ANNUAL REPORT
OF THE ENGINEERING AND PUBLIC WORKS DEPARTMENT

1927

Report of City Engineer for
Year of 1927.

REPORT OF CITY ENGINEER 1927.

TO HIS WORSHIP THE MAYOR AND ALDERMEN OF THE CITY OF FREDERICTON:-

The following is a statement of the work done in the different Departments under the direct supervision of the City Engineer, during the period of time from the first of December, 1926, to the first of December, 1927.

REPORT OF WORK DONE IN THE ROADS AND STREETS DEPARTMENT WITH AN EXPENDITURE OF $25,245.00.

This expenditure is made up of $15,692.00 paid for wages, and $9,553.00 paid for material.

The following earth and gravel streets within the City proper were scarified, reshaped and graded:-

Odell Avenue	1,000 ft.
Smythe Street from George to Aberdeen Street	700 "
Westmorland Street from George to Victoria Street	1,500 "
Allen Street from Brunswick to George Street	300 "
Carleton Street from George to Charlotte Street	300 "
St. John Street from Charlotte to Aberdeen Street	700 "
George Street from Northunberland to Westmorland Street	600 "
Charlotte Street from Odell Avenue to Smythe Street	400 "
Saunders Street from Odell Avenue to York Street	2,400 "
Aberdeen Street from St. John to York Street	600 "
Lansdowne Street	1,000 "
	9,500 ft. or
	1.8 miles.

Besides the above list, Woodstock Road was, at the first of the season, scarified, reshaped and graveled. Later in the season, this road was again scarified, reshaped and given a light coat of gravel.

King Street, from Westmorland to Charlotte, was scarified, reshaped and given a heavy coat of gravel to St. John Street. From St. John Street to Charlotte Street, the coat of gravel was not so heavy.

Church Street, from Queen to Charlotte, (an old McAdam Road) was scarified, reshaped and given a light coat of pea stone and gravel.

The following roads and streets outside the City proper, but inside the City limits, were treated:-

The Hanwell Road from Woodstock Road to the Brook, a distance of about 10,000 feet, was road-machined, and graveled. From the Brook to the City lines, the road was road-machined but not graveled.

The southern end of Smythe Street, that

is the old Brick Hill Road, from the first cross road south to the Milk Farm owned by Mr. Archibald Fraser, was widened out to a distance of 18 feet, and road-machined into good shape. The road was not graveled.

The first cross road from Maryland Hill to Brick Hill was road-machined and given a coat of cinders. Three broken down culverts on this part of the road were renewed.

Poor House Hill, from Dondonald Street south was road-machined, and given a light coat of gravel. A stone culvert, about half way up the hill, was rebuilt and refloored.

Maryland Hill Road, from the Canadian Pacific Railway Track south to the first cross road, was widened out, scarified with the steam roller, and given a light coat of gravel. This was rather a difficult job on account of the steepness of the hill, and on account of the numbers of rocks and bolders in the surface and sides of the road. A small and broken down stone and wooden culvert on this road, situated just north of the first cross road, was replaced by a 30 inch corregated iron pipe culvert. New 24 inch pipe culverts were placed at the intersection of Maryland Hill Road with Green Road and with Albert Street. The wooden top on the culvert of the back drain at the foot of Maryland Hill was partly renewed.

The roads in what is known as "English Settlement", that is the Green Road and Albert Street, were road-machined and given a coat of cinders.

The gravel used on the above mentioned work was dug from the mouth of the Nashwaak River during the winter, and piled in storage piles in the City. 34,004 yards of gravel were so piled at a cost to the City of $3,700.00.

The rear end of the Doak Road was skirted out, and partly reditched, at an expenditure of $131.00 from the above costs. Other work done on this road will be taken up under the heading of "Permanent Roads".

Twenty-eight and a half tons of calcium chloride were purchased and used as a dust layer. Waterloo Row, from Salamanca to Lansdowne Street, Grey Street, Lansdowne Street, part of University Avenue, and the upper part of the Woodstock Road depended entirely on this material as a dist layer. Most of the unpaved streets in the City proper were given a light coat of about one-half pound to a square yard, and were also watered by the watering carts. This light application of calcium chloride helped very materially to cut down the amount of water necessary for the watering carts.

