LAKE WHATCOM WATER AND SEWER DISTRICT
1220 LAKEWAY DRIVE
BELLINGHAM, WASHINGTON 98229

REGULAR MEETING
OF THE BOARD OF COMMISSIONERS

AGENDA

September 13, 2017

6:30 p.m. – Regular Session

1. CALL TO ORDER

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

3. ADDITIONS, DELETIONS, OR CHANGES TO THE AGENDA

4. CONSENT AGENDA

5. SPECIFIC ITEMS OF BUSINESS:

   A. Division 22 Reservoir – Project Close-out
   B. Country Club Sewer Pump Station – AE Agreement Amendment
   C. Abandonment of On-Site Sewer Disposal Systems Update
   D. Resolution 836 – Designating an Applicant Agent
   E. Water Comprehensive Plan Draft Review

6. OTHER BUSINESS

7. MANAGER'S REPORT

8. PUBLIC COMMENT OPPORTUNITY

9. Executive Session Per RCW 42.30.140(4) General Manager Performance Evaluation – 30 minutes

10. ADJOURNMENT

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 12, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Staff	MANAGER APPROVAL _____		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:	4		
SUBJECT:	Consent Agenda		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL:	1. See list below		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND/EXPLANATION

To be updated TNE 9/12/17

- Minutes for the August 9, 2017 meeting
- Accounts Payable Vouchers totaling $XXX,XXX.XX
- Payroll for Pay Period #19 (8/26/2017 through 9/8/2017) totaling $XX,XXX.XX
- Payroll Benefits for Pay Period #19 totaling $XX,XXX.XX

Lake Whatcom Water and Sewer District
Regular Session of the Board of Commissioners
August 30, 2017

Board President Laura Weide called the Regular Session to order at 8:02 a.m. Other District representatives present included Commissioners Todd Citron, Curtis Casey and John Carter; General Manager Patrick Sorensen; District Engineer Bill Hunter; Financial Manager Debi Denton, consulting engineer Melanie Mankamyer; and Recording Secretary Rachael Hope. Commissioner Bruce Ford had an excused absence. A list of interested participants is on file.

- Changes to Agenda

Hunter requested that item 5B, the Geneva Woods Developer Extension Agreement, be moved to the top of the agenda, as developer Murphy Evans was in attendance.

Action Taken
Weide moved, Curtis seconded, to move agenda item 5B, Geneva Woods Developer Extension Agreement, to the top of the agenda for immediate discussion. Motion passed.

- Geneva Woods Developer Extension Agreement

Hunter explained that the developer is diligently working on the installation of water and sewer infrastructure, but has not completed several items required for Final Acceptance of the agreement by the board. Hunter relayed the recommendation of the District's legal counsel, Bob Carmichael, that the Board not make any changes to the process outlined in the Developer Extension Agreement.

Murphy Evans, the developer for the Geneva Woods DEA, presented a case to the board for issuing a Water Availability Certificate before formal completion of the Agreement. His appeal centered on his infrastructure being complete, his October 1 deadline for breaking ground, and risk to the district being mitigated by his performance bond. Discussion followed.

Action Taken
Citron moved, Casey seconded, to authorize staff to issue Final Acceptance after all the requirements of the Developer Extension Agreement have been met; and to authorize the General Manager or Assistant General Manager to execute the Bill of Sale accepting the system after all agreement requirements are completed to satisfaction of staff. Motion passed.

- Consent Agenda

Action Taken
Weide moved, Casey seconded, approval of:

- **Accounts Payable Vouchers totaling $137,753.21**
- **Payroll for Pay Period #17 (7/29/2017 through 8/11/2017) totaling $40,042.94**
- **Payroll for Pay Period #18 (8/12/2017 through 8/25/2017) totaling $44,105.61**
- **Payroll Benefits for Pay Period #17 totaling $44,853.48**
- **Payroll Benefits for Pay Period #18 totaling $28,035.13**
- **Minutes for the August 09, 2017 Meeting**

Motion passed.

- Country Club Sewer Pump Station – Staff Recommendation

Hunter reported that preliminary results from the Hydraulic Fracture and Drilling Fluid Surface Release Evaluation indicate that horizontal directional drilling can be performed successfully and safely if done within the fluid evaluation recommended parameters. Staff recommended that the board authorize an amendment to the Agreement for A/E Professional Services with BHC Consultants, LLC to include geotechnical design as well as the fracture evaluation authorized by letter. Products developed in this scope of work will be utilized for permitting, detailed design, bid documents, and construction.

Action Taken
Ford moved, Citron seconded, to authorize the General Manager to execute Amendment #2 to Agreement for A/E Professional Services for Construction Club Sewer Pump Station Improvements with BHC for an amount not to exceed $119,687. Motion Passed.

- Ratification of Confidentiality Agreement with Administrative Assistant

Sorensen summarized the logic behind having the District's new Administrative Assistant sign a Confidentiality Agreement. The new Administrative Assistant has a background in Human Resources and Administration, and Sorensen hopes to utilize the position as a support person in matters that require confidentiality.

Action Taken
Citron moved, Casey seconded, to ratify the Confidentiality Agreement with the Administrative Assistant as written. Motion passed.

- Final Version of the North Shore Water Consolidation Report

Melanie Mankamyer of Wilson Engineering briefly presented the final version of the North Shore Water Consolidation report. An opportunity for questions followed.

Action Taken
Casey moved, Citron seconded, to accept the North Shore Water Consolidation Report and submit it to the Washington State Department of Health as completed. Motion passed.

- Monthly Budget Analysis

The Board briefly discussed the Monthly Budget Analysis for July.

- Summary of Existing District Projects

Hunter gave a brief update with visual aids of two district projects coming to completion: the Division 22 Reservoir and the Sudden Valley Culvert. He also reported on a small sewer overflow that occurred on August 26 and was successfully contained by the district.

- Manager's Report

Sorensen reminded the Board about upcoming events and agenda items for future meetings.

With no further business, Weide adjourned the Regular Session at 9:28 a.m.

Recording Secretary, Rachael Hope

Date Minutes Approved

Laura Weide

Todd Citron

Bruce R. Ford

Curtis J. Casey

John Carter

LAKE WHATCOM WATER AND SEWER DISTRICT
BOARD OF COMMISSIONERS

MEETING SIGN-IN SHEET
(SUBJECT TO PUBLIC DISCLOSURE)

MEETING DATE: Aug 30, 2017

NAME	ADDRESS/ BUSINESS
Murphy Evan	MJ General LLC

05b

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 7, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Bill Hunter	MANAGER APPROVAL		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:	5.A.		
SUBJECT:	Division 22 Reservoir – Project Close-out		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1.		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

Staff is anticipating T Bailey, Inc. will have completed all contract requirements and punch list items prior to the Board meeting. Staff will give a verbal update at the meeting and tentatively recommend accepting the Division 22 Reservoir No. 2 Project as complete.

FISCAL IMPACT

Original Construction Contract *(T Bailey, Inc.)*	$1,292,650.00	
CO#1 *(Add 42 calendar days to contract time)*	$0	
CO#2 *(Add 7 calendar days to contract time)*	$0	
CO#3 *(Final adjustment of unit price quantities)*	($27,309.22)	-2.1%
Total Construction Cost	$1,265,340.78	
8.5% Sales Tax	$107,553.97	
Grand Total Including Sales Tax	$1,372,894.75	

RECOMMENDED BOARD ACTION

See proposed motion.

PROPOSED MOTION

Accept the Division 22 Reservoir No. 2 Project as complete and direct staff to close out the project.

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 7, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Bill Hunter	MANAGER APPROVAL		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:	5.B.		
SUBJECT:	Country Club Sewer Pump Station		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. Draft AE Agreement Amendment #3		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

Draft Amendment #3 to the Architectural/Engineering Agreement with BHC Consultants includes the scope of work for detailed design drawings, specifications, cost estimates, and additional permitting for horizontal direction drilling a gravity sewer main from Country Club Sewer Pump Station to Ranch House Sewer Pump Station.

FISCAL IMPACT

At the July 12, 2017 Board meeting, BHC and their subconsultant GeoEngineers presented various improvement alternatives for Country Club Sewer Pump Station. The District selected Alternate 3 – HDD as the preferred alternative. Below are the estimated costs that were presented:

	Alt 1 Pump Station Rehab	Alt 2 Pump Station Replacement	Alternate 3 HDD	Alternate 4 CAB
Survey, Design, Plans, Specs, Bid	135,000	135,000	125,000	130,000
Geotech Eng and Permitting	20,000	20,000	65,000	50,000
Services During Construction	80,000	80,000	50,000	100,000
Geotech Observation	-	-	25,000	25,000
Construction Contract	430,000	480,000	435,000	485,000
Total Project Estimate	**665,000**	**715,000**	**700,000**	**790,000**

The scope of work beginning with the original agreement through Draft Amendment #3 includes detailed design, plans, specs, estimates, additional permitting, and services through bidding for horizontal direction drilling. The total price of the agreement with BHC, including Draft Amendment #3, is $205,216.

Comparing this to estimates presented at the July 12, 2017 meeting, the cost for engineering through bidding increased by $15,000. The July 12 estimate was $190,000 (the top two rows, $125k + 65k). Part of the increase is the inclusion of a place holder for an archaeologist that might or might not be necessary.

The 2017 approved budget includes $153,093 for design, permitting, and bidding. The District will need to allocate an additional $55,000 in the 2017 budget for engineering design and permitting.

The estimates for Services During Construction ($50k), Geotech Observation ($25k), and Construction Contract ($435k) are still the best available estimates to date. These estimates will become more accurate as permitting and design progress. This fall, staff will include these costs in the 2018 budget. Construction is anticipated to occur summer 2018.

RECOMMENDED BOARD ACTION

See proposed motion.

PROPOSED MOTION

Authorize the general manager to execute Amendment #3 to Agreement for A/E Professional Services for Construction Club Sewer Pump Station Improvements with BHC for a not to exceed amount of $205,216 and;

Allocate an additional $55,000 of capital improvement funds toward the design and permitting of Country Club Sewer Pump Station Improvements Project for a total 2017 budgeted amount of $208,093.

AMENDMENT 3
TO
AGREEMENT FOR A/E PROFESSIONAL SERVICES
FOR
COUNTRY CLUB SEWER PUMP STATION IMPROVEMENTS

AN AGREEMENT, was made and entered into by and between Lake Whatcom Water and Sewer District, Whatcom County, Washington, hereinafter referred to as "District", and **BHC Consultants, LLC** ("Consultant"), a corporation with a place of business at **1601 Fifth Avenue, Suite 500, Seattle, WA 98101**, collectively referred to as "Parties", effective **September 20, 2016.**

WHEREAS, the District solicited for professional services as required by RCW 39.80; and

WHEREAS, the Consultant has started work on Task 1 – Project Management, Task 2 – Predesign Requirements and Criteria, Task 3 – Surveying, and Task 4 – Permitting as described in the original scope of work; and

WHEREAS, during the pre-design process for the Country Club Sewer Pump Station Improvements District staff explored the conceptual feasibility of eliminating the pump station and instead installing a gravity sewer using horizontal directional drilling (HDD) methods. The District and BHC Consultants have confirmed there is enough elevation change from Country Club Sewer Pump Station to Ranch House Sewer Pump Station for a gravity sewer pipe. In order to proceed with HDD as a design alternative the District needs to field verify if subsurface soils are adequate. The District requested BHC Consultants to prepare a scope of work and fee estimate to perform exploratory borings along the proposed alignment (Task 7); and

WHEREAS, the task, scope, and fee related to detailed pump station design, plans, specifications, and cost estimate titled "Task 5 – Plans, Specifications, and Probable Cost Opinions" is deleted from the agreement;

WHEREAS, upon completion of Task 7, horizontal directional drilling (HDD) was determined to feasible and the preferred alternative selected by the District contingent on the results of a Hydraulic Facture and Drilling Fluid Surface Release Evaluation. This analysis was authorized by the Board of Commissioners at the July 26, 2017 meeting for an amount not to exceed $3,000. Staff authorized BHC (and GeoEngineers as a subconsultant) to perform the analysis by letter;

WHEREAS, preliminary consideration of Hydraulic Fracture and Drilling Fluid Surface Release by the consultant indicates that this risk is manageable with good drilling practices and monitoring flow and pressures during drilling. Other detailed design considerations such as the proximity of the condominium buildings to the drilling alignment present higher priority design challenges. Task 8 includes the fluid evaluation authorized by letter on August 10, 2017 as well as additional geotechnical design needed for permitting, detailed design, specifications, and construction cost estimate for bidding and construction;

WHEREAS, Task 4 - Permitting scope of work is revised to reflect additional permitting requirements for horizontal direction drilling;

WHEREAS, Task 5 – Plans, Specifications, and Probable Cost of Opinions scope of work is added to the agreement for horizontal directional drilling a gravity sewer main from Country Club Sewer Pump Station to Ranch House Sewer Pump Station;

The Parties amend the original Agreement as follows:

SECTION 1: PERIOD OF PERFORMANCE

Task 4 – Permitting and Task 5 Plans, Specs, Cost Estimates shall be completed on **April 27, 2018,** unless extended or terminated earlier by the District pursuant to the terms and conditions of the Agreement.

SECTION 8: COMPENSATION

The Total Price is amended to **Two Hundred Five Thousand Two Hundred Sixteen DOLLARS ($205,216)**.

Original Agreement		
Tasks 1 – Project Management	$	7,198
Tasks 2 – Predesign Requirements and Criteria	$	27,640
Tasks 3 – Surveying	$	674
Tasks 4 – Permitting	$	6,410
Tasks 5 – Plans, Specs, Costs	$	78,109
Tasks 6 – Assistance with Bidding and Award	$	4,010
Other Direct Costs	$	29,052
Subtotal Original Agreement	*$*	*153,093*
Amendment 1		
Delete Task 5 – Plans, Specs, Costs	$	(78,109)
Add Task 7 – HDD Exploratory Drilling	$	25,000
Subtotal Amendment 1	*$*	*(53,109*
Amendment 2		
Add Task 8 – HDD Geotechnical Design Services	$	19,694
Amendment 3 (this amendment)		
Add Task 5 – Plans, Specs, Costs (for HDD)	$	50,480
Revise Task 4 – Increase Permitting Scope		
GeoEngineers	$	23,668
Archaeologist (Estimated)	$	8,250
Other Direct Costs	$	3,140
Subtotal Amendment 3	*$*	*85,538*
Amended Total Price	**$**	**205,216**

EXHIBITS

Exhibit A – Scope of Work. Add attached Exhibit A Amendment to Contract #C1611 and GeoEngineers Supplemental Scope and Fee Estimate dated 9/5/2017.

Exhibit B – Project Budget. Add attached Exhibit B Project Budget for Tasks 4 and 5 dated 9/7/2017.

This Amendment to the Agreement shall be executed in two (2) counterpart copies, any of which shall be considered for all purposes as the original.

IN WITNESS WHEREOF, the Parties hereto have caused this Amendment to the Agreement to be executed by their respective authorized officers or representatives as of the day and year written below.

Lake Whatcom Water and Sewer District

By:_____
(Patrick Sorensen, General Manager)

Dated:_____

Consultant

By:_____

Printed Name: Ron Dorn, PE

Title: Exec Vice President

Dated:_____

APPROVED AS TO FORM:

By:_____
(Robert Carmichael, Attorney for Lake Whatcom Water and Sewer District)

Dated: _____

EXHIBIT A

AMENDMENT TO CONTRACT #C1611

Lake Whatcom Water and Sewer District
Country Club Sewer Pump Station Improvements

PROJECT DESCRIPTION:

The Country Club Sewer Pump Station (CCPS) Improvements was originally scoped to include replacement of the Smith & Loveless top-mounted pump station with new submersible pumps, valves, controls, and telemetry. The station is located adjacent to the condominiums along Marigold Drive in Sudden Valley, Whatcom County, Washington. Following the previously authorized geotechnical soil investigations and analysis to determine feasibility, Horizontal Directional Drilling (HDD) was determined the best approach to convey sewage from Country Club Sewer Pump Station to Ranch House Sewer Pump Station by means of a gravity sewer. Therefore, this amendment addresses modifying the design from CCPS upgrades to HDD installation.

TASK BREAKDOWN:

Task 4: Permitting

1. Prepare Permit Plan identifying permits, regulatory authority, application requirements, agency review process, timeframe, triggering actions, permitting agency key contacts, and permit application fees.

2. Prepare site plan identifying locations of critical areas and buffers, location of proposed structures and construction activities including clearing and grading and general topographic information.

3. Prepare permit applications in draft form for District submittal.

4. Schedule and conduct meetings with permitting agencies as required. Prepare agendas and summary meeting notes.

5. Assist District with discussions and negotiations with permitting agencies.

6. Provide support to the District during discussions and negotiations with permitting agencies.

7. Permitting as required with HDD sewer pipe installation. Details of the additional permitting can be found in the attached GeoEngineers Supplemental Scope and Fee Estimate, dated September 5, 2017.

Products:

- Permit Plan
- Draft and Final SEPA Checklist and Shoreline Application and Natural Resource Assessment Submittal Checklist, if applicable
- Other Draft Permit applications for District submittal
- Draft and Final Aquatic Critical Areas and Shoreline Assessment Report, if applicable
- Agendas, presentation materials, meeting notes, and action item lists for meetings with permitting agencies
- Permits as discussed in the Supplemental Scope and Fee Estimate, GeoEngineers, September 5, 2017

Assumptions and Limitations:

- District staff will submit applications and pay permit fees
- District staff will prepare some application paperwork (generating the notification mailing list, posting signage, etc).
- Archeological services may be required for certain permits. These services have not yet been scoped, but if needed, will be issued as an amendment to Task 4.
- Wetland mitigation services may be required for the project should wetlands be impacted. These services have not yet been scoped, but if needed, will be issued as an amendment to Task 4.

Task 5: Plans, Specifications and Probable Cost Opinions

1. Prepare construction drawings in accordance with District standard specifications and standard plans as appropriate.

2. Prepare project requirements using the new CSI numbering format. Project requirements will include definition of requirements for the construction contractor regarding the following:

    - Sequence of Construction
    - Measurement and Payment
    - Construction Surveys
    - Regulatory Requirements
    - General Safety Requirements
    - Project Data Submittals
    - Operation and Maintenance Manuals
    - Testing and Quality Control
    - Temporary and Construction Facilities

- Protection of and Connection to Existing Utilities
- Consideration of Residents and Businesses
- Easement and Construction Limits
- Construction Cleaning
- Trespass
- Protection of Materials and Equipment
- Product Options and Substitutions
- Facility Startup and Testing
- Project Record Documents

3. Prepare technical specifications in accordance with the District, WSDOT, APWA, and AWWA standard specifications with additional requirements where necessary. Technical specifications will include sections necessary to define and control the construction materials and appropriate methods and will be prepared in the new CSI numbering format.

4. Submit 75 percent design documents to the District for review.

5. Meet with District staff to review the 75 percent documents.

6. Incorporate District review comments and prepare 100 percent design. Documents will include general requirements, project requirements, technical specifications, and drawings.

7. Submit 100 percent design documents to the District for review.

8. Conduct in-house quality control review of drawings and Project Manual.

9. Prepare bid and contract documents for inclusion in the Project Manual.

10. Incorporate District review comments and prepare drawings and Project Manual suitable for advertisement and bidding. Project Manual will include the following:

    - Bidding Documents
    - Contract Documents
    - General Requirements
    - Project Requirements
    - Technical Specifications
    - Prevailing Wage Rates
    - Construction Drawings (half size)

11. Develop opinion of probable construction cost for the facilities included in the design documents to be used for bidding.

12. Provide a local plan center (WCR Plan Center) with a PDF set of bid documents.

Products:

- 75 percent plans and specifications
- 100 percent plans and specifications
- Project Manuals suitable for advertisement and bidding
- Opinion of Probable Construction Cost
- PDF set of bid documents to WCR Plan Center

Assumptions and Limitations:

- District's General Conditions will be used.
- One site visit involving the Project Manager and Project Engineer, and an additional site visit involving the Project Engineer only are anticipated.
- Additional surveying services may be required for the project based on the results of the Geotechnical HDD Design. These services have not yet been scoped, but if needed, will be issued as an amendment to Task 3 of the original contract.

GeoEngineers
600 Dupont Street
Bellingham, Washington 98225
360.647.1510

September 5, 2017

BHC Consultants LLC
1601 Fifth Avenue, Suite 500
Seattle, Washington 98101

Attention: Erika Schuyler, PE

Subject: Supplemental Scope and Fee Estimate
Permitting Services
Country Club Sewer Pump Station Improvements Project
Sudden Valley, Whatcom County, Washington
File No. 0430-013-00

INTRODUCTION AND PROJECT UNDERSTANDING

GeoEngineers, Inc. (GeoEngineers) is pleased to present this supplemental scope and fee estimate to provide critical areas assessment and permitting assistance services to BHC Consultants, LLC (BHC) for the Lake Whatcom Water and Sewer District (LWWSD) Country Club Sewer Pump Station Improvements Project along Marigold Drive in Sudden Valley of Whatcom County, Washington. This supplemental scope and fee estimate, describes additional services that will be required to permit the Horizontal Directional Drilling (HDD) installation of a new sewer line, in addition to those services described in our scope and fee dated October 3, 2016 for improvements to the existing pump station.

We understand that LWWSD has evaluated replacement of the Country Club Sewer Pump Station or installation of a new gravity sewer line between the Country Club Pump Station and Ranch House Pump Station, and has selected an HDD installation of a new 8-inch-diameter line as the preferred alternative. The new line will be approximately 600 feet between connection points and have a uniform gradient between about 2 and 3 percent.

The project involves evaluation and selection of improvements, development of construction plans and specifications, and construction engineering services. Preliminary tasks include identification and evaluation of design alternatives, development of opinions of probable cost, coordination with the public (including a public involvement workshop with appropriate neighbors and community members), selection of preferred alternatives, development of a Preliminary Design Report, 30 percent design drawings, and assistance with required permits and approvals. After selection of a preferred alternative and development of preliminary designs, final plans and specifications will be developed, and bidding assistance and construction engineering services provided. This scope of services is for critical areas assessment and permitting assistance services through final design and up to bidding, but does not include construction phase.

SCOPE

The purpose of our services is to provide supplemental critical areas evaluation and environmental permitting support services for the proposed project through 30 percent design and final permit submittal. Below are descriptions of activities already completed and additional scope and budget authorizations for each task. The additional scope and budget is based on a conservative impact scenario that will be required to permit the HHD installation of the new sewer line.

Task 0100 – Aquatic Critical Areas and Shoreline Reconnaissance (Previously Completed)

The purpose of our aquatic critical areas and shoreline reconnaissance was to rapidly assess the proposed project area for the presence of wetlands, stream and/or shorelines.

GeoEngineers has already completed a site visit with Bill Hunter, of the LWWSD and Erin Paige, of Whatcom County Planning and Development. No critical areas were flagged in the field, but a sketch of potential stream, Lake OPHWM and wetlands was provided to BHC and LWWSD. Whatcom County issued a letter summarizing anticipated assessment and permitting requirements. GeoEngineers also produced a permitting memo/matrix for the various design options (e.g., replace pump station in the same place, replace pump station [to the southwest], auger bore, horizontal directional drilling).

We do not anticipate any supplemental/additional subtasks under Task 100.

Task 0200 – Aquatic Critical Areas and Shorelines Delineation

GeoEngineers has not completed Aquatic Critical Areas and Shorelines Delineation services yet. The original scope of services assumed delineating all critical areas within 100 feet of the project area (including up to two wetlands). The original project area was much smaller, only including the existing pump station and areas along an existing paved roadway. The new HDD installation alignment has the potential to impact a large wetland and a stream (outlet of Lake Louise) on the east side of the HDD, some small potential wetlands within the golf course on the west side of the HDD (identified as potential wetlands from aerial photographs) and a small seasonal stream near the existing pump station. See the attached figure showing the approximate assessment area along the HDD alignment.

To assess critical areas within the larger impact footprint (including pipe laydown areas) and document their condition, characteristics, ratings and functions we assume that up to six wetlands may be identified and will need to be delineated, rated and functionally assessed. In addition, we assume identifying the ordinary high water mark (OHWM) of Lake Louise and of two streams within the assessment area.

Field Delineation (methods for original and supplemental scope)

- If wetlands and/or streams are identified within 100 feet of the project area we will flag wetland boundaries and the OHWM of streams, and conduct formal wetland test plots in the field. We assume that the centerline of small drainages will be picked up by survey. The location of flags will be picked up with a GPS unit.
- For wetlands and/or streams identified within 100 feet of the project area the classification/category of wetland and/or stream habitat identified and the associated regulatory buffer identified in accordance with the Whatcom County Critical Areas Ordinance (WCC 16.16) and Whatcom County Shoreline Master Program (Title 23). Whatcom County requires that "Wetland categories shall be based on the criteria provided in the Washington State Wetland Rating System

for Western Washington, revised August 2004 (Ecology Publication No. 04-06-025), as identify using the appropriate rating forms contained in that publication." (16.16.610 [D] Designation, rating, and mapping – Wetlands).

Reporting

- Complete a draft and final Aquatic Critical Areas and Shoreline Assessment Report according to Whatcom County reporting requirements. Reports will summarize our methodology and our field reconnaissance results. Wetland and stream ratings and suggested buffers will be included in the report and will be based on current guidance in Whatcom County Code.
- Prepare associated data sheets, rating forms and photographs documenting habitat features and their characteristics. These elements will be included as appendices to the main body of the report.

Assumptions

- Budget assumes up to four additional wetlands will be assessed, delineated and rated, for a total of six wetlands (original budget assumed two wetlands would be assessed, delineated and rated).
- Flags within forested areas may be difficult to pick up with a GPS unit. The location of these flags could be off by 10 feet or more because of poor satellite reception.

Deliverables

- Draft and Final Aquatic Critical Areas and Shoreline Assessment Report, with increased assessment area (electronic PDF and up to 3 hard copies).

Task 0300 – Environmental Permitting Assistance

GeoEngineers will provide environmental permitting assistance for project design and construction support to assist with applicable local permitting requirements. The original scope of services assumed that no federal or state permits would be required, and that the only potential impacts to critical areas from the project will be maintenance work conducted within shoreline jurisdiction and/or critical area buffers.

GeoEngineers has already participated in a pre-application meeting with LWWSD and BHC and has participated in several conference calls to discuss permitting with the project team.

