distribution System	Pipes	Low	2031-2040	114,907	9.63%	11,061
22	Distribution System	Pipes	Low	2031-2040	574,537	0.00%	-
23	Reservoirs	Reservoirs	Aspirational	2031-2040	-	0.00%	-
24	Transmission	Pipes	Aspirational	2031-2040	28,726,867	0.00%	-
<b>Total</b>					<b>\$ 37,896,483</b>		<b>\$ 2,077,780</b>

Source: 2021 Water System Master Plan, city staff

## II.C. REIMBURSEMENT FEE

A reimbursement fee is the eligible cost of the water facilities available for future users per unit of growth that such facilities will serve. Since growth was calculated above, we will focus on the eligible cost of the water facilities available for future users. That is, we will focus on the cost of reimbursable water facilities.

### II.C.1. Eligibility

First, to measure the capacity available for growth in the City’s water facilities, the water system was divided into its functions of service. Only the supply, transmission, and storage functions (outside of the Skyline Zone) were found to have capacity based on the 2021 Water System Master Plan. Each of these functions had sufficient capacity to provide for growth not just during the planning period, but beyond. As such, growth’s equitable share of such capacity is best captured by the growth share, or 9.63 percent as discussed in a previous section.

### II.C.2. Reimbursement Fee Cost Basis

The original cost of system facilities with capacity available for growth was calculated using the replacement cost of each asset with an adjustment to the cost at the time of construction based on the



Engineering News-Record's (ENR) 20-City Average Construction Cost Index (CCI). Then, the original cost was totaled by function and the eligibility percentage for each function was multiplied by the total original cost. This is shown in **Exhibit 2.3** below, which shows that the total reimbursable cost is \$351,403,

**Exhibit 2.3 – Water Reimbursement Fee Cost Basis**

Function	Estimated Capacity	Replacement Cost	Original Cost Estimate	Reimbursable Cost
Storage (Outside of Skyline Zone)	9.63%	\$ 650,000	\$ 302,816	\$ 29,150
Supply	9.63%	142,910,001	384,413	37,005
Transmission	9.63%	43,330,000	2,963,206	285,248
<b>Total</b>		\$ 186,890,001	\$ 3,650,435	\$ 351,403

*Source: 2021 Water System Master Plan, City's fixed asset schedules, city staff*

## II.D. CALCULATED SDC

This section combines the eligible costs from the improvement fee cost basis and the reimbursement fee cost basis and applies some adjustments. The result is a total SDC per MCE, which can then be applied to each meter size using the aforementioned flow factors.

### II.D.1. Adjustments

This City estimates that about \$121,459 should be added to the cost basis to account for the costs of administering the SDC program and complying with state law over the planning period.

### II.D.2. Calculated SDC

**Exhibit 2.4** below summarizes the calculation of the water SDC. As shown, the full SDC is \$3,950 per MCE.

**Exhibit 2.4 – Calculated Water SDC**

Calculated SDC	
Improvement Fee Cost Basis	\$ 2,077,780
Reimbursement Fee Cost Basis	351,403
Compliance Costs	121,459
<b>Total</b>	\$ 2,550,642
Growth in MCEs	646
Improvement Fee per MCE	\$ 3,218
Reimbursement Fee per MCE	544
Compliance Fee per MCE	188
<b>Total SDC per MCE</b>	\$ 3,950

*Source: Previous tables*

The SDC per MCE calculated in **Exhibit 2.4** can be applied to each meter size using the schedule shown in **Exhibit 2.5** below.

**Exhibit 2.5 – Water SDC Schedule by Meter Size**

Meter Size	Calculated	
	MCE	SDC
5/8	1.00	\$3,950
3/4	1.00	\$3,950
1	1.67	\$6,583
1.5	3.33	\$13,166
2	5.33	\$21,066
3	10.67	\$42,133
4	16.67	\$65,832
6	33.33	\$131,665
8	53.33	\$210,663
10	76.67	\$302,829

*Source: Previous tables*

## Section III. SEWER SDC

This section provides the detailed calculations of the maximum allowable sewer SDC.

### III.A. GROWTH

This section describes the growth in demand that will serve as the denominator in the SDC calculation, starting by defining the unit of measurement and then measuring the difference between current and future demand.

#### III.A.1. Unit of Measurement

For sewer SDCs, the meter size necessary for a development is broadly used as a measure of its potential water demand, and thus the potential sewage flow. In order to compare meters and calculate the total demand of the system, meters are often compared by their flow rates and measured by their meter capacity equivalents (MCEs). In this system, the smallest meter employed by the City is one MCE, and every larger meter is a larger number of MCEs based on their relative flow rates. Flow rates are most often based on the American Water Works Association's (AWWA) flow rates assuming either a 5/8" meter or 3/4" base. As the City is only installing 3/4" meters, a 3/4" base for the MCE calculations was selected for the sewer SDC calculation.

#### III.A.2. Growth in Demand

The City had 6,034 MCEs as of October 2022 based on monthly meter report. According to the 2019 Wastewater Facilities Plan Update, the dry weather flow in MGD is expected to be 1.43 MGD in 2023 and increase to 1.61 MGD by 2040, the end of the planning period. If MCEs grow at the same rate as demand, there will be 6,795 MCEs in 2040, which means there will be a growth of 761 MCEs. The growth share, or the percentage of MCEs in 2040 that will arrive between 2023 and 2040, is thus calculated to be 11.20 percent.

These calculations are summarized in **Exhibit 3.1** below. The growth of 761 MCEs will be the denominator for the sewer SDC calculation, and the growth share percentage of 11.20 percent will be useful for the reimbursement fee calculation. Note that the growth in MCEs is different from the growth shown in the water SDC calculation. However, it is important that the growth in MCEs be consistent with the projects planned to accommodate that growth, and therefore it is not necessary to adjust the growth in MCEs to match what was shown in the water SDC.

**Exhibit 3.1 – Growth in MCEs for the Sewer SDC**

	2020	2023	2040	Growth (2023-2040)	Growth Share
Average Dry Weather Flow (MGD)	1.40	1.43	1.61	0.18	11.20%
Total MCEs		6,034	6,795	761	11.20%

**Source:** 2019 Wastewater Facilities Plan Update, Table 3-2 (dry weather flow); previous tables (total MCEs)

### III.B. IMPROVEMENT FEE

An improvement fee is the eligible cost of planned projects per unit of growth that such projects will serve. Since we have already calculated growth (denominator) above, we will focus here on the improvement fee cost basis (numerator).

#### III.B.1. Eligibility

A project’s eligible cost is the product of its total cost and its eligibility percentage. The eligibility percentage represents the portion of the project that creates capacity for future users. For this sewer SDC calculation, there are two types of projects to consider. The first is the wastewater treatment plant (WWTP) project totaling \$5.8 million. That project is expected to benefit existing and future users equally, and therefore is eligible at the growth share percentage of 11.20 percent. The second set of projects includes combined sewer overflow (CSO)-related projects, which remove stormwater flow from the sanitary sewer system. Based on discussions with City staff about the amount of stormwater flow that will be redirected, it was determined that such projects provide 0.49 percent of the total sewer system’s capacity to be used by future users.

#### III.B.2. Improvement Fee Cost Basis

Projects in the improvement fee cost basis were taken from discussions with City staff. **Exhibit 3.2** below shows all the projects in the sewer system improvement fee cost basis. Note that the WWTP project is expected to be entirely grant-funded, and thus has no SDC eligible portion after that adjustment. The eligibility for each project is shown in the SDC Eligibility column, and the SDC Eligible Costs column shows that full amount of the improvement fee cost basis is \$44,624.

**Exhibit 3.2 – Sewer SDC Improvement Fee Cost Basis**

#	Category	Asset	Priority	Timeline	SDC Eligibility	Sewer’s Share of Costs	Outside Funding	SDC-Eligible Cost
1	WWTP		High	2023-2027	11.20%	\$ 5,839,270	\$ 5,839,270	\$ -
2	CSO Pipe	Pipes	High	2023-2027	0.49%	430,903	-	2,125
3	Irving Ave between 28th St and 37th St	Outfall	High	2023-2027	0.49%	5,745,373	-	28,333
4	West Astoria between the Port and 3rd St	Outfall	High	2023-2027	0.49%	2,872,687	-	14,166
<b>Total</b>						<b>\$ 14,888,234</b>	<b>\$ 5,839,270</b>	<b>\$ 44,624</b>

Source: City staff

### III.C. REIMBURSEMENT FEE

A reimbursement fee is the eligible cost of the sewer facilities available for future users per unit of growth that such facilities will serve. Since growth was calculated above, we will focus on the eligible cost of the sewer facilities available for future users. That is, we will focus on the cost of reimbursable sewer facilities.

#### III.C.1. Eligibility

First, to measure the capacity available for growth in the City’s sewer facilities, the sewer system was divided into two functions of service: treatment, and transmission. Because the City is building a WWTP expansion to provide capacity for new users, the treatment function was not considered to have any available capacity for growth. However, the City’s transmission function has capacity to

accommodate all growth throughout the planning period. As such, growth’s equitable share of such capacity is best captured by the growth share, or 11.20 percent as discussed in a previous section.

### III.C.2. Reimbursement Fee Cost Basis

In the case of the 1974 sewer projects, the original cost was provided by an audit done by the Environmental Protection Agency (EPA). The original cost of other system facilities with capacity available for growth was calculated using the replacement cost of each asset with an adjustment to the cost at the time of construction based on the ENR CCI (20-City Average). Then, the original cost for each asset category was multiplied by the total original cost, with a reduction made for growth’s equitable share of outside funding. This is shown in **Exhibit 3.3** below, which shows that the total reimbursable cost is \$335,116.

