VILLAGE OF BELCARRA
Water Committee Agenda
Village Hall
Wednesday, July 22, 2020
3:00 pm to 5:00 pm

This meeting is being held via Zoom Teleconference and will be recorded.
Meeting details as follows:
Click link to join meeting: https://zoom.us/j/99470462194 Meeting ID: 994 7046 2194

Committee Members

Brain, Douglas
Chisholm, Jim
Desbois, Martin
Devlin, Ian - Chair
Council Representative – Councillor Bruce Drake

1. Call to Order

Call the meeting to order

2. Approval of the Agenda

2.1 Agenda for July 22, 2020

Recommendation:

That the Agenda for July 22, 2020 be approved as circulated.

3. Adoption of the Minutes

Minutes of May 21, 2019

Recommendation:

That the Minutes of the meeting held May 21, 2019 be adopted.

4. Draft Terms of Reference – discussion

5. Belcarra Residents – Questions on the Water System

The Chair will open the floor for any questions from residents at the start of meeting to collect resident concerns and provide guidance to the Committee as to where particular focus should be made.

6. Committee to provide background information on the Current Belcarra Water System

7. **FUS correspondence and VOB Water System (including 2010 FUS evaluation of the proposed VOB design)**

8. **Tatlow Reservoir Levels during the Turtlehead and Senkler Fires in 2017**

9. **SVFD Fire Events in Belcarra**

10. **Water Committee Discussion on Obtaining Details on District of North Vancouver (DNV) memo to the Belcarra CAO March 1, 2019**

11. **Next Steps**

12. **Adjournment**

Next Meeting Date:

VILLAGE OF BELCARRA
Water System Capacity for Fire Protection Committee
Village Hall
May 21, 2019
Minutes

Minutes of the Water System Capacity for Fire Protection Committee for the Village of Belcarra, held Tuesday, May 21, 2019 at the Municipal Hall, 4084 Bedwell Bay Road, Belcarra BC.

Members in Attendance
Brain, Douglas
Chisholm, Jim
Desbois, Martin
Devlin, Ian – Chair
Kim, Tom – Vice-Chair

Council Member in Attendance
Rob Begg, Councillor

Staff in Attendance
Lorna Dysart, Chief Administrative Officer
Connie Esposito, Recording Clerk

1. Call to Order

Chair Devlin called the meeting to order at 7:01 pm

2. Approval of the Agenda

2.1 Agenda for May 21, 2019

Discussion ensued relative to the process of preparing agendas and minutes.

L. Dysart outlined the process around the preparation of agendas and minutes.

It was moved and seconded:

Amendment:
"Under Unfinished Business:
- Responses provided by Walt Bayless, wsp"

That the Agenda for May 21, 2019 be approved as amended.

CARRIED

Adoption of the Minutes

3.1 Minutes of April 16, 2019

It was moved and seconded:

That the Minutes of the meeting held April 16, 2019 be adopted.

CARRIED

4. Delegation

No items.

5. Unfinished Business

5.1 Principal documents previously provided to Committee as follows:

1. VOB replies to Committee March 11, 2019 questions including partial SCADA data
2. OPUS replies to Committee April 10, 2019 questions (including Aug 8, 2010 FUS letter)
3. Evaluation of Fire Flow Methodologies, Fire Protection Research Foundation
4. Index of Subjects included in Water System Operational Manual being developed

Discussion ensued relative to:

- Limited staff resources and time constraints related to obtaining additional documents associated with the potable water system;
- The Fire Underwriter Study letter of 2010;
- The fire fighting capability of the potable water system;
- How to verify fire flow requirements;
- The Committee to assist with drafting of a letter to FUS requesting fire flow data;
- The benefit of a discussion with Belcarra former Council to answer questions related to the potable water project.

L. Dysart noted that upon researching other municipalities, there is no standard operating procedure manual.

5.2 Outstanding Documents

The Water System Capacity for Fire Protection Committee has requested the following documentation from Village staff which remain outstanding:

1. A list of all water system design, operation and maintenance reports from Ron Beesley, Dayton & Knight and OPUS consulting engineers.
2. A copy of <u>all 2010 to 2019 correspondence</u> between the Village of Belcarra and Fire Underwriter's Survey. L. Dysart will work to determine the information available.
3. A copy of the correspondence from Metro Vancouver which indicates that the alternative to supply water directly to Belcarra (and Anmore) through Port Moody is no longer being considered. Walt Bayless, wsp (formerly OPUS) mentioned this correspondence in the April 2019 Committee meeting.

4. April 12th email requesting operational manuals for the water system and the SCADA system as follows:

   a. In reviewing the design of the VOB water system, the Committee was not able to obtain a listing of documentation provided by OPUS on the design and operation of the various components of the water system.

   b. B. Serné was unable to confirm the availability of procedural or operational manuals. Did OPUS provide VOB with an operating manual for our version or similar version of SCADA? *There are no standard operational manuals.*

   c. *There is no procedural manual for the required reports from the SCADA system. A mandatory annual water report is prepared for Council and Fraser Health. Fraser Health has an Annual Meeting with the CAO and the Superintendent of Public Works following receipt of the annual Water Report being received.*

6. New Business

6.1 Discussion on proposed May 2019 Interim Report on Design Basis for Water Supply System & Fire Protection

It was noted that:
- The FUS letter of August 2010 should be included in the report to Council;
- L. Dysart will assist the Committee in formatting the report to Council.

It was moved and seconded:

That the following items be included in the report to Council:

6 – Fire Underwriters Survey letter dated August 8, 2010 regarding Water Supply System Improvements in Belcarra
7 – Discussion on SCADA issues
8 – Discussion on Turtlehead and Senkler Road Fires
9 – Final Comments on Interim Report
10 – Committee Recommendations Resulting from the Review of Design basis for the water supply system

CARRIED

6.2 It was noted that the Committee will assist in drafting a letter to FUS to request fire flow requirement.

7. Discussion on SCADA issues

It was noted that:
- The vulnerability of the SCADA system is limited and not urgent in nature;
- The SCADA is a useful interface that provides live and trending data;
- Weekly or monthly reports may be useful in detecting potential leaks earlier;
- The interpretation of data provided by the SCADA may be useful information for SVFD;
- Consumption alerts from the SCADA system are sent via email;
- An alert system is now in effect to notify staff if the SCADA is not functioning.

8. Discussion on Turtlehead and Senkler Road Fires

- A summary and analysis of the Turtlehead and Senkler Road fires was provided;
- The revised protocol was established for the Tatlow Reservoir as a result of the two fires.

9. Final comments on Interim Report:

1. Is the Belcarra water system capable of providing 30L/s for 1hr?
⇨ YES (Committee unofficial review and discussions in March 2019)

2. Does the Belcarra water system meet the minimum FUS fire flow requirements?

⇨ Unknown. There is no FUS correspondence confirming that design is acceptable with no Tatlow expansion.

3. Does the Belcarra water system meet the recommended fire flow requirements?
⇨ No, as indicated in Aug 8, 2010 FUS correspondence.

It was noted that fire flow requirements are unknown and there are no definitive calculations to determine fire flows.

4. What are the FUS recommended fire flow requirements?
⇨ Unknown. There is no FUS correspondence defining what is the requirement.

10. Committee Recommendations Resulting from the Review of Design basis for the water supply system

1. Sprinklers – already accepted by the Committee
2. Recommend that additional water supply for fire fighting be sought by the Village of Belcarra as suggested by FUS in 2010 letter with the appropriate Government grants. The supply from District of North Vancouver is one possible option. The other option is water supply from the GVWD system connected to the David Avenue extension.
    a. Formal engineering assessments will be required to support the grant requests.
    b. The engineering consultants will in turn request the FUS correspondence that Committee are seeking.

11. Next Steps

Discussion ensued relative to the interim report that will be sent to Council for the June 10, 2019 Council meeting.

12. Adjournment

The Chair declared the meeting adjourned at 8:31 pm.

Lorna Dysart Chief Administrative Officer	Ian Devlin Chair

Next Meeting Date: Tuesday, June 18, 2019

VILLAGE OF BELCARRA

Water Committee

(Water System Capacity for Fire Protection Committee)

Terms of Reference 2020

Terms of Reference for the Water System Capacity for Fire Protection Committee (WSCFPC) which is now referred to as the Water Committee (WC).

The Water Committee will recommend to Council if the Village should proceed with the construction of a new reservoir.

The Water Committee (WC) will be responsible for gathering and communicating questions and concerns from residents for the Engineering teams.

- This may be accomplished through public forums and/or written communications.
- In order to ensure efficiency and cost savings, the WC will do its best to organize the questions and concerns in advance of engaging the Engineering teams for formal responses.

The Water Committee will serve as the public engagement lead when resident input is requested by Council or the Engineering Teams.

The Water Committee may, at its own discretion, also seek information and offer its own comments and recommendations to Council**.**

The Water Committee may request information from the engineering team, as it may from anyone it feels could assist them. Tasking of the engineering team will remain the responsibility of the Chief Administrative Officer.

