LAKE WHATCOM WATER AND SEWER DISTRICT
1220 Lakeway Drive
Bellingham, WA 98229

REGULAR MEETING OF THE BOARD OF COMMISSIONERS
AGENDA

June 27, 2018

8:00 a.m. – Regular Session

1. CALL TO ORDER

2. COMMISSIONER APPOINTMENT/OATH OF OFFICE

3. PUBLIC COMMENT OPPORTUNITY
   At this time, members of the public may address the Commission. Please state your name prior to making comments.

4. ADDITIONS, DELETIONS, OR CHANGES TO THE AGENDA

5. CONSENT AGENDA

6. SPECIFIC ITEMS OF BUSINESS:

   A. Customer Request – 6 Clear Lake Court
   B. GM and OM&M Manager Recruitment Update
   C. Compulsory Sewer Connections – Award Construction Contract
   D. Water System Comprehensive Plan – Adopt Revisions Addressing Review Comments
   E. Final Phosphorus Loading Report by Herrera Environmental Consultants
   F. Water Base Rates for Very Small Consumption Accounts
   G. District Web Site Update
   H. Status Update on Additional Septic Systems Near District Sewers
   I. Monthly Budget Summary
   J. Summary of Existing District Projects

7. OTHER BUSINESS

8. UPCOMING DATES & ANNOUNCEMENTS

9. PUBLIC COMMENT OPPORTUNITY

10. EXECUTIVE SESSION

11. ADJOURNMENT

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 2

DATE SUBMITTED:	June 20, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Appointment of Commissioner Leslie McRoberts**		
TO: BOARD OF COMMISSIONERS		FROM: Rachael Hope	
GENERAL MANAGER APPROVAL		BH	
DISTRICT ENGINEER/ASST MGR APPROVAL			
FINANCE MANAGER APPROVAL			
ATTACHED DOCUMENTS		1.	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT
At the special meeting on June 18, 2018, the Board moved to appoint Leslie McRoberts to the vacant Commissioner Seat for Commissioner Position Number 4.

Notary Public and Finance Manager Debi Denton will administer the Oath of Office to Commissioner McRoberts.

FISCAL IMPACT
None

RECOMMENDED BOARD ACTION
N/A

PROPOSED MOTION
N/A

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 4

DATE SUBMITTED:	June 21, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Consent Agenda**		
TO: BOARD OF COMMISSIONERS		FROM: Staff	
GENERAL MANAGER APPROVAL		BH	
DISTRICT ENGINEER/ASST MGR APPROVAL			
FINANCE MANAGER APPROVAL			
ATTACHED DOCUMENTS		1. See list below	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☒ / INFORMATIONAL /OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT
****TO BE UPDATED 6/26/18****

- Meeting Notes from the 6/13/2018 Board Meeting
- Meeting Notes from the 6/18/2018 Board Meeting
- Accounts Payable Vouchers totaling $XX,XXX.XX.
- Payroll for Pay Period #13 (6/01/2018 through 06/14/2018) totaling $XX,XXX.XX.
- Payroll Benefits for Pay Period #13 totaling $XX,XXX.XX.

LAKE WHATCOM WATER AND SEWER DISTRICT
1220 Lakeway Drive
Bellingham, WA 98229

REGULAR SESSION OF THE BOARD OF COMMISSIONERS
Minutes

June 13, 2018

Board President Laura Weide called the Regular Session to order at 6:28 p.m.

Attendees: Commissioner Laura Weide
Commissioner John Carter
Commissioner Todd Citron
Commissioner Bruce Ford
Acting General Manager/District Engineer Bill Hunter
Recording Secretary Rachael Hope
District Legal Counsel Bob Carmichael
Consulting Engineer Melanie Mankamyer

Excused Absence(s): Finance Manager/Treasurer Debi Denton

Also in attendance were District employees Ken Zangari and Jason Dahlstrom, Commissioner Candidate Leslie McRoberts, Adam Fulton from the Port of Bellingham, and Eric Johnston and Mark Johnson from the City of Bellingham.

Consent Agenda

Action Taken
Citron moved, Ford seconded, approval of:

- **Meeting Notes from the 5/30/2018 Board Meeting**
- **Accounts Payable Vouchers totaling $176,554.98.**
- **Payroll for Pay Period #12 (05/19/2018 through 05/31/2018) totaling $43,872.81.**
- **Payroll Benefits for Pay Period #12 totaling $52,991.26.**

Motion passed.

City of Bellingham Post Point Wastewater Treatment Plant Biosolids
Eric Johnston, the City of Bellingham's Assistant Public Works Director of Operations, gave a short briefing on where the City is headed with replacing the incinerators with an anaerobic digestion process for solids handling. The City is in the early phases of preliminary design and no cost information is available at this point. Per the 2014 Interlocal Agreement with the City of Bellingham for Sewage Services, the District's cost share of Post Point Treatment Plan capital improvements is 4.8%. Discussion followed.

2018 Salary Survey Draft Review

Ross Ardrey of Northwest Management Consulting LLC ran through his preliminary draft results and details on how the Salary Survey was prepared. The union is concurrently reviewing the preliminary draft. Discussion followed.

General Manager and Operations & Maintenance Manager Recruitment Update

Hunter gave the Board an update on the recruitment process, relaying that on the morning of the 13th The Prothman Company had received 6 applications for the General Manager position, and hoped to receive at least 15-20 by the close of the application period on June 17. A work session and presentation is planned for the July 11 Board Meeting to discuss the top applicants. Discussion followed.

Commissioner Vacancy Update

Hunter recalled that the District has 90 days to appoint a new commissioner from the date of the vacancy, which in this case would be the date Curtis' resignation became effective, April 1, 2018. There is no reprieve available. If the Board does not make the appointment in 90 days, it loses the ability to do so as a Board. Two additional applications for the vacant position were received, and the Board agreed to hold a special meeting on Monday, June 18 to conduct interviews with those candidates and make a decision.

Amendment to Sick Leave Policy within Personnel Policies

Bob Carmichael briefly advised the Board that as of January 1, 2018, employers in Washington State must provide nearly all of their employees with paid sick leave. Initiative 1433, passed in fall 2016, changed requirements for sick leave accrual, usage, and eligibility. Resolution 845 brings District Personnel Policies with respect to sick leave into conformance with the new state law.

Action Taken

Citron moved, Carter seconded, to adopt Resolution 845 amending the District's Personnel Policies Manual as presented. Motion passed.

Washington Association of Sewer and Water Districts Group Retrospective Rating Program

Hunter explained that current utility members of WASWD have the option to participate in a risk pool with other Association members offering a potential cost-saving benefit through the Department of Labor and Industries. By joining this rating program, the District would receive claims management services from a third party administrator. Costs are reduced through the timely closure of claims, discovery of over-payments, and claims wrongly charged to our account. If the total of L&I claims for pool members is less than the L&I premiums paid by participants, the group receives a refund. Discussion followed.

Action Taken

Citron moved, Ford seconded, to adopt Resolution 847 authorizing participation in Retrospective Rating Program with Washington Department of Labor & Industries by and through the Washington Association of Sewer and Water Districts as presented.

2018 Utility Protection Agreement with SVCA

Hunter reminded the Board that last year the District entered into a Utility Protection Agreement with Sudden Valley Community Association (SVCA) for fish habitat improvements to Lake Louise Creek near where the District water main crosses. This year, 2018, SVCA is planning to improve about 2.8 miles of paved access roads by means of Microsurfacing which add about 3/8-inch thickness to the road surface. They are also replacing several culvert sections at several different sites in close proximity to District

water and sewer infrastructure. Staff recommends executing a new agreement with Sudden Valley to define expectations, responsibilities, and liabilities for these 2018 projects.

Action Taken

Citron moved, Ford seconded, to authorize staff to execute the 2018 Utility Protection Agreement with Sudden Valley Community Association as presented.

Proposed County Health Code 24.11 Amendment

Hunter apprised the Board of current County Council discussions that could make it easier for developers to drill an exempt well or develop other alternate water sources, rather than connect to a public water system, even within a public water system's retail service area. Carmichael explained that the proposed standard is not consistent with current District code and could be seen as an intrusion by the County into the affairs of water districts and impair districts' ability to plan for extensions of service.

At the May 16th, 2018 water caucus meeting, the five districts represented expressed interest in having Bob Carmichael review the legal status and provide a position paper directed at the County on the above topic, from a water district standpoint. The paper is also intended to educate the County Council on differences between water districts and water associations.

The Water District Caucus also discussed having Carmichael draft an interlocal agreement that would cover sharing costs in situations such as this. This new interlocal agreement would be the basis for a new water district coalition covering a broader spectrum of issues than previous agreements. An interlocal agreement with other local districts would allow the District to cost share legal research and position papers that address issues common to all districts and could prove to be an effective tool to share costs and coordinate like interests. Discussion followed.

Action Taken

Citron moved, Ford seconded, to authorize the General Manager to sign this draft interlocal agreement between the water Districts in Whatcom County. Motion Passed.

Carter moved, Ford seconded, to authorize Task Order #1 with a budget for our participation in an amount not to exceed $5,000. Motion passed.

Sewer System Time for Connection

Mankamyer communicated that clearing activity work window limitations from June 1 to September 30 within the Lake Whatcom Watershed Overlay District coupled with a twelve month connection requirement for on-site sewage disposal systems (OSSDS) to connect to District sewers (District Code Section 5.1.4), may result in the unintended consequence of a property owner being required to complete the connection with less than one full construction work window. Allowing eighteen (18) months for such OSSDS connections will provide properties with at least one full construction work window to complete such connections.

Action Taken

Ford moved, Carter seconded, to adopt Resolution 846 amending the District's Administrative Code as presented. Motion passed.

Status Update on Additional Septic Systems Near District Sewers

Mankamyer informed the Board that through recent inquiries regarding sewer availability from potential property buyers, the District has identified several properties on septic systems that appear to meet the District's criteria for mandatory connection to its sewer system. This ongoing agenda item

aims to provide the Board with an understanding of the original ULID 18 boundary and assess how existing policies and resolutions impact current requirements to connect to the system; to complete a District-wide sweep of remaining properties served by OSSDS; and to develop a plan to serve the impacted properties discovered. Discussion followed.

Other Business

Hunter relayed that he had communicated with Cory Eckert from the Water & Sewer Risk Management Pool, who asked whether the District would be interested in acting as a potential emergency location for relocation of their Bellevue office in the case that they cannot continue to work there due to a natural disaster or other event. The Board advised staff to move forward in working with Bob Carmichael to draft a memorandum of understanding to allow for this.

Upcoming Events & Announcements

Hunter mentioned several upcoming events, including September 6 Harassment & Discrimination Training with Sound Employment Solutions, LLC, and Commissioners due for their quadrennial Open Public Meetings Act and Public Records Act refresher training.

Executive Session Per RCW 42.30.110 (1)(i): Considering pending or potential litigation – 20 Minutes

Weide recessed the Special Session to Executive Session at 8:54 p.m. It was estimated that the Executive Session would take about 15 minutes. The purpose of the Executive Session was for consideration of pending or potential litigation. Weide recessed the Executive Session and reconvened the Regular Session at 9:09 p.m.

With no further business, Weide adjourned the Regular Session at 9:10 p.m.

Recording Secretary, Rachael Hope	Date Minutes Approved
Laura Weide	Todd Citron
Bruce R. Ford	*Position 4 - Vacant*
John Carter	

LAKE WHATCOM WATER AND SEWER DISTRICT
1220 Lakeway Drive
Bellingham, WA 98229

SPECIAL SESSION OF THE BOARD OF COMMISSIONERS
Minutes

June 18, 2018

Board President Laura Weide called the Regular Session to order at 2:00 p.m.

Attendees:
Commissioner Laura Weide
Commissioner John Carter
Commissioner Todd Citron
Commissioner Bruce Ford
Acting General Manager/District Engineer Bill Hunter
Recording Secretary Rachael Hope

Also in attendance were Commissioner Candidates Leslie McRoberts and Cally Cass.

Commissioner Applications
The Board interviewed two candidates for the open Commissioner seat, Leslie McRoberts and Cally Cass.

Executive Session Per RCW 42.30.110 (1)(h): Evaluating candidate qualifications – 20 Minutes
Weide recessed the Special Session to Executive Session at 2:50 p.m. It was estimated that the Executive Session would take about 20 minutes. The purpose of the Executive Session was for evaluating the qualifications of a candidate for appointment to elective office. Weide recessed the Executive Session and reconvened the Regular Session at 3:10 p.m.

Action Taken
Ford moved, Citron seconded, to appoint Leslie McRoberts to the open position for Commissioner, Position 4 to be sworn in at the June 27, 2018 Board Meeting.

With no further business, Weide adjourned the Regular Session at 3:11 p.m.

_____ _____
Recording Secretary, Rachael Hope Date Minutes Approved

_____ _____
Laura Weide Todd Citron

_____ _____
Bruce R. Ford John Carter

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item A

DATE SUBMITTED:	June 18, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	6 Clear Lake Court Customer Request (SV Div12 Lot 42)		
TO: BOARD OF COMMISSIONERS		FROM: Bill Hunter	
MANAGER APPROVAL		BH	
ATTACHED DOCUMENTS		Letter dated 6/18/2018	
		Board Meeting Minutes 6/14/2017	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☒ / INFORMATIONAL /OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

June 18, 2018 staff received a call from a developer requesting a special exception to the current water/sewer connection fees that went into effect January 1, 2018. Staff explained that the District is a public agency and its policies are set by the elected Board of Commissioners and staff does not have the authority to waive or reduce connection fees. The developer followed up with the attached letter to the Board of Commissioners requesting he be charged the old connection fees.

Summary of events:

- District issued a Water/Sewer Availability Form on 6/6/2017.
- June 14, 2017 District approves new connection fees that went into effect January 1, 2018.
- Whatcom County issued a Residential Building Permit on 8/28/2017
- Developer began construction of the residence.
- The developer obtained a District's water/sewer permit application package and was notified of the connection requirements.
- The week of June 11th, 2018 the developer called to schedule a sewer inspection for the next day. District staff notified the developer that a water/sewer permit must be issued prior to an inspection.
- June 14, 2018 the District received an application for a new water/sewer connection.

FISCAL IMPACT

The basic Water and Sewer Permit fee prior to January 1, 2018 was $10,191.

Beginning January 1, 2018, the basic Water and Sewer Permit fee increased to $14,348.

RECOMMENDED BOARD ACTION

Maintain the policies and fees as adopted in June 2017, and apply them consistently to all customers.

PROPOSED MOTION

To deny Richard Berry's request for special consideration by the District to issue a new water/sewer permit at last year's connection fees.

Board of Commissioners
Lake Whatcom Water and Sewer
1220 Lakeway Drive
Bellingham, Wa. 98229

June, 18, 2018

re: # 6 Clear Lake Court
Sudden Valley

Dear Commissioners,

This has been a long process for me as a single person and building a residence in Sudden Valley. I started in December of 2016 and have worked due diligence to try to complete this process. Out of my control I have called, gone in person and attended meetings to try to get this building through and have reason to believe something is wrong here. From people on vacation, to call back next week, to impatient engineers, County paperwork, Association paperwork and numerous trips to see the secretary and numerous phone calls I kept plugging forward. Each time I met with someone I would do everything I could and then would have to wait, that is when I did the pestering phone calls, to no avail. When I finally received the permit it was October of last year and I had to rush to do the building in the poor time of year.

May I ask for a special reprieve of costs on the water and sewer to reflect last year fees as I feel this is a special circumstance, even the people at the Association have regretted to me the circumstances of my trying to get this done efficiently. I am ready and willing to pay those fees.

Sincerely,

Richard Berry

Lake Whatcom Water and Sewer District
Regular Meeting of the Board of Commissioners
June 14, 2017

Board President Laura Weide called the Regular Session to order at 6:30 p.m. Other District representatives present included Commissioners Todd Citron, Curtis Casey, Bruce R. Ford, and John Carter, General Manager Patrick Sorensen, District Engineer Bill Hunter, Finance Manager Debi Denton, consulting engineer Melanie Mankamyer, legal counsel Robert Carmichael and Recording Secretary Lyn Edwards. A list of interested participants is on file.

- Consent Agenda

Action Taken

Casey moved, Citron seconded, approval of:

- **Accounts Payable Vouchers totaling $480,833.31**
- **Accounts Payable Vouchers totaling $94,537.45**
- **Payroll for Pay Period #11 (5/6/2017 through 5/19/2017) totaling $40,658.92**
- **Payroll Benefits for Pay Period #11 totaling $43,462.00**
- **Payroll for Pay Period #12 (5/20/2017 through 6/2/2017) totaling $39,367.01**
- **Payroll Benefits for Pay Period #12 totaling $43,039.69**
- **Minutes for the May 10, 2017 and May 30, 2017 Meeting**

Motion passed.

- North Shore Water Quality Testing – Presentation by Herrera Environmental

Rob Zissette from Herrera Environmental presented his draft report regarding the results of the North Shore Water Quality Testing Project. In his presentation, Zisette explained how, when, and where the samples were collected and the methods used to analyze the water samples. Discussion followed.

- Connection Fees

Sorensen reported that earlier this year FCS Group was asked to examine the District's General Facilities Charges (Connection Fees) for their adequacy. These fees were last modified in January 1, 2009. At the May 10, 2017 meeting FCSG presented their findings to the Board. After discussing the findings, the Board agreed that the fees needed to be increased and that they should be increased annually over the next four to five years using the Construction Cost Index inflation factor of 2.5% each year. The only remaining policy issue for the Board to decide upon is the initial implementation date. Discussion ensued.

Action Taken

Casey moved, Ford seconded to:

1. **Adopt both the water and sewer General Facilities Charge schedule through 2021 presented in Exhibit G1 of the May 31, 2017 FCSG report. (copy attached)**
2. **Use the 2.5% annual Construction Cost Index to inflate the General Facilities Charge effective January 1 of each year.**
3. **Initiate the new General Facilities Charge fee schedule on January 1, 2018.**

Motion passed.

- Accounting Clerk Position Description Amendment

Sorensen explained that the Accounting Clerk Position Description needs to be amended to add new duties and increase work hours from ½ time to ¾ time. As proposed, the Accounting Clerk position will be utilized as back up for the monthly meter reading function as well as processing all travel/training arrangements for the crew. The increased hours for the position will also help to maintain adequate office coverage on a day to day basis. Discussion ensued.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item B

DATE SUBMITTED:	June 18, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	GM and O&M Manager Recruitment Update		
TO: BOARD OF COMMISSIONERS		FROM: Bill Hunter	
MANAGER APPROVAL		BH	
ATTACHED DOCUMENTS			
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

Prothman is reviewing applications received to date (6/18/2018). Staff will give a verbal update on Prothman's initial application review and screening process.

General Manager Recruitment Schedule

Date	Topic	Notes
May 9, 2018	Prothman meets with LWWSD Board	*Completed.*
May 14, 2018	Post profile and start advertising	*Completed. Profile was posted on Prothman website 5/17/2018.*
June 17, 2018	Application Close Date	*25 applications received as of 6/18/2018.*
June 18-29, 2018	Prothman screens applications & interviews top 8-12 candidates	*Task in progress.*
July 11, 2018	Work session with LWWSD Board to review semifinalists and pick finalists	
July 23-27, 2018	Final Interview Process	

Operation & Maintenance Manager Recruitment Schedule

Date	Topic	Notes
May 9, 2018	Prothman meets with LWWSD Board	*Completed.*
May 14, 2018	Post profile and start advertising	*Completed. Profile was posted on Prothman website 5/17/2018.*
June 17, 2018	Application Close Date	*21 applications received as of 6/18/2018.*
June 18-29, 2018	Prothman screens applications & interviews top 8-12 candidates	*Task in progress.*
July 11, 2018	Work session with LWWSD Board to review semifinalists and pick finalists	*Board directed staff to wait until new GM is contracted prior to reviewing semifinalists.*
August 6-10, 2018	Final Interview Process	*Board directed staff to wait until new GM is contracted prior to interviews.*

FISCAL IMPACT

None.

RECOMMENDED BOARD ACTION

None.

PROPOSED MOTION

None.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item C

DATE SUBMITTED:	June 20, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	Compulsory Sewer Connections		
TO: BOARD OF COMMISSIONERS		FROM: Bill Hunter	
MANAGER APPROVAL		BH	
ATTACHED DOCUMENTS		Bid Summary	
		Draft Cost Allocation to Properties	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☒ / INFORMATIONAL /OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

The District is working with 3 properties currently on septic systems to connect to public sewer. Those properties are:

- 975 Geneva Street
- 1213 Lakeview Street
- 4354 Lakehill Lane

The properties elected to have the District make the connections, which includes development of agreements and deeds of trust to recover District costs, engineering, construction, construction administration, and inspection.

Two of the owners qualify as low-income persons pursuant to RCW 57.08.014 and District Administrative Code 3.5.13, thereby allowing a delay in the collection of District costs by means of agreement and recorded Deed of Trust. The District will be reimbursed when the properties are sold, transferred, or change ownership. Interest will accrue on the debt at a rate equal to the arithmetic mean of the District's current bond issue in place on the date the agreement is executed (currently 3.23%).

The third owner will reimburse the District by making 15 equal annual payments, the first of which is due July 1, 2019 in accordance with District Administrative Code 3.5.12. An agreement and recorded Deed of Trust will secure this debt. Each installment will include

principal, plus interest at a rate equal to the arithmetic mean of the District's current bond issue in place on the date the agreement is executed (currently 3.23%).

An Advertisement for Bids was published in the Bellingham Herald on May 30, 2018, 2018. A non-mandatory pre-construction meeting was held on June 12, 2018. Two addenda were issued. Bids were due June 19, 2018. Two bids were received.

Wilson Engineering is verifying the lower bidder's qualifications for the state's mandatory bidder responsibility requirements and the District's supplemental bidder responsibility criteria established for the project. Wilson will report findings and make a recommendation to award at the board meeting.

FISCAL IMPACT

The District is financing project costs for the 3 properties.

District will be reimbursed for costs from one property (4354 Lakehill Lane) over 15 years.

The District will be reimbursed by the other two properties (975 Geneva St and 1213 Lakeview St) when those properties are sold or transferred.

RECOMMENDED BOARD ACTION

See proposed motion.

PROPOSED MOTION

Award the Septic System Conversions Project to _____for a construction contract amount of $_____ (including 8.5% sales tax) and authorize staff to execute the contract.

Lake Whatcom Water and Sewer District
1220 Lakeway Avenue
Bellingham, WA 98229
(360) 734-9224 fax: (360) 738-8250

Bid Proposal - Summary Sheet

Project Name	Project #	Date	Bid Opening Time	Location	Page # of #
Septic System Conversions	A1815	6/19/2018	2:10 PM	LWWSD Board Room	1 of 1

Name of Firm	Len Honcoop Gravel, Inc.	Blackburn Earthworks LLC

BASE BID

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT	UNIT PRICE	AMOUNT
	Schedule A - Site #1 - 975 Geneva Street						
A-1	Mobilization / Demobilization	1	LS	NA	$ 5,206.20	NA	$ 2,500.00
A-2	Trench Safety Excavation Provisions	1	LS	NA	$ 1.00	NA	$ 1,300.00
A-3	Sewer Service Connection	1	LS	NA	$ 21,680.68	NA	$ 21,500.00
	Schedule B - Site #2 - 1213 Lakeview Street						
B-1	Mobilization / Demobilization	1	LS	NA	$ 1,051.02	NA	$ 900.00
B-2	Trench Safety Excavation Provisions	1	LS	NA	$ 1.00	NA	$ 500.00
B-3	Sewer Service Connection	1	LS	NA	$ 8,264.32	NA	$ 7,900.00
	Schedule C - Site #3 - 4354 Lakehill Lane						
B-1	Mobilization / Demobilization	1	LS	NA	$ 1,859.64	NA	$ 3,200.00
B-2	Trench Safety Excavation Provisions	1	LS	NA	$ 1.00	NA	$ 1,600.00
B-3	Sewer Service Connection	1	LS	NA	$ 28,025.76	NA	$ 28,100.00

BASE BID	**$ 66,090.62**	**$ 67,500.00**
8.5% Sales Tax	$ 5,617.70	$ 5,737.50
Total Base Bid + Sales Tax	**$ 71,708.32**	**$ 73,237.50**
# of Addenda Received	2	2
Bid Security (Yes/No)	YES	YES

017

District Project #A1815 - Compulsory Sewer Connections
Allocation of Project Costs to Properties

Prepared 6/21/2018

Common Expenses Divided Evenly Among 3 Properties

Legal Services	$ 3,365.00	*(Invoices received as of 6/13/2018)*
Legal Notices	$ 330.00	*(Bellingham Herald - Advertisement for Bids)*
Document Recording Fees	$ 318.00	
Engineering Services	$ 21,050.00	*(Wilson Task Orders 2018-01 and 2018-01 Amendment 1)*

Item	Sharon Tirrill (Account #60000039) 975 Geneva Street Bellingham, WA 98229	Alita Walton (Account #60000032) 1213 Lakeview Street Bellingham, WA 98229	Erik Yurk (Account #60001296) 4354 Lakehill Lane Bellingham, WA 98229	Line Item Totals for Project
Sewer General Facilities Fee	$ 7,726.00	$ 7,726.00	$ 7,726.00	$ 23,178.00
Permit Processing	$ 40.00	$ 40.00	$ 40.00	$ 120.00
Initial Inspection	$ 75.00	$ 75.00	$ 75.00	$ 225.00
Subtotal	$ 7,841.00	$ 7,841.00	$ 7,841.00	$ 23,523.00
Construction	$ 26,887.88	$ 9,316.34	$ 29,886.40	$ 66,090.62
8.5% Sales Tax	$ 2,285.47	$ 791.89	$ 2,540.34	$ 5,617.70
Subtotal	$ 29,173.35	$ 10,108.23	$ 32,426.74	$ 71,708.32
Legal Services	$ 1,121.67	$ 1,121.67	$ 1,121.67	$ 3,365.00
Legal Notices	$ 110.00	$ 110.00	$ 110.00	$ 330.00
Document Recording Fees	$ 106.00	$ 106.00	$ 106.00	$ 318.00
Subtotal	$ 1,337.67	$ 1,337.67	$ 1,337.67	$ 4,013.00
Engineering Services	$ 7,016.67	$ 7,016.67	$ 7,016.67	$ 21,050.00
Total	**$ 45,368.68**	**$ 26,303.56**	**$ 48,622.08**	**$ 120,294.32**
Credits	$ (3,835.00) *(Paid 8/30/2010 Receipt #0088391)*			
Total Due	**$ 41,533.68**	**$ 26,303.56**	**$ 48,622.08**	
Annual Interest Rate	3.23%	3.23%	3.23%	
Payment Term (years)	N/A	N/A	15	
Annual Payment with Interest	N/A	N/A	$ 4,140.96	First payment due July 1, 2019
Total Payments	N/A	N/A	$ 62,114.43	
Total Interest	N/A	N/A	$ 13,492.35	
Annual Interest Accrual	$ 1,341.54 Beginning on date agreement is executed	$ 849.61 Beginning on date agreement is executed	N/A	

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LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 5.D.

DATE SUBMITTED:	6/21/2018	MEETING DATE:	6/27/2018
SUBJECT:			
TO: BOARD OF COMMISSIONERS		FROM: Melanie Mankamyer, PE Wilson Engineering, LLC	
MANAGER APPROVAL		BH	
ATTACHED DOCUMENTS		1. Response Letter to DOH which includes: • Local Govt Consistency form • Response letter to Matt Aamot, WC Planning and Development • Change pages to Report	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☒	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

The District submitted its Water System Comprehensive Plan Update to various agencies for review in December 2017. We received approval of the Plan from the Whatcom County Engineer and the Whatcom County Health Officer. We received comments from Washington State Department of Health (DOH) and Whatcom County Planning and Development (Planning) that required minor changes and corrections to the Plan. We have made those changes and have completed our response letters to DOH and Planning - these are attached with the text changes shown as redlines.

The remaining approvals needed are DOH and Whatcom County Council. We recommend that the Board re-adopt the Plan with the changes prior to sending it to the Council for review and approval.

FISCAL IMPACT

N/A

DRAFT

DRAFT

LAKE WHATCOM WATER AND SEWER DISTRICT

RESOLUTION # ~~840~~848

A Resolution of the Board of Commissioners
Adopting Water System Comprehensive Plan Update

WHEREAS, RCW 57.16.010 and WAC 246-290-100 requires the District to adopt and periodically update a Comprehensive Plan for water services within its jurisdiction, and

WHEREAS, the District retained the engineering firm of Wilson Engineering, L.L.C. to prepare a proposed update of the District's Water System Comprehensive Plan, and several drafts of a proposed plan have been prepared by the engineers and reviewed by the Board at various public meetings during the past year, and

WHEREAS, a SEPA environmental checklist was prepared for the District's Water System Comprehensive Plan and the District SEPA official made a Determination of Non-significance therefor on November 28, 2017, and

WHEREAS, the SEPA environmental checklist and Determination of Non-significance for the District's Water System Comprehensive Plan was distributed to all governmental agencies and tribes legally entitled to such distribution on November 28, 2017, and

WHEREAS, notice of said Determination of Non-significance was published in the Bellingham Herald on December 1, 2017, and

WHEREAS, no written comments were received by the District within the required time published for comments, and

WHEREAS, the District's Board of Commissioners notified its water system consumers that the proposed District Water System Comprehensive Plan was available for public inspection at the District office and on the District's website, and

WHEREAS, no one attended a Public Hearing scheduled for the District Board meeting on November 29, 2017, and

WHEREAS, comments were received from Washington State Department of Health and Whatcom County Planning and Development necessitating certain minor revisions to the Plan, which have been presented to the Board for their review, and

WHEREAS, the District has received approval of the Plan from the Whatcom County Engineer, and Whatcom County Health Officer, and

WHEREAS, the Board of Commissioners of the District have carefully and thoroughly considered all public comment and testimony concerning the plan and made adjustments and revisions in all places where the Board considers such changes to be appropriate and in the best interests of the District, now, therefore,

NOW BE IT RESOLVED by the Board of Commissioners of Lake Whatcom Water and Sewer District, Whatcom County, Washington, that the attached Comprehensive Water System Plan

DRAFT

for the provision of water services for Lake Whatcom Water and Sewer District, including a capital construction and improvement plan, is hereby adopted by Lake Whatcom Water and Sewer District and forwarded for approval to the Whatcom County Council, ~~Whatcom County Engineer, and Whatcom County Health Officer~~. In accordance with WAC 246-290-100, the District also forwards the plan to the Washington State Department of Health for approval and to adjacent utilities to assess consistency in planning efforts.

ADOPTED by the Board of Commissioners of Lake Whatcom Water and Sewer District, Whatcom County, Washington, at a regular meeting thereof held this ~~13th~~ 27th day of ~~December~~June, ~~2017~~2018.

_____
Laura Wiede, Board President

_____
Todd Citron, Commissioner

_____
Bruce Ford, Commissioner

_____
~~Curtis Casey~~_____, Commissioner

_____
John Carter, Commissioner

_____
Approved as to form, District Legal Counsel

WILSON ENGINEERING

June 21, 2018

Richard Rodriguez, Regional Planner
Laura McLaughlin, Regional Engineer
Department of Health, Office of Drinking Water NWRO
20425 72nd Avenue South, Suite 310
Kent, WA 98032-2388

RE: LWWSD Systems: S. Shore ID #95910, Eagleridge #08118, Agate Heights #52957, Johnson Well #04782, Whatcom County
Submittal: #18-0104A thru 18-0104D
S. Shore 18-0104A, Eagleridge 18-0104B, Agate Heights 18-0104C, Johnson Well18-0104D

Dear Richard and Laura:

Enclosed for your review are LWWSD's responses to the comments in the letter received from your office dated March 6, 2018 regarding the subject submittals. To provide context we have repeated the comment with the response immediately following.

System Description

1. Please provide determinations of local government consistency from Whatcom County Planning & Development Services and the City of Bellingham.

Response: The Local Government Consistency form from Whatcom County is attached. The District's service areas are completely outside of the City limits so the District is not subject to City of Bellingham's local comprehensive plans, land use plans or development regulations. The City was notified of the Plan as an adjacent water purveyor.

2. Geneva and Sudden Valley are one water system under the South Shore ID number- it is a little confusing to have them addressed as separate water systems.

Response: The intent is to present them as separate service areas of the South Shore Water System. We have adjusted the language to make that clear.

3. P. 10 - System inventory; are all 47 PRVs owned and maintained by the district?

Response: Yes.

4. The service area map should include neighboring water systems as well as water systems within the district boundaries that do not belong to the district.

Response: Figure 1-1 Boundary and Service Areas has been updated to include neighboring water systems as well as those within the District's boundaries.

Basic Planning Data

5. What is the methodology used to calculate the MDD for each system; is it based on daily meter reads or is there some manipulation of the 2014-15 data to give the value?

*Response: The calculation of MDD for Geneva and Eagleridge are based on daily meter readings. Sudden Valley MDD was calculated by daily readings and checked using 1.7*Max Month. Since the Agate Heights water plant is not operated every day, daily readings were not available. The Agate Heights MDD was calculated as a three-day running average and using 1.7*Max Month (results were similar).*

System Design & Analysis

6. Section 3.3.1 A. states that the transmission main is sufficient for the plant- please also include the pipe size, length, and description of the intake.

