

North of River Sanitary District No. 1

Sewer Capacity Fee Study



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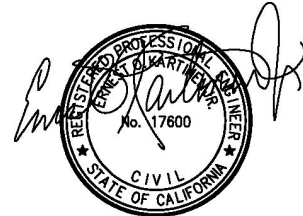
North of River Sanitary District No. 1

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SEWER CAPACITY FEE STUDY

SECTION I: INTRODUCTION

As developed in the District's Master Sewer Plan (MSP), dated February 2013, the average day sewage flow from the Study Area (the District's current Sphere of Influence [SOI]) will be approximately 30 MGD at build-out. Assuming a 2% growth rate as forecasted for Kern County by the State Department of Finance and a current average day flow of 5.5 MGD, it will take about 85 years for the sewage flow to reach 30 MGD.

Estimating population and sewage flow increases over the next 85 years is not reliable. However, since the MSP proposes construction of sewerage system improvements based on sewage flows, knowing the actual year in which a specific flow is reached is not necessary. Sewerage system improvements will be built as needed based on sewage flow increase.

The construction costs of the sewerage improvements will undoubtedly be different than the costs developed in the MSP. Some of the events which will likely affect construction cost include changes in:

- Inflation;
- Regulatory requirements;
- Technology;
- Development patterns; and,
- Rate of increase in sewage flow.

The purpose of this Sewer Capacity Fee Study (SCFS) is to recommend a sewer capacity fee to be charged to new connections to the District's sewerage system to fund the improvements needed to serve growth. The MSP and SCFS describe sewerage system improvements in light of today's regulations, costs, and technology.

It is to be expected that the actual improvements, the years in which they will be needed, and their construction costs will vary from what is stated in the MSP and this report. In light of these facts, this document, and the MSP, should be reviewed every few years and revisions made to the documents to reflect changed conditions.

The opinions of construction cost in the MSP are based on December 2012 dollars. Therefore, the sewer capacity fee recommended in this report should be reviewed every year.

SECTION II: CITY OF SHAFTER'S AND CSA71'S CAPACITY RIGHTS

A Joint Powers Agreement (JPA), dated February 6, 1991, was entered into by:

- NORSD;
- Kern County (CSA-71); and,
- City of Shafter.

As of January 2013, the City of Shafter has capacity rights in the existing Outfall Sewer, WWTP, and effluent disposal ponds. **Table 1** summarizes those rights.

Table 1
City of Shafter Capacity Rights in Existing Facilities

Existing Facility	Reach	Capacity Right Average Day Flows
Outfall Sewer	7 th Standard Road Outfall Santa Fe Way to WWTP	3 MGD
WWTP		1.83 MGD
Effluent Storage Ponds		1.83 MGD

Under terms of the JPA, Shafter has the right to purchase additional capacity in any of the facilities mentioned in **Table 1**. The terms of purchase shall be negotiated by NORSD and Shafter.

The existing trickling filter treatment plant is currently permitted to treat 7.5 MGD, provided that Provision No. 26 of the WDR pertaining to Effluent Nitrogen Limitation is met.

The City of Shafter currently owns 1.83 MGD of the WWTP's (and effluent disposal facility's) capacities. Shafter has agreed to participate in the costs to buy an additional 0.67 MGD of capacity bringing their total capacity share to 2.5 MGD. NORSD's share of existing WWTP and effluent disposal facilities would be 5.0 MGD.

With respect to CSA-71 the JPA states,.....*County shall be permitted to use wastewater treatment plant capacity upon payment of a Connection Fee (Sewer Capacity Fee) as each sewer user in CSA-71 is connected to the public sewer herein described (the Outfall Sewer). The connection fees to be paid to NORSD shall be in the same amount as NORSD charges to equivalent sewer users in its own District for the purchase of capacity in the wastewater treatment plant and disposal facilities which are the subject of this JPA.*

SECTION III: SUMMARY OF SEWERAGE IMPROVEMENTS DESCRIBED IN MSP

The sewerage improvements included in the MSP are briefly described as follows:

- A second trunk sewer (Parallel Trunk Sewer) will be built paralleling the existing Outfall Sewer extending from the site of the original wastewater treatment plant just west of Highway 99 and south of Olive Drive to the existing WWTP site on 7th Standard Road. The existing Outfall Sewer was built in 1991.
- Ten Interceptor sewers built on north/south alignments connecting to the new and/or existing Outfall Sewer, or both, will be needed eventually to serve CSA-71. Pump stations would be required on at least six of the interceptor sewers.