**Exhibit 3.3 – Sewer Reimbursement Fee Cost Basis**

Asset Category	Estimated Capacity	Replacement Cost	Original Cost	Growth's Share		
				Outside Funding	of Outside Funding	Reimbursable Cost
1974 Treatment Project	0.00%		\$ 2,138,539	\$ 1,112,040	\$ 124,562	\$ -
Other Treatment Assets	0.00%	2,908,000	1,718,026	-	-	-
1974 Interceptor Project	11.20%		4,405,931	2,291,084	256,630	236,889
1974 Pump Station Projects	11.20%		1,484,520	771,951	86,468	79,817
Other Collection Assets	11.20%	260,000	164,356	-	-	18,410
<b>Total</b>		\$ 3,168,000	\$ 9,911,373	\$ 4,175,075	\$ 467,661	\$ 335,116

*Source: City's fixed asset schedules, notes on the 1974 project from the EPA's audit, previous tables*

### III.D. CALCULATED SDC

This section combines the eligible costs from the improvement fee cost basis and the reimbursement fee cost basis and applies some adjustments. The result is a total SDC per MCE, which can then be applied to each meter size using the City’s flow factors.

#### III.D.1. Adjustments

This City estimates that about \$18,987 should be added to the cost basis to account for the costs of administering the SDC program and complying with state law over the planning period.

### III.D.2. Calculated SDC

**Exhibit 3.4** below summarizes the calculation of the sewer SDC. As shown, the full SDC is \$524 per MCE.

**Exhibit 3.4 – Calculated Sewer SDC**

Calculated SDC	
Improvement Fee Cost Basis	\$ 44,624
Reimbursement Fee Cost Basis	335,116
Compliance Costs	18,987
<b>Total</b>	<b>\$ 398,727</b>
Growth in MCEs	761
Improvement Fee per MCE	\$ 59
Reimbursement Fee per MCE	440
Compliance Fee per MCE	25
<b>Total SDC per MCE</b>	<b>\$ 524</b>

*Source: Previous tables*

The SDC per MCE calculated in **Exhibit 3.4** can be applied to each meter size using the schedule shown in **Exhibit 3.5** below.

**Exhibit 3.5 – Sewer SDC Schedule by Meter Size**

Meter Size	Calculated	
	MCE	SDC
5/8	1.00	\$524
3/4	1.00	\$524
1	1.67	\$873
1.5	3.33	\$1,746
2	5.33	\$2,794
3	10.67	\$5,588
4	16.67	\$8,731
6	33.33	\$17,462
8	53.33	\$27,939
10	76.67	\$40,162

*Source: Previous tables*

## Section IV. STORMWATER SDC

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This section provides the detailed calculations of the maximum allowable stormwater SDC.

### IV.A. GROWTH

This section describes the growth in demand that will serve as the denominator in the SDC calculation, starting by defining the unit of measurement and then measuring the difference between current and future demand.

#### IV.A.1. Unit of Measurement

For stormwater SDCs, the demand for each development is often measured by the impervious surface area of a development, because the amount of impervious surface area can distinguish different developments' contribution of stormwater runoff or increases in flow.

#### IV.A.2. Growth in Demand

The City has no stormwater master plan, and thus no set planning period for the purposes of the stormwater SDC. For that reason, 2040 was chosen as the planning horizon to be consistent with other SDCs in this document.

The City's 2011 Buildable Lands Inventory (BLI) was used to estimate the City's existing impervious surface area. The BLI provided the number of buildable acres by zone. Assumed impervious surface percentages were applied to each zone to estimate the amount of impervious surface area development of such buildable lands would add. Based on a buildable total of 277.70 acres, the impervious surface assumptions resulted in a total of 128.96 acres of land that would be impervious surface area by the time of the City's buildout. That means that, in 2010 (the year of the BLI's data), there were 5,617,428 square feet available for impervious surface area.

According to the Portland State University (PSU) population forecast, the 2010 population of Astoria was 9,782. According to the 2019 Wastewater Facilities Plan Update, the population will rise to 12,428 by 2040. Interpolation between the 2010 and 2040 estimates gives a population of 10,851 in 2023.

If we assume that impervious surface area in Astoria will grow proportionally with the population, then the land available for impervious surface as determined by the BLI will shrink at an inverse rate. Therefore, if the land available for impervious surface area was 5,617,428 in 2010, then there is expected to be 5,063,867 square feet of land available for impervious surface area by 2023, and 4,421,442 square feet of land available for impervious surface area by 2040. The decrease in land available for impervious surface area between 2023 and 2040 is necessarily equal to the increase in impervious surface area in Astoria. This means that 642,425 square feet of impervious surface is expected to be added to the City of Astoria between 2023 and 2040, which is also the denominator of the SDC calculation. These calculations are summarized in **Exhibit 4.1** below.

### Exhibit 4.1 – Change in Impervious Surface Area

	2010	2023	2040	Growth (2023-2040)	Growth Share
Population	9,782	10,851	12,428	1,577	12.69%
Remaining Buildable Impervious Square Feet	5,617,428	5,063,867	4,421,442	(642,425)	

**Source:** 2020 PSU Population Forecast (2010 population); 2019 Wastewater Facilities Plan Update (2020 and 2040 population estimates); previous tables (remaining buildable impervious square feet in 2010)

## IV.B. IMPROVEMENT FEE

An improvement fee is the eligible cost of planned projects per unit of growth that such projects will serve. Since we have already calculated growth (denominator) above, we will focus here on the improvement fee cost basis (numerator).

### IV.B.1. Eligibility

A project’s eligible cost is the product of its total cost and its eligibility percentage. The eligibility percentage represents the portion of the project that creates capacity for future users. The City’s stormwater projects are sized to accommodate both existing users and growth. As such, growth’s equitable share of such capacity is best captured by the growth share, or 12.69 percent.

### IV.B.2. Improvement Fee Cost Basis

Projects in the improvement fee cost basis were taken from discussions with City staff. **Exhibit 4.2** below shows all the projects in the stormwater improvement fee cost basis. Note that projects one through three are shared equally with the sewer and only stormwater’s share of the costs are shown. The eligibility for each project is shown in the SDC Eligibility column, and the SDC Eligible Costs column shows that full amount of the improvement fee cost basis is \$1,585,323.

### Exhibit 4.2 – Stormwater SDC Improvement Fee Cost Basis

#	Category	Asset	Priority	Timeline	SDC Eligibility	Stormwater's Share of Costs	SDC Eligible Cost
1	Pipe	Pipes	High	2023-2027	12.69%	\$ 430,903	\$ 54,666
2	Outfall	Irving Ave between 28th St and 37th St	High	2023-2027	12.69%	5,745,373	728,884
3	Outfall	West Astoria between the Port and 3rd St	High	2023-2027	12.69%	2,872,687	364,442
4	Storage	Storage (location to be determined)	High	2023-2027	12.69%	3,447,224	437,330
<b>Total</b>						\$ 12,496,187	\$ 1,585,323

**Source:** City staff

## IV.C. REIMBURSEMENT FEE

A reimbursement fee is the eligible cost of the stormwater facilities available for future users per unit of growth that such facilities will serve. Since growth was calculated above, we will focus on the eligible cost of the stormwater facilities available for future users. That is, we will focus on the cost of reimbursable stormwater facilities.



### IV.C.1. Eligibility

The City has been working on CSO improvement since 1993 to divert stormwater flows from the sanitary sewer system. As such, the City has recently constructed much of its stormwater system and all of it is sized to accommodate both existing users and growth. As such, growth’s equitable share of such capacity is best captured by the growth share, or 12.69 percent.

### IV.C.2. Reimbursement Fee Cost Basis

The original cost of CSO improvements since 1993 is about \$32 million. The City has issued debt to help fund these improvements, of which \$16,272,232 in principal is still outstanding, which reduces the original cost for consideration of the reimbursement fee to \$15,727,768. As discussed above, growth’s equitable share of that original cost is 12.69 percent, meaning that the eligible cost for reimbursement is \$1,995,296.

## IV.D. CALCULATED SDC

This section combines the eligible costs from the improvement fee cost basis and the reimbursement fee cost basis and applies some adjustments. The result is a total SDC per impervious square foot.

### IV.D.1. Adjustments

This City estimates that about \$179,031 should be added to the cost basis to account for the costs of administering the SDC program and complying with state law over the planning period.

### IV.D.2. Calculated SDC

**Exhibit 4.3** below summarizes the calculation of the stormwater SDC. As shown, the full SDC is \$5.85 per impervious square foot (ISF). A typical new single-family residence with a 3,000 square foot impervious footprint could be charged up to \$17,550.

**Exhibit 4.3 – Calculated Stormwater SDC**

Calculated SDC	
Improvement Fee Cost Basis	\$ 1,585,323
Reimbursement Fee Cost Basis	1,995,296
Compliance Costs	179,031
<b>Total</b>	<b>\$ 3,759,650</b>
Growth in Impervious Square Feet	642,425
Improvement Fee per ISF	\$ 2.47
Reimbursement Fee per ISF	3.11
Compliance Fee per ISF	0.28
<b>Total SDC per ISF</b>	<b>\$ 5.85</b>

*Source: Previous sections*

## Section V. TRANSPORTATION SDC

This section provides the detailed calculations of the maximum allowable transportation SDC.

### V.A. GROWTH

This section describes the growth in demand that will serve as the denominator in the SDC calculation, starting by defining the unit of measurement and then measuring the difference between current and future demand.

#### V.A.1. Unit of Measurement

For transportation SDCs, a common unit of growth is the PM peak hour person trip end. A PM peak hour person trip end represents one person departing or arriving at a particular property during the peak travel time of the afternoon by any transportation method. So, for example, three people in a van entering a property would count as three person trip ends, even though only one vehicle entered the property. Using person trip ends recognizes that a variety of transportation methods may be used to access the transportation system. Because the planned project list includes accommodations for all travel methods, the person trip end approach is the best option for the SDC calculation.

#### V.A.2. Growth in Demand

According to Volume 2 of the City’s 2013 Transportation System Plan (TSP), there were 9,000 PM peak hour vehicle trip ends during the summer of 2013. That is forecasted to increase to 11,400 PM peak hour vehicle trip ends by 2035.

