

ANNUAL REPORT
OF THE
CITY ENGINEER
1982

CITY OF FREDERICTON

PUBLIC WORKS DEPARTMENT

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TO HIS WORSHIP THE MAYOR & COUNCILLORS
OF THE CITY OF FREDERICTON

Madam and Gentlemen:

I submit herewith this report which is a statement of work done in the various City Departments under the direct supervision of the City Engineer.

This report covers the period from 1982 01 01 to 1982 12 31 and is written for the purpose of maintaining an accurate record on file of the activities and costs of the various departments.

During the year, along with regular maintenance, City forces and contractors constructed the following works:

Concrete Curb & Gutter	7.591	km
New Concrete Sidewalk	1.818	km
New Street Construction	0	km
New Pavement - 20 mm Binder Course	1.515	km
Resurface - 13 mm Surface Course	2.106	km
Resurface - 10 mm Surface Course	1.582	km
Double Chip Sealed Streets	0.869	km
Single Chip Sealed Streets	0	km
Gravity Sanitary Sewer Mains	1.675	km
Sanitary Sewer Force mains	0	km
Storm Sewer Mains	3.374	km
Water Mains	3.422	km

ALSO

- 57 Water Services Installed
- 54 Sanitary Sewer Services Installed
- 5 Sprinkler Lines Installed
- 22 Services Renewed (Water)
- 153 Water Meters Installed
- 0 Extension of Existing Services
- 6 Services Renewed (Sanitary Sewer)

Contractors under contract with the Public Works Department of the City of Fredericton in 1982 constructed, completed construction or began construction, on the following projects:

- Wendell Thomas & Sons Ltd. - supply and delivery of bedding sand
- Wendell Thomas & Sons Ltd. - supply and delivery of topsoil
- Northside Ready-Mix Ltd. - supply and delivery of concrete
- Forbes & Sloat Ltd. - supply and delivery of crushed gravel and crushed rock
- Dunham's Contracting Ltd. - supply and delivery of crushed gravel and crushed rock

- | | |
|---------------------------------|---|
| Gorman Construction Ltd. | - supply and placement of asphalt concrete |
| John Kilburn & Sons Ltd. | - installation of water and sanitary sewer mains on Royal Road |
| Charmac Construction Co. Ltd. | - installation of storm sewer and water mains on Tamarack Terrace |
| Sandico Ltd. | - supply and delivery of winter sand |
| Iroquois Salt | - supply and delivery of highway salt |
| John Kilburn & Sons Ltd. | - installation of water mains on Coronation and Marshall Streets |
| R.C. Bird Construction Ltd. | - water, sewer and roadway upgrading at Devon Indian Reserve No. 30 |
| John Kilburn & Sons Ltd. | - installation of storm sewer and curb and gutter on Royal Road |
| John Kilburn & Sons Ltd. | - installation of storm sewer, sanitary sewer, and water mains in West Nashwaaksis area |
| John Kilburn & Sons Ltd. | - installation of storm sewer in East Nashwaaksis area |
| Shell Canada Limited | - supply and delivery of gasoline and diesel fuel |
| Gallant's Contracting Ltd. | - installation of storm sewer, sanitary sewer, and water mains in the North Devon area |
| Multi-Ventures Ltd. | - installation of storm sewer, sanitary sewer, and water mains in the North Devon area |
| Charmac Const. Co. Ltd. | - installation of water mains on Fisher Avenue |
| Charmac Const. Co. Ltd. | - installation of storm sewer and sanitary sewer on Kings College Road |
| Fundy Contractors Ltd. | - installation of water main across the Nashwaak River between Barker Street and Charles Avenue |
| Ibis Products Ltd. | - supply of traffic lane striping paint |
| Maritime Pavement Markings Ltd. | - supply and placement of highway markings |

- Marine, Industrial, & Technical Sales Co. Ltd. - supply and placement of thermo plastic pavement markings
- Atlantic Colas Ltd. - supply and delivery of single and double chip seal
- P.D. Moore Landscaping - supply and delivery of cover material to sanitary landfill
- Gerard Burns - bulldozing services - sanitary landfill
- Co-op Fuels - supply and delivery of furnace oil
- Electric Motor Services Ltd. - supply and installation of pumping equipment
- Gulf Canada Ltd. - supply and delivery of furnace oil

General Fund expenditures for the period of 1982 01 01 to 1982 12 31 appear as follows:

Item	Budget	Net Expenditure	Deficit	Surplus
Common Services	\$ 1 211 148	\$ 1 256 744	\$ 45 596	\$
Road Transport (Adm)	22 950	23 993	1 043	
Roads & Streets	357 000	332 624		24 376
Sidewalk Repairs	12 650	8 190		4 460
Culverts & Ditches	26 800	10 911		15 889
Storm Sewer Maintenance	75 000	47 683		27 317
Street Cleaning	213 000	229 518	16 518	
Snow & Ice Removal	786 798	911 634	124 836	
Street Lighting	491 700	380 650		111 050
Traffic Services	244 832	235 913		8 919
Garbage & Waste Disposal	321 020	273 663		47 357
Garbage & Waste Collection	432 200	402 000		30 200
Old Burial Ground	9 040	6 616		2 424
Loyalist Burial Ground	300	300		
Wilmot Park	27 750	27 197		553
Odell Park	32 500	30 438		2 062
Carleton Park	11 910	12 100	190	
Riverfront Greens	29 790	26 793		2 997
Development of Park Areas	5 175	1 234		3 941
Other Parks	4 100	3 151		949
Public Works (Greens; Trees; Benches)	331 160	281 638		49 522
TOTALS	\$ 4 646 823	\$ 4 502 990	\$ 188 183	\$ 332 016

SURPLUS: \$ 143 833

Following is a table giving total kilometrage of municipal roads and streets, provincial routes, by-passes, and ramps divided with respect to type of surface on the various streets.

Location	Asphalt	Gravel	Chip Seal	Total	Asphalt	Gravel	Total	T.C.H. By-Passes & Ramps
Fredericton South	88.066	4.964	5.957	98.987	20.067	2.583	22.650	22.697
Fredericton North	18.823	1.218	0.401	20.442	4.770	-	4.770	3.316
Nashwaaksis	37.041	1.827	10.821	49.689	2.533	-	2.533	8.214
Marysville	14.774	1.093	5.572	21.439	8.216	-	8.216	3.460
Barker's Point	3.119	0.394	3.288	6.801	4.643	-	4.643	1.275
Silverwood	3.473	0.579	0.460	4.512	-	-	-	2.757
Garden Creek	5.362	1.685	8.289	15.336	6.294	-	6.294	8.771
Douglas	-	0.191	3.910	4.101	2.554	-	2.554	-
Lincoln	2.435	2.238	3.032	7.705	1.332	-	1.332	-
Lower St. Marys	-	-	1.970	1.970	-	-	-	-
Killarney Road	0.332	-	-	0.332	4.230	-	4.230	-
TOTALS	173.425	14.189	43.700	231.314	54.639	2.583	57.222	50.490

TOTAL (MUNICIPAL AND DESIGNATED ROUTES) = 288.536 km

Following in the body of this report is a detailed statement of the work done, comparative expenditures and unit costs under the various departments. The detailed report of any particular department may be found by referring to the index.

