OUR WATERS RUN DEEP

CHARLOTTETOWN WATER & SEWER UTILITY

2010 ANNUAL WATER REPORT

Message from the Chair – Councillor Edward Rice

Citizens of Charlottetown;

As Chair of the Water & Sewer Committee, I am pleased to present this years' Annual Water Report. The release of this report marks Drinking Water Week 2011, a time when we can stop and think about the vital role water plays in our daily lives.

This Report will provide information on our diligent water testing that, as always, continues to ensure that we provide healthy drinking water. It will profile the cutting-edge technology used in our waste water treatment plant. This year, we will also provide information on how we as a Utility and as part of the City of Charlottetown are striving to be more sustainable – through adherence to the Charlottetown's Integrated Community Sustainability Plan (ICSP) and through action in our water conservation program. Let's celebrate water through Drinking Water Week (May 1-7) and our 2010 Annual Water Report.

2010 WATER REPORT

Connect with us through the City of Charlottetown website:

www.city.charlottetown.pe.ca

Water & Sewer Committee

Edward Rice - Chair
Cecil Villard - Vice-Chair
Mitchell Tweel

Craig Walker - Manager

When the well
is dry, we know
the worth of
water.
BENJAMIN FRANKLIN

WATER CONSERVATION: MOVING TOWARD A MORE SUSTAINABLE CITY

Water is absolutely critical to successful, growing communities. Enjoying a high quality of life in our city is intricately linked to a healthy water supply. Water is integral part of our everyday lives and it's no surprise that improving water resource management is one goal that was developed for the City's Sustainability Plan.

Individuals in our community see the importance of protecting and restoring watersheds, reducing public and private water consumption and creating partnerships to protect the City's water supply. In addition, it's important for our community to have access to our waterfront.

Water resources are a concern in our Province and Capital because we are dependent on groundwater. A key point to understand is that groundwater moves much more slowly than surface water. When water is not replaced or recharged at the same rate at which it is pumped out of the ground, shortages can occur.

It's perceived that Charlottetown has abundant supplies of water but we are actually dependent on the surrounding watersheds for our water. These precious sources need be protected and used in a sustainable manner.

If customer demand increases every year, the City has to increase its pumping and delivery capacity, and once this primary source is overwhelmed, we'll have to find additional sources. Aside from affecting additional watersheds and rural communities, it is actually cheaper for both the utility and its customers to invest in water efficiency rather than increased supply. With proper management, planning and conservation now, Charlottetown can help ensure clean and abundant water supplies far into the future.

Additional benefits of water conservation include improved water quality; a reduced burden on surface water quality, as less wastewater is generated; reduced greenhouse gas emissions due to reduced energy spent on water pumping; and increased spring, stream, and river flows, as less of the groundwater that feeds them is withdrawn.

For information on sustainability, contact Laura MacPherson at 629-4094 or lmacpherson@city.charlottetown.pe.ca

TOILET REPLACEMENT REBATE PROGRAM

"Look at the size of that tank!"

If you have an older toilet in your home chances are you are flushing 13-18 litres down the drain each time you flush. New water-efficient toilets offer optimal performance and use only 4.8L/average per flush. When you replace an older toilet with a 4.8L/flush or dual-flush model you can save 96,000 litres of water per year*.

That's enough to fill a 22' x 44' swimming pool!

The Charlottetown Water & Sewer Utility is developing a toilet replacement rebate program to Utility customers. When you install a water-efficient toilet in your home and dispose of a 13L/flush or higher toilet we will provide you with a rebate of $60 for a 6L toilet, or $75 for a dual-flush or 4.8L toilet. Keep your eyes peeled for the release of program details coming soon.

For more information call Ramona Doyle, Water Conservation Program Coordinator, at 629-4011 or rdoyle@city.charlottetown.pe.ca or log on to our website www.city.charlottetown.pe.ca/waterutility.php

*Based on a family of four

WATER CONSERVATION TIPS

There are many easy ways that you can reduce the water you use inside and outside of your home. Small changes can really add up and if you're a metered customer you'll save money too. Try making 1-2 of these changes a week and you'll be a water-saver in no time!

