

# City of Madras

## Wastewater System Development Charge Update

December 2018

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## I.A. INTRODUCTION

Oregon Revised Statutes (ORS) 223.297 to 223.314 authorize local governments to establish system development charges (SDCs). These are 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. In general, SDCs are calculated by adding together a reimbursement fee component and an improvement fee component, as defined by ORS 223.299.

**Reimbursement Fee:** A reimbursement fee 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.” 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.

**Improvement Fee:** An improvement fee is designed to recover “costs associated with capital improvements to be constructed.” 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.

**Compliance Cost Recovery:** ORS 223.307(5) also authorizes the expenditure of SDCs for “the costs of complying with the provisions of ORS 223.297 to 223.314, including the costs of developing system development charge methodologies and providing an annual accounting of system development charge expenditures.” To avoid spending monies for compliance that might otherwise have been spent on growth-related projects, this report includes an estimate of compliance costs in the SDC calculation.

Figure 1. SDC Equation

<b>Reimbursement Fee</b>		<b>Improvement Fee</b>				
Eligible costs of available capacity in existing facilities	+	Eligible costs of capacity-increasing capital improvements	+	Pro-rata share of costs of complying with Oregon SDC law	=	SDC per MCE
Units of growth (MCEs)		Units of growth (MCEs)				

## I.B. CUSTOMER BASE

In order to calculate an SDC component, a numerator and a denominator must be developed. This section focuses on the denominator (i.e. the customer base). The denominator represents growth that can be served once the capital improvement plan has been executed. In other words, future customers. For the City of Madras wastewater service, the denominator will be developed in two steps:

- Determine future treatment plant capacity in million gallons per day (mgd). [Both the North and South treatment plants are included to determine total system capacity.]
- Calculate growth in mgd, from current, to treatment plant capacity.
- Convert million gallons per day into meter capacity equivalents. The City administers the SDC based on a customer’s meter size, which corresponds to meter capacity equivalents (MCEs) depending on the size of the meter.

### I.B.1. Capacity in Million Gallons per Day

After the execution of the capital plan identified in the utility’s comprehensive plan, the wastewater utility is expected to have 1.65 mgd in treatment capacity. After removing the estimated existing City customer flows as well as the contractual amount allotted to the corrections facility, 0.927 mgd of capacity remains for future customers that have not yet connected to the system. Neither the North Plant’s Phase 2 and 3 capacities (nor costs) are incorporated into this SDC.

**Figure 2. Future Capacity in mgd**

Future Capacity in Million Gallons per Day (mgd)	
Future Capacity (mgd)	
South Plant	1.150
North Plant	0.500
Total Future Capacity	<u>1.650</u>
Total Capacity with New CIP (mgd)	1.650
Less Existing Flows	(0.493)
Less Amount Reserved for Department of Corrections	<u>(0.230)</u>
Net Total Capacity for Future Growth	0.927

### I.B.2. Capacity in Meter Capacity Equivalents (MCEs)

Now that the flow-related capacity has been determined, it must be converted into MCEs so that the charge calculation can align with how it is administered. To do this, the existing flows of 0.493 mgd will be compared to existing meter capacity equivalents within the utility. That will provide an estimate of mgd per MCE.

The City currently has 2,023 meters in the wastewater utility, comprised of customers served by two water systems—the City’s water system and the Deschutes Valley Water District (DVWD). The six-

inch meter serves the Department of Correction’s Deer Ridge facility and is therefore excluded since the facilities entire contracted amount of 0.23 mgd has already been deducted from future capacity in **Figure 2** above.

Based on meter capacity equivalent ratios drawn from the American Water Works Association (AWWA) M1 Manual, each meter size has a corresponding number of meter capacity equivalents. Each number is based on the maximum safe flow capacity in gallons per minute, relative to a base 5/8 x 3/4-inch meter. By multiplying the MCE ratio and the number of meters in each size, 2,023 meters equates to 3,074 meter capacity equivalents.