Respectfully submitted,



E. J. BLISS, P. ENG.
CITY ENGINEER

TOTAL YEARLY NET EXPENDITURE

The total yearly net expenditure under the direct supervision of the City Engineer in 1982 amounted to \$10 499 039, made up as follows:

Operating Accounts

Common Services	\$ 1 256 744
Road Transport	2 181 116
Environmental Health Services (Garbage & Waste Collection & Disposal)	675 663
Public Health Services (Cemeteries)	6 968
Cultural Services (Parks, Trees, etc.)	382 551
Water Department (Including debt charges)	1 938 235
Sanitary Sewer (Including debt charges)	1 281 366
Sub-total	\$ 7 722 643

Capital Accounts

Water	\$ 786 733
Sanitary Sewer	330 623
Storm Sewer)	734 633
Gravel Roads) Permanent	32 039
Curb & Gutter) Streets	220 917
Paving)	175 856
Sidewalks	106 926
Traffic Lights	35 114
Intersection Improvements	23 936
Permanent Streets - Reconstruction	158 003
Surveys	53 752
Transportation	5 195
Solid Waste Disposal	80 828
Equipment	180
Other - Bridge Approaches, etc.	31 661
Sub-total	\$ 2 776 396
TOTAL	<u>\$10 499 039</u>

Following are itemized accounts for the various items included in the total yearly net expenditure.

TRANSPORTATION SERVICES

The expenditure under this item is subdivided under two main headings:

- (1) Common Services
- (2) Road Transport

(1) COMMON SERVICES

The total net expenditure under this heading was \$1 256 744 and is made up as follows:

Administration	\$ 41 996
Engineering Services	146 400
Equipment Maintenance	532 635
Service Depots	195 754
Safety & Benefits	339 959
 TOTAL	 <u>\$1 256 744</u>

(2) ROAD TRANSPORT

Road Transport is made up of the following items:

Administration	\$ 23 993
Roads & Streets	1 540 560
Street Lighting	380 650
Traffic Services	235 913
 TOTAL	 <u>\$2 181 116</u>

- (a) Administration: The total net expenditure under this heading amounted to \$23 993 for wages, pensions, general services, travel, memberships, etc.
- (b) Roads & Streets: The total net expenditure under this item is made up as follows:

(1) Roadway surfaces (maintenance)	\$ 332 624
(2) Sidewalk maintenance	8 190
(3) Culverts & ditching	10 911
(4) Storm sewer maintenance	47 683
(5) Street cleaning & flushing	229 518
(6) Snow control (snow & ice removal)	659 371
(7) Sanding & salting	252 263
 TOTAL	 <u>\$1 540 560</u>

The expenditures for the above items are summarized below.

(1) Roadway surfaces (maintenance)

The net expenditure of \$332 624 is made up as follows:

Gravel Roads & chip seal	\$ 26 630
Paved streets	197 353
Asphalt resurface program	48 100
Curb & gutter repair	17 398
Driveway entrances	4 984
Rights-of-way maintenance	38 159
TOTAL	<u>\$ 332 624</u>

Gravel Roads and Chip Seal

General maintenance and repairs to gravel roads and roadway surfaces.

In 1982 the following streets were double chip sealed:

Location	Length (metres)
Merrithew Avenue	111
Maxwell Street	45
Willis Street	116
Elm Court	56
Forestview Court	83
Essex Street	70
Ascot Drive	<u>388</u>
TOTAL	869

869 metres = 0.869 km

Paved Streets

Patching and repairing pavement, applying seal coat, light tar or asphalt to pavement.

Asphalt Resurface Program

Under this heading, the following streets were resurfaced with Type 'E' (10 mm) asphalt in 1982.

Location	Length (metres)
Kings College Road - Smythe Street to York Street	625
Smythe Street - Charlotte Street to Saunders Street	128
Westmorland Street - Aberdeen Street to Dundonald Street	357
Saunders Street - Smythe Street to Rookwood Avenue	472
* Victoria Health Centre Road	200
** Riverside Drive	183
TOTAL	1965

* Type "B" asphalt was placed.

** Type "D" asphalt was placed.

1965 metres = 1.965 km

Curb and Gutter Repair

Replacement of sections of curb and gutter on various streets. Approximately 543 metres of curb was repaired in 1982.

Driveway Entrances

Repair and placement of asphalt between curb line and street right-of-way primarily on streets curbed in recent years.

Rights-of-way Maintenance

Sodding and seeding, rip rapping, grass cutting, repair and placement of guide rails and clearing of rights-of-way.

(2) Sidewalk Maintenance

The net expenditure of \$8 190 for sidewalk repairs was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 7053
Materials	<u>1137</u>
TOTAL	<u>\$ 8190</u>

(3) Culverts and Ditching

This work involved the maintenance and installation of culverts and ditches.

The net expenditure of \$10 911 was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 8 958
Materials	<u>1 953</u>
TOTAL	<u>\$ 10 911</u>

(4) Storm Sewer Maintenance

This work involved the flushing of mains, cleaning and repair of catch basins and the repair of breaks to mains.

The net expenditure of \$47 683 was made up as follows:

Personnel (labour, pensions, workmen's compensation)	\$ 36 739
Materials	<u>10 944</u>
TOTAL	<u>\$ 47 683</u>

(5) Street Cleaning and Flushing

Two Wayne Sweepers, #50 and #52, and a Vacuum-Sweep, #53, carried out the cleaning of City streets. These machines worked a total of 1823 hours from April 2 to November 15.

The net expenditure under this heading amounted to \$229 518 and was made up as follows:

Personnel (wages, pensions, workmen's compensation)	\$176 589
General Services (trucking & repairs)	37 926
Gas, oil, grease	11 523
Brooms - Main & Gutter	2 238
Brooms - Hand	1 130
Anti-Litter Cans	254
Dust Control	<u>142 CR.</u>
TOTAL	<u>\$229 518</u>

(6) and (7) Sanding & Salting and Snow Control

(a) Salting and Sanding Streets and Sanding Sidewalks

Storing sand and salt in winter storage piles and spreading same on slippery streets and sidewalks.

Streets:

Materials (salt, gas, oil & lubs, sand)	\$149 012
Personnel (labour, pensions, compensation)	55 850
General Services (vehicle repairs)	19 608
New Equipment	<u>8 683</u>
TOTAL	<u>\$233 153</u>

Sidewalks:

Personnel (labour, pensions, compensation)	\$ 11 170
General services (vehicle repairs)	3 922
Materials (gas, oil & lubes, sand)	4 018
TOTAL	<u>\$ 19 110</u>

(b) Snow Control

Blowing, shovelling and hauling snow, plowing or scraping roads, cleaning gutters, thawing catch basins of ice and snow and any other means of snow control.

Streets:

The total net cost of snow control (streets) amounted to \$559 504 and was made up as follows:

Personnel (labour, pensions, compensation)	\$298 176
General Services (repairs & maintenance of vehicles, hired trucks & machinery)	221 140
Materials (fuel & lubricants)	40 188
TOTAL	<u>\$559 504</u>

The City of Fredericton was responsible for plowing, sanding, and salting 288.536 km of roads and streets in 1982 (131.720 km on the north side and 156.816 km on the south side).

As of November 1, 1982 the City of Fredericton became responsible for summer and winter maintenance of the Westmorland Street Bridge along with adjacent highways and ramps. This amounted to another 16.050 km of streets.

