

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

**RESEARCH AND DEVELOPMENT
DEPARTMENT**

REPORT NO. 04-9

*CALCULATION OF USER CHARGE RATES AND
ADMINISTRATIVE COSTS FOR 2004*

July 2004

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**CALCULATION OF 2004
USER CHARGE RATES**

**Research and Development Department
Richard Lanyon, Director**

July 2004

CALCULATION OF 2004 USER CHARGE RATES

Determination of Total Operations, Maintenance and Replacement (OM&R) Costs

The 2003 Metropolitan Water Reclamation District of Greater Chicago (District) Corporate Fund appropriates \$290,800,000 for the support of operations and maintenance to carry out wastewater treatment and other functions. After subtracting the appropriations of those items disallowed by the United States Environmental Protection Agency (USEPA) in 1979, it was determined that \$283,805,006 of the 2003 budget is OM&R related. A breakdown of this total is shown in Table 1.

The segregation of costs associated with wastewater treatment from costs associated with other functions was based on discussions regarding the District's dedicated ad valorem tax revenues, which were held in September and October 1978 between the District staff and the USEPA staff. In these discussions, non-OM&R budgeted line items were identified and disallowed.

For example, the non-OM&R items disallowed include the following programs:

- 4200 Waterways Control and Stormwater Retention Reservoirs
- 4700 Flood and Pollution Control Design
- 4800 Flood and Pollution Control Construction

These programs relate to corporate expenditures for waterways operation and maintenance and flood control design and construction. The total of these disallowed program 2003 expenditures is \$4,832,186. In addition to this amount, a prorated portion of Program 7000, General Support, was also disallowed because it is the overhead support of the items disallowed under Program 4000. The portion of Program 7000 thus disallowed was \$2,062,808. The total of the disallowed funds considered to be non-OM&R related was \$6,894,994. Three additional funds, portions of the Annuity and Benefit Fund, the Reserve Claim Fund, and the Construction and Working Cash Fund were added to the OM&R costs raising the total OM&R cost from \$290,800,000 to \$318,645,119. These funds were added because they relate to OM&R costs. The Annuity and Benefit Fund provides for the District's pension program for retired employees and employee disability payments. The Reserve Claim Fund is used for the payment of workmen's compensation, liability claims, and other associated costs. This fund is also used to pay for repair costs if a catastrophe were to strike the District's facilities.

Up until the 1960s, the Construction Fund had been used as a repair and replacement funding mechanism. The use of this fund was suspended because the District embarked on a major program to upgrade its infrastructure, consisting primarily of expansion and improvement of water reclamation plants (WRPs), construction of new WRPs and collection systems and implementation of the Tunnel and Reservoir Plan, the District's solution to combined sewer overflows. Funding for these major capital improvement projects in the Capital Improvements Bond Fund included issuance of long-term debt as authorized by the state of Illinois.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1

TOTAL OM&R COST FOR 2003 & 2004

Budgeted Corporate Fund Programs Directly Related to OM&R Costs		2002 Budget	2003 Budget
1000	Collection	\$ 47,200,000 ¹	\$ 47,200,000 ¹
2000	Treatment	63,800,000 ¹	58,500,000 ¹
3000	Solids Processing	39,000,000 ¹	39,200,000 ¹
4000	Flood and Pollution Control	26,861,592 ^{1,2}	27,267,814 ^{1,2}
5000	Solids Utilization	25,700,000 ¹	26,700,000 ¹
7000	General Support	<u>102,002,512^{1,3}</u>	<u>84,937,192^{1,3}</u>
Sub-Total		\$304,564,104	\$283,805,006
Annuity and Benefit Fund		25,538,251 ⁴	26,319,432 ⁴
Reserve Claim Fund		16,108,000 ⁵	3,859,000 ⁵
Construction & Working Cash Fund		<u>6,960,998⁶</u>	<u>4,661,681⁶</u>
Total OM&R Cost		\$353,171,353	\$318,645,119

¹See Pages 45, 231 and 250 of the District's 2003 Budget.

²Program total in Corporate Fund is \$32,100,000. USEPA disallowed costs (Programs 4200, 4700 and 4800) are \$4,832,186 leaving a net of \$27,267,814.

³Program total in Corporate Fund is \$87,000,000. USEPA disallowed costs are \$2,062,808, leaving a net of \$84,937,192. A prorated portion of program 7000, General Support, was disallowed as it was determined in the 1979 User Charge Proposal that this portion was related to the overhead support of items disallowed from Program 4000. This prorated portion is the ratio of the disallowed amount (\$4,832,186) to the total for Programs 1000 through 5000 (\$203,800,000) in the 2003 Budget.

⁴The 2003 Budget allocates \$27,583,935 on Page 47 of the 2003 Budget to the Annuity and Pension Fund. Approximately 4.58% of the District's employees and their expenses are not chargeable to the Corporate or Construction Funds leaving a net of \$26,319,432. The 4.58% number represents the ratio of the salaries budgeted under programs 4200, 4210, 4700 and 4800 against the total salaries budgeted under Programs 1000, 2000, 3000, 4000 and 5000.

