

THE CITY OF EDMONTON
SANITARY SERVICING STRATEGY FUND



2003 ANNUAL REPORT

April, 2004

Prepared by:
City of Edmonton
Asset Management and Public Works
Drainage Services

Sanitary Servicing Strategy Fund
Annual Report

MESSAGE FROM THE MANAGEMENT COMMITTEE

This is the fifth annual report of the Sanitary Servicing Strategy Fund (SSSF). Activities in 2003 included revenue collection, completion of the pump station for the South Edmonton Sanitary Sewer (SESS) Stage SW1, completion of concept plan for West Edmonton Sanitary Sewer (WESS) Stages W2-W12, preparation of concept plan for South Edmonton Sanitary Sewer (SESS) Stages SW2-SW7 as well as updating of the SSSF Financial Model. The two committees of the SSSF, the SSSF Management Committee and the SSSF Operational Committee, met several times during the year to monitor construction progress, review the financial status of the Fund, and to consider and approve proposals for future constructions.

At the end of 2003, the Sanitary Sewer Strategy Fund had a closing balance of \$30.2 million with revenues and expenditures for the year of \$13.7 million and \$1.3 million respectively. Due to the sustained strength in the local housing market in 2003, revenues came in ahead of projections by approximately \$3.6 million. Expenditures were lower than projection by approximately \$1.9 million, mainly due to the postponement of the construction for Stage W1 of WESS. In light of the steady growth in revenue and the current positive balance, the SSSF is in a solid financial position to meet the sanitary needs of developments in the next two decades.

Our focus in 2004 will be on commencing the construction of the West Edmonton Sanitary Sewer (WESS) Stage W12, starting the detailed design of WESS Stage W1 and finalizing the construction program for the next 5 years.

Yours truly,

A handwritten signature in black ink, appearing to read "John Hodgson". The signature is fluid and cursive, with a long horizontal stroke at the end.

John Hodgson, Ph.D., P. Eng.
Chairman, Management Committee

Sanitary Servicing Strategy Fund
Annual Report

TABLE OF CONTENTS

	<u>Page</u>
Message from the Management Committee.....	i
Table of Contents.....	ii
1.0 CONSTRUCTION & PLANNING ACTIVITY IN 2003.....	1
2.0 MANAGEMENT AND OPERATIONAL COMMITTEES	3
3.0 FIVE YEAR CONSTRUCTION PLAN.....	5
4.0 FUND BALANCE	
.1 Twenty Year Projection.....	7
.2 Five Year Projection.....	8
.3 Statement of Fund Activities and Balance.....	10

1.0 CONSTRUCTION & PLANNING ACTIVITY IN 2003

South Edmonton Sanitary Sewer (SESS) SW1 Pump Station

Minor outstanding works for SW1 Pump Station were completed in 2003.

SW1 is part of the SESS system that primarily services developments south of the Transportation Utility Corridor. The 40m deep pump station, which pumps sewage to the South East Regional Trunk Sewer (SERTS) was substantially completed by the end of 2002. During 2003, minor outstanding works such as the installation of the grating around the elevator landing and the extension of the water service to the pump station were completed.

South Edmonton Sanitary Sewer (SESS) Southwest Concept Plan

SESS Southwest Concept Plan substantially completed in December.

The development of the SESS Southwest Concept Plan commenced in April and was substantially completed in December. Open house as well as Risk Assessment and Value Engineering Workshop were held in September and October. Different options of crossing the North Saskatchewan River and the Whitemud Creek had been evaluated and inverted siphons were recommended. Also a construction schedule for the various stages of the sanitary trunk to tie in with the given timing of developments in the benefited neighborhoods had been proposed and is currently being reviewed by the Project Team. A recommendation will be forwarded to the SSSF Management Committee in 2004 for approval.

West Edmonton Sanitary Sewer (WESS) Stages W2-W12 Concept Plan

WESS (Stages W2-W12) Concept Plan finalized in August.

The WESS Stages W2-W12 Concept Plan was finalized in August 2003. To be built over a period of 50 years, the WESS system of trunks will ultimately direct flows from new developments in west Edmonton to the existing North and South Highlands tunnels. In addition to providing capacity for future growth in west Edmonton, the WESS trunk will also help to reduce combined sewer overflows to the North Saskatchewan River. The first stage to be constructed is W12 which is estimated to cost \$24 million. The SSSF will contribute \$9 million, with the remaining funding coming from the Combined Sewer Overflow (CSO) program.

West Edmonton Sanitary Sewer (WESS) Stage W12 Design

Preliminary Design of WESS Stage W12 started in April.

