Lake Whatcom Water and Sewer District

Sudden Valley WTP Assessment Project

November 25, 2020, 800 AM

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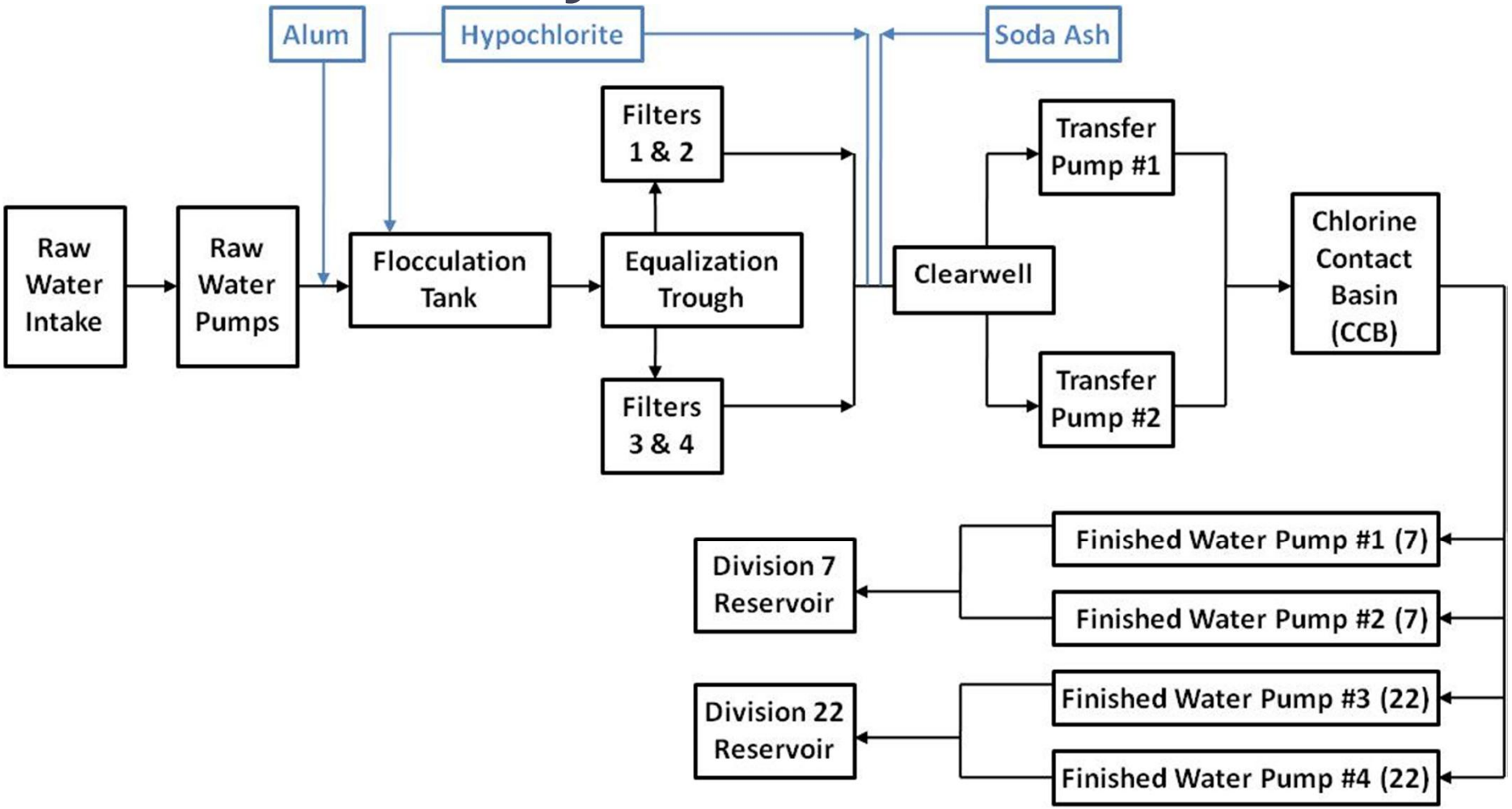
Presentation Outline

