Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Financial Planning

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Financial Planning

1. Introduction

The Detroit Water and Sewerage Department ("DWSD" or the "Department") has engaged in a large-scale master planning effort for its sewer system. The purpose of the Master Plan is to assess the Department's infrastructure needs over the next 50 years. The focus of the Master Plan is the capacity and condition of the sewer collection and conveyance system, including pumping stations. This Master Plan builds from other DWSD long-term planning efforts evaluating CSO related improvements and treatment plant upgrades. Camp Dresser & McKee ("CDM") has been requested to prepare a long-term financial plan of the combined impacts of the Wastewater Master Plan, the Long Term CSO Control Plan, and proposed treatment plant improvements. Since the Master Plan has a very long time frame, we have included allowances for repair and replacement of the Department's infrastructure over the time frame.

As described in a separate section of this report, the Wastewater Master Plan recommendations developed by CDM show two separate scenarios. The two plans are identical relative to treatment plant and CSO related expenditures. The fundamental difference between the two plans is the rate at which certain repair and replacement activities take place over time. An overview of the CIP is presented in Section 4 of this report. The detailed CIP is laid out in the technical memorandum *Capital Improvement Program*.

The purpose of this report is to document the financial analysis conducted as part of DWSD's wastewater Master Plan. The Master Plan projects that the Department will be required to make significant capital improvements over the next 50 years. The estimated capital costs for the lower scenario are $13.5 billion (in 2003 $) and over $16 billion (in 2003 $) for the upper scenario. The Department has recently begun an aggressive program of wastewater capital improvements focused on improving the overall condition of the system and ensuring its long term reliability and integrity. The Master Plan continues that effort.

To assess the financial impacts, it is necessary to analyze the impact of the two CIP alternatives on the Department's annual revenue requirements. The revenue requirements are equal to the annual financial needs, or amounts of money that need to be obtained from sewer rate revenue to fund the anticipated expenses and ensure compliance with the Department's General Bond Resolution. DWSD provides wholesale sewer service to 76 communities in the Greater Detroit metropolitan area as well as retail service to the City of Detroit itself. Total costs of operating the sewer utility are allocated based on flow and strength related components among the customers of DWSD. For the purposes of this report, we have assessed the overall impact on DWSD's revenue requirement as well as the average rate increase projected to be experienced by DWSD's wholesale and retail customers. The analysis does not include detailed revenue requirement or rate projections by individual wholesale customer.

The financial component of the Wastewater Master Plan has been a product of several consulting engineers working together with the Department. CDM, as one of the consultants, was responsible for the development of the CIP as well as the compilation of the financial revenue requirement and rate projections. However, Black & Veatch Inc. ("B&V"), as an additional consultant to DWSD, has been responsible for the on-going advice on financial and rate related issues. It was therefore decided that the already existing financial computer model operated by B&V should be used in the analysis presented in this report. As part of the process, CDM submitted the CIP in its two different cost scenarios to B&V and received in return the final revenue requirement projections as well as the detailed assumptions that had been used in the computation of the results. Detailed discussions on the financial projections as well as the validity of the underlying assumptions have occurred between CDM and B&V. Both consultants are in agreement that the projections as presented in this report reflect the Master Plan developed CIP used for planning purposes.

In addition, we want to express caution about the level of accuracy inherit in these projections. The timeframe of the analysis has been chosen as 50 years. This is a very long period during which the accuracy of the financial projections can vary significantly. Assumptions on borrowing rates, inflation, assumed operating efficiency, and growth directly affect the actual revenue requirements that will be required. However, this long-term financial plan is a useful planning tool that enables the Department to assess and visualize the impact of the Master Plan and other spending requirements facing the Department. Thus, the financial projections are only a guide to the impact that the Master Plan and its projected capital expenditures will have on the revenue requirements.

In this report, we first present the data sources that have been used in completing the assumptions. We then comment on the assumptions and methodologies used, summarize the two CIP alternatives, and describe the resulting revenue requirements.

2. Data Sources

A large amount of data has been used to acquire knowledge of the Department's operating functions, its financial operations and policies and practices dealing with the funding of capital expenses and allocation of costs. Among the documents that have been used in the financial analysis are:

- Official Statements for Sewer Bond Issues 2001
- Sewer Rate Documentation, "Sewer Rates 2002-2003", Black & Veatch
- Audited Financial Statements, FY2002, KPMG
- DWSD Annual Operating Budget FY2003

- Capital Improvement Program, Upper and Lower Range Costs, FY2003-FY2052; developed as part of the Master Plan by CDM

- Projections of customer growth within the wholesale customers and the City of Detroit developed as part of the Master Plan

- Volume 5: Customer Service Program, Human Resources Plan; completed by CDM

Additional information has been obtained through interviews and discussions with DWSD staff. The Master Plan has been an ongoing project for several years, with the financial analysis being completed near the end of the project.