Project approval was obtained from City Council in April 2003. Four consulting firms, specializing in hydraulic, structural and geotechnical fields, were hired to undertake the preliminary & detailed design. A Risk Management session was conducted in September to identify the risks and to develop a risk management plan. Two value engineering sessions were subsequently held in October and November. At the same time, geotechnical investigations were carried out on site in October to gather pertinent data required for the detailed design of the tunnel. Preliminary design will be finalized in the spring of 2004 to confirm the horizontal and vertical alignment of the river crossing prior to commencement of detailed design. Site construction works are scheduled to commence in the fall of 2004.

West Edmonton Sanitary Sewer (WESS) Stage W1 across 170 Street

Construction of the section of WESS Stage W1 across 170 Street will be done in conjunction with the Double Barrel Project.

During the September meeting, the SSSF Management Committee approved the recommendation to construct the portion of WESS Stage W1 across 170 Street in conjunction with the Double Barrel Project. This arrangement will result in significant savings in cost as well as minimizing disruption of traffic. Construction works are expected to be complete by the end of 2004.

SSSF Financial Model Update

SSSF Financial Model Update completed in December. Enhancement of the Model allows quick scheduling decisions to be made with good information.

The SSSF Financial Model was originally developed in 1998. Since that time, there had been a number of changes on the construction sequence and cost estimates for the various stages of the sanitary trunks. It was therefore considered an opportune time to update the data and to have a third party provide an independent review of the Model. The re-design of the Model commenced in April and was completed in December. Opportunity was also taken to add a risk analysis tool to enable assessment of long term impact of rate assumptions in the future. Enhancement of the Model allows quick scheduling decisions to be made with good information.



Figure 1A

WESS (W12) - Site Investigation



Figure 1B

SESS (SW1 Pump Station) – Minor Works

2.0 MANAGEMENT AND OPERATIONAL COMMITTEES

The role of the **SSSF Management Committee** is to make decisions regarding revenues and expenditures that best meet the long-range plan of all the stakeholders. The Committee is composed of five members (three from the City and two from the Urban Development Institute):

Chair: Director of Drainage Planning – John Hodgson
Members: Director of Drainage Design and Construction – K.C. Er
Director of Development Coordination – Wayne Cameron
Chair of UDI Drainage Committee – Bob Gomes
Member of UDI Executive Committee – Peter Cavanagh

Clement Yong (Cost Assessment Engineer) provided support for this committee during the months of January to March 2003. Upon his departure from the City of Edmonton, Francis Wu (Senior Cost Assessment Engineer) took over the responsibilities in May 2003.

Major accomplishments by the Management Committee in 2003 were:

- *Approved financing of WESS Stage W12.*
 - *Approved replacement of WESS Stage W2 by W13.*
 - *Approved construction of portion of WESS Stage W1 across 170 Street.*
 - *Approved commencement of design for WESS Stage W1.*
- Approved financing of West Edmonton Sanitary Sewer (WESS) Stage W12 to a maximum of \$9 million.
 - Approved replacement of West Edmonton Sanitary Sewer (WESS) Stage W2 by Stage W13.
 - Approved construction of the portion of West Edmonton Sanitary Sewer (WESS) Stage W1 across 170 Street in conjunction with the Double Barrel Project.
 - Approved commencement of design for West Edmonton Sanitary Sewer (WESS) Stage W1.

Sanitary Servicing Strategy Fund
Annual Report

- *Approved rate increase of 2.89%.*

The Operational Committee examines technical issues to support project implementation

Major accomplishments included recommending commencement of detailed designs for WESS Stages W1 and W12.

- Endorsed recommended rate increase of 2.89% to take effect on January 1, 2004.

The **SSSF Operational Committee** provides recommendations to the Management Committee regarding the timing and capacity requirements for new trunk construction, and flags relevant issues for consideration by the Management Committee. The Committee is composed of 7 members (five from the City and two from UDI):

Chair: Senior Engineer, Strategic Planning – Paul Hoffart
Members: Program Manager, Design and Construction – Siri Fernando
Planning and Development Representative – Orest Gowda
Drainage Financial Services Representative – Lyle Windsor
Member of UDI Committee – Ken Sadownyk
Member of UDI Committee – Blaine Usenik
Cost Assessment Engineer – Clement Young (Jan – Mar)
Senior Cost Assessment Engineer - Francis Wu (May – Dec)

The Operational Committee met four times in 2003 in joint sessions with the SSSF Management Committee. Major accomplishments for the year included:

- Reviewed and monitor the progress of the SESS SW Concept Plan and the SSSF Financial Model Update.
- Recommended that construction of WESS Stage W12 be started in 2004 and works on WESS Stages W3-W5 be postponed.
- Recommended that portion of WESS Stage W1 across 170 Street be built in conjunction with the Double Barrel Project.
- Recommended that design work for WESS Stage W1 be commenced in 2004.
- Recommended that WESS Stage W2 be replaced by Stage W13.