- The existing 7.5 MGD trickling filter plant will continue in service until its economic life ends. The trickling filter process does not remove nitrogen from the treated effluent. The Waste Discharge Requirements (WDR) adopted by the Regional Water Quality Control Board in 2009 requires that effluent that may reach the underlying groundwater have total nitrogen (TN) concentrations of not more than 10 mg/L. In order to continue to use the existing trickling filter plant, which is only about 12 years old, effluent storage ponds will have to be lined to minimize percolation of effluent into the groundwater.
- The four existing, unlined, effluent ponds will be lined in 2015 to meet the WDR nitrogen limitation requirement. In addition, a fifth lined, emergency storage pond and bypass from major treatment facilities around the trickling filter plant directly to the emergency pond would be built. This is needed because the existing WWTP has no redundancy. If it should be required to divert the plant influent around the plant, there is presently no place to which the influent can be diverted. The existing unlined effluent storage ponds each have a capacity of storing 3 MGD of effluent. About 1 MGD is believed to percolate to the groundwater. Lining the ponds, will reduce the existing pond's capacity to about 2 MGD of influent flow.
- As sewage flow into the WWTP approaches 7.5 MGD, the plant will be expanded. An activated sludge process will be used because it produces better quality effluent than the trickling filter process including the ability to reduce nitrogen concentration to less than the 10 mg/L concentration required in the WDR. In addition, a study prepared for the District in 2009 indicates that an activated sludge WWTP is less expensive than trickling filter WWTP. Additional effluent storage ponds will be needed as WWTP influent flow increases beyond the 8 MGD capacity of the four existing ponds after they are lined. The activated sludge plant will be expanded as needed because of increasing flow. Eventually, the trickling filter plant will be abandoned as it reaches the end of its useful life.

Table 2 was taken from the MSP and summarizes a preliminary schedule of construction projects and construction costs in December 2012 dollars. The California Construction Cost Index maintained by the State of California was 5768 in December 2012.

Table 2 includes the cost of Interceptor Sewers described in the MSP. The District, decided based on representations by land developers' representatives including the Home Builders' Association of Kern County, that the CSA-71 Interceptor Sewers, including their lift stations, would be constructed by the developers.

