

# ANNUAL WATER REPORT



MAKING A SPLASH!  
VILLAGE OF NAKUSP  
2014

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## 1.0 Introduction:

Under the terms of the Village of Nakusp Operating Permit for the Nakusp Water System, Facility #0211995, as per Section 8 of the *Drinking Water Protection Act*, the Village is required to provide an annual report to the public and users of the water system. This report is to provide a summary of the water system operation, maintenance, upgrades and testing procedures and is submitted to Interior Health.

This past year was extremely exciting and challenging. For the first time in history, the Village imposed a complete lawn watering ban, as an emergency measure, in response to a shortage in supply. On the other hand, a new Water Treatment Plant and micro-hydro generation station was commissioned and put into service. 2014 was definitely the year to focus on water issues.

## 2.0 Water Collection, Treatment & Distribution System:

The Village water system is comprised of 756 residential connections, 103 Commercial services and 27 Institutional/Industrial services. Currently, the distribution system runs approximately 26.7 kms and has both surface source water and ground well water.

### 2.1 Surface Source Water:

Surface water sources consist of Halfway Creek, Upper Brouse Creek and Lower Brouse Creek. The piping network consists of 3.5 kms of pipe to the Upper Brouse intake and an additional 3.5 kms to the Halfway intake.

Surface water undergoes course filtration in the Filter Sock Chamber, which houses six perforated PVC pipes covered with mesh filter media (socks). Each pipe is approximately 12" in diameter and 8' long.

Course filtration removes large debris, such as leaves, sticks, pine needles, frogs, etc. These filter socks become clogged, especially during the freshet and require monitoring and cleaning.



**Figure 1 Filter Sock Chamber**



**Figure 2 Micro Hydro Generation Station**

Course filtration is not technically considered a treatment process, as fine materials and micro-organisms are not removed, therefore, water from here runs through the micro-hydro generation station to the new water treatment facility.

High pressure in the water main turns the generator, which creates hydro electricity. This is sold to BC Hydro and is fed back into their power grid. The

Village is licensed to produce 50 kilowatts of power.

The new treatment process consists of: membrane ultra-filtration, UV light and chlorine injection. This is a very technical operation, which is classified as a Level II Water Treatment. With the commissioning of the new plant come new “Conditions on Operating Permit”, which require much more monitoring and reporting to the province. Once treated, the water is stored in the million gallon reservoir.



**Figure 3 Upper Brouse Rd Water Treatment Plant**

In the past, the reservoir was leaking. This was not a huge problem, because the water stored there was not expensive to supply. Now that the finished water is properly treated and costs more to produce, it was imperative that the issue was rectified. A Capital Project was completed in the fall, installing a liner material over the bottom and sides of the reservoir. This has effectively stopped the leaks and reduced water loss. The reservoir also has a polyvinyl chloride cover to keep out debris and wildlife. Towers and weights around the perimeter allow the cover to move with the water level, The reservoir is 14' deep.



**Figure 4 Million Gallon Reservoir**

The Village also has a 200,000 gallon reservoir, which stores treated water for the lower grid.



## 2.2 Groundwater Sources:

The Village currently has two established production wells - Well#1 and Well#2. Both wells are located adjacent to the sports complex and are drawn from the same aquifer. A small amount of chlorine is injected into the discharge line, in order to maintain a residual in the distribution system.

Well#1 (8") consistently produces 25 L/s (330 IGPM), taking the demand off the surface water system in summer, and operating up to 24 hours/day. This flow, combined with the 70 L/s from the surface system (during peak daily demand), provides 95 L/s summer flows, and is adequate for the present Village needs. A single well, however, is at risk to mechanical breakdown.

Well#2 (12"), drilled for redundancy and to provide further flows for growth, has been tested up to 63 L/s (800 IGPM). This well was commissioned with the same pump and motor as Well #1 and, therefore, has the same capacity.

## 3.0 Monitoring & Maintenance:

In addition to the daily facility checks that are conducted by Utility Operators, the Village has the benefit of a Supervisory Control and Data Acquisition (SCADA) system. This system allows the various facilities to communicate remotely through wireless modem radios, and sensing equipment, enabling the Public Works operators to log onto the system remotely to view and/or manipulate reservoir levels, well pump operations, turbidity and chlorine levels, and system flows. The system also logs this data into an archive, for reporting purposes. The system is very valuable for allowing operators to manage the water supplies, and view problems on a color graphics screen.

