

**ANNUAL REPORT**

**OF THE**

**CITY ENGINEER**

**1981**

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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 1981 01 01 to 1981 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 .....	7.696 km
Concrete Sidewalk .....	3.849 km
New Street Construction .....	0.341 km
New Pavement (20 mm Binder) .....	3.626 km
Surface Course (13 mm) .....	1.631 km
Surface Course (10 mm) .....	5.956 km
Double Chip Sealed City Streets .....	3.949 km
Single Chip Sealed City Streets .....	- km
Gravity Sanitary Sewer Mains .....	- km
Sanitary Sewer Force mains .....	- km
Storm Sewer Mains .....	1.273 km
Water Mains .....	1.434 km

ALSO

- 54 Water Services Installed
- 54 Sanitary Sewer Services Installed
- 5 Sprinklers Installed
- 25 Services Relayed (Water)
- 247 Water Meters Installed
- 3 Extension of Existing Services
- 5 Services Relayed (Sanitary Sewer)

Contractors under contract with the Public Works Department of the City of Fredericton in 1981 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
Elmtree Concrete 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
Gulf Canada Products Company	- supply and delivery of unleaded gasoline

Co-op Fuels Fredericton	- supply and delivery of regular gasoline
Shell Canada Limited	- supply and delivery of diesel fuel
Spade Construction Ltd.	- installation of storm sewer services in the West Nashwaaksis Area
Gorman Construction Ltd.	- supply and placement of asphalt concrete
Multi-Ventures Ltd.	- installation of primary water mains and modifications to Wilmot Park Wells
Fundy Contractors Ltd.	- installation of water main across the Nashwaak River between Barker Street and Charles Avenue
The Canadian Salt Company Ltd.	- supply and delivery of highway salt
Wendell Thomas & Sons Ltd.	- supply and delivery of winter sand
Marine, Industrial & Technical Sales Co. Ltd.	- supply of traffic lane striping paint
Marine, Industrial & Technical Sales Co. Ltd.	- supply and placement of thermoplastic 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
Imperial Oil Limited	- supply and delivery of furnace oil
Maritime Pavement Markings Ltd.	- application of traffic lane striping paint
Hayland Ltd.	- supply and installation of salt storage shed
Electric Motor Services Ltd.	- supply and installation of pumping equipment
Gulf Oil	- supply and delivery of furnace oil

The current expenditures for the period of 1981 01 01 to 1981 12 31 appear as follows:

ITEM	BUDGET	NET EXPENDITURE	DEFICIT	SURPLUS
Common Services	\$ 917 830	\$ 1 156 971	\$ 239 141	-
Road Transport (Adm)	19 350	25 243	5 893	-
Roads & Streets	401 800	375 182	-	\$ 26 618
Sidewalk Repairs	13 400	10 356	-	3 044
Culverts & Ditches	29 500	23 246	-	6 254

ITEM	BUDGET	NET EXPENDITURE	DEFICIT	SURPLUS
Storm Sewers	60 000	78 153	18 153	-
Street Cleaning	264 200	273 559	9 359	-
Spring Cleanup	20 200	23 997	3 797	-
Snow & Ice Removal	662 000	735 616	73 616	-
Street Lighting	379 200	369 724	-	9 476
Traffic Services	191 300	187 314	-	3 986
Off-street Parking	820	63	-	757
Garbage Collection	357 200	348 001	-	9 199
Sanitary Landfill	237 230	206 349	-	30 881
Old Burial Ground	8 960	8 906	-	54
Loyalist Burial Ground	300	199	-	101
Wilmot Park	22 250	24 875	2 625	-
Odell Park	28 200	28 797	597	-
Carleton Park	13 200	10 707	-	2 493
Development of Park Areas	5 200	3 129	-	2 071
Other Parks	3 345	3 960	615	-
Public Works	303 561	315 296	11 735	-
<b>TOTALS</b>	<b>\$ 3 939 046</b>	<b>\$ 4 209 643</b>	<b>\$ 365 531</b>	<b>\$ 94 934</b>

OVERALL DEFICIT - \$ 270 597

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

Location	MUNICIPAL ROADS & STREETS				DESIGNATED ROUTES			T.C.H. By-Passes & Ramps
	Asphalt	Gravel	Chip Seal	Total	Asphalt	Gravel	Total	
Fredericton South	87.906	5.568	5.526	99.000	20.067	2.583	22.650	22.610
Fredericton North	18.823	1.218	0.401	20.442	4.770	-	4.770	3.316
Nashwaaksis	36.340	1.592	10.815	48.747	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	4.427	-	4.427	1.491
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	2.359	2.911	7.705	1.332	-	1.332	-
Lower St. Marys	-	-	1.970	1.970	-	-	-	-
Killarney Road	0.332	-	-	0.332	4.230	-	4.230	-
<b>TOTALS</b>	<b>172.564</b>	<b>14.679</b>	<b>43.142</b>	<b>230.385</b>	<b>54.423</b>	<b>2.583</b>	<b>57.006</b>	<b>50.619</b>

TOTAL (MUNICIPAL AND DESIGNATED ROUTES) = 287.391 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. S. BLISS, P. ENG.  
CITY ENGINEER

TOTAL YEARLY NET EXPENDITURE

The total yearly net expenditure under the direct supervision of the City Engineer in 1981 amounted to \$9 310 027.05, made up as follows:

Common Services .....	\$1 156 971.00
Road Transport .....	2 102 455.00
Environmental Health Services (Garbage & Waste Collection & Disposal) .....	554 351.00
Public Health Services (Cemeteries) .....	9 104.00
Cultural Services (Parks, Trees, etc.) .....	386 766.00
Water Department (Including Debt Charges) .....	1 829 981.00
Sanitary Sewer (Including Debt Charges) .....	1 226 088.00

Capital Accounts

(a) Water .....	318 232.48
(b) Sanitary Sewer .....	1 473.21
(c) Storm Sewer ) .....	51 684.82
(d) Gravel Roads ) Permanent .....	39 923.97
(e) Curb & Gutter ) Streets .....	449 639.82
(f) Paving ) .....	392 760.94
(g) Sidewalk .....	94 886.27
(h) Traffic Lights .....	19 541.66
(i) Reconstruction .....	112 675.48
(j) Transportation .....	47 559.81
(k) Other - Westmorland Bridge .....	27 571.87

Capital Service Development Projects

(a) Water .....	124 733.06
(b) Sanitary Sewer .....	11 009.73
(c) Storm Sewer .....	28 558.72
(d) Service Depot & Equipment .....	88 350.38
(e) Equipment Acquisition .....	87 531.16
(f) Solid Waste Disposal .....	148 177.67
	<hr/>
	\$9 310 027.05
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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 \$1 156 971 and is made up as follows:

Administration .....	\$ 39 022
Engineering Services .....	137 247
General Equipment .....	429 177
Service Depots .....	168 149
Safety & Benefits .....	383 376
 TOTAL .....	 <u>\$1 156 971</u>