Deliverables for Task 300 in our original scope of services included a draft and final SEPA checklist, Shoreline Application and Natural Resource Assessment Submittal Checklist (electronic PDF and up to 3 hard copies). These three local permit deliverables have not yet been developed and the remaining authorizations under Task 300 will be adequate to complete these local permit applications.

This supplemental scope of services assumes that the project will result in permanent and temporary impacts to wetlands, streams and their buffers. Below is a summary of anticipated additional permitting services for the HDD option.

State and Federal Permitting

GeoEngineers will complete the following permit applications and supporting materials to satisfy submittal requirements for anticipated state and federal permits:

- JARPA form (BHC will provide JARPA drawings). JARPA will be used to apply for:
  - Shoreline Permit (local)
  - Hydraulic Project Approval
  - 401 Water Quality Certification
  - USACE Section 404 Permit
- Wetland, Stream and Buffer Mitigation Plan
- Biological Evaluation/Assessment

Meetings, Agency Coordination and Communication

- Participate in four conference calls (up to 1 hour each) to discuss permitting with the project team.
- Discuss permitting requirements and project details with State and Federal agencies.
- Address comments on draft materials.

Assumptions

- The LWWSD will pay all permit fees.
- This scope and fee includes permitting services up to 30% design, permit submittal and addressing agency comments and requests for additional information on submitted permit materials. This scope of services does not include 60-100 percent design services, development of specifications or construction observation/support. This scope of services also does not include redeveloping permit materials if designs change significantly after permit materials have been prepared.
- Mitigation site to compensate for permanent wetland, stream or lacustrine impacts will be provided by LWWSD.
- The project will impact waters of the state and waters of the United States. Permanent impacts to wetlands will be minimized and the majority of impacts will be to emergent wetlands, where impacts can be considered temporary. Permanent impacts will need to be mitigated.
- Washington State Department of Fish and Wildlife (WDFW) review and approval of the project required (Hydraulic Project Approval [HPA]).
- United State Army Corps of Engineers (USACE) review of the project will be required (Section 404 permit).
- 401 Water Quality Certification will be required for the project, administered by the Washington State Department of Ecology (Ecology).
- BHC will prepare the necessary figures, including 30% permit drawings for the local permit package and JARPA drawings for the state and federal permit package.
- BHC will provide a detailed project narrative to support development of permit materials.
- A Cultural Resources Report/Survey will be prepared by others to satisfy SEPA and USACE permitting.
- No additional technical supporting documentation other than what is provided in this scope of work will be required to support JARPA package.

Deliverables

- Draft and Final JARPA form (electronic PDF and up to 3 hard copies)
- Draft and Final Wetland, Stream and Buffer Mitigation Plan
- Draft and Final Biological Evaluation/Assessment

SCHEDULE, TERMS AND BUDGET

GeoEngineers is available to begin our services promptly upon receipt of notice to proceed. An Aquatic Critical Areas and Shoreline Assessment Report can be produced within 3 weeks of receiving notice to proceed. If this schedule does not meet your needs, please contact us regarding any modifications that will allow you to meet your time schedule.

We propose to complete the above described services on a cost plus fixed fee basis in accordance with the rates in the attached fee estimate. We estimate that our fee will be $21,516. For a fee breakdown by task see Table 1 below. We will only invoice for those services performed. We will keep you apprised of project status and conditions that may significantly affect our scope and estimate, and will not exceed this budget without written authorization.

TABLE 1. ESTIMATED FEE

Tasks	Original Estimated Fee	Supplemental Estimated Fee
Task 100 – Aquatic Critical Areas and Shoreline Assessment Reconnaissance	$ 3,550	$ 0
Task 200 – Aquatic Critical Areas and Shorelines Delineation	$ 5,200	$ 3,999
Task 300 – Permitting Assistance	$ 8,100	$ 17,517
Budget Totals	**$ 16,850**	**$ 21,516**
Total Revised Permitting Budget		**$ 38,366**

There are no intended third-party beneficiaries arising from the services described in this proposal and no party other than the party executing this proposal shall have the right to legally rely on the product of our services without prior written permission of GeoEngineers.

This proposal is valid for a period of 60 days commencing from the first date listed above and subject to renegotiation by GeoEngineers, Inc. after the expiration date.

We appreciate the opportunity to present this proposal and look forward to working with you and the rest of the team on this project. Formal authorization for our services can be provided by returning one signed copy of the attached task order. Please call if you have questions.

Sincerely,
GeoEngineers, Inc.

Fiona McNair, MS, PWS
Biologist

Joe Callaghan, MS, PWS
Associate Biologist

FMM:JOC:tln

Attachments:
Subconsultant Fee Estimate – Estimate of Costs by Task & Staff Member
Subconsultant Fee Estimate – Direct Salary Cost (DSC)
Subconsultant Fee Estimate – Min/Max Labor Rates Table-Actuals Not to Exceed (NTE)

One copy submitted electronically

Exhibit B - Project Budget
Lake Whatcom Water & Sewer District
Country Club Sewer Pump Station Improvements
Amendment to Contract #C1611 - HDD Gravity Pipe to Ranch House - Task 4 and Task 5

EXHIBIT B

Task	Description	Principal In Charge - QA/QC 244.00 Ron Dorn Hours	Principal In Charge - QA/QC 244.00 Ron Dorn Cost	Project Manager/ Sr. Engineer 167.00 Erika Schuyler Hours	Project Manager/ Sr. Engineer 167.00 Erika Schuyler Cost	Project Engineer 126.00 Kenneth Gray Hours	Project Engineer 126.00 Kenneth Gray Cost	Electrical Engineer 214.00 Jeff Gibson Hours	Electrical Engineer 214.00 Jeff Gibson Cost	Structural Engineer 222.00 Ken Dahl Hours	Structural Engineer 222.00 Ken Dahl Cost	CAD Drafter 100.00 Glenn Castillo Hours	CAD Drafter 100.00 Glenn Castillo Cost	Clerical Support 85.00 Sarah Sifferman Hours	Clerical Support 85.00 Sarah Sifferman Cost	TOTAL Hours	TOTAL Cost
5	HDD Gravity Pipe to Ranch House																
5.1	Site Visits		$ -	4	$ 668	4	$ 504		$ -		$ -		$ -		$ -	8	$ 1,172
5.2	Coordination with GeoEngineers (borings)	2	$ 488	8	$ 1,336		$ -		$ -		$ -		$ -		$ -	10	$ 1,824
5.3	75% Construction Drawings		$ -	17	$ 2,839	68	$ 8,568		$ -	10	$ 2,220	111	$ 11,100		$ -	206	$ 24,727
5.4	Project Requirements		$ -	4	$ 668	8	$ 1,008		$ -		$ -		$ -		$ -	12	$ 1,676
5.5	Technical Specifications		$ -	16	$ 2,672	24	$ 3,024		$ -	4	$ 888		$ -	8	$ 680	52	$ 7,264
5.6	Submit 75% Design		$ -		$ -	1	$ 126		$ -		$ -		$ -		$ -	1	$ 126
5.7	Review of 75% Design w/District		$ -	4	$ 668	4	$ 504		$ -		$ -		$ -		$ -	8	$ 1,172
5.8	Prepare 100% Design		$ -	4	$ 668	17	$ 2,142		$ -	2	$ 444	25	$ 2,500	8	$ 680	56	$ 6,434
5.9	Submit 100% Design		$ -	1	$ 167	2	$ 252		$ -		$ -		$ -		$ -	3	$ 419
5.10	QA/QC Measures	4	$ 976	2	$ 334		$ -		$ -		$ -		$ -		$ -	6	$ 1,310
5.11	Prepare Bid Documents		$ -	2	$ 334	4	$ 504		$ -		$ -	4	$ 400	4	$ 340	14	$ 1,578
5.12	Prepare Docs for Ad/Bidding		$ -	1	$ 167	2	$ 252		$ -		$ -		$ -	4	$ 340	7	$ 759
5.13	Opinion of Probable Cost		$ -	1	$ 167	4	$ 504		$ -	2	$ 444	4	$ 400		$ -	11	$ 1,515
5.14	Production of Documents		$ -	1	$ 167	2	$ 252		$ -		$ -		$ -	1	$ 85	4	$ 504
	Sub-Total	**6**	**$ 1,464**	**65**	**$ 10,855**	**140**	**$ 17,640**	**0**	**$ -**	**18**	**$ 3,996**	**144**	**$ 14,400**	**25**	**$ 2,125**	**398**	**$ 50,480**
Total Direct Labor		**6**	**$ 1,464**	**65**	**$ 10,855**	**140**	**$ 17,640**	**0**	**$ -**	**18**	**$ 3,996**	**144**	**$ 14,400**	**25**	**$ 2,125**	**398**	**$ 50,480**
Other Direct Costs																	
Surveying Subconsultant - Larry Steel and Associates (LSA) (NOT YET SCOPED, PENDING GEOTECHNICAL DESIGN REPORT RESULTS, WOULD BE ADDITIONAL TASK 5 ITEM)																	$ -
TASK 4 Environmental Permitting Subconsultant - GeoEngineers (ADDITIONAL TO THE AMENDMENT #1 FEE)																	$ 23,668
Geotechnical Subconsultant - GeoEngineers (PREVIOUSLY SCOPED IN AMENDMENT #2)																	$ -
Archaeologist Subconsultant - ESTIMATE, TO BE CONFIRMED, WOULD BE ADDITIONAL TASK 4 ITEM																	$ 8,250
Printing																	$ 1,186
Communications (3% of BHC Total Direct Labor)																	$ 1,514
Travel Costs - 2 trips x 200 miles average																	$ 440
TOTAL ODC																	$ 35,058
GRAND TOTAL																	$ 85,538

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 6, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:	5.C.		
SUBJECT:	Abandonment of On-Site Sewer Disposal Systems Update		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL:	1. August 18, 2016 Board Minutes		
	2. Marked Up Resolution # 828		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

In 2016 District staff identified 8 properties in Geneva connected to individual septic systems, despite their being located in the ULID #18 service area adjacent to public sewer lines. For various reasons these had not been compelled to connect to ULID #18.

In June 2016 this information was communicated to the Board of Commissioners for policy direction. On August 18, 2016 the Board reaffirmed the District's long-standing policy requiring sewer connection by adopting Resolution #828 (see attached meeting minutes & resolution). The following is an update of progress made over the last year:

- In September 2016, the District sent a letter to each property owner via certified mail explaining our policy regarding required connection to public sewer from septic systems. The letters contained connection cost information, and the property owners were given one year (until September 2017) to connect. If they did not connect on their own the District would look into connecting them and placing a lien on their property to pay the District back. The property locations include:

  - 1220 Lakeview Street
  - 1213 Lakeview Street
  - 4815 Fremont Street
  - 975 Geneva Street
  - 4354 Lake Hill Lane
  - 935 Lakeview Street

- 2790 Lake Whatcom Blvd.
- 2656 North Shore Road

- Over the last year the District has heard very little from most of the property owners. However, we have learned that the following have either been connected or will be by the end of September:

  - 1220 Lakeview Street – Connected
  - 4815 Fremont Street – Being connected the week of September 5

- On August 15, 2017, the District mailed a second letter to each of the properties which are still not connected. We learned of one property sale to someone out of state and a couple wrong addresses. However, we have had contact with the all of the remaining property owners since the second mailing. There seems to be a stronger interest by some to willingly connect. Because the County building window will be closing October 1 we will be adjusting our project completion for the other properties to June 2018. As discussed last year, we will likely have to compel some of the remaining 6 properties by making the connections ourselves and placing a lien on those who do not, or cannot, pay the connection and construction costs at that time.

- In our most recent efforts we also discovered that 2 of the remaining 6 properties (2790 North Shore Road & 935 Lakeview Street) had not been included in and assessed the original ULID #18 fees. Because of this, the cost calculation for connection we provided to them in the original September 2017 letter ($5,316.00) did not include ULID #18 late comer's fees and latecomer interest penalty charges. Through discussions with legal counsel Bob Carmichael, we concluded that District staff is required to apply the same assessment fees charged to all of the beneficiaries of ULID #18 and therefore the previously provided connection cost estimates for those two properties must be adjusted to include the ULID #18 assessment and latecomer penalty. This conclusion is based on Resolution No. 672, which requires latecomers to pay their share of the assessments and a latecomer penalty established in a table attached to Resolution No. 672. The total cost per lot of the ULID #18 assessment is $2,792.78 and the latecomer penalty (year 2017) is $3,979.71. Fortunately, the other 6 properties have either paid their assessment off, or they are paying it annually. However, for the 2 properties that have not been assessed, the District will need to notify the owners the above ULID #18 assessment and latecomer penalty must be added to the cost of connection set forth in the original letter, unless the Board otherwise directs.

- It is possible that the property owner associated with 2790 North Shore Road may be in attendance to express their concern regarding the late interest charge.

FISCAL IMPACT

The final fiscal impact is not available at this time as some property owners are paying for their own connection and others may have the District pay for the connection and lien their property.

RECOMMENDED BOARD ACTION

This report is intended to be an update on this project and some of the issues we have faced. However, Bob suggests that for the record, the Board reaffirm its intent (per Resolution No. 672) that staff seek collection of the assessment ($2,792.78) and latecomer penalty ($3,979.71) for the two unassessed properties under ULID #18, in addition to the cost of connection for unconnected property described in Resolution #828 on August 18, 2016 ($5,316.00). Bob Carmichael will also be available to address any questions at the September 13 meeting.

PROPOSED MOTION

A motion to reaffirm the Board's August 2016 intent.

Lake Whatcom Water and Sewer District
Special Meeting of the Board of Commissioners
August 18, 2016

Acting Board President Todd Citron called the Special Session to order at 6:30 p.m. Other District representatives present included Commissioners Curtis Casey and Bruce R. Ford, General Manager Patrick Sorensen, District Engineer Bill Hunter, consulting engineer Melanie Mankamyer, legal counsel Robert Carmichael and Finance Manager and Recording Secretary Debi Denton. Commissioner Weide was excused from the meeting. There were no members of the public present.

- Consent Agenda

Action Taken

Casey moved, Ford seconded, approval of:

- **Accounts Payable Vouchers totaling $132,485.29**
- **Accounts Payable Vouchers – Second Quarter Payroll Taxes totaling $7,214.39**
- **Payroll for Pay Period #16 (7/16/2016 through 7/29/2016) totaling $38,450.97**
- **Payroll Benefits for Pay Period #16 totaling $39,444.21**
- **Minutes for the July 27, 2016 Meeting**

Motion passed.

- Sewer Connection Issue – Resolution 828

At the June 8, 2016 meeting, the Board considered two options pertaining to septic system users who have been requested to connect to the District's sewer system but have not yet done so. One of the options the Board considered and selected was to "enforce existing District policy and compel connection of the unconnected properties".

Legal counsel Bob Carmichael gave an overview of Resolution 828 reaffirming the District's long-standing policy requiring sewer connection for those properties using septic systems after sewer service has been made available. Owners of effected properties will be given twelve months' notice to connect to the sewer system after which time the District will enforce connection utilizing its authority under RCW 57.08.005(9). Discussion followed.

Action Taken

Casey moved, Ford seconded, to approve Resolution 828 and direct staff to send a letter substantially in conformance with Exhibit A thereof to effected property owners and to work with such owners. Motion passed.

There was also an unusual instance of a Geneva property owner who discovered that they were still using an old septic system instead of being connected to the sewer as they and the District had thought. Sewer service was made available to this particular property located on Fremont Street in 1982. Staff and legal counsel have been investigating the situation and have drafted a letter to the property owner. The Board discussed the draft letter.

Action Taken

Casey moved, Ford seconded, to approve and authorize the General Manager to send the proposed letter and offer dated August 19, 2016 to the owner of 4815 Fremont Street. Motion passed.

- Monthly Budget Analysis

Denton presented highlights of the July Monthly Budget Analysis and reported on the state audit and the upcoming interim rate study.

- Summary of Existing District Projects

Hunter reported regarding the Division 22 Reservoir Project, the Sudden Valley Culvert Replacement Project, Strawberry Point Sewer Pump Station Improvements Project, Whatcom Falls Manhole Project and various on-going maintenance projects that District staff has been working on.

- McGuire Hydrant DEA Application

Hunter informed the Board that building contractor Kelly Zender is requesting to enter into a Developer Extension Agreement to install one fire hydrant on behalf of the owner of a new home being built at 2355 North Shore Road. The proposed fire hydrant will be installed at the end of the Districts 8" water main that ends on Agate Heights Road.

Action Taken
Casey moved, Ford seconded, to approve the McGuire Developer Extension Agreement to install one fire hydrant on Agate Heights Road. Motion passed.

- Country Club Sewer Pump Station Improvements – Engineering Agreements

Hunter explained that during the spring of 2016 the District completed an engineering consultant selection process for the County Club Sewer Pump Station Improvements Project and formally selected BHC Consultants. BHC and staff have developed a scope of work and schedule with the goal of construction occurring during summer 2017. Due to the proximity to Lake Louise, a Whatcom County Substantial Shoreline Development Permit will be required. This permit process will take several months to complete and needs to begin as soon as possible in order for the project to be ready for construction in 2017.

The District's Capital Improvement Plan estimated $669,500 for the project, including permitting, design, and construction. Staff recommends allocating an additional $153,093 from the 2016 operating fund to pay for this project. Discussion followed.

Action Taken
Casey moved, Ford seconded, to approve BHC's Scope of Work and Fee Estimate for time and materials not to exceed $153,093; and authorize the General Manager to sign and execute the Architectural/Engineering Agreement. Motion passed.

Action Taken
Casey moved, Ford seconded, to authorize $153,093 operating funds to be allocated to the Country Club Sewer Pump Station Project for the scope of work and fee as presented by staff. Motion passed.

- Manager's Report

The Manager's Report was briefly discussed. Commissioner Casey agreed to attend the staff meeting on August 23, 2016 at 8:00 a.m.

- Executive Session Per RCW 42.30.140(4) – Personnel and RCW 42.30.110(1)(i) – Potential Litigation 30 Minutes

Citron recessed the Special Session to Executive Session at 7:29 p.m. The purpose of the Executive Session was to discuss Personnel and Potential Litigation. It was estimated that the Executive Session would take about 30 minutes. Citron recessed the Executive Session and reconvened the Special Session at 7:40 p.m.

Action Taken
Casey moved, Ford seconded, to authorize the General Manager to approve a settlement with the Heintz party of up to $50,000.00 with the District paying a deductible of $5,000.00 and the Heintz party releasing all claims against the District and dismissing the grievance under the AFSCME Union Contract. Motion passed.

With no further business, Citron adjourned the Special Session at 7:41 p.m.

_____ _____
Recording Secretary, Debi Denton Date Minutes Approved

_____
Todd Citron Bruce R. Ford Curtis J. Casey

LAKE WHATCOM WATER AND SEWER DISTRICT

RESOLUTION No 828

A Resolution of the Board of Commissioners Requiring Connection to Sewer System

WHEREAS, Lake Whatcom Water & Sewer District ("District") is a municipal corporation, organized under the laws of the State of Washington, with all the powers granted to water and sewer districts pursuant to Title 57 RCW; and

WHEREAS, among the most fundamental purposes of the District is to provide residents within its boundaries with a system of sewers for all uses and purposes, public and private; and

WHEREAS, the boundaries of the District are within the Lake Whatcom watershed, which is the drinking water supply for approximately 100,000 persons within the District, the City of Bellingham, and its environs; and

WHEREAS, the District's Board of Commissioners find that widespread connection to sewer service within the District's boundaries is in the best interest of the recovery of Lake Whatcom, which is presently listed as an impaired water body under Section 303 of the Clean Water Act; and

WHEREAS, the District's Board of Commissioners further find that provision of municipal sewer service is conducive to the public health, convenience, environment, and general welfare; and

WHEREAS, RCW 57.08.005(9) expressly authorizes the District "to compel all property owners within the District located within an area served by the District's system of sewers to connect their private drain and sewer systems with the District's system"; and

WHEREAS, the District has a long standing policy requiring connection of improved property to its municipal sewer system and also authorizing the compulsory connection of unconnected improved property to District sewers; to wit:

1974 – Resolution No. 146: required improved property to connect to public sewer if there was a line within 200 feet of the property line within 12 months after mailing of notice that sewer is available; and

1976 – Resolution No. 171; the required sewer connection for property within 300 feet of available sewer; and

1989 – Resolution No. 495: provided that for any unconnected property within a ULID, "the District shall compel such connection under the provisions of RCW 56.08.010 (precursor to RCW 57.08.005) should the property owner refuse to connect"; and

During the Sewer Moratorium from 1992 – 2003, by Motion in 2001 the District required improved property within the sewer moratorium area to connect within

60 months from the time that sewer is located within 200 feet of the property line; and

2005 – the District sent written notice to all property owners within ULID No. 18 reminding them to connect to the sewer system and provided a deadline for connection of January 30, 2008; and

2007 – Resolution No. 732: the District amended its sewer code and left in place the requirement that improved property must connect to the District's system within 60 months from when sewer becomes available within 200 feet of the property line, but added the provision that property owners failing to so connect would be charged a sewer service charge; and

2008 – Effective February 1, 2008, the District commenced collecting a monthly sewer penalty charge from owners of improved property in ULID No. 18 who were not connected to sewer; and

2011 – Resolution No. 785: states that property owners are required to connect to the District sewer within 60 months from the date sewer becomes available within 200 feet of the property line if the property is inside the urban growth area ("UGA") or Limited Area of More Intense Rural Development ("LAMIRD") or within 150 feet of the property line if the property is located elsewhere; and

2011 – Resolution No. 785: continues to include requirement of sewer charge for unconnected property owners in ULID No. 18, but amended District Code to state that "The District shall compel such connection under the provisions of RCW 57.08.005 should the property owner refuse to connect"; and

WHEREAS, of the 54 Improved properties unconnected to the District sewer system in ULID #18 on February 1, 2008, 43 have now connected; and

WHEREAS, There are currently 11 properties known to be unconnected to the District sewer system in ULID No. 18 which lie within a UGA and have property lines within 150 feet of a District sewer line; and

WHEREAS, the Board of Commissioners finds that properties within ULID No. 18 having had in excess of 8 years to voluntarily connect to the District's sewer system, the District should now compel such connection for unconnected ULID No. 18 properties and for any other unconnected properties in violation of Resolution No. 785 which are located within District boundaries; and

WHEREAS, given the length of time that has passed since the last District notice requiring connection to the District sewer system, the Board finds it equitable to once more provide a written notice to owners of all known properties required to connect to the District sewer system not less than 12 months prior to seeking to compel such connection; and

WHEREAS, after 12 months following transmission of written notice requiring connection to the District sewer system, the District intends to move forward with legal

action to compel connection to the District sewer system of all such known unconnected improved properties pursuant to all of its authorities under Title 57 RCW; and

WHEREAS, the foregoing recitals are material findings and part of this resolution;

NOW, THEREFORE, THE BOARD OF COMMISSIONERS OF LAKE WHATCOM WATER AND SEWER DISTRICT HEREBY RESOLVES AS FOLLOWS:

Section 1. The third paragraph of Section 5.1.3 of the District Code (based on Resolutions 683, 732, and 785 shall be amended to read as follows (addition shown in underline, strikeouts in strike through):

5.1.3 Sewer Connections Required (~~based on Resolutions 683 and 732~~)

A lot or parcel that has been developed with on-site sewage disposal system (OSSDS) is required to abandon OSSDS systems and connect to the District sewer within 60 months after ~~the~~ a District public sewer collector or transmission line adjoins the property in a public right-of-way or easement benefitting the District, and within twelve months after the date of mailing or personal service of written notice to the lot or parcel owner that a public sewer collector or transmission line has sufficient capacity and is available for such lot or parcel ~~provided that the District determines that the public sewer collector line has sufficient capacity for and is available for such lot or parcel~~. The District shall compel such connection under the provisions of RCW 57.08.005 should the property owner refuse to connect within twelve months after the date of mailing or personal service of such written notice.

Section 2. The twelve month prior written notice to lot or parcel owners not connected to a District sewer collector or transmission line with sufficient capacity for service as required by District Code Section 5.1.3 shall be in a form substantially in accordance with the written notice attached as Exhibit A of this resolution. Such notice shall be sent to all owners of a lot or parcel required to connect to the District sewer system pursuant to District Code Sections 2.03 and 5.13.

Section 3. BE IT FURTHER RESOLVED that any resolutions or parts of resolutions in conflict herewith are hereby repealed insofar as they conflict with the provisions of this resolution.

Section 4. If any section, subsection, sentence, clause or phrase of this Resolution is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this Resolution. The Board of Commissioners hereby declare that it would have passed this Resolution and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases has been declared invalid or unconstitutional, and if, for any reason, this Resolution should be declared invalid or unconstitutional, and if, for any reason, this Resolution should be declared invalid or unconstitutional, then the original Resolution or Resolutions shall be in full force and effect.

Section 5. This Resolution shall become effective upon signing.

ADOPTED by the Board of Commissioners of Lake Whatcom Water and Sewer District, Whatcom County, Washington, at a Regular Meeting thereof, on the 18th day of August, 2016.

Laura Weide, President

Todd Citron, Secretary

Curtis Casey, Commissioner

Bruce Ford, Commissioner

Commissioner

Approved as to form:

Robert A. Carmichael, Attorney for District

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 7, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:			
SUBJECT:	Resolution No. 836 Designating an Applicant Agent for a Federal Emergency Management Agency Hazard Mitigation Grant Program Application & Grant		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL:	1. Draft Resolution No. 836		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☒	INFORMATIONAL/ OTHER ☐

BACKGROUND / EXPLANATION OF IMPACT

The District is preparing to apply for a $ 900,000 grant from the Federal Emergency Management Agency in order to make potential earthquake mitigation improvements to the existing Division 7 water reservoir. This application process requires that we have both a designated applicant agent and an alternate signatory agent. We are proposing that Patrick Sorensen, the General Manager be designated as the Applicant Agent and that Bill Hunter, District Engineer/Assistant General Manager be designated as the alternate. The federal process requires that the Board designate these agents via Resolution.

FISCAL IMPACT

This action will have no direct fiscal impact on the District. If awarded a grant, the Board of Commissioners would have to be the party that accepts it and any terms it may provide for.

RECOMMENDED BOARD ACTION

Staff recommends that the Board of Commissioners designate Patrick Sorensen as its authorized applicant representative and Bill Hunter as the alternate representative.