On July 20th, there arrived here a tank car containing 5,254 gallons of Imperial Gravel Dust Layer. This material was given to the City by the Imperial Oil Company, with the understanding that the City would spread it on some of their streets within the City proper, and also on a piece of the main trunk road running from Fredericton to St. John, and lying within the City limits. This Imperial Gravel Dust Layer was spread on the St. John Road from the Experimental Farm Gates to the Bridge at the intersection of the Wilsey Road, a distance of some 3,925 feet, using about ,3 gallons to a square yard, and spreading 18 feet wide. Also on the Woodstock Road, from Odell Avenue for a distance of 1,600 feet west, at .27 gallons per square yard. Also on York Street from the Canadian Pacific Railway Track to the foot of the Poor House Hill,

a distance of about 1,200 feet at .27 gallons per square yard. Also on Aberdeen Street, from Regent to Church Street, and on St. John Street from Aberdeen to Charlotte Street, a total distance of 1,800 feet, at .25 gallons per square yard. Also on the St. John Road from Fraser's Mill to the Stone Church, a distance of 1,400 feet, at .11 gallons per square yard.

This latter light application soon wore away, but the other heavier application gave excellent results. The total distance spread by the 5,254 gallons was 1.88 miles, and the total unloading and spreading cost was $20.00, or slightly less than .4¢ per gallon.

During the last season, when the weather was suitable, there was continually at work a small patching crew. This crew averaged a team and four men, working on the paved streets of the City, patching holes and cracks in the pavements, and surface treating bituminous pavements with light tar. The streets in the City treated with light tar during the last season were:-

Queen Street and Waterloo Row, from Westmorland to Lansdowne Street.

King Street, from Westmorland to Smythe Street.

Charlotte Street, from Northumberland to Westmorland Street.

Westmorland Street, from Queen to Brunswick Street.

York Street, from Queen to King Street, and from George to Charlotte Street.

Fifty-five barrels (barrels contained about 44 Imperial Gallons) of light tar were used in surface treating the bituminous pavements. We have at the present time in stock:-

Tarvia B	- 33 bbls. or 1,452 gallons @ 26½¢ -	$384.78
Tarvia X	- 24 bbls. or 1,056 gallons @ 27¢ -	$285.12
Tarvia KP	- 2 bbls. or 88 gallons @ 32¢ -	$ 28.16
Asphalt KP	- 7 bbls. or 300 gallons @ 32¢ -	$ 84.00
	TOTAL	$782.06

The catch basins on surface sewers, over 200 catch basins in all, were cleaned out, and the surface sewers themselves thoroughly flushed.

The cinders made by the Maritime Electric Company

were hauled by the City and used to make sidewalks, and as road metal on some of the City streets.

During the last season, the usual amount of street cleaning and grass cutting, etc. was maintained.

A one-team road patrol was kept busy in wet or damp weather on the gravel and dust roads of the City proper. When the roads were too dry to be worked, the team worked on the watering cart. In addition to this patrol, a split log drag patrol was used after every rain on the Maryland Hill south of the City line, and Brick Hill, and front cross roads at the south of the City.

The City stone crusher ran 18 days and crushed 1,170 tons of stone, at a cost of 44¢ a ton for labor charges. This stone was all crushed into finer grades to be used for patching the roads and sidewalks, as we had on hand a quantity of the coarse grade.

The City Dump was maintained on the River Road at the end of Northumberland Street. One man is employed at this dump full time in the summer months, and half time in the winter months. The labor cost for this item was $561.00 for the year.

The snow on the City streets during the season of 1926 was, I believe, a little lighter than the average. The usual sidewalks were ploughed out and sanded when necessary. Some of the City Streets were rolled with the snow roller, and dragged with iron hoops. The Maryland Hill Road, which drifts badly, was kept open to traffic principally by hand shovelling, aided when possible by snow ploughs. Most of the piled snow on Queen Street, from Westmorland to Church Street, was removed by shovelling into teams and dumping on the river.

I have a few recommendations and ideas on this Department, which I would like here to bring to the attention of the Council. King Street, from Westmorland to Carleton Street, is perhaps one of the most difficult pieces of road in the City to maintain in a satisfactory condition. The road is a waterbound McAdam road with gravel top. The street is level and shaded, and does not dry out quickly after a rain. It carries a heavy traffic on account of being a link in one of the main streets in the City, and on account of the nature of the business located on it. I would recommend that this street be paved as soon as the City can conveniently make the necessary expenditure, which would be, I believe, in the vicinity of $4,500.

