



# DISTRICT OF UCLUELET

## WATER CONSERVATION STUDY

**MARCH 2014**





**KOERS  
& ASSOCIATES  
ENGINEERING LTD.**  
*Consulting Engineers*

P.O. BOX 790  
194 MEMORIAL AVENUE  
PARKSVILLE, B.C. V9P 2G8  
Phone: (250) 248-3151  
Fax: (250) 248-5362  
kael@koers-eng.com  
www.koers-eng.com

March 5, 2014  
1330-02

District of Ucluelet  
PO Box 999  
200 Main Street  
Ucluelet, BC V0R 3A0

**Attention: Mr. Warren Cannon**  
**Superintendent of Public Works**

Dear Sirs:

**Re: District of Ucluelet**  
**Water Conservation Study, March 2014 – FINAL Report**

---

We are pleased to submit four bound final copies of our “District of Ucluelet Water Conservation Plan, March 2014”. The report incorporates the District’s comments received on the draft report.

The study entailed a detailed review of water consumption for over the past 15 years. Total system demands compared with metered customer demands were reviewed on an annual and monthly basis. Seasonal demand changes were analysed in relation to weather, summer tourism, and fish processing. A review of average day and maximum day per capita demands was carried out and compared against other Vancouver Island municipalities. A detailed review of system demands during the early morning hours of 2 am to 6 am was conducted and compared with published benchmark data for various land-uses.

A review of indoor and outdoor water use demands and patterns was carried out to assess the anticipated reduction on water demands from specific water conservation programs. The findings were compared against those of the District of Ucluelet Water Audit, 2004 report.

The study findings show the District’s total and maximum day water demands have decreased by 43% and 67%; respectively, for year 2003 compared to 2013. This significant reduction is in large part in response to the decline in fish processing demands. Metered demands now account for around 25% of system demands compared to 57% in 2003. While overall demand has decreased, demands during the early morning hours, which can be used as a basis to estimate system leakage/loss, have increased, going from 12.5% to just under 15% of the daily demand for 2003 and 2013; respectively. Both are considered very high.

System leakage/unaccounted for water demand was estimated to range between 25% and 50% of daily demand for the two monitoring periods of April and July, 2013; respectively. Overflowing of the Matterson reservoir is reported to be one of the sources and is a result of the Mercantile Creek supply being off-line. This can be corrected with the installation of an altitude valve in the distribution system, thereby creating two pressure zones which would be controlled by the Highway Reservoir and the lower Matterson Reservoir.

.../2





March 5, 2014  
1330-02

District of Ucluelet  
Warren Cannon

A 28% to 30% reduction in total annual demand could be achieved by a 50% reduction in lost/unaccounted for water, a 20% reduction in indoor residential use, and a 25% reduction in non-metered summertime demands.

Based on the study findings, the District should proceed with stopping overflow events at the Matterson Reservoir by installing an altitude valve and creating two pressure zones. The most optional location should be determined through computer modelling of the distribution system. The location should be chosen so as to maintain adequate system operating pressures at the higher elevation points as well as the delivery of adequate fire flows to all areas. This should be followed by further review of non-metered demand usage and the source(s) of their large increase in the summer months and determination of appropriate means to reduce them. Increased effort on leak detection, with an initial emphasis on the District's 8 kms of AC mains is also recommended.

Yours truly,

KOERS & ASSOCIATES ENGINEERING LTD.



Chris Holmes, PEng  
Project Engineer

Chris Downey, PEng  
Project Manager





**KOERS  
& ASSOCIATES  
ENGINEERING LTD.**  
*Consulting Engineers*

P.O. BOX 790  
194 MEMORIAL AVENUE  
PARKSVILLE, B.C. V9P 2G8  
Phone: (250) 248-3151  
Fax: (250) 248-5362  
kael@koers-eng.com  
www.koers-eng.com

March 5, 2014  
1330-02

District of Ucluelet  
PO Box 999  
200 Main Street  
Ucluelet, BC V0R 3A0

**Attention: Mr. Warren Cannon**  
**Superintendent of Public Works**

Dear Sirs:

**Re: District of Ucluelet**  
**Water Conservation Study, March 2014 – FINAL Report**

---

We are pleased to submit four bound final copies of our “District of Ucluelet Water Conservation Plan, March 2014”. The report incorporates the District’s comments received on the draft report.

The study entailed a detailed review of water consumption for over the past 15 years. Total system demands compared with metered customer demands were reviewed on an annual and monthly basis. Seasonal demand changes were analysed in relation to weather, summer tourism, and fish processing. A review of average day and maximum day per capita demands was carried out and compared against other Vancouver Island municipalities. A detailed review of system demands during the early morning hours of 2 am to 6 am was conducted and compared with published benchmark data for various land-uses.

A review of indoor and outdoor water use demands and patterns was carried out to assess the anticipated reduction on water demands from specific water conservation programs. The findings were compared against those of the District of Ucluelet Water Audit, 2004 report.

The study findings show the District’s total and maximum day water demands have decreased by 43% and 67%; respectively, for year 2003 compared to 2013. This significant reduction is in large part in response to the decline in fish processing demands. Metered demands now account for around 25% of system demands compared to 57% in 2003. While overall demand has decreased, demands during the early morning hours, which can be used as a basis to estimate system leakage/loss, have increased, going from 12.5% to just under 15% of the daily demand for 2003 and 2013; respectively. Both are considered very high.

System leakage/unaccounted for water demand was estimated to range between 25% and 50% of daily demand for the two monitoring periods of April and July, 2013; respectively. Overflowing of the Matterson reservoir is reported to be one of the sources and is a result of the Mercantile Creek supply being off-line. This can be corrected with the installation of an altitude valve in the distribution system, thereby creating two pressure zones which would be controlled by the Highway Reservoir and the lower Matterson Reservoir.

.../2





March 5, 2014  
1330-02

District of Ucluelet  
Warren Cannon

A 28% to 30% reduction in total annual demand could be achieved by a 50% reduction in lost/unaccounted for water, a 20% reduction in indoor residential use, and a 25% reduction in non-metered summertime demands.

Based on the study findings, the District should proceed with stopping overflow events at the Matterson Reservoir by installing an altitude valve and creating two pressure zones. The most optional location should be determined through computer modelling of the distribution system. The location should be chosen so as to maintain adequate system operating pressures at the higher elevation points as well as the delivery of adequate fire flows to all areas. This should be followed by further review of non-metered demand usage and the source(s) of their large increase in the summer months and determination of appropriate means to reduce them. Increased effort on leak detection, with an initial emphasis on the District's 8 kms of AC mains is also recommended.

Yours truly,

KOERS & ASSOCIATES ENGINEERING LTD.



Chris Holmes, PEng  
Project Engineer

Chris Downey, PEng  
Project Manager





## WATER CONSERVATION STUDY

### TABLE OF CONTENTS

	<u>Page</u>
Letter of Transmittal	
TABLE OF CONTENTS	1
<b>1 INTRODUCTION</b>	
1.1 Authorization .....	1
1.2 Background & Previous Studies .....	1
1.3 Study Objectives .....	2
1.4 Scope of Work .....	2
1.5 Acknowledgements.....	4
<b>2 WATER SYSTEM</b>	
2.1 Background.....	5
2.2 Source and Storage .....	5
2.2.1 Mercantile Creek .....	5
2.2.2 Lost Shoe Creek Aquifer .....	6
2.3 Treatment.....	7
2.4 Distribution System .....	7
<b>3 WATER USE</b>	
3.1 Service Population .....	9
3.2 Metered vs Nonmetered Demand .....	9
3.3 Annual Demand Variation .....	10
3.4 Seasonal & Monthly Demand Variation.....	11
3.5 Commercial/Industrial Demands .....	14
3.6 Per Capita Demands.....	16
3.6.1 Average Day and Maximum Month .....	16
3.6.2 Maximum Day Extrapolation .....	17
3.6.3 Various Vancouver Island Communities.....	17
3.7 Daily and Early Morning Hour Demands.....	18



## TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
<b>4 WATER CONSERVATION</b>	
4.1 General.....	23
4.2 Indoor Water Use.....	23
4.1.1 Toilets.....	24
4.1.2 Faucets & Showerheads .....	24
4.1.3 Appliances.....	24
4.3 Potential Indoor Water Use Reduction .....	25
4.4 Outdoor Water Use .....	26
4.5 Potential Outdoor Water Use Reduction.....	26
4.6 Leak Detection and Repairs.....	27
4.7 Universal Metering .....	28
4.8 Effect of Water Conservation on Water Demand .....	29
<b>5. CONCLUSIONS AND RECOMMENDATIONS</b>	
5.1 Conclusions.....	31
5.2 Recommendations.....	32

### TABLES

1	Lost Shoe Creek Aquifer Well Pump Design Capacities .....	7
2	Water Distribution System Pipe Material, Lengths, and Diameters .....	8
3	Current and Projected Population (to year 2036) .....	9
4	Annual System vs Metered Demand, 2000 - 2004 & 2008 - 2012.....	11
5	Lowest and Highest System Demand Month, 1998 - 2012 .....	11
6	Metered and System Minimum & Maximum Month, 2008- 2012 .....	12
7	System and Metered Seasonal Demand, 2008 - 2012.....	13
8	Seven Largest Metered Water Users, 2003 and 2012.....	14
9	Annual Demands for Metered Customers, 2008 – 2012.....	15
10	Average Day and Maximum Month Demands, 2000 to 2004 & 2008 to 2012 .....	17
11	Average and Maximum Day Per Capita Demands for Various Vancouver Island Communities .....	18
12	2am to 6am & 6am to 2am Demands, 2003 & 2013 .....	19
13	Early Morning Demand Percentages, 2003 and 2013 .....	20
14	Indoor Residential Water Use Reduction .....	25
15	Potential Demand Reduction through Water Conservation Program .....	30



## TABLE OF CONTENTS (Cont'd)

<u>FIGURES</u>	<u>following page</u>
1 Historic Population (1961 – 2012) & Projected.....	9
2 Annual Demand, 1991 – 2012 .....	10
3 Monthly System vs Metered Demand, 1998 – 2012.....	11
4 Monthly System Demand, 2008 - 2012 .....	12
5 2008 System vs Metered Monthly Demand.....	13
6 2009 System vs Metered Monthly Demand.....	13
7 2010 System vs Metered Monthly Demand.....	13
8 2011 System vs Metered Monthly Demand.....	13
9 2012 System vs Metered Monthly Demand.....	13
10 Annual System vs Metered Demand, 2008 to 2012.....	14
11 Average Day and Maximum Month Per Capita Demand & Annual Demand, 2000 – 2012 .....	17
12 Daily Demand, 2003 & 2013 .....	19
13 Average Day and Early Morning Demands, 2003 & 2013 .....	19
14 2 am to 6 am Demands Comparison .....	20
15 Indoor Water Use for a Typical Home .....	on page 23

## DRAWINGS

(Located in pocket at rear of report)

Water Distribution System

## APPENDICES

Appendix A	Mercantile Creek Water Licences
Appendix B	District of Ucluelet Waterworks Regulation and Charges Bylaw No. 1136, 2011



# **1 INTRODUCTION**

---

## **1.1 AUTHORIZATION**

In May 2013, the District of Ucluelet authorized Koers & Associates Engineering Ltd. to assist in developing a water conservation plan. The work was to be carried out in accordance with Koers & Associates' proposal dated January 4, 2011.

## **1.2 BACKGROUND & PREVIOUS STUDIES**

The District's Mercantile Creek water treatment system is being up upgraded to become compliant with the Vancouver Island Health Authority's 4-3-2-1 surface water source treatment policy. The project is partially funded under the provincial government's Towns for Tomorrow program. A condition of the funding grant is the development of a water conservation plan. This requirement is in response to the provincial government Living Water Smart program, which was launched in 2008 and requires 50% of new municipal water needs to be acquired through conversation by Year 2020.

Development and implementation of a Water Conservation Plan will assist in reducing water demands which will in turn reduce water system capital, operational and maintenance costs. Capital costs will be reduced by allowing the capacity of the existing water system to meet the needs of a larger service population. Operational costs will decrease as less sodium hypochloride (for water treatment) will be used and electrical power consumption (for pumping) will decrease. Maintenance costs should also decrease as the service life of electrical pumps should be extended.

Reducing indoor water demands will result in a reduction in flows within the District's sanitary sewer collection system. As all flow is conveyed to the sewage lagoon on Hyphocus Island by a series of pump stations (the District has 14 pump stations), the reduction will result in less pumping, which in-turn will result in a decrease in electrical power consumption and extend the service lives of each of the District's 29 sewage pumps. The potential, power cost savings and extension of pump service lives is significant as many of the pump stations discharge to another pump station further along the collection system, and all pump stations discharge to the Helen Road pump station, which pumps all flows to the sewage lagoon.

In 2004 Koers & Associates completed a Water Audit for the District identifying a large unaccounted for water loss component (as high as 29%) and a per capita water demand that was as much as double that of other Vancouver Island communities. One of the reasons for the high per capita demand was the large water demands from the seafood processing plants. However, even when allowing for the fish plant demands, the remaining per capita demand was still higher than most of the other Vancouver Island communities reviewed.

In 2011, the District adopted a new Official Community Plan, providing a long term vision to guide planning and land use decisions in managing growth. While no specific timeline is set-out, population growth to Year 2036 is reviewed.



### 1.3 STUDY OBJECTIVES

The objectives of this study are to:

- Confirm how and where and quantify the amount of water being used in the District, i.e.,
  - establish the water demands between metered (commercial, industrial, and institutional) and non-metered (residential) customers,
  - determine monthly and seasonal demand changes,
  - establish per capita demand, and
  - quantify the portion of the District's water demand that is classified as lost/unaccounted for (the benchmark).
- Establish the cost vs benefit of water loss reduction efforts and indoor and outdoor water conservation strategies to reduce the District's overall system demand. Strategies to be investigated include:
  - leak detection and repairs
  - pressure management
  - public and industry specific water conservation education programs
  - metering of residential customers (universal metering)
  - water conservation pricing (variable and seasonal)
  - low flow fixture (toilets, faucets, showerheads) retrofit programs
  - rebate programs (toilets, washing machines, dishwashers)
- Develop a District wide Water Conservation Plan for implementation.

### 1.4 SCOPE OF WORK

To meet the study objectives, the following work plan was adopted:

#### Quantify System Loss\Unaccounted for Water Volume (Establish Current Benchmark)

- 1 Monitor reservoir water levels between 2 am and 6 am, when system demands are at their lowest, for a one night a week for at least three weeks, on separate nights each week, for data accuracy verification. The service area of the Matterson Reservoir encompasses the majority of the District's oldest watermains, most of which are Asbestos Cement (AC), and includes majority of the District's water customers. As such this area should have the largest percentage of loss/unaccounted for water.
- 2 Meters of the known high water consumers are to be read during the reservoir level test so their demands can be accounted for. Data to be analyzed and the system current estimated loss/unaccounted for water volume benchmark established.
- 3 Monitor Bay Street Water Treatment Plant pumping cycles over an extended period of time, recording start and stop times of each pump. Analyse data to confirm daily runtimes and reservoir draw down rates throughout the day.

#### Establish Current and Future Water Usage

- 4 Obtain water-use records for bulk meter and individual metered connections. Review records of high water demand customers; such as the fish processing plants, if available.



- 5 Review system operation with District Staff.
- 6 Quantify volume of known unmetered municipal water use, if possible.
- 7 Confirm population during past several years, calculate average day, maximum day and peak hour flows.
- 8 Compare water demands for other similarly sized Vancouver Island municipalities and identify if Ucluelet's are excessive.
- 9 Compare peaking factors for average day, maximum day and peak hour and if excessive review why.
- 10 Analyze individual flow records and assess if quarterly and annual totals are within typical range for customer use.
- 11 Establish metered vs non-metered usage (commercial vs residential), seasonal (winter vs summer), and per capita demands. Estimate percentage of the system lost/unaccounted for water.
- 12 Review and establish future population projects for next 25 years and calculate projected water demand increase.
- 13 Establish water conservation requirements to meet 50% of the projected water demand increase to year 2020 in accordance with provincial Water Smart Program mandate.

#### Develop Water Loss\Unaccounted for Reduction Strategies

- 14 Review water loss reduction strategies, such as leak detection, general public and industry specific education programs, and pressure management.

#### Develop Water Use Reduction Strategies

- 15 Review water strategies and anticipated effectiveness for indoor and outdoor residential use, including:
  - .i Implementation of a residential (universal) metering program and establishment of achievable water use reduction targets.
  - .ii Implementation of variable and seasonal water rate structures, reviewing rate structures in other metered community's and appropriately extrapolate to the District of Ucluelet.
  - .iii Implementation of low-flow fixture retrofit program(s) including low-flow toilets, faucets and showerheads.
  - .iv Implementation of rebate programs for water conservation appliances (dishwashers, washing machines), toilets, and fixture retrofit kits (faucets and showerheads).
  - .v fixture retrofit and rebate programs used by other BC communities.

#### Develop Cost-Benefit Analysis

- 16 Develop costs to implement each of the water loss\unaccounted for water strategies and the water conservation strategies and compared against the estimated percent reduction in the system demand.
- 17 Provide a comparison of expected results against investment (cost-benefit analysis) in order to determine the most cost effective means to reduce system water demand.



### Prepare Report

- 18 Present findings in a report complete with findings, coloured figures, graphs, tables, conclusions and prioritized recommendations of initiatives to be pursued further, along with program budgetary requirements.
- 19 Present draft report to District staff to review and provide comments.
- 20 Finalize and submit report after receipt of comments.

## **1.5 ACKNOWLEDGEMENTS**

Koers & Associates Engineering Ltd. acknowledge with thanks, the assistance provided by Mr. Warren Cannon, Public Works Superintendent in the preparation of this report.



## 2 WATER SYSTEM

---

### 2.1 BACKGROUND

Prior to the arrival of the first European settlers in the early 1870's, the area was inhabited by the Nuu-Chah-Nulth First Nations. Ucluelet or "safe harbour" as named by the Nuu-Chah-Nulth First Nations, is situated on the West Coast of Vancouver Island at the south end of the Pacific Rim National Park.

The Village of Ucluelet was incorporated in 1952. Its status changed to a District in 1997, in part to reflect the then increasing population. The municipal boundaries encompass the entire Ucluth Peninsula, covering an area of more than 1,100 ha.

Ucluelet was established around the logging and fishing industry, but has become known as an eco-tourism based resort area. Development is concentrated on the southern half of the peninsula where there is a municipal sewer collection system. Development on the northern half consists mostly of undeveloped lands with some rural residential properties on larger parcels, and a few industrial and commercial businesses. The northern developed lands are serviced by on-site septic fields. A total of 283 ha of land in the northern west half of the municipality were taken out of the Forest Land Reserve in the early 2000's. Partial development of these lands has started but has been significantly hampered by the economic downturn in 2008. The three largest employment industries are reported to be Hospitality, Fishing, and Logging.

### 2.2 SOURCE AND STORAGE

The District operates two water supply sources: Mercantile Creek, a surface source with a catchment area of approximately 11 kms<sup>2</sup> at the point of diversion, and the Lost Shoe Creek Well Field, a groundwater source. A discussion of each is presented below.

#### 2.2.1 Mercantile Creek

The District maintains five water licences on Mercantile Creek which is located across the Bay on the east side of Ucluelet Inlet. The earliest issued water licence has a priority date of January 1958. The District is authorized to withdraw a maximum of 3,239 m<sup>3</sup>/day. The Yuutu?it?ath community maintains a water licence for the withdrawal of up to 454.6 m<sup>3</sup>/day. A private company maintains a 32.7 m<sup>3</sup>/day withdrawal licence for ice making. A listing of the Mercantile Creek water licences as posted on the Land and Water BC Inc. web site is located in Appendix A.

In 1972 the intake was moved to a slightly higher elevation, now approximately 40 m geodetic, and adjacent to the Creek. A small 3.3 m high concrete dam with removable stop logs was constructed creating an impoundment area. A 9.1 m long by 1.5 m wide covered concrete channel, located just upstream of the dam, conveys water through a coarse screen





before entering a 250 mm diameter intake. Water is conveyed approximately 2.5 kms down the hill and under the inlet to the Bay Street water treatment building and pump station. The supply line is reported to consist of 520 m of 350 mm diameter pipe connected to 1,300 m of 250 mm diameter pipe which connects to 690 m of 300 mm diameter High Density PolyEthylene (HDPE) submarine pipeline. The pipeline is capable of delivering up to 12,440 m<sup>3</sup>/day.



The Bay Street water treatment and pump station building, located at the foot of Bay Street, was constructed around 1985. The water treatment system is presently being upgraded to become compliant with the Vancouver Island Health Authority's 4-3-2-1 surface water source treatment policy. This includes replacement of the sand filters with Ultra

Violet light and an on-line turbidity meter which automatically stops the supply when the turbidity levels exceed 1 NTU.

Treated water is pumped into the distribution system by one of two variable speed 40 hp centrifugal vertical pumps and fills the 1,200 m<sup>3</sup> (250,000 ig) bolted steel water storage reservoir on a local high spot off of Matterson Drive.

Constructed in 1983, the Matterson Drive Reservoir is 8.8m in diameter and 19.8 m tall. Its top water level of 57 m geodetic generates a static pressure of 560 kPa (81 psi) at sea level. The exterior of the reservoir was repainted (recoated) in 2000.



## 2.2.2 Lost Shoe Creek Aquifer



In 1996, an additional water supply was developed using groundwater wells in the Lost Shoe Creek Aquifer (LSCA). The wellfield is located at the junction of Highway 4A and Pacific Rim Highway, approximately 3 kms north of the District's municipal boundary. This source was developed in response to the large water supply requirements of the two main fish processing plants. Mercantile Creek, had limited capacity and was subject to frequent high turbidity runoff events in the watershed.

The LSCA wellfield pumps into the 1,400 m<sup>3</sup> (300,000 ig) bolted steel water storage reservoir (Hwy Reservoir) located along Peninsula Road approximately 3 kms south of the wellfield. Constructed in 1997, the reservoir is 12.5 m in diameter and 11.6 m tall. Its top water level of 64.8 m generates a static pressure of 635 kPa (92 psi) at sea level.





The design capacities of the LSCA well pumps are presented in Table 1.

**Table 1 – Lost Shoe Creek Aquifer Well Pump Design Capacities**

Well No.	Design Capacity	
	(L/s)	(m <sup>3</sup> /day)
1	25.2	2,177
2	28.4	2,454
3	44.2	3,818
4	23.7	2,048
5	Undeveloped	---
Total	121.5	10,497 (437.4 m <sup>3</sup> /hr)

From 1997 to 2002, the LSCA was used to meet the water system demands. Mercantile Creek ceased to be used, being maintained as an emergency source, due to turbidity issues attributed to active logging in the watershed. During this time, the capacity of the wells declined significantly due to biofouling of the well screens and the immediately surrounding aquifer materials from iron and sulphur bacteria. In 2002, chemical re-development of the wells resulted in significant recovery, estimated at 90%, of the original design capacity.

During the 2002 well redevelopment program, the Mercantile Creek source was put back on line in mid-August to meet the summertime demand increase. Water quality had improved in the watershed with the cessation of logging activity. On January 23, 2005, Mercantile Creek was taken off-line in response to a landslide in the watershed. It was not brought back on-line until three years later, in January 2008.

The LSCA well field acts as the primary source. Mercantile is brought on-line to meet large fish processing demands and the seasonal (summertime) demand increase.

The two water supply sources can be isolated from each other with the manual closing of valves at five road intersections, which we understand are: Peninsula Rd at Pacific Crescent; Seaplane Base Rd at Peninsula Rd; Norah St at Peninsula Rd; Marine Drive at Matterson Dr; and Cedar Road at Cypress Rd. When closed, the LSCA services the northern end customers southwest of Rainforest Drive utilizing the Highway Reservoir and Mercantile Creek services the remainder of the District utilizing the Matterson Drive Reservoir.

## **2.3 TREATMENT**

At the LSCA wellfield, raw water is treated by the addition of sodium hypochlorite (NaClO) solution.

For the Mercantile Creek source, raw water passes through a coarse screen to catch larger debris prior to being withdrawn from the Creek. At the Bay Street water treatment pump station, the raw water is treated by Ultra Violet lights followed by sodium hypochlorite solution.



## 2.4 DISTRIBUTION SYSTEM

The distribution system contains 35 kms of pipe ranging in diameter from 100 mm to 450 mm of various material type. Table 2 lists the lengths of pipe for various materials and diameters.

