

**ANNUAL REPORT
OF THE
CITY ENGINEER**

1991

CITY OF FREDERICTON

PUBLIC WORKS DEPARTMENT

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**TO HIS WORSHIP THE MAYOR AND 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 1991 01 01 to 1991 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	17.035	km
Sidewalk	7.680	km
New Street Construction	0.274	km
New Pavement - Type "B" Asphalt Concrete	5.845	km
Resurface - Type "D" Asphalt Concrete	2.115	km
Resurface - Type "E" Asphalt Concrete	6.358	km
Gravity Sanitary Sewer Mains	2.509	km
Sanitary Sewer Force main	0.120	km
Storm Sewer Mains	3.615	km
Water Mains	4.257	km

ALSO

- 187 Water services were installed
- 182 Sanitary sewer services were installed
- 6 Sprinkler lines were installed
- 18 Water services were renewed
- 303 New water meters were installed
- 9 Existing water service installations were extended
- 8 Existing sanitary sewer service installations were extended
- 32 Frozen services were thawed
- 151 Storm sewer services were installed
- 1 Sanitary sewer services were renewed

Contractors under contract with the Engineering Department of the City of Fredericton in 1991 supplied materials, completed construction or began construction, as follows:

- M.R.B. Contractors Ltd. - construction of Longwood Booster Station
- Tacel Ltd. - supply and delivery of traffic controllers
- QM Construction Ltd. - installation of trunk water main - Main Street, Carson Avenue; and along Canadian Atlantic Railway Right-of-way to Brookside Drive
- M.W. Price & Sons Ltd. - supply and delivery of granular material
- Donald Noble & Sons - supply and delivery of bedding sand
- Evans Brothers Ltd. - supply and delivery of topsoil
- Gallants Contracting (1990) Ltd. - storm water separation and sanitary sewer replacement - Union Street; Miles Street; Barker Street; MacLaren Avenue; Sewell Street; and Maxwell Street
- street and storm sewer upgrading - McMinniman Court; Hossack Street; and Victory Avenue
- Masontech (A Division of Maritime Bricklayers) - Montgomery East Reservoir - External Rehabilitation
- Bemrose & Kilburn Ltd. - Brunswick Street trunk sewer and water main upgrading
- Charmac Construction Company Ltd. - Reconstruction of Burpee Street
- Installation of services - Rainsford Lane - Golf Club Road to Anderson Street and Golf Club Road near Golf Course
- R.C. Bird Construction Ltd. - installation of water and sewer services - Douglas Area Phase 2
- Northside Ready Mix - supply and delivery of concrete
- Hogan Paving Ltd. - supply and placement of asphalt concrete

- Wendell Thomas & Sons Ltd. - supply and delivery of winter sand
- Akzo Salt Ltd. - supply and delivery of highway salt
- IBIS - supply of traffic lane striping paint
- Trius Taxi Ltd. - garbage collection services
- Gorman Paving Inc. - installation of curb and gutter and sidewalk
- KWI - reconstruction of Regent Tower Reservoir
- Wilson Builders (1978) Ltd. - upgrading of Regent Street between Montgomery Street and Prospect Street
- Higgins Equipment Ltd. - supply of duplex type water booster system (Rainsford Lane Booster Station)

General Fund expenditures for the period 1991 01 01 to 1991 12 31 were as follows:

Item	Budget	Net Expenditure	Over	Under
COMMON SERVICES				
(Public Works)	\$ 3 822 847	\$ 3 721 072 ✓	-	\$ 101 775
ROAD TRANSPORT SERVICES				
Administration	294 575	304 941 ✓	10 366	-
Roadway Surfaces	1 084 315	1 200 647 ✓	116 332	-
Sidewalk Maintenance	556 600	643 098 ✓	86 498	-
Culverts, Ditching	39 600	58 081 ✓	18 481	-
Storm Sewer Maintenance	154 100	134 214 ✓	-	19 886
Street Cleaning	429 000	406 123 ✓	-	22 877
Spring Cleanup	42 000	42 381 ✓	381	-
Sanding & Salting & Snow Control	1 436 700	1 378 955 ✓	-	57 745
Street Lights	571 450	510 012 ✓	-	61 438
Traffic Services	471 340	449 905 ✓	-	21 435
ENVIRONMENTAL HEALTH SERVICES				
Garbage & Waste Disposal	301 500	289 225 ✓	-	12 275
Garbage & Waste Collection	507 200	534 382 ✓	27 182	-
Hazardous Waste	-	6 458 ✓	6 458	-
PUBLIC HEALTH SERVICES				
Old Burial Ground	15 200	13 712 ✓	-	1 488
Loyalist Burial Ground	356	235 ✓	-	121
PARKS & TREES SERVICES				
Wilmot Park	42 700	51 478 ✓	8 778	-
Odell Park	89 600	96 897 ✓	7 297	-
Carleton Park	12 120	12 149 ✓	29	-
Trees	362 850	361 056 ✓	-	1 794
Greens, Benches, other parks, etc.	170 200	160 555 ✓	-	9 645
TOTALS				
	\$ 10 404 253	\$ 10 375 576	\$ 281 802	\$ 310 479

UNDER: \$ 28 677

Utility Fund expenditures for the period 1991 01 01 to 1991 12 31 were as follows:

Item	Budget	Net Expenditure	Over	Under
COMMON SERVICES				
General Equipment	\$ 585 200	\$ 600 647	\$ 15 447	\$ -
Safety & Benefits	248 800	236 673	-	12 127
Administration	136 000	145 495	9 495	-
WATER				
Purification & Treatment	276 700	281 572	4 872	-
Source of Supply	479 000	418 784	-	60 216
Power & Pumping	55 700	41 465	-	14 235
Maintenance of Equipment (Plant)	100 600	81 533	-	19 067
Transmission & Distribution (Oper)	355 100	273 769	-	81 331
Transmission & Distribution (Maint)	765 900	715 607	-	50 293
Billing & Collection	188 000	183 150	-	4 850
Meters	197 200	194 658	-	2 542
SANITARY SEWER				
Operation (Lift Station)	146 500	162 913	16 413	-
Maintenance	448 200	456 060	7 860	-
Treatment & Disposal	1 575 300	1 478 598	-	96 702
TOTALS				
	\$ 5 558 200	\$ 5 270 924	\$ 54 087	\$ 341 363

UNDER: \$ 287 276

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	101.483	-	7.069	108.552	23.376	-	23.376	24.048
Fredericton North	20.167	0.029	0.653	20.849	9.726	-	9.726	7.447
Nashwaaksis	48.487	0.934	6.512	55.933	2.444	-	2.444	8.194
Marysville	18.715	0.304	3.626	22.645	7.755	-	7.755	3.400
Barker's Point	6.643	-	1.669	8.312	2.246	-	2.246	2.665
Silverwood	4.343	0.085	0.184	4.612	-	-	-	2.748
Garden Creek	13.642	1.101	2.693	17.436	-	-	-	2.482
Douglas	1.855	0.191	2.315	4.361	2.560	-	2.560	-
Lincoln	5.256	1.314	0.879	7.449	4.249	2.523	6.772	2.458
Lower St. Marys	1.138	-	0.832	1.970	-	-	-	2.681
TOTALS	221.729	3.958	26.432	252.119	52.356	2.523	54.879	56.123

TOTAL (Municipal and Designated Routes) = 306.998 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 - GENERAL FUND

The total net expenditure under this heading was **\$ 3 721 072** made up as follows:

Administration	\$ 86 754
Engineering Services	548 978
General Equipment	1 965 592
Service Depots	438 022
Safety & Benefits	<u>681 726</u> \$ 3 721 072

ROAD TRANSPORT SERVICES

Road Transport Services is made up of the following items:

Administration	\$ 304 941
Roads & Streets	3 863 499
Street Lighting	510 012
Traffic Services	449 905
Recovery Account - Rentals	<u>(868 322)</u> \$ 4 260 035

(a) **Administration:** The total net expenditure under this heading amounted to **\$ 304 941** for personnel costs, general services, etc.