3. Assumptions & Methodologies

The methodology used in the completion of the financial projections is directly based on the annual rate projection and documentation by B&V. For the purposes of this analysis, we do not present actual unit costs, flow rates or strength related charges but the annual revenue requirement for the Department overall. Primarily, the revenue requirement consists of operating expenses, annual rate financed capital improvements and debt service resulting from the issue of long-term debt. In the development of the annual revenue requirements, the following assumptions have been used:

- The annual inflation rate is assumed to be 3 percent per year.

- Customer growth of approximately 0.1 percent per year starting in FY2008.

- The Department is not expected to receive any state or federal grants in support of its capital improvement program. However, 10 percent of annual debt financed expenditures will be financed through the State Revolving Fund.

- In the years FY2003 through FY2007, funding in the amount of approximately $374 million is expected to be received as part of the State Revolving Loan Funds (SRF) by DWSD. Starting in FY2008, the Department is assumed to be eligible to finance 10 percent of its annual capital needs through SRF loans. These loans are assumed to carry an interest rate of 2.5% over a term of 20 years.

- The Department is assumed to use both pay as you go capital and debt financed revenue bonds for the balance of the CIP. Pay as you go capital is essentially raised through the Department's debt service coverage amounts described below. All other capital expenditures are assumed to be financed through the issuance of long-term debt. The bond issues are assumed to have a term of 30 years with an interest rate of 6 percent starting in FY 2006. Debt

issued in prior years carries an interest rate of 5.5 percent. The issuance costs of all debt are assumed to be 3 percent of the financed amount plus one percent to be added to a bond reserve fund. For all debt issues, two years of interest payments are assumed to be capitalized. Principal payments are assumed to be delayed by one year to 18 months consistent with the Department's recent debt issuances.

- The Department is assumed to fund an emergency repair and replacement reserve at 15 percent of annual operating expenses. In addition, an operating reserve is assumed to be funded equivalent to 45 days of operating expenses.

- The Department is assumed to follow a debt service coverage requirement of 140 percent for all of its issued long-term bonds. While the Department has a legal coverage requirement of 125 percent, for planning purposes the Department has set a target of 140 which is consistent with the Department's short term planning for the recent past. It is assumed that this requirement will be applied to all senior and junior debt currently outstanding and to be issued over the next 50 years.

- Over the 50-year time frame, the Department will use annual rate revenue to finance capital expenditures in every year. The percentage of total capital expenditures varies significantly over the forecast period. In particular, the Department is assumed to finance between 5 and 43 percent of capital expenditures from current rate revenue.

- As part of the CIP, the Department will add additional facilities to its system. For instance, the CIP lays out that several new CSO facilities will be added over the forecast period. This will require the Department to hire additional staff for the operation of these facilities. In the financial projections, we have conservatively assumed that these new facilities will be staffed entirely with new employees and are assuming that approximately 100 new employees will be required. However, there is the possibility that the District might reallocate existing staff to new functions. However, in order to be conservative in our projections, we have not included a reassignment of staff in our assumptions.

- Existing operating and maintenance costs are projected to inflate at a 3.0 percent average annual rate over the study period. Capital costs are projected to inflate at that same rate. Base year operations and maintenance expenses are based on the Department's approved FY 2003 budget level of approximately $191 million. Over time, we adjust these figures to reflect annual inflation as well as the anticipated staff increases required to operate and maintain new CSO facilities coming on line. Besides these CSO facilities, our projections do not assume that the DWSD will require a significant number of new facilities.

4. Capital Improvement Program

The Capital Improvement Program has been developed by CDM after a thorough review of the Department's current system. An upper and lower cost range has been developed for purposes of the analysis. Considering the long timeframe of the analysis, the approach of using cost ranges of capital expenditures seems appropriate and conservative and will provide the Department ultimately with a range of revenue requirements over the forecast period. It should be noted that the Master Plan recommendations are on top of the Department's approved FY 2003-2007 Capital Improvement Program. The Master Plan recommended projects are targeted to be fully implemented in FY 2008 and beyond. In addition, our analysis accounts for the carry-over CIP, that is the amount identified in the current CIP but which is projected to be expended in FY 2008 and beyond. This is primarily an issue for several large CSO abatement projects, including the Rouge River Tunnel project. The financial modeling assumes that most of the expenditures associated with carry-over projects take place between FY 2008 and FY 2010.

The lower range costs differ from the upper range by the rate and the amount of rehabilitation and renewal work that is completed over the 50-year master planning horizon. Besides the difference in rehabilitation activity, the core components of the CIP in each scenario are identical. The lower range CIP is shown in Table 1.

The lower range CIP totals $13.5 billion in 2003 dollars over the fifty years. Of the total amount, approximately 19% are spent on sewer infrastructure improvements, 47% on system controls and the wastewater treatment facilities, 9% on new CSO programs and the balance of 27% on other programs and miscellaneous items.

On average, the amount of capital investment falling into a five-year period is approximately $1.6 billion, or $270 million per year.

