



REGIONAL DISTRICT OF NORTH OKANAGAN

GREATER VERNON WATER 2012 MASTER WATER PLAN STAKEHOLDER ADVISORY COMMITTEE MEETING

Thursday, March 17, 2016

8:00 am at the Regional District of North Okanagan, Boardroom

REGULAR AGENDA

A. APPROVAL OF AGENDA

1. **Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee – March 17, 2016**

(Opportunity for Introduction of Late Items)

RECOMMENDATION 1

That the Agenda of the March 17, 2016 Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee meeting be approved as presented.

B. ADOPTION OF MINUTES

1. **Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee – February 29, 2016**

RECOMMENDATION 2

Page 1

That the minutes of the February 29, 2016 Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee meeting be adopted as circulated.

C. DELEGATIONS

D. UNFINISHED BUSINESS

1. **Greater Vernon Water 2012 Master Water Plan – Options Discussion** Page 5
 - Consultant to provide detailed summaries of Options 1, 2, 3 and 5 for discussion.
 - Continued discussion on choosing an Option from the remaining 1, 2, 3 or 5.
 - Review of revised Benefit to Cost Ratio spreadsheet.
-

E. NEW BUSINESS

1. Review of Technical Memorandum No. 8 – Greater Vernon Water Financial Issues and Principles to Support the Master Water Plan

- Technical Memorandum No. 8 Summary **Page 7**
 - David Main, P.Eng. with AECOM will provide a presentation on Technical Memorandum No. 8, Greater Vernon Water Financial Issues and Principles to Support the Master Water Plan. **Page 11**
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2. SAC Question and Answer Paper #7 **Page 20**

- Questions submitted via email since the February 29, 2016 SAC meeting.
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F. BUSINESS ARISING FROM DELEGATIONS

G. REPORTS

H. ADJOURNMENT



REGIONAL DISTRICT OF NORTH OKANAGAN

MINUTES of a **REGULAR** meeting of the **GREATER VERNON WATER 2012 MASTER WATER PLAN STAKEHOLDER ADVISORY COMMITTEE** of the **REGIONAL DISTRICT OF NORTH OKANAGAN** held in the Boardroom at the Regional District Office on Monday, February 29, 2016.

Members:	Alternate Director J. Garlick	District of Coldstream	Chair
	Director J. Cunningham	City of Vernon	Vice Chair
	D. Gibbs	Tekmar Control Systems Representative	
	D. Frost	Vernon Jubilee Hospital Representative	
	T. Mooney	Citizens for Changes to the Master Water Plan Representative	
	A. Mohammad	Agricultural Representative	
	M. Witt	Agricultural Representative	
	D. Neden*	Residential Representative	
	R. Foisy	Residential Representative	
	M. Carlson	Residential Representative	
	J. Lainsbury	Residential Representative	
	M. Hubbs-Michiel	Residential Representative	
	D. Bodenham	Residential Representative	
	P. Williamson	Residential Representative	
Staff:	Z. Marcolin	Manager, Greater Vernon Water	
	P. Juniper*	Deputy Corporate Officer	
	D. Douglas	Clerk, Engineering	
Also Present:	B. deWynter	AECOM	
	Director D. Dirk	District of Coldstream	
	M. Baker	District of Coldstream, Director of Infrastructure Services	
	J. Kidston	Agricultural Representative, Greater Vernon Advisory Committee	

* Denotes presence for part of meeting

CALL MEETING TO ORDER

The meeting was called to order at 3:33 p.m.

APPROVAL OF AGENDA

Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee – February 29, 2016

Moved and seconded by Representatives Asif and Hubbs-Michiel
That the Agenda of the February 29, 2016 Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee meeting be approved as presented.

CARRIED

ADOPTION OF MINUTES

Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee – February 25, 2016

Moved and seconded by Representatives Witt and Frost
That the minutes of the February 25, 2016 Greater Vernon Water 2012 Master Water Plan Stakeholder Advisory Committee meeting be adopted as circulated.

CARRIED

UNFINISHED BUSINESS

Greater Vernon Water 2012 Master Water Plan – Option Evaluations Using Non-Cost Considerations

The Chair advised that all Stakeholder Advisory Committee correspondence should be circulated to the entire Committee including the Chair, Vice Chair and Regional District of North Okanagan staff to ensure transparency of the process.

B. deWynter provided a presentation on the Options selection, Net Present Value (NPV) and the Benefit to Cost Ratio.

The Chair requested the Committee vote to remove some of the Options from the list to consider in the Greater Vernon Water Master Water Plan Financial Planning Stage in order to simplify the financial planning exercise. The following recommendations were made:

Moved and seconded by Representatives Frost and Hubbs-Michiel
That Options 4, 6, 7 and 8 be removed from the Options list based on the highest capital cost with lowest non-cost benefit ratio and not be considered in the Financial Planning Stage for the Stakeholder Advisory Committee review of the Greater Vernon Water 2012 Master Water Plan.

Moved and seconded by Representatives Neden and Lainsbury to amend the motion as follows:
That Options 5 and 9 also be removed.

DEFEATED

**Opposed: Representatives Gibbs, Foisy, Frost,
Williamson, Bodenham, Mooney**

Moved and seconded by Representative Mooney and Bodenham to amend the motion as follows:
That Option 7 be retained.

DEFEATED

**Opposed: Representatives Gibbs, Neden, Williamson,
Hubbs-Michiel, Witt, Lainsbury, Mohammad, Foisy, Carlson, Frost**

Moved and seconded by Representatives Mohammad and Hubbs-Michiel to amend the motion as follows:

That Option 9 be removed.

