"To deliver effective and efficient, local government services that benefit our citizens, our businesses, our environment and our future"

THE CORPORATION OF THE CITY OF VERNON

A G E N D A

COMMITTEE OF THE WHOLE

CITY HALL COUNCIL CHAMBER

JULY 19, 2021

AT 8:40 AM

1. CALL TO ORDER

AGENDA

A. THAT the Agenda for the July 19, 2021, Committee of the Whole meeting be adopted as presented.

2. ADOPTION OF MINUTES

MINUTES

A. THAT the minutes of the Committee of the Whole meeting of Council held June 28, 2021, be adopted. **(P. 3)**

3. BUSINESS ARISING FROM THE MINUTES

4. GENERAL MATTERS

5. UNFINISHED BUSINESS

ON LINE SEMINARS – FOCUS ON GOVERNANCE VIDEO (45 minutes) (0530-01) (P. 7)

A. "Good Governance By George" – Part Seven*: Council-Management Relations.*

6. NEW BUSINESS

7. LEGISLATIVE MATTERS

8. COUNCIL INFORMATION UPDATES

9. G.V.A.C. / R.D.N.O REGULAR MEETINGS

SLEEMAN BREWERIES LTD. – WATER DEVELOPMENT VARIANCE PERMIT APPLICATION (0482-05)

A. For discussion, the following alternate resolution was passed at the GVAC meeting on July 7, 2021:

'That it be recommended to the Board of Directors, a Development Variance Permit be issued for the property legally described as Lot A, Plan KAP69958, Section 34, Township 9,

(P. 8)

ODYD and located at 2801 27A Avenue, Vernon, BC to vary Section 112.5 of Greater Vernon Water Subdivision and Development Servicing Bylaw No. 2650, 2013 to waive the requirement for full frontage water main upgrades on 28 Avenue and 25 Avenue with the condition that the developer provides a financial contribution of $37,000 cash in lieu to construct the pipe main casing in the 28 Avenue railway crossing as part of the City of Vernon capital works project to upgrade 28 Avenue.'

2021 GREATER VERNON WATER AGRICULTURE REVIEW – CAPITAL CONTRIBUTION (0482-05-02) (P. 28)

B. For discussion, the following resolution was passed at the GVAC meeting on July 7, 2021:

'That it be recommended to the Board of Directors, the approach and assumptions used to calculate the agricultural sector's contribution towards infrastructure renewal be endorsed, specifically:

- *The 20-year Annual Average Investment from the asset management plan will be used as the basis for calculating the agricultural sector's contribution towards infrastructure renewal in the short term with the long term goal of meeting the Annual Average Life Cycle Investment, and will be reviewed during the next Master Water Planning process; and further,*

- *The infrastructure renewal requirements apportioned to agriculture will be offset by the annual value of water licences.'*

10. INFORMATION ITEMS

11. CLOSE OF MEETING

THE CORPORATION OF THE CITY OF VERNON

MINUTES OF A COMMITTEE OF THE WHOLE MEETING
HELD JUNE 28, 2021

PRESENT: Mayor V. Cumming

Councillors: S. Anderson, K. Gares, B. Quiring,
A. Mund, K. Fehr, D. Nahal (10:17 am)

Staff: W. Pearce, Chief Administrative Officer
K. Austin, Manager, Legislative Services
K. Poole, Director, Community Safety, Lands & Administration
J. Nicol, Deputy Corporate Officer
C. Poirier, Manager, Communications & Grants
D. Law, Director, Financial Services
L. Cordell, Manager, Long Range Planning & Sustainability
J. Rice, Director, Operation Services
D. Lind, Director, Vernon Fire Rescue Services
B. Bandy, Manager, Real Estate
S. Wright, Manager, Recreation Programs
A. Watson, Manager, Transportation
S. Baher, Insp./OIC, RCMP
S. Melenko, Information Technician I

CALL TO ORDER

Mayor Victor Cumming called the meeting to order at 8:42 am.

AGENDA ADOPTION

Moved by Councillor Fehr, seconded by Councillor Quiring:

THAT the Agenda for the June 28, 2021 Committee of the Whole meeting be adopted.

CARRIED

ADOPTION OF THE MINUTES

Moved by Councillor Mund, seconded by Councillor Gares:

THAT the minutes of the Committee of the Whole meeting of Council held June 14, 2021, be adopted.

CARRIED

BUSINESS ARISING FROM THE MINUTES

GENERAL MATTERS

Councillor Anderson left the meeting at 9:12 am and returned at 9:13 am.

TRANSIT SERVICE IN VERNON - UPDATE (VIA ZOOM)

Amanda Watson, Manager, Transportation, Chelsea Mossey, Senior Manager, Government Relations and Erin Sparks, Transit Planner, both of BC Transit provided Council with an update on the 'Overview of Transit Service in Vernon' program.

The following points were noted:

- COVID-19 Response & Impacts – Respond, Recover, Rebuild
- System Performance
- Looking Ahead
  - Expansion Initiatives
  - Electronic Fare Collection
  - Low Carbon Fleet Program
  - Digital On-Demand Transit
  - Free Fares for 12 and Under
  - MicroBird G5
- Transit Future Action Plan – progress to date and updated priorities moving forward.

Moved by Councillor Gares, seconded by Councillor Mund:

THAT Council receives the presentation from Amanda Watson, Manager, Transportation, Chelsea Mossey, Senior Manager, Government Relations and Erin Sparks, Transit Planner, both of BC Transit, regarding an update on the Transit Service in Vernon.

CARRIED

UNFINISHED BUSINESS

Councillor Quiring declared a potential conflict of interest as his firm (MQN) may be involved in the improvements to the Kin Race Track lands and/or the RCMP Building Renovation. Councillor Quiring left the meeting at 9:45 am.

LEGACY RESERVE PROJECT SELECTION (1700-02)

Moved by Councillor Fehr, seconded by Councillor Mund:

THAT Council endorse the following projects to be funded from the Fortis BC Legacy Reserve:

1. Kin Race Track Park (sports fields, trails, outdoor ice rink, dog park and set aside lands for affordable housing and the Active Living Centre) – ($6M)
2. RCMP Building Renovation Analysis ($5M)

DEFEATED, with Mayor Cumming, Councillors Gares and Anderson opposed

Moved by Councillor Gares, seconded by Councillor Anderson:

THAT Council endorse the following projects to be funded from the Fortis BC Legacy Reserve:

1. Kin Race Track Park (sports fields, trails, outdoor ice rink, dog park and set aside lands for affordable housing and the Active Living Centre) ($10M)
2. RCMP Building Renovation Analysis (up to $2M).

CARRIED, with Councillors Mund and Fehr opposed

Councillor Quiring returned to the meeting at 10:13 am.

Councillors Anderson and Fehr left the meeting at 10:14 am and returned at 10:16 am.
Councillor Nahal entered the meeting at 10:17 am.

The Council video was paused at 10:14 am due to copyright laws.

ON LINE SEMINARS – FOCUS ON GOVERNANCE VIDEO (0530-01)

Council viewed a 45 minute videos entitled "Good Governance By George – Part Six: *Governance Mechanisms.*

The Council video resumed at 10:54 am.

NEW BUSINESS

LEGISLATIVE MATTERS

COUNCIL INFORMATION UPDATES

G.V.A.C./R.D.N.O. REGULAR MEETINGS

WATER LINE

Greater Vernon Water and Okanagan Spring are in discussion regarding the 28th Avenue water line to accommodate the Okanagan Spring expansion of ten additional holding tanks.

INFORMATION ITEMS

CLOSE OF MEETING

CLOSE Mayor Victor Cumming closed the meeting at 10:56 am.

CERTIFIED CORRECT:

_____ _____

Mayor Corporate Officer

Session Seven: Council-Management Relations

Relationships between Council/Board and its senior managers are critical to the success of any municipality/region. This relationship is either healthy or it ought to be corrected; you cannot afford to let it hinder the effectiveness of your municipality. There is only one key relationship in the organization for the Council; that is that of Council/Board & its CAO. Where the Council-CAO relationship founders so too does the organization. This is what is referred to as "tone at the top": is there trust and respect or disbelief and no confidence? George discusses this key issue in his usual "no nonsense" style.

Session Seven: Council-Management

1. How would you characterize our Council-management relations? What makes it so?

2. Has Council agreed to certain protocols in terms of how it accesses staff on issues? How does Council ensure that it respects the authority of our CAO over the employees?

3. Is there a clear understanding relative to the distinction in roles and power of Council and management?

REGIONAL DISTRICT NORTH OKANAGAN

STAFF REPORT

TO: Greater Vernon Advisory Committee

FROM: Utilities Department

File No: 21-0592-VER-DVP

Date: July 7, 2021

SUBJECT: Development Variance Permit Application – 2801 27A Avenue, Vernon, BC (Sleeman Breweries Ltd.)

APPLICANT:	Sleeman Breweries Ltd.
LEGAL DESCRIPTION:	Lot A, Plan KAP69958, Section 34, Township 9, ODYD
P.I.D.#	025-146-319
CIVIC ADDRESS:	2801 27A Avenue, Vernon, BC
PROPERTY SIZE:	75,133 square feet
SERVICING:	Water, sanitary and storm
ZONING:	C4 - Street Oriented Commercial
O.C.P. DESIGNATION:	Community Commercial and Mixed Use High Density Commercial and Residential
PROPOSAL:	Construct additional cellar storage
PROPOSED VARIANCE(S):	Waive requirement for full frontage water main upgrades, BL 2650, Section 112.5

UTILITIES DEPARTMENT RECOMMENDATION:

That it be recommended to the Board of Directors, upon consideration of input from adjacent landowners, a Development Variance Permit be issued for the property legally described as Lot A, Plan KAP69958, Section 34, Township 9, ODYD and located at 2801 27A Avenue, Vernon, BC to vary Section 112.5 of Greater Vernon Water Subdivision and Development Servicing Bylaw No. 2650, 2013 to waive the requirement for full frontage water main upgrades on the 25 Avenue/ 27A Avenue section of frontage to the property.

SUMMARY:

There is an application for a Development Variance Permit (DVP) related to the property located at 2801 27A Avenue, legal address Lot A, Plan KAP69958, Section 34, Township 9, ODYD. The application proposes to vary the Section requirement of the *Greater Vernon Water Subdivision and Development Servicing Bylaw No. 2650, 2013* (BL 2650) by waiving Section 112.5, the requirement for water mains to be constructed along the property's full frontage. The Utilities Department recommends that upon consideration of input from adjacent land owners, the application receive approval to waive the requirement on the 25 Avenue frontage but not support the request on the 28 Avenue frontage.

The 25 Avenue frontage is not required for redundancy or improving fire flows in the area, and the costs of maintaining that water main would outweigh the marginal benefits it would provide. The 28 Avenue frontage is important for building redundancy and for fire flows as the downtown area densifies. The City of Vernon (COV) is currently in design phase to rebuild this section of road and upgrade sewer and storm with construction schedule either later this year or early next year; hence, there is an opportunity to have this main constructed in partnership with the COV project. Alternatively, GVW could accept cash-in-lieu and build it the next time major works are being completed in 28 Avenue. An alternative option would be to approve the full variance on the condition that the developer pay to install a casing under the railroad crossing on 28 Avenue in conjunction with an upcoming City of Vernon utilities project.