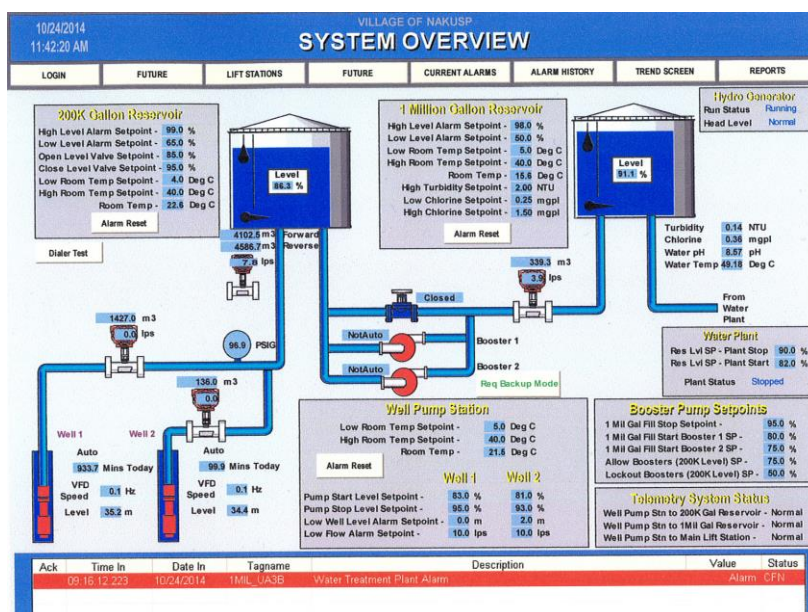


Figure 5 Supervisory Control and Data Acquisition Monitoring System

### 3.1 Water Sampling & Testing:

Prior to the commissioning of the new Water Treatment Plant (WTP), the Village Operating Permit required that water samples be collected weekly and submitted for E. Coli and Total Coliform testing. These tests indicate if contamination of the water system may be present. Samples are collected from seven different sites, on a rotational basis.

See Appendix A for 2014 results.

Monthly samples are also submitted for trihalomethane levels. Trihalomethanes are bi-products of the reaction between chlorine and organic materials.

See Appendix B for 2014 results.

With the implementation of the new WTP, the proposed Water Quality Monitoring Program will be followed in 2015.

<b>WEEKLY</b>	<ul style="list-style-type: none"><li>• Microbiological testing at various test sites throughout the distribution system</li><li>• Raw water microbiological testing at all pre-chlorination source sites</li></ul>
<b>MONTHLY</b>	<ul style="list-style-type: none"><li>• THM testing on a rotational basis throughout the distribution system;</li><li>• Microbiological results reporting;</li><li>• Daily water consumption data;</li><li>• Turbidity monitoring data;</li><li>• UV data</li><li>• Chlorine monitoring data</li><li>• UV sensor reference checks</li><li>• Reporting of source, treatment &amp; distribution system events;</li><li>• Reporting of customer complaints &amp; responses;</li><li>• Outlining major operational activities;</li><li>• Recording of calibration of the chlorine residual analyzer</li></ul>
<b>QUARTERLY</b>	<ul style="list-style-type: none"><li>• Haloacetic acids testing and reporting</li></ul>
<b>SEMI-ANNUALLY</b> (until baseline has been established – then annually)	<ul style="list-style-type: none"><li>• Baseline analysis for potential contaminants of groundwater, including: hydrocarbons (benzene, toluene, ethylbenzene &amp; xylene, light and heavy extractable petroleum hydrocarbons -including polyaromatic hydrocarbons, volatile organic compounds; herbicides and pesticides; metals, nitrates; nitrites and phosphorus; and/or microbiological parameters (coliforms, E. coli);</li><li>• Testing of any specific contaminants of concern</li></ul>
<b>ANNUALLY</b>	<ul style="list-style-type: none"><li>• Full comprehensive raw water analysis of each water source</li><li>• Comprehensive Annual Report</li></ul>

## 3.2 Operator Certification:



**Mike Pedersen, Director; Warren Leigh, Utility Op; Wes Coleman, Utility Op; Bobby Gresiuk, Utility Op; Troy Smith, Casual; Rachel George, Admin. Asst; Gil Battersby, Equipment Operator; Tammy Herridge, Equip. Op**

Utilities and Utility Operators are certified through the Environmental Operators Certification Program (EOCP). The new Village WTP is classified as a Water Treatment Level II and Water Distribution Level II Facility, which requires Level II Operators to run it. At this time, our staff is certified to the following levels:

Employee	Water Treatment	Water Distribution
<b>Mike Pedersen</b>	Operator in Training	WD - III
<b>Warren Leigh</b>	Operator in Training	WD - II
<b>Wesley Coleman</b>	-	WD - I
<b>Bobby Gresiuk</b>	-	WD - II
<b>Rachel George</b>	Operator in Training	Operator in Training
<b>Gilbert Battersby</b>	-	WD - II

As a Condition on Operator Permit, IHA is requiring that the Village provide operators that are certified to the level of the plant.



### 3.3 Routine Maintenance:

**Daily:** Visual checks are conducted of the various facilities to ensure that the equipment is functioning properly and no problems are evident. Filter Sock cleaning is done, as required. The system is also monitored 24/7 by the SCADA system, which can be accessed remotely by Operators. The system is monitored for: Flow Rate; Total Flow; Free chlorine; chlorine pump settings, pH, temperature; well levels & turbidity.

**Weekly:** Every Tuesday the Village conducts facility inspections and bacteriological water sample testing at various end-line locations throughout the municipality.