3.0 FIVE YEAR CONSTRUCTION PLAN

Shown below are the proposed major sanitary trunk construction projects for the next five years, as determined by The City of Edmonton Drainage Services. This proposed program is developed to support orderly development throughout the City of Edmonton in a cost-effective manner, using population and employment projections currently available to the City. It also strives to meet the important objective of maintaining a positive balance for the Sanitary Servicing Strategy Fund. The locations of the construction projects are shown on Figure 2.

2004 – 2005 : West Edmonton Sanitary Sewer (WESS) – Stage W12

Completion of WESS Stage W12 will provide capacity for future growth in west Edmonton as well as help to reduce combined sewer overflows to the North Saskatchewan River.

WESS Stages W2-W12 Concept Plan recommends that the first stage to be constructed should be Stage W12 which crosses the North Saskatchewan River (NSR). When completed, Stage 12 not only provides additional capacity to the sanitary trunk sewer system for future growth in west Edmonton but will also help to reduce the combined sewer overflows to NSR.

Construction of the 2500mm diameter inverted siphon connecting the north side combined sewer to the existing South Highlands Interceptor is scheduled to commence in the fall of 2004 for completion in Spring 2006. The total length of the tunnel will be approximately 1,225 metres.

2005 – 2006 : South Edmonton Sanitary Sewer (SESS) – Stage SW2

Construction timing of SW2 coincides with that for future developments in the Heritage and East Heritage Valley areas.

With the southwest leg of Anthony Henday Drive (between Whitemud Drive and Calgary Trail) scheduled for completion in 2006, the pace of new developments in the southwest quadrant of the City is expected to accelerate in the next few years. Considering that the storage capacity of SW1 is likely to be exhausted by the year 2006 based on current projection on the pace of new houses being occupied in the Ellerslie and East Heritage Valley areas, construction of SW2 is planned to be commenced in 2005. Provisions will be made during the construction of SW2 to allow for future service for the lands to the south, east and west.

Completion of Stage W1 will open up more land for development in the Lewis Farms and the Winterburn Industrial areas.

2006 – 2007 : West Edmonton Sanitary Sewer (WESS) – Stage W1

The approved WESS Stage W1 Concept Plan recommends that a 675mm gravity sewer / forcemain be built along 100 Avenue to connect to the existing sanitary trunk at 163 Street. The Management Committee has also approved the recommendation to construct the portion of the proposed sewer across 170 Street at the same time as the Double Barrel Project so as to reduce overall construction costs and to minimize disruption to traffic during construction. Once completed, it will open up more land for development in the Lewis Farms and the Winterburn Industrial areas. The estimated construction costs is approximately \$8 million.

Current construction schedule for SA6 will need to be re-evaluated in the near future.