BACKGROUND:

This report relates to an application for a DVP for the property located at 2801 27A Avenue in Vernon. The applicant is proposing to add more tanks (termed cellars) for producing beer at Okanagan Springs Brewery (Brewery). This expansion is of a magnitude that it triggers the application of the bylaw. Because there are frontages that are not constructed, the full frontage provision dictates that those frontages must be built. The proposal requires a variance to BL 2650 as it would not comply with the full frontage provision, in Section 112.5. Currently water mains are not constructed in the 25 / 27A Avenue, or 28 Avenue frontage.

Site Context

The subject property is located on both sides of 28 Avenue, between 27 Avenue (becoming 28 Street) and 25 Avenue. The parcel is hooked on either side of 28 Avenue, and also has a rail line running in a north-south direction through the property (Figure 1).

Figure 2 provides the 2018 orthophoto of the subject property and surrounding area. The property slopes up from west to east, but is largely flat. The brewery itself is in the south west quadrant of the property that is south of 28 Avenue and west of the rail track. The existing tanks (and proposed expansion) are on the south east section, south of 28 Ave and east of the rail track. There are accesses to the brewery building for transport trucks on 25 Avenue and 27 Avenue with truck access to the tanks off of 28 Street and 28 Avenue. There is a parking lot north of 28 Avenue and west of the rail tracks which is accessed from 28 Avenue.

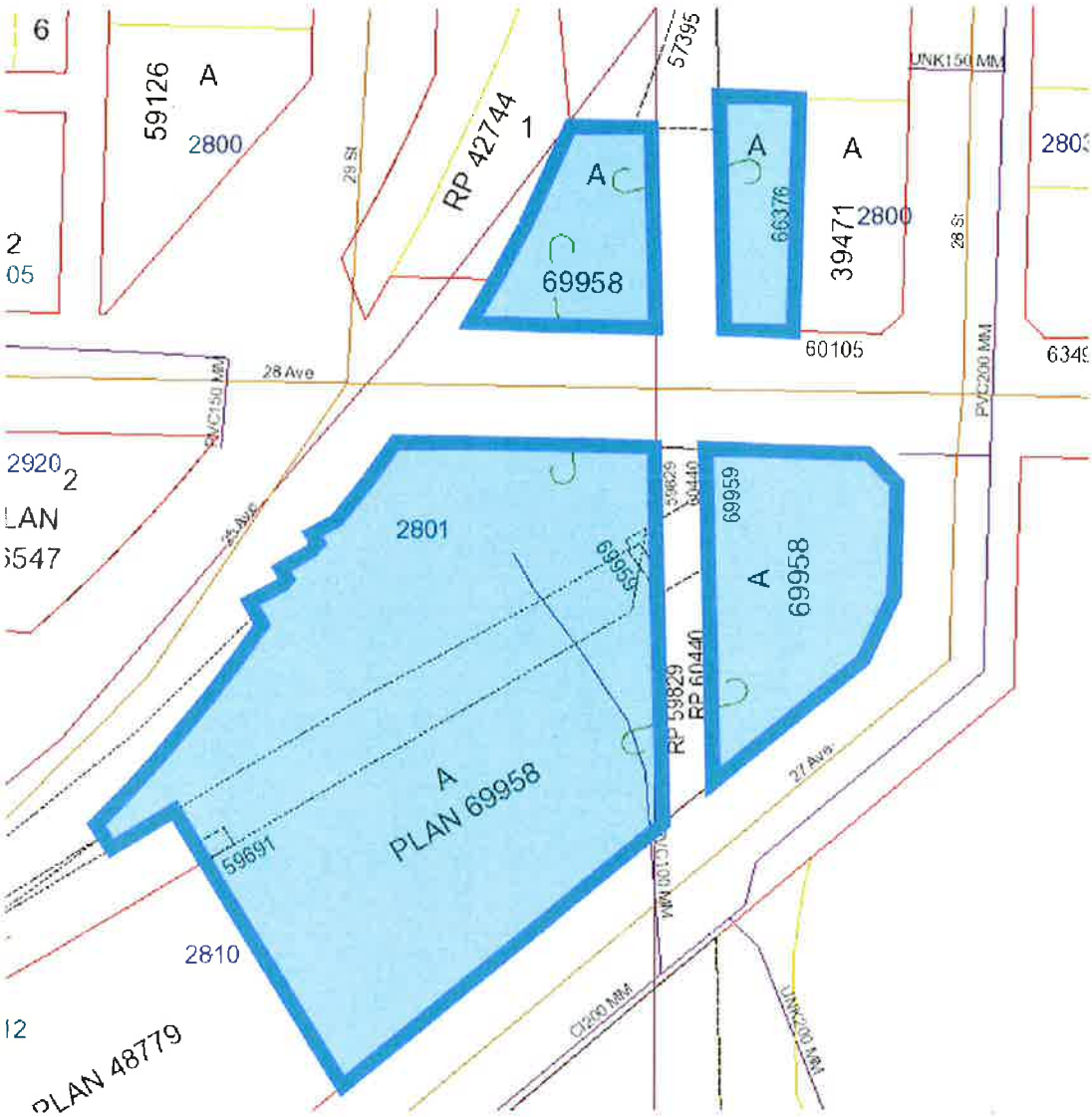

Figure 1. Subject property at 2801 27A Avenue, Vernon, BC – four hooked lots comprise Lot A, Plan KAP69958, Section 34, Township 9, ODYD

The subject parcel is zoned C4, as are all surrounding parcels except for 2700 28 Avenue, which is zoned P3: Private Institutional, and houses a school. The OCP designation of the subject parcel is Community Commercial south of 28 Avenue, and Mixed Use High Density Commercial and Residential north of 28 Avenue. Neighbouring parcels are designated as *Community Commercial*, *Public and Institutional*, *Mixed Use High Density Commercial and Residential*, and *Medium Density Commercial and Residential*.

Figure 2. Orthophoto from 2018 of the subject property and surrounding properties.

Proposal

The applicant is proposing to add more cellars to increase the Brewery's beer making capacity. These will be constructed in the existing tank area, east of the rail tracks and south of 28 Avenue.

The applicant has indicated that in their opinion, a DVP is not applicable as the bylaw should not apply. The following provides their interpretation of bylaw sections and Utilities' rationale of applicability:

1. BL 2650 Section 113.2.C provides an exemption for utilities on sites that are non-habitable and the proponent exerts that the cellars are equivalent to a utility and the cellars are non-habitable. This exemption is applied to properties with no water connection that house utilities

infrastructure that support service to the community such as hydro, Telus, etc. Cellars are not considered a utility and only service the property owner. In addition, the site is serviced with a water connection as it a hooked and the south west quadrant is serviced, which contains the brewery that is an occupied space with many staff. In addition, the cellars will presumably be filled with beer that is processed using GVW water signalling an increase in water capacity to the system as a whole.

2. BL 2650 does not define road frontage and the application has suggested that the Regional District of North Okanagan (RDNO) zoning bylaw definition should be used which only includes reference to highway frontage. First, GVW pipe mains are not restricted to highways only as this would not provide service to even a fraction of customers. The Utilities department has historically and consistently applied frontage requirements on all road Right of Way (ROW) that abuts the property line including undeveloped ROWs and laneways. Full frontage is applied to all property lines fronting all road ROWs. Second, the RDNO zoning bylaw is only applicable in RDNO areas and this site is in Vernon; hence, this bylaw does not apply. Even in RDNO areas, the RDNO zoning bylaw definitions do not apply to BL 2650 as they are standalone bylaws.

3. The proponent indicates that as the south west quadrant of the subject property does not require a service connection, the bylaw should not apply. The service connections to the lot are irrelevant to offsite upgrade requirements and based on the value of the Building Permit (above $100,000) as the site does not have full frontage. This site is connected through the connection to the south west quadrant.

GREATER VERNON WATER SUBDIVISION AND DEVELOPMENT SERVICING BYLAW:

The subject property is zoned *C4 - Street Oriented Commercial*. The uses permitted in the *Street Oriented Commercial* zone include apartment housing, artist studios, class A brewing and distilling, major group homes, offices, general retail stores, used goods stores, among others.

UTILITIES ANALYSIS:

The Brewery is serviced from 27 Avenue for on-site water demands and has fire flows that meet standards. The bylaw provision required by GVW is due to the lack of a pipe main in their 28 Ave and the 25 / 27A Avenue frontage. The frontage on 25 / 27A Avenue is not required now or in the future as all surrounding parcels are serviced from water mains in other streets and no new properties would be serviced from this section of water main. In addition, there would be no improvement or increase of fire flows to the area and the cost to maintain this section of water main would likely outweigh any benefits it would provide; hence, for these reasons, staff are supporting the DVP to not construct frontage on 25 / 27A Avenue.

Staff are not supporting the DVP to not construct or contribute to constructing a water main in the subject property's frontage on 28th Ave for the following reasons:

- Installing a water main in this frontage is in the best interest of the GVW system and in particular, to downtown Vernon as it will provide redundancy and support the increased downtown fire flow requirements outlined in a report commissioned by GVW in 2018. This report identified that future fire flows will increase 25 % from the current 56 mega litres per day (ML/d) to 70 ML/d based on the high and medium density residential development provided for in the COV's Official Community Plan (Attachment "B").
- McMechan reservoir on East Hill supplies fire storage for most of Vernon west of the reservoir, including the downtown core. Pipe main routes from east to west are important and this has been identified as an important connection to support fire flows for development in downtown.

- GVW's Asset Management Program is focused on replacement of infrastructure that is at or beyond its useful life. During a replacement project, GVW will upsize a pipe if required to address future fire flows; however, completing a project strictly to address fire flow issues is not part of the assessment criteria. As there is no current pipe in the 28 Ave ROW alignment, there is no opportunity to upsize a pipe and this connection will likely first be constructed by development.
- The GVW Master Water Plan addresses some projects from a fire flow perspective at a very high level, such as transmission mains, pump stations and reservoirs that service most of the system or very large areas. GVW typically does not participate in projects focused on improving fire flows to a specific site or small area as these are generally regarded as the responsibility of the site developer or area development community as per direction of the Board.
- The COV is in design phase this year of the replacement of the road and city owned infrastructure within 28 Avenue. GVW was approached by COV staff early in the year to determine if GVW wanted to participate in this utility upgrade and install a water main; however, GVW did not participate as this project was not included in the 2021 Capital Works Budget and likely would not have participated even if contemplated during last year's budget planning as per the previous point. GVW considered installation of a pipe casing in the railway Statutory Right of Way (SROW), as it is thought that construction within railways will only get more difficult with permitting and future legislative requirements. Installing a casing would make future construction of a pipe main much easier. In the end, GVW opted not to participate due to cost and because this is considered a developer driven project.
- The COV has confirmed that there is still time to include design and construction of the casing in the project; however, completion of the water main extension would take too long to incorporate into the project.

Based on the rationale outlined in the points above, staff are recommending that the DVP for providing full frontage along 28 Avenue not be supported. As the City of Vernon has indicated that it is likely too late to participate in constructing the full frontage pipe main with their project, staff are recommending cash-in-lieu contribution of **$144,000** with the intention of constructing it the next time that major works are completed on 28 Avenue.