Response: The intake pipe is 12-inch "Lock Tyton" pipe and extends 390 feet from the on-shore check valve vault. It is approximately another 260 feet to the water treatment plant. The intake is a three-foot by 30-inch diameter concrete pipe with metal inlet screens on both ends. The inlet is supported on concrete about 5 feet above the lake floor. The intake pipe is connected at the center bottom of the concrete pipe. This information has been added to the Plan.

7. Storage requirements and analyses need to be completed for Eagleridge; the City of Bellingham needs to know the amount of storage they are required to set-aside for Eagleridge.

Response: The Standby storage for Eagleridge is 42,500 gallons based on a current system capacity of 85 ERUs and an ADD of 250 gpd/ERU. Operational, Equalizing, and Dead storage are system-specific and would be determined by the City of Bellingham. The PHD for Eagleridge that would go in to the calculation of Equalizing storage is 150 gpm. Fire storage would already be addressed by the City and is likely nested within Standby.

8. There appears to be some incorrect information in chapter 3 about the CT volume for the treatment plant. Our records indicate that the minimum required depth for the CT tank is 16.5 ft and that 700 gpm is the peak flow assumed for the plant at this time.

Response: The portion of Chapter 3 that stated a contact volume of 99,000 gallons at 700 gpm has been revised to match the minimum depth of 16.5 ft (155,000 gallons) at 1,000 gpm on a 60-minute basis because of the on/off nature of the constant speed pump that pumps in to the CT basin. The discussion above that section has been left because it demonstrates that the existing infrastructure is capable of a treatment plant flow rate of 1400 gpm if the minimum CT tank level is raised to 21.1 ft.

9. P. 41- Based on MDD of 800 gpd/ERU and build-out of 85 ERUs, it appears that the PHD should be 150 gpm, not 130.5 gpm as shown. As a point of discussion only, the district should be sure to consider customer perception of 'low pressure' that may occur by decreasing the service pressure provided, even though it may meet our regulatory requirements.

Response: The correct PHD is 150 gpm - the correction has been incorporated into the report. The District duly notes the comments regarding perception of low pressure.

10. Please note on p. 31 -the system is currently conducting the second round of required LT2ESWTR monitoring (to be completed in September 2018).

Response: This information has been added to the report.

11. Please update Figure 3.3-2 to show that the new Division 22 reservoir as completed, not under construction.

Response: Figure 3.3-2 has been updated.

12. It would be helpful to include a summary table similar to table 3.3-1 for all booster pumps in all systems.

Response: Tables of all water system pumps have been added to the report (Tables 3.3-1, 3.3-5A, and 3.3-5B).

13. Section 3.3.4 - there is a statement that 'the only shortfall shown is for Eagleridge for the 20 year projection', but it is not clear what this is referring to. At the build-out conditions of 85 ERUs, it appears that there would be no shortfall at 150 gpm supply from Bellingham. How many lots are there in the Eagleridge boundary that meet the City's limitation that the district only serve lots of record as of June 10, 1988?

Response: This was a mistake and has been removed. The Water Rights Self Assessment has been edited accordingly. There is no shortfall at build-out of 85 ERUs. There are 71 lots within the Eagleridge subdivision.

14. Appendix A, sheet 1 map- it appears that the colors for Geneva and Division 22 are the same. Please also confirm that there is 8 ft of operating storage in the tanks - this seems high; more typically we see 1 to 2 ft.

Response: In the current operating mode, the Division 22 reservoir does provide water to the lower pressure zone of Geneva. The operating storage is 8 feet and is based on the frequency of operation of the water treatment plant.

Source Protection

15. Chapter 5 -there appears to be a minor formatting issue with the Watershed Protection Program section not clearly identified.

Response: Formatting issues have been corrected.

Operations & Maintenance

16. For the connections with the individual booster pump credit, does the district review/approve all booster pump designs and are these connections included in the district's cross connection control program?

Response: Future requests will be subject to review and approval by the District. The District is in the process of conducting Cross Connection surveys and will be adding the properties with booster pumps to its program.

17. Please describe the district's flushing program - is it system-wide unidirectional flushing or only at certain hydrants?

Response: The District's flushing program is system-wide, but is not necessarily unidirectional due to the complexity of the system looping through multiple pressure zones, especially in the Sudden Valley service area.

18. A DBP monitoring plan should be completed and included in the water quality section for each system.

Response: DPB monitoring plans for each system, provided by the District, have been added to Appendix D and referenced in each system's water quality section as well as section 6.4.

19. The following comments are based on the Coliform Monitoring Plan (CMP), 2016 Update submitted by Wilson Engineering on Feb. 6, 2018.

Response: The Coliform Monitoring Plan (CMP) has been revised to incorporate DOH comments regarding inconsistencies and deficiencies. The Agate Heights information section has been edited to remove the inconsistent reference to connections. It is resubmitted with this letter.

Operations & Maintenance

20. Agreement with Bellingham- it does not appear to include storage for Eagleridge, as stated in the plan. The documentation provided is also confusing and unclear about the total flow allowed; 150 gpm, 650 gpm, 700 gpm, 750 gpm, and whether or not fire flow is included or added.

Response: The details for City service to Eagleridge is included in the Revised Interlocal Agreement - North Shore Water Service, dated June 8, 1989 (included in Section 10.2). Paragraph 4 discusses the District's payment to the City of $300 per connection "...until the District builds its own reservoir...". Paragraph 5 states that "The City shall supply water service to the District at the rate of 150 gallons per minute for domestic flow and 750 gallons per minute fire flow at the point of delivery."

21. Please provide copies of any comments made by adjacent purveyors or other interested parties along with the (water system's) response to those comments.

Response: The District received comments from Whatcom County Planning, the Deputy Fire Marshal, and DNR. These comments and the District's responses to those comments are included in Section 10.3.

22. Is the District a member of WAWARN?

Response: Yes, the District is a member of WAWARN.

See attached sheets for changes to the body of the report, Section 10, and appendices.

Please feel free to contact me with any questions or comments.

Very truly yours,

WILSON ENGINEERING, LLC

Melanie Mankamyer, P.E.

Enclosures

cc: Lake Whatcom Water and Sewer District
Matt Aamot, Whatcom County Planning & Development Services

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: Lake Whatcom Water and Sewer Distrct PWS ID: 959101, 081181, 52957B, and 047828

Planning/Engineering Document Title: Water System Comp Plan Plan Date: December 2017

Local Government with Jurisdiction Conducting Review: Whatcom County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.		Yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.		Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.		Not Applicable
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.		Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.		Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations, Subject to the attached conditions

Signature

3-5-18

Date

Mark Personius, Whatcom County Planning & Development Services

Local Government Consistency Determination Form - Conditions

Lake Whatcom Water & Sewer District – Water System Comprehensive Plan (December 2017)

The *Lake Whatcom Water & Sewer District – Water System Comprehensive Plan* shall be revised as follows and resubmitted to the Whatcom County Council for review and approval (a copy of the revised Plan shall also be submitted to the County Planning and Development Services Department):

1. The Water System Comprehensive Plan text relating to the Geneva Urban Growth Area (p. 7) shall be modified because the Urban Residential zone previously allowed higher densities, but now allows new land divisions in the Lake Whatcom Watershed at one dwelling/five acres. Sample language, that could be used by the District, is shown below:

   . . . The District's Geneva area currently contains several land use categories:

   - Urban Growth Area ("UGA") zoned ~~at three houses per acre~~ Urban Residential ("UR") . . .

2. The Water System Comprehensive Plan indicates that the District is proposing minor service area adjustments. Therefore, the District shall submit Whatcom County Coordinated Water System Plan Exhibit 4-1, with an associated map, and document it has followed the procedures in Exhibit 4-2 that are applicable to the District.

3. The Water System Comprehensive Plan's Capital Improvement Plan (Appendix I) shall be amended to show a phased improvement plan to address the fire flow deficiencies in accordance with the Whatcom County Coordinated Water System Plan (see Deputy Fire Marshal Mark Sniffen's e-mail dated February 23, 2018).

4. The Water System Comprehensive Plan's financial program (Chapter 9 and/or Appendix F) should be amended to include revenue projections to cover the first 6 years of the Capital Improvement Plan (Appendix I).

WILSON ENGINEERING

June 21, 2018

Matt Aamot
Whatcom County Planning & Development Services
5280 Northwest Dr C
Bellingham, WA 98226

RE: LWWSD Comprehensive Water System Plan

Dear Matt:

Enclosed for your review are LWWSD's responses to the Conditions included with the Local Government Consistency Determination Form received from your office.

1. The text corrections regarding the description of the Geneva zoning have been made.
2. The District has submitted Whatcom County Coordinated Water System Plan Exhibit 4-1, along with a letter documenting the Exhibit 2 procedures it followed that were applicable. You responded to this submittal on May 17, 2018 saying that the service area boundary amendment procedures have been satisfied. Once the District's revised Water System Plan is approved by DOH, the change in the water service area can be finalized by Whatcom County Planning & Development Services.
3. The District has added two projects to its Capital Improvement Plan to address fire flow deficiencies. Project 0187 will remove the fire hydrant at the upper end of Kinglet Court because it is the only hydrant where sufficient fire flow cannot be reasonably achieved, and it is not needed. The District standard spacing for hydrants is 600 feet, and all parcels in this vicinity are within 600 feet of other hydrants. Under Project 0188, additional field testing for hydraulic model calibration will be conducted to determine the appropriate friction factor (C factor) to use in the model. The C factor was reduced globally based on limited field tests which had a significant negative impact on available fire flow in the higher elevation areas. If the current C factor is correct and these are "real" (not modeling) deficiencies, the District will explore options to eliminate the deficiencies. The updated CIP 2018 thru 2027 is attached and replaces the one shown in Appendix I.
4. The financial section in Chapter 9 has been amended to include revenue projections from the District's most recent Rate Study.

We have also completed incorporating the comments from DOH and will submit the revised Comprehensive Water System Plan to the Whatcom County Council for their approval.

Please feel free to contact me with any questions or comments.

Very truly yours,

WILSON ENGINEERING, LLC

Melanie Mankamyer, P.E.

Enclosures
cc: Lake Whatcom Water and Sewer District
Mark Sniffen, Deputy Fire Marshal, Whatcom County Planning & Development Services

Lake Whatcom Water and Sewer District - Capital Improvement Plan 2018 thru 2027

Program Area / CIP Project # / CIP Project Name		Fund	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Both Water and Sewer													
0175	Shake Alert Pilot Program - Integrate Device into SCADA - Auto Close Exist Seismic Valve at Div 22 Res		15,000	15,000									
A0005	Accounting & Administration Server - Replace/Update Hardware, Network Security, & OS		75,000			25,000			25,000			25,000	
E0001	Replace Backhoe and Add Trailer		87,550	87,550									
E0002	Replace 5-yard Dump Truck		123,600					123,600					
E0007	Replace Mini Excavator		66,950								66,950		
E0008	Replace Flush and Vac Truck		420,000		420,000								
V0001	Replace Tool Truck (7 tool trucks in fleet)		325,000	65,000		65,000		65,000		65,000		65,000	
V0002	Replace Administrative Staff Vehicle (4 cars in fleet)		52,000				26,000				26,000		
V0003	Replace Locator / Meter Reading Van		28,000									28,000	
V0004	Replace Light-Duty Truck		35,000	35,000									
	Subtotal		**1,228,100**	**202,550**	**420,000**	**90,000**	**26,000**	**188,600**	**25,000**	**65,000**	**92,950**	**118,000**	
Sewer System													
0032a	Agate Bay Sewer Pump Station - Predesign and Shorelines Permitting		100,000					100,000					
0032b	Agate Bay Sewer Pump Station - Design and Bidding		125,000						125,000				
0032c	Agate Bay Sewer Pump Station - Construction		525,000							525,000			
0044a	Edgewater Pump Station - Predesign and Shorelines Permitting		100,000	100,000									
0044b	Edgewater Pump Station - Design and Bidding		100,000		100,000								
0044c	Edgewater Pump Station - Construction		500,000			500,000							
0053a	Dellesta Pump Station - Predesign and Shorelines Permitting		100,000	100,000									
0053b	Dellesta Pump Station - Design and Bidding		100,000			100,000							
0053c	Dellesta Pump Station - Construction		500,000				500,000						
0055a	Rocky Ridge Pump Station - Predesign and Shorelines Permitting		100,000			100,000							
0055b	Rocky Ridge Pump Station - Design and Bidding		100,000				100,000						
0055c	Rocky Ridge Pump Station - Construction		555,000					555,000					
0056a	Lakewood Pump Station - Predesign and Shorelines Permitting		100,000				100,000						
0056b	Lakewood Pump Station - Design and Bidding		100,000					100,000					
0056c	Lakewood Pump Station - Construction		595,000						595,000				
0128c	Camp Firwood Automatic Transfer Switch and Replace Fence		20,000	20,000									
0128d	Airport Sewer Pump Station Stationary Generator		55,000	55,000									
0157	Install Ball Check Valves at Cable, Ranch House, Flat Car, Beaver		106,090				106,090						
0161	Stationary Generator Closed Loop Cooling Retrofit - North Point, SV, Flat Car, Beaver		212,180						212,180				
0163a	Euclid Sewer Pump Station - Replace Controls, Add Transfer Switch, and Stationary Generator - Permitting		31,827	31,827									
0163b	Euclid Sewer Pump Station - Replace Controls, Add Transfer Switch, and Stationary Generator - Construction		127,308		127,308								
0171	Sudden Valley Sewer Pump Station - Recondition Electrical Controls		159,135							159,135			
0172	Flat Car Sewer Pump Station - Recondition Electrical Controls		159,135								159,135		

Program Area / CIP Project # / CIP Project Name		Fund	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0173	Beaver Sewer Pump Station- Recondition Electrical Controls		159,135									159,135	
A0010	Update Sewer Comprehensive Plan (Current Plan Dated 6-14-2014)		142,055		71,027						71,027		
E0003	Replace Sewer Camera Vehicle		77,613					77,613					
E0004	Replace Camera Equipment		39,140					39,140					
S0001a	EPA Capacity, Management, Operations, & Maintenance (CMOM) Projects - Sewer I&I		30,000	30,000									
S0001b	EPA Capacity, Management, Operations, & Maintenance (CMOM) Projects - Sewer I&I		60,000		60,000								
S0001c	EPA Capacity, Management, Operations, & Maintenance (CMOM) Projects - Sewer I&I		1,320,000			165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
	Subtotal		**6,398,618**	**336,827**	**358,335**	**865,000**	**971,090**	**1,036,753**	**1,097,180**	**849,135**	**395,162**	**324,135**	**165,000**
Water System													
0083	South Shore Water System - SVWTP - Transfer and Transmission Pump VFD's		554,529								554,529		
0084a	Agate Heights Water System - Phase 1 WTP Upgrade 1/3 capacity (from 30gpm to 60gpm) - Prelim Design & Permitting		51,500	51,500									
0084b	Agate Heights Water System - Phase 1 WTP Upgrade 1/3 capacity (from 30gpm to 60gpm)		82,400		82,400								
0144	South Shore Water System - 1992 SVWTP 0.235MG Chlorine Contact Tank Seismic Retrofit - Priority 2		165,500							165,500			
0146	South Shore Water System - 1971 Division 22 0.5MG Reservoir Seismic Retrofit and Coatings - Priority 3		389,350									389,350	
0147	South Shore Water System - 1973 Division 30 0.15MG Reservoir Seismic Retrofit and Coatings - Priority 4		573,947										573,947
0164	Demolish Old Concrete Reservoir at 1010 Lakeview Street		35,000			35,000							
0166	South Shore Water System - SVWTP - Convert from Chlorine Gas to Liquid		106,090							106,090			
0176	SVWTP - Replace 6 Turbimeters and 2 Chlorine Analyzers		38,000	38,000									
0177	Water Meter Registers		284,000	284,000									
0187	Fire Flow Improvements - Remove Deficient Fire Hydrant ID 22-112 (Low flow and pressure) at top of Kinglet Ct		2,000		2,000								
0188	Fire Flow Improvements - Hydraulic Model Calibration of Assumed Pipe Friction Loss Factor (C-Factor) in Areas of Fire Flow Deficiencies		25,000		25,000								
0189	Fire Flow & Seismic Improvements - Replace Division 7 Reservoir (Applied for $1.5M Grant + $215k matching District Funds = $1.7M Total Project Cost)		202,658			202,658							
W0002	Water System Rehab and Replacement Projects		1,760,000			220,000	220,000	220,000	220,000	220,000	220,000	220,000	220,000
W0002b	Water System Rehab and Replacement Projects		140,000		140,000								
W0003	SVWTP Filter 3&4 Media - Replace		24,238								24,238		
W0005	Reservoirs - Inspection & Maintenance		60,000	30,000					30,000				
W0007	SVWTP Filter 1&2 Media - Replace		24,238									24,238	
	Subtotal		**4,518,450**	**403,500**	**249,400**	**457,658**	**220,000**	**220,000**	**250,000**	**491,590**	**798,767**	**633,588**	**793,947**
* Note: Cost Estimates in 2016 Dollars	**Grand Total**		**12,145,168**	**942,877**	**1,027,735**	**1,412,658**	**1,217,090**	**1,445,353**	**1,372,180**	**1,405,725**	**1,286,879**	**1,075,723**	**958,947**

LAKE WHATCOM WATER AND SEWER DISTRICT

WATER SYSTEM COMPREHENSIVE PLAN

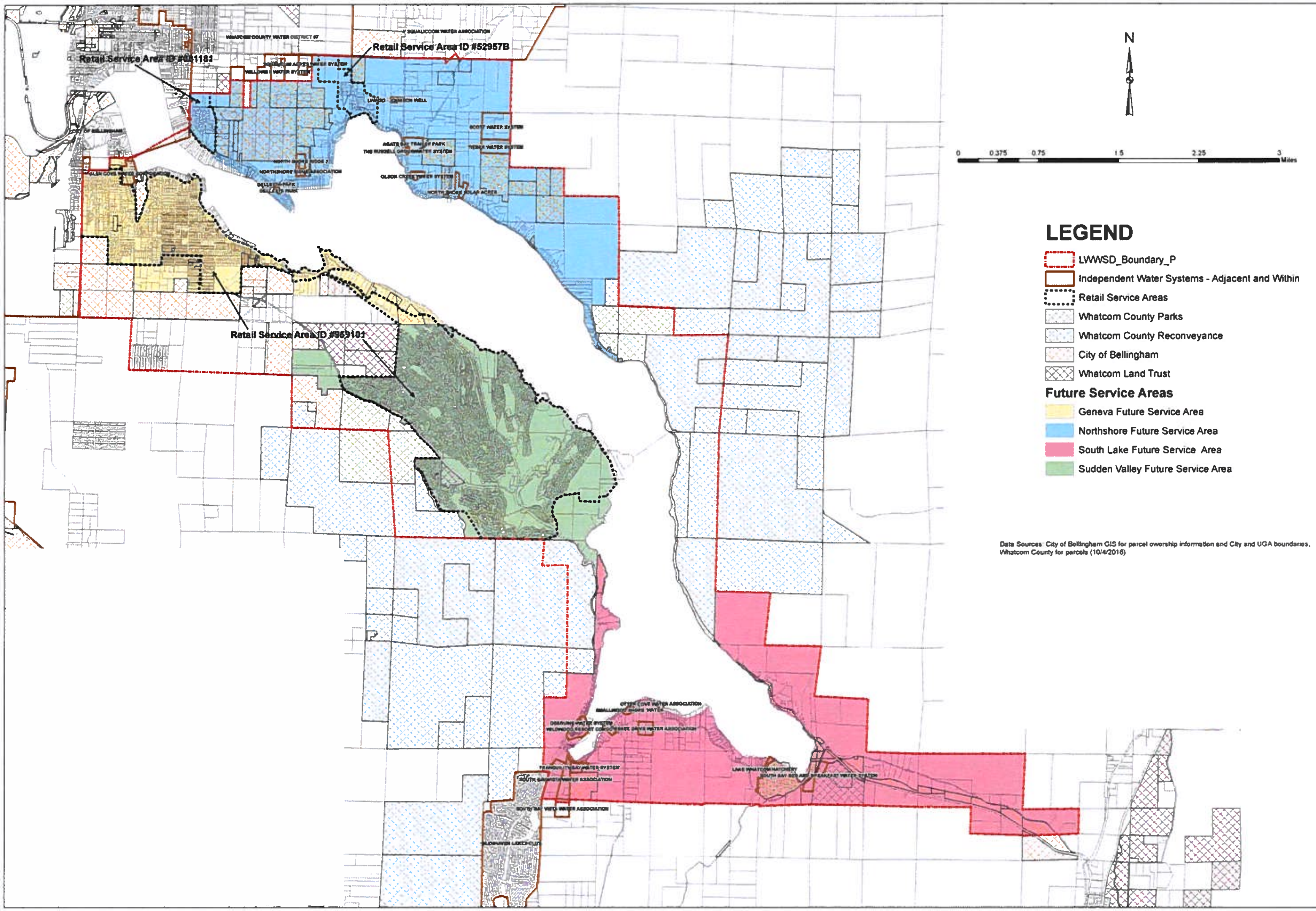
~~***DECEMBER 2017***~~***JUNE 2018***

Board of Commissioners:
Laura Weide,
Todd Citron, Bruce Ford
John Carter, ~~Curtis Casey~~

~~Patrick Sorensen~~Bill Hunter, PE - Interim General Manager

Prepared By:
Wilson Engineering, L.L.C.
805 Dupont Suite 7 Bellingham, Washington 98225
Tel. (360) 733-6100 Fax. (360) 647-9061

This Water System Plan was prepared under the direction of the professional engineers whose seals and signatures appear below, each licensed in the State of Washington under Chapter 18.43 RCW.



Coordinate System: State Plane Washington North North American Datum 1983

Data Sources: City of Bellingham GIS, Whatcom County Planning & Assessor

Wilson SURVEY/ENGINEERING

WILSON ENGINEERING, LLC
805 DUPONT STREET
BELLINGHAM, WA 98225
(360)733-6100 FAX (360)647-9061
www.wilsonengineering.com

LAKE WHATCOM WATER AND SEWER DISTRICT

WATER SYSTEM PLAN

FIGURE 1-1: BOUNDARY AND SERVICE AREAS

DATE	April 2018
SCALE	AS SHOWN
JOB NUMBER	2016-006
SHEET	1
OF	1

City of Bellingham bulk water. Since 1977, the distribution system has been gradually expanded and upgraded by means of numerous utility local improvement districts, developer extensions, and Drinking Water State Revolving Fund loan projects. In 2004, the District installed a water main that connected the Sudden Valley water system to the Geneva water system. This enables the District to supply Geneva with water produced by its water treatment plant in Sudden Valley. The District no longer purchases bulk water from the City of Bellingham, but the connection is still serviceable as an emergency intertie.

The Geneva Area has a mixed history of growth. The State's 1990 Growth Management Act and the 1992 imposition of a sewer capacity moratorium slowed the pace of population growth in the Geneva area. Throughout the 1990-2000's, Whatcom County and the City of Bellingham have been engaged in comprehensive land use planning and/or the legal appeals related thereto in an effort to determine and control maximum potential population densities for the Geneva area. Because most of the Geneva Area is within the Lake Whatcom watershed, efforts have been made to minimize potential impacts of urban development on the water quality of Lake Whatcom while recognizing the existing urban character and development pressures of the area.

The District's Geneva area currently contains several land use categories:

- Urban Growth Area ("UGA"), zoned ~~at three houses per acre~~Urban Residential ("UR")
- Existing urban character residences located outside of the UGA (Strawberry Point area)
- Rural residential areas outside of the UGA, some with water service, and some anticipated to require water service in the future
- Recreational Open Space (land restricted from development)

The Geneva area also includes the District's approximately 90 sewer-only customers along Lake Whatcom Boulevard, between Geneva and Sudden Valley, and Euclid Avenue. The Lake Whatcom Boulevard customers obtain their potable water from individual wells or direct private withdrawals from Lake Whatcom. The Euclid Avenue customers are served by the Glen Cove Water System which purchased water from the City of Bellingham.

C. North Shore Area - Eagleridge:

There are approximately 107 District water connections in the North Shore Areas while there are over 340 District sewer connections in the same area. The majority of the District's customers in this area are sewer-only customers that are served by individual wells or direct private withdrawals from Lake Whatcom.

The District began operating the Eagleridge Water System in 1989. It currently serves 68 residences from an intertie with the City of Bellingham's water system and a District-owned water booster station.

to supply the new, higher elevation reservoir. A Pressure Reducing Valve (PRV) vault was also installed to maintain acceptable pressure at the Agate Height subdivision.

Further expansion of the Agate Heights water system within the North Shore Area, beyond the Agate Heights subdivision, is discussed in detail in the North Shore Consolidation Study (Appendix C). As mentioned above, the Study assumes that the water source for the consolidated system would be the well at Agate Heights, and that the City connection at Eagleridge would remain as an emergency back-up supply. The consolidated water system could merge the Eagleridge other Group A and B water systems, and homes with individual wells and direct private surface water withdrawals with the Agate Heights water system.

1.2.2 Geography

Detailed information on the physical characteristics of the Areas is included in Appendix N. Summaries of the geography for each Area are included below.

A. South Shore (Sudden Valley and Geneva):

~~The~~ In the Sudden Valley area, the water system traverses very steep terrain, with system elevations ranging between 314 and 1,070 feet above sea level. This portion of the system has 47 PRVs to maintain appropriate water pressure throughout the system because of the steep terrain. Sudden Valley~~'s water system is~~ and Geneva are ~~interconnected with the Geneva water system. The two systems are currently~~ connected by 1.3 miles of 8-inch water main and one pressure reducing valve. The District's water intake is in the deeper, larger Basin 3 of Lake Whatcom.

~~**B. Geneva:**~~

The Geneva area also includes steep terrain, with elevations in the current service area ranging between 314 and 800 feet above sea level. Geneva currently has two pressure zones served by gravity and a third higher-elevation pressurized zone to serve the south end of the service area. The City of Bellingham bounds this service area on the west.

C. North Shore - Eagleridge:

The Eagleridge system currently has one pressure zone. The City of Bellingham bounds this area on the west.

D. North Shore - Agate Heights:

The Agate Heights (a.k.a. Richalou Estates) water system contains four pressure zones. The original Agate Heights reservoir is at 557 feet above sea level. A second tank was installed at 825 feet to serve the Lake Whatcom Residential and Treatment Center and the highest zone of Agate Heights.

1.2.3 Neighboring/Adjacent Purveyors:

The City of Bellingham is adjacent to the west of the District at Geneva and at Eagleridge. The Glen Cove Water Corporation is located within the Geneva Area and adjacent to Bellingham's City limits. Glen Cove has 21 connections and purchases

3.2 Water Quality Analysis

A. Sudden Valley:

Lake Whatcom is the raw source water for the Sudden Valley Water Treatment Plant. Source water quality analysis is performed by the District in accordance with State standards and the District's Comprehensive Monitoring Plan (see Chapter 6). Source water quality has remained consistently excellent with temporary seasonal turbidity changes (due to Lake turning impacts). The District submits monthly Water Treatment Plant reports to the Department of Health.

Distribution system water quality is monitored in accordance with the Comprehensive Monitoring Plan. Test results for the past 7 years have yielded acceptable results with three positive coliform tests (for the combined Sudden Valley and Geneva system). The sample locations were re-tested with negative results. A disinfection byproducts monitoring plan is included in Appendix D.

See Section 6.8 for a discussion of water quality complaints.

B. Geneva:

Source is the same as Sudden Valley, see above.

C. North Shore - Eagleridge:

The City of Bellingham is the source water for the Eagleridge Water System. Source water quality analysis is performed by the City. Distribution system water quality is monitored in accordance with the Comprehensive Monitoring Plan. Test results for the past 7 years have yielded acceptable results, with zero positive coliform results. A disinfection byproducts monitoring plan is included in Appendix D.

See Section 6.8 for a discussion of water quality complaints.

D. North Shore - Agate Heights:

The Agate Heights water system was brought on line in May 2001 as a Group A system with manganese removal and disinfection. Distribution system water quality is monitored in accordance with the Comprehensive Monitoring Plan. Test results for the past 17 years have yielded zero positive coliform results. The source water quality for the 10-inch North Shore well was contained in the original engineering project report for *Richalou Estates*. A disinfection byproducts monitoring plan is included in Appendix D.

3.3 System Description and Analysis (existing)

3.3.1 System Description

A. Sudden Valley Area:

Source – The raw water source is Lake Whatcom. The required water rights self-evaluation is included in Chapter 4. Maximum instantaneous withdrawal rate is 3.4 cubic feet per second (1,526 gpm) and annual withdrawal volume is 1,800 acre-feet. The source quality is excellent with only occasional spikes in turbidity due to seasonal lake effect or winter storms that may carry sediment into the lake. The intake facilities

were inspected in 2012 and found to be in good condition. The raw water pumps were replaced in 1992, and the motors were replaced/rebuilt in 2012. Capacity of the transmission main is sufficient. The intake pipe is 12-inch "Lock Tyton" pipe and extends 390 feet from the on-shore check valve vault. It is approximately another 260 feet to the water treatment plant. The intake is a three-foot by 30-inch diameter concrete pipe with metal inlet screens on both ends. The inlet is supported on concrete about 5 feet above the lake floor. The intake pipe is connected at the center bottom of the concrete pipe.

Treatment – The Sudden Valley Treatment Plant was upgraded in 1992 to increase raw water and transmission pumping capacities to match the capacity of the 2-MGD filtration system. Additional objectives included increasing the reliability of the plant and complying with the EPA's Surface Water Treatment Rules (SWTR). The plant is capable of producing 2 MGD of treated, disinfected water and delivering it to the distribution system, with 100% backup capacity of all pumping systems, and natural gas standby power capable of operating the plant at full capacity. The treatment plant is a direct filtration treatment plant with disinfection provided by gas chlorine.

Table 3.3-1 Sudden Valley Water Treatment Plant Pumps and South Shore Transmission / Booster Pumps

Type of Pump	System Capacities	Current Operations
Raw Water	2 - 1400gpm each	700 gpm
Transfer	2 - 1400 gpm each	700 gpm
Transmission – Div. 7	2- 840 gpm @ 390 feet TDH each	840 gpm
Transmission – Div. 22	2- 700 gpm @ 608 feet TDH each	725 gpm
Transmission – Div. 30	2 – 170 gpm @ 520 feet TDH	168 gpm
Transmission – Geneva (Beecher)	2 – 150 gpm @ 135 feet TDH	268 gpm
Booster – South Geneva	2 – 41 gpm @ 255 feet TDH	42 gpm
Booster – LID W5	2 – 12 gpm @ 177 feet TDH	12 gpm

A baffled, welded steel, 0.22 MG above grade storage tank was constructed at the plant site in 1992 to provide disinfection contact time to meet SWTR requirements. Transfer pumps move the water from the clearwell to the contact time storage tank. The transmission pumps then pump water from the storage tank to the portions of the distribution systems that feed the Division 7 and Division 22 reservoirs.

Based on the SWTR Guidance Manual and confirmed by the Department of Health's sanitary survey of operations, the Sudden Valley Water Treatment Plant (WTP) is a "well-operated direct filtration plant." The filtration step of "well-operated direct filtration plants" is assumed to achieve 2-log removal of Giardia cysts and 1-log removal of viruses. SWTR requires an overall 3-log removal of Giardia cysts and 4-log removal of viruses. Therefore the disinfection step must deactivate 1-log of Giardia cysts and 3-log of viruses. The SWTR Guidance Manual contains CT Tables which list Giardia cyst and virus deactivation levels as a function of disinfectant concentration and contact time. CT is the product of the disinfectant concentration and the effective contact time.

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) requires source water monitoring to determine Cryptosporidium risk. As a system serving less than 10,000 people, the south shore water system has monitored source water E. coli to comply with the rule. Monitoring has always shown a concentration less than the trigger level of 10 E. coli / 100 mL. Therefore, additional treatment for Cryptosporidium is not required.

The system is currently conducting the second round of required LT2ESWTR monitoring. This is to be completed in September 2018.

The disinfection contact time provided by the tank was investigated in detail in a study by the Department of Health in 2016. This study concluded that the baffling efficiency (T_{10}/T) used to calculate contact time in the tank should be adjusted from 0.7 to 0.3. This change and its subsequent requirement to increase chlorine concentration to meet the required CT has been implemented.

The required CT for chlorine at 5°C (the plant's minimum water temperature, a conservative assumption), a pH of 7.0 (the plant's minimum finished water pH, a conservative assumption), and a chlorine concentration of 1.2 mg/L (highest typical dose is 1.1 mg/L, so this is a conservative assumption) is listed below:

Table 3.3-2 REQUIRED CT

Disinfectant	1-log Removal Giardia Cysts	pH	3-log Removal Viruses	pH
Cl_2	51	7.0	6	6-9

The minimum capacity required to provide a CT of 51 based on a flow rate of 1,400 gpm (2 MGD), a Cl_2 concentration of 1.2 mg/l, and a short circuiting or hydraulic efficiency factor of 0.3 is 198,000 gallons. The existing 220,000 gallon tank is capable of providing this if it is operated such that the level in the tank is maintained above 21.1 ft to maintain the 198,000 gallons. It may be challenging to operate the system and balance flows in to and out of the CT tank to maintain a level of 21.1 ft without reaching the overflow at a level of approximately 23.3 ft, but it is possible.

