

WATER QUALITY REPORT 2009



Salmon Creek



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1.0 INTRODUCTION

As required by the British Columbia Drinking Water Protection Act, the City of Salmon Arm provides the following annual water quality report. This information has been compiled by the City of Salmon Arm to help you better understand your drinking water.

This report outlines where your water comes from, how it is distributed, and how we ensure it is safe to drink. This information will provide those who want to further inform themselves about their drinking water to do so.

"Water links us to our neighbour in a way more profound and complex than any other."

John Thorson

Drinking water can be a complex issue and much of the information provided in the report is technical in nature. Every effort has been made to provide it in a format that is as understandable as possible. Please contact the City of Salmon Arm Engineering & Public Works Department at 803-4000, should you have any questions.

2.0 BACKGROUND

The City currently operates and maintains a public water distribution system under the regulations of the [Drinking Water Protection Act and Regulations](http://www.qp.gov.bc.ca/statreg/stat/D/01009_01.htm) passed May 16, 2003 (http://www.qp.gov.bc.ca/statreg/stat/D/01009_01.htm) by the Province of BC and the [Guidelines for Canadian Drinking Water Quality](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html), 2006 edition (http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html).

The Interior Health Authority (IHA) have advised the City that *"Under the legislation, the province has increased the basic expectations around assessing water systems, certifying operators and suppliers, and monitoring and reporting on water quality. The legislation gives provincial drinking water officers (i.e. Interior Health Authority) increased powers to protect water sources from contamination by a drinking-water health hazard. In addition, the drinking-water officers will oversee a source-to-tap assessment of every drinking-water system in the province to address all potential risks to human health."*

The City of Salmon Arm commissioned a new water treatment plant in 2009. The new water Plant was built to insure consistent safe drinking water for the growing population of Salmon Arm and to meet new potable water regulations.

3.0 WATER SYSTEM OVERVIEW

The municipal water supply is via three (3) sources, East Canoe Creek at Metford Dam, Shuswap Lake at Canoe Beach and a minor water supply from Rumble Creek for irrigation at the Mt. Ida Cemetery (Figure 1). Water treatment for the system consists of a new water treatment plant for the Shuswap lake intake and chlorine treatment system for the Metford Dam intake. The treatment plant has a design capacity of 40 MLD and this capacity was reached during a warm spell during the 2009 summer. From the Water Plant, water is pumped into 12 reservoirs in different locations throughout the city and also water is supplied to fill the Adams lake Band reservoir. There are 3 booster pump stations and 7 different pressure zones due to elevation changes in the city of Salmon Arm. The distribution system includes approximately 202.5 km of water main varying in diameter from 100 mm to 1000 mm. It also includes eight (8) different pressure zones, thirteen (13) reservoirs, one dam and six pump stations.

Did you know ...?

- *Canada holds 20% of the world's freshwater, but has only 9% of the world's renewable freshwater supply; the rest is "fossil water", a legacy of the melting of large ice sheets that once covered much of Canada.*
- *Canada has more lake area than any other country in the world; Canada'*
- *Every time Beethoven sat down to write music, he poured ice water over his head.*
- *Once you drink water, it leaves your stomach in about 5 minutes!*



Figure 1 – Water Treatment Plant in Salmon Arm

The public water system services an area of approximately 7,290 hectares (see Appendix 2) of which 969 hectares includes Band Lands. The City distributes water in pipes made of a variety of materials.

Pipe Material	Length In Service	Comments
Cast Iron	0.5 km	Majority installed prior to 1978
Ductile Iron	18.9 km	Ductile iron is still used in some applications in Salmon Arm
PVC	89.5 km	Most pipe installed since 1979 has been PVC
Asbestos Cement	92.1 km	Majority installed prior to 1978
High Density Polyethylene	0.8 km	Used for specialized applications

Figure 2 - Pipe materials in service in Salmon Arm

3.0 WATER SYSTEM OVERVIEW *(continued)*

"When the well is dry, we learn the worth of water."

Benjamin Franklin

Shuswap Lake is at a nominal elevation of about 347 m (1135 ft.) Geodetic Survey of Canada (GSC) datum while the Medford Dam intake on East Canoe Creek is at elevation 567 m (1860 ft.) GSC. The Utilities Division attempts to maximize the supply of water from East Canoe Creek so that pumping into the system from Shuswap Lake and the associated costs are minimized. The flow of water from East Canoe Creek into the water system is by gravity.

Periodic problems are experienced with East Canoe Creek, such as:

- turbidity levels that exceed the Interior Health Maximum Allowable Concentration. High turbidity levels are typically associated with higher creek flows during the spring snowmelt and extended high rainfall events in the watershed;
- peak summer water demands that exceed the low natural summer flows in the creek; and
- intermittent high coli form counts, which cause the shutdown of the Metford Dam intake and required the use of Shuswap Lake as the sole water source.

The distribution system is segregated into eight (8) pressure zones. The storage reservoir in the highest pressure zone (Zone 5) is at elevation 615 m (2020 ft.) GSC above sea level. Water has to be pumped over 269 m (885 ft.) in elevation from Shuswap Lake to the storage reservoir at the highest elevation.

Did you know ...?

- About 70% of the earth is covered in water.
- 3% of the water on earth is freshwater and only 1% is available for human consumption.
- Nearly 70% of the earth's fresh water exists in the form of glaciers and permanent snow cover.
- Only 0.3% of total global fresh water is stored in lakes and rivers.

2009 Water Production (CU.M.) by Source
Total 4,107,360 CU. M

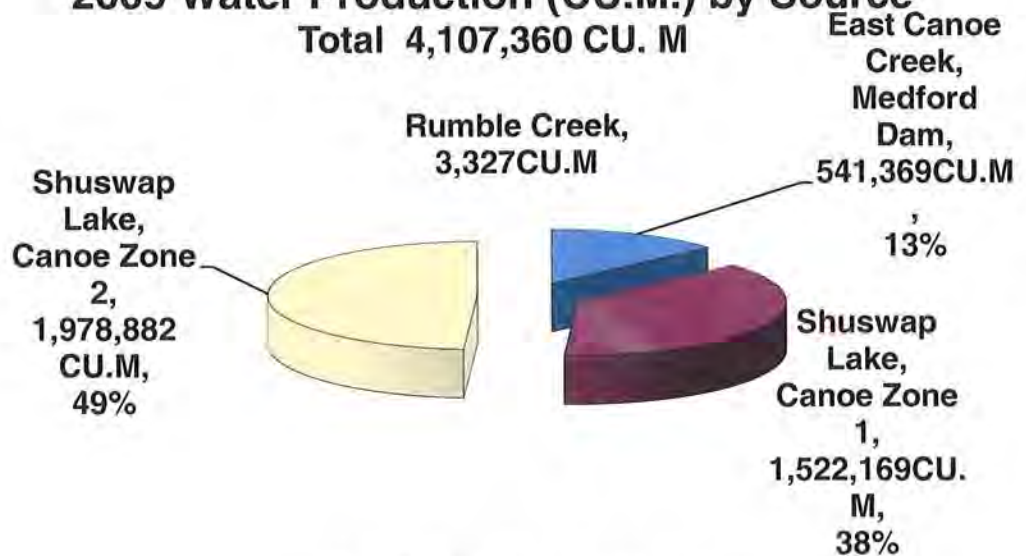


Figure 3 - Water Source Distribution

3.0 WATER SYSTEM OVERVIEW *(continued)*

Water treatment Plant

The New Water Plant was put on line May 12th at 10:00 am and the water quality has improved dramatically for the city residents. Average turbidity leaving the plant is now 0.06 NTU with added UV treatment along with traditional disinfection. Process involves coagulation, filtration, UV treatment and disinfection with added disinfection contact time in the new onsite reservoir. Official commissioning date was June 13 including an open house tour and commissioning speeches etc. Intake piping changes have taken place to draw water from the new water plant instead of directly from the lake. The current structure remains the same although plans are in place to add extra high lift pumps to improve pumping capacity and flow consistency.

Water Pumping Stations

The municipal water system includes 14 water storage facilities and six pumping stations. Normally, if there is a major pumping station or storage facility failure, water service to a large area of the community could be discontinued or adversely affected until repair work is completed. With our gravity feed supply source at Metford Dam, water can be cascaded down through all the zones, with the exception of Zone 5.

"If there is magic on this planet, it is contained in water."

Loran Easley
(Anthropologist),
The Immense
Journey, 1957

The pump stations house a combined total of 21 pumps with a service life of approximately 40 to 50 years for each pump.



Figure 4 - Zone 1 Pumping Station Canoe

3.0 WATER SYSTEM OVERVIEW *(continued)*

System Control – “SCADA” (Supervisory Control And Data Acquisition software)

Maintaining reservoir water levels, operating pumps, monitoring quality control equipment and maintaining a historical data file of the water systems operations is made easier by a comprehensive software program employed by the Utilities Department. Connected by wireless links, the SCADA software is able to monitor sensors at all the reservoirs and pump stations. Interpreting the data received, it then automatically turns pumps on and off to keep the system flowing smoothly. When trouble is detected within the system the software issues alarms and the Utilities Division staff is notified.

The following illustrates how many gallons of water it takes to make some everyday items.

Apple	16
Orange	22
Egg	85
Loaf of Bread	150
Pound of Steel	270
Sunday Paper	280
Pound of Aluminum	1000
Pound of cotton	1300
Pound of Beef	3000

Laura McDonald,
Freshwater Society

Pressure-Reducing Valve Stations

The maximum design water pressure for piping within the majority of the municipal water system is 1034 kPa (150 psi). We have two Pressure reducing valve stations containing one Pressure-reducing valve (PRV) each. Pressure reducing valves are used to control the pressure in the water system by creating head losses that prevent pressures from exceeding the design maximum. The failure of a PRV could disrupt flows and mainline pressures to large areas within the community.

The Utilities Division currently overhauls the PRV stations as required, in an effort to extend their service life. Most individual premises also have secondary PRV's as fluctuating pressures can place excessive stress on internal plumbing systems and fixtures.



Figure 5 – Zone 4 Pump/Pressure Reducing Station on 30th Street NE

"Throughout the history of literature, the guy who poisons the well has been the worst of all villains..."

Author unknown

3.1 Water System Value

The total value of our primary water distribution system, as detailed in Figure 6 below, is approximately \$80,160,000. We budgeted \$4,000,000 in 2008 or approximately 5.0%, on water infrastructure replacement. The replacement program is designed to address some of these previously discussed replacement components and other general deficiencies within the system on a priority basis. However; a thorough and comprehensive maintenance program also helps to extend the life expectancy of a majority of these water infrastructure elements.

System Components	Quantity in Use in Salmon Arm	Approximate Replacement Cost
Water mains	202 km	\$ 50,000,000
Treatment Plant	1	\$ 16,000,000
Reservoirs/Tanks	13 Reservoirs/ 1 Dam	\$ 8,700,000
Pumping Stations	6	\$ 6,000,000
System Control	1	\$ 460,000
Total		\$ 80,160,000

Figure 6 - Infrastructure replacement value

Did you know ...?

- In Canada, there is more water underground than on the surface.
- Canadians are among the biggest water users in the world.
- Annually, Canada's rivers discharge 7% of the world's renewable water supply.
- 40% of Canada's boundary with the United States is composed of water.

4.0 STAFFING

The City of Salmon Arm Engineering and Public Works Department is responsible for this municipal function. The Utilities Division is responsible for the operation and maintenance of the water supply and distribution system.