As an alternative, the Board may consider requiring the developer to partner with the City of Vernon to install the casing under the railroad in conjunction with this year's upgrade, instead of accepting cash-in-lieu for the full upgrade. Although GVW recommends taking cash-in-lieu for the whole 28 Avenue frontage, the casing would be a useful alternative and the cost for this would be **$37,000.** This cost anticipates a cost savings from partnering with the COV on this project. If the casing is not completed with the City of Vernon, the cost would be almost double. The recommended motion to bring this option forward could be:

> *That it be recommended to the Board of Directors, upon consideration of input from adjacent landowners, a Development Variance Permit be issued for the property legally described as Lot A, Plan KAP69958, Section 34, Township 9, ODYD and located at 2801 27A Avenue, Vernon, BC to vary Section 112.5 of Greater Vernon Water Subdivision and Development Servicing Bylaw No. 2650, 2013 to waive the requirement for full frontage water main upgrades on 28 Avenue and 25 Avenue be approved with the condition that the developer provides the financial contribution necessary to construct the pipe main casing in the 28 Avenue railway crossing as part of the City of Vernon capital works project to upgrade 28 Avenue.*

Enclosures:

- Attachment "A" – Location of Subject Property
- Attachment "B" – AECOM, October 21, 2018, Technical Memorandum re Conveyance and Fire Flow in Pressure Zone 483 - Final

Submitted by:

Alec Busby, EIT
Assistant Utilities Engineer

Reviewed and endorsed by:

Zee Marcolin, P.Eng.
General Manager, Utilities

Approved for Inclusion:

David Sewell
Chief Administrative Officer

ATTACHMENT "A"

This map was compiled by RDNO, using data believed to be accurate; however, a margin of error is inherent in all maps. This product is distributed without warranties of any kind, either express or implied, including but not limited to warranties of suitability or particular purpose or use.

2801 27A Ave DVP

Plot Date: Jun 22, 2021

Scale: 1:1,000
Plot Size: 11" x 8.5"

0 25 50 100 Meters

REGIONAL DISTRICT NORTH OKANAGAN

RDNO

ATTACHMENT "B" APPENDIX "B"

AECOM

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Memorandum

To	Zee Marcolin, P.Eng.	Page	1
CC	John Lord, Skyler Ganz, Brett deWynter		
Subject	**Conveyance and Fire Flow in Pressure Zone 483 – Final (Revision 1)**		
From	Jason Foster		
Date	October 31, 2018	Project Number	60505292

Background

The 2012 Master Water Plan (MWP[1]) laid out plans to maintain the Mission Hill Water Treatment Plant (MHWTP) meaning the hydraulic gradeline within the largest pressure zone for the City of Vernon will be 483 m for the foreseeable future (herein referred to as PZ 483). This plan is technically sound since there is significant infrastructure investment in this approach through the historical development of the water system.

There are two key challenges in the existing distribution network within PZ 483 that were identified within the MWP: the hydraulic conveyance capacity from the MHWTP to McMechan Reservoir, and fire flow availability in downtown Vernon in light of planned densification. Both of these items need to be analyzed in more detail to support capital planning and the completion of the Development Cost Charge (DCC) Bylaw.

During the completion of the MWP, the project team met with the City planning staff to improve the allocation of the future water demand to the hydraulic water model. Project No. 7 was developed to address conveyance issues to McMechan Reservoir. Since the completion of the MWP the land use projections for downtown Vernon have densified. The purpose of this memorandum is to review major water conveyance routes in PZ 483 given the revised downtown land use and associated population projections. The water demand of downtown Vernon area has increased significantly due to the current population projections resulting in the following water supply challenges that need to be addressed:

1. McMechan Reservoir filling during MDD; and
2. Conveyance of fire flows to downtown Vernon.

[1] *AECOM, Associated Engineering, Kerr Wood Leidal. Greater Vernon Water 2012 Master Water Plan – Technical Memorandum No. 4 Domestic Water System Analysis. February 6, 2013.*

ATTACHMENT "B" APPENDIX "B"

AECOM

Analysis Parameters

The modelling approach for this analysis is to conduct steady state modelling at both the Maximum Daily Demand (MDD) and Peak Hourly Demand (PHD) with the following goals:

1. Maintain the water level in McMechan Reservoir during the supply of MDD;
2. Meet PHD using McMechan Reservoir to supplement treated water supply; and
3. Meet MDD plus Fire Flow (MDD+FF) using McMechan Reservoir for water supply.

The goal is to develop an effective long term plan to distribute water within PZ 483 using projected 2052 demands. **Table 1** presents the parameters used for this exercise. Modelling is limited to the MHWTP supply area as defined in MWP Technical Memorandum No. 7, Figure 2-1[2].

Table 1 Consolidated Design Parameters

Parameter		Value
Total Demand in Mission Hill Water Treatment Plant Service Area		73 ML/d (refer to the following section)
Supply Source for PZ 483		Mission Hill Water Treatment Plant (54.8 ML/d)
Supplemental Source for PZ 483		Duteau Creek Water Treatment Plant (18.2 ML/d)
Storage for PZ 483		McMechan Reservoir (14 ML)
Water System Demands Scenario		MWP 2052 MDD + Downtown Density
Population Density[1]	Population / Single Family Dwelling	3 ca/dwelling
	Population / Multi Family Dwelling	2 ca/dwelling
Water Demands[1]	Residential Water Demand (MDD)	1,440 L/ca/d
	Commercial / Institutional	28 m^3/ha/d
	Sports Fields	70 m^3/ha/d
System Hydraulics[1]	Maximum Static Pressure	1,030 kPa (150 psi)
	Minimum Static Pressure	275 kPa (40 psi)
	Minimum Pressure (PHD)	200 kPa (29 psi)
	Minimum Pressure (MDD+FF)	140 kPa (20 psi)
	Maximum Velocity (PHD)	2.5 m/s
	Maximum Velocity (MDD+FF)	4.0 m/s
Watermain Sizing[1]	Residential	150 mm
	High Density / Commercial / Institutional	200 mm
	Industrial	250 mm
Fire Flows[1]	Single Family	60 L/s
	Multi-Family / Commercial / Light Industrial	90 L/s
	High Density Residential	150 L/s
	Industrial	200 L/s
Peak Hour Demand Factor		1.5

Notes: *1. Regional District of North Okanagan, Greater Vernon Water Subdivision and Development Servicing Bylaw No. 2650, 2013*

[2] *AECOM, Associated Engineering, Kerr Wood Leidal. Greater Vernon Water 2012 Master Water Plan – Technical Memorandum No. 7 Domestic Water System Analysis. February 6, 2013.*

ATTACHMENT "B" APPENDIX "B"

AECOM

Downtown Area Densification

As presented previously in the July 6, 2017 memorandum titled *Downtown Vernon Densification and Demands*, a critical item affecting analysis of distribution system capacity throughout PZ 483 is the densification of downtown Vernon. Since the completion of hydraulic modelling for the MWP, the development projections for the downtown area have increased significantly. The section summarizes the important details from this previous memorandum including the updated demand projections.

The delineation of the downtown area and land use types are based on the City Center District Neighbourhood Plan[3]. This document states that the downtown area "extends from Polson Park to 43rd Avenue and from the Schubert Centre to the Courthouse". The land use map provided in the Neighbourhood Plan is enclosed with this memorandum.

The MWP estimated the MDD in the downtown area to be 4.6 ML/d (based on development of the hydraulic water model for the MWP). However, a desktop analysis of the proposed downtown land uses indicates a much higher build out demand. **Table 2** presents land use types in the downtown area, the dwelling units per hectare for each and the corresponding water demand.

Table 2 Developed Downtown Water Demands

Designation	Description	Total Dwelling Units	Land Use Area (Ha)	Demand Application	MDD (ML/d)
Residential - High Density	• up to 12 storeys residential	1,781	7.91	225 d.u./Ha	5.13
Residential Small Lot - Single & Two Family Dwelling	• single, two-family, four plex, row housing up to 87 units per Ha	99	9.86	10 d.u./Ha	0.43
Mixed Use - High Density Commercial and Residential	• up to 12 storeys commercial/office and residential	3,723	16.55	225 d.u./Ha	10.72
Mixed Use - Medium Density Commercial and Residential	• up to 6 storeys commercial/office and residential	2,442	17.44	140 d.u./Ha	7.03
Community Commercial	• up to 4 storey mixed use	–	16.18	28 m^3/ha/d	0.45
Parks & Open Space	–	–	6.20	70 m^3/ha/d	0.43
Public & Institutional	–	–	12.89	28 m^3/ha/d	0.36
Total			**87.03**		**24.56**

Notes: *1. Dwelling Units in the 'Demand Application' column are converted to water demands using population density and water demands presented in Table 1.*
2. Dwelling Unit / Hectare values are based on recent AECOM work in the City of Victoria, data from the University of British Columbia Design Centre for Sustainability, and data from the 2016 Statistics Canada Census.

The projections above increase the build-out demand for downtown Vernon from 4.6 ML/d as per the MWP to 24.56 ML/d. This increases the 2052 MDD projection for the MHWTP service area from 56 ML/d to **76 ML/d**. Some variation in these demand projections is anticipated as development progresses but this is not expected to affect the long term supply strategy developed below.

[3] *City of Vernon. City Center District Neighbourhood Plan. November 14, 2011.*

ATTACHMENT "B" APPENDIX "B"

AECOM

Development of the Options

The options developed below seek to supply downtown Vernon while maintaining the water level in McMechan Reservoir. The main source for treated water for this area is the MHWTP at the south of PZ 483. Supplemental water is provided by the Duteau Creek Water Treatment Plant (WTP). Storage for this area is provided by McMechan Reservoir at the east of the pressure zone. The downtown area represents the largest consolidation of demand within PZ 483. These key components are shown on **Figure 1**.

It should be noted that it would be more typical to provide the single largest treated water storage facility close to the supply of the treated water. However, the MHWTP is located where the Kalamalka Lake water enters the potable water distribution system and McMechan Reservoir is located on 39th Avenue (the site of the legacy BX Creek open balancing raw water supply pond). There was significant water distribution infrastructure already constructed to justify the location the MHWTP and McMechan Reservoir. This means the site of these key water system assets are going to be maintained even if the distribution of water is now challenging given all the treated water supply originates from the MHWTP. At the MHWTP there is currently 0.3 ML of storage which is for balancing the treatment process and provides little benefit to the distribution system.

The build out capacity of the MHWTP is 54.8 ML/d based on the current Kalamalka Lake water licences. The RDNO is consolidating their water licences and plans to prepare a memorandum outlining all water licences. This may result in some change to the total build-out capacity of the MHWTP, however, this is not expected to have a significant impact on the results of this analysis.

Regardless of adjustments to the Kalamalka Lake licences, densification in the downtown area is projected to result in future demands beyond the future capacity of the MHWTP. Supplemental water will be provided from the Duteau Creek WTP. The proximity of the Duteau Creek transmission main to McMechan Reservoir means that the worst case scenario for conveyance within PZ 483 is when no water is supplied from Duteau Creek WTP (i.e. the worst case is when a daily demand of 54.8 ML/d is supplied entirely by the MHWTP).

There are generally three conveyance routes through the water system in Central Vernon PZ 483:

1. Transmission from the MHWTP to downtown Vernon, generally following the Highway 97 corridor;
2. Transmission from the MHWTP to McMechan Reservoir, Project No. 7 proposed by the MWP falls into this route; and
3. Conveyance between downtown Vernon and McMechan Reservoir. This route is relied upon during PHD and fires to convey water stored in McMechan Reservoir.