Using data from the U.S. Department of Transportation’s 2017 National Household Travel Survey, on average, one PM peak hour vehicle trip end is equal to 1.68 PM peak hour person trip ends. That means that there were 15,120 PM peak hour person trip ends in 2013, and will be 19,152 such trip ends in 2035. Using interpolation, the 2023 total is equal to 16,835 PM peak hour person trip ends. That means that 2,317 PM peak hour person trip ends are expected to arrive between 2023 and 2035.

These calculations are summarized in **Exhibit 5.1** below. The growth of 2,317 peak hour person trip ends will be the denominator for the transportation SDC calculation, and the growth share percentage of 12.10 percent will be useful for the improvement fee calculation.

**Exhibit 5.1 – Growth in PM Peak Hour Person Trips (Summer)**

	2013	2023	2035	Growth	Growth Share
PM peak hour vehicle trip ends (summer)	9,000	10,021	11,400	1,379	12.10%
PM peak hour person trip ends (summer)	15,120	16,835	19,152	2,317	12.10%

*Source: 2013 TSP Volume 2, Memo 7, pg 4 (vehicle trip end estimates); U.S. Department of Transportation, 2017 National Household Travel Survey (person trip conversion factor of 1.68)*

## V.B. IMPROVEMENT FEE

An improvement fee is the eligible cost of planned projects per unit of growth that such projects will serve. Since we have already calculated growth (denominator) above, we will focus here on the improvement fee cost basis (numerator).

### V.B.1. Eligibility

A project's eligible cost is the product of its total cost and its eligibility percentage. The eligibility percentage represents the portion of the project that creates capacity for future users. Most of the City's transportation projects are sized to accommodate both existing users and growth. As such, growth's equitable share of such projects is best captured by the growth share, or 12.10 percent. However, certain projects in the TSP represent major repair or replacement efforts, and thus do not provide capacity for future users. The eligibility of such projects is 0 percent.

Note that, although certain projects on the project list have a large share of outside funding, it is valid to assume that the outside funding could be applied to the non-eligible parts of the project. Therefore, no reduction is made to the eligible cost for outside funding.

### V.B.2. Improvement Fee Cost Basis

Projects in the improvement fee cost basis were taken from the City's 2013 TSP. Given the length of the project list, the full list is shown in **Appendix A**. The eligibility for each project is shown in the SDC Eligibility column, and the SDC Eligible Costs column shows that full amount of the improvement fee cost basis is \$20.6 million. Short-term projects can be expected to complete in the next five years, medium term in the next five to ten years, and long-term projects can be expected to complete before 2035.

## V.C. CALCULATED SDC

Note that no reimbursement fee is calculated in this SDC's case. So, this section takes the improvement fee cost basis, applies some adjustments, and calculates the SDC per peak hour person trip end that can be applied using a schedule of trip ends by land use type in **Appendix B**.

### V.C.1. Adjustments

This City estimates that about \$1.0 million should be added to the cost basis to account for the costs of administering the SDC program and complying with state law over the planning period.

## V.C.2. Calculated SDC

**Exhibit 5.2** below summarizes the calculation of the transportation SDC. As shown, the full SDC is \$9,347 per PM peak hour person trip end.

**Exhibit 5.2 – Calculated Transportation SDC**

Calculated SDC	
Improvement Fee Cost Basis	\$ 20,625,242
Compliance Costs	1,031,262
<b>Total</b>	<b>\$ 21,656,504</b>
Growth in PM peak hour person trip ends	2,317
Improvement Fee per PM peak hour person trip ends	\$ 8,902
Compliance Fee per PM peak hour person trip ends	445
<b>Total SDC per PM peak hour person trip ends</b>	<b>\$ 9,347</b>

**Appendix B** provides the schedule of transportation SDCs by land use type based on the number of PM peak hour person trip ends each land use is expected to generate.

## Section VI. PARKS SDC

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This section provides the detailed calculations of the maximum allowable parks SDC.

### VI.A. GROWTH

This section describes the growth in demand that will serve as the denominator in the SDC calculation, starting by defining the unit of measurement and then measuring the difference between current and future demand.

#### VI.A.1. Unit of Measurement

For parks SDC, demand that can be attributed to individual developments is usually measured in the number of people who will occupy a development. For residential developments, the number of occupants means the number of residents. We use data from the U. S. Census Bureau to estimate the number of residents for different kinds of dwelling units. For non-residential developments, the number of occupants means the number of employees. We use industry data to estimate the number employees per square foot for different kinds of non-residential developments.

When an agency chooses to impose a parks SDC on both residential and non-residential developments, the demand of one additional resident must be carefully distinguished from the demand of one additional employee. This is usually accomplished by the calculation of a residential equivalent. One resident is equal to one residential equivalent, and one employee is typically less than one residential equivalent.

#### VI.A.2. Demand Adjustment for Non-Residential Users

To charge parks SDC to both residential and non-residential developments, we must estimate both (1) how much availability non-residential occupants (i.e., employees) have to use parks facilities and (2) how that availability differs from residential occupants (i.e., residents).

The calculation begins with the most recent counts for population and employment in the City of Astoria. As shown in **Exhibit 6.1** below, in 2019 (the most recent year for which both population and employment data were available), 9,929 residents lived in Astoria, according to the Census Bureau's American Community Survey. Also, according to the Census Bureau, 4,533 employees worked in Astoria for their primary occupation. Of these, 1,465 people both lived and worked in Astoria.

**Exhibit 6.1 – 2019 Population and Employment in Astoria**

Population and Employment, 2019	Living Inside	Living Outside	Total
	Astoria	Astoria	
Working Inside Astoria	1,465	3,068	4,533
Working Outside Astoria	2,625		
Not Working	5,839		
<b>Total</b>	<b>9,929</b>		

**Source:** U.S. Census Bureau, OnTheMap Application, 2020 Inflow/Outflow analysis (employment); U.S. Census Bureau, 2019 American Community Survey 5-year estimates, Table B01003 (population)

Next, we estimate the number of hours per week that each category of person would be available to use the parks facilities in Astoria. **Exhibit 6.2** below shows an estimate of maximum availability. It assumes that 8 hours each day are used for sleeping for all residents of the City. For those who are not working, the remaining 16 hours of each day are available for use of the parks system, giving a total of 112 hours per week of parks system availability. For workers, 8 hours of each day are assumed to be spent at work, which leaves the remaining 8 hours per weekday available for residential use of the parks system. In addition, workers have 16 hours of residential demand each weekend day, for a total of 72 hours per week of residential demand. During work, 1 hour is assumed to be available for workers to use the parks system, giving 5 hours per week of non-residential demand. These estimates are not of actual use, but maximum availability.

**Exhibit 6.2 – Demand Estimates by Category of Parks User**

Hours per Week of Park Availability Per Person, Residential Demand	Living Inside Astoria
Working Inside Astoria	72
Working Outside Astoria	72
Not Working	112

**Source:** FCS GROUP.

Hours per Week of Park Availability Per Person, Non-Residential Demand	Living Inside Astoria	Living Outside Astoria
Working Inside Astoria	5	5
Working Outside Astoria		
Not Working		

**Source:** FCS GROUP.

When the hours of availability above are multiplied by the counts presented earlier, we can determine the relative demand of residents and employees. As shown in **Exhibit 6.3** below, the parks demand of

one employee is equivalent to the parks demand of about 0.05 residents. To put it another way, the parks demand of about 19.10 employees is equivalent to the parks demand of one resident.

**Exhibit 6.3 – Total Hours per Week of Park Availability**

Total Hours per Week of Park Availability, 2019	Residential	Non-	Total Hours
	hours	residential hours	
Working Inside Astoria	105,480	22,665	128,145
Working Outside Astoria	189,000		
Not Working	653,968		
<b>Total</b>	<b>948,448</b>	<b>22,665</b>	<b>128,145</b>
Hours per resident	96		
Hours per employee		5	
Residents per employee			0.05

**Source:** Previous tables

### VI.A.3. Growth in Demand

The current (2023) demand for parks facilities is 10,638 residential equivalents. That number is the sum of 10,394 residents and 244 residential equivalents for 4,670 employees according to the interpolation of data in Section 2.1 of the City’s 2016 Parks and Recreation Comprehensive Master Plan (Parks Plan).

During the forecast period from 2023 to 2026, the residential population is expected to grow by 315 residents. If total residential equivalents remain proportionate to the residential population, then residential equivalents will grow by 322 to a total of 11,405 residential equivalents. Therefore, 322 residential equivalents will be the denominator for the PIF calculations later in this report. Note that the planning period only goes through 2026 to match the planning period of the Parks Plan.

**Exhibit 6.4** below summarizes these calculations:

**Exhibit 6.4 – Growth in Demand**

	2020	2023	2026	2030	Growth (2023-2026)	Growth Share
Residents	10,088	10,394	10,708	11,143	315	2.83%
Employees	4,533	4,670	4,812	5,007	141	2.83%
Residential-Equivalent Employee	237	244	252	262	7	2.83%
<b>Total Residential Equivalents</b>	<b>10,325</b>	<b>10,638</b>	<b>10,960</b>	<b>11,405</b>	<b>322</b>	<b>2.83%</b>

**Source:** Section 2.1 of the Parks Plan, previous tables

## VI.B. IMPROVEMENT FEE

An improvement fee is the eligible cost of planned projects per unit of growth that such projects will serve. Since we have already calculated growth (denominator) above, we will focus here on the improvement fee cost basis (numerator).

### VI.B.1. Eligibility

A project's eligible cost is the product of its total cost and its eligibility percentage. The eligibility percentage represents the portion of the project that creates capacity for future users. Most of the City's parks projects are sized to accommodate both existing users and growth. As such, growth's equitable share of such projects is best captured by the growth share, or 2.83 percent. However, certain projects in the Parks Plan represent major repair or replacement efforts, and thus do not provide capacity for future users. The eligibility of such projects is 0 percent.