**Table 2 - Water Distribution System Pipe Material, Lengths, and Diameters**

Pipe Diameter (mm)	Length of Pipe (m)				
	Asbestos Cement, AC	Polyvinyl Chloride, PVC	High Density Polyethylene, HDPE	Steel	Total Length (m)
100	425	65			490
150	6,165	3,900		10	10,075
200	1,485	8,540	125	7	10,157
250		3,105		10	3,115
300		1,085	2,630		3,715
350		1,445		5	1,450
400			4,370		4,370
450			1,670	15	1,685
900				25	25
Total:	8,075	18,140	8,795	72	35,082
% of Total	23%	52%	25%	-	100%

A plan drawing of the District's water supply and distribution system is located in the pocket at the end of this report.



## **3 WATER USAGE**

### **3.1 SERVICE POPULATION**

Ucluelet has seen population fluctuations over the years peaking at 1,760 in 1995, followed by a gradual decline to 1,463 by 2003. The District's population experienced a gradual rise over the past nine years, increasing to 1,615 in 2012, as estimated by BCStats. The 2011 Canada Census calculated Ucluelet's population to be 1,627 as of May 31, 2011.

In the fall of 2011 with the passing of Bylaw No. 1140, 2011, Council adopted the Official Community Plan 2011. The OCP projects population growth over the coming 25 years to average 0.60% per year. This would result in the population increasing to 1,864, a 15.4% increase, by Year 2036. Table 3 presents the projected population growth to Year 2036 in five year increments.

**Table 3 – Current and Projected Population (to Year 2036)**

<b>Year</b>	<b>Population</b>
2011	1,627 (Stats Canada)
2012	1,615 (Stats BC)
2016	1,654
2021	1,704
2026	1,756
2031	1,809
2036	1,864

The District's historic population from 1961 to 2012 and the OCP 0.6% per annum growth projection to 2036 is shown on Figure 1.

### **3.2 METERED vs NONMETERED DEMAND**

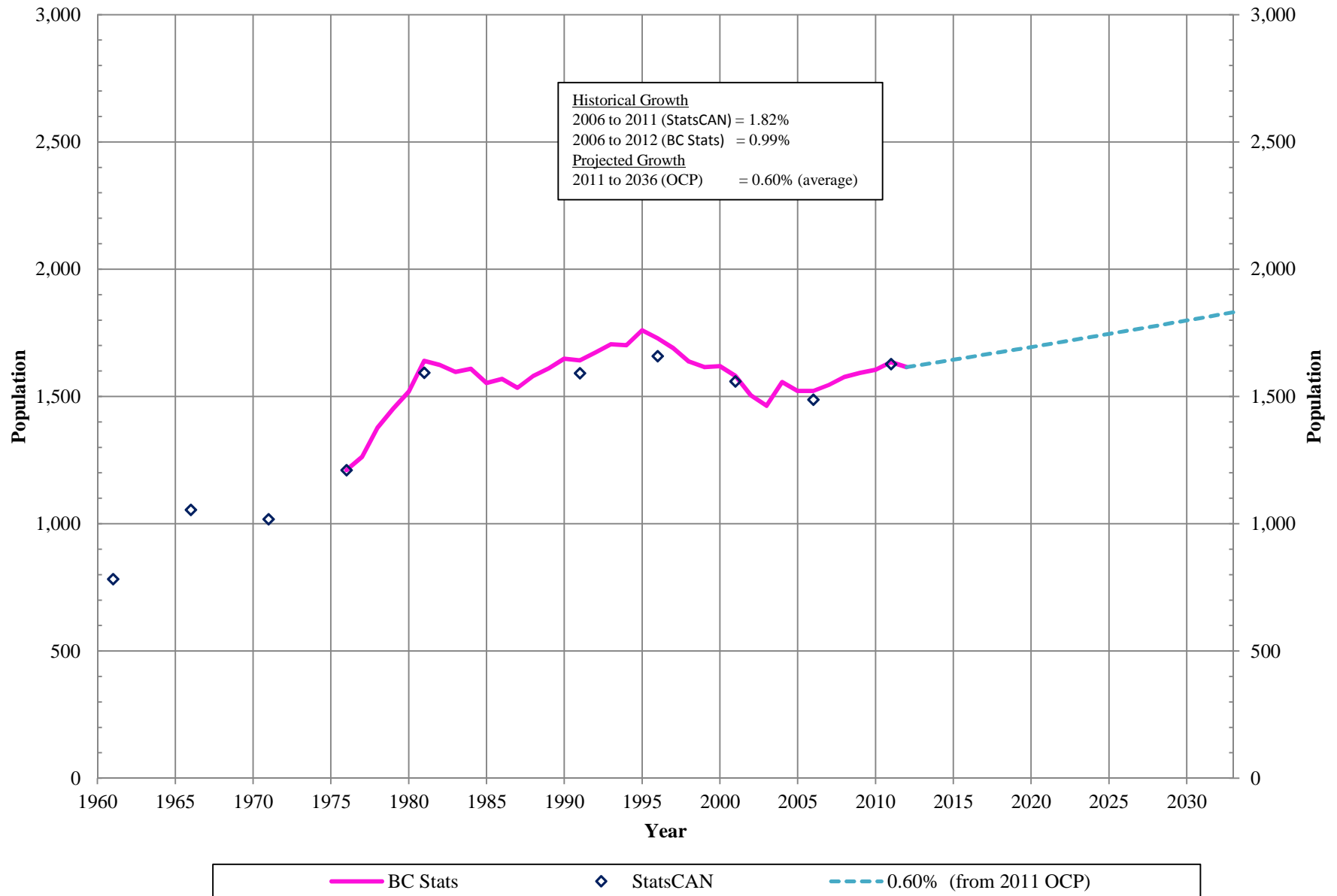
The District provided bulk flow records for the Lost Shoe Creek Aquifer (LSCA) and the Mercantile Creek sources. Water demands from the LSCA records system are calculated based on individual pump run-hours multiplied by the pumping rate for each well. For Mercantile Creek readings are taken from the flow meter which recorded the volume of treated water pumped from the Bay Street pump station into the distribution system.

Water usage within the District is recorded by individual meters installed on commercial/industrial properties. There are 70 individual meters installed, of which 63 recorded flow in 2012. All other water demands, including residential properties, government buildings, parks and playfields are not metered.

Individual meters are read monthly by District staff. This data record permits a detailed assessment of monthly water usage. The difference between the system demand and the metered demand is the non-metered demands. The non-metered demand consists of water use by:



### District of Ucluelet Historic Population (1961 - 2012) and Projected





- residential properties,
- fire department training and firefighting use,
- watermain new construction pressure testing, disinfection, and flushing,
- watermain flushing for quality maintenance purposes by public works,
- district landscaping and Parks use,
- school and community playfield irrigation,
- water theft,
- reservoir refilling after draining for maintenance purposes,
- reservoir overflows,
- watermain breaks, and
- system leakage.

The nonmetered demand can be expressed by the following equation:

$$SD - MD = NMD$$

Where:

SD	=	System Demand (Sum of Water Source Meters)
MD	=	Metered Demand (Sum of all Individual Meters)
NMD	=	NonMetered Demand

### 3.3 ANNUAL DEMAND VARIATION

Figure 2 presents the annual water usage for the past 21 years (1991 to 2012) along with metered demands (commercial and industrial properties) for the two five year periods of 2000 to 2004 and 2008 to 2012. No data was available for the year 1997. The notable increases in demand during the period 1998 through 2003 reflect increasing fish processing plant demands. The low demand of 2010 is attributed to missing flow data for Mercantile Creek.

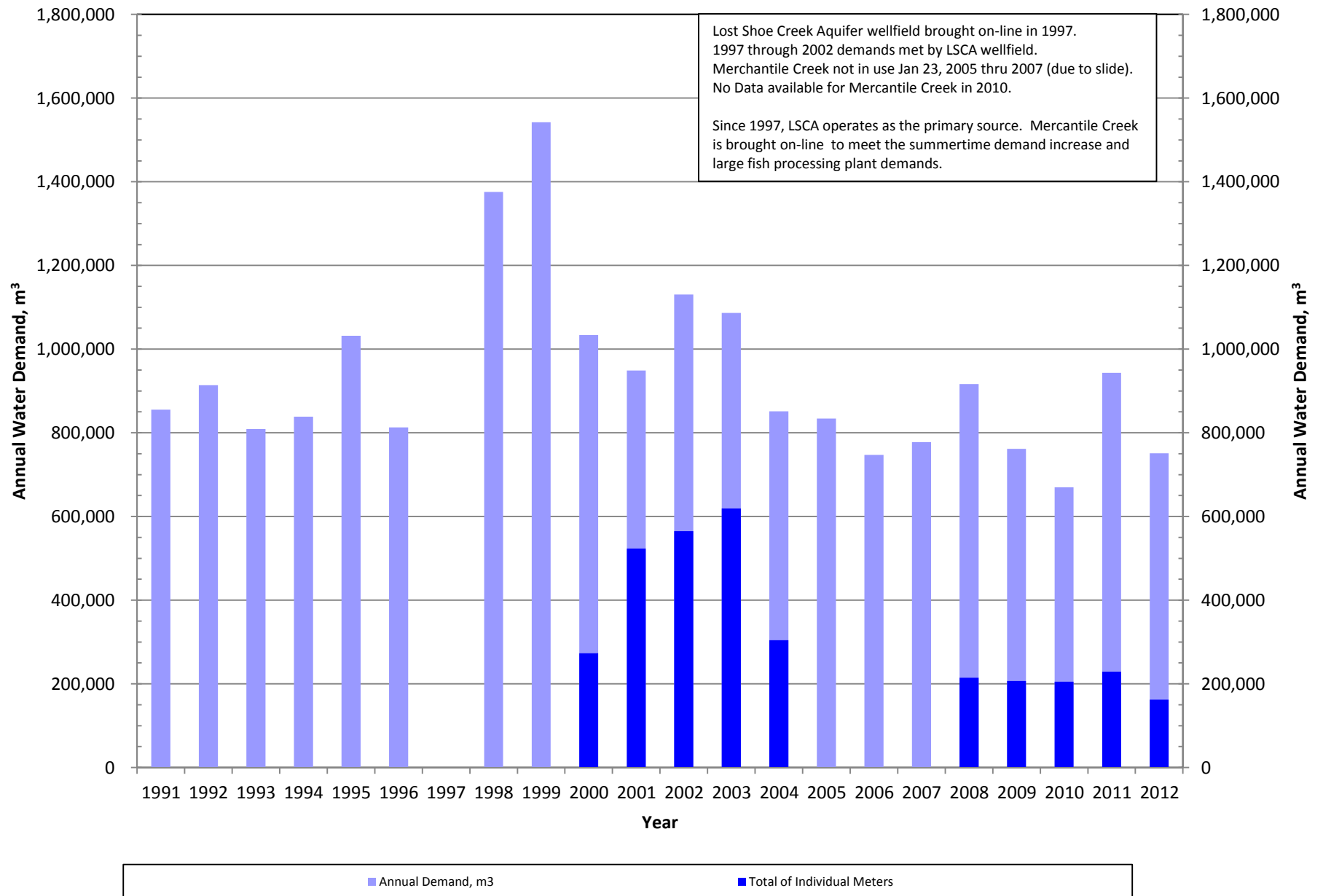
The annual system demand was compared against the annual metered demand for the two - five year periods of 2000 to 2004 and 2008 to 2012 to identify historical trends and is presented in Table 4.

The doubling of metered demand for years 2001, 2002 and 2003 was mostly due to increased demand from fish processing plants and resulted in metered demands accounting for 50% to 57% of the system demands.

Between 2000 and 2001, while metered demand increased by more than 250,000 m<sup>3</sup>, the system demand decreased by 84,500 m<sup>3</sup>. Discussion with the then Director of Public Works revealed that in May 2000, a hydraulic sump pump at the Matterson Reservoir control chamber found to be stuck in the open position was closed. District staff reported the closing was followed by a notable decrease in system demand. This combined net difference of 334,500 m<sup>3</sup>, equating to nearly 35% of the system demand, suggests the sump pump was a major source of non-metered demand.



## District of Ucluelet Annual Demand, 1991 - 2012





**Table 4 –Annual System vs Metered Demand  
2000 - 2004 & 2008 - 2012**

Year	Metered Demand (m <sup>3</sup> )	System Demand (m <sup>3</sup> )	<u>Metered</u> System (%)
2000	<u>272,893</u> <sup>(1)</sup>	1,033,660	<u>26</u> %
2001	523,127	949,104	55 %
2002	565,205	<b>1,130,347</b> <sup>(2)</sup>	50 %
2003	<b>619,078</b>	1,086,266	<b>57</b> %
2004	304,422	<u>851,107</u>	36 %
2008	214,754	916,612	23 %
2009	206,951	761,780	27 %
2010	205,034	669,747 <sup>(3)</sup>	<b>31</b> %
2011	<b>229,290</b>	<b>943,527</b>	24 %
2012	<u>162,365</u>	<u>750,887</u>	<u>22</u> %

Notes:

- (1) Lowest value in each column for each five year period is underlined.
- (2) **Highest value** in each column for each five year period is in **bold**.
- (3) No Mercantile Creek flow data was available for 2010.

### 3.4 SEASONAL & MONTHLY DEMAND VARIATION

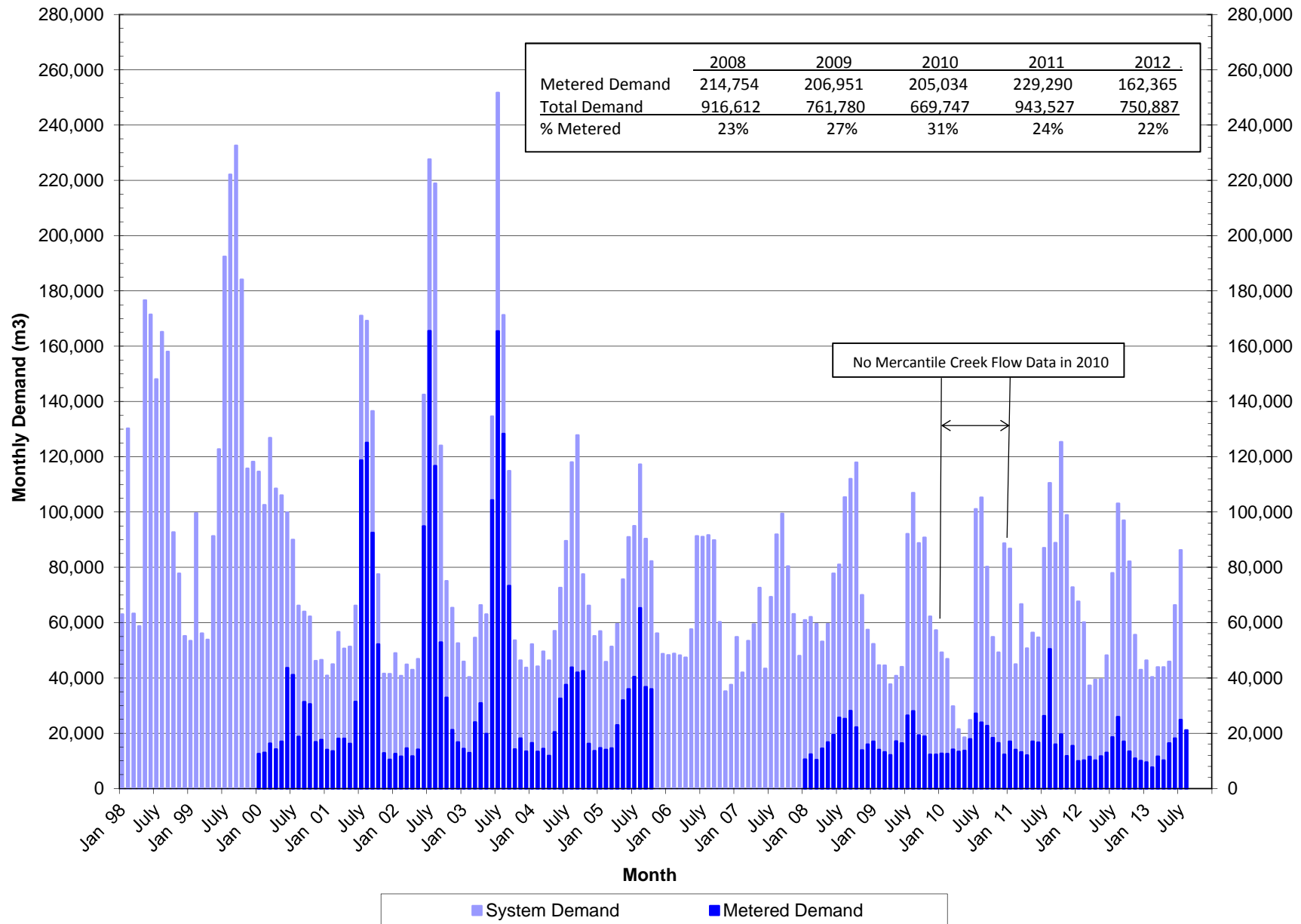
Water demands increase and peak during the summer to early fall months and are lowest during the spring and fall months; a typical water demand pattern. For Ucluelet, the demand increase during the summer is generally associated with warmer, dryer weather, increased fish processing, and seasonal population increase (tourism). These seasonal increases can be seen in Figure 3 which presents monthly demands from January 1998 to August 2013. Table 5 shows the lowest and highest demand months for the years 1998 to 2012.

**Table 5 – Lowest and Highest System Demand Month, 1998 - 2012**

Year	Lowest and Highest System Demand Month												Demand, m <sup>3</sup>	
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Lowest	Highest
1998	<b>L</b>				<b>H</b>								63,005	176,641
1999	<b>L</b>								<b>H</b>				53,424	232,579
2000			<b>H</b>								<b>L</b>		46,198	126,842
2001	<b>L</b>						<b>H</b>						40,852	171,054
2002		<b>L</b>					<b>H</b>						40,770	227,645
<b>2003</b>		<b>L</b>					<b>H</b>						40,270	<b>251,742</b>
2004		<b>L</b>							<b>H</b>				44,123	127,801
2005		<b>L</b>						<b>H</b>					45,802	117,224
2006								<b>H</b>			<b>L</b>		<u><b>35,170</b></u>	91,688
2007		<b>L</b>							<b>H</b>				41,988	99,465
2008				<b>L</b>						<b>H</b>			53,116	117,906
2009				<b>L</b>				<b>H</b>					37,656	106,932
2010 (1)					<b>L*</b>			<b>H</b>					<u><b>18,438</b></u> *	105,304
<b>2011</b>		<b>L</b>								<b>H</b>			44,976	<b>125,335</b>
2012			<b>L</b>					<b>H</b>					37,299	103,136
Totals <b>L</b>	<b>3</b>	<b>6</b>	<b>1</b>	<b>2</b>	<b>1</b>						<b>2</b>			
Totals <b>H</b>			<b>1</b>		<b>1</b>		<b>3</b>	<b>5</b>	<b>3</b>	<b>2</b>				



### District of Ucluelet Monthly System vs Metered Demand 1998 to Present





Note:

- (1) No 2010 flow data was available for Mercantile Creek. It is assumed this demand as well as those for March, April and June 2010 are inaccurate as they are all uncharacteristically low at less than 30,000 m<sup>3</sup> each compared to all other years, especially the two previous and following years, as shown in Figure 4.

While both the system and metered demands increase in the dryer (summer) months and decrease in wetter (fall/winter) months, a comparison of their highest and lowest monthly demands shows they do not necessarily occur in the same month. For the five year period of 2008 to 2012, only 2009 recorded a minimum metered and system demand in the same month; April. A maximum metered and system demand was recorded in the same month (August) in 2009 and again in 2012. Table 6 presents a summary of the annual minimum and maximum metered and system demands for years 2008 to 2012.

**Table 6 - Metered and System Demand,  
Minimum & Maximum Month, 2008 - 2012**

Description	2008	2009	2010	2011	2012
	Minimum Month and Demand (m <sup>3</sup> )				
<b>Metered Demand</b>	March 10,388	April 12,069	Dec 12,069 (1)	Nov 11,741	Jan <b><u>9,965</u></b> (2)
<b>System Demand</b>	April 53,116	April 37,656	May <b><u>18,438</u></b> (1)	Feb 44,976	March 37,299
Description	Maximum Month and Demand (m <sup>3</sup> )				
<b>Metered Demand</b>	Sept 28,102	Aug 28,007	July 27,165 (1)	<b>Aug 50,448</b> (3)	Aug 25,937
<b>System Demand</b>	Oct 117,906	Aug 106,932	Aug 105,304 (1)	<b>Oct 125,335</b>	Aug 103,136

Notes:

- (1) No Mercantile Creek flow data available for 2010.  
 (2) **Lowest value** for the five year period is in **bold and underlined**.  
 (3) **Highest value** for the five year period is in **bold**.

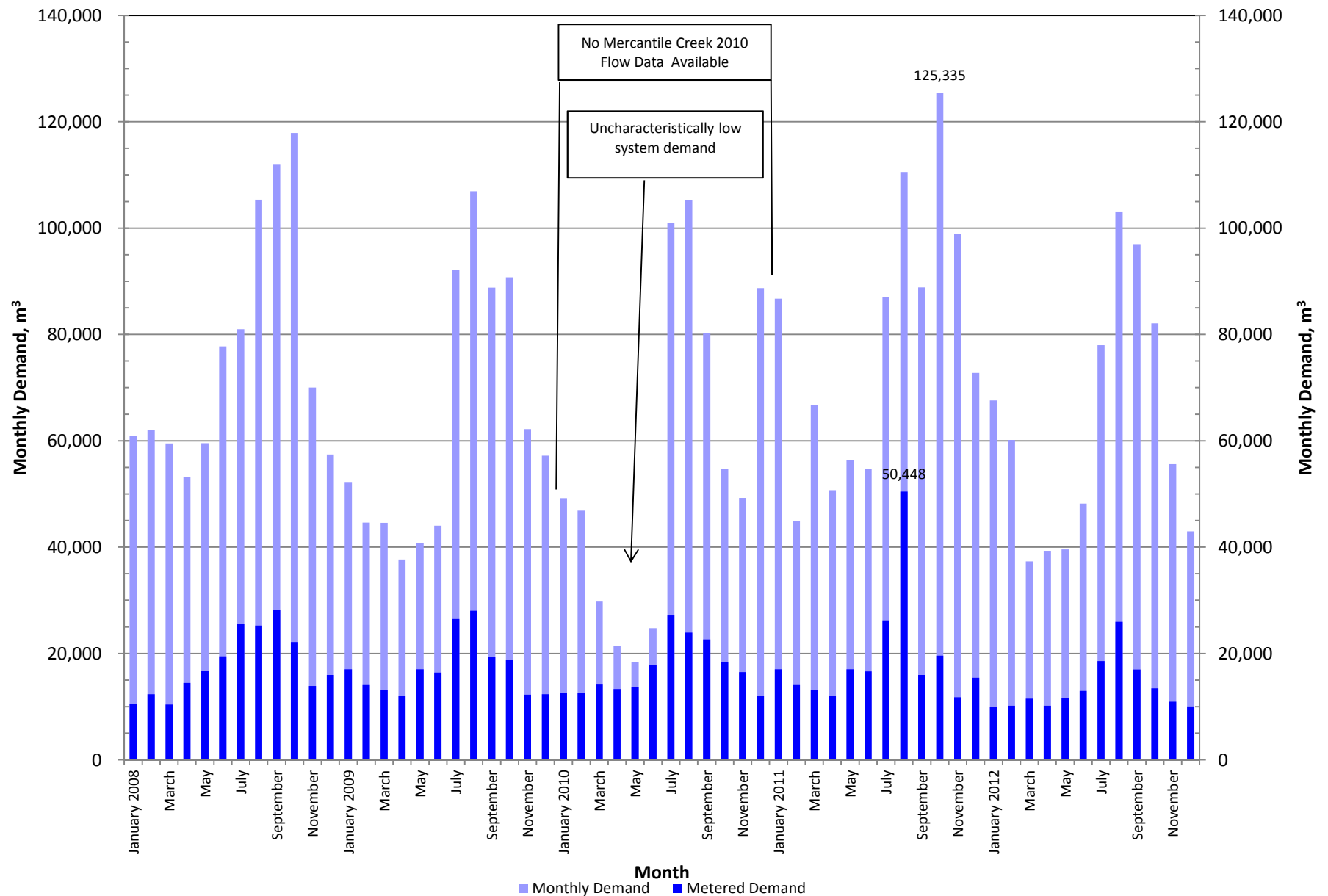
While the lowest metered demand for the five year period occurred in 2012, the lowest system demand was in 2010 (May). However as previously noted, no Mercantile Creek flow data was available for 2010, and is speculated that this is a false reading as this system demand is uncharacteristically low as shown on Figure 4. Only year 2009 recorded a minimum metered and system demand in the same month (April).