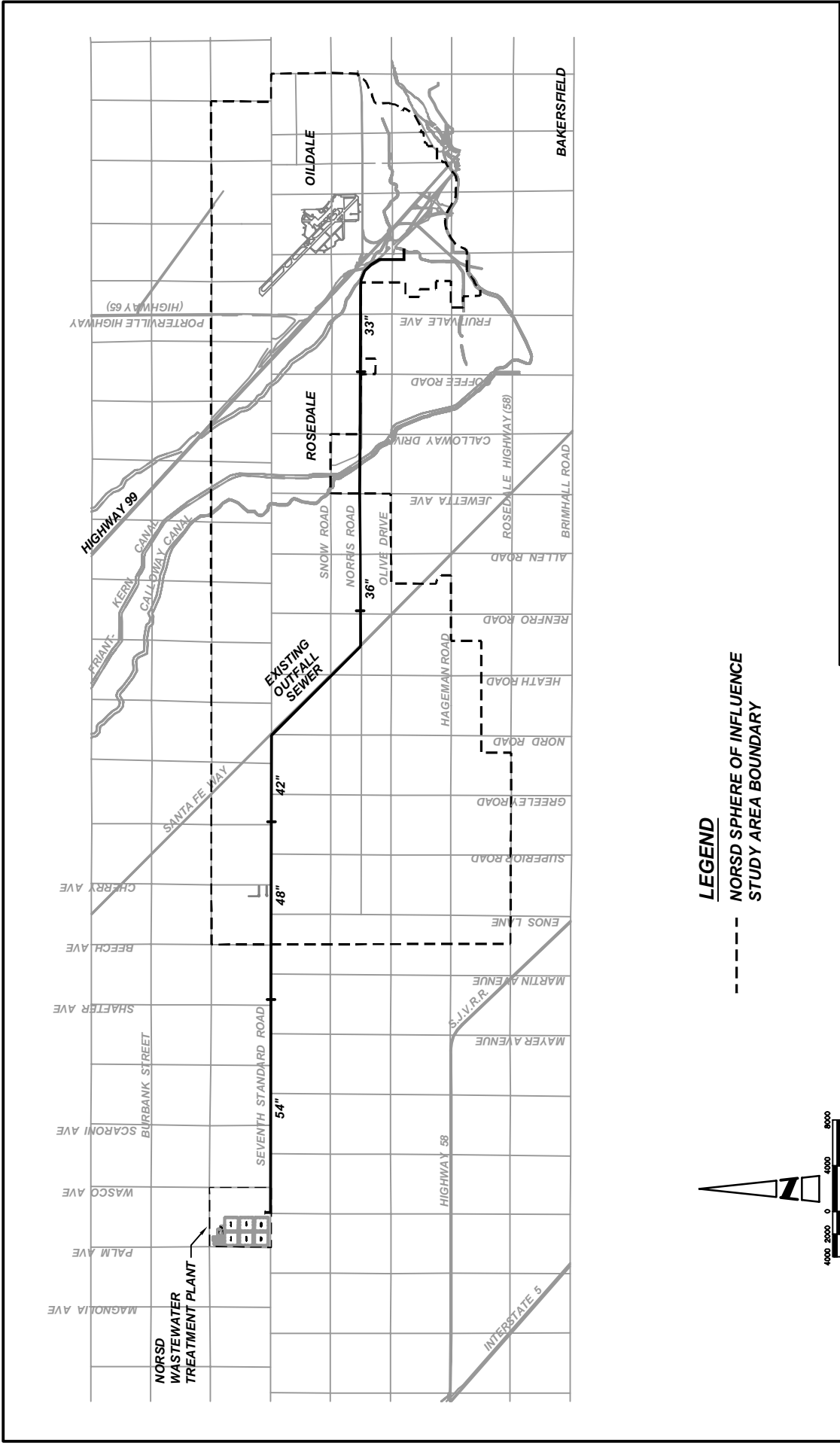
Therefore, the cost of the Interceptor Sewers will not be included in the calculations for the Sewer Capacity Fee discussed further on.

Figures 1 and 2 were taken from the MSP. **Figure 1** shows the District's Sphere of Influence boundary (Study Area) and the locations and alignments of the District's major sewerage facilities. **Figure 2** shows the existing Outfall Sewer, proposed Parallel Trunk Sewer, and the Interceptor Sewers.

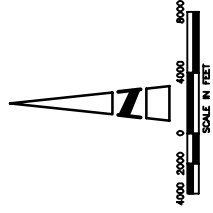
Table 2
Summary of Preliminary Construction Schedule and Project Construction Cost Opinions
(December 2012 Dollars)