There are generally two options to consider for conveyance within PZ 483:

1. **Increase capacity between the MHWTP and downtown:**
    a. Supply water directly from the MHWTP to downtown;
    b. Allow existing capacity in PZ 483 east of downtown to fill McMechan Reservoir.
2. **Increase capacity between the MHWTP and McMechan Reservoir:**
    a. Supply water directly from the MHWTP to McMechan Reservoir;
    b. Allow existing capacity throughout PZ 483 supply downtown.

ATTACHMENT "B" APPENDIX "B"

AECOM

The following are the considerations of these two major conveyance routes:

- Scope of infrastructure required (cost);
- Water quality/water age;
- Align capacity upgrades with renewal of aging infrastructure;
- Transmission main alignment (Minimize transmission infrastructure in high traffic right-of-ways such at the Highway 97);
- Residual system pressure throughout PZ 483; and
- Review of major conveyance routes brings water to the boundary of downtown Vernon, upgrades within the downtown area will need to be addressed as development progresses.

The conveyance options are expanded below.

Option 1 - Increase Capacity to Downtown

Option 1 expands the capacity between the MHWTP and downtown Vernon. The downtown area is projected to be the largest consolidated demand in PZ 483. Increased capacity between the MHWTP and downtown Vernon alleviates the distribution system to the east allowing the existing distribution system to convey flows to and from McMechan Reservoir. The main concern with this option is water age within McMechan Reservoir.

Infrastructure required for this option is the twinning of the transmission main from the MHWTP to the south boundary of downtown Vernon. However, supplying demands directly without balancing storage does provide challenges during elevated network demands. Given the volume of water being supplied directly from the MHWTP with this option balancing storage should be provided at this site. This option includes a 1,500 m^3 balancing storage tank at the MHWTP significantly increasing the cost of this option.

The primary challenge with Option 1 is water age within McMechan Reservoir. By supplying water directly to downtown Vernon, these large flows bypass McMechan Reservoir, significantly reducing the water turn-over in the reservoir. Reduced cycling in McMechan Reservoir will become more of an operational challenge in the future with this option.

The preliminary concept is to twin the existing 450 mm in Highway 97 with approximately 2,800 metres of 300 mm diameter transmission. This twin transmission main would follow the existing alignment from the MHWTP to 15th Avenue and then along 33rd Street toward downtown. In the future, when the main in Highway 97 is renewed, the replacement pipe can be routed in parallel along 33rd Street. An alternative to twinning would be to construct a single 600 mm diameter transmission main in 33rd Street, however, this would increase the capital cost.

The hydraulic model indicates a system failure in PZ 483 during the MDD+FF scenario for both options presented in this memorandum. When build-out demands and a 200 L/s fire flow are applied to the model, the east to west capacity of the distribution system is unable to maintain water pressure in the area of 15th Avenue and 15th Crescent. This can be corrected by providing an interconnecting PRV that supplies water from the current DND pressure zone to PZ 483. Two items should be noted:

1. This failure does not occur when the MHWTP is operating, however, it is typical to assume the treated water sources are not operational during a fire event; and
2. Treated water reservoirs will not be filling during this scenario (eg. PZ 431 Reservoir).

ATTACHMENT "B" APPENDIX "B"

AECOM

The conceptual level capital cost for this option is $4,700,000, including the 1,500 m^3 balancing storage tank at the MHWTP and 2,800 metres of transmission main. Cost estimate breakdowns are enclosed with this memorandum.

A summary of the advantages and challenges of Option 1 is as follows:

Advantages

- More direct flow route from MHWTP to high downtown Vernon demands.
- Maximum use of existing network between MHWTP and McMechan Reservoir.
- Option to move transmission main out of Highway 97.
- Less transmission main construction required.

Challenges

- Higher Capital Cost.
- Required balancing storage at MHWTP.
- Challenging to use the entire volume of the existing McMechan Reservoir.
- Water Quality / Water Age concerns for McMechan Reservoir – operating scenarios and system controls will be required to mitigate this issue.
- Downtown demand projection may change.
- Low Pressures at higher elevations west of Downtown during a fire.
- Highway 97 crossing.

Option 2 – Increase Capacity of Route 2

Option 2 is to expand capacity between the MHWTP and McMechan Reservoir. This option aligns with the conveyance philosophy of PZ 483: primary flow path from the MHWTP to McMechan Reservoir then to the distribution system. The MWP developed Capital Project No. 7 to convey treated water from the MHWTP to McMechan Reservoir. Since the completion of the MWP, the RDNO has twinned the existing 250 mm in 25th Avenue with a new 350 mm main. This means the original scope of Project No. 7 can be reduced.

Option 2 consists of 1,370 metres of a 600 mm transmission main from the intersection of 25th Avenue and 15th Street to McMechan Reservoir. This project is adequate to convey flow from the MHWTP to McMechan Reservoir at a system demand of 54.8 ML/d (with downtown demands increased proportionally). Beyond this demand it is expected that additional flow will be provided from Duteau Creek transmission main which will improve reservoir turnover.

The primary long term advantage of this option is increasing the hydraulic conveyance toward McMechan Reservoir which will promote reservoir turn over and alleviate water age issues within the reservoir. This option also better aligned with the location of the current demands within the distribution system.

As noted with Option 1, if the MHWTP is offline during build-out MDD and a 200 L/s fire event, supply from McMechan Reservoir alone fails to maintain pressures west of downtown in the area of 15th Avenue and 15th Crescent. This can be mitigated with an interconnecting PRV that supplies water from the current DND pressure zone.

The conceptual level capital cost for this option is $2,500,000. This cost has been updated from the original estimate of $1,700,000 in Project No. 7 from the MWP to reflect current construction prices and reduced transmission main length. Cost estimate breakdowns are enclosed with this memorandum.

ATTACHMENT "B" APPENDIX "B"

AECOM

A summary of the advantages and challenges of Option 2 is as follows:

Advantages

- Lower capital costs.
- Aligns with PZ 483 conveyance philosophy.
- Improves conveyance directly to McMechan Reservoir promoting reservoir turn over and effective use of the existing storage facility.
- Operationally passive solution.

Challenges

- Requires large diameter transmission main.
- Low Pressures at higher elevations west of Downtown during a fire.

Closing

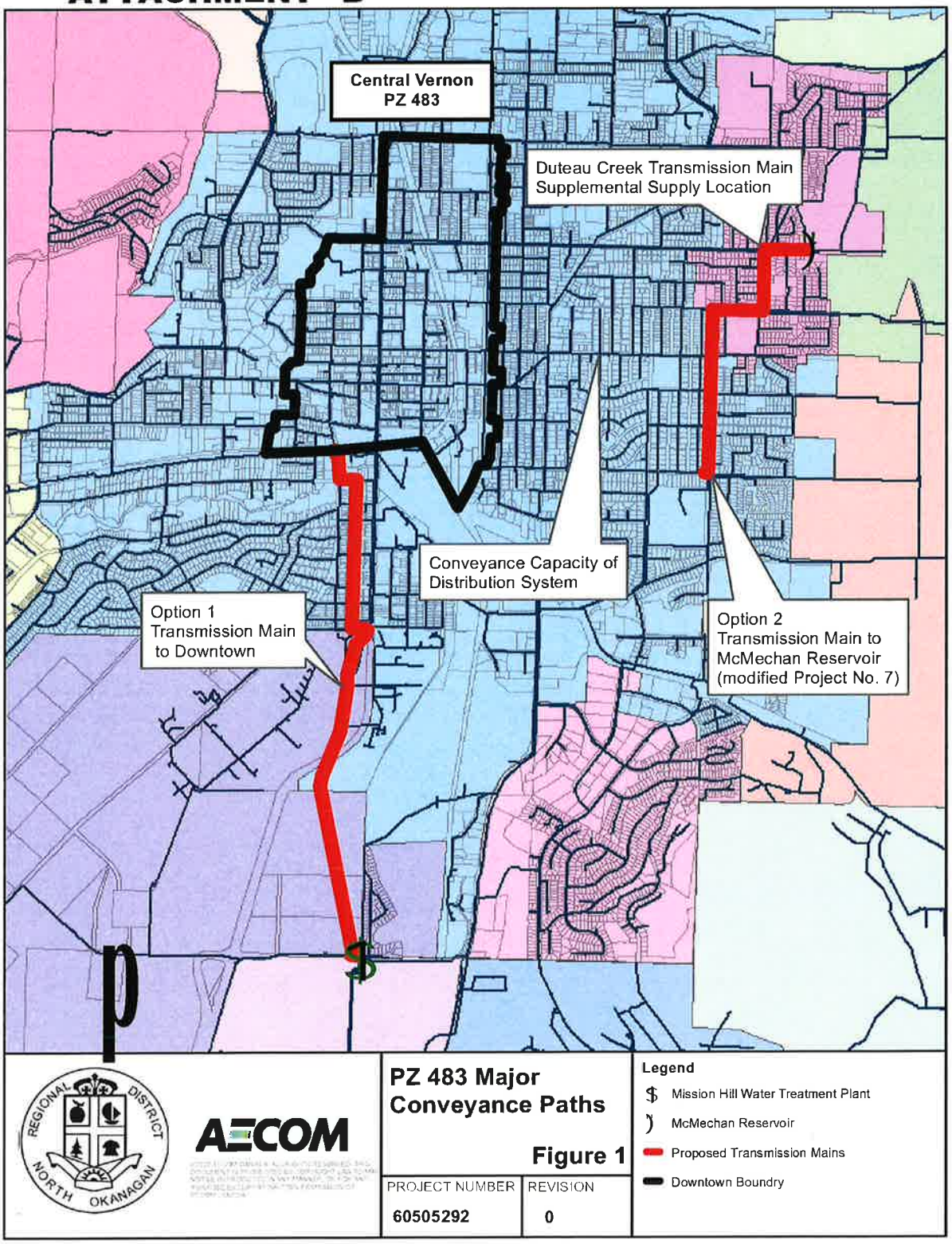
The additional water demand currently being projected for downtown Vernon is a significant increase for the area. This results in more treated water demand for the entire network that needs to be provided from the two long term treated water sources – the MHWTP and the Duteau Creek WTP. The capacity of the MHWTP is limited by the water licences on Kalamalka Lake. Regardless of the demand projections in downtown Vernon, the maximum amount of water that needs to be conveyed from the MHWTP site to McMechan Reservoir site is 54.8 ML/d, the Kalamalka Lake licence capacity.

It is anticipated that future water demands in PZ 483 (and the downstream pressure zones) will exceed the Kalamalka Lake licence capacity, regardless of nominal variation in demand projections. Additional treated water needs to be supplied from the Duteau Creek WTP. Flow from the Duteau Creek transmission main is diverted adjacent the McMechan Reservoir site, meaning no transmission upgrades are required for supplemental flows from Duteau Creek.

AECOM provides the following recommendations:

1. Proceed with Option 2 (modified Project No. 7 of the MWP). This is the least expensive option and aligns with historical development of the distribution system and McMechan Reservoir. Additionally, Option 2 better aligns with the present day locations of demands in the distribution system and maximizes the use of the existing the MHWTP and McMechan Reservoir, both multi-million dollar facilities.
2. The RDNO is consolidating their Kalamalka Lake water licences and plans to prepare a memorandum outlining all water licences. The build-out capacity of the MHWTP should be revisited during detailed design as this will dictate the volume that must be conveyed to McMechan Reservoir.

