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September 14, 2023

SANITARY SEWER RATE STUDY

(DRAFT)

Prepared for:

The City of

Fair Grove

I. INTRODUCTION

The City of Fair Grove owns and maintains a sanitary sewer system serving the community that consists of approximately 115,430' of gravity sewer line, three lift stations, approximately 10,630' of force main, and a mechanical wastewater treatment plant. In order to operate and maintain the sanitary sewer system, the City charges users a fee to recoup expenses and allow wastewater to be transferred and properly treated prior to discharge to a tributary to Pomme De Terre River, which is classified as a losing stream. The intent of this study is to determine if current sewer charges are sufficient, and provide general guidance on what future rates may need to be. In order to review rates, it is necessary to look at the existing wastewater treatment plant (WWTP) capacity and system usage. A general summary of the system, assumed flows, and the contributing population is presented in the following sections:

II. EXISTING TREATMENT PLANT

Installed initially in the early 1990s, the City's wastewater treatment plant consisted of an influent pump station, an oxidation ditch, two clarifiers, one sludge holding tank, two polishing filters and an ultraviolet disinfection system.

The system was upgraded in 2009 with the most significant additions consisting of a second oxidation ditch, a second sludge holding tank, and a new UV system.

The following flow data was extracted from Discharge Monitoring Reports (DMRs) the City has submitted to DNR and illustrates the Daily Maximum and Monthly Average flow rates. Colored values indicate flow in excess of the MDNR permitted design flow rate for the WWTP of 400,000 gallons per day.

Table 1: Flow Rate to Treatment Plant

DATE	DAILY MAXIMUM FLOW RATE (GALLONS PER DAY)	MONTHLY AVERAGE FLOW RATE (GALLONS PER DAY)
5/31/2021	*982,000*	*523,000*
6/30/2021	*761,000*	368,0000
7/31/2021	*672,000*	*485,000*
8/31/2021	277,000	160,000
9/30/2021	137,000	85,000
10/31/2021	*825,000*	286,000
11/30/2021	*480,000*	246,000
12/31/2021	284,000	151,000
1/31/2022	*446,000*	289,000
2/28/2022	*2,183,000*	*749,000*

3/31/2022	*2,865,000*	*586,000*
4/30/2022	*924,000*	*649,000*
5/31/2022	*1,287,000*	*899,000*
6/30/2022	*747,000*	147,000
7/31/2022	112,000	69,000
8/31/2022	*529,000*	364,000
9/30/2022	*470,000*	271,000
10/31/2022	150,000	150,000
11/30/2022	*477,000*	174,000
12/31/2022	*707,000*	328,000
1/31/2023	*1,510,000*	*594,000*
2/28/2023	*572,000*	*406,000*
3/31/2023	*2,375,000*	*837,000*

As can be seen above, wastewater flow to the treatment plant is frequently recorded at levels in excess of the permitted design flow of 400,000 gallons per day based on flow records provided to us. This is believed to be due to Inflow and Infiltration (I&I) in the sewer collection system. I & I typically occurs through pipes and manholes that have flaws that allow stormwater to enter to the sewer system. The City has budgeted for I&I mitigation through repairs and line replacement and has previously investigated portions of the system. Substantial repairs are needed and the City is understood to be budgeting for key repairs and considering funding options to address system needs.

In contrast to the flow periods assumed to be the most impacted by I&I, presumably dry weather periods and flows likely reflect the loading on the system due to actual sewer use and what should be anticipated to occur with the reduction of I&I. Per the above information, during dry weather the WWTP may be operating closer to 250,000 gpd which is about 60% of the design capacity.

III. POPULATION PROJECTION

In a previous study, the projected growth rate was estimated to be 1% per year. The 2010 census population was indicated to be 1,393 and the projected 2020 population was 1,539. The actual 2020 census has the population at 1,582, or about 43 people more than predicted. Based on the census figures, the percentage growth from 2010 to 2020 was approximately 1.36% per year. The following table is based on that assumed annual percentage population growth.