**Figure 3. Meters & Meter Capacity Equivalents**

Meter Size	Meters in City Water System	Meters in DVWD Water System	Less: Department of Corrections	Total Meter Count	Meter Capacity Equivalent (MCE)	Number of MCEs
5/8"	883	935	-	1,818	1.00	1,818
1"	40	39	-	79	2.50	198
1.5"	16	1	-	17	5.00	85
2"	44	57	-	101	8.00	808
3"	3	3	-	6	17.50	105
4"	-	2	-	2	30.00	60
5"	-	-	-	-	62.50	-
6"	-	1	(1)	-	90.00	-
<b>Total</b>	<b>986</b>	<b>1,038</b>	<b>(1)</b>	<b>2,023</b>		<b>3,074</b>

By comparing existing flows with existing meter capacity equivalents, **Figure 4** shows that one MCE is equal to 0.000160 million gallons per day (0.493 mgd ÷ 3,074 MCEs). Additionally, it is estimated that 0.927 mgd of capacity will be available for new customers once the capital plan has been executed (as shown in **Figure 2**). By dividing 0.927 mgd by 0.000160, an additional 5,779 MCEs can be served by the new capacity.

**Figure 4. Future MCEs Able to be Served**

Meter Capacity Equivalents Served by Plant Expansion		
Existing Flows (mgd)	A	0.493
Existing MCEs	B	3,074
MGD per MCE	$C = A \div B$	0.000160
Capacity for Growth (mgd)	D	0.927
MGD per MCE	C	0.000160
Capacity for Growth MCEs	$E = D \div C$	<b>5,779</b>

### I.C. REIMBURSEMENT FEE

The reimbursement fee’s numerator is based on the original cost of the existing system’s “unused capacity available to future system users.” As shown in **Figure 5**, there is approximately 30% remaining capacity for future customers. The remaining 70% is assumed to be utilized by existing customers plus the capacity contractually reserved for the Deer Ridge facility.

**Figure 5. Remaining Capacity in Existing Facilities**

Treatment Plant Analysis		Existing Flows / Capacity
Peak Month Flows (mgd)		
Prison (contract capacity)		0.230
All Others (2016-17 Actuals)		0.493
Total Existing Flows + Contract Capacity		0.723
Existing Capacity (mgd)		
South Plant		0.540
North Plant		0.500
Total Capacity		1.040
<b>% Remaining Capacity</b>		<b>30%</b>

The total original cost of existing assets in the wastewater utility totals \$32.4 million, with \$10.7 million of that estimated to have been funded with grants. The remaining \$21.7 million is assumed to be funded with utility resources. **Figure 6** shows that 30% of the utility-funded assets results in \$6,624,457, which is eligible to be included in the reimbursement fee.

**Figure 6. Net Reimbursement Cost Basis**

Reimbursement Cost Basis					
Asset Category	Original Cost	Grants	Original Cost less Grants	% Available Capacity	Reimbursement Cost Fee Basis
Treatment	\$ 27,909,455	\$ 9,195,436	\$ 18,714,020	30%	\$ 5,704,177
Collection	\$ 2,163,660	\$ 915,107	\$ 1,248,553	30%	\$ 380,569
General	\$ 2,360,881	\$ 590,220	\$ 1,770,661	30%	\$ 539,711
<b>Total</b>	<b>\$ 32,433,996</b>	<b>\$ 10,700,762</b>	<b>\$ 21,733,233</b>		<b>\$ 6,624,457</b>

The calculated reimbursement fee is shown in **Figure 7**, which totals \$586 after deducting unused reimbursement SDC fund balance and a pro-rata share of outstanding debt principal. Outstanding debt principal is deducted from the reimbursement fee cost basis because debt principal is paid for with ratepayer revenue. By deducting a pro-rata share of outstanding debt principal, the fee avoids double-charging for an asset included in the cost basis that may have been funded with debt.