⁵From Table IA on Page 3.

⁶From Table IC on Page 6.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1A

RESERVE CLAIM FUND

2003 Budgeted Cost	\$ 31,000,000
Less 2002 Budgeted Cost	(30,000,000)
Plus 2002 Actual Claims	2,859,000
Total	<u>\$ 3,859,000</u>

Note: Included for the User Charge System are actual expenditures in 2002 plus the amount added to the fund which is the difference in the budget appropriations for 2002 (Page 47 of 2002 Budget) and 2003 (Page 47 of 2003 Budget). The total represents the funding required to bring the fund up to the 2003 appropriated amount. The data for actual claims was provided by the Finance Department on April 2, 2003.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1B

CONSTRUCTION FUND COSTS

Budgeted Programs Directly Related to OM&R Cost	2003 Budget
1000 Collection	\$ 8,541,965.00
2000 Treatment	54,394,102.00
3000 Solids Processing	5,609,067.00
4000 Flood and Pollution Control	10,673,743.00
5000 Solids Utilization	<u>5,109,071.00</u>
Sub-total of Programs 1000 through 5000	\$ 84,327,948.00
Less Ineligible portion of OM&R Cost applicable to Programs 4200, 4210, 4700 and 4800	(10,673,743.00)
Eligible OM&R Cost from Programs 1000 through 5000	<u>73,654,205.00</u>
Ratio of eligible to total program cost	
<u>\$ 73,654,205</u>	= 0.8734
\$ 84,327,948	
7000 Plus General Support (eligible portion) = 0.8734 x 397,452	<u>347,145.00</u>
Total Eligible OM&R Cost	\$ 74,001,350.00

Sources: Information provided by General Administration on June 27, 2003.

Suspending use of the Construction Fund was appropriate at the time, since funding for capital improvement projects came through the issuance of long-term debt recovered under ad valorem taxes, and replacement costs were recovered by way of the designated fixed asset replacement set aside in the Corporate Fund. The designation for fixed asset replacement funding was negotiated with the USEPA in the original User Charge System (UCS) as a mechanism for identifying and recovering infrastructure replacement costs, etc.

Beginning with 1997, it was determined that the eligible portions of the Construction Fund and the Financing Charges for related working cash funds would be included in the OM&R cost. The eligible portion of the Construction Fund, etc., is now designated for "fixed asset replacement."

The Engineering Department has determined that the eligible portion of the Construction Fund from the 2003 budget is \$22,990,000, as shown on Table 1D, Page 7. The 2003 Budget did not allocate construction working cash funds. (See Page 77 of the 2003 Budget.) The Construction Fund was adjusted for the Construction Fund revenues and ineligible Program 4000 costs. The eligible portion to be included in the OM&R costs was determined to be \$4,661,681, as shown on Table 1C.

Determination of Total Revenue to be Generated by User Charge System in 2004

As shown in Table 2, revenues contained in the 2003 budget derived from sources other than the UCS total \$67,912,200. The revenue derived from the sale or use of the District's assets, and other sources is itemized in Table 2. Such revenues are used in the District's budget preparation process to offset the overall tax levy and the amount to be generated by the UCS.

Determination of 2003 User Charge Administration Cost for Each User Charge Class

Table 3 presents the costs for administration of the User Charge system, which will be recovered by direct charges to Large Commercial-Industrial Users and by inclusion in the User Charge rates for other classes. The actual administrative cost to be recovered in 2004 is \$5,831,554. By deducting the total of revenue to be generated from other sources and the administrative cost recovery from the total OM&R cost of \$318,645,119 leaves a net OM&R cost of \$244,901,000 which must be collected by the User Charge system.

Unit Costs of Treatment

District operating records indicate that 454,604 million gallons (MG) of flow, 692,807 thousand pounds (Klbs) of biochemical oxygen demand (BOD), and 865,455 Klbs of suspended solids (SS) were treated during 2002 (data from 2002 water reclamation plant operating records as compiled by the R&D Department). Operating cost accounting data was used to determine the allocation of OM&R costs by parameter, i.e., flow, BOD and SS. The result is that 27.27 percent of the cost was attributed to flow, 38.03 percent to BOD, and 34.70 percent to SS from the initial BOD and SS loadings assigned to the R&SNC-I Class in Table 5, prior to the allocation of I/I, Rain and Recycle in Table 6, were computed based on the volume for the Finance Department Reports CMSRO2 for 1995 through 1999). Using the foregoing data, the unit costs of treatment were derived, as shown in Table 4.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1C

