Methodology Report

Water System Development Charges

Prepared for the City of Beaverton

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Abbreviations and Acronyms

ac-ft	acre-feet
ADD	average day demand
AMI	advanced metering infrastructure
ASR	aquifer storage and recovery
CIP	capital improvement program
City	City of Beaverton
COB	City of Beaverton
EDU	equivalent dwelling unit
FY	fiscal year
gpd	gallons per day
JWC	Joint Water Commission
mgd	million gallons a day
NTL	North Transmission Line
ORS	Oregon Revised Statute
PDD	peak day demand
PHD	peak hour demand
PRV	pressure-reducing valve
PS	pump station
SCM	South Cooper Mountain
SDCs	System Development Charges
STL	South Transmission Line
TVWD	Tualatin Valley Water District
WWSS	Willamette Water Supply System

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SECTION 1: **Introduction**

Oregon legislation establishes guidelines for the calculation of system development charges (SDCs). Within these guidelines, local governments have latitude in selecting technical approaches and establishing policies related to the development and administration of SDCs. A discussion of the legislation is provided in this section, followed by the methodologies for calculating updated water SDCs for the City of Beaverton (the City).

The City is implementing an alternative system to meet irrigation needs in a specific geographic zone – South Cooper Mountain (SCM). This alternative system is referred to as the "purple pipe" system, and will use reclaimed stormwater to meet irrigation demands. While this water is treated, it will not be used for drinking water purposes, and is considered non-potable.

The City therefore has developed two water SDC methodologies – one that will apply to development within the City generally outside of SCM (described in Section 2), and the other that will apply within the SCM zone (described in Section 3).

1.1 SDC Legislation in Oregon

In the 1989 Oregon state legislative session, a bill was passed that created a uniform framework for the imposition of SDCs statewide. This legislation (Oregon Revised Statute [ORS] 223.297-223.314), which became effective on July 1, 1991, (with subsequent amendments), authorizes local governments to assess SDCs for the following types of capital improvements:

- Drainage and flood control
- Water supply, treatment, and distribution
- Wastewater collection, transmission, treatment, and disposal
- Transportation
- Parks and recreation

The legislation provides guidelines on the calculation and modification of SDCs, accounting requirements to track SDC revenues, and the adoption of administrative review procedures.

1.1.1 SDC Structure

SDCs can be developed around two concepts: (1) a reimbursement fee, and (2) an improvement fee, or a combination of the two. The reimbursement fee is based on the costs of capital improvements already constructed or under construction. The legislation requires the reimbursement fee to be established or modified by an ordinance or resolution setting forth the methodology used to calculate the charge. This methodology must consider the cost of existing facilities, prior contributions by existing users, gifts or grants from federal or state government or private persons, the value of unused capacity available for future system users, rate-making principles employed to finance the capital improvements, and other relevant factors. The objective of the methodology must be that future system users contribute no more than an equitable share of the capital costs of existing facilities. Reimbursement fee revenues are restricted only to capital expenditures for the specific system with which they are assessed, including debt service.

The methodology for establishing or modifying an improvement fee must be specified in an ordinance or resolution that demonstrates consideration of the projected costs of capital improvements identified in an adopted plan and list, that are needed to increase capacity in the system to meet the demands of new development. Revenues generated through improvement fees are dedicated to capacity-increasing capital improvements or the repayment of debt on such improvements. An increase in capacity is established if an improvement increases the level of service provided by existing facilities or provides new facilities.

In many systems, growth needs will be met through a combination of existing available capacity and future capacity-enhancing improvements. Therefore, the law provides for a combined fee (reimbursement plus improvement component).

1.1.2 Project List

Local governments are required to prepare a capital improvement program or comparable plan, prior to establishment of an SDC that includes a list of the improvements that the jurisdiction intends to fund with improvement fee revenues and the estimated timing, cost, and eligible portion of each improvement. The project list may be updated at any time. If an SDC is to be increased by a proposed modification to the list then required action includes: (1) written notice provided to interested parties at least 30 days prior to adoption of the proposed modification and (2) hold a public hearing on the proposed modification if a request is received in writing up to seven days before the date of the planned adoption

1.1.3 Credits

A credit must be provided against the improvement fee for the construction of “qualified public improvements.” Qualified public improvements are improvements that are required as a condition of development approval, identified in the system’s SDC project list, and either (1) not located on or contiguous to the property being developed, or (2) located in whole or in part, on or contiguous to, property that is the subject of development approval and required to be built larger or with greater capacity than is necessary for the particular development project to which the improvement fee is related.

1.1.4 Methodology Review and Notification Requirements

The methodology for establishing or modifying improvement or reimbursement fees shall be available for public inspection. The local government must maintain a list of persons who have made a written request for notification prior to the adoption or amendment of such fees. The legislation includes provisions regarding notification of hearings and filing for reviews. The notification requirements for changes to the fees that represent a modification to the methodology are 90-day written notice prior to first public hearing, with the SDC methodology available for review 60 days prior to public hearing.

Application of one or more cost indices periodically is allowable and is not considered a change in the methodology, and is therefore not subject to the above review and notification procedures, provided that the index is published by a recognized agency, independent from the methodology, and incorporated into the methodology or adopted separately by ordinance or resolution. Furthermore, “a

change in the costs of materials, labor, or real property as applied to projects or project capacity"[1] in the adopted project list are not considered modifications to the SDC methodology. As such, the local government is not required to adhere to the methodology notification provisions.