**Monthly:** Flow rate information is compiled for the Million Gallon Reservoir and the wells. Monthly samples are taken to monitor Trihalomethane levels. Sample results are reported to Interior Health.

**Annually:** Waterlines are flushed in the Spring and Fall. This removes debris and stale water that may have accumulated in the piping network.

Fire hydrants are also flushed and inspected. Any repairs necessary are made and two new hydrants are installed each year.

A valve exercising program is conducted each year to ensure that valves remain in good working order.

Halfway water intake is back-flushed annually to remove settled debris and improve flow.

As part of the Village's Cross Connection Control Program, Backflow preventer devices are inspected and tested to prevent any cross contamination of the potable water system.

An annual report is submitted to the Interior Health Authority summarizing the conditions of the Operating Permit.

**On-going:** Data is constantly monitored to assist with identifying leaks in the system. Repairs are made immediately.

The Million Gallon Reservoir cover is pumped off regularly, to remove any precipitation and debris.



## 4.0 Projects & Improvements – 2014:

### Water Treatment Plant

Project complete – plant commissioned. Working out the bugs.

### Micro-Hydro Generation Station

Project complete.

### Fire Hydrants

One new hydrant was installed as part of our Annual Fire Hydrant installation program.

### Well No. 2

Improvements were made to the controls, as the Well failed to run when needed.

### Million Gallon Reservoir Liner

Project completed October/14.

### Columbia Basin Trust (CBT) WaterSmart Program:

In 2011 the Village of Nakusp was one of 22 municipalities to sign the Columbia Basin Water Smart Charter. Collectively, the Water Smart communities desired to achieve an overall water usage consumption reduction of 20% by 2015. Nakusp set its own target of 15% reduction, and established their Water Smart Action Plan to outline the path to attaining this goal.

Four objectives were established in the Plan, namely:

- 1) Investigate and address Unaccounted-for Water/Leakage;
- 2) Amend the existing OCP Policy regarding underground irrigation systems;
- 3) Implement proven strategies for reducing outdoor residential water demands, and lead by example through wise water use in public spaces, and
- 4) Investigate an incremental approach to a more comprehensive water metering program.<sup>1</sup>

Through funding contribution agreements with CBT, the following projects have been completed:

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<sup>1</sup> Village of Nakusp Water Smart Action Plan may 2011, page v - See Appendix C

- **Water Meter Assessment** - the Village hired Urban Systems to complete a Water Meter Assessment. This report will be used as a tool for Council to make an informed decision regarding the possible implementation of a universal water meter program;
- **Water Loss Management Plan** - drafted by Kerr Wood Leidal Consulting Engineers, this plan identifies strategies and recommendations for funding and plan implementation. One of the recommendations was to install a meter at the outlet to the 200,000 gallon reservoir to monitor flows.
- **200,000 Gallon Reservoir Meter** - the Village installed an insertion meter at the outlet to the 200,000 gallon reservoir. Flows can now be monitored from this reservoir to the distribution system.

With only one year left in the Water Smart program, the Village will continue to focus on water consumption reduction. The 15% target may be achieved through: the prevention of leakage at the Million Gallon Reservoir and the implementation of the reclaimed water system, which will recover water from the wastewater treatment plant for irrigation of public green-spaces.

### **Million Gallon Reservoir Lining**

In an effort to prohibit water losses at the reservoir through leakage, the Village hired Titan Environmental to install a poly liner. The project was very intensive and required 24/7 monitoring of the reservoir levels. Completion was achieved before the end of October.

### **Monitoring Improvements**

Substantial improvements were made to the Supervisory Control and Data Acquisition (SCADA) system this year. A new tower was installed with better radios for a more consistent communication link. The new facilities were networked to the existing system and now Utility Operators can access all components of the water and wastewater systems remotely and monitor system activities 24/7.

### **Source Protection Plan**

The Village is working towards the development of a source protection plan that would encompass both the surface and ground water sources – Halfway Creek; Upper Brouse Creek; Lower Brouse Creek; Well #1 and Well #2. This year, the

Village hired Golder & Associates to complete a Groundwater Protection Plan, next year the Village will complete a Surface Source Protection Plan.

### **Decommissioning of Private Well**

In the Groundwater Protection Plan, drafted by Golder & Associates, an active private well was identified within the capture zone of the Village wells. This well was located at 301 4<sup>th</sup> Street NW; however, as a condition of property sale, a Village water service was installed and the well was decommissioned in November.

## **5.0 Challenges & Difficulties – 2014:**

### **Complete Lawn-Watering Ban**

For the first time in its history, the Village of Nakusp implemented a total lawn-watering ban this summer. The perfect storm conspired to create impossible water supply issues:

- 1) Prior to the commissioning of the new Water Treatment Plant, the plant was not running properly, so the water system was switched to well water;
- 2) Well #1 experienced a catastrophic pump failure, rendering it out of service;
- 3) Well #2 was turned on and realized a controls failure;
- 4) Summer peak usage was in effect.