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Table 1: Cost Summary Wastewater Master Plan, 2000-2050 - Lower Range Costs

	Total Expenditures, 5-Year Intervals								
Program	**2008-2010**	**2011-2015**	**2016-2020**	**2021-2025**	**2026-2030**	**2031-2035**	**2036-2040**	**2041-2045**	**2046-2050**
Program 1: Sewer Infrastructure									
City of Detroit	$147,293	$258,447	$253,777	$303,847	$303,847	$309,856	$289,398	$258,712	$258,712
Suburban	$25,764	$31,139	$19,139	$11,139	$11,139	$11,625	$11,625	$11,625	$11,625
Common To All	$7,684	$27,536	$788	$788	$788	$1,311	$1,311	$1,311	$1,311
Total	$180,741	$317,122	$273,704	$315,774	$315,774	$322,792	$302,334	$271,648	$271,648
Program 2: CSO New*									
CSO New Programs	$48,278	$54,305	$165,326	$164,058	$224,963	$193,128	$200,488	$131,604	$45,045
Program 3: System Controls/ WWTP									
Common To All	$450,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000
Other Programs and Miscellaneous**	$225,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000
CIP Total	**$904,019**	**$1,496,427**	**$1,564,030**	**$1,604,832**	**$1,665,737**	**$1,640,920**	**$1,627,822**	**$1,528,252**	**$1,441,693**

* CSO New: Estimates for new CSO programs starting in 2008 (not currently included in the DWSD CIP).

** Other Programs and Miscellaneous category includes Environmental Protection, Customer Service, and Human Resources, Facilities, and Technology Programs. Technology upgrades, engineering and computer services are also included.

On the other hand, the upper range costs capture the higher level of rehabilitation effort. The CIP includes a total level of expenditures of $16.1 billion in 2003 dollars over fifty years, or a level approximately 20 percent greater. Of the total amount, approximately 30% are spent on sewer infrastructure improvements, 40% on system controls and the wastewater treatment facilities, 10% on new CSO programs and the balance of 20% on other programs and miscellaneous items.

The total expenditures are relatively evenly distributed over time. On average, the amount of capital investment falling into a five-year period is approximately $1.9 billion, or $322 million per year. The upper range CIP is shown in Table 2.

Under both scenarios, the total cost is allocated to the different beneficiaries. In particular, the allocation process is based on the following principles:

- Amounts identified as Detroit are allocated 100 percent to the City of Detroit.
- Amounts identified as suburban are allocated 100 percent to the DWSD's suburban communities.
- "Common to all" projects are allocated between Detroit and the suburban communities based on the current allocation of flow between the two communities.
- CSO projects, in accordance with the DWSD's current rate methodology, are allocated 83 percent to the City of Detroit and 17 percent to the suburban communities. (CSO allocation percentages have been used for both CSO projects currently being planned and implemented as well as CSO projects identified as necessary through this master planning process.
- O&M costs are allocated in accordance with the current methodology, assuming the assignment of cost to customer classes by considering both flow and strength related allocation factors.

The allocations provide a basis for illustrating the differential impact that the Master Plan will have on the City of Detroit compared to the suburban communities. The allocation methodology is consistent with the DWSD's current rate allocation methodology. To the extent that the rate methodology is being evaluated and may be revised in the future, their analysis does not capture any such potential modifications.

Table 2: Cost Summary Wastewater Master Plan, 2000-2050 - Upper Range Costs

	5-Year Intervals								
Program	**2008-2010**	**2011-2015**	**2016-2020**	**2021-2025**	**2026-2030**	**2031-2035**	**2036-2040**	**2041-2045**	**2046-2050**
Program 1: Sewer Infrastructure									
City of Detroit	$359,571	$591,250	$553,200	$553,200	$553,200	$556,272	$515,356	$488,079	$488,079
Suburban	$28,666	$34,444	$22,444	$14,444	$14,444	$14,698	$14,698	$14,698	$14,698
Common To All	$9,436	$28,808	$2,060	$2,060	$2,060	$2,334	$2,334	$2,334	$2,334
Total	$397,673	$654,502	$577,704	$569,704	$569,704	$573,304	$532,388	$505,111	$505,111
Program 2: CSO New*									
CSO New Programs	$70,516	$99,235	$202,440	$193,288	$262,026	$232,501	$246,846	$166,390	$79,800
Program 3: System Controls/ WWTP									
Common To All	$450,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000
Other Programs and Miscellaneous**	$225,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000
CIP Total	**$1,143,189**	**$1,878,737**	**$1,905,144**	**$1,887,992**	**$1,956,730**	**$1,930,805**	**$1,904,234**	**$1,796,501**	**$1,709,911**

* CSO New: Estimates for new CSO programs starting in 2008 (not currently included in the DWSD CIP).

** Other Programs and Miscellaneous category includes Environmental Protection, Customer Service, and Human Resources, Facilities, and Technology Programs. Technology upgrades, engineering and computer services are also included.

A more detailed description and illustration of the CIP and its two cost ranges can be obtained from the technical memorandum *Capital Improvement Program*.

