

**DATE:** September 7, 2016**FILE:** 5650-02**TO:** Chair and directors  
Electoral areas services committee**FROM:** Debra Oakman, CPA, CMA  
Chief Administrative Officer**RE:** Royston water local service area water source study

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**Purpose**

To present the findings of the Royston water local service area (RWLSA) water source study completed by Koers and Associates Engineering Ltd.

**Policy analysis**

The Village of Cumberland entered into an agreement dated April 21, 2008 with the Royston Improvement District (RID) whereby the Village of Cumberland agreed it would sell and the RID agreed it would purchase bulk water from the Village of Cumberland upon the terms and conditions set out in the agreement.

On February 24, 2015 the board approved an updated water agreement for the sale of bulk water from the Village of Cumberland to the Comox Valley Regional District (CVRD). The updated agreement includes a requirement for the CVRD to investigate switching to an alternate source for the RWLSA.

Bylaw No. 111, being the “Royston Water Service Regulation, Fees and Charges Bylaw, 2010” allows for the collection of fees to provide revenue for the service.

Bylaw No. 105, being the “Royston Water Service Parcel Tax Bylaw, 2010” sets the parcel tax within the Royston water service.

**Executive summary**

The sale of bulk water by the Village of Cumberland and the purchase of bulk water by the CVRD, for the Royston water system, are included in a water agreement. On February 24, 2015 the Village of Cumberland and the CVRD signed an updated water agreement. Within the updated agreement the CVRD acknowledged that the Village of Cumberland has water capacity limitations and agreed to actively investigate switching to an alternative water source for the RWLSA, with the goal of disconnecting from the Village of Cumberland water supply system.

In 2014, the CVRD retained Koers and Associates to identify alternate long term water supply sources for the RWLSA. The study looked at the following source water options:

1. Ongoing supply from the Village of Cumberland
2. Connection to future regional water system
3. Connection to Comox Valley water system (CVWS)
  - a. Via Buckstone Estates
  - b. Via Highway 19a
4. Connection to Union Bay Improvement District
5. Development of a groundwater source

The report proceeded to recommend that the CVRD pursue a connection to the CVWS via the City of Courtenay at Highway 19a. A connection via the City of Courtenay water system will require approval from the City as well as approval from the Comox Valley water committee for the supply of water to the RWLSA. Each property that is currently serviced by the RWLSA will be required to pay capital improvement cost charges should the Royston system join the CVWS.

As a first step it is recommended that staff meet with the City of Courtenay to further discuss the report's findings, recommending a connection to the City of Courtenay at Highway 19a. In addition the report should also be referred to the Village of Cumberland for their consideration and feedback.

**Recommendation from the chief administrative officer:**

THAT the Royston water local service area water source study dated August 2, 2016 be referred to the Village of Cumberland for information;

AND FURTHER THAT the Royston water local service area water source study dated August 2, 2016 be referred to the City of Courtenay for discussion;

AND FINALLY THAT based on the above referrals, staff report back to the Electoral Area Services Committee with additional information and recommendations.

Respectfully:

***D. Oakman***

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Debra Oakman, CPA, CMA  
Chief Administrative Officer

**Background/current situation**

The RID has purchased bulk water from the Village of Cumberland since the Royston water system was first constructed in 1956. During this time, the sale of water by the Village of Cumberland and the purchase of water by the RID has been included in some form of written water supply agreement.

On January 1, 2010, under Order in Council No. 626, the RID was converted to a CVRD service for water distribution. The CVRD has since entered into subsequent agreements in 2012 and 2014 with both agreements incorporating changes. In 2015, CVRD and Village of Cumberland staff prepared an updated agreement leaving the terms generally unchanged with the exception of a few amendments. One of the new amendments required the CVRD to investigate alternate water supply options. Due to a water supply shortage, the Village of Cumberland is not able to fully meet its own municipal growth objectives in the years ahead and therefore included a requirement within the agreement that the CVRD investigate identifying an alternate source of water for the RWLSA.

Currently the RWLSA obtains treated water from the Village of Cumberland via a transmission main along Royston Road. A flow meter records water volumes as water enters the Royston system, water is retreated then stored in two reservoirs for distribution. The system provides potable water to approximately 2,600 residents with an average daily withdrawal of 1,932m<sup>3</sup>/day.

In April 2014, Koers was retained to conduct a study to identify alternate long-term water supply sources for the RWLSA. The study looked at six alternate options and provided a class 'C' cost estimate for each (Table no. 1).

**Table No. 1: Supply options cost estimate summary**

Option No.	Description	Cost Estimate Class 'C' (excluding GST)
1	Regional water supply, option 1R	>\$7,600,000*
2	CVWS, Marsden watermain extension	\$3,650,000*
3	City of Courtenay, Hwy 19a connection	\$1,300,000*
4	City of Courtenay Buckstone Estates connection	\$1,450,000*
5	Union Bay Improvement District connection	>\$3,400,000
6	Groundwater source	Unknown

\*Does not include capital improvement cost charges for connecting to CVWS

Of the six options reviewed, connection to the CVWS via Highway 19a was recognized as the low cost option at \$1,300,000. The cost estimate is exclusive of capital improvement cost charges and of the proposed CVWS water treatment plant and its associated infrastructure. Table no. 2 below outlines the connection cost estimate.

**Table No. 2: Highway 19a connection cost estimate**

No.	Description	Quantity	Cost Estimate Class 'C' (excluding GST)
1	Flow meter (Hwy 19a) - Connect to City of Courtenay dead-ended watermain (200mm dia.) on Hwy 19a and install flow meter and valve in chamber	1	\$70,000
2	Booster pump station (Royston Rd.) - Construct booster pump station at Royston office to pump water into the Royston Road reservoir (from 87m HGL to 132m HGL)	1	\$600,000
3	Remove PRV #2 (Trent) and PRV #4 (Roy Creek)	1	\$30,000
3	New booster pump station (Royston Road) - Construct booster pump station to maintain 175m HGL pressure zone which services the customers along Kentwood, Mounce and Logan Roads	1	\$600,000
<b>Combined Total:</b>			<b>\$1,300,000</b>

Additionally connection to the City of Courtenay water system will require approval from the City of Courtenay and the Comox Valley water committee for the supply of bulk water to the RWLSA. It should be noted that any of the alternate connection options will not negate the need for improvements within the RWLSA to provide for the required peak hour pressures and available fire flows in the service area, however the scale and magnitude of these projects may be altered. Additionally the pressure zone study as identified within the 2016 budget is no longer required.

### Options

The committee has the following options for consideration:

1. Refer the report to the Village of Cumberland and the City of Courtenay to get feedback on the preferred option.
2. To not refer the report at this time.

The RWLSA water source study provides information and recommended actions for the RWLSA to disconnect from the Village of Cumberland's water supply. As part of the bulk water agreement between the Village of Cumberland and the CVRD, the CVRD agreed to investigate switching to an alternate water source, this report illustrates the CVRD is actively investigating alternate options. In addition the report discusses connection to the CVWS via the City of Courtenay, which would require significant discussion with the City. As such only option No.1 above is recommended.

**Financial factors**

As identified within the report, connection to an alternate source will require significant expenditures for engineering and construction. The current renewal reserve fund balance for the service is \$1,119,568. It should be noted that improvements as identified in the Koers RWLSA water system study and that are included in 2017-2021 budget, may be altered or no longer required depending on the new source. Additionally the pressure zone study as identified within the 2016 budget is no longer required.

**Legal factors**

The current bulk water agreement between the CVRD and the Village of Cumberland expires on December 31, 2017. If the CVRD has not found an alternate water source for the Royston system by the end of 2017, the parties will work closely and strive towards another agreement.

**Regional growth strategy implications**

The regional growth strategy is focused on providing affordable, efficient and effective infrastructure that conserves land, water and energy resources. The water agreement between the CVRD and the Village of Cumberland includes provisions for minimized water use at all times. Reduced water usage can decrease maximum day demands ultimately helping reduce future infrastructure size and cost.

**Intergovernmental factors**

Water is provided in bulk to the CVRD for the Royston water system by the Village of Cumberland. As part of the agreement, the CVRD is working closely with the Village of Cumberland in securing an alternate water source.

**Interdepartmental involvement**

This project is managed by the engineering services branch.

**Citizen/public relations**

This project is focused on identifying possible alternate water supply options for the RWLSA. If the CVRD pursues an alternate water supply option in the future, appropriate communication with residents will be required.

Prepared by:

***Z. Berkey***

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Zoe Berkey, EIT  
Engineering Analyst

Concurrence:

***M. Rutten***

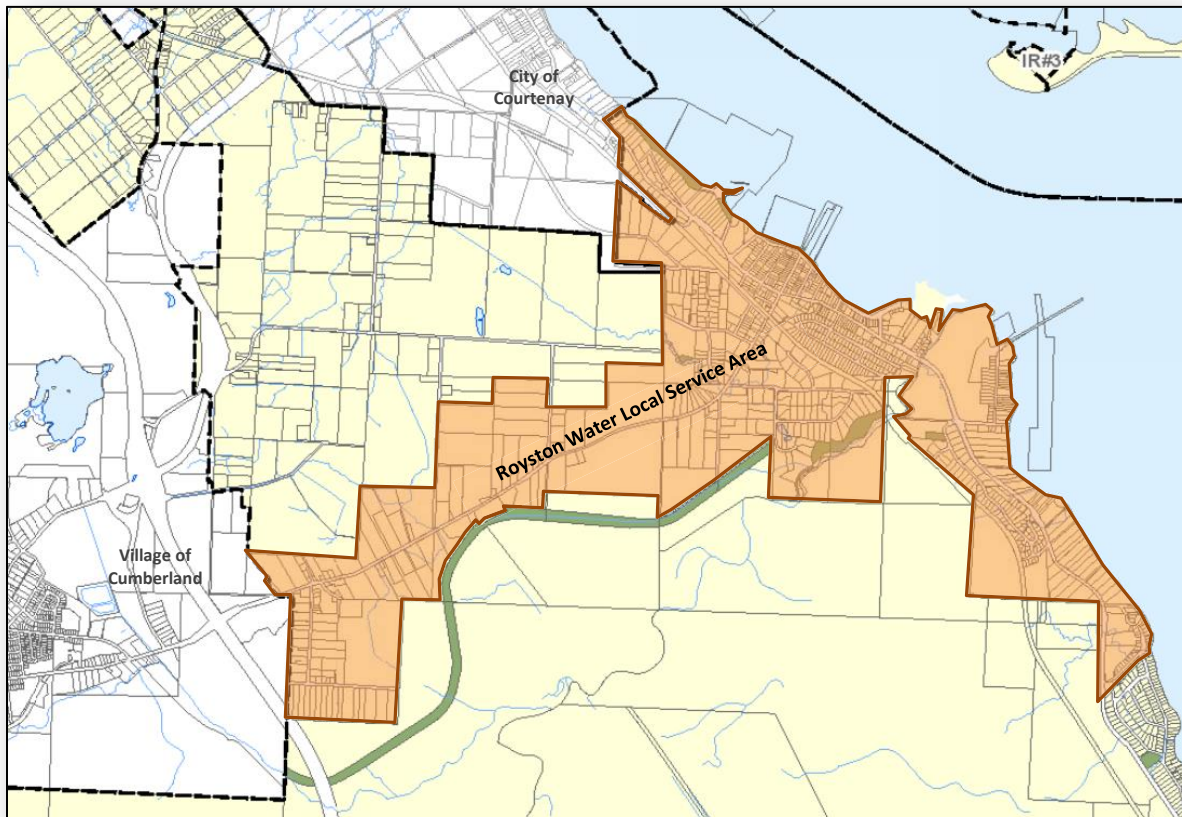
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Marc Rutten, P.Eng  
General Manager of  
Engineering Services

Attachment: Appendix A – “Royston Water Local Service Area Water Source Study”



# ROYSTON WATER LOCAL SERVICE AREA WATER SOURCE STUDY



**-FINAL REPORT-  
AUGUST 2016**



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August 2, 2016  
1417 – Final Report

Comox Valley Regional District  
600 Comox Rd  
Courtenay, BC V9N 3P6

**Attention:**      **Mr. Marc Rutten, PEng**  
                         **General Manager of Engineering Services**

**Re:      Royston Water Local Service Area**  
         **Water Source Study – FINAL REPORT –**

---

We are pleased to submit a digital (pdf) copy of our “Royston Water Local Service Area, Water Source Study – Final Report”. This is an update to the draft report submitted in June 2016. Five water options have been reviewed:

- Supply from the Village of Cumberland (Allen Lake / Henderson Lake source)
- Future Regional Water Supply, Option 1R (Comox Lake as source)
- CVWS Supply (BC Hydro Penstock with Puntledge River as source):
  - Marsden Road Watermain Extension
  - City of Courtenay, Hwy 19a Connection
  - City of Courtenay, Buckstone Estates Connection
- UBID Connection (Langley Lake as source)
- Groundwater Supply

The lowest estimated cost option is the CVWS supply via the City of Courtenay, Highway 19A Connection at \$1,300,000 plus GST. This option requires the construction of a flow meter and check valve, booster pump station. This cost estimate is exclusive of the cost for the proposed CVWS water treatment plant and its associated infrastructure (deep water intake, booster pump and bulk transmission main) and CVWS capital improvement cost charges. Connection to City of Courtenay water system will require approval from the City and work within road allowances within the CVRD will require construction approval from the Ministry of Transportation and Infrastructure.

We have enjoyed the opportunity to be of service to the CVRD on this project. We would be pleased to assist the CVRD in the implementation of the recommendations.

Yours truly,  
KOERS & ASSOCIATES ENGINEERING LTD.

Chris Downey, PEng  
Project Manager

## ROYSTON WATER LOCAL SERVICE AREA

### WATER SOURCE STUDY

April 2016

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A Water Agreement	
Village of Cumberland & Comox Valley Regional District	
(3 Year Period; expires December 31, 2017)	

### 1.1 AUTHORIZATION

In April 2014, the Comox Valley Regional District (CVRD) authorized Koers & Associates Engineering Ltd. to carry out water source options study for the Royston Water Local Service Area (RWLSA). The study is to assess if there is an alternate water source that can be used to service the RWLSA in place of the obtaining water from the Village of Cumberland (VoC). The study was to be carried out in accordance with Koers' proposal dated April 14, 2014.

A 50% stage report was submitted in November 2014. The completion of the report was subsequently given in December 2015.

### 1.2 BACKGROUND

The RWLSA is located east of the VoC and south of the City of Courtenay. The water system was originally constructed in 1956 and has expanded through development to its current configuration. It was operated by the Royston Improvement District (RID) up until 2009 when the RID dissolved and turned the system over to the CVRD.

The current service population is estimated at approximately 2,600 people. The majority of the properties serviced are residential, with some service commercial, a few home based businesses, a resort hotel, and a public elementary school.

The water system is currently supplied from the VoC via a transmission main along Royston Road. It is comprised of four pressure zones supplied from two reservoirs, and five Pressure Reducing Valves. The VoC has a limited water supply and in 2007/08, placed a moratorium on providing new water services until additional water could be secured. In 2012, the VoC installed water meters on all water service connections. In 2013, the VoC's first groundwater well was brought on-line to augment their surface supply source. The well was developed in partnership with a local development to meet the water demands the development will generate.

