Clackamas River Water

WATER SYSTEM DEVELOPMENT CHARGE UPDATE

FINAL REPORT
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GLOSSARY

ADD	average day demand
AWWA	American Water Works Association
CAAGR	compounded average annual growth rate
CCI	construction cost index
CIAC	contribution in aid of construction
CWIP	construction work in progress
CRW	Clackamas River Water District
EHU	equivalent housing unit
ENR	engineering news record
FY:	fiscal year starting July 1 and going through June 30
GPD	gallons per day
GPM	gallons per minute
MCE	meter capacity equivalent
MDD	maximum day demand
MG	million gallons
MGD	million gallons per day
M&S	meters and services
ORS	Oregon Revised Statutes
R&R	renewal and replacement
SDC	system development charge
SFR	single family residential
T&D	transmission and distribution
WSMP	Water System Master Plan

INTRODUCTION

In April 2019, Carollo Engineers, Inc. (Engineer) finalized the development of the Water System Master Plan (WSMP) for Clackamas River Water's (CRW) North and South Water Systems. Following the completion of the WSMP, in 2020 CRW engaged FCS GROUP to update their system development charges (SDCs) based on the capital improvement plan and capacity information included in the WSMP.

SYSTEM DEVELOPMENT CHARGE BACKGROUND

Oregon Revised Statutes (ORS) 223.297 to 223.314 authorize local governments to establish system development charges (SDCs), one-time fees on new development paid at the time of development. SDCs are intended to recover a fair share of the cost of existing and planned facilities that provide capacity to serve future growth.

ORS 223.299 defines two types of SDCs:

- A *reimbursement fee* 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* 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) and on the costs of compliance with Oregon's SDC law.

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 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) and on the costs of compliance with Oregon's SDC law.

SDC CALCULATION

OVERVIEW

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 available future capacity in units of demand. The unit of demand becomes the basis of the charge. **Table 1** shows this calculation in equation format:

Table 1. SDC Calculation

Eligible Costs of Available Capacity in Existing Facilities / Units of Available Future Capacity	+	Eligible Costs of Capacity Increasing Capital Improvements / Units of Available Future Capacity	=	SDC per Unit of Available Future Capacity

REIMBURSEMENT FEE

The reimbursement fee is the cost of available capacity per unit of available future capacity. In order for a reimbursement fee to be calculated, unused capacity must be available to serve future growth. For facility types that do not have available capacity, no reimbursement fee may be calculated.

IMPROVEMENT FEE

The improvement fee is the cost of planned capacity-increasing capital projects per unit of capacity that those projects will provide for future users. In reality, the capacity added by many projects serves a dual purpose of both meeting existing demand and serving future growth. To compute a compliant improvement fee, capacity enhancing related costs must be isolated, and costs related to meeting current demand must be excluded.

The capacity approach to allocate costs to the improvement fee basis was used. Under this approach, the cost of a given project is allocated to growth by the portion of total project capacity that represents capacity for future users. That portion, referred to as the improvement fee eligibility percentage, is multiplied by the total project cost for inclusion in the improvement cost basis.

Adjustments to the Cost Basis

All accumulated SDC revenue currently available in fund balance is deducted from its corresponding cost basis. This practice prevents a jurisdiction from double-charging for projects that were in the previous methodology's improvement fee cost basis but have not yet been constructed. For this analysis it was assumed that the entire SDC fund balance was associated with the improvement fee and deducted from the improvement fee cost basis. The adjustment described above does not impact CRW's existing credit policy.

CUSTOMER BASE & CAPACITY

The available future capacity calculation is the basis by which an SDC is charged. The charge basis should approximate a pro rata share of total system costs (that is, charges that accurately reflect a customer's demand for system capacity). For water utilities, this is often related to either *potential demand* or *estimated demand*. Estimated demand is often approximated by converting such factors as customer type and customer size into **equivalent housing units (EHUs)** based on *projected water use*, while potential demand is often measured by meter size or other surrogates for *maximum potential demand*.

Water systems, generally, must be sized to meet potential demand. For example, while the estimated demand for a commercial establishment served by a 1-inch meter may be no different than that of a customer served by a 5/8-inch meter, its potential is 2.5 times that of the smaller meter (based on American Water Works Association safe operating capacity by meter size) because of the additional flow capacity. There are exceptions a water utility may consider when serving customers that require large volumes without significant peaking.

For this analysis the charges are calculated in both potential demand, expressed in **meter capacity equivalents (MCEs)**, and estimated demand, expressed in EHUs.

EXISTING DEMAND

Potential Demand and MCE Calculation

According to CRW's records, the water utility had 12,458 accounts in fiscal year (FY) 2020. The standard meter size for CRW is a 3/4-inch meter, which equates to 1 MCE. Applying the MCE flow factor ratios utilizing 3/4-inch equivalents by meter size results in 16,223 MCEs in FY 2020. **Table 2** provides a summary of meter-based accounts, flow factors and MCEs. (The MCE calculation used is based on American Water Works Association (AWWA) flow factors, proportionate to a 3/4-inch safe operating flow capacity).

Table 2. FY 2020 Customer Data

Meter	Accounts FY2020	MCE Factor (3/4" Equivalent)	MCEs (FY2020)
3/4"	11,205	1.00	11,205
1"	750	1.67	1,250
1 1/2"	181	3.33	603
2"	246	5.33	1,312
3"	37	10.67	395
4"	19	16.67	317
6"	12	33.33	400
8"	2	53.33	107
10"	4	76.67	307
12"	1	112.50	113
18"	1	215.12	215
Total	**12,458**		**16,223**

Notes:

1. Flow factors based on AWWA Standards, 1984 and 1990.
2. Flow factors for 18" meter are based on regression analysis utilizing smaller meter size data.
3. Includes wholesale accounts.

Estimated Demand and EHU Calculation

From the WSMP, *Tables 3.13 Projected Parameters* provided the definition of EHUs for each system. This analysis used the medium definition of 166 gallons per day (gpd) per EHU for the north system and 253 gpd per EHU for the south system. The charges developed for this SDC update are system wide; therefore, a system wide weighted average gpd per EHU was derived using additional WSMP data.

