System Infrastructure

New Treatment Plant Locations

Representatives from the south Lake Samish community were asked to provide possible locations for the new water system facilities necessary to serve the proposed service area including: treatment, storage, booster pumps. Two possibilities were identified: a vacant lot on Fire Lane adjacent to the lake; and the south end of property owned by the Calmor Cove Club. Preliminary review of the two options indicates that the Calmor Cove property is preferred. The pros and cons for each are shown below:

Fire Lane

Pros

- Proximity to point of diversion
- Proximity to Calmor Cove existing distribution
- Proximity to Shallow Shores Road and related future distribution main

Cons

- Lot may not be available
- Lot size may be to small
- Historical, cultural, and environmental permitting very difficult and may not allow
- Land use may not allow treatment facility
- Location not favorable for construction including setbacks
- Limited Access to other utilities
- Increased traffic through community to facility
- Lot size may not be able to meet screening requirements to maintain residential character of the area that are expected as part of a conditional use permit.
- More difficult to serve area along West Lake Samish Road.

Calmor Cove

Pros

- Adequate space available
- Historical, cultural, and environmental permitting less difficult
- Conditional use permit likely to be approved for water system facilities
- Natural screening in place to protect community view
- Location favorable for construction including setbacks
- Property is likely available subject to negotiations with property owners
- Proximity to Calmor Cove existing distribution
- Proximity to Shallow Shores Road and future distribution
- Direct access from West Lake Samish Road
- Possible service available to immediate area along West Lake Samish Road.
- Closer for service from Skagit PUD if tank was required

Cons

- Proximity to point of diversion – further from the Lake
- Requires easement to connect to Shallow Shores Road distribution mains

Design of Facilities

The criteria for use in the planning level design of water supply, storage, and distribution facilities was based on the requirements or recommendations of the various regulatory agencies, DOH Design Standards, and to the specification of such authorities as the AWWA.

Source Capacity: The minimum production capability of the source and associated pumping system shall be 800 gallons per connection per day, plus capacity required to replenish standby storage except where records support a lower MDD.

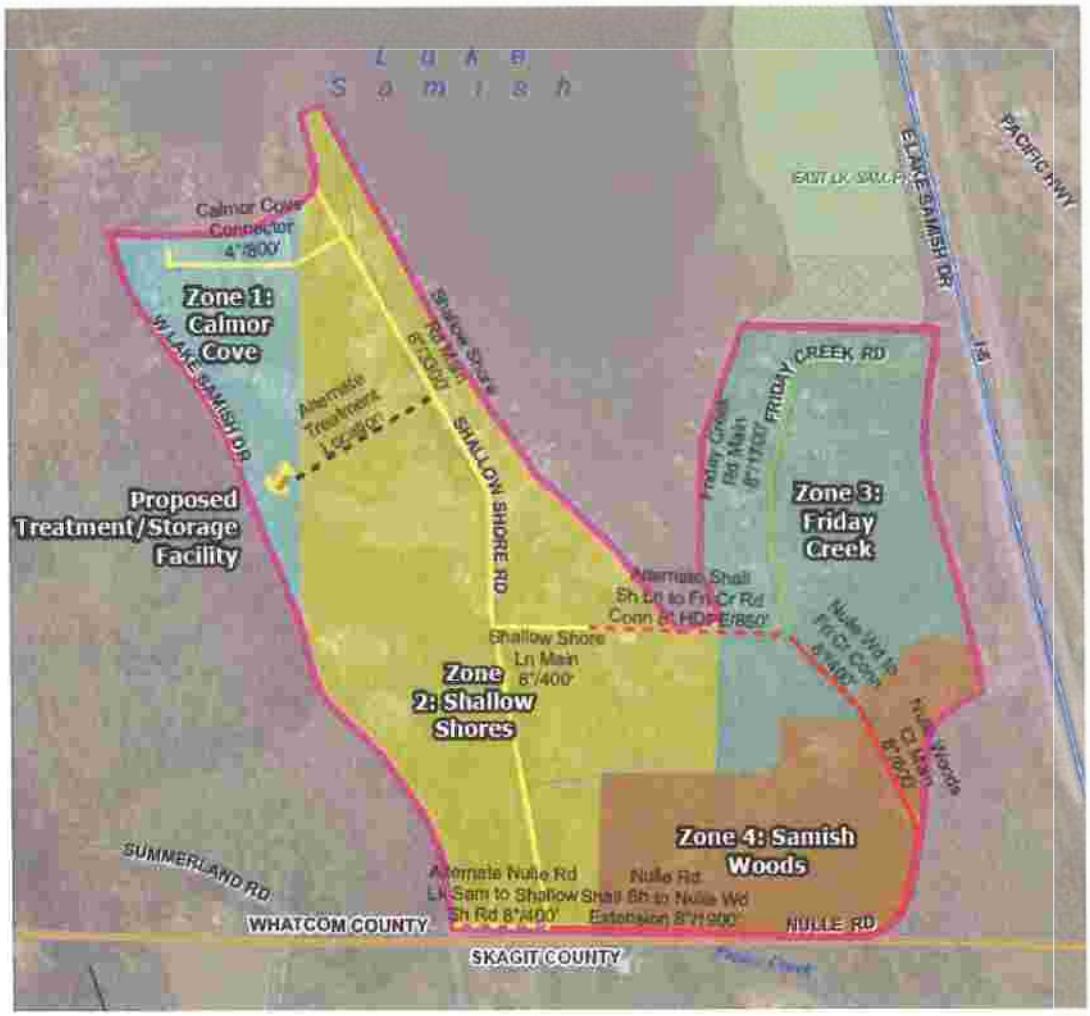
Pumps: Source Pump Capacity for delivering to storage must be of such capacity as to be able to replenish standby storage within 72 hours after the termination of whatever emergency or other condition caused the drawdown of the standby volume and, while so doing, be able to continue to meet MDD established per connection.