DETERMINATION OF TOTAL OM&R COST CONSTRUCTION FUND PORTION
ADJUSTED FOR REVENUES FROM OTHER SOURCES

Revenue/Cost Item	For 2004 from 2003 Budget
Net Assets Appropriable (pp 70, 2003 Budget)	\$ 54,722,100.00
Revenue from Current Services Grants (pp 89, 2003 Budget)	0.00
Revenue from Personal Property Replacement Tax (pp 89, 2003 Budget)	2,716,000.00
Reimbursement from Corporate Fund For Payroll and Indirect Costs (pp 89, 2003 Budget)	0.00
Revenue from Money and Property Investment Income, etc. (pp 89, 2003 Budget)	1,158,000.00
Connection Impact Fees (pp 89, 2003 Budget)	<u>400,000.00</u>
Total Revenues Derived from Other Sources for Construction Fund	\$ 58,996,100.00
Total Costs (from <u>Table 1B</u> on pp 4)	\$ 74,001,350.00
Ratio of Construction Fund Revenue vs. Total Construction Fund Costs (\$58,996,100)/(\$74,001,350) = 0.7972 ¹	
Eligible Construction Fund as Furnished by Engineering Dept. (From <u>Table 1D</u> on pp 7)	\$ 22,990,000.00
Less Proportionate Share for Construction Fund Revenues (0.7972 x 22,990,000) ¹	<u>\$(18,328,319.00)</u> ¹
Net Eligible Construction Fund	\$ 4,661,681.00
Plus Net Eligible Portion of Construction Working Cash Fund = 0.8734 x 0.00 (pp 77, 2003 Budget) as Explained on pp 4 & 5	\$ 0.00
OM&R Cost to be Recovered for Construction Fund Under the User Charge Ordinance	\$ 4,661,681.00

¹79.72% of the Construction Fund is funded by revenue from sources other than the User Charge Ordinance.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1D

2003 CONSTRUCTION FUND REPLACEMENT COST

Project No.	Project Title/Description	Eligible Appropriation* (1,000's)	% Eligible	In-House Cost (1,000's)
<u>2003 Budget Awards</u>				
97-254-2E	Calumet WRP, TARP RTU Replacement	2,400	100	120
99-179-2S	Village of Willow Springs, Provide Sewage Transport Facilities	0	0	0
01-816-1E	Mainstream P.S. and Stickney WRP, Miscellaneous Electrical Improvements	0	0	0
00-473-1D	Egan WRP, Fume Hoods Replacement	1,472	100	74
01-197-2D	Stickney WRP, Relocating Utilities at Sludge Disposal Building	3,200	100	160
99-265-2S	*Calumet WRP, Garden Home and Merrionette Park Outlet Sewer Rehabilitation	0	0	0
95-881-2M	*Calumet and Lemont WRPs, Digester Gas and HVAC System Improvements	1,600	100	80
96-461-1V	Kirie WRP, Administration and Process & Maintenance Building Expansion	0	0	0
01-107-2M	Stickney WRP, Replace Fine Screens	0	0	0
02-820-2E	Various Locations, Addition of Surveillance Cameras	0	0	0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1D

2003 CONSTRUCTION FUND REPLACEMENT COST (Continued)

Project No.	Project Title/Description	Eligible Appropriation* (1,000's)	% Eligible	In-House Cost (1,000's)
99-270-2E	Calumet WRP, Incoming Service Improvements	646	100	32
00-270-2D	Calumet WRP, Concrete Rehabilitation	2,500	100	125
02-818-2P	Stickney and Calumet WRPs, Cleaning and Repair of Anaerobic Digesters	36	20	2
00-184-2M	Stickney WRP, Rehabilitation of Imhoff Galleries	435	100	22
00-809-1E	Remote Unmanned Sites, Smoke Annunciation	1,035	50	52
97-142-2E	Stickney WRP, TARP Hydraulic Grade Line Improvements	0	0	0
01-198-2D	Stickney WRP, Removal of Hazardous and Non-Hazardous Materials from Sludge Disposal Building	0	0	0
01-003-2S	*Northshore 8 and Golf Glenview 2 Rehabilitation	0	0	0
00-185-1E	Stickney WRP, Lighting Improvements at LASMA	0	0	0
01-106-2M	Stickney WRP, Skimming Tank Improvements	4,038	100	202
02-288-2D	Calumet WRP, Part and Equipment and Addition of a Roof at the SEPA I Station	0	0	0
Total 2003 Awards		\$17,362		\$868

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1D

2003 CONSTRUCTION FUND REPLACEMENT COST (Continued)

Project No.	Project Title/Description	Eligible Appropriation* (1,000's)	% Eligible	In-House Cost (1,000's)
<u>2003 Projects Under Construction</u>				
96-116-2P	Stickney WRP, Replace Diffuser Plates	0	0	0
96-117-2P	Stickney WRP, Replace Diffuser Piping	149	100	7
99-169-2M	Racine Avenue Pumping Station, Improve Sluice Gates and Miscellaneous Work	0	0	0
99-176-2S	Broadway-Bellwood Sewer Rehabilitation	0	0	0
00-810-2M	Various Locations, Modifications to Heating Systems	360	50	18
01-102-2P	Stickney WRP, RAS Flow Improvements	0	0	0
97-088-2M	North Side WRP, Screen Replacement and Sewer Control Rehabilitation	356	100	18
99-001-2S	North Side WRP, Niles Center Outlet Sewer Rehabilitation II	0	0	0
00-471-2S	Egan WRP, Plum Grove Road Force Main Extension	0	0	0
00-472-1D	Egan WRP, Control Building Improvements	0	0	0
97-362-1S	TARP Drop Shaft 5 Rehabilitation	1,800	100	90