**Figure 7. Reimbursement Fee**

Reimbursement Fee	
Cost of Net Unused Capacity	\$ 6,624,457
Less: Unused Reimbursement SDC Fund Balance	\$ (35,686)
Less: Pro-Rata Share of Debt Principal (growth related)	\$ (3,202,197)
Reimbursement Cost Basis	\$ 3,386,575
Estimated Capacity (MCEs)	5,779
<b>Reimbursement Fee:</b>	<b>\$586</b>

## I.D. Improvement Fee

This section summarizes the improvement fee cost basis and resulting fee. Planned project cost data was provided by City staff and the City’s consulting engineering firm. The wastewater utility’s 20-year capital improvement plan was evaluated to determine which projects (or portions thereof) provided additional capacity for future customers. The 20-year capital improvement plan identified \$111,630,000 in projects (in 2017 dollars). To determine the net eligible costs, two types of costs were excluded:

- Projects not expected to be funded by the utility: \$65,470,000
  - The bulk of the cost in this category consists of Phases 2 and 3 of the North Wastewater Treatment Plant and related collection system projects (e.g. North Area Parallel Sewer). These capacity expanding phases would only be constructed if a new, significant customer needed capacity. Per City direction, the cost share would be negotiated at that time. To be conservative, all of those costs are assumed to be ineligible at this time.
- Projects funded by the City utility that do not increase capacity: \$21,083,447
  - These projects are funded by the City’s wastewater utility, but do not provide additional capacity for future customers. An example of this type of project would be an 8” collection pipe replacing an existing 8” collection pipe. No additional capacity would be created.

Once these adjustments have been made, **\$25,076,553** can be incorporated into the improvement fee calculation. A detailed, project-by-project list can be seen in the appendix.

**Figure 8. Eligible Future Capital Costs**

Summary of Capital Plan (in December 2017 dollars)		
Total Capital	\$	111,630,000
Less: Projects not funded by utility		(65,470,000)
Cost potentially Eligible for SDC	\$	46,160,000
Less: Non-Capacity Expanding Share	\$	(21,083,447)
Capacity Expanding Costs Funded by City Utility	\$	25,076,553

The total of capacity expanding costs is further adjusted by the improvement SDC fund balance, resulting in a total eligible cost of \$24,839,089. With a denominator of 5,779 MCEs, the resulting improvement fee equals \$4,298.

**Figure 9. Improvement Fee Calculation**

Improvement Fee		
Capacity Expanding Projects	\$	25,076,553
Less: Unused Improvement SDC Fund Balance	\$	(237,464)
Improvement Fee Cost Basis	\$	24,839,089
Estimated Capacity (MCEs)		5,779
<b>Improvement Fee:</b>		<b>\$4,298</b>

## I.E. ADJUSTMENTS

ORS 223.307(5) authorizes the expenditure of SDCs on “the costs of complying with the provisions of ORS 223.297 to 223.314, including the costs of developing system development charge methodologies and providing an annual accounting of system development charge expenditures.” This SDC methodology assumes a compliance cost of 5.7 percent.

**Figure 10. Administrative Adjustment for Compliance**

<b>Administrative Cost Recovery</b>							
Net Annual Administrative Cost related to Wastewater SDC	\$ 2,000						
Amortization of SDC Study Cost over 5 years (1):	<u>2,310</u>						
Net Annual SDC Administrative Cost:	\$ 4,310						
Projected Annual Number of New Connections	15.44						
Annual Administrative Cost per Connection	\$ 279						
Estimated Annual Proposed SDC Revenues before Admin. Cost	\$ 75,431						
<b>Admin. Cost / Total Annual SDC Revenues:</b>	<b>5.7%</b>						
<b>NOTES:</b>							
(1)	Cost of: <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: right;">\$</td> <td style="text-align: center;">10,000</td> </tr> <tr> <td style="text-align: right;">at:</td> <td style="text-align: center;">5.0%</td> </tr> <tr> <td style="text-align: right;">over:</td> <td style="text-align: center;">5</td> </tr> </table> (Cost of FCS GROUP study) years	\$	10,000	at:	5.0%	over:	5
\$	10,000						
at:	5.0%						
over:	5						

The administrative adjustment is incorporated into the SDC by adding the \$279 shown in Figure 10 to the reimbursement and improvement fees. The combined SDC totals \$5,163, which is a decrease of \$126 from the existing SDC of \$5,289 (Figure 11).