5. Revenue Requirement

The annual revenue requirements have been determined by adding the projected expenses for operating and maintenance activities to debt service resulting from the Master Plan and the amount required to comply with the Department's debt service coverage requirements (using the Department's current policy for debt service coverage.) The rate of increase in revenue requirements is therefore dependent on the capital financing assumptions, the rate of increase in existing expenditures as well as the annual volume of capital improvements. Below, we present two different scenarios: the revenue requirements based on the lower and upper cost CIP estimates. The result will be a range of annual financial requirements that can be used by the Department for planning purposes. However, considering the long timeframe of the analysis, we recommend a regular annual re-evaluation of the financial projections. This review can incorporate more detailed CIP planning schedules, updated cost estimates and more current customer allocation information. Updated projections should also reflect changes in the Department's cost allocation methodology, if any are approved and implemented.

The revenue requirements are presented by breaking out the annual financial needs for service to the City of Detroit separately from the cost of service to the suburban communities. For each customer class, the projections show both capital and operating expenses. We have further distinguished the annual revenue requirements based on the existing system from the financial needs incurred due to the upgrades and changes as part of the 50-year Master Plan. The baseline case captures the cost escalation of expenses for existing facilities and capital related costs.

We have summarized the changes in the revenue requirements and only provide a snapshot of the detailed financial projections here. Again, it is important to view these projections as the results of a planning effort. We are certain that as events unfold, the projections contained herein will be subject to significant modification. The Department and it customers must be cognizant of this over time and make adjustments as appropriate.

The projections described below assume that the Department continues to set rates to generate a target debt service coverage ratio of 140 percent consistent with current fiscal planning. However, the Department is evaluating a reduction in the target coverage amount. Such a reduction would reduce the Department's revenue requirements over the short and long-term. However, the reduction in the long-term is not as significant as would be thought, since the coverage amount directly funds capital needs out of rate revenues, as opposed to issuing debt. If the Department reduces targeted coverage, its amount of cash funded capital falls, but the amount of debt it must issue for a given capital improvement program must increase. In the

short term, the resulting revenue reduction could be significant, but the benefit of the lowered target coverage declines with time as debt service increases.

Summary information is contained in this report. In particular, we have chosen to show the first two years of the projections, FY 2004 and FY 2005, and then only document financial revenue requirements in FY2010, FY2020, FY2030, FY2040, and FY2050. In a subsequent section, we also provide the average rate of change for different cost categories over the five decades of the analysis.

5.1 Lower Range Scenario

The revenue requirement projections, as shown in Table 3, use the lower cost range CIP as presented in Table 1. In FY2004, the revenue requirement is projected to be equal to approximately $335 million, of which roughly $191 million, or 60 percent, are due to service provided to the suburban communities. In FY2004, the Master Plan does not yet have an impact on the financial revenue requirement of the department.

Table 3: DWSD Revenue Requirement Projections – Lower Range

In Thousand Dollars

	2004	2005	2010	2020	2030	2040	2050
O&M	*$90,251*	*$90,251*	*$103,971*	*$145,447*	*$195,468*	*$262,693*	*$353,038*
Capital	*$53,761*	*$53,761*	*$53,761*	*$53,761*	*$53,761*	*$53,761*	*$53,761*
Baseline Detroit	**$144,012**	**$144,012**	**$157,732**	**$199,207**	**$249,229**	**$316,454**	**$406,798**
O&M	*$100,749*	*$100,749*	*$116,066*	*$162,365*	*$218,206*	*$293,250*	*$394,104*
Capital	*$90,090*	*$90,090*	*$90,090*	*$90,090*	*$90,090*	*$90,090*	*$90,090*
Baseline Suburban	**$190,840**	**$190,840**	**$206,156**	**$252,456**	**$308,296**	**$383,340**	**$484,194**
Baseline Total	**$334,851**	**$334,851**	**$363,888**	**$451,663**	**$557,525**	**$699,794**	**$890,992**
O&M	*$0*	*$226*	*$3,119*	*$4,363*	*$5,864*	*$7,881*	*$10,591*
Capital	*$0*	*$20,383*	*$89,084*	*$247,155*	*$486,588*	*$601,606*	*$701,409*
Incremental Detroit	**$0**	**$20,609**	**$92,203**	**$251,518**	**$492,452**	**$609,487**	**$712,000**
O&M	*$0*	*$252*	*$3,482*	*$4,871*	*$6,546*	*$8,797*	*$11,823*
Capital	*$0*	*$13,934*	*$63,814*	*$197,123*	*$349,309*	*$445,659*	*$602,704*
Incremental Suburban	**$0**	**$14,186**	**$67,296**	**$201,994**	**$355,855**	**$454,456**	**$614,527**
Incremental Total	**$0**	**$34,795**	**$159,499**	**$453,512**	**$848,308**	**$1,063,943**	**$1,326,527**
Detroit	$144,012	$164,621	$249,935	$450,726	$741,681	$925,941	$1,118,798
Suburban	$190,840	$205,025	$273,452	$454,449	$664,151	$837,797	$1,098,721
TOTAL	**$334,851**	**$369,646**	**$523,387**	**$905,175**	**$1,405,833**	**$1,763,737**	**$2,217,519**

The composition of the revenue requirement changes over the 50-year timeframe. Whereas the cost of service for suburban customers was 60% of the total in FY 2004, this percentage falls to below 50 percent in FY2050. Overall, the revenue requirement,

including the incremental expenses driven by the Master Plan implementation, is projected to increase to approximately $2.2 billion, from the FY 2004 level of $335 million.