### VI.B.2. Improvement Fee Cost Basis

Projects in the improvement fee cost basis were taken from the City's Parks Plan and are summarized in **Exhibit 6.5** below. The eligibility for each project is shown in the SDC Eligibility column, and the SDC Eligible Costs column shows that full amount of the improvement fee cost basis is \$79,753.

**Exhibit 6.5 – Improvement Fee Cost Basis for the Parks SDC**

Project Name	Target	2023 Dollars	SDC Eligibility	SDC-Eligible Cost
	Completion			
Combined Recreation Center Feasibility Study		\$ 50,973	2.83%	\$ 1,440
Site-specific park improvement plans		312,211	2.83%	8,821
Update the Comprehensive Parks and Recreation Master Plan	2024	47,787	2.83%	1,350
Install additional lighting along the River Walk		1,592,913	2.83%	45,003
Add, remove, replace, or repair playground equipment		637,165	0.00%	-
Designate off-leash dog area(s)		7,646	0.00%	-
Install a permanent restroom facility at Fred Lindstrom Park		223,008	2.83%	6,300
Install permanent restroom facilities along the River Walk at People's Park and 9th & Astor Park		446,016	2.83%	12,601
Implement the 2013 Trails Master Plan		-	0.00%	-
Improve signage system-wide		150,000	2.83%	4,238
<b>Total</b>		<b>\$ 3,467,719</b>		<b>\$ 79,753</b>

Source: 2016 Parks Plan, Section 7.1

## VI.C. REIMBURSEMENT FEE

A reimbursement fee is the eligible cost of the parks facilities available for future users per unit of growth that such facilities will serve. Since growth was calculated above, we will focus on the eligible cost of the parks facilities available for future users. That is, we will focus on the cost of reimbursable parks facilities.

### VI.C.1. Eligibility

The City has made several improvements to its playgrounds over the last twenty years. Such improvements are expected to benefit both existing and future users equally. As such, growth's equitable share of such capacity is best captured by the growth share, or 2.83 percent.



## VI.C.2. Reimbursement Fee Cost Basis

The total replacement cost of the playground improvements is estimated to be \$817,000. The original cost of such facilities based on the ENR’s 20-City Average CCI, and totals to \$672,554. The eligible cost of such facilities is 2.83 percent, which means the SDC eligible cost is \$7,993. These calculations are shown in **Exhibit 6.6** below.

**Exhibit 6.6 – Reimbursement Fee Cost Basis for the Parks SDC**

Improvement	Approximate Install Date	Replacement Cost	Original Cost	Eligibility	SDC-Eligible Cost
Tapiola Park Playground	2005	\$ 100,000	\$ 56,517	2.83%	\$ 1,597
Childrens Park Playground	2008	15,000	9,461	2.83%	267
14th & Grand Park Playground	2005	10,000	5,652	2.83%	160
Lindstrom Park Playground	2005	25,000	14,129	2.83%	399
Astoria Recreation Center Park Playground	2019	25,000	21,407	2.83%	605
LaPlante Park Playground	2021	30,000	27,663	2.83%	782
Portland Loo @ Nordic Heritage Park	2022	150,000	148,085	2.83%	4,184
<b>Total</b>		<b>\$ 817,000</b>	<b>\$ 672,554</b>		<b>\$ 7,993</b>

*Source: City staff*

## VI.D. CALCULATED SDC

This section combines the eligible costs from the improvement fee cost basis and the reimbursement fee cost basis and applies some adjustments. The result is a total SDC per residential equivalent.

### VI.D.1. Adjustments

This City estimates that about \$4,387 should be added to the cost basis to account for the costs of administering the SDC program and complying with state law over the planning period.

### VI.D.2. Calculated SDC

**Exhibit 6.7** below summarizes the calculation of the parks SDC. As shown, the full SDC is \$286 per residential equivalent.

**Exhibit 6.7 – Calculated Parks SDC**

<b>Calculated SDC</b>	
Improvement Fee Cost Basis	\$ 79,753
Reimbursement Fee Cost Basis	7,993
Compliance Costs	4,387
<b>Total</b>	<b>\$ 92,133</b>
Growth in Residential Equivalents	322
Improvement Fee per Residential Equivalent	\$ 248
Reimbursement Fee per Residential Equivalent	25
Compliance Fee per Residential Equivalent	14
<b>Total SDC per Residential Equivalent</b>	<b>\$ 286</b>

*Source: Previous tables*

**Exhibit 6.8** below shows the calculated parks SDC applied to residential land uses based on the occupancy data from the American Census Bureau, as well as the SDC applied to an employee based on the residential equivalent calculated above.

**Exhibit 6.8 – Parks SDC Schedule**

	Residential Equivalents	SDC
Single-family	2.10	\$601.86
Multi-family	1.47	\$419.71
Employee	0.05	\$14.97

**Source:** Census Bureau, American  
Community Survey Table B25033 and  
B25024, 2021

The SDC per employee will be applied based on estimates of employee density, as shown in **Exhibit 6.9**.

**Exhibit 6.9 – Non-Residential Parks SDC Schedule**

Employment Density	Industry Type (SIC)	S.F. per Employee	Employees per 1,000 S.F.	SDC per 1,000 S.F.
Ag., Fish & Forest Services; Constr.; Mining	1-19	590	1.695	\$ 25.37
Food & Kindred Projects	20	630	1.587	23.76
Textile & Apparel	22, 23	930	1.075	16.09
Lumber & Wood	24	640	1.563	23.39
Furniture; Clay, Stone & Glass; Misc.	25, 32, 39	760	1.316	19.69
Paper & Allied	26	1,600	0.625	9.35
Printing, Publishing & Allied	27	450	2.222	33.26
Chemicals, Petroleum, Rubber, Leather	28-31	720	1.389	20.79
Primary & Fabricated Metals	33, 34	420	2.381	35.64
Machinery Equipment	35	300	3.333	49.89
Electrical Machinery, Equipment	36, 38	400	2.500	37.42
Transportation Equipment	37	700	1.429	21.38
TCPU--Transportation and Warehousing	40-42, 44, 45, 47	3,290	0.304	4.55
TCPU--Communications and Public Utilities	43, 46, 48, 49	460	2.174	32.54
Wholesale Trade	50, 51	1,390	0.719	10.77
Retail Trade	52-59	470	2.128	31.84
Finance, Insurance & Real Estate	60-68	370	2.703	40.45
Non-Health Services	70-79	770	1.299	19.44
Health Services	80	350	2.857	42.76
Educational, Social, Membership Services	81-89	740	1.351	20.23
Government	90-99	530	1.887	28.24

**Source:** Metro, "1999 Employment Density Study," Table 4.

## Section VII. IMPLEMENTATION

This section addresses practical aspects of implementing SDCs and provides a comparison with relevant jurisdictions. Also note that **Appendix C** describes a method for scaling the SDCs when charging single-family dwelling units.

### VII.A. SETTING THE SDC

The maximum legally defensible SDCs for each service as calculated in the previous sections is shown in **Exhibit 7.1** below. The City has the liberty to set the SDC for each service at any level up to the maximum defensible charge by resolution.

**Exhibit 7.1 – Maximum Defensible SDCs by Service**

Service	Charge Basis	Calculated Maximum SDC	SDC for a Single-family Dwelling Unit
Water	MCE	\$3,950	\$3,950
Sewer	MCE	\$524	\$524
Stormwater	ISF	\$5.85	\$17,550
Transportation	PM p.h.p.t	\$9,347	\$14,794
Parks	Resident	\$286	\$602
<b>Total</b>		<b>\$14,113</b>	<b>\$37,420</b>

The City may also decide to phase-in any or all of the SDCs to the maximum or a lower target charge over a period of time.

### VII.B. INDEXING

ORS 223.304 allows for the periodic indexing of SDCs for inflation, as long as the index used is:

- (A) A relevant measurement of the average change in prices or costs over an identified time period for materials, labor, real property or a combination of the three;
- (B) Published by a recognized organization or agency that produces the index or data source for reasons that are independent of the system development charge methodology; and
- (C) Incorporated as part of the established methodology or identified and adopted in a separate ordinance, resolution or order.

In accordance with Oregon statutes, it is recommended that the City use the ENR Construction Cost Index (CCI) – Seattle as the basis for adjusting SDCs annually. ENR does not have a comparable Oregon-specific index.

## VII.C. COMPARISONS

This section provides comparisons for the City’s proposed SDCs for a single-family residence against those of comparable jurisdictions. As shown in **Exhibit 7.1**, if the City adopted each SDC to the maximum extent, it would have nearly the highest total SDCs of its comparable jurisdictions. In particular, the City’s stormwater SDC would far exceed the next highest stormwater SDC in the sample.

Because of the number of factors that go into an SDC calculation, and because cities have discretion to set SDCs below the maximum defensible amount, it is difficult to determine why Astoria’s stormwater SDC is so much higher than that of comparable jurisdictions and the sewer SDC is so much lower.

To speculate on the reasons, however, the City has recently made major investments in its stormwater infrastructure and still has major improvements to construct, despite expecting a small amount of growth in the coming years. High costs combined with low growth expectations results in a high SDC. In comparison, the planned major sewer improvements are grant-funded and therefore not eligible for inclusion in the SDC. Likewise, the historical sewer investments were outside funded and therefore have little SDC eligibility.