The St. John Road, from the residence of Mr. A. J. Gregory to the City limit at Lincoln, a distance of some 3.8 miles, and the Woodstock Road, from the Tourists' Camping Grounds to the City limit, a distance of about .8 miles, are in fact more a part of the main trunk highway of the Province, than a part of the City road system. The City has during the last two years put these roads in a shape equal tothe main trunk Provincial Highways. It seems to me that these roads should now be maintained by the Provincial Government. The Maryland Road, from perhaps the first cross road south to the City line, a distance of some three miles, is, I think, in the same category, and from the City's point of view, its maintenance should be kept up by the Provincial Government.

The question of motorizing some of our road patrolling and snow removing equipment has become acute. Under the increased traffic of the last few years, and with this increase probably continuing, it is difficult to economically maintain our gravel roads in good condition, with our present equipment. Again, as the winter automobile traffic seems to be increasing from year to year, it becomes more necessary to keep at least our main streets clear of snow, and in a proper condition for this traffic. Here again the question of motorizing our equipment comes up.

WORK DONE UNDER THE HEADING OF PERMANENT ROADS AT A COST TO THE CITY OF $4,941.00, AND AT A COST TO THE FEDERAL GOVERNMENT OF ~~$5,941.00~~ 5,000.00 - $7,899. OF THIS BEING FOR WAGES, AND $2,042.00 FOR MATERIAL.

Some outstanding accounts of last year's construction of the New Maryland Hill Road were cleared up at an expense of $317.75.

The St. John Road from the Experimental Farm Gate east to the City line, a distance of 1.6 miles, was regraded, widened out to a width of 30 feet, and gravelled. Five old culverts on this piece of road were taken out, and replaced by 18 inch and 24 inch corregated iron pipe. This piece of road was constructed up to the standard of the main trunk roads of this Province. The road from Lansdowne Street to the Experimental Farm Gate, was given a light coat of gravel, averaging about four yards to the 100 feet.

Forrest Hill Road, from the Cemetery to the River Road, was machined and given a light coat of gravel. From the cemetery back to the end of the road at Corbett's, the road was skirted out clear of bushes.

The Wilsey Road, from its junction with the St. John Road, to the Canadian Pacific Railway crossing, was road-machined, and had about one-half mile of gravel spread on it, using about 190 yards of gravel. From the Canadian Pacific Railway crossing back to the settlement, about 150 yards of gravel were used in some of the worst places in the road. The back end of the road was skirted out clear of bushes, and three log culverts rebuilt. On this latter work, the Provincial Government bore one-half of the expense, or some $150.00. I believe the Probincial Government, on its own initiative, put some additional money on the back part of the road later in the season, but as at this time the road was impassible, I have not as yet seen what was accomplished. If this road has to be kept open in the future, and made fit for traffic, a considerable amount of work in the way of widening out, grading, draining and gravelling must be done on it next season.

Some of the roads on the Experimental Farm property were road-machined and lightly graveled.

The Doak Settlement Road, from the Canadian Pacific Railway Crossing back a little more than a mile, was road-machined and the bad spots graveled. Five old culverts were taken out and replaced by corregated iron pipes.

A road patrol, consisting of two men and one team of horses, was maintained from April 18th to November 15th on the St. John Road from Lansdowne Street to the eastern City line. This patrol also spent some time on the Wilsey and Doak roads.

This last season, on account of the heavy and numerous rains, was a difficult summer to do this class of road work. The expense of the construction mentioned under this heading was considerably higher than it would have been in an ordinary summer.

WORK DONE UNDER THE HEADING OF PUBLIC WORKS, AND AT A COST OF $2,520.00, MADE UP OF $1,204.00 FOR WAGES, and $1,316.00 FOR MATERIAL.

Last spring, the pools of water in and about the City were sprayed with an oil to kill mosquitos breeding in them. After a two weeks' interval, these pools were again sprayed. The oil used was a mixture of fuel oil and used crank oil.

During the last year, twenty-three standing trees on City property were cut down, and many dead and dangerous branches on other trees cut off or pruned. On account of the location of these trees with regard to electric wires and buildings, the removal of a tree is sometimes a slow and expensive job. The cost of the removal of one tree has run as high as $50.00. Besides the cutting of these trees, all the stumps were cut out below the surface of the ground. This included some stumps of trees which had been taken down before this year.

The old Electric light station was cleared out; the sheds and doors at the back repaired. A new roof was put on the shed, and the roof of the main building was patched in a number of places. The City is now using this plant as a Storehouse and Repair Shop.