The overall net expenditure for plowing, sanding and salting City roads and streets was made up as follows:

Personnel (labour, pensions, compensation)	\$354 026
General Services (repairs & maintenance of vehicles, hired trucks & machinery)	240 748
New Equipment	8 683
Materials (gas, oil & lubes, salt, sand)	189 200
TOTAL	<u>\$792 657 (1)</u>

Sidewalks:

141.83 km of sidewalk were plowed during the winter months of 1982. (46.09 km on the north side and 95.74 km on the south side)

The total net expenditure for plowing amounted to \$ 99 867 and was made up as follows:

Personnel (labour, pensions, compensation)	\$ 59 635
General Services (repairs & maintenance of vehicles)	32 275
Materials (fuel & lubricants)	7 957
TOTAL	<u>\$ 99 867</u>

The overall net expenditure for plowing and sanding sidewalks was \$ 118 977 made up as follows:

Personnel (labour, pensions, compensation)	\$ 70 805
General Services (repairs & maintenance of vehicles)	36 197
Materials (fuel & lubricants, sand)	11 975
TOTAL	<u>\$118 977 (2)</u>
Total net cost of snow control - ADD (1) & (2)	<u>\$911 634</u>

Snowfall in Fredericton for the last five years was as follows:

1978	Agriculture Canada	226.80 cm
	Airport Weather Office	308.20 cm
1979	Agriculture Canada	154.90 cm
	Airport Weather Office	188.00 cm
1980	Agriculture Canada	189.20 cm
	Airport Weather Office	209.70 cm
1981	Agriculture Canada	282.30 cm
	Airport Weather Office	249.10 cm
1982	Agriculture Canada	305.10 cm
	Airport Weather Office	297.20 cm

(c) Street Lighting

The Multiple Lighting System for the City of Fredericton as of 1982 12 31, consisted of:

1 - 180 Watt L.P. Sodium	@	\$170.96	per light per year
35 - 400 Watt H.P. Sodium	@	\$203.28	per light per year
10 - 125 Watt M.V. Wood	@	\$ 94.82	per light per year
2 - 175 Watt M.V. Conc	@	\$135.30	per light per year
201 - 175 Watt M.V. Wood	@	\$114.00	per light per year
347 - 175 Watt Ref. M.V.	@	\$ 88.80	per light per year
12 - 250 Watt M.V. Conc	@	\$172.30	per light per year
4 - 250 Watt M.V. Wood	@	\$151.00	per light per year
1710 - 250 Watt Ref. M.V.	@	\$125.80	per light per year
573 - 400 Watt Ref. M.V.	@	\$172.92	per light per year
1 - 500 Watt Ref. M.V.	@	\$149.58	per light per year
2 - 400 Watt Flood Lights	@	\$ 0.56	per light per year

The total street lighting costs for 1982 were as follows:

Multiple Lighting System Contract	\$ 380 439
New Bulbs	211
TOTAL	<u>\$ 380 650</u>

(d) Traffic Services

The expenditure under this heading is made up as follows:

- (1) Street Signs
- (2) Paint Department
- (3) Traffic Signals
- (4) Railway Crossings

(1) Street Signs

Purchasing, repairing and installing street signs on City streets.

The net expenditure under this heading amounted to \$26 156 made up as follows:

Personnel (labour, pensions, compensation)	\$ 2 026
General Services (repairs & maintenance)	133
Goods (posts, street sign purchases, etc.)	<u>23 997</u>
TOTAL	<u>\$ 26 156</u>

(2) Paint Department

The net expenditure under this heading was \$68 763 made up as follows:

Personnel (labour, pensions, compensation)	\$ 38 940
General Services (equipment repairs, vehicle maintenance, rent, etc.)	4 882
Goods (paint, gas & oil, supplies, signs)	15 057
Fixed Assets (new equipment)	<u>9 884</u>
TOTAL	<u>\$ 68 763</u>

(3) Traffic Signals

The net expenditure under this heading was \$103 592 made up as follows:

Personnel (labour, pensions, compensation)	\$ 30 200
General Services (vehicle maintenance)	2 204
Government Services (electric power)	46 460
Goods (gas & oil, materials, etc.)	24 728
Fixed Assets (new equipment)	0
TOTAL	<u>\$ 103 592</u>

(4) Railway Crossings

The net expenditure under this heading was \$37 402 for maintenance.

CAPITAL ACCOUNT CURB & GUTTER

The net expenditure under this heading amounted to \$220 917.

For the above expenditure, concrete curb and gutter was constructed at the following locations:

Location	Length (metres)
Sunset Drive- Stone Bridge to Airport Rd.	2326 ✓
* K-Mart (Smythe)	22
* Fredericton Mall	137
Mitchell Street	509
Broad Street	332 ✓
Juniper Court	241 ✓
Eagle Court	372 ✓
Mulberry Court	232 ✓
Birdie Court	219 ✓
** Bridge approach connections	81
** Kings College Rd.- York Street to Regent Street	845
Carleton Place Area	98
*** Waterloo Row - Underpass to Lansdowne	1065
*** Canada Street near Bridge Street	87
**** Maliseet Drive	1025
TOTAL	7591

7591 metres = 7.591 km

- * Paid for by the respective malls.
- ** Done under street reconstruction.
- *** Designated Route Program (paid for by the Department of Transportation)
- **** Contracted by City of Fredericton for Department of Indian Affairs.

All the above curb and gutter was constructed by City forces with the exception of Maliseet Drive which was constructed by contractor. Concrete was purchased from Northside Ready-Mix at a price of \$91 per cubic metre.

The average unit cost of one metre of curb and gutter placed by City forces (excluding those denoted by asterisks) was \$50. This cost includes such items as personnel costs, purchasing of forms and other materials, topsoiling, bond discount, interest on demand notes, etc.

CAPITAL ACCOUNT PAVING

In 1982, Gorman Construction Limited was awarded a contract to supply and place asphalt on a number of City streets.

The street preparatory work, other than the laying in place of the pre-mixed material, was done by regular City forces.

The total net expenditure under this heading amounted to \$175 856 made up as follows:

Gorman Construction Ltd.	\$ 151 010
City Payrolls	7 183
City Machinery	5 315
Miscellaneous Materials	2 036
ADI Limited (Asphalt Testing)	9 549
Bond Discount	<u>763</u>
TOTAL	\$ 175 856

The paving program required the supply and placement of the following grades of materials:

- (1) Binder Course (20 mm) - Type B
- (2) Surface Course (13 mm)- Type D

(1) Binder Course - Type B

The following streets were paved with Type "B" asphalt in 1982:

Location	Length (metres)
* \ Kings College Road - York St. to Regent St.	393
\ Juniper Court	129
\ Broad Street	166
\ Mulberry Court	113
\ Mitchell Street	245
\ Eagle Court	161
\ Birdie Court	<u>108</u>
TOTAL	1315

$$1315 \text{ metres} = 1.315 \text{ km}$$

* Done under Capital Account Reconstruction

(2) Surface Course - Type D

The following streets were paved with Type "D" asphalt in 1982:

Location	Length (metres)
Sunset Drive - Stone Bridge to Airport Rd.	1190
Bridgeview Court	198
* Waterloo Row - Underpass to Lansdowne St.	<u>535</u>
TOTAL	1923

$$1923 \text{ metres} = 1.923 \text{ km}$$

* Paid for by the Department of Transportation

CAPITAL ACCOUNT SANITARY SEWER

The net expenditure under this account amounted to \$330 623 in 1982.

The above expenditure was primarily made up of a land purchase for a lift station on the Woodstock Road, costs for professional services regarding sewage treatment in Garden Creek, and inspection, construction and engineering costs regarding projects in the Sunset Drive - McAdam Avenue area and the North Devon area.

Location	LENGTH OF MAINS - metres			
	200 mm D.I.	200 mm PVC	250 mm PVC	300 mm PVC
** Royal Rd.- Barton Cres. to School Site		267	276	
*** Kings College Rd.- York St. to Regent St.		216		
North Devon Area 128-49	21	423		
North Devon Area 128-50		222		
West Nashwaaksis 128-46		114		136
TOTALS	21	1242	276	136

1675 metres = 1.675 km

** Paid for by the Department of Education

*** Done during reconstruction of street and charged to sanitary sewer maintenance.

CAPITAL ACCOUNT STORM SEWER

The net expenditure under this account amounted to \$734 633 in 1982.