The current operation is such that the flow rate through the filters is 700 gpm and that flow rate goes in to the clearwell. From the clearwell, it is pumped by the transfer pump

to the CT reservoir. The transfer pump is a constant rate pump that pumps at 1400 gpm and operates based on an on and off level in the clearwell. The flow rate out of the CT reservoir is dictated by the transmission pump flow rates (either 725 gpm to Div 22 or 840 to Div 7). The greater of the flow in to or out of the CT reservoir (averaged over one hour) dictates contact time. The current average flow rate is 700 gpm based on the operating flow rate of the plant.

But ifwhen the plant were to beis operated at 1400 gpm, the transfer pump would operate at 1400 gpm constantly and would not need to be cycled on and off. The transmission pumps to both Div 22 and Div 7 could be operated (and throttled to 700 gpm each) so that flow in and flow out of the CT reservoir were both 1400 gpm. As long as the above parameters were met (minimum level of 21.1 ft and chlorine concentration of 1.2 mg/L), the required CT would be provided.

The plant is typically operated at half its capacity, approximately 700 gpm. Because the transfer pump that pumps into the CT reservoir is a constant speed pump that pumps at 1400 gpm and is operates on and off while the plant is operating based on a float, the Department of Health has set a minimum contact tank depth of 16.5 ft (155,000 gallons) based on a flow rate of 1,000 gpm on a 60-minute basis.At this flow rate, 99,000 gallons is required. Options could be investigated to utilize additional water system components for the calculation of contact time. Because the plant pre-chlorinates with a low chlorine dose, additional CT could be calculated for the flocculation basin and filters. There is some pipe between the outlet of the CT tank and the first customer. There is a substantial length of pipe between the outlet of the CT tank and the first customer on the line going toward the Division 22 reservoir (approximately 23 minutes of hydraulic residence time). But there is much less pipe between the outlet of the CT tank and the first customer on the line going toward the Division 7 reservoir (approximately 2.5 minutes of hydraulic residence time). Because of the limited additional benefit of the 2.5 minutes of time toward the CT calculation, it would not be worth the cost to add monitoring stations at each of the two entry to distribution points.

The 2-MGD treatment train includes the following functions:

- Screened raw water pumping
- Addition of alum as flocculating agent
- Coagulation and flocculation
- Pre-chlorination
- Filtration
- Automated filter backwash (to equalization tank, then sanitary sewer)
- Filter to Waste (to sanitary sewer)
- Chlorine disinfection in baffled contact reservoir

A more detailed description of the treatment plant process is included in the *Sudden Valley Water Treatment Plant Operations Plan* (revised 2017).

Storage – The Sudden Valley Area includes three older and one new distribution reservoirs and a finished water reservoir for disinfectant contact time at the treatment plant. A second reservoir has recently been constructed at Division 22 to improve

water main pipe material is ductile iron except a couple of sections of HDPE water main. The PRV stations are all are maintained on an annual basis.

There was one section of the distribution that had higher than desirable water pressure (looped area from Lowell Ave. to Oriental Ave.). Pressure Reducing Valve (PRV) stations were installed on Lowell Ave. and Oriental Ave. in 2012 to remedy this issue.

TABLE 3.3-5 GENEVA AREA PIPE MATERIAL QUANTITIES		
Material	Range (Inches)	Length (Ft)
Cast Iron	6	291
Ductile Iron	4-12	78,891
HDPE	8	3334

C. North Shore Area - Eagleridge:

Source – The City of Bellingham provides the source water for the Eagleridge Water System.

Treatment – The City of Bellingham provides treatment.

Storage – The City of Bellingham provides standby storage for the existing Eagleridge Water System.

Distribution System – The Eagleridge Water System was completed in 1989. The system has a booster station (three domestic flow pumps, two fire suppression pumps) and approximately 5,000 feet of ductile iron pipe. See Section 3.3.3 Hydraulic Models for a discussion about potentially eliminating the booster station domestic pumps and potentially fire pumps because of increased pressure from the City source.

Table 3.3-5A Eagleridge Booster Pumps		
Type of Pump	System Capacities	Current Operations
Domestic	3 – 39 gpm at 188 feet TDH	72 gpm
Fire	2 – 790 gpm at 108 feet TDH	Only operate under high demand

D. North Shore Area - Agate Heights:

Department of Health approved the project report, wellhead protection plan, and construction plans for the Agate Heights water system in May 2000. The system was completed and operational in May 2001. The system was expanded in 2008 to connect the Lake Whatcom Residential and Treatment Center.

Source – The 10-inch Agate Heights (a.k.a. Giesbrecht) well was completed in 1990-91 in the Squalicum aquifer. It has a capacity of 484 gpm, and three water rights for a total of 438 gpm instantaneous withdrawal and 506.9 acre-feet annually.

Treatment – The well water quality requires removal of manganese as a secondary contaminant. Manganese removal and a chlorine residual are provided by oxidation of the manganese with chlorine followed by filtration. A package filtration plant was installed to provide this treatment. See Agate Heights Operations and Maintenance Manual (incorporated by reference, updated in 2017) for additional details about this treatment system.

Storage – A 79,300 gallon reservoir was installed in 2000 to supply the Richalou Estates Development (now Agate Heights). This reservoir is made of concrete with a 30 ft diameter, 15 ft height, and base elevation 555.29 ft (NAVD88). A 105,700 gallon reservoir was installed in 2008 to supply the Lake Whatcom Residential Treatment Center and Agate Heights (formerly Richalou Estates). This reservoir is made of concrete with a 30 ft diameter, 20 ft height, and base elevation 824.04 ft (NAVD88). The system has four pressure zones. The 105,700 gallon reservoir directly feeds the treatment center, and it also feeds the zone including houses on Opal Terrace through a PRV. The 79,300 gallon reservoir is used as intermediate storage for the upper system and serves the lower connections, some of which are served by the hydraulic grade of the 79,300 gallon reservoir, and some of which are fed through a PRV in the lowest zone. See Section 3.3.2 for a discussion of the capacities of the storage tanks.

Distribution System – The transmission and distribution system consists of approximately 7,000 LF of 4- to 8- inch ductile iron mains. The pumps that pressurize the package treatment plant also pump the treated, disinfected water to the 79,300 gallon reservoir. With the 2008 improvements, the pressure booster system serving the highest pressure zone was converted to a transmission pump system to pump water from the 79,300 gallon reservoir to the 105,700 gallon reservoir. There are two PRVs to separate the pressure zones. See Section 3.3.3 for further discussion of the distribution system.

Table 3.3-5B Agate Heights Pumps

Type of Pump	System Capacities	Current Operations
Lower Reservoir	2 – 30 gpm	29 gpm
Upper Reservoir	2 – 21 gpm at 274 feet TDH	21 gpm

3.3.2 System Physical Capacities

A. Sudden Valley: and

B. Geneva:

A detailed physical capacity analysis for Sudden Valley and Geneva can be found in Appendix A. The detailed analysis is summarized below. The recent addition of the new Division 22 reservoir is incorporated in to the analysis.

Appendix A demonstrates that the component that limits the physical capacity of the existing water system is storage. Water rights, pump capacity, treatment capacity, and

distribution capacity are less limiting to physical capacity than storage. Physical capacity to serve Equivalent Residential Units (ERUs) is shown below.

	Sudden Valley	Geneva
Capacity based on most limiting factor [storage] (ERUs)	4600	1738

The distribution of these ERUs is constrained by the geographical distribution of the service areas of each reservoir, as shown in Table A-1 of Appendix A.

The physical capacity of the existing system exceeds anticipated build-out of the service area. Appendix A analyzes system component sizing needed to match anticipated build-out to facilitate sizing of any replacement equipment. An analysis shown in Appendix J discusses potentially replacing the existing Division 7 Reservoir with a smaller amount of storage and shifting the service areas of each reservoir to be able to maximize existing storage while still maintaining storage capacity for anticipated build-out.

C. North Shore - Eagleridge:

The Eagleridge system currently has one pressure zone served by a booster station with three identical pumps for residential flows and two large pumps to provide fire flow. Residential instantaneous flows are limited by a contract with the City to a flow of 150 gpm. Storage is provided by the City. The City needs to provide 42,500 gallons of Standby Storage for the 85 ERUs (as discussed further subsequently) at an ADD of 250 gpd/ERU. The City must calculate their own required Equalizing storage based on providing a peak hourly demand to Eagleridge of 150 gpm. Operational, Fire, and Dead storage are determined by the City.

It has recently been found that the pressure from the City source has increased since the pump station was constructed. Now the City source has a pressure that is only slightly less than that of the Eagleridge system. The City source pressure at the pump station was measured by the District on a chart recorder for one week starting October 30, 2017. The pressure varied from approximately 86-90 psi. The pumps currently increase the pressure to approximately 105 psi. A pressure of 86 psi at the pump station elevation is sufficient to provide greater than 30 psi to all connections under peak hour demand, which suggests that the residential pumps may be taken out of service and that the City source pressure could serve residential demand. Analysis indicates that the two large pumps to provide fire suppression flow may not be necessary but require a more detailed investigation before decommissioning. See Section 3.3.3 for further discussion and analysis.

The physical capacity of the Eagleridge system is analyzed in the same way the south shore system was analyzed in Appendix A. Water demands are discussed in Section 2.1, and MDD (without conservation savings) is 800 gpd/ERU. ADD does not impact physical capacity because the contract with the City does not stipulate a maximum

C. North Shore - Eagleridge:

The Eagleridge water system model includes all pipes and pumps. The model demands were updated to reflect a MDD of 800 gpd/ERU and a system PHD of 150~~130.5~~ gpm (based on MDD, build-out of 85 ERUs). Pump curves were updated based on available information. Elevations were updated to all be based on NAVD88 (current datum adopted by the City of Bellingham).

The source from the City of Bellingham was updated to reflect current operating conditions. The connection from the City is at a hydraulic grade of 519 ft.

Summary Analysis Results

The model was analyzed based on the existing configuration with domestic and fire flow pumps. Results indicate that the existing system can provide sufficient pressure and flow to meet Peak Hour Demand for the projected build-out while maintaining the required minimum system pressure of 30 psi. Results also indicate that the existing system can provide 750 gpm at all fire hydrants under MDD while maintaining the required minimum system pressure of 20 psi.

Because of the increase in the source (City) pressure from the previous analysis, the possibility of bypassing or eliminating the pump station was investigated. The model indicates that with the three residential flow pumps bypassed and served by the pressure of the City source, 30 psi can be provided to all connections under peak hour demand.

Additional data is needed to analyze whether the City pressure can provide sufficient fire flow without the fire flow pumps.

D. North Shore - Agate Heights:

The Johnson Well Group B system with two connections was not modeled. The Agate Heights system was modeled and is described below.

The Agate Heights water system model includes all pipes, pumps, tanks and pressure reducing valve stations. MDD was updated to 500 gpd/ERU, and PHD was calculated for each pressure zone. PRV settings were updated to reflect current operational settings. Elevations were updated to all be based on NAVD88.

Summary Analysis Results

The results indicate that the system is capable of maintaining the minimum 30 psi pressure during peak hour demands. The results also indicate that the system can provide in excess of 750 gpm fire flows at the Lake Whatcom Residential and Treatment Center (LWRTC) and throughout the residential subdivisions while maintaining the minimum 20 psi system pressure.

With the addition of a second, higher tank to serve the LWRTC, the Opal Terrace pressure zone was converted from being pressurized by a booster pump station to gravity service. While the analysis indicates the pumps should have sufficient capacity to keep up with refilling the tank under maximum day demand (MDD) conditions, staff

3.3.4 Water Rights Evaluation

The District has conducted a water rights self-evaluation and has determined that the existing permitted and certificated water rights it holds are sufficient for the current twenty year planning period. ~~The only shortfall shown is for Eagleridge for the 20-year projection, but it is anticipated (as shown in the Agate Heights self-assessment) that the North Shore consolidation will be complete in twenty years and the Eagleridge area will be served by the Agate Heights well instead of from the City of Bellingham.~~ Section 10.4 – Water Rights includes copies of the District's water right permits and certificates and completed water right self-assessment forms (DOH 331-372).

A. Sudden Valley Area:

- Source Type – surface water
- Source Location – Lake Whatcom, Basin 3 of the Lake. The intake is 12" diameter, 315 ft from shore and 70 ft deep.
- Purpose of Use – domestic water supply
- Place Of Allowed Use – land within boundaries of LWWSD
- Place of Current Use – south shore service areas
- Time Of Use – See Water Right documents, Section 10.4
- Provisions Or Limiting Conditions – The District has Reservoir Rights, R125120C, associated with Diversion Right # S1-25121P.

B. Geneva Area:

- Source Type – Intertie with Sudden Valley (Lake Whatcom surface water)
- Source (intertie) Location –From Topper Drive, along Dutch Harbor, to Lake Whatcom Blvd.
- Purpose of Use – domestic water supply
- Place Of Use – See Future Service Area, Figure 1-1
- Time Of Use – See Water Right documents, Section 10.4
- Provisions or Limiting Conditions – The District has Reservoir Rights, R125120C, associated with Diversion Right # S1-25121P.

C. North Shore - Eagleridge:

- Source Type – City of Bellingham Intertie (Lake Whatcom surface water)
- Source Location – intersection of North Shore Drive and City limits
- Purpose of Use – domestic water supply
- Place Of Use – See Retail Service Area, Figure 1-1

generation), but the storage volume required for either may be similar since more active chemical needs to be stored for bulk delivery than for on-site generation.

Distribution System – As the hydraulic profile indicates, there are many connections between pressure zones that have a large number of PRVs connecting two adjacent pressure zones. Having more than two or three PRVs connecting two pressure zones is generally overly redundant and results in excess maintenance costs. Having too many PRVs also increases the risk that one may fail and over-pressurize the lower zone. The District is investigating decommissioning some of these redundant PRVs.

The many pressure zones in the South Shore system do not have the pressure continually monitored. This would be helpful to determine if a PRV has failed. The District may consider strategically adding pressure monitoring to closed zones (those not directly fed from a reservoir).

Storage – With the addition of the new, second reservoir at Division 22, the South Shore system has sufficient storage for anticipated build-out within the extents of the existing infrastructure.

The Reservoir Seismic Vulnerability Assessment Report details recommended improvements to all of the storage reservoirs in Sudden Valley and Geneva. Before moving forward with performing these improvements, it would be worthwhile to perform an alternatives analysis to compare making seismic and coating improvements/repairs against replacing reservoirs. Items to keep in mind when doing this analysis include:

1. Estimated costs for seismic improvements for each reservoir.
2. Life of coating for welded steel tanks is estimated to be 25 years. None of the existing reservoirs have been recoated and are over 40 years old. Recoating costs are likely on the order of $500,000 for a 1MG tank *just for the coating work*.
3. If replacing a tank, may be able to relocate to higher location or construct to be taller to provide adequate pressure to all connections, including those immediately adjacent to tank areas. For the Division 7 reservoir, may consider replacing with two smaller reservoirs for redundancy and facilitating taking one out of service for cleaning.

A preliminary alternatives assessment for repairing vs. replacing the Division 7 reservoir was performed and is included as Appendix J. It recommended replacing the existing Division 7 reservoir with two 185,000 gallon concrete storage tanks at a higher elevation.

B. Geneva Area:

Source Capacity -The intertie between Sudden Valley and Geneva provides sufficient supply capacity to the Geneva area. A backup emergency intertie with the City of

5. Source Water Protection

5.1. Wellhead Protection Program

The North Shore Area is the only District facility with a well as a Group A water source. ~~The Wellhead Protection Plan for this system was previously submitted to DOH, approved in May 2000, and is incorporated herein by reference. Conditions near the District's wells have not changed substantially since 2000. Spill response and notification of emergency response personnel is also covered in the District's Emergency Response Plan.~~The Wellhead Protection Plan has not been reviewed or revised since it was first completed (in 1999). It is recommended that the District review this information every 10 years to verify that land uses have not changed within the wellhead protection area and to ensure that all current property owners have been notified. This is being addressed by the District in the near future.

5.2. ~~The Wellhead Protection Plan has not been reviewed or revised since it was first completed (in 1999). It is recommended that the District review this information every 10 years to verify that land uses have not changed within the wellhead protection area and to ensure that all current property owners have been notified. This is being addressed by the District in the near future.~~ Watershed Control Program

The District is a member of the Planning Unit for WRIA 1 and is a member of the Water District Caucus. The District also works with Whatcom County PUD and Whatcom County small cities on water supply coordination and consistency.

The District has actively participated in preparation of the regional watershed control program via the Lake Whatcom Management Program along with the City of Bellingham and Whatcom County. In May 1998, the "Interlocal Agreement Between the City of Bellingham, Whatcom County, and Water District 10 Concerning Joint Management of Lake Whatcom" was adopted. The on-going efforts of the Lake Whatcom Management Program are documented in the five-year Work Plans and updated annually. The District also participates financially in the Lake Whatcom Tributary Monitoring program, led by Whatcom County.

5.3. System Improvements Analysis, Priority, Alternate Selection

There were no water system improvements identified that are associated with the North Shore - Agate Heights Wellhead Protection Plan or the Regional Watershed Protection Plan.

Table 6.3-2. Preventive Maintenance Program		
Major System Component	***Activity***	***Frequency***
PRVs (Geneva, SV, Agate)	Pressure check, visual inspection, repair as needed	Annual
Fire Hydrants (all)	Hydrant flushing (also blow-off flushing)	Annual
Booster Stations (Geneva-2, NS-Eagleridge, Agate)	Inspection, preventive maintenance checklist (i.e. greasing, check voltage, amp draw, ...)	Annual
Generators (Geneva, SV, Eagleridge, Agate)	Inspection, preventive maintenance checklist (i.e. greasing, check voltage, amp draw, ...)	Annual
Reservoirs (Geneva, SV, Agate)	External inspection of screens, foundation Exterior pressure washing Interior inspection/cleaning	Annual 3 years 10 years
Distribution mains (all)	Exercise all valves (concurrent with hydrant flushing) Blow-off flushing of problem dead end lines	Annual Semi-annual
Meters/services (all)	Rebuild/replace aging services	Multi-year plan

6.4 Water Quality Monitoring

The District's water quality monitoring schedules are included in Appendix L. The coliform monitoring plan was updated in April 2017 to comply with the Revised Total Coliform Rule and the Groundwater Rule and was approved by the Department of Health. The coliform monitoring plan and sampling procedures are incorporated here by reference. Each system has a Disinfection Byproducts Monitoring Plan, included in Appendix D.

6.5 Water System Reliability Analysis

Emergency Response Program

The District's emergency response program for the water treatment plant is described in detail in the *Sudden Valley Water Treatment Plant Operations Plan* (revised 2017). A District-wide Emergency Response Program has been developed as a stand-alone document. This plan covers both water and sewer emergencies and is incorporated herein by reference. An emergency notification procedure for residences that draw untreated water direct from Lake Whatcom is included in this plan.

Water Shortage Response Planning

Since seasonal water shortages have never been a problem for any of the District's water sources, water shortage would probably only occur as the result of a catastrophic emergency, such as major earthquake, volcanic eruption, or explosion, or a prolonged drought. The District has developed a stand-alone Emergency Response Plan to address catastrophic emergencies.

8. Improvement Program

8.1 Prioritizing Potential Improvements

8.1.1 Identification of Potential System Improvements

The District has compiled a Capital Improvements Plan which is used to track needs, scheduling, and completion of all projects and major activities for the water and sewer missions of the District.

The Capital Improvements Plan list is included in Appendix I – Capital Improvements Plan. This list includes all planned water projects and the proposed schedule for implementing the projects.

Improvement projects are identified and discussed in Section 3.5 of this water system plan.

8.1.2 Assessment of Alternatives

The projects identified in Section 3.5 and the Capital Improvement Plan in Appendix I include descriptions of alternatives that should be assessed as appropriate. The reservoir projects are especially in need of a detailed alternatives analysis comparing rehabilitating the existing reservoirs to building new reservoirs. The project to switch from gas chlorine to liquid sodium hypochlorite should also include a pre-design phase in which alternatives are assessed, as described in Section 3.5.

Most of the other projects listed in the Capital Improvements Plan do not require analysis of alternatives so much as a balancing any emerging urgency of need with the District's ability to respond and pay for it at an appropriate level of rates and charges. Most of the projects listed are to replace aging infrastructure which will be done in accordance with the District's standards. For those larger projects that do need an analysis of alternatives, a pre-design report will be prepared specifically for each project.

Since the District does not initiate developer projects (DEAs), it also does not assess alternatives for DEAs in advance. The schedule for these projects will depend upon the developer's assessment of market demand, cost, and the ability to obtain environmental permits and approvals. When they occur, development projects will be required to fit into a framework that improves, rather than hampers, the District's ability to operate in the public interest, safely and cost-effectively.

8.1.3 Selection of Alternatives

Since there are many factors involved in the sizing, site selection, operational issues, and reservoir allocation, a specific alternative for reservoir rehabilitation (seismic upgrades, re-coating) vs replacing with smaller reservoirs for the ~~Division 7 and~~ Geneva reservoir~~s~~ has not been selected at this time. A detailed analysis will be conducted and included in the Project Report when the project~~s are~~ is undertaken. A preliminary alternatives analysis was completed for Division 7 (Appendix J).

performance bond when construction begins to ensure the project is completed in accordance with District requirements. Utility local improvement districts are typically formed at the request of the parties in a benefiting area, and guarantee payback to the District for investing in new infrastructure while allowing the benefiting parties to pay off the costs over time.

9.5 Assessment of Rates

LWWSD's Master Fees and Charges Schedule is included in Appendix F – Financial Data. These rates are continuously reviewed and adjusted in consideration of operating costs and proposed capital improvements identified in this plan. The Commissioners have adopted a rate structure that promote water conservation.

The District Commissioners periodically review the planned projects included in the District's Capital Improvements Plan. When substantial changes are made to the capital facility plan, the Commissioners review the impacts on rates and charges and make adjustments accordingly.

~~The Commissioners adopted a rate structure that promote water conservation.~~ The District completed their most recent rate study update in January 2017 (incorporated here by reference). This rate study took into account the District's 10-year Capital Improvement Plan (CIP) for both water and sewer and recommended a rate structure for the next 5 years to provide sufficient funding for the full CIP. The District adopted the recommended rate structure. The rate study also analyzed the affordability of the water (and sewer) rates. The rate study is updated every three years.

Table 9.5-1 presents the financial analysis results of the water utility operations and capital funding from the January 2017 Rate Study by FCSG.

Table 9.5-1 Detailed Water Utility Results

Operating Reserve Summary	2016	2017	2018	2019	2020	2021
Summary of Existing Operations Before Rate Increases						
Rate Revenues Under Existing Rates	$ 2,096,538	$ 2,101,779	$ 2,107,034	$ 2,112,301	$ 2,117,582	$ 2,122,876
Non-Rate Revenues	52,639	53,217	52,731	52,753	52,926	53,159
Total Revenues	2,149,177	2,154,997	2,159,765	2,165,054	2,170,508	2,176,035
Total Expenditures	(2,048,481)	(2,441,846)	(2,530,651)	(2,601,175)	(2,694,618)	(2,770,248)
Cash Surplus / (Deficiency)	**$ 100,696**	**$ (286,849)**	**$ (370,886)**	**$ (436,121)**	**$ (524,110)**	**$ (594,213)**
Annual Rate Increase		**8.75%**	**8.50%**	**4.00%**	**4.00%**	**4.00%**
Cumulative Rate Increase		**8.75%**	**17.99%**	**22.71%**	**27.62%**	**32.73%**
Revenues After Rate Increases						
Rate Revenues (Before Rate Increases)	$ 2,096,538	$ 2,101,779	$ 2,107,034	$ 2,112,301	$ 2,117,582	$ 2,122,876
Additional Revenue from Rate Increases	-	183,906	379,134	479,778	584,919	694,752
Other Revenues & Interest	52,639	53,217	52,731	52,753	52,926	53,159
Total Revenues With Rate Increases	$ 2,149,177	$ 2,338,902	$ 2,538,900	$ 2,644,832	$ 2,755,427	$ 2,870,787
Expenses & Transfers						
Cash Operating Expenses	$ 1,790,638	$ 1,893,879	$ 1,955,386	$ 2,019,294	$ 2,085,712	$ 2,154,754
Existing Debt Service	257,843	347,967	345,569	342,411	359,663	356,479
New Debt Service	-	-	19,697	19,470	19,242	19,015
System Reinvestment Funding	-	200,000	210,000	220,000	230,000	240,000
Additional Taxes After Rate Increase	-	9,249	19,067	24,128	29,416	34,939
Transfer of Surplus to Capital	-	-	-	-	-	-
Total Expenses	$ 2,048,481	$ 2,451,094	$ 2,549,718	$ 2,625,303	$ 2,724,033	$ 2,805,187
Additions / (Subtractions) to Operating Reserve	**100,696**	**(112,192)**	**(10,818)**	**19,529**	**31,394**	**65,599**
Impacts to Operating Reserve						
Beginning Operating Balance	$ 441,527	$ 542,223	$ 430,031	$ 419,213	$ 438,741	$ 470,135
Net Cash Flow After Transfers to Capital	100,696	(112,192)	(10,818)	19,529	31,394	65,599
Ending Operating Balance	$ 542,223	$ 430,031	$ 419,213	$ 438,741	$ 470,135	$ 535,735
Minimum Operating Balance Target	*$ 294,351*	*$ 311,323*	*$ 322,954*	*$ 335,073*	*$ 346,823*	*$ 359,042*
Net Cash Flow After Rate Increase	**100,696**	**(112,192)**	**(10,818)**	**19,529**	**31,394**	**65,599**
Coverage After Rate Increase: Bonded Debt	**10.50**	**5.57**	**7.09**	**7.59**	**6.50**	**6.92**
Coverage After Rate Increase: Total Debt	**1.73**	**1.33**	**1.62**	**1.74**	**1.76**	**1.89**

Capital Reserve Summary	2016	2017	2018	2019	2020	2021
Beginning Capital Balance	**$ 1,418,718**	**$ 854,216**	**$ 787,117**	**$ 1,111,375**	**$ 1,140,888**	**$ 1,016,696**
Capital Revenues:						
System Reinvestment Funding						
Minimum Policy	$ -	$ 200,000	$ 210,000	$ 220,000	$ 230,000	$ 240,000
Operating Surplus	-	-	-	-	-	-
Total	$ -	$ 200,000	$ 210,000	$ 220,000	$ 230,000	$ 240,000
Draws on Existing State Loans	451,298	897,960	-	-	-	-
GFC Revenue Towards Capital	79,381	22,071	22,071	22,071	22,071	22,071
Net Debt Proceeds Available for Projects	-	-	300,000	-	-	-
Interest Earnings	7,525	4,702	4,367	5,988	6,135	5,515
Total Capital Revenues and Beginning Reserve	$ 1,956,922	$ 1,978,949	$ 1,323,555	$ 1,359,433	$ 1,399,094	$ 1,284,281
Capital Project Expenditures	$ (1,102,705)	$ (1,191,832)	$ (212,180)	$ (218,545)	$ (382,398)	$ (256,783)
Ending Capital Balance	**$ 854,216**	**$ 787,117**	**$ 1,111,375**	**$ 1,140,888**	**$ 1,016,696**	**$ 1,027,498**
Minimum Target	*$ 440,004*	*$ 451,922*	*$ 454,044*	*$ 456,229*	*$ 460,053*	*$ 462,621*

Ending Reserve Balances	2016	2017	2018	2019	2020	2021
Operating Reserve	$ 542,223	$ 430,031	$ 419,213	$ 438,741	$ 470,135	$ 535,735
Capital Reserve	$ 854,216	$ 787,117	$ 1,111,375	$ 1,140,888	$ 1,016,696	$ 1,027,498
Debt Reserve	$ 86,211	$ 86,211	$ 86,211	$ 86,211	$ 86,211	$ 86,211
	$ 1,482,650	$ 1,303,359	$ 1,616,798	$ 1,665,840	$ 1,573,042	$ 1,649,444
Operating Reserve: Minimum Days of O&M	*60 days*	*60 days*	*60 days*	*60 days*	*60 days*	*60 days*
Operating Reserve: Actual Days of O&M	*111 days*	*83 days*	*78 days*	*79 days*	*82 days*	*91 days*
Capital Reserve Minimum Target	$ 440,004	$ 451,922	$ 454,044	$ 456,229	$ 460,053	$ 462,621

10.3 Comments on WSP by Others

Washington State Department of Health
Whatcom County Council
Whatcom County Planning and Development
Whatcom County Engineering Department
Whatcom County Health Department
City of Bellingham (adjacent purveyor)
Whatcom County Water District 7 (adjacent purveyor)
Y Squalicum Water Assn. (adjacent purveyor)
Whatcom Meadows (adjacent purveyor)
Glenhaven Lakes Club (adjacent purveyor)
Glen Cove Water Assn. (adjacent purveyor)
Dellesta Park Water Assn. (adjacent purveyor)
Agate Bay Trailer Park (adjacent purveyor)
The Russell Group Water System (adjacent purveyor)
North Shore Solar Acres (adjacent purveyor)
Scott Water System (adjacent purveyor)
Otter Cove Water Assn. (adjacent purveyor)
Renee Dr. Water Assn. (adjacent purveyor)
Smallwood Shores Well (adjacent purveyor)
South Bay Vista Water Assn. (adjacent purveyor)
Wildwood Resort Condos (adjacent purveyor)
Lummi Nation
Department of Natural Resources

WHATCOM COUNTY
PUBLIC WORKS DEPARTMENT

Jon Hutchings
Director

Joseph P. Rutan, P. E.
County Engineer/Assistant Director
322 N. Commercial Street, Ste 301
Bellingham, WA 98225-4042
Phone: (360) 778-6210
Fax: (360) 778-6211

February 12, 2018

Ms. Melanie Mankamyer, PE
Wilson Engineering, LLC
805 Dupont Street, Suite #7
Bellingham, WA 98225

Subject: **REVISED Lake Whatcom Water and Sewer District 2017 Lake Whatcom Water System Comprehensive Plan**

Dear Ms. Mankamyer:

In reply to your letter, and in accordance with reference RCW 57.16.010, I hereby **approve** subject *Lake Whatcom Water and Sewer District 2017 Lake Whatcom Water System Comprehensive Plan*.

Please note the following related to this approval:

- The District should coordinate its planned sewer system facilities construction program with the County's planned road construction program.
- All work performed in a County public road right-of-way requires a Revocable Encroachment Permit as a prerequisite. Gary Johnson, 360.778.6269, is the County's Revocable Encroachment Permit coordinator.
- Depending on the scope of work of any given District planned sewer system facilities project, the County might require:
    - Other permits (e.g., building, conditional use, land disturbance, shoreline) as a prerequisite to project execution, and
    - Stormwater management documentation, with possible consequent engineered stormwater management system design.

Sincerely,

Joseph P. Rutan, PE
County Engineer/Assistant Director

Copy: County Council
County Executive
Public Works Director
Engineering Services Development Division Manager
Engineering Services Traffic Division Senior Engineering Technician for ENCs

WHATCOM COUNTY
Health Department

Regina A. Delahunt, Director
Greg Stern, M.D., Health Officer

March 12, 2018

Melanie Mankamyer, P.E.
Wilson Engineering, L.L.C.
805 Dupont Street Suite 7
Bellingham, WA 98225

Dear Melanie,

The Whatcom County Health Department has received and reviewed the Lake Whatcom Water and Sewer District Water System Comprehensive Plan approved December 13, 2017. We appreciate the efforts put forth to provide residents in the service area with a safe water supply. We have completed our review in accordance with the provisions of WAC 246-290 and based on addressing the Washington State Department of Health list of items, hereby approve your plan.

Sincerely,

John J. Wolpers III RS/REHS
Whatcom County Environmental Health Manager

Cc: Clerk of the Whatcom County Council
Whatcom County Engineer
Whatcom County Planning
Washington State Department of Health. Northwest Regional Office

509 Girard Street
Bellingham, WA 98225-4005
360.778.6000 | FAX 360.778.6001
WhatcomCountyHealth
WhatcomCoHealth

Whatcom County HEALTH Department

1500 North State Street
Bellingham, WA 98225-4551
360.778.6100 | FAX 360.778.6101
www.whatcomcounty.us/health

Washington State Department of Health

Local Government Consistency Determination Form

Water System Name: Lake Whatcom Water and Sewer Distrct PWS ID: 959101, 081181, 52957B, and 047828

Planning/Engineering Document Title: Water System Comp Plan Plan Date: December 2017

Local Government with Jurisdiction Conducting Review: Whatcom County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.		Yes
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.		Yes
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.		Not Applicable
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.		Yes
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.		Yes

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations; Subject to the attached conditions

Signature

3-5-18

Date

Mark Personius, Whatcom County Planning & Development Services

Local Government Consistency Determination Form - Conditions

Lake Whatcom Water & Sewer District – Water System Comprehensive Plan (December 2017)

The *Lake Whatcom Water & Sewer District – Water System Comprehensive Plan* shall be revised as follows and resubmitted to the Whatcom County Council for review and approval (a copy of the revised Plan shall also be submitted to the County Planning and Development Services Department):

1. The Water System Comprehensive Plan text relating to the Geneva Urban Growth Area (p. 7) shall be modified because the Urban Residential zone previously allowed higher densities, but now allows new land divisions in the Lake Whatcom Watershed at one dwelling/five acres. Sample language, that could be used by the District, is shown below:

   . . . The District's Geneva area currently contains several land use categories:

   - Urban Growth Area ("UGA") zoned ~~at three houses per acre~~ Urban Residential ("UR") . . .