The Regional Growth Strategy for the CVRD had identified lands within the RWLSA as one of the future Settlement Expansion Areas (SEAs). This SEA was recently downzoned to 4 ha minimum lots. There is presently limited area for future development within the RWLSA. A regional sanitary sewer system is scheduled to be installed by the end of 2018, which will service Royston and Union Bay and potentially the VoC. This may result in increased water demand, as properties that could not be developed due to on-site sewage disposal constraints, may be developable.

The ability of the VoC to supply enough water to meet the long-term needs of Cumberland and Royston is a continuing concern. One of the requirements of the water supply agreement between the VoC and the CVRD is for the CVRD to investigate the feasibility of an alternate water supply source for the RWLSA.

### 1.3 STUDY OBJECTIVES

The objective of this study is:

- Identify a long-term water supply source for the RWLSA. Five options to be reviewed are:
  - i) Ongoing Supply from the Village of Cumberland (VoC)
  - ii) Connection to Future Regional Water System
  - iii) Connection to Comox Valley Water System (CVWS)
  - iv) Connection to Union Bay Improvement District (UBID)
  - v) Development of a Groundwater Source

### 1.4 SCOPE OF WORK

To meet the study objective, the following scope of work was adopted:

#### Task 1 Project Start-up Meeting, Data Collection & Review

- Meet with District staff and confirm project scope and work plan.
- Obtain and review past reports, including:
  - City of Courtenay Water System Study, Draft Report, April 2016 by Koers & Associates Engineering Ltd.
  - Village of Cumberland Long Term Water Supply Strategy by Koers & Associates Engineering Ltd.
    - Technical Memorandum No. 3, Source Development, Feb 18, 2016
    - Technical Memorandum No. 1, Rev 1, Water Demands, Jan 25, 2016
  - Comox Valley Water System Water Intake & Treatment Facility Study & Concept report, April 2015 by Associated Engineering Ltd.
  - Royston Water Local Service Area, Water System Study, March 2013 by Koers & Associates Engineering Ltd.
  - Review of Rates for Water Service, Comox Valley Water System, October 2011 by AquaVic Water Solutions Inc.
  - Village of Cumberland Long Range Water Supply Strategy, 2011 by McElhanney Consulting Services Ltd.
  - Comox Valley Regional Water Supply Strategy, April 2011 by Wedler Engineering LLP.
  - Comox Valley Regional Water Supply Strategy by Kerr Wood Leidal Associates Ltd.
    - Task 2.1.6 Regional Alternative Water Supplies, June 2010
    - Technical Memorandum #6, Phase 4 – Regional Water Supply Options, Table 2-2, May 31, 2010
    - Technical Memorandum #4, - Task 2.1.9 Water Users Profile, Table 8, April 2010
  - Comox Valley Regional Growth Strategy, 2010 by Urban Strategies Inc.

- Village of Cumberland Master Water Plan, 2007 by Anderson Civil Consultants Inc.
- Obtain and review:
  - Land-use maps
  - OCP document and maps
  - Growth management plan document and maps
  - Water supply agreement between the VoC and CVRD

## **Task 2      Design Criteria - Population and Water Demand Projections**

- Develop Average Day, Maximum Day and Peak Hour Demands for three growth projections (low, medium and high).
- Review potential reduction in water demands based on implementation of water conservation programs based on the findings of the Comox Valley Water System, October 2011 water rate report review by AquaVic Water Solutions Inc.
- Present population and demand findings in a brief technical report to District staff for review and acceptance.

## **Task 3      Options Review**

- i) Ongoing Supply from the Village of Cumberland
  - Review existing water supply agreement terms.
  - Compare 50 year projected water demands, with and without estimated reductions from successful implementation of conservation programs, to current demands. Confirm range of increase.
  - Compare projected water demand increases with VoC water supply source capacity and confirm if system can meet future demands for both systems.
- ii) Connection to Future Regional Water System
  - Review recommended options of 2011 Comox Valley Regional Water Supply Strategy.
  - Identify works required to provide service to Royston.
  - Review with CVRD staff when Regional Water System could be in-place.
  - Confirm probable connection point and impact on Royston water system. Identify if system modifications or upgrading works are required to accommodate connection (new PRV station(s), new reservoirs, main extensions or upgrades, etc.).
- iii) Connection to Comox Valley Water System
  - Review feasibility of extending existing water system to service Royston. Two options to be reviewed:
    - i    Extension of water mains from Buckstone Estates, and
    - ii   Extension of water main along Hwy 19A.

Options are to be modelled using the computer model WaterGems 8i, by Bentley Systems Inc.
  - Analyze water system under three scenarios; Average Day, Maximum Day plus Fire Flow, and Peak Hour.
  - Check modelling results, identify system shortcomings, if any, (inadequate pressures or fire flows or velocities that exceed design guidelines).
  - Adjust model, re-run as needed to establish extent of required works. Investigate if other upgrading options are possible.

- Model other scenarios and compare findings. Confirm pipe sizes, looping and/or main twinning(s) necessary to supply peak hour residual pressures and design fire flows.
- Using 24 hour extended time modelling feature, confirm system's ability to refill the reservoirs.
- Check reservoir storage capacity against design requirements.
- Royston's projected demands in 50 years to be added to a demand node connected to the Comox Valley Water System main and the impact on the CVWS noted. Confirm extent of upgrading works on CVWS and Royston, if any, to meet the demands.

iv) Connection to Union Bay

- Review findings of past Langley Lake water supply capacity studies.
- Compare lake capacity against Royston's projected 50 year demands, with and without estimated reductions from successful implementation of conservation programs.
- Identify infrastructure works required to deliver water from Union Bay to Royston.
- Identify upgrading works to the Royston system to accept water from Union Bay.
- Prepare order of magnitude cost estimates for infrastructure works.

v) Development of a Groundwater Source

- Review findings of groundwater capacity review from available reports.
- Compare aquifer capacities against Royston's projected 50 year demands.
- Identify infrastructure works required to develop groundwater source will be based on a desk top review that does not include field drilling or site review.
- Prepare order of magnitude cost estimates for infrastructure works.

#### **Task 4      Draft Report**

Present findings in a bound draft report, complete with plans, illustrations, graphs, tables, discussion, cost estimates, conclusions, and recommendations.

#### **Task 5      Final Report**

Finalize report upon receipt of District comments and submit a digital (pdf) and five bound copies.

### **1.5      ACKNOWLEDGEMENTS**

Koers & Associates Engineering Ltd. acknowledges with thanks, the assistance provided by the following CVRD and VoC staff in the preparation of this report:

#### CVRD Staff

- Mr. Marc Rutten, PEng, General Manager of Engineering Services,
- Mr. Mike Herschmiller, Manager of Water Services,
- Ms Zoe Norcross-Nu'u, Engineering Analyst, and
- Ms. Zoe Berkey, EIT, Engineering Analyst.

#### VoC Staff

- Mr. Rob Crisfield, Manager of Operations

## 2 WATER SYSTEM

### 2.1 SUPPLY, TREATMENT & DISTRIBUTION SYSTEM

#### 2.1.1 Supply and Treatment

The RWLSA obtains treated water from the VoC via a 200 mm dia. watermain on Royston Road. A flow meter records the water volume as it enters the RWLSA. After the meter, the water passes through a pressure reducing valve (PRV) which lowers the hydraulic grade line to 132 m, with the exception of a small service area on Kentwood Road which has a hydraulic grade line of 175 m.

After the PRV, the water is re-chlorinated with the injection of sodium hypochlorite prior to discharge into a bolted steel reservoir located at 3200 Royston Road. The reservoir has a storage volume of 2,360 m<sup>3</sup> which replaced a 1972 concrete storage reservoir that was abandoned because of seismic concerns.

A second re-chlorination station is located at the Herondale Reservoir which services the most southern end of the system and was built to provide additional fire protection for the Kingfisher Resort. The re-chlorination station is required in order to maintain adequate chlorine residual to the service area.

#### 2.1.2 Distribution System Mains

The distribution system consists of approximately 37 kms of piping that ranges in age from 58 to 8 years old (1956 to 2006).

A breakdown of the pipe type by diameter is presented in **Table 1** below. The layout of the water distribution system is shown in **Figure 1**.

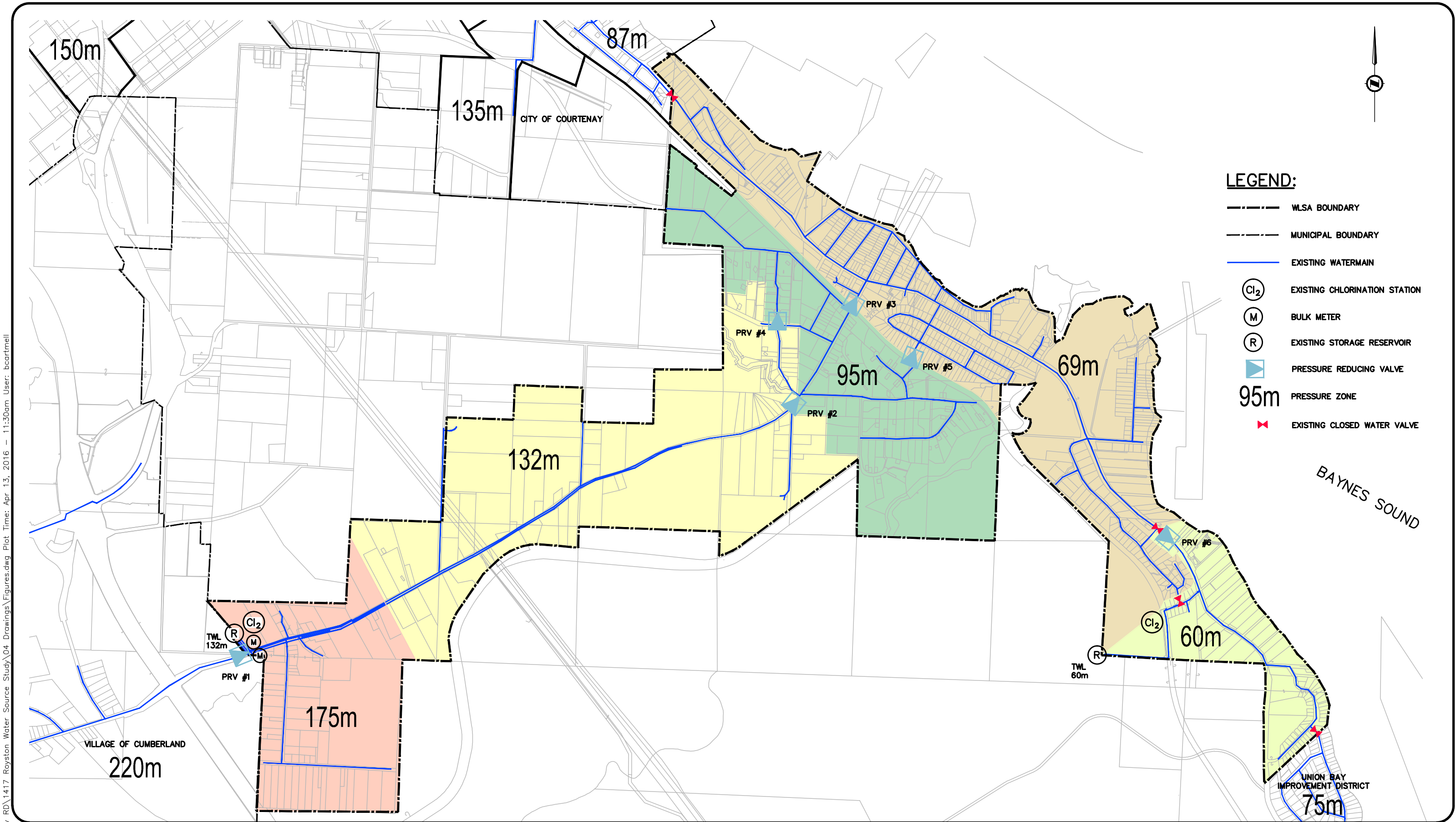
**Table 1**  
**Pipe Diameters, Materials and Lengths**

Pipe Diameter & Material	Length (km)
Asbestos Cement (AC)	
100 mm	2.8
150 mm	9.0
200 mm	10.6
<b>Total AC:</b>	<b>22.4 km</b>
Poly Vinyl Chloride (PVC)	
75 mm	.8
100 mm	.2
150 mm	4.3
200 mm	5.3
250 mm	.8
300 mm	3.1
<b>Total PVC:</b>	<b>14.5 km</b>
<b>Combined Total:</b>	<b>36.9 km</b>

There are 909 service connections. All connections are metered.



File: H:\1014 Comox Valley RD\1417 Royston Water Source Study\04 Drawings\Figures.dwg Plot Time: Apr 13, 2016 - 11:30am User: bcartmell



- LEGEND:**
- WLSA BOUNDARY
  - MUNICIPAL BOUNDARY
  - EXISTING WATERMAIN
  - EXISTING CHLORINATION STATION
  - BULK METER
  - EXISTING STORAGE RESERVOIR
  - PRESSURE REDUCING VALVE
  - PRESSURE ZONE
  - EXISTING CLOSED WATER VALVE



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CLIENT	COMOX VALLEY REGIONAL DISTRICT
PROJECT	ROYSTON WATER SOURCE STUDY

TITLE		EXISTING WATER SYSTEM AND PRESSURE ZONES	
APPROVED		SCALE	1:20,000
DATE	MAR 2016	DWG No.	FIGURE 1
PROJECT No.	1417		



### 2.1.3 Pressure Zones

The distribution system consists of five pressure zones that are controlled by six PRVs and two reservoirs. **Table 2** below presents a summary of the PRV location and settings.

**Table 2**  
**Distribution System Pressure Zones**

Item No.	Location	PRV Ground El. (m)	PRV Pressures kPa (psi)	
			Inlet	Outlet
175 m HGL				
PRV 1	3200 Royston Rd (500 m east of Inland Island Hwy)	121	690 (100)	530 (77)
132 m HGL				
Royston Reservoir	3200 Royston Rd (500 m east of Inland Island Hwy)			
95 m HGL				
PRV 2	3810 Royston Rd - near Trent Rd (4 km east of Inland Island Hwy)	49	830 (120)	455 (66)
PRV 4	Hyland Rd - at Roy Creek/Bear Cat Rd	47	830 (120)	448 (65)
69 m HGL				
PRV 3	3861 Royston Rd - at Livingston Rd (4.6 km east of Inland Island Hwy)	30	630 (91)	380 (55)
PRV 5	3760 Turnbull Rd	30	630 (91)	380 (55)
60 m HGL (Herondale Reservoir)				
PRV 6	4296 Hwy 19A (1.3 km south of Trent River)	20	480 (70)	380 (55)

The service area of each pressure zone is shown in **Figure 2**. A brief description of each pressure zone is presented below.