Table 2: Past Population

YEAR	POPULATION
2010*	1,393
2015	1,487
2020*	1,582
2021	1,603
2022	1,625
2023	1,647

* US Census Data

Based on information provided by the City, there are currently (2023) 631 connections to the system. For a projected population of 1,647 there would be approximately 2.61 persons per connection. The table below shows projected population and corresponding number of connections for the next 10 years.

Table 3: Population Projections

YEAR	PROJECTED POPULATION	ESTIMATED CONNECTIONS
2024	1,669	639
2025	1,692	648
2026	1,715	657
2027	1,738	666
2028	1,762	675
2029	1,786	684
2030	1,810	693
2031	1,835	703
2032	1,860	713
2033	1885	722
2034	1911	733

Based on the above population projections, the current treatment plant should have sufficient capacity to effectively treat domestic wastewater generated by the City through 2034 assuming that the majority of I&I will be eliminated. From the current number of users, it appears that a may be possible to add over 500 users to the system depending on user types and if I&I is controlled.

IV. REVENUE VS. EXPENDITURES AT CURRENT RATE

Per information provided, the current sewer charges consist of a base rate of $22.80 per month plus a use or volume charge of $0.45 per 100 gallons of usage. From the 2022-2023 budget,

sewer collection revenues compared to number of users appears to reflect that the average billing per user is approximately $38.30.

$290,000 (Annual Collections) / 631 Users = $459.59 annually per user
$459.59 /12 months = $38.30 per month.

The average usage charge (volume charge) per user is estimated by removing the base charge from the assumed total user rate: $38.30 - $22.80 base rate = $15.50 use (volume) charge. Dividing $15.50 by the volume fee of $0.45 then multiplying by 100 gallons yields an estimated average usage per user of approximately 3,400 gallons per month. This is believed to a little lower, but comparable to other area cities though the volume billed is substantially less than that treated at the plant due to the high I & I.

The following items are from the 2022-2023 Budget, and are directly associated with the collection and treatment system expense:

• 20-61-6101 Engineering Fees – Sewer	$ 8,000
• 20-61-7101 Repairs & Maintenance	$65,500
• 20-61-7103 Inflow & Infiltration	$80,000
• 20-61-7105 Equipment Repairs	$12,000
• 20-61-9101 Capital Expenditures	$123,000
Total for 2022-2023 Budget	$288,500

Budgeted revenues for 2022-2023	$518,663.08
One-time ARPA fund	$154,265.00
Budgeted Revenue Less ARPA	$364,398.08
Budgeted Expenses	$518,663.08
2022-2023 Deficit W/O ARPA	($154,265.00)
Budgeted Revenue from Sewer Collections	$290,000
Number of User Connections	631
Average Monthly Charge per Connection	$38.30

Budgeted revenues from sources other than sewer collections and ARPA funds amounted to $74,398.08 for 2022-2023. This figure should remain relatively constant in upcoming years. For Sewer Collection revenues to fund the budget deficit (as-is) not considering the one-time ARPA payment, the sewer rate per customer per month would need to be raised to a fee of at least $58.67 which was estimated as follows:

$518,663.08-$364398.08 = $154,265
$154,265/631 users/12 = $20.37
$38.30 (existing rate) + $20.37 = $58.67

The above assumes other revenues remain at the same level. Any reduction in other revenues or decreases in users or usage would result in a higher rate being needed to balance the budget.

V. RECOMMENDED REPAIRS/REPLACEMENT

Treatment Plant:

As previously mentioned, the existing WWTP was installed initially in the early 1990s and was substantially upgraded in 2009.

Based on input from the operator and general assumptions, the following is a list of the equipment and components recommended for replacement over the next 10 years:

1. Replace tertiary filter media
2. Remove corrosion & replace coatings in filter
3. Replace filter controls
4. Replace sludge return pump & controls*
5. Replace influent pump station pumps
6. Replace influent screening
7. Replace flow measurement*
8. Replace malfunctioning VFDs in control room

**These items are included in the 2022-2023 budget.*

Estimated cost for the above items is $850,000.