2. The Water System Comprehensive Plan indicates that the District is proposing minor service area adjustments. Therefore, the District shall submit Whatcom County Coordinated Water System Plan Exhibit 4-1, with an associated map, and document it has followed the procedures in Exhibit 4-2 that are applicable to the District.

3. The Water System Comprehensive Plan's Capital Improvement Plan (Appendix I) shall be amended to show a phased improvement plan to address the fire flow deficiencies in accordance with the Whatcom County Coordinated Water System Plan (see Deputy Fire Marshal Mark Sniffen's e-mail dated February 23, 2018).

4. The Water System Comprehensive Plan's financial program (Chapter 9 and/or Appendix F) should be amended to include revenue projections to cover the first 6 years of the Capital Improvement Plan (Appendix I).

WILSON ENGINEERING

Melanie Mankamyer <mmankamyer@wilsonengineering.com>

LWWSD-2017

Mark Sniffen <MSniffen@co.whatcom.wa.us> Fri, Feb 23, 2018 at 2:43 PM
To: "mmankamyer@wilsonengineering.com" <mmankamyer@wilsonengineering.com>
Cc: Matt Aamot <MAamot@co.whatcom.wa.us>, Mitchell Nolze <MNolze@co.whatcom.wa.us>, Mark Personius <MPersoni@co.whatcom.wa.us>

To : Melanie Mankamyer

Re: Response to LWWSD-2017 Water System Plan Update

The Summary Analysis Results for the Sudden Valley and Geneva (LWWSD Water System Comprehensive Plan, page 40) indicate that there are around 33 fire hydrants that do not meet the minimum fire flow rates of Table 5-3 in the Coordinated Water System Plan (CWSP). Please amend the Water System Comprehensive Plan's capital improvement plan (Appendix I) to show a phased improvement plan to address the fire flow deficiencies as per CWSP Section 5.3.4 " Utilities shall develop their capital improvement programs for meeting their fire flow objectives in consultation with the appropriate local fire authorities. It is the intent that said programs may be scheduled to be phased-in over a specific period of time considered to be reasonable for the individual circumstances. The program and schedule shall be described in the utility's comprehensive water system plan, which is subject to DOH approval" (CWSP, Fire Flow Requirements, pages 5-14 and 5-15).

Thank You

Mark Sniffen, CBO

Building Services Division Manager

Deputy Fire Marshal

Disclaimer: The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act (RCW 42.56).

WILSON ENGINEERING

Melanie Mankamyer <mmankamyer@wilsonengineering.com>

LWWSD - Service Area Boundary Amendment

Matt Aamot <MAamot@co.whatcom.wa.us> Thu, May 17, 2018 at 12:38 PM
To: "patrick.sorensen@lwwsd.org" <patrick.sorensen@lwwsd.org>
Cc: Mark Personius <MPersoni@co.whatcom.wa.us>, Sarah Watts <SWatts@co.whatcom.wa.us>, "Melanie Mankamyer, Wilson Engineering" <mmankamyer@wilsonengineering.com>, "Bill Hunter (bill.hunter@lwwsd.org)" <bill.hunter@lwwsd.org>

Dear Mr. Sorensen:

On March 21, 2018, the Lake Whatcom Water & Sewer District (LWWSD) submitted a "Declaration of Water Utility Service Areas" to amend the District's current service area boundary (attached). As you know, the Whatcom County Coordinated Water System Plan (CWSP) "Service Area Boundary Amendment Procedure" (Exhibit 4-2) sets forth the process for approving service boundary adjustments.

In accordance with these procedures, Whatcom County Planning & Development Services sent a copy of the service area boundary proposal to other water systems within ½ mile and did not receive any comments. Additionally, I talked to the County Planning Director, and he concurred that the District's public process for updating the Water System Plan, which includes the boundary adjustments, satisfied the District's obligation to seek public input on the service area boundary change as proposed in your March 8, 2018 letter.

Whatcom County Planning & Development finds that the service area boundary amendment procedures have been satisfied. However, CWSP Service Area Boundary Amendment Procedure # 2 states ". . . No changes in the service area or to the delivery of water shall be made until the DOH review process has been completed. . ." (Exhibit 4-2).

Therefore, once the District's revised Water System Comprehensive Plan is submitted and approved by the State Department of Health, Whatcom County Planning & Development Services will revise the Coordinated Water System Plan map to reflect the amended water service area as set forth in the District's "Declaration of Water Utility Service Areas" (March 2018).

Sincerely,

Matt Aamot

Whatcom County Planning & Development Services

Service Area Declaration (March 2018).pdf
537K

WILSON ENGINEERING

Melanie Mankamyer <mmankamyer@wilsonengineering.com>

SEPA Determination of Nonsignificance - Lake Whatcom Water and Sewer District - Water System Comprehensive Plan

Bill Hunter <bill.hunter@lwwsd.org> Wed, Nov 29, 2017 at 10:01 AM
To: Bob Carmichael <Bob@carmichaelclark.com>, Melanie Mankamyer <mmankamyer@wilsonengineering.com>
Cc: Patrick Sorensen <patrick.sorensen@lwwsd.org>

FYI.

Bill Hunter, P.E. | Assistant General Manager / District Engineer

LAKE WHATCOM WATER & SEWER DISTRICT

1220 Lakeway Drive

Bellingham, WA 98229

8am – 5pm, Monday – Thursday

(360) 734-9224, Fax: (360) 738-8250

www.lwwsd.org

From: Tamela S. Smart [mailto:TamelaS@lummi-nsn.gov]
Sent: Wednesday, November 29, 2017 8:26 AM
To: Patrick Sorensen
Cc: Lena A. Tso; Kara D. Kuhlman; Kaehler, Gretchen (DAHP); Bill Hunter
Subject: RE: SEPA Determination of Nonsignificance - Lake Whatcom Water and Sewer District - Water System Comprehensive Plan

Dear Patrick Sorensen,

The Lummi Nation has received the SEPA Distribution List, the Determination of Nonsigniicance, the En vironmental Checklist and the Supplemental Sheet for Nonproject Actions for the proposed Water System Comprehensive Plan - 2017 Update (Proponent: Lake Whatcom Water and Sewer District). The Lummi Nation is responding as an affected tribe.

The Lummi Nation Tribal Historic Preservation Ofice (LNTHPO) has r eviewed the above listed documents as well as records on ile at our ofice. Based on this r eview, the LNTHPO would like to be consulted with on a project by project basis. We also recommend that the Lummi Nation Natural Resources Department be consulted with regarding this SEPA.

These comments are based on the information available at the time of the review. The LNTHPO should review any changes related to the proposed project. Should you have any questions or concerns, please do not hesitate to contact me at 360-312-2253 or via email at tamelas@lummi-nsn.gov .

Sincerely,

Tamela S. Smart

Deputy THPO/Compliance Of icer

Lummi Nation Culture Department

2665 Kwina Road, Bellingham, WA 98226

360-312-2253

tamelas@lummi-nsn.gov

** The Lummi Nation recently held tribal elections and new oficers ar e now representing the Lummi Indian Business Council. Jeremiah J. Julius is the Chairman and Travis C. Brockie is the Vice Chairman. Please update your government to government contacts. **

LNTHPO would like to contribute to the conservation of our planet's natural resources and kindly requests that all correspondence and documents be sent electronically.

From: Bill Hunter [bill.hunter@lwwsd.org]
Sent: Tuesday, November 28, 2017 2:35 PM
To: sepaunit@ecy.wa.gov; stormer@wsdot.wa.gov; mcewanr@wsdot.wa.gov; gretchen.kaehler@dahp.wa.gov; joel.ingram@dfw.wa.gov; sepacenter@dnr.wa.gov; Brenda.werden@dnr.wa.gov; Merle Jefferson Sr.; Tamela S. Smart; george.swanasetjr@nooksack-nsn.gov; tdelgado@nooksack-nsn.gov; mpersoni@whatcomcounty.us; rericson@whatcomcounty.us; knabbefeld@cob.org; bbaldwin@cob.org; cfogelsong@cob.org; mjones@cityofblaine.com; rollinh@sehome.com; joriburnett@cityofferndale.org; solanoh@lyndenwa.org; rollinh@sehome.com; jeff.mcmeekin@pse.com; raelynn.asah@pse.com
Cc: Patrick Sorensen; Melanie Mankamyer; Bob Carmichael
Subject: SEPA Determination of Nonsignificance - Lake Whatcom Water and Sewer District - Water System Comprehensive Plan

[Quoted text hidden]

WILSON ENGINEERING

Melanie Mankamyer <mmankamyer@wilsonengineering.com>

SEPA Determination of Nonsignificance - Lake Whatcom Water and Sewer District - Water System Comprehensive Plan

Bill Hunter <bill.hunter@lwwsd.org> Fri, Jan 26, 2018 at 9:02 AM
To: "WERDEN, BRENDA (DNR)" <BRENDA.WERDEN@dnr.wa.gov>
Cc: Patrick Sorensen <patrick.sorensen@lwwsd.org>, Bob Carmichael <Bob@carmichaelclark.com>, Melanie Mankamyer <mmankamyer@wilsonengineering.com>, Kristin Hemenway <kristin.hemenway@lwwsd.org>

Hi Brenda,

Thanks for the information. We will keep this in mind for projects that are located near or on state-owned aquatic lands.

Bill Hunter, P.E. | Assistant General Manager / District Engineer

LAKE WHATCOM WATER & SEWER DISTRICT

1220 Lakeway Drive

Bellingham, WA 98229

8am – 5pm, Monday – Thursday

(360) 734-9224, Fax: (360) 738-8250

www.lwwsd.org

From: WERDEN, BRENDA (DNR) [mailto:BRENDA.WERDEN@dnr.wa.gov]
Sent: Wednesday, January 24, 2018 3:47 PM
To: Bill Hunter
Subject: RE: SEPA Determination of Nonsignificance - Lake Whatcom Water and Sewer District - Water System Comprehensive Plan

Hello Bill my name is Brenda Werden and I work for the Department of Natural Resources as a Land Manager located in Sedro Woolley.

I received your SEPA DNS notice for the above plan. I am reaching out to your District to follow up with some basic ownership information.

As you implement you plan, please keep in mind that new (or existing) structures (intake pipe, discharge pipe or other) when located on DNR aquatic lands - will need prior authorization.

I am happy to talk with you and interested staff if you have any questions about state-owned aquatic lands (SOAL) or our authorization process. A good approach is to think about where structures will be located. If structures have potential to be located on the shorelands or bedlands of Lake Whatcom – feel free to contact me by phone or email. I can do a preliminary ownership check.

Here is a link to our Aquatic leasing website if you would like more information about our Aquatic Program.

Thank you for your time – best regards.

Brenda Werden, Aquatic Land Manager

brenda.werden@dnr.wa.gov

www.dnr.wa.gov

From: Bill Hunter [mailto:bill.hunter@lwwsd.org]
Sent: Tuesday, November 28, 2017 2:36 PM
To: ECY RE SEPA REGISTER <separegister@ecy.wa.gov>; stormer@wsdot.wa.gov; mcewanr@wsdot.wa.gov; Kaehler, Gretchen (DAHP) <Gretchen.Kaehler@DAHP.wa.gov>; Ingram, Joel W (DFW) <Joel.Ingram@dfw.wa.gov>; DNR RE SEPACENTER <SEPACENTER@dnr.wa.gov>; WERDEN, BRENDA (DNR) <BRENDA.WERDEN@dnr.wa.gov>; merlej@lummi-nsn.gov; tamelas@lummi-nsn.gov; george.swanasetjr@nooksack-nsn.gov; tdelgado@nooksack-nsn.gov; mpersoni@whatcomcounty.us; rericson@whatcomcounty.us; knabbefeld@cob.org; bbaldwin@cob.org; cfogelsong@cob.org; mjones@cityofblaine.com; rollinh@sehome.com; joriburnett@cityofferndale.org; solanoh@lyndenwa.org; rollinh@sehome.com; jeff.mcmeekin@pse.com; raelynn.asah@pse.com
Cc: Patrick Sorensen <patrick.sorensen@lwwsd.org>; Melanie Mankamyer <mmankamyer@wilsonengineering.com>; Bob Carmichael <Bob@CarmichaelClark.com>
Subject: SEPA Determination of Nonsignificance - Lake Whatcom Water and Sewer District - Water System Comprehensive Plan

[Quoted text hidden]

10.4 Water Rights

Water Right Self-Assessment Tables

Surface Water Right Permits and Certificates

Ground Water Right Permits and Certificates

Department of Ecology Change in Water Right Approval

Water Right Extensions

Water Right Self-Assessment Form for Water System Plan – Eagleridge Water System

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold				Current Source Production – Most Recent Calendar Year Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP) This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
None																	
	TOTALS =																
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa
None						

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased Current quantity purchased through intertie				10-Year Forecasted Purchase Forecasted quantity purchased through intertie				20-Year Forecasted Purchase Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1 City of Bellingham	**150 gpm for domestic, 750 gpm for fire**	**Not specified**	**None specified**	**126 gpm**	**24 gpm**	**16.0 Acre-feet**	**N/A**	**139 gpm**	**11 gpm**	**22**	**N/A**	**150 gpm**	**0 gpm**	**24**	**N/A**
TOTALS =															
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
None		

ADDITIONAL COMMENTS:

Because there is no storage in this system to provide equalizing storage such that instantaneous flow rates can be calculated based on MDD, instantaneous flow rates are based on a calculated Peak Hourly Demand based on the forecasted number of ERUs in Section 2 of the water system plan and an MDD of 800 gpm (MDD without conservation savings).

Appendix D – Water Quantity / Water Quality Data

Disinfection Byproducts Monitoring Plan

System Name	Lake Whatcom Water & Sewer District	**Type and Population of System**	SW and/or GWI 500 - 9,999
PWSID#	95910		
Date	1/13/2004 (updated 4/22/04)		
Completed by	Charles Anderson (with update by JCL)		

Monitoring requirements are additive; for example a system using ozone and chlorine, or chlorine with conventional filtration must meet the monitoring requirements for both.

Treatment Provided

Chlorine (gas, hypochlorite, etc) or Chloramines

Identify the number of "Treatment Plants" serving your system

A "Treatment Plant" or "TP" may be:

- A single surface water source
- A single well source
- A combination of multiple, individual sources (if all of the water is blended prior to distribution)

1

Enter Description of Treatment Plant Below

TP1	The Sudden Valley Water Treatment Plant (SVWTP) is a direct filtration plant with four multi media filters.
	The coagulant used in alum with no filter aids. The coagulated water is pre-chlorinated prior to flocculation and
	then enters the filtration system. The filtered water is then post chlorinated and the pH is increased with the
	addition of liquid soda ash solution.

Disinfectant Monitoring

Required:

Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl2

Compliance

Compliance is based on the running annual average (RAA) of 12 consecutive months
DOH will determine compliance for chlorine MRDL
Daily residual measurements will / will not be included in the compliance calculations (circle one)

Byproduct Monitoring

Required:

TTHM & HAA5 - 1 sample per quarter at maximum residence time MRT)
TTHM MCL = 0.080 mg/l, HAA5 MCL = 0.060 mg/l

Compliance

Compliance is based on the Running Annual Average (RAA) of quarterly results or averages
Any RAA of quarterly averages that exceeds the MCL is a violation
DOH will determine compliance for TTHM & HAA5 based on data submitted by the lab

Specify sampling location(s) for:

TTHM & HAA5	Enter Sampling Locations	Enter sampling schedule
TP1 (MRT)	Parkstone	Feb, May, Aug, Nov

No information needed here

Attach a distribution map with sample locations

Reduced Monitoring

To qualify for reduced monitoring the following criteria must be met (and State must approve)
TTHM RAA < 0.040 mg/l AND HAA5 RAA < 0.030 mg/l AND
RAA of monthly TOC </= 4.0 mg/l prior to any treatment (surface water sources only)
Monitoring may then be reduced to 1 sample per treatment plant per year
during month of warmest water temperature

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Disinfection Byproducts Monitoring Plan Form

System Name	Egleridge	**Type and Population of System**	SW and/or GWI <500
PWSID#	081181		
Date	5/20/2012		
Completed by	Kevin Cook		

Monitoring requirements are additive; for example a system using ozone and chlorine, or chlorine with conventional filtration must meet the monitoring requirements for both.

Treatment Provided

Chlorine (gas, hypochlorite, etc) or Chloramines

Identify the number of "Treatment Plants" serving your system

A "Treatment Plant" or "TP" may be:

- A single surface water source
- A single well source
- A combination of multiple, individual sources (if all of the water is blended prior to distribution)

1

Enter Description of Treatment Plant Below

TP1	City of Bellingham water treatment plant

Disinfectant Monitoring

Required:

Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl2

Compliance

Compliance is based on the running annual average (RAA) of 12 consecutive months
DOH will determine compliance for chlorine MRDL
Daily residual measurements will / will not be included in the compliance calculations (circle one)

Byproduct Monitoring

Required:

TTHM & HAA5 - 1 sample per year during month of warmest water temperature
at maximum residence time (MRT).
TTHM MCL = 0.080 mg/l, HAA5 MCL = 0.060 mg/l

Compliance

Must go to quarterly monitoring if annual sample exceeds MCL for either TTHM or HAA5
Compliance is then based on the Running Annual Average (RAA) of quarterly results or averages
DOH will determine compliance for TTHM & HAA5 based on data submitted by the lab

Specify sampling location(s) for:

TTHM & HAA5	Enter Sampling Locations	Enter sampling schedule
TP1 (MRT)	Eagleridge sample station MRT	warmest water 7/1/2013
		warmest water 7/1/2014
		warmest water 7/1/2015
		warmest water 7/1/2016
		warmest water 7/1/2017

No information needed here

Attach a distribution map with sample locations

Reduced Monitoring

There is no reduced monitoring for TTHM & HAA5 for SW systems < 500

Send copy of completed form to:

☐ **Eastern Regional Drinking Water Office, 16201 E Indiana Ave, Suite 1500, Spokane Valley, WA 99216**
Phone: (509) 329-2100 Fax (509) 329-2104

☐ **Northwest Regional Drinking Water Office, 20435 72nd Ave S, Suite 200, Kent, WA 98032**
Phone: (253) 395-6750 Fax: (253) 395-6760

☐ **Southwest Regional Drinking Water Office, PO Box 47823, Olympia, WA 98504-7823**
Phone: (360) 236-3030 Fax to (360) 664-8058

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Disinfection Byproducts Monitoring Plan Form

System Name	Agate Hieghts	**Type and Population of System**	SW and/or GWI <500
PWSID#	52957B		
Date	5/20/2012		
Completed by	Kevin Cook		

Monitoring requirements are additive; for example a system using ozone and chlorine, or chlorine with conventional filtration must meet the monitoring requirements for both.

Treatment Provided

Chlorine (gas, hypochlorite, etc) or Chloramines

Identify the number of "Treatment Plants" serving your system

A "Treatment Plant" or "TP" may be:

- A single surface water source
- A single well source
- A combination of multiple, individual sources (if all of the water is blended prior to distribution)

1

Enter Description of Treatment Plant Below

TP1	Agate Hieghts water treatment plant, 3320 Sunny Cove Lane, iron and maganese treatment, filtration
	6 inch well fed

Disinfectant Monitoring

Required:

Chlorine residuals must be measured at the same time and place as routine or repeat coliform samples
MRDL for chlorine and chloramines = 4.0 mg/l as Cl2

Compliance

Compliance is based on the running annual average (RAA) of 12 consecutive months
DOH will determine compliance for chlorine MRDL
Daily residual measurements will / will not be included in the compliance calculations (circle one)

Byproduct Monitoring

Required:

TTHM & HAA5 - 1 sample per year during month of warmest water temperature
at maximum residence time (MRT).
TTHM MCL = 0.080 mg/l, HAA5 MCL = 0.060 mg/l

Compliance

Must go to quarterly monitoring if annual sample exceeds MCL for either TTHM or HAA5
Compliance is then based on the Running Annual Average (RAA) of quarterly results or averages
DOH will determine compliance for TTHM & HAA5 based on data submitted by the lab

Specify sampling location(s) for:

TTHM & HAA5	Enter Sampling Locations	Enter sampling schedule
TP1 (MRT)	Sunny cove sample station MRT	warmest water 7/1/2013
		warmest water 7/1/2014
		warmest water 7/1/2015
		warmest water 7/1/2016
		warmest water 7/1/2017

No information needed here

Attach a distribution map with sample locations

Reduced Monitoring

There is no reduced monitoring for TTHM & HAA5 for SW systems < 500

Send copy of completed form to:

☐ **Eastern Regional Drinking Water Office, 16201 E Indiana Ave, Suite 1500, Spokane Valley, WA 99216**
Phone: (509) 329-2100 Fax (509) 329-2104

☐ **Northwest Regional Drinking Water Office, 20435 72nd Ave S, Suite 200, Kent, WA 98032**
Phone: (253) 395-6750 Fax: (253) 395-6760

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Appendix I – Capital Improvement Plan – 2017 Update

Lake Whatcom Water and Sewer District - Capital Improvement Plan 2018 thru 2027

Program Area / CIP Project # / CIP Project Name		Fund	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Both Water and Sewer													
0175	Shake Alert Pilot Program - Integrate Device into SCADA - Auto Close Exist Seismic Valve at Div 22 Res		15,000	15,000									
A0005	Accounting & Administration Server - Replace/Update Hardware, Network Security, & OS		75,000			25,000			25,000			25,000	
E0001	Replace Backhoe and Add Trailer		87,550	87,550									
E0002	Replace 5-yard Dump Truck		123,600					123,600					
E0007	Replace Mini Excavator		66,950								66,950		
E0008	Replace Flush and Vac Truck		420,000		420,000								
V0001	Replace Tool Truck (7 tool trucks in fleet)		325,000	65,000		65,000		65,000		65,000		65,000	
V0002	Replace Administrative Staff Vehicle (4 cars in fleet)		52,000				26,000				26,000		
V0003	Replace Locator / Meter Reading Van		28,000									28,000	
V0004	Replace Light-Duty Truck		35,000	35,000									
	Subtotal		**1,228,100**	**202,550**	**420,000**	**90,000**	**26,000**	**188,600**	**25,000**	**65,000**	**92,950**	**118,000**	
Sewer System													
0032a	Agate Bay Sewer Pump Station - Predesign and Shorelines Permitting		100,000					100,000					
0032b	Agate Bay Sewer Pump Station - Design and Bidding		125,000						125,000				
0032c	Agate Bay Sewer Pump Station - Construction		525,000							525,000			
0044a	Edgewater Pump Station - Predesign and Shorelines Permitting		100,000	100,000									
0044b	Edgewater Pump Station - Design and Bidding		100,000		100,000								
0044c	Edgewater Pump Station - Construction		500,000			500,000							
0053a	Dellesta Pump Station - Predesign and Shorelines Permitting		100,000	100,000									
0053b	Dellesta Pump Station - Design and Bidding		100,000			100,000							
0053c	Dellesta Pump Station - Construction		500,000				500,000						
0055a	Rocky Ridge Pump Station - Predesign and Shorelines Permitting		100,000			100,000							
0055b	Rocky Ridge Pump Station - Design and Bidding		100,000				100,000						
0055c	Rocky Ridge Pump Station - Construction		555,000					555,000					
0056a	Lakewood Pump Station - Predesign and Shorelines Permitting		100,000				100,000						
0056b	Lakewood Pump Station - Design and Bidding		100,000					100,000					
0056c	Lakewood Pump Station - Construction		595,000						595,000				
0128c	Camp Firwood Automatic Transfer Switch and Replace Fence		20,000	20,000									
0128d	Airport Sewer Pump Station Stationary Generator		55,000	55,000									
0157	Install Ball Check Valves at Cable, Ranch House, Flat Car, Beaver		106,090				106,090						
0161	Stationary Generator Closed Loop Cooling Retrofit - North Point, SV, Flat Car, Beaver		212,180						212,180				
0163a	Euclid Sewer Pump Station - Replace Controls, Add Transfer Switch, and Stationary Generator - Permitting		31,827	31,827									
0163b	Euclid Sewer Pump Station - Replace Controls, Add Transfer Switch, and Stationary Generator - Construction		127,308		127,308								
0171	Sudden Valley Sewer Pump Station - Recondition Electrical Controls		159,135							159,135			
0172	Flat Car Sewer Pump Station - Recondition Electrical Controls		159,135								159,135		

Program Area / CIP Project # / CIP Project Name		Fund	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0173	Beaver Sewer Pump Station- Recondition Electrical Controls		159,135									159,135	
A0010	Update Sewer Comprehensive Plan (Current Plan Dated 6-14-2014)		142,055		71,027						71,027		
E0003	Replace Sewer Camera Vehicle		77,613					77,613					
E0004	Replace Camera Equipment		39,140					39,140					
S0001a	EPA Capacity, Management, Operations, & Maintenance (CMOM) Projects - Sewer I&I		30,000	30,000									
S0001b	EPA Capacity, Management, Operations, & Maintenance (CMOM) Projects - Sewer I&I		60,000		60,000								
S0001c	EPA Capacity, Management, Operations, & Maintenance (CMOM) Projects - Sewer I&I		1,320,000			165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
	Subtotal		**6,398,618**	**336,827**	**358,335**	**865,000**	**971,090**	**1,036,753**	**1,097,180**	**849,135**	**395,162**	**324,135**	**165,000**
Water System													
0083	South Shore Water System - SVWTP - Transfer and Transmission Pump VFD's		554,529								554,529		
0084a	Agate Heights Water System - Phase 1 WTP Upgrade 1/3 capacity (from 30gpm to 60gpm) - Prelim Design & Permitting		51,500	51,500									
0084b	Agate Heights Water System - Phase 1 WTP Upgrade 1/3 capacity (from 30gpm to 60gpm)		82,400		82,400								
0144	South Shore Water System - 1992 SVWTP 0.235MG Chlorine Contact Tank Seismic Retrofit - Priority 2		165,500							165,500			
0146	South Shore Water System - 1971 Division 22 0.5MG Reservoir Seismic Retrofit and Coatings - Priority 3		389,350									389,350	
0147	South Shore Water System - 1973 Division 30 0.15MG Reservoir Seismic Retrofit and Coatings - Priority 4		573,947										573,947
0164	Demolish Old Concrete Reservoir at 1010 Lakeview Street		35,000			35,000							
0166	South Shore Water System - SVWTP - Convert from Chlorine Gas to Liquid		106,090							106,090			
0176	SVWTP - Replace 6 Turbimeters and 2 Chlorine Analyzers		38,000	38,000									
0177	Water Meter Registers		284,000	284,000									
0187	Fire Flow Improvements - Remove Deficient Fire Hydrant ID 22-112 (Low flow and pressure) at top of Kinglet Ct		2,000		2,000								
0188	Fire Flow Improvements - Hydraulic Model Calibration of Assumed Pipe Friction Loss Factor (C-Factor) in Areas of Fire Flow Deficiencies		25,000		25,000								
0189	Fire Flow & Seismic Improvements - Replace Division 7 Reservoir (Applied for $1.5M Grant + $215k matching District Funds = $1.7M Total Project Cost)		202,658			202,658							
W0002	Water System Rehab and Replacement Projects		1,760,000			220,000	220,000	220,000	220,000	220,000	220,000	220,000	220,000
W0002b	Water System Rehab and Replacement Projects		140,000		140,000								
W0003	SVWTP Filter 3&4 Media - Replace		24,238								24,238		
W0005	Reservoirs - Inspection & Maintenance		60,000	30,000					30,000				
W0007	SVWTP Filter 1&2 Media - Replace		24,238									24,238	
	Subtotal		**4,518,450**	**403,500**	**249,400**	**457,658**	**220,000**	**220,000**	**250,000**	**491,590**	**798,767**	**633,588**	**793,947**
* Note: Cost Estimates in 2016 Dollars	**Grand Total**		**12,145,168**	**942,877**	**1,027,735**	**1,412,658**	**1,217,090**	**1,445,353**	**1,372,180**	**1,405,725**	**1,286,879**	**1,075,723**	**958,947**

Appendix J – Division 7 Reservoir Project

WILSON ENGINEERING
805 Dupont Street, Ste. #7, Bellingham, Washington 98225
Telephone: (360) 733-6100 • Facsimile: (360) 647-9061

MEMORANDUM

TO:	LWWSD – Bill Hunter, PE, Rich Munson, and Kristin Hemenway, PE
FROM:	Brian Smith, PE and Melanie Mankamyer, PE
SUBJECT:	Division 7 Reservoir – Seismic Upgrades and Maintenance vs. Replacement
DATE:	February 8, 2018

Introduction

A structural analysis of the Lake Whatcom Water and Sewer District Division 7 water reservoir has found significant deficiencies in its ability to meet existing earthquake code requirements (BHC report, December 2016). The recent Water System Plan also analyzed the capacity of the Division 7 reservoir and found it to be significantly oversized at a volume of one million gallons. The Water System Plan recommended an alternatives analysis for this reservoir to compare the cost of making seismic upgrades and replacing the interior and exterior coatings that are beyond their useful life against the alternative of replacing the Division 7 reservoir with a more appropriate (~half a million gallons) amount of storage volume. This memorandum contains a preliminary analysis of these alternatives.

Alternative 1 – Make Seismic Upgrades and Replace Coatings

Alternative 1 is to make the needed repairs to the Division 7 reservoir and continue to use it for the foreseeable future. There are four major pieces of work that are required to allow the Division 7 reservoir to continue to provide reliable service for the more than 2,000 people that depend on it for their water service:

1. Seismic retrofits as detailed in the December 2016 BHC report.
2. Structural roof support header repair as detailed in the December 13, 2012 Wilson Engineering assessment.
3. Replacement of interior and exterior steel coating systems.
4. Addition of reservoir outlet valve that can respond to earthquake event. This portion of the work would be part of the ShakeAlert Project scope and is not included in the cost estimates in this memo.

Coatings

The existing interior and exterior steel coating systems for the welded steel reservoir are original from its construction in 1971. The Division 7 reservoir had no cathodic protection system from 1971 to 2015. In 2015, a cathodic protection system was installed. In 2014, the coatings were inspected by a qualified professional. The coatings were overall found to be in reasonable condition, although the interior ceiling and roof supports showed visible corrosion and the coatings in that area need to be removed and replaced to prevent further steel corrosion.
It is uncertain if the existing coatings contain lead-based primers. Based on the time of construction (1971), it is possible that they may have lead-based primers. Samples would need to be taken to know for sure, but that has not yet occurred.

The opinion of steel coatings professionals is that the entire interior coating should be removed and replaced. The exterior coating is likely a vinyl coating and is in reasonable condition. With some coatings in reasonable condition, they could be pressure washed and a new coating applied on top of the existing. But vinyl coatings do not work well with standard epoxy overcoats because of the solvent in the epoxy. There are new technologies that may work well with overcoating on top of the vinyl coating, but they are not necessarily time-tested to demonstrate longevity. The District could choose to try a system like this, and there would be substantial initial cost savings, especially if the exterior existing coating was found to contain lead. But because these new technologies have not been time-proven yet and there would be some risk associated with using it, a cost estimate for this option was not included.

Temporary Water Storage

In order to perform the coating work, structural roof repair, and addition of reservoir outlet valve that can respond to an earthquake, the tank would need to be taken out of service and drained. Because there is no alternate storage that could serve this area, temporary storage would need to be installed for the duration of the work. There is no feasible way to temporarily provide the full storage volume. Even to provide a fraction of the full storage volume will be very challenging and expensive. In order to perform the work, the reservoir will likely need to be out of service for a number of months, and this will need to occur in the summer months in order to achieve desirable coating outcomes (hot and dry surfaces). The summer months are also the highest water demand months, which adds to the operational challenge.

One temporary storage solution can be rented from a company called ModuTank. It consists of steel support walls and a water tight, NSF approved liner (with a cover) to contain the water. Based on the design, it is limited to a maximum water height of 4.5 ft. Because of the limited flat space adjacent to the reservoir, the maximum estimated footprint of a temporary storage tank would be approximately 46 ft by 46 ft. Considering that the tank needs 4 ft of framing around the perimeter, this leaves the water tank size at 38 ft by 38 ft for a water volume of 48,600 gallons. Any storage solution to provide more volume than this would likely require a permanent storage solution and would cost significantly more than the temporary tank.

It would be quite challenging to operate the water system with such little water storage at Division 7 (48,600 gallons). An average day demand for the area served by Division 7 (which includes serving Division 30) is approximately 200,000 gallons. If half of the 48,600 gallons was saved for fire suppression / standby storage, this means that there would be 24,000 gallons of operating storage, and it would need to be refilled, on average, every 3 hours. At a fill rate of 700 gpm and with average demand, it would take about 43 minutes to fill the tank. Because the transmission pump is only operated when the treatment plant is running, it makes operation of the whole system challenging, although theoretically possible. Moving forward with this project would require coordination with and approval of the fire department and the Department of Health. It is uncertain if this kind of solution would be acceptable to either of these entities. If it was not, a permanent storage tank would need to be installed next to the Division 7 reservoir that had a more reasonable storage volume, perhaps 100,000 to 200,000 gallons to be able to serve the system temporarily while the Division 7 reservoir is out of service. A permanent storage solution would be significantly more expensive than the temporary tank. A cost estimate for this option was not prepared but may be necessary based on input from the water treatment plant operator, the fire department, and the Department of Health.