ATTACHMENT "B" **APPENDIX "B"**



ATTACHMENT "B" APPENDIX "B"

Regional District of North Okanagan
Estimate of Capital Cost: Option 1 - Highway 97 Route

Job No. 60505292
30-Apr-18

Item	Description	Quantity	Unit	Unit Price	Extension ($)
1.0	**General Requirements**	1	LS	NA	$ 510,000
2.0	**Civil and Site Work**	1	LS	NA	$ 1,719,000
3.0	**Architectural and Structural**	1	LS	NA	$ 1,125,000
	Sub-Total Complete Project				**$ 3,350,000**
	Construction Contingency (approximately 40%)				$ 1,350,000
	ESTIMATED CAPITAL COST				**$ 4,700,000**

ATTACHMENT "B" APPENDIX "B"

Regional District of North Okanagan
Estimate of Capital Cost: Option 1 - Highway 97 Route

Job No. 60441342
30-Apr-18

Item No.	Description	Unit of Measurement	Est. Total Quantity	Unit Price	Extended Total Price
DIVISION 1 - GENERAL REQUIREMENTS					
1.1	Overhead/Indirect Costs (5% of project value)	Lump Sum	1	$ 160,000	$ 160,000
1.2	Profit (10% of project value)	Lump Sum	1	$ 300,000	$ 300,000
1.3	Mobilization\Demobilization	Lump Sum	1	$ 50,000	$ 50,000
TOTAL DIVISION 1 - GENERAL REQUIREMENTS					**$ 510,000**
DIVISION 2 - SITE WORKS					
2.1	300mm Diameter Transmission Main	m	2800	$ 600	$ 1,680,000
2.2	Trenchless Crossing (Casing or Directional Driling)	ea	1	$ 30,000	$ 30,000
2.3	300mm Tie-ins	ea	2	$ 4,500	$ 9,000
TOTAL DIVISION 2 - SITE WORKS\REMOVALS					**$ 1,719,000**
DIVISION 3 - CONCRETE					
3.1	Balancing Storage at Mission Hill WTP	m^3	1500	$ 750	$ 1,125,000
TOTAL DIVISION 3 - CONCRETE					**$ 1,125,000**
TOTAL CAPITAL PROJECT COST SUB-TOTAL					$ 3,350,000

60505292-Options Costs-Rev0.xlsx1: To Downtown Detail

ATTACHMENT "B" APPENDIX "B"

Regional District of North Okanagan
Estimate of Capital Cost: Option 2 - Transmission to McMechan Reservoir

Job No. 60505292
30-Apr-18

Item	Description	Quantity	Unit	Unit Price	Extension ($)
1.0	**General Requirements**	1	LS	NA	$ 410,000
2.0	**Civil and Site Work**	1	LS	NA	$ 1,390,000
	Sub-Total Complete Project				**$ 1,800,000**
	Construction Contingency (approximately 40%)				$ 700,000
	ESTIMATED CAPITAL COST				**$ 2,500,000**

ATTACHMENT "B" APPENDIX "B"

Regional District of North Okanagan
Estimate of Capital Cost: Option 2 - Transmission to McMechan Reservoir

Job No. 60441342
30-Apr-18

Item No.	Description	Unit of Measurement	Est. Total Quantity	Unit Price	Extended Total Price
DIVISION 1 - GENERAL REQUIREMENTS					
1.1	Overhead/Indirect Costs (5% of project value)	Lump Sum	1	$ 130,000	$ 130,000
1.2	Profit (10% of project value)	Lump Sum	1	$ 230,000	$ 230,000
1.3	Mobilization\Demobilization	Lump Sum	1	$ 50,000	$ 50,000
TOTAL DIVISION 1 - GENERAL REQUIREMENTS					**$ 410,000**
DIVISION 2 - SITE WORKS					
2.1	600mm Diameter Transmission Main	m	1370	$ 1,000	$ 1,370,000
2.2	Trenchless Crossing (Casing or Directional Driling)	ea	0	$ 30,000	$ -
2.3	600mm Tie-ins	ea	2	$ 10,000	$ 20,000
2.4	System Upgrades Between McMechan Res and 25th Avenue	LS	0	$ 500,000	$ -
TOTAL DIVISION 2 - SITE WORKS\REMOVALS					**$ 1,390,000**
DIVISION 3 - CONCRETE					
3.1	Balancing Storage at Mission Hill WTP	m^3	0	$ 750	$ -
TOTAL DIVISION 3 - CONCRETE					**$ -**
TOTAL CAPITAL PROJECT COST SUB-TOTAL					$ 1,800,000

60505292-Options Costs.Rev0.xlsx2, To McMechan Detail

REGIONAL DISTRICT NORTH OKANAGAN

STAFF REPORT

TO:	**Greater Vernon Advisory Committee**	**File No:**	**5790.03.02.01**
FROM:	**Utilities and Finance Departments**	**Date:**	**July 07, 2021**

SUBJECT: 2021 Greater Vernon Water Agricultural Review – Capital Contribution

RECOMMENDATION 1:

That it be recommended to the Board of Directors, the approach and assumptions used to calculate the agricultural sector's contribution towards infrastructure renewal be endorsed, specifically:

- The 20-year Annual Average Investment from the asset management plan will be used as the basis for calculating the agricultural sector's contribution towards infrastructure renewal, and
- The infrastructure renewal requirements apportioned to agriculture will be offset by the annual value of water licences.

RECOMMENDATION 2:

That it be recommended to the Board of Directors the agricultural Allocation Fee be increased by an additional 7.5% relative to residential rate increases and be phased-in at 1.5% per year over a 5-year period (2022 to 2026) to fund infrastructure renewal to support agriculture.

RECOMMENDATION 3:

That it be recommended to the Board of Directors staff review the agricultural rate structure to investigate options to implement a volumetric rate for agricultural properties to better incentivize water conservation.

SUMMARY:

As part of the agricultural review requested by the Greater Vernon Advisory Committee (GVAC), staff has completed an analysis of the agricultural sector's proportionate contribution towards infrastructure renewal and the impact on agricultural rates. There is a wide ranging impact on agricultural rates depending upon the approach and assumptions made in the analysis.

Staff is seeking the GVAC's endorsement regarding the reasonableness of the approach and two (2) key assumptions.

- Assumption 1 – when calculating the annual infrastructure renewal cost to support agriculture the 20-year Annual Average Investment (20-year AAI) will be used.

- Assumption 2 – the annual value of the water licences contributed to Greater Vernon Water (GVW) by the agricultural sector will be used to offset the infrastructure renewal requirements to support agriculture.

Based on these assumptions, there is approximately an $80,000 annual revenue shortfall from agriculture to fund the required infrastructure renewal that supports the agricultural sector. The shortfall equates to a 7.5% increase in the Allocation Fee charged to agricultural properties. It is being recommended that the increase be phased-in over a 5-year period; however, the GVAC may wish to shorten or lengthen the phase-in period.

Staff will bring back a GVW rates bylaw amendment to an upcoming GVAC meeting with a January 1, 2022 effective date that incorporates the decisions of the Board.

It is also being recommended as part of the continuing agricultural review that staff review the agricultural rate structure to investigate options to implement a volumetric rate for agricultural properties to better incentivize water conservation. Under the existing rate structure, there is little initiative in the agricultural community to conserve water, fix leaks or invest in more efficient irrigation systems, as long as the customers stay within their overall allocation. By implementing a consumption based rate, there would be an incentive for all of these practices to occur.

BACKGROUND:

The following resolution was carried at the August 19, 2020 Board of Directors (BOD) meeting, as recommended by the GVAC at its August 12th meeting:

> *"That the principles of the Greater Vernon Water (GVW) Guidelines for Rates and Fees Structure dated February 21, 2017 be used for setting the next rates and fees bylaw for GVW; and further,*
>
> *That an investigation be conducted regarding the addition of capital replacement costs to agricultural rates."*

The following resolution was carried at the September 9, 2020 GVAC meeting:

> *"That the presentation and report dated September 9, 2020 from the Utilities and Finance Departments and titled "2021 Greater Vernon Water Rates Discussion – Utility Information" be received.*
>
> *That it be recommended to the Board of Directors, Greater Vernon Water agricultural water rates be increased by 0.5% per year more than residential rate increases for four years as a contribution towards infrastructure renewal."*

However, after discussion at the September 16, 2020 BOD meeting, following resolution was carried:

> *"That the matter of increasing Greater Vernon Water agricultural water rates as a contribution towards infrastructure renewal be referred to the Special Greater Vernon Advisory Committee meeting scheduled for October 14, 2020."*

A Special GVAC meeting was held on October 14, 2020 that included a presentation provided by the General Manager, Utilities and the General Manager, Finance that:

- reviewed the rate structure of the current GVW rates bylaw;
- provided a summary of recommended changes;
- reviewed the Implementation Strategy within the GVW Master Water Plan; and
- reviewed agricultural rates and rate options moving forward.

After discussions, the following motions were carried at the October 14th meeting and at the subsequent October 21, 2020 BOD meeting:

"That the Infrastructure Base Fee and Metered Consumption Rate for Residential and ICI properties and the Allocation Fee for agricultural properties be increased as follows:

	2021	2022	2023	2024
Residential & ICI	1.9%	2.4%	2.4%	2.9%
Agricultural	2.4%	2.9%	2.9%	3.4%

That Greater Vernon Water continue to use 1.9% as a proxy for future inflation for Greater Vernon Water Rates.

That Special Greater Vernon Advisory Committee meetings be scheduled in 2021 to review agricultural water rates.

That Greater Vernon Water agricultural water rates be increased by 0.5% per year more than Residential rate increases for four years as a contribution towards infrastructure renewal.

That the proposed amendments to other Greater Vernon Water rates and regulations structure as outlined in the attachments to the report titled "2021 Greater Vernon Water Rates Discussion - Review of Rate Structure" and dated October 14, 2020 be approved."

The following motions were carried at the November 18, 2021 BOD meeting:

"That Greater Vernon Water Rates Imposition Bylaw No. 2864, 2020 be given First, Second and Third Readings.

That Greater Vernon Water Rates Imposition Bylaw No. 2864, 2020 be Adopted."

DISCUSSION:

GVAC meetings occurred from August to November of 2020 to develop the next GVW rates and fees bylaw as the previous *GVW Rates and Fees Imposition Bylaw No. 2768, 2018* only set rates to the end of 2020. In November of 2020, the BOD adopted *Greater Vernon Water Rates Imposition Bylaw No. 2864, 2020*, which set the GVW rates and fees for the next four years (2021 to 2024).

During the 2020 meetings, there was considerable discussion around a contribution from agricultural customers to capital replacement costs. Bylaw 2864 was adopted with a rate increase that followed the recommendations of the 2017 GVW Master Water Plan (MWP) that recommended a 1% increase

over Consumer Price Index over a 5-year period (2018 to 2022). Within Bylaw 2864 the final two (2) years of increase were spread across 2021 to 2024.

In addition, a 0.5% increase to agricultural rates over and above the Domestic[1] rate increases were approved in order to provide for an initial capital contribution from agriculture. This was adopted with the understanding that an agricultural review process would start in 2021 to complete a full review of the agricultural program as outlined in Attachment "A". Staff were requested to complete the capital contribution calculations for the first agricultural review meeting, which is the basis of this report.

Staff want to highlight that the analysis provided in this report is somewhat subjective, but provides a good basis for discussion. Further discussion on two (2) key assumptions is presented below.