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1D

2003 CONSTRUCTION FUND REPLACEMENT COST (Continued)

Project No.	Project Title/Description	Eligible Appropriation* (1,000's)	% Eligible	In-House Cost (1,000's)
<u>2003 Projects Under Construction</u>				
98-514-2V	Hanover Park WRP, Pump and Blower Building Expansion	29	20	1
98-802-2P	Hanover Park, Kirie & Egan WRPs process Control Systems	941	10	47
96-246-2P	Calumet WRP, Replacement of Piping	898	100	45
	Total of Projects under construction	<u>4,533</u>		<u>227</u>
	Grand Total	\$21,895,000		\$1,095,000

*Difference between 2003 appropriation and amount included in 2002.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2

DETERMINATION OF TOTAL OM&R COST FOR 2002 AND 2003
ADJUSTED FOR REVENUES FROM OTHER SOURCES
AND FOR ADMINISTRATIVE COST

Revenue/Cost Item	For 2003 From 2002 Budget	For 2004 From 2003 Budget
Total OM&R Cost ¹	\$353,171,353	\$318,645,119
Less:		
Net Assets Appropriable ²	(54,189,177)	(42,375,700)
Revenue from Money and Property ²	(7,399,000)	(7,502,000)
Revenue from Current Services for Sewer Service Agreements, Water Sales and Scrap Sales	(431,000)	(529,400)
Revenue from Personal Property Replacement Tax ²	(19,476,700)	(13,492,100)
Reimbursement from Construction Fund ²	(0.00)	(0.00)
Revenue from Miscellaneous Sources Including Administrative Penalties ²	(2,783,300)	(3,788,000)
Village of Glenview Payment	(225,000)	(225,000)
Revenues from Other Sources	(84,504,177)	(67,912,200)
Administrative Costs to be Recovered through Charges Under the User Charge System ³	(5,728,687)	(5,831,554)
Subtotal of Revenues from Other Sources and Administrative Costs	<u>(90,232,864)</u>	<u>(73,743,754)</u>
Adjusted Total OM&R Cost	\$262,938,489	\$244,901,365
Rounded Off Figure	\$262,938,000	\$244,901,000

¹From Table 1 on page 2.

²From pp 81 and 82 of 2002 Budget and pp 81 and 82 of 2003 Budget.

³From Table 3 on page 12.

These unit costs of treatment will be used in the subsequent analysis for distributing costs by class and in distributing the costs of treating infiltration/inflow (I/I) and stormwater. The basis of the District's User Charge system is its cost to treat each gallon of flow, each pound of BOD and each pound of SS.

Distribution of Equalized Assessed Valuations and Quantities by Source

The sources of loadings to the District and the assessed valuations for these sources are shown in Table 5.

The District utilized the 2001 total equalized assessed value (EAV) for its service area of \$92,510,000,000. This included railroad property. Through a review and evaluation of all tax credits claimed by Large Commercial-Industrial and Tax-Exempt Users in 2002, based on their 2001 real estate property taxes, it was established, that the EAV of the Large Commercial-Industrial sources was \$10,593,840,399. These are based on the most recently updated verified User data in the District's files and were for tax year 2001 payable in 2002. Some tax-exempt Users pay property taxes on their facilities which they utilize for commercial purposes. This EAV was \$313,311,721. Subtracting the EAV of the Large Commercial-Industrial Users (\$10,593,840,399) and the EAV of the Tax-Exempt Users (\$313,311,721) on City property leaves a total EAV of \$81,602,847,888 for the Residential and Small Nonresidential Commercial-Industrial Users.

Allocation of Rain, I/I and Recycle

As stated earlier, the total quantities of flow, BOD and SS are determined from District operating records. Following is an explanation of how these quantities were allocated to the four sources of Residential and Small Nonresidential Commercial-Industrial, Large Commercial-Industrial, Tax-Exempt, and I/I, Rain, and Recycle, as shown in Table 5.