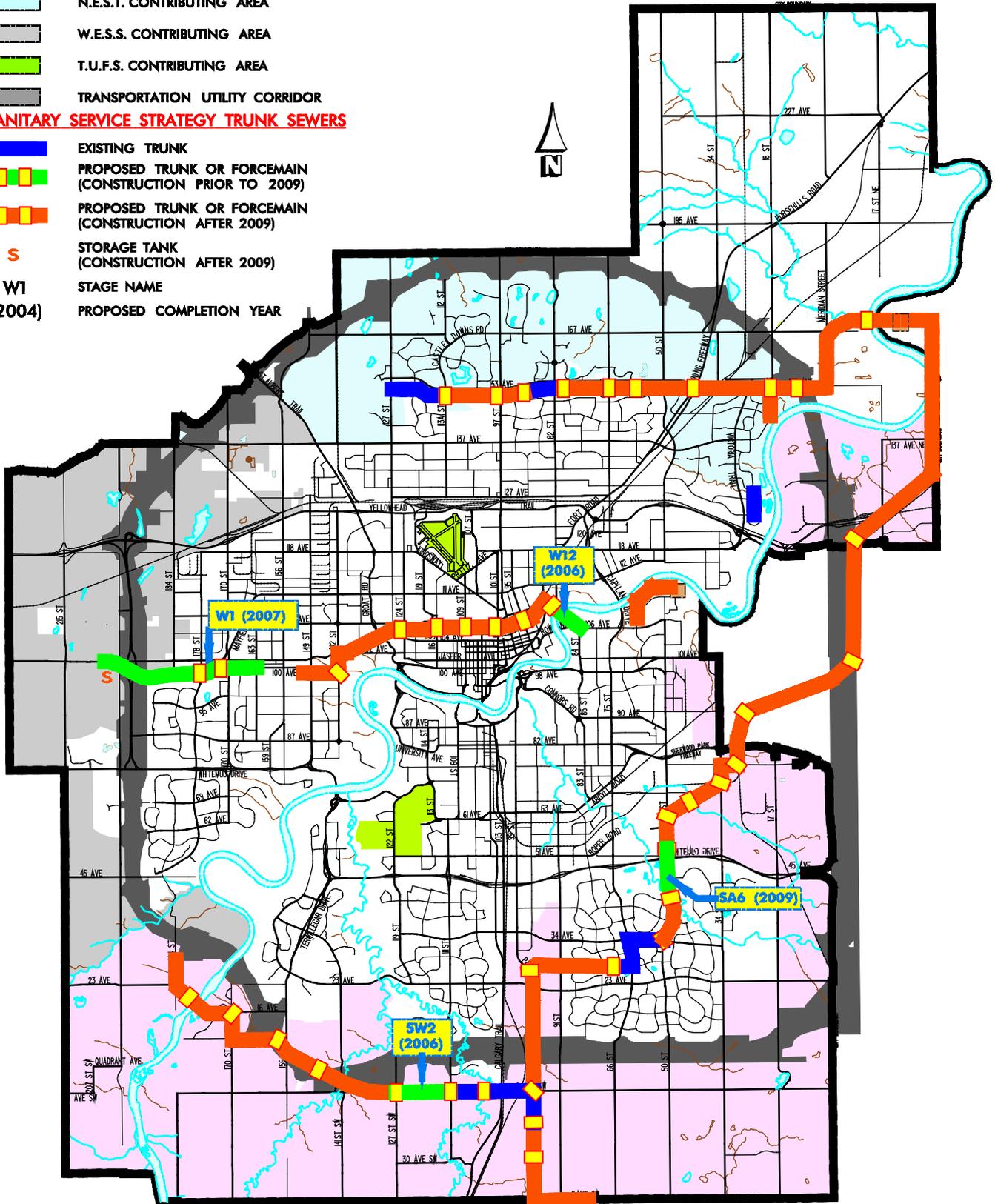
2008 – 2009 (Tentative) : South Edmonton Sanitary Sewer (SESS) – Stage SA6

Under the original schedule, Stage SA6 is proposed to be built during the years 2008 and 2009 to provide the necessary storage of sanitary flow generated from the new residential developments in the Meadows neighborhood. However in view of the apparent shift of new residential developments towards the south and southwest side of the City, the construction schedule for Stage SA6 for SESS will need to be re-evaluated in the near future.

SANITARY SERVICING STRATEGY FIVE YEAR FORECAST: 2004 – 2008

LEGEND

- S.E.S.S. CONTRIBUTING AREA
- N.E.S.T. CONTRIBUTING AREA
- W.E.S.S. CONTRIBUTING AREA
- T.U.F.S. CONTRIBUTING AREA
- TRANSPORTATION UTILITY CORRIDOR
- SANITARY SERVICE STRATEGY TRUNK SEWERS**
- EXISTING TRUNK
- PROPOSED TRUNK OR FORCEMAIN (CONSTRUCTION PRIOR TO 2009)
- PROPOSED TRUNK OR FORCEMAIN (CONSTRUCTION AFTER 2009)
- S** STORAGE TANK (CONSTRUCTION AFTER 2009)
- W1** STAGE NAME
- (2004)** PROPOSED COMPLETION YEAR



NOTE: - ALL PROJECT ALIGNMENTS AND PROJECT TIMING ARE SUBJECT TO REVIEW AND CHANGE
 - CONTRIBUTING AREAS ARE APPROXIMATE & ARE SUBJECT TO ADJUSTMENTS

FIGURE 2

4.0 FUND BALANCE

4.1 TWENTY YEAR PROJECTION

The SSSF Financial Model was updated in 2003 to include latest available data on construction costs and population projections. The latest projection shows that the fund balance (in 2003 dollars) will stay in the black throughout the 75-year period. Figure 3 shows the cashflow projection for the period up to 2024.