The highest metered and system demand for the five year period occurred in 2011, during the months of August and October; respectively.

The highest and second highest system demand occurred in the same month (October) for years 2011 and 2008; respectively. A reason for the system peak occurring in October, compared to the historical months of July, August or September, as shown in Table 5, could not be identified. The increase was not attributable to metered demand increase, as there was no notable increase from the previous month (September). Nor was the demand increase due to dry weather as a review of weekly and monthly October rainfall data indicated no unusual extended period of low rainfall. The Environment Canada recorded amount was just under the 56 year October average of 378 mm for both years.



## District of Ucluelet Monthly Demand, 2008 - 2012





The system maximum month demand had minimal variation in its peaking factor, ranging from 1.54 (2008) to 1.89 (2010) from the five year period average. The metered maximum annual demand however, had a wider peaking factor range, from 1.57 (2008) to 2.64 (2011) from the five year period average. This wider peaking range is not unexpected as flows generated from a subset of a larger group, in general have a larger variation.

A review of the summer time demand increase was carried out to quantify the seasonal increase and assess the potential for water conservation. The system and metered demand for the 4 month period of June to October was compared against the remainder of the year (November to June). The review of the five year period of 2008 to 2012 revealed the total volume during the four months was equivalent to 90% of total volume of the remaining 8 months. The comparison of the metered and system demand for each year is presented in Table 7.

**Table 7 – System and Metered Seasonal Demand, 2008 – 2012**

Year	Metered Demand			System Demand		
	July - Oct (4 months)	Nov - Jun (8 months)	<u>July - Oct</u> Nov - Jun	July - Oct (4 months)	Nov - Jun (8 months)	<u>July - Oct</u> Nov - Jun
2008	101,077	113,677	89%	<b>416,275</b>	500,337	<b>83%</b>
2009	92,601	114,350	<b>81%</b>	378,535	383,245	99%
2010 (1)	92,090	112,944	82%	<b>341,345</b>	<b>328,402</b>	<b>104%</b>
2011	<b>112,220</b>	<b>117,071</b>	<b>96%</b>	411,718	<b>531,809</b>	77%
2012	<b>74,928</b>	<b>87,436</b>	86%	360,223	390,664	92%
Total	472,916	545,478	87%	1,908,096	2,134,457	89%

Notes:

(1) No Mercantile Creek flow data available for 2010.

Largest value for each column is in **bold**.

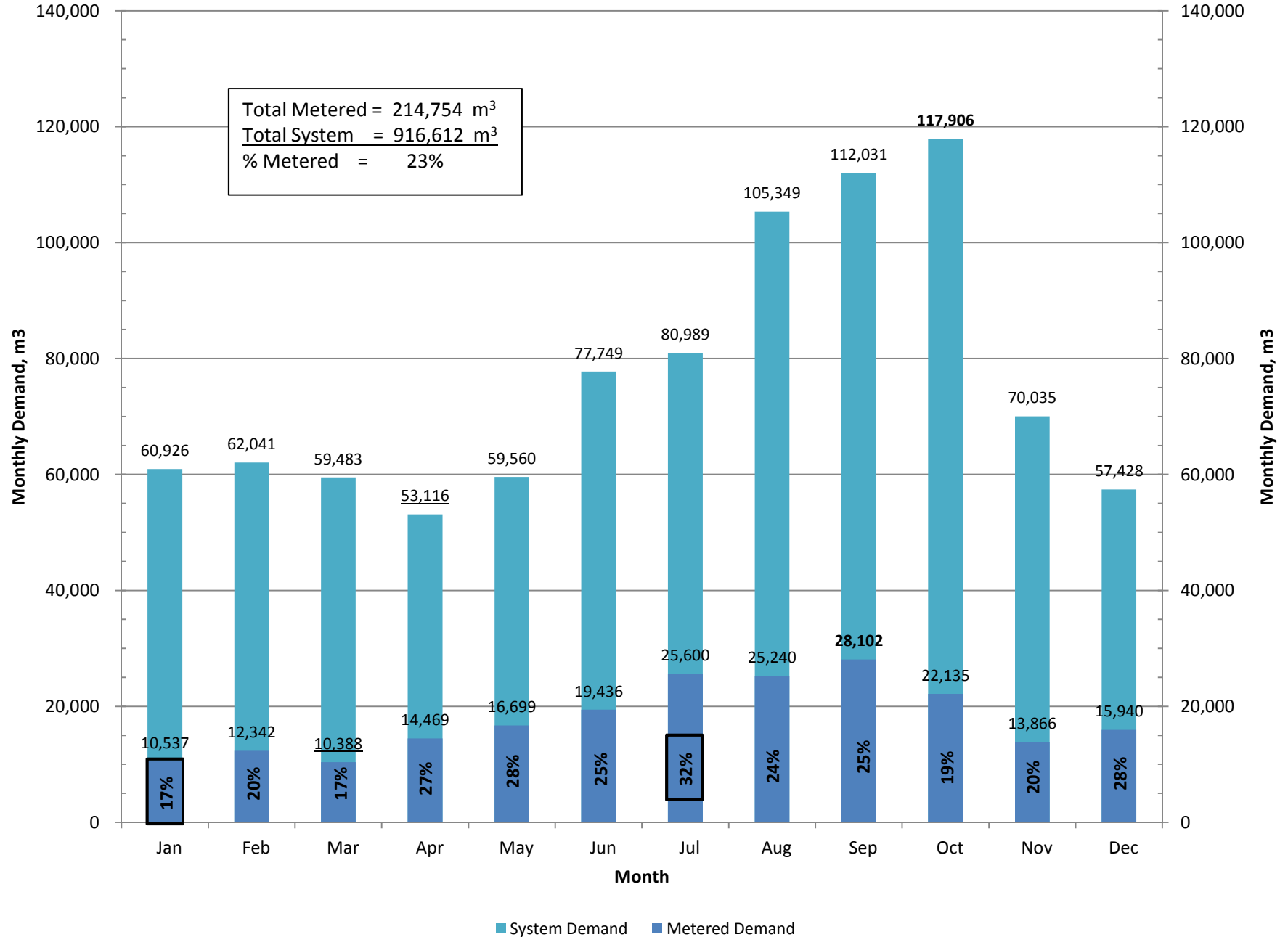
Lowest value for each column is in **bold and underlined**.

While the data shows the average monthly demand nearly doubles for the four month period compared to the eight month period, the increase is not considered unusual or excessive. The increase is significantly lower compared to other communities in the mid-island region on the east of Vancouver Island. For example, the average monthly demand four month period for the Comox Valley Water System can be double to quadruple the average monthly demand for the remaining eight months. This significant increase in the Comox Valley is believed to be mainly due to outdoor water use (lawn and garden watering). Ucluelet, with a more moderate climate, including summertime sea fog and shorter dry periods between rainfall events, would have a lower outdoor watering demand.

Figures 5 to 9 presents the monthly metered demand compared with the monthly system demand for years 2008 to 2012; respectively. The data shows the typical yearly cyclical pattern of increasing demand from spring to summer followed by decreasing demand from fall to winter. The highest and lowest demands per year are in bold and underlined; respectively. The amount of each month's metered demand as a percentage of the system demand is shown with the highest and lowest of each year inside a rectangle for ease of identification and comparison to other years.

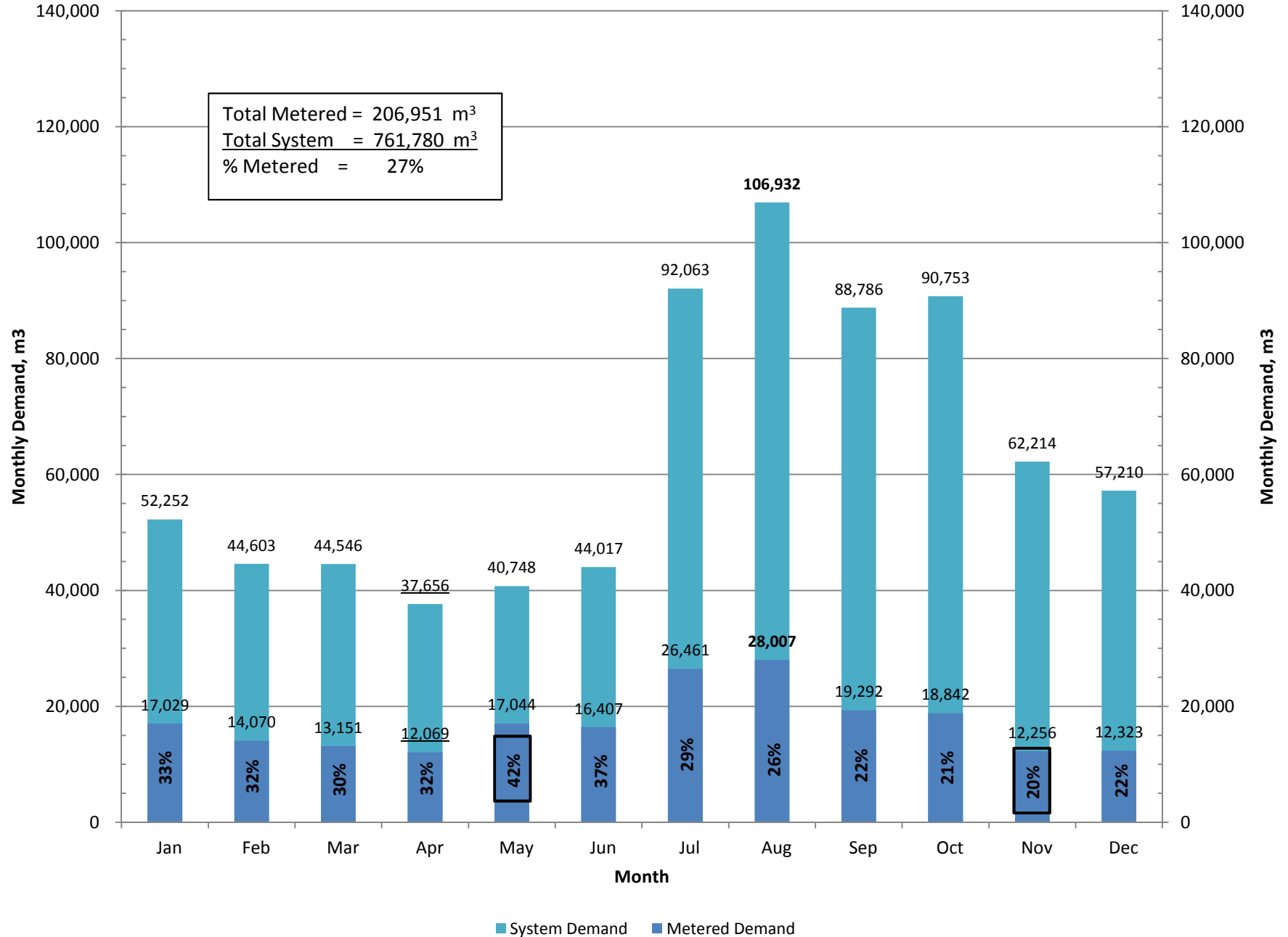


## 2008 System vs Metered Monthly Demand



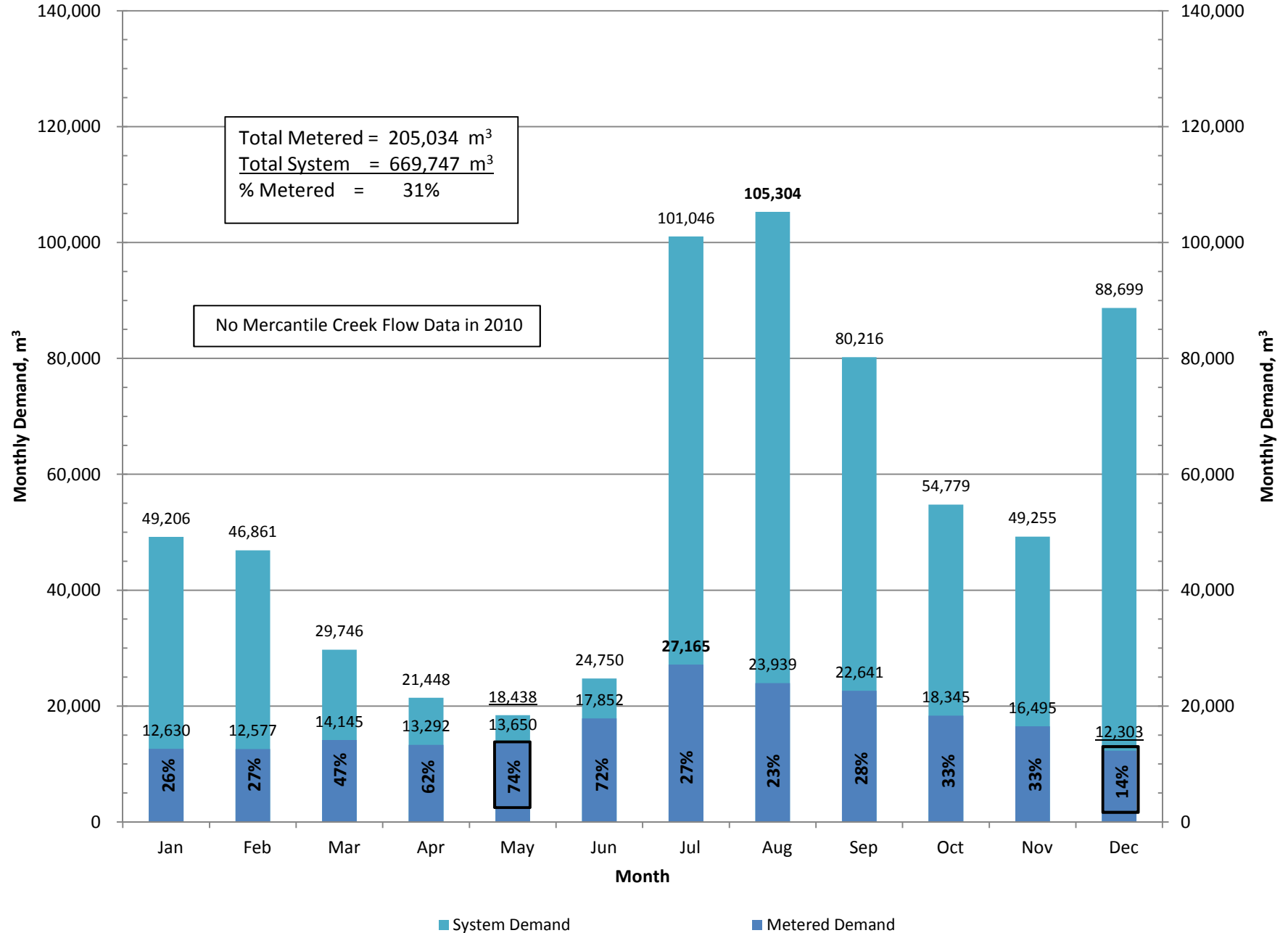


## 2009 System vs Metered Monthly Demand



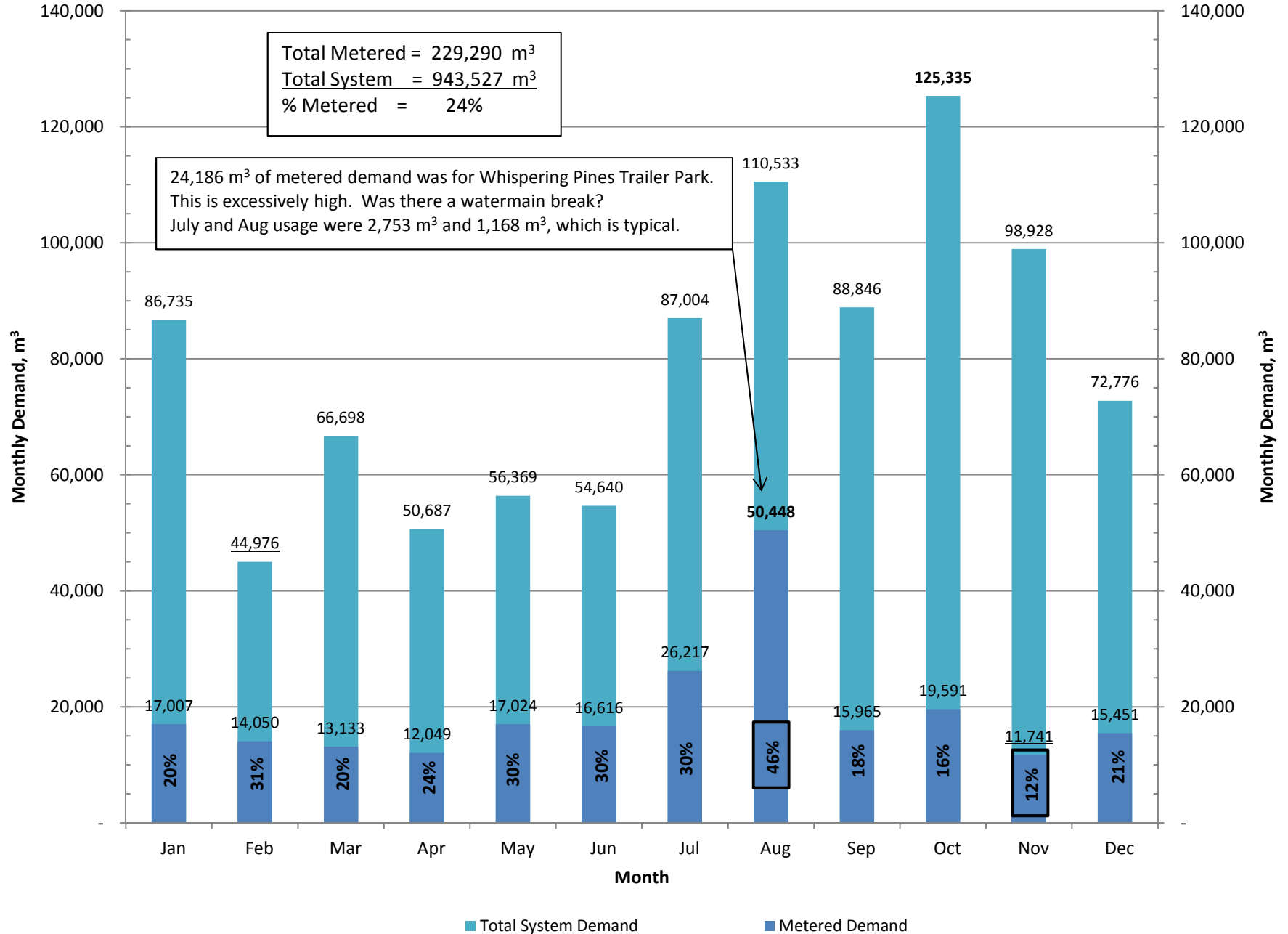


## 2010 System vs Metered Monthly Demand



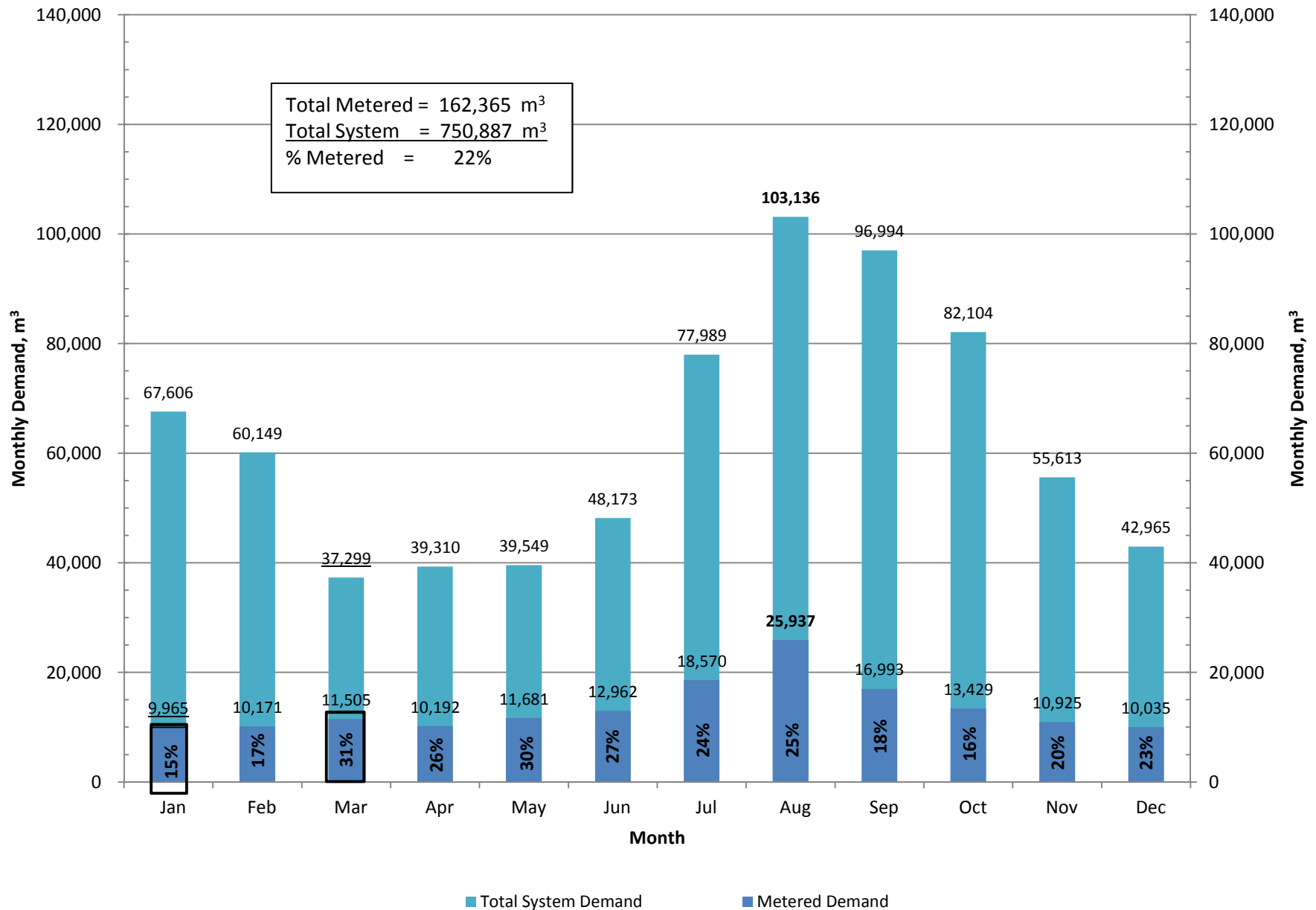


## 2011 System vs Metered Monthly Demand





## 2012 System vs Metered Monthly Demand





### 3.5 COMMERCIAL/INDUSTRIAL DEMANDS

In 2003, the three largest users were seafood processors and accounted for more than 70% of the metered demand. The top seven customers, five of which were seafood processors, accounted for more than 90% of the metered demand and 50% of the total system demand.

By 2008, metered demands had changed considerably with a significant reduction in fish processing demands. From 2008 through, 2012 the single highest user was Ucluelet First Nations (UFN), averaging around 55,000 m<sup>3</sup> per year, excluding 2012 when it dropped to 39,080 m<sup>3</sup> as shown in Figure 10. The UFN annual demand equates to approximately 25% of the metered demand and 5% of the total system demand. They were the single largest user for each year between 2008 and 2012.

By 2012, the three largest users were not seafood processors and their combined demand accounted for only 46% of all metered demand; a significant change from 2003. The top seven customers, of which only two were seafood processors, accounted for 72% of the metered demand and only 16% of total system demand. A comparison of the seven largest metered water users for Year 2003 and 2012 is presented in Table 8.