PROPOSED MOTION

A motion to designate Patrick Sorensen, General Manager, as the District's authorized agent to execute for and on behalf of the District a Hazzard Mitigation Grant Program application, any potential grant agreement, and payment requests. Further, that Bill Hunter, District Engineer/Assistant General Manager, be designated as the alternate agent.

LAKE WHATCOM WATER AND SEWER DISTRICT

RESOLUTION No 836

A Resolution of the Board of Commissioners Designating an Applicant Agent as required by the State of Washington Hazard Mitigation Grant Program Application and Grant

WHEREAS, the Lake Whatcom Water and Sewer District (District) desires to apply for the State of Washington Hazard Mitigation Grant Program;

NOW, THEREFORE, BE IT RESOLVED by the Board of Commissioners of the Lake Whatcom Water and Sewer District, Whatcom County, Washington as follows:

1. Patrick Sorensen, General Manager, is hereby designated the authorized representative and Bill Hunter, District Engineer/Assistant General Manager, is designated the alternate.

2. These representatives are authorized to execute for and on behalf of Lake Whatcom Water and Sewer District, a public agency established under the laws of the state of Washington, the application, grant agreement, and payment requests to be filed with the Military Department, Emergency Management Division, for the purpose of obtaining and administering certain state and federal financial assistance under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Act of 1988, P.L. 93-288, as amended.

3. Lake Whatcom Water and Sewer District hereby authorizes its agent to provide to the Washington Military Department, Emergency Management Division assurances and agreements required for all matters concerning such state disaster mitigation.

4. BE IT FURTHER RESOLVED that any resolutions or parts of resolutions in conflict herewith are hereby repealed insofar as they conflict with the provisions of this resolution.

5. If any section, subsection, sentence, clause or phrase of this Resolution is for any reason held to be invalid or unconstitutional, such decision shall not affect the validity of the remaining portions of this Resolution. The Board of Commissioners hereby declare that it would have passed this code and each section, subsection, sentence, clause and phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases has been declared invalid or unconstitutional, and if, for any reason, this Resolution should be declared invalid or unconstitutional, then the original Resolution or Resolutions shall be in full force and effect.

6. This Resolution shall be effective immediately.

ADOPTED by the Board of Commissioners of Lake Whatcom Water and Sewer District, Whatcom County, Washington, at a Regular Meeting thereof, on the 13th day of September, 2017.

Laura Weide, President

Todd Citron, Secretary

John Carter, Commissioner

Curtis Casey, Commissioner

Bruce R. Ford, Commissioner

Approved as to form:

Robert A. Carmichael, Attorney for District

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 8, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL _____		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:	5.E.		
SUBJECT:	Comprehensive Water System Plan Update Draft for Review		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL:	1. Draft Comprehensive Water System Plan Update		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☐	INFORMATIONAL/ OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

Wilson Engineering has been working on an update to the District's Comprehensive Water System Plan. Attached is a preliminary draft for Board review. There are a few open items remaining that we need to coordinate with District staff, and we will refine a few of the tables and figures to be more readable and easier to understand. The purpose of this presentation and discussion is to affirm both the consultant's and staff's direction in preparing the updated Plan. Final adoption is scheduled for the November 29, 2017 Board meeting. The consultant will also be looking for additional direction on other issues from Board at the November 15, 2017 Special Meeting/Workshop.

FISCAL IMPACT

N/A

RECOMMENDED BOARD ACTION

One of the direction issues at this meeting is to affirm the decision (as previously authorized by the Board in the existing Comp Plan) that the District will not seek approval to be a Satellite Management Agency (see Section 1.9)

PROPOSED MOTION

No formal motion is required to approve the Plan at this meeting.

LAKE WHATCOM WATER AND SEWER DISTRICT

WATER SYSTEM COMPREHENSIVE PLAN

SEPTEMBER 2017

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

Patrick Sorensen- 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.

Introduction

The purpose of this Water System Plan is to assist Lake Whatcom Water and Sewer District (LWWSD, formerly Whatcom County Water District 10) in making the best use of available resources to provide high quality water service and to protect the health of the District's customers.

The Water System Plan will guide the District in its decision-making regarding capital improvements and operations. It will also help the Washington State Department of Health ("DOH") verify that the District's water systems comply with the federal Safe Drinking Water Act and relevant state regulations.

The Water System Plan has been prepared in accordance with the requirements, sequence, and formatting outlined in the Washington Administrative Code WAC 246-290-100. This Plan is an update of the District's 2010 Water System Plan. It is the intent of the Board of Commissioners that, once adopted, this Water System Plan and its appendices will meet current DOH planning standards, and supplant the 2010 Water System Plan. If the current Water System Plan is inadvertently silent on any issue of policy, the Board of Commissioners will separately consider such matters if and when presented by existing or potential water system customers.

1. Description of Water System

Lake Whatcom Water and Sewer District ("District" or "LWWSD") is located immediately east of and adjacent to the City of Bellingham, and its boundaries encompass much of the Lake Whatcom watershed. The District provides water and sewer services to only a portion of the land contained within its boundaries, the remainder of District land being forested or rural residential in character. The District's customer base is almost entirely single-family residential, with a very few multi-family, commercial and institutional customers having only a minor impact on the water and sewer systems.

The 2010 Water System Plan divided the District into five Study Areas: Sudden Valley, Geneva, North Shore/City Source, North Shore/Well Source, and South Lake. This Plan will address the District in four Study Areas with the two previous North Shore study areas combined in to a single North Shore Study Area. When analyzing existing conditions, the Eagleridge (City source) and Agate Heights (well source) systems will be addressed individually because they are currently separate systems. Future forecasting for the North Shore, however, assumes that the two systems will eventually be consolidated into a single system served by the well source. The Sudden Valley and Geneva Study Areas remain separate because they are of different residential character and have different water use patterns. The District does not provide, and does not currently plan to provide, water or sewer service to the South Lake Study Area. Since that represents no change in policy from the 2010 Plan, only the briefest summary of the South Lake Study Area is included in this report.

Figure 1-1 is a map showing the boundaries of the four District Study Areas and the three existing distinct water systems.

Study areas:

- Sudden Valley
- Geneva – Connected to Sudden Valley distribution system
- North Shore – could all be served by District-owned wells in the future
- South Lake – no current District service; no service anticipated in current planning period.

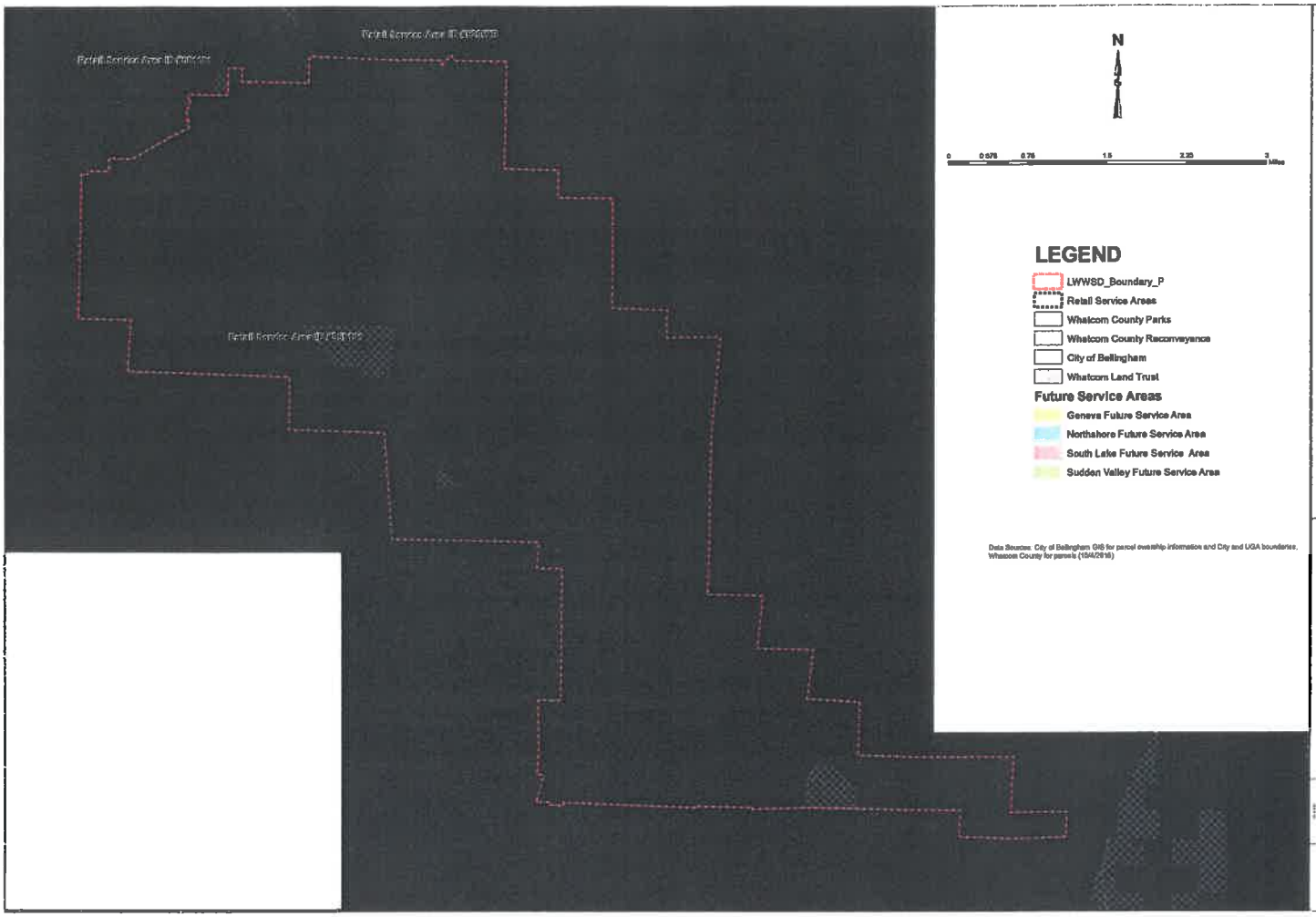
Water systems and sources:

- South Shore (Sudden Valley and Geneva, District treats Lake Whatcom source water)
- North Shore - Eagleridge (bulk water from City of Bellingham (Lake Whatcom source water)
- North Shore - Agate Heights (District-owned wells)
- Johnson Well (2 connections)

This map also shows the current service area boundaries and water system IDs. The District's retail service area extends 200 feet beyond the existing service area and is defined by Resolution 757 and the Lake Whatcom Water and Sewer District Administrative Code, Section 3.4 (see Section 10.1 Supportive Documents).

There are areas within the overall District boundary that are not included in any of the Study Areas. These areas are zoned rural forestry (RF), commercial forestry (CF), or are owned by the City of Bellingham, Whatcom County, or Whatcom Land Trust and designated as space that will not be developed (see Figure 2-1+/-). Given the current climate in the Lake Whatcom Watershed, it is unlikely that these areas will be developed. The District has made no determination not to serve these properties.

The District is proposing minor boundary adjustments in Geneva near its border with the City of Bellingham, and along Academy Road in the North Shore area adjacent to Whatcom County Water District 7. Both of these adjustments are to adjust service areas to eliminate boundary overlaps and acknowledge that the properties are more likely to be served by the adjacent water purveyors.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LEGEND
LWWSD_Boundary_P
Retail Service Areas
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Whatcom County Reconveyance
City of Bellingham
Whatcom Land Trust
Future Service Areas
Geneva Future Service Area
Northshore Future Service Area
South Lake Future Service Area
Sudden Valley Future Service Area
Data Sources: City of Bellingham GIS for parcel ownership information and City and UGA boundaries, Whatcom County for parcels (10/4/2016)
LAKE WHATCOM WATER AND SEWER DISTRICT
WATER SYSTEM PLAN
FIGURE 1 -1: BOUNDARY AND SERVICE AREAS
SHEET 1 OF 1

1.1 Ownership and Management

The water system name as listed in DOH official records is Lake Whatcom Water and Sewer District. The District's Public Water System ID numbers are:

- 959101 – South Shore Service Area (Geneva to Sudden Valley)
- 081181 – Eagleridge Service Area
- 52957B – Agate Heights Service Area
- 047828 – Johnson Well Service Area (Group B)

The District is a special purpose water and sewer district governed by RCW Chapter 57. A copy of the District's Certification of Registration from the Department of Revenue is included in Chapter 10.1 – Supportive Documents.

The District is governed by an elected, five member Board of Commissioners. The Commissioners determine policy, set rates and charges, and approve the budget. The District employs a full-time General Manager and an operating and administrative staff currently numbering seventeen persons. The General Manager is in charge of daily operations and approves expenditures within the budget. The in-house District Engineer also functions as the Assistant General Manager. The District routinely engages a consultant engineering firm and consultant attorney to advise and aid the Board in its decision-making. The consultant-engineering firm provides analysis, design, plan review, and construction management services to the District on an on-call basis. See Figure 1-2 for the full organizational chart.

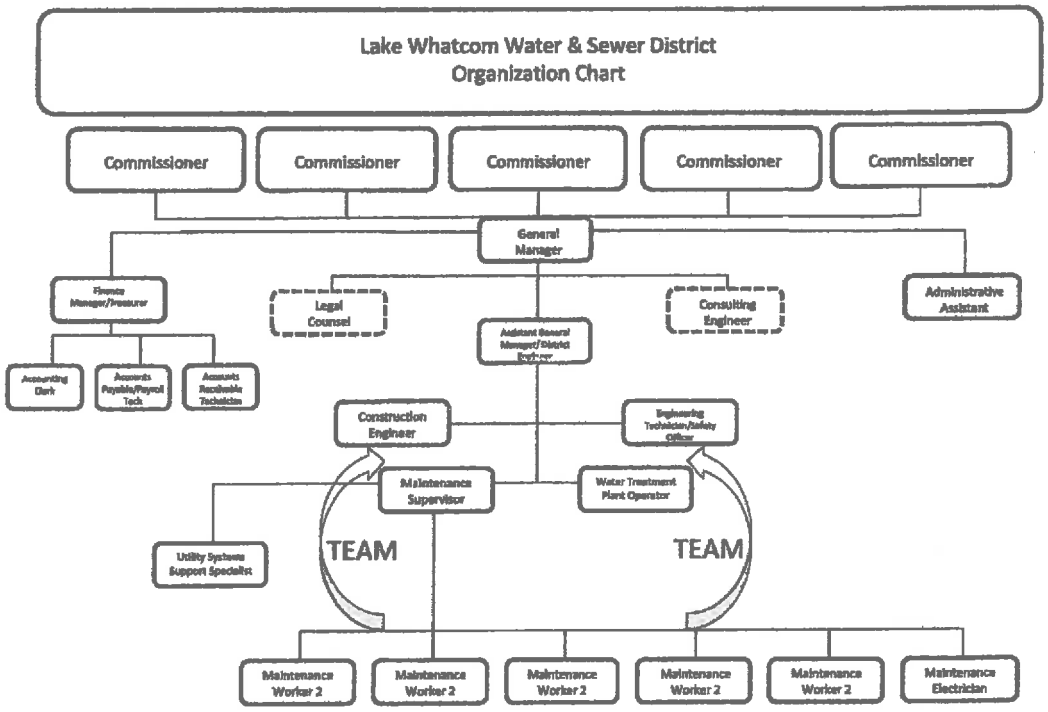


Figure 1-2: Lake Whatcom Water and Sewer District Organizational Chart

Copies of the District's current system Water Facility Inventory forms (WFIs) are included in Chapter 10.1 – Supportive Documents. See these forms for current names, addresses, and telephone numbers of the owners, operators, and emergency contact persons for each system.

1.2 System Background

1.2.1 History of Water System Development and Growth

Lake Whatcom Water and Sewer District was originally formed in 1968 to provide sewer service to the residences around Lake Whatcom that were not already served by the City of Bellingham. Subsequent to formation, the District acquired the water facilities of the Geneva Water Corporation and the Sudden Valley Water Company. From the original purchases, the District has made system extensions and enhancements, and has acquired three water wells on the North Shore of Lake Whatcom.

A. Sudden Valley Study Area:

In January 1977, the District assumed ownership and operations responsibility of the Sudden Valley Water Company. Sudden Valley was platted as an intended recreational subdivision with approximately 4,400 single-family lots, condominium acreage, golf course, marina, and other resort amenities (the golf course has its own source for irrigation water). The water distribution system for the entire development was constructed within a few years, as opposed to a more typical phased program where homes are built on each lot before the next group of developed lots is made available. The water treatment plant was built in the early 1970's, and was expanded and upgraded in 1992. Growth trends for Sudden Valley include almost complete conversion from part time recreational to full-time residency of retirees and working families with children living at home. The Sudden Valley growth rate was restricted throughout the 1990's by a District-imposed sewer moratorium related to insufficient sewer interceptor capacity. The moratorium is no longer in-place. In 1993 Sudden Valley Community Association undertook an initiative to reduce the density in Sudden Valley by 30% (1,400 lots) through various means including acquisition of lots at tax sales and permanently restricting them from development, allowing lot consolidations, and converting building lots to parks. In 2000 Whatcom County, City of Bellingham and Lake Whatcom Water and Sewer District began participating in these efforts. As of August 2015, 775 of the lots are owned by the Sudden Valley Community Association and placed under restrictive covenant as Common Area, and the total number of lots has been reduced by 1,445. About eighty-five percent of the total remaining estimated building of homes and condos in Sudden Valley has been realized to date.

B. Geneva Study Area:

In July 1977, Lake Whatcom Water and Sewer District assumed the Geneva Water Corporation, which owned and operated a distribution system and reservoir distributing

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 Study 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 Study 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 Study area currently contains several land use categories:

- Urban Growth Area ("UGA"), zoned at three houses per acre ("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 Study 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 Study Area - Eagleridge:

There are approximately 107 District water connections in the North Shore Study 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.

In 1994, several North Shore lakefront residents attempted to form a water utility local improvement district (ULID) to bring City of Bellingham water to their existing homes.

The petition drive was not successful, so the ULID was not formed. There is sufficient water available under the District's contract with the City, though the contract conditions may make it challenging to serve existing homes if they were not built on lots of record as of June 10, 1988.

The North Shore Consolidation Study (Appendix C) details the potential options to consolidate the Eagleridge, Agate Heights, other Group A and B water systems, and individual wells and direct private surface water withdrawals on the North Shore of Lake Whatcom. The Study assumes that the water source would be the well at Agate Heights, and that the City connection would remain as an emergency back-up supply.

D. North Shore Study Area - Agate Heights:

The District owns three wells in the same aquifer on the North Shore. They are commonly known as the 6-inch Agate Heights (a.k.a. Giesbrecht) Well, the 10-inch Agate Heights (a.k.a. Giesbrecht) Well, and the Johnson Well.

In 1990, the District entered into an agreement with a group of four developers to construct the 10-inch Agate Heights (a.k.a. Giesbrecht) well east of Agate Bay Road on the North Shore. The intent was to transfer and re-apportion existing District water right permits and applications to better quality wells, so that the new 10-inch well and the existing District "Johnson Well" would comprise the only two points of supply. Department of Ecology (DOE) approved a change in point of withdrawal for a 60 gpm water right permit from the 6-inch Agate Heights (a.k.a. Giesbrecht) Well to the adjacent 10-inch Agate Heights (a.k.a. Giesbrecht) Well based on location criteria. In December, 2002, DOE approved the change in point of withdrawal for a 360 gpm water right permit from the Johnson Well to the 10-inch Agate Heights well. See Section 4.3 for a more detailed discussion of North Shore water rights issues.

The plans for the 10-inch well and a short segment of distribution and transmission mains were approved by Department of Health in the early 1990's with a caveat that manganese treatment and disinfection would have to be provided in later phases before service could be taken from the 10-inch well. This proposed system was identified in the 2001 Water System Plan as the North Shore Central Water System.

Of the four original 1990 developers, Dr. Richard Giesbrecht and Thomas Collins (successor-in-interest to James Doucette) completed a 31-lot subdivision known as Agate Heights (a.k.a. Richalou Estates) in 2001. The subdivision uses water from the 10-inch well, disinfected and treated for manganese. The Department of Health approved the plans for this development and a wellhead protection plan in the spring of 2000. The remaining two original well developers, Trillium and Evergreen View Ventures, have since sold their extensive land holdings on the North Shore to the City of Bellingham, and these properties have been restricted from development.

In 2008, the District added a second water reservoir to serve the Lake Whatcom Residential Treatment Center, located adjacent to Agate Heights. The reservoir provides water for both the treatment center and the upper pressure zone of the Agate Heights subdivision. The existing booster pump was upgraded to a transmission pump 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 Study 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 Study Areas is included in Appendix N. Summaries of the geography for each Study Area are included below.

A. Sudden Valley:

The Sudden Valley water system traverses very steep terrain, with system elevations ranging between 314 and 1,070 feet above sea level. The system has 47 PRVs to maintain appropriate water pressure throughout the system because of the steep terrain. Sudden Valley's water system is 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 Study 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 study 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 Study Area and adjacent to Bellingham's City limits. Glen Cove has 21 connections and purchases water from the City of Bellingham. There have been discussions with the Glen Cove Water Association about consolidating with LWWSD and becoming part of the South Shore water system. Adjacent to LWWSD's northern boundary is Whatcom County

Water District #7. Within the North Shore - Agate Heights Area are the following Group A and Group B water systems: Dellesta Park, Agate Bay Trailer Park, Russell Group, Northshore Ridge, Northshore Ridge #2, and North Shore Solar Acres.

There are also several other Group A and Group B systems within the North Shore and South Lake areas that are farther from District infrastructure.

1.2.4 Ordinances/Bylaws:

Resolutions previously adopted by the District Commissioners that affect basic system design have been incorporated into the *Lake Whatcom Water and Sewer District Design and Construction Standards.* The Commissioners may, from time to time, adopt additional Resolutions, which will be incorporated into future revisions of the District Standards. These District standards define the minimum level of service.

The Whatcom County Coordinated Water System Plan Regional Supplement (CWSP) sets forth the design criteria used for fire flow capacities within the District. The CWSP includes a table of minimum fire flow requirements by zoning, or specify that they are to match that of the adjacent municipal corporation, whichever is greater.

1.3 Inventory of Existing Facilities

A. Sudden Valley Study Area:

The Sudden Valley water system includes:

- 53 miles of water distribution and transmission mains,
- 4 distribution reservoirs (1.0 MG, 0.5 MG, 0.63 MG and 0.15 MG),
- 3 transmission pump installations,
- 47 pressure reducing valve stations, and
- a 2 MGD water treatment plant with adjacent 0.22 MG finished water / chlorine contact reservoir.
- One mile long intertie with Geneva.

The current number of equivalent residential water units (ERUs) in Sudden Valley is 2,685. With approved reduced source criteria (and further decreases in demands, documented in the 2016 Water Use Efficiency Update [Appendix B]), the District's water rights and source supply equipment are sufficient to serve the estimated full build-out of Sudden Valley and Geneva residential connections (see Chapter 10.1 – Supportive Documents for *Sudden Valley Source Criteria Reduction DOH Approval Letter,* April 24, 1996). Estimated full residential build-out for Sudden Valley is 3,267 ERUs based on the number of vacant lots that could be developed (as of August 2015). This build-out estimate does not include ERU allocations for the redevelopment of the closed Sudden Valley Campground, or for the future development of an elementary school. The District's capacity to serve these or other future developments will be evaluated when service is requested.

There is one intertie from the Sudden Valley water system to the Geneva water system. With this intertie the District supplies water to Geneva from its water treatment plant in Sudden Valley.

B. Geneva Study Area:

The Geneva water system includes:

- 15 miles of water distribution mains,
- 0.5 MG distribution reservoir
- Inactive 0.07 MG reservoir
- One mile long intertie with the Sudden Valley water system
- A transmission pump station (Beecher at Columbus Street)
- 7 pressure reducing valve stations, and
- Two distribution pressure booster stations (LID W-5 and South Geneva at Lake Louise Road).
- An emergency intertie with the City of Bellingham located on Lakeway Drive at Scenic Avenue (currently has a transmission booster pump stations but the District is investigating removing and replacing it with PRV since there is increased pressure on the City side.)

The current number of ERUs in Geneva is 1136. With approved reduced source criteria (and further decreases in demands, documented in the 2016 Water Use Efficiency Update [Appendix B]), the water supply source from Sudden Valley is adequate to supply the estimated full build-out of 1250 connections for Geneva.

A small distribution booster station was added in 1999 at Lookout Ave. / Coronado Ave. in the Geneva Study Area. The District received a request for water service from 5 single-family homeowners with failing individual wells. The booster station was required since the houses would not have adequate pressure due to their elevation relative to the existing reservoir and their distance from the water main. The home-owners formed LID W-5, plans were approved by DOH, and construction was completed in 1999.

A Developer Extension Agreement project added a booster pump station and approximately 2234 feet of 8-inch HDPE water main to serve existing and future development. The project was constructed in 2010. The booster pump station is located on Lake Louise Road and serves the area in the vicinity of Beecher Ave and 10^{th} / 11^{th} Streets (currently known as Lost Creek Ln.). The future plan is to construct a reservoir at the top of this highest pressure zone and convert the booster pump station to a transmission pump station to feed the future reservoir.

C. North Shore Study Area - Eagleridge:

Water provided by the District in the Eagleridge water system is supplied from an intertie with the City of Bellingham water system. The City of Bellingham provides

storage for the Eagleridge Water System (for a fee). Eagleridge Water System includes approximately 5000 feet of water distribution mains, and one pressure booster station capable of providing 750 gpm fire flow under peak hourly demand conditions. The system currently serves 68 connections, and build-out for this area would consist of 71 equivalent residential connections. The remaining District customers in the Study Area are sewer only customers who either draw water directly from Lake Whatcom or own and operate their own wells.

D. North Shore Study Area - Agate Heights:

The Agate Heights water system includes the 10-inch Agate Heights (a.k.a. Giesbrecht) Well, a water treatment package plant to chlorinate, remove manganese, and pump water to the 79,300 gallon concrete reservoir; a second transmission pump station to fill the 105,700 gallon reservoir; two PRV stations; and over one mile of transmission and distribution mains.

The Johnson Well on Agate Bay Lane currently serves two homes and is not connected to the Agate Heights water system.

1.4 Related Plans

Listed below are the plans that have a bearing on the District planning activities.