1.1.5 Other Provisions

Other provisions of the legislation require:

- Deposit of SDC revenues into dedicated accounts and annual accounting of revenues and expenditures, including a list of the amount spent on each project funded, in whole or in part, by SDC revenues.
- Expenditure of SDCs may include costs of complying with the provisions of the law, including costs of developing SDC methodologies and providing an annual accounting of SDC expenditures.
- Creation of an administrative appeals procedure, in accordance with the legislation, whereby a citizen or other interested party may challenge an expenditure of SDC revenues. Furthermore, in the event a written objection to the calculation of an SDC is received, the local government must provide information on the right to petition for review pursuant to ORS 34.010, and about any locally adopted administrative review procedures.

[1] 2017 Oregon Revised Statutes 223.304 (8)(b)(A)

SECTION 2: General City Water SDC Methodology

2.1 Overview

The general methodology used to calculate water SDCs begins with an analysis of system planning and design criteria to determine growth's capacity needs, and how those needs will be met through existing system available capacity and capacity expansion. Then, the capacity to serve growth is valued to determine the "cost basis" for the SDCs, which is then divided by the total growth capacity units to determine the system-wide unit costs of capacity. The final step is to determine the SDC fee schedule, which identifies how different users of the system will be charged, based on their estimated capacity requirements.

2.2 Capacity Needs

Table 1 summarizes the existing capacity requirements and projected future requirements for the potable water system. The primary relevant design criteria for the system include the following:

- Average Day Demand (ADD) – Total annual water volume used system-wide divided by 365 days per year.
- Peak Day Demand (PDD) – The highest daily recorded rate of water production in a year.
- Peak Hour Demand (PHD) – Largest hour of demand on the peak day.
- Storage – Includes operational (or equalization) requirements, and storage for emergency and fire protection needs.

Table 1. General City Water System Planning Assumptions[1]

	ADD (mgd)	PDD (mgd)	PHD (mgd)	Storage (MG)
Capacity Requirements				
Current System	8.9	17.0	30.0	22.7
Future Requirements[2]				
Master Plan Period (2038)	11.0	21.0	37.6	27.8
Supply Period (Beyond 2038)	18.5	35.3	na	na
Growth Requirements				
Master Plan Period	2.1	3.9	7.6	5.1
Supply Period	9.6	18.2	na	na

Notes

[1] Water System Master Plan (Murraysmith, 2019)

[2] Master planning period 20 years (through 2038); supply sources serve demand beyond 2038.

MG = million gallons mgd = million gallons per day na = not applicable

As shown in Table 1, system ADD is about 8.9 million gallons per day (mgd) currently, and PDD is about 17 mgd. Growth in ADD and PDD are projected to be about 2.1 mgd and 3.9 mgd, respectively through 2038 (Master Plan planning period). Supply sources included in the general City SDC project list are designed to meet future PDD of 35.3 mgd (which occurs beyond the 2038 period). In addition, the new purple pipe system (included in the SCM SDC) is estimated to add approximately 1

mgd of capacity to help meet peak irrigation demands. The planning assumptions shown in Table 1 exclude demands met through the purple pipe system.

2.2.1 Available Capacity

The total capacity needs of growth will be met in part by existing system available capacity, and planned future capacity expansion. Table 2 provides a summary of the existing capacities by major system function and facility, and compares the capacity to existing demands based on primary facility design criteria. Current supply sources include the City's share of Joint Water Commission (JWC) water treatment and transmission facilities, and City of Beaverton (COB) Aquifer Storage and Recovery (ASR) wells and transmission. The City also owns a portion of capacity in Barney Reservoir and Scoggins Dam.

Table 2. Available Capacity Analysis by System Function/Facility

	Existing		Available Capacity	
	Capacity	Requirements	Quantity	%
Supply				
Barney Reservoir (ac-ft)	4,300	2,824	1,476	34%
Scoggins Dam (ac-ft)	4,000	3,493	507	13%
JWC Treatment (mgd)	18.75	14.0	4.8	25%
JWC South TL (mgd)	14.00	14.0	-	0%
JWC North TL (mgd)	2.10	-	2.1	100%
COB ASR (mgd)	5.00	3.0	2.0	39%
COB Transmission (mgd)	35.3	17.0	18.2	52%
Storage (mg)				
Zone 410	20	16.9	3.1	16%
Zone 550	11	5.0	6.0	55%
Cooper Mountain	5.5	5.0	0.5	9%
Cooper Mountain #2 (in process)	5.5	-	5.5	100%
Pumping (gpm)				
Sexton Mountain	3,750	2,273	1,477	39%
Sorrento constant pressure	1,500	1,773	(273)	0%
Murray Hill Booster	1,000	730	270	27%
Meridian Booster	3,200	1,784	1,416	44%
Distribution Piping (mgd)	21.0	16.7	4.3	21%

Abbreviations and Acronyms

ac-ft = acre-feet
ASR = aquifer storage and recovery
COB = City of Beaverton
JWC = Joint Water Commission
mgd = million gallons per day
TL = Transmission Line

2.3 Cost Basis

As discussed in Section 1, the reimbursement fee is intended to recover the costs associated with the growth-related capacity in the existing system; the improvement fee is based on the costs of

capacity-increasing future improvements needed to meet the demands of growth. The value of capacity needed to serve growth in aggregate within the planning period, adjusted for grants and contributions used to fund facilities, is referred to as the "cost basis".