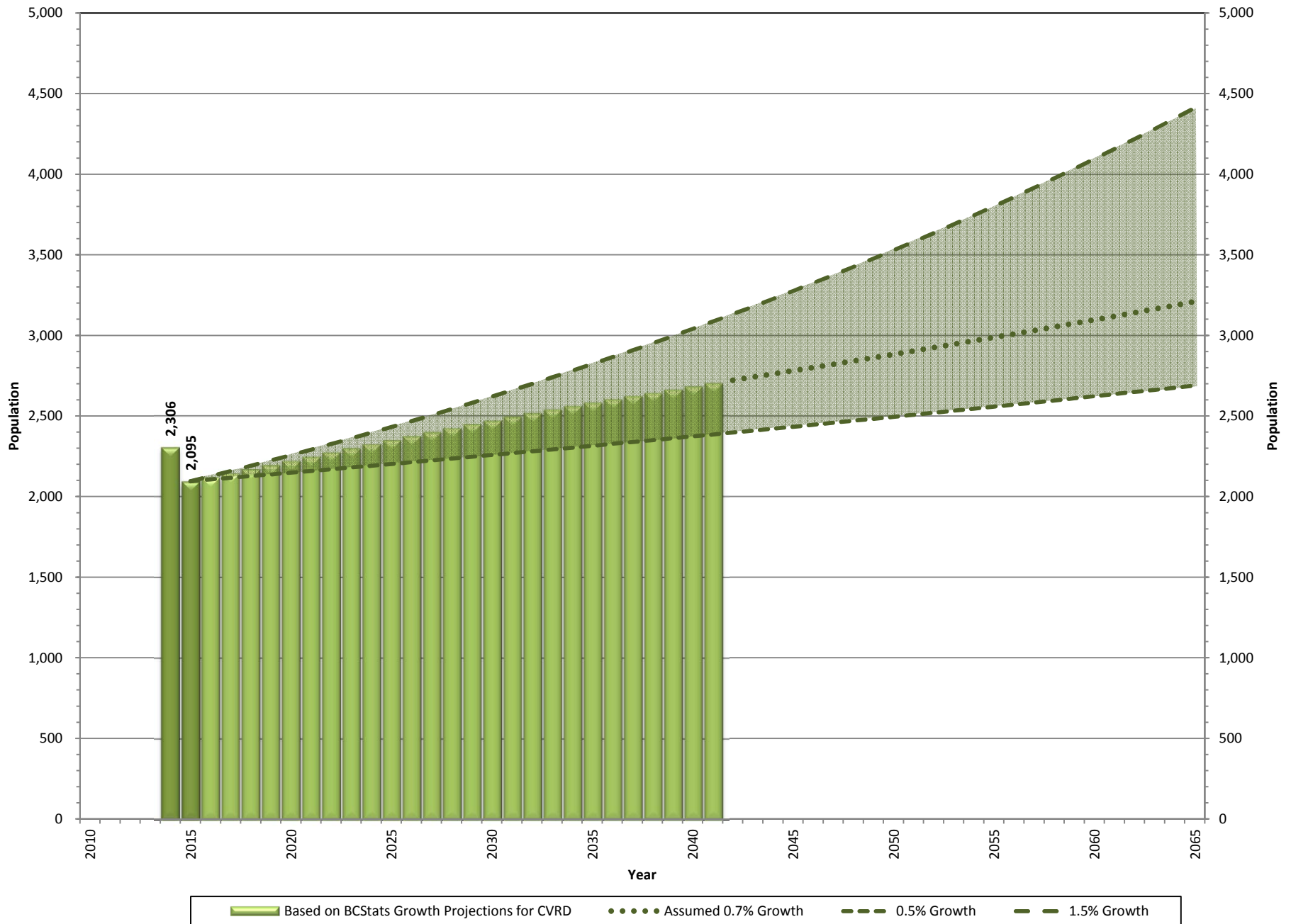
#### **Pressure Zone 175**

This pressure zone is supplied directly from the Cumberland supply main through PRV No.1 and services the area around the Royston Reservoir, Kentwood Road, Mounce Road, and Logan Road. The static pressures range between 530 kPa and 690 kPa (77 psi and 100 psi). There is no storage reservoir for this pressure zone and the fire flows in the area are restricted to the capacity of the Cumberland supply main.

#### **Pressure Zone 132**

This pressure zone is supplied directly from the Royston Reservoir which has a top water level (TWL) of 132 m. The service area covers Royston Road from approximately 575 m

**Royston Water Local Service Area  
Population (2014 - 2015) & 50 Year Projection**



**FIGURE 2**

south of Mounce Road to Trent Road, Trent Road, and Roy Creek Road. The static pressures range between 345 kPa and 830 kPa (50 psi and 120 psi).

#### **Pressure Zone 95**

This pressure zone is supplied from the Trent Road PRV (PRV No.2) and the Hyland Road PRV (PRV No.4). The services area covers the area southwest of the E&N railway tracks to Trent Road and Roy Creek Road. The static pressures range between 455 kPa and 630 kPa (66 psi and 91 psi).

#### **Pressure Zone 69**

This pressure zone is supplied from the Livingston PRV (PRV No. 3) and the Turnbull PRV (PRV No.5). The service area covers the area northeast of the railway tracks. The static pressure in the pressure zone ranges between 380 kPa and 690 kPa (55 psi and 100 psi).

#### **Pressure Zone 60**

This pressure zone is serviced by the Herondale Reservoir, which was constructed to provide additional fire protection storage for the Kingfisher Spa and Resort. The reservoir has a TWL of 60 m. The reservoir is filled by a 75 mm diameter line connected to the 69 m pressure zone on the upstream side of a closed valve at the intersection of Herondale and Briardale roads. The PRV station (PRV No. 6) on Hwy 19A, is equipped with a check valve to allow water to flow north into the 69 m pressure zone during a fire. The PRV is set such that it will open if the reservoir's 75 mm diameter line is not able to refill the reservoir.

#### **2.1.4 Reservoirs**

There are two reservoirs in the water system; at the top (northwest) on Royston Road at the interface between the VoC and the RWLSA system; and at the bottom (southwest) end of the system off Herondale Road. A summary of each reservoir is presented in **Table 3**.

**Table 3**  
**Water Storage Reservoirs**

Location	Storage Volume (m <sup>3</sup> )	Diameter x Height (m)	Top Water Level (m)	Type	Year Built
3200 Royston Rd	2,360 <del>1,139</del>	16.1 x 11.6	132	Bolted Steel Concrete*	2009 1972
off Herondale Rd	534	6.1 x 18.6	60	Bolted Steel	2001

Note:

\* The concrete reservoir is still in place but due to seismic concerns is no longer in service.

## 3 POPULATION

---

### 3.1 HISTORIC

The current population for the Royston Water Local Service Area (RWLSA) is not known. The number of service connections is tracked by the CVRD as all properties are metered. In December 2013, 90 serviced properties were annexed into the City of Courtenay but remained connected to the RWLSA. In November 2014, these properties were removed from the RWLSA water system when they were connected to the City's water system. Immediately prior to the switchover, there were 961 metered connections in the RWLSA system.

As of December 2015, there were 873 connections, including 21 connections that are turned off or not connected to a dwelling or standpipe. The system consists of 867 residential and 6 commercial connections.

Recent water studies of the Royston water system by Koers & Associates estimated its December 2015 service population at 2,095 based on an average population density of 2.4 capita per connection (873 connections \* 2.4 capita per connection = 2,095 capita).

### 3.2 FUTURE

#### 3.2.1 Regional Growth Strategy

The CVRD Regional Growth Strategy (Bylaw No. 120, 2010) projects that the average annual growth rate for the Comox Valley will reduce gradually from 1.6% to 1.4% by Year 2021, with a further reduction to 1.0% by Year 2030. Beyond Year 2030, it has been assumed that the growth rate will remain constant at 1.0%. These were the growth rates published by BCStats.

#### 3.2.2 BCStats

BCStats publishes a forecast of future population growth for the next 25 years for each regional district. It does not publish forecasts for individual municipalities, but they can be provided by BCStats for a fee. The population forecast uses the Component/Cohort-Survival method which ages the population while applying births, deaths, and migration forecasts by age. The forecasts are based on past trends which are modified to account for possible future changes. The growth projections are updated annually.

In September 2015 BCStats updated their annual population projections for all Regional District's, extending them to Year 2041 (the next 25 years). For the Comox Valley Regional District, the annual growth rate for projected to be 1.2% in Year 2016 and Year 2017. This is followed by a projected gradual decline each year for the remaining 23 years; reaching 0.72% in Year 2041. These projected growth rates are slightly slower than those in the above noted CVRD Regional Growth Strategy, 2010.

### 3.2.3 Proposed

Three growth rate projections have been developed as follows:

- **Low growth rate**, 0.5% each year.
- **medium growth rate**, BCStats annual growth rate for the Comox Valley to Year 2041. Beyond Year 2041, the 0.72% annual growth rate of Year 2041 was applied to each of the following years to Year 2065.
- **high growth rate**, 1.5% each year.

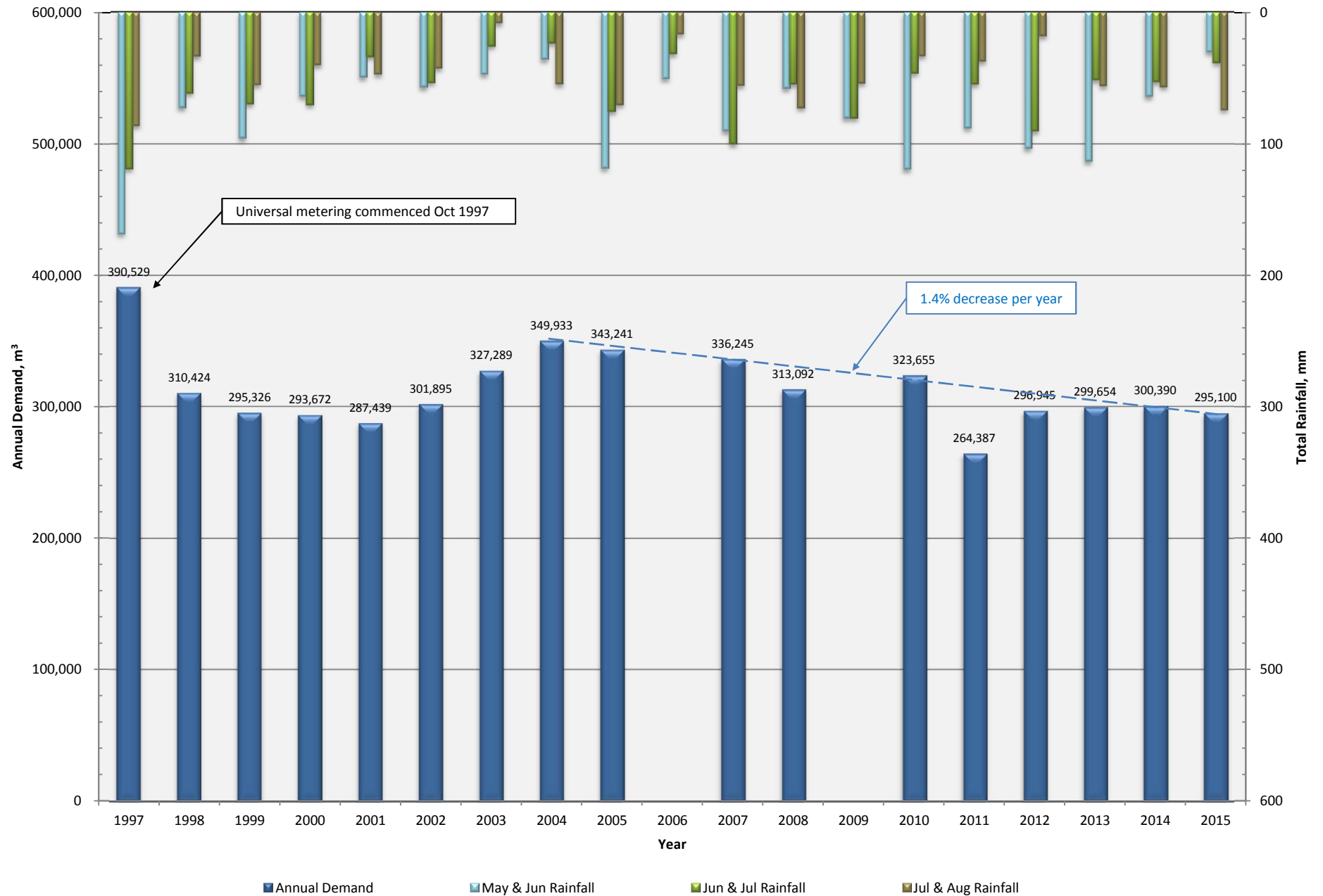
The projected population for each of the three growth rates for the next 50 years is listed in **Table 4** in 10 year increments.

**Table 4**  
**Population Projection, 2015 - 2065**

Year	Projected Population		
	Low (0.5%)	Moderate (1.2% - 0.72%)	High (1.5%)
2015	2,095	2,095	2,095
2025	2,200	2,350	2,430
2035	2,315	2,585	2,820
2045	2,435	2,780	3,275
2055	2,560	2,985	3,800
2065	2,690	3,210	4,410
<b>50 Year Increase: (2015 to 2065)</b>	<b>595 28%</b>	<b>1,115 53%</b>	<b>2,315 111%</b>

The population projection for each year for each growth rate is graphically presented in **Figure 3**.

## Royston Water Local Service Area Annual Demand vs Summer Percipitation, 1997 - 2015



**FIGURE 3**

## 4 WATER DEMANDS

### 4.1 DESIGN CRITERIA

In reviewing the potential of a water sources to meet the water demands of the RWLSA, it must be able to provide the first two of the following three levels of water demands:

Average Day Demand =  $\frac{\text{Total annual consumption}}{365 \text{ days}}$

Maximum Day Demand = Day with highest demand for the year

Peak Hour Demand = Highest flow rate maintained for one hour (generally occurring on maximum day of the year)

The Peak Hour Demand is not normally met by the water source but is provided the water distribution systems water storage reservoir.

The average day and maximum day demands are to be used in assessing the viability of the water sources reviewed in this report.

### 4.2 HISTORIC

Monthly bulk water meter records for the past 17 years (1997 – 2015) were obtained from the CVRD and the VoC and reviewed for:

- seasonal demand changes,
- maximum demand months,
- year over year trends, and
- average day and maximum day demands per year.

#### 4.2.1 Annual

The review showed that annual demand decreased by more than 20%, from 390,529 m<sup>3</sup> to 310,424 m<sup>3</sup>, almost immediately after completion of the universal metering program in the fall of 1997.

Between Year 1998 and Year 2004, demands gradually rose, reaching 349,933 m<sup>3</sup>.

During the past 11 years (Year 2004 to Year 2015), demand decreased by an average of 1.4% per year; for a total decrease of 15.7%. The total demand in Year 2015 was 295,100 m<sup>3</sup>. The cause of the downward trend could not be determined. A decrease in demand per capita has been recorded for the City of Courtenay and the Town of Comox since the latter half of the 2000's. While a specific reason could not be identified, it is believed to be a result of several factors, including public education and water conservation programs in the Comox Valley as well as the moratorium on development in the VoC around 2007 due to the lack of sufficient water supply.