**Figure 11. Total System Development Charge**

<b>Total System Development Charge</b>		
Reimbursement Fee	\$586	
Improvement Fee	<u>\$4,298</u>	
SDC Subtotal	\$4,884	
plus: Administrative Cost Recovery	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;"><b>5.7%</b></td> </tr> </table> \$279	<b>5.7%</b>
<b>5.7%</b>		
<b>TOTAL WASTEWATER SDC</b>	<b>\$5,163</b>	
Existing SDC per MCE	\$5,289	
Change (%) - Calculated from Existing SDC	-2%	
Change (\$) - Calculated from Existing SDC	( <b>\$126</b> )	



## I.F. SUMMARY

SDCs are one-time fees imposed on new and increased development to recover the cost of system facilities needed to serve that growth. As discussed previously, an SDC can include three components: a reimbursement fee, an improvement fee, and a component for compliance cost recovery. The total calculated SDC is shown in **Figure 12**. For a basic 5/8 x 3/4 meter, the calculated SDC would be \$5,163 instead of the existing SDC of \$5,289.

**Figure 12. SDC Schedule by Meter Size**

Wastewater SDC Fee Schedule			
Meter Size	MCEs per Size	Existing	Calculated
5/8"	1.00	\$5,289	\$5,163
1"	2.50	\$13,223	\$12,908
1.5"	5.00	\$26,445	\$25,815
2"	8.00	\$42,312	\$41,305
3"	17.50	\$92,558	\$90,354
4"	30.00	\$158,670	\$154,892
5"	62.50	\$330,563	\$322,692
6"	90.00	\$476,010	\$464,677

The City's existing methodology assigns 0.71 MCEs per Multiple Family Residence unit and 0.74 MCEs per Lodging Facility unit (e.g., hotels/motels). However, based on a recent analysis performed by City staff, hotels/motels should be assigned 0.52 MCEs per unit rather than 0.74 MCEs. The following fee schedule would apply to lodging facilities.

**Figure 13. SDC Fee Schedules for Lodging Facilities**

Wastewater SDC Fee Schedule			
	Assumed MCE per Unit	SDC per 1.0 MCE	Total SDC per Unit
Lodging Facility per Unit (i.e. Hotel, Motel)	0.52	\$5,163	\$2,685

Additionally, City staff would like to begin administering SDCs for Multiple Family Residences based on the meter size schedule as shown in **Figure 12**, rather than per dwelling unit.

## I.G. INDEXING

Oregon law (ORS 223.304) also allows for the periodic indexing of system development charges 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.”

We recommend that the City index its charges to the Engineering News Record 20-City Average Construction Cost Index, and adjust the charges annually as per that index. There is no comparable Oregon-specific index.

## I.H. APPENDIX

## Existing Assets Used for Reimbursement Fee

Existing Fixed Asset List			
Asset Number	Description	Classification	Cost