Lift Stations

1. Lift station control improvements

Estimated cost for the above item is $34,500

Collection System

From the 2018 Facility Report, the total estimate for the collection system upgrade over the following 20 years was $687,500 for SSES and $2,539,460 for repairs, for a total of $3,326,960. The time frame for this rate study is 10 years. It would be logical to complete the SSES initially, then perform the repairs. Inflating the SSES cost at a rate of 3% per year for the last 5 years would increase the estimate to about $797,000. Assuming one half of the repairs could be

completed during the study period of 10 years, and similar inflation, the repair portion would be $1,472,000. The total for the collection system upgrade would then be $2,269,000.

Replacement Summary

WWTP Improvements	$ 850,000
Lift Station Improvements	$ 34,500
Collection System SSES & Rehab	$2,269,000
TOTAL	$3,153,500

Maintenance

The following maintenance items are generally from the June, 2021 CSE report, and are increased by 20% (rounded up) to account for inflation:

1. Influent Pump Station - $3,000
2. South Aeration Rotor - $360
3. North Aeration Rotor - $360
4. West Clarifier - $600
5. East Clarifier - $600
6. Sludge Return Lift Station - $600
7. Sand Filters - $1000
8. Rotors - $480
9. UV Disinfection System - $6,000
10. E-Lift Station - $600
11. Northview Lift Station - $600
12. CC Lift Station - $3,000

Total Maintenance Budget = $17,200 annually

Engineering

Anticipated Engineering services will consist generally of preparation of bid documents and bid assistance for system components to be replaced, preparation of bid documents and bid assistance for CCTV investigation and subsequent repairs, and meetings and reports associated with the recommended wastewater system improvements.
Estimated Annual Engineering Costs - $20,000

Summary

For the 10-year study period the total estimated expenditures are as follows:

Material & Equipment Repair/Replacement	$3,153,500
Maintenance	$ 172,000
Engineering	$ 200,000
Total	$3,525,500

Note that inflation has been factored into the total.

Expenditures other than the above Repair/Replace/Maintenance/Engineering (RRME) costs, according to the 2022-2023 budget, amount to $230,163. These expenditures are expected to increase at approximately the same rate as the estimated inflation rate of 3% per year. Annual expenditures over the 10-year period are estimated to be as follows:

Table 4: Estimates of Expenditures

YEAR	RMME EXPENDITURES	OTHER EXPENDITURES	TOTAL EXPENDITURES
2023	$307,530	$230,163	$537,693
2024	$316,757	$237,068	$553,825
2025	$326,261	$244,180	$570,441
2026	$336,047	$251,506	$587,553
2027	$346,128	$259,051	$605,179
2028	$356,514	$266,822	$623,336
2029	$367,208	$274,827	$642,035
2030	$378,224	$283,072	$661,296
2031	$389,572	$291,564	$681,136
2032	$401,259	$300,311	$701,570
TOTAL	**$3,525,500**	**$2,638564**	**$6,164,064**

The above expenditures are funded in part by sources other than sewer collections, such as impact fees, tap-in feres, fines & penalties, interest income and transfers from debt service fund. From the 2022-2023 budget these funds amounted to approximately $74,400 and has remained constant for the past few years. They are expected to remain fairly constant over the next several years. The following table shows annual expenses minus these funds, resulting in the cost of expenditures that must be funded by collections.