The increase in the revenue requirements means that the cost allocated to the City of Detroit and suburban communities will rise as well. For the purpose of the analysis, we only distinguish between the City and all suburban communities, not individual wholesale customers. The revenue requirement increases are comparable to "rate increases" within the two customer groups. The Department uses a complex rate system, driven by flow and strength related charges, in order to recover costs and charge its customers. We have not attempted to duplicate the rate schedules here in this report. However, we show average rates of change in revenue requirements that will be roughly equivalent to the anticipated changes in rates (assuming no material change in the Department's approved rate methodology.)

A key aspect of this analysis is that the projected revenue requirement increases are front-loaded, that is the rate increase are much greater in the shorter time frame than in the longer term. This reflects the need for the Department to catch up with its system rehabilitation and then the system's costs will stabilize as repair and replacement expenditures stabilize in latter years. The timing of the Department's existing debt payments enhances the projected rate pattern. The Department is projected to pay all of its currently outstanding debt service in approximately 30 years. Eliminating this debt reduces the Department's revenue requirements by a significant amount and provides room within the revenue requirement to support significant new debt without increasing rates.

In Table 4, we have calculated the average annual rate increases for the two main customers in each of the 10-year intervals. As described in the preceding paragraph, whereas initial rates are projected to increase by between 9.4 and 6 percent, these average annual rates of change fall significantly once the end of the analysis timeframe is reached.

As can be seen by the year 2030, when the Department completes repayment of its existing debt, anticipated increases in revenue requirements decline to less than 3 percent or the assumed rate of inflation even though capital expenditures continue.

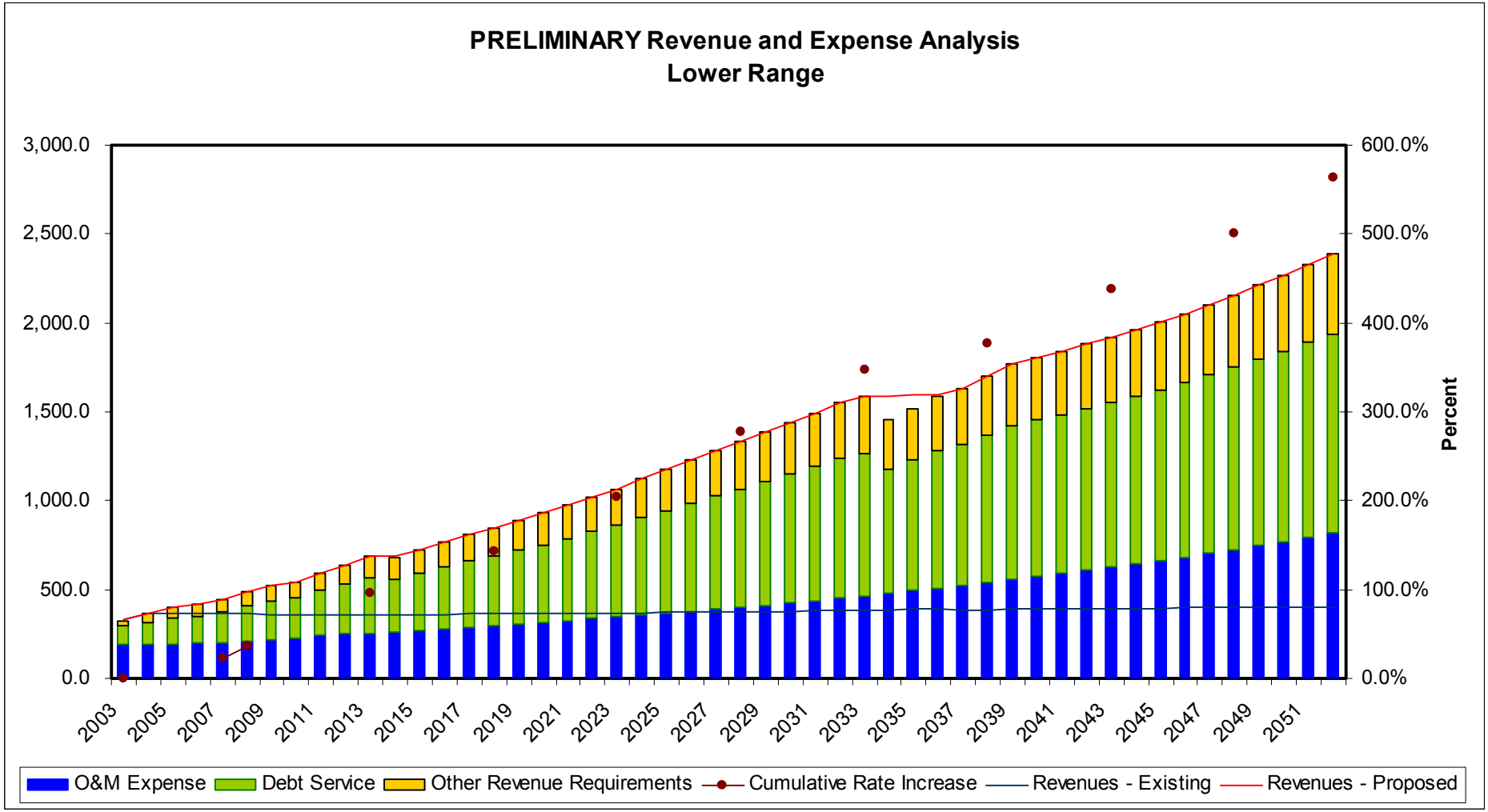
Table 4: Average Annual Rate Increase – Lower Range