- Project Description & Purpose
- Sudden Valley WTP
- Project Approach
- Summary of Findings
- Summary of Recommendations
- Next Steps

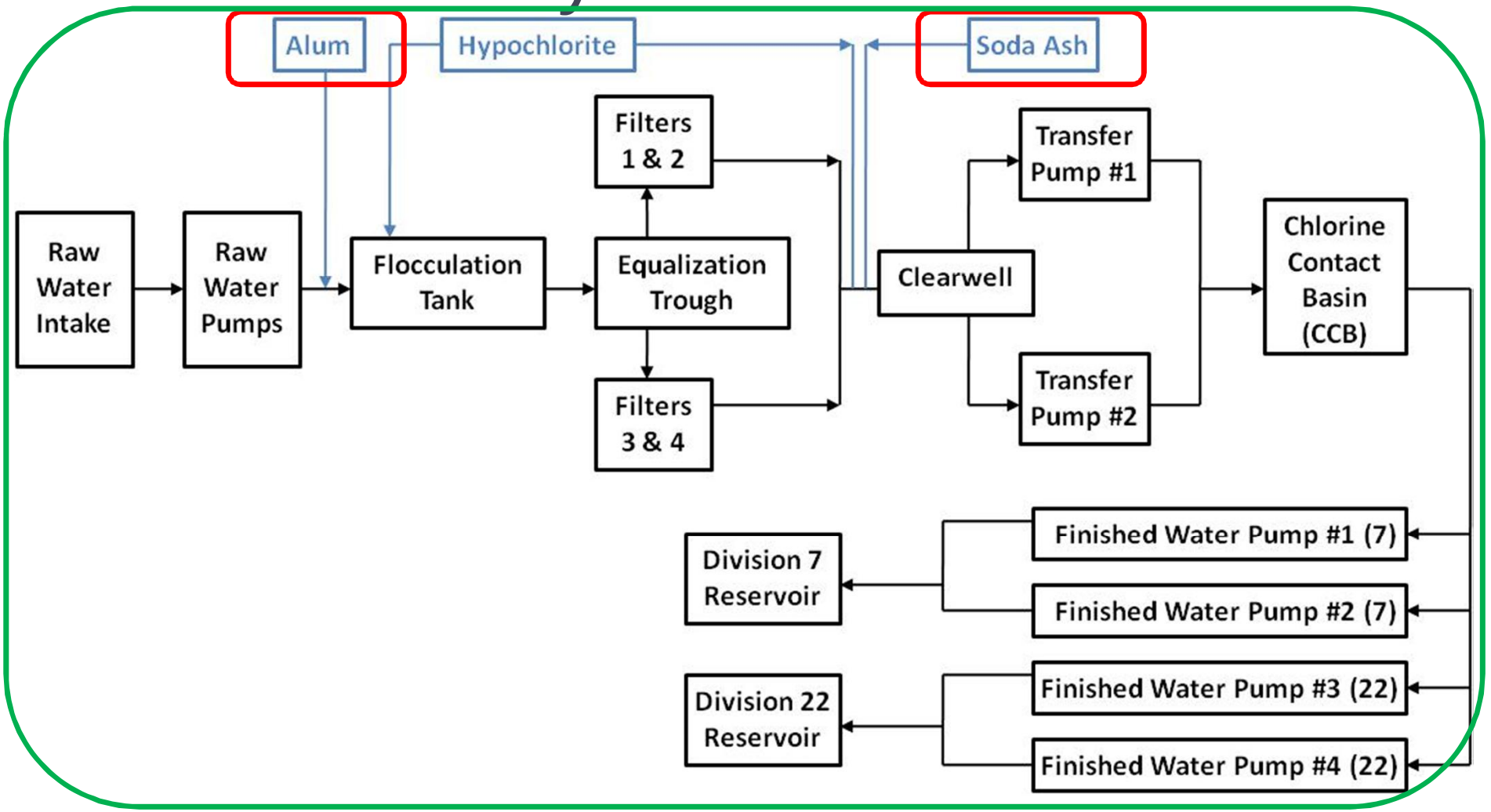
Project Description & Purpose

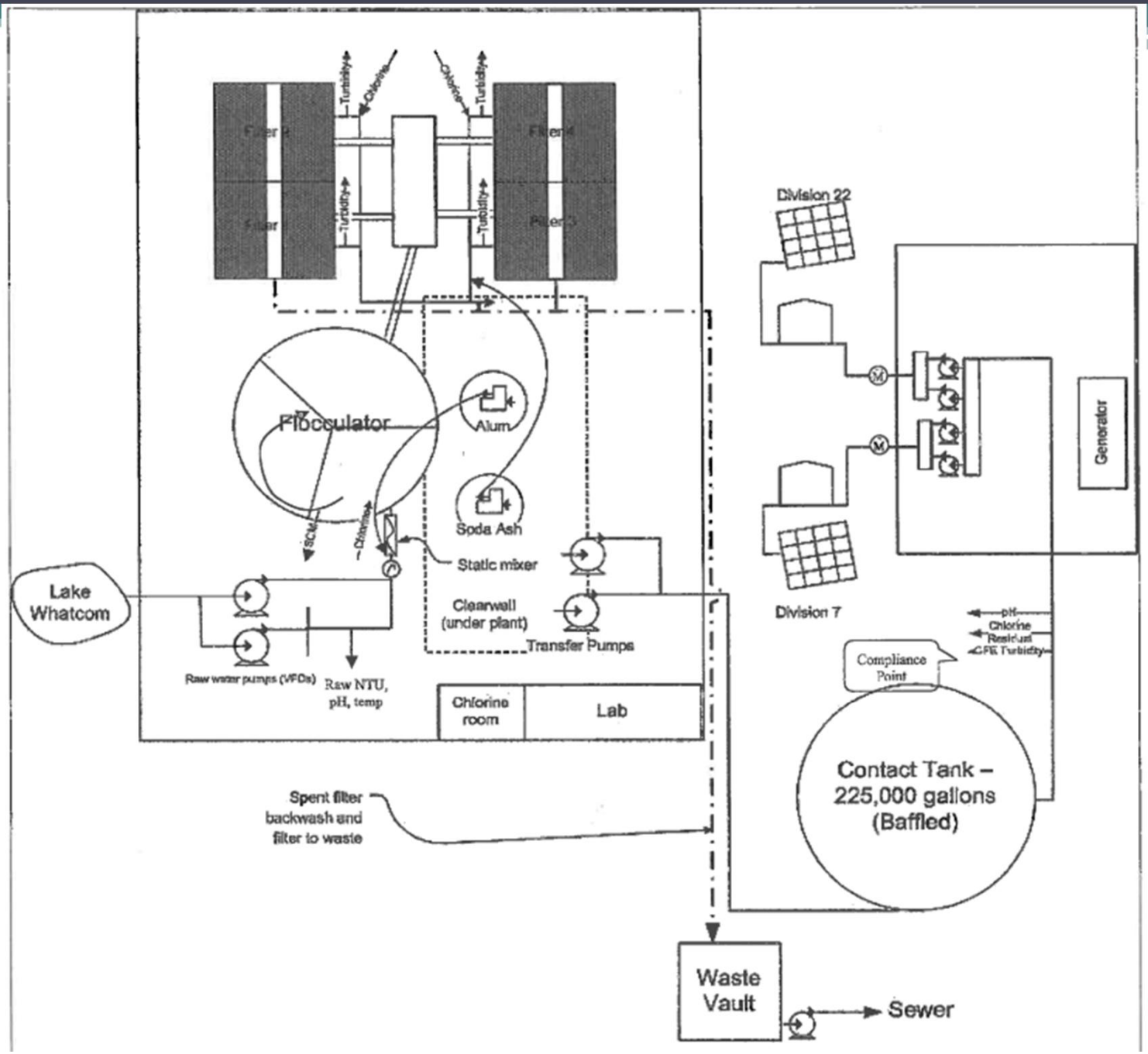
- South Shore Water System Assessment
  - Assess conditions at Sudden Valley WTP
  - Provide basis for decision making with regards to WTP modifications and/or continued use
    - Phase I (Previous)
      - Assess existing condition of structures and equipment
    - Phase II (Current)
      - Provide alternatives analysis (Capital Improvements Plan for the Sudden Valley WTP)