The following revisions to the construction schedule were made to the base case in the updated model:

<u>Stage</u>	<u>Previously Identified Construction Year</u>	<u>Revised Construction Year</u>
W12	2011/2012	2004/2005
W3	2004/2005	2011/2013
W4	2004/2005	2011/2013
W5	2004/2005	2011/2013
SW2	2013	2005/2006
SE2	2004	2015
SA2	2017/2019	2022/2023
SW3	2020	2024

The Twenty Year cash flow projection for the SSSF will be the main factor in any decision to adjust the SSTC and EA rates

The following general assumptions have also been adopted in the updated model:

- a) Population projections were based on the 'Edmonton Population and Employment Forecast Allocation Study (2000-2025)'.
- b) Previously proposed 15% rate increases in 2010, 2015 and 2020 are retained in addition to the annual inflationary increases.
- c) Annual interest rate gradually increases from 2% to 5%.

Sanitary Servicing Strategy Fund 25 Year Cash Flow Projection (1999 - 2024)

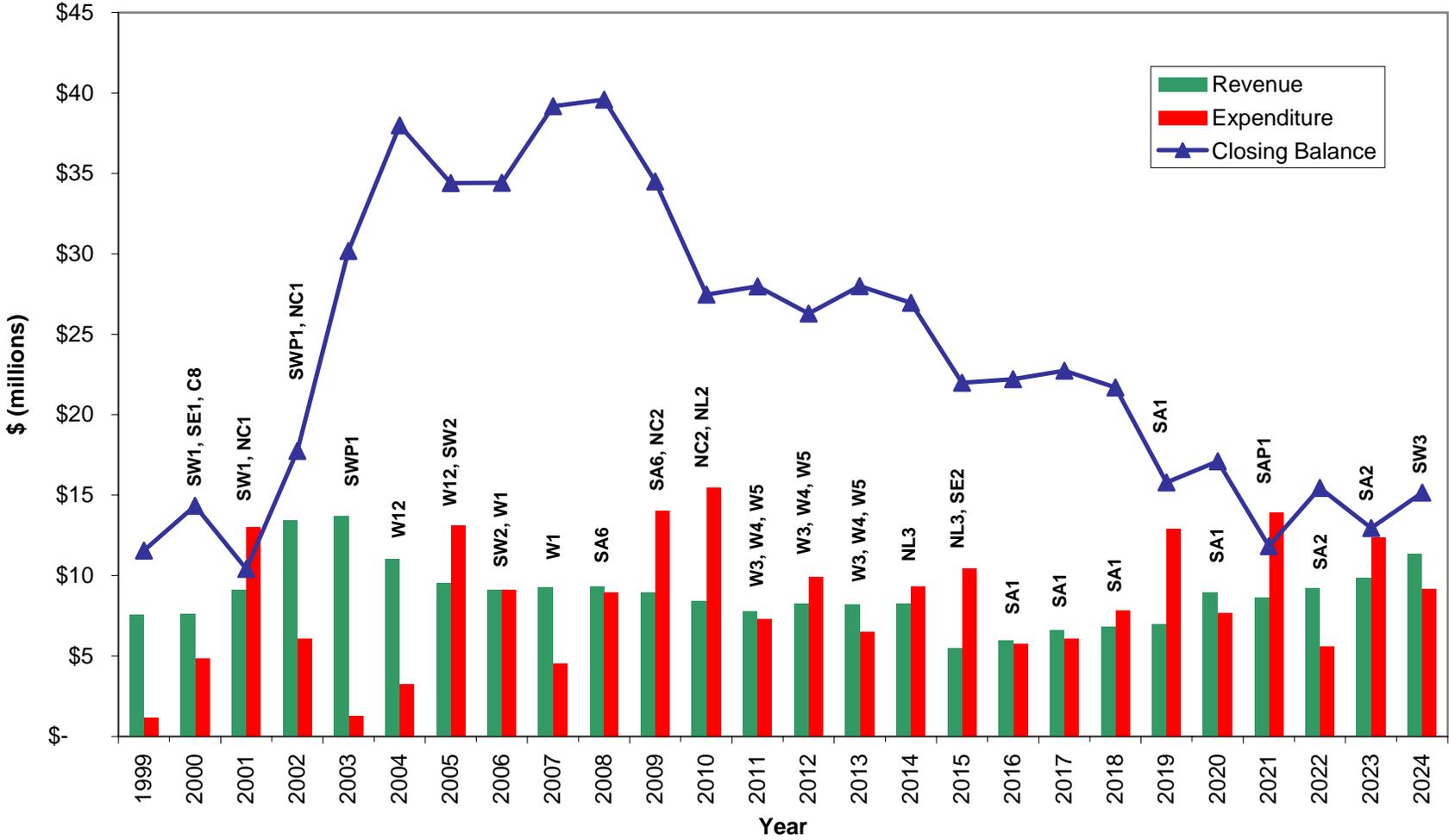


FIGURE 3

Sanitary Servicing Strategy Fund
Annual Report

- d) Annual borrowing rate gradually increases from 4% to 8%.
- e) Annual increases in the rates and construction costs gradually vary from 3% to 6%.