	2005-2010	2011-2020	2021-2030	2031-2040	2041-2050
Detroit	9.4%	6.0%	5.0%	2.1%	1.8%
Suburban	6.0%	5.1%	3.8%	2.2%	2.6%
TOTAL	**7.6%**	**5.5%**	**4.4%**	**2.2%**	**2.2%**

Over the forecast period, revenue requirements are projected for all customers will increase at an average annual rate of 4.1 percent. Thus over the term of the Master Plan, we are projecting that DWSD expenses will increase at a rate slightly greater than the assumed rate of inflation.

Figure 1 illustrates the financial projections graphically.

Figure 1


PRELIMINARY Revenue and Expense Analysis
Lower Range
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2047
2049
2051
O&M Expense
Debt Service
Other Revenue Requirements
Cumulative Rate Increase
Revenues - Existing
Revenues - Proposed

5.2 Upper Range Scenario

All comments on previous section apply to this subsection as well.

The upper range scenario assumes the implementation of a CIP valued at nearly $25 billion, including the change in operations and maintenance expenses. The annual revenue requirement for the Department is projected to increase from roughly $335 million in FY2004 to nearly $2.5 billion in FY2050. In the initial year of the projection, the suburban communities, with 57 percent of the total, occupy the larger share of the total financial need. However, over the fifty-year projection, their respective share falls to 45% of the entire revenue requirement. The total revenue requirement as well as its components are shown in Table 5.

Table 5: DWSD Revenue Requirement Projections – Upper Range

In Thousand Dollars

	2004	2005	2010	2020	2030	2040	2050
O&M	*$90,251*	*$90,251*	*$103,971*	*$145,447*	*$195,468*	*$262,693*	*$353,038*
Capital	*$53,761*	*$53,761*	*$53,761*	*$53,761*	*$53,761*	*$53,761*	*$53,761*
Baseline Detroit	**$144,012**	**$144,012**	**$157,732**	**$199,207**	**$249,229**	**$316,454**	**$406,798**
O&M	*$100,749*	*$100,749*	*$116,066*	*$162,365*	*$218,206*	*$293,250*	*$394,104*
Capital	*$90,090*	*$90,090*	*$90,090*	*$90,090*	*$90,090*	*$90,090*	*$90,090*
Baseline Suburban	**$190,840**	**$190,840**	**$206,156**	**$252,456**	**$308,296**	**$383,340**	**$484,194**
Baseline Total	**$334,851**	**$334,851**	**$363,888**	**$451,663**	**$557,525**	**$699,794**	**$890,992**
O&M	*$0*	*$226*	*$3,119*	*$4,363*	*$5,864*	*$7,881*	*$10,591*
Capital	*$0*	*$20,383*	*$108,265*	*$345,594*	*$644,799*	*$804,348*	*$940,776*
Incremental Detroit	**$0**	**$20,609**	**$111,385**	**$349,957**	**$650,663**	**$812,229**	**$951,367**
O&M	*$0*	*$252*	*$3,482*	*$4,871*	*$6,546*	*$8,797*	*$11,823*
Capital	*$0*	*$13,934*	*$57,949*	*$202,689*	*$364,312*	*$472,062*	*$614,890*
Incremental Suburban	**$0**	**$14,186**	**$61,431**	**$207,560**	**$370,858**	**$480,860**	**$626,713**
Incremental Total	**$0**	**$34,795**	**$172,815**	**$557,517**	**$1,021,521**	**$1,293,088**	**$1,578,080**
Detroit	$144,012	$164,621	$269,117	$549,165	$899,892	$1,128,682	$1,358,166
Suburban	$190,840	$205,025	$267,587	$460,016	$679,154	$864,200	$1,110,907
TOTAL	**$334,851**	**$369,646**	**$536,703**	**$1,009,180**	**$1,579,046**	**$1,992,882**	**$2,469,072**