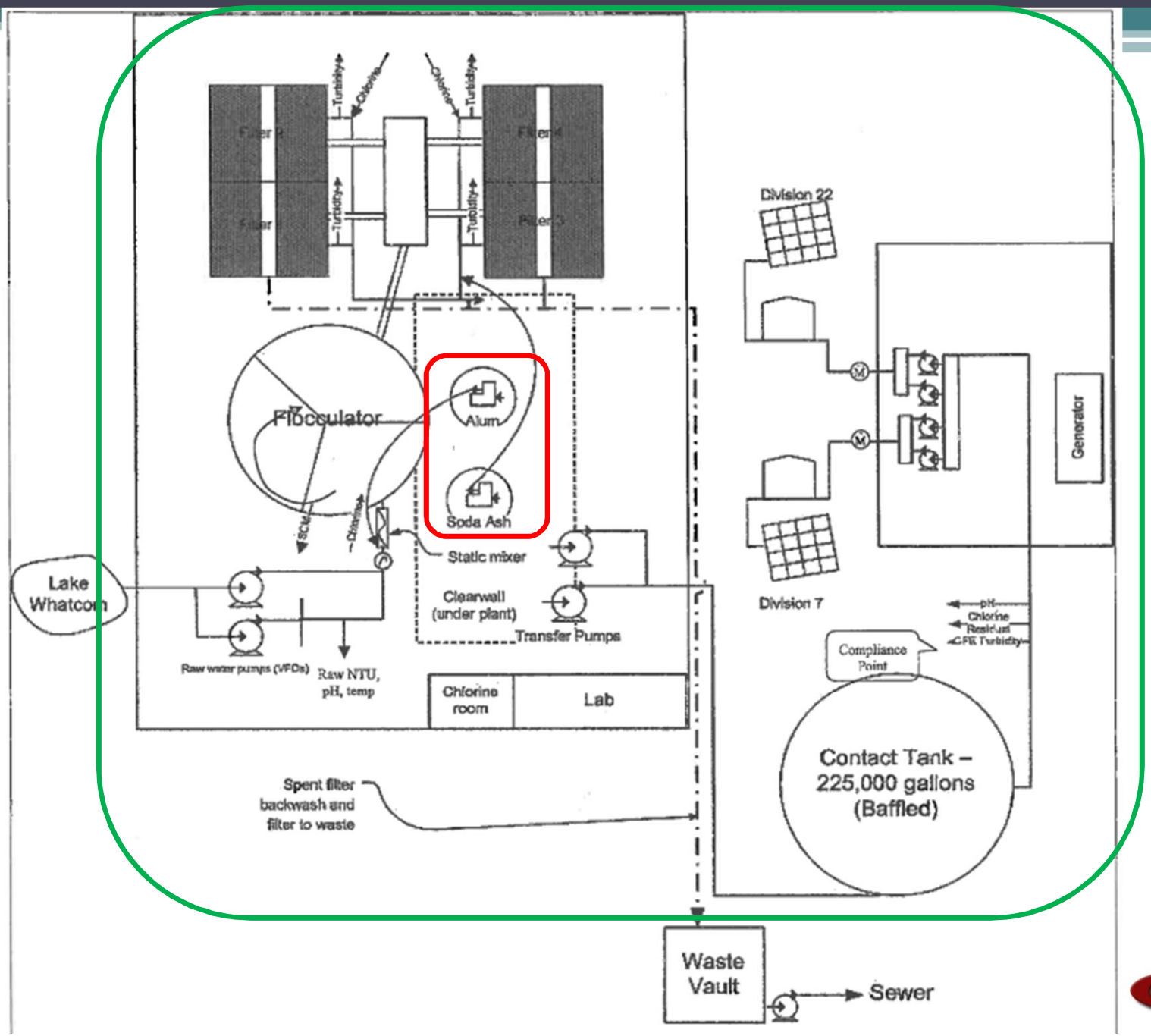
Sudden Valley WTP – Process Flow



Sudden Valley WTP – Process Flow




Filter 4
Filter 3
Turbidity
Chlorine
Flocculator
Alum
Soda Ash
SCM
Static mixer
Clearwell
(under plant)
Transfer Pumps
Lake
Whatcom
Raw water pumps (VFDs)
Raw NTU,
pH, temp
Chlorine
room
Lab
Division 22
Division 7
Generator
pH
Chlorine
Residual
CPE Turbidity
Compliance
Point
Contact Tank –
225,000 gallons
(Baffled)
Spent filter
backwash and
filter to waste
Waste
Vault
Sewer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Turbidity
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SCM
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Static mixer
Lake Whatcom
Clearwell (under plant)
Transfer Pumps
Raw water pumps (VFDs)
Raw NTU, pH, temp
Chlorine room
Lab
Division 22
Division 7
Generator
pH
Chlorine Residual
CPE Turbidity
Compliance Point
Contact Tank – 225,000 gallons (Baffled)
Spent filter backwash and filter to waste
Waste Vault
Sewer

Project Approach

Methodology

- Phase I – WTP Assessment
  - Review existing documentation
  - Conduct on-site assessment at the WTP
  - Prepare written report
  - Provide scoping for Alternatives Analysis
- Phase II - Alternatives Analysis
  - Prepare technical memoranda
    - A la carte approach
  - Prepare final written report

Project Approach

Schedule

Scope of Work Item	Board Meeting Dates								
	Sep-09	Oct-14	Nov-11	Dec-09	Jan-13	Feb-10	Mar-10	Apr-14	May-12
	Sep-30	Oct-28	Nov-25	Dec-30	Jan-27	Feb-24	Mar-31	Apr-28	May-26
1 Project Management	a	a	a	a	a	a	a	a	t
2.1 Pump Performance Test	t								