Section *3.5.2.1 of the WSMP* defined the medium scenario for an EHU as the average single family residential (SFR) gpd for the prior 4-year period. In order to calculate the system wide average gpd per EHU, historical system specific data for SFR customers was utilized. The SFR accounts for each system were multiplied by gpd per EHU for that specific system, and number of days per year to estimate total demand. The north and south demand by year was combined and divided by combined SFR accounts and number of days per year. The latest 4-year gpd per EHU were averaged to estimate a system wide average of 202 gpd per EHU. **Table 3** provides the summary of the system wide average calculation for CRW.

Table 3. System Wide Average EHU

Year	North			South			Total System		
	gpd/EHU	SFR Accounts	Est. Demand	gpd/EHU	SFR Accounts	Est. Demand	Est. Demand	SFR Accounts	gpd/EHU
2013	169	6,709	413,844,665	245	4,920	439,971,000	853,815,665	11,629	201
2014	167	6,687	407,606,085	245	4,893	437,556,525	845,162,610	11,580	200
2015	166	6,754	409,224,860	269	4,901	481,204,685	890,429,545	11,655	209
2016	160	6,888	403,361,280	252	4,922	453,965,904	857,327,184	11,810	198
4-Year Average	**166**			**253**					202

Notes:

1. Tables 3.8 of the North and South WSMP were used for SFR account data.
2. Tables 3.13 of the WSMP were used for the gpd/EHU data.
3. Estimated demand was calculated by multiplying gpd/EHU by SFR and number of days in a year accounting for 2016 leap year.

To calculate existing FY 2020 EHUs, the data from the north and south WSMP tables *3.16* (north) *Projects Summary – Medium Scenario* and *3.15 South System Demand Projection Summary – Medium Scenario* was used. The tables provided EHUs, average day demand (ADD) and maximum day demand (MDD) for the years of 2017, 2028 and 2038. The EHU and gpd/EHU data were used to calculate the system wide EHU projections for 2017, 2028 and 2038. The weighted annual average compounding growth rate was calculated using the 2017 and 2028 projections and applied to the 2017 figures to estimate FY 2020 system wide EHUs of 40,193. **Table 4** provides the summary of the system wide calculation of the FY 2020 EHUs.

Table 4. FY 2020 System Wide EHUs

Year	2017	2028	2038
North EHUs	37,802	40,612	42,653
North gpd/EHU	166	166	166
North Demand - gpd	**6,275,132**	**6,741,592**	**7,080,398**
South EHUs	6,578	7,535	8,691
South gpd/EHU	253	253	253
South Demand - gpd	**1,664,234**	**1,906,355**	**2,198,823**
Total Demand - gpd	**7,939,366**	**8,647,947**	**9,279,221**
System Wide gpd/EHU	202	202	202
System Wide EHUs	**39,267**	**42,771**	**45,893**
CAAGR	0.78%		

Fiscal Year	*EHUs*	*CAAGR*	*EHU w. CAAGR*
2017	39,267	0.78%	39,573
2018	39,573	0.78%	39,882
2019	39,882	0.78%	40,193
2020	40,193		

FY 2020 Estimated EHUs	**40,193**

Notes:
1. System specific EHU data is from tables 3.16 (north) and 3.15 (south) of the north and south WSMP.
2. CAAGR - cumulative annual average growth rate.

FUTURE ALLOCABLE CUSTOMER BASE

Based on the review of the north and south WSMP, CRW's existing system can support varying levels of capacity based on the function of service of the system. Capacity information was provided for the following functions:

1. Supply / Treatment
2. Pumping
3. Storage

Supply / Treatment

From the WSMP, *Chapter 5 – Water Supply – North System* indicates that CRWs existing treatment plant was designed to support 30.0 million gallons per day (mgd). Due to operational constraints, the operational capacity is limited to 23.0 mgd (rounded) as identified in *Section 5.3.1 Comparison of*

Projected Demand to Available Sources. Comparing 23.0 mgd supply / treatment capacity to the existing MDD of 16.0 mgd, identified in Table 5.2 of the north WSMP, indicates that the system currently has 30.4 percent of unused capacity.

Utilizing the unused capacity of 30.4 percent for supply / treatment and existing EHU and MCE figures of 40,193 EHUs and 16,223 MCEs, future available capacity was calculated as identified in **Table 5**.

Table 5. Supply / Treatment Existing and Unused Capacity in EHUs and MCEs

Supply / Treatment	mgd	% Share
Operational capacity	**23.00**	**100.0%**
Maximum day demand	16.00	69.6%
Unused capacity	7.00	30.4%

Supply / Treatment	MCEs	% Share
Existing	16,223	69.6%
Future (unused)	7,097	30.4%
Total	**23,320**	**100.0%**

Supply / Treatment	EHUs	% Share
Existing	40,193	69.6%
Future (unused)	17,584	30.4%
Total	**57,777**	**100.0%**

Existing EHUs of 40,193 and MCEs of 16,223 were divided by the current utilized supply / treatment capacity share of 69.6 percent to estimate the total supply / treatment capacity expressed in EHUs and MCEs. The net difference between the total capacity EHUs of 57,777 and MCEs of 23,320 and existing EHUs of 40,193 and MCEs 16,223, respectively, was calculated to be the unused share of existing available supply / treatment capacity, which is 17,584 EHUs and 7,097 MCEs.

The WSMP for either system does not include capacity enhancing supply treatment projects; therefore, future available capacity EHUs of 17,584 and MCEs of 7,097 remain the same under the existing system and after the improvements identified in the CIPs are implemented.

Pumping

Chapter 6 of both WSMPs provided the firm and required capacities for each booster pumping station. The CIP in the WSMPs did include projects associated with expanding capacity. **Tables 6 and 7** provide the summary of existing and future firm and required capacities as well as pumping capacity expressed in EHUs and MCEs, using data for planning year 2019 from the WSMP.