#### (2) ROAD TRANSPORT

Road Transport is made up of the following items:

Administration .....	\$ 25 245
Roads & Streets .....	1 520 106
Street Lighting .....	369 724
Traffic Services .....	187 380
 TOTAL .....	 <u>\$2 102 455</u>

- (a) Administration: The total net expenditure under this heading amounted to \$25 245 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) .....	\$ 375 180
(2) Sidewalk Repairs .....	10 356
(3) Culverts & Ditches .....	23 245
(4) Storm Sewer .....	78 152
(5) Street Cleaning & Flushing .....	297 556
(6) Snow & Ice Removal .....	497 126
(7) Sanding & Salting .....	238 491
 TOTAL.....	 <u>\$1 520 106</u>

(1) Roadway Surfaces (Maintenance)

The net expenditure of \$375 180 is made up as follows:

Gravel Roads & Chip Seal.....	\$ 25 894
Paved Streets .....	225 678
Asphalt Resurface Program .....	55 883
Curb & Gutter Repair .....	16 062
Driveway Entrances .....	17 526
Right-of-Way, Guard Posts, etc. .....	34 137
TOTAL .....	\$ 375 180

Gravel Roads and Chip Seal

General maintenance and repairs to gravel roads and roadway surfaces. There was no chip seal placed under this account in 1981.

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 1981.

Location	Length (metres)
Reid Street - Albert St. to Kings College Road	372
Kitchen Street	378
Graham Avenue	457
Prince Street	280
Byng Street	187
Henry Street	296
Babbitt Street	116
Smith Street	253
Beckwith Street	106
Turnbull Court	161
Titus Street	280
Medley Street	365
TOTAL .....	3251

3251 metres = 3.251 km

Curb and Gutter Repair

Replacement of sections of curb and gutter on various streets.

### Driveway Entrances

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

### Right-of-Way, Guard Posts, etc.

This work involves sodding and seeding, rip rapping, grass cutting, repair and placement of guard rails and clearing rights-of-way.

## (2) SIDEWALKS (MAINTENANCE)

The net expenditure of \$10 356 for sidewalk repairs was made up as follows:

Personnel (labour, pensions, workmen's compensation).	\$ 9 628
Materials .....	728
TOTAL .....	\$ 10 356

## (3) STREETS (GENERAL MAINTENANCE)

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

The net expenditure of \$23 245 was made up as follows:

Personnel (labour, pensions, workmen's compensation).	\$ 14 265
Materials .....	8 980
TOTAL .....	\$ 23 245

## (4) STORM SEWER

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

The net expenditure of \$78 153 was made up as follows:

Personnel (labour, pensions, workmen's compensation).	\$ 62 017
Materials .....	16 138
TOTAL .....	\$ 78 152

## (5) STREET CLEANING AND FLUSHING (INCLUDES SPRING CLEAN-UP)

Two Wayne Sweepers, #50 and #52, and a Vacuum-Sweep, #53, carried out the cleaning of City streets. These machines worked a total of 3086 hours from 1981 02 25 to 1981 12 10.

The net expenditure under this heading amounted to \$297 556 and was made up as follows:

Personnel (Wages, Pensions, Workmen's Compensation) ..	\$ 199 355
General Services (Trucking & Repairs) .....	68 447
Gas, Oil, Grease .....	13 834
Brooms - Main & Gutter .....	13 174
Brooms - Hand .....	1 829
Anti-Litter Cans & Waste Collection .....	35
Dust Control .....	882
<b>TOTAL .....</b>	<b>\$ 297 556</b>

(6) and (7) SANDING & SALTING AND SNOW & ICE REMOVAL

(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 & lub, sand) .....	\$ 146 515
Personnel (labour, pensions, compensation).....	49 338
General Services (vehicle repairs) .....	21 490
<b>TOTAL NET EXPENDITURE</b>	<b>\$ 217 343</b>

Sidewalks:

Personnel (labour, pensions, compensation).....	\$ 9 868
General Services (vehicle repairs) .....	4 298
Materials (gas, oil & lubs, sand) .....	6 982
<b>TOTAL NET EXPENDITURE</b>	<b>\$ 21 148</b>

(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 \$419 469 and was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 251 777
General Services (repairs & maintenance of vehicles, hired trucks & machinery) .....	139 173
Materials (fuel & lubricants) .....	28 519
<b>TOTAL .....</b>	<b>\$ 419 469</b>

The City of Fredericton was responsible for plowing, sanding, and salting 287.391 km of roads and streets in 1981. (130.562 km on the north side and 156.829 km on the south side)

Beginning in the Fall of 1981, the City of Fredericton also became responsible for the Westmorland Street Bridge, ramps, and riverfront drives for winter maintenance on a contract basis with the Department of Transportation.

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

Personnel (labour, pensions, compensation) .....	\$ 301 115
General Services (repairs & maintenance of vehicles, hired trucks & machinery) .....	160 663
Materials (gas, oil & lubs, salt, sand) .....	175 034
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TOTAL .....	\$ 636 812 (1)
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Therefore, the unit cost of plowing, sanding and salting one kilometre of road (street) was \$2216.

#### Sidewalks:

140.01 km of sidewalk were plowed during the winter months of 1981. (45.31 km on the north side and 94.70 km on the south side)

The total net expenditure for plowing amounted to \$77 657 and was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 50 356
General Services (repairs & maintenance of vehicles)	21 597
Materials (fuels & lubricants) .....	5 704
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TOTAL .....	\$ 77 657
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The overall net expenditure for plowing and sanding sidewalks was \$98 805 made up as follows:

Personnel (labour, pensions, compensation).....	\$ 60 224
General Services (repairs & maintenance of vehicles)	25 895
Materials (fuels & lubricants, sand) .....	12 686
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TOTAL .....	\$ 98 805 (2)
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Therefore, the unit cost of plowing and sanding one kilometre of sidewalk was \$706.

Total Net Cost of Snow Control - ADD (1) & (2) ..... \$ 735 617

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

1977	Agriculture Canada Airport Weather Office	256.79 cm 328.78 cm
1978	Agriculture Canada Airport Weather Office	226.80 cm 308.20 cm
1979	Agriculture Canada Airport Weather Office	154.90 cm 188.00 cm
1980	Agriculture Canada Airport Weather Office	189.20 cm 209.70 cm
1981	Agriculture Canada Airport Weather Office	282.30 cm 249.10 cm

(c) Street Lighting

The Multiple Lighting System for the City of Fredericton as of 1981 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
199 - 175 Watt M.V. Wood	@ \$114.00	per light per year
347 - 175 Watt Ref. M.V.	@ \$ 88.80	per light per year
14 - 250 Watt M.V. Conc.	@ \$172.30	per light per year
3 - 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 1981 were as follows:

Multiple Lighting System Contract .....	\$ 369 369
New Pole Installations.....	178
New Bulbs .....	177
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	\$ 369 724
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(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
- (5) Off-street Parking

(1) Street Signs

Purchasing, repairing and installing street signs on City streets.

The net expenditure under this heading amounted to \$16 061 made up as follows:

Personnel (labour, pensions, compensation).....	\$ 1 722
General Services (repairs & maintenance) .....	31 cr
Materials (posts, street sign purchases, etc.).....	14 370
 TOTAL .....	 <u><u>\$ 16 061</u></u>

(2) Paint Department

The net expenditure under this heading was \$69 937 made up as follows:

Personnel (labour, pensions, compensation).....	\$ 35 129
General Services (equipment repairs, vehicle maintenance, rent, etc.) .....	101 cr.
Goods (paint, gas & oil, supplies, signs).....	29 913
Fixed Assets (new equipment) .....	4 996
 TOTAL .....	 <u><u>\$ 69 937</u></u>

(3) Traffic Signals

The net expenditure under this heading was \$65 729 made up as follows:

Personnel (labour, pensions, compensation).....	\$ 12 393
General Services (maintenance of vehicles).....	144 cr.
Government Services (electric power) .....	43 496
Goods (gas, oil, materials, etc.).....	8 182
Fixed Assets (new equipment) .....	1 802
 TOTAL .....	 <u><u>\$ 65 729</u></u>

(4) Railway Crossings

The net expenditure under this heading was \$35 590 for maintenance.

(5) Off-Street Parking

The net expenditure under this heading amounted to \$63 made up as follows:

Personnel (labour & workmen's compensation) ...	\$ 63.
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The following items of machinery were purchased in 1981 and charged to TRANSPORTATION SERVICES (Common Services):

1- G.M.C. Suburban - Asset No. 4-81

Total Cost ..... \$12 051.00

2- G.M.C. 1/2 Tons - Asset No's. 10-81 & 249-81

Total Cost ..... \$20 808.00

2- International 3 Tons - Asset No.'s 106-81 & 107-81

Total Cost ..... \$40 337.20

1- Hough Loader - Asset No. 140-81

Total Cost ..... \$85 295.16

NOTE:

The total cost of each of the above includes 8% S.S. & E. Tax and costs for license and registration.

GENERAL INFORMATION

CAPITAL ACCOUNT CURB & GUTTER

The net expenditure under this heading amounted to \$449 639.82.

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

LOCATION	metres
Bliss St.	18
Morrison St.	124
Burpee St. - Clearview Ave. to Huron Ave.	157
Huron Ave.	542
Clearview Ave.	590
Oakland Ave.	504
Vineland St.	496
Westview St.	467
Autumn St.	306
Winter St.	332
Summer St.	389
Bruce St.	309
Pugh St. - MacFarlane Ave. to Cherry Ave.	396
Cherry Ave. - MacFarlane Ave. to Pugh St.	265
Monteith Dr. - Mayflower St. to Springhill Rd.	936
Tulip St.	380
Lily St.	413
Sewell St. - Lawson Ct. to Ashfield St.	722
Lawson Ct.	350
TOTAL .....	7696

All the above curb and gutter was constructed by City Forces with concrete purchased from Elmtree Concrete Limited at a price of \$80 per cubic metre.

The average unit cost of one metre of curb and gutter placed by City Forces found by dividing the total length laid into the total cost was \$58.43. 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 1981, Gorman Construction Limited was awarded a contract to supply, and place asphalt on a number of City streets. Atlantic Colas Limited also double chip sealed a number of City streets under the Capital Paving Program.

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 \$392 760.94 made up as follows:

Gorman Construction Ltd. ....	\$ 261 813.40
Atlantic Colas Ltd. ....	58 307.04
City Payrolls ....	25 301.61
City Machinery ....	12 541.00
City Pensions ....	1 088.53
Diamond Construction (1961) Ltd. - Tack Coat 1980 ...	4 500.00
Interest on Demand Notes ....	3 886.50
Bond Discount ....	5 893.00
Gravel & Crushed Rock ....	5 674.61
Miscellaneous Materials ....	647.60
ADI Limited (Asphalt testing) ....	13 107.65
<b>TOTAL .....</b>	<b>\$ 392 760.94</b>

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

- (1) New Pavement - Binder Course (20 mm) - Type B
- (2) Surface Course - (13 mm) - Type D
- (3) Surface Course - (10 mm) - Type E
- (4) Double Chip Seal - (20 mm and 10 mm)

#### (1) New Pavement

The following streets were paved with Type 'B' Binder Course in 1981:

LOCATION	Length (metres)
Burpee St. - Clearview Ave. to Huron Ave.	98
Huron Ave.	256
Clearview Ave.	311
Oakland Ave.	237
Vineland St.	248
Westview St.	246
Autumn St.	150
Winter St.	161
Summer St.	192
Bruce St.	166
Pugh St. - MacFarlane Ave. to Cherry Ave.	77
Cherry Ave. - MacFarlane Ave. to Pugh St.	143
Monteith Dr. - Mayflower St. to Springhill Road	427
Tulip St.	193
Lily St.	193
Sewell St. - Lawson Ct. to Ashfield St.	365
Lawson Ct.	163
<b>TOTAL .....</b>	<b>3626</b>

3626 metres = 3.626 km

(2) Surface Course - Type D

The following streets were resurfaced with Type 'D' Asphalt in 1981:

LOCATION	Length (metres)
Golf Club Road - 1980 construction area	430
* Brookside Drive - end of curb to Reynolds St.	644
McMinniman Court	287
Jarvis Street	106
Hossack Street	164
TOTAL .....	1631
1631 metres = 1.631 km	

\* Portion done by Department of Transportation in conjunction with Ring Road construction.

(3) Surface Course - Type E

The following streets were resurfaced with Type 'E' Asphalt in 1981:

LOCATION	Length (metres)
Young Street	518
Dodona Place	121
Veterans Court	365
Veterans Drive	486
Duke Street	454
Ramsay Street	213
Crocket Street	548
TOTAL .....	2705
2705 metres = 2.705 km	

(4) Double Chip Seal

The following streets were double chip sealed with 20 mm and 10 mm chips in 1981:

LOCATION	Length (metres)
Doak Road	2353
* Flanagan Road	1251
Angelview Court	224
Legere Street	121
TOTAL .....	3949
3949 metres = 3.949 km	

\* A portion at the end of street was single chip sealed.

### CAPITAL ACCOUNT SANITARY SEWER

The net expenditure under this account amounted to \$1473.21 in 1981 after stimulation grant was applied and credit was received for work done with respect to the Devon Indian Reserve.

The above expenditure was primarily made up of materials paid for by Capital Account Sanitary Sewer and charged to other departments, work done and materials sold to private parties, holdbacks from 1980 capital construction projects, inspection, construction and engineering costs associated with the new Wilsey Road lift station and for construction and engineering costs regarding the Devon Indian Reserve through an agreement between the City of Fredericton and the Devon Indian Reserve.

### CAPITAL ACCOUNT STORM SEWER

The net expenditure under this account amounted to \$51 684.82.

The above expenditure was primarily made up of engineering and installation costs for new mains in the Nashwaaksis area, Canada Street near Bridge Street and Hollybrook Street, Minue Terrace, Bridgeview Court and Bowlen Street near St. Mary's Street. There were also costs for holdback payments regarding 1980 construction projects, work with respect to the Devon Indian Reserve and also for the Devon Area Study regarding separation of combined sewers.

The above net expenditure resulted when credits were applied for work paid for by the Province of New Brunswick regarding designated routes, by the St. Mary's Indian Band for work done on the Devon Indian Reserve and by NIP funds used for work done in the Dobie area in 1980.

LENGTH - metres

LOCATION	250 mm	300 mm	375 mm	450 mm	600 mm	750 mm	900 mm
Nashwaaksis West Streets (1981) 128-41	187	531	113		15	116	104
Bowlen Street (St. Mary's St. Ext.)					20		
Canada Street near Bridge St.		13					
Canada Street near Hollybrook St.			80				
Minue Terrace	11						
Bridgeview Court		49					
Brookside Drive						34	
TOTALS	198	593	193	-	35	150	104

1273 metres of main = 1.273 kilometres

## CAPITAL ACCOUNT WATER

The net expenditure under this account amounted to \$318 232.48 in 1981 after Stimulation Grant was applied.

Work done in conjunction with the above expenditure included the Nashwaak River Crossing linking Devon and Barker's Point water systems, Smythe and Montgomery Booster Station upgrading, Well Development and Pump installation costs, Primary Mains and Modifications at Wilmot Park, upgrading in conjunction with the riverfront drive construction, Canada Street upgrading and upgrading in the Nashwaaksis area.

LOCATION	LENGTH - metres						
	100 mm	150 mm	250 mm	300 mm	350 mm	400 mm	450 mm
Sunset Drive		4	117				
Primary Water Mains - Wilmot Park		15	19	15	11	548	257
Nashwaak River Crossing	27	13	15	368			
Smythe Street (near pumping sta.)							25
TOTALS	27	32	151	383	11	548	282

1434 metres = 1.434 kilometres

## CAPITAL SERVICE DEVELOPMENT PROJECTS

In 1974, projects were begun to upgrade and extend services in the amalgamated areas. These projects became known as Capital Service Development Projects - C.S.D.P.

Following is a summary of C.S.D.P. costs from 1974 to 1981 for the various services:

### GROSS EXPENDITURES

Year	Water	Sanitary Sewer	Storm Sewer	Totals
1974	\$ 563 987.05	\$ 169 761.70	\$ 494 027.15	\$ 1 227 775.90
1975	1 570 278.37	1 051 072.99	792 489.97	3 413 841.33
1976	827 814.68	468 296.19	588 338.30	1 884 449.17
1977	786 027.11	1 165 312.06	903 921.97	2 855 261.14
1978	300 561.65	362 441.90	1 214 097.67	1 877 101.22
1979	477 024.22	207 501.83	875 206.28	1 559 732.33
1980	442 954.24	251 344.27	843 874.56	1 538 173.07
1981	124 733.06	11 009.73	28 558.72	164 301.51
TOTALS	\$5 093 380.38	\$3 686 740.67	\$5 740 514.62	\$14 520 635.67

Year	Service Depot & Equipment	Equipment Acquisition	Solid Waste Disposal	Totals
1974	\$ 13 873.23	\$ 479 053.44	\$ 3 153.34	\$ 496 080.91
1975	366 636.81	165 149.47	8 725.42	540 511.70
1976	556 806.34	189 961.50	15 121.10	761 888.94
1977	19 458.69	146 862.61	17 605.61	183 926.91
1978	61 042.81	56 368.95	30 220.05	147 631.81
1979	13 839.00	26 946.18	30 631.67	71 416.22
1980	500.00	28 962.14	43 978.20	73 440.34
1981	88 350.38	87 531.16	148 177.67	324 059.21
TOTALS	\$1 120 507.26	\$1 180 835.45	\$ 297 613.06	\$ 2 598 955.77

OVERALL GROSS EXPENDITURE- \$17 119 591.44

### C.S.D.P. - Water

The above expenditure was primarily made up of holdback payments from 1980 construction projects, engineering costs associated with Monteith Subdivision and Rosewood Booster Station, and professional services regarding the water supply and distribution study for the City of Fredericton.

#### C.S.D.P. - Sanitary Sewer

The above expenditure was primarily made up of holdback payments from 1980 construction projects, engineering costs associated with Monteith Subdivision and professional services in conjunction with the proposed treatment facility for the western suburbs.

#### C.S.D.P. - Storm Sewer

The above expenditure was primarily made up of holdback payments from 1980 construction projects, interest on demand notes and bond discount charges.

#### C.S.D.P. - Service Depot and Equipment

The above expenditure was primarily made up of costs associated with the construction of a salt storage shed by Hayland Limited and interest on demand notes.

#### C.S.D.P. - Equipment Acquisition & Other Projects

The above expenditure was for bond discount charges and work associated with the new Westmorland Street Bridge.

#### C.S.D.P. - Solid Waste Disposal

The above expenditure was primarily made up of costs for purchasing of land for the proposed landfill site, professional services regarding testing of the proposed landfill site and for studies regarding incineration and composting.

### CAPITAL ACCOUNT SIDEWALKS

The net expenditure for sidewalk construction amounted to \$94 886.27 in 1981.

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

LOCATION	metres
Clearview Avenue	288
Sewell Street - Ashfield Street to Lawson Court	376
Bliss Street	26
* Canada Street	864
** Bridge Street	371
*** Westmorland Street Bridge	1757
*** Smythe Street	167
TOTAL .....	3849

$$3849 \text{ metres} = 3.849 \text{ km}$$

- \* 126 m reconstructed due to storm sewer construction
- \*\* Reconstruction of existing sidewalk
- \*\*\* Department of Transportation Bridge contracts.

Actual new sidewalk (not including reconstruction) = 3.352 km

CAPITAL ACCOUNT TRANSPORTATION

Net Expenditure ..... \$ 47 559.81

The expenditure under this account was for interest on demand notes, bond discount, and for professional services regarding the overall transportation study for the City of Fredericton.

CAPITAL ACCOUNT - TRAFFIC LIGHTS

Net Expenditure ..... \$ 19 541.66

The expenditure under this account was for costs associated with the installation of new signals and the upgrading of existing signals in conjunction with the Westmorland Street Bridge construction and also for bond discount and Minister of Finance payments.

CAPITAL PERMANENT STREETS - RECONSTRUCTION

Net Expenditure ..... \$ 112 675.48

The expenditure under this account was for costs associated with reconstruction work on various intersections affected by the new street traffic patterns and also for work on the Doak Road in conjunction with the proposed landfill site.

CAPITAL ACCOUNT - GRAVEL ROADS

Net Expenditure ..... \$ 39 923.97

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.

The City of Fredericton also constructed 0.341 km of new street through local improvement agreement.

CAPITAL - OTHER

Net Expenditure ..... \$ 27 571.87

The above expenditure was primarily for work done in conjunction with the new Westmorland Street Bridge.

PROVINCIAL ROUTE 105

DESIGNATED ROUTES

The City of Fredericton has a total of 57.006 km of provincial designated highways within its boundaries. In 1981, the Provincial Government paid \$1308 and \$330 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 1981:

1)	Installation of Storm Sewer - Route 105 .....	\$ 161 361.12
2)	Installation of Storm Sewer and Curb & Gutter - Route 8 (Canada Street near Bridge Street) .....	27 838.93
3)	Installation of Storm Sewer - Route 8 (Canada Street near Hollybrook Street) .....	9 563.48
TOTAL .....		\$ 198 763.53

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extra time will be charged

ROUTE 8 - 105

DESIGNATED ROUTES

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ROUTE 8 - 105

DESIGNATED ROUTES

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extra time will be charged

### ENVIRONMENTAL HEALTH SERVICES

Net Expenditure ..... \$ 554 350

Under the above heading, the following items were included:

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

#### (1) Garbage and Waste Collection

In 1981, the amount paid for the garbage and waste collection operation was \$356 136 made up as follows:

Personnel (labour, pensions, workmen's compensation) .....	\$ 18 106
General Services (advertising & collection contract) .....	348 030
TOTAL .....	\$ 356 136

#### (2) Sanitary Landfill - Disposal

The expenditure under this section was \$198 214 made up as follows:

General Services (Bulldozing Services Contract) .....	\$ 72 000
Government Services (Provincial Taxes) .....	855
Goods (gravel and cover material) .....	125 359
TOTAL .....	\$ 198 214

### 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 ..... \$ 8 904

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 7 449
General Services (machinery) .....	528
Government Services (lighting) .....	449
Goods (materials, tools, etc.) .....	478
TOTAL .....	\$ 8 904

(2) The Loyalist Burial Ground

Net Expenditure ..... \$ 199

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 199
General Services (machinery) .....	-
<b>TOTAL .....</b>	<b>\$ 199</b>

CULTURAL SERVICES

Included under this heading are:

- (1) Wilmot Park
- (2) Odell Park
- (3) Carleton Park
- (4) Development of Park Areas
- (5) Other Parks
- (6) Public Works (trees, greens, benches, other)

(1) Wilmot Park

Net Expenditure ..... \$ 24 876

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 17 742
General Services (repairs & maintenance, machinery, insurance) .....	3 801
Government Services (water & sewer rates, lights & power ..	1 753
Goods (materials, gas & oil) .....	1 580
<b>TOTAL .....</b>	<b>\$ 24 876</b>

(2) Odell Park

Net Expenditure ..... \$ 28 795

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 24 971
General Services (telephone, insurance, machinery, repairs & maintenance) .....	1 882
Government Services (water & sewer rates, lights & power ..	295
Goods (fuels and lubricants, materials) .....	1 647
<b>TOTAL .....</b>	<b>\$ 28 795</b>

(3) Carleton Park

Net Expenditure ..... \$ 10 707

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 5 335
General Services (machinery & land rental) .....	4 861
Goods (materials, gas & lubricants) .....	511

TOTAL ..... \$ 10 707

(4) Development of Park Areas

Net Expenditure ..... \$ 3 129

The above expenditure was made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 1 871
General Services (machinery) .....	710
Goods (materials, gas & lubricants) .....	548

TOTAL ..... \$ 3 129

(5) Other Parks

Net Expenditure ..... \$ 3 961

The above heading is made up as follows:

Personnel (labour, pensions, compensation) .....	\$ 2 327
General Services (machinery, repairs & maintenance) .....	1 156
Goods (materials) .....	478

TOTAL ..... \$ 3 961

(6) Public Works

Net Expenditure ..... \$ 315 297

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 \$278 831 and was made up as follows:

Personnel (labour, pensions, U.I.C., compensation, honorarium) .....	\$ 197 385
General Services (machinery & trucking, equipment maintenance, building rental).....	47 931
Goods (gas & oil, materials, new trees, small tools & equipment).....	17 972
Fixed Assets (new equipment) .....	15 543
TOTAL .....	\$ 278 831

In 1981, 850 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 1981:

Species	Number removed
Elm	827
Manitoba Maple	4
Maple	15
Ash	1
Silver Maple	1
Poplar	1
Cherry	1
	850

In 1981, 500 trees were removed with Dutch Elm Disease in the City of Fredericton.

Following is a list of trees (Elm) removed from 1964 to 1981:

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
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
TOTALS	4643	67.2	2258	6901

Permission for the removal of trees on private property, as well as a statement to the effect that no claim for damages will be filed by the property owners, are obtained before proceeding with this work.

Trees were planted at the following locations in 1981:

Location	Number of Trees
Corbett Ave.	26
Hashey Ave.	22
Carman Ave. (School)	5
Riverside Motel	4
457 Kings College Rd.	1
Grey St.	3
Waterloo Row	7
329 Saunders St.	1
31 Simcoe Court	1
224 Lynhaven St.	2
Greens - Queen St.	2
York St.	21
King St.	17
Carleton St.	6
25 Fairlawn	1
16 Fairlawn	1
Fairlawn @ Parkhurst	1
Forest Hill Road	2
38 Topcliffe Cres.	2
Lansdowne St.	2
Cathedral	2
765 Charlotte St.	1
498 Charlotte St.	1
470 Charlotte St.	1
64 Charlotte St.	1
17 Lansdowne St.	1
109 Weyman St.	1
295 Canada St.	1
423 Canada St.	1
486 Canada St.	1
544 George to Regent	5
Mooers Drive	24
29 Saunders St.	1
Saunders @ Wilmot Park	8
Rookwood @ Wilmot Park	13
Wilmot Park Recreation	21
Lombardi Lane	28
Dahlia Drive	21
Primrose Ave.	19
340 Wright St.	1
Bliss St. (corner Colebrook)	4
16 Blair St.	1
377 Union St.	2
390 Union St.	1
125 Riverside Dr.	1
370 Inglewood Dr.	1

Location	Number of Trees
Smythe St. (corner Charlotte)	4
Coronation Ct.	22
Wilmot Park	9
Cherry Ave.	60
33 Haines Crescent	1
Haines Cres. (corner Calder)	3
Burpee St.	19
Brunswick St. Graveyard	8
765 Charlotte St.	1
498 Charlotte St.	1
470 Charlotte St.	1
64 Charlotte St.	1
Queen St. Green	7
Lansdowne St.	1
570 Forest Hill Rd.	1
590 Forest Hill Rd.	1
38 Topcliffe Crescent	1
Bradford St. (corner Bristol)	1
Cathedral	4
Gray St.	2
Officer's Square	7
Henry Park	8
School St., Dobie St., Neill St.	17
Nashwaaksis High School	22
Ross Terrace Sewer R.O.W.	6
Odell Park	6
Carleton Park	6
457 Kings College Rd.	1
254 Lynhaven Ct.	1
54 Fairview Dr.	1
5 Robin Dr.	1
15 Fairview Dr.	1
19 Arlington St.	1
TOTAL .....	515

118 trees were planted at various locations to replace losses due to dry weather and vandalism.

Trees purchased in 1981 were obtained from Connon Nurseries, Brookdale Nurseries, and Lansdowne Nurseries.

A number of trees were also trimmed in 1981. The number and class of trees are as follows:

- (a) Trees above 14 m in height - approximately 200 mixed species
- (b) Trees 6 m to 14 m in height - approximately 700 mixed species
- (c) Trees under 6 m in height - approximately 2500 mixed species

Stumps removed, topsoiled and seeded - 438

Trees on 1981 Tree Removal List to be removed in the Spring of 1982.

<u>Location</u>	<u>Number to be Removed</u>
South Side	75
North Side	150
Total trees to be removed from 1981 program .....	225

(b) Greens, Benches, Other

The net expenditure under this account amounted to \$36 466 and was made up as follows:

Personnel (labour, pensions, compensation).....	\$ 21 885
General Services (communications, machinery & trucking, equipment maintenance) .....	1 681
Goods (gas & oil, materials, small tools & equipment)	5 653
Fixed Assets (purchases of equipment) .....	7 247
	<u>TOTAL .....</u>
	\$ 36 466

SANITARY SEWER

Net Expenditure ..... \$ 1 226 088

The above expenditure was made up as follows:

Operating:

Labour - Lift Stations .....	\$ 18 252
Power - Lift Stations .....	10 691
Maintenance - Lift Stations ...	1 324
Materials - Lift Stations .....	<u>62</u>

Maintenance:

Labour .....	\$198 775
Compensation .....	3 783
Materials .....	24 434
Trucking & Machinery Costs .....	<u>41 507</u>

Treatment:

Fredericton Area Pollution Control Commission \$ 681 408

Debt Charges:

Principal .....	\$ 84 834
Interest .....	<u>160 482</u>

Other:

Insurance Liability .....	\$ 536
	<u>TOTAL .....</u>
	\$1 226 088

New customers connected to the City Sewer System in 1981 = 54

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

Size	Silverwood Garden Creek	Nashwaaksis	Marysville	Barkers Point	Fredericton	Totals
100 mm	-	0.098	-	-	-	0.098
100 mm F.M.	0.008	-	-	-	0.512	0.520
150 mm	-	0.900	0.195	-	0.067	1.162
150 mm F.M.	0.019	0.417	0.335	0.042	1.869	2.682
200 mm	6.117	19.347	10.455	4.697	66.902	107.518
200 mm F.M.	0.158	-	0.195	-	0.040	0.393
250 mm	0.951	1.791	0.377	0.185	5.173	8.477
250 mm F.M.	0.732	-	-	-	-	0.732
300 mm	0.275	1.904	0.625	1.161	7.929	11.894
300 mm F.M.	-	-	-	-	0.459	0.459
350 mm	0.099	0.426	-	-	0.443	0.968
350 mm F.M.	-	-	0.328	-	0.158	0.486
375 mm	-	1.344	0.311	0.108	1.630	3.393
400 mm	-	0.047	-	-	0.120	0.167
450 mm	0.496	0.019	0.839	-	2.176	3.530
500 mm	1.851	-	-	-	-	1.851
600 mm	0.097	-	-	-	1.062	1.159
750 mm	-	-	-	-	0.200	0.200
900 mm	-	-	-	-	0.890	0.890
TOTALS	10.803	26.293	13.660	6.193	89.630	146.579

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 25 wells in the City of Fredericton Water System (23 active wells and 2 test wells) and 16 reservoirs.

### Active Wells:

North Side:	Maple Street
	Cliffe Street
	Carleton Well 1963
	Killarney Well
	Nashwaaksis #1
	Nashwaaksis #2
	Nashwaaksis #3
	Sunset Drive
	Marysville #1
	Marysville #2
	Marysville #3
	Barker's Point #1
	Barker's Point #2
	Killarney Road #1
	Killarney Road #2

South Side:	Fredericton #1
	Fredericton #3
	Fredericton #4
	Fredericton #5
	Hanwell Road
	Silverwood #2
	Silverwood #3
	Duval

### Test Wells Only:

Nashwaaksis #4
Silverwood #4

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

### FREDERICTON SOUTH:

Location	No. of Reservoirs	Full Capacity (cubic metres)	Useful Capacity (cubic metres)
Silverwood	1	245	245
Regent Street	1	1 140	1 140
Montgomery Street	2	9 090	4 545
Smythe Street	2	18 180	18 180
Forest Hill (Canterbury Drive)	2	1 105	1 105
Flemming Road	1	3 750	1 880
Hanwell Road	1	460	270
Sub-Total	10	33 970	27 365

FREDERICTON NORTH:

Location	No. of Reservoirs	Full Capacity (cubic metres)	Useful Capacity (cubic metres)
Nashwaaksis	2	2 865	2 865
Barker's Point	1	1 140	1 140
Marysville	1	2 840	2 840
Carleton Ward	1	4 545	4 545
Killarney Road	<u>1</u>	<u>3 750</u>	<u>3 750</u>
Sub-Total	6	15 140	15 140
Overall Totals	16	49 110	42 505

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 .....	\$ 202 297
(2) Water Ordinary (includes meters) .....	583 337
(3) Water Pumping Station & Well Production Costs .....	355 321
(4) Debt Charges - Principal .....	326 257
(5) Debt Charges - Interest .....	362 769
Total Net Expenditure .....	<u>\$ 1 829 981</u>

(1) Water Administration

Net Expenditure ..... \$ 202 297

The above expenditure was made up as follows:

Personnel (Engineering Department Staff) .....	\$ 59 687
Billing & Collecting: Office Salaries &	
Benefits .....	\$ 78 282
Postage .....	10 985
Telephone .....	-
Machinery Rental.....	37 446
Office Rental .....	-
Materials & Supplies : 15 897	<u>142 610</u>
	TOTAL .....
	<u>\$ 202 297</u>

(2) Water Ordinary (including meters)

Net Expenditure ..... \$ 583 337

The expenditure under this heading was made up as follows:

Transmission & Distribution (operation):

Labour - Boosters .....	\$ 61 269
Equipment Maintenance -	
Boosters .....	1 978
Power & Taxes - Boosters ...	43 128
Materials - Boosters .....	<u>1 443</u>
	\$ 107 818

Transmission & Distribution (maintenance):

Labour - Hydrants .....	\$ 108 146
Labour - Maintenance .....	168 122
Workmen's Compensation .....	7 565
Distribution Repair Parts...	46 298
Trucks (maintenance) .....	4 377
Trucks (operating - gas & oil)....	3 447
Materials labour & trucking.	18 950
Hydrants- parts .....	16 258
Fixed Assets - new equipment	<u>349</u>
	\$ 373 512

Meters:

Labour - Reading .....	\$ 22 558
Labour - Repairs .....	9 665
Labour - Installation .....	30 157
Repair Parts .....	4 443
Miscellaneous Parts .....	1 306
Fixed Assets - New Meters ..	<u>33 878</u>
	\$ 102 007
TOTAL .....	<u>\$ 583 337</u>

On 1981 12 31 there were 10 368 water services on meter and 607 on flat rate, making a total of 10 975.