The Management Committee will continue to monitor the fund balance in the future to determine if the previously proposed 15% rate increases in 2010, 2015 and 2020 are still necessary to achieve a positive balance at the end of the Program.

4.2 FIVE YEAR PROJECTION

Table 1 shows the Five Year projection for the Sanitary Sewer Strategy Fund (SSSF). This projection is based on the following data:

Receipts

- ♦ **Opening Balance for 2003** – The actual SSSF balance as of December 31, 2002.
- ♦ **Receipts and Disbursements for 2003** – These are based on actual 2003 amounts (See Table 2)
- ♦ **Interest Accrual (2003 – 2008)** – The 2003 numbers are based on actual amounts. 2004-2008 amounts are based on an assumed rate of return of 2% for the years 2004, 2005 & 2006 and 2.5% for the years 2007 & 2008.
- ♦ **Utility Contribution** – This amount represents contributions from the Sanitary Utility for future diversion of sanitary flows from serviced City lands to the new trunk system constructed under the SSSF. These lands are located in Mill Woods, parts of the Meadows and in Castle Downs. The amount is calculated based on an estimate of the Sanitary Sewer Trunk Charge these lands would have to pay. Based on current projections, the Sanitary Utility will make these contributions to the SSSF until 2014.

The Sanitary Utility is currently providing \$2.6 million per year to the SSSF.

Sanitary Servicing Strategy Fund
Annual Report

- ♦ **Sanitary Sewer Trunk Charge** – The SSTC is collected when an application is made for a Development Permit or sanitary service connection. This charge applies to all new development and redevelopment in the City. The following are the SSTC rates for 2003 and 2004:

The Sanitary Sewer Trunk Charge has increased by 2% from 2002 and will increase by another 2.89% effective 1 January 2004.

<u>Type of development</u>	<u>2003</u>	<u>2004</u>
Single-family/Duplex Residential	\$780/dwelling	\$803/dwelling
Multi-family Residential	\$557/dwelling	\$573/dwelling
Commercial, Industrial, Institutional	\$3,898/ha	\$4,011/ha

Estimated SSTC revenue from 2004 to 2008 is based on projected development within the City.

- ♦ **Expansion Assessment (EA)** – The EA is an area-based assessment that is collected at the time of subdivision, development permit application or sanitary service connection application. The EA applies to those areas of the City that did not have an approved Neighborhood Structure Plan (NSP) before January 1, 1998. The 2003 and 2004 rates for EA are as follows:

The Expansion Assessment is collected from the contributing areas as shown on Figure 2.

<u>Contributing Area</u>	<u>2003</u>	<u>2004</u>
North Edmonton Sanitary Trunk (NEST)	\$11,138/ha	\$11,460/ha
South Edmonton Sanitary Sewer (SESS)	\$11,138/ha	\$11,460/ha
Terwillegar and University Farms (TUFS)	\$11,138/ha	\$11,460/ha
West Edmonton Sanitary Sewer (WESS)	\$13,923/ha	\$14,325/ha

Disbursements

- ♦ **Estimated Construction Costs** – The 2003 amounts are based on actual construction costs incurred. The timing of construction is a critical factor for the fund balance.

SANITARY SERVICING STRATEGY FUND - 5 YEAR PROJECTION (Nominal Dollars)

	<i>2003(Actual)</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>
Opening Balance	\$17,758,944	\$30,188,075	\$37,951,397	\$34,352,372	\$34,343,038	\$39,079,066
Interest	667,069	351,004	276,994	312,095	362,169	365,948
Other Revenues	2,600,000	2,600,000	2,600,000	2,600,000	2,600,000	2,600,000
Sanitary Sewer Trunk Charge	6,490,588	5,091,394	3,665,134	3,234,775	3,499,011	3,087,953
Expansion Assessment	3,931,542	2,982,846	2,972,769	2,949,118	2,781,602	3,249,109
Total Receipts	13,689,199	11,025,244	9,514,897	9,095,988	9,242,782	9,303,010
Estimated Construction Costs	(1,039,673)	(3,000,000)	(12,852,000)	(8,843,400)	(4,244,832)	(8,659,457)
Other Expenditures	(220,395)	(261,922)	(261,922)	(261,922)	(261,922)	(261,922)
Total Disbursements	(1,260,068)	(3,261,922)	(13,113,922)	(9,105,322)	(4,506,754)	(8,921,379)
Closing Reserve Balance	\$30,188,075	\$37,951,397	\$34,352,372	\$34,343,038	\$39,079,066	\$39,460,697