Table 6. Pumping Firm and Required Capacity

Pumping	Required Exist. (gpm)	Existing Firm (gpm)	Future Firm (gpm)
Mather	11,338	15,300	18,900
Otty	2,427	4,500	4,500
Kirkwood	41	-	100
Redland-Mather	2,900	3,889	3,889
Beavercreek	1,575	2,083	2,083
Henrici	478	750	750
Holcomb	684	-	-
Barlow	53	-	-
Hunter Heights	1,045	430	1,130
Total	**20,541**	**26,952**	**31,352**

Notes:

1. Otty represents 90th and Harmony.
2. Redland-Mather's pumping is performed through the Hattan Pump Station.

Table 7. Pumping Existing and Future Available Capacity in EHUs and MCEs

Pumping	gpm	% Share
Existing required capacity	20,541	76.2%
Existing available capacity	6,411	23.8%
Existing firm capacity	**26,952**	**100.0%**

Existing required capacity	20,541	65.5%
Future available capacity	10,811	34.5%
Future firm capacity	**31,352**	**100.0%**

Pumping - Existing Available	MCEs	% Share
Existing	16,223	76.2%
Future (unused)	5,063	23.8%
Total	**21,286**	**100.0%**

Pumping - Existing Available	EHUs	% Share
Existing	40,193	76.2%
Future (unused)	12,544	23.8%
Total	**52,737**	**100.0%**

Pumping - Future Available	MCEs	% Share
Existing	16,223	65.5%
Future	8,538	34.5%
Total	**24,761**	**100.0%**

Pumping - Future Available	EHUs	% Share
Existing	40,193	65.5%
Future	21,154	34.5%
Total	**61,347**	**100.0%**

Similar to the supply / treatment discussion above, existing EHUs of 40,193 and MCEs of 16,223 were divided by the current utilized pumping capacity share of 76.2 percent to estimate the total pumping capacity expressed in EHUs and MCEs. The net difference between the total existing pumping capacity EHUs of 52,737 and MCEs of 21,286 and existing EHUs of 40,193 and MCEs of 16,223, respectively, was calculated to be the unused share of existing available pumping capacity, which is 12,544 EHUs or 5,063 MCEs.

Once the CIPs in the WSMPs are implemented, the available future pumping capacity will increase to 34.5 percent compared to the existing capacity of 23.8 percent. Performing the same calculation discussed above will result in future available pumping capacity of 21,154 EHUs or 8,538 MCEs.

Storage

Chapter 6 of both WSMPs provided the existing and required storage capacity. Similar to the supply / treatment function, the CIP in the WSMPs did not include projects associated with expanding capacity. **Tables 8 and 9** provide the summary of existing and future storage capacity and requirements as well as storage capacity expressed in EHUs and MCEs, using data for planning year 2019 from the WSMP.

Table 8. Storage Required and Available Capacity

Storage	Existing Required (MG)	Existing Available MG
Mather	6.83	14.00
Otty	5.51	6.80
Henrici	1.21	1.55
Beavercreek	1.85	3.50
Redland-Mather	1.23	2.00
Hunter Heights	1.05	1.20
Barlow	0.27	0.23
Total	**17.95**	**29.28**

Notes:

1. MG capacities may include rounding.
2. Based on WSMP, Beavercreek Elevated Reservoir is counted as available capacity, but only if added withing the first 10-year window.

Table 9. Storage Existing and Unused Capacity in EHUs and MCEs

Storage	MG	% Share
Existing required	17.95	61.3%
Existing available capacity	11.33	38.7%
Existing firm capacity	**29.28**	**100.0%**

Storage	MCEs	% Share
Existing	16,223	61.3%
Future (unused)	10,240	38.7%
Total	**26,462**	**100.0%**

Storage	EHUs	% Share
Existing	40,193	61.3%
Future (unused)	25,370	38.7%
Total	**65,562**	**100.0%**

Consistent with the supply / treatment and pumping sections, existing EHUs of 40,193 and MCEs of 16,223 were divided by the current utilized storage capacity share of 61.3 percent to estimate the total storage capacity expressed in EHUs and MCEs. The net difference between the total storage capacity EHUs of 65,562 and MCEs of 26,462 and existing EHUs of 40,193 and MCEs of 16,223, respectively, was calculated to be the unused share of existing available storage capacity, which is 25,370 EHUs and 10,240 MCEs.

The WSMP for either system does not include capacity enhancing storage projects; therefore, future available capacity EHUs of 25,370 and MCEs of 10,240 remain the same under the existing system and after the improvements identified in the CIPs are implemented.

REIMBURSEMENT FEE BASIS

COST BASIS

The reimbursement fee is the eligible cost of available capacity per unit of growth that such available capacity will serve. Calculation of the reimbursement fee begins with the historical cost of assets or recently completed projects that have unused capacity to serve future users. For each asset or project, the eligible cost is the cost portion of the asset or project that is available to serve future users.

To avoid charging future development for facilities provided at no cost to CRW or its ratepayers, the reimbursement fee cost basis must be reduced by any grants or contributions used to fund the assets or projects included in the cost basis. Furthermore, unless a reimbursement fee will be specifically used to pay debt service, the reimbursement fee cost basis should be reduced by any outstanding debt related to the assets or projects included in the cost basis to avoid double charging for assets paid for by debt service in the rates.

CRW's records list $115,882,793 in water fixed assets, net of small vehicles, and $10,482,495 in construction work in progress as of the end of FY 2020. These assets were then allocated into six functional categories:

1. Supply / treatment
2. Pumping
3. Storage
4. Transmission & distribution
5. Meters & services
6. General

It was determined that in five of these six categories there was available capacity for future users. The meters & services category was deducted since it is paid for through a separate fee. Customer Base & Capacity Section of this report provides the available existing capacity to future users for the supply / treatment, pumping and storage functions. The WSMP did not provide equivalent information for the transmission and distribution function; therefore, it was assumed that the transmission and distribution assets are sized to support the available supply / treatment capacity. The general assets were assumed to be in support of the rest of the system and allocated as all other allocable assets. **Table 10** provides the summary of existing capacity available to future users by function of service.

Table 10. Available Existing System Capacity

Available Existing Unused Capacity	Supply / Treatment	Pumping	Storage	Trans. & Distribution
% Available unused capacity	30.43%	23.79%	38.70%	30.43%

Notes:

1. Supply / treatment identified in table 5 of this report.
2. Pumping identified in table 7 of this report.
3. Storage identified in table 9 of this report.
4. Transmission & distribution assumed to be equivalent to supply / treatment.

