Alberni-Clayoquot Regional District

BEAVER CREEK WATER COMMITTEE MEETING
JUNE 7, 2017, 2:00 PM

Regional District Board Room, 3008 Fifth Avenue, Port Alberni, BC

AGENDA

PAGE #

1. CALL TO ORDER

Recognition of Traditional Territories.

2. APPROVAL OF AGENDA

THAT the Agenda of the Beaver Creek Advisory Committee meeting held on June 7, 2017 be approved.

3. ADOPTION OF MINUTES

a. Beaver Creek Water Advisory Committee Meeting held February 14, 2017 — **3 - 4**

THAT the minutes of the Beaver Creek Advisory Committee meeting held on February 14, 2017 be adopted.

4. REQUEST FOR DECISIONS & BYLAWS

a. **REQUEST FOR DECISION**
Additional Leak Forgiveness – 6138 Beaver Creek Road — **5 - 7**

THAT the Beaver Creek Water Advisory Committee not grant the request for additional leak forgiveness of $290 as requested by the owners of the property located at 6138 Beaver Creek Road.

b. **REQUEST FOR DECISION**
Beaver Creek Water System Infrastructure Assessment - 2017 — **8 - 53**

THAT the Beaver Creek Water Advisory recommend the Board of Directors adopt the Beaver Creek Water System Infrastructure Assessment (2017) plan and use the information to design the Asset Management plan for the service.

c. **REQUEST FOR DECISION**
Beaver Creek Water System- Bylaw to Impose Development Cost Charge — **54 - 112**

THAT the Beaver Creek Water Advisory Committee recommend that the Board of Directors adopt a Development Cost Charge bylaw for the Beaver Creek Water System following the "Development Cost Charge – Best Practices Guide" as recommended by the Ministry of Community, Sport and Cultural Development.

5. REPORTS

a. Hydro Consumption – Dan Fredlund (verbal report and report attached) 113-114

THAT the Beaver Creek Advisory Committee receives report a.

6. LATE BUSINESS
(requires 2/3 majority vote)

7. ADJOURN

Alberni-Clayoquot Regional District

MINUTES OF THE BEAVER CREEK WATER ADVISORY COMMITTEE MEETING HELD ON TUESDAY, FEBRUARY 14, 2017, 10:30 AM

Regional District Board Room, 3008 Fifth Avenue, Port Alberni, BC

MEMBERS PRESENT: John McNabb, Chairperson, Director, Electoral Area "E" (Beaver Creek)
Pam Craig
Gord Blakey
Harold Carlson

REGRETS: Patty Edwards
Kelly Schutte
Ginny Stephens

STAFF PRESENT: Andrew McGifford, Manager of Environmental Services
Wendy Thomson, Manager, Administrative Services

1. CALL TO ORDER

The Chairperson called the meeting to order at 10:30 am.

The Chairperson recognized the meeting being held in the Tseshaht First Nation and the Hupacasath First Nation Traditional Territories.

2. APPROVAL OF AGENDA

MOVED: *G. Blakey*
SECONDED: *P. Craig*

THAT the agenda be approved as circulated.

CARRIED

3. ADOPTION OF MINUTES

a. **Beaver Creek Water Advisory Committee Meeting held October 31, 2016.**

MOVED: *P. Craig*
SECONDED: *G. Blakey*

THAT the minutes of the Beaver Creek Water Advisory Committee Meeting held on October 31, 2016 be received.

CARRIED

4. REQUEST FOR DECISIONS & BYLAWS

a. **Request for Decision regarding Beaver Creek Water – 2017-2021 Financial Plan.**

The Manager of Environmental Services provided the Committee with an overview of the Beaver Creek Water System proposed budget for 2017.

MOVED: P. Craig
SECONDED: G. Blakey

THAT the Beaver Creek Water Advisory Committee recommend that the Beaver Creek Water System proposed budget to be included in the first reading of the 2017-2021 Alberni-Clayoquot Regional District Financial Plan.

CARRIED

5. REPORTS

a. **Review of Terms of Reference and Committee Membership.**

The Manager of Administrative Services reviewed the terms of reference with the Committee. The Chairperson will consider nominations for the two vacant positions on the Committee.

6. LATE BUSINESS
(requires 2/3 majority vote)

7. ADJOURN

MOVED: Director P. Craig
SECONDED: Director G. Blakey

THAT this meeting be adjourned at 11:08 am.

CARRIED

Certified Correct:

_____ _____

John McNabb, Chairperson

Wendy Thomson, Manager of Administrative Services

ALBERNI-CLAYOQUOT
REGIONAL DISTRICT

3008 Fifth Avenue, Port Alberni, B.C. CANADA V9Y 2E3 Telephone (250) 720-2700 FAX: (250) 723-1327

REQUEST FOR DECISION

To: Beaver Creek Water Advisory Committee

From: Andrew McGifford, CPA, CGA Manager of Environmental Services

Meeting Date: June 7, 2017

Subject: Additional leak forgiveness – 6138 Beaver Creek Road

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Recommendation:

THAT the Beaver Creek Water Advisory Committee not grant the request for additional leak forgiveness of $290 as requested by the owners of the property located at 6138 Beaver Creek Road.

Desired Outcome:

To provide consistent application of the leak forgiveness policy for all water users within ACRD.

Summary:

The water leak policy provides the ACRD an equitable way to assist owners that have a leak on their property and will forgive fifty percent of the metered overage charges associated with a leak provided the owner has repaired the leak and has provides the receipt or attests to the repair if they have repaired themselves.

The fifty percent forgiveness is a board adopted policy (attached) that was supported by the water advisory committees in both Beaver Creek and Bamfield. Designed to allow the relief from an unexpected charge due to failure of an owners system. It provides the owner an incentive to repair as soon as possible to minimize water losses. The Beaver Creek Water Advisory Committee has consistently applied the policy and where required due to circumstance.

The property owner is aware of the leak policy but chose to write to the advisory to request additional forgiveness; staff recommend that the advisory deny the request but that staff can work with the owner of the property to provide an options to pay down the additional charges over time.

Submitted by: _____
Andrew McGifford, CPA, CGA, Manager of Environmental Services

Approved by: _____
Wendy Thomson, Acting Chief Administrative Officer

Andrew McGifford

From: [redacted]
Sent: April-28-17 1:29 PM
To: Andrew McGifford
Cc: [redacted]
Subject: Water Overage Jan 2017 /Acct# 770 00001073000 000

6138 Beaver Creek Road,
Port Alberni, BC
V9Y 8X4
Account # 770 00001073000 000

Attention: Andrew McGifford and John McNabb, Electoral Representative
Alberni-Clayoquot Water Board Advisory,

Dear Sir(s),
To Whom it May Concern,

In mid January of this year, during a cold snap, I moved into my daughter's house because it was too cold to keep my house warm enough, to live in comfortably.
She lives only a couple of kilometers away, and I was able to come back daily to check on the house.

Around the 12th I saw a small amount of water laying in the yard. On the 13th the puddle seemed bigger.
I checked the taps, but still seemed to have pressure so I didn't quite know what to make of it.

I called Jay's Plumbing and they came out on the 16th; perhaps because water wasn't spraying everywhere.
The Plumber was there 3 hours, under the house, and inside. He said he found 3 splits in my pipes, one was leading to an outside tap.
Because of potential cost and to avoid future problems, we disconnected the water to the yard permanently. He also capped my cold water in the laundry room because it would be more time consuming and hence more expensive to reconnect a new pipe. Now I add buckets of cold water to my washer.
Then the plumber left for the day he said the meter was still turning but not spinning like it was previously. Before he left he took me to the main shut off to show me what he meant. He said he couldn't find another leak and had to go to another emergency.

The next day I could hear the sound of water running somewhere, but unable to pinpoint, so called Jay's again. A different Plumber arrived, stayed 3 more hours and found 2 more leaks.
An hour after he left I had no pressure in my kitchen, so I called a 3rd time.
The plumber came back later that day and fixed another leak under the house.

In total Jay's billed me for 7 hours of labour and materials, for 6 or 7 breaks. Their bill came to $727.87 This statement was submitted with my Adjustment Request.

I believe my meter is read each quarter on the 9th or 10th of the month, so at that time there was no indication of a problem.
After the plumber completed their work on the 17th, I called the Utilities office to advise them of my problem, and ask their advice.

I'm extremely grateful that the Alberni-Clayoquot Utilities office has given me a 50% adjustment on my $580.00 additional billing, after submitting the mandatory 'Leak adjustment Request Form'.
However I'm a Pensioner and the balance of $290.00 over the quarterly amount of $155.00 still creates a financial hardship for me.
I live alone, and you will see from my usage history that I consume well below my limit each quarter.

I'm asking to be forgiven the additional overage charges of $290.00, as a one time compensation.

Thank you,

Sincerely,

[redacted]

ALBERNI-CLAYOQUOT
REGIONAL DISTRICT

3008 Fifth Avenue, Port Alberni, B.C. CANADA V9Y 2E3 Telephone (250) 720-2700 FAX: (250) 723-1327

REQUEST FOR DECISION

To: Beaver Creek Water Advisory Committee

From: Andrew McGifford, CPA, CGA Manager of Environmental Services

Meeting Date: June 7, 2017

Subject: Beaver Creek Water System Infrastructure Assessment - 2017

Recommendation:

THAT the Beaver Creek Water Advisory Committee recommend the Board of Directors adopt the Beaver Creek Water System Infrastructure Assessment (2017) plan and use the information to design the Asset Management plan for the service.

Desired Outcome:

To use the Beaver Creek Water System Infrastructure Assessment (2017) to provide a list of identified short-term and long-term infrastructure upgrades. The information within the assessment to be used to start the Asset Management plan for the Beaver Creek Water System (BCWS).

Summary:

The infrastructure renewal program for the BCWS has been updated from the prior one completed in 2011 under the management of the Beaver Creek Improvement District. Recent improvements that have been undertaken and changes in the water system have been considered. Based on a total of 990 service connections, the annual contribution for each service connection is $617 to provide the Regional District with requiredfunds to replace the infrastructure components once they reach the end of their useful service life.

The water system has approximately 60% Asbestos Cement (AC) watermains and 40% polyvinyl chloride (PVC), in total there are 46,353 meters of pipe ranging from 100 mm diameter to 300 mm diameter. The distribution system also includes approximately 200 valves, 109 fire hydrants, and 41 stand pipe style flush outs.

The total replacement costs for the water system in 2017 dollars is $14,203,330 with an estimated future replacement cost of $28,521,642, based on the estimated service life of the infrastructure components and the assumed inflation rate. Annual inflation rate of 1.5% was used to calculate the future replacement costs.

The short-term improvements required for the system to operate within the distribution system design requirements and provide the recommended minimum fire flow total 9,325 meters and Class D estimates are $5,236,750. The long-term improvements required for the system to operate within the distribution system design requirements and provide the recommended minimum fire flow are 7,150 meters and are estimated to be $4,267,500.

The next step is to review the parcel tax for the water system to meet the long-term capital needs as identified in the report. The water infrastructure is a main component of the capital cost of the water system. The current rate of $238 per parcel, per year, is not adequate moving forward. Increasing the rate in one year by $379 is an

option, it would likely be a shock to the water users of Beaver Creek. The asset management process is early in the development and other factors such as condition assessments, level of risk and level of service will all factor into the long-term needs of the water system. It should be noted that the infrastructure assessment is based on standard lifetime for infrastructure; the asset management process will provide a total service review including other items such as vehicles and buildings.

Staff do not believe the BCWA committee nor would the Board support would the immediate increase. Staff will be recommending an increase to $300 per parcel for 2018 parcel tax to start the increases. A future request for Community Works (Gas Tax) funding will assist in the closing the deficit, staff will bring forth a recommendation at the next meeting. In addition, staff will apply for any grant funding available to minimize this funding gap.

Submitted by: _____

Andrew McGifford, CPA, CGA, Manager of Environmental Services

Approved by: _____

Wendy Thomson, Acting Chief Administrative Officer

Alberni-Clayoquot
Regional District

BEAVER CREEK WATER SYSTEM INFRASTRUCTURE ASSESSMENT UPDATE

FINAL REPORT

May 2017

KOERS
& ASSOCIATES
ENGINEERING LTD.
Consulting Engineers

KOERS & ASSOCIATES ENGINEERING LTD.
Consulting Engineers

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May 31, 2017
1665- 01 (Final Report)

Alberni Clayoquot Regional District
3008 5th Ave
Port Alberni, B.C. V9Y 2E3

Attention: **Mr. Andrew McGifford**
Manager of Environmental Services

Re: Beaver Creek Water System Infrastructure Assessment - FINAL REPORT

We are pleased to submit three bound copies and a digital pdf copy of the final report entitled "Beaver Creek Water System Infrastructure Assessment."

This report presents: a brief summary the water system; the properties it services; the current operation and maintenance status; a review of the condition of the various components of the water distribution system; and recommended upgrading works for short and long term design horizons, and an updated infrastructure renewal program.

The cost of short-term upgrading works total $5,236,750 plus GST, including a 30% general contingency and a 30% allowance for engineering and administration costs. These improvements are required to improve the available fire flow and pressures in the system. The cost of the long-term upgrading work, consisting of watermains required to service future development, totals $4,267,500 plus GST, including a 30% general contingency and a 30% allowance for engineering and administration costs.

The infrastructure renewal program has been updated to reflect the recent improvements that have been constructed in the water system as well changes in the infrastructure costs. Based on a total of 990 service connections the annual contribution for each service connection is $617 to provide the Regional District with funds to replace the infrastructure components once they reach the end of their useful service life.

We thank you for the opportunity to be of service the Alberni Clayoquot Regional District on this interesting assignment. We have enjoyed working with you and your staff and would be pleased to assist in implementation of the report's recommendations.

Please do not hesitate to contact us to discuss the findings in greater detail and we look forward to your response.

Yours truly,

KOERS & ASSOCIATES ENGINEERING LTD.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — M. E. BROOK # 35332

Mitchell Brook, P.Eng
Project Engineer

PROFESSIONAL ENGINEER — PROVINCE OF — G. L. DOWNEY

May. 31 2017

Chris Downey P.Eng
Project Manager

Alberni-Clayoquot Regional District

BEAVER CREEK WATER SYSTEM
INFRASTRUCTURE ASSESSMENT
-FINAL REPORT-

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APPENDICES

1 INTRODUCTION

1.1 Background

The Beaver Creek Water System (BCWS) supplies a community of approximately 2,800 people, just north of Port Alberni. The majority of the BCWS water distribution system was constructed in the 1960s and was owned and operated by the Beaver Creek Improvement District (BCID). The system was installed in accordance with typical standards of the day, including asbestos cement (AC) mains. Over time, additions were made by land developers between 1970 and the present. The majority of mains installed after 1970 are polyvinyl chloride (PVC).

The water supply for the BCWS originally consisted of an infiltration gallery under the Stamp River and a pump station near the foot of McKenzie Road. Water was pumped from the intake, chlorinated by gas chlorination, and then fed directly into the distribution piping to the storage reservoirs. The river supply was subject to high turbidity during heavy rainfall events and the treatment facility was not in compliance with Island Health' surface water treatment objectives

On June 1, 2012 the BCID became a local service area of the Alberni Clayoquot Regional District (ACRD). Since the ACRD has taken ownership of the water system, several improvements have been completed including water distribution main upgrades and the construction of the new Kitsuksis Reservoir. In addition the Strick Road pump station has been constructed, which provides the BCWS with potable water from the City of Port Alberni that meets VIHA's regulations. The Stamp River intake has been maintained by the ACRD for emergency purposes only, in the event of an interruption of the Port Alberni supply.

1.2 Acknowledgements

Koers & Associates Engineering Ltd. acknowledges with thanks the assistance provided by the following Regional District staff during the course of this study:

- Mr. Andrew McGifford
- Mr. Daniel Fredlund

2 EXISTING SYSTEM

Listed below is a summary of the BCWS water system. The pressure zone boundaries, reservoir and pump station locations are shown on **Figure 1.**

2.1 Water Supply

The BCWS is supplied through the Strick Road Pump Station which connects to the City of Port Alberni water system on Beaver Creek Road.

2.1.1 Old Intake

The old Stamp River intake is being maintained as an emergency supply in the event of an interruption to the City of Port Alberni supply.

- The capacity of the intake pump station was recently upgraded by replacing the three pumps with 30 HP low RPM, high volume pumps, including a new 600 V power supply. This provides sufficient capacity to meet maximum day demands well beyond 2035.
- A standby generator and transfer switch was provided for the intake pumps.
- A chlorine residual analyzer was installed at the intake pump station.
- A turbidity analyzer was installed at the intake pump station.
- A SCADA system was installed to monitor flow rate, chlorine residual, source water turbidity, and South Reservoir levels and transmit to central headquarters.

2.2 Water Distribution System

2.2.1 Pressure Zones

Listed below is a summary of the existing pressure zones in the BCWS distribution system:

Pressure Zone 106

The pressure zone services the majority of the distribution system and is supplied by the North Reservoir and Kitsuksis Reservoirs.

Pressure Zone 130

The pressure zone services the area of Beaver Creek Road north of Bainbridge Road and is supplied by the pump station at the North Reservoir Site.

Darnley Road Pressure Zone

The pressure zone services the Darnley Road and Highland Drive area and is supplied by the pump station at the intersection of Darnley Road and Holly Avenue. The discharge HGL of the pump station varies between 128 m and 138 m based on the existing pressure switch settings.

2.2.2 Piping and Appurtenances

The BWS distribution system consists of over 46 km of PVC and Asbestos Cement (AC) watermains ranging from 100 mm dia. to 300 mm dia. as detailed in the **Table 1** below.

Table 1: Distribution Pipe Inventory

Diameter (mm)	Pipe Length (m)		
	PVC	AC	Total
100	360	11,435	11,795
150	12,552	8,238	20,790
200	1,445	8,168	9,613
250	307	0	307
300	3,848	0	3,848
All Diameters	**18,512**	**27,841**	**46,353**

The distribution system also includes approximately 200 valves, 109 fire hydrants, and 41 stand pipe style flushouts. A summary of the appurtenance size, manufacture and any known issues is included in **Appendix A**.

2.3 Water Storage

Listed in **Table 2** below is a summary of the existing storage reservoirs in the BCWS.

Table 2: Reservoir Summary

Reservoir	Style	Material	Volume	Top Water Level
Kitsuksis (new)	Circular (15.4 m dia. x 7 m H)	Bolted Steel	816 $m^{3(2)}$ 1,113 $m^{3(3)}$	±104.4 $m^{(1)}$
Kitsuksis (old)	Rectangular (9.8m W x 23.8m L x 6.0m H)	Concrete	1,135 m^3	±104.4 m
North	Circular (4.6m dia. x 24.1 m H)	Bolted Steel	390 m^3	± 106 m

Notes:

(1) Overflow elevation is at 106.3m. The top water level (TWL) of 104.4 m to match existing concrete reservoir.

(2) Volume based on a TWL of104.4 m.

(3) Volume based on a TWL of 106.0 m.

As shown in the table above the BCWS has approximately 2,341m^3 of total storage under the current configuration with an additional 297 m^3 if a check valve is added to the outlet of the old Kitsuksis Reservoir and the top water level of the new Kitsuksis Reservoir is increased to 106 m.

2.4 Pump Stations

2.4.1 Strick Road Pump Station

The Strick Road Pump Station is the primary source of water for the BCWS. The pump station pumps water from the City of Port Alberni Water System to the North Reservoir and Kitsuksis Reservoirs.

The pump station is equipped with three (3) Grundfos CR90-2 pumps with variable frequency drives (VFDs) and has two modes of operations:

1) Mode 1: Reservoir Control. The pumps are controlled by the level in the North Reservoir and will turn on and off based on adjustable set points. This is the primary mode of operation for the pump station.
2) Mode 2: Pressure Control. The pumps are controlled by the demand in the system and will speed up or down as well as turn on and off based on pressure through the pump station. This is the secondary mode of operation for the pump station and is utilized in the event that the reservoirs are taken offline for maintenance or repairs.

Listed below is a summary of the operating conditions for the Strick Road Pump Station

Operating Mode	Set Points
Mode 1 Reservoir Control	Lead Pump On: North Reservoir at 88% full (Winter) and 92% Full (Summer) Lag Pump 1 On: North Reservoir at 65% full Lag Pump 2 On: North Reservoir at 55% full All Pumps Off: North Reservoir at 98% full
Mode 2 Pressure Control	Lead Pump On: Continuous Lag Pump 1 On: Pressure drops below 135 psi (930 kPa) with the lead pump at 60 Hz Lag Pump 2 On: Pressure drops below 135 psi (930 kPa) with the lead and lag pumps at 60 Hz Lag Pump 1 Stop: Pressure goes above 135 psi (930 kPa) with lag pump 1 at 45 Hz Lag Pump 2 Stop: Pressure goes above 135 psi (930 kPa) with lag pump 2 at 45 Hz

There is one 100 mm pressure relief valve currently to protect the system from high pressures and to provide flow recirculation at low demand to prevent overheating under the continuous pumping scenario.

2.4.2 North Reservoir Pump Station

The North Reservoir Pump Station services the areas on Beaver Creek Road north of the North Reservoir Site.

The pump station is equipped with two Grundfos CR 150-1 pumps with VFDs to meet the desired pressure of 75 psi (134m HGL) through the range of flows from minimum day demand to peak hour demand.

The pumps are controlled by the outlet pressure via the pressure transmitter located in the pump station. The pumps are controlled in a manner such that the lead pump will maintain the design pressure of 75 psi (515 kPa); if the lead pump is unable to maintain the design flow, the lag pump will turn on.

The lead and lag pumps are automatically cycled daily to ensure that the pump operating hours are balanced throughout the life of the pumps.

There is one 63 mm pressure relief valve set at 88 psi (605 kPa) to protect the system from high pressures and to provide flow recirculation at low demand to prevent overheating of the pump motors.

2.4.3 Darnley Road Pump Station

The Darnley Road pump station services the residents on Darnley Road and Highland Drive. The pump station is equipped with two (2) Grundfos CR32-2 pumps, each with a capacity of 10 lps (158.5 usgpm) and a pressure tank. The pumps are operated by a pressure switch and are set to turn on at 80 psi and run until the pressure reaches 95 psi.