Staff Overview:

Engineering and Public Works
Dale Mc Taggart, P. Eng., Director of Engineering and Public Works
Robert Niewenhuizen, A.Sc.T., City Engineer
John Rosenberg, A.Sc.T., Manager of Public Works

4.0 STAFFING (continued)

Between 1972 and 1991, Canada's withdrawal of freshwater resources increased from 24 billion cubic meters/year to over 45 cubic meters/year – a rise of 80%; in the same period, the population increased only 3%.

watercan.com

Utilities Division	
<p>Gerry Rasmuson, B. Sc. <i>Utilities Forman</i></p> <ul style="list-style-type: none"> • Level IV - Water Distribution • Level IV - Wastewater Treatment • Level I - Wastewater Collection 	<p>Roger Parks <i>Utilities Sub-Forman</i></p> <ul style="list-style-type: none"> • Level I - Wastewater Collection • Level II - Water Distribution
<p>Denis Lavoie <i>Chief Operator/Manager</i></p> <ul style="list-style-type: none"> • Level IV – Water Treatment 	<p>John Kalineczuk</p> <ul style="list-style-type: none"> • Level I – Water Treatment • Level II – Wastewater Treatment
<p>Mike Davie</p> <ul style="list-style-type: none"> • Level II - Wastewater Collection • Level I - Wastewater Treatment • Level II – Water Distribution 	<p>Don Smith</p> <ul style="list-style-type: none"> • Level II - Wastewater Collection • Level II – Water Distribution
<p>Rick Webb</p> <ul style="list-style-type: none"> • Level II - Wastewater Collection • Level II – Water Distribution 	<p>Larry Kipp</p> <ul style="list-style-type: none"> • Level I - Wastewater Collection • Level II – Water Distribution
<p>Mike Stremel</p> <ul style="list-style-type: none"> • Level I – Water Distribution 	<p>Ray Muller</p> <ul style="list-style-type: none"> • Level I – Water Distribution

Figure 7 - Staff Overview

5.0 MONITORING PROGRAM

Drinking water quality is a function of source water quality, water treatment, and water quality changes after treatment. As a result the monitoring of drinking water quality consists of three components: source (raw) water monitoring, monitoring after treatment, and monitoring in the distribution system.

5.1 TESTING PARAMETERS

Testing of our water systems is undertaken at both the water treatment plant and throughout our distribution system.

At the water treatment plant, the water plant employees document over 94 daily plant checks, lab testing of 24 different parameters and samples are also sent out to an independent lab for additional bacteria, mineral, UV transmittance and THM. Also plant personnel document monthly, bi-monthly and yearly checks to insure plant is sustained in good functioning order.

Did you know ...?

- Up to 60% of the human body is water.
- The brain is composed of 70% water.
- Blood is 82% water.
- The lungs are nearly 90% water.

Throughout the distribution system, the City of Salmon Arm, as a purveyor of drinking water to a service population of approximately 15,000, is required to test at least 14 samples per month as outlined in the *Guidelines for Canadian Drinking Water Quality, Sixth Edition*. Our water distribution network is approximately 202.5 kilometres in length.

At the time of sampling, the Water Utility Operator also checks the water temperature and chlorine residual to ensure the water continuously has disinfection capability. As it is not economically feasible to test for all pathogens in drinking water, the microbiological guidelines are based on these indicator tests.

A Maximum Acceptable Concentration (MAC) level has been established by Health Canada for microbiological criteria. Each MAC has been designed to safeguard human health, assuming a lifelong consumption of drinking water containing the substances at the maximum concentration level.

Aesthetic Objectives (AO's) apply to characteristics of drinking water that can affect its acceptance by consumers. These would include items such as taste, odour, and appearance. However, there are constituents that could pose a health risk in some individuals (i.e. compromised immunity, etc.) if the allowable AO's are exceeded.

For more information regarding testing parameters and MAC levels, please visit Health Canada's website at www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/sum_guide-res_recom/summary-sommaire-eng.pdf

5.1 TESTING PARAMETERS *(continued)*

Turbidity

Turbidity measurements relate to the optical properties of water. Poor turbidity is caused by suspended matter such as clay, silt, finely divided organic and inorganic matter, soluble coloured organic compounds, plankton, and other microscopic organisms.

Excessive turbidity not only detracts from the appearance and taste of water, it can also serve as a source of nutrients for waterborne bacteria. As our supply source is surficial, and therefore subject to changes in quality due to weather changes, the water is sometimes discoloured and may taste different when it rains heavily after a long dry spell. Excessively high turbidity can also have a negative effect on disinfection techniques. The unit of measurement is the nephelometric turbidity unit (NTU). Turbidity, at the point of consumption, shall be less than or equal to 0.3 NTU in at least 95% of the measurements made, or at least 95% of the time each calendar month, and shall not exceed 1.0 NTU at any time. The Metford Dam intake is automatically shut off when the turbidity level reaches one (1) NTU. The system is monitored and flushed, when unacceptably high turbidity test results are recorded. Turbidity is continuously measured at both water supply sources.

"Anyone who can solve the problems of water will be worthy of two Nobel prizes - one for peace and one for science."

John F. Kennedy

Chemical Analysis

The Utilities Division takes samples on a bi-annual basis from both sources for a chemical analysis of common minerals and other chemical parameters (such as hardness). Results are checked against the *Guidelines for Canadian Drinking Water Quality* (see Appendix 1).

5.2 TESTING PROGRAM

Water at the nine sampling sites is tested and sampled every second week (see Appendix 3) by our Water Utility Operator, see Appendix 4. Samples are tested on-site for temperature and chlorine residual, and the results are recorded. Samples are taken in accordance with the *20th Edition of Standard Methods for the Examination of Water and Wastewater*, placed in a sterile bottle, sealed, identified by location with time of day noted, placed in a cooler, and delivered to a certified laboratory for testing (Caro Environmental Services in Kelowna). The water is tested for total coliform, and E. Coli counts. All results are returned to Interior Health. If there is a positive test result, the local Health Office contacts the Director of Engineering & Public Works. Depending on the location and type of positive test result, the City will institute one or more of the following:

5.1 TESTING PARAMETERS (continued)

Did you know...?

- You can refill an 8-oz glass of water approximately 15,000 times for the same cost as a six pack of soda.
- If all the world's water were fit into a gallon jug, the fresh water available for us to use would equal only about one tablespoon.
- There is the same amount of water on Earth as there was when the Earth was formed. The water from your faucet could contain molecules that dinosaurs drank.

- a) further testing to confirm the previous test results;
- b) main flushing to remove stagnant water;
- c) disinfection, if it appears to have contamination from an outside source; and
- d) Boil Water Advisory, if there is a health risk to users.

Supplementary to the Interior Health requirement for the bi-weekly testing of water within the distribution system, the City has instituted an additional testing program. Random sites are periodically tested for temperature and chlorine residual. These sites are located in key locations on the extremities of the system known to have low flow or stagnant water conditions. This ensures that no biological re-growth is occurring within the system. Where either of these parameters reaches the set limits, flushing to refresh the water supply is instituted.

The health of our water system and public trust in it are issues the City takes seriously. Our Utilities Division staff work closely with Interior Health so that a program is in place that ensures our citizens are provided with safe and healthy drinking water.

New Water mains

Disinfection of a new water main is completed in accordance with AWWA C651, Continuous Feed Method. If the samples are not clean, the whole process is repeated.

6.0 SYSTEM MAINTENANCE

Many Canadians lose more water from leaky taps than they need for cooking and drinking.

watercan.com

Regular inspections, maintenance and water quality testing is performed by certified operators to ensure optimal operation of the City's water system.

To assist the operators of our water system, the City purchased a new, state of the art, maintenance management program in 2009.

Maintenance of the Salmon Arm water system involves five key programs:

- 1) Air Valves – servicing and upgrading.
- 2) Water mains – flushing, scouring for taste and odour control.
- 3) Hydrants – servicing, painting and upgrading.
- 4) Reservoirs – inspection and cleaning.
- 5) Clearing of trees and brush along City rights of ways

As replacement of the entire distribution grid is not financially viable, system maintenance becomes a critical component in the management of the water infrastructure.

6.1 ANNUAL MAINTENANCE PROGRAM

*"We forget that
the water cycle
and the life cycle
are one"*

Jacques Cousteau

Air Valves

Turbulence created in the water as it flows through the system causes some of the dissolved air in the water to collect as bubbles in the pipes. These air bubbles collect at the high points in the system and restrict water flow. We have approximately 109 air valves installed in below-ground chambers that automatically bleed air from the pressurized piping system. If an air valve failed, negative pressures could allow groundwater to infiltrate and contaminate the water system. Air valves receive regular maintenance as required and are replaced at the end of their service life, which is approximately 20 years.

Water mains

Water main maintenance involves both the upgrading of aging water mains and ensuring that existing water mains are operating effectively.

Water main Flushing

As water travels from the watersheds, it collects organic particles and transports them to the water system. As these particles travel to areas of the water system with lower flow velocities they settle out. Accumulated debris and stagnant water inhibit flow through mains, cause dirty water and potentially create a favourable environment for bacterial growth. In response to these concerns, the Utilities Department initiated a water main flushing program for identified problem areas. Each main is flushed annually during daytime hours. When flushing, a hydrant is opened and the water stream is used to expel the contents of the main. There are approximately 47 locations throughout the municipality referred to as "high maintenance areas" where water demand is low or where water mains terminate in a dead end. These areas are flushed as required, sometimes as often as every month during the summer.



Figure 8 – Utilities Department operator flushing water main as part of regular maintenance

6.1 ANNUAL MAINTENANCE PROGRAM *(continued)*

Did you know ...?

- *The value of the in-ground assets of Canadian municipal water supply and wastewater systems totals over \$100 billion.*
- *About 82% of Canadians (1994 data) are served by wastewater treatment plants, compared with 75% Americans, 86.5% Germans, and 99% Swedes.*
- *Less than 3% of the water produced at a large municipal water treatment plant is used for drinking purposes; during the summer, about half of all treated water is sprayed onto lawns and gardens.*

Hydrant Maintenance

To ensure proper fire protection, Salmon Arm implemented a fire hydrant maintenance program. The program requires staff to check the pressure on each hydrant before it is serviced and dismantles each hydrant, renewing worn parts as necessary. The hydrant is then lubricated and reassembled. All hydrants get an overhaul biannually.

Reservoir Maintenance

Debris can accumulate in reservoirs and bacteria and algae can grow on the walls. Each year, the Utilities Department staff cleans and services two different reservoirs. The program involves decommissioning the reservoir, draining it, removing any sediment, repairing leaks, and disinfection. The reservoir is then refilled, chlorinated and tested for water quality. This program requires approximately two days to complete before the reservoir can be brought back into service.



Figure 9 - Metford Dam

7.0 WATERMAIN BREAKS

Most water utilities frequently experience minor disruptions. Pipes break, valves stick, hydrants leak and power outages occur. Although these are not anticipated, the problems experienced can usually be corrected with minimal disruption, and regular service can be quickly restored.

In 2009, our staff responded to and repaired 1 water main break. (Note: service connection or hydrant lead breaks are not included in this total).

Can I make a difference?

Yes, you can...

- Wait till you have a full load before running the dishwasher or doing laundry.
- When brushing your teeth, turn the water off while brushing rather than leaving it running.
- Place a jug of water or a plastic insert (available at hardware stores) into the water tank of your toilet. This can save 45,000L in a household of 4 per year.
- Keep your lawn healthy and maintain at a height of 6.5cm. Taller grass holds water better, and a healthy lawn will choke out weeds.
- Clean sidewalks and driveways with a broom, not a hose.
- Avoid the use of pesticides and hazardous materials in your garden and yard.

7.0 WATERMAIN BREAKS (continued)

In cases of water main breaks, the City adheres to the procedures set out in the American Water Works Association (AWWA) Standard C651-92 regarding water main chlorination prior to re-commissioning of the main.

8.0 NOTIFICATION PROTOCOL

Normally, breaks or disruption to water service are caused by conditions that can be repaired and reinstated quickly, directly by City forces without risk to the public health. Sometimes however, situations arise that require extra care to guarantee that the integrity of our water infrastructure has not been compromised. The Utilities Department endeavours to keep the Medical Health Officer apprised of any extraordinary situations that may adversely impact the City's water system.

9.0 Capital Works Projects

Water main Upgrading

In addition to repairing water mains that break, aging water mains must be replaced. An ongoing replacement/preventative measures program is in place, targeting areas with older piping materials in susceptible condition and areas identified with inadequate fire flow. Future development is also factored into the overall plan.

Water Supply and Distribution System Upgrading

Capital Projects completed in 2009
<ul style="list-style-type: none"> • Numerous water main replacements throughout the City. Replacements are typically added to the Capital plan because of age, material, break history, or fire flow requirements.
<ul style="list-style-type: none"> • Continuation of the Cities water meter program
<ul style="list-style-type: none"> • Commissioning of Canoe Beach Water Treatment Plant
<ul style="list-style-type: none"> • Purchased leak detection equipment to facilitate a proactive approach to water leakage.
<ul style="list-style-type: none"> • Installed an Automatic water main flushing unit to maintain water quality levels in the distribution system.