In response to these issues, a public awareness campaign was undertaken and a complete lawn-watering ban implemented and strongly enforced. The pump for Well #1 was extracted and sent out for emergency repairs. Contractors were hired to address the control failures at Well #2. The Village stopped irrigation of all sports fields and green spaces - except the waterfront walkway that received minimal watering.

Through the efforts and cooperation of the crew, contractors, and the public, the ban was weathered without tragic consequences and the water supply was restored.

### **Grant & Capital Projects**

Staff has been consumed with the completion of many grant and Capital projects. All other regular services have been placed on the back-burner in the meantime. There will be a catch up period, once this year is over.

With the dramatic changes in the water collection, treatment and distribution system overall, the Village will need to: complete a new water system assessment;

update its Master Water Plan; incorporate emergency procedures from the Groundwater Protection Plan; and, include emergency procedures resulting from the proposed Surface/Source Water Protection Plan, scheduled for 2015.

## 6.0 Water Consumption:

This year was a very difficult one to manage consumption wise. Despite concerted efforts to decrease consumption, demand actually increased by 8% over 2012. This can be attributed to hot weather conditions, increased out-door water usage (lawn watering) and continued/increased leakage.

See Appendix C & D for details.

## 7.0 Cross Connection Control Program:

The Village of Nakusp has developed a Cross Connection Control Program, as required by the Drinking Water Protection Act. The purpose of this program is to protect public health, by preventing potential non-potable water sources from cross-contaminating the domestic water supply. This is achieved through the installation, maintenance and inspection of back-flow prevention devices.

Warren Leigh is currently our certified Cross Connection Control Administrator /Inspector and Wes Coleman is our certified Backflow Assembly Tester. Testing of backflow prevention devices is done annually.

Improvements that have been made to the Cross Connection Control System this year include:

- Certification of Warren Leigh as a CCC Inspector;
- Replacement of the dual check valve assemblies for underground sprinkler units along the waterfront; and
- Removal of two cross connections at the new Water Treatment Plant, in accordance with recommendations from Marianne Crowe, IHA.

The Village will endeavor to continue expanding its Program – moving from in-house infrastructure to Intuition/Commercial/Industrial connections.



## 8.0 Emergency Response Plan:

The Village has an Emergency Response Plan for the domestic water system. The plan identifies a number of potential emergency situations and sets out guidelines and procedures on how to deal with each issue. The plan will need to be updated to incorporate recommendations from the Groundwater Protection Plan, as well as, any procedures resulting from the proposed Surface/Source Water Protection Plan, 2015.

The contact information is updated annually – see Appendix E.

## 9.0 Proposed Capital Works/Improvements for 2015:

Council is currently considering the following Capital Expenditures for 2015:

• 75 hp pump for Well #2	\$ 70,000
• Backup Generator at Reservoir	\$ 50,000
• Hydrant Installation (x6)	\$ 10,000
• PRV – Shakespeare/Nakusp East Rd	\$ 150,000
• Water Main Replacement, annual	<u>\$ 40,000</u>
Total:	<u>\$320,000</u>

The 75 hp pump will be installed in Well #1 and will effectively increase its capacity. The replaced pump will be held as a spare, in order to build redundancy into the system.

The back-up generator at the 200,000 gallon reservoir will address issues with power failures and eliminate the need to hook up a portable genset during outages.

Ten thousand dollars has been allocated for the installation of new fire hydrants that were purchased previously, but have yet to be installed.

The installation of a Pressure Reducing Valve in the Sleepy Hollow area will drop the water pressure from 150 psi down to 60 psi. This should result in fewer line failures in this area and address a long-standing issue.

## Appendix A – Bacteriological Testing Results

Sampling Site	Date	Residual Chlorine ppm	Total Coliforms /100 ML	E. Coli /100 ML
<b>Carson's Corner</b>	Jan. 14	0.38	L1	L1
	Feb. 25	0.33	L1	L1
	May 20	0.75	L1	L1
	July 29	0.51	L1	L1
	Sept. 23	0.63	L1	L1
	Nov. 4	0.15	L1	L1
	Dec. 16	0.20	L1	L1
<b>WTP Commissioning</b>	July 29	0.51	L1	L1
	August 5	0.25	L1	L1
<b>Well #1 - repaired</b>	August 9	-	L1	L1
<b>Sports Complex</b>	Feb. 18	0.13	L2.2	L2.2
	Feb. 25	0.49	L1	L1
	Mar. 11	0.37	L1	L1
	June 3	0.20	L1	L1
	July 15	0.07	L1	L1
	Aug. 26	0.03	L1	L1
	Oct. 7	0.04	L1	L1
	Nov. 18	0.44	L1	L1
<b>Crescent Bay Const.</b>	Apr 29	0.20	L1	L1
	June 10	0.64	L1	L1
	July 22	0.02	L1	L1
	Sept. 4	0.08	L1	L1
	Nov. 25	0.13	L1	L1
<b>852 Alexander Rd.</b>	Jan 21/14	0.38	L1	L1
	Apr 15/14	0.08	L1	L1
	May 27/14	0.04	L1	L1
	July 8/14	0.70	L1	L1
	Aug. 19/14	0.42	L1	L1
	Nov 18/14	0.09	L1	L1
<b>Overwaitea</b>	Jan. 28/14	0.72	L1	L1
	Mar 25/14	0.87	L1	L1
	May 6/14	0.11	L1	L1
	June 17/14	0.31	L1	L1