Cost Estimate

A cost estimate is shown below for Alternative 1 based on the conservative approach of removing and replacing the exterior as well as the interior coating. As shown, there is an item for containment if the exterior coating is found to contain lead. If it is not, then this item would not be needed. The Alternative 1 cost estimate is shown for the temporary storage of 48,600 gallons. As described above, this may not be adequate. If it is not adequate, the temporary storage item would be much more expensive.

LAKE WHATCOM WATER AND SEWER DISTRICT 2/8/2018
Division 7 Reservoir Rehabilitation (Alternative 1)
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2018-001**

Preliminary Cost Estimates - Rehabilitate Div 7 (Seismic Retrofits, Re-coatings, Repairs)

Item Description	Quantity	Unit	Unit Price	Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 63,210	$ 63,300
b. Coating work				
If lead is present on exterior coating, need containment for abrasive blasting	1	LS	$ 90,000	$ 90,000
Remove existing coating from interior and exterior and replace coating	29,385	SF	$ 15	$ 440,800
Subtotal				**$ 530,800**
c. Structural repair of roof support header as detailed in December 13, 2012 assessment	1	LS	$ 15,000	$ 15,000
d. Provisions for providing temporary water storage while tank is out of service				
Rental of temporary potable water storage tank assembly (48,600 gallons) for 5 months with freight	1	LS	$ 24,255	$ 24,300
Temporary Erosion and Sediment Control	1	LS	$ 5,000	$ 5,000
Tree removal, clearing and grubbing, and earthwork to provide 46 ft by 46 ft level pad for temporary tank	1	LS	$ 35,000	$ 35,000
Labor to assemble temporary tank, fill, disinfect, and disassemble temporary tank	1	LS	$ 12,000	$ 12,000
Temporary piping to temporary tank (install, test, disinfect appprox 100 ft, 8 inch)	1	LS	$ 10,000	$ 10,000
Subtotal				**$ 86,300**
SUMMARY				
Subtotal				**$ 695,400**
Contingencies	15%			**$ 104,310**
Sales Tax	8.5%			**$ 67,975**
Preliminary Estimated Construction Costs				**$ 868,000**
Complete Estimated Project Costs of Seismic Retrofits from BHC (includes construction, tax, engineering)				$ 721,000
Engineering Design	5%			$ 43,400
Construction Phase Engineering/Inspection	10%			$ 86,800
GRAND TOTAL				**$ 1,720,000**

As described previously, this cost estimate does not include the necessary addition of a reservoir outlet valve that can respond to earthquake event. This portion of the work would be part of the ShakeAlert Project scope.

One piece of information to keep in mind is that the current NSF61 approved interior coating systems have a shorter expected life than previous coating systems because of more stringent requirements for materials in contact with potable water. Current interior coating systems have an expected life of roughly 15 years, at which point they would either need to be coated over or replaced again.

Alternative 2 – Replace Division 7 Reservoir

Alternative 2 entails replacing the existing Division 7 reservoir. The 2016 BHC report performed a quick alternatives analysis of replacing the reservoir instead of retrofitting the existing, but their analysis was based on replacing it with a reservoir of the same size. That analysis also did not account for the need for coatings replacement, structural work, and installation of a new seismic outlet valve, all of which will require the reservoir to be taken out of service and temporary storage put in place.

As the recent Water System Plan points out, the 1,000,000 gallons of storage is roughly twice the storage that is required for build-out. Replacing the Division 7 reservoir with new storage with half the volume is more likely to be a realistic alternative and is analyzed here.

A downside to having an oversupply of treated water storage is that it increases water age and can negatively impact water quality. The American Water Works Association (AWWA) recommends that the hydraulic residence time of water storage reservoirs should not exceed 2.5 days under average demand to maintain water quality. The hydraulic residence time in the existing 1 million gallon Division 7 reservoir under average day demand in a build-out scenario is 4.6 days. Appropriately sized replacement storage for Division 7 would have an average hydraulic residence time within the AWWA recommendation of less than 2.5 days. This lower residence time would help improve water quality in terms of less formation of disinfection by-products and better maintenance of chlorine residual in the distribution system.

One Vs. Two Reservoirs

The Division 7 reservoir could be replaced with one storage reservoir of the appropriate size, or could be replaced with two storage reservoirs that contain an appropriate total volume. Having two reservoirs instead of one offers three major advantages:

1. One reservoir can be taken out of service for maintenance or repairs at any time and the other reservoir is capable of providing sufficient storage for these temporary periods.
2. If one tank happens to have an unexpected leak or failure, the other can be used. If there was only one tank and there was a failure, it would cause a public health emergency until temporary storage was able to be put in place.
3. In a major earthquake, there will likely be both water main breaks that cause major leaks and fires that need fire suppression water. This leads to a situation where if there is only one storage tank it will either be drained quickly by the leaks and fire suppression activities or the outlet valve will be closed to maintain water for the longer-term response but water will not be available for initial fire suppression. With two reservoirs in place, the system can have the best of both because one tank outlet can be left open for immediate fire suppression needs and the other can be closed to maintain a supply of treated water for the days and weeks of response to the emergency.

At the volume being considered (~half a million gallons), the cost of a single reservoir vs two smaller reservoirs will be similar. Because of this and the advantages listed above, this analysis continues with the two reservoir option.

Storage Volume Analysis

The needed storage volume for the Division 7 service area was analyzed in detail. A first step of this was to refine the ERU distribution shown in the Water System Plan to reflect the current status of restricted lots in Sudden Valley and the impact this has on the distribution of ERUs (and subsequent storage needs) throughout the system.

In order to assess ERU distribution throughout the system's water reservoirs, two maps were analyzed. Figure A-1 from the Water System Plan was analyzed to determine the geographic distribution of the service areas of each reservoir. This was cross-referenced with the Sudden Valley Land Use Map (updated August 2015) to determine the number of developed and vacant single-family lots in each of the Division 30 and Division 7 reservoir service areas.

Division 30 serves only single-family lots, so the number of build-out ERUs served by it was easily determined to be 364 ERUs. This is lower than the number of build-out ERUs shown in the Water System Plan (474) because many lots in the Division 30 service area have been converted to SVCA common area and restricted from development.

With the decreased number of ERUs in the Division 30 service area, the Division 30 reservoir can now provide its own standby storage (in the Water System Plan, Div 30 standby storage was provided by Div 7). This change is reflected in Table 1.

The number of ERUs served by Division 7 was determined by counting the number of single-family lots in the service area and adding the numbers of ERUs of the condominiums and commercial areas in the service area from the District's database. The total number of ERUs in the Division 7 service area as defined by Figure A-1 from the Water System plan is 1076 ERUs. This is higher than the number shown in the Water System plan. The total number of build-out ERUs for the water system remains what was shown in the Water System Plan, so the Division 22 ERUs was updated appropriately. An analysis of this distribution of ERUs yielded a required storage volume for the Division 7 service area of 423,000 gallons.

But the service areas shown in Figure A-1 of the water system plan do not fully utilize the existing available storage from Division 22 and Geneva reservoirs. In order to more fully utilize the existing storage of those reservoirs, The Division 22 reservoir could serve a portion (about half) of the lowest pressure zone between Division 22 and Division 7. This would lower the number of ERUs served by Division 7 from 1076 to 654 ERUs. In order for Division 22 to be able to serve this area of the system, the system operation would need to shift so that Geneva reservoir served a portion of the lower pressure zone in Geneva. These shifts in ERU distribution are represented in Table 1 as well as their impact to required storage in each service area. This more efficiently utilizes existing resources and minimizes the required storage volume for the replacement Division 7 reservoirs to about 317,000 gallons.

Note that the Supply Capacity to Division 7 shown in Table 1 is 196 gpm. This is based on the methodology described in the Water System Plan, Appendix A, in that the needed transmission flow rate to Division 7 should be based on the proportional service area and the total needed supply flow. In the Water System Plan, Appendix A, this was 246 gpm, but this was adjusted to 196 based on the updated ERU distribution determined as described above. This means that

the new Division 7 reservoirs are sized based on a supply capacity of 196 gpm so that a future project to replace the transmission pumps can use this design flow rate.

Table 1 shows a reservoir height for the Proposed Division 7 reservoirs of 35 feet, but the intent at this early stage in design is that the top 5 ft will be maintained as freeboard to allow for sloshing in an earthquake event. The amount of freeboard needed will be further refined in a detailed design, but 5 ft should be conservative at this point.

Table 1: Reservoir sizing requirements to meet anticipated build-out based on treatment/pumping capacity appropriate for anticipated build-out - sizing new Div 7 reservoirs - if close valve and have Div 22 serve some of lowest zone instead of Div 7 plus shift some demand from Div 22 to Geneva

					Operating Storage		MDD (gpd/ERU)		ERUs		PHD for Reservoir (gpm)					Equalizing Storage		ADD (gpd/ERU)		Standby Storage		Fire Suppression Storage		Dead Storage	
Reservoir	Base Elevation (ft NAVD88)	Reservoir Height (ft)	Reservoir Diameter (ft)	Reservoir storage per foot (gal/ft)	Storage Volume (gallons)	Level with Storage Depleted (ft)	Geneva	Sudden Valley	Geneva	Sudden Valley	Geneva Contribution	Sudden Valley Contribution	Flow out to other reservoirs (gpm)	Total PHD for Reservoir (gpm)	Supply Capacities (gpm)	Storage Volume (gallons)	Level with Storage Depleted (ft)	Geneva	Sudden Valley	Storage Volume (gallons)	Level with Storage Depleted (ft)	Storage Volume (gallons)	Level with Storage Depleted (ft)	Storage Volume (gallons)	Level with Storage Depleted (ft)
Proposed Division 7A	697	35	30	5,287	42,298	22		250		654		239	165	404	196	31,101	19.06		150	196,200	0.50	45,000	14.80	2,644	0.00
Proposed Division 7B	697	35	30	5,287	42,298	22											19.06				0.50		14.80	2,644	0.00
Division 22	804.65	35	50	14,687	117,496	27	370	250	250	2249	166	682	250	1098	788	46,487	25.60	175	150	762,200	2.58	45,000	24.24	7,343	2.08
Division 22 New	805	35	56	18,423	147,386	27											25.60				2.58		24.24	9,212	2.08
Division 30	1027.98	40	25	3,672	18,359	35		250		364		153	0	153	165	0	35.00		150	109,200	5.26	30,000	26.83	1,836	4.76
Geneva	661.12	32	52	15,885	31,771	30	370		989		482		0	482	250	34,860	27.81	175		346,150	6.02	45,000	24.97	7,943	5.52

Summary:

		Build-out ERUs			
Reservoir	Existing capacity (gallons)	Geneva	Sudden Valley	Sum of required storage (gallons)	
Proposed Division 7A	1,000,000		654	317,186	Two reservoirs, each 30 ft diameter and 35 ft tall, provides this storage with 5 ft freeboard for sloshing
Proposed Division 7B					
Division 22	1,158,859	250	2249	1,090,124	
Division 22 New					
Division 30	146,869		364	129,395	
Geneva	508,333	989		420,724	

Note: Fire Suppression Storage is nested within Standby Storage for all reservoirs

New Reservoir Layout and Elevation

In addition to the existing Division 7 reservoir being vastly oversized for build-out, its base elevation and water elevation do not provide the current required minimum pressure to the residences nearest to the reservoir. The replacement reservoirs can be located at a higher elevation to improve water pressure for these highest residences.

Based on the nearby topography, there is a "bench" further up the ridge to the north with an elevation approximately 25 feet higher than the existing Division 7 reservoir base. Locating the new reservoirs on this bench will provide more pressure to the system served directly from the reservoir but will not increase the pressure so much that there are negative impacts. Increasing the pressure by 25 feet will provide the minimum required pressure to all houses in the service area except for the two highest houses that are adjacent to the existing reservoir. But installing the new reservoirs at a higher location that would provide sufficient pressure to these two houses would increase the maximum pressure in the zone to 130 psi, which is higher than desirable. We propose that installing the new reservoirs on the "bench" with a base elevation of approximately 25 ft higher than the existing Division 7 reservoir is a good balance between improving the pressure for houses at the higher points in the system but not increasing the zone pressure so much that there are detrimental effects. This is a needed balance when modifying an existing system that was not originally designed with this in mind.

Raising the base elevation by about 25 feet will increase the maximum head by about 11 psi. The highest pressure in the area served by the reservoir is at the upstream side of PRV 17-20, which is currently approximately 111 psi. This would increase this pressure to 122 psi. This pressure is slightly higher than desirable, but there are many locations in the water system that have higher pressure because of the topography of the area. The other impact the pressure increase has is on the operating point of the transmission pumps. Based on the existing pump curve and operating pressure, the current transmission pump flow rate is approximately 830 gpm at 405 ft head gain. The increase in system pressure would shift the operating point to approximately 430 ft head gain at a flow rate of 780 gpm. This will not negatively impact operation of the system, as a flow rate of 780 gpm is still well more than what is required. In fact, this flow rate may help ease operation of the system because it is closer to the current treatment plant flow rate of 700 gpm, so it may make it easier to balance the flows.

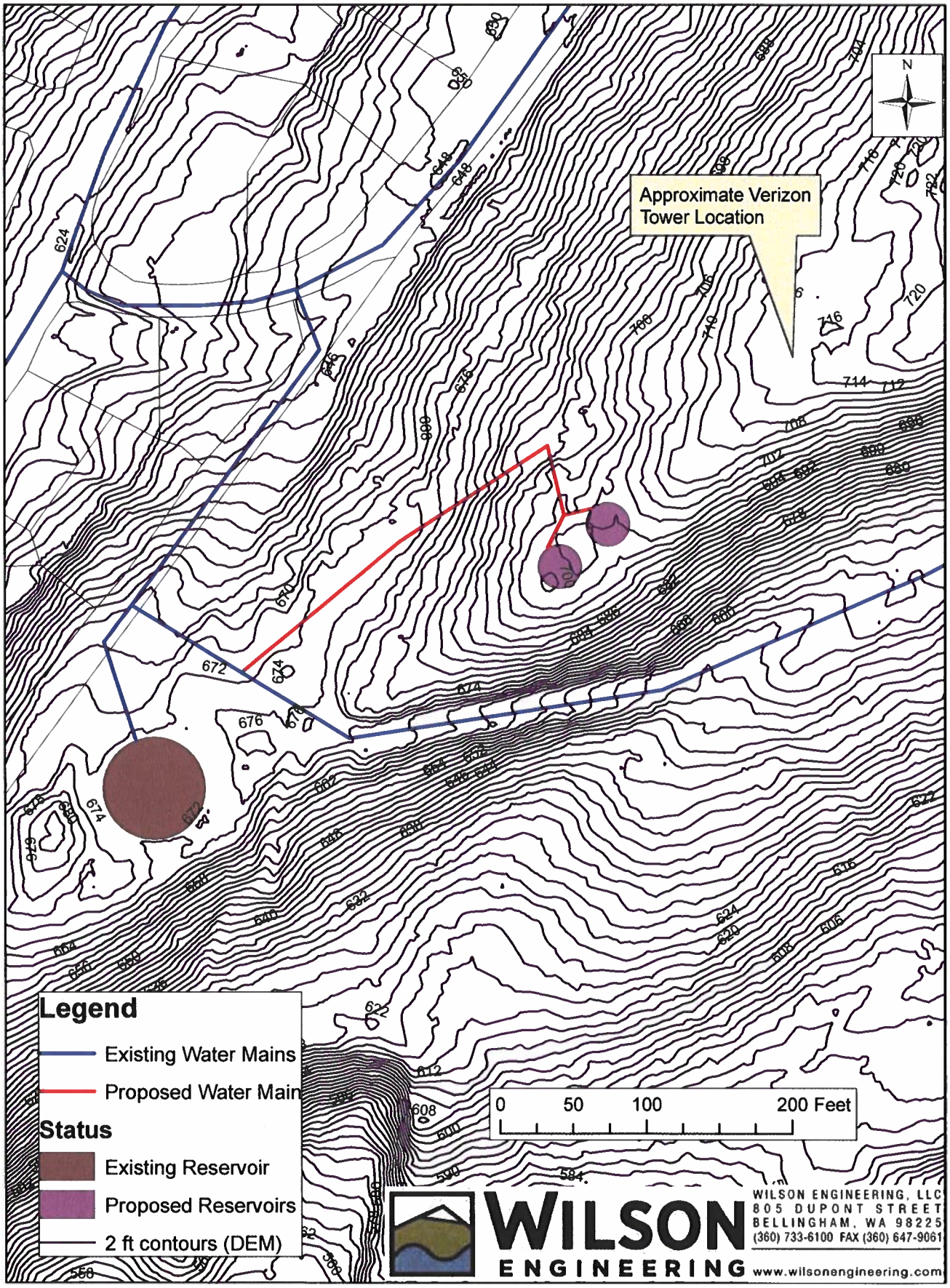
The layout of the proposed location of the new reservoirs is shown in Figure 1. The District has received plans from Verizon for a new cell phone tower in the vicinity of this project. We have confirmed that the proposed reservoir location does not interfere with the Verizon tower.

Cost Estimate

A preliminary cost estimate for Alternative 2 is shown on page 13. Note that demolition of the existing Division 7 reservoir is shown at the bottom. This work could be postponed until a later date depending on funding availability.

As described previously, this cost estimate does not include the necessary addition of a reservoir outlet valve that can respond to earthquake event. This portion of the work would be part of the ShakeAlert Project scope.

Figure 1 - Division 7 Reservoir - Proposed Replacement with 2 Reservoirs



LAKE WHATCOM WATER AND SEWER DISTRICT 2/8/2018
Division 7 Reservoir Replacement (Alternative 2)
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2018-001**

Preliminary Cost Estimates - Replace Div 7 Reservoir with Two Concrete Reservoirs

Item Description	Quantity	Unit	Unit Price	Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 72,200	$ 73,000
b. Temporary Erosion and Sediment Control (1%)	1	LS	$ 7,220	$ 7,300
c. Storage Improvements				
Concrete storage tank 185,000 Gallon 30 ft dia x 35 ft height (installed by supplier, prevailing wages)	2	EA	$ 171,000	$ 342,000
Reservoir railing	2	EA	$ 10,000	$ 20,000
Tree removal	1	LS	$ 30,000	$ 30,000
Clearing and grubbing	1	LS	$ 10,000	$ 10,000
Site earthwork	1	LS	$ 90,000	$ 90,000
Overflow piping	500	LF	$ 100	$ 50,000
Piping from new tank to existing, 12" diameter	500	LF	$ 100	$ 50,000
Manual valve on one tank outlet (other tank to have seismic valve installed as separate scope of work)	1	EA	$ 2,000	$ 2,000
Surface restoration	1	LS	$ 20,000	$ 20,000
Stormwater management	1	LS	$ 8,000	$ 8,000
Electrical, telemetry and instrumentation	1	LS	$ 100,000	$ 100,000
Subtotal				**$ 722,000**
SUMMARY				
Subtotal				**$ 802,300**
Contingencies	15%			**$ 120,300**
Sales Tax	8.5%			**$ 78,421**
Preliminary Estimated Construction Costs				**$ 1,002,000**
Permit Fees	2.2%			$ 22,000
Easement Acquisition				$ 5,000
Topographic Survey	2%			$ 20,040
Engineering Design	10%			$ 100,200
Construction Phase Engineering/Inspection	10%			$ 100,200
Construction Phase Surveying	1%			$ 10,020
NEW CONSTRUCTION TOTAL PROJECT ESTIMATED COST				**$ 1,260,000**
Demolition of Existing Division 7 Steel Reservoir (including permit fee and sales tax)				$ 167,000
NEW CONSTRUCTION PLUS DEMO TOTAL PROJECT ESTIMATED COST				**$ 1,427,000**

Alternative 3 – Do Nothing

The "do nothing" alternative in this case would be to leave the Division 7 reservoir as-is and in operation and not perform the seismic retrofits. This would leave the water system quite vulnerable to significant and perhaps catastrophic damage if/when a large earthquake occurs. The expected failure modes are described in the BHC December 2016 report.

A "do nothing" alternative in terms of maintenance would mean that the coatings and structural roof support header that needs repair are left as-is. Leaving the roof support unrepaired will lead to further corrosion of the structural steel and eventual roof failure under a snow load, as detailed in the December 2012 assessment. This would leave the system very vulnerable to contamination until repairs were able to be made. This would likely require the tank to be taken out of service, which would put the entire area served by the Division 7 and Division 30 reservoirs out of water until either repairs were made or temporary water storage was put in place.

Leaving the coatings as-is leaves the reservoir vulnerable to corrosion. The frequency of needed inspections and potentially spot repairs would increase. If corrosion was not caught early, it could lead to damage to the structural steel and the need to replace portions of the reservoir. This would require the reservoir to be taken out of service and a temporary tank installed. At this point, it would be an emergency situation and the costs for the expedited delivery and assembly of a temporary tank would increase significantly. More importantly, depending on the severity of the damage/failure, the portion of the water system served by the Division 7 reservoir may not have any storage and would therefore not be able to operate until storage was in-place. This would be a major public health emergency.

Summary and Conclusions

The Do Nothing, Alternative 3 is not recommended because it leaves the entire portion of the water system served by the Division 7 reservoir very vulnerable to both seismic risks as well as the inevitable damage caused by corrosion of structural steel. The Division 7 reservoir is an essential piece of the water system, and it cannot function without the reservoir in service.

There are many advantages Alternative 2 (replace reservoir) has over Alternative 1 (rehabilitate reservoir):

1. Capital Cost – the estimated capital cost of Alternative 2 is significantly lower than Alternative 1.
2. Water Quality – The existing Division 7 reservoir is significantly oversized and results in an excessive average water age of 4.6 days. The hydraulic residence time in the reservoirs proposed in Alternative 2 would be 2.1 days under average day demand in a build-out scenario. This would be within the AWWA recommendation of less than 2.5 days average hydraulic residence time and would help improve water quality in terms of less formation of disinfection by-products and better maintenance of chlorine residual in the distribution system.
3. Improved Water Pressure – Installing new storage 25 feet higher than the existing reservoir will improve water pressure for those houses immediately adjacent to the reservoir. The increased pressure will not negatively impact the system in terms of over pressurizing or decreasing pumped flow excessively.
4. Resiliency – Having two parallel water storage reservoirs provides substantially improved system resiliency in case of emergency (earthquake or unexpected failure of one tank) or typical maintenance. Having the ability to keep one reservoir in service while taking the other out of service will improve the District's ability to serve their customers efficiently.
5. Maintenance – Replacing a steel reservoir with concrete reservoirs decreases maintenance efforts and costs. The corrosion protection systems (interior and exterior coatings, cathodic protection) that are required for steel reservoirs are not needed for concrete reservoirs. Current interior coatings for a steel reservoir need to be replaced/refurbished at least every 15 years. This requires the tank to be taken out of service for the work, and this is significantly challenging with only one tank.
6. Construction/Operation Feasibility – Alternative 1 would require temporary storage during construction that would either be prohibitively expensive or would make operation of the system during construction very challenging. It is unknown if the limited temporary storage proposed as part of this alternative would be acceptable to the water system operator, the fire department, or the Department of Health. Alternative 2 allows the existing tank to remain in service during construction and does not impose the operational challenges of Alternative 1.

Alternative 2 has these six significant advantages over Alternative 1. There are no meaningful advantages Alternative 1 has over Alternative 2. Based on this, we recommend Alternative 2 (replacing Division 7 reservoir with two reservoirs) as the preferred alternative.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item E

DATE SUBMITTED:	June 21, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	North Shore On-Site Septic System Phosphorus Loading Analysis		
TO: BOARD OF COMMISSIONERS		FROM: Bill Hunter	
MANAGER APPROVAL		BH	
ATTACHED DOCUMENTS		Technical Memorandum dated 6/21/2018	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

Attached is Herrera's final technical memorandum that addresses comments received from the Board and various agencies. Please review the document over the next couple weeks. Staff will put a discussion item on the July 11, 2018 Board Meeting Agenda to discuss and confirm this is the document to forward to the Lake Whatcom Management Data Team.

Tentatively, at the August Data Team meeting Rob Zisette from Herrera will present the report to the Data Team, answer questions, and coordinate a presentation to the Lake Whatcom Management Policy Group in September.

FISCAL IMPACT

None.

RECOMMENDED BOARD ACTION

None.

PROPOSED MOTION

None.

HERRERA

TECHNICAL MEMORANDUM

Date: June 21, 2018

To: Bill Hunter, Lake Whatcom Water and Sewer District

From: Rob Zisette, Herrera Environmental Consultants

Subject: North Shore On-Site Septic System Phosphorus Loading Analysis

INTRODUCTION

Herrera Environmental Consultants (Herrera) recently conducted a water quality study for the Lake Whatcom Water and Sewer District that identified contamination of the lake with phosphorus and fecal coliform bacteria from on-site septic systems (OSS) in the North Shore subbasin of Lake Whatcom (Herrera 2017a). The study findings were presented to the Lake Whatcom Data and Information Management Team on September 14, 2017, and to the Whatcom County staff on October 31, 2017.

A draft memorandum was prepared on January 25, 2018 to address comments by the Whatcom County Health Department on the study report and a request by the Lake Whatcom Water and Sewer District to estimate phosphorus loading from OSS in the study area. This final memorandum was prepared to address comments on the draft memorandum and the study report by Whatcom County Public Works (WCPW) (Erika Douglas and Gary Stoyka), Washington Department of Ecology (Steve Hood), and City of Bellingham (Peg Wendling). Attached are responses by Herrera to each of these comments. Also attached is the study database updated to include discharge measurement data used for this phosphorus loading analysis.

STUDY REPORT COMMENT RESPONSES

The Whatcom County Health Department (WCHD) acknowledged that the study report provides useful information (Wolpers 2017). Based on the report findings, WCHD has prioritized operation and maintenance of OSS in the North Shore subbasin. During the winter of 2017–2018, WCHD is contacting property owners, surveying properties, inspecting OSS components, and performing drain field dye tests. Failing OSS will be replaced with a system designed by a licensed OSS designer to meet current OSS regulations.

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The problem with this approach is that it primarily addresses failing OSS that result in direct discharge of effluent to surface drainages. An exception is that OSS inspections have identified non-surfacing discharges between septic tanks and drainfields. The study results and the poor soil conditions discussed below clearly indicate that OSS effluent is being transported through saturated soils to drainages or the lake by OSS that are not considered to be failing. The fate and transport of phosphorus through saturated soils from septic tank effluent has been well documented in many other studies, and is diagrammed in Figure 1 from a recent review of those studies (Lusk et al. 2017).

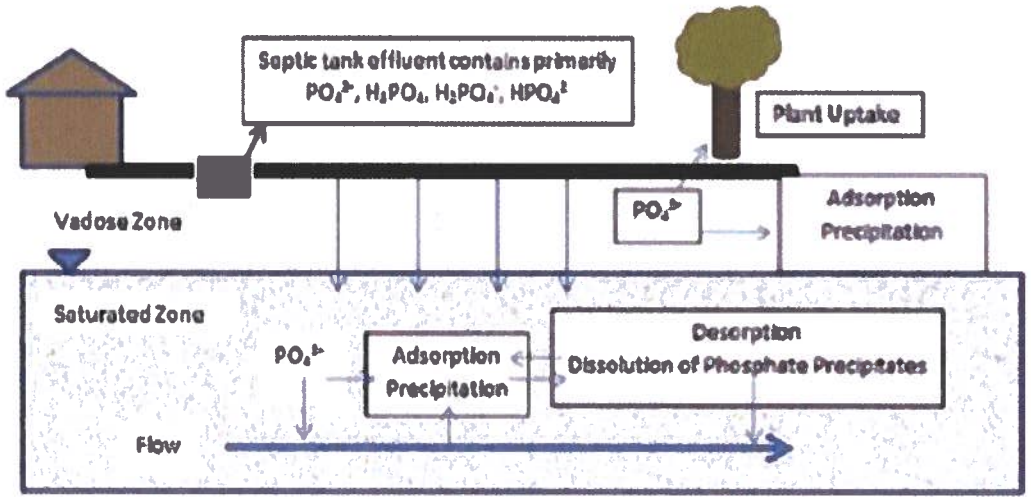

Figure 1. Fate and Transport of Phosphorus in Septic System Effluent.

WCHD commented that the study results did not appear to substantiate the report conclusions because the following factors were not considered:

1. Control stations along areas that are currently served by sewer
2. Potential upland sources from discharge samples
3. Lake Whatcom is not on Ecology's 303(d) list for fecal bacteria
4. Phosphorus contribution to surface water quality is *de minimus*. Phosphorus is typically immobilized within the first 2 or 3 feet of soil below the drain field.

Responses to these comments are provided separately in the following sections.

Control Stations

The purpose of control stations is to provide monitoring locations that are not impacted by human fecal sources and serve as background conditions in the lake. Control stations were appropriately located along a shoreline that has no development or potential input from human fecal sources. Locating additional monitoring stations along a developed shoreline with sewers

would be a reasonable addition for comparison to stations in the developed shoreline with OSS. However, a sewered shoreline would not serve as a good experimental control for this study because the control should represent an area not impacted by human sources to verify parameter detection limits, and drainage from a sewered area may be impacted by human sources due to unknown cross-connections of the drainage system with sanitary sewers.

If the study is repeated again in the future to evaluate effectiveness of WCHD efforts to control failing OSS in the North Shore Road area, then a sewered area should be monitored in addition to the control stations to evaluate potential impacts of sewered areas on human fecal sources to the lake.

Upland Sources

Potential upland sources of human fecal matter were considered in the study design. There are no OSS located upland from the sampled drainages that would not be connected to sewers. The potential for direct deposit of fecal matter by humans in the study area was recognized in the study report as another potential source of human sources in the collected samples. Homeless persons and recreationalists (e.g., hikers) exhibiting unsanitary practices are examples of potential non-septic sources of human fecal bacteria in surface water drainage from the area. However, an apparent lack of homeless persons and recreationalists in the study area during the cold winter sampling period suggests there was a low probability that detected human sources originated from direct deposit of human fecal matter. In addition, direct deposits of fecal matter by humans is typically on soils that have adsorption capacity and not directly into surface water drainages.

Fecal Bacteria Listing

The study report did not state that Lake Whatcom is on Ecology's 303(d) list of impaired waters for fecal coliform bacteria. Contamination of the lake with fecal coliform bacteria is a significant concern to lake users and water utilities regardless of whether it is currently considered to be impaired by high bacteria concentrations.

Soil Immobilization of Phosphorus

The Soil Conservation Service assessment of shoreline soils around Lake Whatcom indicates that virtually all soils have severe limitations for septic systems (Carlson 2011). The soils are characterized as having a shallow depth (3 feet or less) to bedrock, hard pan, or water table, and are subject to seasonal flooding. These conditions promote phosphorus migration downgradient through soils from OSS drain fields to shallow groundwater that seeps into drainages or the lake. Many of the old OSS in the study area do not meet current WCHD regulations for the minimum vertical distance through soil or minimum horizontal distance to surface waters to allow for adequate immobilization of OSS phosphorus in soils.

The transport of phosphorus from septic systems to surface drainages and Lake Whatcom (see Figure 1) is enhanced by the following conditions present in the North Shore Road area:

- Old septic systems discharging effluent and saturating soils with phosphorus for decades
- Septic systems located close to the lake or a surface drainage, reducing the potential for continued adsorption before reaching the lake or a surface drainage
- An area that receives a high amount of rainfall, frequent soil saturation, and shallow depths to groundwater
- Relatively shallow soils overlying bedrock, which prevents downward flow of contaminated groundwater.
- A steep slope that increases the rate of gravity flow through saturated soils.

PHOSPHORUS LOADING METHODS

The annual total phosphorus (TP) loading to Lake Whatcom from all surface drainage in the North Shore subbasin was estimated to be 181.6 kilograms (kg) or 400 pounds (lbs) by the *Lake Whatcom Watershed Total Phosphorus and Bacteria Total Maximum Daily Loads* (TMDLs) (existing conditions scenario in Table 6 of Ecology 2016). This estimate was based on a Hydrological Simulation Program-Fortran (HSPF) model of land cover and hydrologic conditions present in 2003. The TMDLs are based on loadings in 2003 because loadings vary each year with precipitation and 2003 was a normal precipitation year. TP loadings are estimated by multiplying an average TP concentration for each land cover type to the annual runoff volume from each land cover area.

Herrera estimated the septic system contribution to the North Shore TP loading estimate using flow rates, TP concentrations, and human fecal bacteria deoxyribonucleic acid (DNA) concentrations measured in drainage samples collected in March 2017 for the North Shore OSS leachate detection project. The selected TP loading analysis method was to correct the TP concentration for OSS contaminated discharges to the TP concentration typically observed in uncontaminated discharges, and then compare flow-weighted average TP concentrations in all monitored drainages under existing and OSS corrected conditions. The percent change in TP concentration from existing to OSS corrected conditions was then applied to the 2003 TP loading estimate to calculate the TP loading to Lake Whatcom from septic system leachate in the North Shore subbasin. Flow-weighted average concentrations were used because loadings are directly related to flow and the discharges exhibited a wide range of flow rates, ranging from approximately 0.08 to 10 cubic feet per second (cfs).