**Exhibit 7.1 – SDC Comparisons**

	Water	Sewer	Stormwater	Transportation	Parks	Total
Oregon City	\$ 13,967	\$ 11,562	\$ 1,182	\$ 13,886	\$ 7,819	\$ 48,416
West Linn	12,453	13,856	1,741	4,179	16,008	48,237
Wilsonville	11,568	6,631	2,227	16,099	7,349	43,874
<b>Astoria</b>	<b>3,950</b>	<b>524</b>	<b>17,550</b>	<b>14,794</b>	<b>602</b>	<b>37,420</b>
Portland	4,563	8,299	1,251	2,941	16,053	33,107
Hillsboro	13,395	6,625	641	9,998	-	30,659
Independence	3,307	9,988	1,112	8,002	5,190	27,599
Beaverton	10,329	6,625	641	9,998	-	27,593
Molalla	7,035	7,484	984	8,722	2,643	26,868
Troutdale	9,513	12,350	1,771	1,305	-	24,939
Forest Grove	7,208	6,625	641	9,998	-	24,472
Sandy	4,294	6,126	-	4,826	8,897	24,143
Scappoose	8,940	4,927	671	2,171	2,227	18,936
St. Helens	3,099	6,158	2,177	4,433	2,944	18,811
Hood River	4,451	2,002	756	2,097	6,077	15,383
Depoe Bay	3,120	4,343	1,788	3,483	771	13,505
Tillamook	8,556	1,225	2,107	-	-	11,888
Newport	1,613	2,842	2,014	3,375	1,421	11,265
Lincoln City	2,607	4,815	120	915	2,632	11,089
Seaside	2,873	4,882	-	444	1,699	9,898
Cannon Beach	2,034	4,849	424	-	1,116	8,423
Warrenton	1,586	1,586	189	964	721	5,046

Source: Survey by FCS GROUP, 6/29/2023

# APPENDIX A: TRANSPORTATION SDC

## PROJECT LIST

Number	Description	Priority	2023 Cost	SDC Eligibility	Outside Funding*	SDC-Eligible Cost
N/A	Replace Irving Avenue Bridge		8,609,910	0.00%	80.00%	\$ -
D1	7th Street Road Diet	Short-term	149,620	0.00%	0.00%	-
D2	US 101-US 30 Coordinated Signal Timing Plans	Medium-term	108,947	0.00%	80.00%	-
D3	Marine Drive Coordinated Signal Timing Plans	Medium-term	72,631	0.00%	80.00%	-
D4	US 30 Speed Warning System	Long-term	36,316	0.00%	80.00%	-
D5	Downtown Traffic Signal Upgrade	Long-term	2,167,313	12.10%	80.00%	262,186
D6	US 30/Exchange Street 23rd Street Safety Enhanceme	Long-term	2,247,207	12.10%	80.00%	271,851
D7	US 30/45th Street Safety Enhancement	Long-term	469,197	12.10%	80.00%	56,760
D8	US 30/54th Street Safety Enhancement	Long-term	431,429	12.10%	80.00%	52,191
D9	US 30/Nimitz-Maritime Road Safety Enhancement	Long-term	351,535	12.10%	80.00%	42,526
D10	US 30/Liberty Lane Safety Enhancement	Long-term	525,849	12.10%	80.00%	63,613
D11	OR 202/US 101 Business Safety Enhancement	Long-term	7,685,825	12.10%	80.00%	929,775
D12	OR 202/7th Street Safety Enhancement	Long-term	232,420	12.10%	80.00%	28,116
D13	OR 202/Williamsport Road Safety Enhancement	Long-term	169,957	12.10%	80.00%	20,560
D14	Niagara Avenue Road Diet	Short-term	399,471	0.00%	0.00%	-
D15	Irving Avenue/15th Street Safety Enhancement	Long-term	2,905	12.10%	0.00%	351
D16	Niagara Avenue/7th Street Safety Enhancement	Long-term	345,724	12.10%	0.00%	41,823
D17	Niagara Avenue/8th Street Safety Enhancement	Long-term	345,724	12.10%	0.00%	41,823
D18	Harrison Avenue/34th Street Safety Enhancement	Long-term	2,905	12.10%	0.00%	351
D19	US 101/Hamburg Avenue Capacity Enhancement	Long-term	37,768	12.10%	80.00%	4,569
D20	US 30/16th Street Capacity Enhancement	Long-term	463,387	12.10%	80.00%	56,057
D21	Marine Drive -Columbia to 9th Circulation Option	Short-term	647,870	12.10%	80.00%	78,375
D22	OR 202/Denver Street Capacity Enhancement	Long-term	1,453	12.10%	80.00%	176
D23	Bond Street Two-Way	Long-term	1,019,741		0.00%	-
D24	Industry Street Extension	Long-term	1,535,422	100.00%	0.00%	1,535,422
D25	Bay Street Extension	Long-term	425,618	100.00%	0.00%	425,618
D26	Williamsport Road/James Street Realignment	Long-term	392,208	0.00%	0.00%	-
D27	Log Bronc Way Extension	Long-term	1,419,212	100.00%	0.00%	1,419,212
D28	Abbey Lane Extension	Long-term	1,414,854	100.00%	0.00%	1,414,854
D29	Maritime Road Extension	Long-term	1,272,497	100.00%	0.00%	1,272,497
D30	Irving Avenue Extension	Long-term	10,082,652	100.00%	0.00%	10,082,652
D31	US 30 Safety Enhancement	Long-term	387,850	12.10%	80.00%	46,919
D32	OR 202 Safety Enhancement	Long-term	859,952	12.10%	80.00%	104,031
D33	US 101 Business Capacity Enhancement	Long-term	7,945,845	12.10%	80.00%	961,230
D34	Portway Street Capacity Enhancement	Long-term	615,912	12.10%	0.00%	74,509
D35	Bay Street Upgrade	Long-term	98,778	12.10%	0.00%	11,949
D36	Tongue Point Road Upgrade	Long-term	1,625,484	12.10%	0.00%	196,639
D37	54th Street-Old US Highway 30 Upgrade	Long-term	3,381,705	12.10%	0.00%	409,094
D38	Maritime Road-Old US Highway 30 Upgrade	Long-term	1,297,192	12.10%	0.00%	156,925
D39	Downtown Circulation Feasibility Study	Medium-term	145,262	0.00%	80.00%	-
P1	15th Street Sidewalk Infill	Medium-term	296,335	0.00%	0.00%	-
P2	16th Street Sidewalk Infill	Long-term	188,841	0.00%	0.00%	-
P3	1st Street Sidewalk Infill	Long-term	78,442	0.00%	0.00%	-
P4	2nd Street Sidewalk Infill	Long-term	71,178	0.00%	0.00%	-
P5	8th Street (South) Sidewalk Infill	Short-term	143,810	0.00%	0.00%	-
P6	Alameda Avenue Community Based Solution	Long-term	33,410	0.00%	0.00%	-
P7	Bond Street Sidewalk Infill	Long-term	283,261	0.00%	0.00%	-

(continued)

Number	Description	Priority	2023 Cost	SDC Eligibility	Outside Funding*	SDC-Eligible Cost
P8	Florence Avenue Sidewalk Infill	Medium-term	244,041	0.00%	0.00%	-
P9	Franklin Avenue Sidewalk Infill	Medium-term	66,821	0.00%	0.00%	-
P10	Grand Avenue Sidewalk Infill	Long-term	63,915	0.00%	0.00%	-
P12	Irving Avenue Community Based Solution	Long-term	1,204,224	0.00%	0.00%	-
P13	Leif Erickson Drive (West) Sidewalk Infill	Long-term	384,945	0.00%	80.00%	-
P14	Leif Erickson Drive (East) Sidewalk Infill	Long-term	708,880	0.00%	80.00%	-
P17	Niagara Avenue Traffic Calming	Included with D0	-	0.00%	0.00%	-
P19	Olney Avenue Sidewalk Infill	Long-term	3,362,821	0.00%	80.00%	-
P20	Oregon Street Sidewalk Infill	Medium-term	108,947	0.00%	0.00%	-
P21	S Denver Street Community Based Solution	Long-term	71,178	0.00%	0.00%	-
P22	Sonora Avenue Community Based Solution	Long-term	36,316	0.00%	0.00%	-
P23	Vista Drive Sidewalk Infill	Medium-term	193,199	0.00%	0.00%	-
P24	W Grand Avenue Community Based Solution	Long-term	197,557	0.00%	0.00%	-
P25	W Lexington Avenue Community Based Solution	Long-term	283,261	0.00%	0.00%	-
P27a	W Marine Drive Sidewalk Infill	Long-term	5,374,703	0.00%	80.00%	-
P27b	W Marine Drive Sidewalk Infill	Long-term	1,452,622	0.00%	80.00%	-
P28	W Niagara Avenue Sidewalk Infill	Medium-term	183,030	0.00%	0.00%	-
P29	W Niagara Avenue Community Based Solution	Long-term	277,451	0.00%	0.00%	-
P30	Williamsport Road Sidewalk Infill	Long-term	2,504,321	0.00%	0.00%	-
P31	Alameda Avenue Sidewalk Infill	Medium-term	569,428	0.00%	0.00%	-
B1	11th Street (South) Share Roadway Enhancements	Short-term	8,716	12.10%	0.00%	1,054
B2	11th Street (North) Share Roadway Enhancements	Short-term	8,716	12.10%	0.00%	1,054
B3	15th Street Avenue Shared Roadway Enhancements	Short-term	11,621	12.10%	0.00%	1,406
B4	7th Street Bike Lane/Shared Roadway Enhancements	Long-term	42,126	12.10%	0.00%	5,096
B5	29th Street Shared Roadway Enhancements	Short-term	5,810	12.10%	0.00%	703
B6	33rd Street Shared Roadway Enhancements	Short-term	7,263	12.10%	0.00%	879
B7	35th Street Shared Roadway Enhancements	Short-term	2,905	12.10%	0.00%	351
B8	36th Street Shared Roadway Enhancements	Short-term	2,905	12.10%	0.00%	351
B9	37th Street Shared Roadway Enhancements	Short-term	2,905	12.10%	0.00%	351
B10	45th Street Shared Roadway Enhancements	Short-term	1,453	12.10%	0.00%	176
B11	51st Street Shared Roadway Enhancements	Short-term	2,905	12.10%	0.00%	351
B12	6th Street Shared Roadway Enhancements	Short-term	7,263	12.10%	0.00%	879
B13	8th Street Bike Lane/Shared Roadway Enhancements	Long-term	18,884	12.10%	0.00%	2,284
B14	Alameda Avenue (North) Shared Roadway Enhancem	Short-term	47,937	12.10%	0.00%	5,799
B15	Alameda Avenue (South) Shared Roadway Enhancem	Short-term	20,337	12.10%	0.00%	2,460
B16	Birch Street Shared Roadway Enhancements	Short-term	7,263	12.10%	0.00%	879
B17	Bond Street Shared Roadway Enhancements	Short-term	24,695	12.10%	0.00%	2,987
B18	Cedar Street Shared Roadway Enhancements	Short-term	18,884	12.10%	0.00%	2,284
B20	Denver Street Shared Roadway Enhancements	Short-term	11,621	12.10%	0.00%	1,406
B21	Duane Street (West of 8th) Shared Roadway Enhance	Short-term	4,358	12.10%	0.00%	527
B22	Duane Street (East of 8th) Shared Roadway Enhancem	Short-term	20,337	12.10%	0.00%	2,460
B23	Florence Avenue Shared Roadway Enhancements	Short-term	13,074	12.10%	0.00%	1,582
B33	Duane Street (East) Shared Roadway Enhancements	Short-term	2,905	12.10%	0.00%	351
B34	Exchange Street Shared Roadway Enhancements	Short-term	33,410	12.10%	0.00%	4,042
B35	7th Street/Exchange Street Shared Roadway Enhance	Short-term	21,789	12.10%	0.00%	2,636
B36	Florence Avenue/Oregon Street Shared Roadway Enh	Short-term	13,074	12.10%	0.00%	1,582
B37	Franklin Avenue (East) Shared Roadway Enhancemen	Short-term	8,716	12.10%	0.00%	1,054
B38	Franklin Avenue (West) Shared Roadway Enhanceme	Short-term	17,431	12.10%	0.00%	2,109
B39	Glasgow Avenue Shared Roadway Enhancements	Short-term	10,168	12.10%	0.00%	1,230
B40	Harrison Avenue Shared Roadway Enhancements	Short-term	5,810	12.10%	0.00%	703
B41	OR 202/W Marine Drive Bike Lanes	Medium-term	63,915	12.10%	80.00%	7,732
B42	US 30 Bike Lanes	Medium-term	129,283	12.10%	80.00%	15,640
B43	Irving Avenue (East) Shared Roadway Enhancements	Short-term	39,221	12.10%	0.00%	4,745
B44	Irving Avenue (West) Shared Roadway Enhancements	Short-term	13,074	12.10%	0.00%	1,582
B47	Klaskanine Avenue/W Klaskanine Avenue/Alameda A	Short-term	31,958	12.10%	0.00%	3,866
B48	Leif Erikson Drive Bike Lanes	Medium-term	31,958	12.10%	80.00%	3,866
B49	Lexington Avenue/5th Street/Clatsop Avenue Shared	Short-term	21,789	12.10%	0.00%	2,636