REIMBURSEMENT FEE COST BASIS CALCULATION

The reimbursement fee cost is calculated by multiplying the capacity share of each asset category by the net asset value (original cost less contributions) of that category. General plant is allocated as the total capacity share of all other assets. **Table 11** provides the summary of the reimbursement fee cost basis calculation.

Table 11. Net Reimbursement Fee Cost Basis

Reimbursement Fee Cost Basis	Supply / Treatment	Pumping	Storage	T&D	M&S	General	Total
Plant in service	$ 17,671,328	$ 9,197,963	$ 11,201,208	$ 65,912,412	$ 5,396,797	$ 6,503,085	$ 115,882,793
plus: CWIP	167	45,843	9,390,467	1,077,227	-	(31,209)	10,482,495
less: Meters & services					(5,396,797)		(5,396,797)
less: CIAC	(6,589)	(6,590)	(17,591)	(11,856,238)			(11,887,008)
Net plant in service	**$ 17,664,905**	**$ 9,237,217**	**$ 20,574,084**	**$ 55,133,400**	**$ -**	**$ 6,471,876**	**$ 109,081,483**
Reallocation of General	1,114,175	582,617	1,297,665	3,477,418		(6,471,876)	-
Adjusted net plant in service	**$ 18,779,080**	**$ 9,819,834**	**$ 21,871,749**	**$ 58,610,819**	**$ -**	**$ -**	**$ 109,081,483**
Unused capacity	30.43%	23.79%	38.70%	30.43%			
Reimbursement fee cost basis	**$ 5,715,376**	**$ 2,335,818**	**$ 8,463,351**	**$ 17,838,075**	**$ -**	**$ -**	**$ 34,352,620**
less: unused share of existing debt	(958,023)	(306,010)	(1,803,693)	(2,990,057)			(6,057,783)
Net reimbursement fee cost basis	**$ 4,757,352**	**$ 2,029,808**	**$ 6,659,659**	**$ 14,848,018**	**$ -**	**$ -**	**$ 28,294,837**

Notes:

1. Capacity percentages are not rounded, which may cause differences if applying them to the second decimal point.

IMPROVEMENT FEE BASIS

COST BASIS

An improvement fee is the eligible cost of planned projects per unit of future capacity that such projects will serve. For this section, capital improvement information was obtained from Chapter 8 of both North and South WSMP.

IMPROVEMENT FEE COST BASIS CALCULATION

The improvement fee cost basis is based on a specific list of planned capacity-increasing capital improvements. The portion of each project that can be included in the improvement fee cost basis is determined by the extent to which each new project creates capacity for future users. **Tables 12, 13 and 14** show project specific and summary improvement fee cost basis information.

Table 12. Net Improvement Fee Cost Basis

Improvement Fee Cost Basis	Supply / Treatment	Pumping	Storage	T&D	M&S	General	Total
Total capital improvement program	$ 500,000	$ 6,374,000	$ 8,250,000	$ 291,074,000		$ 800,000	306,998,000
less: renewal and replacement share	(347,826)	(5,039,003)	(7,572,831)	(253,531,565)		(530,459)	(267,021,684)
Net capital improvement program	**$ 152,174**	**$ 1,334,997**	**$ 677,169**	**$ 37,542,435**	**$ -**	**$ 269,541**	**$ 39,976,316**
Reallocation of General	1,033	9,062	4,597	254,849		(269,541)	-
Adjusted capital improvement program	**$ 153,207**	**$ 1,344,060**	**$ 681,766**	**$ 37,797,284**	**$ -**	**$ -**	**$ 39,976,316**
less: improvement SDC fund balance	(5,974)	(52,405)	(26,582)	(1,473,724)			(1,558,685)
Net improvement fee cost basis	**$ 147,233**	**$ 1,291,655**	**$ 655,183**	**$ 36,323,559**	**$ -**	**$ -**	**$ 38,417,631**

Notes:

1. Capacity percentages are not rounded, which may cause differences if applying them to the second decimal point.

Note, the net capital improvement program is reduced by any improvement fee revenue currently held by CRW to avoid double-charging for projects that were in the previous methodology's improvement fee cost-basis, and are also in the current WSMP, but have not yet been constructed.