Figure 10 – Capital Projects

10.0 WATER CONSUMPTION

Our community has an above average per capita water use when compared to other Canadian municipalities. Some possible causes of this excessively high per capita consumption may include undetected system leaks, illegal connections, high residential summer irrigation demand, and inaccurate metering. In 2003 the Water Use Efficiency Committee brought forward a Water Conservation policy which Council adopted (see Appendix 6).

The City of Salmon Arm had a Water Audit conducted in 2007 by Hetek Solutions. The objective of the study was to identify sources of water loss from the municipal system. The results of the report will be key in planning future water works and upgrades.

It is evident that leakage within the system combined with actual consumption (as well as unauthorized use) creates somewhat skewed municipal water consumption data. Regardless of potential losses in the system, production data can be used to illustrate consumption trends and is therefore useful in identifying areas where conservation measures can be implemented.

Figure 12 compares the total monthly water consumption from 2006 to 2009 with local weather data for the same period. See Appendix 5 for further total consumption data.

"Man - despite his artistic pretensions, his sophistication, and his many accomplishments - owes his existence to a six inch layer of topsoil and the fact that it rains."

Unknown author

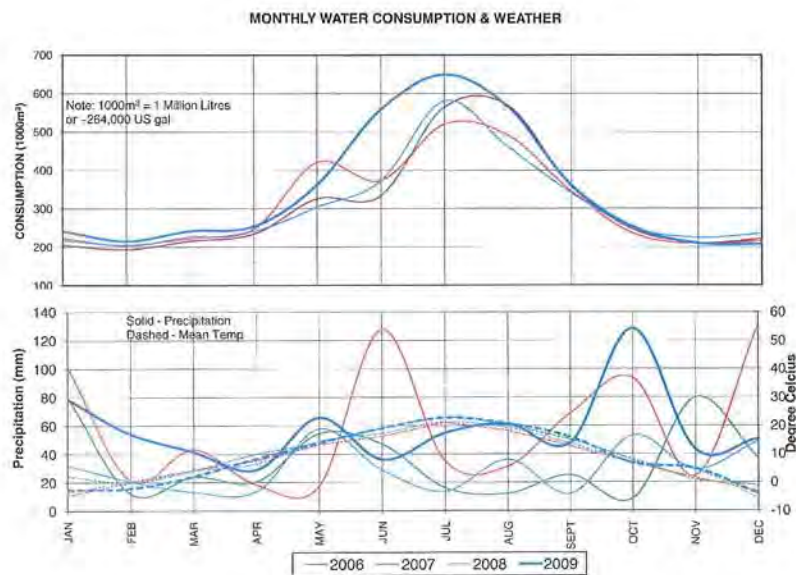


Figure 12 See Appendix 5

The following illustrates how many gallons of water it takes to do some everyday Things.

Brush Teeth	2
Flush Toilet	2 to 7
Shower	25 to 50
Run Dishwasher	9 to 12
Wash Dishes by Hand	20
Clothes Washer	50
10 Min Shower	25 to 50
Bath	25 to 50

11.0 TEST RESULTS

The Guidelines for Canadian Drinking Water Quality, Sixth Edition and the British Columbia Safe Drinking Water Regulation have established the following microbiological criteria:

- No sample should contain more than one total coliform organisms per 100 ml, none of which should be E. Coli;
- No two consecutive samples from the same site should show the presence of coliform organisms; and
- At least 90% of the samples must have zero total coliforms per 100 m.

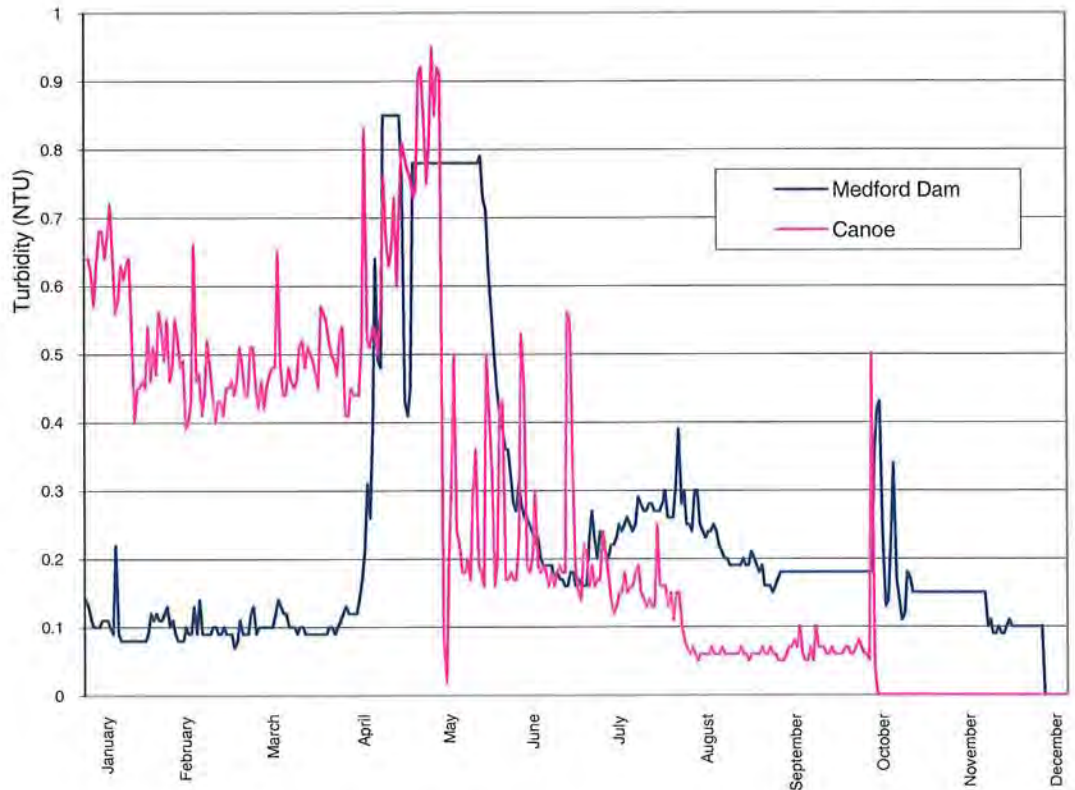


Figure 13 – Average Turbidity : 2008

Of the treated water samples analysed for microbiological criteria in 2009, one positive E. Coli sample was detected of which immediate re sampling resulted in clean water indicating the sample may have been contaminated during the sampling process.

12.0 2009 CHALLENGES TO DRINKING WATER QUALITY

There were no periods in 2009, where the source water on East Canoe Creek was showing high turbidity (above 1NTU). As a follow up to previously recorded fluctuating Aluminum Level test results from the City of Salmon Arm's testing and monitoring program the City initiated an increased random sampling program to proactively monitor the levels of aluminum in the raw water supply as provided by Shuswap Lake. Over the past year, testing was completed confirming that the aluminum levels satisfied the guidelines set forth in the Guidelines for Canadian Drinking Water Quality. No Public Water Quality Advisory Notices were required during 2009 operating season.

13.0 CONCLUSION

The City of Salmon Arm has made a lot of progress in the implementation of BC's Drinking Water Protection Act and Regulations. While there is always ongoing work to do, City staff continues to work hard to maximize the safety and reliability of the water we deliver to our customers.

The City of Salmon Arm is pleased to present the 2009 Annual Water Quality Report, detailing the health and direction of our water system. If you have any questions about this report or want more information about water consumption and production, please contact the Engineering & Public Works Department at 803-4000.