(continued)

Number	Description	Priority	2023 Cost	SDC Eligibility	Outside Funding*	SDC-Eligible Cost
P8	Florence Avenue Sidewalk Infill	Medium-term	244,041	0.00%	0.00%	-
B50	Marine Drive/W Marine Drive Bike Lanes	Short-term	46,484	12.10%	80.00%	5,623
B52	W Marine Drive Bike Lanes	Short-term	11,621	12.10%	80.00%	1,406
B53	Mill Pond Lane Shared Roadway Enhancements	Short-term	15,979	12.10%	0.00%	1,933
B54	Niagara Avenue Bike Lanes	Long-term	33,410	12.10%	0.00%	4,042
B55	Taylor Avenue Shared Roadway Enhancements	Short-term	7,263	12.10%	0.00%	879
S1	Middle School Connector Bicycle and Pedestrian Trail	Long-term	201,915	100.00%	0.00%	201,915
S2	Commercial Connection Bicycle and Pedestrian Trail	Long-term	114,757	100.00%	0.00%	114,757
CR-01	US 30 and Bay Street Crossing Enhancements	Long-term	37,768	12.10%	80.00%	4,569
CR-02	US 30 and 45th Street Crossing Enhancements	Long-term	37,768	12.10%	80.00%	4,569
CR-03	US 30 and 37th Street Crossing Enhancements	Long-term	37,768	12.10%	80.00%	4,569
CR-04	OR202 and 7th Street Intersection Enhancements	Long-term	1,743	12.10%	80.00%	211
CR-05	Niagara Between 8th and 9th Crossing Enhancements	Long-term	49,389	12.10%	0.00%	5,975
CR-06	OR 202 and 4th Street Crossing Enhancements	Short-term	49,389	12.10%	80.00%	5,975
CR-07	OR202 just east of Hannover Street Crossing Enhancer	Long-term	49,389	12.10%	80.00%	5,975
CR-08	US 30 and 6th Street Crossing Enhancements	Included in D21	108,947	12.10%	80.00%	13,180
CR-09	US 30 and 8th Street Crossing Enhancements	Included in D21	108,947	12.10%	80.00%	13,180
CR-10	Commercial and 18th Street Crossing Enhancements	Included in D21	145,262	12.10%	0.00%	17,573
CR-11	Exchange and 13th Street Crossing Enhancements	Medium-term	49,389	12.10%	0.00%	5,975
CR-12	US 30 and 17th Street Crossing Enhancements	Long-term	24,695	12.10%	80.00%	2,987
CR-13	US 30 and 16th Street Crossing Enhancements	Short-term	30,505	12.10%	80.00%	3,690
CR-14	US 30 and 18th Street Crossing Enhancements	Long-term	24,695	12.10%	80.00%	2,987
CR-15	US 30 and 20th Street Crossing Enhancements	Long-term	24,695	12.10%	80.00%	2,987
CR-16	Commercial at 10th, 11th, and 12th Crossing Enhancer	Long-term	145,262	12.10%	0.00%	17,573
CR-17	Roundabout Enhancements	Long-term	1,743	12.10%	80.00%	211
T1	Bus Stop Amenity Enhancement	Medium-term	145,262	12.10%	0.00%	17,573
T2	OR 202/US 101 Business Transit Pullout	Long-term	108,947	12.10%	80.00%	13,180
	<b>Total</b>		<b>\$ 80,157,956</b>			<b>\$ 20,625,242</b>

Source: 2013 Transportation System Plan, city staff

\*Assumes that the City's share of state highway projects is 20% - IE, outside funding is 80%

# APPENDIX B: TRANSPORTATION SDC

## SCHEDULE

	ITE		PM Peak Hour	Pass-by Trip	Person Trip	New PM Peak	Transportation SDC
	Code	Unit of Measure	Vehicle Trip Ends	Reduction Factor	Conversion Factor	Hour Person Trip Ends	
General Light Industrial	110	1,000 SFGFA	0.65	1.00	1.68	1.09	\$10,230
Industrial Park	130	1,000 SFGFA	0.34	1.00	1.68	0.57	\$5,351
Manufacturing	140	1,000 SFGFA	0.74	1.00	1.68	1.25	\$11,647
Warehousing	150	1,000 SFGFA	0.18	1.00	1.68	0.30	\$2,833
Mini-Warehouse	151	1,000 SFGFA	0.15	1.00	1.68	0.25	\$2,361
Utility	170	1,000 SFGFA	2.16	1.00	1.68	3.64	\$33,996
Specialty Trade Contractor	180	1,000 SFGFA	1.93	1.00	1.68	3.25	\$30,376
Single-Family Detached Housing	210	Dwelling Units	0.94	1.00	1.68	1.58	\$14,794
Multifamily Housing (Low-Rise, not close to rail tran	220	Dwelling Units	0.51	1.00	0.95	0.48	\$4,512
Multifamily Housing (Mid-Rise, not close to rail tran	221	Dwelling Units	0.39	1.00	1.18	0.46	\$4,308
Mobile Home Park	240	Dwelling Units	0.58	1.00	1.68	0.98	\$9,128
Senior Adult Housing - Detached	251	Dwelling Units	0.30	1.00	1.68	0.51	\$4,722
Senior Adult Housing - Attached	252	Dwelling Units	0.25	1.00	1.68	0.42	\$3,935
Congregate Care Facility	253	Dwelling Units	0.18	1.00	2.44	0.44	\$4,113
Assisted Living	254	1,000 SFGFA	0.48	1.00	1.68	0.81	\$7,555
Recreational Homes	260	Dwelling Units	0.29	1.00	1.68	0.49	\$4,564
Timeshare	265	Dwelling Units	0.63	1.00	1.68	1.06	\$9,915
Residential Planned Unit Development	270	Dwelling Units	0.69	1.00	1.68	1.16	\$10,860
Hotel	310	Rooms	0.59	1.00	1.68	0.99	\$9,286
Motel	320	Rooms	0.36	1.00	1.68	0.61	\$5,666
Campground/Recreational Vehicle Park	416	Acres	0.48	1.00	1.68	0.81	\$7,555
Multipurpose Recreational Facility	435	1,000 SFGFA	3.58	1.00	1.68	6.03	\$56,344
Multiplex Movie Theater	445	Movie Screens	13.96	1.00	1.68	23.51	\$219,712
Ice Skating Rink	465	1,000 SFGFA	0.17	1.00	1.68	0.29	\$2,676
Soccer Complex	488	Fields	16.43	1.00	1.68	27.66	\$258,586
Health/Fitness Club	492	1,000 SFGFA	3.45	1.00	1.68	5.81	\$54,298
Recreational Community Center	495	1,000 SFGFA	2.50	1.00	1.51	3.78	\$35,305
Elementary School	520	1,000 SFGFA	0.16	1.00	1.68	0.27	\$2,518
Middle School/Junior High School	525	1,000 SFGFA	0.15	1.00	1.68	0.25	\$2,361
High School	530	1,000 SFGFA	0.14	1.00	1.68	0.24	\$2,203
Junior/Community College	540	1,000 SFGFA	0.11	1.00	1.68	0.19	\$1,731
Church	560	1,000 SFGFA	0.49	1.00	1.68	0.83	\$7,712
Day Care Center	565	1,000 SFGFA	11.12	1.00	1.68	18.72	\$175,014
Prison	571	Beds	0.08	1.00	1.68	0.13	\$1,259
Fire and Rescue Station	575	1,000 SFGFA	0.48	1.00	1.68	0.81	\$7,555
Library	590	1,000 SFGFA	8.16	1.00	1.68	13.74	\$128,428
Hospital	610	1,000 SFGFA	0.86	1.00	1.67	1.44	\$13,425
Nursing Home	620	1,000 SFGFA	0.59	1.00	1.68	0.99	\$9,286
Clinic	630	1,000 SFGFA	3.69	1.00	2.48	9.17	\$85,703
Animal Hospital/Veterinary Clinic	640	1,000 SFGFA	3.53	1.00	1.68	5.94	\$55,557
General Office Building	710	1,000 SFGFA	1.44	1.00	1.30	1.88	\$17,557
Small Office Building	712	1,000 SFGFA	2.16	1.00	1.68	3.64	\$33,996
Single Tenant Office Building	715	1,000 SFGFA	1.76	1.00	1.68	2.96	\$27,700
Medical-Dental Office Building	720	1,000 SFGFA	3.93	1.00	1.14	4.50	\$42,043
Government Office Building	730	1,000 SFGFA	1.71	1.00	1.68	2.88	\$26,913
United States Post Office	732	1,000 SFGFA	11.21	1.00	1.68	18.87	\$176,430
Office Park	750	1,000 SFGFA	1.30	1.00	1.68	2.19	\$20,460