3 SYSTEM MAINTENANCE

3.1 Recent Maintenance History

Based on discussions with the ACRD staff, there have been a number of watermain breaks and leaks in recent years. The majority of the recent water system repairs are associated with service connections that are direct tapped into the existing AC watermain. However since the installation of the new looped watermain on Grandview Road in late 2015 the BCWS has not experienced a watermain break.

The maintenance issues for the existing hydrants and valves are detailed in the appurtenance summaries provided by the ACRD and are listed in Appendix A.

In 2015 the ACRD completed repairs to the North Reservoir (November 2015) and the old concrete Kitsuksis Reservoir (May 2015) to correct leakage issues at each site. In 2016 the ACRD drained, cleaned and repaired the new bolted steel Kitsuskis Reservoir to correct warranty issues.

3.2 Recent Improvements to System

Since 2012 improvements to the BCWS supply and distribution system have been made. Listed below is a summary of some of the larger projects that have been completed:

- Strick Road Pump Station and Watermain Upgrades (250 mm and 200 mm dia.)
- Beaver Creek Road from North Reservoir to 7839 Beaver Creek Road (200 mm dia.)
- Pierce Road from Strick Road to Mersey Road (200 mm dia.)
- Mersey Road from Strick Road to existing hydrant (150 mm dia.)
- Grandview Road from Fraser Avenue to George Street (150 mm dia.)
- Chase Drive from George Street to Drinkwater Road (150 mm dia. by developer)

3.3 Scheduled Maintenance

The ACRD carries out regularly scheduled maintenance of its system. The main activities include:

- Daily (Monday to Friday) pump station inspections and maintenance of chlorination and pump equipment. Remote monitoring of the pump station functions are in place.
- Water quality sampling, including daily chlorine residual measurements in critical parts of the system.
- Reservoir level checks. Remote monitoring and control is in place for the South Reservoir.

4 SYSTEM FLOWS

4.1 Bulk Flow Meter Data

Bulk flow meter data from the flow meter at the Strick Road pump station was provided by the ACRD for 2015. The data was provided in cubic meters per day and has been summarized in monthly totals in **Table 3** below.

Table 3: 2015 Bulk Flow Meter Data

Month	Volume (m^3)
January	28,741
February	20,754
March	28,365
April	28,704
May	38,781
June	51,091
July	45,103
August	40,773
September	28,654
October	28,053
November	30,079
December	25,927
Total Annual	**395,025**
Average Day	**1,082**

The maximum daily flow for 2015 was 2,308 m^3, which occurred on July 8th.

4.2 Individual Meter Data

The BCWS is a fully metered system with 990 service connections, of which 967 are active. The ACRD operates on quarterly billing cycles and reads the customer meters in March, June, September and December. Individual meter data for 2015 was provided by the ACRD. The total yearly consumption for the 967 meter accounts was **261,413 m^3.**

4.3 Non Revenue Water (NRW)

Non revenue water is the difference between the bulk flow meter flows and the billed customer meter flows.

Non revenue water consists of water that is lost through the following activities

- system flushing
- reservoir draining for cleaning and maintenance
- watermain breaks
- leaking watermains and services.

It should be noted that the ACRD fixed the leaking Kitsuksis Reservoir in May of 2015 which will reduce the amount of NRW in the system.

Based on the 2015 data the NRW for the BCWS is shown in **Table 4** below:

Table 4: NRW Summary

Flow Data	Annual Usage (m^3)	
	2015	2016
Bulk Meter	395,025	338,518
Service Meters	261,413	240,041
Non-Revenue Water (NRW)	133,611	98,477
NRW (% of Bulk Meter Usage)	**33.8%**	**29.1%**

As shown in the table above the NRW for the system is approximately 34%. The 2016 data has been reviewed to determine the impact on the repairs at the Kitsuksis reservoir. Based on the data the NRW was reduced to 29%. It should be noted that the NRW calculation includes water used for watermain flushing, as well as water that was drained from reservoir for maintenance.

It should be noted that based on the bulk water agreement with the City of Port Alberni this NRW in 2015 accounts for approximately $48,000, based on charge of $0.36/$m^3$ as per the City's Waterworks Bylaw 4494. Monitoring flushing volumes, further system repairs or a leak detection program would be beneficial in reducing the NRW in the system.

4.4 Demand Projections

Based on the system flows identified in Section 4.1 the 2015 Average Day and Maximum Day demands for the BCWS are as shown in **Table 5**:

Table 5: Current Average Day and Max Day Demands

	Demand (m^3/d)	Demand (L/service)[(1)]
Average Day	1,082	1,092
Maximum Day	2,308	2,331

Note (1): based on 990 service connections in 2015

As per the 2007 report for the Beaver Creek Improvement District there were 939 service connections in 2005. This results in a growth of 51 service connections over the last 10 years or an average growth rate of 0.54%. For the purposes of this report this growth rate will be used to project the number of service connection under Build Out conditions (approximately 50 years).

The projected system demands under Build Out conditions were estimated based on the proposed number of connections and the current water demand per connection. A summary of the projected growth and demands is summarized in **Table 6** below:

Table 6: Growth and Demand Projections

	Service Connections	Average Day (lps)	Max Day (lps)	Peak Hour (lps)
Current	990	12.5	26.7	37.5
Build Out	1,314	16.6	35.4	49.9
Increase	**190**	**4.1**	**8.7**	**12.4**

As the ACRD does not record peak hour flows a peaking factor of 3 times the average day demands, as per the 2014 Mater Municipal Construction Documents (MMCD) Design Guidelines, has been used.

4.5 Fire Flow Requirements

The ability to provide adequate fire flow is an important feature of a properly designed water distribution system. Fire flow requirements vary, depending on building design, floor area, number of stories, construction materials, if a fire sprinkler system is installed, fire break walls, and spacing from adjacent buildings (exposure).

The design standards for fire flow demands are in accordance with the most recent version of the MMCD Design Guidelines and the "Water Supply for Public Fire Protection" by the Fire Underwriters Survey (FUS). The assumed minimum required fire flow for various land use, and associated fire flow duration, are presented in **Table 7:**

Table 7: Fire Flow Demands

Land Use	Assumed Minimum Required Fire Flow	
	Demand (L/s)	Duration (hrs)
Single Family Residential	60	1.75
Commercial/Institutional	150	2
Industrial	225	4

4.6 Service Pressure Requirements

The service pressure requirements listed in the MMCD Design Guidelines are listed below in **Table 8**:

Table 8: Service Pressure Requirements

Parameter	Value	
Under Peak Hour Demand Conditions		
Minimum residual pressure at property line	300 kPa	(44 psi)
Under Fire Flow Demand Conditions (during Maximum Day Demands)		
Minimum residual pressure at hydrant	150kPa	(22 psi)
Under Static Conditions		
Maximum service pressure	850 kPa	(123 psi)

5 WATER MODEL ANALYSIS

The current BCWS WaterGems model was used for the water model analysis. The modeling results are discussed below.

5.1 Model Update

The water model was updated to reflect the current BCWS mapping information provided by the ACRD. The Strick Road pump station was inputted into the model and the Stamp River Intake was disconnected to represent the current system operation.

The reservoir storage volume at the Kitsuksis Reservoir site was updated to reflect the improvements completed in 2014.

The pump station at Darnley Road was added to the model to provide an accurate representation of the available pressures and fire flows in the service area.

Piping upgrades that were completed in the summer and fall of 2016, that were not included in the latest water map, were added to the water model.

5.2 Peak Hour Pressure Review

The existing system is capable of providing peak hour demands and maintaining more than 280 kPa (40 psi) throughout the water system, with the exception of the areas adjacent to the reservoirs and areas in Pressure Zone 106 with an elevation greater than where the elevation is greater than 78 m.

The peak hour demand residual pressures for existing conditions are shown on **Figure 2.**

The highest pressures are along Grandview Road south of Gordon Avenue where the pressure is approximately 861 kPa (125 psi).

5.3 Fire Flow Review

The available fire flows during maximum day demand for the current conditions is shown in **Figure 3**. Under the fire flow review it was assumed that the Strick Road, Darnley and North Reservoir Pump Station we operating to provide a representation of how the system would react with heavy demands on the reservoir.

As shown in **Figure 3**, there are large sections of the distribution system that are not able to meet the minimum fire flow requirements. The deficient fire flows can be attributed to small diameter piping (100 mm dia.) and a lack of looped mains.

The fire flows in the areas serviced by the Darnley Road pump station are limited by the capacity of the current pumps at the pump station. In order to increase the fire flows in these areas larger pumps will be required.

5.4 Reservoir Storage

The projected volume for required system storage was calculated using the following formula as listed in the Master Municipal Construction Documents Design Guideline Manual:

Volume (V) = A + B + C

Where: A = Fire Storage
B = Equalization (Peaking) Storage (25% of Max Day Demands)
C = Emergency Storage (25% of A + B)

The requirement for Emergency Storage (C) can be reduced or eliminated based on several factors, including water source dependability; reliability of the supply system (e.g. gravity vs pumped, duplication of mains and treatment, standby emergency power); multiple sources; more than one storage reservoir; and reservoir water circulation needs. The calculated storage volume for the BCWS is shown in **Table 9** for Year 2067.

Table 9: Reservoir Storage Requirements

Year	Storage Volume					
	Required (m^3)				Storage (m^3)	Shortfall (m^3)
	Equalization	Fire Flow	Emergency	Total		
2017	584	1,080	416	2,080	2,341	261
2067	766	1080	461	2,307	2,341	34

As shown in the table above the existing reservoir storage volume is sufficient for build out (50 year) growth projections.

6 PROPOSED IMPROVEMENTS

6.1 Short Term Improvements

The short improvements required in order for the system to operate within the distribution system design requirements and provide the recommended minimum fire flow are presented in **Table 10** and shown on **Figures 4**.

Table 10: Required Short Term Improvement Works

Project No.	Location	Diameter (mm)		Length (m)
		Existing	Proposed	
W-1	Beaver Creek Road – 7874 Beaver Creek Road to the west end	100	200	600
W-2	Drinkwater Road	100	150	695
W-3	Lamarque Road – Wadena Road to Kellow Road	100	150	815
W-4	Walker Road	100	150	805
W-5	Smith Road – Lothian Road to Lamarque Road	100	150	700
W-6	Fayette Road – Beaver Creek Road to Swanson Road	100	150	795
W-7	Falls Street – Malabar Road to Lugrin Road	100	150	405
W-8	Falls Street – Lugrin Road to Georgia Road	100	200	400
W-9	Georgia Road	100	150	565
W-10	Hills Road – 6099 Hills Road to Beaver Creek Road	100	150	220
W-11	Karen Place – 6303 Karen Place to Withers Road	100	150	790
W-12	Withers Road – Karen Place to Falls Street	100	150	175
W-13	Kitsuksis Street, Poplar Road and Dayton Road	100/150	200	475
W-14	Bainbridge Road and Cameron Road	100	200	285
W-15	Tomswood Road	100	150	250
W-16	Holly Avenue – Poplar Road to Willow Road	-	150	920
W-17	Dashwood Road – Beaver Creek Road to Thompson Road	-	150	430
		Total Length:		**9,325**

6.2 Long Term Improvements

As there are no comprehensive development areas identified in the current Beaver Creek Official Community Plan, future development locations have been assumed for this report. The proposed development locations are shown on **Figure 5**. It has been assumed that the future development will not be permitted in the areas located in the Agricultural Land Reserve.

The long improvements required in order for the system to operate within the distribution system design requirements and provide the recommended minimum fire flow are presented in **Table 11** and shown on **Figure 5**.

Table 11: Required Improvement Works

Project No.	Location	Diameter (mm)		Length (m)
		Existing	Proposed	
DA-1	Maple Street, Bigwood Road, McEachren Road Area	-	200	2,500
DA-2	Sefton Road and Nelson Avenue Area	-	200	2,000
DA-3	Upland Road Area	-	200	900
DA-4	Kirkpatrick Avenue Area	-	200	550
DA-5	Donahue Road and Traves Road Area	-	200	750
DA-6	Georgia Road Area	-	150	450
		Total Length:		**7,150**

It should be noted that the proposed improvements should be reviewed as development applications are submitted to the ACRD, as the servicing requirements for future developments may differ from the works proposed.

7 INFRASTRUCTURE RENEWAL PROGRAM

In order to assist the ACRD with budgeting for future replacement works, as the existing watermains and facilities reach the end of their service life, an infrastructure renewal program is required.

The infrastructure renewal plan consists of three parts:

1) Inventory of the existing infrastructure
2) Estimate of the future replacement cost for the infrastructure
3) Calculation of the annual contributions required to fund the infrastructure replacement

The infrastructure renewal plan is listed in **Appendix B** with a brief summary of each part of the renewal plan listed below:

7.1 Infrastructure Inventory

An inventory was completed of the BCWS water supply and distribution infrastructure system and provides a summary of the following information:

1) Location
2) Watermain length, diameter and material
3) Appurtenance type
4) Reservoir and pump stations
5) Estimated installation date and remaining service life

It should be noted that the inventory does not include the proposed system improvements identified in **Section 6**.

7.2 Future Replacement Costs

The future replacement costs are calculated by determining the present day replacement cost for each infrastructure item and then applying an inflation rate over the remaining service life of the item.

The present day replacement costs for the infrastructure items are based on recent watermain projects that have been completed in the BCWS. The pricing for the watermain replacement include excavation, backfill and surface restoration.

The improvement projects noted in **Section 6** have been excluded from the replacement value calculation.

For the purposes of this report an annual inflation rate of 1.5% has been used to calculate the future replacement costs.

The total replacement costs for the water system in 2017 dollars is $14,203,330 with an estimated future replacement cost of $28,521,642, based on the estimated service life of the infrastructure components and the assumed inflation rate.

7.3 Annual Contributions

In order to ensure that the ACRD has sufficient funds to replace the water infrastructure in the BCWS as it reaches the end of its design service life, annual contributions are required.

To determine the annual contributions to the infrastructure renewal program the opportunity value of time was included in the calculation. The opportunity value of time, with regards to future versus current funds, can be represented in terms of the economic return that could be earned if the funds if they were utilized under their next best alterative (ie, the funds could be earning interest). Adjusting for the opportunity value of time is known as discounting. Typical discount rates vary from 3 to 5 percent and for the purposes of this report a value of 3 percent was used.

To determine the annual contributions the following formula was used:

$$Annual\ Contribution = \frac{Future\ Value\ \times \left(\frac{1}{(1+r)^n}\right)}{n}$$

Where:
r = real discount rate (3%)
n = number of years in the future when the cost will be incurred.

Based on the projected future replacement costs identified the annual contribution required for the water system is $611,186 or roughly 2.1% of the future replacement costs.

With the number of serviced parcels at 990, the annual contribution required per serviced parcel to fully replace the system over the remaining useful life is **$617.**

8 COST ESTIMATES

The cost estimates in this report are based on Class 'D' (feasibility study) estimates, made without preliminary design input. The estimates include a 30% general contingency and a 30% allowance for construction, engineering, financing, legal and administration costs. Cost estimates are derived from our in-house construction cost data of watermain construction projects in the mid-Vancouver Island area and are exclusive of GST.

Table 12: Short Term Cost Estimates

Project No.	Location	Length (m)	Dia. (mm)	Unit Price	Extension
W-1	Beaver Creek Rd – 7874 Beaver Creek Rd to the west end	600	200	$600	$360,000
W-2	Drinkwater Rd	695	150	$550	$382,250
W-3	Lamarque Rd – Wadena Rd to Kellow Rd	815	150	$550	$448,250
W-4	Walker Rd	805	150	$550	$442,750
W-5	Smith Rd – Lothian Rd to Lamarque Rd	700	150	$550	$385,000
W-6	Fayette Rd – Beaver Creek Rd to Swanson Rd	795	150	$550	$437,250
W-7	Falls St – Malabar Rd to Lugrin Rd	405	150	$550	$222,750
W-8	Falls St – Lugrin Rd to Georgia Rd	400	200	$650	$260,000
W-9	Georgia Rd	565	150	$550	$310,750
W-10	Hills Rd – 6099 Hills Rd to Beaver Creek Rd	220	150	$550	$121,000
W-11	Karen Pl – 6303 Karen Pl to Withers Rd	790	150	$550	$434,500
W-12	Withers Rd – Karen Pl to Falls St	175	150	$550	$96,250
W-13	Kitsuksis St, Poplar Rd and Dayton Rd	475	200	$600	$285,000
W-14	Bainbridge Rd and Cameron Rd	285	200	$600	$171,000
W-15	Tomswood Rd	250	150	$550	$137,500
W-16	Holly Ave – Poplar Rd to Willow Rd	920	150	$550	$506,000
W-17	Dashwood Rd – Beaver Creek Rd to Thompson Rd	430	150	$550	$236,500
				Total:	**$5,236,750**

Table 13: Long Term Cost Estimates

Project No.	Location	Length (m)	Dia. (mm)	Unit Price	Extension
DA-1	Maple Street, Bigwood Road, McEachren Road Area	2,500	200	$600	$1,500,000
DA-2	Sefton Road and Nelson Avenue Area	2,000	200	$600	$1,200,000
DA-3	Upland Road Area	900	200	$600	$540,000
DA-4	Kirkpatrick Avenue Area	550	200	$600	$330,000
DA-5	Donahue Road and Traves Road Area	750	200	$600	$450,000
DA-6	Georgia Road Area	450	150	$550	$247,500
				Total:	**$4,267,500**

9 CONCLUSIONS

1) The BCWS is supplied through the Strick Road Pump Station which connects to the City of Port Alberni water system on Beaver Creek Road.

2) The BWS distribution system consists of 2 reservoir sites, 2 pump stations and over 46 km of PVC and Asbestos Cement (AC) watermains ranging from 100 mm dia. to 300 mm dia.

3) The majority of the recent water system repairs are associated with service connections that are direct tapped into the existing AC watermain.

4) The existing system is capable of providing peak hour demands and maintaining more than 280 kPa (40 psi) throughout the water system, with the exception of the areas adjacent to the reservoirs and areas in Pressure Zone 106 with an elevation greater than where the elevation is greater than 78 m.

5) Large sections of the distribution system that are not able to meet the minimum fire flow requirements. The deficient fire flows can be attributed to small diameter piping (100 mm dia.) and a lack of looped mains.

6) The fire flows in the areas serviced by the Darnley Road pump station are limited by the capacity of the current pumps at the pump station. In order to increase the fire flows in these areas larger pumps will be required.

7) Based on the 2016 data the NRW for the BCWS was 29%.

8) The projected system demands under Build Out conditions were estimated based on the proposed number of connections and the current water demand per connection. A summary of the projected growth and demands is summarized below:

	Service Connections	Average Day (lps)	Max Day (lps)	Peak Hour (lps)
Current	990	12.5	26.7	37.5
Build Out	1,314	16.6	35.4	49.9
Increase	**190**	**4.1**	**8.7**	**12.4**

9) The existing reservoir storage volume is sufficient for build out (50 year) growth projections.

10) In order to assist the ACRD with budgeting for future replacement works, as the existing watermains and facilities reach the end of their service life, an infrastructure renewal program is required.

10 RECOMMENDATIONS

1) Proceed with the short term and long improvement options outlined in this report.

2) Implement the annual contributions of $617 per lot for the infrastructure renewal plan as outlined in this report.