Table 13. Project Specific North System Portion of the Improvement Cost Basis

Project	Description - North System Projects	Total	Type			Function	Capacity Share of Improvement	Total Eligible (Future Capacity)	Estimated Timing
			Capacity	R&R	Improvement				
	General								
G-01	Water Treatment Plant And Seismic Facility Plan	$ 250,000	0%	0%	100%	Supply / Treatment	30.43%	$ 76,087	1-5 years
G-02	2028 Water System Master Plan	200,000	0%	0%	100%	General	33.69%	67,385	5-10 years
G-03	2038 Water System Master Plan	200,000	0%	0%	100%	General	33.69%	67,385	11-20 years
	Programmatic								
P-01	Repair & Replacement Pipeline Program	55,143,000	0%	100%	0%	T&D	30.43%	-	1-20 years
P-02	Seismic System Pipeline Program	65,011,000	0%	100%	0%	T&D	30.43%	-	11-20 years
	Pressure Zone								
PZ-01	Mather Zone low pressure area near Kirkwood zone	44,000	0%	0%	100%	Pumping	34.48%	15,172	11-20 years
	Storage								
ST-01	Seismic Isolation Valves at Exiting Tanks	1,050,000	0%	0%	100%	Storage	38.70%	406,301	5-10 years
ST-02	Storage Condition Evaluation	250,000	0%	100%	0%	Storage	38.70%	-	11-20 years
ST-03	Storage Repair & Rehabilitation	1,000,000	0%	100%	0%	Storage	38.70%	-	11-20 years
	Pump Station								
PS-01	High Lift Pump Station	525,000	100%	0%	0%	Pumping	34.48%	525,000	5-10 years
PS-02	Kirkwood Pump Station	76,000	0%	0%	100%	Pumping	34.48%	26,207	11-20 years
PS-04	Pump Station Condition Evaluation	250,000	0%	100%	0%	Pumping	34.48%	-	11-20 years
PS-05	Pump Station Repair & Rehabilitation	3,000,000	0%	100%	0%	Pumping	34.48%	-	11-20 years
	Distribution Pipeline								
D-01	SE Jennsen Rd	121,000	0%	100%	0%	T&D	30.43%	-	11-20 years
D-02	SE Flavel Dr Pipe Upsize	277,000	0%	0%	100%	T&D	30.43%	84,304	11-20 years
D-03	Johnson Creek Blvd New Pipe	935,000	0%	0%	100%	T&D	30.43%	284,565	1-5 years
D-04	Springwater Corridor New Pipe	347,000	0%	0%	100%	T&D	30.43%	105,609	11-20 years
D-05	SE 72nd Ave Pipe Upsize	341,000	0%	0%	100%	T&D	30.43%	103,783	11-20 years
D-06	SE Catalina Ln and SE Pembroke Ct Pipe Upsize	332,000	0%	50%	50%	T&D	30.43%	50,522	11-20 years
D-07	SE 75th Ct Pipe Upsize	125,000	0%	0%	100%	T&D	30.43%	38,043	11-20 years
D-08	SE Sunnyside Rd at Clackamas Promenade Pipe Upsize	73,000	0%	0%	100%	T&D	30.43%	22,217	11-20 years
D-09	SE Ryan Ct Pipe Upsize	102,000	0%	50%	50%	T&D	30.43%	15,522	11-20 years
D-10	SE Kuehn Rd/SE Aldercrest Dr New Pipe	506,000	0%	50%	50%	T&D	30.43%	77,000	11-20 years
D-11	SE Ruscliff Rd and SE Eric St Pipe Upsize	735,000	0%	0%	100%	T&D	30.43%	223,696	11-20 years
D-12	SE Parmenter Ct Pipe Upsize	258,000	0%	0%	100%	T&D	30.43%	78,522	11-20 years
D-13	SE Thiessen Rd and SE Oetkin Rd Pipe Upsize	509,000	0%	0%	100%	T&D	30.43%	154,913	11-20 years
D-14	SE Wilshire Ct Pipe Upsize	220,000	0%	50%	50%	T&D	30.43%	33,478	11-20 years
D-15	SE Webster Rd Pipe Upsize	185,000	0%	50%	50%	T&D	30.43%	28,152	11-20 years
D-16	SE Stohler Rd Pipe Upsize	182,000	0%	0%	100%	T&D	30.43%	55,391	11-20 years
D-17	SE Brentwood Ct Pipe Upsize	78,000	0%	0%	100%	T&D	30.43%	23,739	11-20 years
D-18	SE Rofini St Pipe Upsize	207,000	0%	0%	100%	T&D	30.43%	63,000	11-20 years
D-19	SE 55th Ave Pipe Upsize	193,000	0%	0%	100%	T&D	30.43%	58,739	11-20 years
D-20	82nd Drive Replacement (2)	3,018,000	0%	100%	0%	T&D	30.43%	-	5-10 years
D-21	HLPS to 152nd Ave Reservoir New Pipe	15,052,000	100%	0%	0%	T&D	30.43%	15,052,000	1-5 years
D-22	82nd Drive Replacement (1)	438,000	0%	100%	0%	T&D	30.43%	-	1-5 years
D-23	Manfield / Strawberry Lane / Kirkwood PS / Kirkwood Rd.	1,313,000	0%	100%	0%	T&D	30.43%	-	5-10 years
D-24	Roots Road - Hwy I 205 Crossing	443,000	0%	100%	0%	T&D	30.43%	-	5-10 years
D-25	SE Thiessen Road	533,000	0%	50%	50%	T&D	30.43%	81,109	11-20 years
D-26	Johnson St Improvements	145,000	0%	0%	100%	T&D	30.43%	44,130	11-20 years
D-27	82nd Avenue Replacement (3)	4,900,000	0%	50%	50%	T&D	30.43%	745,652	5-10 years
D-28	Lake Rd To Ambler Rd	546,000	0%	100%	0%	T&D	30.43%	-	5-10 years
D-29	SE Orchid Ave	64,000	0%	100%	0%	T&D	30.43%	-	11-20 years
D-30	SE Jennings Ave New Pipe	506,000	0%	50%	50%	T&D	30.43%	77,000	11-20 years
Total North System Projects		**$ 159,683,000**	**$ 15,577,000**	**$ 134,239,000**	**$ 9,867,000**		**$ 3,107,625**	**$ 18,684,625**	