The average annual rate increase patterns follow a path similar to the one outlined in the previous section. In the first five years of the projections, the average annual rate of increase for both the suburban customers and the City of Detroit is significantly higher than in later phases of the CIP implementation. In this case, the City of Detroit will see its average annual rate of increase fall from close to 11 percent to less than 2 percent in the final decade. In case of the suburban customers, the percentage change will decrease from 5.6 percent to 2.4 percent. For the Department overall, this means

that the average annual rate of change will be reduced from 8 percent in the first five years to close to 2 percent in the final decade of the projections as can be seen in Table 6.

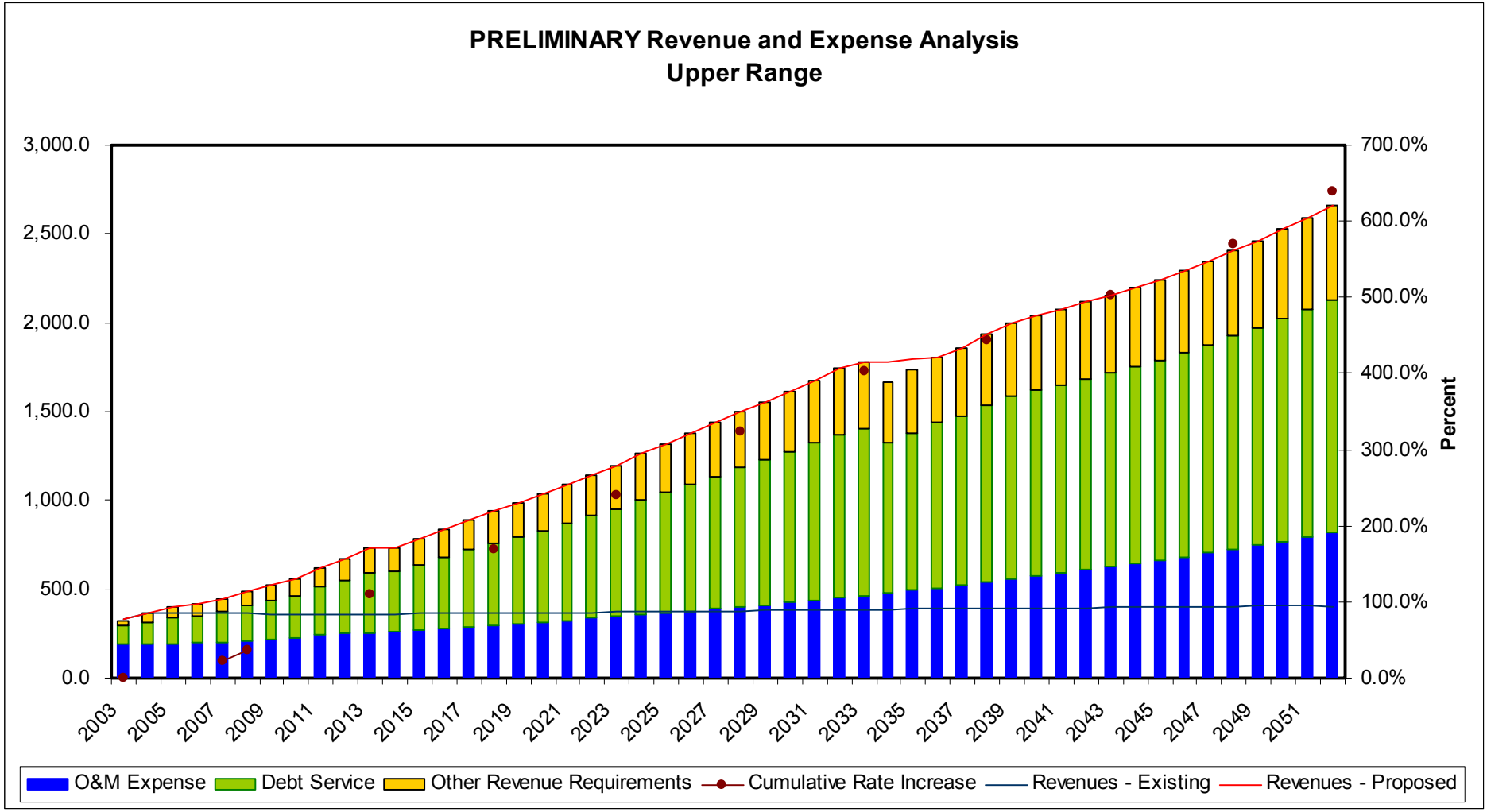
Table 6: Average Annual Rate Increase – Upper Range

	2005-2010	2011-2020	2021-2030	2031-2040	2041-2050
Detroit	10.8%	7.3%	5.0%	2.2%	1.8%
Suburban	5.6%	5.5%	3.9%	2.3%	2.4%
TOTAL	**8.0%**	**6.4%**	**4.5%**	**2.3%**	**2.1%**

Over the entire duration of the implementation of the Master Plan, the Department will experience an average annual rate of increase in the revenue requirements of 4.3 percent. This assumes the implementation of the upper range CIP. In comparison, the City of Detroit's share will increase slightly more rapidly by close to 5 percent whereas the suburban customers will see their share of the revenue requirement increase at an average annual rate of below 4 percent.