- Shorten your shower by 1-2 minutes
- Reduce the frequency of toilet flushing in your home
- Install an aerator on your bathroom or kitchen sink
- Don't let the water run when you brush your teeth or when you are shaving
- Wait until you have a full load before running the dishwasher or doing a load of laundry
- Gradually replace annuals with native perennials which require less watering
- Install a rain barrel to collect rain water for watering your plants and garden
- Use a bucket and sponge to wash your car rather than a hose

For more ways to save water and for information on becoming a metered customer visit our website: www.city.charlottetown.pe.ca/

WATER DISTRIBUTION REPORT

Total Coliform Bacteria and Ecoli (Distribution System)

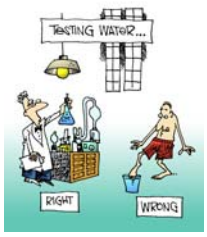
	# of Samples	Positive TC Tests	# of Non-Compliant Samples (TC>10)	Ecoli
January	44			
February	38			
March	37			
April	38			
May	47			
June	41			
July	33			
August	45			
September	41	1		
October	39	1		
November	41		1	
December	35			
Total	479	2	1**	0
Detection %		.417	.209	0

** Re-test reported negative

Total Background Growth (Distribution System)

	# of Samples	Positive BG Tests	# of Non-Compliant Samples (BG>200)
January	44	1	
February	38	2	
March	37	2	
April	38		
May	47	1	
June	41	3	
July	33	3	
August	45	2	
September	41	5	
October	39	3	
November	41	2	
December	35		
Total	479	24	0
Detection %		5.01	0

The water within the distribution system and at our wells is analyzed for bacteria (coliform, Ecoli, and background growth) on a regular basis. A chemistry analysis is done on all our wells a minimum of twice a year. These samples are taken to the accredited lab in Charlottetown where they are analyzed by staff.



CHEMICAL ANALYSES REPORT (WELLS)

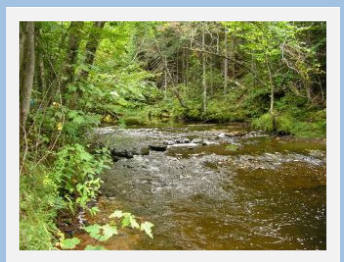
Chemical	Brackley (avg) Concentration, (mg/l)	Suffolk (avg) Concentration, (mg/l)	Union (avg) Concentration, (mg/l)	MAC* (mg/L)	AO* (mg/ L)
Alkalinity Total	141.4	112.3	140.1	--	--
Barium	0.4	0.50	0.52	1.0	--
Cadmium	< 0.005	< 0.005	< 0.005	0.005	--
Calcium	32.2	26.1	34.3	--	--
Chloride	12.8	10.77	15.42	--	≤250
Chromium	< 0.050	< 0.050	< 0.050	0.05	--
Copper	<0.02	<0.02	<0.02	--	≤1.0
Iron	< 0.100	< 0.100	< 0.100	--	≤0.3
Lead	<0.002	< 0.002	< 0.002	0.01	--
Magnesium	18.4	14.3	18.8	--	--
Manganese	< 0.020	< 0.020	< 0.020	--	≤0.05
Nickel	<0.05	<0.05	<0.05	--	--
Nitrate-N	4.4	1.7	4.4	10.0	--
pH	7.9	8.0	7.9	--	6.5 to 8.5
Phosphorus	0.04	0.048	0.046	--	--
Potassium	1.46	1.39	1.63	--	--
Sodium	6.42	7.13	7.74	--	≤200
Sulfate	7.23	6.14	7.61	--	≤500
Zinc	<0.02	<0.02	<0.02	--	≤200
Total Hardness	156	123	163	--	≤200

*MAC - Maximum Acceptable Concentration AO - Aesthetic Objective - as per *Guidelines for Canadian Drinking Water Quality*, Health Canada)

WINTER RIVER WATERSHED

The Winter River watershed, the sole source for water supplied to the City of Charlottetown, includes the communities of Brackley, York, Suffolk, and Pleasant Grove and is part of the larger Tracadie Bay watershed. Like many watersheds on P.E.I., it is used by people for a variety of purposes and some of this activity has led to the degradation of its natural ecosystems. For example, after heavy rainfall events, runoff from some roads and fields transports sediment into the Winter River where it settles and covers naturally occurring gravel beds that serve as spawning areas for trout.