Whatcom County Comprehensive Plan

The District's Water System Plan is reflective of the Whatcom County Comprehensive Plan (August 2016). The District requires applicants to assure it that their proposals meet the requirements for land use approvals as set by Whatcom County. The District does not specify any particular land use, density of development, or fire protection standards itself. Rather, it relies upon Whatcom County County's GMA-compliant plan and development regulations for those standards and requirements. These considerations and requirements are then incorporated into developer extension agreements.

Provision of water service is a feature of development within both urban and rural areas and is both a rural and urban governmental service according to the Growth Management Act's RCW 36.70A.030 (17) and (18). Where the County's plan and development regulations permit neither urban density development nor an urban level of service, water service may still be available to serve a rural density where this is consistent with County planning and development regulations and it is economically feasible to do so.

This water system plan has been submitted to Whatcom County for a consistency review. The letter and associated checklist is included in Section 10.3.

Whatcom County Coordinated Water System Plan

The District's Water System Plan is consistent with the Whatcom County Coordinated Water System Plan (September 2016). Specific areas of impact are discussed in the appropriate sections of this plan.

Lake Whatcom Watershed Protection Plan

The District's Water System Plan is compatible with the Lake Whatcom Management Program 2015-2019.

City of Bellingham Water System Plan

The District's Water System Plan is consistent with the City of Bellingham Water System Plan (2009 with update in 2013). The City of Bellingham is the wholesale water purveyor for the Eagleridge Water System. The City of Bellingham also provides water storage in its own tanks for the Eagleridge Water System. The City of Bellingham can also provide water to the Geneva area through an emergency intertie.

In accordance with the Whatcom County Coordinated Water System Plan Regional Supplement (CWSP), the District matches the minimum fire flow requirements of the City of Bellingham (the adjacent municipal corporation) for the District's Geneva and North Shore/Eagleridge study areas.

Lake Whatcom Water and Sewer District's Sewer Comprehensive Plan

This Water System Plan is consistent with population forecasts of the District's Sewer Comprehensive Plan adopted in May 2014. DOE approval was received on June 6, 2014.

1.5 Existing Service Area Characteristics

Detailed information on the Study Area characteristics are included in Appendix N. The earlier Figure 1-1 showed the geographic relationship of all District territory subareas. The South Lake area has no District water facilities, and none are proposed within the planning horizon of this plan update.

1.6 Future Service Area

Service can be extended into Study Areas shown on Figure 1-1 if all other land use regulations are met. Over the past ten years, distribution system expansions have generally been limited to developer extension agreements or local improvement districts formed by resident petition.

The residences presently served by direct-draw from Lake Whatcom, private wells, or small water systems have been included in the planning forecasts. These residences are located on the north shore from the city limits to the end of North Shore Road, and on the south shore from Strawberry Point in Geneva to Sudden Valley, and along the northern section of Euclid Avenue. The residences on the north shore are discussed in Appendix C, and the residences along the northern section of Euclid Avenue (Glen Cove Water System) have expressed potential interest in consolidating. Grant applications have been submitted to investigate the Glen Cove consolidation feasibility, but the grants have not been granted.

The District considers the South Lake Area a future service area. The District would be open to a citizen petition for a Utility Local Improvement District, or a developer extension, that would bring District service to the area.

The District does not anticipate providing any water service outside its boundaries, and does not anticipate expanding its boundaries in the future. If the District is approached

about providing water service outside its boundary, it would determine the feasibility of the expansion and follow the guidelines outlined by the Whatcom County Coordinated Water System Plan. *The District may also consider selling water wholesale to adjacent water purveyors…* ***(Revisit as needed following November Special Board meeting)***

1.7 Service Area Agreements

The District has an agreement with the City of Bellingham for to provide water via an emergency intertie to the South Shore water system. The emergency intertie is located in Geneva at the City limits, and has the capability to fill the Geneva reservoir which can provide water to the Geneva service area.

The City/ District agreement for water service to the North Shore Study Area - Eagleridge service area is included in Chapter 10.2 – Agreements.

1.8 Service Area Policies

The District's general service area policies are outlined below.

Wholesaling and/or Wheeling Water: The District does not currently wholesale or wheel water to other utilities. Policies governing wholesaling water would need to be developed prior to the District entering into any wholesale agreements. ***(Revisit as needed following November Special Board meeting)***

Annexation: The District currently has no plans to annex additional territory. The District's Geneva Study Area is included in the City of Bellingham's Urban Growth Area (UGA); consequently, this area of the District may be subject to annexation some time in the future.

Direct Connection and Satellite/Remote Systems: Resolution 757 defines the District's policy with regard to providing water and/or sewer service within the District borders. The District will generally allow direct connection to its existing facilities if the following conditions are met:

1) the development meets the County's Growth Management Act-compliant land use regulations, and
2) the development is consistent with the District's own Water and Sewer Comprehensive Plans, and
3) the developer agrees to the District's conditions as set forth in a Developer Extension Agreement (which includes the developer assuming financial responsibility for utility extensions).

However, each request is individually considered in light of potential special circumstances that may affect the feasibility of construction and/or operation of new facilities.

Resolution 757 also outlines the procedure for establishing new temporary water systems within the District's borders. As a general rule within the Study Areas, the District has declined to own and/or operate Group B water systems or Group A systems that were not constructed under developer extension agreements. One exception to this is the operation of the North Shore Johnson well, currently serving only two existing

residences. The District may consider operating satellite/remote systems on a case-by-case basis for compelling public health reasons, and if doing so will not have a negative financial impact on other District ratepayers. The *Eagleridge Water System* and *Agate Heights Water System (aka Richalou Estates)* are isolated Group A systems created by developers to District standards and now owned and operated by the District.

Design and Performance Standards: The District has adopted minimum design and performance standards equivalent to or better than those in the Whatcom County Coordinated Water System Plan. The District's design and performance standards are defined in *Lake Whatcom Water and Sewer District Design and Construction Standards – September 2017*, and incorporated into this Water System Plan by reference.

Surcharge for Outside Customers: The District currently has no out-of-District customers and no surcharge policy. If and when Outside Customers approach the District for service, the District will address the issue of surcharges.

Formation of Local Improvement Districts Outside Legal Boundaries: The District will evaluate LID's outside the legal boundaries on a case-by-case basis. If the District is approached about providing water service outside its boundary, it would determine the feasibility of the expansion and follow the guidelines outlined by the Whatcom County Coordinated Water System Plan.

Urban Growth Area (UGA): Within an Urban Growth Area, the District may extend water services with minimal permitting, although the District will not generally pursue system extensions unless a developer or group of landowners is willing to pay for the extension up front. If the extension will benefit additional future populations (either infilling on individual lots or future raw land developments), the developer is generally required to size the facilities for those anticipated populations, and is generally allowed to recover a proportionate sum via latecomer agreements with the District. The Geneva Study Area is the only District area that is part of an UGA (City of Bellingham). The District may consider up-front participation in a developer extension on a case-by case basis if a public health interest would be served by doing so.

Outside of the UGA, service extension requests will be considered on a case-by-case basis and governed by RCW 36.70A.110(4). The facilities will be designed to provide for rural population densities allowed by current zoning, and will be designed in accordance with good engineering practice. According to the Municipal Water Law, Attachment 8, "'Rural governmental services' or 'rural services' include those public services and public facilities historically and typically delivered at an intensity usually found in rural areas, and may include domestic water systems, [and] fire and police protection services...Water service must be designated at the level of service designated appropriate by the local land use authority for that area."

Latecomer Agreements: The District provides latecomer agreements for developers whose extensions will benefit additional future development. Agreements are governed by RCW Chapter 57.22.

Oversizing: The District will determine facility over-sizing requirements on a case-by-case basis. Oversizing system components or facilities beyond the capacities needed to serve a particular developer's interests may be necessary to provide comprehensive

service to an area without duplication of planning and construction, and to reduce inefficient operations and maintenance. In general, the District will not pay up front for the percentage of oversizing required to support future development of raw land even though the District may require such over-sizing by developers. The District may elect to pay up front for over-sizing necessary to accommodate infilling in areas of existing platted lots. The decisions would be made considering anticipated public benefit and only if the District's up-front contribution was financially feasible.

Cross-Connection Control Program: The District's Cross-Connection Control Program was implemented with the adoption of Resolution No. 227. This Resolution established the legal authority of the District to implement the program, and also adopted the American Water Works Association, Pacific Northwest Section's "*Accepted Procedure and Practice in Cross-Connection Manual*" as the procedural manual for implementing the Cross-Connection Control Program. Resolution No. 227 is included in Chapter 10.1 – Supportive Documents.

Extension: The District has three methods for extending the water system. The first is the Developer Extension Agreement (DEA) – a contractual agreement between a developer and the District to allow the developer to build the extension. This method requires the developer to pay directly for all costs associated with the utility extension.

The second method involves creating a Utility Local Improvement District (ULID). The District pays all costs up front and the beneficiaries of the ULID pay the District back over a period of years.

A third method is a District-initiated project paid for with construction funds on hand, revenue bonds, or public grants and loans. The District may make system upgrades and minor extensions as District-initiated projects, but does not typically extend new lines into previously un-served areas. The payback for borrowed funds is derived from District rates for service and charges for connection to the system. The District has no taxing authority.

Any public system extension must meet the District's minimum design and performance standards, plans must be approved by the District's Engineer, and installation must be inspected by the District or their appointed representative during construction.

1.9 Satellite Management Agencies

The Board of Commissioners reviewed their previous decision not to become a DOH-approved Satellite Management Agency in September 2017. Given that within their borders, the District already has many of the powers associated with being an SMA, the Board affirmed their previous decision and will not seek SMA approval.

1.10 Conditions of Service (Duty to Serve)

The District has two documents that define the conditions of water service. The first is the Residential Water Permit Application for single residential requests. The second is the Developer Extension Agreement (DEA) which is used for system extensions by developers. These documents include Purveyor responsibilities, customer responsibilities, current connection fee schedule, consent agreements for inspection,

maintenance, and repair activities, cross-connection control requirements, latecomer provisions and project-specific system design requirements in the case of developer extensions. Meter and material specifications are included in the District's design and construction standards. A copy of the Residential Water Permit Application and DEA template are included in Appendix G. The District's design and construction standards are included in Appendix H.

1.11 Complaints

The District's policy and process for dealing with complaints is described in detail in Section 6.8 – Customer Complaint Response Program.

2. Basic Planning, Data and Water Demand

This chapter describes probable land use and population densities as they affect current and anticipated demands placed on the public water system. The annual water demand forecast tables are attached at the end of this section. Historical water use and leakage data are included in Appendix B – Water Use Efficiency Plan. The four major areas are addressed separately below.

2.1 Current Population, Service Connections, Water Use and Equivalent Residential Units

In order to estimate the population of each service area, we multiplied the number of connections (or ERUs) by the average household size for the area according to the 2010 US Census data. The average household size is 2.5 for Sudden Valley, 2.7 for Geneva, and 2.8 for the North Shore.

As part of the District's Water Use Efficiency Plan (WUE), metered data was recorded in each service area. The 2016 WUE report with detailed analysis is included as Appendix B. Demands are based on metered water production and consumption. Average Daily Demand (ADD) and Maximum Daily Demand (MDD) are based on gross production metered records and therefore include any system losses. Distribution System Loss (DSL) is quantified by assessing gross water production against metered consumption.

For all systems, bi-monthly and annual production records for 2012-2014 can be seen in Appendix B, Exhibit 5. Usage by customer class can be seen in Exhibit 1 of Appendix B.

A. Sudden Valley Study Area:

The Sudden Valley Study Area had 2,450 connections and 2,687 Equivalent Residential Units (ERUs) as of January 2017. The estimated population is 6,718 (2.5 times the number of ERUs). The majority (88%) of the ERUs come from the "Residential" customer class, 9% of ERUs are of the "Multi Unit" customer class, 3% are of the "Institutional" customer class, and 0.3% are of the "Recreational" customer class.

From the WUE in Appendix B, the highest ADD for 2012-2014 was 131 gallons per day (gpd) per ERU in 2012. This figure assumed 100% full-time occupancy. Based on 2010 Census information, 6.5% of the Sudden Valley area is "occasional use housing", so this would mean that the ADD for full-time residents could be as high as 139.5 gpd/ERU. To remain conservative but more realistic than the 207 gpd/ERU, a value of 150 gpd/ERU will be used for future projections. Because the conservation program is mature and this is a low ADD relative to other water systems, this is the only ADD value used and there is no projection with additional conservation savings.

Based on 2014-2015 data, the highest maximum daily demand (MDD) for Sudden Valley was 175 gpd per ERU, also less than the 335 gpd per ERU approved by Department of Health in 1994. To move closer to actual demands but remain conservative, the value of 250 gpd/ERU will be used for future projections.

Seasonal variation in water demand in Sudden Valley is very small. This can be seen in Appendix B, Exhibit 1 where summer demands are only about 10-20% higher than annual average demands. This is also demonstrated in the low MDD:ADD ratio of 1.34. The low seasonal variation in demand is consistent with the landscaping and forested nature of the community. Exhibit 1 shows that demand from all customer classes increased by a similar amount (roughly 10-20%) in the summer months.

Distribution System Loss (DSL) in Sudden Valley has decreased from 27.6% in 2005-2007 to 12.9% in 2012-2014. See Appendix B for further details and efforts toward minimizing DSL.

B. Geneva Study Area:

As of January 2017, the Geneva Study Area had 1,065 service connections and 1,132 ERUs. The estimated population is 3,056 (2.7 times the number of ERU's). The majority (90%) of the ERUs come from the "Residential" customer class, 4% of ERUs are of the "Multi Unit" customer class, and 5% are of the "Institutional" customer class.

Detailed analysis of water use was presented in the WUE Plan (Appendix B). In summary, the highest ADD for 2012-2014 was 152 gpd per ERU (2013). This assumes an estimated 100% full-time occupancy and is less than the 245 gpd per ERU approved in 1997 Source Criteria Reduction Report approved by Department of Health. To remain conservative but more realistic than the 245 gpd/ERU, a value of 175 gpd/ERU will be used for future projections. Because the conservation program is mature and this is a fairly low ADD relative to other water systems, this is the only ADD value used and there is no projection with additional conservation savings.

MDD for Geneva is based on daily readings of the Dutch Harbor intertie meter. The highest MDD for 2014-2015 was 322 gpd per ERU. This is significantly less than the MDD of 500 gpd per ERU approved in 1997. To move closer to actual demands but remain conservative, an MDD of 370 gpd/ERU is used for future projections.

Demand in the Geneva area demonstrates moderate seasonal variability. Exhibit 1 of the Water Use Efficiency Plan shows that summer demands are about 35% higher than annual average demands. The MDD:ADD ratio of about 2 is also in line with this observation. The summer demand increase of 35% is fairly consistent across all three customer classes.

Distribution System Loss (DSL) in Geneva has decreased from 11.0% in 2005-2007 to 9.1% in 2012-2014. See Appendix B for further details and efforts toward minimizing DSL.

C. North Shore Study Area - Eagleridge:

The District had 68 ERUs on the Eagleridge water system as of January 2017. The estimated population is 197 (2.9 times the number of ERUs). All of the ERUs are from the "Residential" customer class.

Detailed analysis of water use is presented in the WUE (Appendix B). In summary, water use for 2012-2014 shows a maximum ADD of 231 gpd per ERU. This is significantly lower than previous assessments, so to remain conservative but more realistic, an ADD value of 250 gpd/ERU is used for future projections (without

conservation savings). Considering that there is still room for conservation savings since this ADD is still 43% higher than the Geneva ADD, a projected ADD with conservation savings is 210 gpd/ERU.

Based on 2014-2015 data, MDD for Eagleridge future projections is 800 gpd/ERU without conservation savings. With conservation savings, MDD is projected at 600 gpd/ERU.

The Eagleridge water system demonstrates a significant increase in water use in the summer months. Exhibit 1 of the Water Use Efficiency Plan shows that the summer demands of this residential-only system are about 85% higher than the annual average demands. This is consistent with larger lots and summer watering of landscaping. Efforts have been made and are continuing by LWWSD to lower this summer usage (See WUE plan for details).

Distribution System Loss (DSL) in Eagleridge remains minimal at 2.9% in 2012-2014.

D. North Shore Study Area - Agate Heights:

As of January 2017, the District had 37 service connections and 45 ERUs on the Agate Heights water system and two connections on the Johnson Well. Demand data was not analyzed for the Johnson Well. The estimated Agate Heights population is 131 (2.9 times the number of ERUs). 80% of the ERUs are from the "Residential" customer class, and 20% are from the "Institutional" customer class (Lake Whatcom Residential Treatment Center).

Water use data, included in the WUE report, show the highest ADD from 2012-2014 to be 209 gpd per ERU. To remain conservative but more realistic than the previously used ADD of 300 gpd/ERU, an ADD value of 230 gpd/ERU is used for future projections without conservation savings. Considering that there is still room for conservation savings, a projected ADD with conservation savings is 200 gpd/ERU.

Based on 2014-2015 data, MDD for Agate Heights future projections is 500 gpd/ERU without conservation savings and 420 gpd/ERU with conservation savings.

The Agate Heights water system demand has moderate seasonal variability. Exhibit 1 of the Water Use Efficiency Plan demonstrates a typical increase of about 20% in the summer months compared to annual average demands for both the residential and institutional customer classes.

Distribution System Loss (DSL) in Agate Heights has decreased from a wide range of values in 2005-2007 to 2.8% in 2012-2014. See Appendix B for further details.

2.2 Projected Land Use, Future Population, and Water Demand

Figure 2-1 shows the current Whatcom County zoning including the area within the District's boundary. A water demand forecast on an annual basis for the ten year planning period (2017 - 2026) and a forecasted twenty year (2036) planning period for each of the District's water systems is included at the end of Section 2. Included are the forecasted number of ERU's, total average day demand (ADD) and maximum day demand (MDD), with and without water use efficiency savings assumptions (for the North Shore systems).

The minimum zoning outside of the Geneva UGA and the Sudden Valley LAMIRD is one lot per five acres (R5A). Whatcom County Code 20.32.252 Rural Residential Overlay allows higher density development with public water, but it only applies to areas designated Rural Neighborhoods in the Whatcom County Comprehensive Plan. ***There are no areas within the District that are designated Rural Neighborhood.*** Therefore, public water will not change the allowable density of any subdivision in the District.

A Sudden Valley Area

The Sudden Valley Study Area is a residential area with a golf course and a small strip mall. There are no projected agricultural or industrial water needs. The Sudden Valley Community Association has its own water source for irrigation of the golf course. Future development in Sudden Valley may include restoring the SVCA Campground or development of private commercial lots near the Village Market.

Water Demand Forecasting: Water demand forecasting for the Sudden Valley Study Area was summarized in Exhibit 2 of the Water Use Efficiency Plan (Appendix B). We selected a low population growth projection as growth in the District is slowing. The District holds Surface water rights equivalent to 3.4 cfs maximum instantaneous withdrawal, and an average annual withdrawal of 1,800 acre-feet for the combined Sudden Valley and Geneva areas. The table shows the projected demand based on the 2015 Water Use Efficiency Plan Update (Appendix B) for average day demand (ADD-150 gpd/ERU) and maximum day demand (MDD-250 gpd/ERU).

B Geneva Area

The Geneva area is primarily residential but has two schools and a church complex. There are no projected agricultural or industrial water needs.

Water Demand Forecasting: Water demand forecasting for the Geneva Study Area was summarized in Exhibit 2 of the Water Use Efficiency Plan (Appendix B). We used the projected growth analysis prepared by the District in conjunction with its connection fee analysis. The table shows the projected demand based on the 2015 Water Use Efficiency Plan Update for ADD (175 gpd/ERU) and MDD (370 gpd/ERU).

C North Shore - Eagleridge

The Eagleridge Water System services a residential area. There are no Urban Growth Areas in the District's North Shore area and the zoning previously ranged from RR2 to R5A. Whatcom County has imposed restrictions requiring that all new subdivided properties have a minimum of 5 acres. Therefore, any new development will be rural in nature.

The District planned to serve the 71 Eagleridge development and adjacent residences with the existing Eagleridge Water System. There are also 141 ERUs associated with the failed 1995 ULID W-6 that represent potential connections in this area. Many of these ERUs represent existing residences that currently draw water directly from Lake Whatcom or private wells. The costs of any system improvements to serve a future ULID would be born solely by the beneficiaries.

There are no projected non-residential water needs. There are no sources for non-revenue water.

Exhibit 2 of the Water Use Efficiency Plan (Appendix B) includes a summary of the water demand forecasting for the North Shore - Eagleridge Area. Because of the recent downzone in the Lake Whatcom watershed, we anticipate the water system growth in North Shore area to be concentrated where there are existing homes or existing platted lots. For this reason we selected a population growth projection of 1.5% for the Eagleridge area. Since the current number of connections (64) is small, there is a high degree of variability in the measured MDD. The MDD for Eagleridge has been decreasing. At the time of the 2016 Water Use Efficiency Plan Update, MDD was determined to be 800 gpd/ERU without conservation savings and 600 gpd/ERU with conservation savings. Average Day Demand was 250 gpd/ERU without conservation savings and 210 gpd/ERU with conservation savings.

The water usage in Eagleridge is higher per connection than in other District service areas. This may be due in part to larger lot sizes and more landscaping since the highest water use is during the summer. The District has already seen a substantial reduction in MDD and intends to target Eagleridge for further conservation savings. Eagleridge represents less than 2% of the District's connections.

D North Shore - Agate Heights

The Agate Heights System is also rural residential in nature. The initial system is designed to supply 42 connections (with storage for 52 connections).

The tables in Exhibit 2 of the Water Use Efficiency Plan (Appendix B) summarize the water demand forecasting for the North Shore Well System Area. Since the Agate Heights (Wells) System served a new development, Agate Heights Estates, it experienced a higher than normal growth rate or about 50% buildout of the development in the first 3 years. With the County zoning restricting new plats, we can anticipate that the Agate Heights development will continue to experience a high growth rate for the next 6 years. The MDD for 2007 was 469 GPD/ERU (based on a three-day rolling average since the water treatment plant does not operate every day). Average day demand for 2005-2007 ranged between 172 and 210 gpd/ERU, or 59 – 72 GPD per capita.

The Agate Heights System is supplied by a well with a 60 gpm water right permit (G1-22681P), a 360 gpm water right permit (G1-22763P), and a 18 gpm water right certificate (G1-23449). The G1-22763P water right permit was allocated to the 10-inch Geisbrecht (Agate Heights) well through a water right transfer which was completed in 2003. Ownership of the G1-23449 Water Right Certificate was transferred from the Lake Whatcom Residential and Treatment Center to the District when the Center became a District water customer, and the Place of Withdrawal was changed to the 10-inch well. The number of buildout connections does not represent existing zoning for the original service area. However, it is possible that the Eagleridge and Agate Heights systems could be combined in the future and served from the Agate Heights water treatment plant.

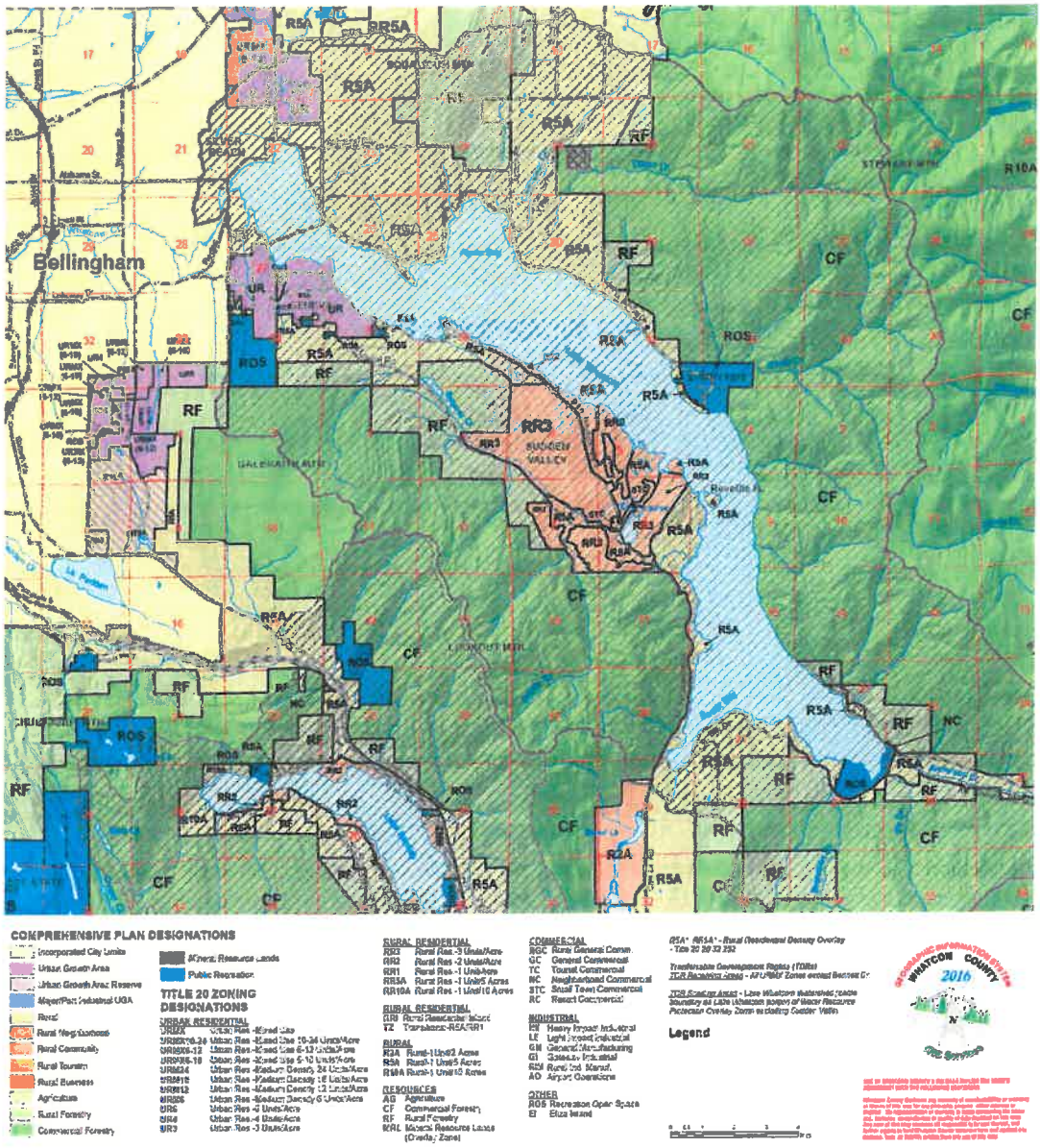


Figure 2-1: Whatcom County Zoning

EXHIBIT 2

Water Demand Forecasting

SUDDEN VALLEY WATER SYSTEM

Water Demand Forecasting	ERUs	With Conservation Savings	
		Total Average Volume -GPD *(based on ADD= 150 gpd/ERU)*	**Maximum Daily Volume-GPD** *(based on MDD= 250 gpd/ERU)*
Current - 2015	2667	400,050	666,750
Six years - 2021	2721	408,150	680,250
20 years - 2035	2847	427,050	711,750
Full build-out	**3267**	490,050	816,750
Water Rights – Annual / Instant. (shared with Geneva)		Annual (Daily Avg) = 1,607,178 GPD Instantaneous = 2,197,472 GPD	

GENEVA WATER SYSTEM

Water Demand Forecasting	ERUs	With Conservation Savings	
		Total Average Volume -GPD *(based on ADD= 175 gpd/ERU)*	**Maximum Daily Volume-GPD** *based on MDD= 370 gpd/ERU)*
Current - 2015	1139	199,325	421,430
Six years - 2021	1181	206,675	436,970
20 years - 2035	1230	215,250	455,100
Full build-out	**1543**	270,025	570,910
Water Rights – Annual / Instant. (shared with Sudden Valley)		Annual (Daily Avg) = 1,607,178 GPD Instantaneous = 2,197,472 GPD	

COMBINED SUDDEN VALLEY/GENEVA WATER SYSTEMS

Water Demand Forecasting	ERUs	With Conservation Savings	
		Total Average Volume *(GPD)*	**Maximum Daily Volume** *(GPD)*
Current - 2015	3806	599,375	1,088,180
Six years - 2021	3902	614,825	1,117,220
20 years - 2035	4077	642,300	1,166,850
Sudden Valley full build-out	3267	490,050	816,750
Geneva full build-out	1543	270,025	570,910
Combined full build-out	**4810**	**760,075**	**1,387,660**
Water Rights – Annual / Instant.		Annual (Daily Avg) = 1,607,178 GPD Instantaneous = 2,197,472 GPD	

* ADD and MDD values are based on source data which includes distribution system leakage.