The above expenditure was primarily made up of engineering and installation costs for new mains in the Nashwaaksis area, North Devon area, and Tamarack Terrace. New mains were also installed on Canada Street near Bridge Street, Canada Street near Ramsay Street and on the Royal Road. This work was paid for by the Department of Transportation primarily under their Designated Route program.

LOCATION	LENGTH - metres									
	250 mm CONC	250 mm PVC	300 mm CONC	300 mm PVC	375 mm CONC	450 mm CONC	600 mm CONC	750 mm CONC	900 mm CONC	1050 mm CONC
*Royal Road										42
**Waterloo Row	40		21							
**Canada St. near Bridge St.						63				
**Canada St. near Ramsay St.			129							
***Kings College Road						159				
Tamarack Terrace	18			133						
North Devon 128-49	104		165			45	92			
**North Devon 128-49	23					10	9			
North Devon 128-50		45		11				183	113	296
**North Devon 128-50		32		36						85
West Nashwaaksis 128-46	106	90		135	161	151	120			
East Nashwaaksis 128-47		56	182	99			10			
****Indian Reserve Cont.#3			12			75				
*****Royal Road	51		22			33	10	202		5
TOTALS	236	239	439	362	234	546	455	435	381	47

3374 metres = 3.374 km

* Paid for by the Department of Education

** Paid for by the Department of Transportation

*** Paid for under Capital Account reconstruction

**** Paid for by the Department of Indian Affairs

***** Contract not finalized. To be paid for by The Department of Transportation

CAPITAL ACCOUNT WATER

The net expenditure under this account amounted to \$786 733 in 1982 after Stimulation Grant was applied.

Work done in conjunction with the above expenditure included a number of carryover projects such as the Nashwaak River Crossing, Montgomery Booster Station upgrading, well development and pump installation costs, and modifications associated with the Wilmot Park Wells.

In 1982 water main upgrading took place in the West Nashwaaksis area, the North Devon area, east Marysville and Tamarack Terrace.

LOCATION	LENGTH - metres						
	100 mm D.I.	150 mm D.I.	200 mm D.I.	250 mm D.I.	300 mm D.I.	350 mm D.I.	400 mm D.I.
Nashwaak River Crossing		2		5		175	
Montgomery Booster Station						141	
** Royal Road		14	21		347	207	
Tamarack Terrace	116	5					
East Marysville-Fisher Ave.		339					
East Marysville-Coronation & Marshall Streets		15	309				
North Devon 128-49		44	110				653
North Devon 128-50	3	21	121		282		292
West Nashwaaksis 128-46				124			
* Indian Reserve Cont. #3		9	67				
TOTALS	119	449	628	129	629	523	945

3422 metres = 3.422 km

* Paid for by The Department of Indian Affairs

** Paid for by The Department of Education

CAPITAL ACCOUNT SIDEWALKS

The net expenditure for sidewalk construction amounted to \$106 926 in 1982.

For the above expenditure, sidewalks were constructed at the following locations:

Location	Length - metres
Regent St.- Prospect St. to Woolco Mall	348
* Prospect St.- Regent St. to Canadian Tire	693
Broad Street	230
** Regent St.- Albert St. to Kings College Rd.	647
Canada St.- Kaine St. to near #129	358
Royal Road - Primrose Ave. to Barton Crescent	155
*** Sunset Drive - Willis St. to Stone Bridge	34
TOTAL	2465

2465 metres = 2.465 km

- * Paid for by Lehndorff Management of the Fredericton Mall
- ** Reconstruction of existing sidewalk. Fifty percent of cost was paid for by N.B. Tel.
- *** Necessitated by curb and gutter construction. Paid for under Capital Curb and Gutter.

Actual new sidewalk (not including reconstruction) = 1.818 km

CAPITAL ACCOUNT - GRAVEL ROADS

Net Expenditure - \$ 32 039

The above expenditure was primarily for the purchase of granular material which eventually will be used by the individual departments and credited back to gravel roads.

CAPITAL ACCOUNT - TRAFFIC LIGHTS

Net Expenditure - \$ 35 114

The above expenditure was made up of costs associated with respect to the Regent and Queen intersection traffic lights started in 1981, the synchronization of traffic lights on Regent Street also begun in 1981 and for stock materials.

CAPITAL ACCOUNT - INTERSECTION IMPROVEMENTS

Net Expenditure - \$ 23 936

The above expenditure was made up of costs associated with upgrading certain aspects of certain intersections. This upgrading included such items as new traffic light controllers, new traffic light bases, etc.

CAPITAL PERMANENT STREETS - RECONSTRUCTION

Net Expenditure - \$ 158 003

The expenditure under this account was for costs associated with the reconstruction of Kings College Road from York Street to Regent Street. This reconstruction included the replacement of granular material, some storm sewer construction, curb and gutter, and paving.

CAPITAL ACCOUNT - SURVEYS

Net Expenditure - \$ 53 752

The expenditure under this account was for legal surveys in the Barker's Point and Marysville areas to determine such things as right-of-way widths, encroachments of right-of-ways, roadway widths and property owners. This information will be used in the future to determine areas of possible upgrading.

CAPITAL ACCOUNT TRANSPORTATION

Net Expenditure - \$ 5 195

The expenditure under this account was primarily for professional services in conjunction with the overall transportation study for the City of Fredericton.

CAPITAL ACCOUNT - SOLID WASTE DISPOSAL

Net Expenditure - \$ 80 828

The expenditure under this account was primarily for work associated with the proposed sanitary landfill on Flanagan Road. Also included in the above are some of the costs associated with the Composting Study.

CAPITAL ACCOUNT - EQUIPMENT

Net Expenditure - \$ 180

The expenditure under this account was for bond discount payments.

CAPITAL ACCOUNT - OTHER

Net Expenditure - \$ 31 661

The expenditure under this account was primarily for work associated with the bridge approaches as well as for a fire department access line to the St. John River.

DESIGNATED ROUTES

The City of Fredericton has a total of 57.222 km of provincial designated highways within its boundaries. In 1982, the Provincial Government paid \$1465 and \$370 per lane kilometre towards winter and summer maintenance of the routes respectively. If any improvements such as curb and gutter, paving or storm sewer installations are done to these routes, they have to be authorized by the Department of Transportation. If so authorized, then the Provincial Government assists the City in paying for the construction.

The following authorized projects were undertaken in 1982:

1)	Installation of storm sewer - Route 105 - Union & St. Marys Street.....	\$ 68 066
2)	Installation of storm sewer and curb and gutter- Route 8- Canada Street near Bridge Street	18 320
3)	Installation of storm sewer - Route 8- Canada Street near Ramsay Street	14 364
4)	Installation of storm sewer, curb and gutter, paving- Route 102 - Waterloo Row	<u>132 740</u>
	TOTAL	\$ 233 490

ENVIRONMENTAL HEALTH SERVICES

Net Expenditure - \$ 675 663

Under the above heading the following items were included:

- (1) Garbage and Waste Collection
- (2) Garbage and Waste Disposal - Sanitary Landfill

(1) Garbage and Waste Collection

In 1982, the amount paid for the garbage and waste collection operation was \$402 000 made up as follows:

General Services (Advertising)	\$ -
General Services (Contract Services)	<u>402 000</u>
TOTAL	\$ 402 000

(2) Garbage and Waste Disposal - Sanitary Landfill

The expenditure under this section was \$273 663 made up as follows:

Personnel (labour, pensions, workmen's compensation).....	\$ 1 158
General Services (equipment services and land rental).....	124 500
Government Services (taxes)	1 178
Goods (gravel and cover material)	<u>146 827</u>
TOTAL	\$ 273 663