- Zoom Committee meetings will be held as a regular Committee meeting as per the Council Committee procedure.

- The Water Committee will present to Council, as a Delegation, in Council meetings:
  - Clear updates on each step of the project throughout the Water Committee involvement.

- Staff will use a separate account code for all costs associated with the Water Committee.

VILLAGE OF BELCARRA

Water Committee – Belcarra Residents Questions On the Water System

- From Bruce Drake: - I believe Metro has its own water tank above the oceanfront park for potable water delivery Prior to connecting to our potable water system. It would be interesting to know its size and altitude as well as it's potential to serve as an ancillary storage or even as a substitute for Dutchman's.

- Bruce Drake - I'd like to formally ask the water committee to consider whether the Tatlow tank could have its measuring instruments (and roof structure?) raised to allow it to fill to a full 270,000 L rather than what I gather is its current limit of 244,600 litres. It seems to me that, under some scenarios the extra 25,400 litres could be important.
  - **Answer**: **The usable volume** in the Tatlow tank is 244,600 litres and not 300,000 litres.
  - i.e: the reservoir is unable to hold more than 244,600 litres.

- Mayor Neil Belenkie
  - It appears that the water committee is not willing to provide a recommendation of fire flow to Council? I would have thought this one of the most valuable contributions the water committee could present?
  - As you are aware, Council is making progress re: sprinklers.
  - Staff have been developing documentation during the isolation periods, I hope that the specific documents you describe are included in their new work.

- "What would be the most effective investment(s) for our Village to improve the safety of residents re fires?"
  - Here I take it as a given that the council is willing to commit resources ... but I would like to know what investments the committee feels are most effective.
  - Obviously one option here is the proposed new water tank.
  - Finally, I appreciate how complex the issues are at play here. Every choice has advantages and disadvantages. I believe your committee can help all of us understand these choices and the trade offs better.

- Submitted by Mrs**. Deborah Struk** April 2020 Barnacle
  Belcarra needs sufficient water so we can effectively fight fires and for our Firehall to be replaced. The residents/taxpayers are worthy of sufficient water regardless of circumstance. We should never have to be concerned about running out of water.

- Submitted **by John Willms** April 2020 Barnacle
  Our water system does not meet the fire under writer's recommendation based on a letter from engineers to council in year 2010, I am not sure how this effects our insurance if this information was made public.

- Submitted **by Des Wilson**
  1. I see that the recent Water System Capacity for Fire Protection Committee report did not recommend a new reservoir but rather recommended an engineering evaluation of the current village water supply and the need for additional supply for fire suppression. Has such a report been completed?
  2. I understand that the council's proposed new reservoir, based on the consumption rate used during the 2017 Turtlehead fire, will provide only a small additional period of water supply for local structural fires?
  3. I assume that our local fire trucks and water supply will be of marginal value for fighting wildfires (presumably water bombers would be used) and so a new reservoir would have limited value in this situation?
  4. What water conservation actions have council proposed to augment our firefighting water supply? For example, whatever happened to the original plan to impose a water use charge for our municipal supply?

- Submitted by **Sherry Chisholm** August 10th, 2019 Barnacle
  It seems to me the Village has enough potable water for home use throughout the community. For firefighting house fires with our present water system of piping, water reservoirs and water trucks we may need to make do until the Village can find a way to get more water. More water would be great and may even be required; but we cannot afford it at this time and it seems to be not readily available. For any forest fires the only option is to evacuate.

- Submitted by **Diana Drake and Carol Drew** Belcarra Block Watch July/August 2019 Barnacle
  create a safety zone around your house, if possible, by removing tall dry grass, leaves, vines, fallen branches, firewood etc.

Questions to Walt Bayless (OPUS Engineer) and his replies (in red)

1. Water inflows from DNV

   VOB staff have confirmed that DNV have been providing ±19.2 L/s since at least 2016. As per attached recent March 2019 correspondence (pages 13-14 of April 8 Council Agenda), DNV now indicate that they can possibly increase the VOB water supply to 60 L/s.

   a) Committee requests clarification on the context of the May 2 2017 OPUS letter which states "OPUS and the Village met with DNV on May 2 2017 to review the additional flow option. The District stated that providing more flow than the agreed upon 14 L/s would likely compromise the District's fire protection capabilities and therefore, is not considered a viable option. Does OPUS have any knowledge to clarify the contradictions with the actual 19.2 L/s? The assessment was completed by DNV in 2006 who provided the 14 L/s recommendation. This is based on a theoretical operating condition in DNV under MDD and FD simultaneously. DNV would be required to comment on any changes to this value, however based on their acceptance of the new values they may have offset this limit or revised their assessment.

   b) Can the VOB water supply / distribution infrastructure handle 60 L/s from DNV and if this is the case, what possible upgrades are required for the current coverage area? Does the DNV $2.5M cost estimate of the required VOB upgrades appear to be accurate? The hydraulic capacity of the supply is the limiting factor to total flow. The two submerged lines have a capacity to provide approximately 30 L/s maximum, however some field testing would need to be done to validate this value as it does not contain a safety factor. I cannot comment on the $2.5M as I do not know the extent of that work. The flow would again be limited by the Village pipe sizes.

VILLAGE OF BELCARRA

Water Committee

Belcarra Water System

1977 the Sasamat Volunteer Fire Department (SVFD) was started.
1977 May the SVFD Board of Trustees purchased a 1952 LaFrance fire truck from Imperial Oil Co. for the sum of $1.00 and in July 1977 purchased a 1967 Ford fuel-oil truck with a 1500-gallon tank. (6,800 Litre)
1978 Sasamat Volunteer Fire Department (SVFD) incurred a start-up debt of $150,000 to pay for a "new" Ford Pumper and construct the Fire Halls in Anmore and Belcarra.
1990, Dayton & Knight Ltd. presented their "Water Supply Study" which considered several options for the development of a community water system, along with an estimate of the costs associated with the options. The primary focus of the study was a domestic potable water supply as opposed to alternatives specifically for enhanced fire protection.
1992, P.S. Turje & Associates Ltd. was retained to study a series of water system storage and distribution designs for fire protection. The concepts examined ranged from two storage tanks with a distribution network, to a system of 11 water tanks at strategic locations throughout the village such that every home would be within 1000 feet of a storage tank. Unfortunately, none of the options

4. EXISTING SERVICES

4.1. Water Supply The residents of Belcarra are served by individual and small shared systems. The sources are wells, surface water taken directly from streams, and springs. Dayton & Knight reported that Ministry of Health testing results of surface water supplies show frequent incidence of bacteriological tests results that do not meet the Canadian Drinking Water Standards. The Dayton & Knight report provided a detailed map of ground water well locations. Most of the wells are drilled in rock. The yield of rock wells are generally highly variable and are very susceptible to reduced capacity from large draw downs and seasonal drought, and to salt water intrusion when located near the ocean. The remaining wells are located in granular aquifers, with a maximum recorded yield of 9 gpm.

The Belcarra Peninsula watershed supplies approximately 35 households from Dutchman Creek, Granny Spring and Bridger Brook. The Dutchman Creek system consists of a small impoundment on the creek, supplying two above ground steel storage tanks with a total reported capacity of 10,000 gallons. A 4-inch water main leads from the tanks to a single hydrant at the entrance to Turtle Head. The other systems do not contain any storage.

A well supplies two 1000-gallon ground level steel tanks, filled by a well, located in the Belcarra Park. This system is restricted to supplying domestic water to park users, and to draughting from the tanks by the Belcarra Fire Department.

A well or spring also fills a 12,000-gallon steel storage tank at the fire hall. The fire department uses this tank for filling the fire trucks, and for tanker shuttles during fires.