EXHIBIT 2

Water Demand Forecasting

NORTH SHORE /EAGLERIDGE WATER SYSTEM

Water Demand Forecasting	ERUs	Without Conservation Savings	
		Total Average Volume -GPD *(based on ADD= 250 gpd/ERU)*	**Maximum Daily Volume-GPD** *(based on MDD= 800 gpd/ERU)*
Current - 2015	68	17,000	54,400
Six years - 2021	71	17,750	56,800
20 years - 2035	71	17,750	56,800
Full build-out**	71	17,750	56,800
City Connection – 150 gpm	*270*	216,000 gpd	

NORTH SHORE /EAGLERIDGE WATER SYSTEM

Water Demand Forecasting	ERUs	With Conservation Savings	
		Total Average Volume -GPD *(based on ADD= 210 gpd/ERU)*	**Maximum Daily Volume-GPD** *(based on MDD= 600 gpd/ERU)*
Current - 2015	68	14,280	40,800
Six years - 2021	71	14,910	42,600
20 years - 2035	71	14,910	42,600
Full build-out **	71	14,910	42,600
City Connection – 150 gpm	*360*	216,000 gpd	

* ADD and MDD values are based on source data which includes distribution system leakage.
** Based on including all vacant lots to determine maximum potential connections. Will require ULID for construction of additional water sytem facilities.

EXHIBIT 2

Water Demand Forecasting

NORTH SHORE /AGATE HEIGHTS WELL SYSTEM

Water Demand Forecasting	ERUs	Without Conservation Savings	
		Total Average Volume -GPD *(based on ADD= 230 gpd/ERU)*	**Maximum Daily Volume-GPD** *(based on MDD= 500 gpd/ERU)*
Current - 2015	45	10,350	22,500
Six years - 2021	52	11,960	26,000
20 years - 2035	52	11,960	26,000
Full build-out**	52	11,960	26,000
Water Rights – Annual	*1968*	Annual (Daily Avg) = 452,530 GPD	
Water Rights – Instantaneous	*1261*	Instantaneous = 630,720 GPD (438 GPM)	

NORTH SHORE /AGATE HEIGHTS WELL SYSTEM

Water Demand Forecasting	ERUs	With Conservation Savings	
		Total Average Volume -GPD *(based on ADD= 200 gpd/ERU)*	**Maximum Daily Volume-GPD** *(based on MDD= 420 gpd/ERU)*
Current - 2015	45	9,000	18,900
Six years - 2021	52	10,400	21,840
20 years - 2035	52	10,400	21,840
Full build-out**	52	10,400	21,840
Water Rights – Annual	*2263*	Annual (Daily Avg) = 452,530 GPD	
Water Rights – Instantaneous	*1502*	Instantaneous = 630,720 GPD (438 GPM)	

* ADD and MDD values are based on source data which includes distribution system leakage.
** Based on including all vacant lots to determine maximum potential connections. Will require ULID for construction of additional water sytem facilities.

3. System Analysis

3.1 System Design Standards

The District has adopted the Design Standards set forth in WAC 246-290-200 through 246-290-250 and the Whatcom County Coordinated Water System Plan (CWSP) (September 2016). The *Standards Incorporated by Reference* into the CWSP are also adopted by the District and incorporated into this Plan. The District's standards can be found in Appendix H.

LWWSD adopts and establishes the following standards for construction and operation of its Group A water systems.

	STANDARD		
PARAMETER	**Sudden Valley**	**Geneva**	**North Shore**
Water Quality	In accordance with the federal Safe Drinking Water Act (SDWA), DOH criteria specified in WAC 246-290, and Whatcom County CWSP, all as amended from time to time.		
Average Daily Demands	150 gpd/ERU	175 gpd/ERU	250 gpd/ERU (city [Eagleridge]) 230 gpd/ERU (wells [Agate Heights])
Maximum Daily Demands	250 gpd/ERU	370 gpd/ERU	800 gpd/ERU (city [Eagleridge]) 500 gpd/ERU (wells [Agate Heights])
Peak Hour Demand	Pressure zone – dependent	Pressure zone - dependent	Pressure zone - dependent
Storage Requirements: Standby	300 gallons/ERU	3500 gallons/ERU	500 gallons/ERU (Eagleridge) 460 gallons/ERU (Agate Heights)
Fire Flow Rate and Duration	Res.: 500 gpm/60 min. Commercial/Condos: 750 gpm/60 minutes	750 gpm/60 minutes	Eagleridge: 750 gpm/60 minutes Agate Heights: 500 gpm/60 minutes
Minimum System Pressure	In accordance with WAC 246-290-230 and the Whatcom County CWSP		
Minimum Pipe Sizes	See *LWWSD Design and Construction Standards – 2017.*		
Telemetry Systems	PLC, PC-based, *Intellution,* open architecture SCADA		
Backup Power Requirements	Reviewed on a case-by-case basis.		
Valve Spacing	Every 500 feet.		
Hydrant Spacing	Every 600 feet.		
Other System Policies that Affect Performance and Design	See *LWWSD Design and Construction Standards – 2017.*		

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.

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.

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.*

3.3 System Description and Analysis (existing)

3.3.1 System Description

A. Sudden Valley Study 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 1998 and found to be in good condition. The raw water pumps were replaced in 1992, and the motors are scheduled for replacement in 2012. Condition and capacity of the transmission mains are sufficient.

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

Type of Pump	System Capacities	Current Operations
Raw Water	2 - 700gpm each	
Transfer	2 - 700 gpm each	
Transmission – Div. 7	2- 840 gpm @ 390 feet TDH each	840 gpm
Transmission – Div. 22	2- 700 gpm @ 608 feet TDH each	

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 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 disinfection contact time provided by the tank was investigated in detail in a study by the Department of Health in 2016 (see Appendix J). 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, 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 near the top to maintain the 198,000 gallons. The plant is typically operated at half its capacity, approximately 700 gpm. At this flow rate, 99,000 gallons is required. Therefore, the tank level can be lower during operation and/or the Cl_2 concentration could be decreased.

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 it to add monitoring stations at each of the two entry to distribution points.

Add a paragraph addressing LT2ESWTR, any crypto monitoring that has been done, ramifications of that

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 was included in the *Sudden Valley Water Treatment Plant Operations Plan* (See Appendix J, revised 2017).

Storage – The Sudden Valley Study 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 storage capacity and operational efficiency. The new Division 22 reservoir will operate in parallel with the existing 0.50 MG Division 22 reservoir.

Table 3.3–3 Sudden Valley Reservoir Characteristics

Reservoir Location	Capacity(MG)	Material	Approx. Base Elev. (ft, NAVD88)	Approx. Top Elev. (ft NAVD88)	Diam. (ft)
SV Div. 7	1.00	welded steel	670.45	705.45	70
SV Div. 22	0.50	welded steel	804.65	839.65	50
SV Div. 22 New	0.63	welded steel	805	840	56
SV Div. 30	0.15	welded steel	1027.98	1067.98	25
SUBTOTAL	2.28				
Water Plant CT	0.22	welded steel	334.29	358.29	40
TOTAL VOL.	2.5				

The three existing distribution reservoirs serve somewhat overlapping geographic areas of Sudden Valley. The Division 7 and Division 22 reservoirs are fed by transfer pumps directly from the CT reservoir at the water treatment plant. The Division 30 transmission pump station is located in the Division 7 reservoir service area; the station pumps water from the 1.0 MG Division 7 reservoir to the Division 30 reservoir. The Division 30 reservoir, the highest reservoir, in turn can supply part of the area also served by the Division 22 reservoir, depending on the settings of the pressure reducing valves.

With the installation of the Sudden Valley-Geneva water intertie in 2003, the Division 22 reservoir is also serving part of Geneva, and the Division 30 reservoir is covering a larger area, to utilize more of the 1.0 MG Division 7 reservoir capacity. This was described in detail in the Sudden Valley- Geneva Water System Intertie Project Report (2002). The second reservoir at Division 22 will allow the system to operate more efficiently. Sufficient storage enables the larger, intended area to be fed from Division 22 instead of being fed from Div. 30 as is the current operation. Appendix A contains the Pre-Design Report for this addition with detailed analysis.

Distribution System – The Sudden Valley water system was completed in 1974. The water system includes approximately 42 miles of water distribution mains of the types and sizes shown in the table below. Some distribution mains that were originally installed have since been decommissioned due to restrictions in development.

The system does suffer isolated main breaks that are difficult to find due to the hilly terrain in Sudden Valley. Much of the water main pipe material is cast iron, and several leaks have been due to full circle pipe breaks. The cause of at least one main break appeared to be point loading of the pipe against rock, indicating improper or shifted bedding.

The 47 PRV stations are maintained annually, and are included in an on-going repair/replacement program. Replacing aging customer services is also part of the on-going maintenance program. Radio-read retrofit for all the residential service meters was completed in 2007. Retrofitting the radio-read meters for commercial services was completed around 2010.

Throughout the Sudden Valley water system, only minor distribution system deficiencies were identified. These include missing and/or never-installed blow-offs on approximately 25 of the dead-end 3" lines and a lack of dedicated sample stations in some of the pressure zones. Also see Section 3.3.3, Hydraulic Models for a discussion of the distribution system and potential deficiencies.

TABLE 3.3-4 SUDDEN VALLEY STUDY AREA PIPE MATERIAL QUANTITIES

Material	Range (Inches)	Length (Ft)
PVC	2	2,000
Ductile Iron/Cast Iron	3-12	219,196

B. Geneva Study Area:

Source – An intertie between the Sudden Valley and Geneva has been installed and is now the primary supply source to Geneva. The old City of Bellingham intertie remains in-place as an emergency backup. The City recently increased its operating pressure in the area by intertie such that the intertie can now be changed from a pump station to a PRV because the City pressure is higher than the operating pressure in Geneva. The water intakes for the City's surface water treatment plant and the District's Sudden Valley surface water treatment plant are approximately four miles apart.

Treatment – Sudden Valley source; See Sudden Valley section for treatment description. See City of Bellingham Water System Plan for treatment description for water fed through emergency intertie.

Storage – The Geneva Study Area has a single, welded steel, 0.5-MG reservoir located behind the District office at 1010 Lakeview Street. It has a base elevation of approximately 661.12 ft (NAVD88), a diameter of 52 ft, and a nominal height of 32 ft. As discussed above, the Division 22 reservoir is also serving part of Geneva. This eliminated the need for additional reservoir capacity in Geneva. See Section 3.3.2 for a discussion of storage capacities.

Distribution System – The distribution system in the Geneva Study Area is a mix of old and new water mains. With the completion of projects in 2000 to replace all old 2"

galvanized waterlines, and completion of the service meter replacement program, distribution system losses in Geneva have been reduced.

The remainder of all known asbestos cement (AC) water main in Geneva was replaced in the summer of 2015 (approximately 12,000 ft of pipe). Now most of the 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 STUDY 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 because of increased pressure from the City source.

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 (August 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.

3.3.2 System Capacities

A. Sudden Valley: and

B. Geneva:

Sudden Valley and Geneva are considered together when determining system capacity for the South Shore Water System. The limiting factor for the overall system was storage prior to construction of the new Division 22 reservoir. Now that this additional reservoir is online, storage is not the limiting factor. The system can now provide storage for full anticipated build-out of the existing service areas in an energy efficient manner.

The service areas of each reservoir shown in Figure 3.3-1 will minimize pumping costs and appropriately distribute demand and storage. Based on these service areas for each reservoir, the storage requirements in Table 3.3-6 were developed for expected build-out ERUs of the existing system.

There are four items in Table 3.3-6 that should be noted. First, it assumes zero dead storage. This has been assumed in previous reports because of the District's Resolution 410 (and Resolutions 721, 778, Administrative Code 4.2.1) that provides a credit for a booster pump for those lots too close to distribution reservoirs to provide sufficient gravity pressure. Note that these lots were platted before the minimum required pressure at the service meter was raised from 20 psi to 30 psi.

Second, Table 3.3-6 assumes that the Standby Storage for the Division 30 reservoir is allocated to the Division 7 reservoir. This has been previously justified because the pumping system to provide water to Division 30 from Division 7 is fully redundant and has an on-site backup generator to keep it pumping in case of a power outage.

A third item to note is that fire suppression storage for all the south shore reservoirs (except Div 30) is nested within the much larger standby storage volume. This is acceptable per WAC 246-290-235(4).

Finally, in Table 3.3-6, note the supply capacities to the Division 7 and Division 22 reservoirs for the calculation of equalizing storage. The water treatment plant that supplies water to Division 7 and Division 22 is typically operated at 1 MGD (694 gpm). To maintain equal flow in to and out of the 225,000 gallon CT tank at the treatment plant, this 694 gpm is pumped either to Division 7 or Division 22. The pumps that pump to each of the reservoirs are redundant, with two pumps each able to provide approximately 700 gpm. The equalizing storage calculation assumes all the treatment plant supply is provided to Division 22 and none is provided to Division 7.

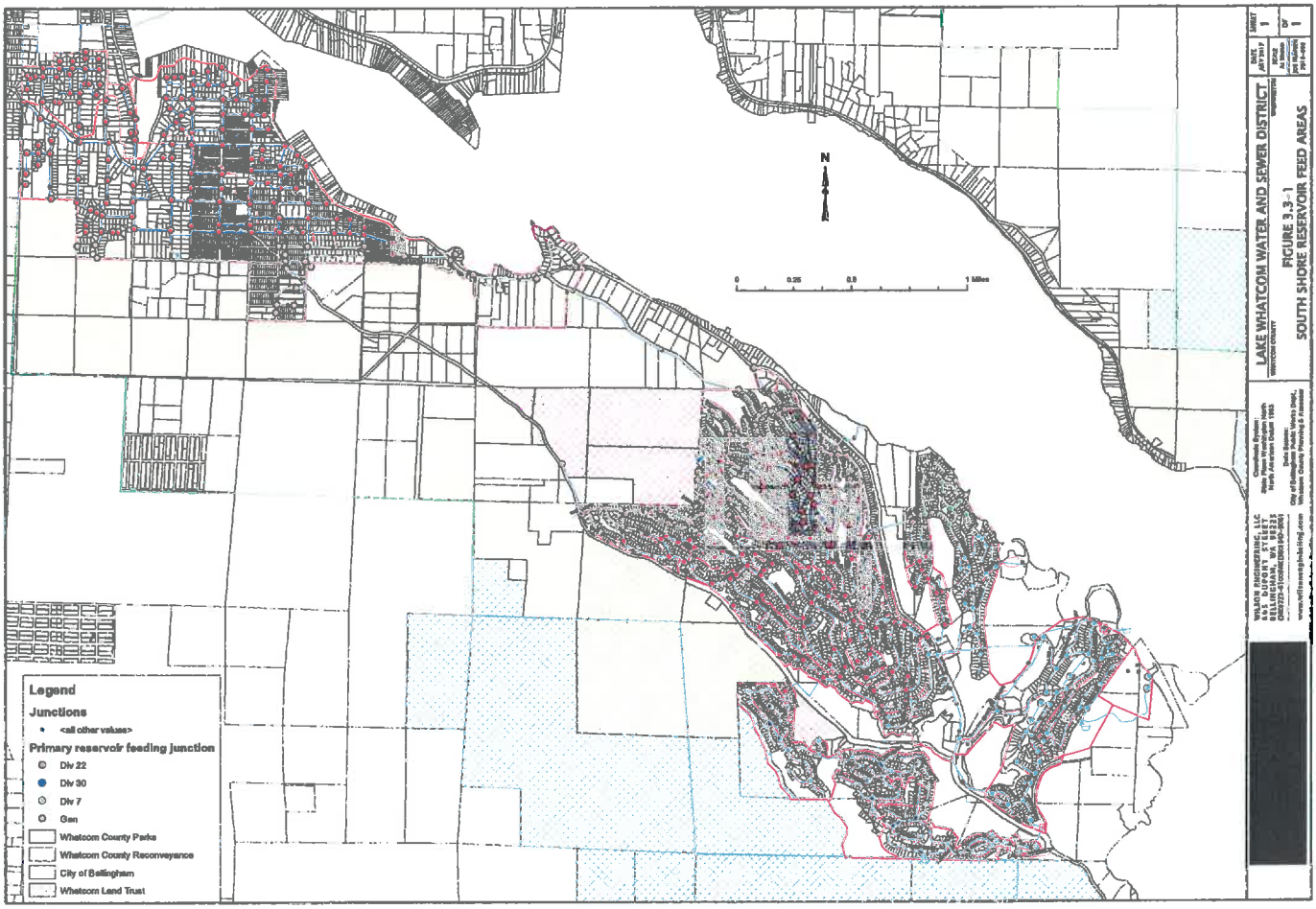

Legend
Junctions
<all other values>
Primary reservoir feeding junction
Div 22
Div 30
Div 7
Gen
Whatcom County Parks
Whatcom County Reconveyance
City of Bellingham
Whatcom Land Trust
N
0
0.25
0.5
1 Miles
LAKE WHATCOM WATER AND SEWER DISTRICT
WHATCOM COUNTY
FIGURE 3.3-1
SOUTH SHORE RESERVOIR FEED AREAS
SHEET 1 OF 1

Table 3.3-6 shows that there is sufficient storage while running the water treatment plant at 1 MGD (half of its capacity) for expected build-out of the south shore water system (4569 ERUs). The levels with Standby/Fire Suppression storage depleted indicate that there is excess storage in all the reservoirs except Division 22. If the operating level of the Division 22 reservoirs was raised (which could be done), this would allow for additional ERUs served from those reservoirs as well. If additional ERUs beyond anticipated build-out are needed, this could be evaluated in the future.

The MDD and ERUs shown in Table 3.3-6 indicate an overall system maximum day demand of 1.3 MGD for anticipated build-out of the system. This can easily be met by the 2 MGD capacity of the treatment plant.

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. 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 is approximately 75 psi, and the pumps currently increase the pressure to approximately 105 psi. A pressure of 75 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 remain necessary to provide the required 750 gpm for fire suppression flow. See Section 3.3.3 for further discussion and analysis.

The maximum system capacity is limited by the ability to provide peak hour demand. Given the contract limit of 150 gpm, and that the current MDD for this area is 800 gpd/ERU (without conservation savings), the existing 2017 system capacity is **85 ERUs** based on equation 5-1 from the DOH Water System Design Manual. Build-out for the Eagleridge subdivision and existing customers is 71 ERUs, so the system has capacity for 14 additional ERUs.

See Appendix C, the North Shore Water System Consolidation Feasibility study, for discussion of potentially consolidating the Eagleridge and Agate Heights water systems, with the Agate Heights well providing the water source for the combined system.

D. North Shore - Agate Heights:

See Table 3.3-7 for a summary of existing storage capacity for the Agate Heights water system. Note that there is no dead storage for either of the reservoirs, as both of the bases are substantially higher than 46 ft above the highest residence served

(providing the required 30 psi at the service meter). Also note that standby storage is nested within fire suppression storage for the upper reservoir while fire suppression storage is nested within standby storage for the lower reservoir. The Fire suppression storage volume for the upper reservoir was set by the local fire authority for serving the treatment center. Fire suppression for the lower reservoir meets the flow and duration recommended by the Whatcom County Coordinated Water System Plan (500 gpm for one hour).

The number of ERUs in Table 3.3-7 is the maximum capacity of the storage system. The current number of ERUs served by the upper reservoir is 18, so there is capacity for 4 more ERUs to be served by this reservoir. The current number of ERUs served by the lower reservoir is 28, and there are ## commitments to provide service. Based on the calculations and requirements listed above, this reservoir could serve 94 ERUs total.

Table 3.3-7 shows that storage is not the limiting factor for capacity of the Agate Heights system, at least for the area served by the lower reservoir. The treatment capacity limits the capacity of the overall system. The current Agate Heights water treatment plant capacity is 30 gpm, **or 86 ERUs** total at MDD = 500 gpd/ERU. This is currently the limiting factor in capacity of the system. Water rights are sufficient for 1261 ERUs (438 gpm at MDD = 500 gpd/ERU). See Appendix C for further discussion of the possibility of expanding the service area of Agate Heights by adding treatment and storage capacity.

3.3.3 Hydraulic Models and Analysis Results

The program used to perform the hydraulic analysis was InfoWater Version 12.3, the Innovyzewater distribution modeling program that is fully integrated with ArcGIS for its graphical interface.

A. Sudden Valley: and

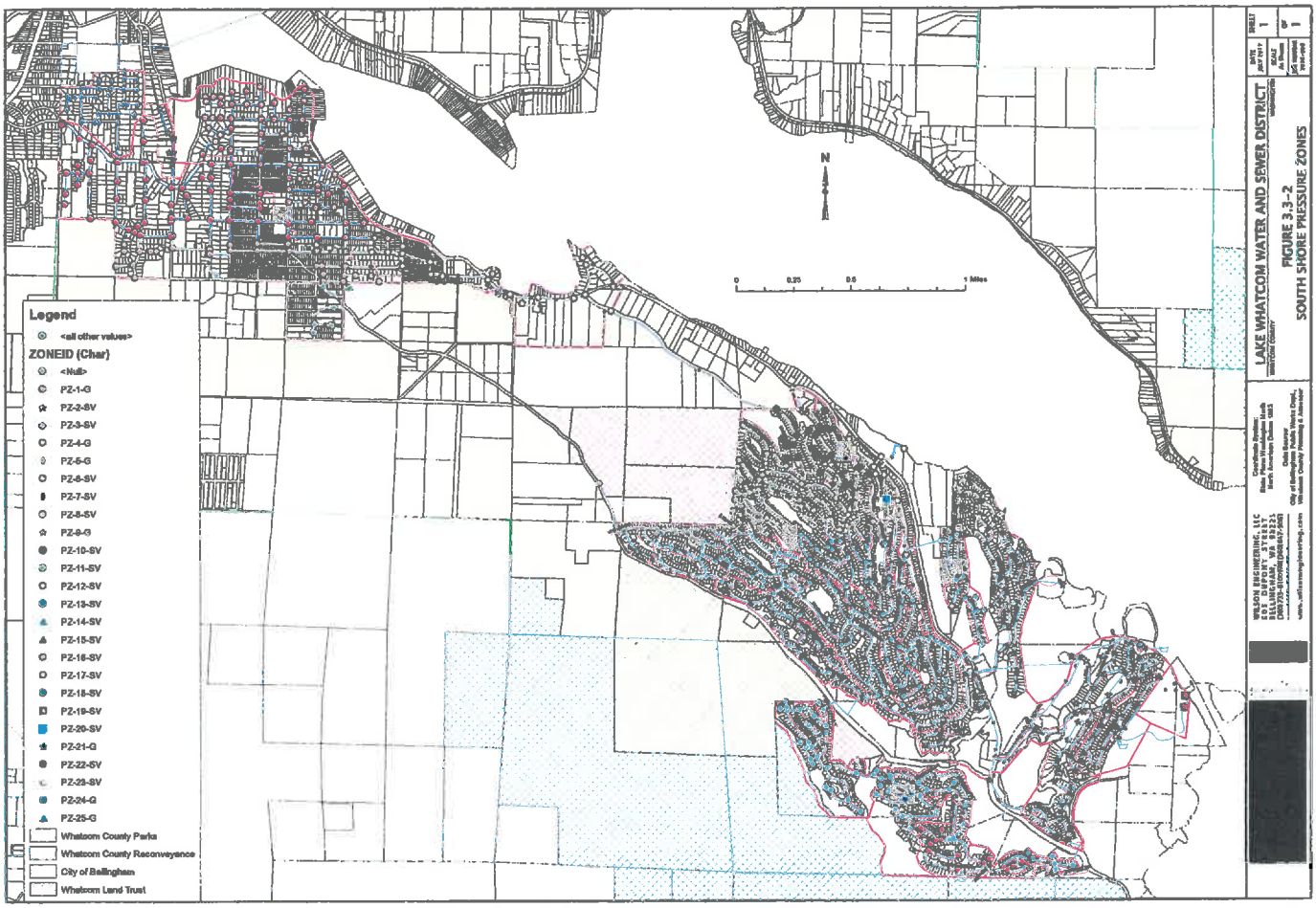
B. Geneva:

Model Set-Up

The hydraulic model for Sudden Valley and Geneva was updated since the previous water system plan update. Updates included infrastructure for all Developer Extension Agreements that have been constructed, updates to Maximum Day Demand (MDD) and Peak Hour Demand (PHD), and updates to PRV settings so that the model represents current settings and conditions. Pump curves were updated so that flow rates accurately represented measured flow rates. Fire flow demands were updated to include junctions with new hydrants. The new Division 22 reservoir that has recently been constructed was added to the model. Elevations were updated to be based on NAVD88 (which is now the vertical datum used by the City of Bellingham).

