

## FRAMEWORK FOR A STAGED APPROACH FOR CENTRALIZED WATER TREATMENT

In April 2019, the FCID Board received a proposal from Aqua Diversities and 9dot Engineering for the design and implementation of a centralized water treatment system. In addition to recommendations regarding installation, operation and water testing, the report provided useful information on collective water demand for a two-month period (August-September 2018), and provided specific chemical and microbiological evaluation of our water quality against Canadian drinking water standards. Unsurprisingly, unacceptable results for microbiological contaminants were identified. Such contamination has been a long-standing issue for the Improvement District and is the basis for our ongoing Boil Water Notice.

A budget estimate of approximately \$519,000 was determined for the implementation of the water system without provision for fire flow (access to water in case of fire within the district). If the district wished to include provision for fire flow, then the overall budget was estimated to almost double to approximately \$1 Million.

To engage the FCID membership and obtain their necessary support, the report along with a survey was distributed to all property owners and a special information meeting was held on June 19, 2019. Survey results revealed there was no community support to borrow money to implement the system (our bylaws prohibit borrowing money without majority support of titled landowners). This result was driven in part by serious doubt that the FCID would qualify for a loan for the dollars needed and in part by concern that, even should we qualify, the increased taxes would be unaffordable.

Two members of the board met with Renee Ansel, Interior Health Environmental Health Officer (EHO), on October 30, 2019 to discuss options for moving forward given the community response. The EHO recommended a staged approach with a focus on water testing/monitoring and filtration as starting points. It was emphasized, however, that ultimately, disinfection will be required to achieve permanent removal of the Boil Water Notice.

Following this meeting, the full Board considered the recommendation regarding a staged approach and felt this would be manageable. We developed a conceptual framework to guide the approach (Figure 1). This framework was shared with R. Ansel who subsequently confirmed that Interior Health is amenable to this proposed plan to implement a centralized treatment system in stages.

The FCID has accumulated approximately \$200,000 in our capital reserve and capital expenditure charge funds. Allowing for some reserves to be held for infrastructure emergencies, we believe the current fund should be sufficient to implement most or all of the first stage, including enhancing our existing infrastructure, strengthening our water testing regime, and introducing a centralized filtration system. Guided by the principle of affordability, we will continue to build our capital reserves and strive to access available funding to finance subsequent stages of the water treatment project.

Figure 1. Conceptual Framework for Staged Approach

WATER TESTING FOR ONGOING MONITORING	USE OF WATER TEST RESULTS FOR IMPACT ASSESSMENT		
<ul> <li>Testing and monitoring of:</li> <li>Water quality (coliforms, fecal coliforms, E. Coli))</li> <li>Temperature</li> <li>Turbidity (amount of suspended organic &amp; inorganic material)</li> <li>Flow (demand/usage)</li> <li>For:</li> <li>Risk communication/ notifications to members</li> <li>Regular reporting to Interior Health (quality);</li> <li>Assessing collective demand &amp; reporting usage to Municipal Affairs &amp; Housing, Forests Lands &amp; Natural Resources (usage)</li> </ul>	Baseline measures: Quality, turbidity		LS
	Infrastructure Development*		
	Prefiltration (at intake)	Filtration	AGE ONE
	Filtration		
	Impact assessment against baseline to determine the difference filtration has made: on water quality and turbidity		
	UV		STAGE TWO
	Impact assessment against baseline & Stage 1 results	Disin	
	Chlorination	ifection	STAGE THREE
	Impact assessment against baseline Stage 1 & 2 results		

\* Includes determining the site of the treatment facility, building the facility, accessing electrical services and other civil works required before filtration is installed.

## Timelines

An implementation plan is presented in Table 1. Timelines are estimates only, as some aspects such as permit approval are beyond FCID control and adjustments are expected as we proceed.

Our focus in 2020 will be on reviewing and enhancing our water testing and monitoring protocols and starting to develop the infrastructure to support the centralized water treatment system. We expect to contract engineering and water specialists in the summer to review possible sites for the treatment facility (each with their own advantages and disadvantages) and to prepare building/construction specifications to accommodate both filtration and disinfection. We hope to submit all necessary permit applications by this fall.

In 2021, we expect to construct the facility, introduce the filtration system and install a centralized flow meter. In 2022, we plan to evaluate the results of the filtration system in terms of the impact of filtration on our water quality and on our operational costs. The disinfection components will be implemented as our capital reserve funds are replenished.

## Table 1. Staged Implementation Plan

STAGE ONE: MONTIORING AND FILTRATION		Estimated Timeline	
Water Testing and Monitoring			
1.	Continue regular water quality testing & reporting (quality & turbidity)	Ongoing	
2.	Review and develop a plan and protocols for enhancing water testing and monitoring	By June, 2020	
3.	Introduce temperature and particulate testing	By June 2020	
4.	Purchase and introduce centralized flow meter when access to electricity is achieved	By fall, 2021	
Pla	nning & Community Engagement		
1.	Engage community through newsletter and AGM or special meeting	Ongoing	
2.	Engage a water specialist/engineer to establish a detailed Stage 1 plan with siting recommendation, treatment system specifications, timelines, and cost estimates	June 2020	
3.	Prepare & submit IHA permit application; receive IHA approval	Sep 2020 - Apr 2021	
4.	Obtain other necessary approvals / permits	By Dec 2020	
Stage 1 Implementation			
1.	Civil works for treatment system infrastructure, including site preparation, foundation, building, electrical	2021	
2.	Construct & implement system components, including flow meter	2021	
3.	Commission first stage of system	By year end 2021	
Monitoring and Impact Assessment		2022	
STAGE TWO: UV DISINFECTION			
Access Financing			
1.	Explore potential funding sources	Ongoing	
2.	Continue to build capital reserves	2021 - 2023	
Planning		2022 – 2023	
Implementation & Impact Assessment		2023 - 2024	
STAGE THREE: CHLORINATION			
Continue to look for funding & build of reserves		Ongoing	
Planning		TBD	
Implementation & Impact Assessment		TBD	