2.4 Growth Costs

2.4.1 Reimbursement Fee

Table 3 shows the calculation of existing system growth costs for the general City water system, as of June 30, 2019. The cost basis excludes grant-funded facilities, as well as developer contributed infrastructure. The City's fixed asset records were used to identify the book value (original cost less accumulated depreciation) by major facility type for City owned and operated facilities. Investments in joint ventures (e.g., JWC and Barney Reservoir) are based on information from the City's Financial Statements for fiscal year (FY) ended June 30, 2019.

Table 3. Reimbursement Fee Cost Basis by System Function

	Total	Growth Share	
Function/Facility	**Value[1]**	**%**	**$**
Supply			
Barney Reservoir	$4,887,362	34%	$1,677,615
JWC Water Treatment Plant	$7,488,712	25%	$1,897,140
Fernhill Reservoir	$4,420,300	25%	$1,119,809
South Transmission Line	$555,586	0%	$0
North Transmission Line (PH I & II)	$982,302	100%	$982,302
Water Rights	$3,590,000	25%	$909,467
JWC ASR	$385,058	-	$0
Other Transmission	$1,626,801	25%	$412,123
Raw Water Transmission	$456,344	25%	$115,607
Subtotal	$24,392,465		$7,114,064
ASR Wells			
Well 4	$1,205,439	39%	$471,223
Subtotal	$1,205,439		$471,223
Transmission			
Transmission	$2,057,107	52%	$1,062,376
Subtotal	$2,057,107		$1,062,376
Storage			
Sexton Mountain	$3,084,365	16%	$482,703
Cooper Mountain	$4,190,503	9%	$396,193
Cooper Mountain #2 (in process)	$18,737,328	100%	$18,737,328
Subtotal	$26,012,196		$19,616,224

Function/Facility	Total Value[1]	Growth Share %	Growth Share $
Distribution			
Water Mains - COB	$50,456,668	21%	$10,346,384
Water Mains - Developers	$24,472,470	0%	$0
TVWD Withdrawal	$7,639,245	0%	$0
Subtotal	$82,568,383		$10,346,384
Total	**$136,235,590**		**$38,610,270**

Notes

[1] Book Value as of June 30, 2019

ASR = aquifer storage and recovery
COB = City of Beaverton
JWC = Joint Water Commission
TVWD = Tualatin Valley Water District

The available capacity for each system component is generally determined from the analysis summarized in Table 2 and reflects the facility-specific design criteria. As shown in Table 3, the reimbursement cost basis is about $38.6 million.

2.4.2 Improvement Fee

The cost of future capacity-increasing improvements is presented in Table A-1 (Appendix A). The improvements are based on costs identified in the Water System Master Plan and the City's Capital Improvement Plan. Each improvement was reviewed to determine the portion of costs that expand capacity for growth, versus replacing existing capacity or providing a higher level of service for existing customers. Table 4 provides a summary of the key assumptions used to determine growth allocations for each facility type.

Table 4. Determination of Improvement Allocation Percentages

		Existing		Growth	
	Expansion	Amount	%	Amount	%
Supply					
New Supply (mgd)	16.25	-	0%	16.25	100%
Scoggins Dam (ac-ft)	4,000	3,493	87%	507	13%
JWC Upgrade (mgd)	18.75	14	75%	4.8	25%
209th Ave PS & COB Trans. (mgd)	35.3	17	48%	18.2	52%
North TL Intertie (mgd)	10.0	5.3	53%	4.8	48%
East Intertie (mgd)	35.3	17	52%	18.2	52%
Cooper Mtn Transmission (mgd)	2.7	-	0%	2.7	100%
Storage (mg)					
Zone 550	5.5	3	59%	2.2	41%

	Expansion	Existing Amount	Existing %	Growth Amount	Growth %
Pumping (gpm)					
Meridian Pump Station	3,220	1,784	55%	1,436	45%
Sexton Mountain Pump Station	3,970	2,273	57%	1,697	43%
Upper Pressure Zone Booster		0	0%	-	100%
Distribution/PRVs/Other (mgd)	21.0	16.7	79%	4.3	21%

Abbreviations and Acronyms

ac-ft = acre-feet
COB = City of Beaverton
JWC = Joint Water Commission
mgd = million gallons per day
mtn = mountain
PS = Pump Station

Planned supply expansion for growth totals about 16.25 mgd, and includes new ASR wells (6.5 mgd), Willamette Water Supply System (5.0 mgd), and expansion of JWC treatment and transmission facilities (4.75 mgd). New and expanded facilities for growth also include Cooper Mountain transmission and upper pressure zone booster station.

The SDC Project List also includes a number of system performance upgrades which provide capacity for both existing and future development; therefore costs are allocated between growth and existing development in proportion to projected capacity utilization. Performance upgrades include planned improvements at Scoggins Dam, existing JWC treatment facilities, and various transmission, storage, and pumping facilities.

As shown in Table A-1, the total improvement fee cost basis is about $156.9 million.