2.2 Chemical Systems Analysis	a	t							
2.3 Disinfection Systems Analysis	p	p	t						
2.4 Backwash Systems Analysis	p	p	p	t					
2.5 Filtration System Analysis	p	a	t						
2.6 Tier 2/3 Seismic and Structural Analysis	a	t							
2.7 Structural/Arch Workspace Analysis	p	p	p	t					
2.8 NACE III Coating Inspection	t								
2.9 Risk Assessment and Project Prioritization				p	t				
2.10 Draft Alternatives Analysis Report				p	p	t			
2.11 Draft Alternatives Analysis Meeting							t		
2.12 Final Alternatives Analysis Report							p	t	
2.13 Alternatives Analysis Board Presentation									t
2.14 Financial Analysis Board Meeting									
3 Quality Assurance/Quality Control	a	a	a	a	a	a	a	a	t

NOTATION LEGEND

p		Planned (labor not started)
a		Active (labor underway)
c		Completed (no further labor needed)
t		Target Completion

Project Approach

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2.5 Filtration System Analysis	p	a	t						
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Summary of Findings

Task 2.2 – Chemical Systems Analysis

- Alum Background
  - Use liquid alum for coagulation
  - Injection upstream of the flocculation tank
  - Delivery of liquid solution by commercial vendor
- Soda Ash Background
  - Dry chemical (55# bags) delivered by vendor
  - Staff offload to cart, then to storage location, then to tank
  - Storage in the WTP fosters corrosion of electrical components

Project Approach

Task 2.2 – Chemical Systems Analysis

- Alum (coagulation) & Soda Ash (pH adjustment)

Alum Storage Tank – HPDE. Installed in 1992 and beyond its recommended useful life (15-17 years).