PUBLIC HEALTH SERVICES - CEMETERIES

Under this heading the following are included:

- (1) The Old Burial Ground
- (2) The Loyalist Burial Ground

(1) The Old Burial Ground

Net Expenditure - \$ 6 668

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation).....	\$ 5 257
General Services (machinery)	143
Government Services (lighting)	455
Goods (materials, tools)	<u>813</u>
TOTAL	\$ 6 668

(2) The Loyalist Burial Ground

Net Expenditure - \$	300
Personnel (labour, pensions, compensation)	\$ 215
General Services (machinery)	85
TOTAL	\$ 300

PARKS AND TREES SERVICES

Included under this heading are:

- (1) Wilmot Park
- (2) Ode11 Park
- (3) Carleton Park
- (4) Riverfront Greens
- (5) Development of Park Areas
- (6) Other Parks
- (7) Public Works - Trees, Greens, Benches & Other

(1) Wilmot Park

Net Expenditure - \$ 27 197

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation)	\$ 20 102
General Services (machinery, equipment repairs)	3 204
Government Services (water rates, light & power)	2 042
Goods (gas & oil, materials)	1 849
TOTAL	\$ 27 197

(2) Ode11 Park

Net Expenditure - \$ 30 438

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation)	\$ 25 650
General Services (telephone, machinery, equipment repairs)	1 653
Government Services (water rates, lights & power)	385
Goods (fuels & lubricants, materials)	2 750
TOTAL	\$ 30 438

(3) Carleton Park

Net Expenditure - \$ 12 100

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation)	\$ 5 825
General Services (machinery & land rental)	4 427
Goods (materials, gas & oil)	1 848
TOTAL	\$ 12 100

(4) Riverfront Greens

Net Expenditure - \$ 26 793

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation)	\$ 9 890
General Services (machinery)	2 973
Goods (gas & oil, materials, new trees)	5 592
Fixed Assets (new equipment)	8 338
TOTAL	\$ 26 793

(5) Development of Park Areas

Net Expenditure - \$ 1 234

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation)	\$ 1 082
General Services (machinery)	132
Goods (gas & oil, materials)	20
TOTAL	\$ 1 234

(6) Other Parks

Net Expenditure - \$ 3 151

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation)	\$ 2 094
General Services (machinery, repairs & maintenance)	811
Goods (materials)	246
TOTAL	\$ 3 151

(7) Public Works

Net Expenditure - \$ 281 638

The above heading is made up of the following:

- (a) Trees
- (b) Greens, Benches & Other

(a) Trees

The net expenditure under this account amounted to \$258 119 and was made up as follows:

Personnel (labour, pensions, U.I.C., compensation, honorarium)	\$ 183 132
General Services (machinery & trucking, equipment maintenance, building rental)	42 636
Goods (gas & oil, materials, new trees, small tools).....	29 597
Fixed Assets (new equipment)	<u>2 754</u>
TOTAL	\$ 258 119

In 1982, 576 trees were removed upon the recommendation of the Fredericton Tree Commission. The condemned trees were either in a decadent condition, a menace to public safety or possible breeding places for the Elm Bark Beetle.

Following is a list of trees removed in 1982:

Species	Number Removed
Elm	537
Maple	28
Ash	1
Willow	2
Poplar	2
Cherry	1
Oak	<u>5</u>
TOTAL	576

In 1982, 487 trees were removed with Dutch Elm Disease in the City of Fredericton.

Following is a list of trees (Elm) removed from 1964 to 1982:

Year	No. Lost to Dutch Elm Disease	% Lost to Dutch Elm Disease	Other Causes	Total
1964	14	29	34	48
1965	8	24	25	33
1966	12	21	44	56
1967	18	20	73	91
1968	33	16	174	207
1969	30	21	108	138
1970	49	39	78	127

Year	No. Lost to Dutch Elm Disease	% Lost to Dutch Elm Disease	Other Causes	Total
1971	57	42	77	134
1972	61	42	84	145
1973	92	46	108	200
1974	132	33	266	398
1975	75	19.6	307	382
1976	118	28.2	300	418
1977	681	91.6	62	743
1978	680	92	56	736
1979	937	91.8	84	1021
1980	1146	95.7	51	1197
1981	500	59.7	327	827
1982	487	90.7	50	537
TOTALS	5130	69	2308	7438

Trees were planted at the following locations in 1982:

Location	Number of Trees
Gorham Drive	31
Fisher Avenue	35
Monteith Drive	43
Mayflower Street	16
Tulip Street	19
Lily Street	17
Winter Street	12
Summer Street	19
Autumn Street	30
Foley Court	5
Inglewood Dr.- corner Sherwood	2
Carman Avenue	2
#41 Juniper Court for Water & Sewer R.O.W.	12
Cherry Avenue	20
Edgewood Drive	20
118 Brookside Drive	2
205 Canada Street	2
McKeen Street	6
111-113 Fulton Avenue	2
43 Veterans Drive	1
305 Gibson Street	4
16 Fairlawn Court	2
64 Charlotte Street	1
Mayland Court corner of Parkside Drive	1
Opposite 1 Heather Terrace	2
Officer's Square	4
667 McLeod Avenue	1
Church Street	3
Carleton Park	3

Location	Number of Trees
Wilmot Park	10
102 Saunders Street	1
746 Hanson Street	1
University Avenue	4
Colonial Heights Street	4
262 Odell Avenue	1
271 Saunders Street	2
300 Block of Saunders Street	5
161 Argyle Street	1
6 Hawthorne Terrace	2
222, 232 Willingdon Street	2
178, 167 Stanley Street	2
255 Kings College Road	1
9 Lorne Street	2
889 Grandame Avenue	1
300 Block of Church Street	5
Winslow Street	6
Grey Street	2
330 Willingdon Street	1
6 Manor Court	1
247, 335 Canterbury Drive	6
190 Woodbridge Street	1
445 Lisgar Street	1
245-255 Cambridge Crescent	6
York Street	2
Fredericton Library	4
329 Aberdeen Street	2
324 Albert Street	1
Smythe Street	4
Odell Avenue	2
Odell Park	3
TOTAL	403

97 trees were planted at various locations to replace losses due to dry weather and vandalism. 118 trees were also planted on the Riverfront Drive.

Trees purchased in 1982 were obtained from Brookdale Nursery, John Connon Nursery, C.C. Smith, Braun Nursery, Capital Landscape and Atlantic Landscape.

A number of trees were also trimmed in 1982. The number and class of trees are as follows:

- (a) Trees above 14 m in height - approximately 150 mixed species
- (b) Trees 6 m to 14 m in height- approximately 600 mixed species
- (c) Trees under 6 m in height - approximately 3000 mixed species

Stumps removed, topsoiled and seeded - 283

Shrubs planted on the Riverfront Drive - 293

Trees on 1982 tree removal list to be removed in Spring of 1983 - 57

(b) Greens, Benches & Other

The net expenditure under this account amounted to \$23 519 and was made up as follows:

Personnel (labour, pensions, compensation)	\$ 16 050
General Services (communications, machinery & trucking, equipment maintenance)	36 CR.
Goods (gas & oil, materials, small tools)	5 321
Fixed Assets (equipment purchases, etc.)	<u>2 184</u>
TOTAL	\$ 23 519

SANITARY SEWER

Net Expenditure - \$ 1 281 366

The above expenditure was made up as follows:

Operating: Lift Stations

Personnel (wages, benefits, compensation)	\$ 41 548
General Services (repairs & maintenance)	7 576
Government Services (power)	10 737
Goods (materials)	<u>1 186</u> \$ 61 047

Maintenance:

Personnel (wages, benefits, compensation)	\$ 245 796
General Services (truckng & machinery)	38 460
Goods (materials)	<u>26 312</u> 310 568

Sewage Treatment & Disposal:

General Services: Repairs & Maintenance	\$ 1 518
Treatment (F.P.C.C.)	713 553

Government Services: Water & Sewer Rates	2 064
Power	9 495

Sewage Treatment & Disposal (continued)

Goods: Chlorine, etc.	200	726 830
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Debt Charges:

Principal	\$130 064	
Interest	<u>52 272</u>	182 336

Other:

General Services (Insurance)	585
TOTAL	\$1 281 366

New customers connected to the City sewer system in 1982 - 54

The Fredericton Sanitary Sewer system consists of approximately ~~147~~ 234.583 kilometres of sewer mains made up as follows:

Size	Silverwood-Garden Creek	Nashwaaksis	Marysville	Barker's Point	Fredericton	Totals
100 mm	-	0.098 <u>0.158</u>	-	-	-	0.098 <u>0.158</u>
100 mm F.M.	0.008 <u>0.013</u>	-	-	-	0.512 <u>0.824</u>	0.520 <u>0.837</u>
150 mm	-	0.900 <u>1.433</u>	0.195 <u>0.314</u>	-	0.067 <u>0.108</u>	1.162 <u>1.855</u>
150 mm F.M.	0.019 <u>0.031</u>	0.417 <u>0.417</u>	0.335 <u>0.539</u>	0.042 <u>0.068</u>	1.869 <u>3.008</u>	2.682 <u>4.063</u>
200 mm	6.117 <u>9.418</u>	19.614 <u>31.09</u>	10.455 <u>16.825</u>	4.697 <u>7.559</u>	(67.547) <u>107.438</u>	108.430 <u>172.332</u>
200 mm F.M.	0.158 <u>0.254</u>	-	0.195 <u>0.314</u>	-	0.040 <u>0.064</u>	0.393 <u>0.632</u>
250 mm	<u>0.951</u> <u>1.279</u>	<u>2.067</u> <u>3.158</u>	0.377 <u>0.607</u>	0.185 <u>0.298</u>	<u>5.173</u> <u>8.325</u>	8.753 <u>13.667</u>
250 mm F.M.	0.732 <u>1.178</u>	-	-	-	-	0.732 <u>1.178</u>
300 mm	0.275 <u>0.443</u>	<u>2.040</u> <u>3.200</u>	0.625 <u>1.006</u>	1.161 <u>1.868</u>	(7.838) <u>12.609</u>	11.939 <u>19.186</u>
300 mm F.M.	-	-	-	-	0.459 <u>0.739</u>	0.459 <u>0.739</u>
350 mm	0.099 <u>0.159</u>	0.426 <u>0.686</u>	-	-	0.443 <u>0.713</u>	0.968 <u>1.558</u>
350 mm F.M.	-	-	0.328 <u>0.528</u>	-	0.158 <u>0.254</u>	0.486 <u>0.782</u>
375 mm	-	1.344 <u>2.163</u>	0.311 <u>0.500</u>	0.108 <u>0.174</u>	(1.456) <u>2.449</u>	3.219 <u>5.286</u>
400 mm	-	0.047 <u>0.076</u>	-	-	0.120 <u>0.193</u>	0.167 <u>0.269</u>
450 mm	0.496 <u>0.798</u>	0.019 <u>0.031</u>	0.839 <u>1.350</u>	-	(2.137) <u>3.403</u>	3.491 <u>5.642</u>
500 mm	1.851 <u>2.979</u>	-	-	-	-	1.851 <u>2.979</u>
600 mm	0.097 <u>0.156</u>	-	-	-	(0.863) <u>1.510</u>	0.960 <u>1.666</u>
750 mm	-	-	-	-	0.200 <u>0.322</u>	0.200 <u>0.322</u>
900 mm	-	-	-	-	0.890 <u>1.432</u>	0.890 <u>1.432</u>
TOTALS	10.803	26.972	13.660	6.193	89.772	147.400

16.708 42.413 21.983 9.967 143.512 234.583
NOTE: Fredericton includes the Lincoln area.

The above kilometragess do not include mains at the Exhibition Grounds, U.N.B., and St. Anne's Point on the Woodstock Road or the Fredericton Area Pollution Control Commission Collector Sewer System which has approximately 11.4 kilometres of main.

WATER

There are at present 24 active wells, 16 reservoirs, and 7 booster stations in the City of Fredericton Water Supply System as noted below.

	Wells	Reservoirs	Booster Stations
South Fredericton System	6	8	7
Hanwell System	1	1	0
Silverwood System	2	1	0
North Fredericton Low Level System	10	4	0
Killarney System	2	1	0
Marysville System	3	1	0
TOTALS	24	16	7

Following is a list of reservoirs and their capacities which provide water storage for the City of Fredericton Water System:

FREDERICTON SOUTH:

Location	No. of Reservoirs	Full Capacity (cubic metres)	Useful Capacity (cubic metres)
Silverwood	1	245	245
Regent Street	1	1140 ✓	1140
Montgomery Street	2	9090 ✓	4545
Smythe Street	2	18180 ✓	18180
Forest Hill (Canterbury Drive)	2	1105 ✓	1105
Flemming Road	1	3750	1880
Hanwell Road	1	460 ✓	270
Sub-Total	10	33970	27365

FREDERICTON NORTH:

Location	No. of Reservoirs	Full Capacity (cubic metres)	Useful Capacity (cubic metres)
Nashwaaksis	2	2865	2865
Barker's Point	1	1140	1140
Marysville	1	2840	2840
Devon	1	4545 ✓	4545
Killarney Road	1	3750	3750
	6	15140	15140
OVERALL TOTALS	16	49110	42505

The Water account includes all expenditures other than Capital Expenditures for water.

Water costs for the City of Fredericton are divided as follows:

(1)	Water Administration (salaries of office staff, office equipment, billing & collecting)	\$ 196 100
(2)	Water Ordinary (includes meters)	634 239
(3)	Water Pumping Station & Well Production Costs	432 326
(4)	Debt Charges - Principal	340 210
(5)	Debt Charges - Interest	335 360
	TOTAL NET EXPENDITURE	\$1 938 235

(1) Water Administration

Net Expenditure - \$ 196 100

The above expenditure was made up as follows:

Personnel (Engineering Department staff)	\$ 69 894
Billing & Collecting:	
Office Salaries & Benefits	\$ 79 150
Postage	19 427
Telephone	2 000
Machinery Rental	135
Office Rental	0
Materials	8 078
New Equipment	17 416
TOTAL	\$ 126 206
	\$ 196 100

(2) Water Ordinary (including meters)

Net Expenditure - \$ 634 239

The expenditure under this heading was made up as follows:

Transmission & Distribution (operation):

Labour - Boosters	\$ 79 757
Equipment Maintenance - Boosters	4 111
Power & Taxes - Boosters	41 877
Materials - Boosters	1 680
	\$ 127 425

Transmission & Distribution (maintenance):

Personnel (labour, pensions, etc.)	\$ 300 848
Workmen's Compensation	7 448
Distribution Repair Parts	48 300
Trucks (maintenance)	4 205
Goods (gas & oil)	5 259
Materials, labour, trucking	10 207 CR.
Hydrant Parts	10 868
Fixed Assets (new vehicles)	<u>27 933</u>
	\$ 394 654

Meters:

Labour - Reading	\$ 44 328
Labour - Repairs	1 570
Labour - Installation	24 960
Meter Parts	8 081
Miscellaneous Parts	2 068
Fixed Assets - New Meters	21 337
Fixed Assets - New Vehicles	<u>9 816</u>
	<u>112 160</u>
TOTAL	\$ 634 239

On 1982 12 31 there were 10521 water services on meter and 496 on flat rate, making a total of 11017.