1013	System	Treatment	\$ 2,777,059
1014	Buildings	Treatment	\$ 180,370
1043	Sewer Improvements	Collection	\$ 42,952
1046	Sewer Improvements	Treatment	\$ 535,603
1053	Sewer lagoon	Treatment	\$ 36,709
1078	Sewer plant expansion	Treatment	\$ 107,333
1079	Sewer Treatment	Treatment	\$ 3,453,308
1080	Sewer plant expansion	Treatment	\$ 622,811
1102	Sewer Treatment	Treatment	\$ 361,864
1117	Sewer Treatment	Treatment	\$ 109,885
1121	Treatment & collection	Treatment	\$ 1,207,127
1133	Phase B treatment	Treatment	\$ 46,612
1134	Buff line	Collection	\$ 20,031
1142	WWTP	Treatment	\$ 436,251
1143	Effluent disposal	Treatment	\$ 160,853
1151	System improvement	Treatment	\$ 104,171
1152	Sewer Treatment	Treatment	\$ 7,061,454
1161	Zemke	General	\$ 1,278,551
1167	South WWTP	Treatment	\$ 461,003
1170	System expansion	Collection	\$ 104,288
1175	Aqua Tec 80,000 lbs	General	\$ 200,000
1178	RV Disposal	Collection	\$ 11,117
1179	South WWTP	Treatment	\$ 1,156,420
1185	Chestnut St. Phase I & 2	Collection	\$ 61,117
1186	North Y relocate	Collection	\$ 137,829
1210	NE 10th and Chesnut	Collection	\$ 239,393
1211	Lee Street Extension	Collection	\$ 44,438
1221	J Street up size- done 08	Collection	\$ 37,270
1222	J street sewer - DOC - done 08	Collection	\$ 218,945
1254	HB Development Sewer Line	Collection	\$ 22,275
1255	Plum Street	Collection	\$ 12,810
1277	Lift Station generator Rep.	Collection	\$ 20,494
1278	Effluent storage/disposal (In svc FY09)	Treatment	\$ 454,783
1279	Chestnut St. Sewer	Collection	\$ 27,686
1284	Effluent storage/disposal (In svc FY09)	Treatment	\$ 11,670
1285	Effluent storage/disposal (In svc FY09)	Treatment	\$ 8,051,926
1296	Bioxide Facility	Treatment	\$ 62,865
1302	Sludge Truck-Freightliner	General	\$ 200,668
1303	Spreader Truck-Freightliner	General	\$ 188,738
1308	Effluent storage/disposal (In svc FY09)	Treatment	\$ 240,478
1313	Service Truck-International 7400	General	\$ 170,291
1314	Sewer Lines at Butler Hangar	Collection	\$ 101,912
1321	North Y Sewer Collector	Collection	\$ 32,764
1327	SWWTP Equipment Storage Building	Treatment	\$ 174,403
1329	Jefferson Street Sewer 2009-03	Collection	\$ 170,049
1337	Effluent Storage & Disposal Land	General	\$ 322,633
1339	NWWTP Emergency Efficiency Program	Treatment	\$ 79,240
1345	Bean Drive Sewer Extension	Collection	\$ 21,211
1350	North Madras Sewer Collector	Collection	\$ 701,044
1351	Pumps for B Street Lift Station	Collection	\$ 65,441
1358	North Plant Thickener Controls	Treatment	\$ 15,257
1380	Cornell Dry Pit Pump	Collection	\$ 35,943
1395	N. Plant Lift Station Pump	Collection	\$ 34,651
<b>Total</b>			<b>\$ 32,433,996</b>