CARRIED

Opposed: Representatives Foisy, Frost, Gibbs, Bodenham

The main motion as amended was adopted with the final wording being as follows:

That Options 4, 6, 7, 8 and 9 be removed from the Options list based on the highest capital cost with lowest non-cost benefit ratio and not be considered in the Financial Planning Stage for the Stakeholder Advisory Committee review of the Greater Vernon Water 2012 Master Water Plan.

CARRIED

Representative Mohammad requested that a representative from Interior Health be at the next meeting.

Representative Gibbs requested that a detailed description of the remaining Options (1, 2, 3 and 5) be provided at the next meeting.

ADJOURNMENT

There being no further business, the meeting was adjourned at 4:56 p.m.

CERTIFIED CORRECT

Chair
Jim Garlick

Zee Marcolin
Manager – Greater Vernon Water

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GROUP 1

Categories	Benefit	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
S - Supply (water sources)		6	8	5	3	9	1	2	4	7
O - Operation (Treatment & Distributions System)		2	6	8	4	9	1	3	7	5
Q - Quality (of finished product)		6	7	4	1	8	2	5	3	9
P - Project (that are required to build the system)		9	7	5	6	8	1	3	2	4
TOTAL		23	28	22	14	34	5	13	16	25
Weighted average		4.7	6.9	6	3.3	8.7	1.2	3.1	4.8	6.3

GROUP 2

Categories	Benefit	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
S - Supply (water sources)		7	8	9	3	4	2	1	6	5
O - Operation (Treatment & Distributions System)		7	8	9	5	4	1	2	6	3
Q - Quality (of finished product)		6	5	4	3	9	8	1	2	7
P - Project (that are required to build the system)		9	8	7	4	5	1	2	3	6
TOTAL		29	29	29	15	22	12	6	17	21
Weighted average		7	7.4	7.8	3.9	5.1	2.7	1.5	4.9	4.7

GROUP 3

Categories	Benefit	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9
S - Supply (water sources)		7	8	9	2	6	1	3	5	4
O - Operation (Treatment & Distributions System)		7	8	9	6	4	3	2	5	1
Q - Quality (of finished product)		5	5	5	5	5	5	5	5	5
P - Project (that are required to build the system)		8	7	9	2	4	1	3	5	6
TOTAL		27	28	32	15	19	10	13	20	16
Weighted average		6.7	7.3	8.2	4.2	4.8	2.6	3	5	3.2
AVERAGE OF ALL 3 GROUPS		26	28	28	15	25	9	11	18	21
Weighted average		6.1	7.2	7.3	3.8	6.2	2.2	2.5	4.9	4.7

Capital Cost	\$ 89,110,000	\$ 108,210,000	\$ 146,210,000	\$ 162,570,000	\$ 148,010,000	\$ 182,800,000	\$ 158,100,000	\$ 145,000,000	\$ 113,830,000
NPV (25 Inflation & 5% Discount Rate)	\$ 113,717,162	\$ 123,771,511	\$ 155,771,137	\$ 171,366,298	\$ 161,790,079	\$ 148,725,300	\$ 166,500,000	\$ 139,100,000	\$ 127,117,753
Benefit-to-Cost-Ratio (Capital)	68.83	66.54	50.16	23.37	41.89	11.85	16.02	33.79	41.58
Benefit-to-Cost-Ratio (NPV)	53.93	58.17	47.08	22.17	38.32	14.57	15.22	35.23	37.24

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REGIONAL DISTRICT
of
NORTH OKANAGAN

TM8 SUMMARY PAPER

File No. 5700.15.11

SUBJECT: 2012 Greater Vernon Water Master Water Plan
Technical Memorandum No. 8
Financial Issues and Principles to Support the Master Water Plan

Summary date: December 2015 / Updated: January 2016

TM8 PURPOSE:

Many water utilities in BC currently do not meet Provincial standards and to do so, must make substantial capital investments. Significant investment is required for GVW to meet standards as detailed in TM9. This work will lead to water rate increases, which is a sensitive issue to political representatives and users, and must be completed in such a way to provide stability to customers and the utility. As part of the MWP, TM8 reviews the progress made on key management and financial strategies recommended in the 2002 MWP and outlines water utility Best Management Practices for financial planning and administration to incorporate into GVW policies and financial strategies.

METHODS:

The following financial aspects of GVW were reviewed, compared to best practices where appropriate, and recommendations as to future direction were made:

- Review of the progress on the recommendations made within the GVW 2002 MWP,
- Review of Best Management Practices for water rate setting and assessing the policies and practices of GVW water rate setting based on Best Management Practices,
- Assessment of the allocation of costs between GVW domestic and agricultural customers,
- Review of financial mechanisms available to GVW to fund capital projects,
- Review of uses for reserve funds and how to efficiently employ these, and
- Recommendation of a framework for preparing financial forecasts.

RESULTS:

Progress since the GVW 2002 MWP

Most of the financial and management recommendations made within the 2002 MWP were implemented over the past 10 years and include the following:

- All water utility assets have been transferred to the RDNO,
- RDNO operates GVW as a standalone water utility and must fund all financial expenditures including operation, maintenance and construction of new capital from water rates (less grants received),
- GVW owns and is responsible for the operation, maintenance, repair, replacement, acquisition and construction of all water infrastructure and associated buildings, equipment, vehicles, etc. needed to run the water system including water licenses, and
- RDNO controls planning for supply and distribution needs, and the provision of bulk water for sale to other jurisdictions.

As a Regional Water System, the RDNO is authorized to borrow money from the Municipal Finance Authority under the *Local Government Act* to construct new capital, establish cash reserve funds and set water rates for GVW.

