2014 WATER REPORT

Calgary's water system delivers a lot for a little.

Water is our most valuable resource and The City of Calgary is dedicated to managing it responsibly. The City of Calgary works around the clock 365 days a year to provide clean drinking water for Calgarians, ensure safe wastewater treatment and sustain a healthy river – for everyone.

We protect public health and this precious resource by ensuring the necessary investments are made in treatment plants, pipes and people to keep pace with the needs of a growing population.

High quality water, wastewater and drainage service is important to all of us, and so is the cost. The City of Calgary understands that our customers expect value for their money, and we work hard to deliver high quality water, wastewater and drainage services.

This Water Report highlights our actions and commitment to protecting Calgary's water supply, public health and the environment in the safest and most cost-effective way possible. It also showcases how citizens and partners are helping to conserve and protect our precious water resources.

2015-0382

OUR WATERSHED

Calgary is located within the Bow River watershed.

Our municipal water experts monitor within and upstream of Calgary to determine water quality and quantity, assess riparian area health, and are involved in land use and development issues that can impact our water.

Our goal is to conserve and protect source waters, limit pollution and ensure the overall health of our watersheds – for now and for the future.

Riparian areas

The ribbons of green that border our rivers and creeks are called riparian areas. These transition zones between water and land can range in width from a few metres to hundreds of metres. Riparian areas are essential to river health. They improve water quality, provide habitat for fish and wildlife, and contribute invaluable social and economic benefits to the city.

Riparian areas and flood mitigation

Healthy riparian areas help lessen the severity of flood damage by absorbing water, reducing erosion to the banks and surrounding areas, slowing down water flow and allowing rivers and streams to change course naturally.

After the 2013 flood, The City studied Calgary's urban riparian areas and determined zones heavily impacted by human use were not as resilient to flooding as their natural, healthy riparian counterparts. The City is working with citizens and community partners to restore damaged or unhealthy riparian zones to a natural, healthy state wherever possible.

Working together

The City of Calgary places a strong value on riparian areas.

We're working with stakeholders and citizens to achieve a shared vision for these areas. The City's Riparian Strategy identifies what needs to be done to keep our riparian areas healthy.

A new online resource, **Riparian areas in Calgary**, is available for citizens and stakeholders wanting to learn more about what makes these areas so valuable. It supports a collaborative approach to the protection, management and use of riparian areas within Calgary.

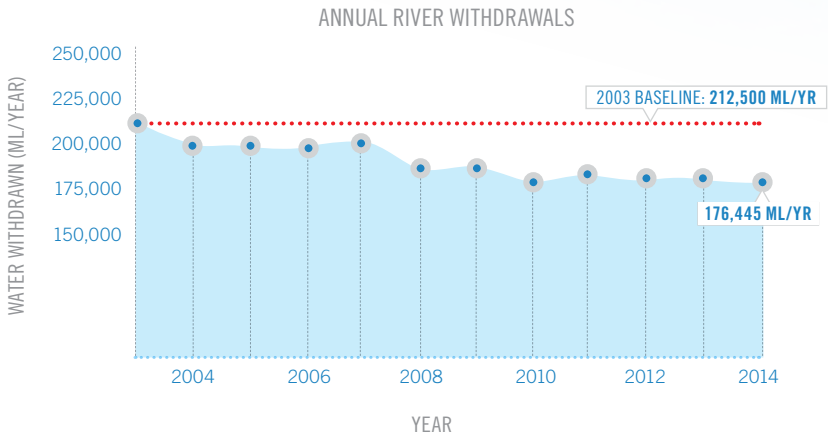
VISIT CALGARY.CA

CONSERVING OUR WATER

River withdrawals

As our population grows, so does the value of our water. Our water efficiency measures are rooted in our 30-in-30 goal – to accommodate Calgary's growing population with the same amount of water withdrawn from the river in 2003.

Together we are making a difference. While you continue to do your part to use water wisely, The City is taking measures within our own operations to help achieve this goal. With the help of citizens, businesses and partners, we continue to meet it. In 2014, Calgarians withdrew a total of 176,445 million litres (ML) of water, a decrease of over 2,000 ML from 2013.



Having fun and saving water

Efficiency is all about doing the same things with less. The City of Calgary Parks is doing just that as they lead by example, bringing water efficiency to City spray parks.

Canmore, Rotary and Prairie Winds spray parks have all been upgraded to incorporate small-scale treatment systems that reuse water and meet stringent health and safety guidelines while providing the same amount of fun. Combined savings at the three parks are approximately 7,000 ML every year – and that is something we can all get excited about.