Salmon Arm

APPENDIX 1

CITY OF SALMON ARM
SOURCE WATER CHEMICAL ANALYSIS
TEST RESULTS



Salmon Arm

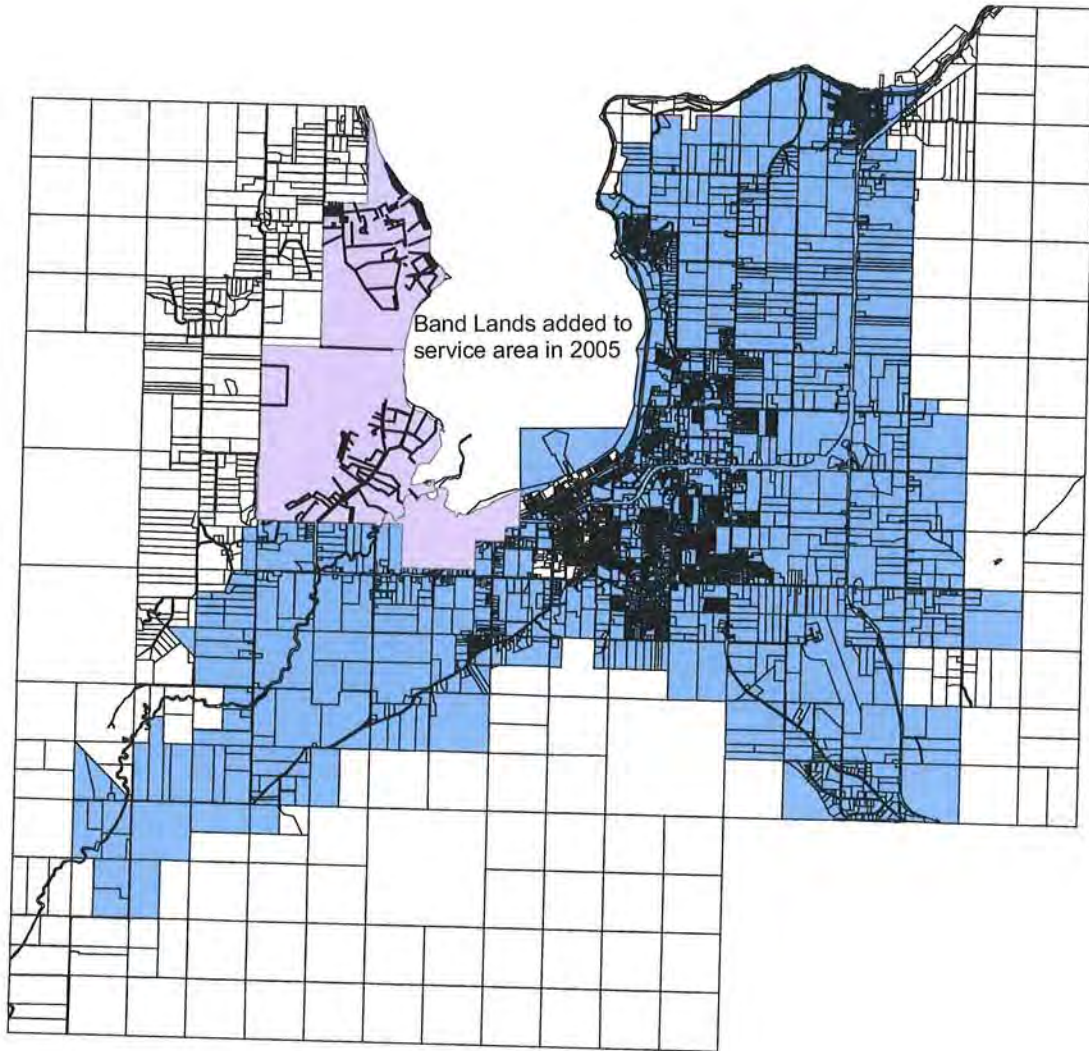
APPENDIX 2

CITY OF SALMON ARM
WATER SERVICE AREA

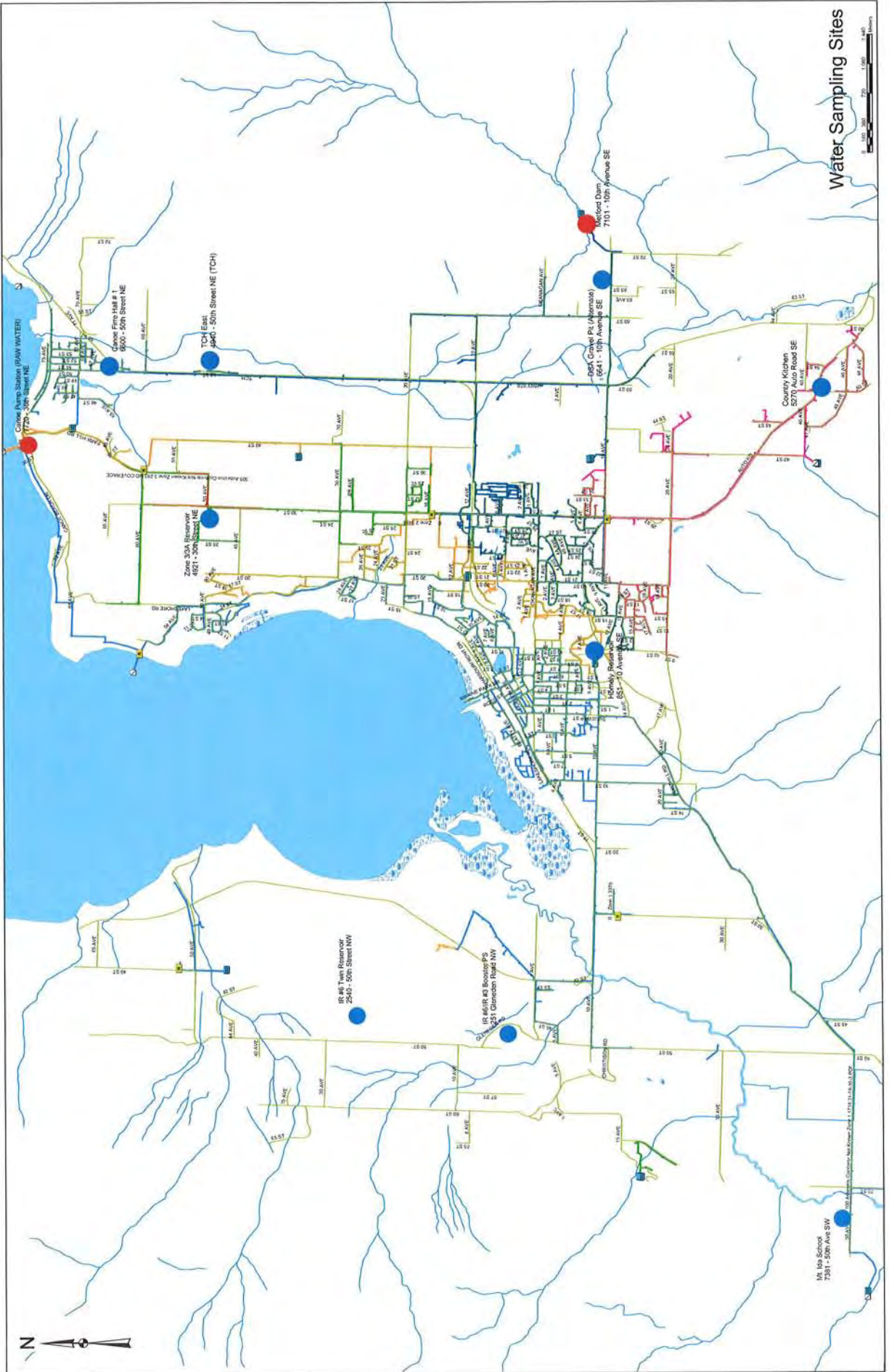
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CITY OF SALMON ARM WATER SERVICE AREA



Band Lands added to
service area in 2005



Water Sampling Sites



Salmon Arm

APPENDIX 3

INTERIOR HEALTH AUTHORITY
CITY OF SALMON ARM
WATER SAMPLE SCHEDULE

**DISTRICT OF SALMON ARM
OPERATIONS DEPARTMENT
WATER UTILITY
WATER SAMPLE SITES & LOCATIONS**

Water Sample Site Name		Street Location
1.	Canoe Fire Hall	6600 – 50 Street NE
2.	Mt Ida School	7381 – 50 Avenue SW
3.	Homely Reservoir	851 – 10 Avenue SE
4.	Zone 3 Reservoir	4921 – 30 Street NE
5.	Country Kitchen	5270 Auto Road SE
6.	TCH East	4940 - 50 Street NE [TCH]
7.	IR #3 Reservoir	251 Gleneden Road NW
8.	IR #6 Reservoir	2540 – 50 Street NW
9.	DSA Gravel Pit* [alternate]	6641 – 10 Avenue SE

WATER SAMPLE SCHEDULE

Week 1 & 3	Canoe Fire Hall Country Kitchen Mt Ida School IR #6 Reservoir
Week 2 & 4	Homely Reservoir IR #3 Reservoir Zone 3 Reservoir TCH East DSA Gravel Pit* [alternate]

*DSA Gravel Pit is an alternate site for water samples when Metford Dam is not in use.

OTHER BACTERIOLOGICAL SAMPLING/TESTING:

Raw Water Sample Sites	Street Location	Sample Schedule
1. Canoe Pump Stn [Raw]	7720 – 36 Street NE	Week 1 & 3
2. Metford Dam [Raw]	7101 – 10 Avenue SE	Week 2 & 4

Canoe Beach [Swimming]

- May and September [Twice a month from the three alternating sites as listed below]
- June, July & August [Once a week 2 samples from the three alternating sights between Canoe Beach Wharf, Canoe Beach in front of the Pump Stn and Canoe Beach East].



Salmon Arm

APPENDIX 4

INTERIOR HEALTH AUTHORITY
CITY OF SALMON ARM WATER SYSTEM
BIOLOGICAL MONITORING REPORTS

City of Salmon Arm - Reporting Database
 From: Jan 01 2009 To: Dec 31 2009

CARO Environmental Services
 E.Coli and Coliform Testing - Part 2

Wednesday, March 23, 2011

DATE	Country Kitchen		T.C.H. East		I.R. #3 Reservoir		Zone 2A Reservoir		D.S.A. Gravel Pit		Panorama Ranch S/D		Miscellaneous Site	
	Total	Over	Total	Over	Total	Over	Total	Over	Total	Over	Total	Over	Total	Over
Sep 10 T														
Sep 15 T							0	0						
Sep 22 T			0	0	0	0	0	0	0	0				
Oct 6 T							0	0						
Oct 13 T			0	0	0	0	0	0	0	0				
Oct 20 T							0	0						
Oct 27 T			0	0	0	0	0	0	0	0				
Nov 3 T							0	0						
Nov 5 T														
Nov 9 M			0	0	0	0			0	0				
Nov 17 T														
Nov 23 M			0	0	0	0			0	0				
Dec 8 T							0	0						
Dec 15 T			0	0	0	0			0	0				
Dec 21 M							0	0						
Dec 29 T			0	0	0	0			0	0				



Salmon Run

APPENDIX 5

DAILY WATER CONSUMPTION 2001 TO 2009

City of Salmon Arm
Daily Water Consumption
2001 to 2009

DISTRICT OF SALMON ARM									
DAILY WATER CONSUMPTION FOR 2001 TO 2009									
(Volume in Cubic Meters, 1 cu m = 220.1 gallons)									
January									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Jan	8,684	8,989	5,632	5,655	6,010	5,966	6428	6258	7352
02-Jan	7,353	6,571	6,484	7,633	6,463	7,329	8301	7498	7214
03-Jan	7,145	6,701	6,467	5,673	6,856	7,216	6382	6666	7507
04-Jan	8,089	6,908	6,965	6,754	5,972	6,738	7979	7616	7944
05-Jan	8,112	6,537	5,461	7,360	6,812	6,141	7203	7207	6793
06-Jan	8,569	7,069	7,509	8,194	6,428	7,105	6724	6680	7678
07-Jan	8,026	6,950	5,568	7,624	6,255	7,002	7678	7195	8174
08-Jan	7,280	6,294	7,013	7,378	6,735	5,862	6941	6772	7926
09-Jan	6,850	6,651	7,004	6,928	6,214	6,736	6786	7156	7741
10-Jan	7,093	6,686	5,922	8,030	6,392	7,016	7850	7290	7485
11-Jan	7,066	6,704	6,618	6,915	6,800	6,214	6882	6416	7780
12-Jan	7,024	5,854	5,996	7,267	6,200	7,077	7410	7153	7580
13-Jan	7,480	7,400	6,837	5,996	7,013	7,056	7350	7332	8182
14-Jan	7,196	6,187	6,865	6,866	7,114	6,416	7360	6372	7806
15-Jan	7,186	8,590	6,308	6,625	7,169	6,395	8384	6855	7611
16-Jan	7,218	7,970	6,025	7,474	6,677	6,830	7500	7507	8117
17-Jan	6,868	5,998	6,561	6,525	6,798	6,472	6086	6983	7660
18-Jan	7,074	6,723	6,116	6,519	6,269	5,960	7587	6202	7138
19-Jan	7,900	7,082	6,409	6,857	7,129	6,451	7000	7078	8074
20-Jan	6,437	7,082	6,431	6,907	6,655	6,033	7027	7106	8677
21-Jan	7,390	7,082	7,090	6,527	6,216	5,240	6772	7773	8025
22-Jan	7,183	7,082	6,348	6,728	6,539	7,724	7904	7067	7758
23-Jan	7,231	7,082	6,209	6,752	6,860	5,865	6593	6460	8053
24-Jan	7,349	8,315	6,157	6,609	6,801	6,457	7477	6918	7731
25-Jan	7,444	6,014	6,927	6,195	6,764	6,360	6647	7537	6974
26-Jan	7,127	6,631	6,620	7,083	6,061	6,760	7175	6555	8205
27-Jan	7,360	6,184	6,310	2,933	7,966	6,393	7256	6485	7691
28-Jan	7,145	7,613	6,010	6,475	6,200	6,374	6761	7184	8787
29-Jan	7,140	6,795	6,670	6,933	7,083	6,563	6610	6896	7360
30-Jan	6,841	6,691	7,064	6,198	6,099	7,529	7554	7193	7432
31-Jan	7,073	6,392	5,697	6,243	7,668	7,070	6591	6958	7952
TOTAL	227,934	214,827	199,292	207,855	206,220	204,346	222,197	216,366	240,403
Max Day	8,684	8,989	7,509	8,194	7,966	7,724	8,384	7,773	8,787
Min Day	6,437	5,854	5,461	2,933	5,972	5,240	6,086	6,202	6,793
Median	7,196	6,723	6,431	6,754	6,677	6,472	7,175	7,067	7,741
Average	7,353	6,930	6,429	6,705	6,652	6,592	7,168	6,980	7,755

City of Salmon Arm
Daily Water Consumption
2001 to 2009

February									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Feb	7,033	7,329	7,101	7,325	6,372	7,214	6913	7539	7968
02-Feb	7,499	6,870	5,850	6,497	6,863	7,253	7122	6596	7386
03-Feb	7,082	6,620	6,762	6,384	6,536	6,858	6859	6781	7602
04-Feb	7,044	7,272	6,529	7,248	5,693	7,220	6747	7076	8126
05-Feb	7,229	6,723	6,027	6,410	7,489	6,833	7243	7313	7934
06-Feb	9,443	6,550	6,686	6,813	5,652	7,514	7115	7240	7987
07-Feb	7,427	6,824	6,010	6,379	7,111	7,177	6838	6814	6987
08-Feb	8,025	6,919	6,657	7,131	4,443	6,835	7516	6378	7285
09-Feb	6,447	6,824	6,431	7,182	9,479	7,278	6612	7002	7993
10-Feb	7,572	6,846	6,280	6,666	5,882	6,933	7450	7182	8346
11-Feb	5,071	7,387	6,820	6,493	6,443	6,652	7107	6454	7954
12-Feb	7,314	6,318	6,281	6,958	6,756	7,073	7397	7610	7191
13-Feb	7,244	6,811	6,795	7,021	6,141	7,218	8194	6733	7616
14-Feb	6,943	6,728	5,552	6,351	7,130	6,882	6911	5997	7256
15-Feb	6,819	6,379	6,746	6,748	6,973	5,978	7242	7765	8666
16-Feb	7,665	6,970	6,318	7,092	5,884	6,775	6416	6910	6927
17-Feb	6,864	7,469	6,930	6,841	6,549	6,734	7077	6957	8229
18-Feb	7,355	6,374	5,983	7,045	6,792	8,032	8103	7099	7285
19-Feb	7,393	6,739	6,412	6,490	7,240	6,935	7139	7709	7402
20-Feb	7,815	7,493	6,790	5,718	6,943	6,349	7504	7199	7251
21-Feb	7,292	5,827	6,338	6,606	6,282	6,647	7719	7694	7669
22-Feb	7,064	7,253	6,392	7,001	6,430	6,698	6861	6637	7878
23-Feb	7,063	6,301	6,361	7,101	6,824	6,088	7097	6781	7981
24-Feb	7,232	6,631	6,298	7,234	6,734	6,931	7302	7031	7558
25-Feb	7,268	6,675	6,809	8,342	6,469	6,612	7835	7578	6527
26-Feb	6,759	6,544	5,952	6,572	6,691	7,092	7820	6998	8020
27-Feb	6,595	6,581	6,508	6,992	6,759	7,328	7130	6760	6672
28-Feb	7,055	6,534	6,607	6,776	7,152	5,387	7342	7620	8464
29-Feb				7,226				6943	
Total	201,615	189,791	180,223	198,664	185,709	192,526	202,613	204,398	214,159
Max Day	9,443	7,493	7,101	8,342	9,479	8,032	8,194	7,765	8,666
Median	7,231	6,734	6,422	6,841	6,712	6,907	7,135	7,002	7,642
Average	7,201	6,778	6,437	6,850	6,632	6,876	7,236	7,048	7,649