The first step in the TP loading analysis was to separate discharge locations into contaminated and uncontaminated discharges based on human fecal bacteria DNA concentrations. Discharges with human Bacteroidetes (either B. dorei or B. EPA markers) detected above the detection limit

PHOSPHORUS LOADING RESULTS AND REMOVAL COSTS

The TP loading analysis results are presented in Table 1. Correcting TP concentrations for OSS contamination reduced the flow-weighted average TP concentration for discharges from the North Shore subbasin by 10 percent from 77 to 69 µg/L. Applying this percentage to the annual TP loading of 400 pounds/year (using 2003 as a typical year) estimated by the TMDL study for the subbasin results in an annual TP loading of 40 pounds/year from OSS in the subbasin. This amount is considered to be underestimated because it does not account for TP loading from OSS that seep directly into the lake, which was detected by the OSS leachate detection study at some, but likely not all, locations in the lake. The estimated 40 pounds/year from discharges was increased by 25 percent to 50 pounds/year to account for direct seepage into the lake. The 25 percent increase is reasonable because approximately 30 percent of the OSS in the subbasin are located between the lake and North Shore Road where leachate would likely not drain to discharges draining the road ditches.

The annual phosphorus loading rate of 50 pounds/year is similar to the 55 pounds/year from 92 OSS located in shallow soils (3 feet or less) within 150 feet of Lake Whatcom that was estimated for the cost/benefit analysis of phosphorus loading reduction methods (Carlson 2011). The cost/benefit analysis method assumed a TP loading to the lake of 0.6 pounds/year for each of the 92 OSS based on 0.8 pound TP/person/year reaching the drainfield, three persons per house for a total of 2.4 pound TP/OSS/year, and 25 percent of the drainfield TP loading reaching the lake. Agreement among results from both methods suggests that the TP loading method developed from drainage monitoring data collected for this study provides a reasonable estimate of TP loading from OSS in the North Shore subbasin.

The cost of reducing TP loading to Lake Whatcom from the North Shore subbasin was estimated for stormwater treatment and sewer extension. Herrera (2017b) recently evaluated the cost, benefit, and feasibility of stormwater treatment for reducing TP loading to Lake Whatcom. A total of 29 stormwater treatment projects were identified that ranked highest by a combined score for cost, benefit, and feasibility. Eight of those projects are located on North Shore Road and include six media filter drains, one biofiltration swale, and one Stormfilter® device with Phosphosorb® media (Table 2).

The cost per pound of TP removed by these projects ranges from $9,000 to $292,000, and the average project cost of all eight projects is $26,000/pound. These costs include design and construction, but not long-term maintenance of the stormwater treatment facilities. To account for long-term maintenance, 10 percent was added to the median stormwater treatment cost, resulting in a total cost of $29,000/pound of TP removal by stormwater treatment.

Table 1. Flow-weighted Total Phosphorus Concentrations in Onsite Septic System Contaminated and Uncontaminated Discharges in North Shore Subbasin.

Discharge Station	Event No.	B. dorei (copies/100 mL)	B. EPA (copies/100 mL)	Total P (mg/L)	Flow (cfs)	Flow-Weighted Mean TP (ug/L)	Mean Flow (cfs)	OSS Corrected Flow-Weighted Mean TP (ug/L)[a]
Uncontaminated Discharges								
525	2	0	0	0.036	0.35	-	-	-
525	3	0	0	0.046	0.35	-	-	-
525	Mean					41	0.35	41
521	3	0	0	0.014	0.08	14	0.08	14
518	2	0	0	0.048	0.42	48	0.42	48
492	2	0	0	0.024	0.75	24	0.75	24
466	2	0	0	0.050	2.5	50	2.50	50
449	3	0	0	0.098	10	98	10.00	98
437	2	0	0	0.032	0.45	-	-	-
437	3	0	0	0.060	1.5	-	-	-
437	Mean					54	0.98	54
Uncontaminated Median						**48**	-	**48**
Contaminated Discharges								
520	2	17,400	1,450	0.052	0.15	-	-	-
520	3	21,700	1,610	0.064	0.38	-	-	-
520	Mean					61	0.26	48
518	3	112	0	0.066	0.38	66	0.38	48
466	3	87	0	0.088	3.3	88	3.30	48
453	2	3	4,050	0.014	0.60	-	-	-
453	3	3	9,960	0.054	0.80	-	-	-
453	Mean					37	0.70	37
440	3	107	0	0.062	3.00	62	3.00	48
430	3	278	0	0.088	0.50	88	0.50	48
Contaminated Median						**64**	-	**48**
All Discharges Overall								
Flow-weighted Mean						**77**	-	**69**
Percent Reduction from Existing to OSS Corrected TP Concentration								**10%**
Possibly Contaminated Discharges Not Used								
509	3	3	0	0.086	0.25	-	-	-
462	2	3	0	0.056	0.73	-	-	-
430	2	3	0	0.016	0.50	-	-	-
Outlier Discharge Not Used								
462	3	0	0	0.218	2.2	-	-	-

[a] Corrected for OSS contamination by reduced the existing TP concentration for a contaminated discharge to 48 µg/L, which represents the median TP concentration of all uncontaminated discharges if the measured TP concentration of a contaminated discharge is greater than 48 µg/L.

Table 2. Proposed Stormwater Projects for North Shore Road.

Project Rank	Project Name	Proposed Solution	Estimated Project Cost	Total Phosphorus Removed (pounds/year)	Cost per Pound of Phosphorus Removed ($/pound/year)
1	East side of Northshore at Edgewater Lane	1,000-linear-foot Media Filter Drain	$320,000	12.23	$26,000
2	North Lake Whatcom Park	Bioretention	$450,000	5.91	$76,000
4	Northshore East of Olsen Creek	275-linear-foot Media Filter Drain	$83,000	5.27	$16,000
5	Northshore West of Olsen Creek	350-linear-foot Media Filter Drain	$105,000	5.08	$21,000
10	Northshore Road at Eagleridge	650-linear-foot Media Filter Drain	$195,000	2.48	$79,000
11	Eagleridge Pond at Northshore	Stormfilter with Phosphosorb	$277,000	31.87	$9,000
28	3303 Northshore Road	550-linear-foot Media Filter Drain	$165,000	1.22	$136,000
29	Northshore Drive at Eagleridge	200-linear-foot Media Filter Drain	$60,000	0.21	$292,000
Total	All Projects	All Solutions	$1,655,000	64.27	26,000

Source: Herrera 2017b.

Wilson Engineering recently estimated the cost of extending the sewer to connect 100 OSS in the North Shore subbasin. The total design and construction cost ranges from $3 to $6 million depending on the sewer extension approach (Melanie Mankamyer, personal communication: e-mail to Rob Zisette, January 17, 2018). Applying this range of cost to 50 pounds/year of TP removal equates a range of $60,000 to $120,000/pound of TP removal by sewer extension. Thus, the cost for TP removal by sewer extension is estimated to be at least twice the cost of stormwater treatment.

The phosphorus TMDL implementation plan is to reduce phosphorus loading from 400 to 193 pounds/year (87 percent rollback scenario) for the North Shore subbasin (Ecology 2016). Thus, the eight highest-ranked stormwater treatment projects for the North Shore subbasin would only remove 64 of the required 207 pounds/year, and achieve only 30 percent of the goal. Additional removal by stormwater treatment would likely cost more than $29,000/pound of TP removed, and the phosphorus reduction goal may not be achievable without the sewer extension. The sewer extension evaluation should evaluate all feasible alternatives for meeting the TMDL goal for the North Shore subbasin, and should also account for the additional benefits of removing OSS phosphorus and other wastewater contaminants that currently seep directly into the lake.

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ATTACHMENT A

Comment Responses

ATTACHMENT A: COMMENT RESPONSES

Responses to Comments on North Shore On-Site Septic System Study Report and Phosphorus Loading Analysis Technical Memorandum

Comment Source	Comment	Response
County - General Comments on Report	Study Design Recommendation: Include a stretch of shoreline with homes serviced by a sewer as an additional control site. It appears that the goal of this project is to determine if a public sewer system would be a better option than individual septic systems for sewage treatment at lakeshore residences in the Lake Whatcom watershed.	The project goal was to determine if septic systems are contaminating the lake. Monitoring the shoreline of a sewered area may provide useful information for estimating potential reductions in contamination by sewering the study area, but characteristics of the sewered areas likely vary widely and may not represent those planned for the study area. We will recommend including a sewered area for future monitoring.
County - General Comments on Report	Study Design Recommendation: Clearly establish prior to the outset of the project which criteria will be used for selecting a site for monitoring (e.g. during first sample run, elevated OB levels observed in lake near this discharge site). The QAPP indicates criteria will be established following survey of the control site and the report references optical brightener levels.	The QAPP specified that OB would be used to select sampling sites based on background levels observed at the lake control sites. The exact OB threshold over background was not specified in the QAPP because this method had not been previously used. The same threshold determined for the first monitoring event was used for the following two monitoring events.
County - General Comments on Report	Study Design Recommendation: Suggest sampling all lake sites throughout the duration of the project. In particular, it is unclear why the lake project area station with the highest fecal coliform bacteria level in Event 1 was not sampled during the following sampling events. It appears that all five lake project area stations were only sampled once while two of the three control lake stations were sampled during all sampling events.	We agree that all lake and discharge stations should be monitoring during all events to better evaluate the entire study area. The project goal and sampling design was to sample worst case conditions, and the project budget did not allow an unlimited the number of samples. We will recommend more samples for future monitoring now that the large number of contaminated lake and discharge sites are known.
County - General Comments on Report	Study Design Recommendation: Suggest establishing sampling stations during first sample run and then consistently sampling these stations throughout the duration of the project. Additional stations may be established during later sampling runs based upon higher optical brightener levels.	We agree as noted above.
County - General Comments on Report	Results Question: Are there similar studies of optical brighteners that could provide ranges of levels typically found in lakes, creeks, and other discharges?	Yes there are, but most of them that we are aware of used a different meter with higher detection limits. We are not aware of any studies in this region and comparison to results for other regions may not be valid due to differences in background OB concentrations.
County - General Comments on Report	Results Question: DOE publication 11-03-038 indicates optical brighteners should be evaluated with other fecal indicators to evaluate public health risk. A wastewater treatment plant's effluent can have optical brighteners regardless of its effectiveness in removing pathogens. Based upon this, which sites have a public health risk?	OB data were not and should not be used to evaluate public health risk. In this study, OB data correlated with fecal coliform data, which is useful and compelling, but not strong enough to use OB as a surrogate for fecal coliform or pathogen concentrations.
County - General Comments on Report	Results Recommendation: Suggest measuring optical brightener levels at a minimum at each discharge site with each sampling run.	We measured OB at every discharge site that we could find during each sampling run.
County - General Comments on Report	Results Question: Are there other similar studies that could be reviewed to provide context for the levels of biomarkers found and the high, moderate, and low categories?	Yes there are comprehensive interlaboratory comparison studies that recommend how to rank biomarker results. The Cao et al 2013 study cited in the report formed the basis for the rankings made in this study.
County - General Comments on Report	Results Question: Are these human biomarkers the same biomarkers used by the EPA in the Tillamook and Nooksack studies?	We do not know and could investigate that if you provide us with reports of the other studies. It is likely that the EPA human marker quantified by Source Molecular for in this study is very similar to the human marker used by EPA in the other studies, but it may have been improved upon if those studies are old.
County - General Comments on Report	Discussion and Conclusions Comment: There seem to be conflicting statements in the results and discussion section. Under Section 3.4 Bacteria Indicators, it is stated that "none of the observed lake or discharge results exhibited high enough fecal coliform bacteria concentrations to strongly indicate contamination from septic system effluent". In Section 3.5 Bacteriodetes, the report indicates "moderate to high concentrations of human biomarkers are considered proof that the samples were contaminated by septic system effluent". This is explained as likely being associated with seepage of septic system effluent through soils rather than a direct discharge to surface waters. It would be valuable to have reference materials for this concept.	We agree that additional research on fecal coliform and Bacteroidetes fate and transport should be conducted to validated this possible explanation of why high Bacteroidetes concentrations are observed where low fecal coliform concentrations are observed. A possible explanation is that only living fecal coliforms are measured, while Bacteroidetes DNA analyses includes dead bacteria that may persist longer than living fecal coliforms. We will recommend addtional research on this topic for future monitoring.
County - General Comments on Report	Discussion and Conclusions Comment: The final conclusion of the report is "connecting homes in the study area to a sanitary sewer would prevent the ongoing contamination of Lake Whatcom from septic systems in the area". One site (520) had a consistent (two sample) pattern of the presence of both human DNA biomarkers and one site (453) had the presence of one of the human biomarkers in both samples. The other discharge sites did not show consistent patterns or moderate to high biomarker levels. One control lake site had the presence of low level of human biomarkers in one sample.	We do not see a conflict with the patterns observed and the conclusion drawn.

Responses to Comments on North Shore On-Site Septic System Study Report and Phosphorus Loading Analysis Technical Memorandum

Comment Source	Comment	Response
Memo Page 1, Pgh 3 (Douglas)	Without the work completed to evaluate septic systems in this area, it isn't clear if the referenced bacteriodes and TP results may be affected by effluent transported through soils, a failing system with a surface discharge, or other source. It was agreed at the meeting this fall that it would be helpful to analyze water samples again after systems were evaluated.	We agree that it would be helpful to conduct additional monitoring to determine if septic system evaluation reduces contamination from septic systems. Study methods would need to be modified to identify the specific means of septic system effluent transport to the lake.
Memo Page 2, Pgh 3 (Stoyka)	This does not make sense. The point of the study is to make a case that connection to sewer will result in water quality improvements, but this is saying that sewer connection will not lead to any water quality improvements b/c of cross connections, etc.	The project goal was to determine if septic systems are contaminating the lake, not to prove that sewers would prevent contamination. Monitoring the shoreline of a sewered area may provide useful information for estimating potential reductions in contamination by sewering the study area, but characteristics of sewered areas likely vary widely and may not represent those planned for the study area. We will recommend including a sewered area for future monitoring.
Memo Page 2, Pgh 4 (Stoyka)	Recreationalists can be a significant source of fecal in some areas and the land above these homes is a County park with trails.	We agree that may be the case in the summer, but discussions with residents indicated that is not the case in January when the ground was covered in snow and in March when it rained almost every day. We will recommend monitoring of recreationalist inputs for future monitoring.
Memo Page 3, Pgh 1 (Stoyka)	this is still within the depth range that would provide full treatment.	Possibly, but P removal likely depends more on the type of soil, amont of sewage loading, age of the drainfield, the amount/rate of rain, and the depth of the water table.
Memo Page 4, Pgh 3 (Stoyka)	I can't figure out where these numbers are coming from.	We will include all raw data and calculations in the revised memo.
Memo Page 4, Pgh 4 (Stoyka)	Why would you reduce the contaminated discharge to the uncontaminated concentration.	We will clarify that the P concentrations in contaminated discharges were reduced to uncontaminated background concentrations to determined the difference between contaminated and uncontaminated for estimating the potential reduction in P loading if OSS contamination is removed.
Memo Page 4, Pgh 5 (Stoyka)	Where does this 50 lbs/yr come from?	10 lbs/yr was added to the estimate of 40 lbs/year for only discharges to account for direct seepage of P from OSS to the lake that was not included in discharge loading estimate.
Memo Page 5, Table 1 (Stoyka)	These numbers do not appear to be correct and do not reflect the averages from the above columns.	We will review the calculations and include all data in the revised memo.
Memo Page 6, Table 2 (Douglas)	These stormwater projects together would remove an estimated 64 pounds of phosphorus per year for a cost of $1,655,000. This is an average cost of about $26,000 per pound of TP removal by stormwater projects. Both sewer and stormwater facilities require ongoing maintenance and the associated costs.	This is a reasonable way to estimate stormwater costs and we will revise the cost analysis to evaluate average cost based on implementationof all planned projects.
Hood - Memo Data Review Comments	1 – In reviewing data, there are no field book notes or other indication to line up Sample ID to Station. It is not possible to verify that the correct analyses are line up with the station. For a random example, sample 9D represents station 453 on one date and station 462 on another date.	As described in the QAPP and report, each sample ID was identified sequentially as samples were collected rather being uniquely associated with the same station ID because the prior lake and discharge sample locations were not known at the time of sampling. The station ID was assigned to each sample ID upon completion of sampling by GIS mapping of the logged GPS location recorded in field notes to determine the lake or discharge station ID for each sample ID.
Hood - Memo Data Review Comments	2 – The COC lists sample ID 10D and 5D but there is no data phosphorus, or chloride for 3/15/2017 sampling event and no explanation for the lack of analysis.	We reviewed the data again for any data entry errors and none were identified. As described in the QAPP and report, some of the samples exhibiting low fecal bacteria concentrations were not analyzed for the chemical and molecular parameters because there was a project budget limit of up to 15 samples per event for analysis of all laboratory parameters. Samples 10D and 5D collected on 3/15/17 are two of the samples analyzed for fecal bacteria and not other parameters due to the budget limitation.

Responses to Comments on North Shore On-Site Septic System Study Report and Phosphorus Loading Analysis Technical Memorandum

Comment Source	Comment	Response
Hood - Memo Data Review Comments	3 – Handling of outliers is not consistent. Denis Helsel advises, "Treat outliers like children -- correct them when needed but never throw them out.' (See https://practicalstats.teachable.com/p/applied-environmental-statistics-1) we should investigate outliers and provide a rationale for any correction. Station 462 sampled on 3/29/2017was eliminated from non-contaminated group because it was an outlier (not 238 but 218 a minor error). The Lab QC was OK. One possible explanation is that the discharge may contain runoff from a wetland during times the water table is very high. The SCS soil map shows a couple of "wet spots" in the shoreline between Smith and Olsen Creeks. Wetlands often have high levels of phosphorus. In addition, wetlands often discharge intermittently. Note that March 2017 was wet, with nearly twice-normal rainfall spread throughout the month. January was mild January and February was normal. The single largest value may be a valid background value demonstrating what happens when wetlands discharge. Likewise, there are unexplored outliners in the bacterioidetes results. Station 520 has B. dorei levels that are an order of magnitude higher than OSS septage, yet FC and E. coli results are quite modest.	We removed the outlier TP value from the flow-weighted average TP concentration for uncontaminated discharges because it a statistical outlier (greater than 2 times all other values) and clearly does not represent an uncontaminated discharge. Wetland discharge of low oxygen waters is a possible high P source at that location, but it seems that this natural source would also have been observed in the sample collected 2 weeks previously from Station 462 or at another locations within the study area. There are other possible causes of the TP outlier, which include a direct application of a phosphorus fertilizer, or soil slumping and erosion caused by the extended wet period and high flow conditions. The bacteroidetes data were only used in the loading analysis to identify if a discharge was OSS contaminated. They were not used to calculate flow-weighted P loadings and removal of the high B. dorei value at station 520 as an outlier would not have changed its designation as contaminated because of the high concentration of B. EPA at that same station.
Hood - Memo Data Review Comments	4 – I cannot find the discharge flows used to calculate the flow weighted means in the 7-12-2017 study, so I cannot verify volume weighted averages for all events. However, when going through the data to verify that the numbers reported were reasonable I found that three of the "contaminated" group used the max value and all were on the second March date. Two of those stations are also in the uncontaminated group using the early March Date. See comment #7 below on the significance of grouping by date of sample.	We calculated discharge data from field notes and entered it into the database after the report was written because it was needed when we were asked to conduct the P loading analysis. We will include all discharge data in the revised memo.
Hood - Memo Data Review Comments	5- At the end of "7-12-17-Final-North-Shore-Herrera-Report", there is a table with all of the data. It would be helpful to understand the difference between less than DL and ND for the bacteroidetes data. One is in the Low "Bacteroidetes Lab Category" and the other is in Non detect. Does less than three represent presence?	Detected below the DL and not detected are distinctions commonly used for trace organics data. Less than 3 means that it was positively detected below the estimated quantitation limit of 3, and that was considered to be a low concentration. Not detected values are considered to not be present in the sample.
Hood - Memo Data Review Comments	6 – Lack of a sewered control area fails to test effectiveness of providing sewers. The extrapolation that contaminated events would mimic uncontaminated events is unsupported because no sites that have sewer were tested.	The project goal was to determine if septic systems are contaminating the lake, not to prove that sewers would prevent contamination. Monitoring the shoreline of a sewered area may provide useful information for estimating potential reductions in contamination by sewering the study area, but characteristics of the sewered areas likely vary widely and extrapolation of sewered area results to the study area may not be relevant. However, it is clear from all reviewers that future monitoring should include monitoring of a sewered area for evaluating potential effects of a sewer extension. We will recommend including a sewered area for future monitoring.
Hood - Memo Data Review Comments	7 – Date of sample seems to be a more significant factor determining phosphorus than contaminated vs. uncontaminated groups identified. The paper claims that the groups are valid at alpha 10%. However, date is significant in defining the groups. 75% of the contaminated group is samples from the second date but only 44% of the uncontaminated group is from samples on the second date. The paper examine the significance of date of sample. A one sided Mann-Whitney test for all discharge sites based on date indicates that that date of sample is significant at alpha = 1% (p = 0.00224, with station 462 and p=0.00319 without station 462) chance that the location shift is equal to zero. This test is significant even at alpha = 1% so the significance of the groups may be more influenced by date. Also note that the date. Below is a box plot of TP for the two days from Discharge Stations. Two stations in the "Uncontaminated" group have sample results for both dates. The TP results on first sample date are 46% and 22% less than the second sample date. This is greater than the reduction estimated by providing sewers.	We recognize that the data vary by sampling event and that is not unique to this study. Collecting grab samples at different points on the hydrograph during different types of storms inherently results in data that varies by sampling event. Finding greater differences between sampling events does not negate statistical differences observed in other data pairings. It is important to recognize that the study was not designed to estimate P loadings from septic systems. P loading is difficult to estimate accurately because of the high variance of P concentrations in drainage. Accurate P loadings would require many more samples collected with automatic samplers, continuous flow meters over at least a 1-year period, and a model to predict P concentrations during unsampled periods of flow. Research has shown that even with a high level of effort, the uncertanty in P loading estimates can exceed 50 percent. Accurate P loadings from septic systems would require additional upstream stations and should also include shallow groundwater well testing.

Responses to Comments on North Shore On-Site Septic System Study Report and Phosphorus Loading Analysis Technical Memorandum

Comment Source	Comment	Response
Hood -Memo Method Comments	8– While the text correctly makes the case that weighted averages should be used it appears that arithmetic averages may have been used. As noted in 4 above I could not recalculate flow weighted TP concentrations for all events. However, weighted averages for the contaminated group are smaller than the reported flow weighted concentration and the weighted average for the uncontaminated group are higher than the reported concentration. The calculations below use the data from table 1. It is unclear when there are two events, if the reported flow is the average or the sum. In the calculations below "Flow.wt" is the concentration times the reported flow. In the column "TFlow?.wt", the weights are the doubled flow. Using the either of the weighted average uncontaminated flow as a target achievable for the contaminated events would only mean a reduction in 25% of the events. If we use the TotalFlow weights and make a similar calculation the contaminated group would drop from 58.4 µg/L to 56.1 µg/L a mere 4% reduction.	We will present all data and calculations, and review those calculations for the final memo.
Hood -Memo Method Comments	9 – Assuming the bottom of table 1 is correct, some area (undefined in the report) contributes 77 µg/L phosphorus, and when sewered the discharge would be 69 µg/L it is important to note that forest covers over half the watershed. Since there seems to be a balance between contaminated and uncontaminated sites, providing sewers will improve only about half of the developed area. It does not seem reasonable to apply a 10% reduction across the watershed. Based on this data, providing sewers would improve only a quarter of the watershed.	The 10 percent reduction to the entire watershed is reasonable because 77 and 69 are flow-weighted values for all discharges measured in the watershed under two different scenarios.
Hood -Memo Method Comments	10 – High flows at the extreme end of the distributions provide a large influence on the weighted means. We should ask if we have a representative sample.	The samples are representative of high flow conditions. We don't know if P concentrations are lower during lower flows, or if the flow- weighting of specific discharges would substantially change during lower flows. There is indication from the one discharge sampled in the North Shore basin for the Phase 2 P loading study (site NS1 referenced in a comment below) that it does have lower P concentrations during the smaller storms sampled for that study. We will add that data comparison and a discussion of representative storms to the final memo. However, we have often seen higher P concentrations during base flow than storm flow in drainages where the groundwater P concentrations are high and runoff dilutes the drainage P concentrations, which may be the case for septic contaminated drainages in the study area.
Hood -Memo Method Comments	11 – There does not seem to be any discussion on how much of the developed area may be increasing TP in discharges.	Samples were not collected upstream of the developed area to determine how development may have affected P loading from non-OSS sources. We recognize that development increases P loading from sources other than OSS and those sources were assumed equavalent in all discharges for this analysis, with the exception of the one outlier removed.
Hood -Memo Method Comments	12 – The multiplier for ground water discharge to the lake does not address that	The multiplier for groundwater discharge is intended to only represent OSS P loading and it would not be appropriate to increase the multiplier for non-OSS loading from development.
Hood - Memo Proposed Solution Comments	12- In dismissing the ability of the OSS maintenance program to address failures that discharge to ground, there is an error in the last paragraph of page 1. I know of at least one case where an OSS inspection identified a failure that was not surfacing. In this case, the septic tank was leaking and septage was going to ground without reaching the drain field. The observation of draw down can capture system problems between the septic tank and the drain field that do not result in surface discharges.	We will revise the statement to clarify that the OSS maintenance program occasionally corrects failures that do not surface.
Hood - Memo Proposed Solution Comments	13- There seems to be a balance between sites identified as contaminated and not contaminated. This would indicated that we are applying a solution to all that may be only necessary for some. A $6MM project should have several alternatives evaluated. We must evaluate more than one alternative, to ensure, we select a cost effective solution. Alternative to consider would be: Include measures to evaluate groundwater separation in the inspection to capture systems that are not functional but do not meet current criteria for drain fields. Require rebuilding failed systems. Alternative such as STEP systems that would reduce the infrastructure cost, so only failed systems need connect.	We agree that there are several alternatives to consider besides maintaining septics and extending the sewer.

Responses to Comments on North Shore On-Site Septic System Study Report and Phosphorus Loading Analysis Technical Memorandum

Comment Source	Comment	Response
Hood - Memo Proposed Solution Comments	14 – To the extent that the results from contaminated groundwater, a greater understanding of groundwater will be required to estimate the benefits. If there is a deep contamination of the groundwater, the contaminated groundwater may continue to flow into the lake for many years.	We agree that a greater understanding of groundwater contamination and P movement towards the lake would be valuable for assessing OSS impacts on the lake.

ATTACHMENT B

Updated Database

ATTACHMENT B: UPDATED DATABASE

Lake Whatcom North Shore On-Site Sewage System Leachate Detection Project Database

Station	Station Type	Sample ID	Event	Date	Time	Lat (°)	Long (°)	Temp (°C)	DO (mg/L)	pH	Sp Cond (uS/cm)	Turbidity (FNU)	OB (RFUB)
OSS	Septage	OSS	2	3/15/2017	15:50	48.73255	-122.31705	7.8	0.30	6.96	963	26.8	633
OSS	Septage	OSS	3	3/29/2017	15:41	48.73254	-122.31709	9.1	0.61	6.91	943.8	32.3	686
C1	Lake	C1	1	1/19/2017	9:26	48.72298	-122.30225	6.7	10.42	7.20	50.7	0.3	8
C1	Lake	C1	2	3/15/2017	9:41	48.72372	-122.30253	6.3	11.55	7.46	57.3	0.4	44
C1	Lake	C1	3	3/29/2017	10:01	48.72375	-122.30257	6.6	11.77	7.41	56.7	0.6	41
C2	Lake	C2	1	1/19/2017	9:32	48.72408	-122.30284	6.7	10.60	7.21	57.7	0.2	43
C3	Lake	C3	1	1/19/2017	9:40	48.72568	-122.30415	6.7	10.60	7.20	58.1	0.2	42
C3	Lake	C2	2	3/15/2017	9:50	48.72564	-122.30418	6.3	11.43	7.39	57.6	0.4	44
C3	Lake	C2	3	3/29/2017	10:12	48.72568	-122.30408	6.7	11.67	7.31	57.1	0.3	46
1L	Lake	1L	3	42823	0.4556	48.73429	-122.31767	6.9	11.31	6.92	56.6	0.6	62
2L	Lake	4L	2	42809	0.4826	48.73649	-122.32124	7.2	11.14	7.08	64.8	3.0	91
3L	Lake	3L	1	42754	0.4889	48.7369	-122.32196	6.8	11.59	7.39	60.9	2.7	81
4L	Lake	11L	2	42809	0.5806	48.74635	-122.33769	7.2	11.67	7.16	59.7	0.4	73
5L	Lake	12L	2	3/15/2017	14:09	48.74685	-122.33852	7.7	11.16	7.08	61.4	1.7	228
525A	Discharge	1D	1	1/19/2017	11:00	48.73471	-122.31801	6.1	10.59	6.55	70.4	5.8	191
525	Discharge	1D	2	3/15/2017	10:50	48.73466	-122.31799	7.4	10.74	6.62	64.4	3.8	151
525	Discharge	2D	3	3/29/2017	11:08	48.73478	-122.31793	7.9	10.62	6.56	64.9	5.1	175
521	Discharge	2D	1	1/19/2017	11:32	48.73633	-122.32094	6.2	11.91	7.24	67.4	10.8	248
521	Discharge	1-2D	2	3/15/2017	11:02	48.73558	-122.31968	6.9	11.35	7.19	61.4	0.9	51
521	Discharge	3D	3	3/29/2017	11:21	48.73546	-122.31934	7.6	10.83	6.80	66.2	1.6	94
520	Discharge	2D	2	3/15/2017	11:05	48.73556	-122.31964	8.7	11.09	7.05	81.9	4.4	147
520	Discharge	4D	3	3/29/2017	11:36	48.73561	-122.31953	8.9	10.92	6.87	75.3	8.3	197
518	Discharge	3D	2	3/15/2017	11:20	48.73634	-122.32094	8.2	11.64	7.24	71.8	8.5	193
518	Discharge	5D	3	3/29/2017	11:50	48.73637	-122.32088	8.2	11.51	7.25	66.7	15.3	223
509	Discharge	4D	1	1/19/2017	11:58	48.73824	-122.32341	6.6	11.84	7.21	65.1	15.8	219
509	Discharge	5D	2	3/15/2017	12:15	48.73822	-122.32336	7.8	11.75	7.38	61.8	7.6	192
509	Discharge	6D	3	3/29/2017	12:10	48.73803	-122.32349	8.1	11.59	7.27	59.1	22.2	187
495	Discharge	5D	1	1/19/2017	12:17	48.74035	-122.3254	6.5	11.07	7.00	115.6	3.6	255
495	Discharge	1-5D	2	3/15/2017	12:07	48.74028	-122.32543	7.4	11.28	7.12	102.0	2.1	212
492	Discharge	6D	1	1/19/2017	12:27	48.74084	-122.32623	6.5	11.92	7.18	41.3	14.1	195
492	Discharge	6D	2	3/15/2017	12:26	48.74082	-122.32623	7.6	11.89	7.22	40.3	2.3	175
492	Discharge	7D	3	3/29/2017	12:33	48.74081	-122.32622	7.8	11.74	7.20	38.9	13.8	163
488	Discharge	7D	1	1/19/2017	12:34	48.74094	-122.32648	6.4	11.92	7.09	52.5	18.6	213
488	Discharge	1-7D	2	3/15/2017	12:35	48.74089	-122.32634	7.5	11.88	7.21	49.1	8.1	177
488	Discharge	1-7D	3	3/29/2017	12:41	48.74098	-122.32636	7.4	11.87	7.25	48.6	15.4	140
481	Discharge	8D	1	1/19/2017	12:45	48.74184	-122.32775	6.0	11.88	6.90	67.2	10.9	188
481	Discharge	1-8D	2	3/15/2017	12:43	48.74184	-122.32772	7.3	11.72	7.02	65.8	3.7	154
481	Discharge	1-8D	3	3/29/2017	12:45	48.74184	-122.32774	7.4	11.85	7.11	57.7	17.0	160
466	Discharge	9D	1	1/19/2017	13:07	48.74336	-122.33008	5.4	11.91	6.84	58.1	6.8	
466	Discharge	7D	2	3/15/2017	12:51	48.74335	-122.33005	6.8	11.47	6.96	58.6	14.4	147
466	Discharge	8D	3	3/29/2017	12:55	48.74333	-122.33004	7.7	11.39	6.94	50.7	17.8	163
462	Discharge	10D	1	1/19/2017	13:16	48.74376	-122.33084	5.4	12.21	7.13	57.7	29.7	
462	Discharge	8D	2	3/15/2017	13:03	48.74375	-122.33079	7.2	11.94	7.33	59.2	10.2	225
462	Discharge	9D	3	3/29/2017	13:05	48.74385	-122.33078	7.6	11.77	7.26	49.4	39.4	207
453	Discharge	9D	2	3/15/2017	13:18	48.74528	-122.33444	6.9	10.48	6.60	59.3	1.4	111
453	Discharge	10D	3	3/29/2017	13:25	48.7453	-122.33442	7.6	10.75	6.43	51.4	6.5	157
449	Discharge	11D	1	1/19/2017	13:29	48.74545	-122.33574	6.6	11.97	7.17	58.8	34.7	
449	Discharge	10D	2	3/15/2017	13:35	48.74546	-122.33574	7.9	11.87	7.37	59.2	6.6	197
449	Discharge	11D	3	3/29/2017	13:39	48.74547	-122.33577	7.6	11.89	7.20	48.6	67.2	149
440	Discharge	12D	1	1/19/2017	13:39	48.7469	-122.3386	5.3	11.88	6.85	53.5	3.6	
440	Discharge	12D	3	3/29/2017	13:57	48.7469	-122.33854	8.4	11.14	7.04	49.1	5.1	271
437	Discharge	13D	1	1/19/2017	13:44	48.74736	-122.33991	5.2	12.17	7.05	41.4	6.4	
437	Discharge	13D	2	3/15/2017	14:20	48.74743	-122.3399	7.6	11.82	7.29	45.6	5.7	264
437	Discharge	13D	3	3/29/2017	14:12	48.74738	-122.33993	8.0	11.64	7.18	37.7	7.7	271
430	Discharge	14D	1	1/19/2017	13:53	48.74865	-122.34364	5.5	11.85	6.94	61.3	9.1	
430	Discharge	14D	2	3/15/2017	14:40	48.74866	-122.34368	7.2	11.99	7.33	60.3	1.3	106
430	Discharge	14D	3	3/29/2017	14:28	48.74871	-122.34364	8.4	11.47	7.00	57.0	11.4	229
429	Discharge	15D	3	3/29/2017	14:47	48.74885	-122.34624	8.9	11.47	6.27	0.2	25.6	297