Table 5: Breakdown of Expenditure Estimates

YEAR	TOTAL EXPENDITURES	EXPENDITURES FUNDED BY SOURCES OTHER THAN COLLECTIONS	EXPENDITURES FUNDED BY COLLECTIONS
2023	$537,693	$74,400	$463,293
2024	$553,825	$74,400	$479,425
2025	$570,441	$74,400	$496,041
2026	$587,553	$74,400	$513,153
2027	$605,179	$74,400	$530,779
2028	$623,336	$74,400	$548,936
2029	$642,035	$74,400	$567,635
2030	$661,296	$74,400	$586,896
2031	$681,136	$74,400	$606,736
2032	$701,570	$74,400	$627,170

Many rate structures require a moderate increase in sewer rates every year. This way, the users become accustomed to the increase and are not faced with infrequent but substantial increases. Below is a table with suggested annual rates which, over the 10-year study period, will finance the described expenditures. The values take into consideration an approximate 3% inflation rate with the number of users each year corresponding to the values in the Population/Connections table above.

Table 6: Rate Estimates

YEAR	ESTIMATED EXPENDITURES TO BE FUNDED BY COLLECTIONS	PROJECTED NUMBER OF USERS	MONTHLY RATE PER USER
2023	$463,293	631	$61.19
2024	$479,425	639	$62.53
2025	$496,041	648	$63.80
2026	$513,153	657	$65.09
2027	$530,779	666	$66.42
2028	$548,936	675	$67.77
2029	$567,635	684	$69.16
2030	$586,896	693	$70.58
2031	$606,736	703	$71.93
2032	$627,170	713	$73.30

Although this is seemingly an excessive increase over the current rate, the suggested rate is estimated to be about 1.16% of the Median Household Income (MHI) which is similar (slightly lower) less than % of MHI of the 2018 rates. Funding agencies such as CDBG, MDNR and USDA often consider rates at or near 2% MHI as the threshold for providing grants and what is believed to be reasonable. For the current MHI of Fair Grove ($63,214), 2% of MHI would be $105.36 per month.

As previously stated, the average billed usage per connection is assumed to be approximately 3,400 gallons per month which is equivalent to about 43 gallons per person per day. That is considerably less than the 100 gallons per day per person design flow as recommended by DNR. Assuming that the usage remains at or near this level, the suggested breakdown of rates consisting of base charge and charge per gallons used would be approximately 60% Base Charge and 40% usage. Should the usage per capita increase, the revenue from collections will increase accordingly. The following table shows potential rates and the revenue generated for the current estimated 3,400 gallons of usage per month per user and revenues if the usage would increase to 5,000 gallons per month per user.

Table 7: Rate Breakdown and Revenue Estimates Based on Usage

YEAR	BASE CHARGE	USAGE CHARGE PER 100 GALLONS	REVENUE PER USER FOR USAGE OF 3,400 GALLONS/MONTH	REVENUE PER USER FOR USAGE OF 5,000 GALLONS/MONTH
2023	$36.71	$0.72	$61.19	$72.71
2024	$37.37	$0.74	$62.53	$74.37
2025	$38.30	$0.75	$63.80	$75.80
2026	$38.91	$0.77	$65.09	$77.41
2027	$39.90	$0.78	$66.42	$78.90
2028	$40.57	$0.80	$67.77	$80.57
2029	$41.62	$0.81	$69.16	$82.12
2030	$42.36	$0.83	$70.58	$83.86
2031	$43.03	$0.85	$71.93	$85.53
2032	$44.06	$0.86	$73.30	$87.06

VI. CONCLUSION

The above rates are based on information taken from several sources, including the City of Fair Grove budget provided to us, the previous Facility Plan Report, and Budget Projections by Clean Stream Enterprise, LLC, among others. Assumptions were made relating to population projections, inflation rates, and individual water use. It is highly recommended that expenditures vs. revenues be reviewed frequently and adjustments made as necessary. MDNR suggests an annual review of rates and adjustments as needed to ensure adequate funds are available to operate and maintain the water system. Initially, a rate of closer to $63 is believed to be needed to fund the system. Five years from now, a rate closer to $70 may be required. The City may do annual increases or choose to do larger, but less frequent increases. As system usage changes and expenses are disclosed, the City should reassess rates and adjust to meet system financial needs.