Trout, and other fish species, are also adversely affected by high water temperatures in the summer. Temperatures as high as 27 ^{0}Celsius were recorded in 2010 and were a result of shallow water depth (as silt accumulates) and reduced flow (as there is less precipitation during the summer). Flow rates are also affected by the 19 million litres of water that are pumped from the watershed each day to meet the demand of the City of Charlottetown



With support from the City, the Winter River-Tracadie Bay Watershed Association has begun taking action to improve the quality of the natural ecosystems in the Winter River. Work completed in 2010 included the installation of two "in-river" silt traps and the planting of almost 800 trees adjacent to the river banks. The Association will also be collaborating with the City on its water conservation program. For more information visit www.wintertracadie.ca

BACTERIAL ANALYSES REPORT (WELLS)

UNTREATED WATER (SAMPLES FROM WELLS)										
	Malpeque	Brackley	Union	Suffolk	Total	TC	>10 TC	Ecoli	BG	>200 BG
January		4	5	4	13	5			7	
February		4	5	4	13	5			1	
March		4	5	4	13	8			10	
April	1	4	5	4	14	2			1	
May		8	10	8	26	2			5	
June										
July		4	5	4	13	3			6	
August	1	12	5	4	22	9	5		12	2
September		8	7	4	19	10	3	1	12	
October		4	5	4	13	2	6		9	
November	1	6	6	4	17	7	5		11	1
December		4	5	4	13	4			7	
TOTAL	3	62	63	48	176	57	19	1*	81	3

* was not confirmed when resampled

HYDRANT FLUSHING

During the spring and fall of each year, the Water & Sewer Utility performs a hydrant flushing exercise for the approximately 1,000 hydrants within the City. One of the primary functions of this exercise is to ensure stable water pressure and flow- producing capabilities are available during the flush on each hydrant. Utility Operator does a visual inspection when the fire hydrant is fully open.

The following outlines the objectives of this exercise;

- to inspect the hydrant for any external damages
- to ensure the fire hydrants functions properly as designed
- to ensure adequate pressure and fire flow can be delivered as required
- to thoroughly flush out any debris/air out of the water system that may have accumulated within the distribution system
- visible inspection on the appearance of water
- improve water quality
- to ensure the barrel of the hydrant is dry to prevent the hydrant from freezing during the winter months
- to lubricate the fire hydrant as required to certain components on each fire hydrant
- flag the fire hydrant for snow removal during the fall exercise
- to inspect & exercise the gate valve the controls each fire hydrant
- to record all inspections and maintenance carried out during each visit

PESTICIDE MONITORING

Each year, the Department of Environment, Energy and Forestry collects samples from the City's three well fields and analyses the samples for a suite of pesticides. Each sample is checked for the presence of approximately thirty (30) active ingredients that are known to be in pesticides. Results indicate that none of these chemicals were detected in the well water in the 2010 program.

CHARLOTTETOWN WASTEWATER TREATMENT PLANT

The Treatment Plant is a Level 4 Wastewater Treatment Facility (the highest classification for a wastewater treatment plant in Canada). Level 4 means the combination of the complexity of the plant and the size (flow).

The present compliment is 10 total staff including management and administrative staff. A few of the credentials are, but not limited to: Millwright, Plumber, Electrician, Welder, Science Background, Oil Burner Mechanic and Environmental Tech. The staff's classifications vary from Level 1-4 of Wastewater Treatment and Wastewater Collection.

As well as the plant on Riverside Drive, the staff also operates Dorchester, Navy Quay, Sherwood/Parkdale, West Royalty and West Royalty Industrial Park Lift Stations, and the East Royalty Lagoon.