	Aug. 5/14	-	L1	L1
	Sept 9/14	0.40	L1	L1
	Sept 30/14	0.20	L1	L1
	Oct. 21/14	0.56	L1	L1
	Dec. 2/14	0.19		
<b>Esso Station</b>	*Jan. 2/14	0.53	-	-
<b>*no courier p/u</b>	Feb. /14	0.37	L1	L1
	Mar 18/14	0.33	L1	L1
	Apr. 1/14	0.68	L1	L1
	May 13./14	0.11	L1	L1
	June 24/14	0.45	L1	L1
	*Aug. 12/14	0.05	*	*
	Aug 19/14	0.16	L1	L1
	Sept. 16/14	0.40	L1	L1
	Oct 28/14	0.11	L1	L1
	Dec. 9/14	0.34	L1	L1

## Appendix B – 2014 Trihalomethane Results

Each water sample is tested for: Bromodichloromethane; Bromoform; Chloroform; and Dibromochloromethane. Results are reported in mg/L. The method reporting limit for each compound is less than 0.001 mg/L. Only results exceeding 0.001 mg/L are shown below:

DATE	SITE	CHLOROFORM	TOTAL
January	Esso Station	0.015	0.015
February	Sports Complex	0.004	0.004
March	Alexander Rd	0.024	0.024
April	Esso Station	0.045	0.045
May	Overwaitea	0.109	0.109
June	Sports Complex	0.057	0.057
July	Alexander Rd	0.033	0.033
August	Carson's Corner	0.029	0.029
September	Crescent Bay Construction	0.028	0.028
October	Sports Complex	<0.001	<0.001
November	Carson's Corner	0.041	0.041
December	Overwaitea Foods	<0.001	<0.001

## Appendix C – Water Consumption Data

		GRAVITY SYSTEM							
MO/YR	DAYS/ MO	MAX DAY	DAY OF MO	MIN DAY	DAY OF MO	READING @ START OF MO	READING @ END OF MO	READING FOR MONTH M3	DAILY AVG
JAN/14	31	1,416	14	807	19	333,666	362,516	28,850	931
FEB/14	28	1,016	20	521	28	362,516	386,695	24,179	864
MAR/14	31	1,316	16	403	4	386,695	418,950	32,255	1040
APR/14	30	1,464	12	943	7	418,950	455,063	36,113	1204
MAY/14	31	1,490	25	620	22	455,063	492,215	37,152	1198
JUNE/14	30	2,577	12	823	15	492,215	542,940	50,725	1691
JULY/14	31	2,402	8	471	26	542,940	591,050	48,110	1552
AUG/14	31	1,868	29	279	16	591,050	612,687	21,637	698
SEPT/14	30	2,984	1	295	3	612,687	644,200	31,513	1050
OCT/14	29	421	1	217	20	644,200	654,649	10,449	360
NOV/14	30	501	12	122	2	654,649	665,298	10,649	355
DEC/14	31	1,233	28	388	2	665,298	692,789	27,491	887
								359,123	

WELL #1 SYSTEM/ *WELL #2/ **#1 & #2									SYSTEMS COMBINED	SYSTEMS COMBINED
DAYS RUNNING	MAX DAY	DAY OF MO	MIN DAY	DAY OF MO	READING @ START OF MO	READING @ START OF NEXT MO	READING FOR MONTH M3	DAILY AVG	GRAVITY PLUS WELL #1 (DAILY AVG)	COMBINED FLOWS 2014 m3
30	457	19	45	28	601,436	609,481	8,045	268	1199	36895
28	789	28	300	11	609,481	620,200	10,719	383	1247	34898
24	830	3	69	23	620,200	625,663	5,463	228	1268	37718
25	155	3	12	27	625,663	627,699	2,036	68	1272	38149
22	711	13	36	5	627,699	631,867	4,168	189	1387	41320
13	1102	14	116	19	631,867	637,504	5,637	434	2125	56362
**29	2232	12	171	7	combined	combined	32,000	1103	2655	80110
*31	1961	14	223	29	34,406	77,747	43,341	1398	2096	64978
30	1596	2	39	17	combined	combined	21,043	701	1752	52556
**31	1709	29	652	31	combined	combined	27,182	877	1237	37631
**30	1399	2	443	27	combined	combined	20,269	676	1031	30918
**16	753	2	8	19	combined	combined	6,724	420	1307	34215
							186627			545750