Appendix A

Water Infrastructure Summary

Line Valve Inventory 2016
(Information Provided by ACRD Staff)

Valve #	Street Address	Street Name	Size	Operational Details	Repairs Required	Replacement Priority
1	5630 Arvay Rd	Arvay Rd	6"	Operates fine		3
2	5630 Arvay Rd	Arvay Rd	6"	Operates fine		3
3	5425 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine		
4	5491 Beaver Creek Rd	Beaver Creek Rd				
5	5491 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
6	5577 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
7	5577 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
8	5577 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine		
9	5691 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
10	5691 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine	Box needs to be cleaned out	
11	5691 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
12	5705 Beaver Creek Rd	Beaver Creek Rd	8"? or 12"?	Operates Stiff		1
13	5705 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
14	5882 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine	Clean out box	
15	5882 Beaver Creek Rd	Beaver Creek Rd	8"	Operates Ok	clean out box	
16	5979 Beaver Creek Rd	Beaver Creek Rd	4'	Operates fine	Packing Leaking	
17	6055 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
18	6197 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine	clean out box	
19	6197 Beaver Creek Rd	Beaver Creek Rd	6"	Operates Ok	clean out box	
20	6401 Beaver Creek Rd	Beaver Creek Rd	4"	Operates stiff		1
21	6497 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine		
22	6561 Beaver Creek Rd	Beaver Creek Rd	4"	Operated fine		
23	6561 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
24	6561 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
25	6615 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
26	6655 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine	could use a ditch plank, valve leaks when being shut off	
27	6719 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
28	6735 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
29	6735 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
30	6941 Beaver Creek Rd	Beaver Creek Rd	8"	Operates a bit stiff		1
31	6941 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
32	6980 Beaver Creek Rd	Beaver Creek Rd	12"	Operates fine		
33	6980 Beaver Creek Rd	Beaver Creek Rd	12"	Operates fine		
34	7015 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine	box full of water and mud	
35	7650 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
36	7650 Beaver Creek Rd	Beaver Creek Rd	2"	Operates fine		
37	7650 Beaver Creek Rd	Beaver Creek Rd		OFF		
38	7650 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
39	7650 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
40	7650 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
41	7650 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine	clean out valve box	
42	7684 Beaver Creek Rd	Beaver Creek Rd				
43	7684 Beaver Creek Rd	Beaver Creek Rd				
44	7700 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
45	7700 Beaver Creek Rd	Beaver Creek Rd	8"	Operates fine		
46	7700 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
47	7700 Beaver Creek Rd	Beaver Creek Rd	8"	OFF		
48	7827 Beaver Creek Rd	Beaver Creek Rd	2"	OFF		
49	7839 Beaver Creek Rd	Beaver Creek Rd	6"	Operates fine		
50	7885 Beaver Creek Rd	Beaver Creek Rd	6"?	Operates fine		
51	7885 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine		
52	7975 Beaver Creek Rd	Beaver Creek Rd	4"	Operates fine	water in Box	
53	Across from Gill school	Beaver Creek Rd				
54	Across from Gill school	Beaver Creek Rd	6"	Operates fine	Water in box	
55	Across from Gill school	Beaver Creek Rd	6"	Operates fine		
56	4939 Bush Rd	Bush Rd	4"	Operates fine	box could be cleaned out	2
57	At hydrant #80	Chase Rd	6"	Operates fine		
58	Lot 3 on Chase Rd	Chase Rd	6"	Operates fine		
59	4335 Compton Rd	Compton Rd	6"	Operates fine		3
60	4535 Compton Rd	Compton Rd	6"	Operates fine		3
61	5150 Darnley Rd	Darnley Rd				
62	5150 Darnley Rd	Darnley Rd				
63	5150 Darnley Rd	Darnley Rd				
64	5150 Darnley Rd	Darnley Rd				
65	5150 Darnley Rd	Darnley Rd				
66	5198 Darnley Rd	Darnley Rd	6"	Operates fine	box could be cleaned out	
67	5264 Darnley Rd	Darnley Rd	6"	Operates fine		
68	5264 Darnley Rd	Darnley Rd	6"	Operates OK	box/riser needs to be centered on operating nut	
69	7230 Dashwood Rd	Dashwood Rd	6"	Operates fine		2
70	4721 Dayton Rd	Dayton Rd	6"	Operates fine		3
71	6060 Drinkwater Rd	Drinkwater Rd	4"	Operates fine		2
72	6253 Drinkwater Rd	Drinkwater Rd	6"	Operates fine		3
73	5867 Falls Rd	Falls Rd	6"	Operates fine		
74	5867 Falls Rd	Falls Rd	6"	Operates fine		
75	5867 Falls Rd	Falls Rd	6'	Operates fine		
76	5950 Falls Rd	Falls Rd	6"	Operates fine	riser isnt centered on operating nut	
77	5957 Falls Rd	Falls Rd	6"	Operates fine		
78	6085 Falls Rd	Falls Rd	4"	Operates fine		
79	6245 Fayette Rd	Fayette Rd	4"	Operates Ok		2
80	6245 Fayette Rd	Fayette Rd	4"	Operates a little stiff	needs a ditch plank	1
81	6111 George Street	George St	6"	Operates fine		
82	6275 Georgia Rd	Georgia Rd	4'	Operates fine	operating nut needs a pin to hold it in place, nut lifts off of valve	1
83	5247 Gordon Rd	Gordon Rd	12"		Water in box, Pumps on at Strick so we didn't operate valve	3
84	5670 Grandview Rd	Grandview Rd	6"	Operates fine		
85	5708 Grandview Rd	Grandview Rd	6"	Operates fine		
86	5708 Grandview Rd	Grandview Rd	12"			
87	5708 Grandview Rd	Grandview Rd	6"	Operates fine		
88	5708 Grandview Rd	Grandview Rd	6"	Operates fine	Water in box	
89	5884 Grandview Rd	Grandview Rd	6"	Operates fine		

1 = highest priority, 3 = lowest priority

Line Valve Inventory 2016
(Information Provided by ACRD Staff)

Valve #	Street Address	Street Name	Size	Operational Details	Repairs Required	Replacement Priority
90	5345 Highland Rd	Highland Rd	6"	Operates fine		3
91	5345 Highland Rd	Highland Rd	6"	Operates fine		3
92	6630 Hills Rd	Hills Rd	4"	Operates fine		2
93	6638 Hills Rd	Hills Rd	6"	Operates fine		
94	6692 Hills Rd	Hills Rd	6"	Operates fine		
95	6692 Hills Rd	Hills Rd	6"	Operates fine		
96	6692 Hills Rd	Hills Rd	6"	Operates fine		
97	6692 Hills Rd	Hills Rd		OFF		
98	5038 Holly Avenue	Holly Ave				2
99	5050 Holly Avenue	Holly Ave				2
100	5050 Holly Avenue	Holly Ave	6"	Operates fine		2
101	5050 Holly Avenue	Holly Ave	12"			2
102	5050 Holly Avenue	Holly Ave				2
103	5050 Holly Avenue	Holly Ave	12"			2
104	5121 Holly Avenue	Holly Ave	12"		Clean out box, Pumps on at Strick so we didn't operate valve	2
105	6303 Karen Place Rd	Karen Place Rd	6"	Operates fine		3
106	6193 Kirkpatrick Rd	Kirkpatrick Rd	4"	Operates fine	box is really high	2
107	5549 Kitsuksis Rd	Kitsuksis Rd	4"	Operates fine	clean out box	2
108	5598 Kitsuksis Rd	Kitsuksis Rd	4"	Operates very stiff	very stiff valve	1
109	5598 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine		2
110	5598 Kitsuksis Rd	Kitsuksis Rd				2
111	5607 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine	box/riser need to be centered on operating nut	2
112	5607 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine	box/riser need to be centered on operating nut	2
113	5607 Kitsuksis Rd	Kitsuksis Rd	4"	Operates fine	box/riser need to be centered on operating nut	2
114	5627 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine		2
115	5653 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine		2
116	5665 Kitsuksis Rd	Kitsuksis Rd	8"?	Operates fine		2
117	5699 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine		2
118	5699 Kitsuksis Rd	Kitsuksis Rd	6"	Operates fine	Raise box	2
119	5960 Kitsuksis Rd	Kitsuksis Rd				2
120	5960 Kitsuksis Rd	Kitsuksis Rd				2
121	5960 Kitsuksis Rd	Kitsuksis Rd				2
122	5960 Kitsuksis Rd	Kitsuksis Rd				2
123	5960 Kitsuksis Rd	Kitsuksis Rd				2
124	5960 Kitsuksis Rd	Kitsuksis Rd				2
125	5960 Kitsuksis Rd	Kitsuksis Rd				2
126	5960 Kitsuksis Rd	Kitsuksis Rd				2
127	5960 Kitsuksis Rd	Kitsuksis Rd				2
128	5960 Kitsuksis Rd	Kitsuksis Rd				2
129	5960 Kitsuksis Rd	Kitsuksis Rd				2
130	5960 Kitsuksis Rd	Kitsuksis Rd				2
131	5960 Kitsuksis Rd	Kitsuksis Rd				2
132	5960 Kitsuksis Rd	Kitsuksis Rd				2
133	5960 Kitsuksis Rd	Kitsuksis Rd				2
134	5960 Kitsuksis Rd	Kitsuksis Rd				2
135	5960 Kitsuksis Rd	Kitsuksis Rd				2
136	6134/6064 Lamarque Rd	Lamarque Rd	6"	Operates fine	box is full of water	
137	6134/6064 Lamarque Rd	Lamarque Rd	4"	Operates fine	clean out box	2
138	6420 Lamarque Rd	Lamarque Rd			CANT OPERATE, box is full of dirt	
139	6480 Lamarque Rd	Lamarque Rd	6"	Operates fine	Remove short metal stake in ground	
140	6593 Lamarque Rd	Lamarque Rd	4"	Operates Ok		2
141	6593 Lamarque Rd	Lamarque Rd	4"	Operates fine	Get measurement off of Standpipe on Lamarque?	2
142	6740 Lamarque Rd	Lamarque Rd	6"	Operates fine	raise box	
143	6780 Lamarque Rd	Lamarque Rd	6"	Operates fine		
144	6780 Lamarque Rd	Lamarque Rd	6"	Operates fine		
145	6184 Lugrin Rd	Lugrin Rd	2"	Operates fine		2
146	6294 Lugrin Rd	Lugrin Rd	6"	Operates fine		2
147	6294 Lugrin Rd	Lugrin Rd	6"	Operates fine		2
148	6294 Lugrin Rd	Lugrin Rd	4"	Operates fine		2
149	5500 Maple Rd	Maple Rd	6"	Operates fine		3
150	5400 McEachren Rd	McEachren Rd	6"	Operates fine		3
151	7120 McKenzie Rd	McKenzie Rd	8"	Operates fine	valve box needs to be cleaned out	2
152	7120 McKenzie Rd	McKenzie Rd	8"	Operates fine	box has water in it	2
153	7120 McKenzie Rd	McKenzie Rd	8"	Operates stiff the whole way	box needs to be cleaned out	1
154	7350 McKenzie Rd	McKenzie Rd	6"	Operates stiff	valve box needs to be cleaned out	1
155	7350 McKenzie Rd	McKenzie Rd	6"	Operates ok	valve box needs to be cleaned out	2
156	7582 McKenzie Rd	McKenzie Rd	6"	Operates fine, Valve is OFF		2
157	7681 Mckenzie Rd	McKenzie Rd	12"	Operates fine		2
158	5597 Mersey Rd	Mersey Rd	12"	Operates Ok		3
159	5694 Mersey Rd	Mersey Rd	6"	Operates Ok		3
160	5722 Mersey Rd	Mersey Rd	6"	Operates Ok	riser and valve box need adjustment, lid doesn't fit properly	3
161	5700 Pierce Rd	Pierce Rd	4"	Operates fine		2
162	7380 Plymouth Rd	Plymouth Rd	12"	Operates fine		3
163	Plymouth Rd	Plymouth Rd				3
164	Plymouth Rd	Plymouth Rd	12"	Operates fine		3
165	5628 Poplar Street	Poplar St	6"	Operates fine		3
166	5695 Saunders Rd S	Saunders Rd	4"	Operates fine		2
167	5695 Saunders Rd S	Saunders Rd	4"	Operates fine		2
168	5695 Saunders Rd S	Saunders Rd	4"	Operates fine		2
169	5709 Saunders Rd S	Saunders Rd	6"	Operates fine		2
170	5825 Saunders Rd	Saunders Rd	6"	Operates fine		2
171	6176 Saunders Rd	Saunders Rd	6"	Operates Ok		2
172	6176 Saunders Rd	Saunders Rd	4"	Operates fine		2
173	6176 Saunders Rd	Saunders Rd	6"	Operates fine		2
174	6240 Smith Rd	Smith Rd	6"	Operates fine		2
175	6240 Smith Rd	Smith Rd	6"	Operates fine		2
176	6240 Smith Rd	Smith Rd	6"	Operates fine		2
177	6485 Smith Rd	Smith Rd	4"	Operates fine		2

1 = highest priority, 3 = lowest priority

Line Valve Inventory 2016
(Information Provided by ACRD Staff)

Valve #	Street Address	Street Name	Size	Operational Details	Repairs Required	Replacement Priority
178	6498 Smith Rd	Smith Rd	6"	Operates fine		2
179	7702 Sportsman Rd	Sportsman Rd	12"	Operates fine		
180	7702 Sportsman Rd	Sportsman Rd	8"	Operates fine		
181	6287 Springfield Rd	Springfield Rd	6"	Operates fine		3
182	6287 Springfield Rd	Springfield Rd	6"	Operates fine		3
183	5525 Strick Rd	Strick Rd	12"		Pumps on at Strick so we didn't operate valve	3
184	5597 Strick Rd	Strick Rd			Pumps on at Strick so we didn't operate valve	3
185	5597 Strick Rd	Strick Rd			valve is OFF	3
186	5695 Strick Rd	Strick Rd	6"	Operates Ok		3
187	5695 Strick Rd	Strick Rd	6"	Operates fine		3
188	5695 Strick Rd	Strick Rd		Operates fine	Bob wrote down to recount turns, got 26.5 turns first time	3
189	5695 Strick Rd	Strick Rd	6"	Operates fine	water in box	3
190	5705 Strick Rd	Strick Rd	12"		Pumps on at Strick so we didn't operate valve	3
191	5705 Strick Rd	Strick Rd	6"	Operates fine	remeasure off of valve cluster at 5695 Strick rd	3
192	6281 Swanson Rd	Swanson Rd	4"	Operates fine		3
193	6281 Swanson Rd	Swanson Rd	4"	Operates fine		3
194	6495 Swanson Rd	Swanson Rd	6"	Operates fine		3
195	6795 Swanson Rd	Swanson Rd	6"	Operates fine		3
196	6795 Swanson Rd	Swanson Rd	6"	Operates fine		3
197	7175 Thompson Rd	Thompson Rd				1
198	5885 Tosca Rd	Tosca Rd	6"	Operates fine		
199	6594 Walker Rd	Walker Rd	4"	Operates fine	clean out box	2
200	6389 Withers Rd	Withers Rd	4"	Operates Ok	Change to Nelson box, needs paint, Valve leaks bad	1
201	6389 Withers Rd	Withers Rd	4"	Operates fine		2

1 = highest priority, 3 = lowest priority

Air Valve Inventory 2016
(Information Provided by ACRD Staff)

Valve #	Street Address	Street	Make	Size	Work to be done	Replacement Priority
1	Mckenzie Pumphouse	McKenzie Rd	Crispin	1"		2
2	Mckenzie Pumphouse	McKenzie Rd	Crispin	1"		2
3	7380 Plymouth Road	Plymouth Rd	TC	1"	Change out AC barrel to a proper man-hole	1
4	Across from 7211 Kerry Rd	Kerry Rd	ValMatic	1"		3
5	7272 McKenzie Road	McKenzie Rd	Crispin	1"	Needs gate valve handle	1
6	6982 Beaver Creek Rd	Beaver Creek Rd	TC	1"		3
7	6365 Beaver Creek Rd	Beaver Creek Rd	Crispin	1"		3
8	6143 Beaver Creek Rd	Beaver Creek Rd		1"		3
9	7380 Beaver Creek Rd	Beaver Creek Rd		1"	Change out galvanized nipple Change out AC barrel to proper man-hole	1
10	7656 Beaver Creek Rd	Beaver Creek Rd	APCO	1"	Cleaned out barrell	3
11	7895 Beaver Creek Rd	Beaver Creek Rd		1"	Change out galvanized nipple Change out AC barrel to proper man-hole	1
12	Kerry Rd. South Donkey Trail East	Kerry Rd	ValMatic	2"		3
13	End of Plymouth Rd 200' down Donkey Trail	Plymouth Rd	Changed out	1"	get new model and address	3
14	6096 Grandview Rd	Grandview Rd	changed out	1"	get new model and address	3
15	6193 Kirkpatrick rd	Kirckpatrick Rd	Crispin	1"	Change out PVC barrel to proper man-hole	2
16	End of Ranworth	Ranworth Rd	Crispin	1"	cleaned out barrel	3
17	End of Drinkwater Rd	Drinkwater Rd	Crispin	1"		3
18	6275-6233 Georgia Rd	Georgia Rd	Crispin	1"	Change out PVC barrel to proper man-hole	2
19	5624 Beaver Creek Rd	Beaver Creek Rd	Crispin	1"		3
20	5621 Gordon Ave.	Gordon Ave	TC	1"	Change out AC barrel to proper man-hole	1
21	5990 Mersy Rd	Mersey Rd	A.R.I	1"	Replace both gate valve handles	1
22	Bush/Tomswood Rds	Bush Rd	Crispin	1"	Replace gate valve handle Change out PVC barrel to proper man-hole Change out possible Galvanized nipple	1
23	End Holly Avenue	Holly Ave	Crispin	1"	Change out possible Galvanized nipple	2
24	5185 Darnley Rd	Darnley Rd	Crispin	1"		3
25	Poplar Rd	Poplar Rd	Crispin	1"	Change out PVC barrel to proper man-hole	3
26	5600 Willow Street	Willow St	TC	1"	Change out PVC barrel to proper man-hole	3
27	4335 Compton Rd	Compton Rd	TC	1"	Change out PVC barrel to proper man-hole	3
28	Mckenzie Pumphouse	McKenzie Rd	A.R.I	1"		2
29	7675 Sportsman rd	Sportsman Rd	A.R.I	1"		3
30	Twisden Rd	Twisden Rd	APCO	1"		3
31	Chase Winery	Chase Rd	A.R.I	1"	2015 brand new	3
32	6982 BC Rd	Beaver Creek Rd	A.R.I	1"	8" pvc riser for valve inside manhole, remove.	3
33	Strick/Gordon Rd	Strick Rd	APCO	1"	water in the manhole, main is in the bottom	3
34	Valve on Chase Rd @ Lot 4	Chase Rd	Crispin	1"	2015 brand new	3

1 = highest priority,
3 = lowest priority

Hydrant Inventory 2016
(Information Provided by ACRD Staff)

Number	Location	Street	Manufacturer	Model No.	Pumper Outlet	Replacement Priority
1	5562 Arvay rd	Arvay Rd	Terminal City	TC #2	No	1
2	5425 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
3	Across from Gill School	Beaver Creek Rd	AVK	AVK-P 27-80	Yes	
4	5577 BC rd (The Island)	Beaver Creek Rd	Terminal City	TC 20P	Yes	
5	5691 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
6	5755 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
7	5915 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
8	6005 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
9	6143 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
10	BC road/Fayette rd	Beaver Creek Rd	Terminal City	TC 20	No	1
11	6401 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
12	6497 BC rd	Beaver Creek Rd	Terminal City	TC C71P	Yes	
13	6561 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
14	6655 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
15	6715 BC rd/Smith rd	Beaver Creek Rd	AVK	AVK-P 27-80	Yes	
16	6815 BC rd/Twisden rd	Beaver Creek Rd	Terminal City	TC 20	No	1
17	7059 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
18	7292 BC rd/Dashwood rd	Beaver Creek Rd	Terminal City	TC 20	No	1
19	7390 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
20	7490 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
21	7550 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
22	7611 BC rd	Beaver Creek Rd	Terminal City	TC C71P	Yes	
23	7620 BC rd/Bainbridge rd	Beaver Creek Rd	Terminal City	TC C71P	Yes	
24	7827 BC rd	Beaver Creek Rd	Terminal City	TC 20P	Yes	
25	7895 BC rd	Beaver Creek Rd	Terminal City	TC 20P	Yes	
26	7975 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
27	6901 BC rd	Beaver Creek Rd	Terminal City	TC 20	No	1
28	6038 BC road (Firehall/Shop)	Beaver Creek Rd	Terminal City	TC 20P	Yes	
94	6197 BC rd/Wadena rd	Beaver Creek Rd	Terminal City	TC 20	No	1
105	7830 BC rd (Kaackamiin Building)	Beaver Creek Rd	Terminal City	TC C71P	Yes	
34	7791 Cameron rd	Cameron Rd	Terminal City	TC 20P	Yes	2
31	5667 Chapman rd	Chapman Rd	Terminal City	TC 20	No	1
79	Chase Rd middle	Chase Rd	Terminal City	C71	Yes	
80	Chase Rd End	Chase Rd	Terminal City	C71	Yes	
32	Corner of Maple St and Compton rd	Compton Rd	Mueller	Mueller 175WP	No	1
33	5400 Compton rd	Compton Rd	Mueller	Mueller 175WP	No	1
35	Hydrant @ Darnley Pumphouse	Darnley Rd	Mueller	Mueller 175WP	No	1
38	Corner of Darnley and Highland rd	Darnley Rd	Mueller	Mueller 175WP	No	1
36	4721 Dayton rd	Dayton Rd	Terminal City	TC 20	No	1
107	End of Donahue rd	Donahue Rd	Terminal City	TC C71P	Yes	2
37	6143 Drinkwater rd	Drinkwater Rd	Terminal City	TC 20	No	1
99	Corner of Weismiller rd & Falls street	Falls St	Terminal City	TC 20	No	1
39	6435 Fayette	Fayette Rd	Terminal City	TC 20P	Yes	2
40	6579 Fayette	Fayette Rd	Terminal City	TC 20	No	1
41	6125 Georgia rd	Georgia Rd	Terminal City	TC 20	No	1
109	End of Georgia	Georgia Rd	Terminal City	TC C71LP	Yes	2
29	6096 Grandview Rd/George Rd	Grandview Rd	Terminal City	C71	Yes	
43	5684 Grandview rd	Grandview Rd	Terminal City	TC 20	No	1
44	5884 Grandview rd	Grandview Rd	Terminal City	c71	Yes	
45	6008 Grandview rd	Grandview Rd	Terminal City	TC C71P	Yes	
46	5670 Grandview rd	Grandview Rd	Mueller	Mueller 175WP	No	1
47	5654 Grandview rd	Grandview Rd	Terminal City	TC C71P	Yes	
48	Beside city hydrant on Grandview rd	Grandview Rd	Terminal City	TC C71P	Yes	
49	6695 Grigg rd	Grigg Rd	Mueller	Mueller 175WP	No	1
50	Across from 5323 Highland rd	Highland Rd	Terminal City	TC C71P	Yes	3
51	5400 Highland rd	Highland Rd	Terminal City	TC C71P	Yes	3
52	5505 Highland rd (end of highland rd)	Highland Rd	Terminal City	TC C71P	Yes	3
53	6572 Hills rd	Hills Rd	Terminal City	TC 20	No	1
54	6692 Hills rd	Hills Rd	Terminal City	TC C71P	Yes	
55	6175 Karen Place	Karen Place	Mueller	Mueller 175WP	No	1
56	6325 Karen Place	Karen Place	Terminal City	TC C71P	Yes	
57	6295 Karen Place	Karen Place	Terminal City	TC C71P	Yes	
58	7300 Kerry rd	Kerry Rd	Mueller	Mueller 175WP	No	1
59	5598 Kitsuksis rd	Kitsuksis Rd	Terminal City	TC C71P	Yes	2
60	5693 Kitsuksis rd	Kitsuksis Rd	Terminal City	TC 20	No	1
61	6260 Lamarque rd	Lamarque Rd	Terminal City	TC 20	No	1
62	6400 Lamarque rd	Lamarque Rd	Terminal City	TC 20	No	1
63	6480 Lamarque rd/Kellow rd	Lamarque Rd	Terminal City	TC 20	No	1
64	Corner of Lamarque rd & Smith rd	Lamarque Rd	AVK	AVK-P 27-80	Yes	
65	6010 Lugrin rd	Lugrin Rd	Terminal City	TC 20	No	1
66	6154 Lugrin rd	Lugrin Rd	Terminal City	TC 20	No	1
67	6294 Lugrin rd	Lugrin Rd	Terminal City	TC 20	No	1

1 = highest priority,
3 = lowest priority

Hydrant Inventory 2016
(Information Provided by ACRD Staff)