Soda Ash Storage Tank & Platform – Welded steel. Installed in 1992 and in good condition. Platform in fair condition while the mixer is in poor condition

Metering Pumps – Lack of features requires daily manual calibration.

Project Approach

Task 2.2 – Chemical Systems Analysis

- Methodology
  - Discuss current operations with WTP staff
  - Technical Memorandum 20434-4
    - Investigate alternatives
    - Estimate costs
    - Provide recommendations

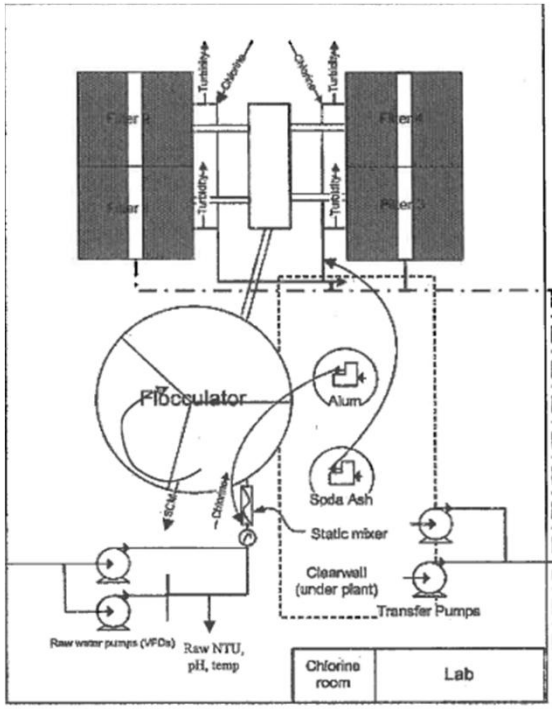
Summary of Findings

Task 2.2 – Chemical Systems Analysis

- Alum Findings
  - Use of liquid alum is best option for District
  - Alum tank is old and should be replaced
  - Metering pump system should be revised
  - Tank location restricts other WTP modifications
- Soda Ash Findings
  - Use of solid soda ash is best option for District
  - Current WTP layout requires the staff move bags at least three times (800 -1,000 pounds each time)
  - Metering pump system should be revised
  - Tank location restricts other WTP modifications
  - Chemicals (wet/dry) are likely contributing to corrosion of the neighboring electrical equipment

Summary of Findings

Task 2.2 – Chemical Systems Analysis



Location – Tanks and components located in the middle of the WTP Main Building.

Chemical Storage & Corrosion – Lack of efficient storage requires frequent movement and proximity enables corrosion of electrical equipment.