Working together

As a public corporation, we're working hard to meet our water efficiency goals, but so are you! The City of Calgary introduced its Toilet Rebate programs in 2003. In the 11 years since, Calgarians have replaced 70,816 toilets,saving an average of 22,000 litres of water per person every year. Way to go!

DID YOU KNOW?

In 2014, The City of Calgary saved over 16 million litres of water through our water main leak detection program and proactive water main replacements. These actions save water and reduce the time citizens might be without water in the event of a water main break.

ENSURING THE QUALITY OF OUR WATER
WATER TREATMENT

Knowing water

The story of our water – where it comes from, our efforts to ensure it meets regulations, both when entering our homes and offices and when it is returned to the river – teaches the value of our water.

The City of Calgary water educators are busy all year long, telling Calgary's water story from river to tap and back again, providing tours at the water and wastewater treatment plants, and participating in events such as Beakerhead, Mayor's Environment Expo and Canada Day celebrations. In 2014, our water educators engaged directly with more than 18,000 citizens.

Visit **calgary.ca** to learn more about what The City of Calgary is doing to protect, treat and distribute this precious resource.

IN 2014 OUR
WATER EDUCATORS
ENGAGED MORE THAN
18,000 CITIZENS

Making a good thing better

The City of Calgary is fortunate to have some of the finest water sources at our doorstep. That said, raw water from the Bow River, which supplies the Bearspaw Water Treatment Plant, and the Elbow River, which supplies the Glenmore Water Treatment Plant, contains sediment, bacteria and other contaminants that need to be removed prior to consumption.

Our water treatment plants run 24/7/365 days a year. They perform complex processes including mixing, settling, disinfection, filtration, testing and distribution of our water. Completed upgrades at both plants have shown their value many times over. Our plants operate more efficiently. By removing sediment and reusing water within the process, we are saving water and helping to protect the river.

These efficiencies have allowed each of Calgary's water treatment plants to reduce water withdrawn from the river by up to 100 ML a day, while we continue to meet or do better than our water quality guidelines.

From river to tap, our technicians and operators test and deliver quality every step of the way. The Bearspaw and Glenmore water treatment plants have the capacity to provide Calgarians with up to 950 million litres of high-quality drinking water every day.

Water fountains designed by Sans façon

FAST FACT

Portable, potable, high-quality drinking water came free of charge to select public events and festivals. It was dispensed from water buggies and fire hydrant water fountains designed by WATERSHED+ public artist team Sans façon.

ENSURING THE QUALITY OF OUR WATER
WATER TREATMENT

IN 2014 THE **WATER QUALITY TEAM** TOOK MORE THAN **68,000 SAMPLES** FROM RIVER **TO TAP** AND BACK **AGAIN**

Ensuring the quality of our water

The City's water quality experts test drinking water, wastewater and stormwater daily to ensure our high standards are met.

In 2014, the water quality team took more than 68,000 samples from river to tap and back again. They monitor over 500 different parameters including pH, turbidity, *E.coli* and total suspended solids and metals. Each water quality laboratory has an ISO 17025 designation from the Canadian Association for Laboratory Accreditation. This means The City is held to the highest standards for analytical testing – and that we measure up.

In order to protect public health and the environment, our water quality experts must remain at the forefront of the ever-changing regulatory environment. Operating approvals are issued for water and wastewater treatment, outlining The City's responsibilities for the treatment, performance, monitoring and reporting at each plant. The City's experts work closely with regulators to ensure all requirements are met.

The City understands the value citizens' place on water quality, and our team of dedicated professionals ensures we continue to meet all federal and provincial standards and guidelines for drinking water and wastewater. For more details about water quality testing, visit **calgary.ca.**

96

PER CENT OF CALGARIANS SURVEYED ARE SATISFIED **WITH THE QUALITY OF OUR DRINKING WATER.**

Source: 2014 Citizen Satisfaction Survey

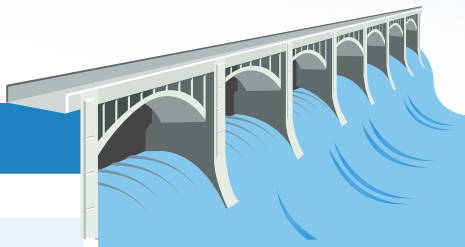
ENSURING THE QUALITY OF OUR WATER
WATER TREATMENT