Estimated Construction Costs (Nominal Dollars)

	<i>Total</i> <i>2004 - 2008</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>
W12	6,080,000	2,000,000	4,080,000	-	-	-
W12P	2,550,000	-	2,550,000	-	-	-
W1	7,855,628	500,000	-	3,641,400	3,714,228	-
SW2	11,924,000	500,000	6,222,000	5,202,000	-	-
SA6	9,190,061	-	-	-	530,604	8,659,457
Total	\$37,599,689	\$3,000,000	\$12,852,000	\$8,843,400	\$4,244,832	\$8,659,457

Over-expenditure Paybacks are payments made to the City for front-ending two sanitary trunks.

- ♦ **Over-expenditure Payback** – The over-expenditure (OE) payback is payable to the City for the construction of two sanitary trunk lines: the N.W. Annexation Area South Sanitary Trunk and the Clareview Interceptor. The City front-ended the construction costs for these two projects. As development occurs within the benefiting areas, the Expansion Assessment is collected from the developments and is paid back to the City. The projected over-expenditure paybacks are based on anticipated developments within the benefiting areas.

4.3 STATEMENT OF FUND ACTIVITIES AND BALANCE

The Statement of Fund Activities and Balance for 2003 is attached as Table 2. Figure 4 shows each revenue component as a percentage of the total revenues.

REVENUES

Total revenues for 2003 were \$13,689,199, which is a 2% increase over the 2002 revenues.

- ♦ **Sanitary Sewer Trunk Charge (SSTC)** – For 2003, SSTC revenues totaled \$6,490,588, which equates to a 3% increase over the 2002 SSTC revenues.

Revenues of \$3,166,028 from single-family and duplex residential developments were the biggest component of the amounts received. Based on the \$780 per dwelling rate in 2003, this represents approximately 4,059 combined single-family and duplex housing starts. This amounts to an 11% drop compared to the estimated 4,541 starts in 2002.

The next largest component of SSTC income came from multi-family developments. The \$2,861,327 collected represents approximately 5,128 units being charged the \$558 per unit rate in 2003. Multi-family unit starts have grown at a very healthy pace in 2003 and were up 15% from 2002.

Total revenues were up 2% from 2002.

SSTC revenues were down by 9% for single-family & duplex developments but were up by 17% for multi-family developments.

Sanitary Servicing Strategy Fund
Annual Report

Expansion Assessment revenues were lower by 7%.

The remaining \$463,233 of SSTC revenue came from commercial, industrial, and institutional developments, representing approximately 119 hectares of assessed development. This is up 18% from the 101 hectares assessed in 2002.

- ♦ **Expansion Assessment (EA)** – For 2003, the total EA collected was \$3,931,542, down 7% when compared with 2002. This echoes the decrease in single family / duplex residential developments in 2003.
- ♦ **Utility Contribution** – Total Utility contribution in 2003 was \$2,600,000.
- ♦ **Interest Earned** – Total interest earned for 2003 was \$667,069, up significantly from \$297,735 earned in 2002. This is primarily the result of having a larger amount of fund balance in the account for a longer period during the year.

EXPENDITURES

The major expenses in 2003 were \$685,085 for the WESS (W2-W12) and SESS (SW2-SW7) Concept Plans as well as \$144,183 for the completion of the SESS (SW1) Pump Station. Other expenses included \$128,423 for the updating of the SSSF Financial Model and \$118,224 for the preliminary design and site investigations for Stage W12 of the WESS Project.

STATEMENT OF FUND ACTIVITIES & BALANCE

Sanitary Service Strategy Fund For the period ending December 31, 2003	2002 Actuals	2003 Actuals	2003 Budget	2003 Variance
REVENUES				
Sanitary sewer trunk charge - single/duplex revenue	3,473,934	3,166,028	2,382,000	784,028
Sanitary sewer trunk charge - multi family revenue	2,440,887	2,861,327	1,354,000	1,507,327
Sanitary sewer trunk charge - commercial/industrial/institutional revenue	385,906	463,233	507,000	(43,767)
Expansion assessment	4,223,962	3,931,542	2,757,000	1,174,542
	10,524,689	10,422,130	7,000,000	3,422,130
Utility system contribution	2,600,000	2,600,000	2,600,000	-
Interest earned	297,735	667,069	535,000	132,069
Total Revenues	13,422,424	13,689,199	10,135,000	3,554,199
EXPENDITURES				
SESS - SW1	2,574,258	144,183		144,183
Clairview Sanitary Trunk - C8	1,425	835		835
NEST - NC1	2,838,649	30,737	747,000	(716,263)
WESS - W1	223,571	60,609	2,263,000	(2,202,391)
WESS - W2-W12 Concept Plan	305,736	284,939		284,939
WESS - W12		118,224		118,224
SESS - SW2-SW7 Concept Plan		400,146		400,146
SSSF Financial Model		128,423		128,423
Over Expenditure Payback	130,139	91,972	170,000	(78,028)
Total Expenditures	6,073,778	1,260,068	3,180,000	(1,919,932)
Excess of Revenue over Expenditures	7,348,646	12,429,131	6,955,000	5,474,131
Opening Balance (January 1, 2003)	10,410,298	17,758,944	17,758,944	
Closing Balance (December 31, 2003)	\$ 17,758,944	\$ 30,188,075	\$ 24,713,944	\$ 5,474,131