2.4.3 Growth Costs by Service Parameter

To recognize the different services provided by the water utility, and to allow integration of the general City and SCM water SDC methodologies, growth costs by component are allocated across the different water system parameters described previously (ADD, PDD, PHD, storage) and fire protection. Table 5 provides the allocations of water system components to the system service parameters based on the relevant design criteria of each facility type, as well as the function performed by the facilities.

Table 5. Summary of SDC Component Allocations

	Service Parameter Allocation %s				
Component	**ADD**	**PDD**	**PHD**	**Fire**	**Total**
Current JWC Supply	99%	1%			100%
Current ASR & Future Supply		100%			100%
Transmission	52%	48%			100%
Storage	78%	18%		4%	100%
Pumping & PRVs	29%	26%	44%		100%
Distribution	24%	22%	37%	16%	100%

Component	Service Parameter Allocation %s				Total
	ADD	PDD	PHD	Fire	
Other (indirect)	6%	91%	2%	1%	100%

Abbreviations and Acronyms

ASR = aquifer storage and recovery JWC = Joint Water Commission PRV = pressure-reducing valve

The City's existing JWC supply capacity (18.75 mgd) is sufficient to meet ADD throughout the planning period (18.5 mgd). Current ASR and future City and regional water source expansion are needed to meet PDD requirements. Transmission facilities sized for peak demands also help meet average demands, so are allocated in proportion to planning factors. A portion of storage and distribution facilities are also designed to meet fire flow needs. The allocations between average and peak demands are based on the information provided in Table 1. For example, transmission facilities sized for PDD are allocated as follows:

ADD = 11 mgd (projected ADD)/21 mgd (projected PDD) = 52%

PDD = 1 - 0.52 = 48%

Storage allocations reflect the sum of planned capacity by zone for operational, fire, and emergency needs. As shown in Table 1, total system storage needs are estimated to be 27.8 mg in 2038, and include the following components:

Emergency (ADD) = 21.6 mgd (78%)

Operational (0.25 PDD) = 5.13 mg (18%)

Fire = 1.08 mg (4%)

Fire protection capacity in the distribution system is estimated to be 16 percent, and is based on the fire flow capacity of each size pipe, relative to the total capacity.

The allocation percentages shown in Table 5 are used to allocate the reimbursement and improvement cost bases across service parameters, as shown in tables 6 and 7.

Table 6. Reimbursement Fee Cost Basis by Service Parameter

	Planning Period	Growth Costs	Growth Costs by Service Parameter				
			ADD	PDD	PHD	Storage	Fire
Supply	Supply	$7,114,064	$7,015,681	$98,382	$0	$0	
ASR	Supply	$471,223	$0	$471,223	$0	$0	
Transmission	Supply	$1,062,376	$557,279	$505,097	$0	$0	
Storage	Storage	$19,616,224				$18,854,429	$761,795
Pumping	2038	$0	$0	$0	$0	$0	
Distribution	2038	$10,346,384	$2,530,645	$2,293,684	$3,833,237	$0	$1,688,818
Other (indirect)	2038	$0	$0	$0	$0	$0	$0
Total		**$38,610,270**	**$10,103,605**	**$3,368,386**	**$3,833,237**	**$18,854,429**	**$2,450,613**
			26.2%	8.7%	9.9%	48.8%	6.3%

Abbreviations and Acronyms

ADD = average day demand
ASR = aquifer storage and recovery
PDD = peak day demand
PHD = peak hour demand

Table 7. Improvement Fee Cost Basis by Service Parameter

	Planning Period	Growth Costs	Growth Costs by Service Parameters				
			ADD	PDD	PHD	Storage	Fire
Supply	Supply	$114,716,522	$0	$114,716,522	$0	$0	
ASR	Supply	$18,100,807	$0	$18,100,807	$0	$0	
Transmission	Supply	$6,515,000	$3,417,501	$3,097,499	$0	$0	
Storage	Storage	$4,633,373				$4,453,436	$179,937
Pumping	2038	$4,877,569	$1,425,735	$1,292,234	$2,159,600	$0	
Distribution	2038	$3,910,975	$956,594	$867,022	$1,448,979	$0	$638,380
PRVs	2038	$201,979	$59,039	$53,511	$89,429	$0	
Other	2038	$2,530,377	$96,924	$2,285,065	$61,177	$73,674	$13,538
Total		**$155,486,602**	**$5,955,794**	**$140,412,660**	**$3,759,184**	**$4,527,110**	**$831,855**
			3.83%	90.31%	2.42%	2.91%	0.54%

Abbreviations and Acronyms

ADD = average day demand

ASR = aquifer storage and recovery

PDD = peak day demand

PHD = peak hour demand

2.5 General City Water SDC Schedule

2.5.1 EDU Capacity Requirements

Table 8 presents the calculation of the capacity requirements per Equivalent Dwelling Unit (EDU) based on information from the Water System Master Plan. Average day demand per EDU (220 gallons per day) is based on estimated per capita demand (103 gallons per day) multiplied by 2.14 persons per household. Peak demands are then calculated based on respective peaking factors.