Surface water Sources: The minimum treatment acceptable by DOH for surface water sources is 4 log removal achieved in addition to treatment that may include coagulation, sedimentation, filtration, disinfection, or combinations of these.

Pipelines: The capacity of pipelines should be so selected as to result in a system capacity sufficient to deliver water at the maximum daily rate of demand plus the required fire flow with residual pressure of not less than 20 psi. The pipe diameter will also need to provide for a minimum fire flow of 500 gpm.

The diameter of the pipe necessary to transport the required quantities of water will be established during hydraulic analysis as part of the design phase. However, for planning purposes 8" standard diameter pipe will be used to provide for both domestic and fire flow demand.

A map of the proposed distribution system is shown below and in the Appendix as Map 12.



Map 12: Proposed Service Area, Zones, and Distribution

Operations & Maintenance

Low quality water and high maintenance costs is a significant factor motivating local residents to consider an alternate source of water or a community treatment system. In home surface water point of use treatment systems commonly used for single family homes around the lake are fairly reliable when maintained properly. However during the summer months, especially during the algae bloom season at the south end of Lake Samish, point of use filters need to be monitored very carefully and filters changes as often as weekly to maintain quality water. Less sophisticated filters system without water quality monitoring alarms are prone to failure.

Group A Water Systems are required to have an operator certified by the Division of Drinking Water. The water system must also ensure that the personnel operating a system subject to Part 6 of WAC 246-290, Surface Water Treatment, also meet the requirements under RCW 70.119 and WAC 246-292. For a system with surface water treatment the operator must be certified as a Water Distribution Manager and a Water Treatment Plant Operator.

The operation of a public water system includes many duties and responsibilities that are necessary to protect public health. Daily operation of a water system include the following responsibilities:

- Ensure that all daily operation and maintenance activities of the water system are completed in accordance with acceptable public health practices and water industry standards.
- Perform water quality monitoring, maintain adequate records, and take follow-up action, if necessary, to comply with state and federal drinking water regulations.'
- Implement preventative maintenance programs, inspect treatment and other systems components for malfunctions, make needed repairs, and keep adequate records.
- Analyze/review recor4ding instrument readings and laboratory tests, determine sites and causes of any malfunctions, adjust various treatment processes or other components accordingly, and keep records of each action.
- Implement a cross-connection control program.
- Determine remedial actions in emergencies, and be available 24 hours a day.

When comparing maintenance and operations programs required for the two sources of supply being considered, Skagit PUD and Lake Samish, it is clear that maintenance of a basic distribution system is easier and less costly than that of a surface water treatment plant.

Operating a distribution system that would receive its supply of water directly from Skagit PUD, even with the possible addition of a local storage tank and booster pumps, is straight forward and requires minimal maintenance and operation. In most cases several routine visits each month, periodic annual maintenance, an alarm monitoring system, and a 24 hour on call certified operator is adequate.