153 new meters were installed in 1982, 167 regular meters changed to TRT or RRT, and 23 ARB meters changed to TRT or RRT.

In 1982, 15 discontinued services were excavated and shut off at the main, 113 stopped meters replaced and 40 frozen meters replaced.

The following sprinklers were installed in 1982:

- (1) Bank of Montreal - 505 King Street
- (2) Fredericton South Nursing Home - 521 Woodstock Road
- (3) Beaverbrook Art Gallery - 703 Queen Street
- (4) NBEPC - Gilbert Street
- (5) Royal Road School - 340 Royal Road

There are in the City as of 1982 12 31, 1342 hydrants situated in the following areas:

Fredericton South	621
Fredericton North	145
Nashwaaksis	245
Marysville	130
Barker's Point	66
Silverwood	<u>22</u>
Sub-total	1229
Located on private property	113
TOTAL	<u>1342</u>

Hydrants were installed or added to City totals at the following locations in 1982:

Location	Number
Royal Road - Barton Cres. to School Site	4
Tamarack Terrace	1
Fisher Avenue	2
Coronation Street	1
Marshall Street	1
Hayes Street	1
Union Street	6
Cliffe Street	1
Provincial Gov't. (St. Annes Pt.)- formerly private	1
Charles Avenue	1
Maliseet Drive	1
TOTAL	20

There was also one hydrant removed from Bowlen Street and seven hydrants removed from Union Street due to construction.

Distribution System

New services installed in 1982	57
Old services relayed in 1982	22
Frozen services that had to be thawed	45

The Fredericton Distribution System consists of 159.842 kilometres of water main, made up as follows:

251.123

Size	Marysville	Nashwaaksis	Barker's Point	Silverwood Garden Creek	Fredericton	Total
31.25 mm	-	0.095 0.153	-	-	-	0.095 0.153
37.5 mm	-	0.045 0.072	-	-	-	0.045 0.072
50 mm	-	-	-	0.096 0.154	-	0.096 0.154
75 mm	-	-	-	-	0.270 0.435	0.270 0.435
100 mm	0.468 0.753	1.387 2.232	-	1.715 2.508	6.333 10.291	9.903 15.784
150 mm	7.622 12.050	12.864 20.669	2.433 3.915	2.614 3.929	36.036 56.412	61.569 96.975
200 mm	3.640 5.670	10.363 16.664	0.593 0.954	1.603 2.580	23.219 37.133	39.418 63.001
250 mm	1.532 2.465	4.652 6.546	3.208 5.163	0.865 0.964	11.816 18.992	22.073 34.130
300 mm	0.383 0.616	1.420 2.074	0.019 0.031	2.832 4.558	14.783 23.385	19.437 30.664
350 mm	-	0.207 0.207	-	-	2.231 3.391	2.438 3.598
400 mm	-	-	-	-	3.081 4.049	3.081 4.049
450 mm	-	-	-	-	1.262 1.859	1.262 1.859
Unknown	0.155 0.249	-	-	-	-	0.155 0.249
TOTAL	13.800	31.033	6.253	9.725	99.031	159.842
	21.803	48.617	10.063	14.693	155.947	251.123

Kilometrages for Marysville, Nashwaaksis, Barker's Point, and Silverwood are approximate only, due to measurement from maps in some instances.

The above kilometrages do not include water mains installed at the Exhibition Grounds; the University of New Brunswick; St. Annes Point Barracks on the Woodstock Road and the low rental housing development in Fredericton North.

(3) Water Pumping Station

Net Expenditure - \$ 432 326

The above expenditure was made up as follows:

Source of Supply:

Labour - Wells	\$ 47 970
Maintenance - Wells	47 908
Power - Wells	144 189
Materials - Wells	<u>2 784</u>
	\$ 242 851

Power & Pumping (Plant):

Labour	123 144
Workmen's Compensation	2 069
Light & Power	30 321
Diesel Fuel & Lubricants	1 387
Heating	5 998
Supplies	711
Miscellaneous	<u>807</u>
	164 437

Maintenance of Equipment (Plant):

Labour	0
Insurance (Pumping Station)	11 047
Maintenance (Equipment)	60
Taxes (Pumping Station)	5 912
Materials	<u>66</u>
	17 085

Purification & Treatment

Labour - Analyst	2 535
Chlorine	4 070
Chemicals	413
H.T.H. Crystals	719
H.T.H. Tablets	0
Chlorinator (Parts)	<u>216</u>
	7 953
TOTAL	\$ 432 326

Following is the yearly costs of heating the Fredericton Pumping Station Plant for the last ten years:

YEAR	COST
1973	\$ 961.12
1974	1836.79
1975	2132.89
1976	2156.01
1977	2176.81
1978	2459.14
1979	3141.97
1980	4502.00
1981	5065.00
1982	5998.00

COMPARISON OF WATER PUMPED AND COSTS FOR
FREDERICTON FOR THE LAST TEN YEARS

Year	cubic metres produced	Production Expenditure	Production Cost per cubic metre
1973	4 280 068	\$ 81 478.87	1.9 cents
1974	4 375 165	105 320.82	2.4 cents
* 1975	6 394 385	165 319.34	2.6 cents
* 1976	6 459 340	207 272.52	3.2 cents
* 1977	6 463 520	215 683.16	3.3 cents
* 1978	6 307 295	246 509.77	3.9 cents
* 1979	6 628 241	303 364.45	4.6 cents
* 1980	7 037 407	360 611.00	5.1 cents
* 1981	6 907 216	355 321.00	5.1 cents
* 1982	7 029 560	432 326.00	6.15 cents

* Production costs for the entire amalgamated area.

The columns in the preceding comparison, showing cubic metres produced, do not include water used from wells in the other sections of the City prior to 1975.

The total amount of water pumped from 1982 01 01 to 1982 12 31 for the entire City was 7 029 559.57 cubic metres divided as follows:

Fredericton South	4 436 226.68
Fredericton North	602 687.55
Nashwaaksis	796 533.77
Marysville (partially estimated)	479 126.94
Barker's Point	214 865.69
Silverwood & Duval	350 821.45
Killarney	149 297.49
TOTAL	7 029 559.57

The total net water expenditure (operating) for the City from 1982 01 01 to 1982 12 31 was determined from the following:

Source of supply	\$ 242 851
Power & Pumping	164 437
Maintenance of Equipment	126
Purification & Treatment	7 953
Transmission & Distribution (operation)	127 425
Transmission & Distribution (maintenance)	394 654
Other (taxes & insurance)	16 959
TOTAL	\$ 954 405

Therefore, the net operating cost to pump and deliver to the customer one cubic metre of water from 1982 01 01 to 1982 12 31 was:

$$\$ \frac{954\ 405}{7\ 029\ 560} = \$0.136$$

The cost of one cubic metre of water delivered including principal and interest charges is as follows:

Total Net Administration & Operating Costs	\$ 1 262 665
Principal and Interest	675 570
TOTAL	\$ 1 938 235

Total cost of water per cubic metre:

$$\$ \frac{1\ 938\ 235}{7\ 029\ 560} = \$0.276$$

Principal and interest costs:

$$\$ \frac{675\ 570}{7\ 029\ 560} = \$0.096$$

Administration and operating costs:

$$\$ \frac{1\ 262\ 665}{7\ 029\ 560} = \$0.180$$

Following is a table showing a comparison of net operating costs, administration and operating costs, principal and interest costs, and total costs per cubic metre from 1968 to 1982:

Costs per cubic metre in cents

Year	Net Operating	Administration & Operating	Principal & Interest	* Total Cost
1968	4.2	5.3	5.5	10.8
1969	6.4	8.0	3.9	11.9
1970	4.3	5.8	4.2	10.0
1971	4.7	6.1	4.9	11.0
1972	5.3	6.7	4.0	10.7
1973	4.1	6.4	4.0	10.4
**1974	6.4	9.2	5.1	14.3
**1975	7.3	10.6	5.9	16.5
**1976	7.5	11.4	10.8	22.2
**1977	8.1	11.9	13.2	25.1
**1978	8.8	12.5	12.5	25.0
**1979	10.3	14.5	11.9	26.4
**1980	12.4	16.3	10.4	26.7
**1981	12.1	16.5	10.0	26.5
**1982	13.6	18.0	9.6	27.6

* Total Cost = Administration & Operating + Principal & Interest

** Values from 1968 to 1973 are for pre-amalgamated City only while values from 1974 to 1982 are for the amalgamated City.