MDD was updated to be 250 gpd/ERU for Sudden Valley ERUs and 370 gpd/ERU for Geneva ERUs (Appendix B). Distribution of MDD was based on the previous model but was updated as appropriate. PHD was updated using Equation 5-1 from the DOH Water System Design Manual calculating a total peak hour demand for each hydraulically distinct pressure zone. The total zone PHD was then distributed to the junctions within that pressure zone with the same distribution as the MDD demand.

There are 25 hydraulically distinct pressure zones within the south shore water system. Many of these are within similar bands of elevation, but due to the topography and distribution do not have connecting pipes. See Figure 3.3-2 for a map of the 25 pressure zones.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<all other values>
ZONEID (Char)
<Null>
PZ-1-G
PZ-2-SV
PZ-3-SV
PZ-4-G
PZ-5-G
PZ-6-SV
PZ-7-SV
PZ-8-SV
PZ-9-G
PZ-10-SV
PZ-11-SV
PZ-12-SV
PZ-13-SV
PZ-14-SV
PZ-15-SV
PZ-16-SV
PZ-17-SV
PZ-18-SV
PZ-19-SV
PZ-20-SV
PZ-21-G
PZ-22-SV
PZ-23-SV
PZ-24-G
PZ-25-G
Whatcom County Parks
Whatcom County Reconveyance
City of Bellingham
Whatcom Land Trust
N
0
0.25
0.5
1 Miles
LAKE WHATCOM WATER AND SEWER DISTRICT
FIGURE 3.3-2
SOUTH SHORE PRESSURE ZONES

All pipes 6" and larger ***or*** part of a loop were included in the Sudden Valley system analysis. All pipes in the Geneva system were included in the analysis. The minimum system pressures used were 30 psi for peak hourly demand conditions and 20 psi for fireflow plus Maximum Daily Demand (MDD) conditions. These are the State required minimum system pressures.

The modeling performed was for the full build-out population of Geneva and Sudden Valley based on existing infrastructure (infill of vacant lots). Build-out for Geneva is estimated at about 1275 ERUs and build-out for Sudden Valley is estimated at about 3294 ERUs. Scenarios for less than full build-out were not assessed because the system currently has capacity for full build-out.

In order to evaluate the system under conditions that deplete all equalizing and/or fire suppression storage volume (per DOH Water System Design Manual, Section 8.2.3.5, a and b), all reservoir storage was evaluated to determine operating, equalizing, and fire suppression storage volumes. Results are summarized in Table 3.3-6. Peak Hour Demand was calculated using DOH Equation 5-1 using the number of ERUs per reservoir. Fire Suppression Storage is 750 gpm x 60 minutes for each reservoir except Division 30 because Division 30 only serves residential connections in Sudden Valley (need 500 gpm x 60 minutes). Other reservoirs could serve Commercial/Condos in Sudden Valley or Geneva connections, which have a fire flow requirement of 750 gpm. Storage for the two Division 22 reservoirs is shared proportionally between the two. Fire Suppression Storage is nested within Standby Storage.

In looking at Division 7 and Division 30, Division 7 has excess storage and Division 30 has a storage shortfall unless it were operated to be continuously full (no operating storage). Previous reports (2009 Reservoir Capacity Analysis, 2015 Division 22 Reservoir Predesign Report [Appendix A]) have addressed this issue and it has been concluded that Division 30 can share the standby storage provided by Division 7 because Division 30 is fed by a booster station from Division 7 and the booster station is fully redundant and can be powered by an on-site generator. This level of reliability is adequate to transfer standby storage from Division 7 to Division 30 in the majority of standby situations, including a prolonged power outage.

Operating Storage levels shown in Table 3.3-6 match current operating records except for Division 22. Currently, Division 22 is serving fewer ERUs and Division 30 is serving more ERUs than shown in the table because the new Division 22 reservoir is not yet in service. Once it is complete, operation will be adjusted to approximately match the ERU distribution shown in Table 3.3-6 and the bottom of the operational level of the Division 22 reservoirs will be raised to the levels shown in Table 3.3-6.

ERU allocations per reservoir are based on the operational PRV settings such that Division 30 does not feed connections on the northeast side of Lake Louise Road. A map of where the reservoirs are feeding under this ERU allocation scenario is shown in Figure 3.3-1.

For Peak Hour Demand, the model was evaluated with tank levels such that all equalizing storage was depleted, as shown in Table 3.3-6. For fire suppression flows during Maximum Day Demand, the model was evaluated with tank levels such that all equalizing storage and fire suppression storage was depleted, as shown in Table 3.3-6.

Model Calibration

The pipes were included in the model based on as-built information, and a Hazen-Williams friction coefficient of 100 has been assumed to be appropriate, if slightly conservative. For this water system plan, pressure and flow rate data were collected during flushing operations to assess the accuracy of the model.

Calibration was performed using the guidance provided by the AWWA Manual M32: Computer Modeling of Water Distribution Systems. Pressures were monitored by two hydrant pressure loggers manufactured by Global Water, installed at appropriate locations in the distribution system. The loggers were factory calibrated from 0-200 psi and were field adjusted with a one point calibration to 0 psi under the guidance of a Global Water technician. The reported accuracy of the loggers is +/- 1% of full scale. Loggers were programmed to collect one pressure reading every 30 seconds. Flow rates were measured using a meter and a stopwatch.

Calibration was performed during the summer months and during the day. Residential demand during this time was assumed to be approximately equal to MDD for comparison to the MDD model demands. Absolute pressures were assessed to determine if there were any major discrepancies in system connectivity or PRV settings. Relative pressure drop during flushing was compared to model pressure drop at the field-measured flow rate and flushing location.

The calibration effort revealed that the model did not contain major errors in connectivity or PRV settings. It also demonstrated that some field-measured pressure drops during flushing were higher than predicted by the model. In order to reconcile these differences, adjustments to the friction coefficient were made as well as minor decreases in pipe diameter to account for tuberculation or build-up within the pipes. Estimated minor losses from pipe bends were also added. These parameters were adjusted to bring the model in to agreement with the field measurements.

Model and Analysis ResultsResults indicate that there is sufficient pressure and flow to meet the District's peak hourly demand (PHD) and fireflow requirements of 500 or 750 gpm at all current fire hydrants while maintaining minimum pressures throughout the system with a few minor exceptions. The original system was designed to previous State standards (20 psi minimum at PHD) and certain lots close to the reservoirs only have 20 psi residual for peak hourly demand conditions. These lots have been identified and qualify for reimbursement by the District for the purchase of a residential booster in accordance with District Resolution 410 (and Resolutions 721, 778, Administrative Code 4.2.1). Because of the low pressures without fireflow, there are approximately six fire hydrants near the reservoirs that do not meet 500 gpm minimum. However, nearly 95% of the Sudden Valley fire hydrants are capable of supplying 750 gpm, including all fire hydrants located adjacent to the high-density residential areas (URM 12 zoning).

The National Fire Protection Association (NFPA) Code 291 sets forth guidelines for marking hydrants that could be implemented by LWWSD in coordination with the local fire districts. It recommends that hydrant tops and nozzle caps be painted according to the following based on rated capacity:

Rated capacity of 1500 gpm or greater: Light blue

Rated capacity of 1000 – 1499 gpm: Green

Rated capacity of 500-999 gpm: Orange

Rated capacity of less than 500 gpm: Red

NFPA 291 also recommends that hydrants having a static pressure of less than 40 psi should be rated at one-half of the static pressure (instead of at 20 psi) and that any pressure rating less than 20 psi should be stenciled on to the top of the hydrant in black. In looking at the six fire hydrants near the reservoirs that do not meet 500 gpm at 20 psi, the model indicates that they should all meet 500 gpm at half their static pressure.

Results indicate that there is sufficient pressure and flow to meet the District's fireflow requirements of 750 gpm at all current fire hydrants in Geneva while maintaining 20 psi residual pressures throughout the system under MDD operating conditions.

In the previous water system plan, there was an area in Geneva where the system pressured exceeded 100 psi. Pressure Reducing Valves were installed at Lowell Ave. and Oriental Ave. in 2012 to remedy this problem. *(Still some areas above 100 psi…Lowe)*

LWWSD may want to consider operating the reservoirs at the lowest allowable level to decrease seismic vulnerability of the reservoirs. A full assessment of the reservoir seismic vulnerability was conducted in 2016. Minimum reservoir storage levels are shown in Table 3.3-8. This assumes that Resolution 410 (and Resolutions 721, 778, Administrative Code 4.2.1) sufficiently addresses those residences immediately adjacent to the reservoirs who experience less than the required pressures. Lowering the reservoir levels may increase the number of residences this would apply to.

NOTE - RESERVOIR TABLES WILL BE SIMPLIFIED

Table 3.3-6 Sudden Valley and Geneva Reservoir Storage with Division 30 Standby Storage re-distributed to Division 7

Reservoir	Base Elevation (ft NAVD88)	Reservoir Height to Overflow (ft)	Reservoir Diameter (ft)	Reservoir storage per foot (gal/ft)	Operating Storage: Storage Volume (gallons)	Operating Storage: Level with Storage Depleted (ft)	MDD (gpd/ERU): Geneva	MDD (gpd/ERU): Sudden Valley	ERUs: Geneva	ERUs: Sudden Valley	PHD for Reservoir (gpm): Geneva Contribution	PHD for Reservoir (gpm): Sudden Valley Contribution	Flow out to other reservoirs (gpm)	Total PHD for Reservoir (gpm)	Supply Capacities (gpm)	Equalizing Storage: Storage Volume (gallons)	Equalizing Storage: Level with Storage Depleted (ft)	ADD (gpd/ERU): Geneva	ADD (gpd/ERU): Sudden Valley	Standby Storage: Storage Volume (gallons)	Standby Storage: Level with Storage Depleted (ft)	Fire Suppression Storage: Storage Volume (gallons)	Fire Suppression Storage: Level with Storage Depleted (ft)
Division 7	670.45	35	70	28,726	250,292	27		250		820		256	165	451	0	67,846	24.65		150	592,100	11.05	45,000	23.99
Division 22	654.65	35	50	14,687	232,162	20	175	250	535	1667	295	629	250	1154	674	56,491	25.92	175	150	782,650	0.25	45,000	22.56
Division 22 New	805	35	56	18,428	165,610	28											25.62				0.58		22.56
Division 30	1027.98	40	25	3,672	18,959	35		250		485		191	0	191	163	1,646	35.95		150	0	31.95	30,000	25.76
Geneva	661.12	52	52	15,885	31,772	50	175		742		381		0	381	250	45,029	26.76	175		259,700	11.62	45,000	23.93

Table 3.3-7: Agate Heights Reservoir Storage Capacity

Reservoir	Base Elevation (ft)	Reservoir Height to Overflow (ft)	Reservoir Diameter (ft)	Reservoir storage per foot (gal/ft)	Operating Storage: Storage Volume (gallons)	Operating Storage: Level with Storage Depleted (ft)	MDD (gpd/ERU)	ERUs	PHD for Reservoir (gpm)	Flow out to other reservoirs (gpm)	Total PHD for Reservoir (gpm)	Supply Capacities (gpm)	Equalizing Storage: Storage Volume (gallons)	Equalizing Storage: Level with Storage Depleted (ft)	ADD (gpd/ERU)	Standby Storage: Storage Volume (gallons)	Standby Storage: Level with Storage Depleted (ft)	Fire Suppression Storage: Storage Volume (gallons)	Fire Suppression Storage: Level with Storage Depleted (ft)
Upper (105K gal)	825	20	30	5,287	12,690	17.6	500	22	41	0	41	21	2,988	17.03	230	10,120	15.12	90,000	0.01
Lower (79K gal)	557	15	30	5,287	21,149	11	500	94	106	21	129	35	14,892	6.10	230	43,240	0.01	30,000	2.51

Table 3.3-8 Sudden Valley and Geneva Reservoir Minimum Storage Levels

Reservoir	Base Elevation (ft NAVD88)	Reservoir Height to Overflow (ft)	Reservoir Diameter (ft)	Reservoir storage per foot (gal/ft)	Operating Storage: Storage Volume (gallons)	Operating Storage: Range of available operational storage (ft)	MDD (gpd/ERU): Geneva	MDD (gpd/ERU): Sudden Valley	ERUs: Geneva	ERUs: Sudden Valley	PHD for Reservoir (gpm): Geneva Contribution	PHD for Reservoir (gpm): Sudden Valley Contribution	Flow out to other reservoirs (gpm)	Total PHD for Reservoir (gpm)	Supply Capacities (gpm)	Equalizing Storage: Storage Volume (gallons)	Equalizing Storage: Upper Level of Storage (ft)	ADD (gpd/ERU): Geneva	ADD (gpd/ERU): Sudden Valley	Standby Storage: Storage Volume (gallons)	Standby Storage: Upper Level of Storage (ft)	Fire Suppression Storage: Storage Volume (gallons)	Fire Suppression Storage: Upper Level of Storage (ft)
Division 7	670.45	55	70	28,786	615,424	19.62 - 25		250		824		265	165	451	850	0	13.62		150	392,100	18.62	45,000	1.56
Division 22	654.65	55	50	14,687	332,327	25.12 - 36	175	250	535	1987	295	605	250	1154	725	64,341	25.34	175	150	782,650	28.64	45,000	1.96
Division 22 New	805	55	56	18,428	178,550	25.56 - 32											25.58				28.60		1.96
Division 30	1027.98	40	25	3,672	113,024	9.22 - 40		250		485		191	0	192	165	3,846	9.22		150	0	0.00	30,000	8.17
Geneva	661.12	52	52	15,885	229,904	17.56 - 32	175		742		381		0	382	250	19,629	17.58	175		259,700	16.35	45,000	2.83

C. North Shore - Eagleridge:

Model Set-Up

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 130.5 gpm (based on MDD, build-out of 71 ERUs). Demands were distributed throughout the system. Pump curves were updated based on available information. Elevations were updated to all be based on NAVD88. For existing information, this was done by converting elevation information from Old City of Bellingham Datum to NAVD88 (Old City of Bellingham Datum is 1.71 ft lower than NAVD88). Junction elevations were updated to NAVD88 using LIDAR from the 2013 City of Bellingham project that produced detailed (3 ft by 3 ft resolution) DTM (Digital Terrain Model) data. This data was downloaded from the Washington State Department of Natural Resources LIDAR portal (http://lidarportal.dnr.wa.gov/).

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 (approximately 75 psi static pressure at the connection elevation). Based on information from the City of Bellingham CityIQ database, the connection is fed by approximately 2500 feet of unlooped 8-inch diameter water main. This information was input in to the model.

Model Verification

SCADA data of pump station discharge pressure and pump on/off status was analyzed to confirm that operation was consistent with model set-up. Suction and discharge pressures as well as the PRV setting were measured manually to confirm parameters.

Model and Analysis Results

The model results indicate that the pumps can provide sufficient pressure and flow to meet 750 gpm at all fire hydrants while maintaining a minimum system pressure of 20 psi. The results also show sufficient capacity to meet peak hour demand for the projected build-out of 85 ERUs while maintaining a minimum system pressure of 30 psi.

Because of the change in source pressure from the previous analysis, the possibility of bypassing or eliminating the pump station was investigated. The hydraulic grade line of the Eagleridge system with the PRV setting of 105 psi is approximately 572 ft whereas the City source hydraulic grade line is approximately 519 ft. The model indicates that with the three residential flow pumps bypassed and served by the pressure of the City source with 20 ft of pipe as small as 2.5 inches in diameter (which is currently installed), 30 psi can be provided to all connections under peak hour demand. It is understood that the District receives low pressure complaints when this existing bypass is in operation, but the model indicates that the minimum pressure is provided to all customers. Supplying water through a larger pipe may alleviate some low pressure complaints.

MDD plus fire flow was also investigated under pump bypass scenarios. It was found that 750 gpm could not be provided to all fire hydrants by the pressure from the City source at a hydraulic grade line of 519 ft while maintaining 20 psi residual pressure if the pumps were bypassed with 8-inch diameter pipe. Available fire flows under this bypass scenario varied between 475 and 546 gpm. One of the existing fire flow pumps was needed to achieve the required 750 gpm, and the second pump is needed for redundancy.

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.

Model Set-Up

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. Demands were appropriately distributed. PRV settings were updated to reflect current operational settings. Elevations were updated to all be based on NAVD88. For existing information, this was done by converting elevation information from Old City of Bellingham Datum to NAVD88 (Old City of Bellingham Datum is 1.71 ft lower than NAVD88). Junction and PRV elevations were updated to NAVD88 using LIDAR from the 2013 City of Bellingham project that produced detailed (3 ft by 3 ft resolution) DTM (Digital Terrain Model) data. This data was downloaded from the Washington State Department of Natural Resources LIDAR portal (http://lidarportal.dnr.wa.gov/).

Model Verification

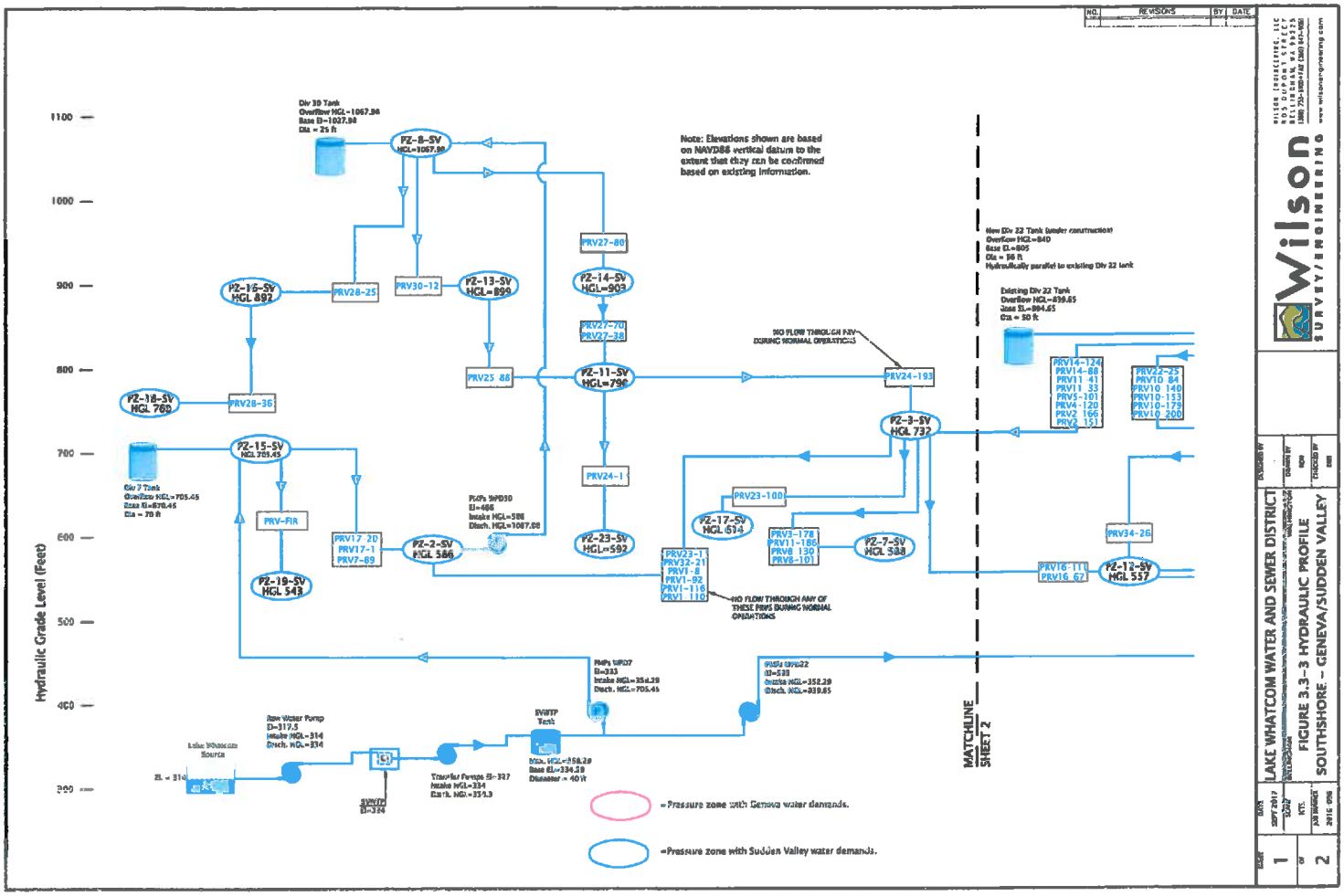
System operating parameters were confirmed from the system's SCADA data. Tank levels were set such that equalizing storage was depleted for the PHD analysis and both equalizing and fire suppression storage volumes were depleted for the MDD + fire suppression flow rate analysis. These were set based on Table 3.3-7.

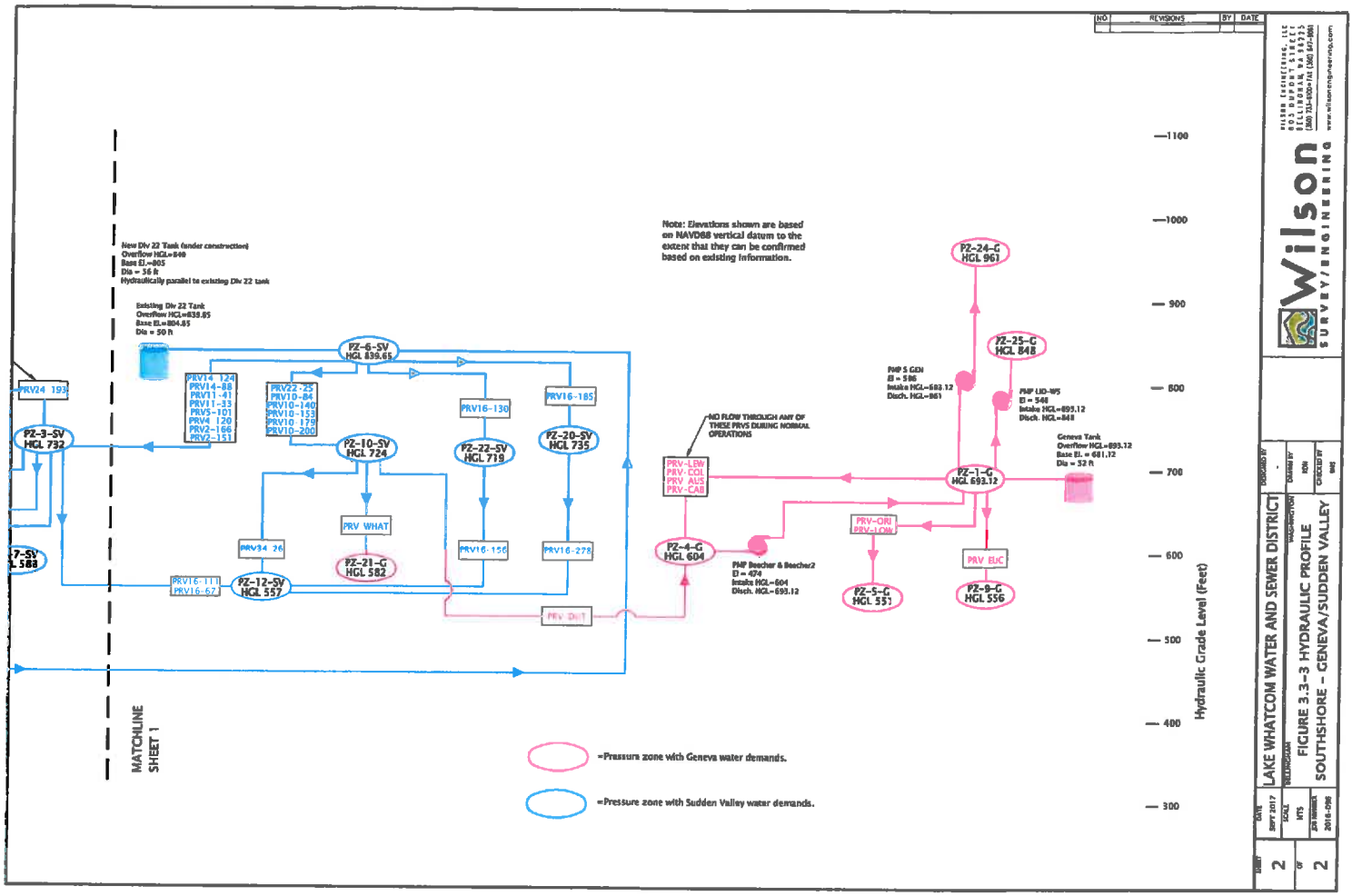
Model and Analysis Results

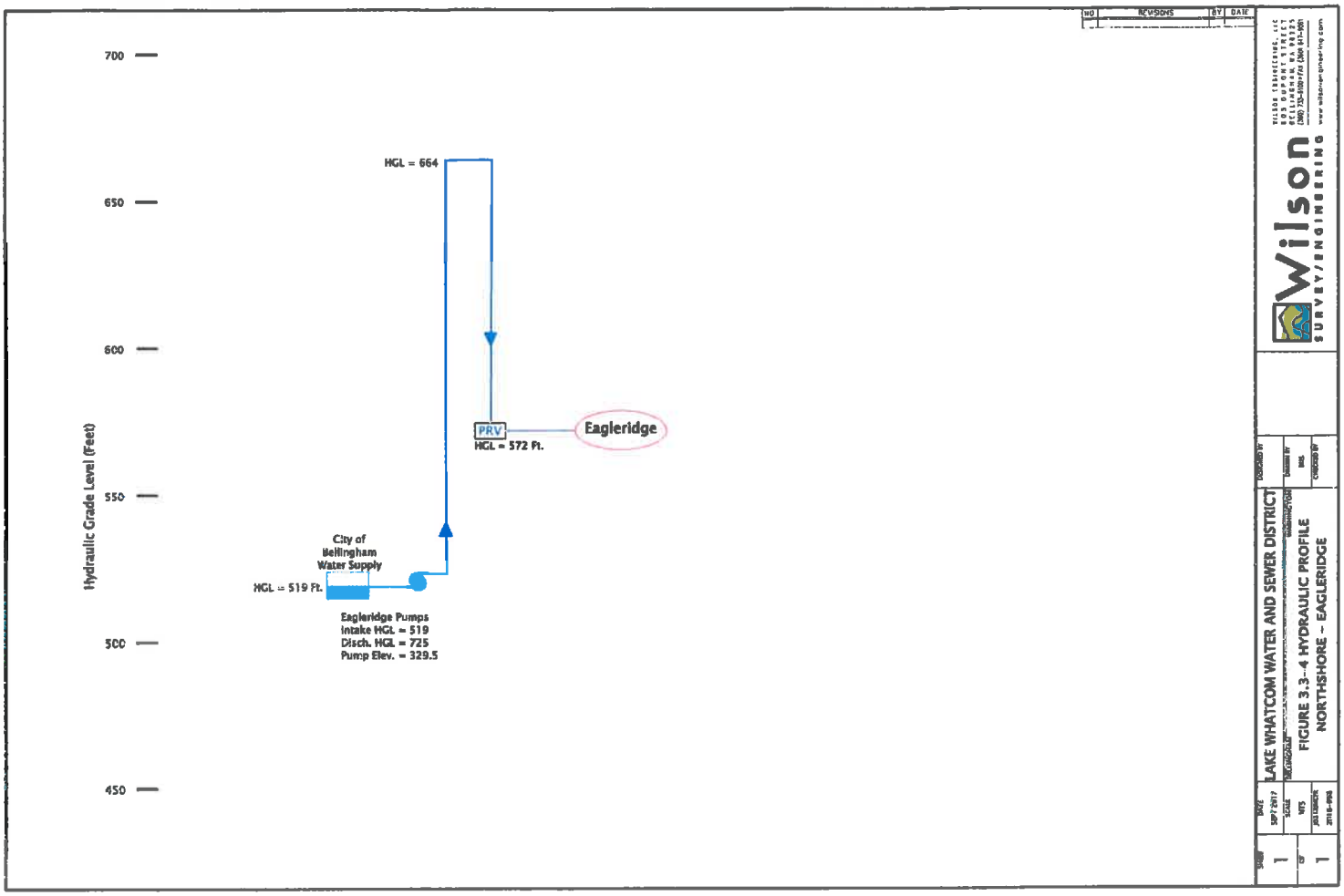
The results indicate that the system can provide 750 gpm fire flows at the Lake Whatcom Residential and Treatment Center (LWRTC), and 500 gpm fire flows in the residential subdivisions while maintaining the minimum 20 psi system pressure. The system is also capable of maintaining the minimum 30 psi pressure during peak hour demands.