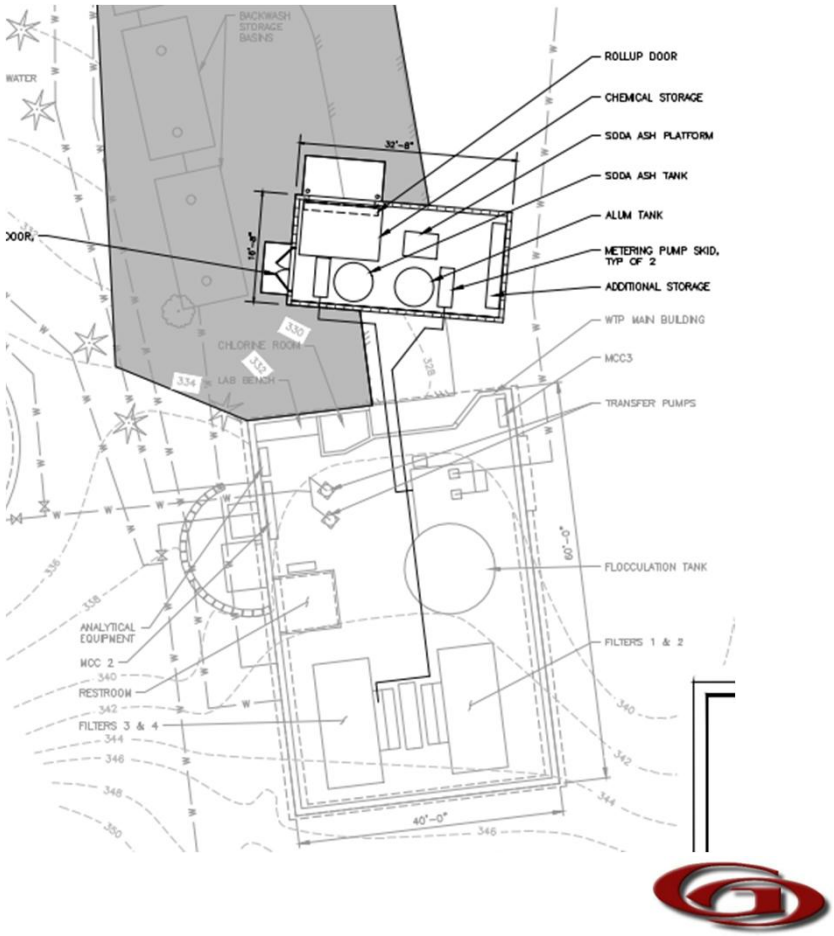
Injection – Lack of features requires daily manual calibration.

Summary of Recommendations

Task 2.2 – Chemical Systems Analysis

- WTP Main Building
  - Replace alum tank
  - Reuse soda ash system
  - Replace metering pump system
  - Relocate chemical storage and delivery equipment to a new building

- Cost Estimate
  - $1.0M – $1.2M



Project Approach

Task 2.6 – WTP Seismic Analysis

Project Approach

Task 2.6 – WTP Seismic Analysis

- Seismic Analysis Methodology
  - Perform visual inspection
  - Define design resiliency level
  - Complete Tier 3 Assessment
    - Per ASCE 41
  - Technical Memorandum 20434-3
    - Estimate costs
    - Provide recommendations

Project Approach

Task 2.6 – WTP Seismic Analysis

WTP Main Building – Exterior front façade.

Seismic support – Example of equipment with insufficient seismic support

Seismic Support – Conduit within the FWP Building with insufficient seismic bracing.

Summary of Findings

Task 2.6 – WTP Seismic Analysis

- WTP Main Building
  - Structural deficiencies
    - None identified
  - Non structural deficiencies
    - Seismic bracing for equipment, panels, and piping

Seismic support –
Example of equipment with
insufficient seismic support

Seismic support –
Example of piping with
insufficient seismic support

Summary of Findings

Task 2.6 – WTP Seismic Analysis

- Finished Water Pump Building
  - Structural deficiencies
    - Shear wall/diaphragm connection, diaphragm shear
  - Non structural deficiencies
    - Seismic bracing for equipment, panels, and piping
    - Gas piping and masonry partition walls

Seismic support – Example of wall mounted with insufficient seismic support

Seismic support – Example of MCCs with insufficient seismic support

Summary of Findings

Task 2.6 – WTP Seismic Analysis

- CCB Tank *(BHC Analysis, 2016)*
  - Structural
    - Foundation ring wall modifications
  - Non structural deficiencies
    - Flexible pipe connections

CCB – Recommendations include ring wall modifications and flexible connections.

Summary of Recommendations

Task 2.6 – Seismic Analysis

- WTP Main Building
  - Structural - $0
  - Non structural - $118,000
- Finished Water Pump Building
  - Structural - $200,000
  - Non-structural - $91,000
- CCB
  - $2.0M

Next Steps

- Technical Memorandum 20434-5
  - Filtration System Analysis
    - Presentation on 12/30/2020
- Technical Memorandum 20434-6
  - Backwash System Analysis
    - Presentation on 12/30/2020
- Technical Memorandum 20434-7
  - Disinfection System Analysis
    - Presentation on 12/30/2020

Questions?