TABLE 2

SSSF Revenues for 2003 (\$13.7 million)

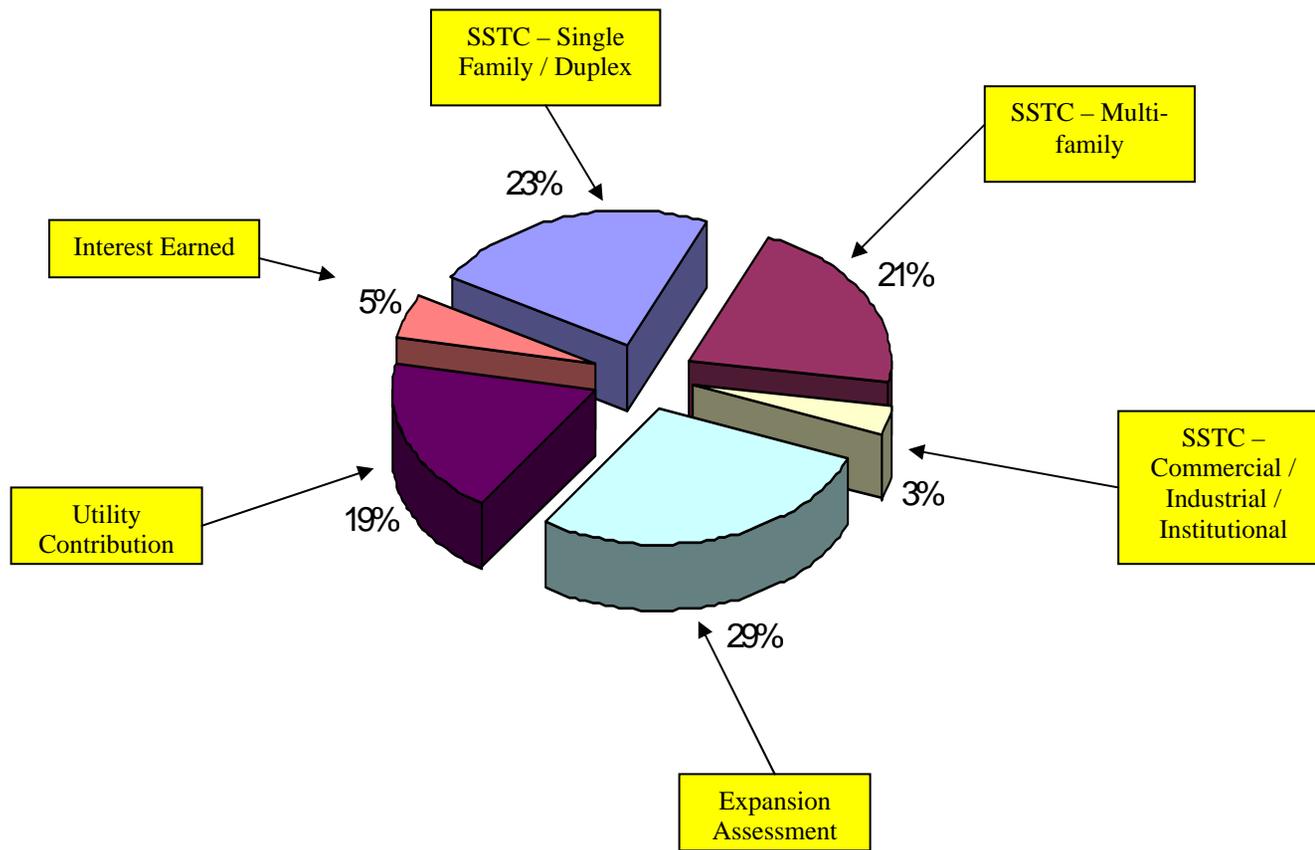


FIGURE 4