Number	Location	Street	Manufacturer	Model No.	Pumper Outlet	Replacement Priority
68	6030 Malabar rd	Malabar Rd	Terminal City	TC 20	No	1
69	6140 Malabar rd	Malabar Rd	Terminal City	TC 20	No	1
74	7291 Mckenzie rd	McKenzie Rd	Terminal City	TC 20	No	1
75	7475 Mckenzie rd	McKenzie Rd	Terminal City	TC 20	No	1
76	7120 Mckenzie rd/BC rd	McKenzie Rd	Terminal City	TC 20	No	1
77	End of Mckenzie near Rages farm	McKenzie Rd	Mueller	Mueller 175WP	No	1
70	5722 Mersey rd	Mersey Rd	AVK	AVK-P 27-80	Yes	3
71	5890 Mersey rd	Mersey Rd	AVK	AVK-P 27-80	Yes	3
72	5980 Mersey rd	Mersey Rd	AVK	AVK-P 27-80	Yes	3
73	5646 Mersey rd	Mersey Rd	Terminal City	TC 20	No	1
78	5694 Mersey rd/Gordon rd	Mersey Rd	Mueller	Mueller 175WP	No	1
81	7380 Plymouth rd	Plymouth Rd	Mueller	Mueller 175WP	No	1
82	7300 Plymouth rd	Plymouth Rd	Terminal City	TC 20	No	1
83	End of Ranworth rd	Ranworth Rd	Terminal City	TC C71LP	Yes	
84	5709 Saunders rd/Lugrin rd	Saunders Rd	Mueller	Mueller 175WP	No	1
85	5993 Saunders rd	Saunders Rd	Terminal City	TC 20	No	1
89	6512 Smith rd	Smith Rd	Terminal City	TC 20	No	1
90	6342 Smith rd	Smith Rd	Terminal City	TC 20	No	1
86	6360 Springfield rd	Springfield Rd	Mueller	Mueller 175WP	No	1
87	End of Springfield rd	Springfield Rd	Mueller	Mueller 175WP	No	1
42	Corner of Gordon rd and Strick rd	Strick Rd	Terminal City	TC 20	No	1
91	5611 Strick rd	Strick Rd	Terminal City	TC C71P	Yes	3
108	5525 Strick rd	Strick Rd	Terminal City	TC C71P	Yes	3
88	6795 Swanson rd	Swanson Rd	Mueller	Mueller 175WP	No	1
92	7175 Thompson rd	Thompson Rd	Terminal City	TC 20	No	1
93	5659 Tomswood rd	Tomswood Rd	Terminal City	TC 20	No	1
106	@ end of Twisden rd	Twisden Rd	AVK	AVK-P 27-80	Yes	3
98	5887 Wadena rd/Saunders N rd	Wadena Rd	Terminal City	TC 20	No	1
95	6290 Walker rd	Walker Rd	Terminal City	TC 20	No	1
96	6426 Walker rd	Walker Rd	Terminal City	TC 20	No	1
97	6594 Walker rd	Walker Rd	Terminal City	TC 20	No	1
100	5415 Willow rd	Willow Rd	Mueller	Mueller 175WP	No	1
101	5595 Willow rd	Willow Rd	Mueller	Mueller 175WP	No	1
102	5670 Willow rd	Willow Rd	Mueller	Mueller 175WP	No	1
103	6070 Withers rd	Withers Rd	Terminal City	TC 20	No	1
104	6110 Withers rd/Karen Place	Withers Rd	Terminal City	TC 20	No	1

1 = highest priority,
3 = lowest priority

Flushout Inventory 2016
(Information Provided by ACRD Staff)

Number	Location	Street
2	Cameron Rd.	Cameron Rd
4	Krause's Grandville Rd.	Granville rd
5	End of Thompson	Thompson Rd
6	Traves Rd.	Traves Rd
9	Kirkpatrick Rd. East	Kirkpatrick Rd
10	Georgia Rd.	Georgia Rd
12	George Rd.	George Rd
13	Popular Rd. South	Poplar Rd
14	Short St.	Short St
16	Arvay Rd.	Arvay rd
18	Mersey Rd.South	Mersey Rd
19	7995 Beaver Creek Rd.	Beaver Creek Rd
20	Kerry Rd. South	Kerry Rd
22	7611 Beaver Creek Rd.	Beaver Creek Rd
23	6000 Kitsusksis	Kitsuksis Rd
24	Dashwood Rd.	Dashwood Rd
25	Wardrop Rd.	Wardrop Rd
26	Lothian Rd South	Lothian Rd
27	Bigwood Rd.	Bigwood Rd
29	W. end of Compton	Compton Rd
30	Strick Rd	Strick Rd
31	Dayton Rd.	Dayton Rd
32	McEachren Rd.	McEachren Rd
33	Swanson Rd.	Swanson Rd
34	Plested Rd.	Plested Rd
35	Tosca Rd.	Tosca Rd
36	Kirkpatrick Rd. West	Kirkpatrick Rd
37	Gordon Ave	Gordon Ave
38	Popular Rd. North	Poplar Rd
39	Willow Rd.	Willow Rd
40	Withers Rd.	Withers Rd
41	Horn Park	?
42	Fern Rd.	Fern Rd
43	Bush Rd.	Bush Rd
44	Dorian Rd.	Dorian Rd
45	Weismiller Rd.	Weismiller Rd
46	Stevens Lane	Stevens Lane
47	Saunders Rd. South	Saunders Rd
48	Twisden	Twisden Rd
49	Maple	Maple Rd
50	Dobie Rd	Dobie Rd

Appendix B

Infrastructure Renewal Plan

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
Beaver Creek Road	See Capital Plan	600	100	AC	1969	70	22		$ -	$ -	$ -	$ -
		790	200	PVC	2015	100	98	$290	$ 229,100	$ 985,592	$ -	$572
		1440	200	AC	1966	70	19	$290	$ 417,600	$ 554,135	$ -	$17,131
		4800	200	AC	1959	70	12	$290	$ 1,392,000	$ 1,664,300	$ -	$100,194
		871	150	AC	1960	70	13	$270	$ 235,170	$ 285,391	$ -	$15,398
		130	200	AC	1960	70	13	$290	$ 37,700	$ 45,751	$ -	$2,468
	Valves	54			1970	70	23	$1,200	$ 64,800	$ 91,263	$ -	$2,071
	Fire Hydrants	32			1970	60	13	$6,000	$ 192,000	$ 233,002	$ -	$12,571
	Blow-offs	6			1970	60	13	$2,500	$ 15,000	$ 18,203	$ -	$982
	Air Valves	8			1970	60	13	$3,000	$ 24,000	$ 29,125	$ -	$1,571
Wardrop Road		200	100	AC	1989	70	42	$250	$ 50,000	$ 93,442	$ -	$662
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1989	60	32	$2,500	$ 2,500	$ 4,026	$ -	$50
	Air Valves							$3,000	$ -	$ -	$ -	
Dobie Road		150	100	PVC	2016	100	99	$250	$ 37,500	$ 163,746	$ -	$91
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			2016	60	59	$2,500	$ 2,500	$ 6,018	$ -	$18
	Air Valves							$3,000	$ -	$ -	$ -	
Cameron Road	See Capital Plan	285	100	AC	1968	70	21		$ -	$ -	$ -	
		285	100	AC	1968	70	21	$250	$ 71,250	$ 97,403	$ -	$2,568
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1968	60	11	$6,000	$ 6,000	$ 7,068	$ -	$478
	Blow-offs	1			1968	60	11	$2,500	$ 2,500	$ 2,945	$ -	$199
	Air Valves							$3,000	$ -	$ -	$ -	
Dashwood Road		140	150	AC	1966	70	19	$270	$ 37,800	$ 50,159	$ -	$1,551
	Valves	1			1966	70	19	$1,200	$ 1,200	$ 1,592	$ -	$49
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1966	60	9	$2,500	$ 2,500	$ 2,858	$ -	$251
	Air Valves							$3,000	$ -	$ -	$ -	
Thompson Road		580	150	AC	1960	70	13	$270	$ 156,600	$ 190,042	$ -	$10,253
	Valves	1			1960	70	13	$1,200	$ 1,200	$ 1,456	$ -	$79
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
McKenzie Road		1595	200	AC	1959	70	12	$290	$ 462,550	$ 553,033	$ -	$33,294
	Valves	9			1959	70	12	$1,200	$ 10,800	$ 12,913	$ -	$777
	Fire Hydrants	4			1959	60	2	$6,000	$ 24,000	$ 24,725	$ -	$12,003
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	5			1959	60	2	$3,000	$ 15,000	$ 15,453	$ -	$7,502
Kerry Road		380	150	PVC	1999	100	82	$270	$ 102,600	$ 347,827	$ -	$387
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1999	60	42	$6,000	$ 6,000	$ 11,213	$ -	$79
	Blow-offs	1			1999	60	42	$2,500	$ 2,500	$ 4,672	$ -	$33
	Air Valves	2			1999	60	42	$3,000	$ 6,000	$ 11,213	$ -	$79
Plymouth Road		2030	300	PVC	1985	100	68	$360	$ 730,800	$ 2,011,358	$ -	$4,082
		400	150	PVC	1999	100	82	$270	$ 108,000	$ 366,133	$ -	$407
	Valves	3			1985	90	58	$1,200	$ 3,600	$ 8,538	$ -	$27
	Fire Hydrants	2			1985	60	28	$6,000	$ 12,000	$ 18,207	$ -	$293
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	2			1985	60	28	$3,000	$ 6,000	$ 9,103	$ -	$146
Twisden Road		255	150	PVC	2009	100	92	$270	$ 68,850	$ 270,882	$ -	$200
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			2009	60	52	$6,000	$ 6,000	$ 13,013	$ -	$55
	Blow-offs	1			2009	60	52	$2,500	$ 2,500	$ 5,422	$ -	$23
	Air Valves	1			2009	60	52	$3,000	$ 3,000	$ 6,507	$ -	$28
Smith Road		555	150	AC	1966	70	19	$270	$ 149,850	$ 198,844	$ -	$6,147

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
	see capital plan	675	100	AC	1966	70	19		$ -	$ -	$ -	
	Valves	5			1966	70	19	$1,200	$ 6,000	$ 7,962	$ -	$246
	Fire Hydrants	2			1966	60	9	$6,000	$ 12,000	$ 13,721	$ -	$1,203
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Lothian Road		330	150	PVC	1992	100	75	$270	$ 89,100	$ 272,164	$ -	$407
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1992	60	35	$2,500	$ 2,500	$ 4,210	$ -	$44
	Air Valves							$3,000	$ -	$ -	$ -	
Springfield Road		690	150	PVC	1992	100	75	$270	$ 186,300	$ 569,070	$ -	$851
	Valves	2			1992	90	65	$1,200	$ 2,400	$ 6,317	$ -	$15
	Fire Hydrants	2			1992	60	35	$6,000	$ 12,000	$ 20,207	$ -	$211
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Lamarque Road		720	150	PVC	1992	100	75	$270	$ 194,400	$ 593,813	$ -	$888
		125	150	AC	1960	70	13	$270	$ 33,750	$ 40,957	$ -	$2,210
	See capital Plan	815	100	AC	1960	60	3		$ -	$ -	$ -	
	Valves	9			1960	90	33	$1,200	$ 10,800	$ 17,652	$ -	$208
	Fire Hydrants	4			1960	60	3	$6,000	$ 24,000	$ 25,096	$ -	$7,885
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Plested Road		210	100	AC	1960	70	13	$250	$ 52,500	$ 63,712	$ -	$3,437
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
East Swanson Road		310	150	PVC	1993	100	76	$270	$ 83,700	$ 259,504	$ -	$372
West Swanson Road		320	150	PVC	1993	100	76	$270	$ 86,400	$ 267,875	$ -	$384
		190	150	PVC	2003	100	86	$270	$ 51,300	$ 184,585	$ -	$174
	Valves	5			1993	90	66	$1,200	$ 6,000	$ 16,029	$ -	$36
	Fire Hydrants	1			1993	60	36	$6,000	$ 6,000	$ 10,255	$ -	$101
	Blow-offs	1			1993	60	36	$2,500	$ 2,500	$ 4,273	$ -	$42
	Air Valves							$3,000	$ -	$ -	$ -	
Ranworth Road		225	150	PVC	1993	100	76	$270	$ 60,750	$ 188,350	$ -	$270
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1993	60	36	$6,000	$ 6,000	$ 10,255	$ -	$101
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	1			1993	60	36	$3,000	$ 3,000	$ 5,127	$ -	$51
Grigg Road		220	150	PVC	1993	100	76	$270	$ 59,400	$ 184,164	$ -	$264
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1993	60	36	$6,000	$ 6,000	$ 10,255	$ -	$101
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Hills Road	See Capital Plan	220	100	AC	1966	70	19		$ -	$ -	$ -	
		100	150	PVC	2014	100	97	$270	$ 27,000	$ 114,438	$ -	$69
		130	150	PVC	2006	100	89	$270	$ 35,100	$ 132,064	$ -	$110
	Valves	6			1966	90	39	$1,200	$ 7,200	$ 12,868	$ -	$107
	Fire Hydrants	2			1966	60	9	$6,000	$ 12,000	$ 13,721	$ -	$1,203
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Karen Road		365	150	PVC	2006	100	89	$270	$ 98,550	$ 370,795	$ -	$309
	See Capital Plan	700	100	AC	1974	70	27		$ -	$ -	$ -	
	Valves	1			1974	90	47	$1,200	$ 1,200	$ 2,416	$ -	$13
	Fire Hydrants	3			1974	60	17	$6,000	$ 18,000	$ 23,184	$ -	$850
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Withers Road		300	150	AC	1960	70	13	$270	$ 81,000	$ 98,298	$ -	$5,303
	See Capital Plan	175	100	AC	1960	70	13		$ -	$ -	$ -	

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
	Valves	2			1960	70	13	$1,200	$ 2,400	$ 2,913	$ -	$157
	Fire Hydrants	2			1960	60	3	$6,000	$ 12,000	$ 12,548	$ -	$3,943
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Traves Road		235	100	AC	1960	70	13	$250	$ 58,750	$ 71,296	$ -	$3,847
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Donahue Road		295	100	AC	1960	70	13	$250	$ 73,750	$ 89,499	$ -	$4,829
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Fayette Road	See Capital Plan	795	100	AC	1960	70	13		$ -	$ -	$ -	
	Valves	2			1960	70	13	$1,200	$ 2,400	$ 2,913	$ -	$157
	Fire Hydrants	2			1960	60	3	$6,000	$ 12,000	$ 12,548	$ -	$3,943
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Dorian Road		75	150	AC	1966	70	19	$270	$ 20,250	$ 26,871	$ -	$831
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1966	60	9	$2,500	$ 2,500	$ 2,858	$ -	$251
	Air Valves							$3,000	$ -	$ -	$ -	
Weismiller Road		145	150	AC	1966	70	19	$270	$ 39,150	$ 51,950	$ -	$1,606
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1966	60	9	$2,500	$ 2,500	$ 2,858	$ -	$251
	Air Valves							$3,000	$ -	$ -	$ -	
Wadena Road		629	150	PVC	1979	100	62	$270	$ 169,830	$ 427,473	$ -	$1,136
		75	150	AC	1960	70	13	$270	$ 20,250	$ 24,574	$ -	$1,326
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1979	60	22	$6,000	$ 6,000	$ 8,325	$ -	$203
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Kellow Road		370	100	AC	1960	70	13	$250	$ 92,500	$ 112,254	$ -	$6,056
								$360	$ -	$ -	$ -	
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Walker Road	See Capital Plan	810	100	AC	1960	70	13		$ -	$ -	$ -	
	Valves	1			1960	70	13	$1,200	$ 1,200	$ 1,456	$ -	$79
	Fire Hydrants	3			1960	60	3	$6,000	$ 18,000	$ 18,822	$ -	$5,914
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Saunders Road		1020	150	AC	1960	70	13	$270	$ 275,400	$ 334,212	$ -	$18,032
		225	100	AC	1960	70	13	$250	$ 56,250	$ 68,262	$ -	$3,683
	Valves	9			1960	70	13	$1,200	$ 10,800	$ 13,106	$ -	$707
	Fire Hydrants	2			1960	60	3	$6,000	$ 12,000	$ 12,548	$ -	$3,943
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Kirkpatrick Road		200	100	AC	1960	70	13	$250	$ 50,000	$ 60,678	$ -	$3,274
	Valves	1			1960	70	13	$1,200	$ 1,200	$ 1,456	$ -	$79
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	2			1960	60	3	$2,500	$ 5,000	$ 5,228	$ -	$1,643
	Air Valves	1			1960	60	3	$3,000	$ 3,000	$ 3,137	$ -	$986
Falls Road	See Capital Plan	805	100	AC	1960	70	13		$ -	$ -	$ -	

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
		270	100	AC	1960	70	13	$250	$ 67,500	$ 81,915	$ -	$4,419
		125	150	PVC	1979	100	62	$270	$ 33,750	$ 84,951	$ -	$226
	Valves	6			1960	70	13	$1,200	$ 7,200	$ 8,738	$ -	$471
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Malabar Road		720	150	AC	1960	70	13	$270	$ 194,400	$ 235,915	$ -	$12,728
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	2			1960	60	3	$6,000	$ 12,000	$ 12,548	$ -	$3,943
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Lugrin Road		810	150	AC	1960	70	13	$270	$ 218,700	$ 265,404	$ -	$14,319
	Valves	4			1960	70	13	$1,200	$ 4,800	$ 5,825	$ -	$314
	Fire Hydrants	3			1960	60	3	$6,000	$ 18,000	$ 18,822	$ -	$5,914
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Georgia Road	See Capital Plan	565	100	AC	1960	70	13		$ -	$ -	$ -	
	Valves	1			1960	70	13	$1,200	$ 1,200	$ 1,456	$ -	$79
	Fire Hydrants	2			1960	60	3	$6,000	$ 12,000	$ 12,548	$ -	$3,943
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves	1			1960	60	3	$3,000	$ 3,000	$ 3,137	$ -	$986
Chapman Road		472	100	AC	1960	70	13	$250	$ 118,000	$ 143,199	$ -	$7,726
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Pierce Road		335	100	AC	1960	70	13	$250	$ 83,750	$ 101,635	$ -	$5,483
		235	200	PVC	2016	100	99	$290	$ 68,150	$ 297,580	$ -	$166
	Valves	1			1960	70	13	$1,200	$ 1,200	$ 1,456	$ -	$79
		5			2016	90	89	$360	$ 1,800	$ 6,773	$ -	$6
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Drinkwater Road	See Capital Plan	700	100	AC	1960	70	13		$ -	$ -	$ -	
		90	150	PVC	1999	100	82	$270	$ 24,300	$ 82,380	$ -	$92
	Valves	2			1960	70	13	$1,200	$ 2,400	$ 2,913	$ -	$157
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	1			1960	60	3	$3,000	$ 3,000	$ 3,137	$ -	$986
Chase Road		880	150	PVC	2015	100	98	$270	$ -	$ -	$ -	
	Valves	2			2015	90	88	$1,200	$ 2,400	$ 8,897	$ -	$8
	Fire Hydrants	2			2015	60	58	$6,000	$ 12,000	$ 28,458	$ -	$91
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	2			2015	60	58	$3,000	$ 6,000	$ 14,229	$ -	$46
											$ -	
Mersey Road		800	150	PVC	2004	100	87	$270	$ 216,000	$ 788,859	$ -	$714
		110	150	PVC	2016	100	99	$270	$ 29,700	$ 129,686	$ -	$72
	Valves	3			2004	90	77	$1,200	$ 3,600	$ 11,329	$ -	$16
	Fire Hydrants	5			2004	60	47	$6,000	$ 30,000	$ 60,398	$ -	$330
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	1			2004	60	47	$3,000	$ 3,000	$ 6,040	$ -	$33
Gordon Avenue		115	100	AC	1963	70	16	$250	$ 28,750	$ 36,483	$ -	$1,464
		915	150	AC	1963	70	16	$270	$ 247,050	$ 313,503	$ -	$12,577
		1435	300	AC	1977	70	30	$360	$ 516,600	$ 807,487	$ -	$11,422
	Valves	1			1977	70	30	$1,200	$ 1,200	$ 1,876	$ -	$27
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1977	60	20	$2,500	$ 2,500	$ 3,367	$ -	$96
	Air Valves	1			1977	60	20	$3,000	$ 3,000	$ 4,041	$ -	$115
Holly Avenue		115	200	AC	1960	70	13	$290	$ 33,350	$ 40,472	$ -	$2,184
	Valves	7			1960	70	13	$1,200	$ 8,400	$ 10,194	$ -	$550