WATER AND SEWER REVENUE - 1982

WATER:

Item	Net Expenditure	Revenue
<u>Water Office Administration</u>		
(a) Administrative (Eng. Dept. staff)	\$ 69 894	\$
(b) Billing & Collecting (office)	126 206	
<u>Water Ordinary</u>		
(a) General-operating & maintenance (includes hydrants)	522 079	1 977 446
(b) Meters	112 160	50 425
<u>Water Pumping Station</u>		
(a) General Costs- Wells, plant purification & treatment, etc.	412 832	
(b) City Analyst	2 535	
(c) Taxes & Insurance	16 959	
Principal & Interest	675 570	
TOTALS	\$ 1 938 235	\$ 2 027 871

SURPLUS: \$ 89 636

SANITARY SEWER:

Item	Net Expenditure	Revenue
Sewerage Domestic- Maintenance & Installation	\$ 385 477	\$ 1 948 093
F.A.P.C.C. Sewage Treatment	713 553	
Principal & Interest	182 336	
TOTALS	\$ 1 281 366	\$ 1 948 093

SURPLUS: \$666 727

Accompanying this report is the report of Laurence Corbett, P. Eng., City Analyst, on the Fredericton Water Supply from 1982 01 01 to 1982 12 31.

WATER QUALITY 1982

Bacterial Analysis

Samples for coliform analysis were taken from the Fredericton Water System at regular intervals through 1982. Most samples were taken from the wells in service with the rest taken at various points within the distribution system. In all, 272 samples were taken from the Water System. These were tested by the membrane filtration technique in the pumping station lab.

The following is a description of those samples which developed coliform colonies:

<u>Date</u>	<u>Location</u>	<u>No. Colonies</u>
82 03 24	Highland Well	1
82 05 04	St. Mary's Street Well	2
82 05 06	No. 5 Wilmot Well	1
82 08 11	No. 3 Silverwood Well	2
82 08 11	Cameron Court Well	30
82 08 16	Cameron Court Well	2
82 09 08	No. 1 Wilmot Well	1
82 11 02	No. 3 Silverwood Well	1
82 11 04	No. 3 Silverwood Well	7

Coliform samples were also analysed for all new mains (to ensure proper disinfection) before opening them to the system.

Chemical Analysis

Samples for chemical analysis were taken from all wells and various locations within the system in February and March of 1982 and sent to Victoria General Hospital, Department of Pathology in Halifax.

As well, the Department of the Environment sampled and analysed all producing wells.

Following is the results of the well analyses as returned from Halifax.

The analyses also included arsenic, beryllium, chromium, cobalt, nickel, antimony, selenium, tin, vanadium. These elements were not found in measureable amounts.

Well	Turbidity (J.T.U.)	Alkalinity mg/L	Hardness mg/L	Manganese mg/L	Iron mg/L	Chloride mg/L	Fluoride mg/L	Nitrate mg/L	Aluminum mg/L	Boron mg/L	Barium mg/L	Cadmium mg/L	Copper mg/L	Zinc mg/L	Silver mg/L
Wilmet No. 1	58	55	0.46	7.0	0.55	0.10	7.0	0.1	<0.05	<0.05	0.01	<0.002	<0.01	<0.02	<0.02
Wilmet No. 3	74	63	0.50	6.9	0.04	0.03	12.0	0.1	0.32	<0.05	0.03	<0.002	<0.01	<0.02	<0.02
Wilmet No. 4	79	53	0.38	6.6	0.39	0.05	21.0	<0.1	0.83	<0.05	0.02	<0.002	<0.01	<0.02	<0.02
Wilmet No. 5	59	53	0.34	7.1	0.60	0.03	4.2	<0.1	0.13	<0.05	0.008	<0.002	0.01	<0.02	<0.02
Duval	101	122	0.15	7.7	0.03	<0.02	24.0	0.2	<0.05	<0.05	0.12	<0.002	<0.01	<0.02	<0.02
Cameron Court	55	92	0.36	7.6	<0.01	0.02	16	0.3	0.35	<0.05	0.03	0.07	<0.002	<0.01	<0.02
Silverwood No. 2	143	131	0.41	7.5	<0.01	0.04	28	<0.1	0.76	40.05	<0.02	0.16	<0.002	<0.01	<0.02
Silverwood No. 3	105	98	0.98	7.8	<0.01	0.10	4.6	<0.1	0.25	<0.05	<0.02	0.07	<0.002	<0.01	<0.02
Nashwaaksis No. 1	149	98	0.49	7.6	0.17	<0.02	53	0.2	0.06	<0.05	<0.02	0.06	<0.002	<0.01	<0.02
Nashwaaksis No. 2	136	96	0.47	7.4	0.01	<0.02	26	0.2	0.17	<0.05	<0.02	0.04	<0.002	<0.01	<0.02
Nashwaaksis No. 3	118	97	0.46	7.7	0.06	0.03	19	0.2	<0.05	<0.05	<0.02	0.03	<0.002	<0.01	<0.02
McKeen Street	137	121	0.39	7.4	0.20	<0.02	32	0.1	<0.05	<0.05	<0.02	0.12	<0.002	<0.01	<0.02
Highland	62	69	3.40	7.3	0.19	0.13	5.4	<0.1	<0.05	0.11	<0.02	0.18	<0.002	0.02	<0.02
Cliffe Street	125	122	1.10	6.8	<0.01	<0.02	20.0	<0.01	0.12	<0.05	<0.02	0.14	<0.002	<0.01	<0.02
Barker's Point No. 1	10	106	4.60	9.1	0.01	0.24	29.0	0.9	<0.05	0.49	0.03	0.02	<0.002	<0.01	<0.02
Barker's Point No. 2	3	123	1.9	9.1	<0.01	<0.02	10.0	0.8	<0.05	0.17	0.03	<0.005	<0.002	<0.01	<0.02
Killarney K-1	70	72	1.20	7.6	<0.01	<0.02	4.6	<0.01	0.06	<0.05	0.05	0.04	0.006	0.003	0.02
Killarney K-10							N O T S A M P L E D								
Marysville No. 1	58	55	2.20	7.5	0.03	0.21	5.0	<0.1	0.19	<0.05	<0.02	0.07	<0.002	<0.01	<0.02
Marysville No. 2	93	67	0.36	7.0	0.01	0.25	30	<0.1	<0.05	<0.05	<0.02	0.09	<0.002	0.02	<0.02
Marysville No. 3	101	81	42.00	9.1	0.29	5.40	31	0.1	<0.05	<0.05	<0.02	0.07	<0.002	0.01	<0.02
St. Mary's Street	255	90	1.80	6.9	1.50	210.0	0.24	1.50	<0.01	<0.05	<0.02	0.43	<0.01	<0.02	<0.02