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

(1) Roadway Surfaces (maintenance)	\$ 1 200 647
(2) Sidewalk Maintenance	643 098
(3) Culverts & Ditching	58 081
(4) Storm Sewer Maintenance	134 214
(5) Street Cleaning (includes Spring Cleanup)	448 504
(6) Winter Maintenance	<u>1 378 955</u> \$ 3 863 499

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 **\$ 1 200 647** was made up as follows:

Paved Streets	\$ 896 792
Curb & Gutter Repair	111 185
Driveway Entrances	5 970
Right-of-way Maintenance	<u>186 700</u> \$ 1 200 647

Paved Streets this includes the patching and repairing of pavement and the asphalt concrete resurfacing program.

The following streets or portions of streets were resurfaced with Type "D" asphalt concrete in 1991.

Location	Length (metres)
Canada Street (selected sections)	1536
Lincoln Road (selected sections)	<u>579</u>
Total	2115

2115 metres = 2.115 kilometres

Also, selected sections of St. Marys Street, Wilsey Road (south of Vanier), Canada Street, McLeod Hill Road, Rainsford Lane, River Street, Springhill Road, Doak Road/Flanagan Road, Hearne Street, Kimble Drive and Wetmore Road, were padded with Type "D" asphalt concrete utilizing a spreader.

The following streets were resurfaced with Type "E" asphalt concrete in 1991.

Location	Length (metres)
Aberdeen Street - York Street to Smythe Street	592
Burden Street	187
Fenety Street	246
Grandame Street	187
Gregg Court	174
Hanson Street - Kings College Road to Fenety Street	280
Jaffrey Street - Union Street to the river	105
Loyalist Court	76
Montgomery Street - Windsor St. to Regent St. construction limits	294
Montgomery Street - York St. to Regent St. construction limits ..	305
Neill Street - Dobie Street to McEvoy Street	527
Oakland Street	259
Priestman Street - York Street to Civic #526	444
Prospect Street/Hanwell Road Intersection	140
Queen Street - York Street to Westmorland Street	184
Reid Street	632
Saunders Street - Northumberland Street to York Street	387
Valleyview Court	76
Valleyview Street	198
Victoria Street	587
Windsor Street (Kings College Rd. to Montgomery St.)	<u>478</u>

6358 metres = 6.358 kilometres

- 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.
- Right-of-way Maintenance** - sodding and seeding, rip rapping, grass cutting, repair and replacement of guide rails and clearing of rights-of-way.

(2) **Sidewalk Maintenance**

The net expenditure of **\$ 643 098** for sidewalk repairs was made up as follows:

Personnel Costs	\$ 84 670
Materials	69 363
General Services (use of equipment & special projects)	<u>489 065</u> \$ 643 098

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

The next expenditure of **\$ 58 081** was made up as follows:

Personnel Costs	\$ 30 492
Materials	9 748
General Services (use of equipment)	<u>17 841</u> \$ 58 081

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

The net expenditure of **\$ 134 214** was made up as follows:

Personnel Costs	\$ 77 867
Materials	20 655
General Services (use of equipment)	<u>35 692</u> \$ 134 214

(5) **Street Cleaning and Flushing**

The City of Fredericton used a number of sweepers, trackless units and a Vac-all unit for street cleaning purposes in 1991.

The net expenditure under this heading amounted to **\$ 448 504 *** and was made up as follows:

Personnel Costs	\$ 305 767
General Services (use of equipment & contract services)	114 682
Brooms - main & gutter	11 083
Brooms - hand	1 178
Anti-litter cans	623
Dust Control	<u>15 171</u> \$ 448 504

* Includes an amount of \$ 42 381 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 323.148 km of roads and streets in 1991 (151.414 km on the north side and 171.734 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 1991, 165.421 km of sidewalk were plowed and sanded. (58.090 km on the north side and 107.331 km on the south side)

Streets:

The total net cost for plowing streets amounted to **\$ 705 464** and was made up as follows:

Personnel Costs	\$ 378 696
General Services (use & maintenance of equipment)	302 442
Goods	470
Fixed Assets (new equipment)	<u>23 856</u> \$ 705 464

The total net cost of sanding and salting streets amounted to **\$ 475 761** and was made up as follows:

Personnel Costs	\$ 152 066
General Services (use & maintenance of equipment)	94 442
Materials (salt and sand)	211 745
Fixed Assets (new equipment)	<u>17 508</u> \$ 475 761

The overall net expenditure of **\$ 1 181 225** for plowing, sanding, and salting City roads and streets was made up as follows:

Personnel Costs	\$ 530 762
General Services (use & maintenance of equipment)	396 884
Fixed Assets (new equipment)	41 364
Materials (salt & sand)	211 745 (1)
Goods	<u>470</u> \$ 1 181 225

Sidewalks:

The total net expenditure for plowing sidewalks amounted to **\$ 136 228** and was made up as follows:

Personnel Costs	\$ 75 739
General Services (use & maintenance of equipment)	<u>60 489</u> \$ 136 228

The total net expenditure for sanding sidewalks amounted to \$ 61 502 and was made up as follows:

Personnel Costs	\$ 30 413
General Services (use & maintenance of equipment)	18 889
Materials (sand)	<u>12 200</u>
	\$ 61 502

The overall net expenditure for snow plowing and sanding of sidewalks was \$ 197 730 and was made up as follows:

Personnel Costs	\$ 106 152
General Services (use & maintenance of equipment)	79 378
Materials (sand)	<u>12 200</u>
	\$ 197 730

TOTAL NET COST OF WINTER MAINTENANCE - ADD (1) & (2) \$ 1 378 955

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

1987	Agriculture Canada Airport Weather Office	212.8 cm 372.2 cm
1988	Agriculture Canada Airport Weather Office	139.2 cm 227.6 cm
1989	Agriculture Canada Airport Weather Office	218.6 cm 350.8 cm
1990	Agriculture Canada Airport Weather Office	151.0 cm 290.4 cm
1991	Agriculture Canada Airport Weather Office	206.2 cm 290.4 cm

(c) **Street Lighting**

The multiple lighting system for the City of Fredericton as of 1991 12 31 consisted of:

13	-	100 Watt H.P.S.	@	\$ 147.79	per light per year
6	-	150 Watt H.P.S.	@	197.04	per light per year
317	-	100 Watt H.P.S.	@	114.79	per light per year
1	-	180 Watt L.P.S.	@	222.70	per light per year
41	-	400 Watt L.P.S.	@	262.94	per light per year
10	-	125 Watt M.V.	@	123.16	per light per year
2	-	175 Watt M.V.	@	174.79	per light per year
203	-	175 Watt M.V.	@	147.79	per light per year
236	-	175 Watt Ref. M.V.	@	114.79	per light per year
12	-	250 Watt M.V.	@	219.73	per light per year
4	-	250 Watt M.V.	@	192.73	per light per year
1552	-	250 Watt M.V.	@	159.73	per light per year
373	-	400 Watt Ref. M.V.	@	223.65	per light per year
1	-	500 Watt Ref. M.V.	@	193.37	per light per year
2	-	400 Watt Flood Lights	@	0.72	per Watt per year
176	-	150 Watt H.P.S.	@	164.04	per light per year
179	-	200 Watt H.P.S.	@	196.60	per light per year

The total street lighting costs for 1991 were as follows:

Salaries & Benefits	\$ 2 352
Municipal Lighting System Contract	504 064
General Services - Maintenance of Equipment	679
Government Services (Power to City Owned Lights)	508
New Poles	2 319
New Bulbs	<u>90</u> \$ 510 012

(d) **Traffic Services**

The expenditure under this heading is made up as follows:

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

(1) **Street Signs**

Purchasing, repairing and installing street signs on City streets.

The net expenditure under this heading amounted to **\$77 625** made up as follows:

Personnel Costs	\$ 30 004
General Services (use of equipment)	12 267
Goods (posts, street sign purchases, etc.)	<u>35 354</u> \$ 77 625

(2) **Paint Department**

The net expenditure under this heading was **\$ 98 517** made up as follows:

Personnel Costs	\$ 57 849
General Services (use & maintenance of equipment)	11 743
Goods (paint, misc. supplies, signs)	<u>28 925</u> \$ 98 517

(3) **Traffic Signals**

The net expenditure under this heading was **\$ 218 965** made up as follows:

Personnel Costs	\$ 85 865
General Services (use of equipment)	24 086
Government Services (electric power)	48 851
Goods (materials)	51 399
Fixed Assets (new equipment)	<u>8 764</u> \$ 218 965

(4) **Railway Crossings**

The net expenditure under this heading was **\$ 54 798** 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
- (3) Hazardous Waste

(1) **Garbage and Waste Collection**

In 1991, the net amount paid for the garbage and waste collection operation was **\$ 534 382** made up as follows:

General Services - (Contracting Services)	\$ 324 760
General Services - (Advertising)	1 570
General Services - (Recycling Collection)	<u>208 052</u>
	\$ 534 382

(2) **Garbage and Waste Disposal**

The net expenditure under this section was **\$ 289 225** made up as follows:

General Services (recycling boxes & advertising)	
Solid Waste Commission payments, and land rental	\$ 287 829
Government Services (taxes)	<u>1 396</u>
	\$ 289 225

(3) **Hazardous Waste**

Costs associated with the cleanup of oil spills from accidents, etc.

The net expenditure under this section was **\$ 6458** made up as follows:

Personnel Costs	\$ 864
General Services (use of equipment & contract services)	2634
Goods (materials)	<u>2960</u>
	\$ 6 458

PUBLIC HEALTH SERVICES

The following items are included under the above heading:

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

(1) Old Burial Ground

The net expenditure under this section was \$ 13 712 made up as follows:

Personnel Costs	\$ 11 749
General Services (use of equipment)	226
Government Services (lighting)	526
Goods (materials)	<u>1211</u>
	\$ 13 712

(2) Loyalist Burial Ground

The net expenditure under this section was \$ 235 made up as follows:

Personnel Costs	\$ 205
General Services (use of equipment)	<u>30</u>
	\$ 235

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 **\$ 51 478** made up as follows:

Personnel Costs	\$ 30 677
General Services (use & maintenance of equipment, building repairs)	8 122
Government Services (water & sewer rates, light & power)	2 665
Goods (materials; fuels & lubricants)	<u>10 014</u>
	\$ 51 478

(2) Odell Park

The net expenditure for this item was **\$ 96 897** made up as follows:

Personnel Costs	\$ 55 468
General Services (use & maintenance of equipment, communications; building repairs)	14 380
Government Services (water & sewer rates, lights & power)	1 244
Goods (materials; fuels & lubricants)	<u>25 805</u>
	\$ 96 897

(3) Carleton Park

The net expenditure for this item was **\$ 12 149** made up as follows:

Personnel Costs	\$ 7 138
General Services (use of equipment & land rental)	2 593
Goods (materials)	<u>2 418</u>
	\$ 12 149

(4) **Trees**

The net expenditure for this item was **\$ 361 056** made up as follows:

Personnel Costs	\$ 267 571
General Services (use & maintenance of equipment)	39 085
Goods (fuels & lubricants, materials, new trees, small tools & equipment)	<u>54 400</u> \$ 361 056

In 1991, 135 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 1991:

<u>Species</u>	<u>Number Removed</u>
Elm	47
Maple	49
Linden	3
Oak	2
Ash	2
Hardwoods (Miscellaneous)	26
Softwoods (Miscellaneous)	<u>6</u>
TOTAL	135

In 1991, 42 trees were removed because of Dutch Elm Disease.

Following is a summary of Elm trees removed from 1964 to 1991:

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
1989	47 (48.0)	51	98
1990	55 (79.7)	14	69
1991	42 (89.4)	5	47
TOTALS	5742 (67.2)	2805	8547

Trees were planted (first planting) at the following locations in 1991:

LOCATION	NUMBER OF TREES
Angelview Park	43
Biggs Street	47
Botanic Gardens	49
Broad Street	21
Carleton Park	14
Carrington Lane	11
Centennial Court	1
Collett Court	5
Coronation Court	3
Crocket Street	5
Estey Lane	26
Evans Street	21
Harrison Court	8
Kingswood Drive	21
Lincoln Road	12
Main Street	3
Marlborough Drive	4
Morrison Street	8
Marysville Cenotaph	5
McGloin Street	21
McGregor Park	25
McNeill Avenue	7
Odell Park	50
Priestman Street	1
Queen Street	50
Ridgewell Place	2
Riverfront Drive Walkway	12
Simpson Court	2
South Green	1
Staples Court	19
Veterans Drive	4
Waterloo Row	18
Wiggins Drive	20
Wilmot Park	42
TOTAL	581

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

A number of trees were also trimmed in 1991. The number and class of trees were made up as follows:

- | | | |
|---------------------------------|---|----------------------------------|
| (a) Trees above 14 m in height | - | approximately 250 mixed species |
| (b) Trees 6 m to 14 m in height | - | approximately 1100 mixed species |
| (c) Trees under 6 m in height | - | approximately 4200 mixed species |

Stumps removed, topsoiled and seeded	-	135
Shrubs planted on City properties and park land	-	approximately 300

(6) **Greens, Benches & Other Parks**

The net expenditure for this item was \$ 160 555 made up as follows:

Personnel Costs	\$ 91 411
General Services (use & maintenance of equipment and special projects)	45 356
Goods (fuels & lubricants materials, small tools & equipment & new trees)	12 648
Fixed Assets (new equipment)	<u>11 580</u> \$ 160 555

UTILITY FUND

The above item is made up of the following headings:

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

(1) **COMMON SERVICES**

In 1991 the net expenditure for this item was **\$ 982 815** made up as follows:

General Equipment	\$ 600 647
Safety & Benefits	236 673
Administration	<u>145 495</u>
	\$ 982 815

(2) **SANITARY SEWER**

In 1991 the net expenditure for this item was **\$ 2 269 833** made up as follows:

Operating: Lift Stations

Personnel Costs	\$ 47 481
General Services (use & maintenance of equipment)	86 210
Government Services (light & power)	10 049
Goods (materials)	<u>19 173</u>
	\$ 162 913

Maintenance:

Personnel Costs	\$ 260 834
General Services (use & maintenance of equipment)	80 060
Goods (repair parts & tools)	<u>115 166</u>

Sewage Treatment & Disposal:

Personnel Costs	\$ 17 041
General Services -use & maintenance of equipment	6 312
- treatment (contract services)	1 420 591
Government Services:	
Water & Sewer Rates	737
Lights & Power	33 546
Goods (Miscellaneous Supplies)	371 \$ 1 478 598

Debt Charges:

**Principal
Interest** \$ 129 068
..... 43 194 \$ 172 262

TOTAL \$ 2 269 833

The Fredericton sanitary sewer system consists of approximately 268 kilometres of mains made up as follows:

SIZE	SILVERWOOD GARDEN CREEK	NASHWAAKSIS DOUGLAS	MARYSVILLE	BARKER'S POINT	FREDERICTON	TOTAL
100 mm	-	0.158	-	-	-	0.158
100 mm F.M.	0.013	-	-	-	1.103	1.116
150 mm	-	1.433	0.314	-	0.253	2.000
150 mm F.M.	0.031	0.417	0.539	0.068	3.008	4.063
200 mm	15.488	37.269	17.684	7.643	115.858	193.942
200 mm F.M.	0.254	0.463	0.314	-	0.064	1.095
250 mm	1.959	3.158	0.955	0.298	9.383	15.753
250 mm F.M.	1.178	-	-	-	-	1.178
300 mm	1.267	3.585	1.006	1.868	17.320	25.046
300 mm F.M.	0.420	0.457	-	-	0.739	1.616
350 mm	0.287	0.719	-	-	0.713	1.719
350 mm F.M.	-	-	0.528	-	0.254	0.782
375 mm	1.138	2.184	0.500	0.174	2.816	6.812
400 mm	0.018	0.076	-	-	0.210	0.304
450 mm	1.039	0.031	1.350	-	2.877	5.297
500 mm	2.979	-	-	-	-	2.979
600 mm	0.156	-	-	-	2.485	2.641
750 mm	-	-	-	-	0.322	0.322
900 mm	-	-	-	-	1.432	1.432
TOTALS	26.227	49.950	23.190	10.051	158.837	268.255

NOTE: Fredericton includes the Lincoln area

The above figures 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 year's end, 14 separately monitored water systems, comprising 22 wells (12 active), 16 reservoirs, 5 active booster stations and the Water Treatment Plant.

The Water Treatment Plant treats the water from the 6 Wilmot Park wells, which provide over 90% of the City's water. The following describes the 14 water systems and their normal sources.

SYSTEM	SOURCE	STORAGE
South Low	5 wells via W.T.P. 1 emergency standby well	18200 kL
North Low	South Low via River Crossing (same pressures) 7 emergency wells	8540 kL
South Intermediate	South Low via Booster	9090 kL
South High	South Interim. via Booster	2410 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
Vanier South Intermediate	South High via Pressure Reducing Valve	0 kL
Hanwell	South High via Pressure Reducing Valve	270 kL
Silverwood	2 Wells Direct	245 kL
Rainsford	1 Well Direct	0 kL
Killarney	2 Wells Direct	3750 kL
Marysville	2 Wells Direct 1 Emergency Standby Well	2840 kL
Canterbury	South High via Altitude Valve	910 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)	\$ 183 150
(2)	Water Ordinary (including meters)	1 184 034
(3)	Water Treatment Facility & Well Production Costs	823 353
(4)	Debt Charges - Principal	287 327
(5)	Debt Charges - Interest	<u>73 242</u>
		\$ 2 551 106

(1) WATER ADMINISTRATION (BILLING & COLLECTION)

The net expenditure of **\$ 183 150** was made up as follows:

Office salaries & benefits	\$ 120 648
Postage	21 162
Machinery Rental	4 038
Professional Services	14 856
Materials	18 177
Office Equipment	2 132
New Equipment	796
Computer Equipment	<u>1 341</u>
	\$ 183 150

(2) WATER ORDINARY (INCLUDING METERS)

The net expenditure of **\$ 1 184 034** was made up as follows:

Transmission & Distribution (Operation)

Personnel Costs	\$ 44 428
General Services (use & maintenance of equipment) ..	113 049
Government Services (light & power, provincial taxes)	104 795
Goods (materials)	<u>11 497</u>
	\$ 273 769

Transmission & Distribution (Maintenance)

Personnel Costs	\$ 394 171
General Services (use & maintenance of equipment & hydrants)	91 763
Goods (fuels & lubricants, tools, materials, parts)	188 455
Fixed Assets (new equipment)	<u>41 218</u>
	\$ 715 607

Meters

Personnel Costs	\$ 116 894
Meter Parts, miscellaneous supplies, & tools	10 022
Use of Equipment	19 436
Fixed Assets (new meters)	<u>48 306</u>
	\$ 194 658
TOTAL	\$ 1 184 034

On 1991 12 31 there were 12 338 water services on meter and 222 on flat rate, making a total of 12 560.

303 new meters were installed in 1991, 45 regular register meters changed to RRT or KRT, and 186 ARB register meters changed to RRT or KRT. 7 flat rate services were metered.

In 1991, 10 discontinued services were excavated and shut off at the main, 164 stopped meters were replaced and 26 frozen meters were replaced.

The following sprinklers were installed in 1991:

- 68 Alison Boulevard (Bruncor)
- 435 Brookside Drive (Zellers)
- 525 Dundonald Street (Norge Cleaners)
- 344 Hodgson Road (Parts for Trucks)
- 12 McGloin Street (Analytical Services Lab)
- 715 Priestman Street (Ecole St. Anne)

There are in the City, as of 1991 12 31, 1603 hydrants situated in the following areas:

Fredericton South	759
Fredericton North	162
Nashwaaksis	293
Marysville	148
Barker's Point	68
Silverwood	<u>23</u>
 SUB TOTAL	1453
 LOCATED ON PRIVATE PROPERTY	<u>150</u>
 TOTAL	1603

Hydrants were installed at the following locations in 1991:

Location	Number
Anderson Street	4
Bear Drive	2
Church Street	1
Claudie Road	3
Day Street	2
Garden Street	3
Hossack Street	1
Marigold Street	2
McMinniman Court	1
Rainsford Lane	3
Sunset Drive	1
Trunk Water Main along C.A.R. row - Wallace to Brookside	2
Trunk Water Main - City Transit to Maliseet Drive	<u>3</u>
 TOTAL	28

The Fredericton distribution system consists of approximately 295 kilometres of water main, made up as follows:

SIZE	MARYSVILLE	NASHWAAKSIS DOUGLAS	BARKER'S PT	SILVERWOOD GARDEN CREEK	FREDERICTON	TOTAL
32 mm	-	0.153	-	-	-	0.153
38 mm	-	0.072	-	-	0.234	0.306
50 mm	-	-	-	0.154	-	0.154
75 mm	-	-	-	-	0.435	0.435
100 mm	0.753	2.232	-	2.508	10.427	15.820
150 mm	12.545	20.929	3.969	4.810	57.352	98.605
200 mm	6.267	22.258	1.035	7.253	43.952	80.765
250 mm	3.071	6.746	5.163	0.966	21.700	37.646
300 mm	1.050	3.816	0.031	7.776	28.868	41.541
350 mm	-	0.207	-	-	5.190	5.397
400 mm	-	1.102	-	-	7.127	8.229
450 mm	-	-	-	-	1.965	1.965
500 mm	-	-	-	-	2.170	2.170
600 mm	-	-	-	-	0.395	0.395
Unknown	0.146	-	-	-	-	0.146
TOTALS	23.832	57.615	10.198	23.467	179.815	294.827

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

The above figures 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 \$ 823 353 was made up as follows:

Source of Supply

Personnel Costs	\$ 129 649
Use of Equipment	13 611
Maintenance - Wells	39 957
Communications	10 992
Power - Wells	211 846
Materials - Wells	<u>12 729</u>
	\$ 418 784

Power & Pumping (Plant)

Personnel Costs	\$ 30 295
Light & Power	4 856
Supplies	<u>6 314</u>
	\$ 41 465

Water Treatment Plant

Personnel Costs	\$ 107 450
Insurance	28 237
Maintenance	95 097
Power	12 793
Taxes	32 132
Materials	16 029
Goods (Chlorine, Soda Ash, Lime, etc.)	<u>71 366</u>
	\$ 363 104
TOTAL	\$ 823 353

The total amount of water pumped into the City's distribution systems from 1991 01 01 to 1991 12 31 for the entire City was 8450 megalitres. The amount of water produced by the Water Treatment Plant in 1991 was 7640 megalitres or 90% of the total City demand. The average daily demand for the City is 23 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
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	8740	743 604	85
1989	8440	734 658	87
1990	8600	679 440	79
1991	8450	823 353	97

The total net expenditure for transmission and distribution of water for the City from 1991 01 01 to 1991 12 31 was determined from the following:

Transmission & Distribution:

Operation	\$ 273 769
Maintenance	<u>715 607</u> \$ 989 376

Therefore, the net expenditure for transmission and distribution of one megalitre of water from 1991 01 01 to 1991 12 31 was:

$$\frac{\$ 989 376}{8450} = \$ 117$$

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

YEAR	NET EXPENDITURE PER MEGLALITRE
1982	\$ 74
1983	87
1984	92
1985	99
1986	88
1987	89
1988	93
1989	126
1990	106
1991	117

The total net expenditure for administration costs and debt charges for the City from 1991 01 01 to 1991 12 31 was determined from the following:

Water Administration

(1) Billing & Collection	\$ 183 150
(2) Meters (Installation, Reading, Repairs)	194 658
<u>Debt Charges (Principal & Interest)</u>	<u>360 569</u> \$ 738 377

Administration costs per megalitre of water produced:

$$\frac{\$ 377\ 808}{8450} = \$ 44.71$$

Debt charges per megalitre of water produced:

$$\frac{\$ 360\ 569}{8450} = \$ 42.67$$

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 MEGLITRE
(rounded to nearest dollar)**

YEAR	ADMINISTRATION (BILLING & COLLECTION & METERS)	DEBT CHARGES
1982	\$ 44	\$ 96
1983	51	107
1984	42	97
1985	43	94
1986	43	75
1987	37	52
1988	39	46
1989	44	46
1990	44	43
1991	45	43

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

TOTAL COSTS PER MEGLITRE

YEAR	PRODUCTION COSTS	TRANSMISSION & DISTRIBUTION COSTS	ADMINISTRATION	DEBT CHARGES	*TOTAL
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	85	93	39	46	263
1989	87	126	44	46	303
1990	79	106	44	43	272
1991	97	117	45	43	302

* TOTAL COST = Production Costs + Transmission & Distribution Costs

S U M M A R Y

WATER AND SEWER REVENUE & EXPENDITURES

1991

ITEM	NET EXPENDITURE	REVENUE
COMMON SERVICES (WATER & SEWER)		
General Equipment	\$ 600 647	\$ 465 085
Safety & Benefits	236 673	
Administration	145 495	
WATER		
Water Administration (Billing & Collection)	183 150	
Water Ordinary (Including Meters)	1 184 034	4 424 524
Water Treatment Facility & Well Production Costs	823 353	
Debt Charges - Principal & Interest	360 569	
SANITARY SEWER		
Operating & Maintenance	618 973	2 967 191
Sewage Treatment & Disposal	1 478 598	
Debt Charges	172 262	
TOTALS	\$ 5 803 754	\$ 7 856 800

1991 SURPLUS:	\$ 2 053 046
SURPLUS @ BEGINNING OF 1991:	1 349 858
OVERALL SURPLUS:	<u>\$ 3 402 904</u>

NOTE: \$ 2 420 000 of the above noted overall surplus was appropriated for utility capital expenditures.

CAPITAL PROGRAMS

The following gives brief descriptions of capital projects begun or completed in 1991:

WATER:

In 1991, water mains were installed along the Canadian Atlantic Railway right-of-way off of Main Street; on Claudie Road; on Rainsford Lane from Golf Club Road to Anderson Street and on a portion of Brunswick Street between the underpass and Church Street.

Streets such as Queen Street between York Street and the Federal Building; McMinniman Court; and Hossack Street had their water mains upgraded or installed under the Capital System Replacement and Oversizing account.

New mains were also installed for the northside high pressure system between the Transit depot and Maliseet Drive and also along Bear Drive in the Devon Indian Reserve.

Following are lengths and sizes of water mains installed in 1991:

LOCATION	LENGTH OF MAINS - metres							
	100 D.I.	150 mm D.I.	200 mm D.I. & P.V.C.	250 mm D.I.	300 mm D.I.	350 mm D.I.	400 mm D.I.	500 mm D.I.
Longwood Booster Station (External Piping)					53			
Main Street - Trunk Water Main along Canadian Atlantic Railway r.o.w.		4	29	26	75		1102	11
Brunswick Trunk - Underpass to Church Street			27					210
Rainsford Lane - Golf Club Road to Anderson Street	26	25	4		649			
Douglas Area (Claude Road)		16			499			
* Queen Street - York Street to Federal Building		28	11	459				
** Devon Indian Reserve Trunk Water Main		22	26			652		
** Devon Indian Reserve (Bear Drive)		12	156					
*** McMinniman Court; Hossack Street		54	81					
TOTALS	26	161	334	485	1276	652	1102	221

OVERALL TOTAL - 4257 metres = 4.257 kilometres

- * Done under system replacement and oversizing.
- ** Paid for by the Department of Indian and Northern Affairs.
- *** Extended during installation of storm sewer and reconstruction of streets.

SANITARY SEWER:

In 1991, sanitary sewer mains were installed on Claudie Road; on Rainsford Lane between the Golf Club Road and Anderson Street; and on a portion of Brunswick Street between the underpass and Church Street.