The Recycle item was introduced in the 1987 User Charge rate calculations for BOD and SS because failure to include this item results in disproportionately high and improper assignment of BOD and SS concentrations and total loadings to the Residential and Small Nonresidential Commercial-Industrial (R&SNC-I) class. This item was designated "Recycle" because, currently, samples of plant loadings include substantial "loadings" due to recycle of in-plant wastestreams and thus do not adequately reflect User-generated loadings. In the 2004 calculations, the recycle flow volume was established as 36.91 million gallons per day (MGD) or 13,472 MG/year, based on the May 12, 2003 memorandum from the Maintenance and Operations Department providing the 2002 recycle flow volume. R&SNC-I Class listed in Table 5 (computed as in prior years), and the standard domestic concentrations of 119 mg/L for BOD and 168 mg/L for SS, I/I, Rain and Recycle flows were determined to be 124,611 MG per year. (see Table 6)

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3

ADMINISTRATION COSTS
OF USER CHARGE AND SEWAGE AND WASTE CONTROL ORDINANCES
TO BE RECOVERED UNDER USER CHARGE SYSTEM

Small Commercial-Industrial Users ¹	\$ 95,443
Tax-Exempt Users ¹	\$ 456,111
Large Commercial-Industrial Users	
User Charge Verification (UCV) Charges ^{1,4}	\$ 2,500,000 ⁴
Minimum Pretreatment Requirement (MPR) Charges ^{2,4}	\$ 2,300,000 ⁴
Non-compliance Enforcement (NCE) Charges ^{3,4}	<u>\$ 480,000</u>
Total Administrative Costs to be Recovered from Users Under the User Charge Ordinance	\$ 5,831,554

¹Based on information provided for by the District's Finance Department.

²This is an estimate based on the total of the Minimum Activity Expenditures and the Minimum Acceptable Sampling Expenditures.

³This is an estimated amount based on the amount collected for 2002 by the District's Finance Department and adjusted for District salary increases for 2001, 2002 and 2003.

⁴These estimated Administrative Costs have been adjusted for District salary increases for 2001, 2002 and 2003.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 4

UNIT COST OF TREATMENT

Total District Loadings for 2002¹

Volume	=	454,604 MG
BOD	=	692,807 Klbs
SS	=	865,455 Klbs

Total OM&R Cost = \$ 244,901,000

Allocation of Cost According to Parameters of Flow, BOD & SS²

Flow	=	27.27% x \$244,901,000 = \$ 66,784,503
BOD	=	38.03% x \$244,901,000 = \$ 93,135,850
SS	=	34.70% x \$244,901,000 = \$ 84,980,647

Unit Costs of Treatment

Volume	=	\$ 66,784,503 / 454,604 MG = \$ 146.91/MG
BOD	=	\$ 93,135,850 / 692,807 Klbs = \$ 134.43/Klbs
SS	=	\$ 84,980,647 / 865,455 Klbs = \$ 98.19/Klbs

¹The 2002 District loadings are used in the calculation of 2004 rates because this is the latest full year's operating data at the time the calculations were made. (Source: R&D Department Water Reclamation Plant 2002 Operating Records.)

²Percent distribution of cost-to-load parameters derived from the Finance Department CMSR02 Reports for the years 1995 through 1999.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 5

DISTRIBUTION OF EQUALIZED ASSESSED VALUATIONS AND QUANTITIES BY SOURCES

Source	Equalized Assessed Valuation (\$)	Volume (MG)	BOD (Klbs)	SS (Klbs)
Residential and Small Nonresidential Commercial-Industrial ¹	\$81,602,847,888 ³	295,005	292,781	413,337
Large Commercial-Industrial ¹	\$10,593,840,399 ²	24,201	120,798	48,673
Tax-Exempt ¹ (and governmental)	\$ 313,311,721 ³	10,787	17,871	43,331
II, Rain and Recycle (See Table 6)		124,611	261,357	360,114
Total (Approximate Due to Roundoff)	\$92,510,000,000 ⁴	454,604	692,807	865,455

¹The quantities shown on these lines constitute the billable flows and loads for the classes indicated.

²EAV is based on actual tax credits reported to District Users. The tax credit data was taken from the 2002 annual statements filed by the Users. This data is verified by ad valorem tax bills submitted with the 2002 annual statements. \$42,481,300 in 2001 real estate taxes were claimed by Large Commercial-Industrial Users in 2002, and the District's 2001 tax rate was 0.401 cents per \$100.00 of EAV. Therefore, $(\$42,481,300/0.401) \times \$100 = \$10,593,840,399$, the imputed EAV of the Large Commercial-Industrial Class.

³Similarly, Users in the City of Chicago airports and several hospitals paid real estate taxes of \$1,256,380 for property which were utilized for commercial usage. Based on this tax paid, the EAV of the tax-exempt class was $(\$1,256,380/0.401) \times \$100 = \$313,311,721$. The EAV of the Residential and Small Nonresidential Commercial-Industrial Class is computed by deducting all other figures from the total EAV.

⁴Total EAV is for the year 2001 as supplied by the Country Assessor, Multiplier = 2.3098.