YEAR	FLOW (MGD)	FACILITIES CONSTRUCTED	CONSTRUCTION COST OPINIONS (\$M)			
			TRUNK SEWERS	WWTP	EFFLUENT PONDS	TOTAL COST
2015	5.8	Line 4 existing ponds, construct emergency storage pond, and construct WWTP bypass facilities to emergency pond. WWTP capacity = 7.5 MGD.			18	18
2027	7.4	3 MGD activated sludge plant (ASP) + 1 lined effluent pond. WWTP capacity = 10.5 MGD with trickling filter plant [TFP].)		28	3	31
2037	9.0	Parallel Trunk Sewer (PTS) from beginning to Renfro Road and Norris Rd.	30			30
2042	10.0	Extend PTS to 7 th Std. Rd.	16			16
2044	10.4	6 MGD ASP expansion + purchase land for future ponds + 2 effluent ponds. (WWTP capacity = 16.5 MGD.)		47	12	59
2052 ¹	12.1	6 MGD ASP expansion + abandon existing TFP. (WWTP capacity = 15 MGD).		47		47
2053	12.4	Extend PTS to Shafter Ave.	30			30
2062	14.8	6 MGD ASP expansion + Oildale Trunk Sewers + 1 effluent pond. WWTP capacity = 21 MGD.	5	47	3	55
2068	16.7	PTS from Shafter Ave to WWTP	23			23
2071	17.7	3 MGD ASP expansion + 1 pond. WWTP capacity = 24 MGD		26	3	29
2079	20.7	3 MGD ASP expansion + 2 ponds. WWTP Capacity =27 MGD		26	6	32
2091	26.3	3 MGD ASP expansion + 1 pond. WWTP capacity = 30 MGD		26	3	29
TOTAL			104	247	48	399

1 The installation of a 6 MGD activated sludge plant and the abandonment of the trickling filter plant in 2052 will be funded by existing users.



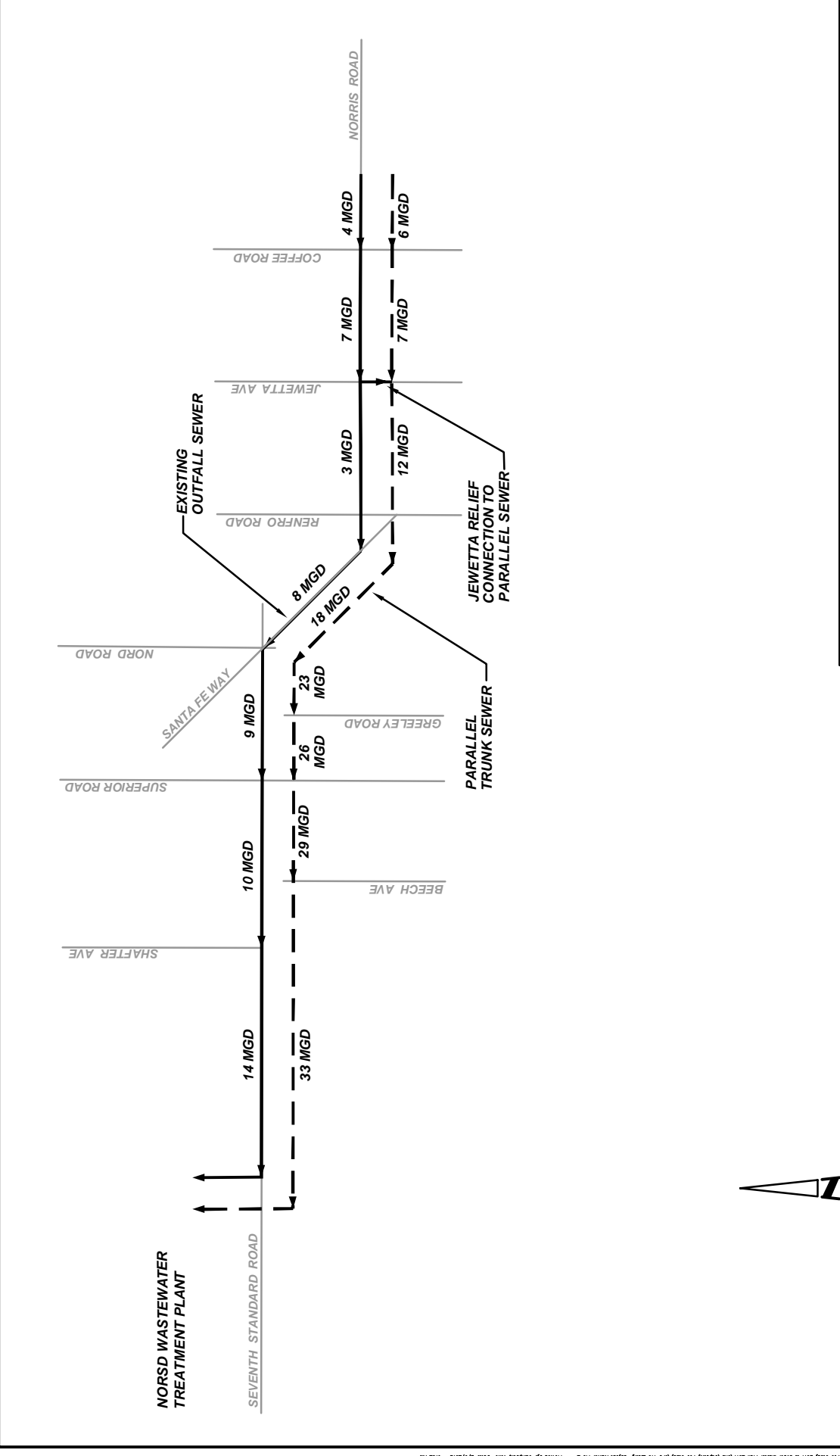
LEGEND
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 - - - - - STUDY AREA BOUNDARY