247 meters were installed in 1981, 169 regular meters changed to TRT, and 22 ARB meters changed to TRT.

In 1981, 21 discontinued services were excavated and shut off at the main, 126 stopped meters replaced and 30 frozen meters replaced.

The following sprinklers were installed in 1981:

- (1) York Developments Limited - Sunset Drive
- (2) Ross Ventures Building - King Street
- (3) Nashwaaksis Sobeys Mall - St. Mary's Street
- (4) Arnold Acton Warehouse - Whiting Road
- (5) Coliseum - Exhibition Grounds

There are in the City as of 1981 12 31, 1347 hydrants broken down in the following areas:

Fredericton South .....	643
Fredericton North .....	141
Nashwaaksis .....	236
Marysville .....	126
Barker's Point .....	63
Silverwood .....	27
Sub-total .....	1236
Located on private property..	111
TOTAL .....	1347

Hydrants were installed or added to City totals at the following locations in 1981:

Location	Number
Woodstock Road	1
Sunset Drive	2
Dedham Street	1
Devon Indian Reserve (formerly private)	7
Hanwell Place (formerly private)	2
Nashwaaksis Sobeys Mall (private)	1
Province of New Brunswick - Bull Barn (private)	1
TOTAL .....	15

There were also two hydrants removed from Brookside Drive and one removed from Barker Street due to construction.

#### Distribution System:

New services installed in 1981 .....	54
Old services relayed in 1981 .....	25
Frozen services that had to be thawed .....	43

The Fredericton Distribution System consists of 156.786 kilometres of watermain, made up as follows:

- (1) York - Beaverlodge Line - 10 km
- (2) Ross Veneer - 10 km
- (3) Nashwaaksis - 10 km
- (4) Amon Action Management - 10 km
- (5) Collision - Building Lines - 10 km

Size	Marysville	Nashwaaksis	Barker's Point	Silverwood Garden Creek	Fredericton	Total
31.25 mm	-	0.095	-	-	-	0.095
37.5 mm	-	0.045	-	-	-	0.045
50 mm	-	-	-	0.096	-	0.096
75 mm	-	-	-	-	0.270	0.270
100 mm	0.468	1.387	-	1.715	6.517	10.087
150 mm	7.268	12.850	2.433	2.614	35.969	61.134
200 mm	3.331	10.342	0.593	1.603	22.970	38.839
250 mm	1.532	4.528	3.208	0.865	11.811	21.944
300 mm	0.383	1.073	0.019	2.832	14.501	18.808
350 mm	-	-	-	-	1.915	1.915
400 mm	-	-	-	-	2.136	2.136
450 mm	-	-	-	-	1.262	1.262
Unknown	0.155	-	-	-	-	0.155
TOTAL	13.137	30.320	6.253	9.725	97.351	156.786

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 watermains installed by the National Defence at the Exhibition Grounds; the University of New Brunswick; St. Anne's Point Barracks on the Woodstock Road and the low rental housing development in Fredericton North.

The supply system consists of 0.58 kilometres of 350 mm cast iron pipe, extending from the well site at Wilmot Park to the pumping station; 0.26 kilometres of 300 mm cast iron pipe extending from the well on the south bank of the St. John River on Woodstock Road to the well site of #1 well at Wilmot Park; and 0.16 kilometres of 375 mm steel pipe extending from the in-take pier in the St. John River to the pumping station.

### (3) Water Pumping Station

Net Expenditure ..... \$ 355 321

The above expenditure was made up as follows:

#### Source of Supply:

Labour - Wells .....	\$ 38 961
Maintenance - Wells .....	9 103
Power - Wells .....	117 161
Materials - Wells .....	4 556
	\$ 169 781

#### Power & Pumping (Plant):

Labour .....	\$ 112 422
Workmen's Compensation .....	1 933
Light & Power .....	40 312
Diesel Fuel & Lubricants .....	1 656

Heating .....	5 065	
Supplies .....	1 620	
Miscellaneous .....	<u>807</u>	\$ 163 815

Maintenance of Equipment (Plant):

Labour .....	\$ 101	
Insurance (Pumping Station) ..	9 978	
Maintenance (Equipment) .....	858	
Taxes (Pumping Station) .....	4 960	
Materials .....	<u>85</u>	\$ 15 982

Purification & Treatment:

Labour - Analyst .....	\$ 1 000	
Chlorine .....	726	
Chemicals .....	966	
H.T.H. Crystals .....	846	
H.T.H. Tablets .....	16	
Chlorinator (Parts) .....	<u>2 189</u>	\$ 5 743
	<b>TOTAL .....</b>	<b>\$ 355 321</b>

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

Year	Cost
1972	\$ 913.02
1973	961.12
1974	1 836.79
1975	2 132.89
1976	2 156.01
1977	2 176.81
1978	2 459.14
1979	3 141.97
1980	4 502.00
1981	5 065.00

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

Year	cubic metres produced	Production Expenditure	Production Cost per cubic metre
1972	4 188 272	\$ 81 585.18	1.9 cents
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

Year	cubic metres produced	Production Expenditure	Production Cost per cubic metre
*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

\* 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 1981 01 01 to 1981 12 31 for the entire City was 6 907 215.72 cubic metres divided as follows:

Fredericton South .....	4 371	121.36
Fredericton North .....	467	498.89
Nashwaaksis .....	858	990.98
Marysville (partially estimated) .....	479	126.94
Barker's Point .....	218	295.71
Silverwood & Duval .....	374	670.57
Killarney .....	137	511.27
TOTAL .....	6 907	215.72

The total net water expenditure (operating) for the City from 1981 01 01 to 1981 12 31 was determined from the following:

Source of Supply .....	\$ 169 781
Power & Pumping .....	163 815
Maintenance of Equipment .....	1 044
Purification & Treatment .....	5 743
Transmission & Distribution (operation)	107 818
Transmission & Distribution (maintenance) .....	373 512
Other (taxes & insurance) .....	14 938
TOTAL .....	\$ 836 651

Therefore, the net operating cost to pump and deliver to the customer one cubic metre of water from 1981 01 01 to 1981 12 31 was:

$$\frac{\$ 836 651}{6 907 216} = \$ 0.121$$

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

Total Net Administration & Operating Costs .....	\$1 140 955
Principal and Interest .....	689 026
TOTAL .....	<u>\$1 829 981</u>

Total cost of water per cubic metre:

$$\frac{\$ 1\ 829\ 981}{6\ 907\ 216} = \$ 0.265$$

Principal and interest costs:

$$\frac{\$ 689\ 026}{6\ 907\ 216} = \$ 0.100$$

Administration and operating costs:

$$\frac{\$ 1\ 140\ 955}{6\ 907\ 216} = \$ 0.165$$

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 1981:

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

\* Total Cost = Administration & Operating + Principal & Interest

\*\* Values from 1968 to 1973 are for pre-amalgamated City only while values from 1974 to 1980 are for the amalgamated City.