A new catch basin, and about 30 feet of 10 inch terra cotta pipe was put in at the corner of Lansdown Street and Waterloo Row. A catch basin and some 70 feet of 9 inch terra cotta pipe was put in in front of the Court House.

The repair work to asphalt sidewalks and the construction of cinder sidewalks was also included in this account.

The surveying and drafting work doen during the season, and not chargeable to any other Department, was charged against the Public Works account.

WORK DONE ON <u>CONCRETE SIDEWALKS</u>, AT A COST OF $5,228.

MADE UP OF $2,313.00 FOR WAGES, AND $2,915.00 FOR MATERIAL.

The following is a list of the concrete walks laid during the season of 1927:-

University Avenue, West side, from Charlotte Street running South - 1,034.8 feet.

Shore Street, North side, from University Avenue to Waterloo Row - 686.5 feet.

Charlotte Street, South side, from York to Regent Street - 1,263 feet.

Saunders Street, South side, from Smythe to Westmorland Street - 643 feet.

George Street, South side, from Carleton to Regent Street - 628.8 feet.

Brunswick Street, South side, from Westmorland to York Street - 632 feet.

Brunswick Street, South side, from Graveyard Lane to Regent Street - 287 feet.

York Street, West side, from Charlotte to Saunders Street - 348 feet.

Queen Street, South side, from Northumberland to Westmorland Street - 624 feet.

<u>TOTALLING</u> - 6,147.1 feet.

The above footage is divided as follows:-

5,991.1 lineal feet built in front of private property, and one-half to be paid by the owners.

156 lineal feet built around corners, curbs, etc., the whole paid by the City.

The above is all five foot walk, except 381 feet on Queen Street, running from Westmorland Street westward. The walk here is seven feet wide.

Altogether the concrete walk laid is a total of 3,500 square yards, costing $1.49 per square yard. Included in this cost is the price of a new concrete mixer, purchased at the first of the season.

WORK DONE ON PERMANENT SEWER INSTALLATION, TO THE AMOUNT OF $15,570.00, MADE UP OF $6,098.00 FOR WAGES, and $9,472.00 FOR MATERIAL.

A surface sewer was laid on the East side of Regent Street, from Union Street to Aberdeen Street; thence up Aberdeen Street to the lowest point in the block; from Union to Aberdeen Street, a distance of some 375 feet, a 12 inch terra cotta pipe was laid with a grade of .25%. A 9 inch terra cotta pipe was laid with a grade of .25% from the end of the 12 inch pipe across Regent Street, and up Aberdeen Street, a distance of 450 feet. 26 feet of 8 inch terra cotta pipe was run across Aberdeen Street to a catch basin on the northern side of Aberdeen Street. 36 feet of terra cotta pipe was laid across Aberdeen Street at the intersection of Regent Street, to a catch basin built on the Northern side of Aberdeen Street. This job used altogether 375 feet of 12 inch terra cotta pipe, 450 feet of 9 inch terra cotta pipe, and 62 feet of 8 inch terra cotta pipe - totalling 887 feet of pipe.

The sewer was laid between the curb and side walk on Regent Street, and outside the street surface on Aberdeen Street. The soil was of a light sandy nature, and required no ~~shoring~~ bracing. In crossing Regent Street, for a distance of 30 feet, it was necessary to partly cut through and partly tunnel a tarvia pavement. The average depth of excavation was 4 feet. The labor cost of excavation, laying pipe, building manholes, catch basins, and back filling was 25¢ a lineal foot.

A 15 inch terra cotta surface sewer on Northumberland Street was removed, and a 24 inch terra cotta sewer was laid in its place. This sewer was run from the river south to Argyle Street, a distance of 3,007 feet with a grade of .25%. The average depth of this sewer was 10.01 feet. A concrete abutment was built at the mouth of the sewer to protect it from ice in the spring.

Twenty-one manholes and catch basins were built on this piece of sewer. The material through which the sewer was laid was mostly sand, with a few streaks of fine gravel. From Queen to Brunswick Street, a distance of 600 feet, the sand through which we dug was mostly full of water, making it difficult to hold the excavation long enough to lay the pipe.