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**NORTH OF RIVER SANITARY DISTRICT NO. 1
 SEWER CAPACITY FEE STUDY**
STUDY AREA

AECOM PROJECT NO.
 60215271
 FIGURE
1

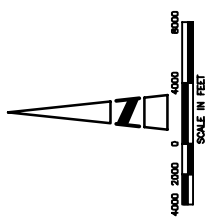


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**NORTH OF RIVER SANITARY DISTRICT NO. 1
 SEWER CAPACITY FEE STUDY
 PARALLEL SEWER
 ULTIMATE AVERAGE DAY FLOW**

AECOM PROJECT NO. 60215271

FIGURE **2**



SECTION IV: ESTIMATED NUMBER OF SFRE TO BE CONNECTED TO SEWERAGE SYSTEM

Table 3 was taken from the MSP and shows the current and future numbers of SFRE expected to be connected to the sewerage system by the time build-out is reached.

Table 3
NUMBER OF SFRE AT BUILD-OUT

Area	Current SFRE	Additional SFRE at Build-out	Total SFRE at Build-out
Oildale	13,849	12,200	26,049
CSA-71	3,211	59,800	63,011
Totals	17,060	72,000	89,060

As was noted in the MSP, "Oildale" refers to that part of NORSD's service area east of Highway 99 and "CSA-71" refers to that part of NORSD's service area west of Highway 99.

SECTION V: REPAYMENT OF BORROWED SEWER FUNDS

Several years ago, the District borrowed from the District's Reserve for Capital Outlay to pay operation and maintenance (O&M) costs. The Reserve for Capital Outlay is the repository for revenues from sewer capacity fees. Borrowing from the fund is acceptable provided that the borrowed funds are repaid.

The District borrowed a total of \$8.9M from the Reserve for Capital Outlay for the Fiscal Years (FY) 2000/01 through 2006/07. If the money had not been borrowed but had remained invested with the Kern County Treasurer, it would have increased to about \$11.5M in 2012. This figure was calculated using the County's interest earning rates for the years 2000 through 2012. The interest rates during that period varied from a high of about 7% to less than 1% per year and averaged about 3%.

The District will begin repaying the \$11.5M in 2013. The funds to repay the borrowed money will come from a component added to the sewer service charge which is collected by the County with property taxes. A charge of \$38 per SFRE will be added to the District's sewer service charge for 20 years. An interest rate of 3% per year is included in the \$38. The County earned an average of 3% on invested funds over the last 12 years or so. The District invests their reserves with the County.

This \$38 payment is shown in **Table 4**.