# Appendix D – CBT WaterSmart 2009-2013 Summary



## Village of Nakusp 2009-2013 data review and actions summary

### Results to date

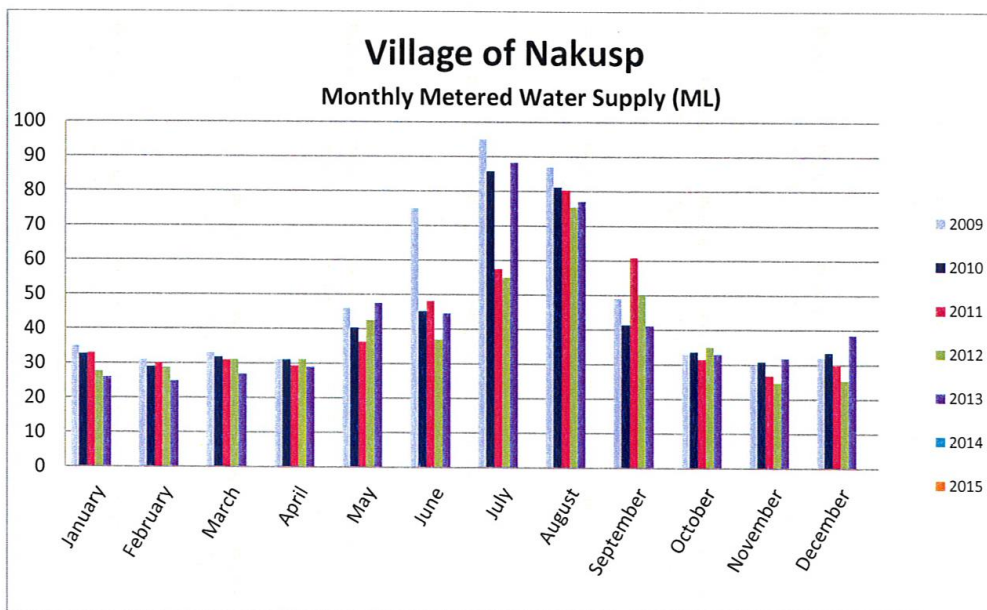
- NAKUSP: From 2009 to 2013 the Village of Nakusp has achieved a 12% decrease in gross community water demand, equivalent to 68 ML or 68,000,000 litres of water saved annually.
- The Village's demand increased by 8% from 2012 to 2013, due in part to increased irrigation during May-July, and possibly to increased distribution system leakage.
- WATER SMART: From 2009 to 2013, Water Smart communities have reduced gross annual demand by an average of 8% and a total of 10%. See [www.cbt.org/watersmart](http://www.cbt.org/watersmart) for more information.

### Primary Drivers of Success to Date:

- Ongoing implementation of water loss management best practices.
- A rigorous pipe repair and replacement plan and program.
- Completion of Water Loss management Plan and Metering Assessment (implementation starting in 2014).
- Development of significant staff capacity for sustainable water utility operations and management.

### Primary Opportunities for Improved Water Use Efficiency

- Implementation of the 2014 Kerr Wood Leidal water loss management plan.
- Reduction in residential irrigation demand via face-to-face public outreach and education
- Reduction in municipal irrigation demand at via improvements to municipal irrigation practices coupled with the pending reclaimed water project (purple pipe).



Nakusp							
Indicator	2013	2012	2011	2010	2009	Basin-wide <sup>1</sup> 2013	B.C. <sup>2</sup> 2009
Total Average Daily Flow (Total water use / service population)	786 lpd <sup>3</sup>	717 lpd	766 lpd	798 lpd	892 lpd	972 lpd (average)	606 lpd (average)
Average Residential Demand (Indoor + outdoor)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	353 lpd
Average Residential Demand <sup>4</sup> (Indoor only)	Unknown	Unknown	Unknown	Unknown	Unknown	230 lpd (estimate)	Unknown
2015 water conservation target	-15%	-15%	-15%	-15%	-15%	-20%	n/a
Change in gross demand from 2009	-12%	-20%	-14%	-11%	-	-10%	n/a
Change in gross demand from 2009	-68 ML	-113 ML	-81 ML	-61 ML	-	-3008 ML	n/a

#### Summary of notable data findings from Nakusp's 2013 Water Smart report

- 2013 was a significant study, planning, and capacity building year for the Village – given this, focus was diverted from physical works in the distribution system that have, in prior years, resulted in significant demand reductions. Coupled with a hot, dry summer it was reasonable to have experienced an increase in demand for 2013.
- A hot and dry July resulted in water demands returning to 2009-2010 levels. Public education about “how much water is enough” would greatly support reduction of peak demand (the period of time when water consumption is at its highest, and the most costly water for the utility).
- Water use reductions continue to be realized primarily through water loss management and repair of some substantial leaks.
- Night flow analysis, including reservoir drawdown tests, has indicated the need for calibration of the source water meter.
- Base demand peaked in November and December corresponding with more than average calls to the Village regarding broken/frozen water services. This increase in demand is likely part leakage and part an increase in winter bleed lines to prevent further breakage.
- While the Village's total average daily flow is below the Basin average, water use in summer (outdoor use) is over 3 times higher (and increasing) than in winter (indoor use). This suggests that reductions in outdoor residential and municipal water demand continues to be a significant water use efficiency opportunity.