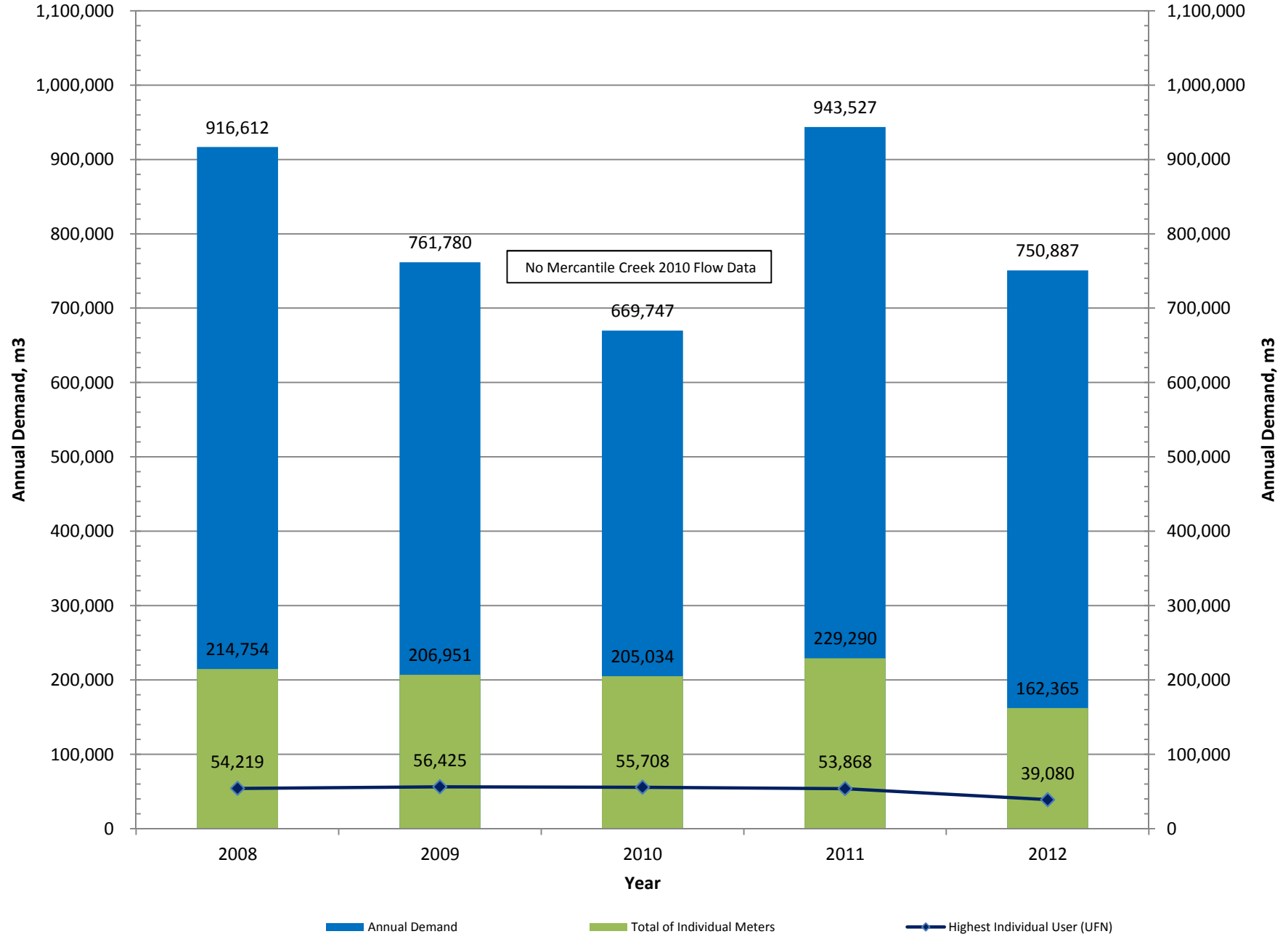
**Table 8 –Seven Largest Metered Water Users, 2003 and 2012**

<b>Customer</b>	<b>Metered Demand (m<sup>3</sup>)</b>	<b>Percentage of Total Metered Demand (%)</b>	<b>Percentage of System Demand (%)</b>
<b>Year 2003 (Metered Demand = 619,078 m<sup>3</sup> System Demand = 1,086,266 m<sup>3</sup>)</b>			
Ucluelet Seafood Processors	231,940	37.5	21.4
Canadian Seafood Processors	146,448	23.7	13.5
R. Wholey International	59,836	9.7	5.5
Ucluelet First Nations	45,740	7.4	4.2
Neptune Packers	37,325	6.0	3.4
Borstein Seafood - Port	26,439	4.3	2.4
Whispering Pines MH Park	19,561	3.2	1.8
<b>Totals</b>	<b>567,289</b>	<b>91.6 %</b>	<b>52.2 %</b>
<b>Year 2012 (Metered Demand = 162,365 m<sup>3</sup> System Demand = 750,887 m<sup>3</sup>)</b>			
Ucluelet First Nations	39,080	24.1	5.2
Black Rock Resort	20,304	12.5	2.7
Whispering Pines MH Park	15,757	9.7	2.1
Ucluelet Harbour Seafood	14,482	8.9	1.9
Borstein Seafood – Port	10,893	6.7	1.5
Ukee Ice	10,312	6.4	1.4
Canadian Princess	6,374	3.9	0.8
<b>Totals</b>	<b>117,202</b>	<b>72.3 %</b>	<b>15.6 %</b>

Table 9 presents the annual demand for each of the 70 meters for the past five years and are listed in order of consumption from largest to smallest consumption for the year 2012.



## Annual Water Demand, 2008 - 2012





**Table 9 - Annual Demands for Metered Customers, 2008 – 2012**

Meter No.	Business	Yearly Total (m <sup>3</sup> )				
		2008	2009	2010	2011	2012
UB258	Ucluelet First Nations	<b>54,219</b>	<b>56,425</b>	<b>55,708</b>	<b>53,868</b>	<b>39,080</b>
BLACK	Black Rock Resort (domestic & fire)		12,756	15,542	13,640	20,304
WP122	Whispering Pines Trailer Park	20,441	28,030	23,786	47,451	15,757
US323	Ucluelet Harbour Seafood	15,925	16,931	16,847	15,013	14,482
BSC01	Borstein Seafood	15,355	17,269	11,866	16,026	10,893
EQ848	Ukee Ice	10,545	8,543	8,229	11,135	10,312
CP262	Canadian Princess (Land & Ship)	10,481	7,844	8,642	8,038	6,374
DAL01	Davison Plaza	7,529	3,149	2,818	4,296	4,855
P1002	Terrace Beach Resort			3,386	1,536	3,594
	Small Craft Harbour	3,787	4,265	2,906	4,557	2,714
UL250	Ucluelet Lodge - meter 1 & 2	1,682	2,522	5,607	4,302	2,572
CH001	Strata Plan VIS5717	3,096	2,745	2,863	8,251	2,490
HTP81	Kampo Holdings (62.110)	1,593	1,682	1,795	1,594	2,485
RIDGE	The Ridge (domestic & fire)	788	1,006	1,467	1,391	2,400
WC275	West Coast Motel			127	1,115	2,258
IW752	Island West Resort	3,396	3,487	2,747	3,488	1,832
PM172/705	Pacific Rim Motel			988	877	1,610
LB712	Little Beach Resort				261	1,225
QC001	Barclay Sound Adventure Centre Inc	1,475	818	873	732	1,087
PR286	Primera 1&2	762	783	1,196	1,470	992
SI496	Nicole Bray	759	993	1,210	924	987
NM001	Pacific Escape Resorts	517	468	551	606	841
CG180	Coda Groups Holdings Inc	625	601	538	591	789
S5243	Strata VIS5243	798	754	835	784	752
	Senior's Centre	484	506	769	755	713
P1917	The Moorage (domestic & fire)		93	331	224	690
IW003	Island West - Eagle's Nest	413	680	517	725	671
RCC01	Cynamocka Coffee House	509	544	628	695	633
B2450	Martyszenko, Gary	632	568	574	603	583
WU001	West Ucluelet Mall	989	834	709	875	556
GH312	Gamel Holdings Ltd.	99	92	4,607	381	552
WD348	Wiskey Landing	3,537	1,637	406	1,265	522
PV379	Outside Inn	484	665	530	694	513
T2420 #1	Tuzo, Dan - Meter #1	322	342	364	419	468
E1332	Pleasant View Apartments			313	354	456
FR273	Jamie's Whaling Station Ltd	523	420	652	487	449
CB450	Coulas, Brent	333	3,209	1,336	1,189	414
PJ093	Pngel	280	447	228	519	400
H1073	Nor'western B & B			114	68	393
GS312	C&N Hostel	515	507	5,276	462	345
M0210	Fortune, Mark & Abby	485	441	348	407	310
ME858	Mas Enterprises Inc		265	373	274	308
PD509	People's Drug Mart	338	343	263	350	296
WK157	Waite, Ken	203	226	305	253	293
D2460	Duckmanton, Leverage	220	257	223	249	254



**Table 9 Continued**

Meter No.	Business	Yearly Total (m <sup>3</sup> )				
		2008	2009	2010	2011	2012
SD402	St. Jacques, Denis	269	353	365	214	223
N2325	Nakoks, Sabine (Walker, Ted)	198	173	204	179	179
GI914	Grimshire Jeffrey		169	91	199	175
KA754	Old Library	320	171	211	168	161
C2440	Cooper	179	215	199	175	151
FR371	Schmidt Thomas		145	140	140	150
SR304	Shantz Robert	99	118	116	130	144
B2490	Fend, Bill	187	132	190	140	133
TR846	Busby, Janet - Thoms, Rob	167	204	197	179	128
SB227	Son Bird Refuse & Recycling Ltd.	147	32	36	34	97
R2435	Reide, Kevin	822	407	278	403	72
ST258	T. Shepherd Trucking					66
OS837	H.L. Ostergaard & Son	22,487	4,551	247	3,844	62
HL195	Haga Leif	54	58	65	78	45
T2420 #2	Tuzo, Dan - Meter #2	82	95	52	74	42
FO313	Braker, Cliff		18	22	13	16
W2430	Whitworth, Jim	130	108	177	48	14
PC627	699122 BC LTD	4	7	14	10	7
E2400	Edward, Barry	157	161	1	-	-
U2390	Ucluelet Contracting Ltd.	2,348	592	1,012	249	-
NC532	Nauffts	57	29	-	-	-
CGB10	Co-op Gas Bar	556	261	435	155	-
RW201	Ucluelet Harbour Seafood Ltd.	-	-	-	-	-
NE788	Neptune Ice	22,352	15,807	11,592	9,664	-
BC722	Jim Pattison Enterprises Ltd.	-	-	-	-	-
Total Annual Metered Consumption, m <sup>3</sup> :		214,754	206,951	205,034	229,290	162,365
Total System Demand, m <sup>3</sup> :		916,612	761,780	669,747	943,527	750,887
Metered/Total System Demand, %:		23%	27%	31%	24%	22%

### 3.6 PER CAPITA DEMANDS

#### 3.6.1 Average Day and Maximum Month

Monthly bulk meter readings from the five year period of 2008 through 2012 were reviewed for the Lost Shoe Creek Wellfield and Bay Street water treatment plant to identify the average day and maximum month demands. Maximum and minimum day demands could not be determined for this period as daily demand data was not available. The same analysis was carried out for the five year period of 2000 through 2004 for comparative purposes. Statistics BC historical population projection data for each year were used to convert the data to per capita demands. This analysis showed a significant decrease in per capita demands corresponding with the large decrease in fish processing between the two periods.

Table 10 presents per capita average day and maximum month water demands for the two five year periods of 2000 - 2004 and 2008 - 2012. The maximum month demand occurred between July and October with the exception of the year 2000, which occurred in March, as previously noted in Table 6.



**Table 10 – Average Day and Maximum Month Demands  
2000 to 2004 & 2008 to 2012**

Year	Stats BC Estimated Population	Per Capita Demand			
		Average Day (lpcd)	Maximum Month Daily (lpcd)	Maximum / Average	Non-Metered Average Day (lpcd)
2000	1,619	1,744	<u>2,527</u> <sup>(1)</sup>	<u>1.45</u>	<b>1,284</b>
2001	1,580	1,646	3,711	2.25	<u>738</u>
2002	1,504	<b>2,059</b> <sup>(2)</sup>	4,883	2.37	1,029
2003	1,463	2,034	<b>5,551</b>	<b>2.79</b>	875
2004	1,557	<u>1,494</u>	2,773	1.86	959
<b>2000 – 2004 Average</b>		1,372	3,889	2.14	977
2008	1,577	<b>1,588</b>	1,878	<u>1.18</u>	<b>1,216</b>
2009	1,593	1,310	<u>1,723</u>	1.32	954
2010 <sup>(3)</sup>	1,605	<u>1,143</u>	1,841	1.61	<u>793</u>
2011	1,635	1,581	<b>2,294</b>	1.45	1,197
2012	1,615	1,270	2,129	<b>1.68</b>	996
<b>2008 – 2012 Average</b>		1,031	1,973	1.45	1,031

Notes:

- (1) Lowest value in each column for each five year period is underlined.
- (2) **Highest value** in each column for each five year period is in **bold**.
- (3) No Mercantile Creek flow data was available for 2010.

As can be seen in the comparison of the averages for each of two five year periods, while, both the average day and maximum month daily average have experienced notable decreases, the non-metered demand has seen a slight increase. The non-metered demand is calculated by subtracting the system demand from the total metered demand, as discussed previously in Section 3.2. This data is graphically presented in Figure 11 with the in-between years of 2005 to 2007 added.

### 3.6.2 Maximum Day Extrapolation

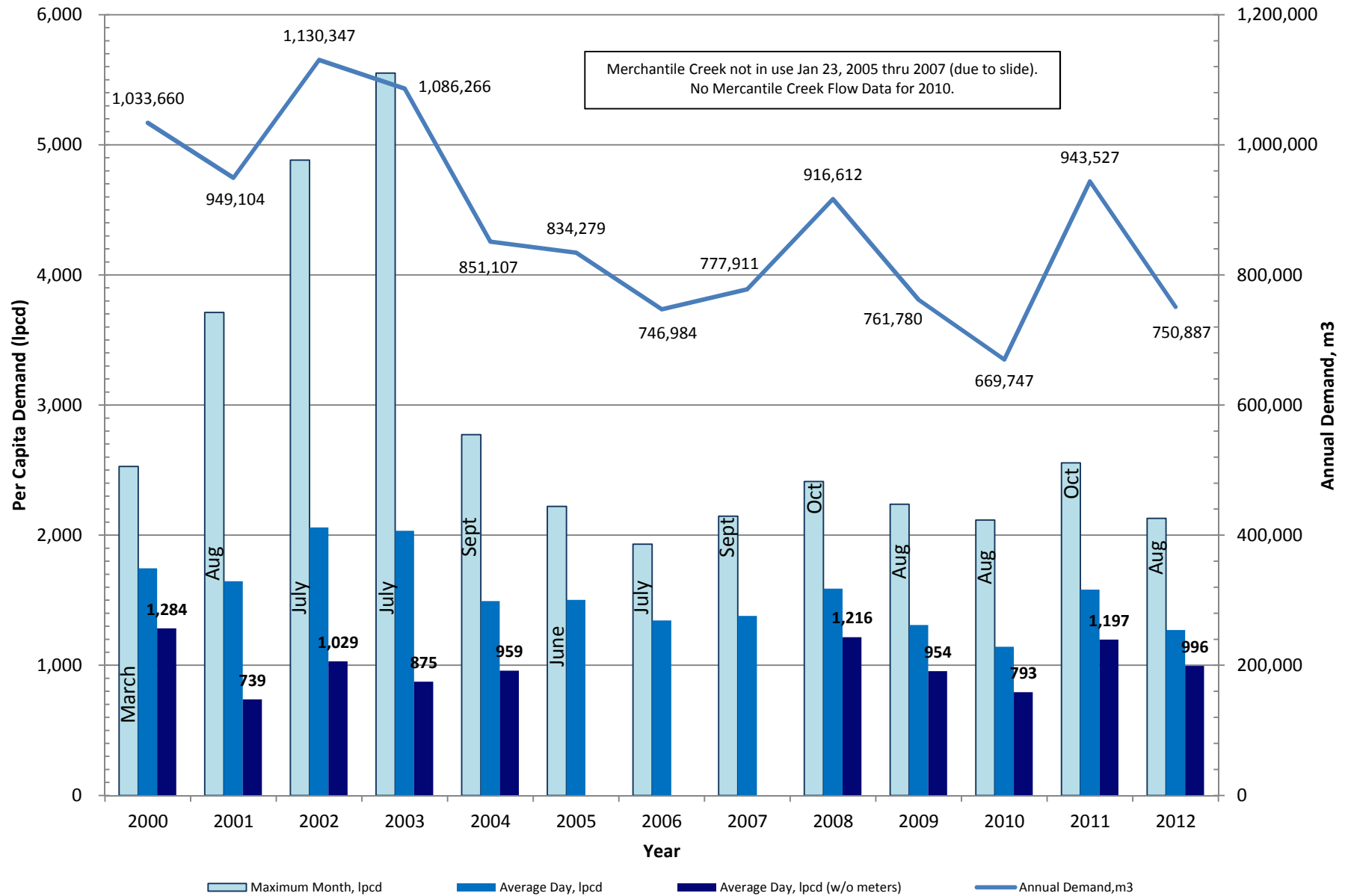
As no daily or hourly flow records are available for the years 2008 through 2012, the actual maximum day and peak hour demands cannot be obtained. The ratio of maximum day to average day was reported in the District's May 2004 Water Audit study by Koers & Associates. For the period of 2000 to 2003 it ranged from a low of 2.6 in 2000 to a high of 4.0 in 2001. Applying the highest multiplier (4.0) to the average day demand to each year between 2008 and 2012 results in an extrapolated maximum day demand ranging from 306 m<sup>3</sup>/hr in 2010 to 431 m<sup>3</sup>/hr in 2011. This compares to the combined pumping capacity of all four wells at the LSCA wellfield of 437.3 m<sup>3</sup>/hr, as noted in Table 1. If one of the pumps were to be unavailable, the wellfield may not be able to keep up with the demand, requiring either the use of the Mercantile Creek source, or development of the fifth well as planned when the wellfield was developed.

### 3.6.3 Various Vancouver Island Communities Demands

For comparison purposes, the average and maximum day per capita water demands experienced in other Vancouver Island communities is presented in Table 11.



## Average Day and Maximum Month Per Capita Demand & Annual Demand, 2000 - 2012





**Table 11 – Average and Maximum Day Per Capita Demands  
for Various Vancouver Island Communities**

Community, Study Year	2011 Canada Census Population	Study Per Capita Demand			
		Average Day (lpcd)		Maximum Day (lpcd)	Max/ Total Ave
		Residential	Total		
Ucluelet, 2012	1,627	996 **	1,270	2,129 ***	1.7 ***
Gold River, 2002	1,267	786 **	866	2,252	2.6
Tofino, 2000 *	1,876	331	1,008	2,168	2.2
Ladysmith, 1995 *	7,921	566	790	1,313	1.7
Qualicum Beach, 2003 *	8,687	---	570	1,420	2.5
Parksville, 1995 *	11,977	---	540	1,180	2.2
Comox, 2013	13,627	---	490	840 ***	1.7 ***
Port Alberni, 1995 *	17,743	366	1,118	1,777	1.6
Courtenay, 2003	24,099	---	635	1,417	2.2
Campbell River, 2001	31,186	---	635	2,100	3.3
Nanaimo, 1998 *	83,810	---	540	1,050	1.9
Average (excluding Tofino/Ucluelet)	---	---	703	1,581	---

\* Indicates municipalities which meter both residential and commercial properties.

\*\* These are non-metered demand values calculated as the difference between system demand and the commercial/industrial metered demands. As such, they are not solely residential demand but include all system water use excluding commercial/industrial use as discussed in Section 3.2.

\*\*\* Calculated as maximum month demand divided by the number of days in the month as daily demand data was not available. Actual maximum day demand and the resulting peaking ratio would be higher.

In general, higher per capita demands are experienced with smaller populations compared to large ones.

Water demands in Tofino and Ucluelet are affected by large tourist population increases in the summer months and high water usage by fish processing plants. Ucluelet has three processing plants while Tofino has one, which is reflected in the total average and maximum day/month values.

Domestic water demand for the pulp mill in Port Alberni and Campbell River is supplied by the municipal system, with the exception of the processing water demand at each Mill.

The comparison of the Ucluelet's average day non-metered demand of 996 lpcd to Tofino's residential demand of 331 lpcd, suggests implementation of a water conservation program for Ucluelet could be successful in reducing water use, resulting in cost savings to the rate payer by decreased annual pumping, water treatment, and disinfection costs and extending the life cycle of the District's wellfield and Bay Street pumping equipment.



### 3.7 DAILY AND EARLY MORNING HOUR DEMANDS

#### 3.7.1 Daily and Early Morning Demands

A comparison of the daily and early morning hour demands was carried out to assess demand changes over a 24 hour period. Daily and early morning demands, between 2 am to 6 am, for 2013 were extracted from the District's SCADA system data storage files. Daily pumped volumes from the LSCA wellfield were reviewed for the period Jan 1 to July 30. Early morning demands in 2013 were reviewed for the months of April and July.

An analysis of early morning demands was carried out as part of the District's May 2004 Water Audit by Koers & Associates. Demands between April 4 to 18, 2003 and May 2 to 7, 2003 were analyzed using water level readings recorded at five minute intervals from the District's highway reservoir. The signal was converted to a water level and plotted against time. The data was reviewed to confirm average day demand and rates of flow out of the reservoir after it had been filled and the wellfield pumps shut off.

Figure 12 presents the recorded daily demands for 2003 and 2013 along with the total demand between 2 am to 6 am; the metered monthly average day demand; and daily rainfall. While the daily demands were similar for the months of January, February and March for 2003 and 2013, the metered demands in 2013 were lower than in 2003. Beyond the month of March, the 2013 daily and metered demands are much smaller than in 2003.

The maximum day demand in 2013 was 3,720 m<sup>3</sup> recorded on July 17. This was only one-third of the 10,228 m<sup>3</sup> peak recorded on July 29, 2003. The lower daily and peak day demands compared to the highs of the early 2000's reflect the significant drop in fish processing demands (as discussed in Section 3.5 and shown in Table 8).

No notable correlation is evident between demand and rainfall, other than the seasonal demand increase occurring during the summer months when rainfall is lower. There is some correlation between early morning hour and daily demands.

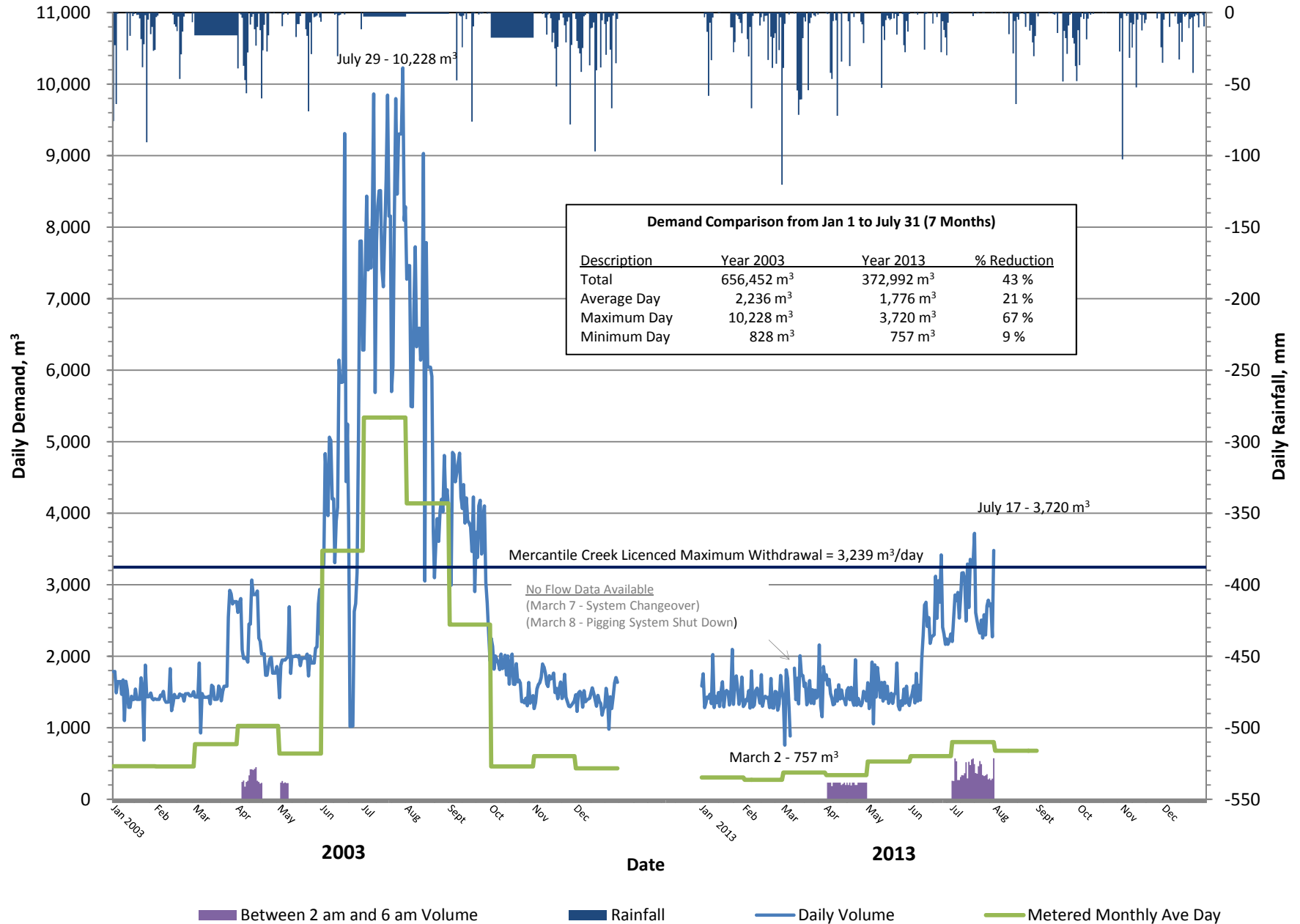
Early morning demands (2 am to 6 am) were compared with the demands for the remainder of the day (6 am to 2 am) by subtracting the 2 to 6 am demands from the daily demand readings. Converting the demands for each block of time to an average hourly reading permitted comparison between the two. These findings are presented in Table 12 for 2003 and 2013 and graphically in Figure 13.

**Table 12 – 2am to 6am & 6am to 2am Demands, 2003 and 2013**

Date	Average Demand, m <sup>3</sup> /hr		<u>2 am to 6 am</u> <u>6 am to 2 am</u>
	2 am to 6 am (4 hours)	6 am to 2 am (20 hours)	
<b>2003</b>			
April 4 – 18	77	104	74%
May 2 – 7	59	86	69%
Difference:	- 18	- 18	
<b>2013</b>			
April 1 – 30	56	62	90%
July 1 – 31	99	119	83%
Difference:		+ 57	

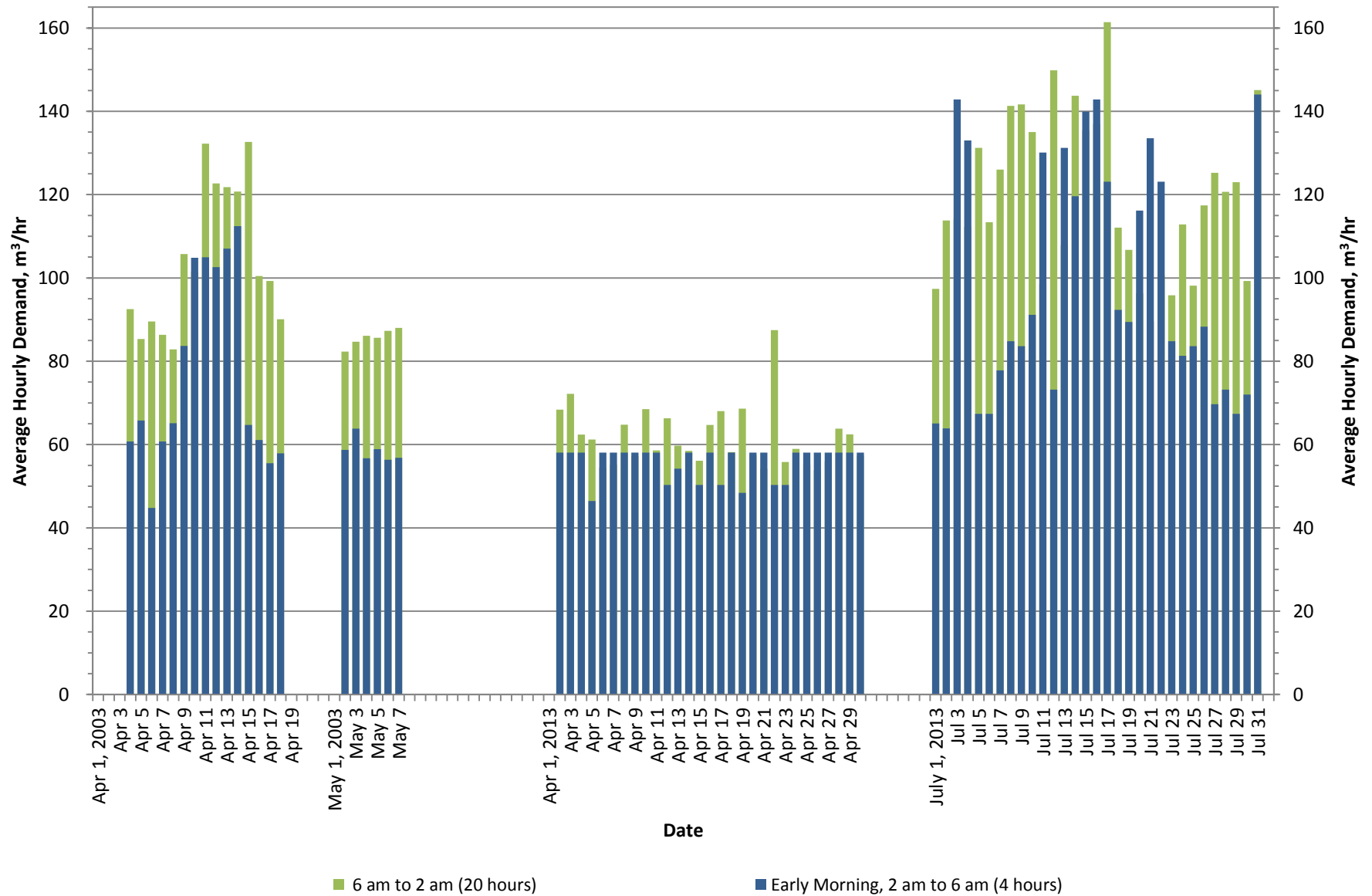


## District of Ucluelet Daily Demand, 2003 & 2013





## Daily and Early Morning Average Hourly Demands 2003 & 2013





Of significant interest is the higher than expected demand experienced between 2 am and 6 am in both years and the notable increase in the early morning hourly demand as a percentage of the 6 am to 2 am demand between 2003 and 2013.

A review of the 2013 metered demands for April and July, revealed an increase in nearly all metered customers with notable increases for fish processing and overnight accommodations. This is reflected in the increase in both the early morning and average day demands between the two months from 56 to 99 m<sup>3</sup>/hr and 62 to 119 m<sup>3</sup>/hr; respectively. Figure 13 shows the general correlation of an increase in daily demand corresponded with an increase in early morning hourly demand, as seen in April 2003 and July 2013. On a few days, in April 2013, the averaged hourly early morning demand was the same as or exceeded the averaged hourly demand for the remainder of the day, as seen on Figure 13 whenever the blue bar completely covers the green bar.

In 2003 and 2013, the lowest recorded flow between 2 and 6 am were nearly identical and only 1 day apart. In 2003, a flow out of the reservoir of 45 m<sup>3</sup>/hr was calculated on April 6. In 2013, a flow of 46 m<sup>3</sup>/hr was recorded on April 5 for the LSCA wellfield.

During the early morning hours, the system demand should normally be minimal, as most residents would be asleep and commercial/industrial businesses closed. Therefore, the majority of the demand during this period should be attributed to system loss/leakage. These could be from underground leaks at watermain joints, valves and tees, fire hydrants services, service connections, repair clamps, and cracks in the pipe wall and fittings; from leaky fixtures such as faucets, toilets and hose bibs; from constantly running taps; from fixtures with automatic or timed flushing valves; and reservoir overflows.

System losses from leaky faucets, toilets or other fixtures that discharge to the sanitary sewer system would be recorded by the Helen Road sewage pump station and the sewage lagoon flow meter, which are read daily. System losses at fish processing facilities would not be recorded, as the plants discharge to a separate sewage collection system, installed in 1996. This system connects directly to the municipal outfall, bypassing the municipal sewage collection and treatment system. In the 2004 Water Audit study, a review of the Helen Road sewage pump station and sewage lagoon flow meter records was inconclusive in identifying if flows entering the sewage collection system were the result of leaky fixtures and/or constantly running taps. No review was carried out for the 2013.

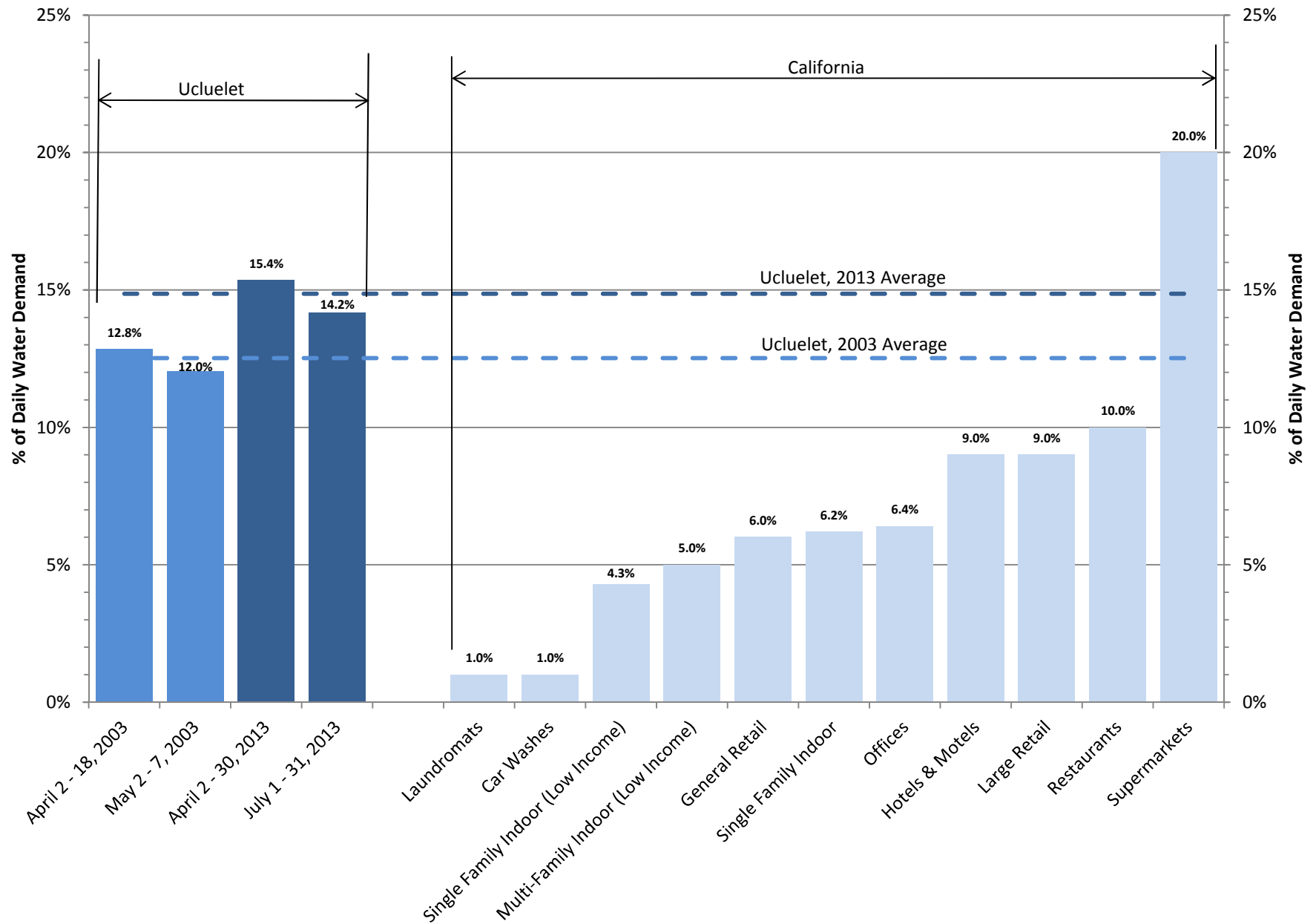
### **3.7.2 Early Morning Demands as Percentage of Daily Demands**

A comparison of Ucluelet's 2003 and 2013 early morning demand volumes as a percentage of the total day demand volumes was compared against published data for 11 different customers or businesses of varying water use patterns. The published data ranges from a low of 1% for laundromats and car washes, to around 6% for single family dwellings, general retail and offices, to 9 – 10% for hotels/motels, large retail businesses and restaurants, to a high of 20% for supermarkets. This information along with Ucluelet's calculated percentages for the 2003 and 2013 monitoring periods are presented in Figure 14. Ucluelet demands comprise the entire water system and include: water leakage/loss in the entire water system; irrigation of public parks, playfields, landscaped areas, and boulevards; and all other unmetered usages. Ucluelet contains each of the land-uses shown in Figure 14 in addition to others; notably fish processing.

As shown in Figure 14 and previously discussed for Table 12, Ucluelet's early morning hour demands appear higher than expected as a percentage of daily water demands.



## 2am to 6 am Demands Ucluelet and Specific California Land Uses





Ucluelet's high non-metered average day for 2012 shown in Table 10 and the District's high average day demand compared to other Vancouver Island communities shown in Table 11, also indicate high water demands.

### 3.7.3 Water Loss/Leakage Estimate

As the District's demands are made up of metered (commercial/industrial) and non-metered (residential and all other demands), an approximation of expected early morning demands as a percentage of daily demand can be made utilizing the District's commercial/industrial demands which are recorded monthly. During the 2003 monitoring periods in April and May, metered demands accounted for 47% and 31% of the system demands; respectively. During April and July of 2013, they accounted for 23% and 29%; respectively. Allowing for an average of 9% of daily demands for all metered customers and 6.5% for all non-metered demands to occur during the early morning hours of 2 am to 6 am, results in the combined totals for each monitoring period as shown in Table 13 below.

**Table 13 – Early Morning Demand Percentages, 2003 and 2013**

Monitoring Period	2am to 6am Demands as % of Daily Demands			Equivalent Hourly Demand (m <sup>3</sup> /hr)	Recorded 2 to 6am Demand (m <sup>3</sup> /hr)
	Metered (Assume 9%)	Non-Metered (Assume 6.5%)	Combined Total		
2003					
April	of 47% = 4.3%	of 53% = 3.4%	7.7%	47	77
May	of 31% = 2.8%	of 69% = 4.5%	7.3%	36	59
2013					
April	of 23% = 2.1%	of 77% = 5.0%	7.1%	26	56
July	of 29% = 2.6%	of 71% = 4.6%	7.2%	40	99

The difference between the equivalent hourly demand and the recorded hourly demand is the unaccounted for water. This lost/unaccounted for water will be occurring 24 hours a day. For the four monitoring periods, the difference ranges from a low of 23 m<sup>3</sup>/hr in May 2003 to a high of 59 m<sup>3</sup>/hr in June 2013. This equates to a daily volume of 552 m<sup>3</sup> and 1,416 m<sup>3</sup>, or 28% and 51% of the daily demand; respectively. The latter is very high, as unaccounted for water should be in the range of 15% to 25%.

The District of Tofino, with a similar size of population as Ucluelet, has a mixture of AC and PVC watermain but meters all residential and commercial customers. A 1999 water study identified the system loss/unaccounted for water volume at 16%.

Unaccounted for water would be made up of system leakage, meter inaccuracies, and non-metered usage occurring throughout the year which could include firefighting demands, watermain flushing, irrigation of public areas, reservoir overfilling, water theft, leaky check valves in well pumps after pump shutoff, etc. District staff have indicated overfilling of the Matterson Reservoir can and does occur when the Mercantile Creek source is not in use, due to its lower top water elevation than the Highway Reservoir (7.8 m difference), from which it is fed. District staff manually throttle one valve in the water distribution system (on Cedar Road at Cypress Road) to control the rate of flow from the Highway Reservoir to Matterson Reservoir. This has the effect of creating a



“temporary” pressure zone downstream of the throttled valves whose pressure will fluctuate with the increase and decrease with system demands. When demands are low, such as in the early morning hours, the system pressure will rise and could result in overflows at the Matterson Reservoir. Replacing the manually throttled valve with an altitude valve would create two pressure zones, eliminating overflows at the Matterson Reservoir. The altitude valve would be set to allow the water level in Matterson Reservoir to fluctuate to ensure turnover.



## 4 WATER CONSERVATION

### 4.1 GENERAL

Water use patterns in water abundant areas, such as the east and west coasts of Vancouver Island, have grown to proportions that are sometimes difficult to justify, considering a growing conservation movement, and the high cost of infrastructure and energy requirements for pumping.

Many people in water rich areas, such as the Vancouver Island, will argue that it is not necessary to conserve water, because there is so much of it. This perception of an abundant supply of water can be applied to Ucluelet, which receives an average of 3.4 metres (11 feet) of rainfall each year.

Reduced per capita water consumption in Ucluelet will have the effect of reducing operating costs, extending the life of the infrastructure, eliminate/delay a tax increase, or permit the reallocation of capital work and O&M moneys to other needed projects.

Water conservation is also termed demand-side management.

### 4.2 INDOOR WATER CONSERVATION

Within a home, the largest volume of water is used in the bathroom, followed by the laundry room and the kitchen. The pie chart below, from the Metro Vancouver website ([www.metrovancouver.org](http://www.metrovancouver.org)), shows, on a percentage basis, where water is used inside a typical home. Not noted in the chart is the percentage of water used for drinking and cooking. The Canadian Mortgage and Housing Corporation estimates this to be approximately 5% of indoor water use. It is assumed this would be included in the 14% associated with faucets.

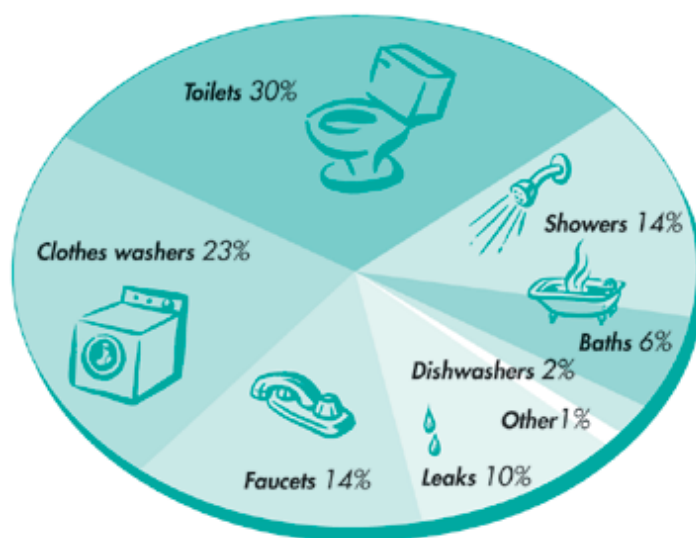


Figure 15 – Indoor Water Use for a Typical Home



A decrease in indoor water use can be achieved by reducing the volume of water used for each component without requiring a reduction in the frequency or duration of use. No change in the behaviour of the user is required. This is achieved by replacing toilets, showerheads, laundry and dishwashing machines with low-flow units, and retrofitting faucets with aerators. The reduction of flows used in the home would result in lower flows in the municipal sanitary sewer system, reduced pumping at the District's many sewage lift stations and free up capacity at the sewage treatment lagoon. Discussions on the installation of low-flow fixtures, aerators, and low water use appliances is presented below.

#### **4.2.1 Toilets**

Older toilets use between 13 to 20 litres per flush, compared to as little as 3 litres for a dual flush toilet. Water efficient toilets are available in four types:

- low flow (LF) – 6 litres per flush,
- high efficiency (HE) – less than 4.8 litres per flush,
- dual flush – 6 litres and 3 to 4 litres per flush,
- and flapperless – 6 litres per flush

A dual flush toilet has a two system flush; a 6 litre flush to remove solid waste and a 3 to 4 litre flush to remove liquid waste. Flapperless toilets use a half cylinder 6 L "tipping bucket" fixed near the top of the toilet tank which replaces the use of flappers and flexible seals inside the tank.

The use of low-flow fixtures in new construction and renovations is required by the BC Building Code, Section 10.3. It requires the use of low flow (6 litre or less) toilets and other water-saving plumbing fixtures and fittings including faucets and showerheads.

The reduction of water use in existing homes and businesses can be achieved through replacement of fixtures. Public education campaigns and/or an incentive programs providing a monetary rebate have been used effectively by other agencies to bring about the desired change.

#### **4.2.2 Faucets & Showerheads**

Standard faucet aerators can allow a flow of up to 16 L/minute whereas low-flow aerators, now required by the BC Building Code, are designed to reduce the flow by almost 50 percent.

Standard shower heads are reported to use between 15 L to 20 L/minute. A typical low-flow showerhead, which is now required by the BC Building Code, uses 9.5 L/minute or less. A further reduction can be achieved with a low-flow showerhead equipped with a shut-off button; allowing the user to interrupt the flow.

A public education campaign and/or distribution of conservation kits consisting of faucet aerators, low flow showerheads, and leak detection dye tablets can be used to bring about water reduction in homes and businesses. The dye tablet, consisting of a few drops of food colouring on a tablet, is placed in the toilet tank. After several minutes, the toilet bowl water is checked for any tinge of colour, which indicates a leak.



### 4.2.3 Appliances

A standard top loading clothes washing machine uses 142 L/load whereas the low-flow front loading model uses 92 L/load. Standard dishwashing machines use 53 L/load whereas low-flow models require only 34 L/load.

BC Hydro, through its Hydro Power Smart ENERGY STAR Appliance Rebate Program, has offered a rebate for the purchase of low flow washers. The District could introduce a rebate program for the purchase of low flow clothes washers similar to what other municipalities have done in recent years include the Comox Valley Regional District and the Capital Regional District.

Garborators require a high level of water to operate properly. The District could adopt a policy that does not allow for garborator installation in new homes or renovations.

## 4.3 POTENTIAL INDOOR WATER USE REDUCTION

Table 14 presents a comparison of the potential reduction in water used inside a home with the installation of water saving fixture and appliances.

**Table 14 – Indoor Residential Water Use Reduction**

Item	% of Water Used Inside the Home		
	Before	After	Reduction
<u>Fixtures</u>			
Toilet (13 vs 6 litres/flush)	30 %	14 %	16 %
Faucet (16 vs 8 litres/minute)	9 %	5 %	4 %
Shower (15 vs 9.5 litres/minute)	14 %	9 %	5 %
Bath	6 %	6 %	-
<u>Appliances</u>			
Clothes washer (142 vs 92 litres/load)	23 %	15 %	8 %
Dishwasher (53 vs 34 litres/load)	2 %	1 %	1 %
<u>Other</u>			
Cooking & Drinking	5 %	5 %	-
Leaks (1)	10 %	10 %	-
Other	1 %	1 %	-
<b>Total</b>	<b>100 %</b>	<b>66 %</b>	<b>34 % (2)</b>

Note:

- (1) No allowance has been made for reducing leaks. Some reduction would most likely occur during retrofitting fixtures and appliances. However, if there is no incentive to prevent leaks, over time they would return.
- (2) For the District of Ucluelet water system, it is estimated that a 1% reduction in residential indoor water use will translate into just under a 0.3% reduction in total annual demand. Therefore a system wide reduction of 34% in residential indoor would result in a system wide annual reduction of 9%.

The installation of a 6 litre per flush toilet will have the largest water use reduction at 16%; nearly ½ of the total estimated reduction. An additional 3% reduction could be achieved with the installation of a High Efficiency or dual flush toilet, which use 20%



less water than 6 litre toilets. Homes with toilets that use 20 L or more per flush would experience even larger reductions.

The 2<sup>nd</sup> largest reduction, at 8%, occurs with the installation of a low water-use clothes washer. However, a larger and significantly lower cost option is the combined installation of a low-flow showerhead and faucet aerators, resulting in a 9 % reduction.

The installation of a low water-use dishwasher results in a 1% reduction in total indoor water use.

Indoor initiatives resulting in a reduction in water flowing down toilets and sinks would result in reduced flows in the municipal sanitary sewer mains, at pump stations, and at the sewage treatment lagoon. These reductions would free up capacity to accommodate future growth, extend the service life of each component and reduce system operating and maintenance costs. Elimination of garborators would reduce organic loading on the sewage lagoon treatment process.

#### **4.4 OUTDOOR WATER USE**

Water use does increase in Ucluelet during the summer months with monthly demands being 2.5 to 3 times the winter month demands. The maximum day demand is even higher. These demand increases are not attributable to significant increases in metered demands, as noted previously in Sections 3.4 and 3.5. As can be seen in Figure 3 for the past five years (2008 to 2013), the increase in metered demands accounts for only a small portion of the increase in the system demand.

The exact cause for the significant increase in summertime non-metered water demand (system demand minus metered demand) cannot be identified from the flow data. For the east coast of Vancouver Island, the summertime increase is associated with significant increase in outdoor water demand for lawn and garden watering. For Ucluelet with its westcoast rainforest climate, summertime rainfall and fog events, and less emphasis on manicured lawns, this is not expected to be the case.

The overflowing of the Matterson Reservoir may be one of the sources for increased summertime demand. Other expected sources would include: irrigation of public playfields, boulevards and landscaped areas; increase in sport and recreational fishing and the associated use of water for fish, boat, and boat motor cleaning; vehicle washing; residential lawn and garden watering; and increase usage (indoor and outdoor) at non-metered connections due to warmer weather and dwelling population increase (vacationing friends, relatives, etc.).

#### **4.5 POTENTIAL OUTDOOR WATER USE REDUCTION**

There is insufficient data to identify, where outdoor water use from non-metered connections is occurring, if it is excessive, and what tools would be most appropriate to bring out demand side management or conservation.

Public education is a significant component of a water conservation and demand management plan. The public must be advised of:

- what the plan attempts to accomplish,



- why it is being implemented, and
- how the desired results will be achieved.

Without a successful public education program, residents may not “buy in” to the program as intended.

The customers need to be prepared for change. The goal of public education is to ensure a smooth process in achieving the objectives of demand-side management. Simply put, this means to reduce water use to slow down the need to expand system capacity in growing municipalities and reduce operating and maintenance costs. The objectives of implementing a public information program should be as follows:

- The public must be convinced that there is a problem that must be resolved. Thus, the question of *why save water?* must be addressed (i.e. to reduce system O&M costs to avoid or postpone increased taxes).
- It must be demonstrated that it need not involve lifestyle changes or sacrifices. Thus, the question of *how can we save water?* must be dealt with.
- Continuing education must be provided in order to reinforce the public awareness of the benefits of *responsible water use*.

These needs are a lot more difficult to communicate in areas where water is abundant during the spring, fall, winter, and sometimes the summer months, like Ucluelet. If the public can be convinced of the needs and advantages to save water and/or eliminate wasteful use, then the necessary measures to implement water conservation should be acceptable.

#### **4.6 LEAK DETECTION**

Leak detection programs can achieve many benefits, including the obvious advantage of reducing water losses. Another not so obvious advantage is the improved knowledge of the distribution system for operators and managers. There are two basic types of leaks: visible and non-visible. These can occur within the road and pipeline rights-of-way where the Village has responsibility for ownership and repair, or on private property.

Leak detection on private property can be identified by the District for metered services, through comparing against previous usage records at the same time-of-year billing period. This loss would normally be noticed by the property owner, as a result of increased billings. Excessive water ponding and running from private property can be indicative of pipe leakage. Leakage on private property, which drains without visible evidence or flooding, can be virtually impossible to detect without individual metering to identify the excessive flow.

As discussed previously in Section 3.7.3, system leakage and unaccounted for water could be 28% or more of the average day demand. This is high and further investigation is warranted to locate and stop it. One of the expected main sources is the overflowing of the Matterson Reservoir, caused by the different top water elevation of the Highway Reservoir and no pressure control valves in the system to create the necessary pressures.



It is understood the District does not have an active leak detection program, but responses to leaks as they become known. A pro-active, in place of a re-active, program would be a key component of a water conservation plan. A leak detection program concentrating initially on older service connections and areas with AC material mains, which comprise 23% of the water distribution system, as shown in Table 2, would be an appropriate starting point.

#### **4.7 UNIVERSAL METERING**

Universal metering cannot be successful as a demand-side management tool unless it is accompanied by an appropriate rate structure that discourages excessive use. There are two significant components to the billing structure. The first component is the rate (\$) per volume ( $m^3$ ) of water used. It is logical to assume that as the cost rises to the point where consumers feel the financial impact, they will likely attempt to reduce their water usage. The second component is that of the type of billing structure used. There are four ways of pricing water: flat rate, declining block rate, constant block rate, and increasing block rate.

The District of Ucluelet has water meters most but not all commercial connections, while residential customers are not metered. The District charges a flat monthly user rate for non-metered customers. Metered customers are charged a combination flat monthly rate depending on the size of the service connection, plus an additional constant block rate when the monthly volume allotment of  $50 m^3$  is exceeded. A copy of the District's water rates and fees is presented in Appendix B.

With the advent of automatic meter reading systems, a fifth method of pricing water is expected to gain in prominence as these systems become more affordable: time of use and seasonal pricing. The latter is considered by many to be the most appropriate billing structure, as it relates closest to the cost of providing peak water demands. This method of pricing has been in use by electrical utilities for some time, but has not yet found much use in the domestic water industry.

An American Waterworks Association (AWWA) Water Industry Data Base shows that in 1994 roughly eighty four (84) percent of the utilities surveyed did not use conservation pricing for water. About half of those used declining block rates and the other half used uniform rate structures. Only 16 percent used conservation pricing by increasing block rates.

Traditionally, water rates that decline with increased use have been used to attract industry and to promote water use for revenue gain. However, as population pressures and water development costs increase, it is considered unwise to use cheap water as an economic development or revenue tool.

The B.C. Government is actively encouraging water conservation and demand-side management pricing, to conserve aquatic environments, to promote efficient use of water, and discourage wastage of water. In time, revisions to the Water Act and government funding policies may be implemented to support these objectives.

The objective of conservation pricing would be to move to a user pay system, which would fairly reflect the true cost of providing additional water at peak flow rates. Thus, it would provide a means to encourage responsible use.



When moving from a flat rate to a user pay system, it is important to emphasize that pricing levels are set so that the average user sees little or no change in its water bill.

It is also important to recognize the difference in residential, tourist commercial, and commercial/industrial water use. Whereas residential and tourist commercial water conservation targets low flow fixtures, wasteful use, and seasonal outdoor use, commercial/industrial water conservation should only target wasteful use, as a certain base use is required to maintain a viable production or service level. A unit of residential development uses more water than a unit of tourist commercial development. Care must be exercised to not apply the same base usage values to residential, tourist commercial, and commercial/industrial establishments, as this would result in non-achievable conservation targets, and increased water bills for those not able to meet the base target due to minimum requirements to maintain a viable business. Increasing block pricing structures should be designed for several water use categories.

The Greater Vancouver Water District considered a three tier modified increasing block rate structure, where the lower first two price levels are keyed to cost recovery in order to ensure that the utility generates adequate revenues to cover its fixed costs. The third price level increases with increased use and represents the long term costs to the water supply and transmission system due to wasteful water use.

The goal in applying that type of pricing system is to reward those consumers who use water responsibly. If the pricing levels are properly designed, the average consumer should not be faced with a higher bill. The user pay philosophy also provides the consumer with freedom of choice to waste water. The two or three tiered system of pricing also lends itself to seasonal pricing, from regional as well as municipal perspectives. If the revenues from the lowest tier of the rate structure are set to recover the utility's fixed costs, the vulnerability to revenue fluctuation is reduced.

Some water systems charge a higher rate for water used during the summer. Because the peak summer demand drives the need for system expansion, peak use is billed at marginal cost (i.e. the cost of expansion due to peak demands). In order to deal with revenue instability that may be associated with conservation rate structures, the City of Seattle established a Rate Stabilization Fund, which is replenished in years when water sales are high, and drawn upon when sales are low.

Installation of a universal metering in Ucluelet would be appropriate if the results of the leak detection program show there is minimal system loss, which is suspected not to be the case. Installation of water meters for the approximately 800 dwelling units in Ucluelet is expected to cost between \$800,000 – \$1,000,000.

#### **4.8 EFFECT OF WATER CONSERVATION ON WATER DEMAND**

Conservation efforts in Ucluelet will have the most effect if they are directed at reducing non-metered water demands which count for more than 70% of water demand. This is a significant change from 10 years ago, when metered demands accounted for more than 50% of system demands and fish processing demand made up more than 80% of the metered demands, or 40% of the system demands.



The motivation for conservation of water use is immediate reduction in O&M costs and the future postponement of major capital expenditures for water supply and distribution. It is believed the most appropriate starting point for a successful water conservation program is the elimination of overflows at the Matterson Reservoir with the installation of pressure control valves. This will create two pressure zones; the Highway Reservoir zone and the Matterson Reservoir zone. The second step would be an emphasis on understanding non-metered water demand usage and the causes for the large summertime demand increases and/or a concerted effort on leak detection, with initial emphasis on the 23% of the water system with AC mains.

It is believed that a successful water conservation\leak reduction program in Ucluelet may result in a 27% or greater reduction in water use as follows:

**Table 15 – Potential Demand Reduction through Water Conservation Program**

<b>Description</b>	<b>Potential Annual Demand Reduction</b>
50% reduction in loss/unaccounted water	15 %
20% reduction in indoor residential use	5%
25% reduction in non-metered summertime demand (July/Aug/Sept/Oct)	8 – 10 %
Total Reduction:	28 – 30 %



## **5 CONCLUSIONS AND RECOMMENDATIONS**

---

### **5.1 CONCLUSIONS**

The following conclusions may be drawn from the work presented in this report:

1. The District obtains its water from two sources; one being groundwater, the other surface water. Groundwater is extracted by four wells at the Lost Shoe Creek Aquifer (LSCA) wellfield located at the northern end of the District. Surface water is collected from Mercantile Creek, located on the east side of the Ucluelet Inlet at the southern end of the District, via a stop-log weir with spillway and a concrete intake channel.
2. The District's population is experiencing positive but slow growth, equal to approximately 1% per year for the past six years (2006 to 2012). In 2012, the population was estimated to be 1,615. The OCP projects population will continue to rise over the coming years at an average rate of 0.6% per year, reaching 1,800 by 2031.
3. Ucluelet's per capita water demands are notably compared to other central Vancouver Island communities. It is thought these high demands are due to excessive water loss/leakage within the water distribution system.
4. Water meters are installed on commercial/industrial businesses. Residential properties are not metered.
5. Metered demands account for approximately 25% of the District's entire system demand.
6. Fish processing plant water demands are down significantly from a 10 years ago and are no longer the largest user. The largest user for the past five years has been Ucluelet First Nations, accounting for just under 25% of all metered demands and 5% of the District's entire system demand.
7. Maximum month demands, for both the system and metered customers, occur between July and October, with the most common month being August.
8. Summertime system demands are 2.5 to 3 times winter time demands, and is not unexpected. The increase in metered demands accounts for only a small portion of the increase in the system demand as can be seen in Figure 3.
9. In 2013, the District's water demands during the early morning hours of 2 am and 6 am equaled 15% of the daily water demand. In 2003, it was 12.5%. Both are considered to be very high. The expected range is 7% to 8%.
10. The excessive early morning demands equate to 28% to 51% of the daily demands. This unaccounted for water use is considered excessive as the range of 15% to 25% is expected.
11. District staff has indicated overflowing at the Matterson Reservoir does occur when only the wellfield source is in use. This is because of the lower top water



level of the Highway Reservoir than the Matterson Reservoir and no pressure reducing valves in water system to create the necessary separate pressure zones between the two.

12. A 50% reduction in unaccounted for water demand would result in a 15% decrease in the District's total annual demand.
13. A 20% reduction in indoor residential water demand would result in a 5% reduction in District's total annual demand.
14. A 25% reduction in non-metered demands during the four months of July, August, September, and October would achieve a 8% - 10% reduction in the District's total annual demand.
15. A reduction in water demand will have the effect of reducing operating costs, extending the life of the infrastructure, and eliminating/delaying a tax increase or permitting the reallocation of capital work and O&M moneys to other needed projects.
16. Based on the information available, the District of Ucluelet would benefit the most by water conservation\reduction through elimination of overflows at the Matterson Reservoir by installing pressure reducing stations. This should be followed by understanding non-metered water demand usage and the causes for the large summertime demand increases and/or a concerted effort on leak detection, with an initial emphasis on the 23% of the water system with AC mains.

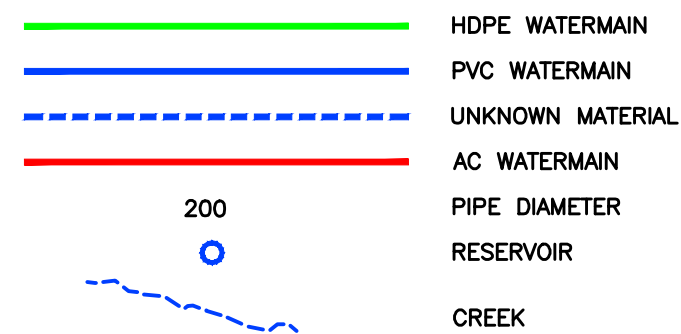
## **5.2 RECOMMENDATIONS**

Based on the conclusions reached in this report, it is recommended that the District:

1. Install pressure reducing valves to create two separate pressure zones; the Highway Reservoir zone and the Matterson Reservoir zone.
2. Undertake a proactive approach to a Leak Detection and Repair program, starting with a concerted effort on the 23% of the District's watermains that are AC.
3. Continue to monitor water demands during the early morning hours of 2:00 am to 6:00 am, to confirm the extent of the reduction in system losses as leaks are found and repaired, or determine if system leakage is increasing due to ageing watermains.



LEGEND



LOST SHOE CREEK WELLFIELD, 1997  
SODIUM HYPOCHLORITE SOLUTION  
PUMP 1: 25.2 l/s, 67 m TDH  
PUMP 2: 28.4 l/s, 67 m TDH  
PUMP 3: 44.2 l/s, 68.5 m TDH  
PUMP 4: 23.7 l/s, 67 m TDH  
PUMP 5: UNDEVELOPED

HIGHWAY RESERVOIR  
BOLTED STEEL, 1997  
1,400 m<sup>3</sup> (300,000 i.g.)  
BASE ELEV. 53.2 m  
TWL ELEV. 64.8 m  
DIAMETER 12.7 m

BAY STREET PUMP STATION, 1985  
2014 UPGRADES INCLUDE TWIN UV  
REACTORS WITH SODIUM HYPOCHLORITE AND  
TWO 40 hp VERTICAL CENTRIFUGAL TURBINE  
PUMPS, 40 l/s EACH AT 45 m TDH.

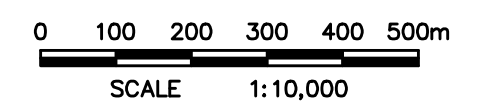
MERCANTILE CREEK, 1958  
INTAKE UPGRADE, 1972  
GRAVITY INTAKE ELEVATION 40m.  
2.5 KMS, INTAKE TO BAY ST.

MATTERSON DRIVE RESERVOIR  
BOLTED STEEL, 1983  
EXTERIOR REPAINTED IN 2000  
1,200 m<sup>3</sup> (250,000 i.g.)  
BASE ELEV. 37.2 m  
TWL ELEV. 57.0 m  
DIAMETER 8.8 m



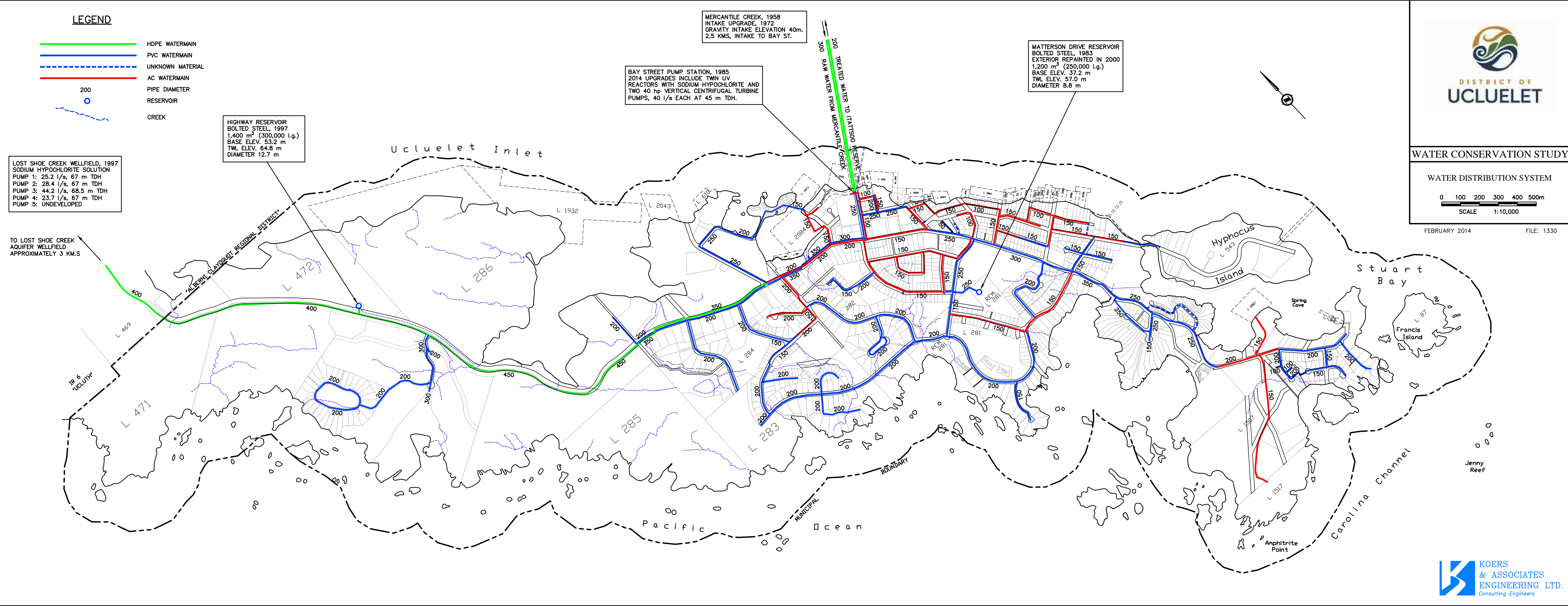
WATER CONSERVATION STUDY

WATER DISTRIBUTION SYSTEM



FEBRUARY 2014

FILE: 1330





## APPENDIX A

-

Mercantile Creek Water Licences



## Water Licences Report

Scroll to bottom of page for unique count of licences and/or applications found in your search

<u>Licence No</u>	<u>WR Map/ Point Code</u>	<u>Stream Name</u>	<u>Purpose</u>	<u>Quantity</u>	<u>Units</u>	<u>Qty Flag</u>	<u>Rediv Flag</u>	<u>Licensee</u>	<u>Water District/Precinct</u>	<u>Licence Status</u>	<u>Process Status</u>	<u>Priority Date</u>	<u>Issue Date</u>
C024206	92.C.093.3.2 A (PD29529)	Mercantile Creek	Waterworks Local Auth	41483.071	MY	T	N	DISTRICT OF UCLUELET PO BOX 999 UCLUELET BC V0R3A0	ALB - ALBERNI	Current	N/A	19580128	
C026923	92.C.093.3.2 A (PD29529)	Mercantile Creek	Waterworks Local Auth	41483.071	MY	T	N	DISTRICT OF UCLUELET PO BOX 999 UCLUELET BC V0R3A0	ALB - ALBERNI	Current	N/A	19610329	
C029963	92.C.093.3.2 A (PD29529)	Mercantile Creek	Waterworks Local Auth	41483.071	MY	T	N	DISTRICT OF UCLUELET PO BOX 999 UCLUELET BC V0R3A0	ALB - ALBERNI	Current	N/A	19650104	
C035653	92.C.093.3.2 A (PD29529)	Mercantile Creek	Waterworks Local Auth	829661.425	MY	T	N	DISTRICT OF UCLUELET PO BOX 999 UCLUELET BC V0R3A0	ALB - ALBERNI	Current	N/A	19690618	
C061385	92.C.093.3.2 A (PD29529)	Mercantile Creek	Waterworks (Other)	454.609	MD	T	N	UCLUELET FIRST NATION PO BOX 699  UCLUELET BC V0R3A0	ALB - ALBERNI	Current	N/A	19821015	
								DISTRICT OF					



C104912	92.C.093.3.2 A (PD29529)	Mercantile Creek	Waterworks Local Auth	228213.718	MY	T	N	UCLUELET PO BOX 999 UCLUELET BC V0R3A0	ALB - ALBERNI	Current	N/A	19920615	20011210
C109594	92.C.093.3.2 A (PD29529)	Mercantile Creek	Ice Making	327.318	MD	T	N	465792 BC LTD C/O BORNSTEIN SEAFOODS OF PO BOX 188 BELLINGHAM WA 98227 USA 98227	ALB - ALBERNI	Current	N/A	19410128	19950719

Total number of Licences and/or Applications found is 7

[New Query](#)

Use the **BACK** button on the browser to retain previous search criteria



## APPENDIX B

-

District of Ucluelet Waterworks Regulation and Charges Bylaw No. 1136, 2011



## DISTRICT OF UCLUELET

### BYLAW No. 1136, 2011

---

A bylaw to authorize the supplying of *water* to inhabitants of the *District and adjacent localities*, to fix the *rates*, fees, charges, conditions and terms under or upon which *water* may be supplied, protected and used, and to establish the conditions under which the *District* will expand its *water* system.

.....

**WHEREAS** pursuant to its powers under the Community Charter, the District of Ucluelet has established a self-liquidating utility for *water* distribution to supply *water* to the inhabitants of the *District* and adjacent localities, primarily for the purposes identified within the Bylaw;

**AND WHEREAS** it is necessary to fix the *rates*, fees, charges and terms and conditions under which *water* may be supplied, protected and used;

**AND WHEREAS** it is necessary from time to time to expand the *waterworks system* to provide *service* to additional and other residents of the *District*;

**AND WHEREAS** it is deemed just that the cost of making such expansions to the *waterworks system* should not be permitted to place any undue burden upon the revenues of the *water* utility;

**AND WHEREAS** it is deemed fair to impose charges, rates and fees to defray the costs or portion of the costs of constructing additional *waterworks* and extensions thereof and fix the terms of payment against the *owners* of the *parcels* who connect to, or whose properties front or abut on, the *waterworks* extension;

**NOW THEREFORE** the *District Council* of the District of Ucluelet, in open meeting assembled, ENACTS AS FOLLOWS:

#### PART 1 - CITATION

1. This bylaw shall be cited for all purposes as "District of Ucluelet Waterworks Regulation and Charges Bylaw, No. 1136, 2011."

#### PART 2 - DEFINITIONS

2. In the construction and for the purposes of this Bylaw, unless the context otherwise requires, the following words and terms shall have the meaning hereinafter assigned to them:

"**ACTUAL COST**" means the final cost of *works* which shall include all relevant costs incurred to achieve completion of the *works*. These costs shall include engineering, supply of materials, construction, inspection, supervision, administration, processing, right-of-way negotiations and registration, and liaison with, and/or, fulfilling requirements of other utilities or agencies.



**"AGENT"** means a professional engineer or contractor appointed by the *Superintendent of Public Works* to install and construct a *waterworks* on behalf of the *District*.

**"APARTMENT HOUSE" OR "MULTIPLE DWELLING"** means any building, not being a *lodging-house* or *hotel*, or portion thereof, which is designed, built, rented, leased, let or hired out to be occupied, or which is occupied, as the home or residence of three or more families living independently of each other and doing their own cooking within their apartment or suite.

**"APPLICANT"** means an *owner* making application in writing for a *water service connection* or extension of *water service* and from whom the *District* may expect to receive revenue on a continuing basis for this *service* at the current *rates* as established by this Bylaw.

**"BACKFLOW"** means a flowing back or reversal of the normal direction of flow.

**"BACKFLOW PREVENTER"** means a device or method that is designed to prevent *backflow*.

**"BENEFITING LAND"** means a *parcel* fronting, flanking or abutting a *water main extension*, or otherwise benefiting from the *water main extension*.

**"BOARDING HOUSE"** means a building containing not more than five (5) sleeping rooms, where lodging and meals for three (3) or more individuals are provided for compensation pursuant to previous arrangements or agreements, and with no provision for cooking in any such sleeping room so contained.

**"COMMERCIAL PREMISES"** means all land and premises, on or within which any interchange of commodities, or any dealing or trading in any article of commerce or other thing is carried on as a business, and shall include all premises in which any service, professional or otherwise is provided, given, or made available and for which any fee, charge, rent or commission is payable, and without limiting the foregoing shall include *auto courts*, *hotels*, *lodging houses*, *boarding houses*, offices, theatres, bowling alleys, billiard rooms, places of entertainment or amusement, tent camping grounds and *mobile home parks*.

**"COMMERCIAL UNIT"** means any business which is operated separately from any other business on or within *commercial premises*.

**"CONNECTION CHARGE"** means the amount due and owing to the *District* for the installation and construction of a *service connection* as set out in Schedule "D" to the Bylaw, including any *latecomer agreements*.

**"CONSUMER"** means any *person*, company, or corporation who is the *owner*, or agent of the *owner* of any premises to which *water* is supplied or made available from any of the *Works* and shall include any *person* who is the occupier of such premises and any *person* who is a user of *water* supplied to any premises or by any *service* from the *Works*.

**"COOKING EQUIPMENT"** means equipment, devices or appliances that can be utilized to prepare a meal within a *dwelling unit* and includes a sink, counter-top, gas or electric range or stove, counter-top cooking unit, hot plate, wall oven, microwave oven, convection oven, toaster oven, electric frying pan, electric wok, pressure cooker, crock pot, cabinet for the storage of food or any other such culinary facility or any



combination of such culinary facilities and includes the arrangement of service lines which provide the energy source being used or intended to be used to service such facilities.

**"COUNCIL"** means the Council of the *District of Ucluelet*.

**"CROSS CONNECTION"** means any actual or potential physical connection between the *waterworks system* or any *potable water* system connected to the *waterworks system* and any auxiliary water source or pipe, vessel, machine or other source that may contain a non-potable fluid or other contaminants, such that it is possible to enter the *waterworks system* or any *potable water* system due to *backflow*.

**"CURB STOP"** means the *District*-owned valve on a *service* pipe located on a *District* street or lane or right-of-way or within an easement at or near the *consumer's* property line, or easement line.

**"DIRECTOR OF FINANCE"** means the Director of Finance or his or her duly appointed assistants and representatives in the Finance Department of the *District*.

**"DISTRICT"** means the District of Ucluelet.

**"DUPLEX HOUSE"** means any building used or designed to be used by two families.

**"DWELLING UNIT"** means one or more habitable rooms which constitute one self-contained unit used or intended to be used for living and sleeping purposes for which is provided:

- a) *cooking equipment* or the facilities for the installation of *cooking equipment*; and
- b) one or more bathrooms with a water closet, wash basin and shower or bath.

**"FIRE SERVICE"** means any installation which may be provided to supply *water* for firefighting purposes only.

**"FRONTAGE"** means the boundary of a *parcel* abutting a *District* Road right-of-way. Where the *parcel* abuts more than one *District* road right-of-way other than a lane, the frontage shall be that boundary having the least measurement.

**"FRONT-ENDER"** is a *person* who pays the *actual costs* of an *extension* and who may enter into a *latecomer agreement* with the *District*, and shall include the assignee of the *latecomer agreement*.

**"GARDEN IRRIGATION"** means the *sprinkling* or pouring of *water* by means of a hose, pipe or any *sprinkling* device upon, over or under the surface of the ground.

**"HOTEL"** means a building occupied as the more or less temporary abiding place of individuals who are lodged therein with or without meals and in which there are more than five (5) sleeping rooms, and with no provision for cooking in any such individual sleeping room or apartment.

**"INDEPENDENT MOBILE HOME"** means a mobile home equipped with a water closet and a bath tub or shower, waste from both of which may be disposed directly into a sewer through a drain connection.



**"INSPECTOR"** means the Building Inspector for the *District*, or his or her duly appointed representatives and assistants.

**"LATECOMER"** means the *owner* of a *parcel* within the *benefiting lands* and who has not initially participated in the costs of the *water main extension*.

**"LATECOMER AGREEMENT"** means a written agreement in the form prescribed by the *Superintendent of Public Works* under which the *District* agrees to impose a charge on the *benefiting land* and for which there is a *front-ender*.

**"LOCAL SERVICE TAX"** means a tax imposed under Section 216 (local services taxes) of the Community Charter, S.B.C. 2003.

**"LODGING HOUSE"** means a building (other than a *hotel*) containing not more than five (5) sleeping rooms where lodging for three (3) or more individuals is provided for remuneration and with no provision for cooking in any such sleeping room so contained.

**"METERED SERVICE"** means a *service* having attached to it a meter or other measuring device for determining the quantity of *water* used or supplied through the *service*.

**"MOBILE HOME"** means a structure manufactured as a unit designed to be transported on its own wheels or by other means, and arriving at the site ready for occupancy apart from incidental operations and connections.

**"MOBILE HOME PARK"** means any parcel of land, upon which two or more mobile homes, occupied for dwelling purposes, are located, including all buildings, structures or accessories used or intended to be used as equipment for such mobile home park, but shall not include vehicle sales or other lands on which mobile homes are manufactured or placed solely for the purposes of storage or inspection and sale.

**"MOTEL"** means a group of furnished rooms or separate buildings providing sleeping and parking accommodation for transient tourist trade and commonly known as tourist cabins, or motor courts, as distinguished from furnished rooms in an existing residential building.

**"NORMAL USE"** means *water* used for essential purposes including household sanitation, human consumption and food preparation and *water* essential for the needs of commerce and industries, other than that required for firefighting purposes.

**"OWNER"** means an owner of a *parcel* of *real property* including:

- a) the registered owner of an estate in fee simple;
- b) the tenant for life under a registered life estate;
- c) the registered holder of the last registered agreement for sale, and
- d) the holder or occupier of land held in the manner referred to in the definition of "Owner" in the Schedule to the *Community Charter* and amendments thereto.

**"PARCEL"** means any lot, block, or other area in which *real property* is held or into which *real property* is subdivided.



**"PERSON"** shall, when necessary, mean and include the *Owner*, natural persons of either sex, associations, corporations, bodies politic, co-partnerships whether acting by themselves or by a servant, agent, or employee and the heirs, executors, administrators and assigns or other legal representatives of such person to whom the context can apply according to law.

**"RATE"** means the price or sum of money to be paid by any *consumer* for any *water* supplied or made available from the *Works*.

**"REAL PROPERTY"** means land, with or without improvements so affixed to the land as to make them in fact and in law a part of it.

**"SERVICE"** means the supply of *water* from the *Works* to any *person*, company or corporation, including all pipes, taps, valves, connections, meters, *backflow preventer* and other appurtenances necessary to or actually used for the purpose or protection of the supply.

**"SERVICE CONNECTION"** means the connecting pipe and appurtenances between any *water* main and the property line of the premises served and shall include the necessary *District* valves and meters.

**"SERVICE CONNECTION (TEMPORARY)"** means the connecting pipe between a municipal *water* main and the property line of premises which do not front upon the *water* main from which *service* is provided and shall include the necessary *District* valves and meters.

**"SPRINKLING"** means the application or distribution of *water* on lawns or boulevards by sprinkling or spraying but does not include the method known as "drip irrigation" i.e. supplying *water* to plants through capillary tubing at a rate of a few drops a minute as and when required.

**"SUPERINTENDENT OF PUBLIC WORKS"** means the Superintendent of Public Works for the *District* and shall include his or her duly appointed assistants and representatives.

**"TEMPORARY"** means lasting, or intended to last, only for a short time and supplied by others under agreement with the *District* as determined by the *District*.

**"WATER"** means water supplied by the *District*.

**"WATER MAIN EXTENSION"** means any installation requiring the construction of a water main on any highway, or municipal right-of-way or easement, from the most suitable existing *Waterworks System* having sufficient surplus capacity and pressure to provide *service* to the properties to be served. Water main extension shall not include upgrading or replacement of an existing main or *service connections*.

**"WATERWORKS" or "WORKS"** means the *waterworks system* of the *District of Ucluelet*.

**"WATERWORKS SYSTEM"** means all waterworks and all appurtenances thereto, including *water* mains, *service connections*, pumping stations, wells, *water* storage facilities and treatment plants, and owned, controlled, maintained and operated by the *District* or by agreement between the *District* and others.



### **PART 3 – GENERAL PROVISIONS**

3. *Council* may from time to time amend this bylaw in whole or in part and may without limiting the generality of the foregoing establish or amend policies, criteria, *rates* and fees.
4. In this bylaw words importing the male gender include the female gender and either includes neuter and vice-versa and words importing singular number include the plural number and vice versa.
5. The Schedules annexed hereto shall be deemed to be an integral part of this bylaw.

#### **Applicability of Bylaw**

6. This bylaw shall have reference and apply to the *waterworks system* owned and operated by the *District*.

#### **Role of the *Director of Finance* and *Superintendent of Public Works***

7. For the purposes of this bylaw the *Director of Finance* shall have charge of the rating of all buildings and premises supplied with *water* and the *Superintendent of Public Works* shall have charge and control of all properties and *works* in connection with the *waterworks system* and of all connected engineering and mechanical work.

#### **Supply of *Water* throughout the *District***

8. It shall be lawful for the *District* to supply *water* to the inhabitants of the *District* who can be served from the *District's water mains* and the provisions of this bylaw shall extend to and be binding upon all *persons* so served.

#### **No Obligation to Provide *Service***

9. Nothing in this bylaw shall obligate the *District* to supply *water* to any *person* when the cost of laying the supply of *service* mains to the premises of such *person* would be excessive and create an additional burden upon the revenues of the system, unless such *person* shall be prepared to pay to the *District* the cost of laying the supply or *service* mains to the *person's* premises and the trunk mains to which such supply or *service* mains are to be connected are of sufficient capacity to provide the additional *water* required for such *service*.
10. Nothing in this bylaw shall obligate the *District* to enter into an agreement for *water* supply to private *water* utilities within the *District* or to *persons*, properties or areas in the outside localities adjacent to the *District*.

#### **Purpose of the *Water Service***

11. The *water* supplied by the *District* is for *normal use* and *fire service*. Subject to the availability of *water* in excess of *normal use* and *fire service*, *water* may also be used for other less essential, aesthetic-enhancing purposes such as lawn and *garden irrigation*, car washing and other cleaning processes.



### ***District Not Liable for Failure of the Water Supply***

12. The *District* shall not be liable for the failure of the *water* supply in consequence of any accident or damage to the *Works*, or for excessive pressure or lack of pressure, or any temporary stoppage on account of alterations or repairs, whether the failure arises from the negligence of any *person* in the employ of the *District* or any other *person* or through natural deterioration or obsolescence of the *District's* system, or otherwise.

### **Pressure, Supply and Quality**

13. The *District* does not guarantee pressure or continuous supply of *water*, nor does it accept responsibility at any time for the maintenance of pressure either on its lines or for increases or decreases in pressure. The *District* reserves the right at any and all times, without notice, to change operating conditions of a *service* or *service connection* for the purposes of making repairs, extensions, alterations or improvements, or for any other reason, and to increase or reduce pressure at any time. Neither the *District* its officers, employees or *agents* shall incur any liability of any kind whatsoever by reason of the cessation in whole or in part of *water* pressure or *water* supply, or changes in operating pressures, or by reason of the *water* containing sediments, deposits, or other foreign matter.
14. *Consumers* depending on a continuous and uninterrupted supply of *water* or having processes or equipment that require particularly clear or pure *water* shall provide on the *parcel* and at their cost, such emergency storage, over-size piping, pumps, tanks, filters, means of *water* treatment, pressure regulators, check valves, additional service pipes, or other means for a continuous and adequate supply of *water* suitable to their requirements.
15. Where steam or hot *water* boilers or other equipment is fed with *water* by pressure direct from the *District water* mains the *District* shall not be liable for any injury or damage which may result from such pressure or from lack of such pressure.

## **PART 4 - ESTABLISHMENT OF WATER SERVICE**

### **Work on the Service Connection**

16. No work of any kind connected with the *service connection*, either for the laying of new, or repairing of existing *service connections* shall be permitted within road rights-of-way or statutory rights-of-way by any *person* other than an employee or *agent* of the *District* and no *person* shall make any connection to the *waterworks system* whatsoever without permission in writing from the *District of Ucluelet*.

### **Interference with Water Service**

17. No *person* shall in any manner interfere with the *service connection* or make any addition or alteration in or about or turn on or off any *District curb stop* valve or meter without permission in writing from the *District of Ucluelet*.

### **Hydrant, Standpipe or Valve**

18. No *person*, except an employee of the *District* in the course of his or her employment, shall without written authority of the *District*, open any hydrant,



standpipe or valve or use *water* there from. Such authority when granted by the *District* shall be limited to a period not exceeding three (3) months and shall reserve the right to the *District* to stop the use at any time for any reason without liability for damages resulting there from in any manner whatsoever.

19. Every *person* who receives authority from the *District* to open any hydrant, standpipe or valve and take *water* from it shall pay the permit fee plus the *water* usage fees as set out in Schedule "C-1" to this bylaw.

### ***Temporary Service Connection***

20. When there is no *water* main abutting the *parcel*, a *temporary water service connection* may be approved by the *District* from the nearest *waterworks system*. The applicant shall be responsible for the installation and maintenance of the *temporary service connection* in accordance with Section 22. The *temporary service connection* is to conform to the conditions listed in Section 22. Where an *owner* requires the installation of a *water service* across or through another *parcel* the *owner* shall be responsible for all costs associated with obtaining and registering an easement. The *owner* shall provide to the District documentation of the easement with the application for *temporary water service*.
21. All applications for the installation of a *temporary service connection* shall be made at the District of Ucluelet office by the *owner*, who shall at the time of making the application, execute an agreement with the *District*, which application and agreement shall be in the form required by the *District*. A restrictive covenant in a form acceptable to the *District* will be required to be registered against the *parcel*.
22. Every *temporary service connection* provided in the *District* shall be of such size, type, length and capacity as may be prescribed by the *District*, who shall determine the location of the main to which the *service* shall be connected, provided, however, that the *District* may refuse a *temporary* connection if such a connection would have a detrimental effect on the *waterworks system*. All *temporary service connections* shall be provided subject to the following conditions:
- (a) Each connection shall serve one *parcel of land* only.
  - (b) Each *applicant* shall pay the *connection charge* as set out in Schedule "D" to this bylaw and the *District* will provide a connection to the main within the boundaries of the road allowance, lane or easement where the main is laid.
  - (c) Each *applicant* shall provide, construct and maintain at the *owner's* expense the pipe from the point of connection to the municipal main, complete to the premises for which the connection is provided. Where the pipe is to be laid within any road or lane allowance or *District* right-of-way or easement, the *applicant* shall conform to the applicable bylaws of the District. Where the pipe is to be laid through lands not owned by the *applicant*, an easement to accommodate the pipe shall be obtained by the *applicant* prior to any connection being provided by the *District*.
  - (d) Each *applicant* shall be responsible for the maintenance and upkeep of the pipe from the point of connection to the municipal main, complete to the premises for which the connection is provided.



- (e) Every connection shall be deemed to be *temporary* and the *District* may discontinue *service* in any of the following circumstances:
- (i) When application is made by any other *person* or *persons* for extension of a *water* main along the street, lane or road allowance which will provide service to the *parcel*,
  - (ii) When the *District* decides to proceed with the construction of a *water* main on the street, lane or road allowance which will provide service to the *parcel*,
  - (iii) If the *applicant* fails to properly maintain the pipe from the point of connection to the municipal main, complete to the premises for which the connection is provided,
  - (iv) If the *applicant* contravenes any of the provisions of this bylaw.
- (f) Where any *temporary service connection* is discontinued pursuant to (i) or (ii) of sub-section (e) of this Section 22 and the *parcel* served thereby are to be subsequently connected to a *water* main which has been constructed by the *District* to serve the *parcel*, the *owner* shall pay the *connection charge* incurred in providing an appropriate connection plus the *actual costs* of connecting and disconnecting the *temporary* connection. In these circumstances *service* to the *parcel* by means of the *temporary service connection* shall be continued until the connection to the new main has been provided.
- (g) Each *applicant* shall register a restrictive covenant on title to the land to include conditions (a) to (f) of this Section 22.
- (h) Each *applicant* shall pay all costs associated with the *temporary service connection* including those *connection charges* prescribed in Schedule "D", and all other *rates*, fees and charges.

### **Application for Installation of *Service Connection***

23. All applications for the installation of *service connections* shall be made at the *District* office by the *owner(s)* who shall at the time of making the application, execute an agreement with the *District*. The application and agreement shall be in the form prescribed in the "Application for Service Connection".
24. When an application for a *service connection* accompanies a building permit with a construction value greater than \$100,000, or where a *parcel* is being redeveloped, and the connection is 30 years old or older; a replacement or new *service* is required. All costs associated with the requirements of the application(s), as determined by the *District*, shall be the responsibility of the *owner*.

### **Statement of Use**

25. Each application for the installation of a *service connection*, *temporary* or otherwise, shall give a full, true and correct statement on the form (provided by the *District*) prescribed for the purpose, of the size and description of the *applicant's parcel*, the use for which the *service* is required, and all other information which may be necessary to form a correct estimate of the volume of *water* required and the *rates* to be charged



for *water* supplied to the *parcel*. If the statement given is not correct, and any additional *rate* shall be chargeable by reason of the statement being incorrect, the additional *rate* shall be payable by the *owner* forthwith. An *applicant* shall be personally responsible for the payment of all *rates*, fees and charges until the *applicant* shall have delivered to the *District* a signed notice in writing in the manner prescribed by this Bylaw, ordering discontinuance of the *service*.

#### **Change or Addition in the Number, Type of Fixtures**

26. No change or addition shall be made by any *person* to the number or type of fixtures to increase the consumption of *water* on any existing *parcel* until approval has been obtained in writing from the *District*.

### **PART 5 – DISCONTINUANCE OF A WATER SERVICE**

#### **Discontinuance of *Water Service***

27. It shall be lawful for the *District* to reduce the quantity of *water* supplied to, or to entirely discontinue the *service* to any *consumer* who has violated any of the provisions of this Bylaw, or when, in the opinion of the *Council*, the public interest requires such action.
28. Any *consumer* wishing to have the *water service* discontinued either temporarily (not greater than a twelve-month period from the delivery of notice) or permanently, shall deliver a written notice to the *District* and pay the fees set out in Schedule "D-1" to this Bylaw. In the case of permanent termination, the *consumer* shall give the *District* not less than five (5) working days notice of the discontinuance of the *service*. The notice shall be provided in writing and shall be delivered together with the fee for turning off the *service* to the *Director of Finance*. The burden of proof of delivery of the notice shall be upon the *consumer*. Every *consumer* shall be liable for the full amount of *rates* chargeable for the *service* for five (5) days after the notice has been delivered to or received at the *District* office. If no notice is provided, the *rates* shall be charged until a notice is given and the *water* turned off.
29. When a flat rate *water service* is discontinued upon request by a *consumer* in the manner described in Section 28, the *Director of Finance* shall allow a rebate of the flat *rate* proportionate to the remaining portion of the current billing period, and shall cause the rebate to be entered upon the current year's *water rates* roll, provided that the *Director of Finance* shall apply the rebate first against arrears of charges owing by the *owner* under this Bylaw.
30. Prior to starting any demolition work the holder of a demolition permit shall apply for and pay the fees set out in Schedule "C-1" to this Bylaw, to temporarily or permanently discontinue the *water service connection*. Failure to make application shall be subject to the fines prescribed in this Bylaw.

#### **Reconnection of *Service Connection***

31. When any *service* has been discontinued from any *parcel* for non-payment of *rates* or violation of any of the provisions of this Bylaw, the *District* may, before reconnection is made to the *parcel*, require payment of the fees set out in Schedule "C-1" to this Bylaw and all *service* charges owing by the *owner* under this Bylaw as well as



the monthly flat *rate* prescribed in Schedule "A", if applicable. The *Director of Finance* shall allow a reduction of the fee proportionate to the remaining portion of the current year at the date of the reconnection. The *Director of Finance* shall cause the flat *rate*, or part thereof, together with *service* charges, to be entered in the current year's *water rates* roll.

32. When any *service* has been discontinued from any *parcel* for reasons not requiring a plumbing permit, at the request of the *consumer*, the *District* may, before reconnection is made to the *parcel*, require payment of the fees set out in Schedule "D-1" to this Bylaw and all service charges owing by the *owner* under this Bylaw as well as the annual flat rate service fee prescribed in Schedule "B". The *Director of Finance* shall allow a rebate of the fee proportion to the remaining portion of the current year expired at the date of the application for reconnection. The *Director of Finance* shall cause the flat *rate* or part thereof, together with *service* charges, to be entered in the current year's *water rates* roll.
33. No *person* shall turn on any *service* which has been turned off by the *District*, and should any *service* be turned on by any *person* other than an employee of the *District*, fines, as prescribed in this Bylaw shall apply. Further, the *service* shall be deemed to have been continued from the date it was turned off and the *owner* shall be liable accordingly for payment of the user *rates* from that date. Any resulting damage from the *service* being turned on shall be the responsibility of the *owner*.

## **PART 7 – RESPONSIBILITIES OF THE PUBLIC / OWNER / CONSUMER**

### **Obstruction or Destruction of the *Water Works***

34. No *person* shall destroy, or damage in any manner any hydrant, standpipe, meter, valve or other fixture or any property of the *works*.
35. No *person* shall obstruct, at any time, or in any manner, the access to any hydrant, standpipe, valve, meter or other fixture connected with the *waterworks system*, by placing thereon or in the vicinity thereof, any lumber, timber, wood, brick, stone, gravel, sand or other material or thing. The *District* or any employee or agent of the *District* may remove the obstruction and the expense of the removal shall be charged to and paid by the offending *person* in addition to any other penalty imposed by this Bylaw.
36. No *person* shall bury, cover or obstruct the *water* shut off and/or meter to a *parcel*. The *District* will take reasonable efforts to locate a shut-off and/or meter. The *District* may remove the obstruction and the costs associated with the removal and reinstatement of the *water* shut off and meter shall be charged to and paid by the *owner*.

### **Private Disposition or Sale of *Water***

37. No *person* being an *owner*, occupant, tenant, or inmate of any premises supplied with *water* by the *District*, shall sell or dispose of any *water* or permit *water* to be carried or taken away, or used, or apply it for the benefit or use of others or to any other than the *person's* own use and benefit without prior written approval of the *District*.



## Maintenance of Private Water Service

38. It shall be the duty of every *consumer* to ensure that all taps, fittings and appurtenants connected with the *service* within the existing *parcel of land* are good and sufficient and installed and connected in accordance with the requirements the *District*. The *District* or any agent or employee of the *District* shall refuse to turn on the *water* to any existing premises and may discontinue *service* to any existing premises should the provisions not be complied with to the satisfaction of the *District*. All *persons* shall maintain in good order and repair the *service* pipes, valves, meters, and meter boxes, plumbing and other fixtures located on the *parcel*.
39. Every *consumer* shall provide for each *service connection* to the *consumer's parcel of land* a strainer and a pressure-reducing valve upon the request of the *District*.

## Right of Inspection

40. Every *person* to whom *water* is supplied under this Bylaw shall at all reasonable times allow, suffer and permit the *District* or agent or employee to enter into and upon the premises in respect of which *water* is supplied, for the purpose of inspecting the *water* pipes, connections, fixtures, taps, meters and any other apparatus used in connection with the *water* supply.

## Wastage of Water

41. Any *consumer* deliberately wasting *water* shall be guilty of a violation of this Bylaw.
42. If any *consumer* on a flat *rate service* allows *water* to run to waste, whether wilfully or by permitting pipes, taps, toilets or other fixtures and means of distributing or storing *water* to remain in disrepair, or by any device or for any change in the use of the premises, increases the amount of *water* consumption or expedites the rate of *water* usage, the *person* shall be guilty of a breach of this Bylaw. In addition to the penalty provided for in this Bylaw, it shall be lawful for the *District* to require that, as a condition of further and future *service*, a meter be installed on the *service connection* at the expense of the *Owner* and the *rates* payable by the *consumer* from the date on which the meter is installed shall be in accordance with Schedule "B" to this Bylaw.
43. If any pipes, connections, fixtures, taps, meters or other fixtures used in connection with the supply of *water* to premises are found to be leaking or defective, or if any wastage of *water* is found to exist, notice in writing shall be given by the *District* requiring the *person* owning or using the premises, to remedy the defects or leaks or to stop the wastage. If the requirements are not fulfilled within seventy-two (72) hours from serving the notice, the *water* supply to the premises may be shut off and the *person* owning or using the premises shall be guilty of a breach of this Bylaw.

## Water Usage for Building Purposes

44. No contractor, builder or other *person* shall use for building purposes of any kind or description any *water* from any pipe or main of the *waterworks*, or from any other *consumer*, without written permission from the *District* and not until the amount fixed by the *rates* in force at the time has been paid and all provisions made for the proper protection of the supply pipe have been complied with. In addition,



the *District* must first be satisfied that adequate provision has been made to control a *cross connection* to the *District water* system.

## **PART 8 – PREVENTION OF CONTAMINATION**

### **Contamination, *Cross Connection* and *Backflow* Prevention**

45. No *person* shall allow water, waste water, or any harmful liquid or substance, to enter any part of the *waterworks system*, including any *water service* or any fire hydrant or standpipe.
46. No *person* shall connect, cause to be connected, or allow to remain connected, any piping fixture, fitting, container, appliance or *cross connection* that could cause or allow drinking water quality, the *service*, or a private service to become contaminated, degraded or polluted in any way.

## **PART 9 – WATER METERS**

### **Water Meter Requirements**

47. *Water* meters shall be installed on all *water services* where:
  - (a) a new *service connection* is made to an existing or new building or premises; or
  - (b) the *service connection* is *temporary*.
48. The *Council* may, whenever it shall deem it advisable, compel the use of *water* meters by any *person* using or consuming *water* supplied by the *District* and may refuse to supply *water* to any premises unless the *person* requiring the *water* shall first enter into an agreement to take, use and pay for the *water* according to the terms and conditions outlined in Schedule "B" to this Bylaw.
49. The *District* shall have the right at any time to install a *water* meter in any existing premises at the expense of the *owner* and to substitute in lieu of a flat *rate* (whether already paid or not) a meter *rate* according to Schedule "B" to this Bylaw.

### **Installation of *Water* Meters**

50. Meters shall be installed on all *water services* in a manner and of such make and design as is prescribed by the *District* from time to time.
51. The cost of supplying and installing a meter, meter box, fittings and all appurtenances shall be borne by the *consumer*.
52. The *District* shall have the right to enter into the premises and onto the *real property* to inspect and maintain the *water* meter, fixtures and appurtenances at any reasonable time.

### **Water Meter *Rates* and Credit**

53. Every *consumer* having a *metered service* shall pay for the full amount of *water* as registered by the meter, according to the *rate* applicable to the *service*.



54. When the *District* imposes a meter on the *water* connection, the *Director of Finance* shall adjust the *water rates* roll accordingly and a credit shall be allowed to the *consumer* on the meter *rate* account for the balance of the flat *rate* proportionate to the unexpired portion of the year covered by the flat *rate* payment. The balance of the meter *rate* shall be payable from the time the meter is installed whether during any period already paid for by the flat *rate* or not.
55. If a meter sticks or fails to indicate correctly the quantity of *water* which is passing or which has passed through it, or if the meter cannot be accessed, the *District* shall be entitled to charge for the *water* according to the average consumption for the twelve (12) months immediately preceding the date upon which the meter was last known to be in order, or based on consumption measured by the new or repaired meter for four (4) months, whichever is higher.

### **Responsibility for Maintenance of Water Meters**

56. The meter is owned and maintained by the *District*. The meter chamber, lid, fixtures and appurtenances other than the meter are owned and maintained by the *owner*.
57. The *District* shall maintain and repair or replace all meters, regardless of size, when rendered unserviceable through fair wear and tear. Where replacement or repair of any meter is rendered necessary by the act, neglect, or carelessness of the *owner* or occupant of any premises, any expense caused to the *District* shall be charged against and collected from the *owner* or occupant of the premises.
58. The *Owner* of a *parcel* shall maintain full and unobstructed access to the meter and meter chamber to allow the *District* to read and maintain the meter.

### **Testing of Water Meters**

59. When any *consumer* notifies the *District*, in writing, that an account for *service* for any past time is excessive the *District* shall arrange to have the meter tested at the *consumer's* expense.
60. Before making a test outlined in Section 59, the *consumer* requesting the test shall pay the fee in accordance with Schedule "C-1".

### **Refunds on Water Meter Charges Due to Inaccuracy of Water Meter**

61. The *District* will consider refunds, adjustments and/or meter repair or replacement only when the meter is registering at least a five percent (5%) inaccuracy, otherwise the meter is considered accurate.
62. If the test outlined in Section 59 shows an error in favour of the *consumer*, the meter testing fee shall be refunded to the *consumer*, the water meter will be replaced or repaired, and the *consumer's* account for *service* shall be adjusted accordingly.
63. If the test outlined in Section 59 shows an error in favour of the *District*, the meter testing fee shall be retained by the *District*.



## **PART 10 – FIRE SERVICE**

64. All *fire services* shall be installed so that *water* used or which could be used for other than fire purposes, shall be metered and all costs shall be borne by the *owner*. The meter shall be fire rated.
65. All meters used on *fire services* shall be of a make and design approved by the *District*.
66. For all new construction, where a *fire service water* main is required, a dedicated main for the sole purpose of fire fighting shall be provided by the *owner* with no connection to any domestic service.

### **Fire Service Connection Costs**

67. The cost of installing each *fire service* including the cost of the meters, *backflow preventer*, and all piping, valves and fittings as provided for in this Part of this Bylaw, shall be borne by the *owner* of the premises.

## **PART 11 – WATER MAIN EXTENSIONS**

### **General Conditions**

68. *Water main extensions* at the expense of the *District* shall only be provided in accordance with the program adopted by *Council* in the current annual budget of the *waterworks system* utility and any other capital funds raised by the *District* and specifically appropriated by the *Council* for *waterworks* construction.
69. The cost of constructing each such extension shall be shared by the *District* and the *owners* of the *benefiting lands* in accordance with the provisions and subject to the limitations in this Bylaw.
70. *Water main extensions* for which the *District* bears any portion of cost shall only proceed provided the costs are:
- (a) recoverable in part or whole from each of the existing as well as future parcels of land that will be served by the *water main extensions*; and
  - (b) within the limit of the funds allocated for these purposes within the budget of the *water* utility; and
  - (c) not excessive, as determined by the *Council*.

### **Application for Water Main Extensions**

71. All applications for a *water main extension* shall be made in writing to the *District* by the *owner* or *owners* of the *parcel* to be served by the extension. The *District* shall, as soon as convenient, determine the practicality and feasibility of the extensions and communicate, in writing, its findings to the *applicant* along with the estimated costs payable by the *applicant*, where the work is determined feasible.



72. The cost payable by an *applicant* shall be the *actual cost* to extend the *waterworks* on a legally designated road-allowance or a right-of-way acceptable to the *District*, in accordance with the current *design and construction standards* adopted by the *District*. The *water main extension* shall commence from the most suitable existing *waterworks system* as determined by the *District* having sufficient surplus capacity and pressure to provide *water* to the *benefiting lands* on the extension, to a point opposite the farthest boundary of the last *parcel* to be served by the extension or to such other point where the *District*, in his or her discretion to be exercised reasonably, decides such extension should end. In addition, the costs of *service connection(s)* to each *parcel* of the applicant's property to be served by the extension and the costs of right-of-way acquisitions shall be added to the costs payable. Where rights-of-way are required for the construction of any portion of such extension, all the costs incurred in connection with the rights-of-way shall be added to and form part of the costs in providing such extension.
73. Subject to the provisions of Sections 75 and 76, the *applicant* wishing to front-end the costs and proceed with the extension of the *waterworks system* shall deposit to the *District* an amount equal to the *District's* estimate of the costs, prior to any construction being undertaken.
74. The *applicant* shall enter into a *water main extension* agreement as required by the *District*.

#### **Water Main Extensions Proposed for Construction by an Applicant**

75. The *District* may approve construction of a *water main extension* by an *applicant* wishing to front-end its costs subject to the *applicant's* acceptance of the conditions listed in Schedule "E" attached hereto and forming a part to this Bylaw.
76. An *applicant* wishing to construct a *water main extension* at the *applicant's* expense shall:
- (a) enter into an agreement with the *District* containing the conditions listed in Schedule "E" to this Bylaw, and
  - (b) pay to the *District* all fees in accordance with Schedule "E" to this Bylaw.

#### **Refunds**

77. An *applicant* who wishes to front-end the costs may apply to the *District* for refunds.

#### **Upsizing of Water Mains**

78. Where any *water main extension* is to be undertaken pursuant to the provisions of this Bylaw and where the *District*, in its discretion, determines a main of greater capacity should be installed than is required to provide *service* to the lands for which an application for extension has been made, the proponent will upsize the *water main*, the *District* shall pay the cost of providing such excess capacity, provided however that the proposed extension does not create an excessive burden for the *District* and the funds required are available. This provision shall apply only to upsizing of a *water main* of larger than 200mm diameter for residential zones, and 250mm diameter for industrial, commercial and institutional zones.



## Recovery of *District's* Costs

79. Where the *District* has incurred capital costs in the expansion of the *waterworks system*, the *owner* of the *benefiting land*, shall pay the *local service tax* or *latecomer charges* prescribed under the applicable bylaw, contract or agreement.

## General Provisions

80. Notwithstanding the provisions of this Bylaw, the *District* shall not be obligated to construct any *water main extension*:
- (a) if the supply of *water* available for distribution within the *waterworks system*, or any part of it, is inadequate to meet the needs of the *consumers* already receiving *service*; or
  - (b) if the existing *waterworks system* from where the extension is to be made is of inadequate capacity to supply the additional *service* proposed.
81. No provisions of this Bylaw shall be deemed to or be held to limit or restrict in any way the *Council* from exercising full jurisdiction and control over the operation of the *water system*, and the fact that any extension may have been installed without cost to the *District*, shall not in any way exempt the *persons* receiving *service* from any regulation, *rates*, order or bylaw of the *District*, nor shall the payment of part or all of the construction costs by any *applicant* for *service* be construed as a guarantee by the *District* with respect to continuity or adequacy of *service*, or other conditions as outlined in Section 13.
82. No provisions of this Bylaw shall be deemed to or be held to exempt any *person* from payment of the *connection charges*, user *rates* or *frontage* taxes which may, from time to time, be imposed with respect to the *waterworks system* or any other bylaw of the *District*.
83. All the provisions of this Bylaw with respect to *water main extension* shall be applicable as appropriate, to the expansion of the *waterworks system*.

## PART 12 – RATES, FEES AND CHARGES

### Establishing *Water Rates, Fees and Charges*

84. It shall be lawful for the *Council* from time to time to fix *water rates* to be paid by *consumers* of *water* for the *water* supplied from the *works*.
85. The *rates* which shall be payable in respect of existing flat *rate services* shall be in accordance with Schedule "A" to this Bylaw.
86. The *rates* which shall be payable in respect of *metered services* shall be in accordance with Schedule "B" to this Bylaw.
87. The *rates* types which shall be applicable in respect of designated uses shall be in accordance with Schedule "C" to this Bylaw.



88. The fees which shall be payable in respect of hydrant use, requests for turning off and on of *water services* and *water meter testing* and removal shall be in accordance with Schedule "C-1" to this Bylaw.
89. The fees which shall be payable in respect of all *service connections* shall be in accordance with Schedule "D" to this Bylaw.

### **Water Service Rates, Fees and Charges**

90. The *rates*, fees and charges enumerated in Schedules "A", "B", "C-1", and "D" are hereby imposed and levied for *water* supplied or ready to be supplied by the *District* and for connections to the water mains of the *District*. All *rates*, fees and charges shall form a charge on the *parcels* of the respective *owners* using the *water* and may be recovered in the same manner and by the same means as overdue taxes.
91. No rebate, refund or credit whatsoever of any moneys paid or payable for *water service* shall be made except as provided in this Bylaw.
92. No prepayment for any *service* shall prevent the amount of any increase being charged to and collected from any *consumer*.
93. The *District* shall furnish to any *consumer* or ratepayer, on request, one copy of a statement showing the *rates*, fees and charges for the time being in force for each type of *service*.
94. For all new construction of strata buildings or premises to which a *service connection* is made during any year, the applicable user *rate* chargeable for that year according to Schedule "A" shall be one-half (1/2) of the full annual *rate* per dwelling unit. This charge will be applied at the building permit stage and will be non-refundable. The amount collected will be applied as a credit to the strata property's metered utility account.

## **PART 13 – OFFENCES AND PENALTIES**

### **Offences**

95. Every *person* who violates any of the provisions of this Bylaw or who suffers or permits any act or thing to be done in contravention of any of the provisions of this Bylaw, or who neglects to do or refrains from doing anything required to be done by any of the provisions of this Bylaw, or who does any act, or who violates any of the provisions of this Bylaw shall be deemed to be guilty of an infraction and liable to the penalties imposed in this Bylaw.

### **Penalties**

96. Every *person* who violates any of the provisions of this Bylaw, or who suffers or permits any act or thing to be done in contravention of this Bylaw, or who refuses, omits, or neglects to fulfill, observe, carry out, or perform any duty or obligation imposed by this Bylaw is liable, on summary conviction, to a fine of not less than the sum of One Hundred Dollars (\$100.00), but not exceeding the sum of Ten Thousand Dollars (\$10,000.00).



97. Where there is an offence that continues for more than one day, separate fines may be issued for each day or part thereof in respect of which the offence occurs or continues.
98. Any *person* who contravenes any provision of this Bylaw is liable to the *District* and must indemnify the *District* from all costs, expenses, damages and injuries resulting from the contravention. This does not in any way limit any other provision or any other remedy the *District* may have under this Bylaw or otherwise at law.
99. The *District* may enforce compliance with the stipulations within this Bylaw or non-payment of fines by shutting off the provision of *water services* being supplied to the user or discontinuing the service thereof.
100. Nothing in this Bylaw limits the *District* from utilizing any other remedy that is otherwise available to the *District* at law.

#### **PART 15 – SEVERABILITY**

101. Each provision of this Bylaw is severable from each other provision, and, if any provision is determined to be void or unenforceable in whole or in part, this determination shall not be deemed to affect or impair the validity of any other provision, unless a Court otherwise determines.

#### **PART 16 – ADMINISTRATION**

102. This bylaw hereby repeals "District of Ucluelet Waterworks and Water Rates Bylaw No. 660, 1995" and all amendments thereto.
103. This bylaw shall come into effect upon its adoption.

**READ A FIRST TIME** on the **28th** of **June 2011**.

**READ A SECOND TIME** on the **9<sup>th</sup>** day of **August, 2011**.

**READ A THIRD TIME** on the **9<sup>th</sup>** day of **August, 2011**.

**ADOPTED ON** the **16<sup>th</sup>** day of **August, 2011**.

-----  
Bill Irving,  
Acting Mayor

-----  
Andrew Yeates,  
CAO

**CERTIFIED CORRECT:** District of Ucluelet Waterworks Regulation and Charges Bylaw,  
No. 1136, 2011.

-----  
Andrew Yeates,



**"DISTRICT OF UCLUELET WATERWORKS REGULATION  
AND CHARGES BYLAW NO. 1136, 2011"**

**SCHEDULE "A"**

**WATER RATES AND FEES**

**I. FLAT RATES\*\***

DESCRIPTION*	Trimester	Monthly	Annual	Trimester	Monthly
Effective Date	Sep 1/11	Sep 1/11	Jan 1 /12	Jan 1/12	Jan 1/12
Dwelling Unit, per unit (single family, duplex unit, apartment, suites, Guesthouses, etc.)	116.00	29.00	288.00	96.00	24.00
Mobile Home Park - per pad	116.00	29.00	288.00	96.00	24.00
Schools	116.00	29.00	288.00	96.00	24.00
plus, per classroom	116.00	29.00	288.00	96.00	24.00
Bed & Breakfast, Boarding, Lodging & Rooming Houses	116.00	29.00	288.00	96.00	24.00
plus, per room	60.00	15.00	144.00	48.00	12.00
Hotels & Motels	116.00	29.00	288.00	96.00	24.00
plus, per room for let	60.00	15.00	144.00	48.00	12.00
plus, pool charge	124.00	31.00	312.00	104.00	26.00
Restaurants, Cafes, Dining Room, Lounges, Beer Parlours, Pubs					
up to 60 seats	404.00	101.00	984.00	328.00	82.00
over 60 seats	484.00	121.00	1,176.00	392.00	98.00
Churches	116.00	29.00	288.00	96.00	24.00
Clubs	208.00	52.00	504.00	168.00	42.00

Continued next page



**Schedule I, Flat Rates cont.**

DESCRIPTION*	Trimester	Monthly	Annual	Trimester	Monthly
Effective date	Sep 1/11	Sep 1/11	Jan 1 /12	Jan 1/12	Jan 1/12
Home Occupations – Hairdressers, Salon/Spa/Beauty Services, Health Services, Daycares, Catering/Food and/or Food Preparation Services, and other like classifications	116.00	29.00	288.00	96.00	24.00
plus	40.00	10.00	96.00	32.00	8.00
Retail Establishments, Banks, Offices & Others not classified herein	136.00	34.00	336.00	112.00	28.00
plus, per square foot gross area	0.0432	0.0108	0.1056	0.0352	0.0088
Garage & Service Stations	156.00	39.00	384.00	128.00	32.00
Laundromats	136.00	34.00	336.00	112.00	28.00
plus, per washing machine	40.00	10.00	96.00	32.00	8.00

\* Except where specified, all rates apply whether occupied or not, whether operating or not.



**"DISTRICT OF UCLUELET WATERWORKS REGULATION  
AND CHARGES BYLAW NO. 1136, 2011"  
SCHEDULE "B"  
WATER RATES AND FEES FOR METERS**

**II. METERED RATES**

	Minimum Monthly Rate*** Effective Date	Minimum Monthly Rate*** Effective Date	Water Volume Allotment**
	1 Sep/11	1 Jan/12	
Minimum for all meters	\$17.55	\$14.25	23 Cu. M.
** When monthly allotment is exceeded, additional charges per cubic meter will be	\$.7539	\$.6119	

Monthly rate for Fire Lines shall be \$15.00 per month.

\*\*\*  
For areas outside municipal boundaries, the above minimum monthly rates are multiplied by 1.4.

1. When a building containing multiple units is being supplied metered service through a common connection line, if each unit has its own certificate of indefeasible title, the minimum usage charge will apply to each unit. Should the building be under one title, only one minimum usage charge will apply.
2. Adjustment Due to Faulty Meter  
Where a meter is found defective when read, and has not indicated correctly the volume of water which has passed through it, the provision of Section 55. of this Bylaw shall apply, and the rates billed for that period or month shall be computed accordingly.
3. Undetected Leaks  
Notwithstanding the provision of Sections 61 through 63 of this Bylaw, where an underground leak is discovered in a consumers waterworks system, and where the consumer could not reasonably have been expected to be aware of such a leak, the District shall be entitled to charge for such water a rate which does not exceed the average of the rates billed for the preceding twelve (12) months plus a rate of 50 cents per cubic meter for all water which, as recorded by the meter, has passed through the meter since the previous reading thereof, and which is in excess of the average consumption or use over the preceding twelve (12) months and provided that repairs of the consumer's waterworks system have been carried out to the Superintendent of Public Works' satisfaction within 96 hours of discover of the leak.

\* Except where specified, all rates apply whether occupied or not, whether operating or not.



**"DISTRICT OF UCLUELET WATERWORKS REGULATION  
AND CHARGES BYLAW NO. 1136, 2011"  
SCHEDULE "C"  
USER RATE CATEGORIES**

<i>Apartment houses and multiple dwelling units</i> (Existing) (except condominiums)	Minimum flat rate or <i>metered service</i> (subject to minimum charge)
<i>Apartment houses and multiple dwelling units</i> (New)	By metered service only (subject to minimum charge)
<i>Motels and Mobile Home Parks</i> (Existing)	Minimum flat rate or metered service (subject to minimum charge)
<i>Motels and Mobile Home Parks</i> (New)	By <i>metered service</i> only (subject to minimum charge)
<i>Boarding houses</i> (Existing)	Flat rate or <i>metered service</i> ( <i>subject to minimum charge</i> )
<i>Boarding houses</i> (New)	By metered service only (subject to minimum charge)
Churches (Existing)	Flat rate or metered service (subject to minimum charge)
Churches (New)	By metered service only (subject to minimum charge)
Combination - small <i>commercial premises</i> (Existing)	Minimum flat rate or metered service (subject to minimum charge)
Combination - small commercial premises (New)	By metered service only (subject to minimum charge)
<i>Commercial premises</i> and industrial premises (Existing)	By metered service only (subject to minimum charge)
<i>Commercial premises</i> and industrial premises (New)	Minimum flat rate or metered service (subject to minimum charge)
Condominiums (Existing)	By metered service only (subject to minimum charge)
Condominiums (New)	Minimum flat rate or metered service (subject to minimum charge)
<i>Hotel and lodging houses</i> (Existing)	By metered service only (subject to minimum charge)
<i>Hotel and lodging houses</i> (New)	Minimum flat rate or metered service (subject to minimum charge)
<i>Service connection</i> (temporary)	By <i>metered service</i> only
Other special uses	By <i>metered service</i> only



**"DISTRICT OF UCLUELET WATERWORKS REGULATION  
AND CHARGES BYLAW NO. 1136, 2011"  
SCHEDULE "C-1"  
SPECIAL FEES**

1. FOR USE OF DISTRICT'S HYDRANT FOR WATER SUPPLY

Fee for the initial application for a permit to use a <i>District</i> hydrant	\$ 75.00	
For further extension of the initial permit period	\$ 25.00	
For <i>Water</i> usage from hydrant (Plus <i>water</i> meter charges)	\$10.00	/day

2. FOR TURNING OFF AND TURNING ON OF *SERVICES*

Permanent turn off (Disconnection) (at water main) (Actual cost including all costs of pavement and sidewalk cut & repairs)		100% of <i>actual</i> <i>cost</i>
Temporary turn off (Disconnection) (at property line) (Actual cost including all costs of pavement and sidewalk cut & repairs)		100% of <i>actual</i> <i>cost</i>
Temporary turn off / on		
- during regular <i>District</i> working hours	\$25.00	
- outside regular <i>District</i> working hours	\$100.00	

3. FOR TESTING OF *WATER* METERS

For 16mm and 19mm (3/4") meter	\$110.00
For 25mm (1") meter	\$110.00
For 38 (1 1/2") meter	\$110.00
For 50 mm (2") meter	\$410.00
For 75 mm (3") meter	\$600.00
For 100 mm (4") meter	\$600.00
For 150 mm (6") meter	\$600.00
For meters over 150mm (6")	\$600.00

4. FOR REMOVAL OF *WATER* METER

For 19mm <i>water</i> meter	100% of <i>actual</i> <i>cost</i>
For meter larger than 19mm (Actual cost including all costs of pavement and sidewalk cut & repairs)	100% of <i>actual</i> <i>cost</i>

5. Non-Emergency Service Call, after hours \$200.00



**"DISTRICT OF UCLUELET WATERWORKS REGULATION  
AND CHARGES BYLAW NO. 1136, 2011"  
SCHEDULE "D"  
CONNECTION FEES**

The following fees shall be charged for all *water service connections* and shall be payable in advance and prior to connection:

- A. All new connections
  - 19mm (3/4") - 50mm (2") \$750.00 plus cost of meter, pavement and sidewalk cut repairs
  - Over 50mm (2") \$900.00 plus cost of meter, pavement and sidewalk cut repairs
- B. Existing connections
- C. Meter 19mm (3/4") diameter or smaller for single family and duplex residential construction where connection, meter box, and meter setter have been provided by developer or *consumer*.



**"DISTRICT OF UCLUELET WATERWORKS REGULATION  
AND CHARGES BYLAW NO. 1136, 2011"  
SCHEDULE "E"  
WATER MAIN EXTENSIONS  
BY AN *APPLICANT* WISHING TO FRONT-END ITS COSTS**

1. Where an *Applicant* wishes to front-end the costs to provide a *water main extension* the conditions in this Schedule shall apply.
2. The *Applicant* shall execute a *servicing agreement* with the *District*, indicating the description and the location of the *water main extension*, and agreeing to the terms and conditions in the *servicing agreement*.
3. No provision of this Schedule shall be deemed to exempt any *parcel* from payment of taxes, charges, *rates* or fee imposed by any bylaw of the District.
4. The *Superintendent of Public Works* and *District* CAO are authorized to execute the *servicing agreement*.