KEY DRINKING WATER PARAMETERS 2014

TREATED WATER AT PLANT

ON TARGET

Water quality parameter	Units	Drinking water MIN - MAX	Limit [a]	Major source
BASIC WATER CHEMISTRY				
Colour	TCU [b]	<2	≤15 [e]	Erosion of natural deposits in watershed.
Hardness as $CaCO_3$	mg/L	141 – 240	No limit	Erosion of natural deposits in watershed.
pH	pH	7.1 – 8.1	6.5 – 8.5	Influenced by the dissolved minerals in the water.
Temperature	°C	1.2 – 21.5	≤15[e]	Surface water temperature.
Total dissolved solids	mg/L	161.6 - 296.8	≤500 [e]	Erosion of natural deposits in watershed.
Turbidity	NTU [c]	<0.05 – 0.09	<0.15	Suspended particles in solution.
INORGANIC SUBSTANCES				
Aluminum[h]	mg/L	0.0681 – 0.109	0.1 [f]	Plant treatment.
Arsenic	mg/L	<0.0005	0.010	Erosion of natural deposits in watershed.
Barium	mg/L	0.0329 – 0.0757	1.0	Erosion of natural deposits in watershed.
Cadmium	mg/L	<0.0005	0.005	Erosion of natural deposits in watershed.
Calcium	mg/L	32 – 65	No limit	Erosion of natural deposits in watershed.
Free chlorine residual	mg/L	0.80 – 1.53	≥0.2	Plant treatment.
Chromium	mg/L	<0.0005 – 0.0007	0.05	Erosion of natural deposits in watershed.
Copper	mg/L	<0.0005 – 0.004	≤1.0 [e]	Erosion of natural deposits in watershed.
Fluoride	mg/L	0.08 – 0.26	1.5	Naturally occurring. [j]
Iron	mg/L	<0.050	≤0.3 [e]	Erosion of natural deposits in watershed.
Lead	mg/L	<0.0005	0.010	Erosion of natural deposits in watershed.
Magnesium	mg/L	10 – 22	No limit	Erosion of natural deposits in watershed.
Manganese	mg/L	<0.0005 – 0.0035	≤0.05 [e]	Erosion of natural deposits in watershed.
Mercury	mg/L	< 0.00005	0.001	Erosion of natural deposits in watershed.
Nickel	mg/L	<0.0005 – 0.0014	No limit	Erosion of natural deposits in watershed.
Nitrate as Nitrogen	mg/L	0.040 – 0.224	10	Erosion of natural deposits in watershed.
Nitrite as Nitrogen	mg/L	<0.003	1	Erosion of natural deposits in watershed.
Potassium	mg/L	0.48 – 3.11	No limit	Erosion of natural deposits in watershed.
Sodium	mg/L	2.2 – 15.8	≤200 [e]	Erosion of natural deposits in watershed.
Sulfate	mg/L	32 - 89	≤500 [e]	Erosion of natural deposits in watershed.
Zinc	mg/L	<0.003 – 0.008	≤5.0 [e]	Erosion of natural deposits in watershed.



GLENMORE RESERVOIR CAN BE UP TO 17m DEEP WHEN FULL – HOLDING ABOUT 18 MILLION CUBIC METERS OF WATER

ENSURING THE QUALITY OF OUR WATER
WATER TREATMENT

KEY DRINKING WATER PARAMETERS 2014

TREATED WATER AT PLANT

ON TARGET

Water quality parameter	Units	Drinking water	Limit [a]	Major source
MICROBIOLOGICAL ORGANISMS		(<1 indicates none were detected)		
E. coli.	MPN/100 mL [d]	<1	0	Domestic animals, wildlife and human waste.
Total Coliform	MPN/100 mL [d]	<1	0	Soil, domestic animals and wildlife.

TREATED WATER IN DISTRIBUTION SYSTEM

ON TARGET

Water Quality Parameter	Units	Drinking Water	Limit [a]	Major Source
VOLATILE ORGANIC SUBSTANCES				
Total trihalomethanes [h]	mg/L	0.0142 – 0.0348	0.1	By-product of chlorination.
MICROBIOLOGICAL ORGANISMS [i]				
E. coli.	Present or absent/100 mL	Absent	0	Domestic animals, wildlife and human waste.
Total Coliforms	Present or absent/100 mL	Absent	0	Soil, domestic animals and wildlife.

a Limit stipulated by Guidelines for Canadian Drinking Water Quality (Health Canada, Oct. 2014) or Alberta Government operating approval for aesthetic, health and operational reasons.

b TCU = True Colour Units.

c NTU = Nephelometric Turbidity Units, a measure of water clarity.

d MPN = Most Probable Number.

e Aesthetic objective, which is not a health-related limit.

f Federal operational guidance value, which is not a health-related limit.