Assumption 1 – Infrastructure Renewal Costs to Support Agriculture

GVW is a complex utility that has a large agricultural base, as well as a large Domestic customer base with total flows that fluctuate from about 15 MLD (megaliters per day) in the winter to 200 MLD in the summer. In addition, Domestic and agricultural customers require different system designs, water quality, service levels and legislative outcomes.

In order to calculate a reasonable infrastructure renewal cost allocation to the agricultural customer base, staff used similar assumptions that were incorporated within the assignment of the operations and maintenance (O&M) cost allocation exercise.

The GVW Asset Management Plan (AMP) was also used as the basis for determining the infrastructure renewal requirements over the long term. The Plan and the calculations in Attachment "B" consider both the Annual Average Life Cycle Investment (AALCI) and the 20-Year Annual Average Investment (20-Year AAI). The MWP incorporates the AALCI, in part, because the Master Plan's time horizon is 25 years and most of GVW capital assets (water pipes) have long life spans (+/- 80 years). Most of the Regional District's other services incorporate the 20-Year AAI into their capital plans and budget discussions.

Much of the infrastructure that supports agriculture was constructed in the 1970s after the canal system was replaced by pipes; therefore it is relatively "young". In comparison, some areas of the Domestic system were built in the early 1920-40s. The current capital plan for GVW focuses on water quality improvements, system improvements for Domestic customers (i.e. generators, fire flow storage, etc.) and infrastructure renewal. The replacement of older Domestic infrastructure will generally occur in the near term and infrastructure to support agriculture in later years. Hence, it was deemed appropriate to have a shorter time horizon with respect to the agricultural sector and adjust the calculations over time with the changing conditions.

The use of AALCI results in a higher contribution from agriculture ($2.41 million versus $1.24 million); however, the 20-year AAI figure is assumed to reflect a more appropriate goal in the shorter term for infrastructure renewal to support the agricultural sector. It is recommended that these calculations be reviewed in the next update of the Master Water Plan, which will be completed after the filtration plant is constructed at the Mission Hill Water Treatment Plant.

[1] Domestic customers include Residential customers and Industrial, Commercial and Institutional (ICI) customers that require potable water.

The calculations and assumptions related to the infrastructure renewal costs to support agriculture is provided in Attachment "B".

Assumption 2 - Value of Water Licences

Due to this historic access of the Vernon Irrigation District (VID) water licences to facilitate growth in the City of Vernon, staff were directed to review the value, if any, towards a contribution towards the agricultural capital contribution as the Duteau water licences are generally considered an agricultural asset.

Staff completed preliminary on-line research on water trading to assess if a value can be attributed to water licenses based on practices in different areas of the world. Although water markets do not seem to be widespread, staff found examples in Australia, California and South Africa (Attachment "C"). Regional water shortages appear to be the impetus of the development of a water market. Staff are providing this information for interest; however, due to the large fluctuations in pricing from normal versus drought conditions, it was difficult to use these examples to assign a value in the case of GVW.

There is no open market on water trading in BC based on the *Water Sustainability Act* (WSA) which requires beneficial use; a person / organization must apply for a water licence for the right to use water, pay their rental fee and are obligated to actively put the water to a "beneficial use" as defined by the Act. Within the WSA, the Province has the ability to cancel a licence and reassign water to another proponent if the water licence is not being used for beneficial use. There is no opportunity to sell a water licence for monetary gain and the only value is application and infrastructure development costs for new water licences. Hence, for this exercise, a proxy for the value of accessing the VID water licences was correlated to the avoidance of having to develop another source to supply water for growth in the City of Vernon.

Based on this assumption, staff completed an assessment based on infrastructure and operations and maintenance costs that would have been required by the City of Vernon to develop Okanagan Lake as a potable water source. Attachment "D" provides background and the calculation of costs for this assumption.

The AALCI and O&M costs are the long term annual savings of using the VID water licences and infrastructure compared to developing the Okanagan Lake Pump Station as a Domestic water source. Hence, based on the assumption that this amount represents a continual annual cost that would have required funding if the VID water licences and infrastructure were not available. This amount has been used as the annual cost of the water licences, which was calculated to be $1.16 million per year.

Options for the Timeframe of Increases to Agricultural Rates

Based on the calculations and assumptions, there is approximately an $80,000 annual revenue shortfall to fund infrastructure renewal in support of agriculture.

The current revenue from agriculture is, on average, approximately $1,100,000 based on the analysis completed for 2017 to 2019. It should be noted that this amount is strictly based on user rates and fees and does not include any Allocation Purchase Fees that are collected.

Allocation Purchase Fees should be viewed from the same viewpoint as Water Development Cost Charges. They are charged and collected to assist in funding growth-related capacity increases, rather than to be used to fund infrastructure renewal. As such, Allocation Purchase Fee revenue has not been

included in this analysis. If revenue from the Allocation Purchase Fee was included, it would lower the proposed rate increase for agriculture.

Table 1 presents a number of options to implement the increase. Staff has recommended a 5-year phase-in for discussion purposes. The 2021 Allocation Fee is $320.56 per hectare per year.

Table 1. Timeframe to Implement Increase and Annual Impact on Agricultural rates

Years to Implement Increase	Annual $ Increase	Annual % Increase	Total % Increase with 1.9% CPI
Over 1 Year	$80,000	7.5%	9.4%
Over 3 Years	$26,667	2.5%	4.4%
Over 5 Years	$16,000	1.5%	3.4%
Over 10 Years	$ 8,000	0.7%	2.6%

Enclosures:

- Attachment "A" – Greater Vernon Water – 2021 Agricultural Review: List of Topics
- Attachment "B" – Memo dated June 11, 2021 titled "Infrastructure Renewal Cost to Support Agriculture"
- Attachment "C" – Memo dated May 25, 2021 titled "Water Trading Summary"
- Attachment "D" – Memo dated June 14, 2021 titled "Value of Duteau Creek Water Licences based on Infrastructure Costs"

Submitted by:

Zee Marcolin, P.Eng.
General Manager, Utilities

Submitted by:

Stephen Banmen
General Manager, Finance

Approved for Inclusion:

David Sewell
Chief Administrative Officer

ATTACHMENT "A"

Greater Vernon Water – 2021 Agricultural Review

List of Topics

1. **Asset Management – Capital Contribution**
   - Consideration in rate setting
     - Domestic (includes Residential & Industrial, Commercial and Institutional (ICI)) vs Agricultural operations costs
     - Capital replacement costs
   - Value of Domestic services (i.e. hydrants and fire protection flows) on the non-potable, separated areas
   - Value of water licences
2. **Allocation**
   - Allocation – history, where from and comparison to other jurisdictions
   - Historic use versus forecast demands due to climate change
   - Modernization recommendations
   - Increasing customer base where no capacity for further Allocation purchases exist based on "full Allocation".
   - Cost to Purchase Allocation
     - Capital contribution fee / capital expenditure charge?
     - How much charged and how was rate set?
     - Impact on land value
     - Payback period of purchasing Allocation
     - Allocation as a form of Development Cost Charge (DCC)
3. **Rates and Rate Setting**
   - Allocation – flat fee
   - Season – "April 15 to Sept. 15" - "Irrigation Season" versus "Off Season rates"
     - Analysis of what crops are most likely to need water early or late in the year, pushing demand for an extended irrigation season.
   - Review of eligibility criteria of agricultural rates – BC Assessment and Regional District of North Okanagan (RDNO) Farm Classification (for smaller hobby farms)
   - Options on rates setting - future direction
     - Volumetric / consumption based billing – review flat rate or combination of the volumetric / flat fee in order to incentivize conservation and investment in irrigation systems by the agricultural community and provide rate stability.
     - Beyond "over-consumption" rate

ATTACHMENT "A"

- Entire agricultural water used versus individual Allocation (if change fee direction - how to ensure enough water in a season)

4. **Farming Practices**
   - Changes in crops (RDNO – change from forage crops to grapes and other cash crops like lettuce and cherries)
     - Pressure to price differently
   - Farming practices (industrial farming vs family farms)
   - Distribution / irrigation changes – i.e. new industrial farming customers with expectations not conducive to water system design
     - Ramping rates
     - Flow rates
     - Change from 24 hour / 7 day / week irrigation to high flow / short duration
     - Use of physical equipment (Dole valves, pressure sustaining valves, system to "call for" water, etc.)
     - Use of Domestic water for industrial agriculture (e.g. lettuce washing is done using potable water at ICI rates). This high off-season demand impacts distribution infrastructure, shift in utility operations to supply higher demands in winter.
5. **Other**
   - Climate change predictions - impacts on agriculture and Allocation
   - Enforcement – effect enforcement
   - Self serves (private valves not controlled by the water utility on property)
   - Agricultural properties using water for landscape
   - Wasting water to accommodate flow fluctuations (operations issue) and potential direction to reduce.

ATTACHMENT "B"

REGIONAL DISTRICT NORTH OKANAGAN

MEMORANDUM

File No: 5790.03.02.01
Date: June 11, 2021

TO: **Greater Vernon Advisory Committee**

FROM: **Utilities Department**

SUBJECT: **Infrastructure Renewal Cost to Support Agriculture**

BACKGROUND:

Agricultural Program Financing Background

A comprehensive analysis of the Greater Vernon Water (GVW) revenue / expenses was completed in 2016 (using 2015 actuals) for the development of the 2017 GVW rates bylaw. This analysis was able to be completed after GVW staff worked with the finance departments of the Regional District of North Okanagan (RDNO), City of Vernon (CoV) and District of Coldstream (DoC) to update the general ledger (GL) accounts to focus coding revenues and operating and maintenance (O&M) costs to the following categories: Domestic only, Agriculture only and Mixed (where expenses that relate to a mixed service for both Domestic & Agriculture are charged).

The initial analysis review in 2016 of the O&M costs related to agricultural supply relative to agricultural fee revenue generated found that there was approximately a $72,000 shortfall between agricultural expenses and agricultural revenue. To align the agricultural program expenses to revenue, agricultural rates were increased by 3.7% over three (3) years (2017 to 2019). In 2020, the agricultural rate increase was 2.9%, consistent with other GVW rate increases.

During the development of *Greater Vernon Water Rates Imposition Bylaw No. 2864, 2020 (*BL 2864), staff reviewed GVW actual revenue / O&M costs for the three (3) preceding years (2017 to 2019) to assess if the increase was sufficient to realign the agricultural rates to cover O&M costs. This analysis found that the rate increase from 2017 to 2019 was sufficient to cover the agricultural program O&M costs.

GVW Asset Management Plan

The 2017 GVW Master Water Plan (MWP) was endorsed by the Board of Directors on November 15, 2017 and accepted by Interior Health on January 25, 2018. The Financial Implementation Strategy (FIS) within the 2017 GVW MWP incorporated the Asset Management Investment Plan (AMIP) for GVW, as well as new capital required to meet Provincial drinking water standards. The FIS incorporated a full suite of tools for financing that included reserves, grants, Development Cost Charges (DCC) and the use of current revenues to balance new capital projects with asset renewal projects.