City of Salmon Arm
Daily Water Consumption
2001 to 2009

March									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Mar	6,849	7,077	6,330	6,594	5,873	6,576	7292	6699	7294
02-Mar	7,202	5,862	6,425	7,185	7,508	6,576	7330	7670	7411
03-Mar	7,452	7,147	6,268	6,021	7,695	6,911	6877	7775	7248
04-Mar	7,086	6,528	6,728	7,490	7,320	6,825	7304	7113	8128
05-Mar	7,599	5,868	5,662	6,743	6,021	7,154	7954	6884	6722
06-Mar	7,919	6,801	6,693	7,043	6,845	6,292	7509	6602	8385
07-Mar	6,693	6,045	6,850	6,412	7,182	7,589	8126	7151	7499
08-Mar	7,478	7,245	6,076	6,615	6,681	6,483	6499	7592	7831
09-Mar	6,944	5,985	6,432	6,897	7,119	7,618	6362	6796	7077
10-Mar	7,067	6,544	7,492	6,724	6,148	6,928	7635	6482	7375
11-Mar	7,036	6,696	5,711	6,845	6,391	6,835	6605	6217	8221
12-Mar	7,550	6,396	7,076	6,127	6,153	6,721	7081	7155	7147
13-Mar	7,364	7,168	5,608	7,077	7,763	6,682	6782	6427	7951
14-Mar	7,186	5,773	6,929	6,470	6,075	5,904	6373	8186	7123
15-Mar	6,733	6,663	6,344	6,193	7,378	8,494	6941	6876	7882
16-Mar	7,104	6,546	6,368	7,484	6,216	6,751	7342	6853	8197
17-Mar	6,923	6,268	6,734	6,272	7,489	6,068	7137	7363	7476
18-Mar	7,927	6,472	6,152	7,292	6,168	7,201	7037	5918	8768
19-Mar	6,902	6,665	6,922	6,337	6,296	7,257	6938	7490	8187
20-Mar	7,436	6,458	6,831	6,959	6,229	5,781	8039	7251	7554
21-Mar	7,424	6,880	6,031	7,681	7,292	7,227	6749	6468	8035
22-Mar	7,228	6,887	6,321	6,831	7,323	6,608	8016	7612	7675
23-Mar	7,023	6,164	6,344	7,465	7,299	6,470	6780	6455	7915
24-Mar	6,849	7,339	7,116	6,464	7,197	6,996	7141	7294	7656
25-Mar	7,357	6,246	6,353	7,188	6,184	7,061	7717	7178	8479
26-Mar	8,308	6,889	6,445	7,031	6,869	7,001	7153	7462	7267
27-Mar	7,307	6,061	7,113	6,483	6,295	6,847	6844	6835	7868
28-Mar	7,417	7,008	5,999	7,507	7,868	7,290	8144	8056	7697
29-Mar	6,351	6,518	6,917	7,300	7,249	7,442	7762	6896	8530
30-Mar	8,018	6,451	7,171	7,463	7,126	7,216	7235	7520	8124
31-Mar	6,496	6,087	6,757	7,037	6,136	7,271	7946	8014	7908
TOTAL	224,225	202,736	202,197	213,226	211,386	214,073	224,650	220,289	240,629
Max Day	8,308	7,339	7,492	7,681	7,868	8,494	8,144	8,186	8,768
Median	7,202	6,528	6,432	6,897	6,869	6,911	7,153	7,151	7,831
Average	7,233	6,540	6,522	6,878	6,819	6,906	7,247	7,106	7,762

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	April								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Apr	7,256	7,262	7,595	7,572	7,434	7,003	7744	7274	8441
02-Apr	7,365	6,679	5,996	6,967	6,919	7,052	7419	7241	7354
03-Apr	6,240	6,958	6,692	7,625	7,198	7,191	8651	7567	7767
04-Apr	7,392	7,001	6,791	8,424	7,077	6,713	435	7666	7156
05-Apr	6,816	6,417	6,767	8,016	7,404	7,530	8331	7156	8154
06-Apr	7,298	7,242	6,932	8,838	6,865	7,301	8160	7780	7618
07-Apr	7,297	7,088	7,179	9,772	7,911	7,111	7842	7845	7634
08-Apr	7,919	7,716	7,487	8,439	7,224	7,900	8893	7248	8804
09-Apr	7,775	6,286	6,905	8,611	7,978	7,406	7716	7912	7016
10-Apr	7,722	6,968	7,395	9,085	8,657	7,629	8128	8311	8169
11-Apr	7,642	6,519	7,612	8,964	7,062	7,664	8071	7135	6764
12-Apr	7,351	7,752	6,704	10,396	7,669	7,220	8466	8601	7882
13-Apr	6,585	6,001	8,001	9,287	6,939	7,415	6856	8553	7526
14-Apr	7,433	6,781	6,786	6,894	7,945	7,567	7897	7519	7359
15-Apr	7,554	6,661	6,378	7,832	7,032	6,902	9991	8304	8592
16-Apr	8,555	6,906	6,526	7,736	7,044	7,179	7879	7943	8548
17-Apr	6,994	7,253	7,182	6,865	7,838	6,872	7990	8801	8291
18-Apr	8,104	6,848	6,811	8,241	7,735	7,567	7946	7933	8233
19-Apr	7,366	6,501	6,908	8,036	7,303	7,927	8528	8255	8933
20-Apr	8,619	7,806	7,043	7,605	9,070	8,436	8203	7435	8375
21-Apr	7,965	7,657	7,940	7,673	9,059	7,213	8616	8167	8157
22-Apr	8,618	7,029	7,892	9,010	9,584	7,773	10199	8633	8703
23-Apr	8,620	6,688	7,633	8,351	9,571	8,496	9380	8423	10700
24-Apr	8,159	6,602	7,657	9,047	10,661	8,336	9277	7948	8958
25-Apr	8,925	7,509	6,777	10,739	10,955	9,688	8598	8011	8102
26-Apr	9,972	7,355	6,948	9,586	10,809	7,755	8578	8740	10189
27-Apr	9,689	8,067	6,860	8,717	10,396	9,506	7702	9120	8697
28-Apr	8,182	10,072	7,820	10,177	11,710	8,807	9763	8695	10027
29-Apr	8,062	9,996	7,573	11,733	11,078	8,132	8407	7475	10850
30-Apr	7,617	9,353	7,217	11,177	10,990	9,646	9612	8408	10206
TOTAL	235,091	218,969	214,003	261,414	255,116	232,937	245,278	240,096	253,204
Max Day	9,972	10,072	8,001	11,733	11,710	9,688	10,199	9,120	10,850
Median	7,682	7,015	6,995	8,525	7,874	7,567	8,267	7,945	8,262
Average	7,836	7,299	7,133	8,714	8,504	7,765	8,176	8,003	8,440

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	May								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-May	8,437	12,012	9,378	12,368	12,208	7,215	10223	8288	11720
02-May	8,113	10,505	7,584	12,265	12,010	9,161	7922	9057	11598
03-May	7,070	9,914	7,600	11,344	11,013	9,406	8286	8804	10209
04-May	8,326	8,620	7,411	11,382	11,083	10,089	7900	10491	10816
05-May	7,669	8,531	7,137	10,003	11,392	9,750	8899	9559	9175
06-May	9,115	7,235	6,925	10,281	10,996	10,134	10013	9703	10726
07-May	8,338	8,092	8,354	11,812	12,825	9,071	9973	9087	9608
08-May	8,610	7,774	7,561	11,241	11,509	9,273	9057	8788	8794
09-May	9,091	8,728	7,639	9,463	11,962	11,577	11486	9649	10711
10-May	10,129	9,568	8,625	10,499	13,410	10,518	23426	8531	9667
11-May	10,062	10,537	8,262	9,857	16,563	9,438	11497	8397	10147
12-May	10,878	11,308	6,583	9,310	15,357	9,094	13205	8699	9003
13-May	12,930	11,592	8,960	10,571	13,092	10,715	13036	8365	9849
14-May	9,305	7,884	10,584	10,610	12,675	12,626	13358	8758	9146
15-May	8,619	10,496	12,180	11,737	12,143	12,674	15348	10336	11212
16-May	8,655	9,862	11,230	13,836	9,545	15,061	12927	12062	10392
17-May	7,703	9,139	8,497	12,844	9,140	14,842	14562	12109	11235
18-May	9,083	9,092	8,583	15,191	9,857	15,970	15299	11807	10575
19-May	8,977	10,026	10,193	15,535	8,723	14,971	13211	9465	10504
20-May	9,525	9,345	9,609	14,872	8,743	11,118	14104	8802	9713
21-May	12,673	8,028	10,465	13,168	8,984	10,368	14358	9919	10074
22-May	14,318	7,641	8,733	9,599	9,040	9,583	17815	9050	11840
23-May	15,376	7,430	9,330	9,052	9,950	10,053	17171	10223	12410
24-May	14,000	7,356	11,256	10,175	10,468	9,699	16869	10233	14451
25-May	16,724	7,191	8,763	10,297	12,293	8,118	16328	10521	13578
26-May	16,466	7,911	8,305	9,367	12,651	9,168	16148	9307	12103
27-May	9,712	5,959	15,041	8,940	15,241	9,227	11871	9240	14271
28-May	10,619	8,114	19,675	9,590	16,677	8,637	11675	9974	14997
29-May	9,117	9,930	22,776	8,618	18,154	8,210	16466	10463	16383
30-May	10,300	10,124	21,389	8,800	13,926	9,438	18824	11595	16702
31-May	12,254	8,870	9,166	7,494	13,254	10,133	19874	11771	19445
TOTAL	322,191	278,814	317,793	340,119	374,882	325,335	421,129	303,051	361,054
Max Day	16,724	12,012	22,776	15,535	18,154	15,970	23,426	12,109	19,445
Median	9,305	8,870	8,763	10,499	12,010	9,750	13,211	9,559	10,726
Average	10,393	8,994	10,251	10,972	12,093	10,495	13,585	9,776	11,647