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	1			1960	60	3	$3,000	$ 3,000	$ 3,137	$ -	$986
Grandview Road		842	150	AC	1960	70	13	$270	$ 227,340	$ 275,889	$ -	$14,885
		385	150	PVC	1994	100	77	$270	$ 103,950	$ 327,122	$ -	$449
		440	150	PVC	2015	100	98	$270	$ -	$ -	$ -	
	Valves	3			1960	70	13	$1,200	$ 3,600	$ 4,369	$ -	$236
	Fire Hydrants	7			1960	60	3	$6,000	$ 42,000	$ 43,918	$ -	$13,799
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	1			1960	60	3	$3,000	$ 3,000	$ 3,137	$ -	$986
George Street		70	100	AC	1960	70	13	$250	$ 17,500	$ 21,237	$ -	$1,146
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Strick Road		290	250	PVC	2014	100	97	$360	$ 104,400	$ 442,493	$ -	$267
		400	200	PVC	2014	100	97	$290	$ 116,000	$ 491,659	$ -	$297
	Valves	9			2014	90	87	$1,200	$ 10,800	$ 39,443	$ -	$36
	Fire Hydrants	3			2014	60	57	$6,000	$ 18,000	$ 42,057	$ -	$141
	Blow-offs	1			2014	60	57	$2,500	$ 2,500	$ 5,841	$ -	$20
	Air Valves	1			2014	60	57	$3,000	$ 3,000	$ 7,009	$ -	$23
Horne Road		135	150	PVC	1997	100	80	$270	$ 36,450	$ 119,945	$ -	$145
	Valves	1			1997	90	70	$1,200	$ 1,200	$ 3,403	$ -	$6
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1997	60	40	$2,500	$ 2,500	$ 4,535	$ -	$36
	Air Valves							$3,000	$ -	$ -	$ -	
Compton Road		145	100	AC	1960	70	13	$250	$ 36,250	$ 43,991	$ -	$2,373
		435	150	PVC	1991	100	74	$270	$ 117,450	$ 353,460	$ -	$552
	Valves	2			1991	90	64	$1,200	$ 2,400	$ 6,224	$ -	$15
	Fire Hydrants	2			1991	60	34	$6,000	$ 12,000	$ 19,908	$ -	$221
	Blow-offs	1			1991	60	34	$2,500	$ 2,500	$ 4,147	$ -	$46
	Air Valves	1			1991	60	34	$3,000	$ 3,000	$ 4,977	$ -	$55
Tomswood Road	See Capital Plan	285	100	AC	1960	70	13		$ -	$ -	$ -	
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Bush Road		210	100	AC	1960	70	13	$250	$ 52,500	$ 63,712	$ -	$3,437
	Valves	1			1960	70	13	$1,200	$ 1,200	$ 1,456	$ -	$79
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves	1			1960	60	3	$3,000	$ 3,000	$ 3,137	$ -	$986
Kitsuksis Road	See Capital Plan	163	150	AC	1960	70	13		$ -	$ -	$ -	
		367	150	AC	1960	60	3	$270	$ 99,090	$ 103,616	$ -	$32,556
		320	100	AC	1960	60	3	$250	$ 80,000	$ 83,654	$ -	$26,284
	Valves	12			1960	70	13	$1,200	$ 14,400	$ 17,475	$ -	$943
	Fire Hydrants	2			1960	60	3	$6,000	$ 12,000	$ 12,548	$ -	$3,943
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Short Street		130	100	AC	1960	70	13	$250	$ 32,500	$ 39,440	$ -	$2,128
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Stevens Lane		95	100	AC	1960	70	13	$250	$ 23,750	$ 28,822	$ -	$1,555
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
Poplar Road	See Capital Plan	165	100	AC	1960	70	13		$ -	$ -	$ -	
	See Capital Plan	165	150	PVC	1994	100	77		$ -	$ -	$ -	
		110	150	PVC	1994	100	77	$270	$ 29,700	$ 93,463	$ -	$128
	Valves	1			1994	90	67	$1,200	$ 1,200	$ 3,254	$ -	$7
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	2			1994	60	37	$2,500	$ 5,000	$ 8,674	$ -	$81
	Air Valves	1			1994	60	37	$3,000	$ 3,000	$ 5,204	$ -	$49
Dayton Road	See Capital Plan	95	150	PVC	1991	100	74		$ -	$ -	$ -	
	See Capital Plan	215	100	AC	1960	70	13		$ -	$ -	$ -	
	Valves	1			1991	90	64	$1,200	$ 1,200	$ 3,112	$ -	$8
	Fire Hydrants	1			1960	60	3	$6,000	$ 6,000	$ 6,274	$ -	$1,971
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Arvay Road		490	150	PVC	1991	100	74	$270	$ 132,300	$ 398,150	$ -	$622
		15	150	PVC	2016	100	99	$270	$ 4,050	$ 17,685	$ -	$10
	Valves	2			1991	90	64	$1,200	$ 2,400	$ 6,224	$ -	$15
	Fire Hydrants	1			1991	60	34	$6,000	$ 6,000	$ 9,954	$ -	$110
	Blow-offs	1			2016	60	59	$2,500	$ 2,500	$ 6,018	$ -	$18
	Air Valves							$3,000	$ -	$ -	$ -	
Ires Road		100	150	PVC	1991	100	74	$270	$ 27,000	$ 81,255	$ -	$127
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Maple Road		200	150	PVC	1991	100	74	$270	$ 54,000	$ 162,510	$ -	$254
	Valves	1			1991	90	64	$1,200	$ 1,200	$ 3,112	$ -	$8
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1991	60	34	$2,500	$ 2,500	$ 4,147	$ -	$46
	Air Valves							$3,000	$ -	$ -	$ -	
Bigwood Road		95	100	PVC	1991	100	74	$250	$ 23,750	$ 71,474	$ -	$112
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1991	60	34	$2,500	$ 2,500	$ 4,147	$ -	$46
	Air Valves							$3,000	$ -	$ -	$ -	
McEachren Road		95	100	PVC	1991	100	74	$250	$ 23,750	$ 71,474	$ -	$112
	Valves	1			1991	90	64	$1,200	$ 1,200	$ 3,112	$ -	$8
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1991	60	34	$2,500	$ 2,500	$ 4,147	$ -	$46
	Air Valves							$3,000	$ -	$ -	$ -	
Willow Street		635	150	PVC	1991	100	74	$270	$ 171,450	$ 515,970	$ -	$806
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants	3			1991	60	34	$6,000	$ 18,000	$ 29,862	$ -	$331
	Blow-offs	1			1991	60	34	$2,500	$ 2,500	$ 4,147	$ -	$46
	Air Valves	1			1991	60	34	$3,000	$ 3,000	$ 4,977	$ -	$55
Holly To Tank		365	300	PVC	1977	100	60	$360	$ 131,400	$ 321,039	$ -	$935
								$360	$ -	$ -	$ -	
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Darnley Road		640	150	PVC	1995	100	78	$270	$ 172,800	$ 551,944	$ -	$727
								$360	$ -	$ -	$ -	
	Valves	8			1995	90	68	$1,200	$ 9,600	$ 26,422	$ -	$54
	Fire Hydrants	2			1995	60	38	$6,000	$ 12,000	$ 21,130	$ -	$186
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves	1			1995	60	38	$3,000	$ 3,000	$ 5,282	$ -	$47
Highland Road		625	150	PVC	2006	100	89	$270	$ 168,750	$ 634,924	$ -	$529
	Valves	2			2006	90	79	$1,200	$ 2,400	$ 7,781	$ -	$10

Road Name	Appurtenances	Length of Pipe (m)	Pipe Size (mm)	Pipe Material	Date Installed	Expected Service Life (years)	Remaining Life (years)	Unit rate	2017 Replacement Cost	Future Replacement Cost	Actual Reserves	Annual Contribution Required
	Fire Hydrants	3			2006	60	49	$6,000	$ 18,000	$ 37,334	$ -	$184
	Blow-offs							$2,500	$ -	$ -	$ -	
	Air Valves							$3,000	$ -	$ -	$ -	
Fern Road		75	100	AC	1960	70	13	$250	$ 18,750	$ 22,754	$ -	$1,228
	Valves							$1,200	$ -	$ -	$ -	
	Fire Hydrants							$6,000	$ -	$ -	$ -	
	Blow-offs	1			1960	60	3	$2,500	$ 2,500	$ 2,614	$ -	$821
	Air Valves							$3,000	$ -	$ -	$ -	
Stamp River Intake and Pump Station		1	No Longer In Use		1959	55	-3		$ -	$ -		
North Reservoir		1			1996	70	49	$250,000	$ 250,000	$ 518,533	$ -	$2,561
North Reservoir Pump Station		1			2011	30	24	$150,000	$ 150,000	$ 214,425	$ -	$4,527
Old South Reservoir		1			1973	70	26	$500,000	$ 500,000	$ 736,355	$ -	$13,526
New South Reservoir		1			2013	70	66	$750,000	$ 750,000	$ 2,003,642	$ -	$4,445
Darnley Road Pump Station		1			2006	30	19	$150,000	$ 150,000	$ 199,043	$ -	$6,154
Strick Road Pump Station		1			2014	50	47	$650,000	$ 650,000	$ 1,308,631	$ -	$7,148
Water Meters & Service Connections		990			2014	30	27	$500	$ 495,000	$ 739,926	$ -	$12,707
								Totals	$ 14,203,330	$ 28,521,642	$ -	$ 611,186
										Number of Serviced Parcels		990
										Annual Cost per Parcel		**$617**

REGIONAL DISTRICT OF ALBERNI-CLAYOQUOT
BYLAW NO. F1132

A Bylaw to Impose Development Cost Charges for the Beaver Creek Water System Local Service Area

WHEREAS pursuant to the Local Government Act, where a Board has the responsibility of providing a service in a participating municipality, the Board may, by bylaw, impose development cost charges;

AND WHEREAS Bylaw No. E1054 being "A bylaw to establish a local service area within a portion of Electoral Area "E" (Beaver Creek) to provide for the supply, conveyance, storage and distribution of water to the Beaver Creek Community" was adopted by the Regional District Board on the 13th day of June 2012;

AND WHEREAS the development cost charges imposed by this Bylaw are for the purpose of providing funds to assist the Regional District to pay the capital cost of providing, altering or expanding water facilities to service directly or indirectly, development in respect of which the charges are imposed;

AND WHEREAS the Regional District is authorized to construct the facilities for which development cost charges are imposed under this Bylaw;

AND WHEREAS the Board of the Regional District has taken into consideration:
a) future land use patterns and development; and
b) the phasing of waterworks and services
in the Local Service Area;

AND WHEREAS the Board of the Regional District considers that the development cost charges imposed by this Bylaw:
a) are not excessive in relation to the capital cost of prevailing standards of service; and
b) will not deter development; and
c) will not discourage the construction of reasonably priced housing or the provision of reasonably priced serviced land
in the Local Service Area;

AND WHEREAS this Bylaw requires the approval of the Inspector of Municipalities prior to adoption;

NOW THEREFORE, the Board of Directors of the Regional District of Alberni-Clayoquot in open meeting assembled enacts as follows:

1. Definitions:

"Dwelling, Single Family" means a detached building or mobile home containing one dwelling unit used or intended for residential use.

"Dwelling Unit" means a self-contained unit consisting of one or more rooms designed occupied or intended for occupancy as a separate household with sleeping, sanitary and cooking facilities.

"Service Area" means that local service area within a portion of Electoral Area "E" (Beaver Creek) of the Regional District of Alberni-Clayoquot located within the local service area created under Bylaw No. E1054 being "A Bylaw to Impose Development Cost Charges for the Beaver Creek Water System Local Service Area Bylaw No. F1132, 2017" as amended from time to time.

2. This Bylaw applies to subdivisions and development in the Beaver Creek Water system Service Area.

3. Every person who obtains, in the local service area:

   a) an approval of the subdivision of a parcel of land under the Land Title Act or the Strata Property Act, or;
   b) A building permit, whose value of the work authorized by the permit exceeds fifty thousand dollars ($50,000), authorizing the construction, alteration or extension of a building that will, after the construction, alteration or extension

      1) Contain two or more self contained dwelling units; and
      2) Be put to no other use than the residential use in those dwelling units;

   shall pay the applicable development cost charges as set out in schedule 'A' to the Regional District of Alberni-Clayoquot at the time of approval of the subdivision or the issuance of a building permit, whichever the case may be.

   c) a building permit authorizing the construction, alteration or extension of a building or structure

   except where

      a) the permit authorizes the construction, alteration or extension of a building or part of a building that is, or will be after the construction, alteration or extension, exempt from taxation under the Local Government Act, or
      b) the permit authorizes the construction, alteration or extension of a building or part of a building that will, after the construction, alteration or extension
         i.) contain less than four (4) dwelling units, and
         ii.) be put to no other use other than the residential use of those dwelling units, or
      c) the value of the work authorized by the permit does not exceed $50,000.00 or any other amount the Minister may, by regulation, prescribe,

   must pay to the Regional District of Alberni-Clayoquot at the time of approval of the subdivision or the issuance of a building permit, whichever the case may be, the applicable development cost charges prescribed in Schedule 'A' of this bylaw.

4. This bylaw comes into effect on _____, 2017.

5. This bylaw may be cited as **the "A Bylaw to Impose Development Cost Charges for the Beaver Creek Water System Local Service Area Bylaw No. F1132, 2017"**

Read a first time this	day of	2017
APPROVED BY THE INSPECTOR OF MUNICIPALITIES THIS	day of	2017
Read a second time this	day of	2017
Read a third time this	day of	2017
ADOPTED this	day of	2017

Certified true and correct copy of **"A Bylaw to Impose Development Cost Charges for the Beaver Creek Water System Local Service Area Bylaw No. F1132, 2017"**

The Corporate seal of the Regional District of Alberni-Clayoquot was hereto affixed in the presence of:

Wendy Thomson
Acting Chief Administrative Officer

John Jack
Chairperson

Schedule 'A'

Development cost charges payable under this bylaw are:

Type of Development	Upon Subdivision
Residential Dwelling, Single Family	$5,023 per parcel created for one dwelling unit
Residential Dwelling, Single Family (duplex)	$10,046 per parcel created for two dwelling units
Residential Dwelling, Single Family (triplex)	$15,069 per parcel created for three dwelling units
Residential Dwelling, Single Family (four plex)	$20,092 per parcel created for four dwelling units
Residential Dwelling, Multi Family	$4,186 per dwelling unit permitted to be constructed under zoning; or
Commercial	$18.80 per gross floor area, m2
Institutional	$23.00 per gross floor area, m2
Industrial	$94,188 per gross site area, m2

ALBERNI-CLAYOQUOT
REGIONAL DISTRICT

3008 Fifth Avenue, Port Alberni, B.C. CANADA V9Y 2E3 Telephone (250) 720-2700 FAX: (250) 723-1327

REQUEST FOR DECISION

To: Beaver Creek Water Advisory Committee

From: Andrew McGifford, CPA, CGA Manager of Environmental Services

Meeting Date: June 7, 2017

Subject: Beaver Creek Water System - Bylaw to Impose Development Cost Charges

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Recommendation:

THAT the Beaver Creek Water Advisory Committee recommend that the Board of Directors adopt a Development Cost Charge bylaw for the Beaver Creek Water System following the "Development Cost Charge - Best Practices Guide" as recommended by the Ministry of Community, Sport and Cultural Development.

Desired Outcome:

To have a fair Development Cost Charge (DCC) applied on new developed lands within the service area.

Summary:

Koers & Associates Engineering Ltd. provided the attached technical report to support the submission to the Ministry of Community, Sport and Cultural Development ensuring the best practice are followed.

The ACRD does not currently have a water system DCC for the BCWS. The Koers report reviews current applicable projects for the applicable functions to the build-out of the total serviceable land within present BCWS boundaries with up-to-date cost estimates, estimates growth in each of the various development types, and calculates required amended charges in each DCC category. It should be noted that a development in one area of the BCWS may contribute to the need for upgrading, expanding or construction of new infrastructure in another area of the system.

DCCs represent a part of the funding required to construct the capital projects. The remainder of the required funding will come from the Regional District at large (tax payers) and possibly from senior government by way of infrastructure grant funding programs, when they are available and for which the Regional District's projects qualify for and are approved. The Regional District's contribution portion takes into account the benefit to the existing users of the local government systems, also provides an additional assistance factor to the development's share of the project costs as per the provincial government DCC Best Practice Guide.

Section 559 (2) of the Local Government Act allows local governments to use DCC to assist in the payment of capital projects associated with providing, constructing, altering, or expanding sewage, water, drainage and highway facilities, other than off-street parking facilities, and for providing and improving parkland.

The DCC Best Practices Guide has two primary objectives:

- to encourage local governments to standardize the establishment and administration of development cost charge programs; and
- to provide some flexibility to accommodate a municipality's specific circumstances.

Staff recommend that the committee concur that the board give first and second reading to the bylaw and there be a public consultation session before the end of June 2017 in order to receive public feedback and to forward this proposed bylaw to the Ministry of Community, Sport and Cultural Development for approval in July. The inspector will review and Koers will amend if required.

This is the proposed table of charges within the report:

Type of Development	Upon Subdivision
Residential Dwelling, Single Family	$5,023 per parcel created for one dwelling unit
Residential Dwelling, Single Family (duplex)	$10,046 per parcel created for two dwelling units
Residential Dwelling, Single Family (triplex)	$15,069 per parcel created for three dwelling units
Residential Dwelling, Single Family (four plex)	$20,092 per parcel created for four dwelling units
Residential Dwelling, Multi Family	$4,186 per dwelling unit permitted to be constructed under zoning; or
Commercial	$18.80 per gross floor area, m2
Institutional	$23.00 per gross floor area, m2
Industrial	$94,188 per gross site area, m2

Submitted by: _____

Andrew McGifford, CPA, CGA, Manager of Environmental Services

Approved by: _____

Wendy Thomson, Acting Chief Administrative Officer

Alberni-Clayoquot
Regional District

BEAVER CREEK WATER SYSTEM

DEVELOPMENT COST CHARGE BYLAW

TECHNICAL REPORT

June 2017

KOERS
& ASSOCIATES
ENGINEERING LTD.
Consulting Engineers

KOERS & ASSOCIATES ENGINEERING LTD.
Consulting Engineers

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June 1, 2017
1666-01 (Draft Report)

Alberni Clayoquot Regional District
3008 5th Ave
Port Alberni, B.C. V9Y 2E3

Attention: **Mr. Andrew McGifford**
Manager of Environmental Services

Re: **Beaver Creek Water System**
Development Cost Charge Bylaw - Draft Technical Report Rev 1

We are pleased to submit a pdf copy our draft report entitled Beaver Creek Water System, Development Cost Charge Bylaw, Technical Report.

The ACRD does not currently have a DCC Bylaw for the Beaver Creek Water System and this technical report will help form the basis of the new bylaw. This report has been prepared in accordance with the Development Cost Charge Best Practise Guide published by the BC government.

The DCC land-use categories identified under the DCC study are as follows;

- Single Family,
- Multi-Family,
- Commercial/Institutional, and
- Industrial & Public Use

The capital projects are derived from the Beaver Creek Water System Infrastructure Assessment, May 2017 by Koers & Associates Engineering Ltd. The DCCs are based on the development growth projections to municipal build-out based on the current OCP.

The development of this technical report is the beginning of the process in the passage of an updated DCC Bylaw. The other steps in the process include; public and development community notifications and input; bylaw readings by the Board; and bylaw approval from the provincial government.

We would be pleased to meet with you, at your convenience after your review, to discuss the findings in detail. The final report will be issued upon receipt of your comments.

Yours truly,

KOERS & ASSOCIATES ENGINEERING LTD.

Mitchell Brook, P. Eng
Project Engineer

Chris Downey, P. Eng
Project Manager

Alberni-Clayoquot Regional District

BEAVER CREEK WATER SYSTEM DEVELOPMENT COST CHARGE BYLAW

TECHNICAL REPORT -DRAFT-

June 2017

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1 INTRODUCTION

1.1 Background

The Beaver Creek Water System (BCWS) is owned and operated by the Alberni Clayoquot Regional District (ACRD). The water system is supplied from the City of Port Alberni through an interconnection between the systems at the Strick Road Pump Station.

The infrastructure owned and maintained by the ACRD includes:

i) transmissions mains,
ii) booster pump stations,
iii) reservoirs,
iv) residential water meters,
v) valves, hydrants, flushouts, air valves, and other system appurtenances,
vi) Supervisory Control and Data Acquisition (SCADA) system

The ACRD does not currently have a water system Development Cost Charge (DCC) for the BCWS. Findings detailed in this report result from the ACRD's need to establish a new DCC Bylaw for the BCWS. This report reviews current applicable projects for the applicable functions to the build-out of the total serviceable land within present BCWS boundaries with up-to-date cost estimates, estimates growth in each of the various development types, and calculates required amended charges in each DCC category. It should be noted that a development in one area of the BCWS may contribute to the need for upgrading, expanding or construction of new infrastructure in another area of the system.

DCCs represent a part of the funding required to construct the capital projects. The remainder of the required funding will come from the Regional District at large (tax payers) and possibly from senior government by way of infrastructure grant funding programs, if or when they are available and for which the Regional District's project(s) qualify for and are approved. The Regional District's contribution portion takes into account the benefit to the existing users of the municipal systems and also provides an additional assistance factor to the development's share of the project costs as per the provincial government DCC Best Practise Guide.

The proposed DCCs are to be based on growth to build-out and the resulting capital works required as identified in the infrastructure and planning documents listed in **Table 1**.

Table 1 - Relevant Infrastructure & Planning Documents

Document	Date
BCWS Infrastructure Assessment – Koers & Associates	2017

1.2 Acknowledgements

We gratefully acknowledge with thanks the assistance provided by the following Regional District staff during the course of data collection, analyses, and report preparation:

- Mr. Andrew McGifford

2 BYLAW DEVELOPMENT & IMPLEMENTATION OVERVIEW

2.1 Purpose of DCCs

Development Cost Charges (DCCs) are intended to facilitate development by providing a method to finance capital projects related to roads, drainage, sewerage systems, waterworks, and parks. They are enacted by local government bylaw, pursuant to the *Local Government Act*, RSBC 2015, c. 1. Sections 558 through 570 which are under Part 14 – Planning and Land Use Management and Division 19 – Development Cost Recovery.

Section 559 (2) of the Local Government Act allows local governments to use DCC to assist in the payment of capital projects associated with providing, constructing, altering, or expanding sewage, water, drainage and highway facilities, other than off-street parking facilities, and for providing and improving parkland.

DCCs are monies collected from developments to offset some of the infrastructure expenditures incurred to service the needs of the development while not adversely affecting existing users. The remainder of the required funding will come from the District users (tax payers) and possibly from senior government by way of infrastructure grant funding programs, if or when they are available and for which District project(s) qualify for and are approved.

DCCs allow monies to be pooled from many developments so funds can be raised to construct the necessary services in an equitable manner. Those who will use and benefit from the projects should pay infrastructure costs. Recognizing that costs should be shared amongst benefiting parties, a breakdown between existing users and new development should be provided.

The 'Development Cost Charge - Best Practices Guide' (BPG), 3rd Edition 2005 is a publication by the BC Ministry of Community Services. The objective of the BPG is to standardize general practices in the formation and administration of DCC bylaws, while allowing flexibility to meet specific needs as allowed by the Local Government Act. The BPG consists of the following two sections:

Section 1 A guidebook for councillors and administration staff responsible for developing and adopting policies.

Section 2 A technical manual detailing procedures and calculations for the technical personnel who will carry out the DCC calculations and prepare the bylaw.

DCC bylaws must be approved by the provincial government's Ministry of Community, Sport and Cultural Development. The Ministry has indicated that expedient approval of DCC bylaws will be received when prepared in accordance with the BPG. To assist Ministry staff in the review of the proposed DCC bylaw, a Ministry Submission Summary Checklist is included in the BPG. A copy of the checklist is included in this report in Appendix A. It requires finalization before attaching it to the bylaw approval package to be submitted to the Inspector of Municipalities.