## Capital Project Costs, Funding Source, and Before/After Capacity

Improvement Fee Cost Basis							
Project Name	Total Cost	Estimated Timing of Project (Years)	Funding Source	Current Capacity	Future Capacity	Eligible Portion	Eligible Cost
<b>Gravity Sewers</b>							
Mountain View / Sky Ridge Sewer Extensions	\$ 1,175,000	0-5	City Utility Fund	0.00	8.00	100%	\$ 1,175,000
Jefferson Street / North Unit	\$ 555,000	0-5	City Utility Fund	0.00	8.00	100%	\$ 555,000
Bel Air / Herzberg Heights -- Grant Funded	\$ 500,000	0-5	CIAC	0.00	8.00	100%	\$ -
Bel Air / Herzberg Heights	\$ 655,000	0-5	City Utility Fund	0.00	8.00	100%	\$ 655,000
Hess Street Sewer	\$ 350,000	6-10	City Utility Fund	0.00	8.00	100%	\$ 350,000
Mill Street Sewer	\$ 300,000	6-10	City Utility Fund	0.00	8.00	100%	\$ 300,000
North Y Sewer Replacement	\$ 880,000	11-15	City Utility Fund	8.00	12.00	56%	\$ 488,889
Culver Hwy, Parallel Sewer	\$ 760,000	11-15	City Utility Fund	0.00	10.00	100%	\$ 760,000
Juniper Heights Sewer Extension	\$ 1,400,000	16-20	City Utility Fund	0.00	8.00	100%	\$ 1,400,000
Willow Creek North Sewer Extension	\$ 565,000	16-20	City Utility Fund	0.00	8.00	100%	\$ 565,000
Eldorado Estates/The Ridge Sewer Extension Project	\$ 100,000	0-5	City Utility Fund	0.00	8.00	100%	\$ 100,000
<b>Potential Sewers for Major Industrial Park Users</b>							
North Area Parallel Sewer -- Airport Way	\$ 940,000	Developer Dependent					
<b>Pump Stations</b>							
Influent Screen at "B" Street North PS -- No expansion	\$ 465,000	0-5	City Utility Fund	1.11	1.11	0%	\$ -
Golf Course PS Replacement -- Expanded Capacity	\$ 490,000	6-10	City Utility Fund	17.00	213.00	92%	\$ 450,892
"B" Street North PS Renovation -- No expansion	\$ 610,000	11-15	City Utility Fund	1.11	1.11	0%	\$ -
"B" Street North & South Generator Set Replacement	\$ 245,000	11-15	City Utility Fund	0.00	0.00	0%	\$ -
South U.S. 97 PS Renovation -- No Expansion	\$ 60,000	11-15	City Utility Fund	0.06	0.06	0%	\$ -
"B" Street South PS Expansion & Renovation	\$ 730,000	16-20	City Utility Fund	1.33	2.66	50%	\$ 365,000
Demers PS Replacement -- Expanded Capacity	\$ 1,790,000	Developer Dependent					
Demers Force Main Replacement -- 8" Pipe	\$ 1,585,000	Developer Dependent					
Airport Area PS and Force Main	\$ 2,340,000	Developer Dependent					
<b>WWTPs &amp; Effluent Recycling</b>							
NWWTP Phase 1A Improvements	\$ -	0-5	City Utility Fund	0.50	0.50	0%	\$ -
Alternate NWWTP Phase 1A Improvements	\$ 1,355,000	0-5	City Utility Fund	0.50	0.50	0%	\$ -
SWWTP Biosolids Thickening System	\$ 1,255,000	0-5	City Utility Fund	0.54	0.65	17%	\$ 212,385
SWWTP Phase 1 Expansion/Renovation	\$ 1,245,000	6-10	City Utility Fund	0.54	0.65	17%	\$ 210,692
SWWTP Irrigation System Expansion	\$ 515,000	6-10	City Utility Fund	0.00	0.65	100%	\$ 515,000
NWWTP Phase 1B Improvements	\$ 8,210,000	11-15	City Utility Fund	0.50	0.50	0%	\$ -
NWWTP Phase 1 Land Acquisition & Irrigation System	\$ 1,600,000	11-15	City Utility Fund	0.50	0.50	0%	\$ -
SWWTP Phase 2 Expansion and Renovation	\$ 10,025,000	16-20	City Utility Fund	0.65	1.15	43%	\$ 4,358,696
SWWTP Phase 2 Effluent Storage Expansion	\$ 9,200,000	16-20	City Utility Fund	0.00	0.50	100%	\$ 9,200,000
SWWTP Phase 2 Farmland Acquisition & Irrigation System	\$ 3,415,000	16-20	City Utility Fund	0.00	0.50	100%	\$ 3,415,000
NWWTP Phase 2 Treatment Module w/aerated lagoons	\$ 10,685,000	Developer Dependent					
NWWTP Phase 2 Effluent Storage Pond	\$ 12,535,000	Developer Dependent					
NWWTP Phase 2 Farmland Acquisition & Irrigation System	\$ 4,695,000	Developer Dependent					
NWWTP Phase 3 Treatment Module w/aerated lagoons	\$ 12,490,000	Developer Dependent					
NWWTP Phase 3 Effluent Storage Pond	\$ 12,535,000	Developer Dependent					
NWWTP Phase 3 Farmland Acquisition & Irrigation System	\$ 5,375,000	Developer Dependent					
<b>Total</b>	<b>\$ 111,630,000</b>						<b>\$ 25,076,553</b>

CIAC means contributions in aid of construction—essentially NOT funded with Utility resources—be it grants or developer funded.

Current and Future capacity notes:

- Gravity sewer: size of pipe in inches
- Pump Stations: million gallons per day (mgd)
  - Golf Course PS Replacement project: Dwelling Units served before and after (17, 213 respectively)
- WWTP and Effluent Recycling: million gallons per day (mgd)

## Existing System Flows (0.493 mgd)

Data from Harper Houf Peterson Righellis Inc. in May 2018.