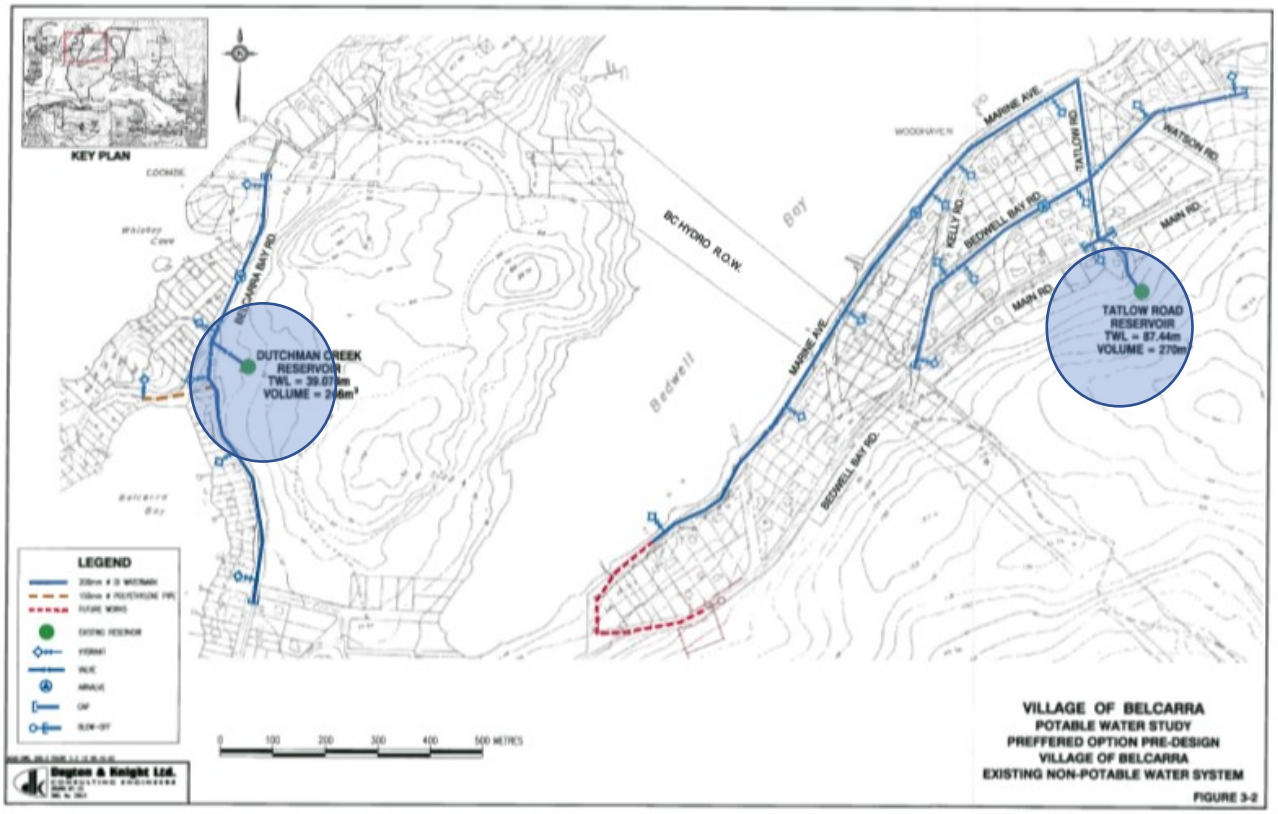
Reference:

1992, P.S. Turje & Associates Ltd. May 25, 1993, Fire Protection Study, Village of Belcarra

meant a reduction of fire insurance premiums for homeowners. Thus, with no financial incentive to pursuing any one of the systems, consideration of a water storage system had to be solely based on enhanced fire protection.

CURRENT FIRE FIGHTING EQUIPMENT:
Sasamat Voluntary Fire *Department (SVFD), thanks to the· dedication of neighbours in Belcarra and Anmore, provides protection to our homes. The Department has a 1992 pumper truck capable of pumping 1050 gal/minute and a built in 8oo gallon tank on board. SVFD also has two older units: a 1984 tanker with 1500-gallon* capacity and a 400 gal/min pumping capacity as well as a 1979 truck with 650 gal/min pumping capacity and a 700-gallon tank. Both older units can serve as reservoirs and shuttles for the newer truck. For resupply Belcarra has a 12,000-gallon steel tank beside our fire hall which is filled from stream water. In addition, through the efforts of the Belcarra Water Users Community, SVFD has access at Turtlehead Rd and Belcarra Bay Rd to the storage tank for this shared domestic system which, when full, could provide a further 10,000 gallons.
Reference:
FIRE TANK STUDY COMPLETED page 16- Councillor Bruce Drake 1993

September 12 1993 - there was a structure fire within the Village of Belcarra. This was the first serious house fire in more than 25 years;
1994 June - six months later there was another house fire across from the Belcarra Fire Hall. Both these fires had to be fought using SVFD's tanker truck carrying 6,800 litres (1500 gallons) of water and shuttling from these pieces of equipment were the only fire fighting available for the SVFD members to fight this fire.
These two events prompted Belcarra Council to establish a system of fire hydrants connected to water storage tanks to enhance fire protection for the community, and from 1993 to 1998 a series of such works were pursued. (19)
1994 The Village of Anmore offered to donate two 10,000-gallon tanks for fire protection purposes for the price of relocating same from the Fire Hall site in Anmore. The Village of Belcarra had applied for a right-of-way on Crown Land in the forest above the turn-around located at the high-point of Bedwell Bay Road. This site was very strategic in that it was centrally located, it had a large level area for fire trucks and equipment to operate, and it was height-of-land.
1994 – A fire hydrant was connected to the 10,000-gallon tank at the Belcarra Fire Hall site. The 2-1/2" pipe connection on the tank was replaced with a 4" flange and valve which was connected to the roadside fire hydrant.



1998, Belcarra acquired a Crown Land lease located at the top-end of Tatlow Road, a very strategic location since the Tatlow Road allowance runs from Main Avenue downslope to Marine Avenue. A water reservoir located at the top-end of Tatlow Road could supply fire hydrants located at Main Avenue, Bedwell Bay Road, and Marine Avenue, and could also accommodate subsequent extensions of the watermain along Main Avenue, Marine Avenue, and Bedwell Bay Road. The second strategic site identified for location of a water storage reservoir was next to the Belcarra Water Users' Community water tanks on Dutchman Creek, and discussions were initiated to acquire a lease for the site from the GVRD Parks Department. (19)

> Council decided to design and construct the watermain to meet fire protection standard and potable water municipal standard. With this decision Council augmented its investment to accommodate future commitments, and arguably this decision was the beginning of Belcarra's future municipal water distribution system.

1999 June – Tatlow Tank Fire Protection project was completed. This included site surveying, design engineering, site preparation, and installation of a 50,000-gallon storage tank connected to the first hydrant at Main Avenue.

The Tatlow Tank Fire Protection project consisted of extension of the "backbone water line down Tatlow Road to provide hydrants at Bedwell Bay Road and Marine Avenue. The design also includes "T" connections pre-installed at Main Avenue, Bedwell Bay Road and Marine Avenue to accommodate additional extensions and hydrants as desired in the future.

Belcarra Water System

Dutchman's Creek project included site preparation involved installation of a 50,000-gallon storage tank adjacent to the Belcarra Water Users water tanks at Dutchman's Creek, along with the first hydrant on Belcarra Bay Road at Salish Road.

2000 July the Dutchman's Creek system includes acquiring the six-inch pipe that was pre-installed by the Dutchman's Creek Water Users to service additional fire hydrants on Turtlehead Road and Belcarra Bay Road. The engineering design work was completed over the winter.

2001 February 26 – April 6th The construction on the Dutchman Creek Fire Protection Water Main (Salish Road To Bedwell Bay Road).the existing 8-inch water main that connects to the fire hydrant located on the corner of Salish Road and Belcarra Bay Road was extended west along Belcarra Bay Road, and terminate near the stop-sign at the corner of Belcarra Bay Road and Bedwell Bay Road.

The engineering design for the Tatlow Road water main system along Marine Avenue from Tatlow Road to Young Road was completed in 2001, and construction of the section from Tatlow Road to 3752 Marine Avenue was completed in the summer of 2002. Work on the section from 3752 Marine Avenue to Young Road is scheduled for the summer of 2004.

The engineering design for the Tatlow Road system along Marine Avenue from Young Road to West Road started, and work on that section of the water main system was scheduled for the summer of 2005

2002 Summer Construction of the section from Tatlow Road to 3752 Marine Avenue was completed.

2003 Tatlow Fire Protection project. The water main system along Marine Avenue from Tatlow Road to Young Road The engineering design for was completed in 2001. Work on the section from 3752 Marine Avenue to Young Road is scheduled for the summer of 2004. The engineering design for the Tatlow Road system along Marine Avenue from Young Road to West Road was started, and work on that section of the water main system is scheduled for the summer of 2005.

2003 Dutchman's Creek system from Salish Road to Whiskey Cove Lane was constructed which provided coverage to the end of Coomb Lane and completed the water main system for the southwest portion of Belcarra.

2004 Tatlow Road Fire Protection project. The engineering design for system along Marine Avenue from Young Road to West Road started, and work on that section of the water main system was scheduled for the summer of 2005.

2005 September - Belcarra retained Dayton & Knight Ltd. to update the 1990 water supply study and revise the design, existing infrastructure assumptions, feasibility of development options, and capital cost estimates not referenced in the 1990 study.

Belcarra Water System

2007 February – Extract from Dayton and Knight Water Use Efficiency Study

Dedicated Fire Protection System

Fire protection for a water system is typically provided by reservoirs and storage. VOB's dedicated fire protection system is being constructed in phases. The dedicated fire system consists of 200 mm diameter cement mortar lined PC 350 ductile iron watermains. Watermain, hydrants, reservoirs and air valve locations are shown schematically in Figure 2-1. Two reservoirs are on the system and are currently filled with non-potable water supplies. The fire protection system operates with two independent pressure zones.