(continued)

	ITE		PM Peak Hour	Pass-by Trip	Person Trip	New PM Peak	Transportation
	Code	Unit of Measure	Vehicle Trip Ends	Reduction Factor	Conversion Factor	Hour Person Trip Ends	
Research and Development Center	760	1,000 SFGFA	0.98	1.00	1.45	1.42	\$13,273
Business Park	770	1,000 SFGFA	1.22	1.00	1.68	2.05	\$19,201
Tractor Supply Store	810	1,000 SFGFA	1.40	1.00	1.68	2.36	\$22,034
Construction Equipment Rental Store	811	1,000 SFGFA	0.99	1.00	1.68	1.67	\$15,581
Building Materials and Lumber Store	812	1,000 SFGFA	2.25	1.00	1.68	3.79	\$35,412
Free-Standing Discount Superstore	813	1,000 SFGFA	4.33	0.71	1.68	3.68	\$34,354
Variety Store	814	1,000 SFGFA	6.70	0.66	1.68	4.91	\$45,934
Free-Standing Discount Store	815	1,000 SFGFA	4.86	0.83	1.68	5.64	\$52,694
Hardware/Paint Store	816	1,000 SFGFA	2.98	0.74	1.68	2.75	\$25,683
Nursery (Garden Center)	817	1,000 SFGFA	6.94	1.00	1.68	11.69	\$109,226
Nursery (Wholesale)	818	1,000 SFGFA	5.24	1.00	1.68	8.82	\$82,471
Shopping Center	820	1,000 SFGLA	3.40	0.66	2.03	3.01	\$28,160
Factory Outlet Center	823	1,000 SFGFA	2.29	1.00	1.68	3.86	\$36,042
Automobile Sales (New)	840	1,000 SFGFA	2.42	1.00	2.11	5.11	\$47,754
Automobile Sales (Used)	841	1,000 SFGFA	3.75	1.00	1.68	6.31	\$59,020
Recreational Vehicle Sales	842	1,000 SFGFA	0.77	1.00	1.68	1.30	\$12,119
Automobile Parts Sales	843	1,000 SFGFA	4.90	0.57	1.68	2.68	\$25,056
Tire Store	848	1,000 SFGFA	3.75	0.72	1.68	3.27	\$30,596
Tire Superstore	849	1,000 SFGFA	2.11	1.00	1.68	3.55	\$33,209
Supermarket	850	1,000 SFGFA	8.95	0.64	2.88	10.57	\$98,794
Convenience Market	851	1,000 SFGFA	49.11	0.49	1.76	20.77	\$194,109
Discount Club	857	1,000 SFGFA	4.19	0.63	1.68	2.80	\$26,174
Wholesale Market	860	1,000 SFGFA	1.76	1.00	1.68	2.96	\$27,700
Sporting Goods Superstore	861	1,000 SFGFA	2.14	1.00	1.68	3.60	\$33,681
Home Improvement Superstore	862	1,000 SFGFA	2.29	0.58	2.03	1.56	\$14,618
Electronics Superstore	863	1,000 SFGFA	4.25	0.60	1.68	2.58	\$24,080
Toy/Children's Superstore	864	1,000 SFGFA	5.00	1.00	1.68	8.42	\$78,693
Baby Superstore	865	1,000 SFGFA	1.82	1.00	1.68	3.06	\$28,644
Pet Supply Superstore	866	1,000 SFGFA	3.55	1.00	1.68	5.98	\$55,872
Office Supply Superstore	867	1,000 SFGFA	2.77	1.00	1.68	4.66	\$43,596
Book Superstore	868	1,000 SFGFA	15.83	1.00	1.68	26.65	\$249,143
Discount Home Furnishing Superstore	869	1,000 SFGFA	1.57	1.00	1.68	2.64	\$24,710
Bed and Linen Superstore	872	1,000 SFGFA	2.22	1.00	1.68	3.74	\$34,940
Department Store	875	1,000 SFGFA	1.95	1.00	1.68	3.28	\$30,690
Apparel Store	876	1,000 SFGFA	4.12	1.00	1.05	4.32	\$40,380
Arts and Crafts Store	879	1,000 SFGFA	6.21	1.00	1.68	10.46	\$97,737
Pharmacy/Drugstore without Drive-Through Window	880	1,000 SFGFA	8.51	0.47	3.15	5.92	\$55,317
Pharmacy/Drugstore with Drive-Through Window	881	1,000 SFGFA	10.25	0.51	1.68	4.49	\$41,960
Marijuana Dispensary	882	1,000 SFGFA	18.92	1.00	1.68	31.86	\$297,776
Furniture Store	890	1,000 SFGFA	0.52	0.47	1.68	0.19	\$1,808
Medical Equipment Store	897	1,000 SFGFA	1.24	1.00	1.68	2.09	\$19,516
Liquor Store	899	1,000 SFGFA	16.62	1.00	1.78	29.61	\$276,730
Walk-in Bank	911	1,000 SFGFA	12.13	1.00	1.68	20.42	\$190,910
Drive-in Bank	912	1,000 SFGFA	21.01	0.65	0.42	3.69	\$34,488
Hair Salon	918	1,000 SFGFA	1.45	1.00	1.68	2.44	\$22,821
Copy, Print, and Express Ship Store	920	1,000 SFGFA	7.42	1.00	1.68	12.49	\$116,781
Food Cart Pod	926	Food Carts	6.16	1.00	1.68	10.37	\$96,950
Fast Casual Restaurant	930	1,000 SFGFA	12.55	1.00	1.68	21.13	\$197,520
Quality Restaurant	931	1,000 SFGFA	7.80	0.56	1.68	4.12	\$38,498
High-Turnover (Sit-Down) Restaurant	932	1,000 SFGFA	9.05	0.57	1.99	5.84	\$54,575
Fast-Food Restaurant without Drive-Through Window	933	1,000 SFGFA	33.21	1.00	1.68	55.92	\$522,681
Fast-Food Restaurant with Drive-Through Window	934	1,000 SFGFA	33.03	0.50	2.13	17.60	\$164,530
Fast-Food Restaurant with Drive-Through Window and Drive-Through Window	935	1,000 SFGFA	59.50	1.00	1.68	100.18	\$936,451
Coffee/Donut Shop without Drive-Through Window	936	1,000 SFGFA	32.29	1.00	2.18	70.33	\$657,431
Coffee/Donut Shop with Drive-Through Window	937	1,000 SFGFA	38.99	1.00	0.69	26.94	\$251,789
Coffee/Donut Shop with Drive-Through Window and Drive-Through Window	938	1,000 SFGFA	15.08	0.11	1.68	0.31	\$2,872
Quick Lubrication Vehicle Shop	941	1,000 SFGFA	8.70	1.00	1.68	14.65	\$136,926

(continued)

	ITE		PM Peak Hour	Pass-by Trip	Person Trip	New PM Peak	
	Code	Unit of Measure	Vehicle Trip	Reduction	Conversion	Hour Person Trip	Transportation
			Ends	Factor	Factor	Ends	SDC
Automobile Care Center	942	1,000 SFGFA	3.11	1.00	1.68	5.24	\$48,947
Automobile Parts and Service Center	943	1,000 SFGFA	2.06	1.00	1.68	3.47	\$32,422
Gasoline/Service Station	944	Vehicle Fueling Positions	13.91	0.58	1.68	7.88	\$73,646
Convenience Store/Gas Station	945	Vehicle Fueling Positions	18.42	0.44	1.68	6.00	\$56,126
Self-Service Car Wash	947	Wash Stalls	5.54	1.00	1.68	9.33	\$87,192
Automated Car Wash	948	Car Wash Tunnels	77.50	1.00	1.68	130.49	\$1,219,747
Car Wash and Detail Center	949	Wash Stalls	13.60	1.00	1.68	22.90	\$214,046
Truck Stop	950	Vehicle Fueling Positions	15.42	1.00	1.68	25.96	\$242,690
Super Convenience Market/Gas Station	960	Vehicle Fueling Positions		1.00	1.68	1.68	\$15,739
Winery	970	1,000 SFGFA	7.31	1.00	1.68	12.31	\$115,050
Drinking Place	975	1,000 SFGFA	11.36	1.00	1.68	19.13	\$178,791

Source: ITE, Trip Generation Manual, 11th edition; Abbreviations: ITE = Institute of Transportation Engineers.