#### 2011 Water Smart Action Plan objectives, actions taken, and results

<sup>1</sup> Including the 17 of the 23 participating Water Smart communities; data known to be unreliable or unavailable has been omitted from the overall analysis.

<sup>2</sup> Environment Canada. pp. 6. 2011 Municipal Water Use Report. Municipal Water Use 2009 statistics.

<sup>3</sup> lpd = litres per capita per day

<sup>4</sup> Note: 350+ lpd is considered a “high use home”; 200 lpd would be the expected demand in a home built to current building code standards; and 150 lpd is considered an achievable conservation target for indoor per capita water demand in BC.

**Objective 1: Investigate and address Unaccounted-for Water / Leakage.**

- Nakusp contracted Kerr Wood Leidal to develop a Water Loss Management Plan specific to the Village in 2013, completed in 2014. Recommendations include:
  - Development of a new pressure zone with a PRV station on Shakespeare Rd
  - Creation of two District Metered Areas (DMAs)
  - Perform night flow analysis twice a year in March and October or when unexpected rises in daily bulk water are noticed.
  - Regular collection and analysis of water data including min night flows, zone pressures, and locations of main breaks & leak detection work.
  - Verify meter accuracy every 2 years via reservoir drawdown tests.
  - Acoustic leak detection in spring when min night flows exceed target ILI rates
- Staff attended 2013 Water Loss Management training and continue to incorporate water loss management into regular maintenance activities.
- Plans to repair liner in Million Gallon reservoir in 2014
- Purchased two mag meters to monitor flow at 200,000 Gallon and Million Gallon reservoirs with sufficient sensitivity at low range (1 L/s) to allow for accurate night flow analysis.
- In 2013 the Infrastructure Leakage Index (ILI) was 5.5 and by implementing all of the recommendations in the WLM report (\$10-15,000/year), a target ILI of 3 should be attainable with projected savings of \$3,700 annually.

**Objective 2: Amend the existing OCP Policy regarding underground irrigation systems.**

- While somewhat counterintuitive, there is a common misconception that in-ground irrigation systems conserve water when compared to manual sprinkler systems. **An improperly maintained and operated automatic irrigation system will typically use 25-30% more water** than surface irrigation - often with limited benefits for turf and plant growth.
- As outlined in the Village of Nakusp Water Smart Action Plan at sections 8.2 and 8.3.3 (pages 20-23), it is strongly recommended that the OCP policy requiring installation of automatic irrigation systems be repealed as soon as possible. *Please refer to the Village of Nakusp's Water Smart Action Plan for details.*
- ***While removal of this policy from the OCP will not result in short term water savings, it is very important as a preventative measure to avoid enforcing a policy that will inadvertently drive up both total and per capita water demand when planned residential development occurs.***

**Objective 3: Implement proven strategies for reducing outdoor residential water demands, and lead by example through wise water use in public spaces.**

- The pending purple pipe water reuse project to reduce summer peak demand on potable water system will provide approximately 600,000 Imperial gallons of treated waste water treatment plant effluent for irrigation of a municipal park. Project is planned to go into effect in 2015.
- The Village will add rain sensors in to all municipal irrigation connections in 2014.

**Objective 4: Investigate an incremental approach to a more comprehensive water metering program.**

- The Village contracted Urban Systems Ltd. to develop a water metering assessment for universal metering only. The resulting analysis indicated that universal metering will not provide a net positive financial outcome for the utility using the current rate structure. There are, however, a number of significantly positive operational, social, and environmental benefits that are relevant to Nakusp's water utility and that should be considered in conjunction with the financial analysis.



Village staff will refine the cost benefit analysis considering a rate increase to account for planned increases in treatment plant cost and include meter costs.

#### Summary of required revisions to Water Smart Action Plan based on data analysis and spring meeting

No revisions required at this time.

#### Summary of recommendations for action based on data analysis and spring meeting

##### Water Loss Management (WLM)

- Kerr Wood Leidal developed a detailed, customized WLM plan for the Village of Nakusp. The Water Smart team has reviewed the plan and strongly encourages the Village to develop a viable approach to implementation of all recommendations contained in the plan.
- Complete bi-annual night flow analysis (March and October), and an annual Infrastructure Leakage Index (ILI) Calculation to provide a benchmark for the water utility's infrastructure condition.
- Develop a revised 2015 water balance with support from Water Smart Team using 2014 night flow and monthly total flow data sets, as well as a revised indoor demand estimate.
- It is important to continue efforts in water loss management. As leaks are repaired, system pressure increases, resulting in increased stress elsewhere in the distribution system, thereby increasing the risk of new water loss events. Implementation of a long term water loss management plan supported by capital budgets will help to retain current water savings over the long term AND extend the life of existing infrastructure.
- Continue to work internally on cost/benefit of implementation of water metering.