One recommendation not fulfilled from the 2002 MWP was to fully separate the agricultural and domestic water systems before embarking on treatment. This plan was updated when it was established that grant funding could only be obtained for treatment projects and not separation. To not miss out on the opportunity for Federal/Provincial grant funding, the plan was updated in the 2004 MWP update which called for installation of treatment before separation. As a result, GVW received significant grant funds to install treatment at Duteau and Mission Hill.

GVW Domestic Water Rates

GVW, as with other Okanagan Valley water utilities (but unusual to most of other utilities in North America), has the unique challenge of servicing two distinct customer classes that require vastly different services: agriculture and domestic. Agriculture requires water in sufficient quantities during the growing season while domestic customers require high quality treated water year round.

Since 2002, major infrastructure and treatment upgrades were completed that have cost over \$60 million (with \$18 million from grants). This has resulted in a dramatic improvement to the safety and water quality of the GVW domestic water supply. The significant investment from 2002 to 2012 resulted in rates increasing by 119% for domestic customers based on an annual consumption of 350 m³ and 29% for agricultural customers. The inflation rate during this time was 21%.

As the original agricultural system was paid for by the agricultural community through grants, rates and improvements required to meet Provincial standards are for domestic customers only, domestic rates will need to increase further to fund the capital projects needed. In setting future rates, it was recommended that GVW should follow Best Management Practice rules for water utilities set by the InfraGuide and AWWA. The following table provides a review of GVW rates verses Best Management Practice criteria.

Goal	Compliant?	Review of GVW Domestic Water Rates
Full Cost Recovery	Yes	The 2012 water rates were designed to recover all the 2012 budgeted costs, including contributions to reserves for future infrastructure renewal and to pay for 2012 capital costs. The rates should result in a balanced budget at year end.
Level of Service	Generally	Water quality levels are regulated, and rates are based on the cost to treat water to the regulated standard. Other levels of service are not published, but GVW meets levels of service considered normal for the industry.
Fairness and Equity	Yes	Customers are charged for the water they use based on quarterly meter reads and published pricing. Water customers that consume high volumes of water will pay more than other customers under the inclined block rate.
Transparency	Yes	Customers can forecast and impact their water bill by water conservation. Since the rates are set to recover annual budget costs, customers can request budget details. Bylaw changes are subject to review prior to ratification.
Promote Water Conservation	Yes	GVW uses inclined block rates to encourage water conservation during the high demand summer season. It is reasonable to expect that water conservation strategies will be successful over time and that individual households could see annual water consumption decrease by up to 10%.
Revenue Stability	Yes	The Greater Vernon Water Utility Rates Imposition Bylaw No. 2527, 2012 saw a return to a larger portion of revenue based on a capacity charge to reduce risk of revenue instability (50% of revenue). The water rates were designed to ensure that the utility could withstand wet summer seasons, when customers use less water or during drought years when restrictions occur. GVW also maintains an Operating Reserve which can be used to bridge the occasional years where revenues are below annual costs.

GVW Agricultural Water Rates

GVW provides agriculture an “allocation” which is tied to a property and is equivalent to 550 mm/yr per hectare. The 2012 fee was a flat fee of \$238/yr/ha and charged whether water is used or not. In 2012, an over-consumption charge was introduced to promote water conservation. Agricultural rates have basically increased according to inflation to promote competitive agricultural rates in the Okanagan Valley, remain stable and encourage efficient use of water.

A review for the agricultural water rates based on AWWA Best Practices is as follows:

Goal	Compliant?	Review of GVW Agricultural Water Rates (Allocation-based Rates)
Full Cost Recovery	Unsure	Allocation fees are not set according to the revenue requirements of any specifically developed water utility budget because domestic and agricultural systems are combined into one. The rate is determined annually based on the principle that the rate should be competitive with other agricultural rates within the Okanagan Valley, while remaining stable from year to year all the while encouraging the efficient use of water.
Level of Service	Yes	Since agricultural water quality does not need to be at the same level as drinking water, levels of service are limited to water outages and availability. GVW is responsive to issues that result in loss of service.
Fairness and Equity	Beginning	A flat rate is charged, up to allowable water allocation, regardless of the actual amount of water consumed, but as of 2012 surcharges are made for water consumption in excess of the allowable allocation. The surcharge increases in stepped blocks to promote water conservation.
Transparency	Yes	Customers understand the nature of the charge due to its simplicity.
Promote Water Conservation	Partially	Surcharges are made for water consumption in excess of allowed allocation. The allocation is based on minimum requirements for crop production, thus; there are no rate-based financial incentives for reducing water consumption. GVW also participates in the Okanagan Irrigation Management Program (OKIM), a program aimed at providing resources for customers to improve water demand side management.
Revenue Stability	Yes	The mostly flat rate system ensures that revenue stability is assured.

With the current rate structure, agricultural customers do not contribute to funding of capital projects. As system separation projects are completed and as the agricultural water system deteriorates, agricultural customers should start paying into agricultural water infrastructure.

Allocating Costs between Domestic and Agricultural Sectors

Since 2002, GVW has derived all of its revenue from water rates and some grant funding. In 2011, GVW generated \$18,829,000 in revenue. \$12,977,000 was revenue from domestic and agricultural rates and other fees/services. The remaining \$5,582,000 was from Federal/Provincial grants, reserve transfers, development cost charges and surplus from previous years. An estimate of the operation and maintenance costs for domestic and agriculture services was developed and is provided in the table below:

Allocation of GVW O&M and Administrative Costs			
	Agricultural	Domestic	Total
2011 Actual Cost	\$ 1,760,000	\$ 8,170,000	\$ 9,930,000
2012 Budget Cost	\$ 1,400,000	\$ 8,580,000	\$ 9,980,000

Infrastructure Renewal

In addition to new capital required to meet Provincial standards, GVW must also fund infrastructure renewal or the replacement of old infrastructure to ensure a sustainable utility and continuity of service. Based on pertinent information about GVW infrastructure (i.e. age, material and quantities) and on estimated infrastructure lifespans, on an annual basis GVW should fund \$2.9 million for the replacement of old infrastructure. For infrastructure renewal projects, it is recommended that a “pay-as-you-go” method be used as taking debt to finance projects only adds to the overall costs.