However, operating and maintaining a surface water treatment plant is vastly more complicated. Daily site visits are required to monitor the treatment plant and collect water quality samples. Extensive maintenance and operational activities are time consuming and expensive. A higher level of operator certification is also required. Unfortunately, is often not feasible to hire a full time qualified treatment plant operator for a small system and this makes it difficult to find stable, competent staff.

Calmor Cove existing treatment plant maintenance and operations costs are difficult to determine because the onsite club maintenance person has broad duties including operation of the treatment facility. For the purpose of this study we have estimated the routine hours required on a daily, weekly, and monthly basis. We then used the costs to hire an outside contract certified water treatment plant operator to perform the tasks required. It is important to recognize that Calmor Cove has been able to operate at a lower cost than those being projected. However, if their current operator were not available those costs are expected to increase dramatically if they were not able to find a maintenance person also qualified to operate the treatment system.

As a general observation, it is believed that the operation of an updated 20 gpm surface water treatment plant would be more efficient and cost effective than that currently being operated by for Calmor Cove. Furthermore, there is not expected to be any significant increase in operating cost for a 50 gpm treatment plant over a 20 gpm treatment plant other than an increase in chemicals. Certainly this is important to consider because the potential exists to spread the same operating costs over a much larger number of users thereby reducing the cost of water per customer.

Financial Analysis

Based on data gathered during this study the table below was prepared to summarize the planning level cost estimates for each source option including the estimated cost per connection assuming various levels of initial participation. The table below is based on funding provided by a Drinking Water State Revolving Fund Loan at 1.5% interest for 20 years. An alternate table was prepared based on funding from US Department of Agriculture (USDA) at 4% interest for 25 years. Both tables are include in Exhibit 19. The analysis also provides a long term cost comparison based on the useful life of each option. In particular, the anticipated useful life of a package treatment plan is 25 years where as the useful life of a distribution system can be up to 4 times that of the package treatment plan. This is significant when comparing the short term and long cost of each option. Safe, reliable, and sustainable delivery of drinking water is a priority for the department of health.

In the short term, 20-25 years, the table shows that the estimated monthly capital and operational cost per customer for treated water from Lake Samish drops significantly as the number connections increases primarily due to economies of scale.

During the same period, the capital and operational cost for water sourced from Skagit PUD is only considered for the full development of the South Lake Samish System (181 connections) because it is not remotely feasible for the smaller systems considered (49-63 connections). While the Skagit PUD option is more expensive in the short term it is a feasible options and much less complicated to operate.

In the long term (100 years), the package treatment plant would need to be replace 4 times during the life of the distribution system. Taking this into consideration the analysis shown at the bottom of the table clearly shows that sourcing water from Skagit PUD is far less expensive than treated water from Lake Samish in the long term.

While it appears to be less expensive to source water from Lake Samish in the short term, long term water sourced from Skagit PUD is by far the most feasible option financially and operationally long term.

CAPITAL COSTS	Lake Samish Treatment CalmorCove Only	Lake Samish Treatment Zone 1	Lake Samish Treatment Zone 1 - 4	Wholesale Skagit Zone 1 - 4
Project Description (See Table 1 for abbreviations)	CC	CC+ FL	CC+FL+SS+FC + NW w/o Bore	CC+FL+SS+FC + NW w/o Bore
Number of Connections	49	63	181	181
Source: Skagit/Treatment (25 Year Life Cycle)	$ 533,505	$ 535,505	$ 950,994	$ 4,500,000
Water Distribution System (100 Year Life Cycle)	$ -	$ 56,000	$ 637,000	$ 665,000
Project Total	$ 533,505	$ 591,505	$ 1,587,994	$ 5,165,000
Capital Cost Per Connection	$ 10,888	$ 9,389	$ 8,773	$ 28,536
Monthly Cost Per Connection @Terms Below	$ 53	$ 45	$ 42	$ 138
Eligible for consolidation subsidy 50%*	N/A	Low	Moderate	High@50%
Net Impact	$ 53	$ 45	$ 42	$ 69

* Eligibility is based on current DWSRF guidelines and subject to change with each loan cycle and available funding.