Table 14. Project Specific South System Portion of the Improvement Cost Basis

Project	Description - South System Projects	Total	Type			Function	Capacity Share of Improvement	Total Eligible (Future Capacity)	Estimated Timing
			Capacity	R&R	Improvement				
	General								
D-01	Water Treatment Plant And Seismic Facility Plan	250,000	0.00%	0.00%	100.00%	Supply / Treatment	30.43%	$ 76,087	1-5 years
D-02	2028 Water System Master Plan	200,000	0.00%	0.00%	100.00%	General	33.69%	67,385	5-10 years
D-03	2038 Water System Master Plan	200,000	0.00%	0.00%	100.00%	General	33.69%	67,385	11-20 years
	Programmatic								
P-01	Repair & Replacement Pipeline Program	22,953,000	0.00%	100.00%	0.00%	T&D	30.43%	-	1-20 years
P-02	Seismic System Pipeline Program	41,976,000	0.00%	100.00%	0.00%	T&D	30.43%	-	11-20 years
	Pressure Zone								
PZ-02	New Beavercreek Pressure Zone	1,879,000	0.00%	0.00%	100.00%	Pumping	34.48%	647,929	11-20 years
	Storage								
ST-01	Seismic Isolation Valves at Existing Tanks	700,000	0.00%	0.00%	100.00%	Storage	38.70%	270,867	5-10 years
ST-02	Storage Condition Evaluation	250,000	0.00%	100.00%	0.00%	Storage	38.70%	-	11-20 years
ST-03	Storage Repair & Rehabilitation	5,000,000	0.00%	100.00%	0.00%	Storage	38.70%	-	11-20 years
	Pump Station								
PS-03	Hunger Heights Pump Station	350,000	0.00%	0.00%	100.00%	Pumping	34.48%	120,689	11-20 years
PS-04	Pump Station Condition Evaluation	250,000	0.00%	100.00%	0.00%	Pumping	34.48%	-	11-20 years
PS-05	Pump Station Repair & Rehabilitation	-	0.00%	100.00%	0.00%	Pumping	34.48%	-	11-20 years
	Distribution Pipeline								
D-31	Barlow Crest New Pipe	1,194,000	0.00%	0.00%	100.00%	T&D	30.43%	363,391	11-20 years
D-32	S Brunner Rd Pipe Upsize	1,207,000	0.00%	50.00%	50.00%	T&D	30.43%	183,674	11-20 years
D-33	Forsythe Road (1)	966,000	0.00%	100.00%	0.00%	T&D	30.43%	-	1-5 years
D-34	Forsythe Road (2)	886,000	0.00%	100.00%	0.00%	T&D	30.43%	-	1-5 years
D-35	Bradley Road	664,000	0.00%	100.00%	0.00%	T&D	30.43%	-	1-5 years
D-36	S Overlook Rd Pipe	945,000	0.00%	50.00%	50.00%	T&D	30.43%	143,804	11-20 years
D-37	S Archer Dr Pipe Upsize	134,000	0.00%	0.00%	100.00%	T&D	30.43%	40,783	11-20 years
D-38	S Holcomb Blvd Pipe Upsize	675,000	0.00%	0.00%	100.00%	T&D	30.43%	205,435	11-20 years
D-39	E Edgewood St Pipe Upsize	389,000	0.00%	50.00%	50.00%	T&D	30.43%	59,196	1-5 years
D-40	S Dick Dr and S Lucky Ln Pipe Upsize	1,601,000	0.00%	50.00%	50.00%	T&D	30.43%	243,630	11-20 years
D-41	S Clear Acres Dr Pipe Upsize	348,000	0.00%	0.00%	100.00%	T&D	30.43%	105,913	11-20 years
D-42	S Sandalwood Rd and S Brook Ct Pipe Upsize	1,022,000	0.00%	50.00%	50.00%	T&D	30.43%	155,522	11-20 years
D-43	WS Wildflower Ln and S Pam Dr Pipe Upsize	620,000	0.00%	0.00%	100.00%	T&D	30.43%	188,696	11-20 years
D-44	S Neibur Rd Pipe Upsize	1,788,000	0.00%	0.00%	100.00%	T&D	30.43%	544,174	11-20 years
D-45	S Redland Rd New Pipe	2,010,000	0.00%	0.00%	100.00%	T&D	30.43%	611,739	11-20 years
D-46	SE Beckman Rd New Pipe	980,000	0.00%	50.00%	50.00%	T&D	30.43%	149,130	11-20 years
D-47	S Burkstrom Rd Pipe Upsize	301,000	0.00%	50.00%	50.00%	T&D	30.43%	45,804	11-20 years
D-48	S Canter Ln Pipe Upsize	743,000	0.00%	50.00%	50.00%	T&D	30.43%	113,065	11-20 years
D-49	S Norman Rd, S Elida Rd/S Glisan Rd New Pipe	1,178,000	0.00%	0.00%	100.00%	T&D	30.43%	358,522	11-20 years
D-50	Fischers Mill Rd Upsize; S Hinkle Rd/S Kimball Rd New Pipe	11,309,000	0.00%	0.00%	100.00%	T&D	30.43%	3,441,870	11-20 years