#### 4.2.2 Seasonal

As anticipated, a review of monthly demands revealed they are lowest in the wet winter months, rise in the spring, peak in the summer (either July or August) and decline in the fall.

A review of monthly rainfall records indicates a correlation between increasing water demands, peaking in July, with decreasing rainfall/warmer temperatures. Monthly rainfall data for 2007 to 2015 is presented in **Table 5**.

While weather patterns do have an impact on demand, a comparison of annual demand vs rainfall for the four months of May through August, when demands are the largest was inconclusive in a direct correlation of highest demand with lowest rainfall totals. **Figure 4** presents annual demand vs May - August rainfall from 1997 to 2015. Annual demand for years 2006 and 2009 were not available due to either incomplete or missing data.

**Table 5**  
**Comox Airport Monthly Rainfall, 2007 - 2015**

Month	Monthly Rainfall per Year (mm) *									Average (mm)
	2007	2008	2009	2010	2011	2012	2013	2014	2015	
January	134	<b>153</b>	55	241	119	185	84	80	117	130
February	116	46	34	133	128	125	87	167	173	112
March	82	57	93	125	<b>200</b>	131	81	149	102	113
April	86	30	27	<b>97</b>	32	93	44	55	33	55
May	22	29	51	<b>75</b>	67	26	64	48	<b>13</b>	44
June	69	29	29	44	21	77	49	<b>17</b>	<u>17</u>	39
July	31	26	51	<b>2</b>	34	<u>13</u>	<b>2</b>	36	21	24
August	<b>25</b>	47	<b>3</b>	31	<b>4</b>	<b>6</b>	54	20	53	27
September	72	<b>17</b>	49	66	85	<u>7</u>	116	47	38	55
October	125	123	139	103	63	178	15	238	78	118
November	181	132	<b>371</b>	208	159	205	<b>140</b>	103	103	178
December	<b>208</b>	138	126	<b>319</b>	76	<b>281</b>	62	<b>242</b>	<b>356</b>	201
Total	1,150	827	1,030	1,445	987	1,327	799	1,202	1,105	1,097

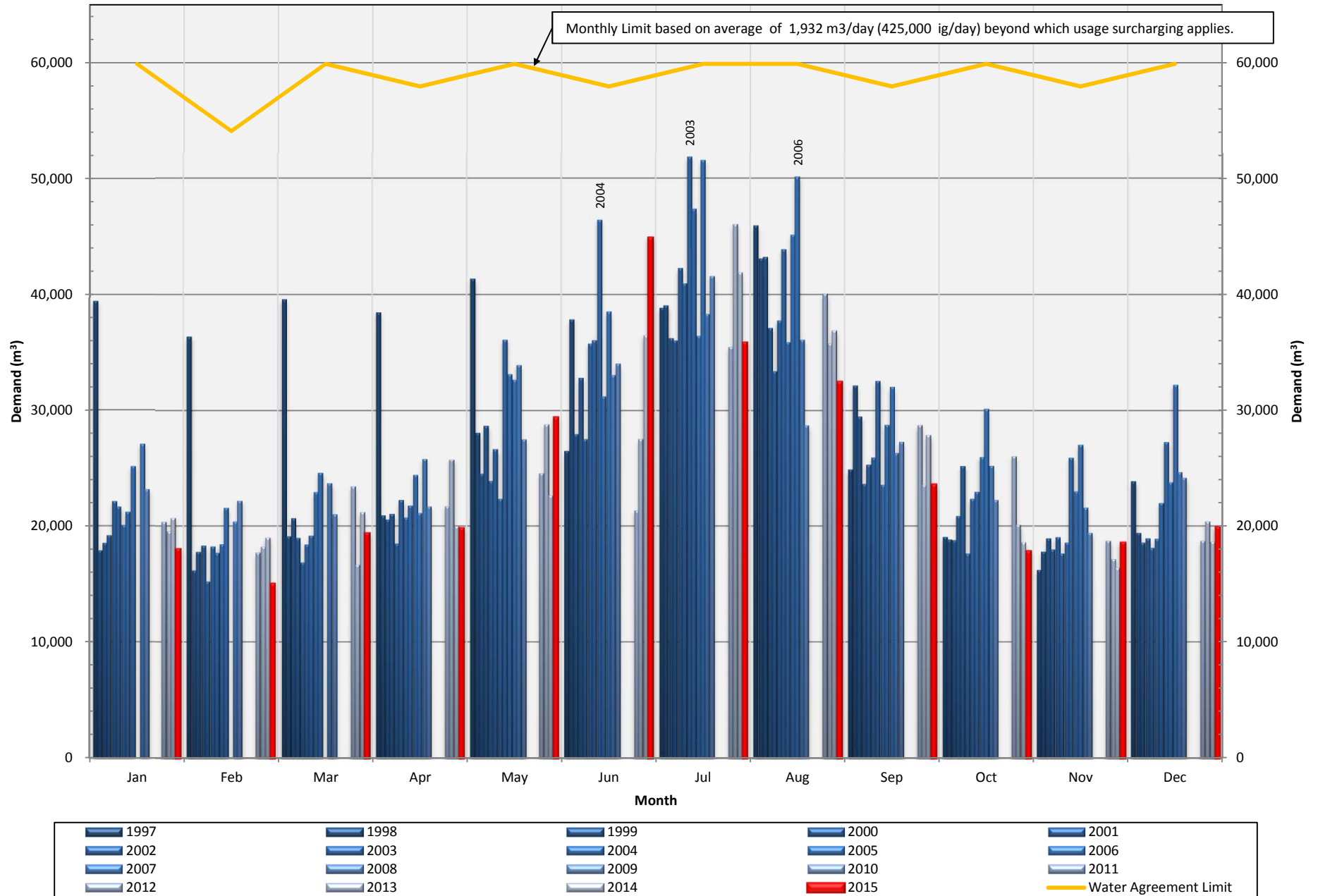
Note: - Highest monthly rainfall for the year is in **bold** text.  
- Lowest monthly rainfall for the year is in **bold red** text  
- Monthly rainfall less than 20 mm is in underlined dark red text.

#### 4.2.3 Monthly

A review of monthly demand from 1997 to 2015, revealed the RWLSA is operating well within the monthly withdrawal limit permitted under the VoC water supply agreement based on an average day withdrawal of 1,932 m<sup>3</sup>/day, after which a rate surcharge is applied. This can be seen in **Figure 5**.

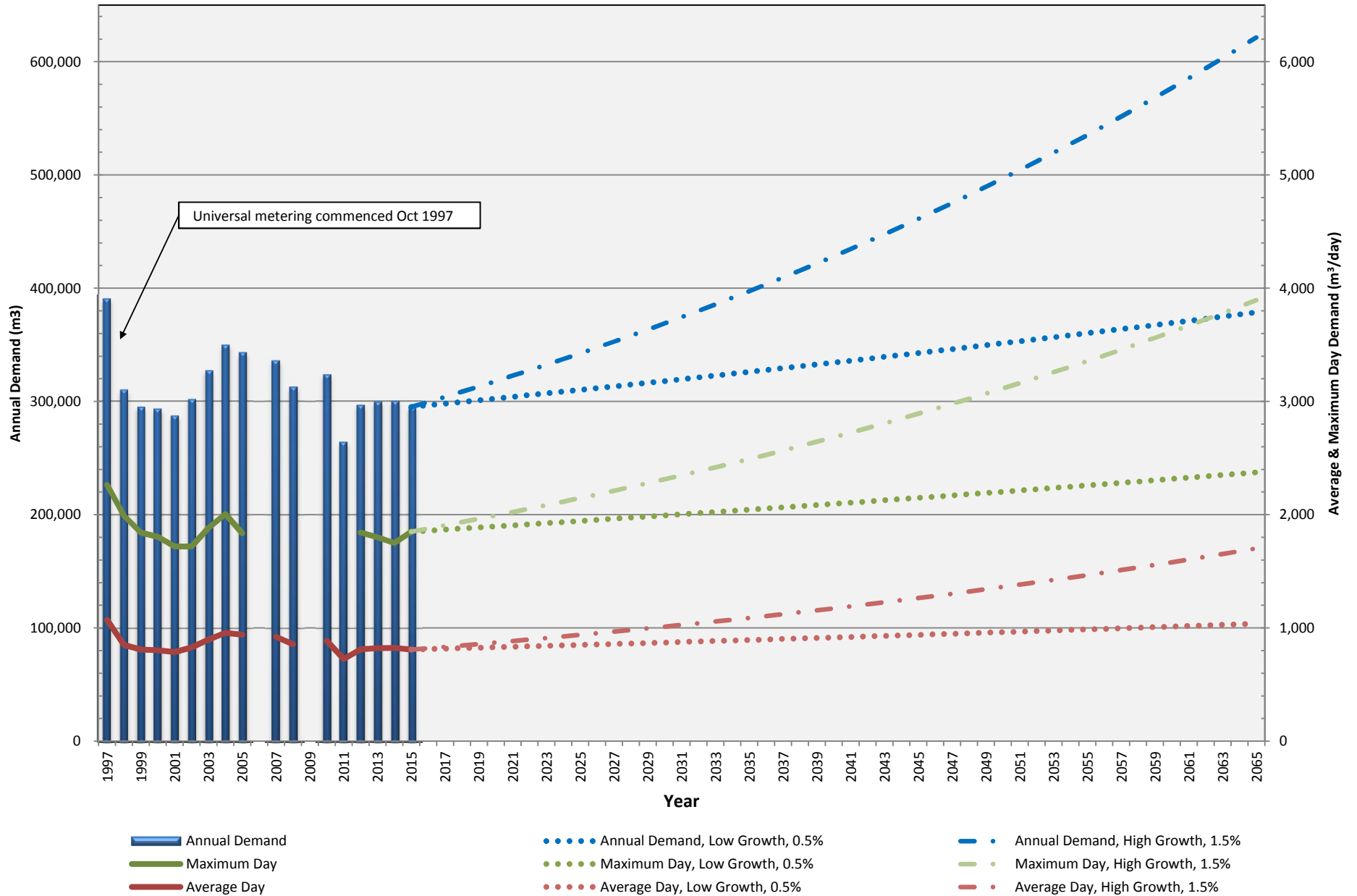
A review of monthly water demands, revealed demand peaks in July and were 2 to 2.5 times of fall/winter time demands (40,000 m<sup>3</sup> to 50,000 m<sup>3</sup> compared to 20,000 m<sup>3</sup>).

## Royston Water Local Service Area Monthly Demands, 1997 - 2015



**FIGURE 4**

# **Royston Water Local Service Area** **Annual, Average & Maximum Day Demands, 1997 - 2065**



**FIGURE 5**

#### 4.2.4 Daily Demands

Daily flow data was obtained from the Comox Valley Regional District and the Village of Cumberland. The data was processed by Koers to provide a reading for each day as the majority of readings are for week days only. If a reading covered more than one day, such as a Monday reading covering three days (Friday, Saturday and Sunday), the reading was divided by three and applied to each day.

##### 1997 – 2015 Average Day and Maximum Day Demands

A review of the daily demands revealed demands increased and peaked during the summer months. The highest daily demand was recorded in June, July or August, with the most highest annual demand occurring in the month of July (8 times), followed by August (4 times), and June (once).

A comparison of Year 2005 demands to Year 2015 demands revealed a decrease in average day demand of 14% (940 m<sup>3</sup>/day to 800.8 m<sup>3</sup>/day) while maximum day demand was almost unchanged by less than 1% (1,837 m<sup>3</sup>/day to 1,850 m<sup>3</sup>/day).

**Table 6** presents the recorded average and maximum day demands since 1997 for those years which data was available.

**Table 6 – Average & Maximum Day Demands, 1997 - 2015**

Year	Annual Demand (m <sup>3</sup> )	Average Day (m <sup>3</sup> )	Maximum Day	
			(m <sup>3</sup> )	Date
1997	390,529	1,070	2,264	Aug 12
1998	310,424	850	1,991	Aug 5
1999	295,326	809	1,841	Aug 24
2000	293,672	802	1,805	Jul 18
2001	287,439	788	1,718	Jul 10
2002	301,895	827	1,718	Jul 24
2003	327,289	897	1,882	Jul 29
2004	349,933	956	2,005	Jun 23
2005	343,241	940	1,837	Jul 28
2006	-	-	-	-
2007	336,245	921	-	-
2008	313,092	855	-	-
2009	-	-	-	-
2010	323,655	887	-	-
2011	264,387	724	-	-
2012	296,945	811	1,841	Aug 15
2013	299,654	821	1,800	Jul 25
2014	300,390	823	1,750	Jul 15
2015	295,100	808	1,850	Jul 3

### 4.3 FUTURE

Water demands to Year 2065 (the next 50 years) have been developed for the three growth rates noted in [Table 4](#).

Based on these growth scenarios, water demands are projected to increase by a low as 28% to a high of 111%. The Year 2015 and Year 2065 demands are presented in [Table 7](#). The annual, average day, and maximum day demands from Year 1997 to Year 2065 are presented graphically in [Figure 5](#).

**Table 7**  
**Existing & Projected Future Demands, 2015 & 2065**

Description	Annual Growth		Projected Population	Projected Demands		
	(%)	Data Source		Annual (m³)	Ave Day (m³/day)	Max Day (m³/day)
Year 2015						
Existing	-	-	2,095	295,100	808	1,850
Year 2065						
Growth Rate:						
- Low	0.5%	-	2,690	380,000	1,040	2,340
- Moderate	1.2 to 0.72%	BCStats	3,210	452,000	1,240	2,830
- High	1.5%	-	4,410	620,000	1,700	3,900
50 Year Increase						
Increase:						
- Low	28%		595	84,900	232	490
- Moderate	53%		1,115	156,900	432	980
- High	111%		2,315	324,900	892	2,050

## 5 SOURCE OPTIONS REVIEW

### 5.1 VILLAGE OF CUMBERLAND

#### 5.1.1 Existing Water Agreement

The Village of Cumberland (VoC) and the CVRD currently have a renewable 3 year water supply agreement in place for the RWLSA which is set to expire on December 31<sup>st</sup>, 2017. A copy of the signed agreement is included in [Appendix A](#).

The VoC has agreed to supply water to the CVRD at the fixed rate of \$0.73/m<sup>3</sup>. In the event consumption exceeds 1,900 m<sup>3</sup> on any day (excluding events due to unforeseeable major system supply break; fire; Act of God or other natural disaster; or emergency) a surcharge of 100% for the exceeded amount will be paid by the CVRD.

The agreement notes in item 4 that CVRD acknowledges that the VoC has water storage capacity limitations and that the CVRD will actively investigate switching to an alternative water source with the goal of disconnecting from the VoC water supply system.

### 5.2 FUTURE REGIONAL WATER SYSTEM

#### 5.2.1 Option R1

As noted in the 2011 Comox Valley Regional Water Supply Strategy the least cost option for servicing Cumberland and Royston was option R1. This option would also be able to service the Union Bay Improvement District.