ND = not detected, < = detected at less that practical quantitation limit

U = undetected at reporting limit, J = estimated value based on data quality review

Lake Whatcom North Shore On-Site Sewage System Leachate Detection Project Database

Station	Fecal coliform (CFU/100mL)		E coli (CFU/100mL)		EC/FC Ratio	B dorei (copies/100mL)		B EPA (copies/100mL)		Lab Category	Total P (mg/L)		Chloride (mg/L)		Bromide (mg/L)	
OSS	1500000	J	1500000	J	1.0	1030		55000		Moderate	10.3		46.8		0.10	U
OSS	4080000	>	4080000	>	1.00	1460		141000		High	10.2		48.1		0.10	U
C1	2	U	2	U	1.0											
C1	5	U	5	U	1.0	3	<	0	ND	Low	0.008	U	2.68		0.10	U
C1	2	U	2	U	1.00	0	ND	0	ND	Not detected	0.008	U	2.59		0.10	U
C2	2	U	2	U	1.0											
C3	4	J	4	J	1.0											
C3	5	U	5	U	1.0	0	ND	0	ND	Not detected	0.008	U	2.68		0.10	U
C3	2	U	2	U	1.00											
1L	9	J	9	J	1	0	ND	0	ND	Not detected	0.012		2.56		0.10	U
2L	5	U	5	U	1	0	ND	0	ND	Not detected	0.018		2.59		0.10	U
3L	46		42		0.913											
4L	5	J	5	J	1	3	<	0	ND	Low	0.024	J	2.63		0.10	U
5L	9	J	9	J	1.0	60		0	ND	Low	0.030		3.05		0.10	U
525A	150		145		1.0											
525	114		114		1.0	0	ND	0	ND	Not detected	0.036		2.63		0.10	U
525	112		112		1.00	0	ND	0	ND	Not detected	0.046		2.30		0.10	U
521	135		105		0.8											
521																
521	16	J	16	J	1.00	0	ND	0	ND	Not detected	0.014		2.66		0.10	U
520	100		7	J	0.1	17400		1450		Moderate	0.052		3.47		0.10	U
520	62		62		1.00	21700		1610		Moderate	0.064		3.10		0.10	U
518	44		13	J	0.3	0	ND	0	ND	Not detected	0.048		2.16		0.10	U
518	29	J	29	J	1.00	112		0	ND	Low	0.066		1.77		0.10	U
509	55	J	27	J	0.5											
509	4	J	4	J	1.0											
509	342	J	342	J	1.00	3	<	0	ND	Low	0.086		1.42		0.10	U
495	5	U	5	U	1.0											
495																
492	68	J	55	J	0.8											
492	7	J	7	J	1.0	0	ND	0	ND	Not detected	0.024		1.15		0.10	U
492	2	J	2	J	1.00											
488	5	U	5	U	1.0											
488																
488																
481	5	J	5	J	1.0											
481																
481																
466	73	J	68	J	0.9											
466	198	J	191	J	1.0	0	ND	0	ND	Not detected	0.050		2.41		0.10	U
466	127	J	122	J	0.96	87		0	ND	Low	0.088		1.87		0.10	U
462	82	J	64	J	0.8											
462	4	J	4	J	1.0	3	<	0	ND	Low	0.056		2.08		0.10	U
462	15	J	11	J	0.73	0	ND	0	ND	Not detected	0.218		1.46		0.10	U
453	38	J	38	J	1.0	3	<	4050		Low	0.014		2.82		0.10	U
453	124	J	110		0.89	3	<	9960		Low	0.054		2.17		0.10	U
449	190	J	180		0.9											
449	2	J	2	J	1.0											
449	20	J	18	J	0.90	0	ND	0	ND	Not detected	0.098		1.71		0.10	U
440	50	J	32	J	0.6											
440	44		44		1.00	107		0	ND	Low	0.062		1.80		0.10	U
437	18	J	14	J	0.8											
437	9	J	9	J	1.0	0	ND	0	ND	Not detected	0.032		1.96		0.10	U
437	20	J	20	J	1.00	0	ND	0	ND	Not detected	0.060		1.38		0.10	U
430	125		100		0.8											
430	7	J	7	J	1.0	3	<	0	ND	Low	0.016		2.70		0.10	U
430	800		82		0.10	278		0	ND	Low	0.088		1.78	J	0.10	U
429	262	J	260	J	0.99											

Lake Whatcom North Shore On-Site Sewage System Leachate Detection Project Database

Station	Sample Analysis Code	Depth (ft)	Width (ft)	Area (ft2)	Velocity (fps)	Flow (cfs)		Flow Data Source
OSS	All parameters							
OSS	All parameters							
C1	Field a0 Fecals							
C1	All parameters							
C1	All parameters							
C2	Field a0 Fecals							
C3	Field a0 Fecals							
C3	All parameters							
C3	Field a0 Fecals							
1L	All parameters							
2L	All parameters							
3L	Field a0 Fecals							
4L	All parameters							
5L	All parameters							
525A	Field a0 Fecals	0.15	1.50	0.23	2.0	0.45		photo
525	All parameters	0.33		24" pipe	1.0	0.35		notes
525	All parameters	0.33		24" pipe	1.0	0.35		notes
521	Field a0 Fecals	0.25		36" pipe	0.1	0.04		notes
521	Field only			36" pipe	0.0	0.00		notes
521	All parameters	0.50		36" pipe	0.1	0.08		notes
520	All parameters	0.29	1.00	0.29	0.5	0.15		notes
520	All parameters	0.25	1.00	0.25	1.5	0.38		notes
518	All parameters	0.21		36" pipe	2.0	0.42		notes/photo
518	All parameters	0.25		36" pipe	1.5	0.38		notes/photo
509	Field a0 Fecals			36" pipe		0.25	J	other events
509	Field a0 Fecals	0.13		36" pipe	2.0	0.25		notes/photo
509	All parameters	0.17		36" pipe	1.5	0.25		notes/photo
495	Field a0 Fecals					0.05	J	other event
495	Field only					0.05		photo
492	Field a0 Fecals	0.25	1.50	0.38	4.0	1.5		photo
492	All parameters	0.25	1.50	0.38	2.0	0.75		notes/photo
492	Field a0 Fecals	0.25	1.50	0.38	2.0	0.75		notes/photo
488	Field a0 Fecals					0.75	J	other events
488	Field only	0.17	2.00	0.33	1.5	0.50		notes/photo
488	Field only	0.25	2.00	0.50	1.5	0.75		notes
481	Field a0 Fecals	0.21		36" pipe	3.0	0.65		photo
481	Field only	0.17		36" pipe	2.0	0.35		photo
481	Field only			36" pipe		0.35	J	other events
466	Field a0 Fecals			36" pipe		3.0	J	other events
466	All parameters	1.67		36" pipe	0.5	2.5		notes/photo
466	All parameters	2.67		36" pipe	0.5	3.3		notes/photo
462	Field a0 Fecals					2.0	J	other events
462	All parameters	0.17	2.20	0.37	2.0	0.7		notes/photo
462	All parameters	0.50	2.20	1.10	2.0	2.2		notes/photo
453	All parameters	0.83		24" pipe	0.5	0.6		notes/photo
453	All parameters	1.67		24" pipe	0.3	0.8		notes
449	Field a0 Fecals					10		photo
449	Field a0 Fecals	0.50	2.20	1.10	6.0	6.6		notes/photo
449	All parameters	0.67	3.00	2.00	5.0	10		notes
440	Field a0 Fecals					3.0	J	other event
440	All parameters	1.50	8.00	12.00	0.25	3.0		notes/photo
437	Field a0 Fecals	0.10	2.50	0.25	3.0	0.75		photo
437	All parameters	0.10	1.50	0.15	3.0	0.45		notes/photo
437	All parameters	0.10	5.00	0.50	3.0	1.5		notes/photo
430	Field a0 Fecals	.15/.1		8"/12" pipe	5/3	0.5		photo
430	All parameters					0.5		photo
430	All parameters					0.5		photo
429	Field a0 Fecals	0.05	0.50	0.03	1.5	0.04		photo

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 5.F.

DATE SUBMITTED:	6/20/2018	MEETING DATE:	6/27/2018
SUBJECT:	**Water base rates for very small consumption accounts**		
TO: BOARD OF COMMISSIONERS		FROM: Debi Denton, Finance Manager	
DISTRICT ENGINEER/ASST MGR APPROVAL		BH	
FINANCE MANAGER APPROVAL			
ATTACHED DOCUMENTS		1. FCS Group 2014 Rate Study excerpts	
		2. Irrigation Rate Samples	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

During a customer request discussion, the scenario of consumption below the 600ccf base was raised. This issue has two components and attached are documents speaking to each:

1. The FCS Group rate study which was completed in 2014 examined two alternatives that would eliminate the usage allowance. Neither of these were recommended because of the decrease in revenue stability and it would mean reducing the charges to the people who use less than the allowance and also to the people who use a lot of water, at the expense of the people who use a medium amount of water.
2. Another option is to charge those customers who only have an outside source of water at an irrigation rate. I have attached a spreadsheet of a sampling of irrigation rates and compared them to our current monthly water base rate. They appear comparable at this time.

FISCAL IMPACT
No impact.

RECOMMENDED BOARD ACTION
No action at this time. Staff would recommend that this be looked at again during our rate study which is due next year in 2019.

PROPOSED MOTION
No motion.

5.5.5. Alternative D – Eliminate Usage Allowance

Exhibit 5-9 shows rates which eliminate the usage allowance. No consumption is included within the fixed charge, so every cubic foot of water used by a customer is charged at the stated rate.

Exhibit 5-9: Alternative D – Rate Schedule

Cost of Service - Eliminate Usage Allowance		Fixed: 40%		Variable: 60%		
With Low-Income Senior / Disabled	2014	2015	2016	2017	2018	2019
Fixed Charge						
0.625	$ 50.05	$ 37.17	$ 40.42	$ 43.96	$ 47.69	$ 49.60
1.00	$ 62.84	$ 73.30	$ 79.71	$ 86.68	$ 94.05	$ 97.81
1.50	$ 86.31	$ 131.37	$ 142.87	$ 155.37	$ 168.58	$ 175.32
2.00	$ 109.78	$ 206.04	$ 224.07	$ 243.67	$ 264.38	$ 274.96
3.00	$ 212.05	$ 424.61	$ 461.77	$ 502.17	$ 544.86	$ 566.65
Volume Charge						
Allowance (cf)	600 cf	0 cf	0 cf	0 cf	0 cf	0 cf
Usage Charge (per cf)	$ 0.0632	$ 0.0523	$ 0.0569	$ 0.0619	$ 0.0671	$ 0.0698
Usage Over Allowance (per ccf)	$ 6.32	$ 5.23	$ 5.69	$ 6.19	$ 6.71	$ 6.98
System - Wide Rate Increases		**8.75%**	**8.75%**	**8.75%**	**8.50%**	**4.00%**

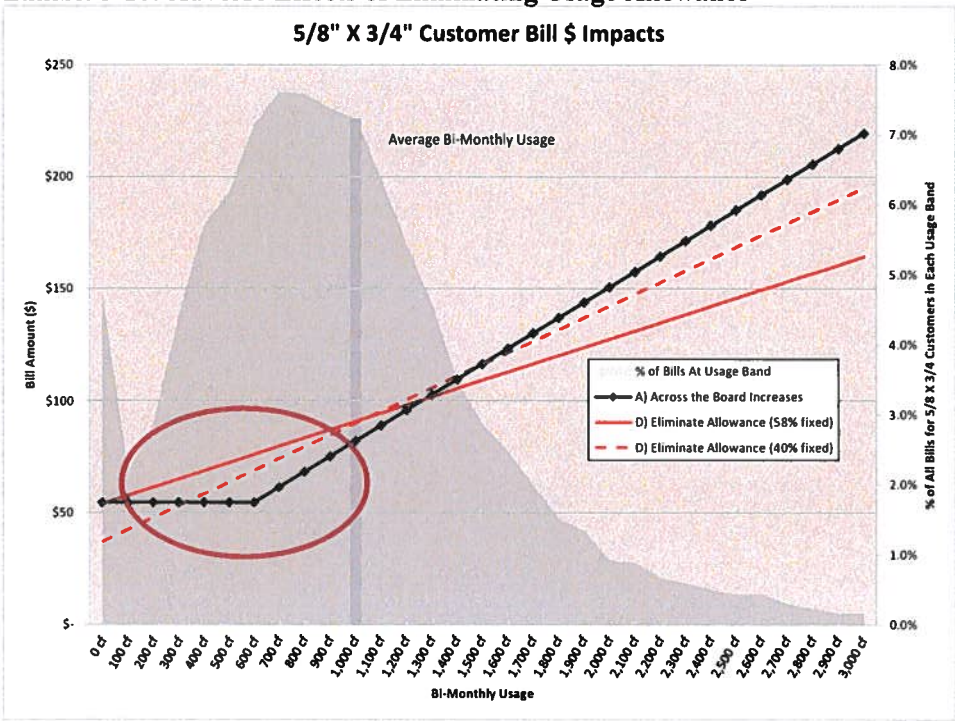
This rate alternative brings significant customer impacts. If the revenue profile were to remain at 58% fixed and 42% variable (the current 2014 level), fixed meter rates would have to remain essentially the same and the variable charge would be reduced. However, this would largely benefit large users that could recoup savings over large amounts of water usage (resulting from lower volume charges). Small water users would still have similar fixed charges without the included allowance, so essentially any usage would create a higher bill in comparison with fixed rates not being reduced.

In attempt to avoid hurting the relatively small water users, the revenue profile was reduced to the lowest recommended industry standard of 40% fixed and 60% variable, accomplished by proportionately reducing the fixed charges. This adjustment helps somewhat to reduce the bill increases to the smaller water users, but that increase is still significant.

In trying to eliminate the usage allowance, the major tradeoff is revenue stability versus the relative rate burden between large users and the large number of medium-small users who consume about as much as the allowance. Currently, about half of the total volume falls within the allowance of 600 cf/bi-month. The relative rate burden between high users and the medium-small users who consume 600 cf/bi-month is mainly determined by the volume rate. However, if we were to keep the volume rates without the allowance exactly the same as they are with the allowance, we would approximately double the revenue received from the volume rates, going from 42% of total revenue to roughly 84% of total revenue. Fixed rates would have to be reduced commensurately. A utility that received only 16% of its total revenue from fixed charges would be far too unstable financially. In order to maintain a prudent level of revenue stability (a minimum of 40% from fixed charges), eliminating the allowance inevitably means reducing the charges to the people who use very little water (less than the allowance) and also to the people who use a lot of water, at the expense of the people who use a medium amount of water.

Exhibit 5-10 graphically illustrates the impact of eliminating the allowance for customers with a 5/8" meter, where the horizontal axis represents water consumption in cubic feet. The mountain-shaped dark background indicates the frequency of bills at the various levels of consumption; it refers to the percentages along the right axis. The left axis is the amount of the bill.

Exhibit 5-10: Adverse Effects of Eliminating Usage Allowance



In **Exhibit 5-10**, the black squared line shows the status quo rate design, continuing the existing 600 cf usage allowance. The inequity of the rate allowance is easy to see—customers who use 100 cf are charged the same amount per billing period as customers using 600 cf.

The solid red line shows the effect of eliminating the allowance while keeping the fixed charges the same, which would preserve revenue stability. This would provide no benefit to the very lowest users, a sharp increase to the medium users (those within a few hundred cubic feet of the 600 cf threshold), and a definite break to the highest users.

The red dotted line represents Alternative D, in which the allowance is eliminated, and fixed charges are reduced, but only as far as can be done without making the revenue from fixed charges less than 40% of total revenue. This scenario does provide some benefit to the very lowest users. It also reduces the volume rate and therefore the bills for the very highest users. However, the large group of users in the middle would still see substantial increases compared with the current rate design. Given this distribution of impacts to the various groups of users, on top of the already-high overall increases needed by the Water system, we do not recommend this alternative.

5.5.6. Alternative E – Eliminate Usage Allowance, Create Three-Tiered Block Rates

Exhibit 5-11 shows rates which eliminate the usage allowance rate structure while incorporating a three-tiered increasing block rate design for single-family customers.

Exhibit 5-11: Alternative E – Rate Schedule

Cost of Service - Three-Tiered Increasing Block With Low-Income Senior / Disabled	2014	Fixed: 40% 2015	2016	Variable: 60% 2017	2018	2019
Fixed Charge						
0.625	$ 50.05	$ 37.17	$ 40.42	$ 43.96	$ 47.69	$ 49.60
1.00	$ 62.84	$ 73.30	$ 79.71	$ 86.68	$ 94.05	$ 97.81
1.50	$ 86.31	$ 131.37	$ 142.87	$ 155.37	$ 168.58	$ 175.32
2.00	$ 109.78	$ 206.04	$ 224.07	$ 243.67	$ 264.38	$ 274.96
3.00	$ 212.05	$ 424.61	$ 461.77	$ 502.17	$ 544.86	$ 566.65
Volume Charge (cubic feet)						
Block One - (0-600)		$ 0.0417	$ 0.0454	$ 0.0493	$ 0.0535	$ 0.0557
Block Two - (601 - 2000)		$ 0.0626	$ 0.0680	$ 0.0740	$ 0.0803	$ 0.0835
Block Three - (> 2000)		$ 0.0834	$ 0.0907	$ 0.0986	$ 0.1070	$ 0.1113
Non Single Family Uniform Charge (per cf)		$ 0.0529	$ 0.0575	$ 0.0625	$ 0.0679	$ 0.0706
System - Wide Rate Increases		**8.75%**	**8.75%**	**8.75%**	**8.50%**	**4.00%**

Like Alternative D, this rate structure generates 40% of revenue from fixed charges and 60% of revenues from usage charges. For the same reasons discussed with Alternative D, the revenue profile was adjusted downward in an attempt to reduce the effects on the low-to-medium users of the system.

The recommended thresholds for these blocks were based on an evaluation of historical water usage patterns of District customers with 5/8" meters, which are assumed to be single family customers.

- Block 1 (0 – 600 cubic feet per two-months) is set to equal the current usage allowance. This is a recognizable usage amount that is familiar to customers already. This accounts for about 51% of single family residential water usage.
- Block 2 (601 – 2,000 cubic feet per two-months) typically falls into place after determining blocks 1 and 3. In this case, approximately 42% of volume would fall within this range.
- Block 3 (Over 2,000 cubic feet per two-months) is the "penalty block" and is typically designed to capture between 5 – 10% of volume. In this case, approximately 6.5% of single family usage would fall within the third block. This block helps send a conservation message to the largest of water consumers.

Customers with meters that were larger than 5/8" were the school, the fire authority, commercial, or assumed to be multi-family residential in condos and apartments. These customers would pay a uniform usage charge just like they do now.

We do not recommend this alternative because of the decrease in revenue stability and significant change in rate structure during times of material rate increases. Current industry trends show utilities moving towards rate structures that increase rather than decrease the share of revenue received from fixed charges, so this further supports not adopting Alternatives D or E.

IRRIGATION RATE SAMPLES
3/4" METER

MONTHLY BASE FEE	PER CCF	ESTIMATED VOLUME COST FOR 5 CCF	TOTAL ESTIMATED MONTHLY COST	LWWSD MONTHLY COST
$ 11.68	$ 1.89	$ 9.45	$ 21.13	$ 33.80
$ 15.02	$ 6.06	$ 30.30	$ 45.32	
$ 13.85	$ 3.70	$ 18.50	$ 32.35	
$ 24.95	$ 2.47	$ 12.35	$ 37.30	
$ 23.05	$ 4.42	$ 22.10	$ 45.15	

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 5.G.

DATE SUBMITTED:	June 21, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Update on District Website**		
TO: BOARD OF COMMISSIONERS		FROM: Rachael Hope	
DISTRICT ENGINEER/ACTING GM APPROVAL		BK	
ATTACHED DOCUMENTS		1.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

At the beginning of 2018, the District contracted with consultant Sole Graphics to perform an update to LWWSD's website, as well as providing some technical and IT support on an ongoing basis. At the end of March, Sole Graphics presented to the board, sharing a first look at the new design and requesting feedback.

Rachael has been working with Sole consistently since, and has met with them a couple of times to tweak things, finalize the site map, and do some training. She is currently in the process of revising/creating content page by page. Her main goals are to update content to match current policies and procedures, make sure all information is up-to-date, increase the usability and readability of website pages, and provide more information in a useful manner.

The current goal is to complete the content by the end of June and have a final version to bring before the Commissioners for approval.

FISCAL IMPACT

N/A

RECOMMENDED BOARD ACTION

N/A

PROPOSED MOTION

N/A

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item H

DATE SUBMITTED:	June 21, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Status Update on Additional Septic Systems Near District Sewers**		
TO: BOARD OF COMMISSIONERS		FROM: Bill Hunter	
MANAGER APPROVAL		BH	
ATTACHED DOCUMENTS		1.	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT
This is a place holder for ongoing discussions on this issue.

Wilson Engineering is in the process of preparing information for further board discussion. Melanie Mankamyer will give a verbal progress update on what they are working on.

FISCAL IMPACT
N/A.

RECOMMENDED BOARD ACTION
N/A.

PROPOSED MOTION
N/A.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 5.I.

DATE SUBMITTED:	June 20, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Monthly Budget Analysis**		
TO: BOARD OF COMMISSIONERS		FROM: Debi Denton	
GENERAL MANAGER APPROVAL		BH	
DISTRICT ENGINEER/ASST MGR APPROVAL			
FINANCE MANAGER APPROVAL			
ATTACHED DOCUMENTS		1. Monthly Budget Through 5/30/2018	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT
Information only.

FISCAL IMPACT
N/A

RECOMMENDED BOARD ACTION
N/A

PROPOSED MOTION
N/A

LAKE WHATCOM WATER AND SEWER

INVESTMENTS/CASH AS OF 05/31/2018

	Petty Cash		$ 1,600		
	Cash		$ 474,023		0.40%
401 Restricted (Operating Reserve)	Public Funds Account		$ 752,610		1.75%
401 Restricted (Operating Reserve)	LGIP		$ 605,291		1.80%
			PAR VALUE		YIELD
	FNMA - ProEquity	Callable	$ 1,007,665	Jul-18	1.00%
	FICO - ProEquity	Non-Callable	$ 440,000	Aug-18	0.91%
	FICO - ProEquity	Non-Callable	$ 625,000	Dec-18	0.90%
	FFCB - ProEquity	Callable	$ 500,000	Oct-19	1.44%
	FFCB - ProEquity	Callable	$ 750,000	Aug-20	1.10%
	US Bank		$ 3,322,665		
	TOTAL		**$ 5,156,189**		

	401	$1,375,000
Restricted (Sewer Contingency)	425	$ 750,000
Restricted (Water Contingency)	426	$ 440,000
Reserved (Bond Reserve)	460	$ 750,000

LAKE WHATCOM WATER AND SEWER FUND SUMMARY 2018

	401 OPERATING	420 SYSTEM REINVESTMENT	425 SEWER/ STORM WATER CONTINGENCY	426 WATER CONTINGENCY	431 2016 BOND FUND	450 DEBT SERVICE	460 BOND RESERVE (RESTRICTED)	TOTAL
2018 REVENUES AND TRANSFERS IN	2,704,940	500,000	-	-	183,450	362,070	-	3,750,460
2018 EXPENDITURES AND TRANSFERS OUT	(2,779,130)	(463,101)	(20,793)	-	-	(362,069)	-	(3,625,093)
CASH/INVESTMENTS 2017 CARRYOVER	2,131,222	520,357	770,229	440,000	396,681	-	772,334	5,030,823
ALLOCATED TO OPERATING RESERVES	**$2,057,032** **-$850,000** **$1,207,032**	**$557,256**	**$749,436**	**$440,000**	**$580,131**	**$1**	**$772,334**	**$5,156,189**

LAKE WHATCOM WATER AND SEWER REVENUE

	Description	Budget 2018	ACTUAL 5/31/2018 42%	
OPERATING FUND - 401				
REVENUES				
401-333-97-00	FEMA 2015 Storm Grant		250	
401-343-40-10	Water Sales Metered (8.5% base rate increase) *	2,437,545	935,618	
401-343-41-10	Permits (10 new connection permits)	143,480	26,336	
401-343-50-11	Sewer Service Residential (2.5% rate increase) *	3,949,323	1,637,403	
401-343-50-19	Sewer Service Other	4,000	1,753	
401-343-50-80	Latecomer's Fees	-	6,772	
401-343-81-10	Combined Fees	30,000	11,622	
401-359-90-00	Late fees	50,000	25,457	
401-361-11-00	Investment Interest	20,000	18,678	
401-361-40-00-80	ULID 18 Interest/Penalties	8,000	4,364	
401-368-10-00-80	ULID 18 Principal Payments	50,000	18,516	
401-369-10-00	Sale of scrap metal and surplus	1,000	1,887	
401-369-10-01	Miscellaneous	-	4,284	
401-395-10-00	Sale of Capital Assets		12,000	
401-395-20-00	Insurance recovery	-	0	
	TOTAL REVENUES	**6,693,348**	**2,704,940**	**40%**

	LAKE WHATCOM WATER AND SEWER EXPENDITURES		
	Description	BUDGET 2018	5/31/2018
OPERATING FUND - 401			42%
EXPENDITURES			
401-53X-10-10	Admin Payroll (3% cola plus step increases - 2018)	652,846	269,562
401-53X-10-20	Admin Personnel Benefits (Medical,Retirement etc)	274,332	118,508
401-53X-10-31	Gen Admin Supplies/Equipment	30,000	8,868
401-53X-10-31-01	Meetings/Team building	3,000	1,504
401-53X-10-40	Web pay/Bank Fees	30,000	14,867
	Interlocal - Lake Whatcom Management Program (City)		
	Interlocal - Invasive Species (City)		
	Interlocal - Lake Whatcom Tributary Monitor (County)		
401-534-10-41	Water Quality Assurance Programs (TOTAL)	55,000	50,000
	Simplifile (County Auditor Filing Fees)	6,500	
	Data Bar (Statement processing)	25,000	
	Answering Service	2,000	
	Data Pro (Time clock system)	2,000	
	BIAS Financial Software Maintenance	8,000	
	Web Check services	5,000	
	CPA (Internal audit and Financial statements)	6,000	
	WA State Audit	9,000	
	Salary study	15,000	
	Docuware/Web site maintenance and upgrade	5,000	
	Legal Counsel	100,000	
	3D - Computer support	25,000	
	3D - Firewall renewal	15,000	
	3D - Anti virus subscription	1,000	
	Building security for offices	1,500	
	Building custodial	9,500	
	Pest control	500	
	Landscaping service	4,500	
	South Whatcom Fire (hydrant maintenance)	3,500	
	GE Scada System Software Maintenance - Operations	7,500	
	Wilson Engineering	20,000	
	Camera Van Software	1,500	
	SCADA/PLC Support - Engineering/Operations	5,000	
	Cartegraph - Engineering/Operations	6,000	
	Auto Desk - Engineering	1,000	
	GIS Partnership	1,000	
	Rockwell - Engineering/Operations	500	
	IT Pipes	1,500	

	LAKE WHATCOM WATER AND SEWER EXPENDITURES		
	Description	**BUDGET 2018**	**5/31/2018**
	ESRI - ARC GIS	1,500	
	Innovyze - Engineering	2,500	
	Master Meter	2,000	
	Generator Load Testing	15,000	
	Cyberlock software	-	
	Whatcom County Emergency Management	20,000	
	Misc (Bid notices etc.)	5,000	
401-53X-10-41-01	Professional Services (TOTAL)	334,000	198,533
401-53X-10-42	Communication	50,000	19,652
401-53X-10-45	Admin Lease	2,000	298
401-53X-10-46	Property Insurance	140,000	-
401-53X-10-49	Admin Misc.	1,000	3,086
401-53X-10-49-01	Memberships/Dues	17,000	13,276
401-53X-10-49-02	WA State Dept of RevenueTaxes/Permits	205,000	90,192
401-53X-40-43	Training & Travel	35,000	12,532
401-53X-40-43-01	Tuition reimbursement	1,000	-
401-53X-50-31	Maintenance Supplies	150,000	62,362
401-53X-50-48	Operations Repair/Maint	190,000	46,955
401-53X-50-49	Insurance Claims	5,000	2,366
401-53X-60-41	Operations Contracted	8,500	1,887
401-534-60-47	Water City of Bellingham	40,000	16,774
401-535-60-47	Sewer City of Bellingham Treatment Fee	640,000	281,196
401-53X-80-10	Operations Payroll (3% cola plus step increases - 2018)	954,742	402,687
401-53x-80-10-01	Operations Capital Projects Payroll	-	-
401-53X-80-20	Operations Personnel Benefits (Medical,Retirement etc)	446,472	178,114
401-53X-80-32	Fuel	24,000	10,943
401-53X-80-35	Safety Supplies	10,000	683
401-53X-80-35-01	Safety Supplies Boots	2,500	-
401-53X-80-35-02	Emergency Preparedness	10,000	720
401-53X-80-47	General Utilities	208,000	109,809
401-53X-80-49	Laundry	4,000	1,686
	OPERATING EXPENDITURES	**4,523,392**	**1,917,060**

	LAKE WHATCOM WATER AND SEWER EXPENDITURES		
	Description	**BUDGET 2018**	**5/31/2018**
TRANSFERS	Transfers Out to System Reinvestment Fund 420	1,505,000	500,000
	Transfers Out to Sewer/Storm Water Contingency Fund 425	60,000	-
	Transfers Out to Water Contingency Fund 426	120,000	-
	Transfers Out to Debt Service Fund 450	938,885	362,070
	Transfers Out for Matching to Grant	200,000	
	TOTAL EXPENDITURES	**7,347,277**	**2,779,130**
OPERATING FUND	**OPERATING REVENUES**	**6,693,348**	**2,704,940**
	EXPENDITURES	**(7,347,277)**	**(2,779,130)**
	2017 BALANCE CARRYOVER	**1,750,000**	**2,131,222**
	ALLOCATED TO OPERATING RESERVES	**(850,000)**	**(850,000)**
		246,071	**1,207,032**

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 5.J.

DATE SUBMITTED:	June 20, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Summary of Existing District Projects**		
TO: BOARD OF COMMISSIONERS		FROM: Bill Hunter & Staff	
GENERAL MANAGER APPROVAL		BH	
DISTRICT ENGINEER/ASST MGR APPROVAL			
FINANCE MANAGER APPROVAL			
ATTACHED DOCUMENTS		1. June 2018 Summary of Existing District Projects	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT
Staff presentation of Summary of Existing District Projects and priorities

FISCAL IMPACT
Not applicable at this time.

RECOMMENDED BOARD ACTION
Review and discuss.

PROPOSED MOTION
Not applicable at this time.