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	June								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Jun	10,986	8,702	8,925	8,658	11,142	8,955	19690	9894	16403
02-Jun	9,369	10,868	10,279	9,002	10,420	8,598	21225	10076	19844
03-Jun	8,568	11,824	11,207	10,486	12,284	8,076	21432	10491	18663
04-Jun	5,012	12,431	13,379	12,367	13,759	9,080	14843	11381	20959
05-Jun	13,923	11,831	14,519	10,942	13,873	9,237	10923	9294	18836
06-Jun	9,519	9,729	15,318	8,704	10,935	10,746	9409	9042	20802
07-Jun	9,012	8,254	16,645	9,159	9,409	11,875	9519	9196	18288
08-Jun	9,911	8,078	15,987	10,759	9,354	9,350	9572	8483	16652
09-Jun	9,122	8,726	9,684	12,116	9,993	9,814	9002	9118	21840
10-Jun	8,339	11,056	10,123	9,872	11,546	9,386	10145	9663	20931
11-Jun	7,812	13,409	9,939	8,781	12,196	9,453	8944	9860	20711
12-Jun	7,920	14,789	11,113	8,381	9,802	9,493	11015	10859	20679
13-Jun	8,016	16,263	9,674	9,110	9,818	10,037	10747	10210	20440
14-Jun	7,971	17,524	9,637	8,598	10,124	8,789	11441	9214	19845
15-Jun	7,996	16,651	10,161	8,420	9,379	8,485	12578	11310	16894
16-Jun	8,240	15,247	11,663	10,659	11,110	10,029	11186	11527	20822
17-Jun	8,414	14,671	15,740	11,421	10,731	8,760	15303	13144	18575
18-Jun	9,585	9,896	14,026	12,657	8,471	8,292	9972	13992	17657
19-Jun	13,061	10,207	12,378	14,645	8,898	9,180	11117	13957	18050
20-Jun	12,537	11,420	9,579	14,477	10,032	8,602	12896	14283	19442
21-Jun	13,810	14,878	8,973	13,317	10,795	9,899	13830	12496	14519
22-Jun	14,262	16,376	7,178	17,521	10,049	9,424	14087	11689	12925
23-Jun	14,820	16,857	9,275	18,088	9,296	11,492	14595	12757	17242
24-Jun	13,781	17,784	9,501	18,082	9,442	12,963	12982	15123	15789
25-Jun	13,600	17,927	9,852	17,539	9,067	15,560	9984	15459	16086
26-Jun	12,550	19,923	11,367	15,423	8,637	13,746	11746	15293	18508
27-Jun	10,686	16,471	11,906	11,345	13,379	17,924	12835	17653	18170
28-Jun	9,115	11,038	13,960	11,398	8,629	18,488	11395	17776	20642
29-Jun	11,848	11,362	13,370	15,335	10,675	18,804	10605	20189	17030
30-Jun	13,098	9,877	10,657	15,649	9,121	18,446	10597	18394	20912
TOTAL	312,883	394,066	346,014	362,909	312,365	332,978	373,614	371,804	558,156
Max Day	14,820	19,923	16,645	18,088	13,873	18,804	21,432	20,189	21,840
Median	9,552	12,131	10,885	11,371	10,041	9,473	11,290	11,454	18,619
Average	10,429	13,136	11,534	12,097	10,412	11,099	12,454	12,393	18,605

City of Salmon Arm
Daily Water Consumption
2001 to 2009

July									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Jul	13,262	11,716	13,763	14,611	10,472	19,379	11033	20331	22071
02-Jul	15,653	13,693	11,156	13,770	10,105	18,944	12616	20149	22630
03-Jul	17,706	15,596	12,174	15,271	9,777	18,033	14911	18555	22911
04-Jul	18,625	13,644	11,812	15,357	8,961	18,736	16259	16391	22942
05-Jul	18,937	11,774	11,878	15,152	12,737	14,361	18654	18991	22017
06-Jul	18,937	14,373	14,307	13,311	10,340	12,307	18556	18741	13495
07-Jul	17,799	17,561	12,177	13,456	10,285	14,775	19820	15753	13286
08-Jul	17,131	11,915	14,628	11,909	10,276	17,231	17430	20346	13572
09-Jul	20,931	13,355	15,975	13,612	10,923	16,738	17457	19808	15300
10-Jul	20,684	17,383	16,960	13,199	11,544	12,540	20819	15627	17809
11-Jul	22,283	19,017	17,564	10,790	10,425	16,403	21622	13944	20250
12-Jul	19,739	20,084	17,863	10,593	13,724	14,449	21754	16599	19353
13-Jul	17,900	16,721	17,014	15,231	12,752	14,556	21817	19525	15359
14-Jul	17,830	15,256	14,396	15,577	13,469	17,571	20338	16756	18733
15-Jul	13,719	19,290	18,287	16,750	12,998	18,291	21032	19471	20080
16-Jul	10,778	19,889	19,711	17,691	10,402	18,607	18142	19816	23164
17-Jul	9,826	20,785	19,704	19,475	11,316	16,376	21348	20541	22863
18-Jul	9,168	19,953	18,615	19,398	12,955	20,417	16624	17994	23595
19-Jul	8,914	21,180	19,560	15,198	17,010	20,142	12093	18629	22813
20-Jul	9,322	19,664	18,201	16,943	16,001	20,081	10913	20605	20096
21-Jul	9,766	20,118	16,515	17,142	17,397	21,086	10442	18901	24976
22-Jul	11,019	23,080	21,364	17,142	14,717	22,005	11084	23601	25570
23-Jul	8,108	21,892	22,452	19,213	12,698	19,834	11213	19970	24490
24-Jul	10,971	23,915	22,350	20,398	15,557	23,578	12422	21493	19478
25-Jul	12,055	22,937	21,141	19,758	13,355	21,668	14319	22315	21667
26-Jul	15,689	23,172	21,974	16,960	17,916	21,799	17002	20245	21500
27-Jul	15,161	21,220	21,080	20,787	17,809	21,529	18441	20942	20522
28-Jul	12,719	19,824	17,643	21,045	18,644	21,251	17944	17113	24040
29-Jul	10,838	19,869	22,009	21,177	19,497	21,284	19077	18712	25053
30-Jul	11,338	17,643	22,731	21,007	19,170	17,645	16297	14465	24508
31-Jul	11,142	13,677	21,600	21,593	18,818	13,484	19790	14441	24796
TOTAL	447,952	560,195	546,602	513,513	422,050	565,097	521,268	580,770	648,936
Max Day	22,283	23,915	22,731	21,593	19,497	23,578	21,817	23,601	25,570
Median	13,719	19,290	17,863	16,750	12,955	18,607	17,457	18,991	22,017
Average	14,450	18,071	17,632	16,565	13,615	18,229	16,815	18,735	20,933

City of Salmon Arm
Daily Water Consumption
2001 to 2009

August									
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Aug	12,554	15,562	21,800	19,752	15,477	20,343	19324	14149	24497
02-Aug	13,000	14,551	21,855	17,705	20,868	19,544	19620	17085	23448
03-Aug	13,000	14,887	19,723	19,957	20,748	19,180	19560	16531	21166
04-Aug	13,500	12,411	16,458	17,571	19,620	18,356	16461	18242	22802
05-Aug	13,000	13,275	20,706	11,368	20,440	19,236	17682	20445	21003
06-Aug	12,000	13,532	20,431	12,379	21,282	19,669	15621	20809	23265
07-Aug	12,500	16,574	19,013	10,863	21,674	17,549	19040	21086	23185
08-Aug	12,000	17,682	19,663	13,027	17,377	20,344	19131	19783	23612
09-Aug	12,000	17,895	19,785	10,956	22,001	19,825	16420	13657	22731
10-Aug	12,000	16,259	18,792	17,382	21,593	14,018	15375	12704	16023
11-Aug	12,000	18,067	12,886	17,581	19,348	13,905	15891	12776	16923
12-Aug	11,000	19,079	18,272	17,506	22,256	15,524	17219	14558	18109
13-Aug	12,437	20,049	19,118	19,373	20,684	17,027	14026	16188	18098
14-Aug	12,353	20,309	18,461	19,717	20,487	14,938	18790	18558	14197
15-Aug	12,609	18,260	19,141	18,013	18,300	19,877	19455	18638	12990
16-Aug	17,043	17,573	19,336	14,700	18,963	19,797	19000	19021	13724
17-Aug	17,727	16,031	18,588	17,694	13,385	18,364	19191	18731	13165
18-Aug	15,706	16,692	15,075	18,542	14,968	19,146	18393	15151	17021
19-Aug	15,690	18,295	18,931	17,664	16,361	19,460	12543	13831	17698
20-Aug	15,520	17,435	19,699	17,758	17,014	19,049	11219	11779	18693
21-Aug	13,204	18,533	18,309	15,171	17,964	16,210	12969	12685	15788
22-Aug	10,673	18,585	18,369	10,871	14,503	19,779	13712	11920	16010
23-Aug	9,780	19,776	17,830	10,211	14,963	18,018	14399	12107	16630
24-Aug	10,090	18,426	16,602	11,083	14,881	18,374	15453	11714	13892
25-Aug	9,850	18,162	12,999	9,132	15,932	17,589	13810	10930	17397
26-Aug	11,504	17,103	16,540	9,348	17,332	19,440	12245	12182	16885
27-Aug	12,302	18,529	17,694	9,436	16,287	20,137	10998	11145	16476
28-Aug	13,111	18,155	16,983	10,019	16,675	16,902	12182	10646	18270
29-Aug	13,979	18,137	16,976	8,695	11,086	22,169	14048	11169	17740
30-Aug	13,550	17,732	17,539	8,244	9,672	17,212	14216	11196	17367
31-Aug	13,838	16,534	16,215	9,584	11,959	17,858	13892	10897	15409
TOTAL	399,517	534,089	563,789	441,299	544,098	568,837	491,885	460,313	564,209
Max Day	17,727	20,309	21,855	19,957	22,256	22,169	19,620	21,086	24,497
Median	12,554	17,732	18,461	14,700	17,377	19,049	15,621	13,831	17,397
Average	12,888	17,229	18,187	14,235	17,552	18,350	15,867	14,849	18,200

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	September								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Sep	10,437	11,586	14,158	9,967	9,706	17,455	11952	11145	16928
02-Sep	11,586	11,852	16,628	8,716	11,571	17,017	12201	11622	14311
03-Sep	14,593	11,611	18,291	8,204	12,178	16,003	11754	12747	12444
04-Sep	11,730	11,906	15,992	7,851	9,636	14,754	12998	11941	12066
05-Sep	12,871	12,356	15,898	8,333	10,045	17,810	13485	10843	11077
06-Sep	10,618	11,827	16,679	8,457	12,040	17,131	13342	10258	10714
07-Sep	10,492	12,301	14,791	8,628	12,185	16,238	12098	10818	10301
08-Sep	10,493	12,198	9,741	8,297	11,512	16,115	12675	11333	11466
09-Sep	10,802	11,252	13,159	8,506	10,285	13,733	12979	12111	11693
10-Sep	12,693	12,673	12,518	7,850	9,516	12,694	11813	12811	10867
11-Sep	11,517	13,332	11,197	8,547	10,270	11,569	14662	12272	11290
12-Sep	11,442	14,028	9,788	7,824	8,898	14,857	14115	11783	11312
13-Sep	12,252	13,937	11,073	8,583	10,582	12,452	15183	11481	12539
14-Sep	13,189	12,781	10,194	7,817	9,165	9,772	13165	13506	11744
15-Sep	11,436	12,900	7,745	8,490	8,899	10,008	13110	11735	13406
16-Sep	13,827	11,403	9,507	8,067	8,703	9,519	13907	11915	12803
17-Sep	13,378	11,097	9,107	6,618	9,425	9,705	10869	14161	12148
18-Sep	12,450	11,984	8,742	8,237	9,844	9,375	11953	12551	12801
19-Sep	11,506	10,711	7,637	6,838	8,636	9,992	12287	11962	10389
20-Sep	10,191	10,552	9,411	7,795	9,397	9,321	10641	12190	11003
21-Sep	8,753	10,323	7,971	8,280	9,619	8,905	9306	10846	10999
22-Sep	9,167	11,608	8,343	7,486	7,677	9,372	10082	9678	12072
23-Sep	10,832	11,569	8,254	7,726	9,008	8,551	9264	10312	12767
24-Sep	10,059	12,263	8,979	7,901	9,339	9,672	8861	10371	12615
25-Sep	9,518	11,271	9,200	7,753	9,455	8,924	9474	9251	12024
26-Sep	8,477	9,983	8,943	8,182	9,767	9,818	9365	9971	12440
27-Sep	8,230	10,686	9,771	7,853	9,690	8,959	9212	9970	12006
28-Sep	8,126	10,006	9,477	7,725	8,833	9,058	8587	10215	10892
29-Sep	8,106	9,054	8,845	8,080	8,846	9,539	8664	10386	11481
30-Sep	8,953	9,487	9,510	8,073	8,172	8,627	7842	9873	11510
TOTAL	327,724	348,537	331,549	242,683	292,900	356,944	345,843	340,057	360,107
Max Day	14,593	14,028	18,291	9,967	12,185	17,810	15,183	14,161	16,928
Median	10,817	11,610	9,625	8,077	9,567	9,905	11,952	11,407	11,875
Average	10,924	11,618	11,052	8,089	9,763	11,898	11,528	11,335	12,004