The upper range financial projections are also illustrated in Figure 2.

Figure 2


PRELIMINARY Revenue and Expense Analysis
Upper Range
3,000.0
2,500.0
2,000.0
1,500.0
1,000.0
500.0
0.0
700.0%
600.0%
500.0%
400.0%
300.0%
200.0%
100.0%
0.0%
Percent
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
2043
2045
2047
2049
2051
O&M Expense
Debt Service
Other Revenue Requirements
Cumulative Rate Increase
Revenues - Existing
Revenues - Proposed

6. Summary

The Detroit Water and Sewerage department has engaged in a large-scale master planning effort for its sewer system. The purpose of the Master Plan is to assess the Department's infrastructure needs over the next 50 years. The CIP includes improvements to the existing collection system as well as the treatment and CSO facilities. The CIP ranges from between $13.5 to $16.1 billion over fifty years depending on the chosen level of annual replacement and renewal. These capital expenditures will place a significant financial burden on the Department as well as the City of Detroit and the wholesale suburban customers.

Overall, the revenue requirement is projected to increase from $335 million in FY2004 to between $2.2 and $2.5 billion depending on which CIP alternative is chosen. A significant amount of these expenses will be incurred in early years, which results in average annual rates that are projected to increase by 8 percent on average. However, in the long run, the impact of the CIP will be mitigated by the long implementation timeframe of the CIP and the advantages of replacing expiring debt with newly issued bonds.

The comparison of the two CIP ranges and their respective effects is shown in Figure 3 below.

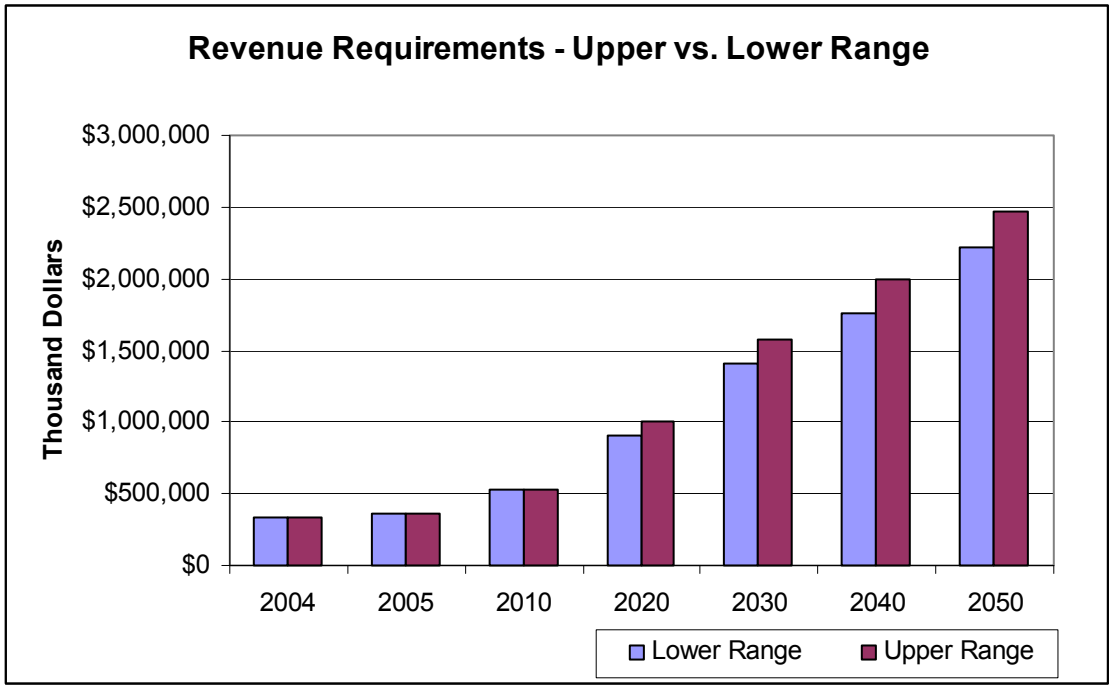


Figure 3

Over the fifty years implementation timeframe, the revenue requirement for the Department is projected to increase by between 4.1 and 4.3 percent depending on the exact cost alternative chosen. However, the exact rate of increase is highly dependent on the assumptions used, the overall economic environment, and the timing of the CIP projects. The timing of the increases is heavily front-loaded, with the required increases much larger in the early years than later years. In addition, the increase for the City of Detroit customer base will be higher than those anticipated for the suburban customer base.