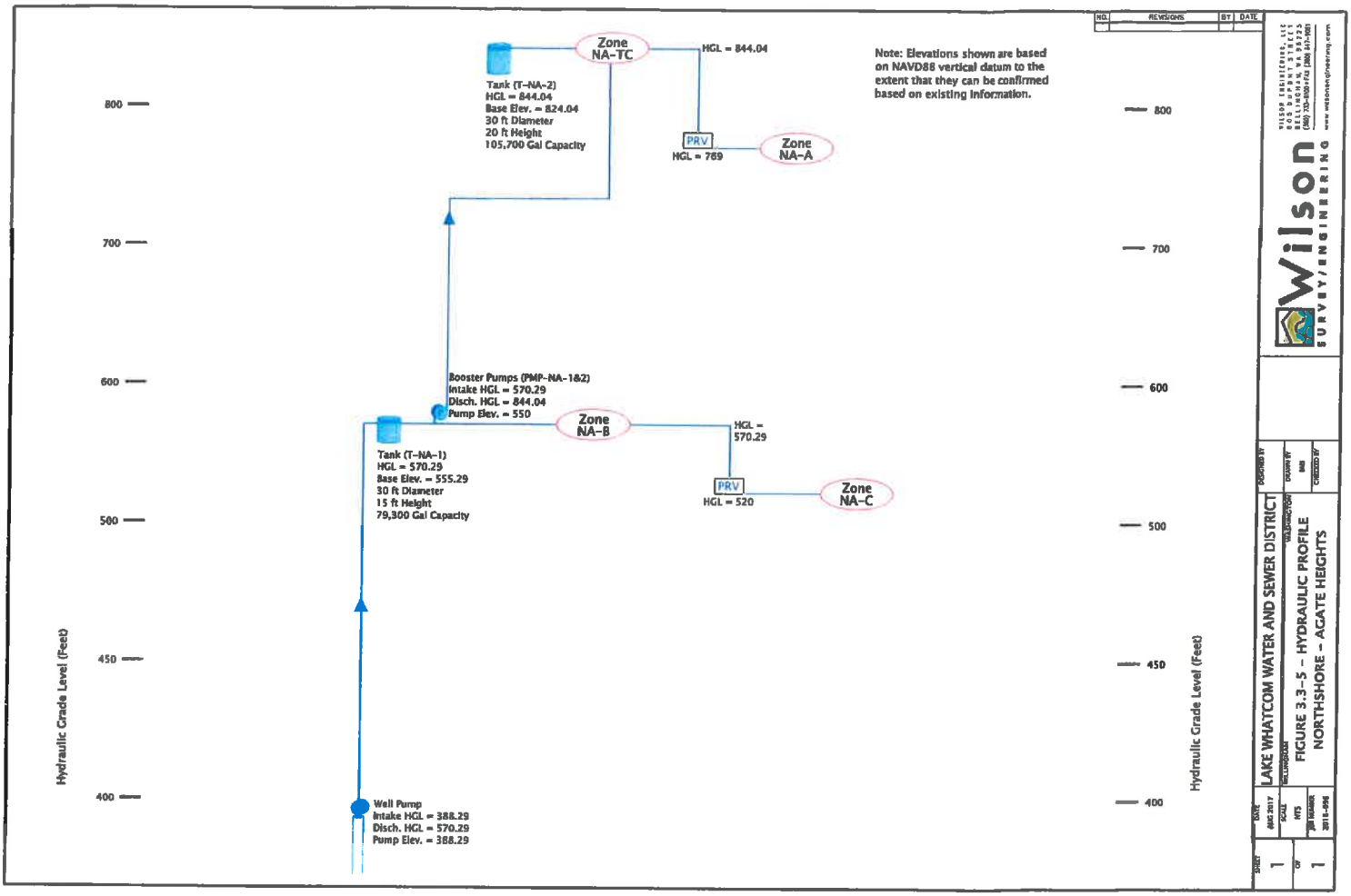
With the addition of a second, higher tank to serve the LWRTC, the Opal Terrace pressure zone was converted from being pressurized by a booster pump station to gravity service. While the analysis indicates the pumps should have sufficient capacity to keep up with refilling the tank under maximum day demand (MDD) conditions, staff have indicated that larger pumps would aid in overall system operations. This upgrade will be coordinated with the proposed project to increase the capacity of the Agate Heights Water Treatment Plant.

Hydraulic profile schematics for the District's three Group A systems (South Shore, Eagleridge and Agate Heights) can be found on the following pages (Figures 3.3-3 through 3.3-5). There is no profile for the Johnson Well system since it only consists of a well and two services, and is not expected to expand.


Hydraulic Grade Level (Feet)
1100
1000
900
800
700
600
500
400
300
Note: Elevations shown are based on NAVD88 vertical datum to the extent that they can be confirmed based on existing information.
PZ-8-SV HGL=1067.96
PZ-16-SV HGL 892
PZ-18-SV HGL 760
PZ-15-SV HGL 705.45
PZ-19-SV HGL 543
PZ-13-SV HGL=859
PZ-14-SV HGL=903
PZ-11-SV HGL=796
PZ-23-SV HGL=592
PZ-2-SV HGL 586
PZ-17-SV HGL 614
PZ-3-SV HGL 732
PZ-7-SV HGL 388
PZ-12-SV HGL 557
PRV28-25
PRV30-12
PRV28-36
PRV25 88
PRV27-80
PRV27-70
PRV27-28
PRV24-1
PRV24-193
PRV-FIR
PRV17 20
PRV17-1
PRV7-89
PRV23-100
PRV3-178
PRV11-166
PRV8 130
PRV8-101
PRV34-26
PRV16-111
PRV16 67
PRV14-124
PRV14-68
PRV11 41
PRV11 33
PRV5-101
PRV4-120
PRV2 166
PRV2 151
PRV22-25
PRV10 84
PRV10 140
PRV10-153
PRV10-179
PRV10 200
PRV23-1
PRV32-21
PRV1-8
PRV1-92
PRV1-116
PRV1 110
NO FLOW THROUGH PRV DURING NORMAL OPERATIONS
NO FLOW THROUGH ANY OF THESE PRVS DURING NORMAL OPERATIONS
MATCHLINE SHEET 2
Div 3 Tank
Overflow HGL=705.45
Base El=670.45
Dia = 70 ft
Div 10 Tank
Overflow HGL=1067.96
Base El=1027.96
Dia = 25 ft
New Div 22 Tank (under construction)
Overflow HGL=840
Base El.=805
Dia = 90 ft
Hydraulically parallel to existing Div 22 tank
Existing Div 22 Tank
Overflow HGL=839.65
Base El.=804.65
Dia = 80 ft
Raw Water Pump ID=319.5
Intake HGL=314
Disch. HGL=334
Lake Whatcom Source
Transfer Pumps ID=327
Intake HGL=334
Disch. HGL=354.3
WWTP Tank
Max. HGL=358.29
Base El.=334.29
Diameter = 40 ft
PMPs WP07 ID=333
Intake HGL=354.29
Disch. HGL=705.45
PMPs WP22 ID=533
Intake HGL=352.29
Disch. HGL=839.65
= Pressure zone with Geneva water demands.
= Pressure zone with Sudden Valley water demands.
NO. REVISIONS BY DATE
Wilson Engineering, LLC
805 Dupont Street
Bellingham, WA 98225
(360) 733-4080 • FAX (360) 647-9081
www.wilsonengineering.com
Wilson
SURVEY/ENGINEERING
LAKE WHATCOM WATER AND SEWER DISTRICT
FIGURE 3.3-3 HYDRAULIC PROFILE
SOUTHSHORE - GENEVA/SUDDEN VALLEY
DESIGNED BY
DRAWN BY MDH
CHECKED BY MM
DATE SEPT 2017
SCALE NTS
JOB NUMBER 2016 096
SHEET 1 OF 2


NO
REVISIONS
BY
DATE
Wilson
SURVEY/ENGINEERING
LAKE WHATCOM WATER AND SEWER DISTRICT
FIGURE 3.3-3 HYDRAULIC PROFILE
SOUTHSHORE – GENEVA/SUDDEN VALLEY
DESIGNED BY
DRAWN BY
RDN
CHECKED BY
DATE
SCALE
JOB NUMBER
2016-098
SHEET
2
OF
2
New Div 22 Tank (under construction)
Overflow HGL=840
Base El.=805
Dia = 36 ft
Hydraulically parallel to existing Div 22 tank
Existing Div 22 Tank
Overflow HGL=838.85
Base EL=804.85
Dia = 30 ft
Note: Elevations shown are based on NAVD88 vertical datum to the extent that they can be confirmed based on existing information.
PZ-6-SV HGL 839.65
PRV14 124
PRV14-88
PRV11-41
PRV11-33
PRV5-101
PRV4 120
PRV2-166
PRV2-151
PRV22-25
PRV10-84
PRV10-140
PRV10-153
PRV10-175
PRV10-200
PRV16-130
PRV16-185
PZ-3-SV HGL 732
PZ-10-SV HGL 724
PZ-22-SV HGL 719
PZ-20-SV HGL 735
PRV WHAT
PRV34 26
PZ-21-G HGL 582
PRV16-156
PRV16-278
PRV16-171
PRV16-62
PZ-12-SV HGL 557
PRV DIST
MATCHLINE SHEET 1
NO FLOW THROUGH ANY OF THESE PRVS DURING NORMAL OPERATIONS
PRV-LEW
PRV-COI
PRV AUS
PRV-CAR
PZ-4-G HGL 604
PMP Beecher & Beecher2
ID = 474
Intake HGL=604
Disch. HGL=693.12
PZ-24-G HGL 961
PZ-25-G HGL 848
PMP S GEN
ID = 586
Intake HGL=683.12
Disch. HGL=861
PMP LID-WS
ID = 548
Intake HGL=693.12
Disch. HGL=848
Geneva Tank
Overflow HGL=693.12
Base El. = 681.12
Dia = 32 ft
PZ-1-G HGL 693.12
PRV-ORI
PRV-LOW
PZ-5-G HGL 551
PRV ELC
PZ-8-G HGL 556
1100
1000
900
800
700
600
500
400
300
Hydraulic Grade Level (Feet)
=Pressure zone with Geneva water demands.
=Pressure zone with Sudden Valley water demands.


NO
REVISIONS
BY
DATE
700
650
600
550
500
450
Hydraulic Grade Level (Feet)
HGL = 664
PRV
HGL = 572 Ft.
Eagleridge
City of
Bellingham
Water Supply
HGL = 519 Ft.
Eagleridge Pumps
Intake HGL = 519
Disch. HGL = 725
Pump Elev. = 329.5
Wilson
SURVEY/ENGINEERING
LAKE WHATCOM WATER AND SEWER DISTRICT
FIGURE 3.3-4 HYDRAULIC PROFILE
NORTHSHORE – EAGLERIDGE
DRAWN BY
DESIGNED BY
CHECKED BY
DATE
SCALE
JOB NUMBER
SHEET


Zone NA-TC
HGL = 844.04
Tank (T-NA-2)
HGL = 844.04
Base Elev. = 824.04
30 ft Diameter
20 ft Height
105,700 Gal Capacity
PRV
HGL = 769
Zone NA-A
Note: Elevations shown are based on NAVD88 vertical datum to the extent that they can be confirmed based on existing information.
800
700
600
500
450
400
Booster Pumps (PMP-NA-1&2)
Intake HGL = 570.29
Disch. HGL = 844.04
Pump Elev. = 550
Zone NA-B
HGL = 570.29
Tank (T-NA-1)
HGL = 570.29
Base Elev. = 555.29
30 ft Diameter
15 ft Height
79,300 Gal Capacity
PRV
HGL = 520
Zone NA-C
Well Pump
Intake HGL = 388.29
Disch. HGL = 570.29
Pump Elev. = 388.29
Hydraulic Grade Level (Feet)
Hydraulic Grade Level (Feet)
NO. REVISIONS BY DATE
Wilson ENGINEERING
SURVEY/ENGINEERING
LAKE WHATCOM WATER AND SEWER DISTRICT
FIGURE 3.3-5 – HYDRAULIC PROFILE
NORTHSHORE – AGATE HEIGHTS
DESIGNED BY
DRAWN BY MB
CHECKED BY
DATE AUG 2017
SCALE NTS
JOB NUMBER 2015-094
SHEET 1 OF 1

3.4 Summary of System Deficiencies

System deficiencies identified are summarized in the following table.

Table 3.4-1 Summary of System Deficiencies

	Sudden Valley Area	Geneva Area	Eagleridge	Agate Heights
Source	Replace pump motors	None	None	None
Treatment	None	N/A	N/A	Additional treatment capacity needed with system expansion
Storage	Reservoir seismic upgrades Reservoir recoating	Reservoir seismic upgrades Reservoir recoating	N/A	Additional storage needed with system expansion
Distribution System	Missing blow-offs, lack of sample stations, low pressure areas around Div 22, consider decommissioning some PRVs	Consider PRV for one high pressure area (Lowe)	Consider removing the three low flow pumps and PRV	Replace transmission pumps

3.5 Selection and Justification of Proposed Improvement Projects

A. Sudden Valley Area:

Operational Adjustments Once New Division 22 Reservoir Comes Online – The current operation of the water system is such that approximately half of the treatment plant flow is sent to the Division 22 reservoir and the other half is sent to the Division 7 reservoir. PRVs are currently adjusted so that the Division 30 reservoir (as fed from Division 7) is providing water to more connections than is optimal because of the existing lack of storage in the Division 22 reservoir.

Once the new Division 22 reservoir comes online, PRV settings should be adjusted so that Division 22 feeds more connections and Division 30 feeds fewer connections. This will entail adjusting PRV settings such that there is no flow through PRV24-193 and the flow to pressure zone PZ-3-SV comes through the PRVs from PZ-6-SV (See hydraulic profile, Figure 3.3-3, for schematic). This will use less power because that volume of water will only need to be pumped to Division 22 at an elevation of 805 ft instead of to Division 30 at an elevation of 1027.98 ft with subsequent pressure drops (wasted energy) through PRVs. See Figure 3.3-1 for a map showing which areas

should be fed by which reservoir. There should be a schedule for regularly adjusting PRV settings temporarily to flush those pipes without flow during normal operation.

Adjusting PRV settings to feed the areas as shown in Figure 3.3-1 will result in a flow distribution of roughly 70% of the treatment plant flow being sent to Division 22 and 30% of the treatment plant flow being sent to Division 7.

Communications To Water Treatment Plant – It is recommended that communications between the Sudden Valley water treatment plant and the rest of the south shore water system be improved. Methods of doing so should be investigated but could include installing underground fiber optic cable or radio communications.

Distribution System - A system survey identified about 25 blow-offs missing from dead-end lines. Installing blow-offs will improve the water quality on the dead-end lines by allowing stagnant water to be flushed out. The District currently flushes blow-offs every six months. This item is included in the District's 6-year capital facilities plan along with the installation of dedicated sample stations in each pressure zone. The District is also planning on replacing several Condominium meters with radio-read meters and replacing several service lines.

There are historically low pressure areas near the reservoirs in Sudden Valley which the District has previously addressed with policies to subsidize the purchase of individual residential boosters where the pressure at the service meter was less than 30 psi. This policy was developed assuming that these substandard services would have had at least 20 psi at the service, which was the previous standard. The calibration efforts revealed that about 10 properties near the Division 22 Reservoir (Kinglet Ct and Water Tower Ct) have less than 20 psi when the tank level reaches the bottom of the operating storage. This severely limits the amount of fire flow available in the area since the minimum residual pressure ***with*** fireflow needs to be 20 psi. A small District-owned water booster station could be installed to increase the pressure for these 10 properties and an additional 11 properties with less than 30 psi at the service meter.

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 PRVs connecting two pressure zones is generally overly redundant and results in excess maintenance costs. The District is investigate decommissioning some of these redundant PRVs.

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 may 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 on the order of $500,000 for a 1MG tank *just for the painting*.
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.

Raw water pump motor replacement?

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 Bellingham provides emergency standby capacity. As mentioned previously, the emergency intertie currently consists of a pump station to provide water from the City of Bellingham to the Geneva area. In the time since the Geneva – Sudden Valley intertie was completed and Geneva no longer regularly purchased water from the City of Bellingham, the City has increased its distribution system pressure feeding the suction of that pump station. Investigations have found that that City-side pressure at the existing pump station suction is approximately 160 psi and that the LWWSD-side pressure at the existing pump station discharge is approximately 120 psi. Therefore, for this connection to be functional, the pump station will need to be removed and replaced with a pressure reducing valve.

Storage – The new, second reservoir at Division 22 will provide water service to and storage for the lower zone of Geneva, PZ-4-G. With this addition, there is sufficient storage for the anticipated build-out of the Geneva study area.

When the South Geneva pump station and PZ-24-G was added, the intent was that when future development in that area progressed, a reservoir would be built to serve this area by gravity and the booster pump station converted to a transmission pump station to fill the reservoir. With this intent in mind, fire hydrants were installed on the system, although the booster pump station is not sized to provide fire flows and they remain bagged and out of service until the reservoir is constructed. There is currently no timeline or plans for construction of such a reservoir.

LWWSD is investigating removing the 0.07 MG tank that is not currently in regular use. Removing this tank would require the connection with the City of Bellingham to be active and functional so that the connection could serve the Geneva area when the 0.5 MG Geneva reservoir is out of service for cleaning/maintenance. As discussed above, making the connection active and functional will require replacement of the existing pump with a PRV.

Distribution - The District had a prioritized list of aging water mains that are candidates for replacement. Leaking and undersized lines receive the highest priority for replacement. To the best of their knowledge, the District has now replaced all AC

water mains. Budgetary numbers are included in the six-year capital facilities plan for additional distribution system replacements.

Expansion of Service Area – The District may investigate serving additional areas that have already been developed in the Geneva area. There have been preliminary discussions of consolidating with the Glen Cove water system to the North of the existing service area along Euclid Avenue. The District may also investigate expanding to serve the residences along Lake Whatcom Boulevard between Strawberry Point and Sudden Valley.

C. North Shore - Eagleridge:

Storage – The existing Eagleridge water system currently relies on storage provided by the City of Bellingham. It is anticipated that this will remain until the Eagleridge system is consolidated with the Agate Heights system. See Appendix C for more information on the North Shore Consolidation study.

Distribution - The District will need to replace the pumps and controls at Eagleridge if they are not able to eliminate the domestic pumps and rely on City pressures for normal demands, and simplify the controls upgrade for the fire pumps.

D. North Shore - Agate Heights:

There have been inquiries over the years by individual residents regarding the possibility of expanding the public water system on the North Shore. Several individual wells and Group B systems suffer seasonal shortages of water. See Appendix C for a thorough discussion on the potential for consolidation of the north shore water systems. In general, the Agate Heights well source has sufficient capacity and water rights to serve all of the development along North Shore Road, including Eagleridge and existing private Group A and Group B water systems. This would require new pipe and additional treatment and storage capacity depending on the extent of the consolidation.

Water Treatment - The existing treatment plant is limited to 30 gpm, which is far less than the well capacity and water right. In order to provide treated water to additional customers, the package water filtration plant capacity will need to be increased. Even without additional customers, it may be desirable to increase the treatment capacity to allow the treatment plant to operate more within normal working hours so that staff is available to respond to issues that arise.

Storage – If system consolidation or expansion is pursued beyond the capacity of the existing reservoirs, additional storage will need to be constructed. Options for this are discussed in Appendix C.

Distribution - With the mixed survey results received from potential customers along North Shore Road, the District is carefully considering its role in the expansion of the Agate Heights service area. However, a successful petition for a utility local improvement district or a developer extension request would be considered and would define the extents of that particular distribution expansion. The District anticipates future extensions of water along North Shore Road to the east and to the west.

4. Water Resource Analysis

4.1 Water Use Efficiency Plan Development and Implementation

The District has had a conservation plan in effect since 1988. The District adopted its current Water Use Efficiency Plan in February 2016. The Plan outlines current and future water conservation measures and relevant data. The WUE plan is incorporated here in Appendix B.

The Sudden Valley area had a history of high levels of distribution system losses. The 3 year average distribution system losses (DSL) (2005-2007) were 27.59%. The District has taken actions to decrease DSL, and the 2012-2014 3 year average DSL was 12.86%. Current goals for further improvements in water use efficiency for Sudden Valley include reducing DSL to less than 10%, reducing summer peak usage to 55 gallons per capita per day by 2020, and reducing average annual usage by 2% by 2020. Because current DSL is greater than 10%, the District is implementing water use efficiency measures as detailed in Appendix B.

The Geneva area's 3 year average DSL for 2012-2014 was 9.1%. Current goals for water use efficiency include maintaining less than 10% DSL, reducing summer peak usage to 65 gallons per capita per day by 2020, and reducing average annual usage by 2% by 2020. After replacing over 12,000 feet of asbestos concrete mains in 2015, the District anticipates the DSL to continue going down.

Distribution system losses in North Shore - Eagleridge have been minimal, averaging 2.87% from 2012 to 2014. Current goals for water use efficiency include maintaining low DSL, reducing summer peak usage to 100 gallons per capita per day by 2020, and reducing average annual usage by 10% by 2020.

The North Shore - Agate Heights distribution system losses in 2012-2014 averaged 2.83%. Current goals for water use efficiency include maintaining low DSL, reducing summer peak usage to 75 gallons per capita per day by 2020, and reducing average annual usage by 10% by 2020.

The decreases in distribution system losses is a result of the concerted effort by the District and show the effectiveness of their water use efficiency plan.

4.2 Source of Supply

A. Sudden Valley Area:

The District does not anticipate pursuing additional water rights for the Sudden Valley Study Area within the next 20 years. The District received Department of Health approval in 1996 for a reduction in source criteria and documented further decreases in water demand that should allow the existing water rights to support full build-out (Appendix B). The Sudden Valley Community Association actively pursued population density reduction in the watershed by acquiring and restricting properties, and reducing dues for consolidated lots. As of August 2015, 1439 of the original lots have either been purchased by the Sudden Valley Community Association and placed under restrictive covenant or consolidated with other lots, which allows the water rights to adequately service full build out (including the Geneva area).

The District's water treatment plant has the ability to produce water for beneficial use up to the level of the existing water rights. The water is needed to serve projected populations within existing subdivisions at buildout for both Sudden Valley and Geneva.

B. Geneva Area:

Geneva is supplied under the Sudden Valley water rights, which are adequate for both systems.

The City of Bellingham has pursued a program to reduce development in the watershed by acquiring and restricting undeveloped properties. These efforts have removed at least 332 future lots (the former Summit View and Cedar Hills West subdivisions) from the Geneva area.

C. North Shore - Eagleridge Area:

The District does not anticipate pursuing any additional water allocation for the North Shore/Eagleridge Area within the next 20 years. The City of Bellingham holds water rights for the existing source. The existing supply agreement with the City (150 gpm domestic flow) is adequate for the Eagleridge Water System to support 85 ERUs without a reservoir. If another ULID is initiated on the North Shore to take residents off of private lake withdrawals, the District may or may not have enough contractual City capacity to serve at that tim. If existing residential owners petition for a water ULID, the District will re-evaluate the adequacy of supply at that time and consider the need for a contract increase from the City of Bellingham versus the cost-effectiveness of an intertie with the Agate Heights system, or adding a reservoir to the Eagleridge system. See also Appendix C for further discussion of options to consolidate the north shore water systems.

The Eagleridge Water System has a history of high per-connection water use that has been anecdotally attributed to subdivision covenants requiring green lawns. The peak day per-connection usage is approximately twice as high as the Geneva and Sudden Valley service areas, so there are opportunities for conservation in this neighborhood.

D. North Shore - Agate Heights Area:

The District does not anticipate pursuing any additional water allocation for the North Shore - Agate Heights Area within the next 20 years. The existing ground water rights for the well source exceed current demand, and would support a system expansion or water system consolidation as described in Appendix C.

The Johnson Well currently uses less than 5000 gallons per day and therefore operates as an exempt well which does not require a water right.