DCCs are to be developed in accordance with the LGA. The BPG is based on six principles which are recommended to be followed in the development of a DCC Bylaw:

1) **Integration** – A DCC program is subordinate to the broader goals of a community.
2) **Benefiter Pays** – Infrastructure costs should be paid by those who will use and benefit from the installation of such systems.
3) **Fairness and Equity** – Costs should be distributed between existing users and new development in a fair manner.
4) **Accountability** – All information on which DCC's are based on should be accessible and understandable by stakeholders.
5) **Certainty** – The DCC program should provide both stable charges and orderly construction of infrastructure
6) **Consultative Input** – Must provide adequate opportunity for meaningful and informed input from the public and other interested parties.

Maintenance & Rehabilitation Projects

Maintenance and rehabilitation of existing infrastructure (e.g., street repairs; watermain flushing; and storm and sanitary main cleaning or repairs), and replacement due to age are not included in DCCs as per the BPG.

2.2 Exemptions, Waivers & Reductions

The LGA describes circumstances when a development can be exempt from paying (Section 561) or can have DCCs waived or reduced (Section 563). A brief overview of each is presented below.

2.2.1 Sample Exemptions

Section 561 of the Local Government Act describes circumstances when development is exempt from paying DCCs. These specific cases are:

1. Where a building permit authorizes the construction, alteration, or extension of a building, or part of a building which is solely for public worship, such as a church.
2. If a development cost charge has previously been paid for the same development unless, as a result of further development, new capital cost burdens will be imposed on the municipality.
3. If the development does not impose new capital cost burdens on the municipality, with the exception of a development cost charge imposed for the purpose referred to in section 559 (3) *[resort region employee housing]*.
4. A development authorized by a building permit that authorizes the construction, alteration or extension of a building that will, contain fewer than 4 self-contained dwelling units, and be put to no other use other than the residential use in those dwelling units. It should be noted that a **local government may**, in a development cost charge bylaw, provide that a development costs charge is payable under these circumstances.
5. The construction, alteration or extension of self-contained dwelling units in a building authorized under a building permit if
   a. each unit is no larger in area than 29 square metres, and

b. each unit is to be put to no other use other than the residential use in those dwelling units.

6. Where the value of the work covered by the building permit does not exceed $50,000.

It should be noted that under Section 563 the local government has the ability to modify the minimum area and costs associated with the items listed above in the DCC blyaw, pending ministry approval.

2.2.2 Sample Waivers & Reductions

In 2008 with the passage of Bill 27 (Local Government – Green Communities), the provincial government enacted legislation that allowed for the waiver or reduction of DCCs. This is now Section 563 of the LGA which provides municipal governments with the ability to waive or reduce DCCs within a broad range of one or more of the following classes of "eligible developments":

i. not-for-profit rental housing, including supportive living housing

ii. for-profit affordable rental housing

iii. a subdivision of small lots that is designed to result in low greenhouse gas emissions

iv. a development that is designed to result in a low environmental impact

Council may adopt further bylaw(s) that provide specific detail of the type of development that qualify(s), the amount of the waiver or reduction, and requirements that must be met in order to obtain a waiver or reduction.

The BPG states "the intent of the legislation is that the cases where the DCC is waived or reduced, the amount waived is to be entirely supported by the existing development."
By providing a waiver or reduction, council is signaling that this specific type of development is encouraged and financially supported by the local community.

2.3 Bylaw Approval Process & Stakeholder Input

When a DCC bylaw is implemented or amended, developers or those parties paying DCCs will be affected by the new charges. The BPG recommends a suitable period of notification before the new or amended DCC bylaw is in effect. This is known as a "Grace Period" (see Section 2.8 for further discussion). Newspaper articles and notices, information circulars, and verbal communications should be provided to the residents, taxpayers, and land developers, so they are aware of the proposed update, the anticipated charges, and the approximate timing of the new/amended bylaw's implementation.

The BPG recommends opportunities for stakeholder input be provided at two points during DCC bylaw development:

i. before first reading by the Council

ii. before third reading by the Council

In addition, a public information meeting is recommended between the second and third readings of the bylaw, such that stakeholders can be involved in any revision(s) of the bylaw, and concerns arising from the public meeting can be considered in any revision(s).

2.4 Service Area & Time Frame

DCC are to be charged on either a **'municipal wide'** or '**area specific'** basis. The composition of the DCC program and the resulting charges can vary significantly between the two options, which can be summarized as follows:

i. A **municipal wide** DCC applies the same rate for a particular type of land use regardless of the location of any specific development.

ii. An **area specific** DCC divides the District into separate areas based on specific features such as geographic boundaries or a municipal service boundary.

When developing the bylaw, an appropriate time frame for the DCC program has to be considered. The DCC can be established on either a "**build out**" or "**revolving**" basis. These are defined as:

i. **Build out** applies to the construction of all necessary infrastructure to accommodate development to the full extent of the Official Community Plan, which generally has a long-term time horizon of 20 to 25 years.

ii. **Revolving** applies to construction of the necessary infrastructure to accommodate development for a defined period of time, such as five, 10 or 15 years. A number of revolving time windows would be required to reach the OCP build-out.

2.5 Recoverable Costs

The BPG states recoverable DCC costs should be clearly identified in the DCC documentation and must be consistent with Ministry provisions.

Ministry policy does not consider inflation and long term debt financing eligible for DCC recovery. However, Section 566(2)(d) of the Local Government Act does allow funds in DCC reserve accounts to be used to pay for the interest and principal on a debt resulting from DCC project costs.

2.6 Municipal Assist Factor

Section 559 (2) of the Local Government Act states the purpose of DCCs is to provide funds to "assist" local government in paying the costs of infrastructure. By not allowing 100% of the growth related costs to be charged to new developments, the legislation implicitly requires an "assist factor". This assist factor is separate from the allocation of project costs between new development and existing users, which is considered on a project specific basis.

The assist factor chosen reflects the District's desire to encourage development, and is largely a political decision. Most DCC bylaws use assist factors in the 1% to 10% range. The Local Government Act requires a minimum 1% assist.

2.7 Bylaw Administration

Once the Inspector of Municipalities has granted statutory approval of the DCC bylaw and the Board has adopted it, ongoing administration will be required. This will involve collection of charges, monitoring and accounting, credits and rebates, and the process for bylaw amendment.

2.7.1 Time of Collection

Section 559 (1) of the Local Government Act states DCCs are payable at either the time of subdivision approval or at issuance of building permit. The BPG recommends charges be applied as follows:

i. **Single Family** – at the subdivision approval stage, per building parcel being created, and upon the issue of building permit authorizing the construction, alteration or extension of a building that will contain fewer than four residential units.
ii. **Multi-Family** - either at the subdivision approval stage for each dwelling unit permitted to be constructed pursuant to zoning, or upon issue of building permit per dwelling being built.
iii. **Commercial/Institutional** - upon issue of building permit based on square metre of gross building area.
iv. **Industrial** - upon issue of building permit based on hectares of lot area under development.

2.7.2 Separate Accounts

Section 566 (1) of the Act stipulates DCCs shall be deposited in a separate special DCC reserve fund. The monies collected (together with reserve fund interest) shall then be used to pay for the capital projects within the DCC program. DCC accounts should be set up in a manner that allows easy reporting of:

i. how much money has been collected from DCCs
ii. the amount of government grants, if any, received towards the capital DCC projects
iii. amounts designated as DCC “credits” or “rebates”
iv. the amount of funds representing the District’s share of project costs in the DCC program
v. interest earned
vi. under/overages
vii. identification of completed projects

2.8 Grace Period & In-Stream Applications

When a DCC bylaw is implemented or amended, it affects those parties paying DCCs. The BPG recommends a suitable period of notification before a new DCC bylaw is in effect. This is known as a “Grace Period”.

The “Grace Period” should not be confused with “In-Stream Protection”. The “Grace Period” serves to allow enough time for people to be notified of the new DCC rates as

related to building permit applications. "In-Stream Protection" seeks to provide stability for developers with an application in process during the introduction or amendment of DCCs provided the application meets certain time criteria as noted below.

2.8.1 Subdivision Applications

Section 511 of the Local Government Act provides "In-Stream Protection" for a subdivision application for a 12 month period after the DCC Bylaw is adopted if:

i. An application for a subdivision of land within a municipality has been submitted to a designated municipal officer and the applicable subdivision fee has been paid before the bylaw was adopted.

unless the applicant agrees in writing that the bylaw should have effect.

2.8.2 Building Permit, Development Permit, and Rezoning Applications

Section 568 of the LGA provides "In-Stream Protection" for building permits as well as for "precursor applications" for a building permit, a development permit and a rezoning application if:

i. A building permit authorizing that construction, alteration or extension is issued within 12 months of the date the DCC bylaw is adopted.

ii. A precursor application to that building permit is in-stream on the date the DCC bylaw is adopted.

unless the applicant for that building permit agrees in writing that the bylaw should have effect.

2.9 Credits, Rebates & Latecomers Agreement

There are no specific references to "DCC credits" or "DCC rebates" in the Local Government Act. The intent of Section 565 is that developers providing trunk services beyond the local servicing needs of the development shall have those costs deducted from the applicable DCCs payable. To implement the provisions of the legislation, the concepts of a "DCC Credit" and a "DCC Rebate" are introduced. Policies regarding when the Regional District should offer a credit versus a rebate should be carefully considered. In either case, the DCC accounting system should allow credits and rebates to be monitored and tracked.

2.9.1 Credits

The DCC program is compiled to service new development in an orderly manner. A situation is likely to arise where a developer desires to proceed with a development before the required trunk services are installed in that area. This type of development can be considered to be "out of sequence". If the Regional District cannot afford the financial burden of additional infrastructure requirements, the Approving Officer would decline the development for the present time. Alternatively, the developer can construct the necessary trunk services, in advance of the proposed timing. In this case, the "out of sequence" development would be offered a DCC credit, where the cost of constructing the required trunk works is deducted from the amount of DCCs that would have otherwise been payable. The DCC credit cannot exceed the amount of DCC payable. Should the developer submit a development by phases, each phase will be reviewed independently.

2.9.2 Rebates

The DCC program allows for facility oversizing for cost recovery, that is the difference in the capital cost between a local service and a trunk service that is 'oversized' to service lands/facilities beyond the services for each phase required for the local development area(s). Should a developer wish to proceed with a development before the trunk services fronting his property are installed, the Regional District may allow the developer to construct the necessary portion of the works to a trunk. The Regional District would then offer a DCC rebate for the incremental portion of the cost beyond the local requirement. The incremental cost portion is the cost for the 'oversizing' of the service. The rebate cannot exceed the amount of the DCC payable. Should the developer submit a development by phases, each phase will be reviewed independently.

2.9.3 Latecomers Agreement

Where a development constructs trunk works which benefit other development(s), the oversizing costs may be considered for inclusion in a Latecomers Agreement if the project is not a DCC project because it is not within the service area for which DCCs are applied. The agreement would be in accordance with the provisions of the Local Government Act. In this scenario, the development would be responsible for setting up the agreement and the costs associated to do so. The agreement would be administered by the Regional District.

2.10 Amendment Process (Minor vs Major)

The average cost of a typical unit of development should not change significantly over time except for the effects of inflation or changes in standards, provided development projections are accurate. However, periodic revision(s) of the OCP, the Regional District's financial situation, changing infrastructure needs, and other factors affecting new development that are beyond the Regional District's control, will require amendments to the DCC Bylaw. In general there are two levels of amendments; **minor** and **major.**

A **minor amendment** is generally associated with an updating based on changes in construction costs and inflationary effects. This type of bylaw amendment requires provincial statutory approval, but due to its nature is anticipated to receive expeditious Ministry approval. This amendment should be carried out no more than once a year and perhaps once every two to three years.

A **major amendment** involves a full review of the DCC methodology, including:

ii. Underlying DCC assumptions
iii. Broad policy considerations
iv. Updated development projections
v. DCC program costs
vi. Timing of proposed capital works
vii. Addition of new projects to the DCC program, when necessary
viii. Removal of completed projects or that are no longer required

In accordance with the BPG recommendation, the major amendment to the DCC bylaw should be completed once every five years.

3 DEVELOPMENT GROWTH PROJECTION

3.1 Service Area & Time Frame

3.1.1 Service Area

The Regional District's current DCC Bylaw applies DCCs to water infrastructure projects on a '**municipal wide'** basis, which means the same rate for a particular type of land is applied regardless of the location of the development in the system.

3.1.2 Time Frame

The proposed Bylaw will be based on a **'build-out'** basis for this DCC update. This means DCCs are based on the construction of the infrastructure needed to accommodate development the full extent of the Official Community Plan

3.2 Growth Projections By Land-Use

Non-residential land uses are categorized separately from residential land use for DCC bylaws. In order to keep the number of designated land uses at a practical level, it is normal practice to consider the groupings under residential, commercial/industrial, and institutional categories.

3.2.1 Residential

The current bylaw has three residential categories (Single Family and Multi-Family). Listed below is a brief description of the anticipated growth for the areas serviced by the BCWS.

Table 2 summarizes the projected unit increase for the BCWS based on current population projections identified in the 2017 Beaver Creek Water System Infrastructure Assessment of an additional 190 service connections.

Table 2 - Projected Residential Units

Service Area	Number of Units
Single Family	165
Multi Family	25
Total	**190**

3.2.2 Commercial & Institutional

The BPG recommends commercial and institutional development be charged on the basis of building floor space expressed in square metres. The Regional District has selected to charge on the basis of gross building area expressed in square metres.

Commercial land use includes the following:

- service commercial
- office commercial

- mixed commercial/residential development

Institutional use includes the following:

- government offices
- recreational facilities
- public and private schools
- colleges and universities
- hospitals including private care facilities.

Where land uses on a site are mixed, it is intended that applicable DCCs be charged on the basis of all actual uses on a site. This may include a residential and a commercial component or some other combination.

Given the limited areas zoned for commercial and institutional use in the BCWS it has been assumed that all existing commercial and institutional lands will be redeveloped prior to build out. The floor area shown in **Table 3** is based on an assumed 70% lot coverage for the land use

Table 3 - Projected Growth of Commercial and Institutional Development

Commercial Development	Institutional Development
Total Gross Floor Area (m^2)	Total Gross Floor Area (m^2)
24,540	54,600

3.2.3 Industrial

For industrial and public utility uses, which are predominantly single storey development, the BPG prefers charging on the basis of gross site area measured in hectares, which the Regional District has selected. As charges are based on single storey development, they would be increased for any additional storeys in direct proportion to the ratios of the additional floor area to the ground level floor area. It is assumed industrial/public utility developments would have an average site coverage of 60% by building area.

Industrial use includes:

- light, medium or heavy industrial uses
- warehouses
- mini-storage
- minor repair
- fabrication and storage facilities or space
- fuel storage areas.

Public utility use includes:

- BC Hydro, Fortis BC Gas, telephone, cable, and similar utility storage, distribution and plant facilities.

Given the limited areas zoned for industrial use in the BCWS it has been assumed that all existing industrial lands will be redeveloped prior to build out. The anticipated industrial development growth is shown in **Table 4**.

Table 4 – Projected Growth of Industrial Development

Industrial Development, ha
Total
3.7

A summary of the projected growth for each land use category for build out is presented in **Table 5**.

Table 5 - Projected Growth by Land-Use

Land Use	Anticipated Growth
	Total
Single Family	165
Multi Family	25
Total Dwellings	**190**
Commercial/Institutional/Industrial	
Commercial	24,540 m^2
Institutional	54,600 m^2
Industrial	3.7 ha

4 PROJECT COST ALLOCATION

4.1 Introduction

With the establishment of a list of capital projects and their estimated construction costs, the portion of the project cost attributed to development is calculated using the equation:

DCP = PC – GG – BEU – AF – RF

Where:

DCP = Development Cost Portion
PC = Project Cost
GG = Government Grants
BEU = Benefit to Existing Users
AF = Assist Factor
RF = Reserve Funds

A discussion on each category and the amounts used in this study is presented below. The Regional District's contribution to the DCC projects consists of:

i) total capital cost attributed to existing users (BEU)
ii) assist factor (AF)
iii) portion of costs associated with developments exempt from DCCs (see previous discussion under Section 2.2)

4.2 Project Costs

Project construction costs in this report are preliminary, order of magnitude, estimates based on the 2017 Beaver Creek Water System Infrastructure Assessment.

No preliminary or detail engineering design work has been completed, and as such, the costs are Class D estimates. They are suitable for project control budgets, for program planning, and to obtain approval in principle. The estimates include allowances for engineering design, tendering and construction services and construction contingencies.

No allowance has been made for Regional District internal management or legal costs. There is no allowance for long-term financing or future inflation as this is not allowable under the Local Government Act. The impact of inflation should be reviewed regularly as time and projects proceed, and project costs adjusted accordingly as part of a minor amendment to DCCs.

Costs are Class D estimates and are exclusive of GST. They are in 2017 dollars as of when the Engineering News Record Construction Cost Index (ENR CCI) was 10,530.

4.3 Government Grants

Government grants, including Federal/Provincial infrastructure funding programs and Provincial revenue sharing programs, can no longer be relied upon to provide significant funding for all types of capital improvement projects. Some grants are available for projects, particularly those which contribute towards improved public health and water

quality considerations, but sporadically for other priorities. When awarded, senior government grants can provide:

- A significant portion of study cost recovery.
- Provincial government funding up to 80% of a project cost.
- A total of 2/3rds combined assistance under Infrastructure Funding Programs supported through joint Federal/Provincial agreements.

For the purposes of this report it has been assumed that **no grant funding** will be available. In recent years given the financial constraints of the federal and provincial government and the demand on the gas tax revenue program administered by the Union of BC Municipalities these grants are becoming more difficult to obtain. However, the Regional District should continue to make every effort to obtain financial assistance toward key eligible projects as funding programs become available.

4.4 Benefit to Existing Users

Capital costs for DCC calculations must be net costs. It is recognized that most improvements within the system provide a benefit to the existing residents and users.

The percentage benefit to existing users estimated for each project has been made. The cost for each project applicable to existing users is then deducted from the project cost, after government grants are deducted, to calculate the allowable DCC recoverable portion of the project.

4.5 Municipal Assist Factor

Section 559 (2) of the Local Government Act states the purpose of DCCs is to provide funds to “assist” local government in paying the costs of infrastructure. By not allowing 100% of the growth related costs to be charged to new developments, the legislation implicitly requires an “assist factor”. This assist factor is separate from the allocation of project costs between new development and existing users, which is considered on a project specific basis.

Most DCC bylaws use assist factors in the 1% to 10% range. Under certain conditions, the assist factor is adjusted to maintain DCC rates within a perceived affordable level. When the economy is slow, a higher assist factor, such as 10%, can be used to encourage new development. With a very healthy development climate, a low assist fact, such as 1% is considered appropriate.

A 1% assist factor has been chosen for all projects.

4.6 DCC Reserve Funds

The reserve funds are the total amounts that have been collected from development and not yet spent on DCC projects. As the ACRD currently does not have a DCC program, the reserve fund is zero.

5 DCC CALCULATION

5.1 Common Unit Calculation Method

The BPG recommends DCCs be calculated using a common unit basis for each municipal service. To meet this requirement, the following common unit was applied to each land use for each municipal service:

Water Works - Costs are related using an equivalent population demand, which is based on average densities and usage for each land-use category.

6 WATER SYSTEM DCCs

6.1 Proposed Water System Works

The proposed water work projects are taken from the findings of the:

- *Beaver Creek Water Systerm Infrastructure Assessment 2017* by Koers & Associates Engineering Ltd.

Water system DCCs are to be imposed on a municipal wide basis, in keeping with the BPG.

6.2 Calculation Unit

Water system DCCs were calculated based on the common unit of equivalent population served for each land-use category. The equivalent population factors are based on the Ministry's BPG.

Table 6 shows the equivalent population data used for the water system DCC calculations.

Table 6 – Water System Equivalent Population Summary

Land Use Category	Anticipated Growth	Equivalent Population Factor	Equivalent Population
Single Family (lots)	165	2.4	396
Multi Family (units)	25	2.0	50
Commercial (m^2)	24,540	0.0090	221
Institutional (m^2)	54,600	0.011	601
Industrial (ha)	3.7	45	166
Total Equivalent Population			**1,434**

6.3 Cost Charge Calculations

Table 7 - Water DCCs lists all applicable projects and costs, and the resulting net DCC recoverable amount after subtraction of the DCC Reserve fund balance.

The DCC per water system Equivalent Population Demand (EPD) is calculated by dividing the DCC recoverable amount by the Total Equivalent Population of **1,434**.

The Water System DCC per land-use is arrived at by multiplying the DCC unit cost per EPD by the Equivalent Population Demand for each land-use.