Summary of Flow Data - North & South Combined (MGD)

2017		Flow Unit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mar-Oct w/o Aug	
Total Avg Flow		(MGD)	0.616	0.589	0.569	0.569	0.558	0.573	0.586	0.627	0.587	0.582	0.570	0.588	0.575	
Avg Prison Flow		(MGD)	0.081	0.083	0.079	0.082	0.072	0.072	0.072	0.076	0.071	0.070	0.074	0.086	0.074	
Net Flow w/o Prison		(MGD)	0.536	0.506	0.489	0.487	0.486	0.501	0.514	0.552	0.515	0.512	0.496	0.502	0.501	
2016		Flow Unit	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mar-Oct w/o Sept	
Total Avg Flow		(MGD)	0.526	0.523	0.518	0.526	0.557	0.555	0.560	0.549	0.503	0.555	0.538	0.576	0.546	
Avg Prison Flow		(MGD)	0.047	0.059	0.058	0.059	0.062	0.062	0.063	0.062	0.061	0.061	ND <sup>(4)</sup>	ND <sup>(4)</sup>	0.061	
Net Flow w/o Prison		(MGD)	0.478	0.464	0.460	0.467	0.495	0.493	0.497	0.487	0.442	0.494	---	---	0.485	
2016-17 Net Flow		(MGD)	0.507	0.485	0.475	0.477	0.490	0.497	0.505	0.519	0.479	0.503			0.493	
															Net Flow Per MCE (MGD)	0.000160
															(gpd)	160

- Notes:
1. Exclude Winter months due to inflow from snowmelt (particularly high during winter of 2016-17)
  2. Exclude August 2017 due to unusually high flows from visitors for eclipse.
  3. Exclude September 2016 due to flow instrument failure.
  4. No prison flow data available for November-December 2016.
  5. Total MCE = 3,074

## ODOC Contract Capacity (0.23 mgd)

Data from Harper Houf Peterson Righellis INC. in 2017.

### **WASTEWATER MASTER PLAN UPDATE**

### **CITY OF MADRAS**

The plant headworks consist of influent screening and grit removal processes. The screenings and grit removed by these processes are disposed of at a landfill. The SBR process is an activated-sludge system that provides biological treatment. The filters remove suspended solids to reduce chlorine demand and prevent fouling of irrigation components. Because the City does not need to produce Class A effluent, chemicals are not added upstream of the filters to increase solids removal.

The SWWTP was designed to ultimately have three 0.5-MGD SBR modules and two of those modules have been built. But when the second module was added, the plant design was modified to treat more-highly concentrated WW from the prison. The design WW strength for the prison is three times the design strength for the City. As a result, the expansion increased the capacity to treat a higher organic loading, but did not significantly increase the flow capacity. Now the two SBR modules have a 0.54-MGD average design flow capacity rather than a 1.0-MGD capacity.

The agreement between the City and the ODOC stipulates that an average flow capacity of 0.23 MGD at the SWWTP is dedicated to serving the prison. Although the prison is not fully occupied, this study assumes it will be contributing the maximum allowed flow within five years to avoid reliance on capacity that is dedicated to the prison. This currently leaves the City with an available capacity of 0.31 MGD at the SWWTP.

## North Plant Existing Design Capacity (0.50 mgd)

Data from Harper Houf Peterson Righellis INC. in 2017.

<b>Table 2-3 Existing NWWTP Design Parameters and Components</b>	
<b>1. Plant Influent Design Parameters</b>	
Average Daily Flow:	0.50 MGD
Peak Hourly Flow:	1.35 MGD
Design Average BOD <sub>5</sub> Concentration:	200 mg/L
Design Average TSS Concentration:	215 mg/L
<b>2. Biological (Oxidation) Process</b>	
Process:	Partially-Aerated/Facultative Lagoon System
Total System Surface Area & Volume:	28 acres & 50 MG
Average Organic Surface Loading Rate:	30 lbs. BOD <sub>5</sub> /acre/day
Primary Lagoon Aerators (each cell):	10 units @ 5.0 hp each (50 hp/cell)
<b>3. Clarification/Filtration Process</b>	
Process Capacity:	1.0 MGD Avg. Recycling Flow
Clarification Process:	Krofta SupraCell (SPC) Dissolved Air Flotation (DAF) Clarifier
Filtration Process (Not Used):	Krofta Sandfloat (SASF 20) Filter
<b>4. Disinfection Process</b>	
Disinfectant:	Sodium Hypochlorite Solution
Maximum Feed Rate:	170 gpd
<b>5. Effluent Storage Pond</b>	
Total Storage Volume:	79 MG
Design Storage Capacity:	Five Months @ 0.5 MGD Avg. Flow
<b>6. Intermediate Lift &amp; Effluent Irrigation Pumps</b>	
No. of Pumps:	Two (one intermediate & one effluent)
Design Pump Capacity:	700 gpm each
<b>7. Sludge Drying Beds</b>	
No. of Beds:	24
Bed Dimensions:	24 ft. x 100 ft. x 12 in. Deep (each)

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## South Plant Existing Design Capacity (0.54 mgd)

Data from Harper Houf Peterson Righellis INC. in 2017.