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The following table is the AMIP scenarios in Section 6.5 of the 2017 MWP as developed by Urban Systems and used to develop the MWP and the FIS:

Asset Category	Scenario 1: Standard Service Life	Scenario 2: Service Life Increased by 25%	Scenario 3: Service Life Increased by 50%
AALCI	$13,500,000	$10,800,000	$9,000,000
20 Year AAI	$17,200,000	$3,500,000	$2,500,000

The MWP set the long-term goal of an Annual Average Life Cycle Investment (AALCI) of $10.8 million per year for asset renewal (in 2017 dollars) to ensure sustainability for the utility. This assumes that GVW can increase the infrastructure service life by 25%. The 20 Year Average Annual Investment (20-Year AAI) shows that the current level of funding is sufficient in the short term, but needs to be increased in the long term to achieve sustainability. The goal to reach the sustainable level of funding of the AALCI was within 25 years of the MWP (i.e. 2042) as based on the current age and condition of the GVW infrastructure as demonstrated by the lower 20-Year AAI. This allows GVW to increase funding slowly to avoid rate shock to align with the Best Management Practices for setting rates.

To achieve this goal, the FIS recommended a 5% rate increase, over and above inflation, phased-in over five (5) years (2018 to 2022). The 5% increase was fully attributed to the phase-in of the Asset Management Investment Plan. Other large cost increases were offset by the reduction of debt servicing costs over the time horizon of the plan.

As part of the 2020 rates discussion, an analysis was completed to ensure the projections made in 2017 were still valid and have been realized. The analysis showed that overall the plan was on target, which means that although an additional 2% rate increase over and above inflation is required in the short term, the plan's long term objective of only inflationary increases remained intact. A fairly significant increase in the long term capital plan due to construction costs being higher than expected was offset by better than expected reserve balances, higher annual revenue and lower annual debt payments due to favourable rates for debt issues that have been refinanced. Furthermore, the additional 3% rate increase spread over the prior three (3) years (2018, 2019 and 2020) was shown to have been allocated to the capital program as planned, and was not absorbed by operations. The 5% increase as recommended will be fully achieved at the end of BL 2864, after which only inflationary increases will be required assuming economic conditions align with the predictions of the 2017 GVW MWP. It should be noted, that this is assuming that the projections within the MWP are correct and will be updated during each rates setting cycle with a full review at the next MWP update planned after the Mission Hill Water Treatment Filtration Plant is constructed.

Asset Management / Lifecycle Cycle Costing for Agriculture

Staff has been tasked to split the assets of GVW to assign an infrastructure value for Domestic use and agricultural use. Staff has tried to complete this assignment with a fair and equitable breakdown based on the differing requirements for each customer class; however, it should be noted that there is a fair amount of subjectivity to this assessment due to the unknowns and many factors involved in operating a mixed system.

ATTACHMENT "B"

Memorandum dated: June 11, 2021
Subject: Infrastructure Renewal Cost to Support Agriculture

Table 1 below provides an overview of the Asset Management calculations assigned for Mixed, Domestic and Agricultural assets and provides full replacement costs, deficit, Annual Average Life Cycle Investment (AALCI) and 20 Year Annual Investment (20-Year AAI). It should be noted that the overall infrastructure values presented below may differ than those presented in the Urban Systems report; however these values have been updated by staff and are considered more accurate.

Table 1 - Overview of Infrastructure Assignment - Mixed, Residential & Agricultural

System	Replacement Cost	Remaining Value	% Remaining Value	Deficit Backlog	% Infrastructure Deficit	AALCI [1]	20 YAAI [2]
Mixed	$326,960,000	$143,463,000	44%	$26,041,000	8%	$4,345,000	$2,089,000
Domestic	$388,980,000	$250,743,000	64%	$11,407,000	3%	$5,473,000	$2,122,000
Agricultural	$14,600,000	$6,916,000	47%	$3,110,000	21%	$239,000	$197,000
Total	**$730,540,000**	**$401,122,000**	**55%**	**$40,558,000**	**6%**	**$10,057,000**	**$4,408,000**

Notes

1. Annual Average Life Cycle Investment (AALCI) is the replacement cost divided by the infrastructure lifespan (sum of the assessment completed at the infrastructure level). This is considered the annual investment required to renew infrastructure long-term and provide a fully funded sustainable renewal program
2. 20 Year Annual Investment (20 YAAI) - is the cost infrastructure replacement requirements in the next 20 years.

Table 2 provides the calculations for the AALCI and 20-Year AAI for the mixed infrastructure that supports agriculture and Domestic are assigned a value of 50% to each customer class. The rationale being that each customer class is equally dependent on the existence of the infrastructure and without it, each customer class would require fully supporting the lifecycle cost to maintain the system. This is an important assumption that impacts the amount allocated to agriculture and Domestic customers.

Table 2 - Option 1 - Mixed infrastructure assigned equally to agricultural and Residential customers

System	Replacement Cost	Remaining Value	% Remaining Value	Deficit Backlog	% Infrastructure Deficit	AALCI	20 YAAI
Domestic	$552,460,000	$322,475,000	58%	$24,428,000	4%	$7,646,000	$3,167,000
Agricultural	$178,080,000	$78,648,000	44%	$16,131,000	9%	$2,411,000	$1,241,000
Total	**$730,540,000**	**$401,123,000**	**55%**	**$40,559,000**	**6%**	**$10,057,000**	**$4,408,000**

The assumptions related to the values presented in Table 1 and 2 use the same method of customer class assignments as the O&M budget agriculture versus Domestic assignment with the following assumptions:

- All treatment facilities and infrastructure related to fire flows and storage are assigned to Domestic
- Infrastructure that service Domestic customers only are assigned to Domestic
- Infrastructure that service agricultural customers only are assigned to agricultural
- Infrastructure that service both Domestic and agricultural customers are assigned to a combined class called "Mixed"
- Mixed infrastructure is assigned a 50:50 between Domestic and agriculture
- Reflects a 25% increase in life span for infrastructure.

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Memorandum dated: June 11, 2021

Subject: Infrastructure Renewal Cost to Support Agriculture

There has been some discussion about each customer class requiring different sizes of infrastructure which could influence the mixed cost assignment. Staff has not included this differentiation in this calculation as the cost to upsize a water main is very low compared to the full cost of construction (i.e. 10% or less) and the larger water mains required for agricultural flows closer to the Duteau Creek source would be offset by the larger water mains required to support fire flows in the BX and Bella Vista areas. Based on this rationale, it is unlikely there would be a significant change to the outcome and the analysis would be complicated and subjective; hence, would not add substantial value to this discussion.

Submitted by:

Zee Marcolin, P.Eng.
General Manager, Utilities

Submitted by:

Stephen Banmen, MBA
General Manager, Finance

ATTACHMENT "C"

REGIONAL DISTRICT NORTH OKANAGAN

MEMORANDUM

File No: 5790.03.02.01
Date: June 28, 2021

TO: **Greater Vernon Advisory Committee**

FROM: **Utilities Department**

SUBJECT: **Water Trading Summary**

BACKGROUND:

The following is a summary of preliminary research completed on water trading in different areas of the world. Water trading appears to be concentrated in parts of the world that undergo extreme water shortages; examples from Australia, California, and South Africa are provided below.

A. **AUSTRALIA:** In Australia, a cap and trade system was developed in the late 1990's due to increasing water scarcity. In this system, water cost fluctuates depending on storage and drought, where the cost of water is highest during a drought. The price per megalitre (ML) was over $1,000 (AUS) during the worst period of drought in 2007. The price dropped to just over $100/ML in 2018, when water supplies rebounded. The Australian system has changed significantly since 2011 when improvements were made to carryover (store) water from year to year. With more storage, the pressure to trade water has dropped.

B. **CALIFORNIA:** In California, buyers and sellers trade water through short and long-term leases and permanent sales of water rights. Similar to B.C.'s beneficial use rules, California will claw back water rights if not used for five (5) consecutive years. Farms and cities can trade water, with cities taking a growing share in the last 20 years, and environmental water purchases have also been made to support wildlife and reduce salt infiltration. The trading process is very complex, taking months or years, as regulators must address impacts from moving water from one place to another on both the environment and other water users. Storage is another issue – to have water to sell more storage is needed. Due to this complexity, few short-term trades are made and trading only accounts for 5% of all water used in California. Trading systems in California are also under scrutiny due to the indirect economic impacts of the fallowing of lands when water is traded outside the local community or region. The loss of employment and revenue to adjacent businesses is not compensated for in the sale price paid to the private water holder. These impacts are lessened when trades are made at the local scale, but the loss of employment or other community benefits such as weed management on the fallowed properties may still have a significant impact on the wider community.

C. **SOUTH AFRICA**: Researchers have found that South African water users have a greater appreciation of the value of the resource, and there is more crop production with fewer water resources, in their water markets. Past rate schemes undervalued water, often charging fees at 30% of the operation and maintenance cost. Current market systems have encouraged farmers to change to higher efficiency irrigation systems in order to sell surplus water. The

research reviewed by staff indicated that prices were highly variable, but one study found the marginal value of water ranged from zero to $1.75/m^3$; however, there is a transaction cost in the market system, raising the overall cost. In South Africa, markets have been plagued with problems of over exploitation, damage to ecosystems, and increasing inequality. An example of the exploitation issue is seen in the rental arrangements established between small-scale farmers that own the land and water rights, but have limited resources to practice full-scale, who enter into an agreement with larger commercial farms to rent their land and water rights in exchange for a percentage of the profits. While these arrangements can be beneficial to both parties, particularly if the larger operation can implement higher efficiency cultivation practices, there are also two (2) key risks. The commercial business may take advantage of the small scale farmer, making minimal investments into the land and leaving the owner with fertility problems and other issues after the agreement is completed. Over-cultivating the land may also increase water use, particularly if cash crops of high sale value as well as high water demand (e.g. nuts) are grown.

DISCUSSION:

From these examples, several commonalities can be observed.

1. Adequate storage and ease of conveyance is critical to water trading. Without excess supply, there is little incentive to sell water unless the cost is very high. Improved irrigation efficiency and a shift to lower water demand crops may allow those producers to need less water, opening up supply for others.

2. Extreme scarcity appears to be the main driver for producers to participate in trading. South Africa and California has seen the movement of water across watersheds and major distances to address water scarcity. In Australia, trading is open to a large area but actual trading activity only occurs in the most water scarce regions, as indicated by the higher volume of trading in the VIC Murray, Murrumbidgee, and NSW Murray areas over others (see Figure 1). There is less economic incentive to trade if there is sufficient supply within an area and therefore other economic instruments that have lower transactional costs, such as volumetric pricing, may be more effective in managing water demand.

3. Trading may encourage a shift in crop types. Higher costs for water encourage a shift to either lower water demand crops (to reduce the input cost of water) or more economically valuable crops (to recoup the increased cost of water). In Australia, pasture/grazing irrigation has dropped significantly while irrigation of crops with a higher international trade value (cotton, fruits, and nuts) is increasing. The increase in nut production, a high water demand crop, is an unexpected shift as higher water prices should encourage lower water demand crops like grapes. This risk may also be incurred in the use of volumetric pricing, depending on the rates, although many other market drivers also determine crop preferences.

4. Due to the large fluctuations in price in normal versus drought conditions, it is difficult to use these examples to determine an average water value per megalitre. Figure 2 illustrates the huge swings in price from $100's to $1,000's from year to year per megalitre of water traded in Australia between 2000 and 2019. These swings in revenue would be problematic to the water utility's requirements for annual budgeting.