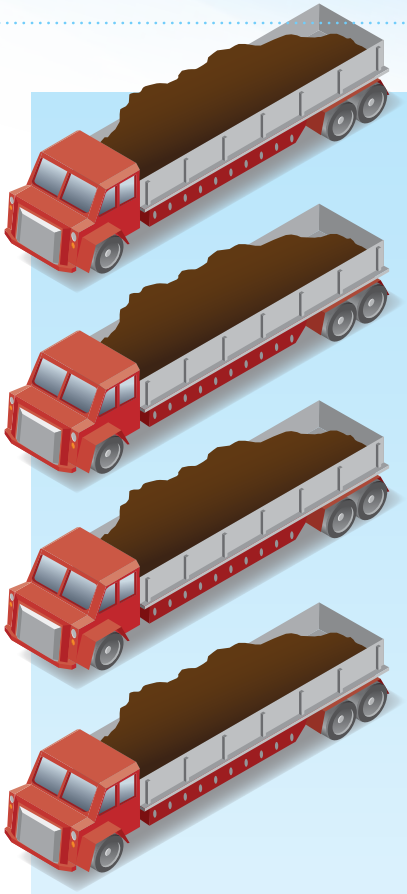
g Lower limits are stipulated for some operation conditions.

h Annual average values.

i Samples collected from the distribution system are analyzed at the Provincial Laboratory for Public Health as required by Alberta Government operating approval.

j The City of Calgary ceased fluoridation of its drinking water on May 19, 2011.

NOTE: mg/L = milligrams per litre, or parts per million (ppm).



FAST FACT

Dirt removed from the water treatment process is sent to landfill.

On average there are 3 - 4 truckloads per week, but during spring runoff there can be up to 8 truckloads per day!

WASTEWATER
PROTECTING OUR RIVERS AND OUR NEIGHBOURS

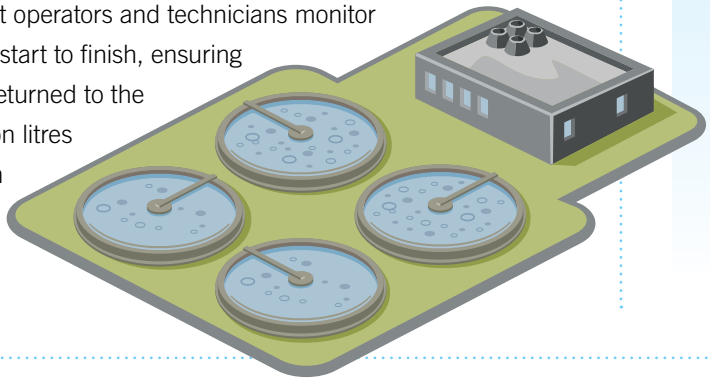
Top-rated

Every day wastewater is collected from Calgary homes, schools, businesses and industries, and travels to one of three wastewater treatment plants in Calgary.

The Bonnybrook, Pine Creek and Fish Creek wastewater treatment plants operate all day and night, every day of the year, treating the wastewater of almost 1.2 million Calgarians.

In 2014, the Open Doors YYC event provided an opportunity for The City of Calgary to showcase the complex process of wastewater treatment at Pine Creek Wastewater Treatment Plant. Calgary's wastewater treatment process starts with screening the wastewater to remove trash and grit for disposal at the landfill. This is followed by several more stages of cleaning that include separation through settling, nutrient removal and disinfection. The end result is clean, safe, treated effluent water that is returned to the Bow River. Solids produced as a part of the wastewater treatment process are broken down and the by-products are used to generate heat and power in The City's wastewater treatment plants.

City of Calgary wastewater treatment operators and technicians monitor and test this cleaning process from start to finish, ensuring only the highest quality of water is returned to the Bow River. Approximately 430 million litres of wastewater is treated every day in Calgary. It's all part of protecting public health, the environment and downstream communities.



FAST FACT

The more people there are, the more wastewater we produce. Since 2013, The City of Calgary has invested over $500 million at Bonnybrook Wastewater Treatment Plant to accommodate our continued growth and to ensure improved flood resiliency.

Reducing Fats, Oil and Grease (FOG) in our wastewater system

More than 7,000 kilometres of wastewater pipes run beneath our feet. The City spends millions of dollars each year keeping these pipes functioning and efficient, and responding to emergencies that arise from everyday items being disposed of incorrectly. Personal hygiene products such as dental floss, wipes and feminine hygiene items, hair and food waste such as fats, oils and grease should all go in the trash rather than down the drain.