Table 8. Capacity Requirements per Equivalent Unit[1]

	Amount
Avg. per capita demand (gpd)	103
Persons per household	2.14
Average demand per EDU (gpd)	220
ADD:PDD peaking factor	1.90
PDD per EDU (gpd)	419
PHD per EDU (gpd)	814
Storage per EDU (gallons)	547

Notes

[1] Source: Water System Master Plan (2019)

ADD = average day demand

ASR = aquifer storage and recovery

EDU = equivalent dwelling unit

gpd = gallons per day

PDD = peak day demand

PHD = peak hour demand

2.5.2 Unit Costs and SDC per EDU

Table 9 shows the calculation of the reimbursement fee per EDU based on the cost basis, and system-wide growth and EDU-specific capacity requirements presented previously. The cost basis by service parameter (from Table 6) is divided by the total growth-related capacity requirements by parameter (from Table 1) to determine the unit costs of capacity. The growth units for PDD and PHD reflect the additional demand in excess of the ADD, and PDD (for PHD), and exclude capacity added by the purple pipe system. The capacity requirements per EDU (from Table 8) are multiplied by the unit costs to determine the reimbursement fee SDC per EDU. As with the total growth requirements, the EDU requirements for peak demands are the incremental increase over ADD/PDD only.

Table 9. Reimbursement Fee Unit Costs

	Service Parameter					
	ADD	**PDD**	**PHD**	**Storage**	**Fire**	**Total**
Growth Cost						
2038	$2,530,645	$2,293,684	$3,833,237	$18,854,429	$2,450,613	$29,962,608
Supply	$7,572,960	$1,074,702	$0	$0	$0	$8,647,662
Total	$10,103,605	$3,368,386	$3,833,237	$18,854,429	$2,450,613	$38,610,270
Growth Requirements						
Units	*mgd*	*mgd*	*mgd*	*MG*	*EDUs*	
2038	2.1	1.8	3.7	5.1	8,278	
Supply	9.6	8.6				
Unit Cost of Capacity						
2038	$1,210,835	$1,250,258	$1,035,609	$3,680,708	$296	
Supply	$790,439	$124,620				
Total Cost per Unit	$2,001,274	$1,374,878	$1,035,609	$3,680,708	$296	
Requirements per EDU	0.000220	0.000198	0.000395	0.000547	1.00	
SDC per EDU	**$441**	**$273**	**$409**	**$2,012**	**$296**	**$3,431**

Abbreviations and Acronyms

ADD = average day demand
ASR = aquifer storage and recovery
EDU = equivalent dwelling unit
MG = million gallons
mgd = million gallons per day
PDD = peak day demand
PHD = peak hour demand
SDC = system development charge

Table 10 shows the improvement fee calculations. Future development capacity needs will be met by a combination of existing available and future capacity, so both the reimbursement and improvement cost basis are spread over the total projected growth in demand.

Table 10. Improvement Fee Unit Costs

	System Component					
	ADD	**PDD**	**PHD**	**Storage**	**Fire**	**Total**
Growth Cost						
2038	$2,538,292	$4,497,832	$3,759,184	$4,527,110	$831,855	$16,154,273
Supply	$3,417,501	$135,914,828	$0	$0	$0	$139,332,329
Total	$5,955,794	$140,412,660	$3,759,184	$4,527,110	$831,855	$155,486,602
Growth Requirements						
Units	*mgd*	*mgd*	*mgd*	*MG*	*MG*	
2038	2.1	1.8	3.7	5.1	8,278	
Supply	9.6	8.6				
Unit Cost of Capacity						
2038	$1,214,494	$2,451,711	$1,015,603	$883,770	$100	
Supply	$356,707	$15,760,310				
Total Cost per Unit	$1,571,201	$18,212,021	$1,015,603	$883,770	$100	
Require per EDU	0.000220	0.000198	0.000395	0.000547	1.00	
SDC per EDU	**$346**	**$3,613**	**$401**	**$483**	**$100**	**$4,944**

Abbreviations and Acronyms

ADD = average day demand
EDU = equivalent dwelling unit
MG = million gallons
mgd = million gallons per day
PDD = peak day demand
PHD = peak hour demand
SDC = system development charge

2.5.3 Compliance Costs

Local governments are entitled to expend SDC revenue on the costs of complying with provisions of the SDC statutes. Compliance costs generally include those associated with developing the SDC methodology and project list (i.e., a portion of master planning costs). Table 11 shows the calculation of the compliance charge per EDU. Annual SDC compliance costs are determined by dividing the total estimated costs for each item by the estimated frequency of update (5 years for SDC study, 10 years for master planning, and 1 year for financial/legal development). The annual costs are then divided by the estimated annual number of new EDUs which yields a fee of approximately $343 per EDU.

Table 11. Compliance Charge

Component	Frequency (Years)	Total	Growth	Annualized
SDC Study	5	$50,000	100%	$10,000
Master Planning				
Urban Reserve 6B Infrastructure Analysis	20	$600,000	100%	$30,000
Water System Master Planning	10	$800,000	79%	$62,866
Water Management & Conservation Plan	10	$159,840	52%	$8,935
Financial/Legal/Development	1	$30,000	100%	$30,000
Total Annual Costs				**$141,801**
Estimated Annual EDUs				414
Compliance Charge/EDU				**$343**

Notes

EDU = equivalent dwelling unit

SDC = system development charge

2.5.4 General City Water SDC Schedule

The combined SDCs per EDU are shown in Table 12. The total SDC per unit is $8,712 including the reimbursement component of $3,431, the improvement component of $4,944, and the compliance charge of $343. The SDCs for larger meter sizes are scaled up based on hydraulic equivalencies relative to a 5/8-inch meter (the typical size for a single family residential dwelling).