PASTERIZATION TANKS

We have a computer SCADA System (System Control and Data Acquisition) that receives alarms when something is wrong in the Plant; it also indicates levels, pressures, and flows throughout the system. **This is the brain of the plant**. Operators can control and adjust the plant using the computers located in the office. They can turn on and off pumps, adjusting levels, etc. The plant handles roughly 20,000 cubic meters of wastewater per day and upwards of 60,000 cubic meters when there's heavy rain or a snowmelt.

The wastewater first enters the headworks area, where the rags and grit are removed. From there it flows to primary clarifiers, where the settled solids will settle to the bottom. Solids from the bottom will now go to the Gravity Thickener and then the biosolids facility. The wastewater will overflow the weirs in the primary clarifiers into the activated sludge basins. This is where the remaining solids in suspension in the wastewater are removed.

Bacteria consume the solids/waste in presence of oxygen provided by four large air compressors. Once the wastewater has reached the end of the activated sludge basins the wastewater flows to the secondary clarifiers where the biomass settles to the bottom and pumps return it to the head of the activated sludge basins to start the process again and excess is wasted to the Primary Clarifiers for cothickening. The clean water overflows the secondary clarifier weirs and now travels to the UV lights for disinfection and release into the harbour. We remove 85-95% of the solids and waste from the water.

AERATION TANKS

In the past the Wastewater Treatment Plant used chlorine as a disinfectant for the outgoing wastewater, however during the recent upgrade a new ultraviolet light system was installed to replace the chlorine system. This system is safer for staff and more so environmentally friendly.

We "recycle and reuse" some of the treated effluent (water after disinfection) after it's gone through the process for certain aspects of our facility, i.e.- cleaning primary and secondary clarifiers, etc. We also have a biosolids facility that is used to stabilize the biosolids for land application.

Biosolids (settled solids) are collected off the bottom of a tank (Gravity Thickener), and fed through a pasteurization system (Kruger). This is where the sludge is heated to 70 °c to kill the pathogens (bacteria harmful to man), and from there goes to a two-stage anaerobic digester system (no oxygen) where bacteria break down the biosolids and produce methane gas. We collect the gas and reuse it by burning it in the boilers to heat the plant and run the pasteurization system.

TANKS CONTAINING CLEAN WATER (SECONDARY CLARIFIERS)

The settled sludge in the Secondary Digester is pumped back to the process building where polymer is added as it is fed into the centrifuges for dewatering. The liquid goes to the head of the plant and the solids are dumped into a disposal bin and later land applied.

During the upgrade a Septage Receiving area was added- one of two in this province. All septic tanks from the eastern half of the province come to our system and go through the biosolids pasteurization system before being land applied. RV's also come to this area to dump their waste.

Our biofilter system was recently incorporated in the system in 2010. The biofilter is a system to help remove some of the smells of the Treatment Plant. The air is piped through a pile of tree roots, and a bacteria film on the tree roots removes the bad smell as it goes through the pile.

UV LIGHTS

BIOFILTER SYSTEM (Tree Roots)

WASTEWATER TREATMENT REPORT

East Royalty Lagoon Effluent						
	CBOD (mg/L)	Suspended Solids (mg/L)	Faecal Coliform (MPN/100ml)	Ammonia-N	Nitrogen, Total	Phosphorus, Total
January	15	21	2400	16.6	21.3	3181
February						
March	14	16	920			
			2			
April						
May	10	7	540			
June	10	5	1600			
	10	7	1600			
July						
August						
September						
October						
November						
December	10	9	920			

WASTEWATER TREATMENT REPORT

Treatment Plant Effluent						
	CBOD (mg/L)	Suspended Solids (mg/L)	Faecal Coliform (MPN/100ml)	Ammonia-N	Nitrogen, Total	Phosphorus, Total
January	10	6	17			
	10	6	13	0.82	20.9	2248
February	10	11	920			
March			130			
			2			
			5			
	10		79	0.48	18.4	1343
			23			
April	10	4	2			
May	10	2	2			
June	10	3	23	0.1	21.1	
July						
August	10	7	220			
September			1600 (WRL)			
	10	8	920	3.972	6	5342.54
				27.1	0.241	3419.05
			23			
October	10	2	46			
November						
December	10	17	110			

WRL – West Royalty Lift Station

CENTRIFUGES

BIOSOLIDS BIN