The reservoirs on the system are as follows:

Tatlow Road Reservoir

- Volume 270,000 L
- Top Water Level 87.44 m geodetic
- Diameter 8.0 m
- Water Depth 5.44 m

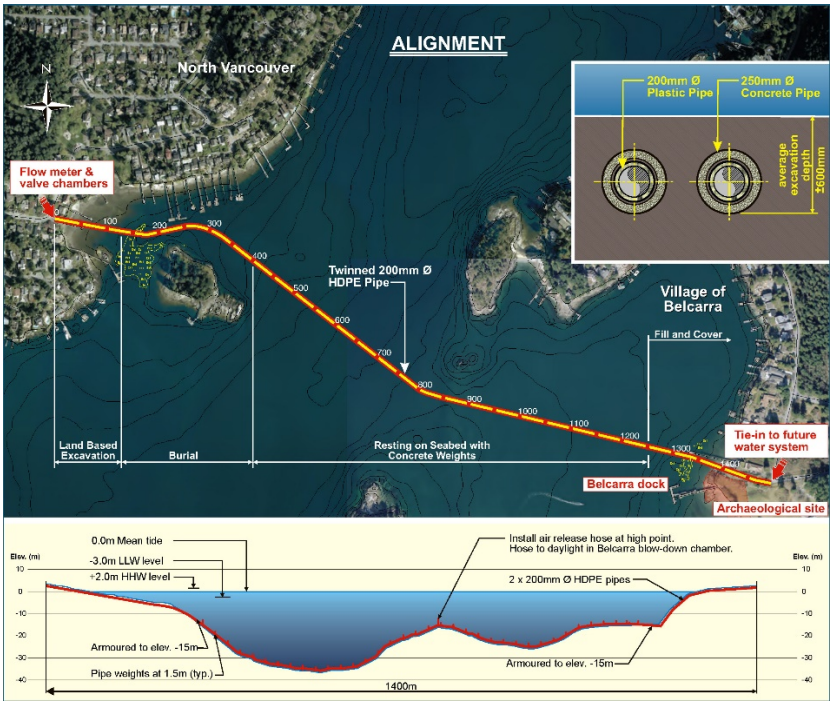
Dutchman Creek Reservoir

- Volume 246,000 L
- Top Water Level 39.074 m geodetic
- Diameter 8.0 m
- Water Depth 4.90 m

2005 November - Jack Lee (Project Manager) and Walt Bayless (Project Engineer) of Dayton & Knight attended an information meeting in Belcarra to provide the study findings.

2006 May - an analysis of the water source options affirmed the preferred option as a submarine watermain crossing of Indian Arm to the District of North Vancouver (DNV).

2006 October- Jack Lee (Project Manager) and Walt Bayless (Project Engineer) attended an information meeting in Belcarra to provide an overview of the pre-design study findings. The preferred alignment of the submarine crossing was identified as originating from Strathcona Road, at Cove Cliff in North Vancouver, and terminating at Midden Road in Belcarra. The distance of this crossing was only 1.4 km, and with twinned 200mm HDPE pipe crossing at that alignment.



2010 August- a major milestone was reached in the project when a was awarded to Vancouver Pile Driving Ltd. for the construction of the watermain crossing under Indian Arm. Council also approved a 60-year lease with Port Metro Vancouver (PMV) for the seabed under the watermain.

2010 August 8 - FUS Letter to Larry Scott

This document was referenced in the Water Committee interim Report to Council dated May 2019.

2010 September - Council awarded a contract to Mission Contractors Ltd. for the construction of the water system 'backbone' from the valve chamber at Midden Road, along Bedwell Bay Road and Main Avenue to the Tatlow Reservoir, and beyond to the eastern end of Main Avenue — which included the fibreoptic communications cables between the Midden Road Valve Chamber and the Tatlow Road Valve Chamber.

2010 October - a ground-breaking ceremony was held at Midden Road to celebrate the start of construction of the municipal water system. The final engineering design identified the need for a pressure zone not contemplated as part of the original water system design — with associated standby emergency electrical generator and high capacity pump for the fire hydrants in the pressure zone — the original project cost estimates immediately became out-dated.

2010 – 12-December FUS Village of Belcarra Water System Overview

The following section 8.2(dealing with the Village of Belcarra Water System Overview) is extracted from the FUS report. This is good documentation on the water system that Belcarra had in 2010 when the FUS provided a letter to the Village assessing the water system capability for fire fighting. This material was also included in the FUS letter to Village of Belcarra, May 28, 2019

Note: This might be the same details that FUS used in their detailed assessment for the August 8, 2010 letter to the Village.

8.2. Village of Belcarra's Water System Overview

During the process of the Fire Underwriters Survey, implementation of the Village of Belcarra's potable water system was underway. The Village of Belcarra plans to connect to the Greater Vancouver Regional District water system. A water supply connection point is currently under construction to connect North Vancouver to Belcarra. Additional water mains with hydrants are planned for installation to create one water system combining the Dutchmen Creek system and the Tatlow Road system. Once the water system is operational Fire Underwriters Survey should be contacted to complete a full review of the water system for fire insurance grading purposes.

Four non-potable water systems have been developed to provide water for firefighting purposes. Fire Underwriters Survey had previously reviewed each system in 2000. The systems have been recognized for fire insurance grading purposes. However, each system is designed only to meet the minimum requirements to be recognized for fire insurance grading purposes.

Systems present during the 2010 field survey:

Tatlow System
The Tatlow system consists of a single 59,391 Imperial Gallon storage tank that supplies water to 13 hydrants. Piping consists of 200 mm mains that are not looped. A 25 mm poly pipe fed from a dry creek keeps the tank topped up when the creek is flowing (wet weather winter months only). When the tank has to be refilled, a dam is created in the storm creek along Main Ave. and a portable pump is used to refill the tank over a period of 8 hours. Alternatively, tanker trucks can be used to pump water to the tank.

Bostock System
The Bostock system consists of two 12,540 Imperial Gallon tanks and one hydrant connected by 200 mm pipe. The only means to fill the tank is by hauled water and portable pump. This system is considered supplemental by the fire department. There is no visual means to indicate the fullness of the tanks.

Fire hall System
The fire hall system consists of three steel storage tanks with a total volume of 25,675 Imperial Gallons that supply a single fire hydrant. The tanks are all balanced by interconnected 100 mm piping. Supply piping is 200 mm. The storage tanks are refilled by a tanker truck. There is no visual means to indicate the fullness of the tanks.

The Dutchman Creek System
The Dutchman Creek system consists of a single steel storage tank with a volume of 54,112 Imperial Gallons that supplies water to five hydrants through 200 mm piping. There is no automatic refilling of the storage tank. A 25 mm poly pipe connected to a dry creek tops up the tank in wet weather conditions. The usual practice of filling the tank is by damming a storm ditch running alongside Belcarra Bay Road and pumping water to the tank utilizing portable pumps over a one-day duration. When the ditch runs dry, tankers are used to pump water to the tank.

Belcarra Water System

2011 March- Vancouver Pile Driving Ltd. completed construction of the watermain crossing under Indian Arm. In April, detailed design was finalized for construction of the Valve Chambers, chlorine monitoring, emergency fire pump, distribution pumps and back-up generator at Midden Road and Tatlow Road. (36)

2011 May- a contract was awarded to Merletti Construction Ltd. for construction of the Valve Chamber at Strathcona Road in North Vancouver and upgrading of the Dean Place pressure reducing valve station, and in June a contract was awarded to Merletti Construction Ltd. to construct the valve chambers, chlorine monitoring, emergency fire pump, distribution pumps, and back-up generator at Midden Road and Tatlow Road Reservoir Building.

2011 August- a contract was awarded to Sandpiper Contracting Ltd. to install watermains and service connections along Belcarra Bay Road from Midden Road to Bedwell Bay Road, Turtlehead Road, Robson Road, Salish Road, Whiskey Cove Lane and Coombe Lane.

2011 October - another contract was awarded to Sandpiper Contracting Ltd. to install watermains and service connections along Senkler Road, Watson Road, Kelly Road, West Road and the southern portion of Marine Avenue.

2012 October- after careful review of multiple water quality tests, the Fraser Health Authority authorized Belcarra to commence operating its new municipal water system.

2015 June 13 - 4:24PM Hamber Island Fire

The Sasamat Volunteer Fire Department were called out to put a fire on a private island in Indian Arm. Members of the Sasamat Volunteer Fire Department began battling the fire on Hamber Island around 3:30 p.m. on Saturday.

A fire that that blazed on a private island in Indian Arm was put out after three hours – but volunteer firefighters are disappointed that a second fire in the area was caused by humans in as many weeks. A spokesperson with the Fire Department says they believe the fire was human caused, and witnesses told firefighters a group of young people left the scene shortly after the blaze began.

2017 April 9 - 12:52-19:09 Turtlehead Fires

Two waterfront homes in Belcarra on Indian Arm are destroyed by fire on Sunday. Photo from VANCOUVER POLICE MARINE UNIT

The SVFD was dispatched to a structure fire in Belcarra: likely the largest fire in community history.