Analysis of Dry- and Wet-Weather Flows

The method of determining dry- and wet-weather flows in the 2001 through 2004 rate-setting process was revised from the method used in the rate calculations for 2000 and previous years. For rate settings prior to 1982, rain-attributed loads were derived by extracting all loads received at a WRP on a day with 0.10 inches of precipitation or more, projecting the remaining loads over 365 days, and subtracting this value from total WRP flows. This method, however, does not account for rain loads received days after a storm due to the lag time required for flows to arrive from the perimeter of a collection area.

In the 1982 through 1989 rate calculations, rain-attributed flows were determined by an analysis of the daily plant operating records for a previous year. For the 1986 through 1989 rate calculations, the records for 1985 were used. Because the dry-weather flow is thought to be relatively stable, it was felt that a separate determination each year was not warranted. The month in 1985 exhibiting the lowest total precipitation was identified as January.

The month of January 1985 was chosen because it has these characteristics and, therefore, represented a baseline condition. The flow and pollutant loadings for each day during this month were calculated and totaled for the month. The monthly sums were then divided by the number of days in the month.

The difference between total dry-weather load and the total load was considered to be the wet-weather or rain load. For the 1990 through 1998 rate calculations, the Rain and I/I flows were determined by using 1988 plant operating data. The operating records from each WRP were screened to find the five lowest flow days. These days were averaged and used as dry-weather flow for each of the seven WRPs. The seven WRPs were tabulated to give a District-wide daily dry-weather flow quantity of 911 million gallons per day. The tabulated daily dry-weather flow was converted into an annual volume.

However, for the 1999 and 2000 rate calculations, it was decided to update the dry-weather flow quantity and methodology, because the 1988 data was then ten years old and the method did not account for changes which may reasonably occur over time. Therefore, for 1999 and 2000, the User Charge rate calculation utilized the average of the five lowest days for each of the previous five years for which flow data was available to identify the average dry-weather flow. WRP flow data was available for 1994 through 1998 for the 2000 rate calculations. For each WRP the five lowest days for each year were averaged for each of the five available years.

Based on 1994 through 1998 WRP operating data, the average daily dry-weather flow was 923.34 MGD (rounded off to 923 MGD). The highest year was 1997 with an average dry weather flow of 939.90 MGD, while the lowest year was 1995 with 890.73 MGD.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 6

ALLOCATION OF I/I, RAIN AND RECYCLE

Class Loadings	Flow (MG)	%	BOD (Klb)	%	SS (Klb)	%
<u>Dry-Weather Loadings</u>						
Residential and Small Nonresidential Commercial-Industrial ¹	295,005	89.40	292,781	67.86	413,337	81.79
Large Commercial-Industrial ²	24,201	7.33	120,798	28.00	48,673	9.63
Tax-Exempt (and Governmental) ²	<u>10,787</u>	<u>3.27</u>	<u>17,871</u>	<u>4.14</u>	<u>43,331</u>	<u>8.57</u>
TOTAL	329,993	100.00	431,450	100.00	505,341	100.00
<u>Allocating I/I, Rain and Recycle</u>						
Residential and Small Nonresidential Commercial-Industrial	111,399		177,356		294,550	
Large Commercial-Industrial	9,139		73,175		34,685	
Tax-Exempt (and Governmental)	<u>4,073</u>		<u>10,826</u>		<u>30,878</u>	
TOTAL ³	124,611		261,357		360,114	
GRAND TOTAL ⁴	454,604		692,807		865,455	

¹Residential and Small Nonresidential Commercial-Industrial (R&SNC-I) flows are derived by subtracting rain, I/I and recycle figures as well as known Large Commercial-Industrial and Tax-Exempt loads from the grand totals. Standard domestic sewage concentrations of 119 mg/L for BOD and 168 mg/L for SS are used (as specified in Section 7g of the User Charge Ordinance) and have been applied to the volume so derived to establish the R&SNC-I BOD and SS loadings, respectively.

²These numbers were arrived at from the District's records of all 2002 User Charge Annual Statements.

³Daily M&O Department records for the District's seven WRPs for the year 2002 show a total volume treated of 454,604 MG. The projected annual dry-weather volume is 941 x 365 days = 343,465 MG. I/I, Rain and Recycle flows are equal to Total Flow (454,604 MG) minus Dry-Weather Flow (343,465 MG), or 111,139 MG plus Recycle (13,472 MG) = 124,611 MG. See Page 10 for an explanation of the Recycle item as first introduced in the 1987 User Charge rate calculations. Totals may not equal sum of components due to rounding.

⁴Grand totals come from 2002 operating records as explained on Page 5.

Beginning with the 2001 rate calculations, the District determined that it would utilize the total of the seven consecutive lowest flow days recorded in 1999 at each of the District's WRPs for identifying the average daily dry weather flow. This method accounts for a complete normal workweek for each WRP along with weekends. Utilizing this method, the dry weather flow for 1999 was 941 MGD. The tabulation of this 1999 data is shown in Table 7.