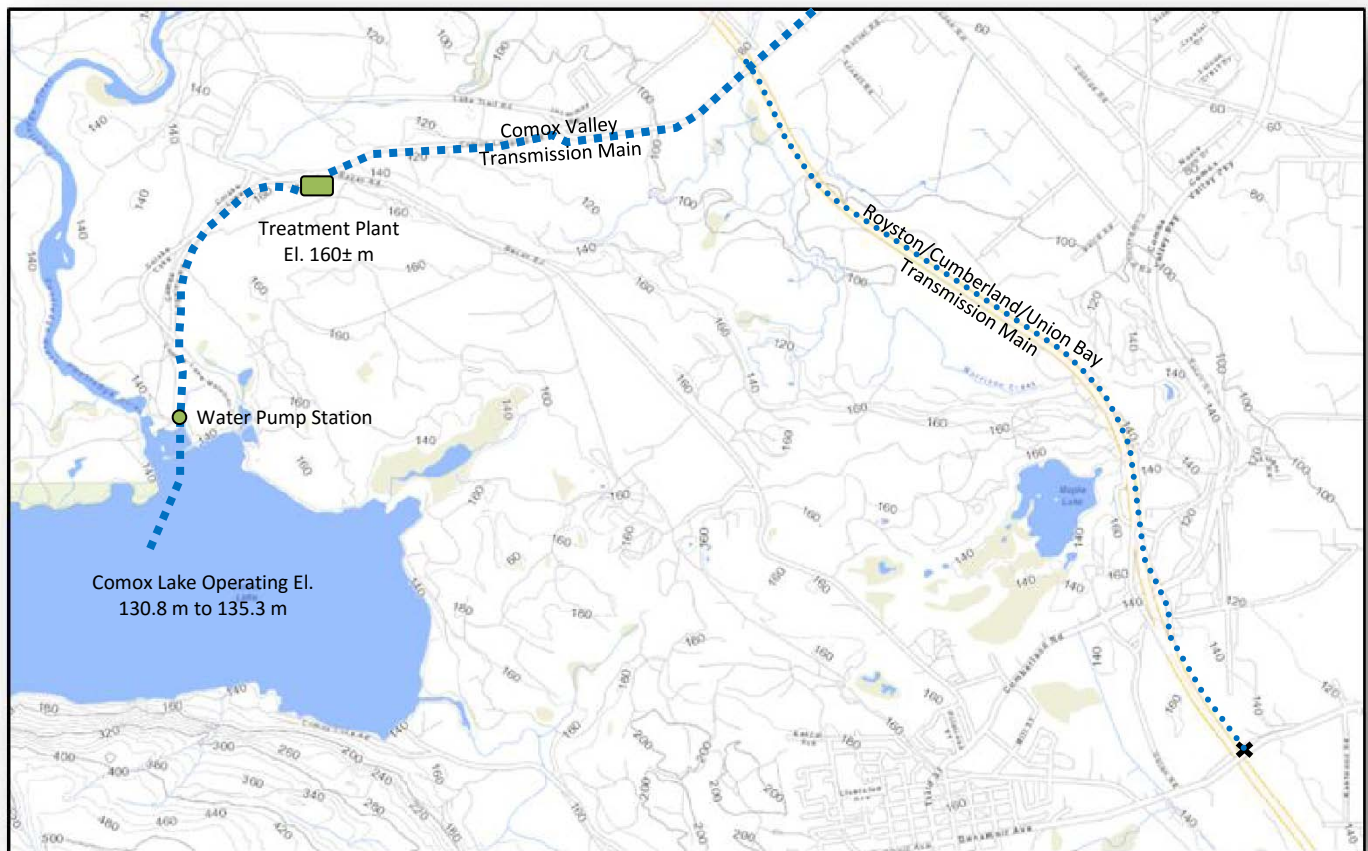
#### 5.2.2 Infrastructure Required

The conceptual layout of option 1R is shown in [Figure 6](#). The location of the treatment plant site is taken from the Comox Valley Water System Water Intake & Treatment Facility Study & Concept report, April 2015 by [Associated Engineering Ltd.](#)

After the deep water intake, water pump station, treatment plant and bulk transmission main to service the CVWS are completed, the required works specific to service the RWLSA and Cumberland include:

- i) A 5.5± km long transmission main along the Inland Island Highway (Hwy 19) from Lake Trail Road to Royston Road. The main diameter is preliminarily sized at 600 mm diameter.
- ii) The PRV servicing the 175 m pressure zone can be removed and replaced with a pipe spool.

The improvements noted in the Koers & Associates Engineering Ltd. RWLSA Water System Study April 2013, are still considered valid and will be required in order to provide the required peak hour pressures and available fire flows in the service area.



**Figure 6 – Regional Water System Conceptual Layout, Option 1R**

### 5.2.3 Project Timing

Based on discussions with CVRD staff the proposed deep water intake, supply main and water treatment plant are scheduled to start detailed design in 2017 with construction to follow after approvals.

Once the deep water intake and treatment plant are constructed the supply main to supply the RWLSA can be considered.

## 5.3 COMOX VALLEY WATER SYSTEM

Connection to the CVWS can be made by upsizing and extending the existing watermain on Marsden Road. The infrastructure work would consist of five components:

- i) replace 1,000 m of 150 mm dia. (AC) main along Marsden Rd (from Lake Trail Rd to near 4191 Marsden Rd),
- ii) install 3,600 m of 250 mm diameter watermain from the intersection of Marsden Rd and Cumberland Rd to Royston Rd via: Cumberland Rd, Comox Valley Parkway and Small Rd,



- iii) Connect to the RWLSA on the downstream side of flow meter and PRV #1 chamber on Royston Road near the water reservoir. This would allow the existing connection from the Village of Cumberland water system to remain as an emergency connection,
- iv) Upgrade the CVWS Marsden pump station on the standpipe reservoir (110 m HGL) on Lake Trail Rd in order to fill the Royston Road reservoir which has a top water level of 132 m geodetic, and
- v) Install a booster pump station with a discharge HGL of 175 m to service the properties along Kentwood Rd, Mounce Rd, Logan Rd, and Royston Rd to around #3355 Royston Rd which are currently serviced by the use of a PRV (downstream HGL of 175m) connection on the Village of Cumberland main. The pump station would need to be designed to provide domestic demands as well as fire flows.

The required works are presented in **Figure 7**.

The improvements noted in the Koers & Associates Engineering Ltd. RWLSA Water System Study April 2013, are still considered valid with the following exceptions noted below and will be required in order to provide the required peak hour pressures and available fire flows in the service area.

Project 1A & 1B have been constructed.

Project 6A, 6B, and 6C are not required. This area is part of the City of Courtenay.

Project 7 is not required. This area is part of the City of Courtenay.

## 5.4 CITY OF COURTENAY

Two connection options were reviewed.

- Hwy 19a Connection
- Buckstone Estates Connection

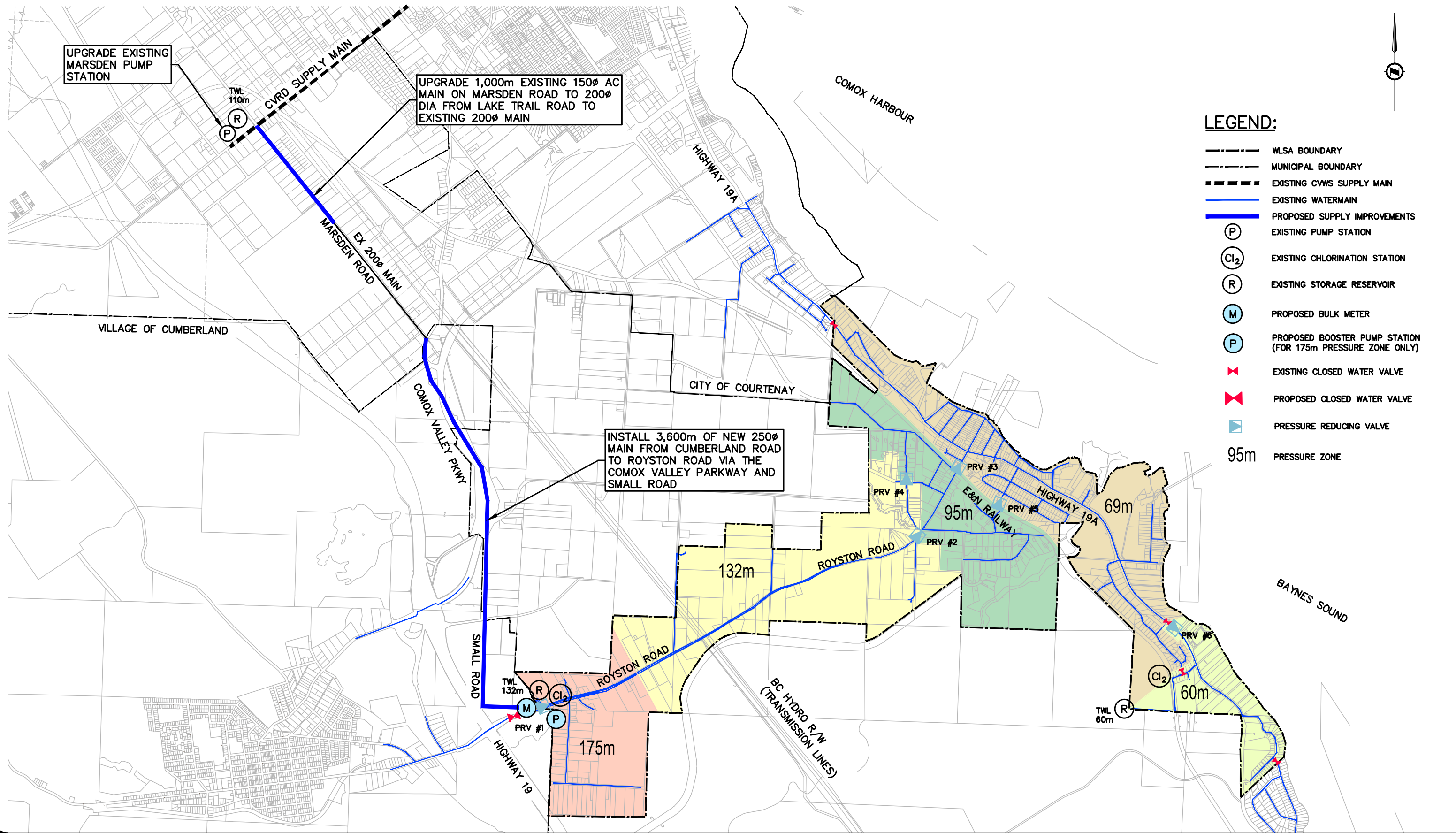
For each, a pump station would be required to service the properties along Kentwood Rd, Mounce Rd, Logan Rd, and Royston Rd to around #3355 Royston Rd. These properties are currently serviced off of the Village of Cumberland main by way of a PRV which reduces the system pressure from 226 m (in) to 175 m (out). The pump station would need to be designed to provide domestic demands as well as fire flows.

A brief overview of each connection option is presented below.

### 5.4.1 Hwy 19a Connection

Connection to the City of Courtenay can be made on Hwy 19a near Monaltrie Road. This connection would be between the RWLSA 69 m pressure zone and the City of Courtenay 87 m pressure zone. It is recommended a PRV not be installed, but the RWLSA pressure becomes the same as the City's 87 m pressure zone. This would result in a pressure increase of 176 kPa (25 psi). This new 87 m pressure zone would be very similar to the RWLSA existing 95 m pressure zone; a difference of 78 kPa (11 psi). A preliminary review suggests the 95 m zone could operate effectively as the 87 m pressure zone. The works for this option include:

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CLIENT	COMOX VALLEY REGIONAL DISTRICT
PROJECT	ROYSTON WATER SOURCE STUDY

TITLE		COMOX VALLEY WATER SYSTEM CONNECTION MARSDEN SUPPLY OPTION	
APPROVED		SCALE	1:30,000
DATE	MAR 2016	DWG No.	FIGURE 7
PROJECT No.	1417		

- i) A short section of 200 mm diameter pipe to connect the two system mains together and the installation of a chamber containing a check valve and flow meter.
- ii) Removal of PRVs No. 2 (Trent) and No. 4 (Roy Creek). This will allow the 95 m zone to become the 132 m zone.
- iii) PRVs No. 3 and No. 5 would remain with their outlet pressure settings increased to reflect the 87 m HGL.
- iv) A booster pump station to pump the water from the 87 m pressure zone into the 132 m pressure zone (in order to service this area and fill the Royston Road reservoir). The pump on/off would be controlled by the reservoir levels. The ideal location for the pump station would be the CVRD's Royston Office located at that intersection of Royston and Livingston roads.
- v) Install a booster pump station with a discharge HGL of 175 m to service the properties along Kentwood Rd, Mounce Rd, Logan Rd, and Royston Rd to around #3355 Royston Rd which are currently serviced by the use of a PRV (downstream HGL of 175m) connection on the Village of Cumberland main. The pump station would need to be designed to provide domestic demands as well as fire flows.

The required works for this option are presented in **Figure 8**.

The improvements noted in the Koers & Associates Engineering Ltd. RWLSA Water System Study April 2013, are still considered valid with the following exceptions noted below and will be required in order to provide the required peak hour pressures and available fire flows in the service area.

Project 1A & 1B have been constructed.

Project 2 A is not required.

Project 2B can be reduced to 200 mm dia.

Project 2C is not required.

Project 6A, 6B, and 6C are not required. This area is part of the City of Courtenay.

Project 7 is not required. This area is part of the City of Courtenay.

#### **5.4.2 Buckstone Estates Connection**

The Buckstone Estates development is serviced by a booster pump station located on Beachwood Rd on the west (uphill) side of the E&N railway. This station is connected to the City's 87 m pressure zone and boosts the pressure to 135 m.