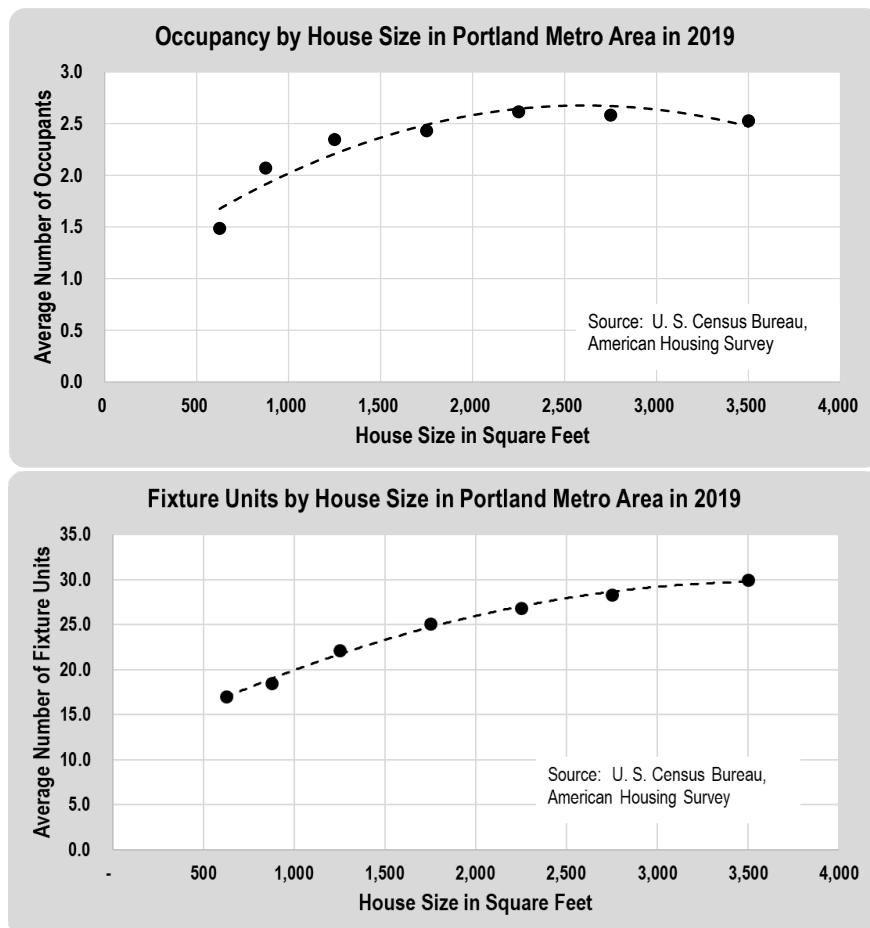
# APPENDIX C: SCALING SDCs FOR SINGLE-FAMILY DWELLING UNITS

If the City wishes to scale its SDCs for single-family dwelling units, the following sections lay out an equitable and defensible approach for doing so. Note that the individual sections provide a method for scaling single-family SDCs by square foot. However, the summary section at the end provides a method for scaling based on larger 500 square foot increments.

## OCCUPANCY AND FIXTURE UNITS BY HOUSE SIZE

Data from the U. S. Census Bureau for the Portland Metro Area indicates that, to a point, the number of occupants in a single-family dwelling unit is positively correlated with that unit's size. The same data shows a similar relationship for fixture units. This data is shown in **Exhibit C.1** below.

**Exhibit C.1 – Occupancy and Fixture Units by House Size**



At 2,605 square feet, there is no longer a positive relationship between square footage and occupancy. Similarly, at 3,648 square feet, there is no longer a relationship between square footage and the number of fixture units. Further, the smallest home is expected to have 17 fixture units.

The average single-family home in Astoria has 2.10 occupants based on American Census Bureau data and has 2,331 square feet of heated floor area according to City data. That means that, on average, there are 9 ten-thousandths of an occupant per square foot. Further, the smallest home that could support one occupant in Astoria based on those averages is 1,108 square feet.

## SCALABLE WATER SDC

According to Census Data discussed in the previous section, the average single-family home in Astoria (2,331 square feet) should have 23.16 fixture units. That means that on average, one MCE is equal to 23.16 fixture units in Astoria. Therefore, an SDC of \$3,950 per MCE is equivalent to a charge of \$170.54 per fixture unit.

According to Census data, the smallest home in Astoria should have 17 fixture units. Further, at 3,648 square feet, a home in Astoria should have 29.79 fixture units.

Therefore, the minimum water SDC based on square footage should equal the charge for 17 fixture units, or \$2,899. The maximum charge should be for 29.79 fixture units at 3,648 square feet, or \$5,080. For every square foot between, the charge should be \$0.86 per square foot, or \$86 per 100 square feet. These calculations are summarized in **Exhibit C.2** below.

**Exhibit C.2 – Scalable Single-family Water SDC**

	Square Feet	Fixture Units	SDC
Minimum SDC per single-family residence	1,108	17.0000	\$2,899
SDC per additional square foot	1	0.0050	\$0.86
Maximum SDC per single-family residence	3,648	29.7887	\$5,080

## SCALABLE SEWER SDC

The sewer SDC per MCE is \$523.85. If the average single-family home in Astoria has 2.10 occupants, the equivalent SDC is \$249 per resident.

Based on Census Bureau data, the smallest home in Astoria that could support one occupant is 1,108 square feet, at which point the charge would be \$249. Every additional square foot supports 0.0009 residents, which is charged at \$0.22 per square foot, or \$22 per 100 square feet. However, at 2,605 square feet, Census Bureau data would suggest that there is no relationship between house size and number of occupants, which caps the SDC at \$585. These calculations are summarized in **Exhibit C.3** below.

**Exhibit C.3 – Scalable Single-family Sewer SDC**

	Square Feet	Residents	SDC
SDC per resident	1,108	1.0000	\$249
SDC per square foot of single-family residence	1	0.0009	\$0.22
Maximum SDC per single-family residence	2,605	2.3523	\$585

## SCALABLE STORMWATER SDC

The stormwater SDC calculated to be \$5.85 per impervious square foot. This SDC scales naturally based on the impervious surface area of a new single-family dwelling unit, so no additional work to provide a scaled SDC is required.

## SCALABLE TRANSPORTATION SDC

The transportation SDC per trip end is \$9,347.31, and single-family homes in Astoria are charged for 1.583 trip ends, or \$14,793.99. If the average single-family home in Astoria has 2.10 residents, the equivalent SDC is \$7,028.47 per resident.

As in the sewer case, that means that the transportation SDC for a 1,108 square foot home would be \$7,028, the SDC for every additional square foot would be \$6.35, or \$635 per 100 square feet, and the maximum transportation SDC at 2,605 square feet would be \$16,533. These calculations are summarized in **Exhibit C.4** below.

**Exhibit C.4 – Scalable Single-family Transportation SDC**

	Square Feet	Residents	SDC
SDC per resident	1,108	1.0000	\$7,028
SDC per square foot of single-family residence	1	0.0009	\$6.35
Maximum SDC per single-family residence	2,605	2.3523	\$16,533

## SCALABLE PARKS SDC

The parks SDC per dwelling unit is \$285.93 per residential equivalent. As in the previous cases for sewer and transportation, that means that the parks SDC for a 1,108 square foot home would be \$285.93, the SDC for every additional square foot would be \$0.26, or \$26 per 100 square feet, and the maximum transportation SDC at 2,605 square feet would be \$672.60. These calculations are summarized in **Exhibit C.5** below.

**Exhibit C.5 – Scalable Single-family Parks SDC**

	Square Feet	Residents	SDC
SDC per resident	1,108	1.0000	\$285.93
SDC per square foot of single-family residence	1	0.0009	\$0.26
Maximum SDC per single-family residence	2,605	2.3523	\$672.60

## SUMMARY OF SCALABLE SINGLE-FAMILY SDCS

To summarize the scalable single-family SDCs, an assumption must be made for the impervious surface area of a single-family dwelling unit. For the purposes of the summary in **Exhibit C.6**, it was assumed that, in addition to the heated floor area, each single-family dwelling unit would have 669 additional square feet of impervious area to account for garages, driveways, and other impervious surface areas. That would make the total ISF of the average house in Astoria to be 3,000 square feet.

Using the baseline and per square foot charges calculated above, the total single-family SDCs in Astoria would range from: \$20,857 for a 1,108 SF dwelling; to \$48,132 for a 3,648 SF dwelling. The

average SDC for a single-family dwelling unit would be \$37,426. The calculation of SDCs at various SF break points are provided below in **Exhibit C.6** below.

**Exhibit C.6 – Summary of Scalable Single-family SDCs**

Sq. ft.	Water	Sewer	Stormwater*	Transportation	Parks	Total
≤ 1,108	\$2,899	\$249	\$10,391	\$7,028	\$286	<b>\$20,853</b>
1,500	\$3,236	\$337	\$12,686	\$9,518	\$387	<b>\$26,165</b>
2,000	\$3,665	\$449	\$15,611	\$12,691	\$516	<b>\$32,934</b>
2,331	<b>\$3,950</b>	<b>\$524</b>	<b>\$17,550</b>	<b>\$14,794</b>	<b>\$602</b>	<b>\$37,420</b>
2,500	\$4,095	\$562	\$18,536	\$15,864	\$645	<b>\$39,702</b>
2,605	<b>\$4,185</b>	<b>\$585</b>	<b>\$19,153</b>	<b>\$16,533</b>	<b>\$673</b>	<b>\$41,130</b>
3,000	\$4,524	\$585	\$21,461	\$16,533	\$673	<b>\$43,777</b>
3,500	\$4,953	\$585	\$24,386	\$16,533	\$673	<b>\$47,131</b>
≥ 3,648	<b>\$5,080</b>	<b>\$585</b>	<b>\$25,251</b>	<b>\$16,533</b>	<b>\$673</b>	<b>\$48,122</b>
<i>Green = SDCs at the average house size in Astoria</i>						
<i>Yellow = The maximum wastewater, transportation, and parks SDC</i>						
<i>Pink = The maximum water SDC</i>						

\*Assumes an additional 669 square feet for other impervious surfaces