<b>Table 2-4 Existing SWWTP Design Parameters and Components</b>	
<b>1. Plant Influent Design Parameters</b>	
Average Daily Flow:	0.54 MGD
Peak Hourly Flow:	1.33 MGD
Design Average BOD <sub>5</sub> Concentration:	465 mg/L
Design Average TSS Concentration:	465 mg/L
<b>2. Headworks</b>	
Influent Screening:	One Mechanically-Cleaned Fine Screen
Design Screen Capacity:	4.0 MGD
Grit Removal Process:	One Low-Energy Vortex Circular Chamber
Design Grit Removal Capacity:	2.5 MGD
<b>3. Biological (Oxidation) Process</b>	
Process:	SBR, Activated-Sludge System
No. of SBR Basins:	Two
Design Effluent BOD <sub>5</sub> Concentration:	10 mg/L
Design Organic Loading Rate:	0.5 lbs. BOD <sub>5</sub> /lb. MLSS @ 4,500 mg/L MLSS
Design Oxygen Requirements:	1.5 lbs. O <sub>2</sub> /lb. BOD <sub>5</sub> and 4.6 lbs. O <sub>2</sub> /lb. TKN
<b>4. Filter Process</b>	
Process:	Cloth-Media Disk Filter
Peak Process Capacity:	2.4 MGD
No. of Filter Disks:	Four
Design Effluent TSS Concentration:	5.0 mg/L
<b>5. Disinfection Process</b>	
Disinfectant:	Sodium Hypochlorite Solution
Maximum Feed Rate:	170 gpd
<b>6. Biosolids Handling</b>	
Stabilization Process:	Aerobic Digesters
No. of Digester Basins:	Three
Design Avg. Retention Time:	60 Days
Drying Process:	AC-Lined Sludge Drying Beds @ NWWTP
Biosolids Disposal:	Land Application of Class B Biosolids
<b>7. Storage Ponds</b>	
Lower Pond Volume:	25 MG (Onsite SBR Effluent Storage)
Upper Pond Volume:	88 MG (Remote Site)
Design Storage Capacity:	Five Months @ 0.54 MGD Avg. Flow
<b>8. Effluent Pumps</b>	
No. of Pumps:	Two
Design Pump Capacity:	1,050 gpm each

## Future South (1.15 mgd) and North Plant (0.50 mgd) Capacities

It is assumed that the South Plant will have a future capacity of 1.15 mgd once the plan is completed.

The evaluation assumes the SWWTP will be expanded in two phases as described in Chapter 5 to provide a design capacity of **1.15 MGD**. These SWWTP expansions would provide flexibility both in freeing up capacity at the NWWTP for industrial developments and accommodating gravity service to east-side developments in the Main Collection System. Plus, this would take advantage of the existing SWWTP design to accommodate such expansions resulting in capital savings relative to an entire new 0.5-MGD treatment facility at the NWWTP.

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UPDATED DRAFT-01/15/17

It is assumed that the North Plant will have a future capacity of 0.50 when the plan is completed—the same as the existing capacity. This does not include the Phase 2 or Phase 3, which are entirely excluded from the SDC calculation.

<b>B. North WWTP Upgrades</b>				
1. Phase 1 Retrofit to Maintain 0.5 MGD Capacity	10-12	0.50	<b>0.50</b>	\$10,180,000
2. Phase 2 Retrofit for 0.5 MGD Expansion (to 1.0 MGD)	(2)	0.50	1.00	\$10,740,000
3. Construct Effluent Storage for 0.5 MGD Expansion	(2)	0.50	1.00	\$12,137,000
4. Phase 3 — Construct 0.5-MGD Module (Expand to 1.5 MGD)	(2)	--	1.5	\$12,333,000
5. Effluent Storage Ponds for Expansion to 1.5 MGD	(2)	--	1.5	\$12,137,000