Table 12. General City SDC Schedule

Meter Size	Reimbursement SDC	Improvement SDC	Compliance	SDC	Meter Equivalent
5/8-inch	$3,431	$4,944	$343	$8,717	1.00
3/4-inch	$5,146	$7,416	$514	$13,076	1.50
1-inch	$8,577	$12,360	$856	$21,794	2.50
1 1/2-inch	$17,155	$24,720	$1,713	$43,587	5.00
2-inch	$27,448	$39,551	$2,741	$69,740	8.00
3-inch	$74,795	$107,778	$7,469	$190,041	21.80
4-inch	$128,660	$185,397	$12,847	$326,905	37.50
6-inch	$274,475	$395,514	$27,407	$697,397	80.00
8-inch	$480,332	$692,149	$47,963	$1,220,444	140.00

Notes

SDC = system development charge

SECTION 3: South Cooper Mountain Water SDC Methodology

3.1 Overview

The South Cooper Mountain (SCM) "purple pipe" water system will provide an alternative water supply source for irrigation uses in the SCM area. The purple pipe system will allow stormwater reuse for irrigation purposes, and while treated, is not considered potable. The non-potable element of the SCM water system will also provide environmental benefits as a source of stream flow enhancement for Summer Creek. The capital costs of this new purple pipe system will be recovered through separate zonal SCM water SDCs assessed to new development served by the system.

The SCM Water SDC methodology follows the same general approach as the City-wide water SDC methodology – system capital costs are divided by the projected number of capacity units to be served by the system in order to determine the cost per unit of capacity. The SDCs for individual developments are then determined based on the estimated capacity requirements of each development.

Because non-potable water can only be used for irrigation purposes, development in SCM will also be served by the general City water system to meet indoor water demands, as well as any irrigation needs not directly served by the non-potable distribution system. Therefore, new development in SCM will be assessed a zonal SCM water SDC comprised of both potable and non-potable elements. The SCM water SDCs assessed to new development served by the purple pipe system substitute the capital costs attributed to a portion of peak capacity; because irrigation demands in the SCM zone will primarily be met by the purple pipe infrastructure, those capital costs replace certain infrastructure costs in the City-wide water SDC.

Furthermore, new development in SCM will be installing both local potable and purple pipe distribution lines; therefore, this directly funded private investment replaces the distribution capital component of the general water SDC for development in SCM.

3.2 Capacity Needs

Table 13 summarizes the planning assumptions for the SCM purple pipe SDC.

Table 13. Non-Potable (Purple Pipe) Water System Planning Assumptions[1]

Item	Total
Non-Potable System Capacity (mgd)	1.0
Total Meter Equivalents[1]	747
Capacity Requirements per Meter Equivalent (gpd)	1,340
Single Family Residential Dwelling (gpd)	307

Note

[1] Estimated number of meters by meter size multiplied by meter equivalency factors shown in Table 12. Meters include approximately 600 single family and 1,400 multifamily residences (the latter of which assumed to be served by 1 meter per 20 residences), plus parks and other greenways, and schools.

Mgd = millions of gallons per day gpd = gallons per day

As with the general City water SDCs, the SCM SDCs will be assessed based on meter size. Non-single family developments are estimated to have larger irrigation needs per meter, based on greater quantity of irrigated acreage per meter. The estimated average demand per meter equivalent is 1,340 gallons per day.

3.3 Cost Basis

As discussed in Section 1, the reimbursement fee is intended to recover the costs associated with the growth-related capacity in the existing system; the improvement fee is based on the costs of capacity-increasing future improvements needed to meet the demands of growth. The value of capacity needed to serve growth in aggregate, adjusted for grants and contributions used to fund facilities, is referred to as the "cost basis".

The purple pipe water supply system is comprised of groundwater pumping and injection system and stormwater treatment system, as well as program design costs. With the exception of previously incurred costs associated with Aquifer Storage and Recovery (ASR) well drilling, the system costs will be constructed over the next three years as shown in the SDC Project list (Table A-2).

Table 14 provides a summary of the reimbursement and improvement costs bases for the SCM water SDC. The improvement costs exclude developer contributions for distribution piping and grants for stormwater treatment.

Table 14. SCM Non-Potable (Purple Pipe) Water SDC Cost Basis and Unit Costs

Item	Reimbursement	Improvement[1]	Total
Supply			
ASR 3a well drilling	$625,486		$625,486
Program Design		$635,456	$635,456
PRV		$260,000	$260,000
Ground water pumping & injection system		$3,600,000	$3,600,000
Stormwater Treatment		$537,500	$537,500
Subtotal	$625,486	$5,032,956	$5,658,442
Distribution piping			
Proposed		$717,426	$717,426
Subtotal	$0	$717,426	$717,426
Total SDC Costs	$625,486	$5,750,382	$6,375,868
Capacity (mgd)[2]	1.0	1.0	1.0
Unit Costs ($/mgd)	$625,486	$5,750,382	$6,375,868
$ per Single Family Dwelling Unit	$192	$1,765	$1,957
$ per Non-SF Meter Equivalent	$838	$7,703	$8,541

[1] From Project List (Table A-2)

[2] From Table 13

Abbreviations and Acronyms

ASR = aquifer storage and recovery
mgd = millions of gallons a day
PRV = pressure-reducing valve
SDC = system development charge
SF = single-family

3.4 South Cooper Mountain Water SDC Schedule

3.4.1 Unit Costs of Capacity

Table 14 also shows the calculation of the reimbursement and improvement fees per unit of capacity system-wide, and by development type. The system-wide unit costs are multiplied by the capacity requirements per unit shown in Table 13 to determine the cost per unit. As shown in Table 14, the total SDC per single family residential unit is $1,957 including the reimbursement component of $192 and the improvement component of $1,765. For other development, the purple SDC is $8,541 per meter equivalent.