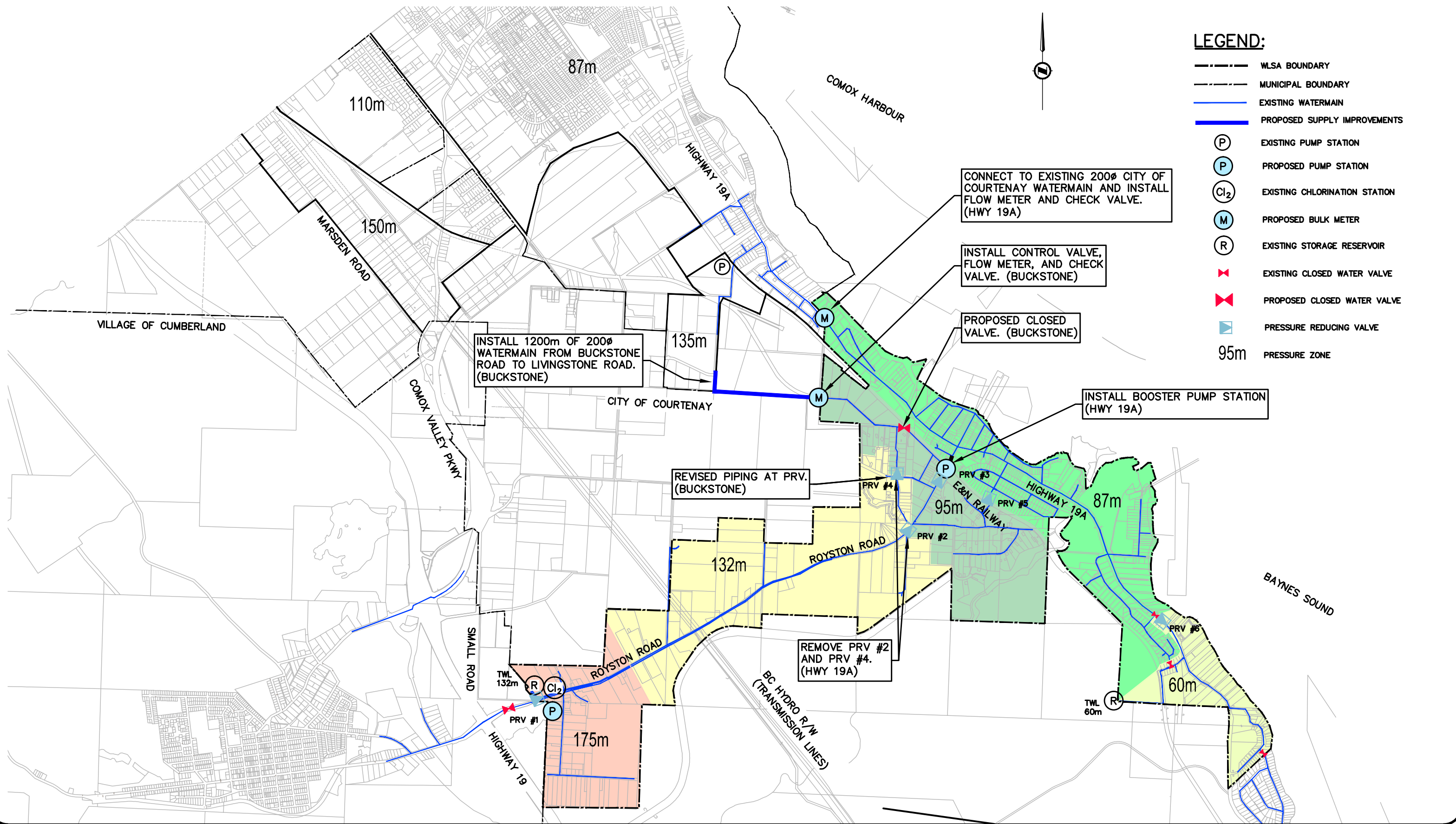
#### **Interim 135 m Pressure Zone**

A preliminary review suggests this 135 m pressure zone could be brought to the RWLSA by:

- i) 1,200 m extension of watermain along Livingston Rd from Buckstone Rd to end of the RWLSA watermain on Livingston Road at #4032 Livingston Rd and the installation of a chamber containing a control valve, check valve and flow meter.
- ii) Close the valve on Livingston Road on the east side of the tee at Little Bear Way. This will separate the 135 m pressure zone from the existing 95 m pressure



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CLIENT	COMOX VALLEY REGIONAL DISTRICT
PROJECT	ROYSTON WATER SOURCE STUDY

TITLE		COMOX VALLEY WATER SYSTEM CONNECTION CITY OF COURTENAY SUPPLY OPTION	
APPROVED		SCALE	1:30,000
DATE	MAR 2016	DWG No.	FIGURE 8
PROJECT No.	1417		

zone. Alternatively, a PRV station could be installed in-place of closing the valve.

- iii) PRV No. 4 on Hyland Rd relocated on to the 200 mm diameter main on Hyland Rd on the east side of the Bear Cat Rd tee. This will separate the 135 m and 95 m pressure zone and allow the 135 m to feed into the 95 m zone.
- iv) Construct a booster pump station at the Royston Road reservoir to service the 175 m pressure zone which encompasses the properties along Kentwood Rd, Mounce Rd, Logan Rd, and Royston Rd to around #3355 Royston Rd. The pump station would need to be designed to provide domestic demands as well as fire flows.

The existing watermain along Livingston Rd from #4032 Livingston Rd to Little Bear Way should be monitored as it is DR 25 with a pressure class rating of 1,140 kPa (165 psi) which is just above the pressure 930 kPa to 1,035 kPa (135 psi to 150 psi) that would be experienced on the main.

These changes will increase the pressure in the 132 m zone to 135 m which will fill the Royston Road Reservoir.

The improvements noted in the Koers & Associates Engineering Ltd. RWLSA Water System Study April 2013, are still considered valid with the following exceptions noted below and will be required in order to provide the required peak hour pressures and available fire flows in the service area.

Project 1A & 1B have been constructed.

Project 2 A is not required.

Project 2B can be reduced to 200 mm dia.

Project 2C is not required.

Project 6A, 6B, and 6C are not required. This area is part of the City of Courtenay.

Project 7 is not required. This area is part of the City of Courtenay.

#### ***Ultimate 110 m Pressure Zone***

Ultimately the Buckstone Estates area is to be serviced by the 110 m pressure zone supplied by the Marsden Reservoir. This would require the construction of a booster pump station to pump the water from the 110 m pressure zone into the original 132 m pressure zone. The ideal location for the pump station is near the PRV No. 2 on Royston Road between Cameron and Trent roads.

With the addition of the RWLSA to this servicing option the transmission main sizing from the 110 m pressure will need to be reviewed and the proposed main increased to accommodate the additional demand. In addition the reservoir storage requirements at the Marsden reservoir will need to be reviewed and storage requirements for the RWLSA accounted for.

## 5.5 UNION BAY IMPROVEMENT DISTRICT

### 5.5.1 Licenced Storage and Withdrawal

There is an emergency interconnection between the RWLSA and the Union Bay Improvement District (UBID) water systems. It is a closed valve on Kilmarnock Drive at Spindrift Road. The RWLSA has a 60 m HGL while the UBID has a 74 m HGL.

Union Bay is supplied by Langley Lake. There are two water licence's issued to the UBID. They both authorize the water storage and withdrawal at Langley Lake as summarized in **Table 8**.

**Table 8 – Langley Lake Water Licences**

Licence No. & Priority Date	Storage Volume		Maximum Day Withdrawal m <sup>3</sup> /day <sup>(1)</sup>
	Annual m <sup>3</sup> /yr	Equivalent Daily Flow m <sup>3</sup> /day <sup>(1)</sup>	
<b>Union Bay Improvement District</b>			
C 112815      October 29, 1913	161,841	443	1,643
C 112817      October 29, 1913	647,364	1,774	6,667
<b>Total</b>	<b>809,204</b>	<b>2,217</b>	<b>8,310</b>

Note:

- 1 The licences state a maximum daily withdrawal limit. No average day limit is shown. The licenced annual storage volume expressed as an equivalent daily flow in this table is calculated by dividing the storage volume by the number of days in a year ( $809,204 \text{ m}^3/\text{yr} \div 365 \text{ days/yr} = 2,217 \text{ m}^3/\text{day}$ ).

### 5.5.2 Historical Demands

A review of available data showed that annual water demands for the UBID have been well below the licenced withdrawal limits as shown in **Table 9**.

**Table 9 – UBID Water Demands, 2008 – 2013**

Year	Connections (#)	Average Day m <sup>3</sup> /day	Maximum Day m <sup>3</sup> /day
2008 <sup>(1)</sup>	640	700	2,600
2009	-	-	-
2010 <sup>(2)</sup>	-	713	1,585 - Jul 14
2011 <sup>(2)</sup>	-	784	1,413 - Sept 8
2012 <sup>(2)</sup>	656	647	1,328 - Sept 20
2013 <sup>(2)</sup>	-	627 <sup>(3)</sup>	1,434 - Aug 8

Notes:

- 1 Comox Valley Regional Water Supply Study, **Kerr Wood Leidal Associates Ltd.** Technical Memorandum 4, April 2010 - Task 2.1.9 Water Users Profile, Table 8.
- 2 UBID Daily Water Demand Records.
- 3 Based on Jan through November demands only. December data missing.

### 5.5.3 Future Growth

Kensington Island Properties (KIP) is a large development proposed for the Union Bay area. The UBID and KIP completed a Water Infrastructure Agreement in Year 2011 which acknowledged the servicing of up to 3,354 residences within the KIP development. This agreement expired on December 31, 2014 and as of the end of December 2015, it has not been renewed.

It is understood that the K'omoks First Nation owns several larger parcels of land in and around Union Bay which they would like to develop.

The Year 2012 average day demand equates to a per connection demand of  $1 \text{ m}^3$  ( $647 \div 656$ ) and the maximum day demand equates to a per connection demand of  $2 \text{ m}^3$  ( $1,328 \div 656$ ). These per connection demands are similar to those of the RWLSA for Year 2015 which were,  $0.93 \text{ m}^3/\text{day}$  ( $808 \div 873$ ) for average day and  $2.1 \text{ m}^3/\text{day}$  for maximum day ( $1,850 \div 873$ ). Applying the UBID Year 2012 per connection demands to the Langley Lake licenced volume and withdrawal limits, the potential ultimate number of service connections would be:

- 4,155 connections based on the maximum day limit ( $8,130 \div 2$ ).
- 2,217 connections based on the equivalent daily flow of the annual storage volume limit ( $809,204 \text{ m}^3/\text{yr} \div 365 \text{ days/yr} \div 1 \text{ m}^3/\text{connection}$ ).
- 4,400 connections based on the annual storage volume limit being applied to 6 months (May – October) of the year ( $809,204 \text{ m}^3/\text{yr} \div 184 \text{ days/yr} \div 1 \text{ m}^3/\text{connection}$ ). This analysis assumes that for the 6 months of November – April Langley Lake is constantly full and water is flowing over the spillway, i.e., the flow into the Lake exceeds the demand of the UBID.

If the KIP development were to be developed to its full extent, the total number of connections on the UBID would be just over 4,000 ( $3,354 + 656 = 4,010$ ). This does not include any other growth such as K'omoks First Nation's lands or lands within the UBID current service area boundary.

The total number of service connections projected for the RWLSA by Year 2065 is 1,121 for the low growth rate; 1,338 for the moderate growth rate; and 1,839 for the high growth rate. Adding these to the UBID Year 2015 current connection and the potential KIP connections, the total number of connections would be: 5,130; 5,350; and 5,850. Any development of the K'omoks First Nation land or lands within the UBID current service area boundary, would add to the number of connections. **This preliminary review suggests that because of the projected growth for the Union Bay area, the existing Langley Lake water licences are not sufficient to service both the UBID and the RWLSA.**

It is noted that the UBID is currently in the process of reviewing water treatment options for the Langley Lake source to meet VIHA's 4-3-2-1 treatment regulations. The plant may be modular in style to allow the treatment system to be expanded as demands increase. Presently a design flow of  $1,730 \text{ m}^3/\text{day}$  ( $20 \text{ L/s}$ ) is being considered.



#### 5.5.4 Infrastructure Required

If sufficient licence could be secured to service both the anticipate growth for:

- the UBID (Kensington K'omoks First Nation, and undeveloped lands within the UBID boundary), and
- the RWLSA,

significant infrastructure would be required. As a minimum, the following would be needed:

- i) The RWLSA 69 m pressure becoming a 74 m pressure zone. This will require:
  - Replacing the closed valve on Spindrift Rd at Kilmarnock with a check valve and flow meter both installed in a chamber.
  - Construction of a 4 km long transmission watermain along Highway 19a from Glover Road (in Union Bay) to the upstream (north) side of the RWLSA PRV No. 5 with a check valve and flow meter installed in a chamber before the tie-in point.
- ii) The outlet pressure setting on PRV No. 3 and No. 5 changed to 74 m from the current 69 m. The RWLSA 60 m pressure zone would remain unchanged.
- iii) A booster pump station to pump the water from the 74 m pressure zone into the 132 m pressure zone (to service this area and fill the Royston Road reservoir), by passing the 95 m pressure zone which would remain unchanged. The pump on/off would be controlled by the reservoir levels. The pump station would be located at the CVRD's Royston Office located at the intersection of Royston and Livingston roads. Bypassing the 95 m pressure zone would require the construction of an approximately 650 m of watermain from the pump station to the upstream side of PRV No. 2.
- iv) Construct a booster pump station at the Royston Road reservoir to service the 175 m pressure zone which encompasses the properties along Kentwood Rd, Mounce Rd, Logan Rd, and Royston Rd to around #3355 Royston Rd. The pump station would need to be designed to provide domestic demands as well as fire flows.
- v) The capacity of the proposed UBID water treatment plant increased to accommodate RWLSA demands.

The improvements noted in the Koers & Associates Engineering Ltd. RWLSA Water System Study April 2013, are still considered valid with the following exceptions noted below and will be required in order to provide the required peak hour pressures and available fire flows in the service area.

Project 1A & 1B have been constructed.

Project 2B can be reduced to 200 mm dia.

Project 2C is not required.

Project 6A, 6B, and 6C are not required. This area is part of the City of Courtenay.

Project 7 is not required. This area is part of the City of Courtenay.

Connection to UBID requires refinement of future demands for both RWLSA and UBID to ensure adequate licenced water supply is available to service the projected growth of the two communities.

## 5.6 GROUNDWATER SOURCE

### 5.6.1 Previous Reports

Information was reviewed from three reports a summary of each is presented below:

Groundwater Potential, Fanny Bay to Oyster Bay by E. Livingston PEng to Associated Engineering Services Ltd, letter report dated April 26, 1974.

- Minimal well drilling information available for Cumberland Royston area to indicate groundwater potential for a municipal system because the area has for many years been supplied by Cumberland and Perseverance creek system.
- Arden Spring, located approximately at the halfway distance on the Cumberland to Courtenay road, discharges at about 1,090 m<sup>3</sup>/day (200 usgpm).

Comox Valley Regional Water Supply Study Strategy, Technical Memorandum, Task 2.1.6 – Alternative Water Sources by **Kerr Wood Leidal Associates Ltd.** to Wedler Engineering LLP, June 25, 2010

The primary purpose of this memorandum was to identify possible alternative water supply sources which could be used in addition to or in place of Comox Lake. With regards to groundwater capabilities in the Cumberland/Royston Area, three potential areas were identified, as follows:

- In the Royston Area, Gartley Point (notably south of the mouth of the Trent River) could potentially be a high yield area and supportive of a well(s) with an individual capacity of 670 m<sup>3</sup>/day to 6,700 m<sup>3</sup>/day because of the potential for permeable sands and gravels anticipated at the river delta (mouth).
- In the Cumberland area, Aquifer No. 417, a sand and gravel aquifer, located generally north and west of Cumberland Road, north of Ulverston Ave and west of Third St, could have the potential for development of more than one well with a capacity larger than 1,300 m<sup>3</sup>/day.
- A second potential area in Cumberland is an interpreted buried channel aquifer suspected to be located approximately 50 m to 75 m south of Comox Lake Road and generally follows the unnamed creek that flows into Maple Creek which in turn flows into the Trent River. It is suspected this may be a former drainage route of Comox Lake discharging into the Trent River, and as such, the buried channel could contain good water bearing gravels. Yields in the range of 570 m<sup>3</sup>/day to 5,700 m<sup>3</sup>/day could be possible if the channel exists. This is in the general area of the VoC's Coal Creek PW1 which came on-line in 2013. The well has an estimated long-term yield of 1,365 m<sup>3</sup>/day.