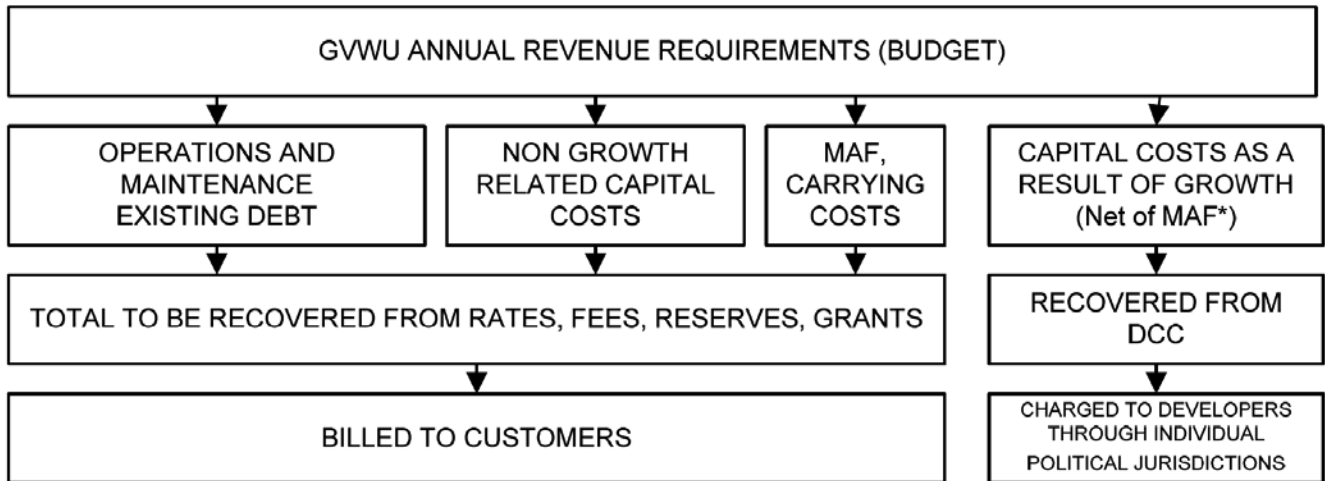
Any expenditures as a result of development should be funded by Development Cost Charges.

GVW Reserve Funds

Currently GVW has three types of reserve funds; 1) Operating 2) Statutory and 3) Development Cost Charge (DCC) Fund. Operating reserves are used to act as a “cushion” against unexpected but necessary expenses. Typically used to provide revenue stability through wet and dry years so that water rates do not fluctuate wildly. This fund can also be used as a general purpose or non-specified reserve fund and can be used to fund a wide variety of projects and operational expenditures. Statutory reserves act as a capital reserve and can be used to fund capital projects such that they can be executed on a “pay-as-you-go” basis. The DCC reserve is used to offset costs accrued due to system capacity increasing projects used to service new customers.

Framework for Preparing Financial Forecasts

Once the technical recommendations from the MWP have been executed, it is recommended that GVW develop their proposed revenue rates and sources using the following structure as a guide:



*MAF: Municipal Assist Factor




Greater Vernon Water Utility
Master Water Plan Update
March 2016

Technical Memorandum 8

David Main, AECOM


Feb 28, 2012



Technical Memorandum 8

- Financial Issues and Principles to Support the Master Water Plan
- Goal
 - Update progress of GVW since the last Master Water Plan (2002)
 - Document base information and data for use in TM 9
 - Identify a range of water utility financial management Best Practices
 - Identify areas of potential financial risk
 - Guide future initiatives to mitigate financial risk

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Progress Since 2002

- GVW now operates as a stand-alone water utility that serves the entire Greater Vernon Region
- GVW is required to meet the needs of both domestic and agricultural water customers
 - Presents important system management challenges
 - 2002 recommendation of complete separation has not occurred and may not ever occur (due to lack of economic justification)
- Completion of major water treatment program has increased the cost of treating drinking water
 - Driven by regulatory requirements for domestic water customers
 - Cost of water treatment program paid only by domestic customers

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GVW Price of Water Trend: 2002 - 2015

GVW Customer	2002	2008	2015	% Increase (since 2008)
Average Domestic SFD Residence	\$286*	\$392**	\$762***	94%
Agricultural Allocation per Hectare	\$185	\$205	\$264	29%
Inflation (Canadian Consumer Price Index)	100	102.8	126.6	23%

* flat rate regardless of actual consumption

** based on 350 m³ annual consumption (estimated average for GVW service area)

*** based on 263 m³ annual consumption (estimated average for GVW service area)

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BC Water Rate Trends: Catching up to Canada