SECTION VI: PROPOSED SEWER CAPACITY FEE FOR ONE SFRE

Allocating costs of sewerage improvements needed to serve future sewage dischargers is typically done in terms of *Single Family Residential Equivalents* (SFRE), or a similar term. Flows (gallons per day [gpd]) and strength (Biochemical Oxygen Demand [BOD] and Total Suspended Solids [TSS]) of sewage discharges to a sewer vary considerably from sewer user to sewer user. SFRE is commonly used to calculate sewer capacity fees for new connections. A single family home is assigned a value of one SFRE

and the sewer capacity fee is expressed as cost per SFRE (\$/SFRE). Different SFRE values are assigned to different “classes” of sewer users based on their sewage flows and strengths and the \$/SFRE value is multiplied by the SFRE value to calculate the sewer capacity fee for different classes of new sewer connections.

In the MSP one SFRE was assumed to discharge:

- 300 gpd;
- 295 mg/L of BOD = 0.73 pounds per day and,
- 540 mg/L of TSS = 1.35 pounds per day.

These figures were taken from the *2009 Wastewater Treatment Alternatives Report* prepared for the District by AECOM and are based on WWTP operating data.

Table 4 shows how the proposed Sewer Capacity Fee for one SFRE was calculated. An extremely important objective adhered to in calculating the fee was to construct sewerage facilities on a “pay-as-you-go” basis. That is, no debt would be incurred to finance the improvements. Not only does debt financing increase the cost due to bond issuance costs and interest on the bonds, but the salability of bonds is dependent on an assured revenue stream sufficient to meet bond service requirements. Sewer capacity fee revenues do not meet this criterion. The housing market varies considerably from year to year. Recent history is an example. The District’s customers would be responsible to paying debt service obligations not paid by sewer capacity fee revenue.

Other assumptions upon which the Sewer Capacity Fee calculations were based are listed at the top of **Table 4**.

It may be noticed that **Table 2** shows improvements taking place until almost the 22nd century. That table was based on what facilities will be needed by the time build-out of the Study Area (see **Figure 1**) is reached. **Table 4** only addresses the facilities expected to be needed until 2044. If the assumptions upon which the MSP and this Sewer Capacity Fee Study (SCFS) are based prove correct, the WWTP will have been expanded to 16.5 MGD by 2044.

As shown in **Table 4**, it is proposed to levy a Sewer Capacity Fee of \$6,000 per SFRE beginning this year (2013) and increase the fee 4.25% annually. As shown in the table, when the expansion of the WWTP to 16.5 MGD is completed in 2044, there may be no money remaining in the sewer fund and another \$77M (in 2012 dollars) will be needed by 2052/53 as shown on **Table 4**.

SECTION VII: SEWER CAPACITY FEES FOR OTHER THAN SINGLE FAMILY HOMES

The sewer capacity fees for most new sewer connections can be expressed in terms of SFREs. The District's Ordinance No. 2000-01 specifies the equivalent SFREs for a number of different classes of sewer dischargers. (A copy of the ordinance is available for viewing at the office of the District.) Sewer capacity fees for new connections for which SFRE are included in the ordinance should be calculated by multiplying the SFRE for a particular new sewer connection by the sewer capacity fee for one SFRE.

For new sewer connections for which no SFRE is included in the District's ordinance, the sewer connection fee may be calculated based on the quantity (gpd) and quality (BOD, TSS, other). These connections not included in the District's ordinance will be addressed on a case by case basis.

SECTION VIII: CONCLUSIONS

As shown in **Table 4**, the capacity fee for 2013 is \$6,000 per SFRE. This capacity fee will be increased annually by 4.25%. The Sewer Capacity Fee Study will be revisited as deemed necessary by the District.