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	October								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Oct	8,007	8,134	9,825	7,870	7,796	9,955	8314	10237	10328
02-Oct	8,829	8,869	9,793	8,395	7,873	8,548	8356	10129	9862
03-Oct	8,530	8,306	8,774	7,334	8,085	9,410	8350	9201	9165
04-Oct	7,857	8,787	10,094	7,621	7,536	8,425	7846	8563	9430
05-Oct	8,446	7,848	9,444	8,390	7,882	9,421	8092	8052	8858
06-Oct	7,766	8,971	8,112	7,530	7,687	8,552	7948	8486	9291
07-Oct	7,733	8,359	8,687	8,129	7,870	7,777	8114	9374	9329
08-Oct	7,851	8,409	7,331	7,901	7,472	8,994	7192	8637	9574
09-Oct	7,554	7,309	8,432	8,071	7,437	9,121	8498	7564	8393
10-Oct	7,995	7,655	7,579	6,467	7,561	7,821	7534	8039	8125
11-Oct	6,813	7,130	7,381	7,914	8,280	8,184	7407	7686	7741
12-Oct	6,430	8,500	6,984	7,142	7,477	8,957	7646	7540	8168
13-Oct	7,861	6,591	6,689	7,391	6,717	7,520	7763	7415	7898
14-Oct	6,911	8,161	7,981	7,651	8,408	8,568	6967	8351	8036
15-Oct	7,437	7,979	6,651	7,358	7,281	7,896	8155	7464	7607
16-Oct	7,075	7,588	6,901	6,553	7,651	7,481	7497	8565	7492
17-Oct	6,562	7,605	6,886	7,367	7,082	7,591	7852	7629	7048
18-Oct	6,844	7,408	6,318	6,833	6,209	7,581	7116	7897	7322
19-Oct	6,632	7,471	6,543	7,308	7,368	6,594	7014	7072	8132
20-Oct	6,631	7,014	7,508	6,241	7,757	7,748	7044	7636	7363
21-Oct	7,016	6,768	6,099	7,232	7,311	7,035	6799	8270	7415
22-Oct	6,642	7,940	6,833	7,061	6,714	6,362	7929	7294	7883
23-Oct	6,065	7,509	6,690	6,989	7,295	7,416	7771	7007	7193
24-Oct	7,141	6,881	6,399	6,129	7,218	7,392	7166	7610	7350
25-Oct	6,123	7,297	7,918	7,450	7,531	7,207	7040	6386	7349
26-Oct	6,472	6,620	6,793	6,756	6,706	6,588	7108	8524	7232
27-Oct	6,237	6,942	6,172	6,651	7,292	7,721	7281	7124	7484
28-Oct	5,537	6,844	5,330	6,688	7,492	6,556	6936	7159	7550
29-Oct	6,093	7,059	8,297	6,823	7,071	7,224	8269	8169	7322
30-Oct	7,459	6,529	7,076	7,021	5,491	7,451	6543	7907	7263
31-Oct	6,581	6,617	7,012	7,519	6,688	7,246	6790	7584	6798
TOTAL	221,129	235,098	232,530	225,785	228,237	244,340	234,336	248,570	250,002
Max Day	8,829	8,971	10,094	8,395	8,408	9,955	8,498	10,237	10,328
Median	7,016	7,509	7,076	7,334	7,472	7,721	7,534	7,897	7,741
Average	7,133	7,584	7,501	7,283	7,362	7,882	7,559	8,018	8,065

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	November								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Nov	6,159	6,616	6,044	6,587	6,357	6,971	6506	7004	7135
02-Nov	6,103	6,783	6,341	6,901	7,399	6,953	7340	8483	7456
03-Nov	6,729	6,545	6,878	7,140	6,131	7,618	6925	8899	7762
04-Nov	6,803	7,092	6,390	6,483	7,016	6,133	7753	8525	6934
05-Nov	6,657	6,203	6,831	6,468	6,846	7,302	6926	7380	7910
06-Nov	6,369	6,608	6,480	7,123	7,111	7,499	7221	7109	6904
07-Nov	7,357	6,945	6,293	6,495	8,193	6,877	6569	7318	7260
08-Nov	6,734	6,402	6,116	6,826	7,510	7,006	7269	7059	6260
09-Nov	6,659	6,489	5,978	7,016	6,750	8,121	7196	7500	7768
10-Nov	7,179	6,605	6,543	6,276	5,914	6,536	7449	7484	6732
11-Nov	5,833	6,461	6,709	6,249	8,139	6,491	6422	7141	6495
12-Nov	6,426	6,811	6,572	7,203	6,479	7,130	7096	7083	7873
13-Nov	7,134	6,558	6,972	5,992	6,515	7,100	7714	7789	6461
14-Nov	5,929	7,059	6,395	6,685	7,419	6,877	6108	7151	6656
15-Nov	6,245	6,265	6,170	6,632	6,495	7,039	6943	7052	7360
16-Nov	6,702	6,394	6,045	7,083	7,080	6,518	7034	7800	6938
17-Nov	6,307	6,806	6,489	6,624	7,303	7,224	6481	7656	7075
18-Nov	5,977	6,939	7,247	6,638	5,814	6,753	6919	7102	6416
19-Nov	7,647	6,608	6,886	6,865	6,728	6,691	6878	6885	7250
20-Nov	7,568	6,491	6,261	7,143	6,611	7,291	7130	7828	6386
21-Nov	5,753	6,929	6,534	6,874	7,755	7,686	6286	7069	6697
22-Nov	6,108	6,302	5,342	6,061	6,010	6,451	6946	7371	6974
23-Nov	5,994	6,074	6,537	6,914	7,858	6,822	7386	7022	7204
24-Nov	0	6,360	7,219	7,020	6,136	7,559	6677	7549	6989
25-Nov	9,122	6,231	6,254	6,657	7,039	7,101	6993	7894	6512
26-Nov	6,244	6,968	7,117	6,439	6,597	6,510	6579	7246	6861
27-Nov	6,240	6,681	6,595	6,453	6,867	7,081	7300	7294	6518
28-Nov	7,400	6,341	6,607	6,556	6,476	6,859	6009	7863	7141
29-Nov	6,139	6,862	6,768	7,242	7,907	8,453	7551	6939	6986
30-Nov	6,782	6,066	6,679	5,999	6,750	6,160	6965	7455	6438
TOTAL	192,298	197,494	195,291	200,641	207,205	210,812	208,567	223,949	209,351
Max Day	9,122	7,092	7,247	7,242	8,193	8,453	7,753	8,899	7,910
Median	6,397	6,582	6,535	6,648	6,798	6,989	6,955	7,345	6,956
Average	6,410	6,583	6,510	6,688	6,907	7,027	6,952	7,465	6,978

City of Salmon Arm
Daily Water Consumption
2001 to 2009

	December								
	2001	2002	2003	2004	2005	2006	2007	2008	2009
01-Dec	5,573	6,625	6,883	6,548	6,894	7,030	6824	6958	7389
02-Dec	7,224	6,864	6,443	6,627	5,985	7,467	6567	8043	6399
03-Dec	6,461	5,767	6,462	6,229	7,198	7,666	7063	7472	7008
04-Dec	3,143	6,160	6,471	6,505	6,662	6,709	6233	7779	5583
05-Dec	6,528	7,239	6,528	6,470	6,810	7,562	7961	7700	7364
06-Dec	5,058	6,151	5,670	6,598	6,907	7,336	6721	7028	7025
07-Dec	8,345	5,874	6,214	5,698	7,052	6,442	6741	7261	6706
08-Dec	6,691	6,502	7,604	7,593	7,269	6,803	6580	7929	6810
09-Dec	6,291	6,246	6,113	6,080	6,244	6,614	7108	8217	6976
10-Dec	6,515	6,536	6,729	6,127	6,715	7,437	6686	7823	6562
11-Dec	6,344	6,277	6,486	6,260	6,035	7,510	7373	6713	6300
12-Dec	6,451	6,890	6,348	6,836	7,713	6,935	6937	8107	6464
13-Dec	6,053	6,622	5,509	7,283	5,889	7,258	7189	7301	6654
14-Dec	6,427	5,473	6,645	6,585	7,430	6,479	7218	7013	6714
15-Dec	6,187	6,265	7,079	7,377	6,319	6,918	6913	7517	6831
16-Dec	6,800	6,771	6,679	6,276	5,649	6,896	6502	6776	6737
17-Dec	6,711	6,743	6,517	7,185	7,248	7,571	6937	8240	6705
18-Dec	6,998	6,745	6,749	6,156	7,126	6,780	7840	6920	6939
19-Dec	0	6,054	6,407	6,534	6,187	7,657	6450	7853	6762
20-Dec	8,046	6,459	6,393	6,697	6,891	6,437	6765	7026	5917
21-Dec	6,435	7,162	6,791	6,280	6,542	8,031	7614	8218	7790
22-Dec	6,543	5,722	6,752	6,454	6,769	6,277	7252	8256	6703
23-Dec	5,194	7,518	7,360	7,662	7,012	7,788	6997	7250	6476
24-Dec	6,829	6,133	6,614	6,584	6,810	7,313	6973	7322	6934
25-Dec	5,842	6,303	6,091	5,967	6,183	6,839	6482	7014	5929
26-Dec	5,594	6,005	6,005	5,996	6,411	7,029	6438	7806	6006
27-Dec	7,454	6,324	6,829	6,571	7,379	6,988	6997	7377	6845
28-Dec	6,015	6,723	6,473	6,390	6,149	6,780	7868	7568	6663
29-Dec	6,451	6,525	7,403	6,412	6,379	7,762	6416	8384	6810
30-Dec	7,309	5,402	6,839	6,777	7,012	6,681	7087	7467	6621
31-Dec	7,170	7,548	6,515	6,734	7,119	7,752	7247	8007	6528
TOTAL	192,681	199,627	203,600	203,488	207,986	220,745	215,979	234,346	207,151
Max Day	8,345	7,548	7,604	7,662	7,713	8,031	7,961	8,384	7,790
Median	6,451	6,459	6,517	6,534	6,810	7,029	6,937	7,517	6,706
Average	6,216	6,440	6,568	6,564	6,709	7,121	6,967	7,560	6,682



Salmon Run

APPENDIX 6

WATER CONSERVATION POLICY

TOPIC: To establish City water reduction goals and a water use efficiency program

PURPOSE:

1. to effectively defer the need for water & sewage system capacity improvements and the resultant other associated infrastructure costs;
2. to reduce operating / maintenance (o & m) costs;
3. to establish a more fair and equitable water rates structure;
4. to contribute directly or indirectly to the reduction of impact on the environment;
5. to have in place a City water conservation strategy so as to qualify for senior government funding programs.

**POLICY
(GOALS)**

Goals: Years 2003, 2004, 2005, 2006 and 2007

1. Develop and deliver a public awareness & education program for VOLUNTARY water use efficiencies to achieve
 - a. a reduction of PEAK daily use by 20% (Factor of 1:5)
 - b. a reduction of AVERAGE daily use by 14% (Factor of 1:7)

There shall be a report back to Council in 2006 / 2007.

POLICY

(IMPLEMENTATION) Implementation Strategy – Goals

1. Formalize the rationale in support of deferral of infrastructure and related costs in relation to peak daily demand.
2. Formalize the rationale in support of reduction in average daily demand.
3. Approach the goals on three fronts:
 - a. Public use (leakage & public land sprinkling).
 - b. Business use: water audits and/or inventory of use.
 - c. Residential use: conservation by education.
4. Review the water user fee rates (i.e. metered vs non-metered).
5. Review commercial, industrial, institutional and multi-family metered accounts to ensure consistency.
6. Adopt a Bylaw requiring “ultra-low” flush toilets.
7. Develop a Water Efficiency Program using internal resources (staff) and external resources (consultant or others), funded through the Water Management budget; such program to include, at minimum, the following elements:

- a. Water efficiency theme, logo, or slogan for purposes of branding and imaging of objectives.
 - b. Education materials for multi-media communication purposes, such materials to clearly present the goals, rationale and strategies being pursued in the interests of conservation.
 - c. Establish media partnerships, as appropriate, with newspaper, radio, television and internet services for short and long-term use of multi-media communication with water users.
 - d. Establish business partnerships, as appropriate, with suppliers, service businesses and others to facilitate and encourage more efficient water management in and around the home and business.
 - e. As appropriate from year to year, engage the resources of third party agencies to supplement the primary efforts of the City in public education.
8. Amend Bylaw No. 1274 to effectively convert permissible outdoor sprinkling from the current "alternate odd/even days" which results in potential 50% peak daily demand to a "three-day cycle" which results in a potential 33% peak daily demand.
 9. Develop and implement an evaluation process to monitor the success of the Water Efficiency Program, the results of which shall be made public at intervals as part of the public education process.
 10. Assess, identify and develop maintenance practices to reduce / eliminate water distribution system leakage.
 11. Develop and implement a "cross-connection" control program.
 12. Residential Lawn – Profiling – continue with program (limited version).
 13. Automated underground irrigation systems – documentation, audit and public education.