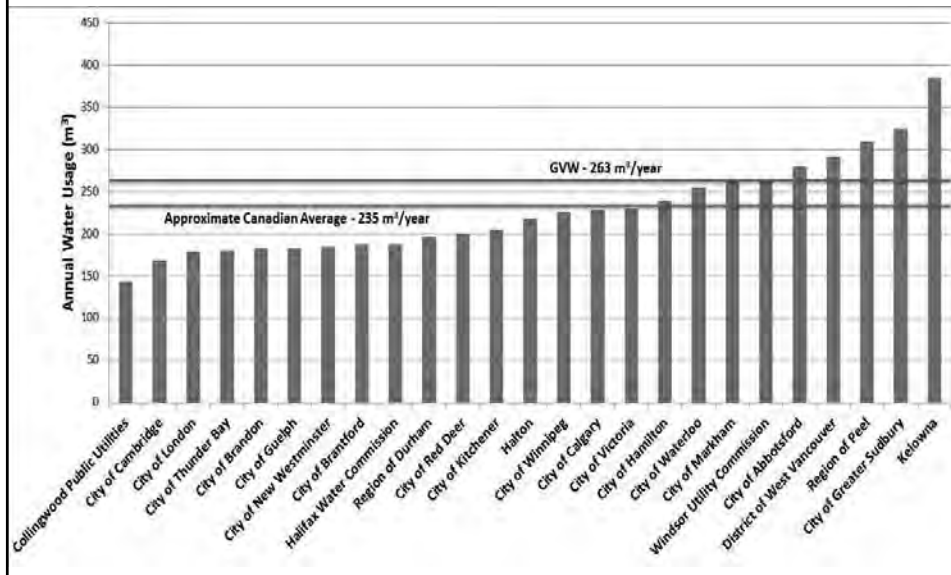
- Rapid increase over the past decade
- From very low rates to even higher than national average
- Financing many new water treatment plants
- Introduction of water meters and consumption billing (and use of inclining blocks) is new to many jurisdictions
- Canadian water consumption has been dropping
 - This trend has begun in BC and it will increase
 - BC consumption had further to fall because it started from a higher point

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Canadian Water Consumption Trends (2013 data)



Impact on Domestic Water Rates

- Almost all Canadian water utilities with an inclining block are worried about revenue erosion
 - Demand side management works: water is easy to conserve
 - Changing weather patterns
 - Loss of water intensive industries
- GVWU rates are presently based on an expected average of 263 cubic meters per year
 - 2016 Bylaw No. 2707 decreased lower block rates, and increased upper block rates – resulting in reduced bill for average consumption
- Future water consumption trends will have a major impact on revenue generation
 - Future rates must anticipate consumption trends and strategies.

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GVW Domestic Water Rate Goals:

- Current GVW Water Rate Policy is Meeting AWWA Best Practice Water Rate Goals:
 - Full Cost Recovery
 - Level of Service
 - Fairness and Equity
 - Transparency
 - Promote Water Conservation
 - Revenue Stability*

* GVW has done an excellent job in monitoring water consumption trends to ensure inclining blocks are taking water conservation trends into account (Bylaw No. 2707)

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Agricultural Water Rate Goals

- Current goals of GVW Agricultural Water Rate:
 1. Be competitive with agricultural water rates within the Okanagan Valley.
 2. Remain stable from year to year.
 3. Encourage efficient use of water to ensure equitable distribution.

- Agricultural Water Rate has no direct connection to system costs
 - It is not possible using data that is currently available to accurately document the full cost of service to agricultural users

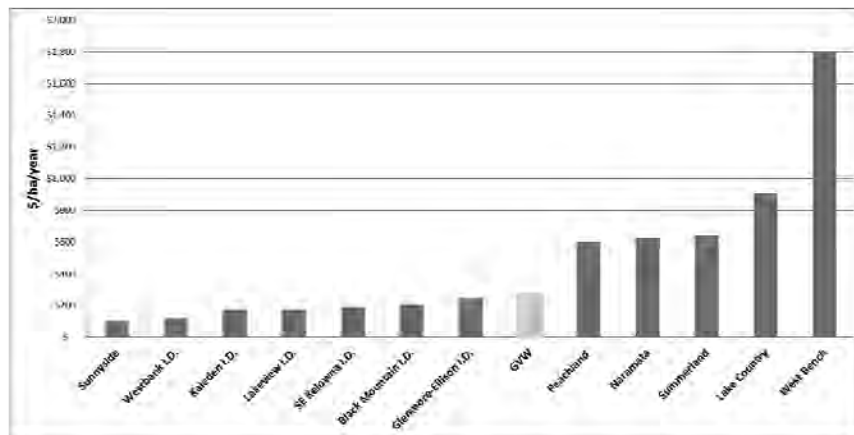
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Current Agricultural Water Goal: “Competitive Within Region”

Okanagan Region Agricultural Water Rates



*Data source is RDNO staff via email March 8, 2016

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Enable the Process of Comparing Technical Options

- Current GVW cost accounting does not presently allocate costs between agricultural and domestics customers
- TM 9 will require a split between agricultural and domestic O&M costs to enable option analysis and life cycle costing
- The computed split was based on a review of GVW O&M activities and each activity's allocation as a domestic, agricultural or a combined activity (2011 and 2012).

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Allocation of O&M costs to Support Technical Option Analysis (TM 9)

	Agricultural	Domestic	Total
2011 Actual Cost	\$1,760,000	\$8,170,000	\$9,930,000
Percent of Total Cost	18%	82%	100%
2012 Budget Cost	\$1,400,000	\$8,580,000	\$9,980,000
Percent of Total Cost	14%	86%	100%
Average of Percentage	16%	84%	100%