MANAGEMENT & OPERATIONS				
Monthly Management & Operation	$ 70	$ 54	$ 26	$ 4
Monthly Base Rate Skagit	$ -	$ -	$ -	$ 4
Monthly Cost of Water (200 gpd ADD/400gpd MDD)	$ 8	$ 8	$ 8	$ 16
Net Impact	$ 78	$ 62	$ 34	$ 24
Total Monhly Cost Per Customer (Initial 20 Years)	**$ 130**	**$ 108**	**$ 76**	**$ 93**

Long Term Analysis Based on 100 Year Distribution & 25 Year Treatment Plant Life Cycles

Average Monthly Cost of Per Customer (100 Years)	**$ 107**	**$ 86**	**$ 48**	**$ 38**

Financing Terms Rate	1.5%
Financing Terms Term (Years)	20

Funding Options

The primary methods of funding water utility capital improvements are: savings, loans, and grants.

Savings or a sinking fund as it is often called is by far the least expensive financing option. However, this requires a great deal of time and commitment to plan and execute. In this case no significant savings are available for capital improvements of the magnitude proposed and even a dramatic rate increase will not accumulate funds fast enough to address the problem in a timely manner. The primary role of saving in this case will be to pay for preliminary engineering including cultural and historical reviews, and meeting other loan application requirements such as water system planning.

Generally speaking **grants** have become very scarce and eligibility is focused on the most serious problems in economically disadvantaged communities. If you are eligible for these limited resources it is still very competitive and difficult to justify expending resources to apply when the likelihood of success is so slim. There are some grants available that would be well suited for this type of project but they are only available to municipal entities such as a Public Utility District or a Water District. In order for this project to be eligible, the lead agency would need to become a water district, be taken by the PUD No. 1 of Whatcom County, or possibly have the PUD own a portion of the infrastructure.

Loans are the most common and likely financing option available for the proposed project. The two primary funding sources are the Drinking Water State Revolving Loan Program and the US Department of Agriculture Rural Development. Each loan program has its unique characteristics and challenges.

- **The Drinking Water** State **Revolving Loan Program** has a 1.5 percent basic interest rate on a 20-year loan and is well suited for this type of project. The State Revolving Fund Loan Program is ideal because it provides financing for preliminary engineering, construction documents, and retroactive financing funds expended for the required Water System Plan shortly after the loan is approved. However, an approved water system plan is required before loan can be approved in most cases and therefore the funds necessary to complete an approved Water System Plan must be spent in advance of the funds being available which can be many months or longer.

  A copy of the 2011 Drinking Water State Revolving Fund Program is available on the DOH website. There are a variety of workshops available to assist with DWSRF loan applications. March 1, 2011 is the next application deadline at which time the Water System plan must also be submitted. While the 2011 deadline is not realistic, it is anticipated that March 2012 will be the following application deadline that should be considered.

  During the feasibility study Part I, Meadowbrook Water Association submitted an application for $2.89M and was ranked number one in the first draft based on need. However, during the review process the loan committee determined that the project did not have adequate planning in place to proceed in a timely manner and more important the applicant was not able to demonstrate the ability to service the debt payments.

- **USDA Rural Development Loans** currently have a 4% interest rate for terms up to 40 years and are also well suited for this type of project and can be applied for at any time. The Rural Development loan application process is significantly more difficult and costly up front because the Water System Plan and all of the preliminary engineering must be in place including cultural and historical approval before the application will be approved. After the loan has been approved the first draw is not available until the first construction notice to proceed is issued and that can be three to six months or more after the loan is approved during which time the construction engineering and approvals need to be completed and approved by DOH and Rural Development for receiving the approval to begin construction.

  In order to pursue a Rural Development loan it is very important to have adequate savings and bridge financing in place to cover interim planning, preliminary engineering, application costs, and project engineering through the first notice to proceed with construction. USDA Rural Development Water and Waste Program– Direct Loans and Grants information is readily available on the local USDA website or by calling the local USDA office.

Governance

This section presents a brief overview of governance options to be considered for developing a new south Lake Samish community water system.

The governing body would be responsible for executing a plan of action including: water rights development, obtaining easements and/or franchises, conforming with local ordinances, the Coordinate Water System Plan, and with WAC 246-290-100 and -230.

Ideally there would be a feasible governance structure already in place "that is willing" to represent the south Lake Samish community and continue immediately with an action plan following this feasibility study. However, presently there is no organization or governance in place to represent the residents of the proposed South Lake Samish service area. Addressing this governance issue will quickly become the single most important factor in taking the next steps towards the establishment of a community water system. Stakeholders will need to continue to be engaged at each new increment of requested commitment, especially concerning the raising of revenues.