The two homes were unoccupied at the time. As flames breached the first home, there were multiple 911 calls from North Vancouver and Belcarra residents. At 12:54, our Dispatch paged out our volunteers. At 12:54, the VPD Marine Unit, patrolling the area, took the first photograph of the incident (photo above). One house was engulfed in flames and the second was now on fire.

Belcarra Water System

2017 August 2 – Senkler Road Fire19:29 (Aug 2) – 08:00 (Aug 3)

 At 7:29PM, our Dispatch paged out our volunteers. As members responded and smoke and flames began to breach the roof, more calls from neighbours flooded 911.First crew arrived 8 minutes after the page out. Quickly surveying the scene, the incident commander focused on two things: containing the fire to the top floor of the home, while keeping fire embers from spreading to neighbouring properties and to the surrounding forest.
Supplementing hydrant supply with tender shuttles and hale pumps, our firefighters battled the blaze for many hours. Firefighters did some outstanding work to contain the blaze to the top story and then moved into a mop-up and overhaul phase after dark. A fire patrol remained overnight, extinguishing hotspots and drowning embers. Final mop-up ended on August 3rd. All together, 35 SVFD firefighters responded.

2017 (*Date to be determined*) seismic valve at the Tatlow Reservoir

Installation and monitoring of the seismic valve at the Tatlow Reservoir were initiated and went into full service.

2017 – 08-04 Proposal from OPUS for Potable Water Storage Increase

Evaluate several options to increase potable water storage. The two options studied include:

1. Adjusting the minimum level of the Tatlow Reservoir (“Tatlow”)
2. Adding additional reservoir capacity

2018 (*Date to be determined*) an actuated altitude valve at the Tatlow Reservoir

Installation of an actuated altitude valve at the Tatlow Reservoir

2019 – 03 – 01 Letter from District of North Vancouver - Discussion of Belcarra Water Supply Scenarios

Possible increase in peak flows to Belcarra for 30 L/second or possibly 60 L/second

References:

A Brief History of the Sasamat Volunteer Fire Department by R Drew March 13, 2020

VILLAGE OF BELCARRA

Water Committee - Chronology of documents with Fire Underwriters Survey (FUS) Documents

Correspondence for Water Committee discussion:

1. **2010-08-08** FUS Letter from Michael Currie to Larry Scott – this was referenced in Water Committee May 2019 Interim report to Belcarra Council

2. **2010-10-18** FUS Letter to Larry Scott – Proposal to Conduct Fire Underwriters Survey

3. **2019-05-28** FUS Letter from Michael Currie to Lorna Dysart

4. **2020-05-28** FUS Letter from Michael Currie to Mayor Belenkie and Council

5. **2020-05-08** FUS email from Michael King to Mayor Neil Belenkie

6. **2020-06-02** FUS email from Michael Currie

7. **2020-07-06** FUS email from Michael Currie to Mayor Belenkie

Fire Underwriters Survey™

May 28, 2019

Lorna Dysart
Chief Administrative Officer
Village of Belcarra
4084 Bedwell Bay Road
Belcarra, BC V3H 4P8
Via email: ldysart@belcarra.ca

Dear Ms. Dysart

Re: Village of Belcarra 2010 Design Review Correspondence

In response to your letter dated May 24, 2019 I am providing the following information which hopefully answers any questions you have and provides information needed to make decisions around provision of water supplies for public fire protection.

Response to question about source of information for comment:

> *The comment from the August 8, 2010 correspondence states: "Knowing that the water supply system as designed would not provide the recommended fire flows for the types of structures being protected, fire prevention and mitigation measures are strongly encouraged to reduce the risk of loss of life and property when a fire occurs."*

This comment references the previously completed Fire Underwriters Survey (year 2000) which included a fire risk assessment in terms of required fire flows and assessment of water systems and available fire flows and volumes. See Appendix A for flow test results, associated required fire flows, and internal memo to survey file from the FUS surveyor that completed this survey and grading. Note that the calculations of required fire flows were not included in the files for this survey. The calculations may have been mis-filed or the surveyor may have estimated required fire flows based on the fairly simple risk profile fire the community. This was a common practice for communities primarily made up of dwellings, as per Note J in the Water Supply for Public Fire Protection, see Appendix B. Required fire flows determined in this manner are adjusted for increased or decreased risk factors such as

- size of buildings (smaller or larger than typical dwelling of 2,000 sq.ft)

Fire Underwriters Survey™

- roof construction (wood shake roofs increase risk)
- exposures (closely spaced buildings and wildland exposures increase risk)
- sprinkler protection (consistent presence of sprinkler protection in all dwellings reduces risk)

The reference Basic Fire Flow from the year 2000 survey documents was 1,100 lgpm and the reference design flow was 400 lgpm. This deficiency (700 lgpm) in design was the source of the comment regarding the system not being designed for the required fire flows.

Further Notes:

1. *Required fire flows* refer to the flow rate (and duration) of water necessary to combat a fully involved structure fire considering application at a specified intervention time for Initial Response.
2. After the memo referenced in this letter (August, 2010) was received, a more comprehensive review of the Sasamat Fire Protection Area was undertaken in December of 2010. This review included calculation of a number of required fire flows for dwellings and commercially insured structures. Based on these calculations, the Basic Fire Flow for the Belcarra area was conservatively increased to 1,200 lgpm. See Appendix C for Required Fire Flows calculated for Belcarra during this survey. The full report will be attached to this email separately.

Hopefully this is helpful.

Please let us know if you have any further questions or would like to discuss further. Also, please let FUS know if the water system or fire protection risk or suppression capacities have changed so that the grades can be updated to reflect the changes.

Best regards,

Michael Currie, P.L. Eng,
Fire Underwriters Survey
Email: michael.currie@fireunderwriters.ca

FIRE UNDERWRITERS SURVEY
A SERVICE TO INSURERS AND MUNICIPALITIES

May 28, 2020

Village of Belcarra
4084 Bedwell Bay Road
Belcarra, BC V3H 4P8

Attention: Mayor Belenkie and Council

Subject: Fire Underwriters Survey - Village of Belcarra's Water Distribution System

Further to your recent inquiry relating to fire insurance grades and water supplies for public fire protection in the Village of Belcarra, please find the following summary and comments that are provided for your information.

Fire Underwriters Survey is a national organization administered by Opta Information Intelligence Corp, formerly the Insurers' Advisory Organization. FUS provides data on public fire protection for fire insurance statistical work and underwriting purposes of subscribing insurance companies. Subscribers of Fire Underwriters Survey represent approximately 85 percent of the private sector property and casualty insurers in Canada.

Fire Underwriters Survey measures fire risk in all Canadian communities in terms of required fire flows. This refers to the flow rate (and duration) of water necessary to combat a fully involved structure fire considering application at a specified intervention time for Initial Response (by an adequately trained and equipped fire department).

The following steps are followed to determine the fire insurance grades of communities:

1. Measure risk of representative (and peak) buildings in terms of required fire flows
2. Measure capacity of water infrastructure to support required flows and associated durations
3. Measure capacity of fire department to respond in appropriate time frames and with adequately trained and equipped companies for effective response
4. Measure capacity of emergency communications systems to support effective alarm communications and responses
5. Measure level of fire prevention systems and reduce frequency and severity of incidents
6. Calculate level of effectiveness under conditions:
    a. Normal Loss Expectancy (all systems functioning)
    b. Probable Maximum Loss (one key system malfunctioning)
    c. Maximum Foreseeable Loss (multiple failing systems)
7. Combine and weight effectiveness grading into a single aggregate score (1-10)

With respect to risk level, the Village of Belcarra was determined to have a range of required fire flows when surveyed in 2010, however the majority of buildings were under 1,200 lgpm and this value was used as the Basic Fire Flow for measuring the effectiveness of the community's public fire protection systems and infrastructure.

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The community was credited with being capable of providing at least the absolute minimum required flow (400 Igpm) to be recognized for fire insurance grading, however was also noted to be unable to produce the required fire flow (for effective protection). This is common in smaller communities across Canada. Although it is generally recommended that communities invest in infrastructure to support the required fire flows, often communities can not afford to make these investments, or do not have a fire department that is adequately resourced to make full use of that amount of water so it would not make sense to provide it.

It is important to note that communities should consider all relevant factors when making decisions around emergency service funding. This includes the economic factors of costs of services, desired outcomes, risk tolerance, etc. Often the most cost effective approaches to managing fire risk are with built-in systems, prevention and mitigation activities such as implementing sprinkler bylaws, requiring clear space between vegetation and structures, implementing FireSmart guidelines for property owners, etc.