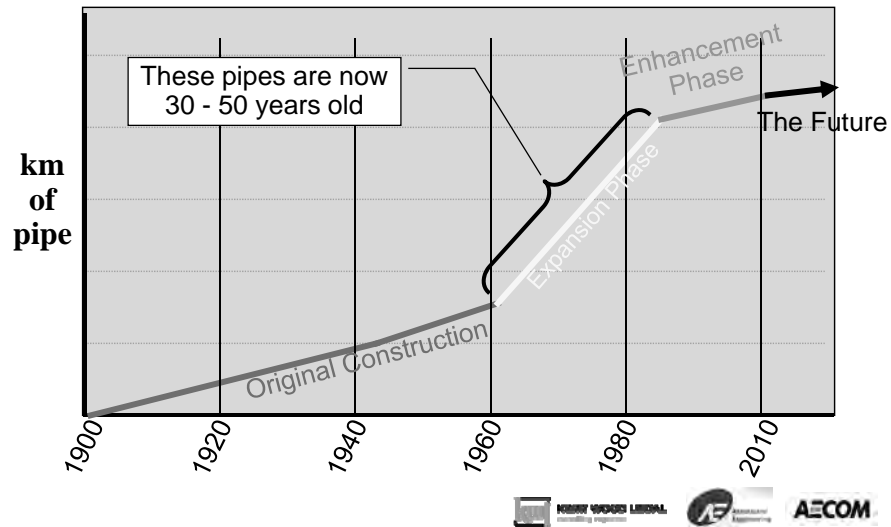
- Recognize that uncertainty remains with these estimates
- But basically, 85% of O&M costs are domestic water costs

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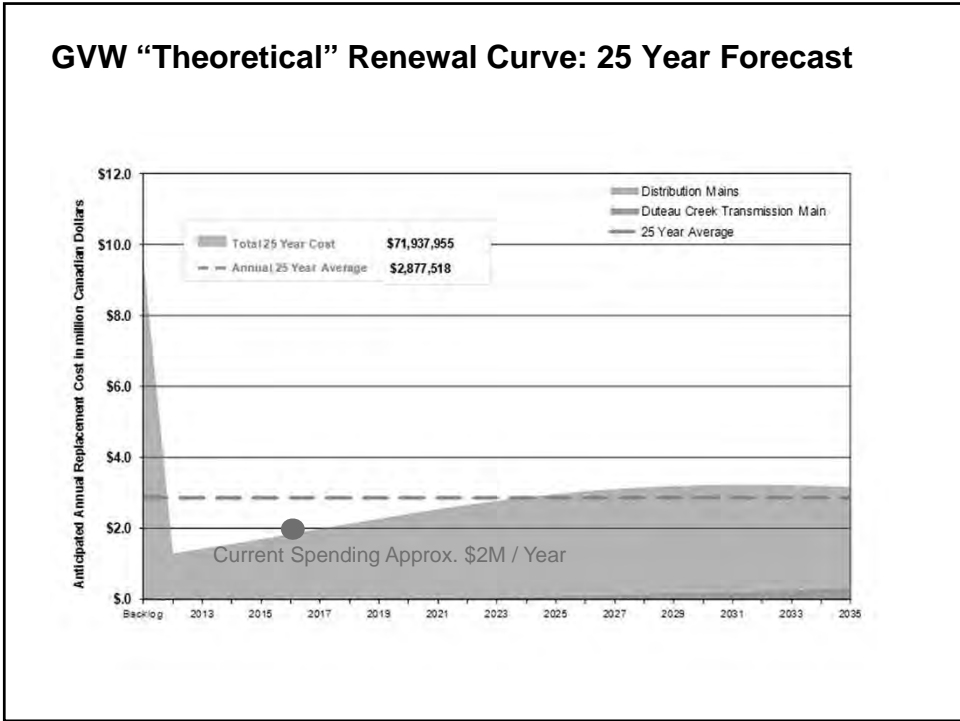


Asset Management: Typical Western Canadian City Water Main Growth



Planning for GVW Infrastructure Renewal

- Most GVW infrastructure has decades of remaining useful life
- GVW has a large volume of older (1950s) asbestos cement (AC) water mains. AC mains account for about 1/3 of the total inventory (by length). This inventory of pipes could present significant renewal demands to the GVW in the near to medium term.
- GVW has begun examining and funding infrastructure renewal activities.



Capital Program Will Impact Future Rates

- Water Quality Related Capital Projects: To be bourn by domestic water customers
 - Grant funding availability is uncertain
- Separation of Domestic and Agricultural Distribution Systems: To be bourn by domestic water customers
 - Conducted where they are economically beneficial
- Growth and Capacity Capital: Paid through DCC Charges
- Infrastructure Renewal: Shared based on a formula to be determined
 - Looming impact that needs to be quantified in terms of timing and cost

Critical Variables that May Impact Master Water Plan Financial Strategies and Domestic Water Rates

- Availability of Grant Funding
 - Past level of support on qualifying water quality improvement projects have been as high as 35% to 50%. Current programs are uncertain but we may see shortly.
- Timing of Infrastructure Renewal Requirements
 - Theoretical analysis suggests that there may be a significant backlog of fully deteriorated AC water mains.
- Water conservation trends and their impact on the ability of the inclining block rate to collect budgeted revenue
 - Summer weather patters have a major impact on revenue
 - Adoption of indoor conservation strategies (plumbing fixtures, etc.)
 - Impact of climate change in the longer term.

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Questions and Discussion

March 11, 2016





REGIONAL DISTRICT
of
NORTH OKANAGAN

SAC Question Paper 7

File: 5730.15.13.01.04

MEETING DATE: March 17, 2016

SUBJECT: Stakeholder Advisory Committee (SAC)
Questions Raised since the February 29, 2016 meeting and submitted via email

The following questions were submitted via email since the February 29, 2016 SAC meeting:

1. **Question:** Re GVW's data/comment that "**ingesting** asbestos isn't harmful, **inhaling** it is", have a look at this Oregon State University document:

"not generally considered to be harmful unless it is releasing dust or fibers into the air where they can be inhaled **or ingested**. Many of the fibers will become trapped in the mucous membranes of the nose and throat where they can then be removed, but some may pass deep into the lungs, or, **if swallowed, into the digestive tract**. Once they are trapped in the body, the fibers can cause health problems."