Project	Description - South System Projects	Total	Type			Function	Capacity Share of Improvement	Total Eligible (Future Capacity)	Estimated Timing
			Capacity	R&R	Improvement				
D-51	S Dillman Rd Pipe Upsize	$ 390,000	0.00%	0.00%	100.00%	T&D	30.43%	$ 118,696	11-20 years
D-52	S Grasle Rd south of Team Ct Pipe Upsize	199,000	0.00%	0.00%	100.00%	T&D	30.43%	60,565	11-20 years
D-53	S North End Rd, S Terry Michael Dr New Pipe	1,079,000	0.00%	0.00%	100.00%	T&D	30.43%	328,391	11-20 years
D-54	S Thayer Rd, S Walker Rd, S Ferguson Rd Pipe Upsize	4,743,000	0.00%	0.00%	100.00%	T&D	30.43%	1,443,522	11-20 years
D-55	S Maplelane Rd New Pipe, New PRV Station	3,012,000	0.00%	0.00%	100.00%	T&D	30.43%	916,696	1-5 years
D-56	S Maplelane Road	347,000	0.00%	50.00%	50.00%	T&D	30.43%	52,804	11-20 years
D-57	S Loder Rd, Thimble Creek Dr Pipe Upsize	1,380,000	0.00%	50.00%	50.00%	T&D	30.43%	210,000	5-10 years
D-58	S Ferguson Rd, S Heidi St Pipe Upsize	1,288,000	0.00%	50.00%	50.00%	T&D	30.43%	196,000	5-10 years
D-59	S Creek Rd Pipe Upsize	932,000	0.00%	0.00%	100.00%	T&D	30.43%	283,652	11-20 years
D-60	S Athens Rd, S Olympus Rd Pipe Upsize	1,206,000	0.00%	50.00%	50.00%	T&D	30.43%	183,522	1-5 years
D-61	Beavercreek Loop Connection	1,033,000	100.00%	0.00%	0.00%	T&D	30.43%	1,033,000	5-10 years
D-62	Henrici Rd New Pipe; Henrici Tank PRV Station	2,605,000	0.00%	0.00%	100.00%	T&D	30.43%	792,826	1-5 years
D-63	Danny Ln Pipe Upsize	511,000	0.00%	50.00%	50.00%	T&D	30.43%	77,761	1-5 years
D-64	S Saddle Ln Pipe Upsize	393,000	0.00%	0.00%	100.00%	T&D	30.43%	119,609	11-20 years
D-65	Woodglen Way, Crystal Ct Pipe Upsize	536,000	0.00%	0.00%	100.00%	T&D	30.43%	163,130	11-20 years
D-66	Beavercreek - Henrici Rd	959,000	0.00%	0.00%	100.00%	T&D	30.43%	291,870	11-20 years
D-67	S Quail Crest Ln Pipe Upsize	344,000	0.00%	50.00%	50.00%	T&D	30.43%	52,348	5-10 years
D-68	S Mossy Rock Ct, S Greeentree Dr Pipe Upsize	676,000	0.00%	50.00%	50.00%	T&D	30.43%	102,870	11-20 years
D-69	S Clear View Ct Pipe Upsize	350,000	0.00%	0.00%	100.00%	T&D	30.43%	106,522	11-20 years
D-70	S Farm Pond Ct Pipe Upsize	330,000	0.00%	0.00%	100.00%	T&D	30.43%	100,435	11-20 years
D-71	S Hawthorne Ct, S Firethorne Ct Pipe Upsize	778,000	0.00%	50.00%	50.00%	T&D	30.43%	118,391	11-20 years
D-72	S Lammer Rd Pipe Upsize	886,000	0.00%	50.00%	50.00%	T&D	30.43%	134,826	5-10 years
D-73	S Levi Ct, S Levi Rd Pipe Upsize	850,000	0.00%	0.00%	100.00%	T&D	30.43%	258,696	11-20 years
D-74	S Leland Rd, S Beavercreek Rd Pipe Upsize	2,216,000	0.00%	0.00%	100.00%	T&D	30.43%	674,435	11-20 years
D-75	S Leslie Ave Pipe Upsize	382,000	0.00%	0.00%	100.00%	T&D	30.43%	116,261	11-20 years
D-76	S Kamrath Rd Pipe Upsize	735,000	0.00%	0.00%	100.00%	T&D	30.43%	223,696	11-20 years
D-77	S Ferguson Rd Pipe Upsize	680,000	0.00%	0.00%	100.00%	T&D	30.43%	206,957	11-20 years
D-78	Henrici Rd New Pipe; Henrici Tank PRV Station	520,000	0.00%	0.00%	100.00%	T&D	30.43%	158,261	11-20 years
D-79	S Redland School Rd, S Redland Rd New Pipe	1,802,000	0.00%	0.00%	100.00%	T&D	30.43%	548,435	1-5 years
D-80	Redland Road	830,000	0.00%	0.00%	100.00%	T&D	30.43%	252,609	11-20 years
D-81	Ferguson Road (1)	1,006,000	0.00%	0.00%	100.00%	T&D	30.43%	306,174	11-20 years
D-82	Redland Road	733,000	0.00%	0.00%	100.00%	T&D	30.43%	223,087	11-20 years
D-83	S Jason Dr Pipe Upsize	419,000	0.00%	0.00%	100.00%	T&D	30.43%	127,522	11-20 years
D-84	S Dans Ct Pipe Upsize	667,000	0.00%	0.00%	100.00%	T&D	30.43%	203,000	11-20 years
D-85	S Lance Ct Pipe Upsize	564,000	0.00%	0.00%	100.00%	T&D	30.43%	171,652	11-20 years
D-86	S Copley Ct Pipe Upsize	753,000	0.00%	0.00%	100.00%	T&D	30.43%	229,174	11-20 years
D-87	S Hentrici Rd (between Redland Rd and S Bogynski Rd) Pipe Upsize	1,713,000	0.00%	0.00%	100.00%	T&D	30.43%	521,348	11-20 years
	Backbone								
BB-02	Backbone project	6,500,000	0.00%	0.00%	100.00%	T&D	30.43%	1,978,261	1-10 years
Total South System Projects		**$ 147,315,000**	**$ 1,033,000**	**$ 62,570,000**	**$ 96,772,000**		**$ 45,439,882**	**$ 21,291,691**	

SYSTEM DEVELOPMENT CHARGES

CALCULATION

Dividing the sum of the net functional cost bases identified in **Tables 11 and 12** by the future available capacity identified in **Tables 5, 7 and 9** results in the calculated SDC. The charges are calculated both on a per MCE and a per EHU basis. **Tables 15 and 16** provide the calculation of the charges.

Table 15. SDC Calculation – MCE Basis

SDC - MCE Basis	Supply / Treatment	Pumping	Storage	T&D	Total
Net reimbursement cost basis	$ 4,757,352	$ 2,029,808	$ 6,659,659	$ 14,848,018	$ 28,294,837
Allocable future capacity - MCEs	7,097	8,538	10,240	7,097	
Reimbursement fee per MCE	**$ 670**	**$ 238**	**$ 650**	**$ 2,092**	**$ 3,650**
Net improvement cost basis	$ 147,233	$ 1,291,655	$ 655,183	$ 36,323,559	$ 38,417,631
Allocable future capacity - MCEs	7,097	8,538	10,240	7,097	
Improvement fee per MCE	**$ 21**	**$ 151**	**$ 64**	**$ 5,118**	**$ 5,354**
System Development Charge (per MCE)	**$ 691**	**$ 389**	**$ 714**	**$ 7,210**	**$ 9,004**

Table 16. SDC Calculation – EHU Basis

SDC - EHU Basis	Supply / Treatment	Pumping	Storage	T&D	Total
Net reimbursement cost basis	$ 4,757,352	$ 2,029,808	$ 6,659,659	$ 14,848,018	$ 28,294,837
Allocable future capacity - EHUs	17,584	21,154	25,370	17,584	
Reimbursement fee per MCE	**$ 271**	**$ 96**	**$ 263**	**$ 844**	**$ 1,473**
Net improvement cost basis	$ 147,233	$ 1,291,655	$ 655,183	$ 36,323,559	$ 38,417,631
Allocable future capacity - EHUs	17,584	21,154	25,370	17,584	
Improvement fee per MCE	**$ 8**	**$ 61**	**$ 26**	**$ 2,066**	**$ 2,161**
System Development Charge (per EHU)	**$ 279**	**$ 157**	**$ 288**	**$ 2,910**	**$ 3,634**

As discussed in the Customer Base & Capacity Section of this report, either the MCE or EHU bases are appropriate. The MCE approach is less burdensome to administer, because it is based on the physical characteristics of the connection. Utilities commonly utilize either the MCE or EHU approach for SDC fee basis. To equitably recover costs from peak based and large average consumption based future customers, utilities may choose to impose the greater of the two bases for meters 1.5-inches and above. Customers of that size often impact the system more through their total demand, represented by the EHU approach, than by their peaking behavior.