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Memorandum dated: June 28, 2021

Subject: Water Trading Summary

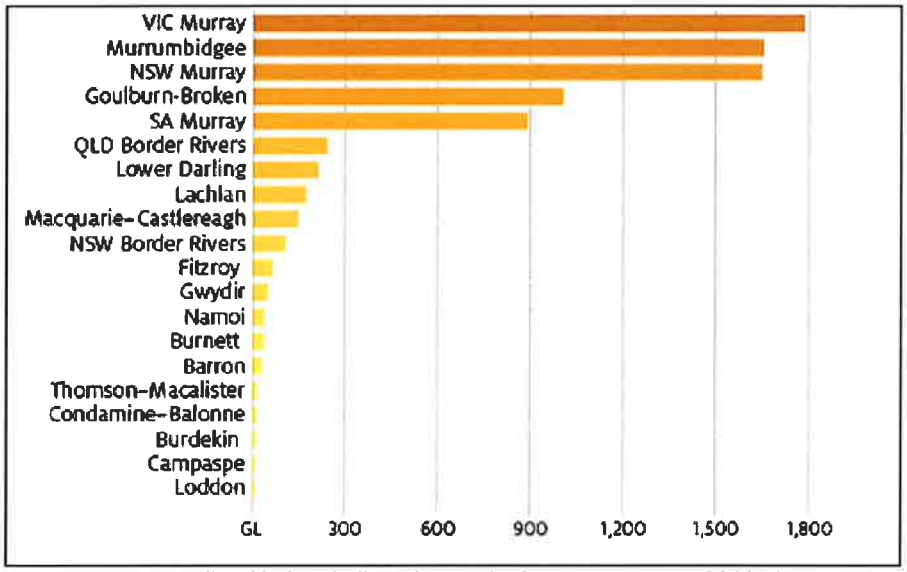

Figure 1: Australian National allocation trade, by water system 2016–17

(Source:https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-water-markets#australian-water-markets-why-where-who-and-how)

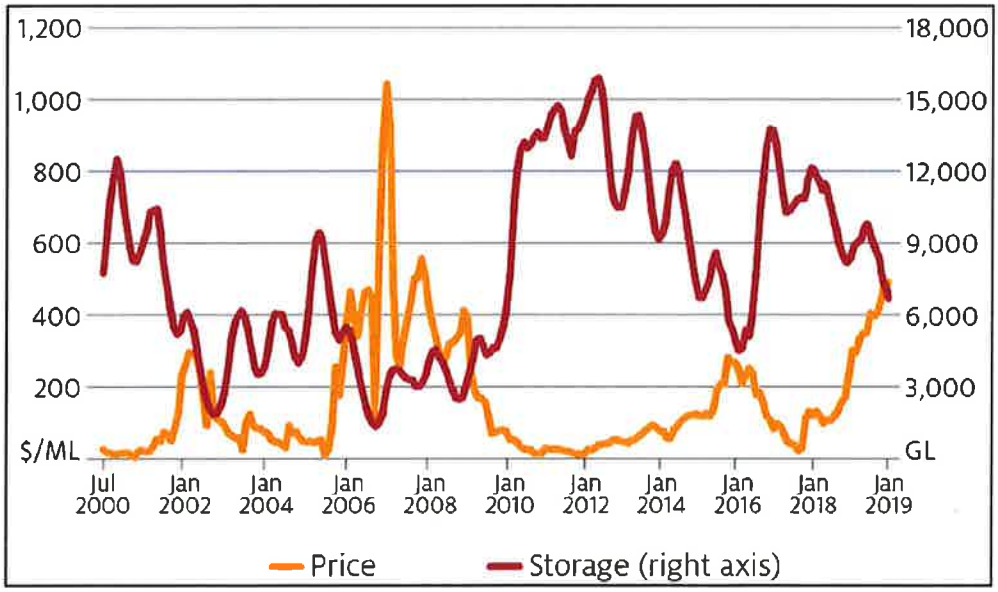

Figure 2: Australian Water Prices Compared to Water Storage, 2000-2019

(Source: https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-water-markets#australian-water-markets-why-where-who-and-how).

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Memorandum dated: June 28, 2021
Subject: Water Trading Summary

RESEARCH SOURCES:

1. Australian Bureau of Agricultural and Resource Economics and Sciences. ABARES Insights - Snapshot of Australian Water Markets: https://www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-water-markets#australian-water-markets-why-where-who-and-how

   The *Snapshot of Australian Water Markets* describes the main features of Australia's water markets and details key factors influencing water prices in the Murray-Darling Basin.

2. Ellen Hanak and Elizabeth Stryjewski. California's Water Market, By the Numbers: Update 2012: https://www.ppic.org/content/pubs/report/R_1112EHR.pdf

   This report provides an overview of the policy context for water marketing and the related practice of groundwater banking and summarizes recent trends in both areas. The water market enables the temporary, long-term, or permanent transfer of the rights to use water in exchange for compensation. The ability to transfer these rights adds flexibility to the state's water supply—helping to address temporary drought conditions and to accommodate longer-term changes in the pattern of demand. Groundwater banking involves the deliberate storage of surface water in aquifers during relatively wet years, for use in dry years. Both tools are part of a modern water management portfolio that enable California to manage its water resources sustainably, benefitting both the economy and the environment.

3. Greenwell Matchaya, Luxon Nhamo, Sibusiso Nhlengethwa and Charles Nhemachena. An Overview of Water Markets in Southern Africa: An Option for Water Management in Times of Scarcity
   https://www.mdpi.com/2073-4441/11/5/1006

   This article provides an overview of the benefits and challenges faced by water users across southern Africa, including a review of water trading in South Africa. This review outlines the role of water markets in water management in times of water scarcity, highlighting the drivers of water markets such as water scarcity, transboundary nature of water resources, and their uneven distribution. Uneven distribution appears to be a key driver of water markets, with markets being seen as the most effective economic instrument to recover the costs of re-distributing supplies.

Submitted by:

Zee Marcolin, P.Eng.
General Manager, Utilities

ATTACHMENT "D"

REGIONAL DISTRICT NORTH OKANAGAN

MEMORANDUM

File No: 5790.03.02.01
Date: June 28, 2021

TO: **Greater Vernon Advisory Committee**

FROM: **Utilities Department**

SUBJECT: **Value of Duteau Creek Water Licences based on Infrastructure Costs**

BACKGROUND:

Records show that discussions regarding the formation of a regional water system to amalgamate the Vernon Irrigation District (VID), CoV and DoC water utilities started shortly after the replacement of the Grey Canal water distribution system with underground pressurized pipes in the early 1970s. The realization of the regionalized Greater Vernon Water (GVW) system did not occur until 2003. The primary motivation of the formation of GVW at that time was different for each participating partner:

- The CoV made an application to increase their water licensing on Kalamalka Lake which was denied in the late 1990s, as the Province indicated that Kalamalka Lake was fully allocated. The CoV had a large quantity of licences on BX Creek; however, the source was not developed and lacked storage, hence was not easily accessible for Domestic use. In order to facilitate future growth in the CoV, amalgamation to access the plentiful VID water licences could be at the lowest cost. Their only other viable option would have been to develop Okanagan Lake as a domestic water source, which costs are provided in the following section.
- With new drinking water regulations looming requiring extensive upgrades to treat for higher water quality requirements, the VID was motivated to dissolve and become a regional water utility as they had a low customer base to finance the higher treatment costs and a large area with lots of infrastructure.
- The DoC was also looking at large infrastructure costs from treatment and aging infrastructure.
- For all three (3) jurisdictions, the amalgamation and interconnection of the distribution system would reduce treatment costs for all three (3) jurisdictions by consolidating the number of treatment facilities required to service the entire area.

DEVELOPING OKANAGAN LAKE AS A DOMESTIC SOURCE:

The GVW Master Water Plan (MWP) reviewed the Class D costs to develop Okanagan Lake as a Domestic source. Realistically this would have been the next best option for the CoV to pursue expansion of their water supply if they had decided not to amalgamate with the VID and the DOC as the storage options required to access their BX Creek water licences would have been unfeasible from both a financial and land limitation perspective.

ATTACHMENT "D"

Memorandum dated: June 28, 2021
Subject: Value of Duteau Creek Water Licences based on Infrastructure Costs

The following table is from Technical Memorandum 9 (TM9), Appendix I of the 2017 GVW MWP, which provides the overview costs of this option:

Table 4.12 Option 6 – Capital Cost Summary

Description	Year	Cost ($ million)	Net Annual O&M Change ($ millions)
1. Water Supply and Treatment			
a. Duteau Creek Filtration – No Treatment		-	($ 1.50)
b. Mission Hill Filtration – 80 ML/d	2042	$ 50.0	$ 1.28
c. Okanagan Lake Intake, PS and Raw Watermain	2017	$ 34.7	$ 0.23
d. 20 ML/d (600 hp) Coldstream East PS	2022	$ 2.50	$ 0.14
e. 10 ML/d (200 hp) McMechan Booster PS	2022	$ 1.50	$ 0.10
Sub-Total Water Supply and Treatment		***$ 88.7***	***$ 0.25***
2. Domestic System Distribution Improvements			
a. Domestic System Investments		$ 13.2	$ 0.12
Sub-Total Domestic System Distribution Improvements		***$ 13.2***	***$ 0.12***
3. System Separation Implementation/Expansion			
a. System Separation	2017	$ 63.8	$ 0.92
b. Transmission Main	2017	$ 17.1	-
Sub-Total Agricultural Irrigation Improvements		***$ 80.9***	***$ 0.92***
TOTAL OPTION 6 CAPITAL COSTS		**$ 182.8**	**$ 1.3**

The costs to develop Okanagan Lake as a potable water source as per the analysis of Option 6 of TM9 would have involved the construction of an intake and pump station near Kin Beach and a transmission main from this pump station to Mission Hill Water Treatment Plant (MHWTP). The alternative would be the construction of a site specific treatment plant; however, this cost would likely have been higher based on recent costing completed to include filtration at the MHWTP. The additional Class D cost in 2012 dollars for the intake, pump station and transmission main was $34.7M with an annual net increase of $0.23M / year for Operations & Maintenance (O&M) costs.

Staff reviewed this costing based on recent pricing of the Kin Beach Pump Station and other recent pipe main projects to calculate current costs in 2021 dollars and is provided in the following Table 2:

Table 2 - AALCI costs for Okanagan Lake Pump Station Option 6 (2021 dollars)

Item	Description	Unit	Quantity	Unit Rate	Extension	w/ Cont + Eng	Lifespan	AALCI
1	Okanagan Lake Intake - 1,200 mm dia.	Linear m	5000	$ 2,560	$ 12,800,000	$ 19,840,000	80	$ 248,000
2	Okanagan Lake Pump Station - 2,800 hp	LS	1	$ 8,000,000	$ 8,000,000	$ 12,400,000	30	$ 413,333
3	Raw Water Transmission Main - 900 mm dia.	Linear m	9000	$ 1,040	$ 9,360,000	$ 14,508,000	80	$ 181,350
4	Permits and Approvals	LS	1	$ 500,000	$ 500,000	$ 775,000	80	$ 9,688
				Sub-total	**$ 30,660,000**	**$ 47,523,000**		**$ 852,000**
5	Annual O&M Costs	annual	1	$ 310,000	$ 310,000			$ 310,000
				TOTAL				$ 1,162,000

The Annual Average Life Cycle Investment (AALCI) plus O&M costs are the annual savings of using the VID water licence and infrastructure compared to constructing the Pump Station and related infrastructure required to develop Okanagan Lake as a Domestic source. This amount could be considered the cost of the water licences as it represents a cost that would have required

ATTACHMENT "D"

funding if the VID water licences and infrastructure were not available. For comparison, the cost to borrow $47,523,000 over 20 years equates to approximately $3.1 million per year.

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