Streets such as Union Street near Miles Street; Miles Street; Barker Street between Miles Street and Titus Street; Maxwell Street; McMinniman Court; Hossack Street; and Forest Hill Road from Woodbridge Street to Kimble Drive had their sanitary sewer mains upgraded or installed under the system replacement and oversizing account.

New sanitary sewer mains were also installed on Bear Drive in the Devon Indian Reserve.

Following are lengths and sizes of sanitary sewer mains installed in 1991:

LOCATION	LENGTH OF MAINS - metres								
	200 mm P.V.C.	250 mm P.V.C.	300 mm D.I.	300 mm P.V.C.	350 mm D.I.	375 mm P.V.C.	600 mm P.V.C.	200 mm D.I.F.M.	300 mm D.I.F.M.
* Union Street; Miles Street; Barker Street	232								
* MacLaren Avenue; Sewell Street	6	2		329					
* Maxwell Street	117								
*** McMinniman Court; Hossack Street	84								
✓ Brunswick Trunk - Underpass to Church St.								211	
Rainsford Lane - Golf Club Road to T.C.H.	449								
Douglas Area (Claudie Road)	67		56	329	33	21		60	60
✓ Forest Hill Rd. - Woodbridge to Kimble	422								
** Devon Indian Reserve (Bear Drive)	151								
TOTALS	1528	2	56	658	33	21	211	60	60

OVERALL TOTAL - 2629 metres = 2.629 kilometres

- * Done under system replacement and oversizing.
- ** Paid for by the Department of Indian and Northern Affairs.
- *** Extended during installation of storm sewer and reconstruction of streets.

STORM SEWER:

In 1991, storm sewer mains were installed on Union Street near Miles Street; on Miles Street; on Barker Street between Miles Street and Titus Street; on MacLaren Avenue between Gibson Street and Sewell Street; on Sewell Street from MacLaren Avenue to Henry Park; on Maxwell Street; on McMinniman Court; on Hossack Street; on Victory Avenue; on Rainsford lane between Golf Club Road and the Trans Canada; on Golf Club Road adjacent to and across the golf course; on Claudie Road; on Canada Street (associated with sidewalk construction); and at the Regent/Priestman intersection.

New storm sewer mains were also installed on Bear Drive in the Devon Indian Reserve.

Following are lengths and sizes of storm sewer mains installed in 1991:

LOCATION	LENGTH OF MAINS - metres					
	250 mm	300 mm	375 mm	450 mm	600 mm	900 mm
Union Street; Miles Street; Barker Street	58	98		147	359	
MacLaren Avenue; Sewell St.	31	79	87	91	76	
Maxwell Street	7	117				
McMinniman Court; Hossack Street	60	404			43	
Victory Avenue	14	80				
Rainsford Lane - Golf Club Road to T.C.H.	42	344	12	40		
Golf Club Rd. - across golf course			295			
Golf Club Road - adjacent to golf course	49			266		
Douglas Area (Claudie Road)	48	74		54	89	122
Canada Street (Associated with sidewalks)	10	101	70		16	
* Regent/Priestman Intersection	44					
** Bear Drive extension (Devon Indian Reserve)	55	133				
TOTALS	418	1430	464	598	583	122

OVERALL TOTAL - 3615 metres or 3.615 kilometres

* Done in conjunction with Regent Street upgrading.

** Paid for by the Department of Indian and Northern Affairs.

CURB AND GUTTER

Concrete curb and gutter was constructed at the following locations in 1991:

Location	Length (metres)
Baxter Court	354
Baxter Street	221
* Bridge/Canada Intersection	555
Broad Street - existing to Carrington Lane	280
** Brunswick St. - Church St. to Underpass	562
Burpee Street	680
*** Canada Street	1142
Carrington Lane	1138
**** Charles Avenue	248
Cherry Avenue - existing to Fulton Ave.	74
Cowperthwaite Street - Hollybrook St. to Mason Ave.	386
Ferris Street	501
*** Forest Hill Road	241
Fulton Avenue - Sierra Dr. to Cherry Ave.	578
***** Graham Avenue	881
Hearne Street	1212
***** Hollybrook Street - Canada St. to Cowperthwaite St.	400
Kimble Drive	227
Malibu Street	208
Mason Avenue - Canada St. to Cowperthwaite St.	479
***** McInnis Court	245
Nashwaaksis Access Road (to Indoor Pool) - for Recreation Dept.	744
***** Needham Street	834
***** Queen Street - Regent Street to Westmorland Street and in front of parking structure	1040
***** Regent/Priestman Intersection	123
***** River Street - Bridge St. to Allen St.	377
*** Riverside Drive	762
***** Sunset Drive - Currie Ave. to Clements Dr.	827
Sutton Street	396
Talisman Crescent - existing to the end	189
Thorburn Court	179
Thorndale Court	496
*** Waterloo Row	198
Wetmore Road - Pugsley St. to Hearne St.	258
TOTAL	17 035

17 035 metres = 17.035 kilometres

Curb and Gutter (continued)

- * Done under Traffic Management.
- ** Done in conjunction with water and sanitary sewer installation.
- *** Done in conjunction with sidewalk installation.
- **** Done under O & M budget.
- ***** Done under Street Upgrading.
- ***** Done under the Mainstreet Program.
- ***** Special upgrading project. Cost shared with Department of Transportation.

PAVING:

In 1991, Gorman Paving Inc. 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 - Type "B" at \$ 39.85 plus G.S.T. per tonne in place
- 2) Surface Course - Type "D" at \$ 41.10 plus G.S.T. per tonne in place

(1) BINDER COURSE - TYPE "B"

The following streets were paved with Type "B" asphalt concrete in 1991:

LOCATION	Length (metres)
Baxter Court	170
Baxter Street	115
Broad Street - existing to Carrington Lane	150
Burpee Street near Robinson Drive	356
Carrington Lane - Fulton Avenue to Broad Street	605
Cherry Avenue - existing to Fulton Avenue	40
Cowperthwaite Street - Hollybrook Street to Mason Avenue	206
Ferris Street	247
Fulton Avenue - Sierra Drive to Cherry Avenue	315
Graham Avenue	427
Hearne Street - Limerick Road to Wetmore Road	505
Hollybrook Street - Canada Street to Cowperthwaite Street	200
Kimble Drive - R.R. Tracks to end of curb	115
Malibu Street	100
Mason Avenue - Canada Street to Cowperthwaite Street	249
McInnis Court	91
Nashwaaksis Junior High Access Road to Pool	221
Needham Street	392
River Street - Bridge Street to Allen Street	176
Sunset Drive - Currie Avenue to Clements Drive	420
Sutton Street	205
Talisman Crescent - existing to the end	93
Thorburn Court	83
Thorndale Court	233
Wetmore Road - Pugsley Street to Hearne Street	<u>131</u>
 TOTAL	5845

5845 metres = 5.845 kilometres

CONCRETE SIDEWALKS:

New sidewalks were constructed at the following locations in 1991:

LOCATION	Length (metres)
Baxter Street	109
Bridge/Canada Intersection	288
Broad Street - existing to Carrington Lane	128
Canada Street - Daulphin Drive to Civic #505	614
Carrington Lane - Fulton Avenue to Broad Street	563
Cherry Avenue - existing to Fulton Avenue	34
Cowperthwaite Street - Hollybrook Street to Mason Avenue	178
Forest Hill Road - Beaverbrook Street eastwards	222
Fulton Avenue - Sierra Drive to Cherry Avenue	302
Graham Avenue	424
* Hearne Street	598
Hollybrook Street - Canada Street to Cowperthwaite Street	195
Kimble Drive	107
Mason Avenue - Canada Street to Cowperthwaite Street	230
Nashwaaksis Access Road to Pool	177
** Needham Street	382
*** Queen Street - Regent Street to Westmorland Street (both sides)	966
*** Queen Street - Frederick Square to Lofood (south side)	38
**** Regent/Priestman Intersection	210
** Riverside Drive	734
** River Street - Bridge Street to Allen Street	162
Sunset Drive - Currie Avenue to Clements Drive	345
Sutton Street	203
Talisman Crescent - existing to Thorndale Court	30
Thorndale Court	99
Waterloo Row - existing to former Riverview Arms property	238
Wetmore Road - Pugsley Street to Hearne Street	104
TOTAL	7680

7680 metres = 7.68 kilometres

- * Approximately 79 metres of total was for reconstruction of existing sidewalk.
- ** Reconstruction of existing sidewalk.
- *** Reconstruction of existing sidewalk under Capital Mainstreet Program.
- **** Done in conjunction with Regent Street upgrading.

STREET UPGRADING:

In 1991, a number of streets were upgraded with curb and gutter and paving and, in some instances, sidewalk. These streets included Sunset Drive from Currie Avenue to Clements Drive; McInnis Court; River Street between Bridge Street and Allen Street; Hollybrook Street between Canada Street and Cowperthwaite Street; Burpee Street between Robinson Drive and Hildebrand Crescent; Needham Street and Graham Avenue.

TRAFFIC MANAGEMENT:

In 1991, work and/or design was done for the Canada Street - Bridge Street; Woodstock Road - Hanwell Road; and Lincoln Road - Wilsey Road intersections.

Work done took the form of new underground conduit and traffic lights, new curb and gutter and paving and in some instances, new sidewalk.

SPECIAL PROJECT:

In 1990, work began on the first phase of widening Regent Street between Montgomery Street and Prospect Street. This phase was finalized in 1991. The next phase of the project is scheduled to begin in 1992.

MAINSTREET PROGRAM:

In 1991, the upgrading of the downtown area of the City continued. Work was finalized on Queen Street between York Street and Regent Street and in front of the Frederick Square Parking Structure.

NEW STREET CONSTRUCTION:

The following new streets or portion of streets were constructed in 1991:

LOCATION	Length (metres)
* Bear Drive (Devon Indian Reserve)	145
** Hossack Street Extension	15
** McMinniman Court Extension	92
** Victory Avenue Extension	<u>22</u>
TOTAL	274

274 metres = 0.274 Kilometres

* Paid for by the Department of Indian and Northern Affairs
** Extended during installation of storm sewers and reconstruction of streets.

DESIGNATED ROUTES

The City of Fredericton has a total of 54.648 km of provincial designated highways within its boundaries. In 1991, the Provincial Government paid \$ 323.76 (winter) and \$ 81.69 (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 project was undertaken in 1991:

(1)	Route 101 - Regent Street (Montgomery to Priestman) Reconstruction and Widening	\$ 908 567
	TOTAL	\$ 908 567

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
GENERAL FUND			
Claudie Rd. Phase I - STORM SEWER	\$ 90 000	\$ 102 363	
Rainsford Lane (Golf Club Rd to T.C.H.) - STORM SEWER	\$ 70 000	\$ 56 951	
Regent Street Widening Special Project (Montgomery to T.C.H.)	\$2 000 000	\$ 908 567	
College Brook Phase I - STORM SEWER	\$ 200 000	\$ 2 302	To be continued in 1992
Golf Club Rd. (along Golf Course) - STORM SEWER	\$ 70 000	\$ 55 028	
MacLaren Avenue & Sewell Street - STORM SEWER	\$ 80 000	\$ 101 883	
McMinniman-Jarvis-Hossack - STORM SEWER	\$ 150 000	\$ 150 316	
Maxwell Street - STORM SEWER	\$ 50 000	\$ 53 867	
Victory Avenue - STORM SEWER	\$ 40 000	\$ 40 090	
Golf Club Rd. (across Golf Course from Kelly's) - STORM SEWER	\$ 30 000	\$ 29 187	
South Devon (Miles & Titus) - STORM SEWER	\$ 160 000	\$ 199 632	
Cowperthwaite, Mason, Malibu - CURB & GUTTER AND PAVING	\$ 110 000	\$ 125 997	
Ferris Street - CURB & GUTTER AND PAVING	\$ 50 000	\$ 53 663	
Baxter, Hearne, Sutton, Wetmore, Kimble - CURB & GUTTER AND PAVING	\$ 280 000	\$ 332 662	The existing part of Hearne Street was reconstructed.

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
GENERAL FUND (continued)			
Talisman, Thorndale - CURB & GUTTER AND PAVING	\$ 80 000	\$ 76 594	
Broad, Carrington, Cherry, Thorburn, Fulton CURB & GUTTER AND PAVING	\$ 260 000	\$ 261 598	
Sunset Drive (Currie Avenue to Clements Drive) STREET UPGRADING	\$ 130 000	\$ 140 005	
McGinnis Court - STREET UPGRADING	\$ 30 000	\$ 39 208	
River Street (Bridge Street to Allen Street) - STREET UPGRADING	\$ 80 000	\$ 61 599	
Hollybrook Street (Canada Street to Cowperthwaite Street) STREET UPGRADING	\$ 70 000	\$ 95 282	
Waggoner's Lane (Hanwell Rd. to Post Office Bldg.) - STREET UPGRADING	\$ 210 000	\$ 49 199	To be finalized in 1992
Burpee Street - STREET UPGRADING	\$ 200 000	\$ 220 679	
Needham Street - STREET UPGRADING	\$ 150 000	\$ 144 690	
Graham Avenue - STREET UPGRADING	\$ 200 000	\$ 193 877	
Bridge/Canada Intersection - TRAFFIC MANAGEMENT	\$ 200 000	\$ 211 682	
Woodstock/Hanwell Intersection - TRAFFIC MANAGEMENT	\$ 120 000	\$ 4 755	
Lincoln/Wilsey Intersection - TRAFFIC MANAGEMENT	\$ 60 000	\$ 2 553	
Mainstreet Program	\$ 800 000	\$ 733 079	Cost shared with DDFI and ACOA

CAPITAL PROGRAMS
SUMMARY OF EXPENDITURES

ITEM	BUDGET	EXPENDITURE	REMARKS
GENERAL FUND (continued)			
Dewitt Acres - STORM SEWER	\$ 40 000	-	Deferred - awaiting easement acquisitions
NEW SIDEWALK (DONE UNDER O & M BUDGET)			
Cowperthwaite Street; Mason Avenue	\$ 30 000	\$ 20 311	
Baxter St; Hearne St; Sutton St; Wetmore Rd; Kimble Dr.	\$ 70 000	\$ 63 633	
Talisman Cres.; Thorndale Ct.	\$ 10 000	\$ 7 395	
Broad; Carrington; Cherry; Fulton	\$ 70 000	\$ 61 315	
Canada Street (Dauphin to #505)	\$ 110 000	\$ 173 490	
Waterloo Row (#569 to former Riverview Arms property)	\$ 50 000	\$ 113 683	
Riverside Drive (Watters Drive to Hillside Nissan)	\$ 140 000	\$ 151 433	
Forest Hill Rd. (Beaverbrook St. eastwards)	\$ 20 000	\$ 34 521	

WATER QUALITY - 1991

GENERAL

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 treated water 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 less treated 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 by the public. As chlorine residuals have continued to rise throughout the systems served by the Water Treatment Plant, complaints concerning objectionable tastes and odours have continued to decrease.

Breakpoint chlorination began in the Killarney and Marysville water systems during May, 1989, after laboratory testing and public meetings on the subject. As chlorine residuals made their way through the systems, some taste and odour complaints were received. These have also continued to decrease.

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.

Forty-two locations, including all active and emergency wells and key distribution system locations, are each sampled by water operators twice each month. All samples are 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. During 1991, no samples contained more than a few coliform and no location provided positive results on resampling.

CHEMICAL ANALYSIS

Samples for chemical analysis were taken from wells and the distribution system in January, 1992 and analysed by Environment New Brunswick's laboratory. Results are displayed on the following page. All water delivered to the distribution system meets the Guidelines for Canadian Drinking Water Quality, Health & Welfare Canada.

One column concerning annual pumpage is added for quick reference.

LOCATION	pH pH units	Hardness mg/LCaCO ₃	Ca mg/L	Cl mg/L	Cord. Us/cm	Cu mg/L	F mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	N ug/L	Pb ug/L	SO ₄ mg/L	Turb NTU	Zn mg/L	1991 Pumpage	
																		ML	ML
WILMOT #1 WELL	7.15	56.1	18.4	7.8	150	.014	.13	.0	.65	2.49	1.05	6.4	.06	.4	10.2	.1	.009	1505	
WILMOT #2 WELL	6.49	57.9	18.3	16.5	178	.006	.13	.02	.52	2.94	1.65	9.6	.17	.1	14.8	.2	.023	1420	
WILMOT #3 WELL	6.95	120.8	40.3	39.2	340	.008	.11	.0	2.26	4.89	.03	14.1	.64	.0	21.4	.1	.017	997	
WILMOT #4 WELL	6.98	60.3	19.9	13.2	177	.010	.12	.0	1.15	2.54	.51	10.3	.24	.0	11.4	.0	.022	582	
WILMOT #5 WELL	7.05	56.5	18.7	7.6	139	.007	.10	.0	.68	2.35	.82	4.9	.20	.0	10.3	.1	.019	1593	
WILMOT #6 WELL	6.97	50.1	16.3	7.2	128	.007	.16	.0	.42	2.26	.51	4.8	.25	.0	9.7	.1	.007	1612	
WTP INFILTRANT	7.07	84.4	28.1	20.5	225	.010	.11	.0	1.59	3.47	.40	9.8	.36	.2	14.9	.0	.0	-	
WTP EFFLUENT	7.97	107.4	37.1	22.7	278	.007	.12	.0	1.47	3.56	.00	12.7	.35	.0	15.6	.1	.001	-	
SILVERWOOD #2 WELL	7.75	181.1	37.8	30.6	435	.009	.09	.0	.54	21.02	.00	19.1	.12	.4	14.8	.3	.128	11.5	
SILVERWOOD #3 WELL	7.75	113.4	25.5	7.3	232	.007	.08	.0	.30	12.06	.00	3.4	.06	.2	8.7	.2	.036	56.6	
CAMERON CT. WELL*	7.41	95.7	32.7	30.5	346	.008	.20	.0	.49	3.42	.00	32.8	.25	.0	16.1	.1	.004	0.0	
DOWAL WELL*	7.71	151.3	52.6	33.2	383	.008	.19	.0	.79	4.83	.08	18.3	.09	.1	19.1	.1	.015	0.4	
NOT SAMPLED																			
RAINFORD WELL*	*	37.6	12.4	284	.018	.18	.0	.40	3.57	.03	12.8	.02	.0	44.7	.4	.017	121		
TOWER RD. #1 WELL	7.44	108.5	30.8	27.9	266	.006	.13	.0	.42	4.07	.00	13.1	.10	.2	14.7	.0	.010	310	
TOWER RD. #2 WELL	7.37	93.8	32.2	16.2	274	.003	.20	.02	.57	3.48	.26	16.6	.18	.1	21.8	.3	.007	0.0	
MCCOIN WELL*	7.59	94.8	34.4	5.8	206	.009	.12	.02	.49	1.92	.19	8.7	.01	.1	14.6	.1	.049	0.0	
CLIFFE WELL*	7.52	93.8	83.4	28.8	219	.009	.11	.0	.55	2.81	.01	9.9	.13	.1	16.9	.1	.025	0.0	
HIGHLAND WELL*	*	7.02	131.0	44.9	382	.006	.18	.01	.68	4.55	.03	24.3	.34	.0	22.6	.1	.056	0.6	
MAPLE #1 WELL*	*	7.34	129.8	46.9	338	.006	.14	.0	.61	3.08	.03	15.6	.02	.0	21.0	.1	.009	1.7	
MAPLE #3 WELL*	*	7.80	2.3	16.8	326	.004	.97	.06	.15	0.06	.03	69.5	.01	.1	14.8	.3	.000	0.0	
GREENWOOD #1 WELL*	*	8.98	6.0	30.8	5.8	.013	.10	.36	.47	3.38	.01	4.8	.04	.1	21.2	.9	.051	284	
GREENWOOD #2 WELL*	*	7.10	90.9	126.1	42.8	6.5	283	.011	.16	.49	4.65	1.02	10.0	.01	.0	11.7	.3	.023	35
KILLARNEY K1 WELL*	*	7.63	95.6	31.6	27.9	.036	.14	.0	.43	4.06	.00	13.1	.28	.3	15.6	.1	.017	-	
NEHC BUNKER***	7.27	106.8	36.9	18.6	250	.145	.13	.0	1.24	3.51	.01	10.6	.27	.4	17.0	.1	.003	-	
TRUDELL BLDG., PEPIN ***	7.77	102.6	35.3	18.8	248	.015	.12	.0	1.29	3.47	.01	11.5	.28	.0	17.4	.1	.007	-	
PARK ST. SCHOOL***	7.58	105.8	36.5	19.2	252	.030	.13	.0	1.30	3.55	.02	11.7	.25	.0	17.1	.1	.003	-	
WOODRIDGE REHAB***	7.58	97.6	33.4	17.4	237	.067	.12	.0	1.29	3.44	.01	11.0	.26	.5	16.7	.0	.003	-	
TOTAL																			
Aesthetic Objective	6.5-8.5	250	1.0	1.5	0.3	0.05	200	10	500	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Maximum Acceptable Concentration																			8544

* These wells are on emergency standby duty.

** Sample points within distribution system.

*** Aesthetic objectives and maximum acceptable concentration are from guidelines for Canadian Drinking Water Quality, Health and Welfare Canada, 1989.