TABLE 7
Beaver Creek Water System
Water Project List and Land-Use DCC Calculation

June 1, 2017

Project No.	Project Description	Project Cost Estimate A	Benefit to Existing Users % B	Benefit to Existing Users $ C = (A*B)	New Development D= (A-C)	Municipal Assist Factor 1% E= (D*%)	Existing User Costs F= (C+E)	Recoverable DCC G = (A-F)
W-1	Beaver Creek Rd – 7874 Beaver Creek Rd to the west end	360,000	80%	288,000	72,000	720	288,720	71,280
W-2	Drinkwater Rd	382,250	80%	305,800	76,450	765	306,565	75,686
W-3	Lamarque Rd – Wadena Rd to Kellow Rd	448,250	80%	358,600	89,650	897	359,497	88,754
W-4	Walker Rd	442,750	80%	354,200	88,550	886	355,086	87,665
W-5	Smith Rd – Lothian Rd to Lamarque Rd	385,000	80%	308,000	77,000	770	308,770	76,230
W-6	Fayette Rd – Beaver Creek Rd to Swanson Rd	437,250	80%	349,800	87,450	875	350,675	86,576
W-7	Falls St – Malabar Rd to Lugrin Rd	222,750	80%	178,200	44,550	446	178,646	44,105
W-8	Falls St – Lugrin Rd to Georgia Rd	260,000	80%	208,000	52,000	520	208,520	51,480
W-9	Georgia Rd	310,750	80%	248,600	62,150	622	249,222	61,529
W-10	Hills Rd – 6099 Hills Rd to Beaver Creek Rd	121,000	95%	114,950	6,050	61	115,011	5,990
W-11	Karen Pl – 6303 Karen Pl to Withers Rd	434,500	95%	412,775	21,725	217	412,992	21,508
W-12	Withers Rd – Karen Pl to Falls St	96,250	95%	91,438	4,813	48	91,486	4,764
W-13	Kitsuksis St, Poplar Rd and Dayton Rd	285,000	95%	270,750	14,250	143	270,893	14,108
W-14	Bainbridge Rd and Cameron Rd	171,000	95%	162,450	8,550	86	162,536	8,465
W-15	Tomswood Rd	137,500	95%	130,625	6,875	69	130,694	6,806
W-16	Holly Ave – Poplar Rd to Willow Rd	506,000	75%	379,500	126,500	1,265	380,765	125,235
W-17	Dashwood Rd – Beaver Creek Rd to Thompson Rd	236,500	75%	177,375	59,125	591	177,966	58,534
TOTAL SHORT TERM PROJECTS		**5,236,750**					**4,348,039**	**888,711**
DA-1	Maple Street, Bigwood Road, McEachren Road Area	1,500,000	50%	750,000	750,000	7,500	757,500	742,500
DA-2	Sefton Road and Nelson Avenue Area	1,200,000	50%	600,000	600,000	6,000	606,000	594,000
DA-3	Upland Road Area	540,000	50%	270,000	270,000	2,700	272,700	267,300
DA-4	Kirkpatrick Avenue Area	330,000	50%	165,000	165,000	1,650	166,650	163,350
DA-5	Donahue Road and Traves Road Area	450,000	50%	225,000	225,000	2,250	227,250	222,750
DA-6	Georgia Road Area	247,500	50%	123,750	123,750	1,238	124,988	122,513
TOTAL LONG TERM PROJECTS		**4,267,500**					**2,155,088**	**2,112,413**
	TOTALS	**$9,504,250**		**$6,472,813**	**$3,031,438**	**$30,314**	**$6,503,127**	**$3,001,123**

Notes:
Cost Estimates are based on the 2017 BCWS Infrastructure Assessment Report

Development Cost Charge per Equivalent Person	
Total DCC Recoverable Costs	$3,001,123
DCC Reserves	**$0**
Net Development Costs	$3,001,123
Total Equivalent Population	1,434
DCC per Equivalent Person	**$2,093.06**

Development Growth Projection			
Land-Use Category	**Total**	**Equivalent Population Density**	**Total Equivalent Population**
Single Family Residential, units	165	2.4	396
Multi-Family Residential, units	25	2.00	50
Commercial, m^2	24,540	0.0090	221
Institutional, m^2	54,600	0.011	601
Industrial / Public Utility, ha	3.7	45	166
	Total Equivalent Population		1,434

Equivalent Populations as per the DCC BPG

DCC Charge Calculation				
Land-Use Category	**Equiv. Pop Density**	**DCC per Equiv Pop Density**	**DCC Charge**	**DCC Unit**
SF Res	2.4	$2,093.06	**$5,023**	**per residential unit**
MF Res	2	$2,093.06	**$4,186**	**per residential unit**
Commercial	0.0090	$2,093.06	**$18.80**	**per m2 of gross building area**
Institutional	0.0110	$2,093.06	**$23.00**	**per m2 of gross building area**
Indus/Public Util	45	$2,093.06	**$94,188**	**per ha of gross site area**

6.4 Costs to Existing Users

Table 8 provides a summary of the annual cost of the DCC program to existing system users. This covers the capital works projects' percentage benefit to existing users plus the 1% municipal assist factor applied against the developers' portion of the costs. These are the total funds the Regional District needs to provide in order to carry out the DCC projects listed in the tables.

Table 8 – Existing User & Development Charges

Year	Project Costs	
	Existing Users	Development
Total Cost	**$6,503,127**	**$3,001,123**

6.5 Comparison to Current DCC Rates

Table 9 details of the proposed DCC rates by land-use

Table 9 – Summary of DCCs by Land-use

Land-Use	Proposed DCCs	
Single Family	**$5,023**	per unit
Multi-Family	**$4,186**	per unit
Commercial	**$18.80**	per gross floor area, m^2
Institutional	**$23.00**	per gross floor area, m^2
Industrial	**$94,188**	per gross site area, m^2

7 SUMMARY OF DCCs

7.1 Summary

To receive expedient approval of the amended DCC bylaw, the Ministry of Community Services publication *Development Cost Charge - Best Practices Guide* should be followed in amending the bylaw preparation, including stakeholder consultation and public notifications.

The completed 'Ministry Submission Summary Checklist' a copy of which is presented in Appendix A, should be completed and forwarded with the amended bylaw for the Ministry's review and approval.

The DCCs are established on a "Build Out" basis.

A major bylaw amendment with a full review of the DCC methodology should be completed once every five years. This report and the proposed DCC are a major amendment.

A minor bylaw amendment should be carried out once every two to three years to accommodate inflationary costs and changes in construction costs.

In-stream protection is to be provided to a completed subdivision application, and for "precursor applications" for a building permit, a development permit and rezoning applications.

Section 563 of the LGA provides municipal governments with the ability to waive or reduce DCCs within a broad range of "eligible developments".

When a DCC bylaw is implemented or amended, those parties paying DCCs will be affected by the new or amended charges. As project funding is generally arranged in the early stages of a development, sometimes even in advance of obtaining rezoning, cost increases can have a significant impact on a project's viability. As such a "grace period" is recommended before new or amended DCCs are brought in. The "grace period" is a length of time providing notification before the new or amended DCCs are adopted. The "grace period" is provided by the municipality as an acknowledgement to the development industry the impact DCCs may have on their business.

Table 7 provides a summary of the proposed DCC for each land-use category.

Table 8 provides a summary of the cost of the DCC program to existing system users.

APPENDIX A

Ministry Submission Summary Checklist

Development Cost Charge

GUIDE FOR ELECTED OFFICIALS

BRITISH COLUMBIA
Ministry of Community Services

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Introduction

It is widely accepted that growth, when facilitated by good planning, benefits communities and their economies. Local governments have come to recognize, however, that the accommodation of growth is not a cost-free exercise. Growth creates demands for the construction of new infrastructure, and the expansion of existing local services. The cost of meeting these demands is often substantial and, at times, beyond the ability of local governments to fund using existing financial resources.

The development industry understands that growth creates new demand for local government infrastructure and services. The industry also understands that local governments are not able to directly absorb all growth-related service costs, and that growth itself should assist in funding service needs. A range of development finance tools has been created to enable local governments to collect from development a portion of growth-related expenditures. Development cost charges (DCCs) represent one such tool.

The *DCC Guide for Elected Officials* is designed to increase understanding about DCCs among local government leaders. The *Guide* uses a "question & answer" format, which addresses important questions on DCCs and their use. The questions are grouped under the following headings:

- DCCs Defined;
- Establishing DCCs;
- When to Use DCCs;
- DCCs in the Broader Context;
- DCCs and Development; and,
- DCCs across British Columbia.

The *Guide* deals with the basics, or fundamentals, of DCCs.

For a more detailed review and information about the technical aspects of DCCs, please refer to the *Development Cost Charge Best Practices Guide*, a Ministry of Community Services publication available electronically through the search function of the British Columbia Government website at www.gov.bc.ca

DCCs Defined

What are development cost charges?

Development cost charges are fees that municipalities and regional districts choose to collect from new development to help pay the cost of off-site infrastructure services that are needed to accommodate growth.

Local governments are limited in the types of services they may fund using DCC revenues. Specifically, DCCs may be used to help offset costs associated with the provision, construction, alteration or expansion of:

- roads, other than off-street parking;
- sewer trunks, treatment plants and related infrastructure;
- waterworks; and,
- drainage works.

DCCs may also be collected to assist in the acquisition and development of parkland, but may not be used to pay for other types of services, such as recreation, policing, fire and library, that are affected by growth.

DCCs are applied as one-time charges against residential, commercial, industrial and institutional developments. DCCs are usually collected from developers at the time of subdivision approval in cases where such approval is required. Where subdivision approval is not required, the charges are applied at the building permit approval stage.

DCCs may be imposed on most, but not all, development that occurs in a community. The *Local Government Act* specifies that DCCs may not be levied against:

- any building which is used solely for public worship;
- developments that are subject to a land-use contract;
- a residential building which contains fewer than

four units, unless otherwise specified by the local government; and,

- developments of less than $50,000 in value, unless otherwise specified by the local government.

What is the history of DCCs in British Columbia?

The history of DCCs in British Columbia began in 1958. In that year, amendments to the *Municipal Act* were made to address the growing inability of local governments to fund growth-related works. The amendments empowered the approving officer in each municipality to reject a subdivision plan if, in the opinion of the officer, the cost to the municipality of providing the related off-site infrastructure services was excessive.

Prior to these changes, municipalities were expected to provide off-site infrastructure services to all subdivisions using tax revenues and other sources of funding. Approving officers were not permitted to reject applications on the basis of servicing costs. With the changes to the *Municipal Act*, municipalities introduced Excessive Subdivision Cost Bylaws or Impost Fees to try to recover servicing costs for new development.

Court challenges in the early 1960s resulted in impost fees being rendered invalid. Municipalities, it turned out, had the authority to reject subdivision plans on the basis of service costs, but had no authority to tie the approval of plans to the payment of impost fees. The court rulings returned municipalities to the difficult position they occupied prior to 1958. To capture the benefits from growth, municipalities had to fund, on their own, the off-site infrastructure required to accommodate the growth. If municipalities were unable to fund the infrastructure, development applications were rejected, and the benefits from growth were lost.

Further amendments to the *Municipal Act* were introduced to overcome this dilemma. In 1971, local governments were given the power to enter into land use contracts with developers. These contracts became the vehicle for imposing off-site infrastructure servicing requirements and impost fees on development within the specified contract area. The validity of imposing fees under these contracts was upheld by the courts.

Land use contracts often involved protracted negotiations and produced a patchwork of contracts, each with its own requirements and fees for development. In 1977, land use contract powers were eliminated, and the current authority to impose development cost charges was introduced.

Using DCCs, local governments (municipalities and regional districts) can apply a common set of rules and charges to all development within a community.

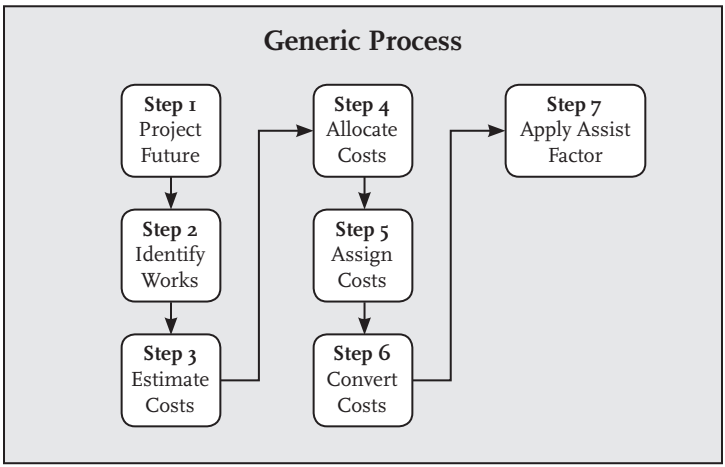
Over the past twenty-five years, court rulings and legislative changes have refined DCCs and their application in British Columbia. The fundamental principle and structure of DCCs, however, remains unchanged.

How are DCC rates calculated?

The calculation of DCCs brings together a number of pieces of information, including the:

- types, locations and amounts of growth that are projected to occur over a specified future period;
- infrastructure services required over the same period to accommodate the growth;
- estimated cost of the services;
- portion of the total cost to be paid by the existing population (which benefit from new infrastructure);
- relative impact of each type of growth on the services; and,
- degree to which the existing users assist growth in paying its share of costs.

Approaches to calculating DCCs will vary to some extent by community. It is possible, however, to outline a set of generic steps that are important to developing a DCC program. The accompanying flowchart presents a generic seven-step process. The text below the chart describes each individual step in detail.



- **STEP 1 – Project Future Growth**
  A local government begins the process by determining the amount of growth that is projected to occur over a specified future period of time (e.g., 5 years, 10 years, and 20 years). Because DCCs are applied to actual development instead of new population, the amounts of the different types of development that are expected to occur are projected. Most local governments project figures for various types of residential development (e.g., single family, townhouses, apartment), as well as commercial, industrial and institutional growth.

- **STEP 2 – Identify Required Works**
  Once growth has been projected, the local government determines the specific infrastructure works that will be required to accommodate the growth. As noted earlier, DCCs can only be collected to help fund waterworks, wastewater projects, drainage works, major roads, and acquisition and development of parkland. Other infrastructure services cannot be funded, in whole or in part, using DCC revenues, and are, therefore, not identified in the calculation.

- **STEP 3 – Estimate Infrastructure Costs**
  The infrastructure projects identified in Step 2 are costed in Step 3 of the process. For DCC purposes, the total cost estimate for each project can include a variety of separate costs that will be incurred by the local government in providing the infrastructure. Project costs related to the following activities may be included.

  - Planning
  - Engineering design
  - Land acquisition
  - Contract administration
  - Contingencies
  - Remittance of net GST
  - Public consultation
  - Right of way
  - Interim debt financing
  - Construction
  - Legal review

Long-term debt financing costs cannot be included in cost estimates for DCC projects.

- **STEP 4 – Allocate Costs to Growth/Existing Users**
  Not every project identified for DCC purposes will be required solely to accommodate growth. Most, if not all, of the identified works will be deemed to benefit, and will be required by, both growth and the existing population. Growth is expected to pay only for the portion of the works that it requires. The existing population is expected to pay for the remaining portion using other sources, such as tax and utility revenues.

  The costs of the DCC works are allocated between growth and the existing population on the basis of benefit.

- **STEP 5 – Assign Costs to Land Use Types**
  Once the infrastructure costs have been allocated between the existing population and growth, the portion attributable to growth is assigned to the various types of growth – residential, commercial, industrial, institutional – that are projected to occur. Costs are assigned in a way that reflects the relative impact of each type of development on the works required.

- **STEP 6 – Convert Costs into DCC Rates**
  The assigned infrastructure costs are converted into actual DCC rates that can be charged to individual development projects. The total cost assigned to each development type is divided by the number of development units (e.g., number of dwellings, square metres, hectares) expected over the DCC program time frame. The result is a per-unit charge that can be easily applied to individual developments as they occur.

- **STEP 7 – Apply Assist Factor**
  The final step in calculating DCCs is to apply the assist factor. The assist factor is the contribution that the existing population must provide to assist future growth in paying its portion of the DCC infrastructure costs. The assist factor is over-and-above the portion of the total infrastructure cost that is allocated to existing users in Step 4.

  The assist factor reduces the DCC rates by the specific level of assist chosen. Under the *Local Government Act*, the level chosen must be at least one percent.

What are some of the decisions that need to be made?

Over the course of the DCC establishment process, local governments are required to make certain decisions. Individually and together, these decisions give shape to the DCC program, and help to determine the specific DCC rates. Some examples of the types of decisions local governments need to make are provided below.

Time period for the DCC program
A local government must choose a future period of time over which to apply its DCC program. This choice will be influenced by the time period that has been established for the community's broader growth management framework, particularly its Official Community Plan (OCP) and servicing plans.

The OCP projects the amount and types of growth that are expected in the community over a specified future period of time. The servicing plans identify the servicing efforts that the community needs to undertake in order to provide for, and to shape, the growth that is projected to occur.

In many communities, the OCPs and servicing plans cover only a short- or medium-term future period of five to ten years. Local governments in these places are limited to the same period for their DCC programs (the required growth and infrastructure projections for longer DCC programs are not available). An increasing number of local governments are now, however, beginning to conduct detailed growth and capital planning exercises for longer periods of time, in some cases twenty years. The data available from the long-term planning efforts enable these local governments to create equally long-term DCC programs.

For a number of reasons, long-term DCC programs are considered preferable to short-term programs. Long-term programs tend to provide greater flexibility to governments in the scheduling of works, since specific works can be delayed or brought forward without upsetting the overall rate structure. Developers know that the rates charged today will remain relatively stable over a longer period of time. Longer time frames provide greater certainty to developers who wish to invest in communities.

It should be noted that local governments that extend their DCC programs over a long-term period are not "locked in" to the set of DCC rates and the specific infrastructure projects for the entire duration of the program. Like all long-term planning documents, DCC programs are regularly updated to account for changes in trends, policy objectives, inflation and other inputs. These updates provide local governments the opportunity to modify DCC programs and rates.

Use of DCC sectors
By default, a local government's DCC program applies to all new development throughout the entire community. Local governments may choose, however, to divide the community into different DCC sectors, and develop a separate DCC program for each one. Local governments may even choose to have different sets of sectors for different types of works. For example, three sectors for roads, five sectors for drainage, and so on.

The decision to establish DCC sectors will reflect, in part, a community's planning goals. A community that wishes to encourage efficient, higher density development in a town centre, for example, may create a separate town centre DCC sector for roads. The roads DCC program for this sector would allow the local government to take into account the low impact that high density housing has on roads, relative to that of additional road requirements for low density, suburban housing. The lower road DCC rates in the town sector would acknowledge the differences in impact.

The decision to establish sectors may reflect, in addition, the infrastructure projects to be developed. Some works, such as wastewater collectors, pump stations and water mains may be deemed to have a specific benefit to a defined area. The creation of DCC sectors for the funding of these works would promote the principle of equity by enabling the local government to apply the project costs directly, and solely, to the project beneficiaries. Other works, such as wastewater and water treatment plants, tend to provide a broad and equal benefit to the entire community. Separate DCC sectors would probably not be appropriate for these works.

Method of allocating costs

As noted earlier, off-site infrastructure services required to accommodate growth will often provide some benefit to the existing population. Where a dual benefit is deemed to exist, growth should not be expected to fund the entire cost of the DCC works. The existing population should, through its local government, pay its fair share, using tax or other financing sources.

Calculating the existing population's share of costs is, in some cases, an exact process. Consider a new wastewater treatment plant. Existing users will represent an exact percentage of the total number of users (including newcomers) that will ultimately be connected to the system. The actual percentage can be used to represent the existing population's share of costs.

In other cases, the local government may choose to take a different approach to allocating costs. Consider a major, 20-year road program. Any attempt to precisely determine the existing population's benefit may prove difficult. The local government may determine that the major road program will equally benefit growth and the existing population, and decide the cost for the program be split 50-50.

The decision on how to allocate costs between growth and the existing population is a choice over which a local government has considerable discretion. However, the decision should be defendable on the basis of sound and well-reasoned arguments, because it will be scrutinized by the public, development industry and reviewed by the Ministry of Community Services.

Assigning costs to land use types
Each type of development has a different impact on the off-site infrastructure services being provided. The impact of each type, relative to that of others, needs to be considered when assigning the portion of total infrastructure costs attributable to growth - costs need to be assigned to development types on the basis of relative impact.

Local governments express relative impacts in terms of "equivalent units." Equivalent units express the impact of each type of development on a service relative to that of a single-family house. The relative impacts of the different development types will vary, as might be expected, by type of service.

Different sets of equivalent units, therefore, need to be developed for each service being included in a DCC program. Various sources of data are used by local governments to help establish equivalent units. Trip generation manuals published by traffic engineering associations are often used to determine relative impacts on road networks. Water usage data, collected from water metres, can be used to help determine relative impacts on waterworks.

Assist factor
The assist factor is the contribution that the existing municipality and/or regional district must provide to help growth in meeting its service cost obligations. The assist factor is over-and-above the portion of the infrastructure cost that is allocated to the existing population. Under the *Local Government Act*, the assist factor must be at least one percent.

The assist factor may vary by type of infrastructure, but not by type of development, or by DCC sector. For example, the assist factor applied to roads may differ from the factor applied to waterworks. A common roads assist factor, however, must be applied to all types of development throughout the entire community.

The setting of the assist factor is a policy decision made by elected officials. Decision-making should take into consideration the local government's objectives in addressing issues of land efficiency, housing affordability, and community sustainability. In some communities the assist factor is used as a tool to promote certain goals, such as the development of affordable housing.

Who is involved in determining the rates?

Elected officials, staff and stakeholders have important roles to play in determining DCC rates.

Elected Officials
Municipal councils and regional district boards are responsible for the DCCs that are imposed on new development in their communities. Given this responsibility, it is important for elected officials to be involved in setting the rates.

Councils and regional district boards have some specific responsibilities. They must make decisions on a wide variety of issues – some of which have been discussed already – that arise during the DCC establishing process. In making decisions, the elected officials rely on staff to identify options, outline implications and provide recommendations.

Elected officials are also responsible for ensuring that the DCCs reflect important best practices, as well as key principles such as fairness and equity. Are the DCCs fair to both growth and existing ratepayers?

Finally, elected officials need to remain aware of their statutory obligation to consider the impact of the DCCs on development and, in particular, the development of reasonably-priced housing and serviced land.

Staff

Staff have two key responsibilities in the DCC rate-setting process. First, staff are responsible for undertaking all of the technical work required to produce, collect and assemble the data. Second, staff are responsible for advising the elected officials on the full range of issues that need to be considered. Examples of such issues include:

- the possible use of DCC sectors in place of area-wide charges;
- the time frame for the DCC program;
- the types of development to be charged under different DCC categories (e.g., should all types of development pay parkland DCCs?);
- the development units on which to base charges (e.g., dwelling unit or size of built floor space);
- the eligibility of projects and the cost components to include in determining total project cost;
- the allocation of project costs between new and existing growth; and,
- the size of the assist factor.

Staff need to bring each of these issues, along with options and recommendations, to elected officials.

An additional role for staff in the rate-setting process is to help elected officials understand DCCs. In some communities, staff begin each DCC review with a detailed briefing on the purpose of DCCs, and the issues that need to be considered by council or the regional district board.