Distribution of I/I, Rain, and Recycle OM&R Costs

As shown in Table 5 on Page 13, there are four sources of loadings to the District's WRPs. However, under the ad valorem tax system, there are three sources which contribute toward the payment of OM&R costs: the Residential and Small Nonresidential Commercial-Industrial User classes and the Large Commercial-Industrial User class. Of the two remaining sources, namely, the Tax-Exempt class, and I/I, Rain and Recycle, only the Tax-Exempt class source can contribute toward the payment of OM&R costs. The OM&R costs to treat flows and loads from the remaining source, I/I, Rain, and Recycle must be distributed to the Residential and Small Nonresidential Commercial-Industrial, Large Commercial-Industrial and Tax-Exempt classes in proportion to the dry-weather loads and flows contributed by these three regulated classes. The results of the distribution of loads and flows are shown in Table 6.

Calculation of Rates for the Large Commercial-Industrial and Tax-Exempt Classes

After allocating the I/I, Rain, and Recycle-attributed flows to the three classes, a cost for each class was calculated by multiplying each class parameter quantity by the unit cost generated in Table 4 on Page 14. The results of these calculations are shown in Table 8. Please note that the class totals shown include the administrative cost for the Residential and Small Nonresidential Commercial-Industrial Class and the Tax-Exempt Class distributed to volume, BOD and SS in proportion to the total other costs, for each parameter, for each class. These costs, totaling \$245,450,402 must be recovered by the District through the ad valorem (real estate) tax system and User surcharges.

In summary, the total OM&R cost by class is:

Residential and Small Nonresidential	
Commercial- Industrial	\$192,508,797
Large Commercial-Industrial	39,158,691
Tax-Exempt	<u>13,783,514</u>
TOTAL	\$245,450,402

The Residential and Small Nonresidential Commercial-Industrial classes' OM&R costs are collected through the District's dedicated ad valorem tax system. Using the equalized assessed class value of \$81,602,847,888 for the Residential and Small Nonresidential Commercial-Industrial classes as shown in Table 5, and the class OM&R cost of \$192,508,197 for the Residential and Small Nonresidential Commercial-Industrial classes, as shown in Table 8, the ad valorem residential OM&R rate was determined as follows:

$$\$192,508,197 / \$81,602,847,888 = 0.236 / \$100 \text{ EAV}$$

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TABLE 7

LOWEST SEVEN CONSECUTIVE DAYS AVERAGE FLOW
AT WRPS FOR 1999

WRP	Million Gallons Per Day
Stickney	527.00
North Side	198.00
Calumet	167.00
Egan	19.30
Hanover	5.74
Kirie	22.86
Lemont	<u>1.40</u>
Total	941.00

This constitutes the OM&R rate for all classes under the ad valorem tax system and represents a 11.61 percent decrease from the 2003 rate of 0.267/\$100 EAV.

In the collection of ad valorem tax revenues, the Cook County Treasurer has experienced a shortfall over the years due to delinquencies. The actual extent of this shortfall is unknown. To compensate for this shortfall, however, it is customary for taxing bodies to increase their tax levies by an amount which approximates the shortfall. The District's budget for 2003 included a 3.5 percent allowance for tax revenues uncollected in the year of levy.

The calculation of the ad valorem residential OM&R rate of 0.236/\$100 EAV is without the allowance for uncollectibles. This rate adjusted downward by 3.5 percent for uncollectibles would be 0.228/\$100 EAV. The adjusted ad valorem OM&R rate is 56.9 percent (0.228/0.401) of the District's total 2001 ad valorem tax rate.

The User Charge rates for the Large Commercial-Industrial class are equal to the total cost per parameter for this class divided by the billable flow and loads, as shown in Tables 5 and 8. Using this data, the following rates were established for the Large Commercial-Industrial User class:

Flow:	\$ 4,897,979/24,201	MG	=	\$202.39/MG
BOD:	\$ 26,075,790/120,798	Klbs	=	\$215.86/Klbs
SS:	\$ 8,184,922/48,673	Klbs	=	\$168.16/Klbs

The Tax-Exempt class OM&R costs must be fully collected by the User Charge System. Using the total cost per parameter for this class divided by the billable flow as shown in Tables 5 and 8 the following rates were established for the Tax-Exempt User class:

Flow:	\$ 2,257,796/10,787	MG	=	\$209.31/MG
BOD:	\$ 3,989,763/17,871	Klbs	=	\$223.25/Klbs
SS:	\$ 7,535,955/43,331	Klbs	=	\$173.92/Klbs

The 2004 rates compare with current 2003 rates as follows:

<u>Class Parameters</u>	<u>2004</u>	<u>2003</u>	<u>% Change</u>
Large Commercial-Industrial			
Flow \$/MG	\$202.39	\$217.74	-7.05
BOD \$/Klbs	\$215.86	\$227.39	-5.07
SS \$/Klbs	\$168.16	\$182.75	-7.98