WATER AND SEWER REVENUE - 1981

WATER:

Item	Net Expenditure	Revenue
<u>Water Office Administration</u>		
(a) Administrative (Eng. Dep't. Staff)	\$ 59 687	\$
(b) Billing & Collecting (Office)	142 610	
<u>Water Ordinary</u>		
(a) General - Operating & Maintenance	356 926 )	1 496 034
(b) Meters	102 007 )	
(c) Hydrants	124 404	648 240
<u>Water Pumping Station</u>		
(a) General Costs - Wells, Plant Purification & Treatment, etc.	339 383	
(b) City Analyst	1 000	
(c) Taxes & Insurance	14 938	
<u>Principal &amp; Interest</u>	689 026	
<b>TOTALS</b>	<b>\$ 1 829 981</b>	<b>\$ 2 144 274</b>

Surplus: \$ 314 293

SANITARY SEWER:

Item	Net Expenditure	Revenue
Sewerage Domestic - Maintenance & Installation	\$ 299 364	\$ 1 423 250
F.A.P.C.C. Sewage Treatment Principal & Interest	681 408 245 316	
<b>TOTALS</b>	<b>\$ 1 226 088</b>	<b>\$ 1 423 250</b>

Surplus: \$ 197 162

Accompanying this report is the report of Judy Mercer, City Analyst, on the Fredericton Water Supply from January 1, 1981 to December 31, 1981.

## REPORT 1981

In 1981, monthly samples were taken at each of the wells for total coliform analysis. Any 100 ml sample containing four or more coliform organisms established by membrane filter tests indicates the need for immediate remedial action and additional examinations.

There were a few problems in some of the wells but re-examination would show the problem could have just been in sampling.

From June 5th to October 5th the sampling was carried out by Jim Hersey and Dave MacIntosh.

Following is a chronological list of sample locations and results for 1981. Most locations were tested for the presence of the coliform group although some iron and manganese testing was done.

The locations include monthly samples from the Fredericton wells, spot checking throughout the system, individual problems and complaints and samples taken from new lines before they are put into the system.

- NOTE:
- (1) All of the well samples (unless otherwise stated) are taken before chlorination.
  - (2) Only those samples showing coliform or were tested for iron and manganese are listed. Those of zero coliform are not listed.

Judy Mercer,  
City Analyst

Revolving	Revolving	Revolving	Revolving	Revolving
801 180	802 250	803 172	804 180	805 245
806 250	807 245	808 172	809 250	810 250
811 250	812 250	813 250	814 250	815 250
816 250	817 250	818 250	819 250	820 250

Date	Sample Location	Total Coliform/100 ml
Jan. 28	Hanwell Well	1 coliform
Feb. 19	Wilmot Park Well #5	Mn= 1.6 mg/l
Feb. 23	69 McNair Drive	Mn= 1.1 mg/l
Feb. 23	Z. Patterson's Sample	Mn= 0.3 mg/l
Mar. 27	Maggie Jean Residence (laundry staining)	Mn= 1.0 mg/l
Apr. 3	422 Gibson Street	Black particle sample Fe= > 5.0 mg/l Mn= 0.3 mg/l
		Rusty coloured sample Fe= > 5.0 mg/l Mn= < 0.1 mg/l
Apr. 3	St. Marys St. Well	10 coliform
May 6	St. Marys St. Resample	2 coliform
June 3	Maple - McKeen Well	2 coliform
June 3	St. Marys St. Well	2 coliform
June 30	Silverwood Well #3	1 coliform
June 30	Maple - McKeen Well	1 coliform
July 28	Hanwell Well	2 coliform
July 28	Maple - McKeen Well	4 coliform
July 28	St. Marys St. Well	6 coliform
July 29	Maple St. 200 mm #1	2 coliform
July 29	Line to Sobeys (Devon) #2	2 coliform
July 30	Hanwell Well Resample	4 coliform
July 30	St. Marys St. Well Resample	2 coliform
July 31	Line to Sobeys (Devon) #2	1 coliform
Aug. 1	262 St. Marys St.	Mn= 1.9 mg/l Fe= 1.0 mg/l
Sept. 1	St. Marys St. Well	1 coliform
Sept. 22	Silverwood Well #3	3 coliform
Sept. 22	Hanwell Well	7 coliform
Sept. 22	Barkers Point Well #2	2 coliform
Sept. 22	Maple - McKeen Well	5 coliform
Sept. 22	Highland Avenue Well	1 coliform
Sept. 22	St. Marys St. Well	7 coliform
Sept. 24	Silverwood Well #3 Resample	1 coliform
Sept. 24	Hanwell Well Resample	5 coliform
Sept. 24	Maple - McKeen Well	1 coliform
Sept. 28	Silverwood Well #3 Resample	3 coliform
Sept. 28	Hanwell Well Resample	1 coliform
Oct. 20	517 Gibson Street	Mn= 0.2 mg/l Fe= 0.7 mg/l
Oct. 21	Silverwood Well #3	1 coliform
Oct. 29	Nashwaaksis Well #2	1 coliform
Oct. 29	St. Marys St. Well	5 coliform
Oct. 29	Highland Avenue Well	1 coliform
Nov. 17	Silverwood School	1 coliform
Nov. 19	YMCA Pool Water	Mn= 0 mg/l Fe= 0.5 mg/l
Nov. 19	YMCA Tap Water	Mn= 0.4 mg/l Fe= 0.4 mg/l
Nov. 19	Plant Raw Water	Mn= 0.8 mg/l
Nov. 19	Wilmot Park Well #5	Fe= 1.0 mg/l
Nov. 20	Wilmot Park Well #5	Mn= 1.2 mg/l Fe= 0.4 mg/l
Nov. 20	Plant Raw Water	Mn= 1.0 mg/l
Nov. 30	1413 Woodstock Road	Mn= < 0.1 mg/l Fe= 0.3 mg/l
Dec. 7	Nashwaaksis Well #2	1 coliform
Dec. 7	St. Marys St. Well	3 coliform
Dec. 7	Highland Avenue	1 coliform