The issue of Wildland Urban Interface (WUI) is not considered extensively in the Canadian Fire Insurance Grading Index which provides two systems (DPG for dwellings and PFPC for commercial) of indexing structure fire risk, but neither of these systems is focused on WUI events. A new grading index has recently been developed (the Wildfire Grading Index) for this purpose, however the focus of this index is on measuring the implementation of prevention measures as described in FireSmart manuals and other WUI mitigation systems as opposed to measuring suppression capacity.

The reason for this is that fires coming from the forest into a community tend to be larger and more challenging to deal with. These fires require a response from the province and may require joint efforts from local fire departments also.

In areas with significant WUI exposure, FUS strongly recommends engaging with a professional consultant to conduct a Community Wildfire Hazard Assessment and develop a Community Wildfire Prevention Plan. Bylaws can be created to limit the use of combustible materials in roofs and exterior siding as well as other mechanisms for hardening the built environment and improving resilience to WUI events.

If structures in the built environment have significant WUI exposure and there is concern not only about fire coming into the community through the forest, but also getting into the forest from structure fires, then strong consideration should be given to mitigation techniques that reduce the risk of this by limiting vegetation in the area around structures. There is a lot of information and guidance available at:

- FireSmartBC website: https://firesmartbc.ca/
- UBCM Community Resiliency Investment website: https://www.ubcm.ca/EN/main/funding/lgps/community-resiliency-investment.html

In our communication it was noted that one of the serious concerns was the lack of multiple egress paths out of the community. The community should develop a clear plan for evacuating all residents safely for all foreseeable perils including significant wildfire. A comprehensive emergency response plan should be created that considers the access to egress and in cases where this is limited, may require development of shelter in place systems and protocols.

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Providing adequate water supplies for fire protection is an important part of an effective strategy but should be considered as one inter-connected element of public fire protection and should consider probable time frames for intervention as well as limitations of the fire department (apparatus, training, access, etc.).

A comprehensive study can be undertaken with a professional consultant to provide multiple options along with costs and benefits of different approaches to managing the fire risk in the community. The Fire Commissioner and provincial and national Associations of Fire Chiefs can also provide guidance in this area.

The community should be re-surveyed by FUS approximately every 5 years to ensure that community has a measurement of the risk in the built environment and can make informed choices around the changing level of fire risk and measured levels of fire protection and prevention.

All decisions around investments in public fire protection and emergency response have serious consequences. These decisions should carefully consider all aspects of fire protection and prevention and what makes sense for each community considering the specific relevant factors and economics. Improvements in risk control or suppression capacity should be reported to FUS to ensure that fire insurance grades accurately reflect the fire risk levels as this can impact insurance rates.

Fire protection effectiveness is a function of the severity of the risk and the adequacy of the intervention. The greater the risk, the stronger, or faster, an intervention needs to be, to be effective. The Village of Belcarra has many large wood frame dwellings which are built close to combustible vegetation, and therefore the risk of larger fires is somewhat greater than in many other residential areas across the province. The community should carefully consider options around mitigating or preparing to respond to the fire risk, or if it is not economically feasible, property owners can be warned of the limitations of the protection systems and advised to carefully manage their fire risk, knowing that the response may be more limited.

Regards,

Michael Currie, P.L. Eng,
Fire Underwriters Survey
Email: michael.currie@fireunderwriters.ca

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Water System Capacity for Fire Protection Committee – Attachments to Agenda Items

From: Michael King <michael.j.king@scm.ca>
Sent: May 8, 2020 12:11 PM
To: Neil Belenkie <NBelenkie@belcarra.ca>
Cc: Michael Currie <michael.currie@scm.ca>; Robert McGuinness <robert.mcguinness@scm.ca>
Subject: Fire Underwriters Survey - Village of Belcarra's Water Distribution System

Hi Neil,

Attached is the most recent letter submitted to our office by Ms. Dysart in 2019 and our response.

You indicated on the telephone yesterday two fires occurred in the Village that resulted in the system being brought to its maximum and running out/low on water for structural fire protection. It is definitely a concern and FUS recommends further review should occur to determine what measures may be warranted to ensure events do not continue to occur.

Past reviews completed by FUS indicated the water distribution system surpassed the minimum requirements for fire insurance grading recognition as outlined in our document Water Supply for Public fire Protection. However, the water distribution system was noted to be deficient when measuring its ability in being able to provide the full Required Fire Flow (1,200 Igpm) of buildings serviced by the water distribution system.

Attached is map information FUS has on file for the Village's water distribution system. FUS recommends that details be obtained from the Village's water system operator to confirm available fire flows from hydrants on the distribution system and duration available for fire flows based on the reservoir storage and supply from the DNV. The following below is a quick summary from the mapping provided.

- Twinned 200 mm main from DNV in 2012.
    - Confirm what supply amount is provided by the DNV through the mains
- Connection at the Midden Road Receiving Building –
    - converts to one 200 mm main which then provides water to the Tatlow Road Reservoir
    - Tatlow Road Reservoir – 58,8000 Imperial Gallons (surpasses the minimum requirement of 24,000 Imperial Gallons for fire insurance grading recognition)
- There than appears to be two water distribution systems
    - High Pressure system (Portion of main Road) – fed from a connection of the regular system but has own pump station
    - Regular pressure system – gravity fed from the reservoir to the distribution system

If any improvements or decreases in public fire protection have occurred, they should be reported to FUS so they can be reviewed to determine if any adjustment is warranted to the fire insurance grades published in the Canadian Fire Insurance Grading Index.

If you wish to discuss further, please let us know.

Michael King, B.Sc & Fire, C.Tech
Fire Protection Specialist
michael.j.king@scm.ca | www.fireunderwriters.ca
Direct: 604-609-4137 | **Telephone:** 604-684-1581 | **Toll Free:** 800-665-5661
Fax: 604-688-6986

From: Michael Currie
Sent: Tuesday, June 2, 2020 5:00 PM
To: Neil Belenkie <NBelenkie@belcarra.ca>
Cc: Lorna Dysart <ldysart@belcarra.ca>; Michael King <michael.j.king@scm.ca>
Subject: RE: Fire Underwriters Survey - Village of Belcarra's Water Distribution System

Hello Mayor Belenkie,

I have superficially reviewed the required fire flow calculations performed by ISL Engineering and dated May 6, 2020. Although some of the details regarding source data and methods of determining some values are not included, generally the method used and findings are correct. However as noted, the FUS method of determining required fire flows should be done in the context of the available response from the fire department and taking into account the time frame for response and capacity of the department (ex. pumps, apparatus, etc.).

The community currently has a Basic Fire Flow of 1,200 lgpm which with rounding is in the same order of magnitude as the required fire flow determined in the ISL report. See the following table which shows the various flow ranges rounded to the nearest 1,000 LPM, 100 lgpm and 100 USgpm.

LPM	LPS	lgpm	USgpm
4000	67	900	1100
5000	83	1100	1300
6000	100	1300	1600
7000	117	1500	1800

The highlighted values show the risk range that Belcarra has been determined to be in for the majority of risks. Note that this method of determining required fire flows was not developed specifically for use in wildfire urban interface areas. However, the Wildland Urban Interface Code does address this in section 404.5, requiring 1,000 USgpm for dwellings up to 3,600 square feet and 1,500 USgpm for dwellings over this size (see attached).

It is important to stress that Belcarra has been determined by FUS to meet or exceed the minimum requirement for FUS Dwelling Protection Grades which affect dwelling insurance. As insurers of dwellings often treat this as a binary determination of either having water supplies or not having water supplies, increasing the amount of water available to that which would be effective for firefighting (required fire flow), may not have an impact on insurance grades and premium pricing for dwellings. However, FUS encourages insurers to use the PFPC system for large dwellings (over 3,600 square feet) which would affect the risks in this area.

Providing additional water infrastructure for firefighting is one area in which the community can improve its effectiveness and manage the fire risk. Other areas include, but are not limited to:

- implementing FireSmart and managing the wildland urban interface exposure,
- integration of sprinkler requirements for all combustible buildings,
- implementing requirements for noncombustible cladding and roofing materials for all buildings with WUI exposure,
- increasing the staffing of the fire department and/or developing a duty crew system focusing on improving turn out times and maintaining on-duty coverage levels of the fire department,
- utilization of foam and CAF technologies to maximize effectiveness of limited amounts of water where deemed inadequate,
- increasing training levels and including regular live fire training and wildfire training as well as cooperative exercises with the province in coordinated response tactics and pre-incident plans.

To begin the process of updating the fire insurance grades for the community please have the attached forms completed and submitted.

- FS4 – Fire Station (Fire Chief or Officer)
- CU4 – Community (Fire Chief or Officer)
- WS4 – Water System (Water Engineer)

Once the completed forms (and reference exhibits) are received we will schedule times with the Fire Chief and water system engineer to facilitate an updated risk assessment and complete any additional tests and field data collection required.

Thank you and please let me know if you have any questions,

Submit Form

Fire Underwriters Survey Outreach - Fire Station Form (FS4)

Please fill out this form, save and email the form to outreach@fireunderwriters.ca, we may also request a signed hard copy.