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 8

COST PER PARAMETER AND TOTAL COST PER USER CLASS
FOR 2004 RATES

Class	Flow (MG)	BOD (Klbs)	SS (Klbs)	Total
Residential and Small Nonresidential Commercial-Industrial	406,404	470,137	707,887	
UNIT COST	\$ 146.91	\$ 134.43	\$ 98.19	
TREATMENT COST + ADMINISTRATION COST	\$59,704,812	\$63,200,517	\$69,507,425	\$192,412,754
CLASS TOTAL	<u>\$ 29,616</u> \$59,734,428	<u>\$ 31,350</u> \$63,231,867	<u>\$ 34,478</u> \$69,541,903	<u>\$ 95,443</u> \$192,508,197
Large Commercial- Industrial	33,340	193,973	83,358	
UNIT COST	\$ 146.91	\$ 134.43	\$ 98.19	
TREATMENT COST CLASS TOTAL	<u>\$4,897,979</u> \$4,897,979	<u>\$26,075,790</u> \$26,075,790	<u>\$8,184,922</u> \$8,184,922	<u>\$ 39,158,691</u> \$ 39,158,691
Tax-Exempt (and Governmental)	14,860	28,697	74,209	
UNIT COST	\$ 146.91	\$ 134.43	\$ 98.19	
TREATMENT COST + ADMINISTRATION COST	\$2,183,083	\$3,857,738	\$7,286,582	\$ 13,327,403
CLASS TOTAL	<u>\$ 74,713</u> \$2,257,796	<u>\$ 132,025</u> \$3,989,763	<u>\$ 249,373</u> \$7,535,955	<u>\$ 456,111</u> \$ 13,783,514
TOTAL COST				\$245,450,402

<u>Class Parameters</u>	<u>2004</u>	<u>2003</u>	<u>% Change</u>
Tax-Exempt			
Flow \$/MG	\$209.31	\$223.29	-6.26
BOD \$/Klbs	\$223.25	\$233.19	-4.26
SS \$/Klbs	\$173.92	\$187.41	-7.20
OM&R Factor	0.569	0.624	-8.81

The above comparison shows decreases in the rates for both the Large Commercial-Industrial and Tax-Exempt User classes. These decreases are due to a number of factors. The 2002 plant loadings are lower than the 2001 loadings – flow decreased by 12 percent, BOD loading decreased by 10 percent and SS loadings decreased by 21 percent. There is also a similar decrease in User Class loadings. The rate calculation uses financial data from the District's 2003 Budget, District operating cost and loading data for 2002 and User loading data for 2002. This is the most recent data available. This decrease in Plant and User Class loadings would increase the User Charge rates. However the I/I, rain and recycle loadings decreased in 2002 from 2001 by 34.3 percent for flow, 19.71 percent for BOD and 39 percent for SS. This would cause a decrease in the rates. The net effects of the decrease in the plant loadings and the user loadings and the decrease in the I/I, rain and recycle loadings cancel each other out. That leaves the recoverable OM&R cost as the principal factor to impact the rates. The District's total OM&R costs showed a decrease between 2002 and 2003. The recoverable OM&R cost decreased from \$263 million to \$245 million, i.e. a seven percent reduction. This reduction is the principal reason for the decrease in the rates.

Administrative Cost Recovery

The costs incurred by the District in 2002 in administering the Sewage and Waste Control Ordinance (SWCO) and the User Charge Ordinance (UCO) were considered in determining the 2004 User Charge for the Large Commercial-Industrial User class, the Residential and Small Nonresidential Commercial-Industrial User class, and the Tax-Exempt User class.

Prior to 2001, the administrative costs were included in determining the User Charge rates for flow, BOD and SS for the above three classes of Users and/or were recovered from Users subject to federal categorical pretreatment standards. However, on December 7, 2000, the District's Board of Commissioners amended the UCO, which altered the method of recovery of the administrative costs. Under these amendments, the cost for administering the minimum pretreatment requirements (MPR) and the cost for administering the noncompliance enforcement activities (NCE) of the SWCO were segregated from the administrative costs. Similarly, the cost for administering the User Charge Verification requirements (UCV) of the UCO was also segregated from the administrative costs.

Beginning in 2001, the MPR charges are recovered from the Significant Industrial Users in the Large Commercial-Industrial User class. The NCE charges are recovered from Users who are found in noncompliance with the SWCO. The UCV charges are recovered from the Large Commercial-Industrial User class.

The activities associated with MPR, NCE, and UCV are explained in detail in Section 10 of the UCO. The applicable MPR, NCE, and UCV charges are listed in Appendix F of the UCO.

The Schedule of Charges listed in Appendix F of the UCO are based on the costs for inspection, sampling, analysis and administration of District's activities and were used in computing the 2004 User Charge rates. In computing the 2003 and 2004 User Charge rates, the Schedule F Charges were revised to reflect increases in unit costs for inspection, sampling, analysis and administration due to the increases in District salary costs.

Prepared by _____

Reviewed by _____

Approved by _____