SCHEDULE OF SYSTEM DEVELOPMENT CHARGES

In order to impose water SDCs on an individual developing property, the number of MCEs is determined by the size of the property's water meter. The MCE calculation used is based on American Water Works Association (AWWA) flow factors, proportionate to a 3/4-inch safe operating flow capacity, as shown in **Table 17** where one MCE is a 3/4-inch by 3/4-inch meter.

Table 17. Water SDC Schedule (MCE Basis)

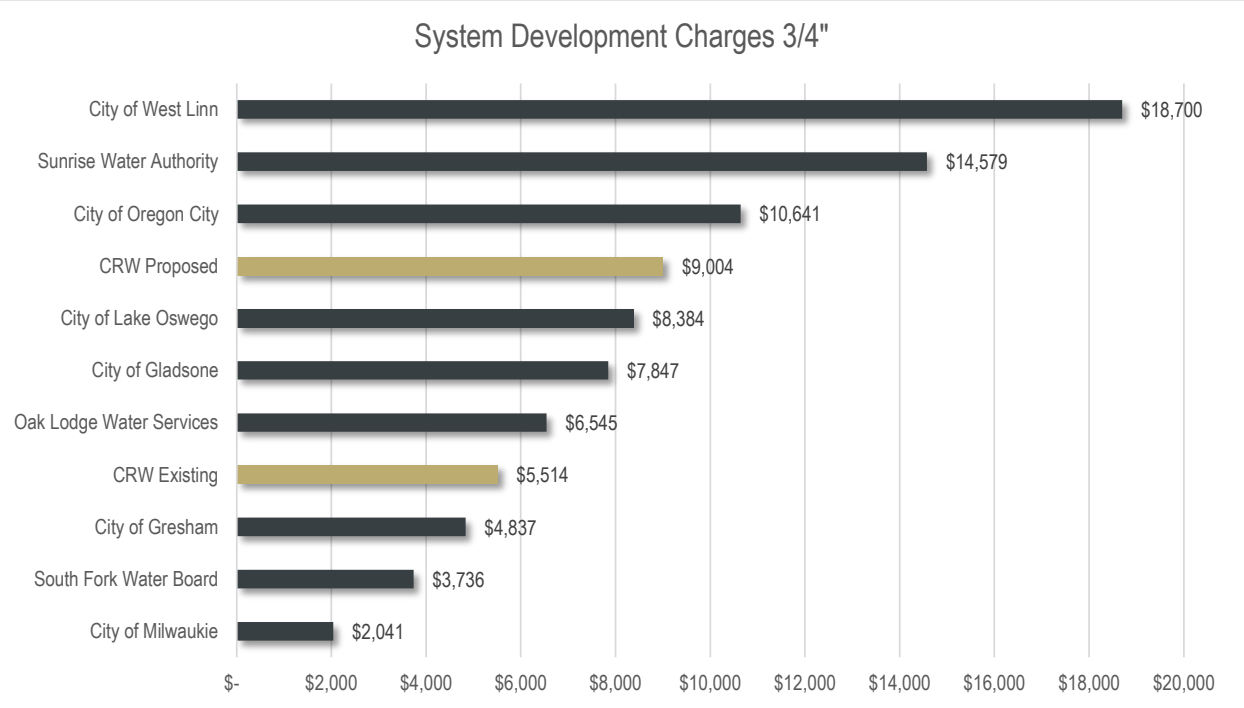
Meter	MCE Factor (3/4" Equiv.)	SDC
3/4"	1.00	$ 9,004
1"	1.67	15,007
1 1/2"	3.33	30,014
2"	5.33	48,023
3"	10.67	96,046
4"	16.67	150,072
6"	33.33	300,144
8"	53.33	480,231
10"	76.67	690,332
12"	112.50	1,012,986
18"	215.12	1,936,997

For new customers connecting to the system, the MCE basis serves as a multiplier for any required capacity greater than that provided by a 3/4-inch meter. Under the EHU basis for services of 1.5-inch or greater, the charge could be calculated based on the number of EHUs, defined as 202 gpd per EHU, multiplied by $3,634 (see **Table 16**).

COMPARISONS AND RECOMMENDATION

Table 18 shows how CRW's existing and proposed 3/4-inch by 3/4-inch water SDCs compare with SDCs adopted by other water utilities in the region. It should be noted, the comparisons include local and regional charges. Specifically, the cities of West Linn and Oregon City include South Fork Water Board's SDC. Based on these comparisons, the characteristics of the District, and this report's resulting calculations for both the MCE and EHU basis for SDCs, it is recommended that the MCE methodology be adopted for all meter sizes as presented in **Table 17**.

Table 18. Regional Comparisons



SDC IMPLEMENTATION

The SDCs calculated in this report represent our opinion of the maximum water SDCs that CRW can legally charge. CRW is under no legal obligation to impose the full, calculated SDC. However, CRW should be aware that any discounting or phase-in period that reduces SDC revenue will, other things being equal, increase the funding requirement from other resources.

CREDITS

A credit is a reduction in the amount of the SDC for a specific development. ORS 223.304 requires that SDC credits be issued for the construction of a qualified public improvement which is: required as a condition of development approval; identified in CRW's adopted SDC project list; and either "not located on or contiguous to property that is the subject of development approval," or located "on or contiguous to such property and is required to be built larger or with greater capacity than is necessary for the particular development project . . ."

Additionally, a credit must be granted "only for the cost of that portion of an improvement which exceeds the minimum standard facility size or capacity needed to serve" the particular project up to the amount of the improvement fee. For multi-phase projects, any "excess credit may be applied against SDCs that accrue in subsequent phases of the original development project."

ORS 223.304 authorizes agencies to grant credits beyond the minimum requirements stated above.

INDEXING

Oregon law (ORS 223.304) also 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 these;
>
> (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.

It is recommended that CRW index its charges to the Engineering News Record Construction Cost Index for the City of Seattle and adjust its charges annually. There is no comparable Oregon-specific index.