Print Form

Local Government Legal Name:

Fire Department Name:

Date Completed:

FUS Office Use Only:

Fire Hall Name	#	Address	Nearest cross street

Staffing at Fire Hall			
	Fire Fighters *(excluding Officers)*	Officers/captains *(including "acting" but excluding Chief Officers)*	Chiefs *(include Platoon/Deputy/District)*
Career			
Auxiliary			

		Number	Time From	Time To
For career fire fighters/officers on duty, what is the minimum on-duty staffing?	Day:			
	Night:			

Type	Identifier	Manufacturer	Year	ULC #	Pump Capacity IGPM	Tank Capacity I.Gal
1st Line Pumper						
2nd Line Pumper						
Reserve Pumper						
1st Line Ladder						
Reserve Ladder						
1st Line Tender						
2nd Line Tender						
Initial Attack						

Is there a pressurized water system in this fire hall's response area? ☐ Yes ☐ No

Water System (WS) contact:

WS Phone: WS Email:

Completed By: Date:

www.fireunderwriters.ca

Submit Form

Fire Underwriters Survey Outreach – Community Update Form (CU4)

Please fill out this form, save and email the form to outreach@fireunderwriters.ca

Print Form

Community Name:			
Fire Department Name:			
Fire Chief (FC) Name:			
FC Phone:		FC Email:	
GIS/Mapping contact Name:			
GIS Phone:		GIS Email:	
FUS Office Use Only:			

Part 1 – Response Area

- Does your Fire Department provide first alarm automatic aid to other communities? (list communities and provide contract)
- Does your Fire Department receive first alarm automatic aid to other communities? (list communities and provide contract)
- Does your Fire Department provide other types of fire response aid to other communities? (list communities and provide contract)
- Does your Fire Department receive other types of fire response aid to other communities? (list communities and provide contract)

Part 2 – Training

- Training frequency:
- Number of fire fighters certified to NFPA 1001 (or equivalent) — Lvl 1: Lvl 2:
- Number of fire fighters certified to NFPA 1021 (or equivalent) — Lvl 1: Lvl 2:
- Number of NFPA 1041 certified trainers (or equivalent)
- Is there an appointed Training Officer?
- Training curriculum used (provide syllabus)
- Live Fire Training hours per fire fighter annually

Part 3 – Communications

- Is the community on 911?
- Name of PSAP (Public Safety Answering Point)
- Name of Dispatch provider

Part 4 – Prevention/Public Education

- Inspection frequency *(excluding dwellings)*:

☐ Semi-annual ☐ Annual ☐ Every 3 years ☐ No routine ☐ Request/Complaint

- How many inspections completed for previous year?
- Is there a public education program in place?
- How many Dwellings visited annually (smoke alarm/education/inspection)
- Number of fire prevention inspectors/public educators
- Number of inspectors certified to NFPA 1031 (or equivalent) — Lvl 1: Lvl 2:
- Number of public educators certified to NFPA 1035 (or equivalent) — Lvl 1: Lvl 2:
- Number of pre-incident plans created for the community

Please include the following attachments:

☐ Training syllabus ☐ FS4 – Fire Station Form for each Fire Station ☐ Fire Protection Area Boundary Map or GIS contact ☐ Aid Agreements

www.fireunderwriters.ca

Submit Form

Fire Underwriters Survey Outreach - Water Supply Form (WS4)

Please fill out this form, save and email the form back to our office, with attachments if specified.

Province:		Water System Name:	
Region/County/District:		Water System Type:	
Municipality:		Contact Name:	
Date Completed:		Contact email:	
FUS Office Use Only:		Contact phone:	

Part A – Hydrant Coverage and Water System Basic Information

Please provide the following background information on the water system(s).

1. *Is there a servicing bylaw that requires fire hydrants for all new developments?*
2. *Is the Water Supply for Public Fire Protection Guide referenced in the servicing bylaw for determination of required fire flows and hydrant coverage?*
3. *What is the hydrant spacing standard used for dwelling districts/zones?*
4. *What is the hydrant spacing standard used for non-dwelling districts/zones (ex. industrial)?*
5. *Are all dwelling structures within 300 metres of a fire hydrant?*
6. *Are all structures other than dwellings within 150 metres of a fire hydrant?*
7. *Visual inspection of hydrants frequency:*
8. *Full tear down of hydrants frequency:*
9. *Flow testing of hydrants frequency:*
   If available, please provide flow test results with the completed form submission.
10. *Has a hydrant map been created?*
    If yes, please provide the hydrant map with the completed form submission.
11. *Have any engineering reports been created for the system?*
    If yes, please provide the report(s) with the completed form submission.
12. *Has a hydraulic model been created for the water system?*
    If yes, please provide the hydraulic model results for fire flow plus Max Day Demand conditions with the completed form submission.
13. *Has a flow schematic been created for the system?*
    If yes, please provide the flow schematic with the completed form submission.
14. *Are there multiple pressure zones within the system?*
    If yes, please indicate the number of pressure zones:
15. *How many pumps are used throughout the system?*
    If yes, please provide the capacities of the pumps with completed form submission.
16. *Are there any non-pressurized (dry) hydrants?*
    If yes, please provide the hydrant map attached with the completed form submission.

Western Canada	Ontario	Quebec	Atlantic Canada
3999 Henning Drive Burnaby, BC V5C 6P9 1 (800) 665-5661	150 Commerce Valley Drive West Markham, ON L3T 7Z3 1 (800) 268-8080	1611 Cremazie Boulevard East Montreal, QC H2M 2P2 1 (800) 263-5361	238 Brownlow Avenue, Suite 300 Dartmouth, NS B3B 1Y2 1 (800) 639-4528

Water System Capacity for Fire Protection Committee – Attachments to Agenda Items

From: Michael Currie <michael.currie@scm.ca>
Sent: July 6, 2020 4:35 PM
To: Neil Belenkie <NBelenkie@belcarra.ca>
Cc: Lorna Dysart <ldysart@belcarra.ca>; Michael King <michael.j.king@scm.ca>
Subject: Fire Underwriters Survey - Village of Belcarra's Water Distribution System

Hello Mayor Belenkie,

As per our discussion today please find attached the previous 2010 letter regarding FUS and water supplies for public fire protection in Belcarra.

Also please find attached the Water Supply for Public Fire Protection reference document which includes the durations of design fire events for each benchmark required fire flow level in Table 1, on page 4.

The following points are provided for clarification,

- FUS conducts risk assessments of Canadian communities, including Belcarra by calculating required fire flows and found that the majority of buildings in Belcarra at the time of survey were at, or below 1,200 lgpm required fire flow, therefore, a Basic Fire Flow of 1,200 lgpm is used as the benchmark against which Belcarra is measured for fire insurance grading purposes
- The absolute minimum required flow to be recognized for fire insurance grading is 200 lgpm for dwellings
- Generally communities should strive to provide adequate water supplies for the calculated required fire flows however they are not legally required to do so, but it does affect fire insurance grades
- Providing adequate water supplies for fire fighting is one element of many that influence the fire insurance grades including adequacy of response, training, equipment, etc.,
- The FUS method of calculating required fire flows does not take into account significant wildfire exposure, however a charge of up to 75% can be applied to any required fire flow calculation for exposure conditions depending on the severity of the condition and the probable amount of water required to protect the exposure under fire conditions
- FUS measures fire risk and the effectiveness of the response for the purposes of fire insurance grading

Thank you for your interest and please let me know if you have any questions,

VILLAGE OF BELCARRA

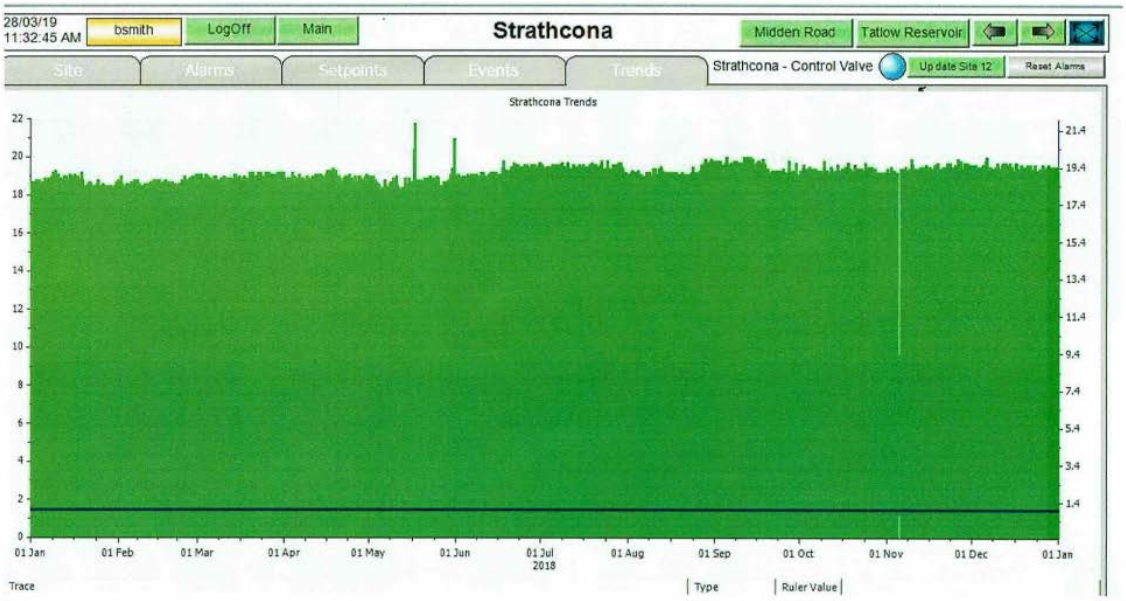
Water Committee –
Tatlow Reservoir Levels during the 2017 Turtlehead and Senkler Fires

"What information or documentation does the committee feel the Village should ensure it has and why?