The City spends $3 million a year responding to problems associated with the improper disposal of fats, oils and grease in wastewater which are particularly troublesome. Restaurants generate large amounts of FOG, and in 2014, The City worked closely with over 100 food establishments near areas of known concern. Our intent was to help these businesses understand the issue and better manage the FOG waste they generate. Educational tools (available in five languages) outline the sources of FOG and ways to manage it before it causes damages to businesses and wastewater pipes below.

STORMWATER
KEEPING POLLUTION OUT OF THE RIVER

Part of being a good neighbour involves maintaining the quality of our rivers and recognizing the value of those rivers for downstream users.

Stormwater, the water from rain or melting snow, runs along our streets picking up sediment and pollutants along the way. It flows from gutters into catch basins that feed the underground pipe system which carries it back into the river – mostly untreated. Without intervention, the pollutants and sediment in stormwater will dramatically affect the health of our rivers and the water quality for users downstream.

The City of Calgary protects our rivers with a variety of stormwater infrastructure, both large and small. Storm ponds have been an important addition to Calgary communities since 1997. During a heavy rainfall, storm ponds collect stormwater from the street and slow it down, letting sediment settle to the bottom, before the cleaner water flows back to the river.

In existing communities where storm ponds are not feasible, The City is focusing on Low Impact Development strategies to manage stormwater where it falls. The City's Community Rain Garden program is preserving and recreating natural landscape features to use stormwater as a resource rather than a waste product. In 2014, The City constructed two new rain gardens in the community of Bridgeland. These are great examples of how stormwater management can be functional and beautiful.

Cleaning our streets

Another way The City prevents additional sediment and pollutants from getting into our rivers is with the annual spring cleanup of our roads.

With over 16,000 kilometres of roadways and an exceptionally snowy winter in 2013/2014, the hard-working folks at Roads used twice the normal amount of sanding materials to keep the roadways safe. When the snow finally thaws, all those sanding materials can become a problem for our rivers.

Each year, spring cleanup sees an average of more than 31,000 m^3 of dirt, sanding material and other debris collected from our roads and safely disposed of in the landfill rather than in our rivers.

How smart is your yard?

The City has collaborated with the Calgary Horticultural Society on a successful YardSmart campaign to help all of us better manage the stormwater on our properties.

Through gardening workshops and advice about how to make our yards water-wise, program participants learn how to create a low-maintenance, beautiful space that slows down and soaks up rain water.

FAST FACT

Rain barrels help keep the rivers clean by reducing urban runoff. Don't let your rain water go down the drain.

Thousands of Calgarians are collecting and using free rainwater to water their gardens. The City of Calgary has Rainwater Harvesting Guidelines to show you how.

Visit calgary.ca for more information.

24/7/365 CUSTOMER SERVICE
WE'RE HERE FOR YOU.

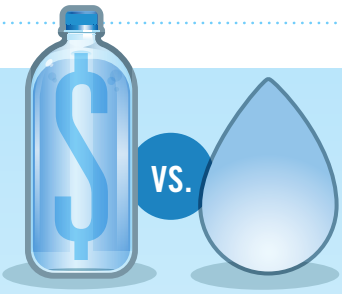
A little help for friends

City departments frequently work together and help each other out in times of need. Water Services and Roads worked side by side during the flood in 2013, an event that was definitely water-dominated.

Again in 2014, these two teams were able to work together when Water Services helped Roads clear the unending snow and ice making way for Calgarians to get around the city.

99 PER CENT OF CALGARIANS SAY THE QUALITY OF DRINKING WATER IS IMPORTANT

Source: 2014 Citizen Satisfaction Survey



BOTTED WATER IS 1000X MORE EXPENSIVE THAN TAP WATER

Calgary's water system is not funded by property tax dollars

Monthly water bills cover the costs of essential water, wastewater and drainage services.

Catching them all

After the long winter of 2013/14 finally came to an end, Water Services crews were very busy keeping over 48,000 catch basins all across the city free from ice and snow. This is necessary to allow snowmelt to drain into our stormwater infrastructure.

Between January and April of 2014, we responded to over 4,100 calls about catch basins. That compares to just 1,100 calls over the same period in 2013. Crews responded quickly to prevent property damage, clear roadways and keep Calgarians happy and safe.

FAST FACT

The City of Calgary delivers value every time you turn on your tap. An average single family residential demand is 220 litres per person per day.

At less than a penny per litre, this is quite a deal... especially if you compare it to using bottled water at up to $4 per litre!