"**Water damage**, continual vibration, **aging**, and physical impact such as drilling, grinding, buffing, cutting, sawing, or striking can break the materials down making fiber release more likely."
Document here: <http://oregonstate.edu/ehs/asb-when>.

Can you include the above in your answer to the posted question regarding AC piping?

Answer: This question was in relation to Question 1 of the SAC Question Paper 5, which is repeated here for context:

Question 1 from SAC Question Paper 5: After considerable discussion and reflection and varying levels of input from water customers and critics who have followed the progress of the water system in its evolution, I am beginning to question the scope of the Evaluation process as it is unfolding. My concerns centre on the status of the Distribution system, particularly the status of the aging AC piping. In order to do justice to the weighting process in this and other categories, I would appreciate your input in providing a management perspective on a few issues.

What is your assessment of the overall condition of the AC piping components in the system?
I am aware of the risks to the system and its user base in prolonging the reliance on aging AC piping through exposure from asbestos leaching to water, soil and air.

Answer from SAC Question Paper 5: Infrastructure renewal is part of the GVW Asset Management Program and specific details are beyond the scope of the Master Water Plan with the exception of specifying that \$2 million/year be included in the budget for this purpose. No matter what option is chosen, infrastructure renewal will be the same and is independent of source and treatment.

That being said, for your general information, the condition of the AC pipe in the GVW system is pretty good relative to the cast iron (CI) pipe in the system based on age, breaks and water quality issues.

As to the health risk - asbestos is a health risk when friable (i.e. fibers are airborne) and hence the health risk of AC pipe is to workers removing it and not as a risk within our drinking water source. The following are statements from the guidelines from the Canadian Drinking Water Guidelines and the World Health Organization (WHO):

- GUIDELINES FOR CANADIAN DRINKING WATER QUALITY:
GUIDELINE TECHNICAL DOCUMENT – ASBESTOS

GUIDELINE:

There is no consistent, convincing evidence that ingested asbestos is hazardous. There is, therefore, no need to establish a maximum acceptable concentration (MAC) for asbestos in drinking water.

(<http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/water-asbestos-amiante-eau/index-eng.php>)

- ASBESTOS IN DRINKING-WATER
BACKGROUND DOCUMENT FOR DEVELOPMENT OF WORLD HEALTH ORGANIZATION GUIDELINES FOR DRINKING-WATER QUALITY

CONCLUSIONS:

Although asbestos is a known human carcinogen by the inhalation route, available epidemiological studies do not support the hypothesis that an increased cancer risk is associated with the ingestion of asbestos in drinking-water. Moreover, in extensive feeding studies in animals, asbestos has not consistently increased the incidence of tumors of the gastrointestinal tract. There is therefore no consistent, convincing evidence that ingested asbestos is hazardous to health, and it is concluded that there is no need to establish a guideline for asbestos in drinking-water.

(http://www.who.int/water_sanitation_health/dwq/asbestos.pdf)

Answer comments to the comments in Question 1 above: The Oregon State document referenced above is for building materials and includes the following:

*“Asbestos-containing ceiling tiles, floor tiles, undamaged laboratory cabinet tops, shingles, fire doors, siding shingles, etc. **will not release asbestos fibers** unless they are disturbed or damaged in some way. If an asbestos ceiling tile is drilled or broken, for example, it may release fibers into the air. If it is left alone and not disturbed, it will not.”*

This document does not reference AC pipe. The impact of AC pipe to health via ingestion in drinking water has been studied extensively as outlined in the above documents and the studies have concluded that the type of asbestos found in drinking water are not a concern as per the following quote from “Asbestos Cement Drinking Water Pipes And Possible Health Risks Review For DWI by John K Fawell Published May. 2002:

“The World Health Organization considered asbestos in drinking water arising from asbestos cement pipe in their 1993 edition of the Guidelines for Drinking Water Quality. The guidelines state “Although well studied, there has been little convincing evidence of the carcinogenicity of ingested asbestos in epidemiological studies of populations with drinking water supplies containing high concentrations of asbestos. Moreover in extensive studies in laboratory species, asbestos has not consistently increased the incidence of tumors of the gastrointestinal tract. There is therefore no consistent evidence that ingested asbestos is hazardous to health and thus it was concluded that there was no need to establish a health-based guideline value for asbestos in drinking water”.

In addition, due to the limited funding available to GVW for infrastructure renewal (approximately \$2M/year) this budget must be spent strategically and wisely. GVW uses a risk assessment and renewal criteria to prioritize where this funding should be directed.

From a financial perspective, the replacement cost for all the GVW pipe infrastructure is \$620M based on the estimate within the MWP. 31% of GVW pipe is AC pipe with most installed after 1978 (or pipe age of 38 years or younger) and an estimated replacement cost of \$192M. As the health risk has been determined to be minimal as per the WHO and Guidelines for Canadian Drinking Water Quality and as GVW has 10% Cast Iron (CI) and Steel (S) pipe which are old (i.e. 80 years plus) with a replacement value of \$62M which most of this pipe being in questionable shape with certain sections having frequent breaks, GVW must prioritize and concentrate their replacement efforts on the worse of these pipes.

2. **Question:** Are there sufficient pumping stations currently in place to supply all domestic customers (e.g. Lavington) with water from MHWTP? This assumes there is little or no agricultural demand at that time.

Answer: Yes, during off peak times (i.e. little or no agriculture or domestic irrigation demands), domestic use can be supplied from MHWTP.

3. **Question:** Under the current plan for separation of agricultural water, can the piping be shut down and drained during the winter so the pipes will not need to be (generally) buried more than 3 feet deep?

