

**ANNUAL REPORT  
OF THE  
CITY ENGINEER**

**1988**

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..... Letter to Mayor re Capital Budget for 1989  
..... General Services (Dept of Public Works) building  
..... Business Estuary Study  
..... Water Treatment plant  
..... Sewerage system  
..... Building code  
..... Building bylaw  
..... Building equipment bylaw  
..... Capital & General Maintenance fund within  
..... Water and Sewer

**CITY OF FREDERICTON**

**PUBLIC WORKS DEPARTMENT**

TABLE OF CONTENTS  
BY TOPIC  
INDEX

	<u>PAGE</u>
Letter of Transmittal .....	1
Capital Programs .....	35
Common Services (Public Works) .....	7
Environmental Health Services .....	16
Parks and Trees Services .....	18
Public Health Services .....	17
Road Transport Services .....	7
Utility Fund (Sanitary Sewer & Water) .....	23
Water Quality - 1988 .....	49

published to VILLETTES DES VILLETTES - OTI PAGE 2 SAINT L'ISLENE

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

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

This report covers the period from 1988 01 01 to 1988 12 31 and is written for the purpose of maintaining an accurate record on file of the activities and costs associated with the various operations.

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

Concrete Curb and Gutter .....	8.992 km
Sidewalk Reconstruction .....	1.188 km
New Concrete Sidewalk .....	3.466 km
New Street Construction .....	1.040 km
New Pavement - Type "B" Asphalt Concrete .....	5.141 km
Resurface - Type "D" Asphalt Concrete .....	4.191 km
Resurface - Type "E" Asphalt Concrete .....	3.651 km
Gravity Sanitary Sewer Mains .....	5.415 km
Storm Sewer Mains .....	6.081 km
Water Mains .....	7.740 km
Double Chip Sealed Streets .....	1.556 km
Street Reconstruction (Capital) .....	0.285 km

ALSO

327 Water services were installed

324 Sanitary sewer services were installed (includes Glengarry Place)

4 Sprinkler lines were installed

21 Water services were renewed

5 Sanitary sewer services were renewed

249 New water meters were installed

3 Existing water & sanitary service installations were extended

7 Frozen services were thawed

255 Storm sewer services were installed

Contractors under contract with the Engineering Department of the City of Fredericton in 1988 supplied materials, completed construction or began construction, as follows:

WENDELL THOMAS & SONS LTD.	-	supply and delivery of bedding sand
NORTHSIDE READY MIX	-	supply and delivery of topsoil
DUNHAM'S CONTRACTING LTD.	-	supply and delivery of concrete
DURAPAVE LTD.	-	supply and delivery of granular material
SANDI-CO LTD.	-	supply and placement of asphalt concrete
IROQUOIS SALT PRODUCTS LTD.	-	supply and delivery of winter sand
IBIS PRODUCTS LTD.	-	supply and delivery of highway salt
TRIUS TAXI LTD.	-	supply of traffic lane striping paint
ATLANTIC COLAS LIMITED	-	garbage collection services
HAYLAND LTD.	-	supply and placement of double chip seal
CHARMAC CONSTRUCTION COMPANY LIMITED	-	supply and erection of salt/sand storage facility
		installation of storm, sanitary sewer and water mains Wilkins Avenue, Spur Street, Embleton Avenue & McNeill Avenue
	-	installation of water main- Kimble Drive across Vanier Highway.
	-	Brunswick Street trunk sewer and water main upgrading
	-	installation of services- Glengarry Place - Golf Club Road area
	-	installation of services - Golf Club Road from Coburn Drive to Duval Court

R.C. BIRD CONSTRUCTION LTD.	-	installation of storm sewer, water main and street construction - McLaren Avenue and Gibson Street
GORMAN PAVING INC.	-	installation of water main and sanitary sewer - Hodgson Road.
ATCO CONSTRUCTION LTD.	-	installation of curb and gutter and sidewalk
JOHN KILBURN & SONS LTD.	-	construction of Silverwood Reservoir
SMITH CONSTRUCTION LTD.	-	installation of services - Riverview Drive - Golf Club Road area
	-	installation of water mains- Glengarry Place - Hanwell Road interconnection

General Fund expenditures for the period 1988 01 01 to 1988 12 31 were as follows:

<u>Item</u>	<u>Budget</u>	<u>Net Expenditure</u>	<u>Over</u>	<u>Under</u>
<b>COMMON SERVICES (Public Works)</b>	\$3 111 580	\$3 079 909	\$ -	\$ 31 671
<b>ROAD TRANSPORT SERVICES</b>				
Administration	222 000	184 907	-	37 093
Roadway Surfaces	1 054 775	1 063 728	8 953	-
Sidewalk Maintenance	272 800	291 949	19 149	-
Culverts, Ditching	37 400	32 664	-	4 736
Storm Sewer Maintenance	133 950	160 450	26 500	-
Street Cleaning	390 400	407 275	16 875	-
Spring Cleanup	31 250	21 547	-	9 703
Sanding & Salting & Snow Control	1 106 000	1 064 690	-	41 310
Street Lights	501 900	476 597	-	25 303
Traffic Services	376 400	367 143	-	9 257
<b>ENVIRONMENTAL HEALTH SERVICES</b>				
Garbage & Waste Disposal	274 600	270 702	-	3 898
Garbage & Waste Collection	373 000	374 431	1 431	-
<b>PUBLIC HEALTH SERVICES</b>				
Old Burial Ground	14 700	9 563	-	5 137
Loyalist Burial Ground	353	286	-	67
<b>PARKS &amp; TREES SERVICES</b>				
Wilmot Park	39 700	33 724	-	5 976
Odell Park	56 400	67 054	10 654	-
Carleton Park	12 350	7 426	-	4 924
Trees	321 300	304 685	-	16 615
Greens, Benches, other parks, etc.	135 400	139 948	4 548	-
<b>TOTALS</b>	<b>\$8 466 258</b>	<b>\$8 358 678</b>	<b>\$ 88 110</b>	<b>\$195 690</b>

UNDER: \$ 107 580

Utility Fund expenditures for the period 1988 01 01 to 1988 12 31  
were as follows:

Item	Budget	Net Expenditure	Over	Under
<b>COMMON SERVICES</b>				
General Equipment	\$ 282 300	\$ 270 995	\$ -	\$ 11 305
Safety & Benefits	230 500	245 389	14 889	-
Administration	109 500	114 268	4 768	-
<b>WATER</b>				
Purification & Treatment	241 500	240 141	-	1 359
Source of Supply	423 800	394 928	-	28 872
Power & Pumping	62 700	49 897	-	12 803
Maintenance of Equipment (Plant)	81 310	58 638	-	22 672
Transmission & Distribution (Oper)	459 300	284 815	-	174 485
Transmission & Distribution (Maint)	649 800	528 030	-	121 770
Billing & Collection	188 700	173 369	-	15 331
Meters	182 200	171 372	-	10 828
<b>SANITARY SEWER</b>				
Operation (Lift Stations)	100 200	59 948	-	40 252
Maintenance	430 000	413 417	-	16 583
Treatment & Disposal	1 219 600	1 178 870	-	40 730
<b>TOTALS</b>	<b>\$4 661 410</b>	<b>\$4 184 077</b>	<b>\$ 19 657</b>	<b>\$496 990</b>

UNDER: \$ 477 333

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

LOCATION	MUNICIPAL ROADS & STREETS				DESIGNATED ROUTES			T.C.H., BY-PASSES & RAMPS	
	Asphalt	Gravel	Chip	Seal	TOTAL	Asphalt	Chip	Seal	TOTAL
Fredericton South	95.347	0.591	6.851	102.789	20.073	2.523	22.596		22.234
Fredericton North	20.167	0.029	0.578	20.774	9.000		9.000		3.701
Nashwaaksis	44.332	1.422	7.112	52.866	2.533		2.533		8.214
Marysville	16.352	0.863	5.270	22.485	8.216		8.216		3.460
Barker's Point	4.513		1.894	6.407	4.671		4.671		1.275
Silverwood	4.343	0.085	0.184	4.612					2.757
Garden Creek	10.778	1.101	4.804	16.683	6.294		6.294		8.771
Douglas	1.855	0.191	2.055	4.101	2.571		2.571		
Lincoln	4.606	1.314	1.529	7.449	1.332		1.332		
Lower St. Marys	1.138		0.832	1.970					
<b>TOTALS</b>	<b>203.431</b>	<b>5.596</b>	<b>31.109</b>	<b>240.136</b>	<b>54.690</b>	<b>2.523</b>	<b>57.213</b>	<b>50.412</b>	

TOTAL (Municipal and Designated Routes) = 297.349 km

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

Respectfully submitted,

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

COMMON SERVICES (PUBLIC WORKS)

The total net expenditure under this heading was \$3 079 909 made up as follows:

Administration .....	\$ 61 964
Engineering Services .....	343 810
General Equipment .....	1 705 263
Service Depots .....	283 635
Safety & Benefits .....	<u>685 237</u> \$ 3 079 909

ROAD TRANSPORT SERVICES

Road Transport Services is made up of the following items:

Administration .....	\$ 184 907
Roads & Streets .....	3 042 303
Street Lighting .....	476 597
Traffic Services .....	367 143
Recovery Account - Rentals .....	<u>(885 702)</u> \$ 3 185 248

(a) Administration: The total net expenditure under this heading amounted to \$184 907 for wages, pensions, general services, etc.

(b) Roads & Streets: The total net expenditure under this item was made up as follows:

(1) Roadway Surfaces (maintenance) .....	\$ 1 063 728
(2) Sidewalk Maintenance .....	291 949
(3) Culverts & Ditching .....	32 664
(4) Storm Sewer Maintenance .....	160 450
(5) Street Cleaning (includes Spring cleanup) .....	428 822
(6) Winter Maintenance .....	<u>1 064 690</u> \$ 3 042 303

The expenditures for the above items, as well as a brief description of work done, are summarized as follows:

(1) Roadway Surfaces (maintenance)

The net expenditure of \$1 063 728 was made up as follows;

Gravel Roads .....	\$ 25 590
Paved Streets .....	868 604
Curb & Gutter Repair .....	72 590
Driveway Entrances .....	7 695
Right-of-way Maintenance .....	<u>89 249</u>
	\$ 1 063 728

Gravel Roads - general maintenance and repairs to gravel roads and roadway surfaces.

Paved Streets - this includes the patching and repairing of pavement, the asphalt resurface program and the chip seal program.

The following streets or portions of streets were double chip sealed in 1988:

Location	Length (metres)
* Broad Street .....	163
* Carrington Lane .....	606
* Cherry Avenue .....	39
* Fulton Avenue .....	317
Talisman Crescent .....	102
* Thorburn Court .....	87
Thorndale Court .....	<u>242</u>
<b>TOTAL .....</b>	<b>1556</b>

1556 metres = 1.556 kilometres

\* Paid for by developer through Local Improvement Agreement

The following streets or portions of streets were resurfaced  
with Type "D" asphalt concrete in 1988.

Location	Length (metres)
Babbitt Street	116
Broadview Avenue	76
Diamond Street	576
Emerald Street - R.R. Tracks to Dobie St.	150
Gill Street	55
Goodine Street near Vanier Industrial Drive	36
Kaine Street - Miller St. to the end	250
* Kimble Drive - end of existing to Fire Station	597
McGregor Street	324
Pine Street - R.R. Tracks to Dobie St.	45
<b>TOTAL .....</b>	<b>2225</b>

$$2225 \text{ metres} = 2.225 \text{ kilometres}$$

\* Paved using Type "B" asphalt.

Also, selected sections of McLeod Hill Road, Rainsford Lane, River Street, Springhill Road, Royal Road, Highland Avenue, Doak Road and Hanwell Road were padded utilizing a spreader.

The following streets were resurfaced with Type "E" (10 mm) asphalt concrete in 1988.

Location	Length (metres)
Ashland Court	92
* Church Street	942
Churchill Row	518
Dundonald Street - York Street to Regent Street	408
Fairlawn Court	92
Haviland Street	122
Londale Court	85
Main Street - Wallace Ave. to Douglas Ave.	442
Parkhurst Drive - Brookmount St. to Inglewood Dr.	558
Priestman Street - Smythe Street to F.H.S. entrance	358
Prospect Street - K-Mart Road to Kentucky Fried	600
Riverdale Court	92
Smythe Street near Waggoner's Lane	30
St. John Street - Aberdeen Street to McLeod Ave.	162
Woodbine Court	92
<b>TOTAL .....</b>	<b>4593</b>

$$4593 \text{ metres} = 4.593 \text{ kilometres}$$

\* Portion between King Street and Brunswick Street done with Type "B" asphalt.

Curb and Gutter Repair - replacement of sections of curb and gutter on various streets.

Driveway Entrances - placement of asphalt between curbline and street right-of-way primarily on streets curbed in recent years.

Right-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 \$ 291 949 for sidewalk repairs was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 119 284
Materials .....	143 221
General Services (use of equipment) ....	<u>29 444</u> \$ 291 949

(3) Culverts and Ditching - the maintenance and installation of culverts and ditches

The net expenditure of \$ 32 664 was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 15 958
Materials .....	5 547
General Services (use of equipment) ....	<u>11 159</u> \$ 32 664

(4) Storm Sewer Maintenance - the flushing of mains, cleaning and repair of catch basins and the repair of mains

The net expenditure of \$ 160 450 was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 100 036
Materials .....	19 180
General Services (use of equipment) ....	<u>41 234</u> \$ 160 450

(5) Street Cleaning and Flushing

The City of Fredericton used sweepers #51 and #57, Vac-all unit #54, and trackless units #120, #121, #122, #129, #130 and #220 for street cleaning purposes in 1988. These pieces of equipment worked a combined total of 2622 hours in this operation. A contractor was also engaged to sweep major streets on a regular basis in 1988.

The net expenditure under this heading amounted to \$ 428 822\* and was made up as follows:

Personnel (labour, pensions, worker's compensation .....	\$ 238 162
General Services (use of equipment & contract services).....	173 334
Brooms - main & gutter .....	10 882
Brooms - hand .....	1 323
Anti-litter cans .....	1 603
Dust Control .....	<u>3 518</u> \$ 428 822

\* Includes an amount of \$ 21 547 for Spring Cleanup

(6) Winter Maintenance

(a) Sanding and Salting Streets and Sanding Sidewalks

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

(b) Snow Control

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

The City of Fredericton was responsible for plowing, sanding, and salting 314.238 km of roads and streets in 1988 (150.667 km on the north side and 163.571 km on the south side). Included in these figures is the Westmorland Street Bridge along with adjacent highways and ramps which are maintained through an agreement with the Department of Transportation.

During the winter months of 1988, 154.635 km of sidewalk were plowed and sanded. (52.326 km on the north side and 102.309 km on the south side)

Streets:

The total net cost for plowing streets amounted to \$584 430 and was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 295 503
General Services (use & maintenance of equipment).....	288 621
Goods .....	<u>306</u>
	\$584 430

The total net cost of sanding and salting streets amounted to \$320 625 and was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 100 524
General Services (use & maintenance of equipment) .....	67 673
Materials (salt and sand) .....	138 220
Fixed Assets (new equipment) .....	<u>14 208</u> \$320 625

The overall net expenditure of \$905 055 for plowing, sanding, and salting City roads and streets was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 396 027
General Services (use & maintenance of equipment) .....	356 294
Goods .....	306
Fixed Assets (new equipment) .....	14 208 (1)
Materials (salt & sand) .....	<u>138 220</u> \$905 055

Sidewalks:

The total net expenditure for plowing sidewalks amounted to \$120 759 and was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 59 100
General Services (use & maintenance of equipment) ....	57 724
Goods .....	61
Fixed Assets (new equipment) .....	<u>3 874</u> \$120 759

The total net expenditure for sanding sidewalks amounted to \$38 875 and was made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 20 105
General Services (use & maintenance of equipment) ....	13 535
Materials (sand) .....	<u>5 235</u>
	\$ 38 875

The overall net expenditure for snow plowing and sanding of sidewalks was \$159 634 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 79 205
General Services (use & maintenance of equipment) ....	71 259
Materials (sand) .....	5 235
Fixed Assets (new equipment) .....	3 874
Goods .....	<u>61</u> \$159 634

TOTAL NET COST OF WINTER MAINTENANCE - ADD (1) & (2) = \$1 064 689

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

1984	Agriculture Canada Airport Weather Office	297.50 cm 332.90 cm
1985	Agriculture Canada Airport Weather Office	178.90 cm 198.20 cm
1986	Agriculture Canada Airport Weather Office	193.10 cm 259.70 cm
1987	Agriculture Canada Airport Weather Office	212.80 cm 372.20 cm
1988	Agriculture Canada Airport Weather Office	139.20 cm 227.60 cm

(c) Street Lighting

The multiple lighting system for the City of Fredericton as of 1988 12 31 consisted of:

8 - 100 Watt H.P.S.	at	\$138.09 per light per year
1 - 150 Watt H.P.S.	at	184.16 per light per year
116 - 100 Watt H.P.S.	at	107.38 per light per year
1 - 180 Watt L.P.S.	at	208.33 per light per year
38 - 400 Watt L.P.S.	at	245.97 per light per year
10 - 125 Watt M.V.	at	115.05 per light per year
2 - 175 Watt M.V.	at	163.40 per light per year
203 - 175 Watt M.V.	at	138.09 per light per year
354 - 175 Watt Ref. M.V.	at	107.38 per light per year
12 - 250 Watt M.V.	at	205.44 per light per year
4 - 250 Watt M.V.	at	180.13 per light per year
1709 - 250 Watt M.V.	at	149.42 per light per year
573 - 400 Watt Ref. M.V.	at	209.21 per light per year
1 - 500 Watt Ref. M.V.	at	180.89 per light per year
2 - 400 Watt Flood Lights	at	0.67 per Watt per year
1 - 150 Watt H.P.S.	at	153.45 per light per year
19 - 150 Watt H.P.S.	at	60.42 per light per year

The total street lighting costs for 1988 were as follows:

Salaries & Benefits .....	\$ 980
Multiple Lighting System Contract .....	473 362
General Services - Maintenance of Equipment .....	161
Government Services (Power to City Owned Lights) .....	2 915
New Poles .....	(1 399)
New Bulbs .....	<u>578</u> \$476 597

(d) Traffic Services

The expenditure under this heading is made up as follows:

- (1) Street Signs
- (2) Painting & Striping
- (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 \$46 052 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 2 708
General Services (repairs & maintenance of signs & use of equipment) .....	3 807
Goods (posts, street sign purchases, etc.)	<u>39 537</u>
	\$ 46 052

(2) Painting & Striping

The net expenditure under this heading was \$152 414 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 80 312
General Services (use & maintenance of equipment) .....	15 966
Goods (paint, misc. supplies, signs) ...	43 914
Fixed Assets (new equipment) .....	<u>12 222</u>
	\$152 414

(3) Traffic Signals

The net expenditure under this heading was \$125 996 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 33 813
General Services (use of equipment) ....	18 121
Government Services (electric power) ....	36 084
Goods (materials) .....	21 442
Fixed Assets (new equipment) .....	<u>16 536</u>
	\$125 996

(4) Railway Crossings

The net expenditure under this heading was \$42 681 for maintenance done by railway companies.

ENVIRONMENTAL HEALTH SERVICES

The following items are included under the above heading:

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

(1) Garbage and Waste Collection

In 1988, the net amount paid for the garbage and waste collection operation was \$374 431 made up as follows:

General Services - (Contract Services) ....	\$372 000
General Services - (Advertising).....	<u>2 431</u>
	\$374 431

(2) Garbage and Waste Disposal

The net expenditure under this section was \$270 702 made up as follows:

General Services ( diversion fees, to solid waste commission payments, and land rental) .....	\$269 063
Government Services (taxes) .....	<u>1 639</u>
	\$270 702

PUBLIC HEALTH SERVICES

The following items are included under the above heading:

- |                                  |              |
|----------------------------------|--------------|
| (1) Old Burial Ground            | \$ 9 563     |
| (2) Loyalist Burial Ground       | 286          |
| <br>(1) <u>Old Burial Ground</u> | <br>\$ 9 563 |

The net expenditure under this section was \$ 9 563 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 8 502
General Services (use of equipment) .....	92
Government Services (lighting) .....	545
Goods (materials) .....	<u>424</u> \$ 9 563

- (2) Loyalist Burial Ground

The net expenditure under this section was \$ 286 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 286	\$ 286
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### PARKS AND TREES SERVICES

The following items are included under the above heading:

- (1) Wilmot Park
- (2) Odell Park
- (3) Carleton Park
- (4) Trees
- (5) Greens, Benches & Other Parks

(1) Wilmot Park

The net expenditure for this item was \$33 724 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 21 460
General Services (use & maintenance of equipment, building repairs).....	6 808
Government Services (water & sewer rates, light & power) ....	2 318
Goods (materials; fuels & lubricants)...	<u>3 138</u> \$ 33 724

(2) Odell Park

The net expenditure for this item was \$ 67 054 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 42 557
General Services (use & maintenance of equipment, communications; building repairs) .....	13 216
Government Services (water & sewer rates, lights & power) ...	753
Goods (materials; fuels & lubricants)...	<u>10 528</u> \$ 67 054

(3) Carleton Park

The net expenditure for this item was \$ 7 426 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 3 355
General Services (use & maintenance of equipment & land rental) .....	2 876
Goods (materials) .....	<u>1 195</u> \$ 7 426

(6) Trees

The net expenditure for this item was \$304 685  
made up as follows:

Personnel (labour, pensions, UIC, worker's compensation) .....	\$220 780
General Services (use & maintenance of equipment) .....	44 345
Goods (fuels & lubricants, materials, new trees, small tools & equipment) ....	<u>39 560</u>
	\$304 685

In 1988, 144 trees were removed. These 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 1988:

<u>Species</u>	<u>Number Removed</u>
Elm	79
Maple	44
Birch	5
Poplar	6
Ash	1
Willow	1
White Pine	<u>8</u>
<b>TOTAL .....</b>	<b>144</b>

In 1988, 43 trees were removed because of Dutch Elm Disease.

Following is a summary of Elm trees removed from 1964 to 1988:

Year	No. Lost (% Lost) To Dutch Elm Disease	No. Removed For Other Reasons	Total No. Removed
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
1982	487 (90.7)	50	537
1983	133 (36.5)	231	364
1984	121 (63.4)	70	191
1985	77 (80.2)	19	96
1986	45 (60.8)	29	74
1987	49 (53.8)	42	91
1988	43 (54.4)	36	79
<b>TOTALS</b>	<b>5598 (67.2)</b>	<b>2735</b>	<b>8333</b>

Trees were planted (first planting) at the following locations in 1988:

Location	Number of Trees
Adney Street	11
Anderson Street	24
Arbor Day Draw	2
Barton Crescent	15
Barker's Point War Memorial	2
Berwick Street	2
Broad Street	28
Broadview Avenue	14
Brunswick Street	56
Burpee Street	4
Carol Avenue	16
Charlotte Street	1
Cherry Avenue	35
Church Street	18
Colwell Drive	20
Day Street	16
Fulton Avenue	9
Garden Street	34
Greenwood Drive	74
Jewett Street	9
Kent Street	4
King Street	3
Marigold Street	19
Maritime Forestry Complex	3
Marlborough Drive	35
Odell Park	19
Priestman Street by D.E.C.H.	12
Queen Street	2
Queen Street Arbor Day Draw	3
Queen Street - N.B. Legislature	1
Queen Street Police Station	6
Recreation Department - Malloy Park	7
Recreation Department - Reading Street	8
Recreation Department - Sierra Park	85
Ridgewell Place	8
Riverfront Drive	5
Sierra Drive	18
Tweedie Court	11
Waterloo Row	5
Watters Drive	5
Wilmot Park	28
Woodstock Road	19
York Street - 225	1
York Street opposite City Hall	3
<b>TOTAL . . . . .</b>	
<b>700</b>	

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

A number of trees were also trimmed in 1988. The number and class of trees were made up as follows:

- (a) Trees above 14 m in height - approximately 300 mixed species
- (b) Trees 6 m to 14 m in height - approximately 700 mixed species
- (c) Trees under 6 m in height - approximately 3000 mixed species

Stumps removed, topsoiled and seeded - 125

Shrubs planted on City park land - 803

#### (7) Greens, Benches & Other Parks

The net expenditure for this item was \$ 139 948 made up as follows:

Personnel (labour, pensions, worker's compensation) .....	\$ 64 793
General Services (use & maintenance of equipment & special projects)..	48 824
Goods (fuels & lubricants, materials, small tools & equipment & new trees)..	16 019
Fixed Assets (new equipment) .....	<u>10 312</u> \$139 948

UTILITY FUND

The above item is made up of the following headings:

- (1) Common Services
- (2) Sanitary Sewer
- (3) Water

(1) COMMON SERVICES

The net expenditure for this item in 1988 was \$630 652.  
This expenditure was made up as follows:

General Equipment .....	\$270 995
Safety & Benefits .....	245 389
Administration .....	<u>114 268</u> \$630 652

(2) SANITARY SEWER

In 1988 the net expenditure for this item was \$ 1 945 263  
made up as follows:

Operating: Lift Stations

Personnel (labour, pensions, worker's compensation) .....	\$ 35 758
General Services (use & maintenance of equipment) .....	12 798
Government Services (light & power) ....	10 507
Goods (materials) .....	<u>885</u> \$ 59 948

Maintenance:

Personnel (labour, pensions, worker's compensation) .....	\$222 216
General Services (use & maintenance of equipment) .....	56 496
Goods (materials & tools) .....	119 387
Fixed Assets (new equipment) .....	<u>15 318</u> \$413 417

Sewage Treatment & Disposal:

Personnel (labour, pensions, worker's compensation) .....	\$ 15 980
General Services - use & maintenance of equipment .....	7 946
- treatment (contract services) .....	1 122 673
Government Services: Water & Sewer Rates .....	657
Lights & Power...	30 958
Goods (Miscellaneous Supplies) .....	<u>656</u> \$1 178 870

Debt Charges:

Principal .....	\$ 148 282
Interest .....	<u>144 746</u> \$ 293 028
TOTAL ..... \$1 945 263	

New customers connected to the City sewer system in 1988  
(including Glengarry Place) .... 324

The Fredericton sanitary sewer system consists of approximately 256 kilometres of mains made up as follows:

Size	Silverwood Garden Creek	Nashwaaksis	Marysville	Barker's Point	Fredericton (Pre 1973)	Total
100 mm	-	0.158	-	-	-	0.158
100 mm F.M.	0.013	-	-	-	1.103	1.116 ✓
150 mm	-	1.433	0.314	-	0.108	1.855
150 mm F.M.	0.031	0.417	0.539	0.068	3.008	4.063 ✓
200 mm	14.841	34.660	17.523	7.559	111.680	186.263
200 mm F.M.	0.254	-	0.314	-	0.064	0.632 ✓
250 mm	1.959	3.158	0.955	0.298	8.756	15.126
250 mm F.M.	1.178	-	-	-	-	1.178 ✓
300 mm	1.267	3.200	1.006	1.868	15.177	22.518
300 mm F.M.	0.420	-	-	-	0.739	1.159 ✓
350 mm	0.287	0.686	-	-	0.713	1.686
350 mm F.M.	-	-	0.528	-	0.254	0.782 ✓
375 mm	1.138	2.163	0.500	0.174	2.816	6.791
400 mm	0.018	0.076	-	-	0.210	0.304
450 mm	1.039	0.031	1.350	-	3.088	5.508
500 mm	2.979	-	-	-	-	2.979
600 mm	0.156	-	-	-	1.672	1.828
750 mm	-	-	-	-	0.322	0.322
900 mm	-	-	-	-	1.432	1.432
TOTALS	25.580	45.982	23.029	9.967	151.142	255.700

NOTE: Fredericton includes the Lincoln area.

F.M. = 8.93

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

(3) WATER

There are at present 13 separately monitored water systems, comprising 22 wells (12 active), 16 reservoirs, 5 booster stations and the Water Treatment Plant.

The Water Treatment Plant treats the water from the 5 Wilmot Park wells, which now provide over 90% of the City's water. The following describes the 13 water systems and their normal sources.

<u>SYSTEM</u>	<u>SOURCE</u>	<u>STORAGE</u>
South Low	5 wells via W.T.P., 1 well direct	18200 kL
North Low	South Low via River Crossing	8540 kL
South Intermediate	South Low via booster	9090 kL
South High, Canterbury	South Interm. via booster	2209 kL
Golf Club Road	South High via Pressure Reducing Valve	0 kL
Rosewood	South Low via booster	0 kL
Lincoln	South Low via booster	3750 kL
Flemming	Lincoln via booster	0 kL
Hanwell	1 well direct	270 kL
Silverwood	2 wells direct	245 kL
Rainsford	1 well direct	0 kL
Killarney	2 wells direct	3750 kL
Marysville	2 wells direct	2840 kL

The water account includes all expenditures other than capital expenditures for water.

Water costs for the City of Fredericton were made up as follows:

(1) Water Administration	
(Billing & Collection) .....	\$ 173 369
(2) Water Ordinary (including meters) ....	984 217
(3) Water Treatment Facility & Well	
Production Costs .....	743 604
(4) Debt Charges - Principal .....	239 789
(5) Debt Charges - Interest .....	<u>166 099</u> \$2 307 078

(1) WATER ADMINISTRATION (BILLING & COLLECTION)

The net expenditure of \$173 369 was made up as follows:

Office salaries & benefits .....	\$ 93 546
Postage .....	21 428
Machinery Rental .....	3 000
Professional Services .....	13 714
Materials .....	12 949
New Equipment .....	<u>28 732</u> \$ 173 369

(2) WATER ORDINARY (INCLUDING METERS)

The net expenditure of \$984 217 was made up as follows:

Transmission & Distribution (Operation)

Labour - Boosters .....	\$ 61 043
Use of Equipment .....	15 685
Equipment Maintenance - Boosters .....	125 957
Power - Boosters .....	64 589
Taxes - Boosters .....	12 939
Materials - Boosters .....	<u>4 602</u> \$ 284 815

Transmission & Distribution (Maintenance)

Personnel (labour, pensions, U.I.C., worker's compensation) .....	\$ 249 484
General Services (use & maintenance of equipment) .....	77 196
Goods (fuels & lubricants, tools, materials, parts) .....	<u>201 350</u> \$ 528 030

Meters

Personnel (labour, pensions, etc.) ...\$ 93 148	
Meter Parts, miscellaneous supplies, & tools .....	6 329
Use of Equipment .....	17 234
Fixed Assets (new meters) .....	<u>54 661</u> \$ 171 372
TOTAL .....	\$ 984 217

On 1988 12 31 there were 11787 water services on meter and 243 on flat rate, making a total of 12030.

249 new meters were installed in 1988, 100 regular meters changed to VRT, and 90 ARB meters changed to VRT. 6 flat rate services were metered. 67 meters were also changed for various reasons.

In 1988, 8 discontinued services were excavated and shut off at the main, 162 stopped meters replaced and 14 frozen meters replaced.

The following sprinklers were installed in 1988:

Galaxie Developments	-	500 Venus Court
Eastern Drug Building	-	40 Pepin Road
Tarrel Office Building	-	217 Brunswick Street
J. & R. Properties	-	951 Regent Street

There are in the City as of 1988 12 31, 1486 hydrants situated in the following areas:

Fredericton South .....	700
Fredericton North .....	153
Nashwaaksis .....	269
Marysville .....	143
Barker's Point .....	66
Silverwood .....	<u>23</u>
<b>SUB TOTAL .....</b>	<b>1354</b>

**LOCATED ON PRIVATE PROPERTY .....** 132

**TOTAL .....** 1486

Hydrants were installed at the following locations in 1988:

<b>Location</b>	<b>Number</b>
Crocket Street	1
Draeman Drive	3
Duval Court	2
Glengarry Place	8
Golf Club Road	9
Hanwell - Glengarry Interconnection	3
Herschel Court	1
Hodgson Road	4
Jewett Streets	1
Kimble Drive	1
Riverview Court	2
Riverview Drive	4
St. Marys Street (475)	1
Team Drive (Silverwood Reservoir)	1
Wildwood Lane	2
<b>SUB-TOTAL (CITY OWNED).....</b>	<b>43</b>

**PLUS: PRIVATE HYDRANTS**

500 Venus Court	1
University of New Brunswick (not included previously)	<u>3</u>

**OVERALL TOTAL .....** 47

The Fredericton distribution system consists of approximately 277 kilometres of water main, made up as follows:

Size	Marysville	Nashwaaksis	Barker's Pt.	Silverwood	Garden Creek	Fredericton	TOTAL
32 mm	-	0.153	-	-	-	-	0.153
38 mm	-	0.072	-	-	-	-	0.072
50 mm	-	-	-	0.154	-	-	0.154
75 mm	-	-	-	-	0.435	0.435	0.435
100 mm	0.753	2.232	-	2.508	10.401	15.894	
150 mm	12.323	20.810	3.915	4.789	57.080	98.917	
200 mm	6.252	19.878	0.954	6.849	40.880	74.813	
250 mm	2.951	6.546	5.163	0.966	20.681	36.307	
300 mm	1.050	2.794	0.031	7.524	26.045	37.444	
350 mm	-	0.207	-	-	3.679	3.886	
400 mm	-	-	-	-	5.364	5.364	
450 mm	-	-	-	-	1.965	1.965	
500 mm	-	-	-	-	1.359	1.359	
600 mm	-	-	-	-	0.395	0.395	
Unknown	0.146	-	-	-	-	-	0.146
<b>TOTAL</b>	<b>23.475</b>	<b>52.692</b>	<b>10.063</b>	<b>22.790</b>	<b>168.284</b>	<b>277.304</b>	

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. Anne's Point Barracks on the Woodstock Road and the low rental housing development in Fredericton North.

### (3) WATER PRODUCTION COSTS

The net expenditure of \$743 604 was made up as follows:

#### Source of Supply

Labour - Wells .....	\$ 90 603
Use of Equipment .....	11 625
Maintenance - Wells .....	60 100
Communications .....	16 515
Power - Wells .....	198 572
Materials - Wells .....	<u>17 513</u> \$ 394 928

Power & Pumping (Plant)

Labour .....	\$ 35 583
Communications .....	1 108
Light & Power .....	6 120
Supplies .....	<u>7 086</u>
	<b>\$ 49 897</b>

Water Treatment Plant

Labour .....	\$ 112 009
Insurance .....	26 435
Maintenance of Equipment .....	45 678
Power .....	9 692
Taxes .....	29 090
Materials .....	3 251
Goods (Chlorine, Soda Ash, Lime, etc.)	<u>72 624</u>
	<b>\$ 298 779</b>
<b>TOTAL .....</b>	<b>\$ 743 604</b>

The total amount of water pumped from 1988 01 01 to 1988 12 31 for the entire City was 8960 megalitres. The amount of water produced by the five Wilmot wells in 1988 was 8010 megalitres or 89% of the total City supply. The average daily demand for the City is 24.5 megalitres.

The following table gives a comparison of water production costs for the last ten years:

#### WATER PRODUCTION COSTS

Year	megalitres Produced	Production Expenditure	Production Cost per megalitre
1979	6628	\$ 303 364	\$ .46
1980	7037	360 611	51
1981	6907	355 321	51
1982	7030	432 326	62
1983	7225	435 929	60
1984	7368	523 393	71
1985	7880	646 991	82
1986	7781	732 141	94
1987	8177	712 102	87
1988	8960	743 604	83

The total net expenditure for transmission and distribution of water for the City from 1988 01 01 to 1988 12 31 was determined from the following:

#### Transmission & Distribution:

Operation .....	\$ 284 815
Maintenance .....	<u>528 030</u> \$ 812 845

Therefore, the net expenditure for transmission and distribution of one megalitre of water from 1988 01 01 to 1988 12 31 was:

$$\frac{\$ 812 845}{8960} = \$ .91$$

The following table gives a comparison of net expenditures for transmission and distribution of one megalitre of water for the last ten years:

Transmission and Distribution Costs

<u>YEAR</u>	<u>NET EXPENDITURE per megalitre</u>
1979	\$ 57
1980	72
1981	70
1982	74
1983	87
1984	92
1985	99
1986	88
1987	89
1988	91

The total net expenditure for administration costs and debt charges for the City from 1988 01 01 to 1988 12 31 was determined from the following:

Water Administration

(1) Billing & Collection .....	\$ 173 369
(2) Meters (Installation, Reading, Repairs) .....	171 372
<u>Debt Charges (Principal &amp; Interest)</u> .....	<u>405 888</u> \$ 750 629

Administration costs per megalitre of water produced:

$$\frac{\$ 344 741}{8960} = \$ 38.50$$

Debt Charges per megalitre of water produced:

$$\frac{\$ 405 888}{8960} = \$ 45.30$$

The following table gives a comparison of administration costs and debt charges per megalitre of water produced for the last ten years:

Administration Costs and Debt Charges per megalitre  
(rounded to nearest dollar)

<u>Year</u>	<u>Administration (Billing &amp; Collection &amp; Meters)</u>	<u>Debt Charges</u>
1979	\$ 42	\$ 119
1980	39	104
1981	44	100
1982	44	96
1983	51	107
1984	42	97
1985	43	94
1986	43	75
1987	37	52
1988	39	45

The following table gives a comparison of total water costs per megalitre of water produced for the last ten years:

Total Costs per megalitre

<u>Year</u>	<u>Production Costs</u>	<u>Transmission &amp; Distribution Costs</u>	<u>Administration Costs</u>	<u>Debt Charges</u>	<u>*TOTAL</u>
1979	\$ 46	\$ 57	\$ 42	\$ 119	\$ 264
1980	51	72	39	104	266
1981	51	70	44	100	265
1982	62	74	44	96	276
1983	60	87	51	107	305
1984	71	92	42	97	302
1985	82	99	43	94	318
1986	94	88	43	75	300
1987	87	89	37	52	265
1988	83	91	39	45	258

\* TOTAL COST = Production Costs + Transmission & Distribution Costs  
+ Administration Costs + Debt Charges

S U M M A R YWATER AND SEWER REVENUE & EXPENDITURES1988

<u>Item</u>	<u>Net Expenditure</u>	<u>Revenue</u>
<b>COMMON SERVICES (WATER &amp; SEWER)</b>		
General Equipment	\$ 270 995	\$ 232 723
Safety & Benefits	245 389	
Administration	114 268	
<b>WATER</b>		
Water Administration (Billing & Collection)	173 369	
Water Ordinary (Including Meters)	984 217	4 166 954
Water Treatment Facility & Well Production Costs	743 604	
Debt Charges - Principal & Interest	405 888	
<b>SANITARY SEWER</b>		
Operating & Maintenance	473 365	\$ 2 787 006
Sewage Treatment & Disposal	1 178 870	
Debt Charges	293 028	
<b>TOTALS</b>	<b>\$ 4 882 993</b>	<b>\$ 7 186 683</b>
	<b>SURPLUS: \$ 2 303 690</b>	

NOTE: \$2 011 222 of the above noted surplus was appropriated for Utility Capital expenditures.

CAPITAL PROGRAMS

The following gives brief descriptions of capital projects begun or completed in 1988.

**WATER:**

In 1988, water mains were installed in the Riverview Drive - Golf Club Road - Glengarry Place - Wildwood Lane area; Kimble Drive from the Fire Station across the Vanier Highway to the new ramp near Sutherland's Toyota; Hodgson Road; Brunswick Trunk near Waterloo Row; McNeill Avenue - Burpee Street; Gibson Street near MacLaren Avenue and Golf Club Road from Coburn Drive to Duval Court.

New mains were also installed by developers in the Sunset Subdivision (Drammen Drive & Jewett Street); Herschel Court; Duval Court - Golf Club Road and Crocket Street extension.

Following are lengths and sizes of mains installed in 1988.

LENGTH OF MAINS - metres

LOCATION	150 mm D.I.	200 mm D.I.	250 mm D.I.	300 mm D.I.	350 mm D.I.	500 mm D.I.
Riverview Dr. & Ct.; Golf Club Rd.; Glengarry Place; Wildwood Lane Area (including Hanwell connection)	124	1691	2	1974		
* Kimble Dr. - Fire Station across Vanier Hwy. to ramp near Sutherland's Toyota	6		533			
Hodgson Road	48	40	41	597	157	
✓ * Brunswick Trunk				9		165
* McNeill Avenue - Burpee	5	134				
✓ * Gibson Street near McLaren Avenue				102		
** Sunset Subdivision (Drammen Dr. & Jewett St.)	24	189		407		
** Herschel Court	136					
** Duval Court-Golf Club Rd.	13	253		180		
Golf Club Rd.- Coburn Dr. to Duval Ct.	22	8		612		
** Crocket St. Extension	7	261				
TOTALS	385	2576	576	3881	157	165

OVERALL TOTAL - 7740 metres or 7.74 kilometres

\* Done under Major System Repair and Replacement

\*\* Entire cost paid by Developers through Local Improvement Agreements

SANITARY SEWER:

In 1988, sanitary sewer mains were upgraded for the Brunswick Trunk near Waterloo Row; McNeill Avenue; Wilkins Avenue, Embleton Avenue, Spur Street; MacLaren Avenue from Carney Street to Medley Street and Sunset Drive from Wilkins Avenue to Drammen Drive.

New sanitary sewer mains were installed in the Riverview Drive - Golf Club Road - Glengarry Place - Wildwood Lane area; Hodgson Road and Golf Club Road from Coburn Drive to Duval Court.

New sanitary sewer mains were installed by developers in the Sunset Subdivision (Drammen Drive & Jewett Street); Herschel Court; Duval Court - Golf Club Road and Crocket Street extension.

Following are lengths and sizes of mains installed in 1988:

LOCATION	LENGTH OF MAINS - metres			
	200 mm PVC	250 mm PVC	300 mm PVC	600 mm PVC
Riverview Dr. & Ct.; Golf Club Rd; Glengarry Place & Wildwood Lane Area	1671			
Hodgson Road		72	693	
* Brunswick Trunk				162
* McNeill Ave. (upgrading of existing)	141			
* Wilkins Ave.; Embleton Ave.; Spur St. (upgrading of existing)	408			
* MacLaren Ave. - Carney to Medley (upgrading of existing)	312			
** Sunset Subdivision (Drammen Dr. & Jewett St.)	558			
** Herschel Court	70			
** Duval Court - Golf Club Rd.	517			
Golf Club Rd.- Coburn Dr. to Duval Ct.	544			
** Crocket St. extension		104		
**** Sunset Dr.-Wilkins Ave. to Drammen Dr. (upgrading of existing)			163	
<b>TOTALS</b>	<b>4221</b>	<b>176</b>	<b>856</b>	<b>162</b>

OVERALL TOTAL - 5415 metres or 5.415 kilometres

\* Paid for under Major System Repair & Replacement

\*\* Entire cost paid by Developers through Local Improvement Agreements

\*\*\* Cost shared by City and Developer of Sunset Subdivision

STORM SEWER:

In 1988, storm sewer mains were upgraded on MacLaren Avenue near Carney Street; Gibson Street near MacLaren Avenue; Lincoln Road (Woods property easement) and Sunset Drive from Wilkins Avenue to Drammen Drive.

New storm sewer mains were installed in the Riverview Drive - Golf Club Road - Glengarry Place - Wildwood Lane area; McNeill Avenue; Wilkins Avenue, Embleton Avenue, Spur Street; and Golf Club Road from Coburn Drive to Duval Court.

New storm sewer mains were installed by developers in the Sunset Subdivision (Drammen Drive & Jewett Street); Herschel Court; Duval Court - Golf Club Road and Crocket Street extension.

Following are lengths and sizes of mains installed in 1988:

LOCATION	LENGTH OF MAINS - metres								
	250 mm	300 mm	375 mm	450 mm	600 mm	750 mm	900 mm	1050 mm	
Riverview Dr. & Ct.; Golf Club Rd.; Glengarry Place; Wildwood Lane area	255	819	392	424	90	621	75		147
McNeill Avenue	35	286							
Wilkins Ave.; Embleton Ave.; Spur St.	68	276	170	48					
MacLaren Avenue (upgrading of existing)	38	10	113						
Gibson Street (upgrading of existing)	30		3		132				
* Sunset Subdivision (Drammen Dr. & Jewett St.)	83	119	152	249					
* Herschel Court	15	68							
* Duval Court - Golf Club Rd.		337			159				
Golf Club Rd.-Coburn Dr. to Duval Ct.	15	402	130		16				
* Crocket St. extension	15			104					
*** Lincoln Rd.(Woods property easement) (upgrading of existing)					29				
** Sunset Dr.-Wilkins Ave. to Drammen Dr. (upgrading of existing)					156				
<b>TOTALS</b>	<b>554</b>	<b>2317</b>	<b>960</b>	<b>825</b>	<b>582</b>	<b>621</b>	<b>75</b>	<b>147</b>	

OVERALL TOTAL - 6081 metres or 6.081 kilometres

- \* Entire cost paid by Developers through Local Improvement Agreements
- \*\* Cost shared by City and Developer of Sunset Subdivision
- \*\*\* Paid for under operating and maintenance

CURB AND GUTTER

Concrete curb and gutter was constructed at the following locations in 1988:

Location	Length (metres)
Acquarius Street	339
Adams Street - Lincoln Road to existing	1324
Blizzard Street by Eastern Drug	374
Case Street	1265
Derby Court	321
Gill Street - Union Street to R.R. Tracks	439
Holland Street	158
Johnston Avenue	354
London Court	609
* MacLaren Avenue - Carney Street to Medley Street	606
McMann Court	186
Nottingham Street-London Court to Beaconsfield Cres.	223
Piercy Crescent	958
Pine Street - Union Street to R.R. Tracks	396
** Prospect Street - Smythe Street intersection	535
*** Union Street - Neill Street to Henry Street	616
*** Watters Drive (eastside)	289
<hr/>	
TOTAL .....	
8992 metres = 8.992 kilometres	

TOTAL ..... 8992

8992 metres = 8.992 kilometres

- \* Done under Capital Street Construction and Reconstruction
- \*\* Done under Capital Intersection Improvements
- \*\*\* Done under Designated Route Program

PAVING:

In 1988, Durapave Ltd. was awarded a contract to supply and place asphalt concrete on a number of City streets.

The street preparatory work was done by City forces.

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

- 1) Binder Course (20 mm) - Type "B" at \$37.00 per tonne in place
- 2) Surface Course (13 mm)- Type "D" at \$40.00 per tonne in place

(1) BINDER COURSE - TYPE "B"

The following streets were paved with Type "B" asphalt concrete in 1988:

Location	Length (metres)
Acquarius Street	170
Adams Street	662
Blizzard Street	187
Case Street	633
Derby Court	161
Gill Street - Union St. to R.R. Tracks	220
Holland Street	79
London Court	305
MacLaren Avenue - Carney St. to Medley St.	303
McMann Street	93
Nottingham Street - London Ct. to Beaconsfield Cres.	112
Piercy Crescent	479
Pine Street - Union St. to R.R. Tracks	198
<b>TOTAL .....</b>	<b>3602</b>

$$3602 \text{ metres} = 3.602 \text{ kilometres}$$

(2) SURFACE COURSE - TYPE "D"

The following streets were paved with Type "D" asphalt concrete in 1988:

<u>Location</u>	<u>Length (metres)</u>
* Canada Street - Murray Ave. to Bridge St.	2255
* Union Street - Neill St. to Henry St.	308
TOTAL .....	2563

2563 metres = 2.563 kilometres

\* Done under Designated Route Program

CONCRETE SIDEWALKS:

New sidewalks were constructed at the following locations in 1988:

<u>Location</u>	<u>Length (metres)</u>
York Street (Montgomery to Priestman) - eastside...	499
Maple Street (Preston to Wallace)- to be finalized in 1989 .....	181
Canterbury Drive (Liverpool to Bradford) .....	175
Brookside Drive (Oakland Ave. to the Mall) .....	465
Smythe Street (Waggoner's Lane to Exhibition Grounds) .....	210
Waggoner's Lane (Smythe to Simpson Ct.) .....	73
Goodine Street .....	194
Adams Street .....	827
Piercy Crescent .....	450
London Court - Nottingham Street .....	214
Johnston Avenue .....	178
TOTAL .....	3466

3466 metres = 3.466 kilometres

Major sidewalk upgrading was done on Union Street (285 metres), Woodstock Road (703 metres) and Watters Drive (200 metres), in conjunction with water main and curb and gutter construction.

STREET CONSTRUCTION AND RECONSTRUCTION:

In 1988, MacLaren Avenue between Carney Street and Medley Street was completely reconstructed. Work also began on Kimble Drive from Wilsey Road to the railway tracks. The work on Kimble Drive will continue in 1989.

WORKS FACILITIES:

In 1988, a new sand/salt storage dome was constructed at the St. Mary's Street depot.

INTERSECTION IMPROVEMENTS:

In 1988, the Prospect Street - Smythe Street intersection was upgraded. This upgrading included the installation of new curb and gutter, the construction of slip off lanes and the installation of new traffic signals.

MAIN STREET PROGRAM:

In 1988, the upgrading of the downtown area of the City continued. Work was finalized on York Street near the Justice Building.

SOLID WASTE MANAGEMENT:

Work continued on closing out the Vanier landfill site in 1988. Further work is planned for 1989.

RETAINING WALL:

Preliminary Engineering was done in 1988 in conjunction with the repair of the retaining wall on Woodstock Road near the Condor Motel. It is anticipated that the work will be done in 1989.

RAILROAD SIGNALS

In conjunction with the Chippins Limited Riverview Subdivision, railroad signals were installed on Kimble Drive in 1988.

NEW STREET CONSTRUCTION:

The following new streets or portion of streets were constructed in 1988:

<u>Location</u>	<u>Length (metres)</u>
Burpee Street (near McNeill Avenue)	58
Crocket Street	109
Drammen Drive	395
Duval Court	218
Herschel Court	80
Jewett Street	149
McNeill Avenue	31
<b>TOTAL .....</b>	<b>1040</b>
<b>1040 metres = 1.040 kilometres</b>	

**NOTE:** All the above streets with the exception of Burpee Street and McNeill Avenue were constructed through Local Improvement Agreements.

SANDIP GAORILAL

DESIGNATED ROUTES

The City of Fredericton has a total of 57.213 km of provincial designated highways within its boundaries. In 1988, the Provincial Government paid \$ 299.34 (winter) and \$ 75.53 (summer) per lane kilometre towards maintenance of the routes respectively. If any improvements such as new curb and gutter, paving or storm sewer installations are done to these routes, authorization by the Department of Transportation is required.

The following authorized projects were undertaken in 1988:

- |  |                              |                  |
|--|------------------------------|------------------|
| (1) Route 105 - Union Street (Neill St.<br>to Gibson St.)  | Curb & Gutter & Paving ..... | \$ 102 962.19    |
| (2) Route 8 - Canada Street (Murray Ave. to<br>Bridge St.) | Resurface .....              | 70 460.18        |
| (3) Route 10 - Watters Drive                               | Curb & Gutter & Paving ..... | <u>47 637.20</u> |
|  | TOTAL .....                  | \$ 221 059.57    |

**CAPITAL PROGRAMS**  
**SUMMARY OF EXPENDITURES**

ITEM	BUDGET	EXPENDITURE	REMARKS
<b>UTILITY FUND</b>			
Silverwood Reservoir	\$ 650 000*	\$ 507 924	
St. John River Water Main Crossing	2 000 000*	1 286 343	
Woodstock Rd. Water Main (Rookwood to Hanwell)	400 000*	306 432	
Riverview Dr.; Golf Club Rd.; Glengarry Place area - water and sanitary sewer	1 240 000	1 024 648	
Kimble Dr. across Vanier Hwy.-Water	100 000	-	To be done in 1989.
Hodgson/Service Rd. - Water & Sanitary Sewer	830 000	410 628	To be finalized in 1989.
Regent St.-Montgomery to Priestman- Sanitary Sewer	130 000	-	To be done in 1989.
Major System Repair and Replacement	200 000	180 752	
Golf Club Rd.- Coburn Dr. to Duval Ct.- Water & Sanitary Sewer	300 000	175 929	
<b>GENERAL FUND</b>			
Riverview Dr.; Golf Club Rd.; Glengarry Place area- Storm Sewer	650 000	595 669	
McNeill Avenue - Storm Sewer	60 000	63 335	
Wilkins-Embleton-Spur - Storm Sewer	150 000	129 661	
MacLaren Ave.-Carney to Medley - Storm Sewer and Reconstruction	150 000	168 453	
Gibson St. near MacLaren Ave. - Storm Sewer	30 000	67 896	
Pine St. & Gill St.- Union St. to R.R. Tracks - Curb & Gutter & Paving	120 000	76 519	

\* Budget figures were established for a two year program (1987 & 1988)

CAPITAL PROGRAMS  
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
<u>GENERAL FUND</u> (continued)			
Johnston Avenue - Curb & Gutter	20 000	47 756	Reinforced concrete
Adams Street-Lincoln Rd. to existing - Curb & Gutter, Paving & Sidewalk	200 000	157 814	Concrete + asphalt + drainage channels
Piercy Crescent - Curb & Gutter, Paving & Sidewalk	145 000	106 293	Asphalt + drainage channels
Case Street - Curb & Gutter & Paving	140 000	115 540	Asphalt
London Ct.-Nottingham St. - Curb & Gutter, Paving & Sidewalk	100 000	82 870	
Derby Court - Curb & Gutter & Paving	50 000	34 165	
Holland St. & McMann St.	50 000	40 437	
Kimble Dr.- Wilsey Rd. to R.R.Tracks Railroad Signals and Street Construction	110 000	53 825	Further work in 1989 on street construction
Sand/Salt Storage Facility - St. Mary's Depot	160 000	145 032	
Mainstreet Program	100 000	85 760	
Solid Waste Management (Vanier Landfill Site Closeout)	100 000	78 226	
Woodstock Rd. (near Condor Motel) Retaining Wall	50 000	16 893	
Goodine Street - Sidewalk	15 000	11 008	
Golf Club Rd. - Coburn Dr. to Duval Ct. - Storm Sewer	120 000	80 499	
Acquarius Street - Curb & Gutter & Paving	40 000	29 650	
Blizzard Street by Eastern Drug Bldg. - Curb & Gutter & Paving	50 000	37 445	

**CAPITAL PROGRAMS**  
**SUMMARY OF EXPENDITURES**

WATER QUALITY - 1988WATER TREATMENT PLANT

Fredericton's Water Treatment Plant was put into service in July 1984, and with the commissioning of the pipeline to Fredericton North in late 1987, is now treating approximately 90% of the City supply. The plant removes iron and manganese and raises the pH to approximately 8 pH units, thus reducing the damage by corrosion to the water system. The chlorine content of the effluent is 0.9 - 1.1 mg/L measured as free chlorine. This water is odourless, colourless, and has an agreeable taste.

Layers of impurities and corrosion byproducts left in parts of the distribution system by previous water supplies tend to deplete the free chlorine residual until their own chlorine demand is satisfied. When the resultant chlorine residual is low, reaction byproducts with chemical or bleach like odours can be sensed. This situation caused public concern in Fredericton North during most of 1988, and was responsible, along with a poor public acceptance of the change in supply, for numerous complaints. At years end, chlorine residuals had risen throughout the north side, objectionable tastes and odours could not be sensed by department staff, and the number of complaints had tapered off.

BACTERIAL ANALYSIS

Coliform bacteria counts are accepted as a good index of the degree of bacteriologic safety of water. Although they are not themselves disease producers, coliform bacteria are found in densities roughly proportional to the degree of fecal pollution in polluted water. When members of the coliform group are present, other kinds of microorganisms capable of causing disease may also be present. The absence of coliform bacteria from water is an indication that the water is bacteriologically safe for human consumption, since coliform bacteria are more hardy than disease-causing bacteria.

Samples for coliform analysis were taken monthly from the wells in service and on stand-by and various distribution points in the City water system. Samples were also taken in response to customer inquiries. All samples were tested for total coliform by the membrane filtration technique.

Tests showing positive with small numbers of coliform are not uncommon, and are usually attributed to poor sampling conditions, slight contamination of sample tap, or inexperience of sampler, in such cases, resampling and reanalysis is carried out.

Two of Fredericton's water systems, Marysville and Upper Nashwaaksis, were still unchlorinated in 1988; and after repeat high counts of coliform were found in one of these systems, increased monitoring was set up. After localized flushing of the distribution system, the affected areas were retested with negative results. Chlorination equipment was installed at the source wells of these two systems and plans have been made to chlorinate the systems on a continuous basis in 1989 after the spring flushing program.

#### CHEMICAL ANALYSIS

Samples for chemical analysis were taken from wells and the distribution system in January, 1989 and analysed by Environment New Brunswick's laboratory. Results are displayed on the following page.

One column concerning pumpage is added for quick reference.

## FREDERICTON WATER CHEMICAL ANALYSES; 1989-01

LOCATION	pH	TOT.ALK units mg/LCaCO <sub>3</sub>	TURB. NTU	COND. μs/cm	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	Cl mg/L	S04 mg/L	F mg/L	N mg/L	Cu mg/L	Mn mg/L	In mg/L	Pb-gf ug/L	1989 PUMP ML	
WILMOT #1 WELL	7.259	54.84	0.1	148	17.1	2.39	6.53	0.906	3.9	10.4	0.12	0.01	0	0.86	0.131	0.075	0.4	1820.0
WILMOT #2 WELL	6.681	47.18	0.1	176	17.6	2.76	9.28	0.678	11.4	18.5	0.13	0.16	0.112	2.02	0.044	0.096	0.2	1280.0
WILMOT #3 WELL	7.19	76.28	0.1	319	35.9	4.48	13.7	2.94	30.6	28.4	0.11	0.75	0	0.057	0.018	0.049	0	1860.0
WILMOT #4 WELL	7.099	51.72	0.1	169	18.2	2.56	9.07	1.42	10.8	12.6	0.12	0.09	0.145	0.359	0.007	0.059	4.1	990.0
WILMOT #5 WELL	7.223	52.73	0.2	141	17.3	2.24	5.28	1.09	3.5	10.7	0.12	0.01	0.112	1.12	0.138	0.083	0.7	2070.0
DOVAL WELL	7.668	109.95	0.2	339	39.2	3.79	21.7	0.851	26.9	19.4	0.17	0.27	0.192	0.086	0.011	0.097	0.1	78.4
CAMERON CT. WELL	7.181	75.68	0.3	309	30.7	3.68	23.4	0.659	36.2	15.7	0.12	0.99	0.065	0.046	0.085	0	40.5	
RAINSFORD WELL	7.249	53.22	0.4	135	18.2	1.87	4.91	0.341	1.4	12.6	0.1	0.07	0.153	0.009	0.007	0.135	0	20.0
SILVERWOOD #2 WELL	7.907	156.5	0.6	674	37.8	24.2	27.7	0.721	46.9	18.1	0.1	0.58	0	0.026	0.054	0.204	0	11.7
SILVERWOOD #3 WELL	7.868	97.42	0.6	236	25.3	11.1	4.83	0.393	10.5	8.7	0.1	0.03	0.135	0.009	0.004	0.102	0.3	54.2
KILLARNEY #KI WELL	7.362	72.58	0.6	186	14.3	2.48	7.14	0.496	6	15.3	0.11	0.06	0.178	0.002	0	0.104	2.3	83.9
KILLARNEY #K'D WELL	7.825	114.6	0.2	254	36.1	3.53	11.3	0.566	5.3	11.8	0.15	0.01	0.082	0.37	0	0.068	0	154.3
TOWER RD. #1 WELL	7.668	78.62	0.4	318	40.9	3.65	15.8	0.487	9.3	56.6	0.17	0.01	0.146	0.036	0.021	0.175	0.7	82.5
TOWER RD. #2 WELL	7.472	67.89	0.2	264	30	3.96	12.9	0.53	29.5	16	0.13	0.03	0.146	0.009	0.019	0.235	0.2	298.8
MCGLOIN ST. WELL	7.706	90.6	3.8	307	33	3.84	21.5	0.827	23.3	25.8	0.23	0.1	1.36	0.312	0.011	0.143	0	
MAPLE ST. #1 WELL	7.325	99.36	0.8	390	43.1	4.26	29.4	0.801	43.5	25.6	0.15	0.48	0.104	0.068	0.027	0.131	0.7	
MAPLE ST. #2 WELL	7.2	114	4.7	466	62.4	6.72	21.4	1.21	56.6	32.4	0.15	1.03	0.15	0.062	0.035	0.129	0.1	
MAPLE ST. #3 WELL	7.845	102.2	0.4	346	43.9	2.81	18.8	0.725	28.5	27.6	0.15	0.12	0.067	0.163	0.023	0.034	0.1	
HIGHLAND WELL	7.096	61.83	0.5	189	22.7	2.25	8.72	0.638	4.2	24.2	0.1	0.07	0	0.125	0.036	0.088	0	
CLIFFE ST. WELL	7.622	90.23	0.5	210	30.2	1.68	8.79	0.573	1.1	15.4	0.1	0.01	0.107	0.192	0.064	0.112	0	
GREENWOOD #1 WELL	9.043	124.45	3.5	334	2.79	0.18	70.8	0.337	17.9	15.9	1.04	0.01	0.267	0.019	0.012	0.079	0.3	
GREENWOOD #2 WELL	7.475	96.47	37.6	445	11.3	1.29	81.5	1.17	67.1	16.7	0.48	3.1	0.196	0.151	7.3			
WTP RAW WATER	6.927	60.07	0.6	223	20.8	3.28	10.3	1.8	18.4	20.7	0.12	0.39	0	0.451	0.004	0.005	0	
WTP FINISHED WATER	7.942	85.88	0.2	280	28.9	3.34	14	1.83	22.3	19.2	0.12	0.39	0	0.018	0.036	0.003	0	
PARK STREET	7.617	100.1	0.2	233	32.3	3.24	9.59	0.618	2.5	13.8	0.13	0.01	0.018	0.077	0.068	0.039	0.3	
WOODBRIDGE ST.	7.937	87.3	0.2	262	36	3.07	10.9	1.52	15.4	16.4	0.12	0.24	0.163	0.014	0.024	0.132	0	
NBHC BUNKER	7.436	69.36	0.3	269	32	3.85	13	0.553	30	17.3	0.12	0.01	0.142	0.003	0.159	0.144	1	
YANIER IND. PARK	8.524	84.08	0.3	260	32.8	3.1	12	2.05	19.6	17.5	0.11	0.04	0.152	0.055	0.035	0.066	0.4	
M.A.C.				<250			500		1.5		10	<0.3	<0.05	<1.0	<5.0	50		
A.O.				6.5-8.5													TOTAL= 8844.3	