3.4.2 South Cooper Mountain Water SDC Schedule

The SCM water SDCs will be assessed based on a flat fee per dwelling unit for single family residential development. As mentioned previously, each dwelling unit will also be served by a general City water meter to serve indoor uses, as well as any back or side yard irrigation not connected to the purple pipe distribution system. The general City water SDCs include separate cost components for different system facility types (as was shown in Tables 6 and 7), and for different service parameters (shown in Tables 9 and 10).

As shown in Table 15, the combined SDC for a single family dwelling unit served by both the general City and the purple pipe systems is $6,971, which includes the purple pipe component of the SDC of $1,957, and a general City SDC of $5,015 for the SCM zone. As discussed previously, the general City SDC for development served by the purple pipe system is reduced by general city distribution system costs, and 50 percent of peak demand costs, reflecting irrigation needs provided by the purple pipe system.

The purple pipe SDCs for other types of development will be assessed on the basis of meter size. As shown in Table 15, the purple pipe SDC is $8,541 per 5/8” meter equivalent. As for single family dwellings, other developments whose total water demand is met through a combination of purple pipe and general City water will pay general City water SDCs reflecting reduced peak demands and private investment substituting for the general city distribution component. The total SDC for a development will be based on the required purple pipe and general City water meter sizes.

Table 15. Water SDC Schedule for South Cooper Mountain

Customer Type/Size	Non-Potable SDC/ Unit	General City SDC[1]				SCM Combined SDC
		ADD +Fire	PDD+PHD	Compliance	Total	
General City SDC Per Unit		**$3,200**	**$5,175**	**$343**	**$8,717**	
Distribution Component		*$655*	*$921*		*$1,576*	
Other System Components		*$2,545*	*$4,254*	*$343*	*$7,142*	
Single Family Residential SDC per Dwelling Unit						
Component Share[2]	100%	80%	41%	100%		
Single Family	$1,957	$2,545	$2,127	$343	$5,015	$6,971
Other Development (per Meter)[3]						
Non-Potable Meter						
5/8-inch	$8,541					$8,541
3/4-inch	$12,812					$12,812
1-inch	$21,353					$21,353
1 1/2-inch	$42,705					$42,705
2-inch	$68,328					$68,328
Potable Meter (with partial irrigation) General City SDC						
Meter Size						
5/8-inch		$2,545	$2,127	$343	$5,015	$5,015
3/4-inch		$3,818	$3,190	$514	$7,522	$7,522
1-inch		$6,363	$5,317	$856	$12,537	$12,537
1 1/2-inch		$12,725	$10,635	$1,713	$25,073	$25,073
2-inch		$20,361	$17,016	$2,741	$40,117	$40,117

Potable Meter (no potable irrigation) General City SDC Meter Size				
5/8-inch	$2,545	$343	$2,888	$2,888
3/4-inch	$3,818	$514	$4,331	$4,331
1-inch	$6,363	$856	$7,219	$7,219
1 1/2-inch	$12,725	$1,713	$14,438	$14,438
2-inch	$20,361	$2,741	$23,101	$23,101

Notes

[1] From General City SDC Methodology; based on 5/8 X 3/4" meter

[2] Assumes purple pipe (non-potable) irrigation of 50%, and private investment substitute for distribution component.

[3] General City SDC to be determined based on meter size and potable irrigation needs

Abbreviations and Acronyms

ADD = average daily demand
PHD = peak hour demand
SDC = system development charge
PDD = peak day demand
SCM = South Cooper Mountain

SECTION 4: **Appendix A – SDC Project Lists**

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Table A-1. General City Water SDC Project List

PROJECT	Time Period 2023	2024–2028	2029–2038	Total Cost	SDC Portion %	$
Water Supply						
JWC						
JWC upgrade and replacement projects	$3,946,383	$2,000,000	$4,000,000	$9,946,383	25%	$2,519,750
JWC capacity projects	$1,000,000	$5,000,000		$6,000,000	100%	$6,000,000
Scoggins Dam seismic modification		$7,500,000		$7,500,000	13%	$950,625
209th Avenue Pump Station in-line booster to City 36-inch transmission main		$6,500,000		$6,500,000	52%	$3,356,871
NTL intertie and transmission main	$37,734,000			$37,734,000	48%	$17,923,650
WWSS	$17,028,000			$17,028,000	8%	$1,382,985
WWSS supply system development						
Intertie - WWSS - Cornelius Pass/TV Hwy to 209th	$10,000,000	$20,000,000	$33,003,040	$63,003,040	100%	$63,003,040
Intertie - Tile Flat w/ fluoridation & Pump Station	$3,650,000			$3,650,000	52%	$1,885,012
East Intertie	$800,000	$6,700,000		$7,500,000	100%	$7,500,000
Subtotal				**$178,601,483**		$114,716,522
ASR						
ASR No. 5	$8,550,000			$8,550,000	100%	$8,550,000
ASR No. 6		$5,075,000		$5,075,000	100%	$5,075,000
ASR No. 7	$4,475,807			$4,475,807	100%	$4,475,807
Subtotal				**$18,100,807**		**$18,100,807**