Lake Whatcom Water & Sewer District
Summary of Existing District Projects

Prepared for the June 27, 2018 Board Meeting
Data Compiled 05/22/18 by RH, BH, RM & KH

Status of Water and System Capacities				
	South Shore ID# 95910	Eagleridge ID# 08118	Agate Heights ID# 52957	Johnson Well ID# 04782
DOH Approved ERUs	3935	85	54	2
Connected ERUs	3828	70	44	2
Remaining Capacity (ERUs)	107	15	10	0
Permitted ERUs Under Construction	21	0	0	0
Pre-paid Connection Certificates & Expired Permits	11	0	5	0
Water Availabilities (trailing 12 months)	41	0	0	0
Subtotal - Commitments not yet connected	73	0	5	0
Available ERUs	**34**	**15**	**5**	**0**

Completed Capital Projects in 2018	
Proj #	Project Name
C1407	Lowe sewer Pump Station VFDs
C1704	Business Server Hardware Replacement
C1709	2017 Sewer Capacity Management Operation Maintenance
C1804	SVWTP Turbidimeters and Chlorine Analyzers
M1806	Water Facilities Inspection & Maintenance

State Required Report Status

Monthly Reports

Name Of Report		Completed											
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Chlorination Report Agate Heights Prepared by: Kevin	Postmarked by the 10th of month	x	x	x	x	x	x						
Surface Water Treatment Rule Report (SVWTP) Prepared by: Kevin	Postmarked by the 10th of month	x	x	x	x	x	x						
Department of Revenue Prepared by: Debi	Due end of following month	x	x	x	x	x							

State Required Report Status (cont'd)					
Annual Reports					
Name Of Report	**Deadline**	**Completed**			
Community Right to Know (Hazardous Materials) Prepared by: Rich	March 31	February 14, 2018			
Annual Reports					
Name Of Report	**Deadline**	**Completed**			
WA State Cross Connection Report Prepared by: Rich	May	March 15, 2018			
OSHA 300 Log Prepared by: Rich	February 1	January 23, 2018			
Water Use Efficiency Performance Report Prepared by: Kevin	July 1				
Consumer Confidence Reports Prepared by: Kevin	May	Geneva 6/19/18	SV 6/19/18	EagleR 6/19/18	Agate Ht 6/19/18
Hazardous Waste Activity Report Prepared by: Rich	March 31	Inactive site, no longer need to report			
Report Number of Sewer ERUs to City of Bellingham Prepared by:	January 15	March 21, 2018			
Other Reports					
Name Of Report	**Deadline**	**Completed**			
Water Right Permit No. G1-22681 Development Extension	Due Every 5 Years Next Due Feb 15, 2023	March 20, 2018			
Water Right Permit No. S1-25121 Development Extension	Due Every 5 Years Next Due March 30, 2023	March 20, 2018			
CPR/First Aid Training Coordinated by: Rich	Due Biennially Next Due 2019	May 24, 2017			
Flagging Card Training Coordinated by: Rich	Due Triennially Next Due 2019	August 3, 2016			

Safety Program Summary Completed by Rich Munson			
Summary of Annual Safety Training *2018 Testing Period - Jan 1, 2018 to June 30, 2018*			
	Enrollments	Completions	% Complete
Engineering - Managers	40	40	100%
Engineering - Staff	21	21	100%
Field Crew	206	185	90%
Office - Managers	19	19	100%
Office - Staff	52	44	85%
Overall	**338**	**309**	**91%**

Safety meetings for the field crew take place every Tuesday or Wednesday at 5:00 pm.

Dates of Completed Safety Committee Meetings		
Wednesday, January 17, 2018	Wednesday, June 14, 2018	
Thursday, February 15, 2018		
Thursday, April 12, 2018		
Thursday, May 17, 2018		

Summary of Work-Related Injuries & Illnesses					
	2018	2017	2016	2015	2014
Total Number of Work Related Injuries Defined as a work related injury o rillness that results in: · Death · Medical treatment beyond first aid · Loss of consciousness · Significant injury or illness diagnosed by a licensed health care professional · Days away from work (off work) · Restricted work or job transfer	0	1	0	1	1
Total Number of Days of Job Transfer or Restriction (light duty or other medical restriction)	0	13	0	0	
Total Number of Days Away from Work (at home, in hospital, not at work)	0	4	0	0	
Near Misses	2	1			

Developer Extension Agreements
None currently active

District Projects

Staff Report

6/19/2018

A1815 Compulsory Sewer Connections

Compel property owners on private septic systems to connect to adjacent public sewer mains.

01 Administration

1/30/2018	Staff reviewing Wilson Task Order for design, bid, and construction services to connect 2-3 properties.
2/12/2018	District attorney prepared draft agreements and deeds of trust for 3 properties.
2/28/2018	Wilson Task Order for design, cost estimates, bidding, and construction support executed.
3/14/2018	Certified letters sent to 3 property owners that include a sample agreement and estimated hookup costs.
6/6/2018	Final draft agreements sent to customers along with letter with project status and tentatively construction schedule.

05 Design

3/21/2018	Wilson working on design and bid documents.
4/19/2018	Design/bid package almost complete. Advertisement for bids will be issued in the next few weeks.
5/14/2018	Staff received draft bid documents from Wilson and is reviewing. Staff will coordinate bid advertisement, pre-bid meeting, and bid opening with Wilson.

06 Bidding

5/30/2018	Advertisement for bids published in Bellingham Herald.
6/12/2018	Non-mandatory pre-bid meeting.
6/19/2018	Bid opening.
6/27/2018	Tentative construction contract award.

A1816 Salary Survey

Salary survey for all positions in district.

01 Administration

2/26/2018	Professional services agreement executed. Consultant started employee interviews on 2/26/2018.
3/12/2018	Consultant finished staff interviews.
4/19/2018	Staff coordinating meetings with comparable agencies. Meetings are intended to review other agency job descriptions and to match with District positions. Consultant, District Management, and Union Rep will attend these agency meetings.
5/22/2018	Meeting with consultant scheduled to review progress and draft results management staff and union reps.
6/13/2018	Consultant discussed preliminary draft with board. Union is currently reviewing draft document.

A1817 Web Site Update

Improve District web site and access to information.

01 Administration

3/14/2018	Staff reviewed draft web site changes with consultant.
3/29/2018	Consultant to present draft web site changes to board.
4/19/2018	Draft website was presented to board at 4/11/2018 Board meeting. Some comments were received at the board meeting and will be taken into consideration by staff. Staff also solicited commissioners via email for any additional comments or ideas - none were received as of 4/19/2018. Staff is moving forward to complete the redesign using information received to date.
5/21/2018	New web site framework is essentially complete. Staff is organizing, polishing, and uploading content to the new site (new site is not live yet). Once this is complete, the old site will be turned off and the new site switched on to go live. Staff is anticipating the new site ready to go live in about a month.

C1504 - - Reservoir Site Security

Install site security system as 1 reservoir site. Pilot project to evaluate equipment, configuration, and telemetry options.

01 Administration

5/4/2015	District staff have done initial research on available security camera systems and motion detection. List of equipment and options is in development. Initial pilot site will be the SVWTP.
12/21/2016	Staff ordered equipment. Should arrive soon. Equipment will be installed at SVWTP. Motion detection from camera system will be integrated into SCADA system for alarm monitoring by District crews.
1/19/2017	Equipment has been received. District staff will begin installation soon.
11/20/2017	Staff working to contract with electrician to install conduit and cabling at SVWTP.
1/25/2018	Quote from electrician is larger than expected. Staff re-evaluating wiring schematic and conduit run options.

C1605 Water System Plan Update

Update District's Water System Plan. Current edition expires 3-15-2017.

01 Administration

4/6/2016	Selection of consultant is part of the general engineering services RFQ.
5/3/2016	State DOH would like to meet with the District and consultant to coordinate the water system plan update prior to beginning work. The intent is to coordinate the scope of work for the plan update.
8/16/2016	Meeting with Wilson and DOH to coordination scope of work. Wilson developing scope and fee for task order.
9/8/2016	Wilson developed scope of work after coordination with District staff and DOH. Scope/fee will be present at next board meeting for approval.
9/20/2016	Task Order with Wilson Engineering executed. Wilson will start work soon.
2/15/2017	Wilson collecting and analyzing data for the plan update.
9/13/2017	Draft comp plan text delivered to Board for review. Text will be discussed and reviewed/approved by Board over the next several meeting this fall.
11/28/2017	District issued Determination of Nonsignificance as part of SEPA process. Sent DNS to entities on SEPA Distribution List.
11/29/2017	Board to review and comment on draft water comp plan. Meeting was advertised as the public hearing for the water system comprehensive plan update.
12/1/2017	Determination of Nonsignificance was published in the Bellingham Herald as part of the SEPA process.
12/13/2017	Board adopted water comp plan update. Plan will be routed to multiple agencies for review and approval.

2/12/2018 Wilson assisting staff to update the "Designated Water Service Areas" map in the Coordinated Water System Plan with the boundary revisions proposed in the water comp plan.
3/8/2018 Letter sent to County initiate Service Area Boundary Amendment process.
3/14/2018 District received approvals from Whatcom County Engineering and Health Departments. Received Local Government Consistency Determination Form with Conditions from Whatcom County Planning and Development Services.
4/18/2018 Staff met with Wilson to finalize response to state DOH comments. Wilson is finalizing the response and will submit package to DOH next week.
5/17/2018 County Planning and Development reviewed and approved the boundary amendments. The boundary changes will not take effect until Washington State DOH has reviewed and approved the comprehensive plan update.
6/27/2018 Board to review and adopt revisions addressing agency review comments.

C1607 Northshore Water Quality Sampling

Water quality sampling plan to evaluate impact of existing onsite sewage disposal system at the end of Northshore road.

01 Administration

3/30/2016 Request for Proposals advertised in Seattle Daily Journal of Commerce
4/28/2016 Request for Proposal advertised in Seattle Daily Journal of Commerce
5/1/2016 Request for Proposals advertised in Bellingham Herald
5/24/2016 Proposals due 4pm. Received one proposal.
7/27/2016 Agreement with consultant has been executed.
9/8/2016 Staff received preliminary draft plan from consultant and will share with board
10/3/2016 Workshop with County and City to review draft sampling plan.
10/19/2016 Consultant working on sampling plan revisions based on workshop comments with City and County.
11/21/2016 Consultant will start sampling during next good rain event.
1/19/2017 Consultant performs first sampling event.
2/9/2017 Tentative 2nd sampling event.
3/22/2017 Consultant completed second round of sampling in mid-March.
6/14/2017 Consultant presented draft report to board. Consultant is working to incorporating board and staff comments.
7/20/2017 Final report has been published. Original project scope complete.
12/18/2017 Additional scope of work was authorized for Herrera to develop a phosphorus loading analysis. Rob updated Board on progress at 12/13/2017 board meeting. The goal is to estimate the $/pound of phosphorus removed if septic systems were served by public sewer. District is planning to present report and loading analysis to Lake Whatcom policy group in February 2018.
1/25/2018 Staff received 2nd draft of phosphorus loading analysis. Staff to do initial review and forward on board of commissioners and county staff.
2/5/2018 Herrera presents sampling study and results to Lake Whatcom Policy Group.
2/12/2018 Herrera finalizing phosphorus loading analysis. District received draft comments from County and DOE. District will coordinate with City to get their comments on the draft. Once all the comments are collected Herrera will finalize the report and address the comments. District will then present the final package to the Lake Whatcom Data and Information Management Team for review and discussion as to where and what the next steps might be.
2/27/2018 District received comments from the City and forwarded them to Herrera.
4/11/2018 Herrera reviewed agency comments and the response to each with the board on 4/11/2018. Herrera is finalizing the memo that addresses all the comments. The goal is to have the final memo completed and sent to the Data Team in the next couple weeks. Tentatively, the memo will be presented by Herrera at the Data Team meeting in May.

C1610 - - Little Strawberry Water Leak on Bridge

Water main has small leak. Leak is in a section of main that is mounted to a bridge on Little Strawberry.

01 Administration

4/6/2016	Staff evaluating alternatives to get within reach of pipe to find and repair leak.
7/20/2017	Leak has gotten worse. Wilson completed hydraulic analysis that shows the main across the bridge can be isolated (turn-off) and not significantly affect fire flow or operation pressures. If leak gets bad, staff can isolate the main until a repair can be figured out and made.
2/12/2018	Crew confirmed dripping water is from the water main by getting a positive test for chlorine residual. Crews are in process of relocating a water service that will enable the District to isolate the section pipe on the bridge - either temporarily or permanently.
2/27/2018	Crews relocated a water service line so that the section of water main on the bridge can be isolated with valves located on each embankment at any time without affecting any customers.
3/19/2018	Staff working with a specialized rental vendor to provide a "bridge walker" that includes an operator. This specialized piece of equipment has a platform that articulates over the side to reach under the edge of the bridge. The equipment is in high demand all across the nation. Staff is working to have it scheduled for a week to allow crew to remove pipe insulation, find and repair leak, and replace insulation. Estimated rental cost is $10,000 per week.
4/19/2018	There is a rental slot open in June. Staff is working to confirm the June slot and will start preparing to perform the work.
5/21/2018	Staff is actively pursuing rental company to schedule bridge walker. Nothing scheduled yet.
6/19/2018	Staff procuring materials needed for leak repair.

10 Construction

7/9/2018	Specialized bridge-walker equipment schedule to be onsite for use by District crew for the whole week. District crews will remove pipe insulation and hopefully find and repair the leak. Crews will install new insulation after repair. Work is expected to take about 1-week. Staff is coordinating with SV on bridge closure during working hours.

C1611 Country Club Sewer Pump Station

Rehabilitation of Country Club Sewer Pump Station.

01 Administration

4/6/2016	Selection of consultant is in conjuction with general engineering services RFQ.
8/9/2016	Staff working with BHC to develop scope of work
9/8/2016	AE agreement finalized and being routed for execution. Scope/fee was approved by board on 8/31/2016. Work to begin as soon as agreement is executed.
11/2/2016	District attended Center Condo Owner's Association board meeting to present and coordinate the project. Association gave District needed letter of authorization to pursue Whatcom County permits for construction - of either option (pump station or direction drill).
12/21/2016	AE Agreement Amendment being routed for execution that includes scope for geotech test borings to determine directional drilling feasibility. BHC and GeoEngineers are scheduling work and preparing permit applications.
8/30/2017	Board authorizes Amendment 2 to AE Agreement. This work includes detailed geotechnical design for horizontal directional drilling.
9/13/2017	Board authorizes Amendment 3 to AE Agreement. This work include additional permitting and detailed design thru bidding.
11/8/2017	Staff attended Center Condo Owner's Association board meeting to brief board of progress and to coordinate future work.

02 Predesign

10/11/2016 Held predesign meeting with BHC and District staff. BHC beginning preliminary design.
11/21/2016 Staff and BHC working on scope amendment to investigate horizontal direction drilling as the primary option. This option has the potential to eliminate the need for the pump station.
3/21/2017 Consultant completed 3 test bores to determine feasibility of horizontal direction drilling. They did not encounter any hard rock. One bore had sandstone the last 5 feet.
4/19/2017 District received copy of Geotechnical Data Report that documents soil conditions found during exploratory boring. Geotechnical engineers are working on a 2nd report that will discuss and recommend horizontal drilling methodology for construction and bid documents.
5/17/2017 District received copy of draft geotech report regarding Trenchless (HDD) Alternative Evaluation. BHC also reviewing report and coordinating with subconsultant.
6/22/2017 Geotechnical subconsultant addressing District and BHC review comments and will be including a discussion on auger drilling in addition to the horizontal drilling method.
7/12/2017 Consultants presented horizontal direction drilling and conventional auger bore alternates to Board. Staff will make a recommendation a next Board meeting on the preferred alternative.

03 Permitting

10/20/2016 Pre-Application meeting with Whatcom County to review anticipated permitting requirements.
11/7/2016 District and GeoEngineers met wet Whatcom County Critical Areas Biologist to review potential critical areas.
12/22/2016 GeoEngineers submitted shoreline exemption permit application for test borings to Whatcom County.
11/16/2017 Held 2nd pre-application meeting with County staff. 2nd meeting was necessary due to scope change from replacement of pump station to horizontal directional drilling. Consultants are preparing permit applications for project to be submitted early December.
1/25/2018 Consultants are still preparing permit applications. Draft applications are expected any day for District review. Staff has rescheduled construction from summer 2018 to summer 2019. A revised CIP plan will be presented to board for approval on 1/31/2018.
2/12/2018 Staff have reviewed draft permit application package and is coordinating with consultant to address minor comments.
3/8/2018 District received permit application materials from consultant. Staff working to obtain Center Condo and SVCA notarized signatures.
4/13/2018 Permit applications submitted to Whatcom County.
4/17/2018 Corps and JARPA documents sent to agencies.
5/10/2018 County issued SEPA notice to agencies and property owners within 1000-feet of project for comment period. Written comments are due by June 10, 2018.
5/11/2018 District received Nationwide Permit12 (Utility Line Activities) from Army Corps of Engineers.
6/10/2018 Written SEPA comments to County due.
6/18/2018 As of today the shorelines administrator said he is still waiting on comments from critical areas staff, and that he'd check-in with those staff tomorrow.

05 Design

10/18/2017 BHC and Geoengineers working on detailed design and permit application submittal for HDD.
12/6/2017 District received Wetland Delineation Report, HDD Design Report, and Design Report from BHC. Staff is reviewing and coordinating with consultant.
2/12/2018 Staff received 30% complete plans for review and comment.

C1703 Utility System Support Specialist Vehicle

Procure vehicle from Washington State bid.

01 Administration

3/22/2017 Needed vehicle type not currently on state bid. Staff working to get quotes from vendors for new vehicle that meets District specifications.
6/21/2017 Vehicle ordered using state bid.
12/18/2017 Still waiting for delivery of vehicle.
1/25/2018 The rig was assembled in Spain. Vehicle is in the USA, but still be processed by US Customs. Dealer has not been notified of a delivery date yet.
3/19/2018 Vehicle received by District. Staff will license and outfit with bins, shelves, etc. to put it into service.
5/21/2018 Internal bins, shelving, etc have been installed by vendor. Radio and light bar will be installed next.
6/19/2018 Following delivery of vehicle from vendor installing electrical equipment, the battery died overnight. Vehicle was returned to vendor to troubleshoot electrical problem.

C1705 Geneva and Par Sewer Pump Station Improvements

Sewer pump station improvements for Geneva and Par stations.

01 Administration

1/19/2017 Staff developing Request for Proposal.
1/28/2017 Request for Proposals published in Bellingham Herald.
2/17/2017 Proposals are due.
2/21/2017 Selection committee meets to review proposals.
2/23/2017 RH2 was selected and approved by the Board for the project. Staff and consultant working to execute an AE Agreement.
4/10/2017 AE Agreement executed.
6/22/2017 Staff working with RH2 to execute amendment to survey an alternate alignment for a possible gravity main from Par Sewer Pump Station to a manhole at the Sudden Valley Marina. This alternate alignment is longer, but does not have to cross Austin Creek. Alignment feasibility will be discussed in the predesign report.
10/11/2017 Board approved Amendment 2 to AE Agreement that includes detailed design through bidding for both Geneva and Par Sewer Pump Stations.
11/14/2017 Staff met with neighbor onsite to discuss project concerns. Neighbor may attend 11/29/2017 board meeting to voice concerns.

02 Predesign

4/18/2017 RH2 performed pump tests at both stations to collect hydraulic operating parameters for design.
7/20/2017 Staff reviewing draft predesign report. Presentation to Board tentatively scheduled for August 9th.
8/9/2017 RH2 presents Geneva Pump Station alternatives to Board. District select submersible pump alternative with exterior permanent generator.
9/26/2017 RH2 presents Par Sewer Pump Station alternative, including eliminating the pump station and installing gravity mains.

03 Permitting

9/14/2017 RH2 and District meet with County staff for pre-application meeting. RH2 gathering application information and will submit to County as soon as possible.
10/13/2017 RH2 submitted shorelines permit application to County for Geneva Sewer Pump Station.
12/13/2017 Neighbors had discussion with Board regarding placement of generator and control panels for the Geneva Sewer Pump Station. Staff will explore the possibility of locating the Generator on the east side of the right-of-way. RH2 and staff will contact County and east neighbor to get their input. Staff will keep Board informed with progress to address neighbor's concerns.
1/25/2018 County permitting is progressing. Still no public hearing date scheduled.
6/20/2018 Geneva Sewer Pump Station Shorelines Substantial Development Public Hearing at 130pm in County Council Chambers.

04 Predesign and Permitting

5/1/2017 RH2 and staff met to go through predesign alternatives and options. RH2 is working on producing the predesign report. Topographic surveying is done at both sites. Topo maps will be completed soon.

05 Design

12/18/2017 RH2 is working on detailed plans, specifications, and estimates.
1/9/2018 RH2 working on 60% bid docs for district review and coordination. Goal is to submit to district by the end of January 2018.
2/12/2018 District received 90% complete plans, specs, and cost estimate for final review before advertising for bids.

06 Bidding

3/1/2018 Advertisement for bids published in Bellingham Herald.
3/13/2018 Non-mandatory pre-bid meeting 2pm
3/16/2018 Addendum #1 issued.
4/12/2018 Bid opening 205pm. 3 bids received.
4/25/2018 Tentative award contract at Board meeting.

10 Construction

5/10/2018 Construction contract executed.
5/14/2018 Notice to proceed issued.
6/11/2018 Pre-construction meeting with contractor, District, SV, and County. Contractor is planning to mobilize onto site July 2, 2018.
10/11/2018 Substantial Completion Date of original contract. (150 calendar days from Notice to Proceed)

C1707 Level Transmitter Replacement and Beaver and Flat Car Pump Stations

Replace level transmitters. They are starting to lose sensitivity and will fail soon.

01 Administration

5/10/2017 Staff met with vendor to review new radar level sensor equipment. District will demo a unit at Sudden Valley Sewer Pump Station. If unit performs as expected, it could be the preferred solution at Flat Car and Beaver Pump Stations.
6/22/2017 District received demo unit and plans to install it at a non-critical pump station to test function, accuracy, reliability, etc. soon.
7/20/2017 Demo unit has been installed. District crew is beginning to evaluate the product and configuration options.
9/20/2017 Demo level transmitter worked great. District issued purchase order for two for installation at Beaver and Flat Car pump stations.
3/21/2018 Staff preparing bid documents to contract work.
3/28/2018 Purchase order sent to QCC to build and install electrical panels and equipment.
4/19/2018 Staff finalizing the bid package which will advertise in the next week or two. The construction contract scope is to modify electrical equipment, install conduit runs, wiring, installation, and configuration of new equipment.
5/21/2018 Panel fabrication done and in testing phase at panel shop. Staff scheduling supplier to deliver and install equipment.

06 Bidding

4/29/2018 Advertisement for bids published in Bellingham Herald.
5/8/2018 Non-mandatory pre-bid meeting held.
5/15/2018 Bid opening. 1 bid received.
5/30/2018 Contract award by board.

10 Construction

6/13/2018 Contract documents executed. Contractor and District coordinating start date.

C1708 - - Ball Check Valves at Airport and Beaver Sewer Pump Stations.

Install 2 ball check valves at Airport and 1 ball check valve at Beaver.

1/18/2017 District crew verified measurements of existing swing check valves. Proposed ball check valves will fit. Staff will order new ball check valves.

01 Administration

6/22/2017 District solicited quotes from 3 vendors. A purchase order has been issued for the ball check valves. They should arrive soon.

7/20/2017 District received ball check valves. District crews to install valves.

C1710 - - Eagleridge Fire Pump Controls

Develop scope of work and cost estimate to update fire pump controls to meet current electrical codes.

01 Administration

6/22/2017 The City has made some water system improvements in this vicinity. Wilson confirmed that City's normal water system pressure at Eagleridge is now 78 PSI. This is sufficient to decommission some or all of the pumps and fire pumps at Eagleridge. Hydraulic modeling shows that available fire flows would be above the required 750 GPM minimum without the fire pumps. District will be re-scoping this project to de-commission booster and fire pumps.

C1713 - - Eagleridge Booster Pump Station - Decommission Pumps

City's normal operating pressure was increased to about 78 psi. This is sufficient to decommission booster pumps. Project includes design report, obtaining DOH approval, and work performed by District crew.

01 Administration

6/22/2017 Staff investigating City water pressure. Booster station may no longer be needed.

7/20/2017 The City has made some water system improvements in this vicinity. Wilson confirmed that City's normal water system pressure at Eagleridge is now 78 PSI. This is sufficient to decommission some or all of the pumps and fire pumps at Eagleridge. Hydraulic modeling shows that available fire flows would be above the required 750 GPM minimum without the fire pumps. District will be re-scoping this project to de-commission booster and fire pumps. We will need to get DOH project approval to modify the booster station before any changes are made. Staff will begin preparing a project report and design for submittal to DOH.

C1716A Dead End Blowoffs - -

Installing new blowoffs on dead end mains

01 Administration

1/19/2017 Staff researching each site to determine detailed scope of work for each location.

5/25/2017 Crews continue to pick away at blow-off installation. 8 of 41 done.

6/22/2017 Crews installed a few more. 12 of 41 done.

7/20/2017 14 done.

11/20/2017 15 of 41 done.

12/18/2017 16 done.

3/21/2018 19 done.

4/19/2018 22 done.

5/21/2018 25 done.

6/19/2018 32 done.

C1716B Geneva Booster Station - PRV's and Backflow Assembly

Replace pumps at Geneva Booster Station at Scenic Ave with pressure reducing valves following hydraulic modeling verification. Replace old backflow assembly at City intertie.

01 Administration

2/27/2017 Wilson prepared engineer's brief sheet that includes details PRV sizing and configuration. Staff will begin preparing a bill of materials and order parts. It is anticipated District crews will perform the work.

6/22/2017 Staff coordinating with City on what they need for a backflow assembly.

7/20/2017 Staff considering COB suggestion to move intertie to top of ridge on Parkstone at COB/District boundary.

9/20/2017 District considered moving PRV station per City suggestion. There are more benefits to the District to keep the Geneva Booster building and infrastructure. District staff is preparing the design report and construction drawings for submittal to DOH for installation of a PRV. Project will be coordinated with the water comp plan update in progress. We still need to coordinate with the City before going too much further in design/planning.

C1801 Shake Alert Pilot Program

Integrate ShakeAlert earthquake early warning signal into SCADA system that will automatically close valve on new Division 22 Reservoir No. 2 and activate audible alarms at the Administrative Building, Shop, and Sudden Valley Water Treatment Plant.

01 Administration

1/25/2018 Staff reviewing USGS ShakeAlert License Agreement and Terms of Service and RH2 ShakeAlert Pilot Application scope of work.

5/14/2018 Staff reviewed scope of work and is working with RH2 to execute agreement.

5/30/2018 Agreement with RH2 executed.

6/18/2018 ShakeAlert application completed and submitted to USGS.

C1802 Edgewater, Dellesta, Euclid Sewer Pump Station Improvements

Replace/renew Edgewater and Dellesta sewer pump stations that were installed in the 1970's. Replace/renew electrical controls and install permanent standby generator at Euclid sewer pump station.

01 Administration

1/25/2018 Staff developing RFP for selection of engineering consultant. 1st phase will includes predesign and shorelines permitting in 2018.

2/10/2018 Request for Proposals published Bellingham Herald.

3/7/2018 RFP submittals due at 1pm. Distribute RFP's to selection committee by end of week.

3/22/2018 Consultant selection committee meets to review and rank consultant proposals.

3/29/2018 Board selects RH2 as the most qualified consultant for projects to board. Staff will begin scope/fee negotiations with the consultant.

5/21/2018 Staff working with RH2 on initial scope of work. Intent is to have board authorize scope/fee at 5/30/2018 board meeting.

6/14/2018 Agreement executed with RH2.

02 Predesign

6/18/2018 Surveyors beginning site survey at Euclid.

C1803 Camp Firwood Standby Generator

Recent severe snow/ice/wind weather events have made the process of getting a portable generator to the station difficult. The access road is a long steep gravel road that can have deep snow, ice, and downed trees blocking access. This project includes installing an automatic transfer switch and replacing the wood security fence around the station. A portable generator will be parked and wired to the ATS to automatically start during fall, winter, and spring months and would be removed when the camp is active during summer.

01 Administration

1/3/2018 Staff met with Camp Firwood maintenance staff to discuss pump station generator options. The simplest solution is to install an automatic transfer switch (ATS) and hookup a portable generator when the camp is closed to campers (fall, winter, and spring). This would provide automatic emergency power when we need it during the wet season. We can try this for several seasons. If it works as we think, we will not need a permanent generator at the site.

05 Design

2/27/2018 ATS sized by electrical engineer. Staff working procurement thru GSA.

C1805 Water Meter Registers

Replace remaining 1582 1st generation radio read meter registers still in service that had a design life of 10-years. New generation registers have a design life of 20-years.

01 Administration

3/20/2018 District placed order for 300 new meter registers.

C1808 Replace Tool Truck

Replace tool truck.

01 Administration

2/8/2018 Truck ordered off of state bid.
2/12/2018 Truck has been ordered using Washington State bid.
5/21/2018 Truck as been received. New radio, spot light, and safety lights are being installed.

C1809 - - Replace Backhoe

Replace backhoe

01 Administration

2/12/2018 Staff looking into equipment available on Washington State bid.
5/21/2018 Staff working with vendor on state bid to put together order.

C1810 Airport Sewer Pump Station Stationary Generator

Install stationary generator at Airport Sewer Pump Station.

01 Administration

4/19/2018 Staff review GSA quote and will be placing order soon. This will also include the ATS for Camp Firwood.

5/21/2018 Staff reviewed potential generator locations on site. The best place for installation is next to the control/electrical panels. This location, however, is not in the County road right-of-way, but on WWU Lakewood Facility land. Staff plans to try working with WWU to obtain an easement for the generator. This will require survey and engineering support from Wilson. A task order will be developed for Wilson to assist District staff in this process. An access easement to the District's Lakewood Sewer Pump Station serving WWU will also be part of the discussions.

05 Design

2/27/2018 Generator sizing completed by electrical engineer. Staff now working on site plans and GSA procurement of generator.

C1813 Division 7 Reservoir FEMA Seismic and ShakeAlert Grant Application

Revise FEMA grant application to include ShakeAlert components. Total grant could be as high as $1.1M

01 Administration

2/28/2018 Grant application submitted to FEMA.

4/19/2018 Staff heard that state level emergency management accepted the application and forwarded it on to the federal level.

C1814 - - Agate Height WTP and Opal Booster Upgrades

Increase treatment and pumping capacity from 30gpm to 60 gpm.

01 Administration

2/12/2018 Staff asked Wilson to prepare Task Order to assist with preliminary design and permitting.

3/28/2018 Staff and Wilson toured two treatment plants that have "Atec" iron/manganese removal package treatment plant systems at Pole Road Water Association. Tour facilitated project scope development with staff and Wilson.

4/19/2018 Task order scope of work is being developed by staff and Wilson. Once a draft is complete it will be presented to the Board for authorization.

M1811 Northshore Sewer Force Main Stream Crossing Protection

Ductile iron sewer force main pipe is exposed in stream bed on Northshore. Project scope includes permitting, design, and construction of pipe protection.

01 Administration

2/12/2018 Staff executed Wilson Task Order for per permitting and design phase.

M1812 CMOM Manhole, Wet Well, and Vault Pressure Grouting

Project to pressure grout several structures where infiltration was found.

01 Administration

4/19/2018 Crews working to identify and list structures that require pressure grouting that have infiltration problems.

M1818 Sewer ARV Maintenance

Test sewer ARVs throughout the system

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL
Item 7

DATE SUBMITTED:	June 20, 2018	MEETING DATE:	June 27, 2018
SUBJECT:	**Upcoming Events and Announcements**		
TO: BOARD OF COMMISSIONERS		FROM: Rachael Hope	
GENERAL MANAGER APPROVAL		BK	
DISTRICT ENGINEER/ASST MGR APPROVAL			
FINANCE MANAGER APPROVAL			
ATTACHED DOCUMENTS		1. Upcoming Events & Announcements	
		2.	
		3.	
TYPE OF ACTION REQUESTED		RESOLUTION ☐	FORMAL ACTION/ MOTION ☐ / INFORMATIONAL /OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT
Updated information from the Recording Secretary in advance of the Board meeting.

FISCAL IMPACT
None.

RECOMMENDED BOARD ACTION
None required.

PROPOSED MOTION
None.

LAKE WHATCOM WATER AND SEWER DISTRICT

Upcoming Dates & Announcements

Regular Meeting – Wed. June 27, 2018 – 8:00 a.m.

Important Upcoming Dates

Lake Whatcom Water & Sewer District			
Next Regular Board Meeting	Wed July 11, 2018	6:30 p.m.	Board Room
Next Employee Staff Meeting	Thu July 12, 2018	8:00 a.m.	Board Room Scheduled to Attend: Commissioner Todd Citron
Safety Committee Meeting	Tue July 10, 2018	8:00 a.m.	Small Conference Room
Finance Committee Meeting	Wed June 27, 2018	9:30 a.m.	Board Room
Lake Whatcom Management Program			
Policy Group Meeting	Mon Sept 17, 2018	3:00 p.m.	City of Bellingham's Fireplace Room 625 Halleck St *Enter through the Halleck St entrance*
Management Meeting	None Planned		Last meeting – March 28, 2018
Other Meetings			
Whatcom Water District's Caucus Meeting	Wed July 18, 2018	1:00 p.m.	Board Room

Other Announcements & Reminders

- **Committee Meeting Reports as Needed**: This is a place holder for Board and staff members to report on recent committee meetings, such as the Lake Whatcom Policy Group.

- **Upcoming Important Agenda Topics & Meetings:**

  - Bill has been in contact with Janice Corbin of Sound Employment Solutions, LLC regarding an all-staff Harassment/Bullying/Discrimination Training. The half day training is scheduled for September 6, 2018.
  - Commissioners are due for their quadrennial Open Public Meetings Act and Public Records Act refresher training. Commissioners Citron and Weide have completed the training individually. Please email completion certificates to Rachael when finished.