- SCADA documentation and a manual
- Water System Operating Manual
- Sprinkler requirements is another example.

"SCADA Monitoring SCADA is an acronym for 'Supervisory Control and data Acquisition". This is a computer system for gathering and analyzing real-time data programmed to generate alarms and notifications tot he water system operators. Belcarra's water system design includes a SCADA system used to remotely monitor and control the system on a 7/24 basis which negates the need to have staff onsite after hours. Pre-programmed set-points will generate alarms and email notifications for reservoir high and low levels, low chlorine residual, pressure zone pump status, emergency generator and fire pump status, high and low temperature, DNV supply flow, smoke and carbon monoxide alarms. These functions greatly reduce the time otherwise required to manually monitor and control the system.

The SCADA System allows the key functions and alarms of the water system to be monitored in the Village Hall and remotely on smart phones. Apart from providing operational flexibility to confirm that the system is operating correctly and that there is chlorine in the system. When alarms are triggered (say a low reservoir alarm), staff will be able to identify the problem remotely and decide if they need to respond immediately, especially outside normal working hours. The system has been custom programmed to display information deemed necessary to confirm the system is operating correctly."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01 Sep
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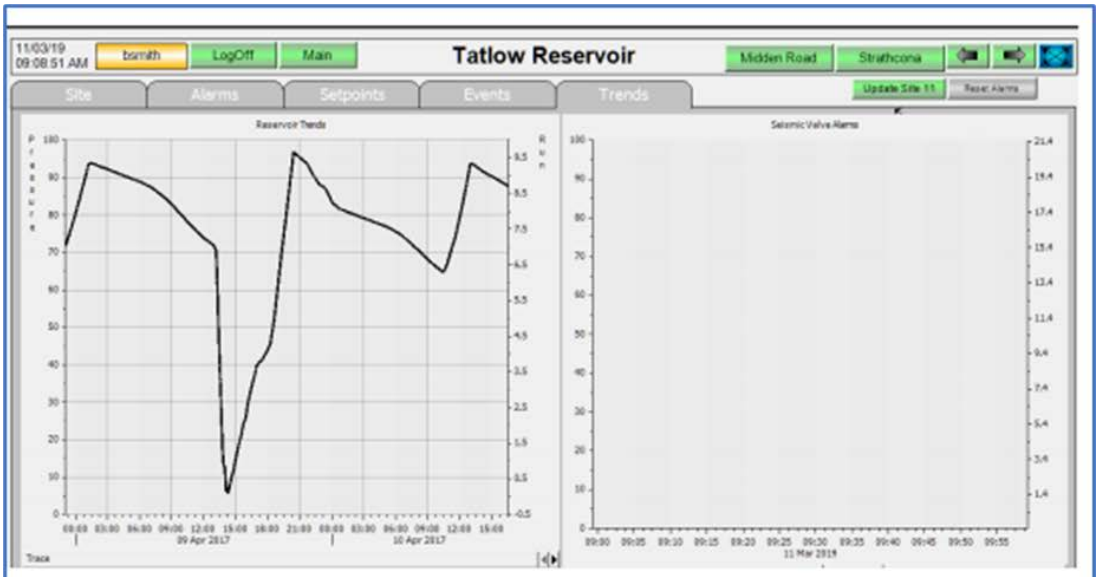

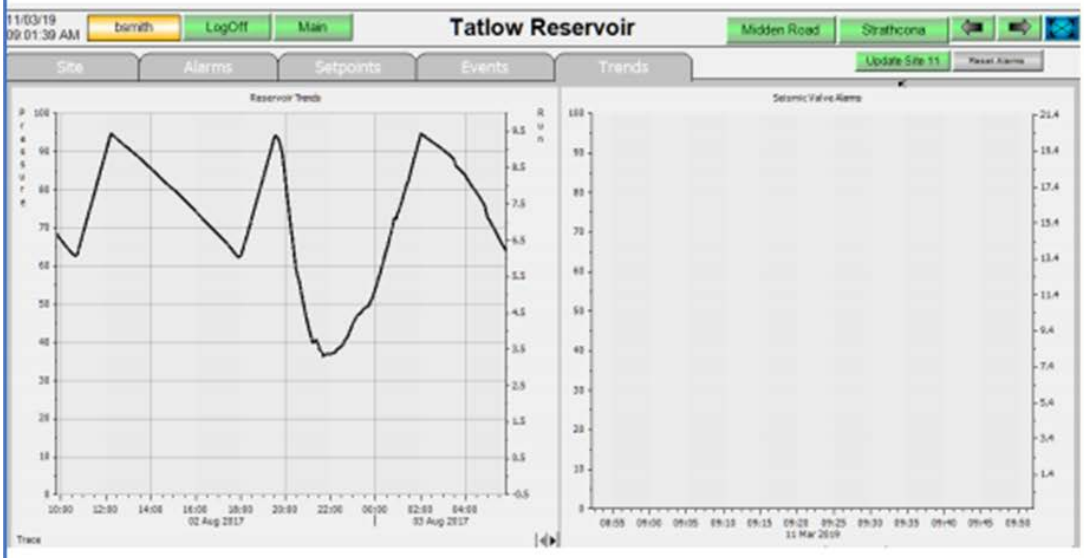

Turtlehead Fires 2017/04/09		Res =		97.5%	238.5	CM
Time	Reservoir	Flow L/s				
1:11:00 PM	70.5%	Start		172.5		
1:23:00 PM	63.0%		19.2		49.5	CM from DNV
2:06:00 PM	6.2%	Stop		15.2	157.3	CM From Tank
8:26:00 PM	95.0%		19.2	232.4		
					206.8	CM Total
Senkler Fire 2017/08/02		Res =		97.5%	238.5	CM
Time	Reservoir	Flow L/s				
7:52:00 PM	88.0%	Start		215.3		
8:24:00 PM	63.0%		19.2		90.3	CM from DNV
9:42:00 PM	36.0%	Stop		88.1	127.2	CM From Tank
12:00:00 PM	95.0%		19.4	232.4		
					217.5	CM Total

VILLAGE OF BELCARRA

Water Committee – Listing of Major Fires in Belcarra

Sasamat Fire Department Significant Fire Events

Date	Location	Village	Type
1993-Sept-12	?	Belcarra	Structure
1994-June	Bedwell Bay Road	Belcarra	Structure
2015 June 13	Hamber Island	Belcarra	
2016-May-14	Bedwell Bay Road	Belcarra	Structure
2016 Sept-28	Marine Avenue	Belcarra	Structure
2009-Apr-17	Turtlehead Road	Belcarra	2 Structures
2017-Jun-04	Main Avenue	Belcarra	Vehicle
2017-Aug-02	Senkler Road	Belcarra	Structure
2017-Oct-17	Main Avenue	Belcarra	Structure
2018-May-29	Main Avenue	Belcarra	Structure
2020-Jan-12	Bedwell Bay	Belcarra	Hydro Pole

Summary: Since 1993 there have been 4 structure fires in the Village of Belcarra that would be considered as “significant fire events”.

VILLAGE OF BELCARRA

Water Committee
Discussion of Obtaining Details of DNV memo to Belcarra CAO March 1, 2019

Fire Fighting.

5. ***Increase DNV peak supply flow to 30L/s or 60 L/s.*** Preliminary modeling shows that the DNV system is likely capable of supplying 30 or 60 L/s at the existing VOB feed without immediate impact to the DNV system. Upgrades to the VOB system would be required. Further modeling is required to identify long term capital upgrade impacts to DNV system. Preliminary estimated capital upgrades to the VOB system is $2-3M.

Move that Belcarra Council (uncertain if this will be necessary?)

1. Send a written request to the District of North Vancouver, to determine if they would be able do the modeling to provide an increased flow to Belcarra beyond the current 21 l/s (eg 30, 45 or 60 l/s) and ask that DNV identify the long term capital upgrade impacts and estimated costs, if any, to the DNV system**. OR**
2. That Council request our engineer Chris Boit of ISL Engineering engage with DNV on this matter