Stakeholders

It is important for local governments to involve key stakeholders in setting DCC rates. As explained in the *DCC Best Practices Guide*, stakeholders include "all persons, groups or organizations that have a perceived, actual or potential stake or interest in the results of the decision-making process." The list of stakeholders in developing DCCs should include:

- development industry groups, such as the Urban Development Institute, the Canadian Home Builders Association, and the British Columbia Real Estate Association;
- local private sector developers;
- public sector developers such as the local School District and Health Authority;
- business groups such as the Chamber of Commerce;
- local ratepayers groups and neighbourhood associations; and,
- the general public.

Each of these stakeholders will be impacted, to some degree, by the DCC rates established. Some will be impacted directly, in that they will have to pay the rates in order to proceed with development. Others will be impacted indirectly. Existing ratepayers, for example, will be required to pay the share of infrastructure costs that is not applied to growth.

During the DCC rate-setting process, the local government needs to provide opportunities for stakeholders to become informed of the issues and options, and to participate in the decisions that are made by the elected officials. At a minimum, the local government should hold a general public information meeting to present a draft DCC bylaw. The local government could also ask interested parties to review and comment on a draft DCC program. Stakeholder forums are another method of involvement to consider.

Some local governments have developed, in conjunction with the Urban Development Institute, local government liaison committees. These committees provide a forum for government officials to meet regularly with development industry representatives to discuss important issues, including DCCs.

The appropriate degree of stakeholder involvement will depend on a number of factors, including the size of the DCC program, the potential impact of the DCC rates, the level of interest expressed by stakeholders to participate and the local government's policy with respect to stakeholder involvement in governance. In all cases, some effort to provide meaningful opportunities for participation should be made. The opportunities should be available early in the DCC setting process, before any final decisions have been made.

The *DCC Best Practices Guide* recommends at least three opportunities for stakeholder involvement in the DCC rate-setting process:

- during the development of draft DCC rates by staff;
- immediately following first reading of the DCC bylaw by council or regional district board; and,
- during the revision of the bylaw, before second reading.

How are DCCs implemented?

DCCs are implemented by bylaw. Council or the regional district board initiates the bylaw process by instructing staff, often in response to a staff recommendation, to develop a DCC bylaw or amend an existing DCC bylaw. Staff develop the bylaw with input from the elected body and stakeholders, then forwards the bylaw to council or the regional district board for first reading. After first reading, more consultation with stakeholders and the governing body is undertaken to obtain input and to determine if amendments are required. Council or the regional district board then gives the bylaw second and third reading.

After third reading, the local government forwards the bylaw and all supporting information to the Ministry of Community Services, for the review of the Inspector of Municipalities, who is required under the *Local Government Act* to review and give approval to the bylaw before fourth reading. The bylaw and supporting documents are reviewed to ensure that:

- the methodology used to determine the rates is sound and complies with all legislative requirements;
- stakeholders have been consulted; and,
- the impacts of the rates on development have been considered.

If there are no issues with the bylaw, the Inspector of Municipalities grants statutory approval and returns it to the local government. Council or the regional district board gives fourth reading to the bylaw, after which it is ready to be implemented.

There are some specific policy issues related to implementation that the local government needs to consider. One issue concerns when to collect DCCs from growth. The *Local Government Act* states that DCCs are payable either at the time of subdivision approval, or at the issuance of a building permit. For single family residential developments, local governments typically choose to collect payments at subdivision approval in order to avoid having to front-end any infrastructure costs.

For non-residential development, local governments usually collect DCCs at the time of building permit issuance. DCCs for these developments are often based on built floor space rather than dwelling unit (the total floor space to be charged can be difficult to determine at subdivision approval). With respect to multi-family development, local governments often have no choice but to collect payments at the building permit stage, since multi-family housing subdivisions are relatively infrequent, compared to single family development subdivisions.

Another policy decision for elected officials relates to the notion of a "grace period." A grace period is the period of time between the approval of the DCC bylaw and the bylaw's effective date of application. If the rates in the bylaw are significantly higher than those that were previously charged, the local government may wish to grant a substantial grace period (e.g., up to one year) to allow developers to expedite projects for which financing has already been arranged.

Finally, it should be noted that the *Local Government Act* gives some protection to "in-stream" developments. Developments that have submitted complete subdivision applications, and that have paid their subdivision

application fees, are given a 12 month exemption from new DCC rates. These developments are entitled to pay the lower existing DCCs as long as they receive final subdivision approval during the 12 month period. This in-stream protection is distinct from any grace period that the local government may choose to offer.

When to use DCCs

When are DCCs a good idea?

DCCs are best suited to situations in which expenditures on works can be delayed until the DCC funds required to help pay for the works have been collected. As growth occurs, a local government begins collecting DCCs to help fund the necessary infrastructure. If possible, the local government will choose to delay the construction of the works until sufficient DCC funds have been collected. By treating DCC funds as a source of capital for the works, the local government can avoid having to front-end construction using borrowed funds.

Infill and mixed infill-greenfield developments that can benefit from a certain level of servicing already in place are considered to be particularly well-suited to DCCs. In these situations, the local government can postpone the construction of infrastructure until growth has materialized, and sufficient DCC revenues have been collected.

When should alternatives to DCCs be considered?

Greenfield developments, which typically do not have any level of servicing in place prior to growth occurring, are not always suited to DCCs. Greenfield sites can often require a significant up-front investment in infrastructure before development occurs and before DCCs can be collected. If the required works are part of the DCC program, it is the local government that is expected to front-end the works, and then recover up-front costs from growth as it occurs.

This reliance on DCCs as a method of cost-recovery can be difficult for local government. If growth does not occur as projected, the local government may not be able to recover all of its sunk costs.

What alternatives to DCCs exist?

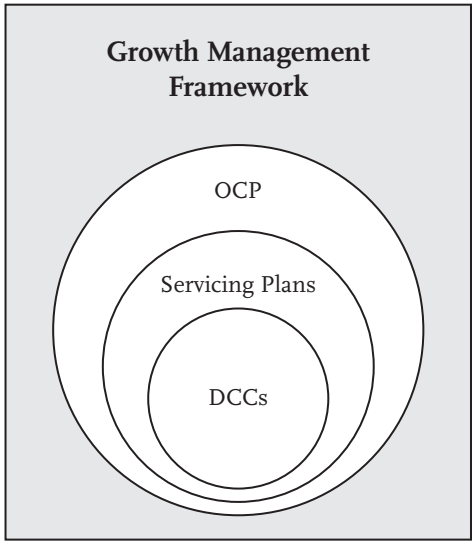
It is important to recognize that DCCs are not the only development finance tool available to local governments in British Columbia. The *Development Finance Choices Guide*, published by the Ministry of Community Services, identifies and provides advice on other development finance tools that local governments can use to help fund the cost of infrastructure required by growth. The complete list of tools includes:

- Comprehensive development agreements
- Local improvements
- Specified areas
- User fees and charges
- Short-term borrowing
- Long-term borrowing
- Latecomer charges
- Development works agreements
- DCC credits and rebates
- Density bonusing
- DCCs
- Public-private partnerships
- Public-public partnerships

DCCs are probably the most popular tool in use today, but are clearly not the only one available. The key for local governments is to determine which tool, or set of tools, should be used at any given time. Different tools are both well-suited and poorly-suited to different types of situations. Chapter 6 of the *Development Finance Choices Guide* is designed to assist local governments in choosing the right approach for any given situation.

How do DCCs fit into a local government's growth management framework?

A local government's DCC program does not exist in isolation to the community's growth management framework. On the contrary, the DCC program is a critical element of the broader planning context that includes the local government's OCP and servicing plans. The accompanying figure illustrates how these key components fit together.



The OCP presents the local government's preferred long-term development pattern, which describes:

- where future growth will be encouraged;
- where growth will not be encouraged;
- what types of development (e.g., mixed-use, high density residential) will be encouraged; and,
- what types of development (e.g., low density residential) will not be encouraged.

The local government's servicing plans identify the specific types and amounts of infrastructure that are required to bring the preferred development pattern to fruition. Servicing plans are normally created for

all major types of local infrastructure, such as roads, waterworks, sewerage and drainage systems, as well as for parkland.

The local government's DCC program contains the individual works, identified in the servicing plans that are required to accommodate growth. The cost of each of the works is allocated in the program between growth and the existing population. The portion allocated to growth forms the basis of the DCC rates.

What is the importance of good planning to DCCs?

The OCP's preferred development pattern is a direct reflection of the local government's growth management objectives. Many local governments have adopted what are typically referred to as "smart growth" objectives. Smart growth emphasizes the importance of environmentally-sustainable and economically-efficient development, characterized by compact urban forms, high density, mixed-use developments and an increased reliance on alternative modes of transportation.

Development patterns that are based on smart growth objectives are less expensive to service than patterns which encourage low density, spatially-dispersed growth. The higher servicing costs associated with traditional low density "sprawl" result in higher DCCs.

How can DCCs be structured to promote smart growth objectives?

DCCs are collected from growth to help pay the cost of services required to accommodate the growth. Existing data demonstrate that the overall cost of providing services to compact, medium, or high density, mixed-use development is lower than the cost of servicing traditional low density, suburban development. DCCs can be structured to recognize the differences in service

costs, and to provide an incentive for smart growth developments. DCC sectors and density gradients are two mechanisms that can be used to achieve the desired effect.

DCC sectors can be established to separate compact, high density development areas from other parts of the community.

Infrastructure projects that are deemed to have no benefit to the growth within these sectors can be excluded from the sectors' DCC programs. The exclusion of such projects results in lower DCC rates.

Major (costly) trunk extensions and arterial roads required to service outlying development areas are examples of the types of projects that can be excluded from smart growth DCC sectors. Development that occurs in these sectors is not required to pay toward the cost of these projects.

Density gradients differentiate among developments on the basis of density rather than type of growth. Gradients are created to take advantage of the inverse relationship that exists between the density of a development and its impact on key services. In general, the lower the density of a development, the higher the impact of that development on the cost of providing water, wastewater and road infrastructure. Applying density gradients to growth serves to lower the DCC rates payable by higher density projects.

Most local governments with DCCs make use of a two-level residential density gradient that differentiates between single family and multi-family developments. Some local governments have four-level residential gradients that account for the different impacts of large- and small-lot single family dwellings, and of low-rise and high-rise apartment buildings.

Do DCCs deter development?

The total cost of developing a piece of land in a community can be broken into various individual components. The price of the land is one component, as is the cost of construction materials, the price of labour and the developer's return on investment, or the development's profit. DCCs – the cost of providing off-site infrastructure services to the land – represent another component. As the individual cost components change, so does the total cost of the development. Steep increases in individual costs can result in an overall cost that the market is unwilling to support. In such cases, development will be deterred.

DCCs, as one cost component, do affect the overall cost of development. A significant increase in DCCs could push the total cost above the level that the market is willing to pay, and could discourage development. The size of the DCC increase required to generate this result depends, in large part, on the magnitude of the other cost components. In markets where DCCs comprise a relatively large part of the total cost, changes in rates may have a considerable impact on development decisions.

The potential for DCCs to deter development is an important point for local governments to consider. In setting DCC rates, local governments need to recognize that the decisions they make will influence the overall cost of development in the community. Careful consideration needs to be given to the:

- amount of future infrastructure required (is it reasonable?);
- infrastructure cost projections (are they fair?);
- methods of allocating costs between growth and the existing population (is the split equitable?);

- rates charged to different sectors (do smart growth and infill developments pay in accordance with their lower relative impact on works, or do they subsidize greenfield projects?);
- need for a grace period (do developers need time to adjust to new rates?); and,
- assist factor (do the final rates need to be adjusted?).

The potential for DCCs to deter development should focus a local government's attention on the need to establish DCCs that are fair and reasonable. If DCCs have the potential to adversely impact development, local officials should consider the wider range of development finance tools that may be used in place of, or in addition to, DCCs. These are described in the *Development Finance Choices Guide*.

DCCs Across British Columbia

Who uses DCCs in British Columbia?

DCCs are a popular development finance tool in British Columbia. In high growth areas, such as the Lower Mainland, parts of Vancouver Island and the Central Okanagan, DCCs are quite common. The widespread use of DCCs in these regions reflects the strong demand for infrastructure to accommodate ongoing development. In regions characterized by more modest growth, DCCs are slightly less popular, but are still used. For example, several local governments in the Central Interior and Kootenay regions of the province have DCC bylaws in place.

Who charges what?

Comparisons of rates across communities are inherently problematic, in part because of differences in growth pressures and infrastructure needs, but also because of differences in the way that individual DCC programs are constructed. Local governments have considerable flexibility in setting DCC rates. The rates that are ultimately determined in any one jurisdiction will reflect that local government's decisions related to a wide variety of inputs, including the costing of works, the existing population's share of total infrastructure costs, the use of DCC sectors, the assignment of costs among development types, the units on which to base charges and the municipal assist factor. The rates will also reflect the local government's decision to use other development finance tools in place of, or in addition to, DCCs.

Notwithstanding the problems inherent with cross-jurisdictional DCC comparisons, elected officials may appreciate the opportunity to review the approaches taken in other communities. The table on the following page provides a general sense of current DCCs across British Columbia, specifically for residential development.

It should be noted that the figures presented in the table have been rounded-off, and certain assumptions have been made (see "comments" column) in order to generate comparable data.

For a list of detailed rates, as they apply to all types of development throughout each of the centres listed, the local government should be contacted directly. The Ministry of Community Services can also provide a list of DCCs being applied throughout the province.

Residential DCCs across BC – January 2004

Jurisdiction	SFR*	MFR*	Comments
Abbotsford	$ 13,700	$ 7,600	
Burnaby	$ 7,450 - $ 7,850	$ 5,000 - $5,400	both include GVS&DD charge; assumes 100m² MFR unit; high rate in Edmonds Town Centre
Castlegar	$ 4,800	$ 3,620	
Coquitlam	$ 14,500	$ 10,400	both include GVS&DD charge; assumes medium density MFR
Kelowna	$ 9,900 - $ 17,300	$ 7,500 - $ 13,000	lower rates are for City Centre; higher rates for outlying area
Langford	$ 6,100	$ 4,800	includes CRD water DCC; assumes medium density MFR
Nanaimo	$ 9,000	$ 6,000	assumes 100m² MFR unit; DCCs recently eliminated for City Centre
Parksville	$ 2,800 - $ 7,000	$ 5,000 - $ 5,500	ranges over sectors; assumes 100m² MFR unit
Prince George	$ 3,410	$ 1,900	core area; medium density MFR
Richmond	$ 14,300	$ 11,400	both include GVS&DD charge; assumes medium density MFR
Sidney	$ 970 - $ 3,225	$ 970 - $ 3,225	range for both types over sectors
Surrey	$ 21,000	$ 6,000 - $13,200	both include GVS&DD charge; medium density 100m² MFR unit assumed; low rate in City Centre

*Figures provided are per dwelling unit. SFR – Single Family Residential, MFR – Multi-family Residential, GVS&DD – Greater Vancouver Sewerage and Drainage District, CRD – Capital Regional District

Closing Comments

DCCs are a popular tool of development finance that can help a local government achieve its growth management and financial objectives, while at the same time promoting and supporting growth.

When considering DCCs, local government officials are encouraged to keep in mind certain guiding principles that have been addressed in this *Guide*. These principles are summarized below.

- **DCCs represent one choice.**
  DCCs represent one of the tools available to local governments in the provision of growth-related infrastructure. The *Development Finance Choices Guide* introduces and provides advice on other development finance tools. Certain tools are better suited than others to different development situations. Local government officials need to explore all options before choosing which tools to use.

- **DCCs should support broader growth management objectives.**
  DCCs are an integral component of the local government's growth management framework. They should be developed and applied in ways that support, rather than undermine, the broader growth management objectives.

- **Fairness and equity are critical in a DCC program.**
  Those who require and benefit from municipal infrastructure should pay their fair share of the cost of providing the infrastructure. DCC rates, and the decisions on which they are based, need to be fair and equitable to the various types of growth that are projected to occur, and to existing taxpayers.

- **Transparency in the rate-setting process is required.** DCCs will be scrutinized by the public, the development industry and reviewed by the Ministry of Community Services. Local government decisions related to project costs, allocation of costs, use of sectors, the assist factor and other issues should be well-reasoned and explained.

- **DCCs should be current.** Local governments should regularly update their DCC bylaws to ensure that the rates reflect changes to infrastructure needs and project costs, as well as changes to important growth management objectives. At the same time, notwithstanding the need for regular updates, developers do expect a certain degree of stability in rates over time. Major changes to DCC programs may create uncertainty and discourage development.

- **Stakeholder input is important.** DCCs impact many different organizations and individuals, including the development industry and existing ratepayers. All parties that may be affected by a DCC program should be afforded meaningful opportunities to participate in the DCC decision-making process.

For More Detailed Information

Ministry Best Practice Guides

Development Cost Charges Best Practices Guide
Development Finance Choices Guide
Available electronically through the search function of the British Columbia Government website at: www.gov.bc.ca

Or call

Ministry of Community Services
Intergovernmental Relations
and Planning Division 1-250-387-3394

Ministry of Community Services
Infrastructure and Finance Division 1-250-387-4060

Toll Free through Enquiry BC
In Vancouver call: 1-604-660-2421
Elsewhere in BC call: 1-800-663-7867

From	To	Sportsman Road	Holly & Darney	Kitsuksis	North Reservoir	Strict Road	
February 23, 2013	April 23, 2013	24,100	2,331	1,009	16,113	-	
April 24, 2013	May 24, 2013	24,100	-	-	-	-	
April 25, 2013	June 21, 2013	24,100	2,810	268	18,499	-	
June 22, 2013	July 24, 2013	24,100	-	-	-	-	
June 22, 2013	August 22, 2013	24,100	2,454	214	17,554	-	
July 25, 2013	August 23, 2013	24,100	-	-	-	-	
August 23, 2013	October 23, 2013	24,100	1,698	222	17,436	-	
September 25, 2013	October 24, 2013	24,100	-	-	-	-	
October 24, 2013	December 23, 2013	24,100	2,069	805	18,658	-	
December 24, 2013	February 24, 2014	24,100	2,838	1,086	18,704	-	**GRAND TOTAL**
	TOTALS	**241,000**	**14,200**	**3,604**	**106,964**	**-**	**365,768**
							kWh

From	To	Sportsman Road	Holly & Darney	Kitsuksis	North Reservoir	Strict Road	
December 23, 2015	February 23, 2016	-	2,665	953	18,421	11,065	
February 5, 2016	March 28, 2016	-	-	-	-	11,666	
February 25, 2016	April 26, 2016	4,367	2,031	695	17,416	11,849	
April 28, 2016	May 26, 2016	-	-	-	-	8,427	
April 26, 2016	June 22, 2016	3,174	2,193	191	13,156	8,667	
June 25, 2016	July 26, 2016	-	-	-	-	10,341	
June 23, 2016	August 23, 2016	3,071	1,951	131	14,178	11,425	
August 26, 2016	September 26, 2016	-	-	-	-	9,031	
August 24, 2016	October 26, 2016	3,391	1,446	302	13,797	7,945	
October 27, 2016	November 25, 2016	-	-	-	-	8,187	
October 25, 2016	December 22, 2016	-	1,877	794	13,981	9,388	**GRAND TOTAL**
	TOTALS	**14,003**	**12,163**	**3,066**	**90,949**	**107,991**	**228,172**
							kWh

	Difference @ current rate	Cost of Power 2013 consumption @ $.0928	Cost of Power 2013 consumption @ $.1116	Cost of Power 2016 consumption @ $.0930	Cost of Power 2016 consumption @ $.1116	% Decrease in power use
	137,596	38,135	45,861	23,789	28,609	37.62%
current rate	$ 0.1116					
Rate rider 5%	$ 767.79					
PST	$ 1,128.64					
	$ 17,252.14					

From	To	Sportsman Road	Holly & Darney	Kitsuksis	North Reservoir	Strict Road	
February 23, 2013	April 23, 2013	24,100	2,331	1,009	16,113	-	
April 24, 2013	May 24, 2013	22,760	-	-	-	-	
April 25, 2013	June 21, 2013	21,382	2,810	268	18,499	-	
June 22, 2013	July 24, 2013	27,830	-	-	-	-	
June 22, 2013	August 22, 2013	-	2,454	214	17,554	-	
July 25, 2013	August 23, 2013	35,347	-	-	-	-	
August 23, 2013	October 23, 2013	29,652	1,698	222	17,436	-	
September 25, 2013	October 24, 2013	23,522	-	-	-	-	
October 24, 2013	December 23, 2013	-	2,069	805	18,658	-	
December 24, 2013	February 24, 2014	82,252	2,838	1,086	18,704	-	**GRAND TOTAL**
	TOTALS	**266,845**	**14,200**	**3,604**	**106,964**	**-**	**391,613**
							kWh

From	To	Sportsman Road	Holly & Darney	Kitsuksis	North Reservoir	Strict Road	
December 23, 2015	February 23, 2016	-	2,665	953	18,421	11,065	
February 5, 2016	March 28, 2016	-	-	-	-	11,666	
February 25, 2016	April 26, 2016	4,367	2,031	695	17,416	11,849	
April 28, 2016	May 26, 2016	-	-	-	-	8,427	
April 26, 2016	June 22, 2016	3,174	2,193	191	13,156	8,667	
June 25, 2016	July 26, 2016	-	-	-	-	10,341	
June 23, 2016	August 23, 2016	3,071	1,951	131	14,178	11,425	
August 26, 2016	September 26, 2016	-	-	-	-	9,031	
August 24, 2016	October 26, 2016	3,391	1,446	302	13,797	7,945	
October 27, 2016	November 25, 2016	-	-	-	-	8,187	
October 25, 2016	December 22, 2016	-	1,877	794	13,981	9,388	**GRAND TOTAL**
	TOTALS	**14,003**	**12,163**	**3,066**	**90,949**	**107,991**	**228,172**
							kWh

	Difference @ current rate	Cost of Power 2013 consumption @ $.0928	Cost of Power 2013 consumption @ $.1116	Cost of Power 2016 consumption @ $.0930	Cost of Power 2016 consumption @ $.1116	% Decrease in power use
	163,441	40,830	49,101	23,789	28,609	41.74%
current rate	$ 0.1116					
Rate rider 5%	$ 912.00					
PST	$ 1,340.64					
	$ 20,492.66					