PROJECT	Time Period 2023	2024–2028	2029–2038	Total Cost	SDC Portion %	$
Cooper Mountain Transmission						
175th - Winkelman Park to Alvord Lane, Kemmer Rd - 176th to 182nd, 794 Zone meter, SCM Heights PRVs	$4,635,000			$4,635,000	100%	$4,635,000
175th/Kemmer Intersection roundabout	$920,000			$920,000	100%	$920,000
Weir Road 16-inch - 173rd to 165th Ave/city limits	$960,000			$960,000	100%	$960,000
Subtotal				**$6,515,000**		**$6,515,000**
Storage						
Cooper Mountain #3 (550)		$7,300,000		$7,300,000	41%	$2,966,985
Subtotal				$7,300,000		$2,966,985
Pumping						
Meridian Pump Station Upgrade	$2,975,000			$2,975,000	45%	$1,326,699
Sexton Mountain Pump Station Upgrade	$5,500,000			$5,500,000	43%	$2,350,871
Upper Pressure Zone Booster PS	$1,200,000			$1,200,000	100%	$1,200,000
Subtotal				$9,675,000		$4,877,569
Distribution Mains						
Water Main Replacements	$5,235,000	$4,400,000	$8,600,000	$18,235,000	0%	$0
Distribution Opp. Projects - Upsizing & Exten.	$5,000,000	$3,000,000	$5,800,000	$13,800,000	21%	$2,829,757
SCM Infrastructure	$1,000,000			$1,000,000	100%	$1,000,000
Waterline Maintenance & Replacement Projects	$325,000	$400,000	$800,000	$1, 525,000	0%	$0
COB Direct Water Supply to TVWD Withdrawal Areas	$500,000	$500,000		$1, 000,000	8%	$81,218
Subtotal				**$35,560,000**		**$3,910,975**

PROJECT	Time Period 2023	2024–2028	2029–2038	Total Cost	SDC Portion %	$
PRVs						
PRV 9 - Davies & Brockman - Upgrade	$265,000			$265,000	21%	$54,340
PRV 12, 13, 14 - Weir Rd 675 to 550 - consolidate	$360,000			$360,000	21%	$73,820
Division & Village Place		$360,000		$360,000	21%	$73,820
Subtotal				**$985,000**		**$201,979**
Other						
Annual Water System Telemetry Upgrade	$900,000	$1,000,000	$2,000,000	$3, 900,000	21%	$799,714
SCM Fixed base AMI System	$7,500,000			$7,500,000	21%	$1,537,911
Water system security upgrades	$280,000	$100,000	$200,000	$580,000	21%	$118,932
Emergency generator (mobile)	$360,000			$360,000	21%	$73,820
Subtotal				$12,340,000		$2,530,377
Total Infrastructure				$269,077,290	57%	**$153,820,214**
Planning						
Cooper Mountain 550 Storage (Cooper Mtn Res No. 3) Siting Evaluation and Land Purchase	$4,100,000			$4,100,000	41%	$1,666,389
Subtotal				$4,100,000		$1,666,389
Total				**$273,177,290**	57%	155,486,602

Abbreviations and Acronyms

AMI = automated meter infrastructure
ASR = aquifer storage and recovery
COB = City of Beaverton
Mtn = Mountain
NTL = Northside Water Transmission Facilities
PRV = pressure-reducing valve
PS = Pump Station
Res = reservoir
SCM = South Cooper Mountain
SDC = system development charge
TV = Tualatin Valley
TVWD = Tualatin Valley Water District
WWSS = Willamette Water Supply System

Table A-2. Non-Potable Water System Project List

Item	Total Costs[1]	Adjustments[2]	Developers / Grants[3]	Improvement SDC Eligible	Timing
Supply					
Program management	$1,700,000	-$1,064,544	$0	$635,456	1-3 years
PRV	$260,000			$260,000	1-3 years
ASR Well 3a Improvements	$3,600,000			$3,600,000	1-3 years
Stormwater Treatment	$1,400,000		$862,500	$537,500	1-3 years
Subtotal	$5,000,000		$862,500	$5,032,956	
Distribution piping					
2"	$2,320,000		$2,320,000	$0	1-3 years
4"	$90,000		$90,000	$0	1-3 years
6"	$730,000		$730,000	$0	1-3 years
8"	$110,000		$85,831	$24,169	1-3 years
10"	$1,010,000		$537,264	$472,736	1-3 years
12"	$390,000		$169,478	$220,522	1-3 years
Subtotal	$4,650,000		$3,932,574	$717,426	
Total	**$12,950,000**		**$4,795,074**	**$5,750,382**	

Notes

[1] From Murraysmith; includes Contingency and ELA

[2] Includes O&M planning, ordinance and permitting, financial management, master planning and Area 6B Coordination costs.

[3] Includes stormwater treatment grants and private development construction based on 6" equivalent cost.

ASR = aquifer storage and recovery PRV = pressure-reducing valve SDC = system development charge