4.3 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. 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 Study Area, Figure 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 Study Area, Figure 1
- Time Of Use – No limits
- Provisions or Limiting Conditions – Supply is limited to 150 gpm domestic, 750 gpm fire flow by agreement with the City of Bellingham.

D. North Shore - Agate Heights:

- Source Type – ground water
- Source Location – Section 24, Township N. 38, Range 3E W.M., Whatcom County

- Purpose of Use – domestic water supply
- Place Of Allowed Use – land within boundaries of LWWSD
- Place Of Use – See service area, Figure 1
- Time Of Use – No limits
- Provisions Or Limiting Conditions – N/A.

4.5 Interties

Existing Interties

Sudden Valley :
Sudden Valley has an intertie with Geneva, which is used to supply Geneva. This is a connection between two District service areas that are now considered one water system (with one DOH system ID number).

B. Geneva :

The Geneva water source is an intertie with the Sudden Valley. The location is from Topper Drive, along Dutch Harbor Road, connecting at Lake Whatcom Blvd., near Strawberry Point. There is also a back-up, emergency intertie with the City of Bellingham, which used to be the primary supply to Geneva. The emergency intertie is located on Lakeway Boulevard at the City limits (Scenic Ave).

C. North Shore - Eagleridge:

The water source for the Eagleridge Water System is an intertie with the City of Bellingham. It was first used in 1989. Its purpose is to supply water to the Eagleridge Water System. The physical capacity of the intertie is 750 gpm and is limited by agreement with the City. The District's Eagleridge booster station currently has the combined capacity to pump 750 gpm (to meet fireflow requirements). The intertie agreement is included in Section 10.2 – Agreements.

D. North Shore - Agate Heights:

There are no existing interties between the Agate Bay water system and the Johnson Well.

New Intertie Proposals

A new intertie between the Agate Heights water system and the Eagleridge water system would be considered if there is sufficient interest in a public water system in the North Shore area. This would be an intertie between two separate District water systems, and would most likely result in the discontinuation of purchasing water from the City of Bellingham. This scenario was explored in detail in the North Shore Consolidation Feasibility study (Appendix C).

4.6 Reclaimed Water Opportunities

Lake Whatcom Water and Sewer District currently sends all sewerage collected to the City of Bellingham for wastewater treatment. Since the District does not have any facilities to process wastewater, and the City's treatment plant is over 8 miles from the District's service areas, there are no immediate opportunities for implementing reclaimed water use within the District. The City currently has no plans to implement any reclaimed water projects. It is unlikely that the District will pursue any reclaimed water projects in the next ten years.

The District did include advanced wastewater treatment as one of the alternatives evaluated in the Final Environmental Impact Statement for South Shore Sewage Disposal Alternatives (August 1997) although it was not ultimately selected. The wastewater plant would have produced up to 1 MGD of reclaimed quality water.

The most obvious potential consumer of reclaimed water in the District service area would be the Sudden Valley Community Association (SVCA) golf course. However, SCVA holds certificated water rights for withdrawals from Lake Louise which they use for irrigating the golf course. They do not purchase water from the District for irrigating the golf course.

5. Source Water Protection

5.1. Wellhead Protection Program

The North Shore Study 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.

5.2. Watershed Control Program

The District is a member of the Planning Unit for WRIA 1 and is amember 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.

6. Operation and Maintenance Program

6.1. Water System Management and Personnel

The management structure of the District consists of an elected five-member Board of Commissioners who determine policy, set rates, and approve the budget. The Board employs a full-time General Manager who hires additional staff, manages the day-to-day business of the District, and carries out the policies set by the Board. The General Manager is in charge of daily operations and approves expenditures within the budget. The District employs a staff Engineer who is also the Assistant General Manager.

The Board and General Manager are assisted and advised by a consultant attorney firm and a consultant engineering firm. The attorney provides general advice and counsel to the Board regarding the legal requirements of their operations, contracts, permits, personnel, and legal challenges to the District's activities. The consultant engineering firm provides general assistance, surveying, analysis, design, plan review, and construction management services to the District.

In addition to the General Manager and District Engineer / Assistant General Manager, the District staff includes an Office Administrator, Accounting Manager, a Maintenance Supervisor, several maintenance workers, meter reader, and clerical support staff. An organization chart is in Section 1.1, Figure 1-2.

6.2 Operator Certification

The District is required to have Certified Operators including one Water Distribution Manager 1 and one Water Treatment Plant Operator 2. The District is committed to supporting on-going training for its operators to maintain or improve their certifications.

The highest level certifications obtained by current District staff are summarized below.

POSITION	WATERWORKS CERTIFICATIONS							
	Backflow Assembly Tester	Cross Connection Control Specialist	Water Distribution Manager in Training	Water Distribution Manager 1	Water Distribution Manager 2	Water Treatment Plant Operator in Training	Water Treatment Plant Operator 1	Water Treatment Plant Operator 2
Engineering Technician		X			X			X
Maintenance Supervisor	X	X			X			X
Maintenance Worker		X			X			X
Maintenance Worker Specialist 1		X		X				X
Maintenance Worker Specialist 2					X			X
Maintenance Worker Specialist 3				X				X
Utility Systems Support Specialist				X				
Utility Worker			X			X		
Utility Worker			X			X		
Water Treatment Plant Operator	X	X			X			X

6.3 System Operation and Control

The District's water system operation and control can be divided into two categories: Water Treatment, and Distribution/Transmission. The District operates the Sudden Valley Water Treatment Plant (SVWTP) which serves the Sudden Valley area and Geneva area; and the Agate Heights Water Treatment Plant (AHWTP) which serves the North Shore - Agate Heights area. Source water for Eagleridge is purchased from the City of Bellingham. The operation and control of the SVWTP is described in detail in the *Sudden Valley Water Treatment Plant Operations Plan* (revised August 2017). The operation and control of the AHWTP is described in detail in the *North Shore Well and Water Treatment System Management and Operations Manual* (revised August 2017). These documents cover the identification of major system components, routine system operation, preventive maintenance program, and equipment, supplies and chemical listing for the water treatment plants, and are incorporated here by reference.

System Operations and Control for the Distribution/Transmission for the water systems in the District's Study Areas can be addressed together. The District Engineer is responsible for planning routine and preventive maintenance activities. The Tables below summarize the daily, weekly, monthly, and annual activities associated with the major system components. Routine operations also include utility locates, service installations, investigation of customer complaints, and real estate/rental closings on an as-required basis.

Table 6.3-1. Routine System Operations

Major System Component	***Daily***	***Weekly***	***Monthly/Bi-monthly***	***Annual***
Master Meter (Agate, Eagleridge, Dutch Harbor)	Record meter reading			
SCADA/Chart Recorders	check data	replace chart		
Pump Stations (Agate, Eagleridge, Lookout, Div 30)		visual inspection, pump operation check		
Generators (Agate, Eagleridge, Div 30)		automated test		
Reservoirs (Agate, Geneva, Sudden Valley)		visual inspection		
Distribution mains (all)	Cl residual test	Coliform sample		
Meters (all)			Meter reading (Bi-monthly)	
Maintenance Planning			Monthly calendar	Annual 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 Comprehensive Monitoring (Regulatory Compliance) Plan

The District submitted its revised Comprehensive Monitoring Plan to Department of Health in March 2001. ***(Check for update).***

The District received Department of Health approval of the revised monitoring plan in May 2001, and is incorporated here by reference.

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.

Monitoring Well Levels

The Agate Heights (a.k.a. Giesbrecht) 10-inch well is an artesian well and therefore does not have a traditional well level to be monitored. The District does have a pressure gage on the well supply and they record the static pressure periodically.

The Johnson well is also an artesian well and only has two services connected. Monitoring will not be performed at that location unless use increases.

Summary of System Reliability Efforts by Area

A. Sudden Valley Area:

Source Reliability –The intake depth and location in Basin 3 provides high confidence in the reliability of the water quality and quantity. Lake Whatcom water quality has been, and continues to be, extensively monitored by the City of Bellingham and other groups. The District's Final Environmental Impact Statement (1997) for South Shore Sewage Alternatives presented an extensive literature review of water quality monitoring results. There continues to be scientific disagreement regarding indicator parameters and interpretation of trends.

Water Right Adequacy – Assuming historic usage patterns remain constant, the existing permitted and certificated water rights (shared with Geneva area) are adequate for the current 20-year planning period, and should be adequate for full build-out. (See Section 2.2) On a state-wide basis, the Department of Ecology may attempt to recall portions of certificated water rights not already put to actual beneficial use. Such an agency action might impact the District's ability to make long range commitments to serve vacant, platted lots. The extent of such potential problems and resolutions cannot be predicted at this time because the District has a combination of certificated and permitted water rights.

Facility Reliability – The Sudden Valley water system was originally designed to provide 500 gpm of fire flow throughout the system. The District goals are to meet the standards of the Whatcom County Coordinated Water System Plan (CWSP) - 500 gpm for 60 minutes for UR3 and RR2 zoning; and 750 gpm for 60 minutes for resort commercial and URM12 zoning. The current system can meet these fire flow requirements on top of the buildout projected Maximum Daily Demand (MDD) for 95% of the fire hydrants. The Study Area also includes R2A and Rural forestry zoning for which there is no fire flow requirement in the CWSP.

All water booster stations have redundant pumps and standby power for facility reliability.

B. Geneva Study Area:

Source Reliability – The water source for Geneva is the same as Sudden Valley, see above for detailed information. An emergency intertie with the City of Bellingham also exists as backup. The City draws its water from Lake Whatcom. Reliability of source water quality is the purview of the City of Bellingham.

Water Right Adequacy – Assuming historic usage patterns remain constant, the existing permitted and certificated water rights (shared with Sudden Valley area) are adequate for the current 20-year planning period, and should be adequate for full build-out. (See Section 2.2)

Facility Reliability – The Geneva water system is capable of providing 500 gpm of fire flow throughout the system. The District's current goals for fire flow in Geneva are to meet the standards of the Whatcom County Coordinated Water System Plan - 500 gpm for 60 minutes for RR2 zoning and 750 gpm for 60 minutes for UR3 zoning (to match that of adjacent municipal corporation). The current system can meet these fire flow requirements on top of both the buildout projected MDD. The Geneva Study Area also includes R2A and Rural forestry zoning for which there is no fire flow requirement in the Whatcom County Coordinated Water System Plan.

C. North Shore - Eagleridge:

Source Reliability – The water source for Eagleridge is the City of Bellingham. The City draws its water from Lake Whatcom. Reliability of source water quality is the purview of the City of Bellingham. Water quantity is limited by agreement with the City and is delivered through a single intertie. The City provides standby storage. The booster station has redundant pumps and dedicated standby power. As noted elsewhere, the District may be able to remove the domestic flow pumps and have a direct connection to the City system.

Water Right Adequacy – Water is supplied to Eagleridge through a single intertie with the City of Bellingham. Capacity is limited by agreement to 150 gpm domestic use and 750 gpm fireflow. The existing booster pump station and intertie capacity are more than adequate for ultimate buildout of Eagleridge. In the event of the existing residential owners in the area petitioning for a water ULID, the District will re-evaluate the adequacy of supply and consider the need for a contract increase from the City of Bellingham, or potentially connecting Eagleridge to the Agate Heights water system.

Facility Reliability – There were no issues identified with regard to facility reliability associated with the Eagleridge Water System.

The Eagleridge water system is capable of providing fire flow capacity of 750 gpm. This is more than adequate for the RR2 zoning (CWSP: 500 gpm for 60 minutes) and matches the City of Bellingham standards.

D. North Shore - Agate Heights:

Source Reliability – The water source for the Agate Heights water system is a 10-inch artesian well. Water quantity is currently limited by the water treatment plant capacity. Standby storage is provided by two concrete tanks. The pump stations both have redundant pumps and dedicated standby power.

Water Right Adequacy – The District has two water right permits and a water right certificate associated with the system well. If historic usage patterns remain constant, the existing water rights are adequate for the current 20-year planning period, and should be adequate for full build-out, including potentially serving a water ULID for the residential properties along North Shore Road (see Appendix C).

Facility Reliability – There were no issues identified with regard to facility reliability associated with the Agate Heights Water System. The Agate Heights water system is capable of providing fire flow capacity of 500 gpm.

6.6 Safety Procedures

The District has adopted the Safety Manual supplied by Water and Sewer Risk Management pool. A copy of this Manual is provided to each employee. The Manual included chapters on Safety Responsibility, Confined Space Entry, Lock-out/Tag-out, Rescue Procedures, Respirator Protection, Accident Prevention and Investigation, Hearing Safety, Meter Reading Safety, Back Injury Prevention, Poisoning and Insect Bites and Stings, and Bomb Threat Training.

Material Safety Data Sheets are kept at the office and posted where the chemical is used. Safety and First Aid equipment owned by the District includes a manlift, ventilation blowers, self contained breathing apparatuses, respirators, personal protective equipment, 3 gas detectors, and first aid kits in each truck and at the office. All personnel are required to attend monthly safety meetings and to take Safety training classes including First Aid and CPR certification. District staff have also completed numerous additional safety related classes.

6.7 Cross-Connection Control Program

The District's Cross-Connection Control Program was authorized and implemented by Resolution No. 227. The Resolution adopted the American Water Works Association, Pacific Northwest Section's "*Accepted Procedure and Practice in Cross-Connection Manual*" as the procedural manual for implementing the cross connection control program. Resolution No. 227 is included in Chapter 10.1 – Supportive Documents, and the "*Accepted Procedure and Practice in Cross-Connection Manual*" is incorporated herein by reference.

The District conducts annual tests of all District backflow prevention equipment. The District sends the results to the City of Bellingham since the equipment tested is located at the interties with the City's water system. The District also maintains a list of privately owned and maintained backflow prevention equipment, and notifies the owners when it is time for required annual testing. The customers send their test results to the District, where they are reviewed and kept on file.

6.8 Customer Complaint Response Program

The District's Customer Inquiry/Complaint Response Program focuses on service to customers and is outlined on the following page, which contains the District's Inquiry/Complaint form. The District's procedure starts with a customer contacting the District, usually by phone, and the administrative staff person fills out the first part of the form. Forms with service complaints are then passed on to the Engineering Tech for input into the tracking system. The maintenance supervisor reviews the complaint, then he assigns a maintenance staff member to investigate the complaint. If possible, this staff member resolves the issue. If not, the staff member reports back for further

review and direction. Once the item is resolved, the resolution is recorded in the tracking system.

Approximately half of the Water Service Inquiry or Complaint forms are inquiries, for example general service questions, or requests for water quality reports instigated by Customer Confidence Report distribution. The majority of the complaint forms are regarding low pressure, with some chlorine odor complaints.

The District has developed a Waterborne Illness Procedure which requires that any report concerning possible waterborne illness be reported immediately to the Whatcom County Health Department. The full procedure is found in the District's Policy and Procedures Manual.

6.9 Record Keeping and Reporting

The District maintains the following types of records at its headquarters and/or operations buildings:

- water quality (various parameters) at the Sudden Valley Water Treatment Plant and Agate Heights Water Treatment Plant
- water quality in all distribution systems
- meter readings (customer and master meters)
- repair records
- reservoir levels
- equipment maintenance records
- customer service requests
- customer complaints and inquiries
- rainfall

The District follows a formal records retention schedule detailing the type of records, the required statutory retention period, and the District retention period. The District also maintains an active file index and an inactive/archive records index. The Records Retention Policy is incorporated here by reference.

The water plant operator is responsible for scheduling and conforming to all DOH reporting requirements.

6.10 O & M Improvements

The current telemetry/data management system ("DMS") was replaced about seven years ago. This DMS includes system control and data acquisition (SCADA) functions. All new system expansions (water or sewer) involving telemetry and controls will incorporate the new SCADA architecture. All existing facilities have been upgraded with new telemetry panels incorporate the new SCADA architecture in the last seven years. This has greatly enhanced the District's ability to monitor ongoing operations, and retain a historical log of facility performance. The District also plans to upgrade

and automate the telemetry/control system at the Sudden Valley Water Treatment Plant.

7. Distribution Facilities Design and Construction Standards

7.1 Project Review Procedures

For District initiated projects, the District's project engineer prepares the project reports and construction documents and conducts an internal quality assurance review. The District's staff engineer performs an independent review of the work completed by the project engineer. The District's senior field staff review distribution system plans to confirm that existing system information is correctly shown, and proposed connections are feasible with respect to valve arrangements.

The District's General Manager also reviews project documents to assure that general District goals have been addressed by the project. The General Manager's review is not intended to be a detailed engineering design review such as that performed by the Department of Health project engineer.

For projects covered by Developer Extension Agreements, the developer's engineer prepares the project reports, plans and construction documents, and the District's engineer reviews them. If the project includes more than water distribution mains, the project reports, plans and construction documents are sent to the State Department of Health for review and approval.

The District does request advance approval of their design and construction standards in order to be eligible for project review exception for distribution main projects. This request is noted on the District's water system plan review application.

7.2 Policies and Requirements for Outside Parties

The District's design and construction standards apply to outside parties and include requirements for utility easements and pipe looping. The District has adopted a standard Developer Extension Agreement (DEA) template that is included in Appendix G. Each application to enter into a DEA is evaluated against the District's Comprehensive Plan to determine specific requirements that may be imposed, and against Resolutions that may require special fees.

7.3 Design Standards

The District's design and construction standards are included in a stand-alone document titled *Lake Whatcom Water and Sewer Design Standards and Construction Standards and Details – September 2017* The District requests concurrent DOH approval of these updated design and construction standards, included herein as Appendix H.

7.4 Construction Standards

See 7.3 above and Appendix H.

7.5 Construction Certification and Follow-up Procedures

The District requires an inspector for both District-initiated and developer extension construction projects. The inspector checks all materials at the site against approved submittals, advises the project engineer of job progress, conditions and concerns. The inspector or the District's designated representative witness all pressure tests, water quality sampling, and startup. District field crew make, or directly supervise, all new water connections to the existing system. Tests are conducted in accordance with the District's Standards and WSDOT Standard Specifications.

Upon completion of the project, the District's project engineer signs and submits the Certificate of Completion form to Department of Health, if required, or provides the Certificate of Completion form to the District for their records.

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

The District has four welded steel distribution reservoirs that are over 40 years old and need seismic retrofits and re-coating. Two of these reservoirs are oversized - Division 7 was always larger than it needed to be, and Geneva has had excess capacity since the installation of the Intertie.

Other potential system improvements identified include increasing the Agate Heights water treatment plant capacity, reducing the number of PRVs in Sudden Valley, and adding a pressure booster station near the Division 22 reservoir.

8.1.2 Assessment of Alternatives

Most of the Operations, Maintenance, and Infrastructure 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 (water mains, PRVs, fire hydrants) which will be done in accordance with the District's standards.

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 reservoirs has not been selected at this time. A detailed analysis will be conducted and include in the Project Report when the projects are undertaken.

8.2 Improvement Schedule

The improvement schedule is incorporated in the District's Capital Improvements Plan, included here in Appendix I.

9. Financial Program

Lake Whatcom Water and Sewer District is a water system with 1,000 or more connections, not regulated by the State Utilities and Transportation Commission.

9.1 Past and Present Financial Status

Summaries of the District's operating income and expenses for the past 6 years are included in Appendix F – Financial Data. The reader should note that the District balance sheet includes a large amount of depreciation, and it does not operate with negative cash flow.

The District's 2017 operating budget is also included in Appendix F – Financial Data.

The District's past and present plan for financing major water system improvements is to use a combination of revenue from water rates (General Fund), connection fees (Construction Fund), Utility Local Improvement Districts (ULIDs), and Developer Extension Agreements (developer financed). Both revenue bonds and low-interest Drinking Water State Revolving Fund and Public Works Trust Fund loans have been used for cash flow to construct projects. The long-term debt for both sources is retired with a combination of General Fund (existing customer) and Construction Fund (future customers) moneys.

9.2 Available Revenue Sources

Anticipated revenue sources for making system improvements include connection fees, water rates, utility local improvement districts and developer extension agreements.

9.3 Allocation of Revenue Sources

The District has a combined rate structure applied to all service areas, replacing the previous area-specific rate structure. The District's sewer system rate structure has been combined for all areas since approximately 1994.

The Capital Improvement Plan includes an assessment of the beneficiaries of each improvement and allocates costs by new vs existing customers. Connection fees are used to pay for improvements that benefit new connections; water rates are used to pay for improvements that benefit existing customers; Developer Extension Agreements pay for system extensions/improvements that benefit development (typically new subdivisions or extensions to previously unserved areas). The costs to construct and /or operate improvements that benefit more than one customer class are allocated on a percentage benefit basis.

9.4 Program Justification

Projected revenue requirements are included in the most recent Capital Improvement Plan draft dated September 2017. For District-funded projects, the District has the ability to secure these funds through assessment of rates and

charges. Developer extensions are funded directly by the developer, and the District requires a 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 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. During the last rates and charges review, the Commissioners adopted a rate structure that promote water conservation.

10. Miscellaneous Documents

10.1 Supportive Documents

State Environmental Policy Act – Environmental Checklist

Determination of SEPA Official

Certification of Registration from the Department of Revenue

Water Facility Inventory forms for each system

Sudden Valley Source Criteria Reduction DOH Approval Letter, April 24, 1996

Geneva Source Criteria Reduction DOH Approval Letter, 1997

Cross Connection Control Program. Resolution No. 227

Requirements for Water and Sewer Service, Resolution 757

Insert: Determination of SEPA Official

Certification of Registration from the Department of Revenue

District's WFI's (Water Facility Inventory forms) (8Pages)

Sudden Valley Source Criteria Reduction DOH Approval Letter, April 24, 1996 (3 Pages)

Geneva Source Criteria Reduction DOH Approval Letter, 1997 (2 Pages)

Cross Connection Control Program. Resolution No. 227 (4 Pages)

Resolution 757 – Requirements for Water and Sewer Service

10.2 Agreements

City/District Agreement for Geneva Area Water Service

City/District Agreement for North Shore Water Service

10.3 Comments on WSP by Others

Department of Health

Whatcom County Council

Whatcom County Engineering Department

Whatcom County Health Department

City of Bellingham (adjacent purveyor)

Glen Cove (adjacent purveyor)

Whatcom Co Water District 7 (adjacent purveyor)

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

10.5 District Documents Incorporated by Reference

Emergency Response Plan

Comprehensive Monitoring Plan

Richalou Estates Wellhead Protection Program

Richalou Estates System Project Report

North Shore Well and Water Treatment System Management and Operations Manual

Sudden Valley Water Treatment Plant Operations Plan

Records Retention Policy

LAKE WHATCOM WATER AND SEWER DISTRICT

AGENDA BILL

DATE SUBMITTED:	September 7, 2017		
TO BOARD OF COMMISSIONERS			
FROM: Patrick Sorensen	MANAGER APPROVAL		
MEETING AGENDA DATE:	September 13, 2017		
AGENDA ITEM NUMBER:	7.0		
SUBJECT:	Manager's Report		
LIST DOCUMENTS PROVIDED ⇨ NUMBER OF PAGES INCLUDING AGENDA BILL: _____	1. Manager's Report		
	2.		
	3.		
TYPE OF ACTION REQUESTED	RESOLUTION ☐	FORMAL ACTION/ MOTION ☐	INFORMATIONAL/ OTHER ☒

BACKGROUND / EXPLANATION OF IMPACT

Updated information from the General Manager in advance of the Board meeting.

FISCAL IMPACT

None

RECOMMENDED BOARD ACTION

None required.

PROPOSED MOTION

None

General Manager Comments

Wednesday

September 13, 2017

Regular Meeting

6:30 p.m.

Important Upcoming Dates:

- **Meetings Associated with the Lake Whatcom Management Program:**
  - **Policy Group Meeting:** The next meeting is scheduled for October 16, 2017 at 3:00 p.m. downstairs at the Municipal Court Building in the conference room.
  - **Management Meeting:** There is not a meeting scheduled at this time.

- **Next Regular Board Meeting:** Will be held on **Tuesday, September 26, 2017** at 8:00 a.m. This is a Special Meeting.

- **Employee Staff Meeting**: The next staff meeting is set for **Thursday, September 14, 2017 at 8:00 a.m.** in the Board Room. Commissioner Carter is scheduled to attend this meeting.

- **Employee Safety Committee Meeting**: The next meeting is set for **September 14, 2017 at 9:00 a.m.** in the small conference room.

- **Washington Association of Sewer & Water Districts (WASWD) Section III Meeting:** The next Section III meeting will be held at the WASWD Fall Conference in the Wenatchee Convention Center **on September 28, 2017** at 7:00 a.m. The location will be posted at the Convention Center.

- **Whatcom Water District's Caucus Meeting**: The Caucus meeting is set for **September 20, 2017** at 1:00 p.m. in the Board Room.

Other:

- **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, since the last Board Meeting.

- **Date of Fall 2017 WASWD Conference**: The Fall Conference will be September 27 - 29 in Wenatchee. The conference ends on Friday at noon. Both Commissioner Weide and I will be attending.

- **Upcoming Important Agenda Topics:**

  - The North Shore Water Quality (Herrera) report is scheduled to be presented at the City & County Data Meeting which will be held on Thursday, September 14 at 9:00 a.m. The location is 2221 Pacific Street at the City Public Works Building in the Public Works Operations conference room. Rob Zisette's presentation is approximately 30 minutes long.

  - The Herrera Report will also be presented at the October 16 L.W. Policy Group Meeting.

  - On Thursday, September 21 at 9:00 a.m. RH2 Engineering's President Dan Ervin will making a presentation at the District Office regarding the our participation in Shake Alert, which addresses an early earthquake notification program being developed along the west coast. RH2 is a major player in this programs development in Washington State. Any interested commissioners are invited to attend this presentation at 9:00 a.m. in the Board Room.

  - As a reminder a Special Meeting Workshop is set up for November 15 to address legal issues associated with N.S. Shore water issues.

- **Out of Area & Meeting Changes Reminder**:

  - The General Manager will be missing the September 13 Board meeting and the Data Team meeting presentation on September 14. I am going to be at an Insurance Pool related conference in California from September 12 through the 15th. In addition I will be taking a few days off on vacation returning to the office on the 20th.

  - The regular September 27, 8:00 a.m. meeting was moved to the 26th at 8:00 a.m. as a special meeting. The 27th conflicts with the Fall WASWD Water & Sewer Conference.

  - Please remember to notify staff and the rest of the Board of any anticipated Board meeting absences through the rest of 2017.