##### OCP Irrigation policy amendment

- The WS Team strongly recommends repealing policies mandating automatic irrigation in all new development residential development.
- *While removal of this policy from the OCP will not result in short term water savings, it is very important as a preventative measure to avoid enforcing a policy that will inadvertently drive up both total and per capita water demand when planned residential development occurs.*

##### Peak demand reduction

There are two major opportunities for reducing peak demand in Nakusp: residential and municipal irrigation.

- **Residential demand reduction**
  - Due to the efforts of staff and council in Nakusp, significant progress has been made in the area of water loss management (WLM). While WLM continues to be a vital water utility priority, it now appears that reducing outdoor residential demand (irrigation) can be reasonably addressed as the next opportunity for demand reduction. The Village uses 3x more water in summer months than in winter months, and as such, peak demand reduction would have both infrastructure management and water conservation benefits.
  - Implementation of a proven, face-to-face approach to reducing outdoor *residential* demand is a now a key-opportunity for water use efficiency in Nakusp. Water Smart is able to provide support if the Village chooses to take action in this area.
  - **In addition to face-to-face outreach, it may be useful to consider a universal metering program IF the cost of metering were factored into the water rate and structure.** In this case, universal metering may be revenue/cost neutral for the utility, while providing significant benefit in terms of utility operations and sustainability.



- It is recommended that staff conduct a financial analysis for universal metering that INCLUDES the full cost of meters in the water utility rate.
- **Municipal Demand Reduction**
  - The pending Purple Pipe program will have a direct water conservation benefit for the Village. However, given the Village's significant irrigation-season demand peak, it is likely that improvements to municipal irrigation practices would also reduce total demand.
  - It is recommended that Village staff participate in summer 2014 irrigation field training, to be provided on site in interested communities. This field training will be followed by a course in the fall to develop customized irrigation schedules for each irrigated site in the municipality.

**Other areas of action**

- The Village may wish to consider conducting a cost of services analysis for the water utility (and possibly also the sewer utility) once costs for the new plant can be properly assessed.

# Appendix E – ERP Contact Information

## VILLAGE OF NAKUSP - Domestic Water EMERGENCY RESPONSE PLAN

### EMERGENCY CONTACT LIST – Updated October 2014

Emergency Agency	Contact Person	Phone # (250)	Cell No. (250)	Emerg. # (250)	Fax # (250)
<b>Fire Dept/Police/Ambulance</b>	<b>Emergencies Only</b>			<b>9-1-1</b>	
Village of Nakusp: Main Office	Linda Tynan, CAO	265-3689	265-1727		265-3788
Public Works Yard	Warren Leigh, Acting Director	265-3556	265-1725	265-3861	265-3262
Fire Chief	Terry Warren	265-3563	265-1756		265-3571
<b>** Emergency Coordinator</b>	<b>Terry Warren</b>	<b>265-0230</b>	<b>265-1920</b>		<b>265-3571</b>
Drinking Water Officer	Juliana Gola	364-6202	231-4525	800-457-5648	364-6218
Well Pump Installation & Repair	Mearls – Greg Anderson	763-0109	212-5173		763-4940
BC Hydro	Power Outage: 1-888-769-3766	Emergency: 1-877-520-1355			
Bottled Water Supplier	Crystal Clear Water	265-1874			
Bulk Water Hauler - Kamloops	Diamond C Ventures Ltd.	374-1314			
Environmental Protection Service	Tamara Michel	354-6162	1-800-663-3456		354-6332
Excavation Services	Arrow Lakes Ready Mix	265-4615	265-1146		
Extended Care Facility (Halcyon)	Robin Hicks, Site Mgr.	265-3692	265-8546	265-8077	265-4141
Health Clinic	Linda Nero	265-3608 ext 263			265-3104
Nelson Health Unit Office	1-877-221-3388	505-7200			505-7211
Medical Health Officer, office hrs	250-364-6219	Drinking Water Specialist – Julianna Gola			
Medical Health Officer, After Hrs	1-866-457-5648				
Municipal Project Manager	Simon Bamber	265-3689	265-1767		265-3788
Newspaper	Arrow Lakes News	265-3823			265-3841
Plumbing Services	Dave's Plumbing	265-2113	265-1760		
Public Health Engineer	Marianne Crowe	505-7200	505-7225	354-2850	505-7211
Radio Station	Easy Rock	352-5510			352-9189
RCMP – Nakusp Detachment	Debra McCoy	265-3677 or 265-3678		9-1-1	265-4292
School District No. 10	Art Olson, Mtnce Foreman	265-3638	265-1075		265-3701
Arrowtarian Rotary Villa	Trish Cannon	265-2020		265-1886	265-4355
Spill Reporting for BC	1-800-663-3456	Environmental Protection: Tamara Mickel			
TV Station	Local Channel 13	265-3733			837-2900
Water Stewardship Office	354-6333 Ask for Brendan or Thomas				

**\*\* Phone first to obtain a PEP number**