Prepared by: Director of Operations	Date: March 15, 2003
Approved by Council	Date: March 24, 2003
Amended:	Date: December 11, 2006



Salmon Run

APPENDIX 7

WATER EMERGENCY RESPONSE PLAN



Salmon Arm

City of Salmon Arm

**EMERGENCY RESPONSE PLAN
FOR**

**CONTINUED SUPPLY OF
SAFE POTABLE DRINKING WATER
& WATER FOR FIRE FIGHTING
PURPOSES**

City of Salmon Arm Emergency Response Plan

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<i>APENDIX II – WATER SYTEM MAPS</i>	

PREFACE

The purpose of an Emergency Response Plan [ERP] is to provide a reference guide for the City of Salmon Arm to use in the event of an emergency in the City's water supply and distribution system. Emergencies may be an incident which presents a threat to the health of people drawing potable water from the system or a disruption to the City's normal fire fighting capabilities.

The ERP is divided into three sections:

Part I - Action Plans

The following possible emergency scenarios are listed with recommended responses and procedures provided:

1. Contamination of Source
2. Loss of Source
3. Chlorinator Failure
4. Backflow Contamination
5. Broken Watermain
6. Pressure Reducing Valve [PRV] Failure
7. Pump Failure
8. Power Failure

Part II – Contact List

A contact list is provided which identifies key personnel and agencies that may need to be notified.

Part III – System Inventory

Description of the major components of the water system is provided along with mapping to assist the City in identifying the location of the problem in relation to the overall system.

Appendix I

Water user notification templates notices that describe the situation and the effect of the emergency.

Appendix II

Water Systems Maps

- Section maps of the City water infrastructure which can help locate applicable infrastructure throughout the City limits

PART I - ACTION PLANS

1. CONTAMINATION OF SOURCE

ACTIONS REQUIRED:

1. Shut down source
2. Assess nature and cause of problem
3. Contact local Interior Health Authority, Public Health Inspector
4. Notify users of water contamination. In case of bacteriological contamination, issue a Boil Water Notice. In case of chemical or toxic substance, advise accordingly.
 - **Hand deliver Boil Water Notice to all homes in the immediate vicinity [see notification templates] or publicly advertise in all media where large areas are affected**
 - **In particular ensure at risk users ie: hospitals, nursing homes are contacted directly**
 - **Make direct calls and notification to users and alert local media requesting public service announcements**
5. Post notice on all public water taps and fountains [shut off if possible/practicable]
6. Contact Government Agencies and Emergency Personnel:
 - Ministry of Environment
 - Fire Department
 - Provincial Emergency Program
 - Shuswap Emergency Program
7. Arrange for alternate drinking water source if necessary or issue immediate ban on all outdoor and non-essential water use
8. Once problem is rectified, initiate water flushing and disinfection procedures in distribution system to remove contaminate
9. Re-test source and system, report to Interior Health Authority, Public Health Inspector
10. When safe to do so and permission in writing has been received from Interior Health Authority turn water source back on and issue a “Notice - Drinking Water Problem Corrected”
11. Cancel all boil water notices, advertise water is safe again
12. When appropriate determine if contamination can be prevented in future. If so include capital works or operational changes required in annual budget for consideration

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Interior Health Authority, Public Health Inspector
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- Applicable Operational Procedures
- Water Notices
- Contact List

2. LOSS OF SOURCE

ACTIONS REQUIRED:

1. Identify lost source
2. Assess nature and cause of problem
3. Notify users of water shortage and the need for conservation, if deemed necessary issue a Voluntary Conservation Notice or Mandatory Consumption Notice
4. Notify Interior Health Authority, Public Health Inspector where contamination has occurred [see contamination of source response]
5. Arrange for alternate drinking water source if necessary
6. Correct loss of source problem, initiate water flushing where required
7. Put back into service
8. Inform affected users that operations are back to normal, issue “Notice – Water System Recovering” if deemed necessary

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Interior Health Authority
- Fire Department
- Provincial Emergency Program/Shuswap Emergency Program
- Ministry of Environment
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- Applicable Operational Procedures
- Water Notices
- Contact List

3. CHLORINATOR FAILURE

ACTIONS REQUIRED:

1. Assess nature and cause of problem
2. Arrange for other disinfection procedures [shut off source and use alternate source only] if possible
3. Contact Interior Health Authority, Public Health Inspector
4. Notify users of water disinfection failure and issue a Boil Water Order
 - **Produce and issue a mail out to all City of Salmon Arm homes immediately [see notification templates]**
 - **In particular ensure that at risk users i.e. hospitals, nursing homes are contacted directly**
5. Make direct calls for notification to users and alert local media requesting public service announcements
6. Post notice on all public water taps and fountains [shut off if possible]
7. Arrange for alternate drinking water source if necessary
8. Arrange for chlorine failure repairs
9. Make direct calls and notification to users and alert local media requesting public
10. Contact chlorinator manufacturer for advice on repairs to chlorinator if required
11. Once problem is rectified, initiate water flushing and disinfection program in distribution system to remove contaminate if required
12. Test source, report to Interior Health Authority, Public Health Inspector
13. When safe to do so and permission in writing has been received from the Interior Health Authority, turn water source back on and issue a “Notice – Drinking Water Problem Corrected”

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Interior Health Authority
- Fire Department
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- Chlorinators Manufacture’s Specifications
- Applicable Operational Procedures
- Water Notices
- Contact List

4. BACKFLOW CONTAMINATION

ACTIONS REQUIRED:

1. Assess nature and cause of backflow contamination problem
2. Contact Interior Health Authority, Public Health Inspector
3. Isolate area if possible
4. Arrange for alternate drinking water source if unable to isolate the area of contamination
5. Notify users of potential water contamination. In case of bacteriological contamination, issue a Boil Water Order. In case of chemical or toxic substance, advise accordingly
6. Make direct calls and notification to users [if reasonable] and alert local media requesting public service announcements
7. Make corrections to fix or eliminate the source of contaminate
8. Once problem is rectified, initiate water flushing and disinfections procedures in distribution system to remove contaminate if required
9. When safe to do so and permission in writing has been received from the Interior Health Authority turn water source back on and issue “Notice – Drinking Water Problem Corrected”

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Interior Health Authority, Public Health Inspector
- Fire Department
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- Applicable Operational Procedures
- Water Notices
- Contact List

5. *BROKEN WATERMAIN*

ACTIONS REQUIRED:

1. Isolate break at nearest valves
2. Repair water break as quickly as possible
3. Determine zone of influence
 - (a) If break is limited to a specific area, inform affected users of temporary loss of service or pressure reductions while repairs are being completed
 - (b) If break causes disruption to overall system issue a Voluntary Conservation Notice or Mandatory Conservation Notice as deemed necessary
4. Try to maintain positive pressure throughout the distribution system
5. Contact Government Agencies and Emergency Personnel if break deemed serious enough to cause a health hazard:
 - Interior Health Authority, Public Health Inspector
 - Fire Department
 - Director of Engineering & Public Works
 - City Engineer
6. Arrange for alternate drinking water source if necessary
7. Once repair is completed, initiate water flushing and disinfection procedures in affected watermains
8. Re-instate main operation and contact affected users and issue “Notice – Water System Recovering” if deemed necessary
- 9.

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Interior Health Authority, Public Health Inspector
- Fire Department
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- Applicable Operational Procedures
- Water Notices
- Contact List

6. *PRESSURE REDUCING VALVE [PRV] FAILURE*

ACTIONS REQUIRED:

1. Assess nature and cause of problem, manually control distribution pressures with system valves
2. Follow standard City procedures to repair PRV valve and contact PRV supplier and City Engineer for assistance when required
3. Determine zone of influence. With a large PRV failure, the small PRV may become the primary source of water supply to some users and pressure reductions may occur at peak demands conditions. Notify affected users and if deemed necessary issue Voluntary Conservation Notice or Mandatory Conservation Notice to reduce water consumption
4. Contact the Fire Department to let them know locations where fire fighting flows have been reduced
5. If large PRV needs to be removed for servicing, install a spool piece for manual operation during fire fighting events
6. Once corrected contact affected users and the Fire Department to let them know the PRV is back in service and issue “Notice – Water System Recovering” if deemed necessary

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Fire Department
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- PRV Manufacture’s Specifications
- Applicable Operational Procedures
- Water Notices
- Contact List

7. PUMP FAILURE

ACTIONS REQUIRED:

1. Determine if sufficient capacity is still available to supply the water distribution system
2. Utilize Metford Dam source as much as possible if required
3. Assess nature and cause of pump problem [if pump is located at a reservoir re-route water if possible]. If unable to correct contact appropriate supplier/consultant for assistance
4. Contact BC Hydro if power failure is cause of pump failure
5. Notify users of water shortage and the need for conservation [if demand is higher than Metford can supply] where total water supply, is insufficient. When total water supply is insufficient, issue immediately a Notice for Voluntary Conservation or Mandatory Conservation Notice. In addition contact the Fire Department that fire flows/storage may be reduced
6. Once pump failure is corrected put back into service
7. Contact all affected users and inform them the pump is back on line, issue Notice Water System Recovering

CONTACTS

- Director of Engineering & Public Works
- City Engineer
- City Staff [Utility personnel, Managers]
- Fire Department
- Interior Health Authority, Public Health Inspector [if deemed necessary]
- Refer to contact list as necessary

USEFUL RESOURCES

- City Maps
- PRV Manufacture's Specifications
- Applicable Operational Procedures
- Water Notices
- Contact List

PART III – SYSTEM INVENTORY

Water Source

The City water system consists of two [2] main raw water sources, treatment systems for the source waters and an extensive water pumping, distribution, and storage system. The City water supply is via two [2] sources, East Canoe Creek at Metford Dam and Shuswap Lake at Canoe Beach. Water treatment of the source waters is by primary disinfection with chlorine.

Shuswap Lake is at a nominal elevation of about 346 m [1135 ft] while the Metford Dam intake on East Canoe Creek is at elevation 567 m [1860 ft]. The Utilities Department attempts to maximize the supply of water from East Canoe Creek so that pumping into the system from Shuswap Lake and the associated costs are minimized. The flow of water from East Canoe Creek into the water system is by gravity.

Distribution System

The public water system services an area of approximately 6,322 hectares [see Appendix 2]. The City distributes water in pipes made of a variety of materials. The first watermains were made of wood and these wooden mains have since been replaced with cast iron, ductile iron, PVC, polyethylene, steel, asbestos cement, spun concrete and some copper piping. The oldest mains still operating in the City of Salmon Arm water system inventory are cast iron pipes.

The distribution system includes approximately 196 km of watermain varying in diameter from 100mm to 600mm. The distribution system also includes six different pressure zones, ten reservoirs, one dam and four pump stations. There was a major expansion in the northwest sector of the City to service the Adams Lake Band Reserve, Neskonlith Band Reserve and some lands in the Gleneden area. This extension adds three [3] reservoirs, one [1] pump station and 5600 meters of 300mm diameter watermain to the water system.

Pressure Zones

The distribution system is segregated into six [6] pressure zones. The storage reservoir in the highest pressure zone is at elevation 615m [2020 ft]. Water has to be pumped over 269m [885 ft] in elevation from Shuswap Lake to the storage reservoir at the highest elevation.

*Telephone & name updates done January 2009

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