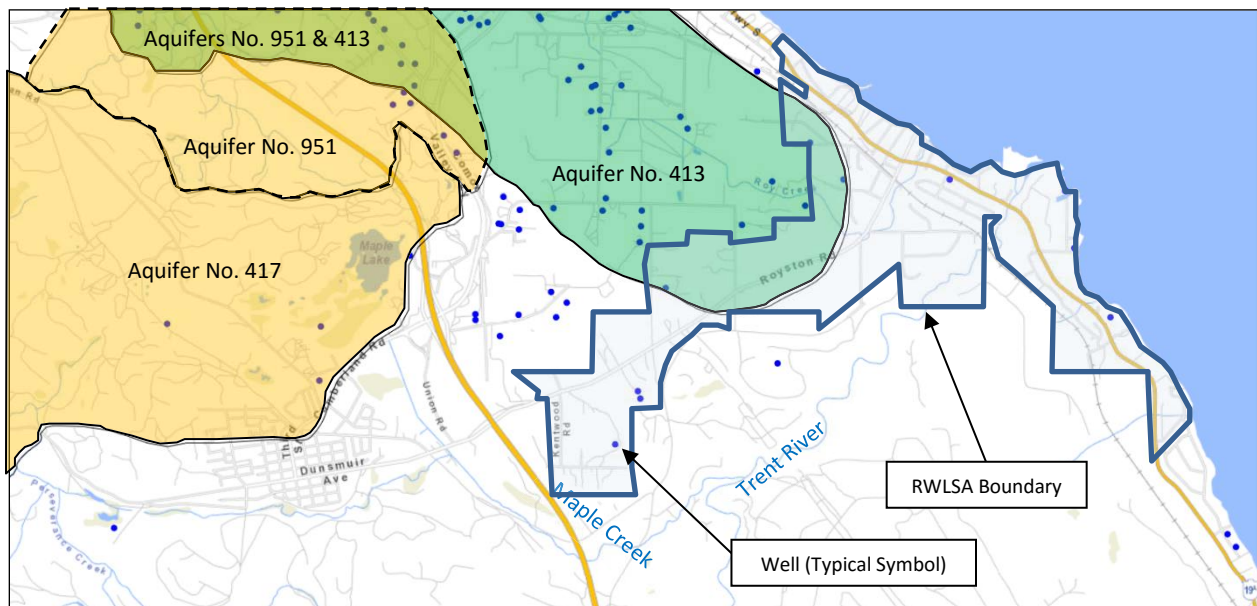
Village of Cumberland Long Range Water Supply Strategy – Desktop Review of Groundwater Supply Resources, by Tetra Tech EBA to Koers & Associates Engineering Ltd., letter report dated Feb 16, 2016 (Issued for Review)

The purpose of this report was to assess the feasibility of groundwater becoming the water supply source for the VoC and the RWLSA. The report review groundwater quantity and quality data.

- Four possible areas for the development of municipal scale water supply wells (flows greater than 280 m<sup>3</sup>/day) were identified. All were within the VoC and within or near Aquifer No. 417.
- The analysis of the available information indicates there is potential for development of additional groundwater as a supplementary supply to the VoC's existing surface and Coal Creek PW1 sources. However, it is suspected the groundwater aquifers by themselves are not capable of meeting the Year 2065 (50 year) combined water demands of the VoC and RWLSA.

### 5.6.2 Local Aquifers & Wells

The BC Ministry of Environment (BC MoE) has identified three aquifers in the Cumberland/Royston Area (No. 413, No. 417, and No. 951). Only No. 413 is located within the boundary of the RWLSA. A brief summary of each aquifer is presented below. The location and extent of the aquifers is shown in **Figure 9**.



**Figure 9 – Royston/Cumberland Area Aquifers**

#### *Aquifer No. 413*

This is the only aquifer identified within the RWLSA. It is a low productive bedrock aquifer that is reported to be confined in most areas with a moderate vulnerability to surface contamination from land use impacts. A confined aquifer is one that has an impermeable dirt/rock layer which prevents water from seeping into it from the ground surface located above it.

The BC Water Resource Atlas shows three wells (all domestic wells) within the area of the RWLSA located within this aquifer as follows:

- A yield of 8 m<sup>3</sup>/day (28 m deep, drilled in 1979).
- A yield of 27 m<sup>3</sup>/day (41 m deep, drilled in 1987).
- A dry hole drilled (35 m deep, drilled in 2010).

### *Unidentified Aquifer(s)*

The BC Water Resource Atlas does not label an aquifer for any of the lands within the RWLSA boundary, except for the properties within aquifer No. 417. There are seven wells within this area: three near the foreshore; one between Hwy 19a and the E&N Railway; and three near the Inland Island Hwy. A brief summary of each is presented below.

For the three wells near the foreshore, they consist of:

- dry hole (19 m deep, date unknown),
- no rating (drilled in 2002), and
- $65 \pm \text{m}^3/\text{day}$  (drilled in 2010).

The well between Hwy 19a and the E&N Railway was drilled in 1995 and has a rating of  $1.4 \text{ m}^3/\text{day}$ .

For the three wells near the Inland Island Hwy, they consist of:

- A yield of  $164 \text{ m}^3/\text{day}$  (45 m deep, drilled in 2008).
- A yield of  $14 \text{ m}^3/\text{day}$  (30 m deep, drilled in 2012).
- A yield of  $33 \text{ m}^3/\text{day}$  (78 m deep, drilled in 2012).

### *Aquifer No. 417*

This aquifer is located within the VoC, north of Cumberland Road and north of Ulverston Ave west of Third St. It is a moderately productive sand and gravel aquifer that is unconfined to semi-confined with a high vulnerability for contamination from land use impacts. From Year 2008 to Year 2013, three test wells were drilled in this aquifer within the VoC. The estimated yields range from  $276 \text{ m}^3/\text{day}$  to  $1,417 \text{ m}^3/\text{day}$ , for a combined total of  $2,780 \text{ m}^3/\text{day}$ .

### *Aquifer No. 951*

This aquifer is located at the northern end of the VoC municipal boundary and is the farthest away from the RWLSA boundary. This is a moderately productive sand and gravel aquifer and overlies portions of Aquifer No. 417. It is semi-confined with a high vulnerability to contamination from land use impacts.

## **5.6.3 Groundwater Quality**

There is very little water quality data for the wells. The most promising aquifer for a water supply source appears to be Aquifer No. 417. Of the three test wells drilled within this aquifer (all within the Village of Cumberland and between Year 2008 and Year 2013):

- at least one test well had iron and manganese levels about the Aesthetic Objective (AO) of the Canadian Drinking Water Quality Guidelines,
- another test well had PH levels beyond the AO limits and was classified as being Groundwater Under Direct Influence of surface water (GUDI).

It appears that treatment of a groundwater supply source may be required.

#### 5.6.4 Infrastructure Required

Additional exploratory work is required to confirm that one or more wells can be developed to serve as a viable long-term water supply source for the RWLSA. If this was proven to be, the extent of infrastructure to deliver the water to the RWLSA could then be determined. As a minimum, the required works would include:

- i) Well pump
- ii) Control building with emergency power generator
- iii) Transmission main from the well to the RWLSA

As previously noted in 5.6.3 Groundwater Quality water treatment may be required. In addition to the above noted infrastructure, the following will also be required:

- iv) Securing groundwater use licence from the province
- v) Obtaining source approval from Island Health
- vi) Development of a Wellhead Protection Plan
- vii) Managing land-use within the wellhead capture zone to minimize the potential of groundwater contamination.

The improvements noted in the Koers & Associates Engineer Ltd. RWLSA Report, dated April 2013, are still considered valid and will be required in order to provide the required peak hour pressures and available fire flows in the service area.

## 5 COSTS ESTIMATES

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### 6.1 BASIS OF ESTIMATES

#### 6.1.1 Class C Estimate

Cost estimates developed for this study can be considered **Class C** ( $\pm 25\%$  to  $40\%$ ) as defined by the Association of Professional Engineers of BC as:

Class C is: “An estimate prepared with limited site information and based on probable conditions affecting the project. It represents the summation of all identifiable project elemental costs and is used for program planning, to establish a more specific definition of client needs and to obtain preliminary project approval.”

The estimates are based on our in-house record of similar watermain projects for mid-Vancouver Island.

#### 6.1.2 Time Frame

Cost estimates have a limited life span and are subject to inflation and market conditions. The estimates in this report are as of February 2016 when the Engineering News Record Construction Cost Index was 10,128 and the construction market considered to be relatively slow.

### 6.2 COSTS

#### 6.2.1 Summary

A summary of the estimated cost for each option is presented in **Table 10**. The total cost estimate includes a 25% allowance for engineering fees and contingencies.

No allowance has been made for project administrative, legal, interim financing costs, property acquisition or securing rights-of-way.

**Table 10**  
**Supply Options Cost Estimate Summary**

Option No.	Description	Cost Estimate Class C (excluding GST)
1	Regional Water Supply, Option 1R	> \$7,600,000 <sup>(1,2)</sup>
2	CVWS, Marsden Rd Watermain Extension	\$3,650,000 <sup>(1,3)</sup>
3	City of Courtenay, Hwy 19a Connection	\$1,300,000 <sup>(1,4)</sup>
4	City of Courtenay, Buckstone Estates Connection	\$1,450,000 <sup>(1,4)</sup>
5	UBID Connection	> \$3,400,000 <sup>(5,6)</sup>
6	Groundwater Source	Unknown <sup>(7)</sup>

**Notes:**

- 1** Exclusive of the cost of the proposed deep water intake, booster pump station, water treatment plant and CVWS transmission main on Lake Trail Road which would be charged to all users of the regional water system and the CVWS.
- 2** These costs would be shared with the Village of Cumberland and Union Bay Improvement District if they were to be serviced by a regional water system.
- 3** These costs could be shared with the Village of Cumberland if they were to be serviced by the CVWS.
- 4** This option required approval from the City of Courtenay to connect to their water system.
- 5** As noted in **5.5.3 Future Growth**, the preliminary in this report suggests that the because of the projected growth for the Union Bay area, the existing Langley Lake water licences are not sufficient to service both the UBID and the RWLSA.
- 6** Exclusive of the cost of the proposed water treatment plant for UBID.  
The potential of connecting to UBID requires refinement of future demands for both RWLSA and UBID to ensure adequate licenced water supply is available to service the projected growth of the two communities.  
Connection to the UBID will require approval from the UBID.
- 7** Additional work is required in order to confirm the viability of the groundwater source option and where the wells could be located.

### 6.2.2 Breakdown

A breakdown of the individual cost of the general components required for each source option is presented in the **Table 11** to **Table 15**. No costing for development of a groundwater source is provided as additional work is necessary to confirm the viability of groundwater as a source and where the wells could be located.



**Table 11**  
**Regional Water Supply, Option 1R**

No.	Description	Quantity	Cost Estimate Class C (excluding GST)
1	Deepwater Intake, Booster Pump Station, Water Treatment Plant, CVWS Transmission Main	1	TBD <sup>(1)</sup>
2	Watermain (Inland Island Hwy) - 600 mm diameter from Lake Trail Road to Royston Road.	5,500 m of 600 mm dia.	\$7,600,000 <sup>(2, 3)</sup>
<b>Combined Total:</b>			<b>&gt; \$7,600,000 <sup>(3)</sup></b>

Notes:

- 1 These infrastructure costs would be borne by all users of the system, including the existing CVWS users (City of Courtenay, Town of Comox, K'omoks First Nation, and the five CVRD Local Water Service Areas.
- 2 Unit rate cost from Comox Valley Regional Water Supply Strategy, **Kerr Wood Leidal Associates Ltd.** A Technical Memorandum #6, Phase 4 – Regional Water Supply Options, Table 2-3, May 31, 2010. Costs have been increased by 19% based on the increase in the Engineering News Record Construction Cost Index from 2009 to February 2016 (8,570 to 10,182).
- 3 These costs would be divided between the Village of Cumberland, RWLSA and Union Bay Improvement District.

**Table 12**  
**CVWS, Marsden Rd Watermain Extension**

No.	Description	Quantity	Cost Estimate Class C (excluding GST)
1	Booster Pump Upgrade (Lake Trail Rd) - Upgrade existing booster pump connected to the standpipe reservoir on Lake Trail Rd to increase the HGL from 150 m to 160 m.	1	\$30,000
2	Watermain Upgrade (Marsden Rd) - Replace 150 mm diameter AC main from Lake Trail Rd to near #4191 Marsden Rd.	1,000 m of 200 mm dia.	\$600,000
3	New Watermain (Cumberland Rd & Small Rd) - Install 250 mm diameter main on Cumberland Rd at Marsden Road intersection to Royston Rd via Cumberland Rd and Small Rd.	3,600 m of 250 mm dia.	\$2,350,000
4	New Flow Meter & Check Valve (Royston Rd) - Connect to existing 300 mm diameter main upstream of Royston Rd Reservoir and install flow meter and check valve in a chamber.	1	\$70,000
5	Booster Pump Station (Royston Rd) - Construct booster pump station to maintain 175 m HGL pressure zone which services to the customers along Kentwood, Mounce and Logan Rds.	1	\$600,000
<b>Combined Total:</b>			<b>\$3,650,000<sup>(1,2)</sup></b>

Note:

- 1 Exclusive of the cost of the proposed CVWS deep water intake, booster pump station, water treatment plant and bulk transmission main.
- 2 Exclusive of the cost of the CVWS capital improvement cost charges.

The location of these works is shown on **Figure 7**.

**Table 13**  
**City of Courtenay Hwy 19a Connection Cost Estimate**

No.	Description	Quantity	Cost Estimate Class 'C' (excluding GST)
1	Flow Meter (Hwy 19a) - Connect to City of Courtenay dead-ended watermain (200 mm dia.) on Hwy 19a and install flow meter and check valve in a chamber.	1	\$70,000
2	Booster Pump Station (Royston Rd) - Construct booster pump station at Royston Office to pump water into the Royston Road reservoir (from 87 m HGL to 132 m HGL)	1	\$600,000
3	Remove PRV #2 (Trent) and PRV #4 (Roy Creek)	1	\$30,000
4	New Booster Pump Station (Royston Rd) - Construct booster pump station to maintain 175 m HGL pressure zone which services the customers along Kentwood, Mounce and Logan Rds.	1	\$600,000
<b>Combined Total:</b>			<b>\$1,300,000<sup>(1,2)</sup></b>

Note:

- 1 Exclusive of the cost of the proposed CVWS deep water intake, booster pump station, water treatment plant and bulk transmission main.
- 2 Exclusive of the cost of the CVWS capital improvement cost charges.

The location of the required works is shown on **Figure 8**.