NORTH OF RIVER SANITARY DISTRICT
TABLE 4
SEWER CAPACITY FEE STUDY
CALCULATION OF SEWER CAPACITY FEES

YEAR	AVG. DAY FLOW (MGD)	NEW SFRE	TOTAL SFRE	SEWER SVRC. CHG. (\$/SFRE)	SEWER CAP. FEE (\$/SFRE)	2012 TRUNK SEWER CONST. COST (\$M)	2012 WWTP TREATMENT CONST. COST (\$M)	2012 WWTP POND CONST. COST (\$M)	2012 WWTP CONST. COST (\$M)	FUTURE ADL. CONST. COST (\$M)	SHAFTER SHARE (1/3)	NORSRD SHARE (2/3)	NORSRD SRV CHG REV. (\$M)	NORSRD CAP FEE REV. (\$M)	NORSRD INT. ON SEWER FUND (\$M)	NORSRD BEGIN YEAR FUNDS AVAIL. (\$M)	NORSRD END OF YEAR SEWER FUND (\$M)	ANNUAL INCREASE IN SEWAGE FLOW PER SFRE	TOTAL CONNECTIONS AT BUILD-OUT	2.0% \$9,060	300 \$6,000	\$38	14.0 \$M	3.0% PER YEAR	3.0% PER YEAR	4.25% PER YEAR												
																											CONSTRUCTION FEE	INFLATION RATE	SEWER CAPACITY FEE ANNUAL ADJUSTMENT									
2012	5.5	17,060															14.0																					
2013	5.6	367	17,427	38	6,000								0.7	2.2	0.4	14.0	17.3																					
2014	5.7	374	17,801	38	6,255								0.7	2.3	0.5	17.3	20.8																					
2015	5.8	381	18,182	38	6,521			18	18	19.7	6.6	13.1	0.7	2.5	0.6	20.8	11.5																					
2016	6.0	389	18,571	38	6,798								0.7	2.6	0.3	11.5	15.2																					
2017	6.1	397	18,968	38	7,087								0.7	2.8	0.5	15.2	19.2																					
2018	6.2	405	19,373	38	7,388								0.7	3.0	0.6	19.2	23.5																					
2019	6.3	413	19,786	38	7,702								0.8	3.2	0.7	23.5	28.1																					
2020	6.4	421	20,207	38	8,029								0.8	3.4	0.8	28.1	33.1																					
2021	6.6	430	20,637	38	8,371								0.8	3.6	1.0	33.1	38.5																					
2022	6.7	438	21,075	38	8,726								0.8	3.8	1.2	38.5	44.3																					
2023	6.8	447	21,522	38	9,097								0.8	4.1	1.3	44.3	50.5																					
2024	7.0	456	21,978	38	9,484								0.8	4.3	1.5	50.5	57.2																					
2025	7.1	465	22,443	38	9,887								0.9	4.6	1.7	57.2	64.3																					
2026	7.3	474	22,917	38	10,307								0.9	4.9	1.9	64.3	72.0																					
2027	7.4	484	23,401	38	10,745			28	3	31			0.9	5.2	2.2	72.0	80.8																					
2028	7.6	493	23,894	38	11,202								0.9	5.5	1.0	80.8	89.7																					
2029	7.7	503	24,398	38	11,678								0.9	5.9	1.2	89.7	99.7																					
2030	7.9	513	24,911	38	12,174								0.9	6.3	1.4	99.7	109.7																					
2031	8.0	524	25,435	38	12,692								1.0	6.6	1.7	109.7	119.7																					
2032	8.2	534	25,969	38	13,231								1.0	7.1	2.0	119.7	129.7																					
2033	8.3	545	26,514	38	13,793									7.5	2.3	129.7	139.7																					
2034	8.5	556	27,070	38	14,380									8.0	2.6	139.7	149.7																					
2035	8.7	567	27,636	38	14,991									8.5	2.9	149.7	159.7																					
2036	8.8	578	28,215	38	15,628									9.0	3.2	159.7	169.7																					
2037	9.0	590	28,804	38	16,292					30				9.6	3.6	169.7	179.7																					
2038	9.2	602	29,406	38	16,985									10.2	2.1	179.7	189.7																					
2039	9.4	614	30,020	38	17,706									10.9	2.5	189.7	199.7																					
2040	9.6	626	30,645	38	18,459									11.6	2.9	199.7	209.7																					
2041	9.8	638	31,284	38	19,243									12.3	3.3	209.7	219.7																					
2042	10.0	651	31,935	38	20,061					16				13.1	3.8	219.7	229.7																					
2043	10.2	664	32,599	38	20,914									13.9	3.1	229.7	239.7																					
2044	10.4	677	33,277	38	21,803									14.8	3.6	239.7	249.7																					
Totals																																						