There are a variety of governance structures to be considered including: private entities, cooperatives, associations, water districts, and a local utility district which is formed under the local public utility district. It is uncommon and not recommended for a community potable water system to be governed as a private entity or cooperative. The remaining three governance structures are considered briefly below.

Existing Water District: Samish Water District

Samish Water District (SWS) was formed in 1972 under RCW 57 and provides public sewer service to the residents around Lake Samish. RCW 57 provides broad enough statutory mandate for a Water District to initiate and maintain governance and funding authority for water potable water system management within its service area. The Samish Water District is governed by an elected body of commissioners who represent the community within its service area boundary.

Under RCW 57 Samish Water District has the powers necessary to:

- Construct, condemn and purchase, add to, maintain, and operate a public water systems
- Issue general obligation bonds, revenue bonds, local improvement district bonds, or utility local improvement bonds for the purpose of paying all or any part of the cost of developing infrastructure.

As discussed earlier in the study, Samish Water District has undertaken several comprehensive drinking water supply planning efforts to serve the residents around Lake Samish and each effort failed to garner sufficient public support for implementation. Samish Water District has reservations about supporting any further planning effort towards the development of a south Lake Samish community water system.

Conclusion: Samish Water District is an existing feasible governance structure that is well suited to support the development of a south Lake Samish Water System. However, at this time the District is unwilling to lead in the planning effort.

New Water District

It would be possible to form a new water district under RCW 57 provided that Samish Water District was not willing to serve potable water to the proposed service area. However forming a water district is complicated and requires a well-organized, dedicated group, with overwhelming community support to be successful. Forming a Water District also requires a significant financial investment over a period of months and possibly years.

Conclusion: Given the findings and recommendations of this study the formation of a new Water District is not recommended at this time due primarily to the complexity and cost compared to other short term options. At some time in the future forming a water district may become feasible.

Existing: PUD No. 1 of Whatcom County

PUD No. 1 of Whatcom County was formed under RCW 54 "Public Utility Districts" and is authorized to provide public water service in Whatcom County. Currently PUD No. 1 of Whatcom County only serves one potable water system. However, under RCW 54.16.120

> "The district may, by resolution, establish and define the boundaries of local assessment districts to be known as Local Utility District No. . . . . , for distribution, under the general supervision and control of the commission, of water for all purposes, public and private, including domestic use, ….., and in like manner provide for the purchasing, or otherwise acquiring, or constructing and equipping and maintaining and operating distribution systems for such purposes, and for extensions and betterments thereof, and may levy and collect in accordance with the special benefits conferred thereon, special assessments and reassessments on property specially benefited thereby, for paying the cost and expense thereof, or any portions thereof, as herein provided, and issue local improvement bonds or warrants or both to be repaid wholly or in part by collection of local improvement assessments. A district also may form local utility districts located entirely or in part outside its limits or the limits of the county in which the district is located to provide water, or sewer facilities if otherwise authorized under this title."

Conclusion: Whatcom PUD No. 1 is an existing feasible governance structure that is cable of supporting the development of a south Lake Samish Water System. However, given the findings and recommendations of this study the formation of a new "Local Utility District" by Whatcom PUD No. 1 is not recommended at this time due primarily to the complexity and cost compared to other short term options. In the future, if Samish Water District elects not to participate in the formation of a South Lake Samish Water System, a "Local Utility District" is a viable option.

Water Association:

An Association is a very common form of governing structure that is successfully used by community water systems across the State of Washington. Associations are generally registered with the secretary of state as a Washington State Non-Profit Corporation. Forming a Non-Profit Water Association is a fairly straight forward and inexpensive process. An example of Non-profit Water Association Articles of Incorporation are included as Exhibit 20.

As a non-profit organization, it is not anticipated that there will be any surplus funds or net income to the Association at the end of the fiscal year after provisions are made for the payment of the expenses of operation and maintenance and the funding of the various reserves for depreciation, debt retirement, and other purposes, including those required by the terms of any borrowing transaction. The occurrence in subsequent fiscal years of surplus funds or net income above the requirements of the Association as above mentioned, including, if any, a reserve for improvements and extension of the facilities, shall be taken into consideration by the board of directors in determining the water rates to be charged the members.