At Station #14 (just north of ~~Carleton~~ Charlotte Street) we ran through clay for about 60 feet. The elevation of the top of the clay was about 14 inches above the grade of the sewer. Again at Station #24 (at Aberdeen Street), we ran through hard pan. The elevation of the top of the hard pan was about 4 feet above the grade of the pipe. Practically the whole 3,000 feet of excavation had to

be tightly sheathed and braced. The excavation was all done by hand, as we had to go under water and sewerage connections for each house as well as the main domestic sewer on Brunswick Street. The price for labor per lineal foot of sewerage was $1.71. This price includes excavation, laying pipes, back filling, building catch basins, unloading and hauling pipe to jobs, as well as the cost of time keeping and instrument work.

The 24 inch surface sewerage on Northumberland Street was continued down Argyle Street to Westmorland Street, and from Westmorland Street to Victoria Street by a 15 inch terra cotta sewer, running 620 feet on Argyle Street, with a grade of .3% and 370 feet on Westmorland Street, with a grade of .3%.

The 15 inch terra cotta pipe used in this Argyle and Westmorland Street construction was pipe salvaged from the old 15 inch sewer removed on Northumberland Street.

At the corner of Westmorland and Argyle Street, 60 feet of 9 inch terra cotta pipe was used to connect the catch basins which we built to drain the other side of the street. 50 feet of 9 inch terra cotta pipe was used for the same purpose at the corner of Victoria and Westmorland Street. Nine manholes and catch basins were built on this Argyle and Westmorland Street section. The average depth of excavation was 6.8 feet, dug through sand and gravel material. The excavation on Argyle Street was all braced, although not closely sheathed. That on Westmorland Street did not need to be braced.

In all 990 feet of 15 inch pipe was laid, and 110 feet of 9 inch pipe, at a labor cost of $368.00, or 34¢ a lineal foot. This cost included labor cost of excavation, bracing, hauling, laying pipe, building catch basins and back filling.

The Brook running along the foot of the hills at the back of the City proper, and known as the "City Back Drain" was cleared of grass and weeds, widened at the bottom, and in two places dyked, where the old dyke had been washed away.

The material taken from the bed of the Brook was thrown on the northerly side of the Brook, and used to increase and strengthen the dyke there existing.

This work was all done by hand labor. The Canadian Pacific Railway treated that part of this back drain which lies within their right-of-way in the same manner as did the City. The City cleaned out that part of the drain which lies within the right-of-way of the Canadian National Railway, and collected the costs, some $46.50 from the Canadian National Railway. The cost to the City for the work done on the back drain was $303.05 less $46.50 paid by the Canadian National Railway, making a total of $256.55.

A comparison between the costs and estimates of this permanent sewerage costs, shows by the figures below that the costs were 11% below the estimates.

Estimate of the Northumberland Street Sewer - $13,070.00

Estimate of the Regent and Aberdeen Street Sewer - $ 1,098.00

Estimate of the Argyle and Westmorland Street extension $ 3,335.00

$17,503.00

The total costs of installation, namely $15,570.00 is 89% of the estimated costs.

You will note that the costs of $15,570.00 included some $256.55 for work done on the back drain, for which there is no account shown in the above estimate. However, in the above figures, the estimate for Argyle and Westmorland Street, shows that the amount of small pipe laid was some 1,000 feet short of the estimated quantity. We have that pipe on hand, and the $256.55 would about offset the cost of laying same.

WORK DONE ON THE CITY WHARF AT A COST OF $203.60, MADE UP OF $51.90 for WAGES, AND $151.70 FOR MATERIAL.

The roof on the storehouse at the City Wharf became leaky in a few places, These holes were patched up. A loading platform was built on this wharf. The platform is about 15'x40' constructed of spruce crib work, stone filled, and having a top of fine stone and cinders.

WORK DONE UNDER STREET LIGHTING AT A COST OF $8,088.41.

This cost is divided as follows:-

Current (December 1926 to December 1927) 155,600 K. W. H.	$5,032.01
Maintenance of line and street lights by the Maritime Electric at a contract price of $20.00 a mile	886.25
Lamps	312.77
New Installations	1,685.75
Wages for work done by men on the City Payroll (Principally making plans of system)	60.70
Fixtures	54.97
Hospital account (April 1926 to November 1926, inclusive)	55.96
	$8,088.41.

The charge for current was made at the old rate, namely 4¢ a K. W. H. up to the last of Fewruary, 1926. The City was from that time billed under the new contract with the Maritime Electric Company. From March 1926 to November 1926, this new contract gave a saving to the City, on the price of current used for street lights, of $1,191.99. The total current used from December 1926 to November 1927, inclusive, was 155,600 K. W. H. against 156,500 K. W. H. used from December 1925 to November 1926, inclusive.

The charge of $312.97 is merely the cost of new lamps, 120 - 250 C. P. Lamps, and 136 - 100 C. P. lamps being used.

The charge of $886.25 for maintenance, includes the amount of $495.00 for maintenance from February 1926 to Februart 1927. After this time, the maintenance bills were sent in and paid monthly.

The new installation costs of $1,685.75 are made up of $131.20, rewiring the Fredericton Highway Bridge, $610.98 new Lighting system on the Northerly side of Queen Street, from Carleton to Regent Street, and $943.57, lighting the Wilmot Park and the Experimental Farm Road.

The charge of $54.97 is for the new fixtures bought to maintain the lights, such as brackets, cutouts, etc.

The Hospital Account shows a charge of $55.96. The City buys electric current from the Maritime Electric at their contract price, and according to agreement, sells it to the Victoria Public Hospital at 4¢ a K. W. H. This agreement was started April 1927, and this cost of $55.96 is the standing of the account from April, 1927 to November, 1927, inclusive, and is made up as follows:-

Amount paid by the City to the Maritime Electric for demand and current for the Victoria Public Hospital	$ 738.32
Amount paid by the Hospital to the City for current @ 4¢ a K. W. H.	$ 682.36
Difference	$ 55.96

As there is no meter as yet installed to measure the demand, the Hospital demand is taken as 20K.W The current used was 17,059 K. W. H.

WORK DONE IN WATER DEPARTMENT AT A COST OF $24,636.62.

This cost is divided into two charges, $6,595.97 under "water ordinary" and $18,040.65 under "water at the Pumping Station".

"Water ordinary" with a cost of $6,595.97, accounts for all work done to water outside the Pymping Station, that is, installing of new water services, renewing old services, repairing and installing water mains, gates, hydrants, etc., and installing, repairing and reading of water meters. This cost of $6,595.97 is made up of $3,388.36 in wages and $~~3,210.61~~ $3,207.61 for material.

A new six H. P. boiler was purchased, and a sled with house built for same, the total unit to be used as a thawing machine.

Five new water services were installed, and three worn out services relayed. Seven leaks in water services were dug up and repaired. Fire hydrants, some 135 in number, were packed at the beginning of the cold weather, and were inspected regularly while the weather remained cold. Three of these hydrants, which were not working properly, were dug up and repaired. All the water mains in the City were flushed in the fall. Those mains which run to a dead end, or on which there is not much consumption, were flushed when necessary, which is about once a month.

Fifty new 5/8" meters, and one 2" meter were purchased this season. Forty-nine water ~~mains~~ meters were placed on services, which before did not have meters. Forty-three meters in service were repaired. Four meters, where the bill for water seemed abnormal, were taken off and tested. The meters now in stock are:-

26 new unused 5/8" Empire Meters.

12 used 5/8" Trident Meters fit for service.

7 used 5/8" Empire Meters fit for service.

1 used 1" Trident Meter fit for service.

All water meters were read four times a year. Some twenty meters, where there is a large and varied consumption, are read once a month.

WATER - PUMPING STATION, WITH A COST OF $18,040.65, IS MADE UP OF $6,905.40 FOR WAGES, AND $11,135.25 FOR MATERIAL.

Of the Wage Cost of $6,905.40, some $6,615.00 is for wages of Engineers employed at the Pumping Station, and $290.40 is for wages of other men on the City payroll, while working on jobs at the Pumping Station. The $11,135.25 is made up as follows:-

$ 160.62	..... Light.
201.34	..... Lime - 5,703 lbs.
679.02	..... Alum - 44,092 lbs.
3,677.93	..... Coal - 650 tons.
3,084.26	..... Fuel Oil - 26,516 gallons.
118.19	..... Gargoile Oil (steam cylinder oil) - 93 gallons.
147.69	..... Engine Oil (Renown) - 314 gallons.
349.28	..... Motor Oil (Polarine) - 536½ gallons.
65.17	.....Gasoline - 225 gallons.
1,064.56	.....Maintenance and Repairs.
312.14	.....Special Repair Work to Oil Engine.
345.12	.....Installation to motorize blower.
939.93	,,,.....Material for new hook-up with the Maritime Electric.
$11,135.25	

The total water pumped into the mains for the year was 198,165,000 gallons, against a consumption of 206,076,526 gallons last year. The cost to the City was 9.1¢ a 1,000 gallons, This cost is taken from the above figures, and does not include such costs as overhead, interest on bonds, sinking fund, etc.

I am here affixing the yearly repor of Dr. H. H. Hagerman, the City Analyst, and that of Mr. John M. Malloy, Chief Engineer at the Pumping Station.

Dr. Hagerman's report shows, I think, that the safety of the water consumers, as far as danger from drinking City water is concerned, has been carefully guarded.

I would like here to bring to the attention of the Council, the responsibilities which rest upon the employees at the Water Pumping Plant. They must insure to the public a continuous and adequate supply of pure water for twenty-four hours of each day, and for every day of the year. We have, besides the Chief Engineer, three sub-engineers at the Pumping Plant, each of whom have an eight hour shift.

Mr. Malloy, Chief Engineer, is in continuous charge, and has the continual responsibility of the Plant. He is to be found at the Plant during the day time for the seven days of every week, and at other times when there is an extra demand, such as a fire call. In fact, all the Engineers are required to report at the Plant in the event of a fire alarm being rung in. Again, all the Engineers are required to report at the Plant in case of any special work to be done, such as cleaning of repairing of any machinery in use.

Mr. Malloy is paid by the City $125.00 per month. Considering the service he gives, and the average salary for similar services, Mr. Malloy is not adequately paid by the City. I therefore feel that I should bring this matter to the Council's attention.

in my opinion

The following are Dr. H. H. Hagerman's and Mr. John M. Malloy's Reports:-

(Copy)

John D. MacKay, Esq.,
City Engineer, Fredericton, N. B.

Dear Sir:-

Herewith please find my report on the Fredericton Filtration Works for the year 1927.

1. Total bacteria by plate counts on Agar (room temperature)

Twenty-six series of tests were made during the year, each test including a sample of raw water taken at the intake pumps, a sample of filtered water (effluent) taken from the filter outlet and a sample of tap water taken at a city residence.

Year	Average Bacteria per c. c. for Year Raw Water	Effluent	Tap	Per cent Removal
1925	1632	7.5	24.8	99.6
1926	1916	6.4	24.8	99.6
1927	1767	7.3	14.5	99.6

These results indicate a high percentage of removal of bacteria and, in a general way, are similar to results obtained in preceding years.

2. Dosage of Chemicals

Alum, when used, 2.8 to 4.0 grains per imp. gallon.
Hypo (used constantly) 0.45 to 1.5 parts per million available chlorine.

3. Following previous practice the plant was operated for 101 days during the year using the Hypo treatment alone and thus saving a large quantity of alum. This method is used at such times as the water does not respond satisfactorily to the ordinary alum treatment.

4. Supervision and Chemical Tests

Daily tests of chemical solutions continue to be made and charts of the rate of flow are kept. These, in connection with practically daily inspections of the plant, tend to produce that uniformity in operation which is essential for success.

5. General Observations

The year 1927 was a difficult one from the standpoint of filtration. Abnormally high water at various times brought high color and increased bacterial content in the river water which made satisfactory treatment difficult. Although it was possible to keep the water safe at all times it was not always possible to produce a water which might be regarded as satisfactory from the physical standpoint. This has always been our experience and I imagine will continue to be our experience while working under present conditions. On the whole I think that the operation of the filtration plant for the year 1927 should be regarded as satisfactory.

Fredericton, N. B.,
February 3rd, 1928.

(Sgd) H. H. Hagerman.

J. D. MacKay, Esq.,

City Engineer,

Fredericton, N. B.

Dear Sir:-

I herewith submit my Report on the operation of the City of Fredericton Water Pumping Plant from December 1st, 1926 to November 30th, 1927.

From December 1st, 1926 to January 4th, 1927, power was supplied by our Oil Engine Plant. From January 4th, 1926 to April 14th, 1927, power was supplied by our Steam Plant. From April 14th, 1927 to November 30th, 1927, power was supplied by our Oil Engine Plant.

The total amount of water pumped for the year was 198,165,000 gallons, giving an average daily consumption of 542,918 gallons.

From December 1st, 1926 to January 4th, 1927, inclusive, the Oil Engine was supplying power to the Plant. During this period, 3,530 gallons of fuel oil, 52.5 gallons of lubricating oil, and 36 tons of coal were consumed. The coal was used in order to operate the air blower, and heat the Plant.

From January 4th, 1927 to April 14th, 1927, the Stram Plant supplied power. Some 353 tons of coal were consumed. From April 14th, 1927 to November 30th, 1927, the Oil Engine supplied power to the Plant.

The consumption of Fuel Oil, Lubricating Oil, and Coal was as follows:-

Month	Fuel Oil	Lubricating Oil	Coal
April	1,393 gallons	24.50 gallons	15.2 tons
May	3,003 "	50.00 "	21.7 "
June	3,017 "	49.75 "	15.0 "
July	3,087 "	52.50 "	13.0 "
August	2,961 "	48.50 "	12.0 "
September	2,942 "	48.50 "	12.3 "
October	3,080 "	53.50 "	13.5 "
November	2,997 "	48.00 "	18.0 "
	22,480	375.25	120.7

When the Oil Engine is in operation we have an average daily consumption of fuel oil of 98.1 gallons, and an average daily consumption of lubricating oil of 1.61 gallons. The fuel oil and lubricating oil cost per K. W. H., generated by the Oil Engine, is 1½¢.

This year there was installed a 10 H. P. motor, belt connected to the old steam driven air pump. This makes the operation of the Plant independent of Steam, while power is being taken from the Oil Engine or from the Maritime Electric, except of course, the steam necessary for heat.

During the year, wells in the intake pier, and the pump well, were once cleaned out, and the coagulating basin was three times cleaned out, of all silt and mud accumulation.

On account of the formation of carbon and dirt lodging in the pit from the exhaust of the Oil Engine, the installation of a 4" drain with gate valve from the pit to the outside sewer was necessary.

The chemical sheds and stock sheds, were repaired and are in good condition. The grounds surrounding the Plant were graded, and the lawns marked off and seeded. Railings of pipe were put up along the walks enclosing the grounds. This work, I think, makes a great improvement in the appearance of the grounds. I would recommend a continuation of improvements along this line for the coming season.

The steam line on the top of the boilers leading to the Allis-Chalmers Engine is in need of repair. #1 boiler is in first class condition, except for the pipe line and furnace setting. I would recommend a new steam line from the boiler to the Allis-Chalmers Engine; also a change made in the boiler setting, as we will need this boiler in first class condition for an auxiliary to the electric plant, while any electric equipment is under repair.

Respectfully submitted,

(Signed) John J. Malloy

Chief Engineer.

A BATHING BEACH was maintained at the Western end of the City from June 13th, 1927 to September 9th, 1927. This beach was in charge of Charles Williams, who acted as Caretaker and Lifeguard. The cost to the City was $286.70, made up of $271.80 in wages, and $14.90 for incidental charges, such as lumber for walks, bandages, etc.

A TOURISTS' CAMPING GROUND was maintained at the Western end of the City, on land owned by the Federal Government, who permit the City to make use of it for this purpose. This is the same location as used last year. The Camping Ground is supplied by the City with water, sewerage and light, also a cooking shanty and fuel. The Caretaker receives from the City a grant of $25.00 for the season.

The register at the Camping Grounds shows as having registered:-

15 parties for the month of May.
64 " " " " " June.
253 " " " " " July.
185 " " " " " August.
114 " " " " " September.
15 " " " " " October.

A total of 646 parties, with over 2,000 persons, registered, against 483 parties last year. Parties were registered from every province of the Dominion, and from 19 states, as well as parties from England and the West Indies.

This Camping Ground was, I think, kept in excellent condition, and judging from the complimentary remarks on the register, was very much appreciated by the campers.

The cost to the City for this Camping Ground amounted to $97.48.

WORK DONE UNDER SEWERAGE (DOMESTIC) AT A COST TO THE CITY OF $518.50.

Nine new house services were installed this year. However, as the customer pays for the entire sewerage installation, the cost of this work does not appear in the above $518.50.

The sewerage system of the City was thoroughly flushed out twice during the year, once in the spring, and once in the fall. Over 100 house connections, which had become stopped, were cleaned out during the year. I believe that most of these stoppages were caused by the growth of roots in the sewer pipes.

The Pump House at the sewerage outlet was rented to the Maritime Electric, who removed all the pumping outfit, and stored same in the City Storehouse at Carleton Street. While at this work, the Maritime Electric workmen accidently closed a gate which controlled the main sewer pipe of the City. This caused the sewerage to back up in the sewers, and flow into the pump house, through the holes which had been left open, when the old pumping machinery was removed. After opening the gate, and letting the sewerage out, this Pump House had to be cleaned out, and the holes plugged by the City,

All of which is respectfully submitted.

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City Engineer.

Fredericton, N. B.,

January 31st, 1928.