**Table 14**  
**Buckstone Estates Connection Cost Estimate**

No.	Description	Quantity	Cost Estimate Class 'C' (excluding GST)
1	New Watermain (Livingston Rd) - Install 200 mm diameter main along Livingston Rd from Buckstone RD to #4032 Livingston Rd and install control valve, flow meter and check valve in a chamber.	1,200 m of 200 mm dia.	\$800,000
2	Revise PRV No. 4 Piping (Hyland Rd) - Revise the inlet and outlet piping so that it is connected to the 200 mm diameter main on Hyland Rd on the east side of the Bear Cat Rd tee. This will separate the 135 m and 95 m pressure zone and allow the 135 m to feed into the 95 m zone.	1	\$50,000
3	New Booster Pump Station (Royston Rd) - Construct booster pump station to maintain 175 m HGL pressure zone which services the customers along Kentwood, Mounce and Logan Rds.	1	\$600,000
<b>Combined Total:</b>			<b>\$1,450,000<sup>(1,2)</sup></b>

Note:

- 1 Exclusive of the cost of the proposed CVWS deep water intake, booster pump station, water treatment plant and bulk transmission main.
- 2 Exclusive of the cost of the CVWS capital improvement cost charges.

The location of these works is shown on **Figure 8**.

**Table 15**  
**UBID Connection Cost Estimate <sup>(1)</sup>**

No.	Description	Quantity	Cost Estimate Class 'C' (excluding GST)
1	New Flow Meter & Check Valve (Spindrift Rd) - Replace closed valve with flow meter and check valve in a chamber.	1	\$70,000
2	New Watermain (Hwy 19a) - Install 250 mm diameter main along Hwy 19a from Glover Rd to upstream side of PRV No. 6 at #4296 Hwy 19a.	4,000 m of 200 mm dia.	\$2,400,000
3	Booster Pump Station & Main (Royston Rd) - Construct booster pump station at Royston Office to pump water into the Royston Road reservoir (from new 74 m HGL to 132 m HGL)	1	\$600,000
4	- New Watermain (Royston Rd) Install 150 mm diameter main on Royston Rd for the booster pump station (from south side of E&N Railway right-of-way to upstream side of PRV #2 at Trent Rd and install check valve at Trent Rd tie-in	650 m of 150 mm dia.	\$330,000
5	UBID Water Treatment Plant -Increase capacity of proposed water treatment plant to accommodate RWLSA demands.	1	TBD
<b>Combined Total:</b>			<b>&gt; \$3,400,000</b>

Note:

- 1 As noted in [5.5.3 Future Growth](#), the preliminary in this report suggests that the because of the projected growth for the Union Bay area, the existing Langley Lake water licences are not sufficient to service both the UBID and the RWLSA.

The potential of connecting to UBID requires refinement of future demands for both RWLSA and UBID to ensure adequate licenced water supply is available to service the projected growth of the two communities.

## 6 CONCLUSIONS & RECOMMENDATIONS

### 6.1 CONCLUSIONS

Based on the findings of this study, the following conclusions are made:

- 1 The renewable 3 year water supply agreement between the Village of Cumberland (VoC) and the CVRD which is set to expire on December 31<sup>st</sup>, 2017, acknowledges the CVRD will actively investigate switching to an alternative water source with the goal of disconnecting from the VoC water supply system.
- 2 As of December 2015, the RWLSA has 873 connections consisting of 867 residential and 6 commercial connections.
- 3 A comparison of Year 2005 demands to Year 2015 demands revealed a decrease in average day demand of 14% (940 m<sup>3</sup>/day to 800 m<sup>3</sup>/day) while maximum day demand was almost unchanged by less than 1% (1,837 m<sup>3</sup>/day to 1,850 m<sup>3</sup>/day).
- 4 If growth over the next 50 years (to Year 2065) averages 0.5% per year (a low rate of growth), the average day and maximum day demands would increase by 28% to 1,040 m<sup>3</sup>/day and 2,340 m<sup>3</sup>/day; respectively.
- 5 If growth over the next 50 years (to Year 2065) averages 1.5% per year (a fast rate of growth), the average day and maximum day demands would increase by 111% to 1,700 m<sup>3</sup>/day and 2,050 m<sup>3</sup>/day; respectively.
- 6 The RWLSA is gravity fed from the Village of Cumberland. The RWLSA has five pressure zones: 175 m, 132 m, 95 m, 69 m and 60 m as shown on **Figure 1**.
- 7 All of the options, excluding implementation of the future Regional Water Supply will require two pump stations: one for the 132 m pressure zone; the other for 175 m pressure zone. The future Regional Water Supply will require a pump station for the 175 m pressure zone. It may also require a pump station to overcome high ground elevations if the transmission main is installed along the Inland Island Hwy.
- 8 The lowest cost option is to be serviced by the CVWS through a connection to the City of Courtenay along Highway 19A. The estimated cost for this option is \$1,300,000. This is exclusive of the cost for the proposed water treatment plant and associated works (deep water intake, booster pump station, and bulk transmission main) and the CVWS capital improvement cost charges.
- 9 Servicing by the UBID requires further study to confirm there will adequate licenced water supply is available to service the projected growth of the two communities.
- 10 There is insufficient information to confirm the viability of the groundwater source option and where the wells could be located.

## 6.2 RECOMMENDATIONS

Based on the conclusions listed in this report, it is recommended that the CVRD:

- 1 Pursue the connection of the RWSLA to the CVWS by a connection to the City of Courtenay through Highway 19a.
- 2 Maintain an emergency connection with the Village of Cumberland.
- 3 Pursue the connection of the RWSLA to the CVWS by a connection to the City of Courtenay through Buckstone Estates if a connection through Highway 19A is not available.
- 4 Pursue a connection to the CVWS through a connection on Marsden Road if a connection to the City of Courtenay is not available.



# APPENDIX A

-

**Water Agreement**  
**Village of Cumberland & Comox Valley Regional District**  
3 Year Buy/Sell Agreement (Expires Dec 31, 2017)

**Contract #**

<b>Type of Contract</b>	<b>Acquisition (includes acq</b>		<b>Copied to Accts Payable:</b>		<b>Yes</b>
<b>Function No.</b>	312	<b>Staff contact:</b>	D. Leitch	<b>Contract signed by:</b>	Chair, J. Warren
<b>Replaces/Refers to Contract No.</b>			<b>Location:</b>	Royston	

<b>Company/Party name:</b>	Village of Cumberland				
<b>Contact name:</b> (If different than above)	Rachel Parker				
<b>Address:</b>					
<b>Phone:</b>		<b>Fax:</b>			

**Purpose of contract:** Supply of bulk water for the Royston water local service area

**Board approval:** E. Grieve/G. Sproule: THAT the agreement, attached to the staff report dated January 27, 2015, between the Comox Valley Regional District and the Corporation of the Village of Cumberland for the provision of water services to the Comox Valley Regional District Royston water service be approved; AND FINALLY THAT the chair and corporate legislative officer be authorized to execute the agreement.

<b>Contract start date:</b> (dd/mm/yy)	01/12/2015	<b>Contract termination:</b> (dd/mm/yy)	31/12/17
<b>Renewal options:</b>	Mutal agreement		

**Name of Insurance Company Copy Attached:**

**Reason insurance is not attached:**

**WCB Notice of Project required?** No.

**If yes, has it been filed with WBC and is a copy attached:**

**WCB Safety Covenant On File:**

**Reason WCB Safety Covenant is not required:**

<b>Perf. Bond required:)</b>	N/A	<b>If yes, \$ value:</b>	\$
<b>Bond expiry date:</b> (dd/mm/yy)		<b>Bond renewal date:</b> (dd/mm/yy)	
<b>Perf. Requirements &amp; dates:</b>			
<b>Total contract commitment:</b>	\$		
<b>Available budget:</b>	\$		

## **WATER AGREEMENT**

THIS AGREEMENT made as of the 1st day of January, 2015.

### **BETWEEN:**

**THE CORPORATION OF THE VILLAGE OF CUMBERLAND**

(hereinafter referred to as the "Village")

**OF THE FIRST PART**

**AND**

**COMOX VALLEY REGIONAL DISTRICT**

(hereinafter referred to as "CVRD")

**OF THE SECOND PART**

### **WHEREAS:**

- A. The Village entered into an agreement dated the 21<sup>st</sup> day of April, 2008 with Royston Improvement District ("RID") whereby the Village agreed that it would sell and the RID agreed that it would purchase bulk water from the Village upon the terms and conditions set forth in the Agreement;
- B. The Royston Improvement District was dissolved by Order In Council No. 626 and all of its obligations under the water service were transferred to the CVRD, and the CVRD established a local service for the supply of water for the Royston Water Local Service Area (RWLSA);
- C. The Village and CVRD entered into an amendment to the said agreement setting the bulk water rate for 2010, and further entered into a new agreement on the 11<sup>th</sup> day of December 2012;
- D. The said agreement expired on the 31<sup>st</sup> day of December, 2014 and the Parties hereto wish to enter into a further agreement for the supply of bulk water, subject to the terms and conditions contained in this agreement and provided always that the Village retain the ownership of its present water supply system and retain the authority under law to maintain, improve and extend said water supply system;

- E. The Village is moving towards providing bulk water that meets the 4321 objectives of the Vancouver Island Health Authority's Drinking Water Treatment for Surface Water Supplies policy by the year 2017.

**NOW THEREFORE** in consideration of the covenants contained herein and other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Parties hereto agree as follows:

1. The Village shall sell water to the CVRD and the CVRD shall purchase water from the Village subject to the terms and conditions hereinafter set out. The bulk water purchased by the CVRD shall be solely used for supplying water to the RWLSA.
2. It is acknowledged that it is not possible for the Village to warrant the supply of water, as droughts and other conditions beyond the control of the Village of Cumberland impact the amount of water available for the Village to distribute to its residents and the RWLSA.
3. During times of diminished water supply, the terms of any bylaw or policy of the Village restricting water consumption shall apply equally to the residents of RWLSA and the CVRD shall adopt and make all reasonable efforts to enforce bylaws consistent with the Village's to govern the use of bulk water in RWLSA.
4. The CVRD acknowledges that the Village has existing water storage capacity limitations and demands for increased water consumption within the Village, and agrees that it will actively investigate switching to an alternative water source for the RWLSA, with the goal of disconnecting from the Village of Cumberland water supply system.
5. The Parties agree that in the event water consumption by the RWLSA exceeds an average of 1900 cubic metres per day in any one month period, the surcharge set out in clause 8 hereof shall apply. The parties acknowledge that in the event that water consumption by the CVRD exceeds the said average daily consumption limit due to an unforeseeable major system supply break, fire, Act of God or other natural disaster or emergency, the surcharge set out in clause 8 hereof shall not apply.
6. The CVRD shall be solely responsible for the design, installation and maintenance of all necessary facilities and infrastructure for the distribution of water within RWLSA, including any required reservoirs, treatment system and pressure reducing valves where

necessary, in a manner that their operation does not negatively affect the operation of the Village's waterworks system.

7. The Parties shall meet regularly as required to discuss planned expansions and upgrades to the bulk water supply system.
8. During the term of this agreement the CVRD shall pay to the Village for all water supplied under this Agreement the following rate per cubic metre of water:
  - 2015 - .73 cents per cubic metre
  - 2016 - .73 cents per cubic metre
  - 2017 - .73 cents per cubic metre

In the event water consumption exceeds the maximum quantity set out in clause 5 hereof in any month, the CVRD shall pay a surcharge equal to 100% of any amount that exceeds the maximum quantity for that month. The Village shall invoice the CVRD and the CVRD shall pay the Village at three month intervals throughout the term of this Agreement.

9. The bulk water rate set out in clause 8 shall only be adjusted by the mutual agreement of the Parties hereto. Any such adjustments shall be based upon any significant increase or decrease of the volume of water consumed by the CVRD as a percentage of the total cost borne by the Village in supplying bulk water, including any debt, operating, reserve and capital costs associated with the Village water supply and distribution systems attributable to supplying bulk water to the RWLSA, or the introduction of any new major capital projects into the Village Five-Year Financial Plan Bylaw directly attributable to supplying bulk water to the RWLSA. Any rate adjustment shall be completed by October 1<sup>st</sup> in order to allow for timely completion of any bylaw adoption process.
10. The Village agrees to properly maintain a satisfactory meter to record the amount of water consumed by the RWLSA pursuant to this Agreement. In the event it is found that the meter has malfunctioned, the Village will adjust accounts to the CVRD based on the average quantity of water purchased by the CVRD in the immediately preceding period similar to the period in which the meter malfunctioned. In the event that the Village meter does not correspond within 5% of the CVRD meter the dispute will be resolved as per section 20 of this agreement.
11. The Village is not liable for interruptions in service or supply and the Village will remedy such interruptions as expeditiously as reasonably possible. The Village agrees to notify the CVRD of any interruption in service and provide the expected time for return to service. The CVRD agrees to indemnify and save harmless the Village from any and all

causes of action or claims for any loss caused by a "shut off" of the water supply.


12. In the event that the Village knowingly causes a reduction in water quality due to the operation or maintenance of the bulk water supply system the CVRD is to be notified of such a reduction in a timely manner.
13. During the currency of this Agreement, any proposed new connection to the water system within RWLSA required by way of expansion of the boundaries of the RWLSA shall be subject to the written approval of the Village. This approval shall not be unreasonably withheld, but must be in compliance with any existing policy of the Village restricting water connections.
14. Upon approval of all new water connections with the RWLSA, the CVRD shall ensure that a water meter is installed.
15. The Village, its elected and appointed officers and employees shall not be responsible for any loss occurring as a result of the inability to fight fire or carry on gardening or any other use within the RWLSA due to insufficient supply of water, insufficient water pressure or any other reason relating to the provision of bulk water under this Agreement.
16. The CVRD shall indemnify and save harmless the Village, its elected and appointed officers and employees from any and all actions, causes of action, suits or other liability whatsoever which may arise as a consequence of the Village entering into or carrying out the provisions of this Agreement.
17. This Agreement shall come into force as of the date of its execution by the parties and shall terminate on the 31<sup>st</sup> day of December 2017, unless the Parties mutually agree to an earlier termination date. This Agreement may be renewable in one year increments by mutual agreement of the Parties.
18. This Agreement shall not be assigned by any of the Parties hereto except with the prior written consent of the other, which consent shall not be unreasonably withheld.
19. Termination of this agreement will be by mutual consent of both Parties. Either Party may initiate the termination upon six (6) months' written notice to the other Party. Where such notice is given and is mutually consented to, and upon the expiry of the six month period, this Agreement will terminate and the Parties will be under no further

obligation to each other except that the CVRD shall pay to the Village any amounts outstanding for services supplied up to the date of termination.

20. If a dispute relating to this Agreement should arise, and the Parties cannot settle the dispute through mutual agreement or negotiation, then the Parties must attempt in good faith to resolve the dispute through non-binding mediation, with each Party appointing one impartial mediator. If mediation is unsuccessful, the Parties may submit the dispute to binding arbitration pursuant to the *Commercial Arbitration Act (BC)*. If any dispute is referred to mediation or to an arbitrator, the costs shall be borne equally by the Parties.
21. This Agreement may be amended from time to time upon terms and conditions mutually acceptable to the Parties and any amendments must be in writing and executed by the Parties.

IN WITNESS WHEREOF the Parties hereto have executed this Agreement as evidence by the signatures of their duly authorized signatories.

THE CORPORATION OF THE VILLAGE OF  
CUMBERLAND

Per:   
Mayor

Per:   
Corporate Officer

COMOX VALLEY REGIONAL DISTRICT

Per:   
Chair

Per:   
Corporate Legislative Officer