Answer: Depends on whether fire flows are supplied on the separated agriculture or domestic line, for the current areas that are separated, fire flows are provided on the agricultural lines which has saved GVW money by being able to reduce the domestic line pipe and eliminate the need for building tanks (enclosed reservoirs) to store capacity for fire flows.

Another consideration for the shallow bury of the pipes is the pipes will need to be drained for winter and draining is time consuming and a maintenance issue. Draining all the low points is typically not practical and compressed air can be dangerous for large diameter piping.

4. **Question:** Can the branch piping (< 100 mm) be continuous lengths of high density polyethylene installed by a pipe pulling machine rather than the common gasketed / glued PVC in a trench? If so, would these design changes reduce the cost of system separation? An estimated savings would be appreciated.

Answer: The use of HPDE was considered and was actually used for a section of the irrigation main near the Duteau Creek WTP. The challenge with this pipe is the installation at utility crossings and connections. These become expensive for the parts and labour to complete. Also, the irrigation system operates at high pressure meaning a thick wall HDPE pipe will be required. Thick wall HPDE is often a higher installed cost than bell and spigot PVC pipe. For select situations where there is a benefit to the utility HDPE will be used, but for the majority of the system other pipe systems are expected to be a lower cost. HDPE pipe is very difficult to repair in the event of accidental damage due to the price and type of fittings required.

5. **Question:** (i) Are all agricultural customers metered separately for agricultural water vs domestic water? (ii) In the meter replacement plan, could new agricultural meters record water use by time of day and day of week? (iii) For sizing of the piping, can agricultural customers generally be limited to a particular water flow rate per hectare?

Answer: (i) Yes all agricultural customers are metered separately. (ii) Yes, once all the infrastructure is in place, time of day and day of week flows can be recorded; however, this information gathering can significantly reduce battery life. (iii) There is currently a limit on flow for agricultural customers which is 0.78 L/sec per hectare as per GVW Water Use and Regulation Bylaw no. 2545. It would be difficult to reduce this flow as many of the large fields are on a 2 week watering rotation with a 24 hour watering schedule. Reducing this flow would likely reduce the productivity of the many fields.

6. Question: I have the following table of actual usage, but don't have the peak water flows from each treatment plant during that time. Can the highlighted cells of this spreadsheet be filled out and returned to me before our next meeting?

Answer: Staff will not have the domestic use number for a few weeks as the information was just received from the municipalities and takes considerable staff time to manipulate into useable data for planning purposes. (Which is one of the reason that GVW is pursuing the meter improvement program for better data management).

Year	Annual Usage			Max. Daily Demand	
	Domestic use <i>ML/yr</i>	Ag use <i>ML/yr</i>	Total use <i>ML/yr</i>	DCWTP <i>ML/day</i>	MHWTP <i>ML/day</i>
2011	6,359	7,810	14,169	129.9	45.1
2012	5,720	5,986	11,706	122.2	42.6
2013	6,043	6,815	12,858	127.2	32.5
2014	5,618	6,812	12,430	120.0	46.3
2015		7,420		106.7	41.0
MWP projected 2016	9,880	12,600	22,480	215.0	58.0
Average actual use	5,935	6,969	12,791		

The following questions will be addressed before or by the March 17, 2016 meeting:

7. **Question:** (i) Is it worth considering using the BX aquifer (270) as an agricultural source for the BX? This area has been lumped in with the rest of the Ag load but it seems to be different in nature. Smaller hobby farms meaning a smaller load and more connections to the distribution than the rest of the Ag system. Tbl 7.1 in TM7 shows the peak demand is only 20ML/d and aquifer 270 can support 35ML/d. I'm only looking at the 2 N BX and 2 S BX pressure zones however. I am not sure if Pleasant Valley should be included in this. (ii) Could the existing distribution system in this area be used for domestic and smaller ag distribution be added from aq270? Does this help overall capital and O&M costs? (iii) Alternatively, can the license on BX Creek be used effectively in this area? I'm not sure what can be used for storage in this regard however.

Answer:

8. **Question:** TM3 Section 4 states that the Gold-Paradise extension can provide 3000 to 7000ML/y. Is raising the Aberdeen Dam by 4m really necessary? Raising it 2m gains 5300ML of additional storage and 4m gets 10,000ML of storage. Is 2m sufficient?

Answer:

9. **Question:** TM3 Section 4 also states that there are significant regulatory hurdles for this project due to the inter-basin transfer. (i) Does this so hold true? (ii) Current plan suggests raising the dam 15yrs before the GP extension. Would it make sense to push this out closer to the GP project? (iii) What is the driving motivation for this particular project? Is the increased storage needed for 1:10 drought, 1:50, changing precipitation and flow patterns due to climate change? (iv) what is the utilities obligation to meet the Ag allocation as opposed to actual consumption? The former is about 50% more than the latter.

Answer:

10. **Option Submission – Option 3 Hybrid:** The following is a submission to the SAC Agenda for March 17th:

Option 3-amended (or Option 3 Hybrid):

"Complete Separation, Two Treatment Facilities: Complete separation of domestic and agricultural with filtration at MHWTP and DCWTP deferred."

1. Diversion of King Edward license and supply by pipeline to MHWTP (Deer Creek license transfer and flow via Coldstream Creek)
2. Aggressively apply for license for Okanagan Lake in support of the current 50k ML reserve.
3. Continue water supply from DUC to Goose Lake.....Ag/raw water only.
4. 90%/10% Ag/Dom from DCWTP....all Vernon Ag. supply, domestic supply for Lavington/East Coldstream areas only.
5. Initiate talks with The Province for use of reclaimed wastewater water for food crops.....a practice currently underway in other parts of Western N.A.
6. Consideration for expansion of domestic and agricultural supply to Spallumcheen, OKIB, areas north from a future Okanagan Lake licence/source.

Comments: