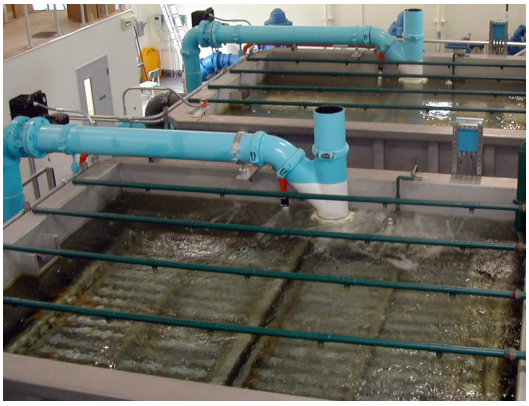




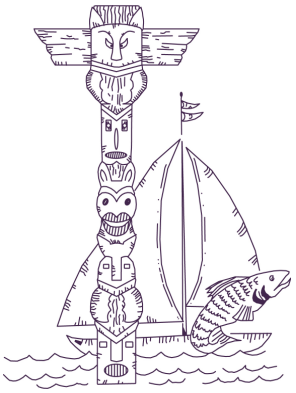
CITY OF KALAMA
Water System Plan
Volume 2 – Water System Operation and Maintenance Manual

G&O #15228
April 2017

Gray & Osborne, Inc.

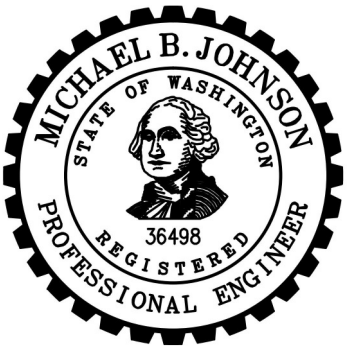
CITY OF KALAMA

COWLITZ COUNTY **WASHINGTON**



WATER SYSTEM OPERATION AND MAINTENANCE MANUAL

VOLUME 2



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APRIL 2017

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CHAPTER 1

RESPONSIBILITY AND AUTHORITY

INTRODUCTION

There are two primary objectives for the Operation and Maintenance Manual for a water system. The first is to provide documentation of satisfactory water system management operations in accordance with WAC 246-290-100 and 246-290-415. The second objective is to furnish a stand-alone document that clearly describes the day-to-day operations that keep the water system running properly. Information regarding the individual water system components, winter and summer operation procedures, routine maintenance, safety, emergency response, and cross-connection control is provided. This document can be used in conjunction with the City's Employee Handbook as an overview of the operation of the water system for new employees or other interested persons.

ORGANIZATION

The City of Kalama (the City) owns and operates a municipal water system that serves the incorporated City of Kalama, as well as a portion of unincorporated Cowlitz County. The City of Kalama is governed by a Mayor and a five member City Council. The current Mayor and City Council members are listed as follows:

Mayor:	Pete Poulsen
Council Members:	Mike Truesdell
	Dominic Ciancibelli
	Mike Langham
	Rosemary Brinson Siipola
	Mary Putka

Kelly Rasmussen is the current Kalama Public Works Superintendent and Water System Manager. Mr. Rasmussen is certified by the Washington State Department of Health (DOH) as a Water Distribution Manager II, and he is the responsible official in direct charge of the Kalama Water System. A listing of water system personnel and their current levels of water certifications follows. Figure 1-1 is an organization chart.

CERTIFICATION REQUIREMENTS

Water Works Operator Certification, required under WAC 246-292-060, mandates large Washington State public water systems retain in their employment individuals who are certified, by examination, as competent in water supply operation and management. The Washington State Department of Health (DOH) determines the required level and

number of certified positions based on the population and complexity of the water system. The public water system classification provided in WAC 246-292-040 is listed in Table 1-1.

TABLE 1-1

Water System Classification

Classification	Population Served
Group 1	less than 1,500
Group 2	1,501 – 15,000
Group 3	15,001 – 50,000
Group 4	greater than 50,000

The City of Kalama is classified as a Group 2 system, which corresponds to a required level of certification. The various certification levels and their minimum education and experience requirements are summarized in Table 1-2.

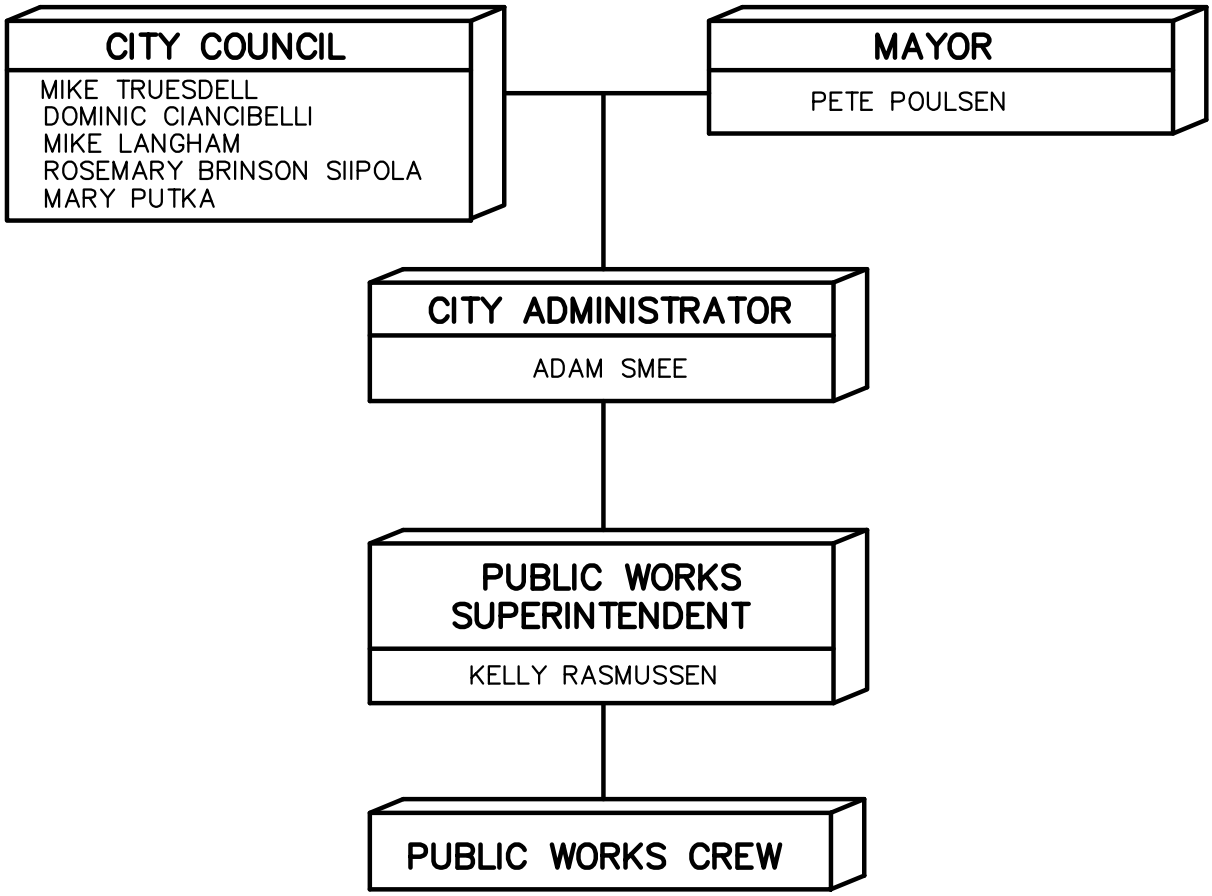
TABLE 1-2

Minimum Education and Experience Requirements for Water Works Operator Certifications

Water Works Operator Classification	Certification Level				
	Operator in Training	Level One	Level Two	Level Three	Level Four
Water Distribution Manager (WDM)					
Education	12 years	12 years	12 years	14 years	16 years
Experience	3 months	1 year	3 years	4 years	4 years
Water Treatment Plant Operator (WTPO)					
Education	12 years	12 years	12 years	14 years	16 years
Experience	3 months	1 year	3 years	4 years	4 years
Water Distribution Specialist (WDS)					
Education	12 years	12 years	12 years	NA	NA
Experience	3 months	1 year	3 years		
Cross Connection Control Specialist (CCS)					
Education	NA	12 years	12 years	NA	NA
Experience		3 months	3 years		
Backflow Assembly Tester (BAT)	NA	NA	NA	NA	NA
Basic Treatment Operator (BTO)	NA	NA	NA	NA	NA

CITY OF KALAMA

WATER SYSTEM ORGANIZATIONAL CHART



CITY OF KALAMA

FIGURE 1–1
ORGANIZATIONAL CHART

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Under the current certification requirements, the two mandatory certified positions the City must have on staff is a Water Distribution Manager (WDM) Level 2 and a Water Treatment Plant Operator (WTPO) Level 2. It is also required that personnel with supporting certifications be available as back-up for the mandatory certified position. The supporting certifications may be one grade lower than the required Level 2.

Table 1-3 provides the name and water system certifications of City Public Works personnel. The City must notify the Water Works Certification Board in the event of any changes in the mandatory or supporting certification personnel. The City makes a priority of assuring that all certified operators remain current with regard to CEUs.

TABLE 1-3

Water System Personnel Certifications

Public Works Personnel	Water System Certifications
Kelly Rasmussen	WDM 2, WDS 1, WTPO 2, CCS
Chad Moon	WDS 1, WTPO 1, WDM 2
Travis VanSkike	WDS 1, WTPO 1
Gary Griggs	WTPO 1
Daniel Woolford	WTPO 1

PROFESSIONAL GROWTH

In order to promote and maintain expertise for the various grades of operator certification, Washington State requires that all certified operators meet professional growth requirements by completing no less than three CEUs within each 3-year period. Programs sponsored by both Washington Environmental Training Resources Center (WETRC) and the American Water Works Association (AWWA) Pacific Northwest Subsection are the most popular source of CEUs for certified operators in Washington State. The professional growth requirement may also be met by advancement by examination or certification by examination in a different classification. The City's Public Works personnel have traditionally been quite active in operator training programs. The City's 2016 training budget is $3,500 annually.

CHAPTER 2

WATER SYSTEM OPERATION AND CONTROL

INTRODUCTION

It is important for water utilities to have a program in place to ensure satisfactory operation of the water system and continuous reliability of critical system components. This chapter details the City's program for operation, monitoring, and control of its various water system facilities. These facilities include 11 reservoirs, 10 booster stations, 18 pressure reducing stations, and approximately 2,500 service meters. The City's telemetry system, which allows for monitoring of important water system functions is also described. The related operational activities performed by operations staff are identified, and the schedule under which these tasks are performed is presented.

MAINTENANCE AND CUSTOMER COMPLAINT RECORD SYSTEM

The City of Kalama has a work order form which is used to document maintenance and repair work. This form must be approved by the Public Works Superintendent prior to beginning work. This allows the Public Works Superintendent to track maintenance work and adjust budgets accordingly. A copy of this form is included in Appendix A.

The Public Works Department documents customer complaints. An example of a form, which can be used to track complaints, is included in Appendix A. This form can be used electronically in spreadsheet form to allow the Public Works Department to efficiently store and manage the information as necessary.

NORMAL SYSTEM OPERATION

Effective operation and control is an essential component of managing a water system. The operational capability of the City's water system must be flexible to allow for control of the system during unanticipated conditions or events. The following sections describe the typical day to day operation and control of the various water system components and the intrinsic capability of the existing control structure to meet unexpected events or changes in the water system conditions.

Operation and control of the City's water system is overseen by the Public Works Superintendent, Mr. Kelly Rasmussen, and is performed by the City's Public Works personnel. The Public Works Department is headquartered at the City Shop, located at 6315 Old Pacific Highway South. The City's telemetry system provides the Public Works staff alarm indications for low water level in each of the City's reservoirs. A schematic drawing of the City's water system is provided as Figure 2-1.

TELEMETRY SYSTEM

The City's telemetry system is operated through Kalama Telephone Company toll lines. An alarm board is located at the Public Works Superintendent's office at the City Shop. During non-business hours, the alarm board is monitored by the Kalama Police Department. This alarm board identifies low water level alarms, which may occur at any of the City's reservoirs. City staff are able to monitor reservoir level alarms and Drinking Water Treatment Facility status at the Public Works Shop or at the Drinking Water Treatment Facility (DWTF). A SCADA system relays alarms to personnel during non-working hours.

An additional telemetry system conveys reservoir level signals between the 2.0 MG reservoir and the DWTF to start and stop the lag pump. This system coordinates operation of the Ranney Well Pump Station with the treatment equipment and finished water pumps. A description of this system is included in the Drinking Water Treatment Facility Operations and Maintenance Manual.

SOURCE OPERATION AND CONTROL

Existing Ranney Well

The City's sole source of supply is the Ranney Well collector, which withdraws water adjacent to the Kalama River. The Ranney Well facility supplies raw river water to the DWTF for treatment.

Drinking Water Treatment Facility

A detailed Operation and Maintenance Manual for the new water treatment facility is available as a separate document. A simple description of the facility is provided below.

The Drinking Water Treatment Facility consists of a Diatomaceous Earth (DE) filtration system with two filter units and room for a third expansion unit, a sodium hypochlorite feed system, and a sodium fluoride feed system.

The Diatomaceous Earth filtration equipment is comprised of vacuum leaf filters with monofilament septa. The septum surfaces are spaced 6 inches apart to prevent bridging of diatomaceous earth and to facilitate spent cake removal. Two filter basins are provided for redundancy and reliability. The basins are constructed of stainless steel for corrosion resistance. The design loading rate for the filtration equipment is 1.0 gallon per minute per square foot (gpm/sf). The minimum filter run time is 7 days, assuming continuous filtration. The diatomaceous earth used is either Celite Grade 535 or Eagle-Picher grade SW-50, depending on availability.

LEGEND

- ALTITUDE VALVE
- CHECK VALVE
- NORMALLY CLOSED VALVE
- PRESSURE REDUCING VALVE
- F — FLOURIDE ADDITION
- C — CHLORINE ADDITION
- BOOSTER PUMP STATION
- 430' — RESERVOIR WITH OVERFLOW ELEVATION
- MG — MILLION GALLONS
- KG — THOUSAND GALLONS

PUMP STATIONS		MOTOR HP AND CAPACITIES
A	DWTF	(2) 900 GPM @ 585' TDH
B	CEMETERY	(2) 30 GPM @ 100' TDH
C	FIFTH ST.	(1) 200 GPM @ 300' TDH
D	LOWER GORE	(1) 60 GPM @ 466' TDH
E	JAEGER	(1) 60 GPM @ 800' TDH
F	LOWER GREEN MTN.	(1) 60 GPM @ 719' TDH
G	CONFER	(1) 30 GPM @ 505' TDH
H	VIVIAN	(1) 22 GPM @ 431' TDH
I	UPPER GORE	(1) 40 GPM @ 347' TDH
J	SIMMONS	(1) 6 GPM @ 300' TDH
K	AGATE MTN.	(1) 30 GPM @ 495' TDH

PRV LOCATIONS		DOWNSTREAM PRESSURE
1	FIR ST. & N. 2ND ST.	95 PSI
2	ELM ST. & 1ST ST.	110 PSI
3	ELM AND 2ND ST.	93 PSI
4	ASHLAND	100 PSI
5	VINCENT ROAD	30 PSI
6	KILKELLY ROAD	60 PSI
7	SPENCER CREEK RD.	90 PSI
8	VIVIAN ROAD	32 PSI
9	MODROW ROAD	115 PSI
10	GWYNNE	58 PSI
11	WATER'S WATCH	75 PSI
12	CONFER ROAD	75 PSI
13	DAVE'S VIEW 2	60 PSI
14	STONE FOREST	75 PSI
15	PARADISE ACRES	60 PSI
16	HIDDEN SPRINGS	60 PSI
17	TAYLOR ROAD	50 PSI
18	CEMETERY ROAD	45 PSI
19	NORTH 5TH STREET	55 PSI

JAEGER RESERVOIR
866'
70 KG
866 ZONE
PARADISE ACRES
703 ZONE
NEW CONFER RESERVOIR
834'
80 KG
834 ZONE
AGATE MT. RESERVOIR
1101'
70 KG
1101 ZONE
SIMMONS RESERVOIR
1116'
6 KG
1116 ZONE
UPPER GORE RESERVOIR
929'
10 KG
929 ZONE
NEW TAYLOR ROAD RESERVOIR
830'
0.2 MG
830 ZONE
703 ZONE
LOWER GORE RESERVOIR
707'
30 KG
707 ZONE
703 ZONE
HIDDEN SPRINGS
LOWER GREEN MT. RESERVOIR
820'
10 KG
820 ZONE
DAVE'S VIEW
701 ZONE
VIVIAN RESERVOIR
790'
30 KG
790 ZONE
SPENCER CREEK ZONE
330 ZONE
WTP
2.6 MG
RANNEY WELL
430 ZONE
584'
10 KG
CEMETERY RESERVOIR
584 ZONE
430'
2 MG
DOWNTOWN KALAMA
430 ZONE
285 ZONE
PORT OF KALAMA
KALAMA RIVER
COLUMBIA RIVER
FIR ST.
ELM ST.
2nd ST.

CITY OF KALAMA

FIGURE 2-1
WATER SYSTEM SCHEMATIC

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Each filter is provided with a filtered water pump to draw the vacuum through the filter. The filter pumps are end-suction centrifugal pumps driven by variable speed motors to allow the same pumps to be used for filter and recycle modes. The filters are designed to operate at a constant flow rate. During periods of low water demand, the filters will automatically enter a recycle mode to maintain the filter cake on the septa.

STORAGE OPERATION AND CONTROL

Kingwood Reservoirs

The 1.0 MG and 2.0 MG reservoirs (Kingwood 1 and 3) have pump control floats, and the 2.0 MG reservoir has a pressure transducer for monitoring of water level. Information from this transducer is transmitted the DWTF SCADA. The 2.0 MG reservoir has separate inlet, outlet and drain pipes. The 1.0 MG reservoir has not been in service since 1999 due to noticeable cracks in the concrete. If necessary, the 1.0 MG reservoir could be brought back into service and would have the same overflow as the 2.0 MG reservoir.

Small Pressure Zone Reservoirs

Telemetry for all of the smaller reservoirs generally consists of two floats in each reservoir. One float serves as an on/off control for the booster station serving that reservoir. The second float serves as a low-level reservoir alarm float. This is hardwired to the nearest telephone pedestal that transmits the signal over telephone lines to the City Shop. Appendix D includes figures that show the site piping for many of the City's small reservoirs. As shown, not all reservoirs have a separate inlet and outlet, and some do not have overflow pipes or drain lines.

BOOSTER STATION OPERATION AND CONTROL

Information including the make, model, serial number, and installation date of each of the booster stations, as available, is shown in Table 2-1.

TABLE 2-1

Booster Station Information

Pump Station	Type	Make	Model #	Serial #	Output	Date of Pump Installation
Fifth Street/ Taylor	Vertical Multi-stage	Grundfos	CR-45-41	NA(1)	230 at 374′ (30 hp)	2005
Vivian	Vertical In Line	Grundfos	CR4-120	C41000072P 19616P19638	22 gpm at 430′ (5 hp)	1996
Cemetery	Vertical In Line	Paco	6-12705-700161-153	95B5992	30 gpm at 100′	1986
Simmons	Vertical In Line	Grundfos	CR11-12	TD89B02011	9.7 gpm at 264′ (1.5 hp)	2014
Lower Gore	Submersible	Grundfos	8P9625	NA(1)	-	1966
Upper Gore	Submersible	Jacuzzi	NS-650-10	92622590	-	1990
Jaeger	Submersible	Grundfos	85S 150-11	NA(1)	-	1990
Agate Mountain	Submersible	NA(1)	NA(1)	NA(1)	-	1981
Lower Green Mountain	Submersible	NA(1)	NA(1)	NA(1)	-	1970
Confer	Vertical Multi-stage	Grundfos	CR20-08	NA(1)	-	2005

(1) Information not available.

Each of the small booster stations are operated based on reservoir levels in the reservoir serving that pressure zone. A float in the reservoir(s) is hardwired down to the booster station to call the booster station on or off according to the reservoir level. Currently, there is no provision to monitor the status of all reservoirs and booster station status from a central location. Booster station on/off set points are generally set as follows:

- Pump On—3 feet below the overflow
- Pump Off—1.5 feet below the overflow
- Low Alarm—4 feet below the overflow

The typical booster station operating conditions are listed in Table 2-2.

TABLE 2-2

Typical Booster Station Operating Conditions

Booster Station	Pump On Pressure (psi)	Pump Off Pressure(psi)
Fifth Street/Taylor	N/A(1)	N/A
Vivian	N/A	180
Cemetery	N/A	62
Simmons	N/A	108
Lower Gore	185	145
Upper Gore	N/A	N/A
Jaeger	240	220
Agate Mountain	240	210
Lower Green Mountain	N/A	N/A
Confer	N/A	N/A

(1) N/A = Information not available.

Auxiliary Power

Lower Green Mountain, Upper Gore, and Lower Gore Booster Pump Stations are equipped with transfer switches. The City owns a portable emergency generator, and therefore would like to move towards equipping all the booster stations with transfer switches to allow provision of auxiliary power.

DISTRIBUTION SYSTEM OPERATION AND CONTROL

The distribution system components include water mains, water main valves, pressure reducing valves (PRVs), fire hydrants, bridge crossings, and other related appurtenances. All pressure reducing valves, with the exception of the Vivian and Cemetery PRVs close automatically if the upstream pressure is below the PRV set point. All other components are operated manually. Table 2-4 provides a list of the City's PRVs and their estimated outlet pressure settings.

Table 2-5 provides a list of the total lengths of pipe in the City's water system organized by pipe diameter.

TABLE 2-3

Pressure Reducing Valves

PRV Station Location	Elevation (ft)	Pressure Zones	Size	Downstream Pressure (psi)
Fir & N. 2nd Street	105	430 Zone to 285 Zone	2″	95
Elm & 1st Street	37	430 Zone to 285 Zone	8″ & 4″	110
Elm & 2nd Street	70	430 Zone to 285 Zone	6″	93
Ashland	75	430 Zone to 285 Zone	6″	100
Vincent Road (1)	215	430 Zone to 285 Zone	6″	30
Kilkelly Road (1)	220	430 Zone to 285 Zone	2″	60
Spencer Creek Road	40	430 Zone to 330 Zone	4″ & 1.5″	60
Vivian Road(2)	240	595 Zone to 430 Zone(1)	4″	32
Cemetery Road(2)	440	584 Zone to 430 Zone	2.5″	45
Gwynne	650	830 Zone to 705 Zone	6″	58
Modrow Road	30	430 Zone to 285 Zone	6″ & 12″	115
Waters Watch	450	830 Zone to 430 Zone	4″ & 2″	75
N. 5th Street	450	595 Zone to 430 Zone	6″ & 2″	55
Dave's View 2	307	701 Zone to 430 Zone	6″ & 2″	60
Confer Road	459	834 to 701 Zone	6″ & 2″	75
Stone Forest	170	430 to 285 Zone	6″ & 2″	75
Paradise Acres	560	703 Zone	1.5″	60
Hidden Springs	560	703 Zone	1.5″	60

(1) The Vincent Road PRV station currently only serves homes on Vincent Road. A valve located downstream of this PRV is closed which prevents water from flowing to the 285 Zone.

(2) The PRVs located at the Vivian Booster Station and on Cemetery road are normally closed and opened manually on an as needed basis.

TABLE 2-4

Pipe Lengths by Diameter(1)

Pipe Diameter	Pipe Length (LF)
3 inch or less	45,400
4 inch	14,700
6 inch	48,400
8 inch	129,800
10 inch	7,700
12 inch	58,700
16 inch	6,700
Total	**311,400**

(1) Pipe lengths are taken from the City of Kalama water system model (2015).

SAFETY PROCEDURES

An important consideration of any successful operation and maintenance program is the safety of the employees. The City's safety program is in compliance with the Occupational Safety and Health Administration (OSHA) and the Washington State Department of Labor and Industries (L&I). The safety program addresses the situations that employees may encounter during the performance of operation and maintenance tasks.

CITY SAFETY PROGRAM

The City has four safety manuals, which include the *Water System Emergency Plan, City of Kalama Accident Prevention Program, Safety and Health Procedures,* and a *Bloodborne Pathogen Exposure Plan*. The *Water System Emergency Plan* outlines safety guidelines with respect to the following.

- Standard excavation safety procedures
- Standard operating procedures for working in street right-of-ways
- Excavation, trenching, and shoring
- Head protection
- Foot protection
- Flagger clothing, equipment, signals, rules of conduct
- Sign placement
- Channelizing devices

Excerpts from the *Water System Emergency Plan* are included in Appendix B.

The City has safety meetings on the first Thursday of each month. Crew members take turns presenting information and training on various safety issues. All employees have training in CPR, First Aid, and Confined Space Entry.

CHAPTER 3

ROUTINE AND PREVENTIVE MAINTENANCE

INTRODUCTION

A significant responsibility of the Public Works staff is performing routine maintenance for various water system components. This chapter discusses the City's preventative maintenance program for various system components, presents a review of recent maintenance activities, and summarizes the City's materials inventory. Finally, suggestions and recommendations are presented for the City's existing operation and maintenance program.

ROUTINE AND PREVENTIVE MAINTENANCE PROGRAM

The purpose of maintenance in any business endeavor is to preserve the value of the physical infrastructure and ensure that the City can continue to provide a safe and reliable water supply. The most cost effective method for maintaining a water system is to provide a planned preventive maintenance (PM) program. Through a planned PM program, the optimum level of maintenance activities can be provided for the least total maintenance cost.

SOURCE

The Ranney Well is monitored on a weekly basis by Public Works personnel. Flow and pump run time is recorded daily at the Drinking Water Treatment Facility (DWTF) constructed in 2002.

The City performs on-going maintenance of the pumps and motors at the Ranney Well site.

Significant maintenance was completed on the Ranney Well itself in August 2014. Ranney Well collector laterals were cleaned, disinfected and inspected in order to maximize the capacity of the well. A high pressure rotating water jet was slowly inserted into the full length of the collector laterals. Encrustive deposits within the laterals and in the adjacent aquifer materials were loosened by the jet and removed by vacuum suction. The laterals and the interior walls of the caisson were then disinfected with a chlorine solution. Following the underwater maintenance work, the capacity of the Ranney Well increased by approximately 36 percent.

It is recommended by the Ranney Division and Layne Geosciences, who completed the maintenance on the Ranney Well, that the Ranney Well be inspected every 5 years and that the well is cleaned every 10 years. Monthly monitoring (including collector

pumping level, pumping rate, discharge temperature, river level and river temperature) and annual evaluation of the monitoring data by a hydrogeologist experienced with Ranney Wells is also recommended to help determine well performance and to project future maintenance requirements.

In 2014, the Ranney Well was flow tested (in addition to cleaned and videoed). This testing concluded that the Ranney Well has a capacity of approximately 2,400 gpm. If a new filter is added at the DWTF to increase the treatment capacity to 2,700 gpm, the Ranney Well will need to be rehabilitated to provide increased capacity.

DRINKING WATER TREATMENT FACILITY

A Drinking Water Treatment Facility Operations and Maintenance Manual was produced under a separate cover in 2002. For a detailed description of the facility and all appurtenances, refer to the DWTF Operations and Maintenance Manual.

STORAGE FACILITIES

Improperly maintained reservoirs can cause contamination in public water systems. This is a result of contaminants entering the reservoir through cracks or openings at the vent, overflow or drain. Deteriorating hatch covers and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a water system. If reservoir drains are not functioning properly, it may be difficult to purge a contaminant from the system. Written documentation of reservoir maintenance must be completed with each inspection and repair, and a copy of the report retained on file. A reporting form is included in Appendix A.

The City's Public Works maintenance crews visit and inspect each reservoir site monthly. The floats of the reservoirs are tested at this time to ensure proper operation.

BOOSTER STATIONS

The City's booster stations are inspected on a monthly basis. Pumps are lubricated and repaired as needed.

DISTRIBUTION SYSTEM FACILITIES

Various distribution system facilities, including pressure reducing valves (PRVs), distribution system valves, hydrants, water mains, and water meters require on going maintenance to prevent malfunction and water quality problems.

Pressure Reducing Valve Maintenance

PRVs are inspected monthly and repairs are made on an as needed basis.

Distribution System Valve and Hydrant Maintenance

Valves that do not close tight should be removed, repaired or replaced. An important aspect of distribution system valve maintenance is to ensure distribution valves are completely open. A partially closed valve can seriously reduce peak day operation and fire flow supply. The City is in the process of developing a program for distribution valve and hydrant exercising. A suggested valve and hydrant maintenance program is shown in Table 3-3. Example maintenance reporting forms are included in Appendix A.

Dead-End Waterlines

Dead-end waterlines are susceptible to water quality problems and should be flushed at least quarterly or more frequently to remove stagnant water and sediment which may have been deposited. Flushing of all dead end mains should be accomplished twice each year or more often if water quality complaints should occur. The City currently flushes dead end mains to maintain water quality at certain locations once a month and other locations based on customer complaints. Appendix C includes a list of locations where the City currently regularly flushes dead end mains.

Meters

Accurate water metering is an essential financial and conservation oriented component of water system infrastructure. A substantial amount of revenue may be lost through inaccurate metering of residential, commercial, and industrial accounts. Without accurate master or source meter readings, the water utility cannot determine lost and unaccounted for water volumes. Service meters, including all residential and commercial customer meters, should be calibrated and/or replaced according to the following schedule:

1. 3/4-inch and 1-inch meters should be tested every 10 years and replaced, if necessary. Replacement is recommended if it is cheaper to replace meters than to test and if necessary, repair meters.

2. 2-inch through 4-inch meters should be tested and calibrated every 3 to 5 years.

3. 4-inch and larger meters should be tested and calibrated every 1 to 3 years.

Inspections and replacement or repair of water meters are completed by Public Works personnel in response to customer requests or when other evidence suggests a meter has become inoperative. Public Works has recently implemented a process of replacing all of its older water meters.

EQUIPMENT AND SUPPLIES

The City maintains a stock of equipment and supplies necessary for maintenance of the water system.

PREVENTIVE MAINTENANCE SCHEDULE SUMMARY AND RECOMMENDATIONS

Tables 3-1 through 3-3 summarize the daily, weekly, and monthly maintenance schedule recommended for each component of the City's water system.

TABLE 3-1

Recommended Daily Maintenance Schedule

Facility	Daily Maintenance Activity
Ranney Well	· Site visit · Evaluate site security · Check pumps for proper operation · Observe piping for visible leaks
Water Treatment Facility (DWTF)	· Site visit · Evaluate site security · Record turbidity, chlorine residual, and fluoride residual · Run daily monitoring test · Check pumps for proper operation · Observe piping for visible leaks · Adjust chlorine and fluoride levels, as needed

TABLE 3-2

Recommended Weekly Maintenance Schedule

Facility	Weekly Maintenance Activity
Reservoirs	· Site visit · Evaluate site security · Check reservoir level
Booster Stations	· Site visit · Evaluate site security · Check pumps for proper operation · Observe piping for visible leaks
Distribution System	· Check distribution system for leaks

TABLE 3-3

Recommended Monthly Maintenance Schedule

Facility	Monthly Maintenance Activity
PRVs	· Check upstream and downstream pressures
Distribution System	· Collect coliform samples for testing · Read service meters · Check reservoir telemetry operation · Replace, repair, calibrate approximately 12 service meters · Exercise approximately 10 valves and hydrants · Flush dead end mains

In addition to the recommended daily and monthly maintenance activities, the City should plan for and schedule regular thorough maintenance on the Ranney Well and storage facilities. Table 3-4 provides a list of recommended maintenance activities and a proposed schedule.

TABLE 3-4

Recommended Maintenance Schedule

Maintenance Activity	Schedule
Ranney Well thorough inspection	Every 5 years
Ranney Well cleaning	Every 10 years
2 MG Reservoir draining and cleaning-including checking hatches, screens, ladders, roof, steel integrity and repairing/replacing as necessary	Every 5 years
Small Reservoirs draining and cleaning-including checking hatches, screens, ladders, roof, concrete/steel integrity and repairing/replacing as necessary	Two reservoirs annually
2 MG Reservoir Repainting	Every 15-20 years

WATER QUALITY MONITORING SCHEDULE

Table 3-5 outlines the City's water quality monitoring schedule.

TABLE 3-5

City of Kalama Water Quality Monitoring Requirements

Parameter	Sample Location	Frequency	Notes	Consequence of Exceeding Standard
Routine Coliform	Distribution System	Sample 6-7 times per month.	See Coliform Monitoring Plan in Appendix F for location map.	Follow-up and Repeat Sampling
Inorganic Chemicals	Source	Once every 9 years	(1)(2)	Possible Treatment Modifications
Nitrates	Source	Annually	(1)	Possible Treatment Modifications
VOCs	Source	Once every 6 years,	(2)	Possible Treatment Modifications
SOCs	Source	Once every 9 years	(2)	Possible Treatment Modifications
Lead and Copper	Distribution System	Once every 3 years.	20 samples are required	Additional Treatment Modifications
Disinfection Byproducts	Distribution System	Two samples each for THMs and HAA5s.	Sample location at extreme end of distribution system during warmest month.	Possible Treatment Modifications
Radionuclides	Source	Once every 6 years		Possible Treatment Modifications

(1) Nitrate analysis is included as a part of inorganic chemical analysis. This test should not be duplicated in years when inorganic chemicals are tested.

(2) Confirm establishment of monitoring waiver with DOH for every monitoring period.

CHAPTER 4

EMERGENCY RESPONSE

INTRODUCTION

The operation of the water system under emergency conditions is an important responsibility of City Public Works personnel. Emergency response procedures should be rehearsed and reviewed by personnel. The City has developed an Emergency Response Manual. The purpose of this Manual is to provide Public Works personnel responding to an emergency situation with enough information to begin assessing the situation, making decisions, and taking action to control the situation. A copy of the Emergency Response Manual is provided in Appendix D.

NOTIFICATION PROCEDURES

A procedure for quickly notifying all City staff, customers, other utilities, and if necessary, the local health department and DOH, of a water system related emergency is a necessary component of an Emergency Response Program.

EMERGENCY PHONE NUMBERS

An updated emergency phone list is shown in Table 4-1. This list should be kept on file and visible at City Hall, the Public Works Shop, and the Fire and Police Departments for use in the event of an emergency.

TABLE 4-1

Emergency Phone List

Agency/Group	Contact	Phone Number
Fire/Police	--	911
Public Works Superintendent	Kelly Rasmussen	360-353-3545(H) 360-430-2675(C)
Public Works Technician	Daniel Woolford	360-703-8219
Public Works Technician	Chad Moon	360-673-5275 (H) 360-353-8282(C)
Public Works Technician	Travis VanSkike	360-673-3701 (H) 360-353-8282(C)
Public Works Technician	Gary Griggs	360-673-4627(H) 360-560-1678(C)

TABLE 4-1 – (continued)

Emergency Phone List

Agency/Group	Contact	Phone Number
Fire Department	Victor Leatzow	360-673-2222 (W)
Police Department	--	360-673-2165 (W)
Public Works Shop	--	360-673-3706
Cowlitz County Public Works	Kent Cash, PE	360-673-2175 360-577-3030
County Road Department	--	360-673-2175
Pipe/Fitting Suppliers	Ferguson	360-425-5330
Pipe/Fitting Suppliers	United Pipe	800-288-6271
Pipe/Fitting Suppliers	Consolidated Supply	800-929-5810
Testing Lab	Columbia Analytical	360-577-7222
Testing Lab	Coffey Lab	503-254-1794
WSDOT	SW Regional Office	360-905-2222
WSDOH	SW Regional Office	360-236-3030
Ecology Spill Response	--	360-407-6300
Comcast	--	888-824-8264
Cowlitz County PUD	On Call Personnel	360-423-2210
Waste Control Inc	--	360-425-4302
Kalama Telephone Company	--	360-673-3322
Cascade Natural Gas	--	888-522-1130
NW Natural Gas	--	360-571-5465
Williams Northwest Pipeline	--	800-972-7733
Cowlitz-Wahkiakum	Public Health	360-414-5578
State Wide One-Call	Utility Locates	800-424-5555
Gray & Osborne, Inc.	Seattle Number Olympia Number	206-284-0860 360-292-7481
County Emergency Management	--	360-577-3130

PUBLIC NOTIFICATION

There may be instances in which the general public must be informed of a water system related emergency. A violation of a maximum contaminant level would be the most likely situation in which public notification would be required.

Bacteriological Presence Detection Procedure

Notification procedures for notifying system customers, the local health department, and DOH of water quality emergencies are an important component of an emergency response program. Any public water systems may occasionally detect positive coliform samples, mainly as a result of minor contamination in distribution mains or sample taps, or improper bacteriological sampling procedures. However, the persistent detection of

coliforms in the water supply, particularly E. coli or fecal bacteria, may require issuing a public boil water notice to ensure the health and safety of the water customers.

WAC 246-290-320 requires water utilities to follow specific procedures in the event coliform bacteria are detected in the water system. There are two kinds of coliform MCL violations, acute and non-acute. DOH has standard verbiage to be included in notices for each kind of violation, which include language mandated by the EPA. In each case, the current form for the appropriate type of violation must be used. The forms are available on-line or from the DOH Office of Drinking Water. Emergencies such as floods, earthquakes, and other disasters can affect water quality as a result of damage to water system facilities, thereby warranting an acute MCL notice also referred to as a boil water notice, in advance of supply. Non-acute MCL violations do not warrant such a notice. Example forms (notices) for both acute and non-acute MCL violation are included in Appendix D. The City is advised to contact the area representative at DOH in the event of coliform bacteria detection.

VOC/SOC Detection Procedures

Organic chemical VOC and SOC samples are routinely taken from water supply sources. VOC and SOC tests include numerous different chemicals. VOCs and SOCs are generally not detected in water supply sources. Therefore, any detection of VOCs or SOCs may warrant follow-up investigation even if it does not exceed an MCL. If routine VOC or SOC samples detect one or more chemicals, additional samples may be taken specifically for that chemical or possibly for a surrogate such as Total Organic Carbon if it reduces follow-up chemical testing costs. Follow-up procedures in the event of VOC or SOC detection are specified in WAC 246-290-320 (6). Follow-up actions may vary depending upon the specific chemical detected and the level at which it is detected. The DOH area representative should be contacted to coordinate follow-up sampling and appropriate responses.

Inorganic Chemical Detection Procedures

Inorganic chemical/physical characteristics (IOC) samples are routinely collected from water supply sources. IOC tests include numerous different chemicals. If routine IOC samples detect one or more samples in excess of an MCL, additional samples may be collected specifically for that sample if it reduces follow-up chemical testing costs. Follow-up procedures in the event of an inorganic chemical/physical characteristics MCL violation are specified in WAC 246-290-320 (3). Follow-up actions may vary depending on the specific chemical detected and the level at which it is detected. The DOH area representative should be contacted to coordinate follow-up sampling and appropriate responses.

EMERGENCY RESPONSE PROCEDURES

The City's Emergency Response Manual provides guidelines for the general assessment of an emergency situation. The first order of business is to assess whether or not an Emergency Operations Center (EOC) should be established. An EOC is probably not necessary under the following conditions.

- A single event has occurred
- A small number of similar events have occurred
- The event has already peaked or ended

Establishing an EOC should be considered under the following conditions.

- Multiple events have occurred
- Several system outages
- Severity or length of event is increasing
- Communications are down or failing
- Event is regional

Once a general assessment of the situation has been completed, the Manual outlines procedures for emergency situations such as distribution line breaks and low water levels in reservoirs.

VULNERABILITY ANALYSIS

It is important to estimate the degree to which system facilities may be vulnerable to various types of emergency situations in order to identify system weaknesses. The following sections provide information regarding which facilities would be vulnerable to various types of emergency situations and recommended actions that Public Works personnel could take to mitigate the problem. Vulnerability assessment forms which have been filled out for various water system facilities are included in Appendix D.

Power Failure

Various types of weather can cause loss of power. In order to alleviate the effects of a power outage, the City owns a portable emergency generator. However, many of the booster stations are not equipped with transfer switches. Table 4-2 presents the potential effects of a lengthy power failure on the water system components.

TABLE 4-2

Emergency Response Procedures for a Power Failure

Water System Component	Potential Effects	Recommended Actions
Ranney Well Drinking Water Treatment Plant (DWTF)	Pumps and DWTF equipment will be inoperable without auxiliary power	Auxiliary generator onsite will provide power to Ranney Well pumps and DWTF.
Storage Facilities	Telemetry may be inoperable.	Manually check reservoir levels.
Booster Stations	Booster stations will be inoperable without auxiliary power	Monitor reservoir levels. Equip booster stations with transfer switches in order to utilize portable emergency generator.
Transmission and Distribution System	No effect.	No Action.

Earthquake

A severe earthquake may have a substantial impact on the City's water system. An earthquake could cause damage to the distribution system and water system facilities. In addition, communication and transportation systems may be interrupted. Table 4-3 presents potential effects of a severe earthquake on water system components.

TABLE 4-3

Emergency Response Procedures for an Earthquake

Water System Component	Potential Effects	Recommended Actions
Ranney Well Drinking Water Treatment Facility (DWTF)	Structural damage may have occurred to the DWTF or Ranney Well building, lateral collection pipes, caisson, or mechanical damage to pumps may have occurred.	Check Ranney Well and shut down pumps as required. Check DWTF and shut down pumps as required.
Storage Facilities	Reservoirs may be leaking or structurally damaged.	Check each reservoir for structural damage or cracks and leaks and seal or drain as required.

TABLE 4-3 (continued)

Emergency Response Procedures for an Earthquake

Water System Component	Potential Effects	Recommended Actions
Booster Stations	Booster stations may be structurally damaged or mechanical damage to pumps or piping may have occurred.	Check booster stations and shut down pumps as required.
Transmission and Distribution System	Transmission and distribution system mains may be broken and Public Works staff transportation for monitoring system and making repairs may be limited.	Isolate broken sections as they are located and repair.

Severe Snowstorm

A severe snowstorm will limit motor vehicle transportation, including the transportation of Public Works personnel. Table 4-4 provides the emergency response procedures for a severe snowstorm.

TABLE 4-4

Emergency Response Procedures for a Severe Snowstorm

Water System Component	Potential Effects	Recommended Actions
Ranney Well Drinking Water Treatment Facility (DWTF)	No immediate effect. Snow may prevent access.	Clear snow from access roads.
Storage Facilities	No immediate effect. Snow may prevent access.	Clear snow from access roads.
Booster Stations	No immediate effect. Snow may prevent access.	Clear snow from access roads.
Transmission and Distribution System	Public works staff transportation for monitoring system and making repairs will be limited.	Contact county or state highway department to expedite plowing of problem areas. Keep chains or other snow gear for maintenance equipment on hand and keep valve locations current and available for maintenance.

Flooding and Landslides

Heavy snow melt and/or rains have the potential to cause flooding and landslides in the City. Table 4-5 presents the emergency response procedures for flooding.

TABLE 4-5

Emergency Response Procedures for Flooding and Landslides

Water System Component	Potential Effects	Recommended Actions
Ranney Well	The Ranney Well and DWTF should not be affected by flooding or landslides.	No Action. The DWTF will be shut down for high raw water turbidity.
Drinking Water Treatment Facility (DWTF)		
Storage Facilities	Many storage facilities could be damaged by landslides.	Check all storage facilities following heavy rainfall.
Booster Stations	Some booster stations could be damaged by landslides.	Check all booster stations following heavy rainfall.
Transmission and Distribution System	Transmission and distribution mains could be affected by landslides or high water levels and Public Works transportation for monitoring system and making repairs may be limited.	Take more frequent bacteriological tests to assure water quality and observe conditions at bridges and prepare to close off washed out pipes if necessary.

Fire

An extensive fire may result in low distribution system pressures and drawing down of City reservoirs. Table 4-6 presents the emergency response procedures for a fire.

TABLE 4-6

Emergency Response Procedures for a Fire

Water System Component	Potential Effects	Recommended Actions
Ranney Well	Additional filters and pumps may be called on to keep up with demand.	Monitor pumping and water levels in the collector.
Drinking Water Treatment Facility (DWTF)		
Storage Facilities	Draw down will occur with increased demand.	Monitor reservoir levels.
Booster Stations	Pumps may be called on due to drop in reservoir levels.	No action.

TABLE 4-6 (continued)

Emergency Response Procedures for a Fire

Water System Component	Potential Effects	Recommended Actions
Transmission and Distribution System	Low pressure may result in the extremities of the distribution system depending on the extent of the fire demand.	No action.

Contamination of Water Supply

Contamination of the water supply may occur due to main breaks or pollution from an isolated source. Table 4-7 presents the emergency response procedures for contamination of the water supply.

TABLE 4-7

Emergency Response Procedures for Contamination of the Water Supply

Water System Component	Recommended Actions
Ranney Well	Identify source of contamination. Turn off pumps at Ranney Well and DWTF. Isolate the contamination from system if it is located at Ranney Well source.
Drinking Water Treatment Facility (DWTF)	
Storage Facilities	Isolate contaminated reservoir from the distribution system and decide on method of disinfection. Consider draining, cleaning, and disinfecting reservoir if water is determined to be unsuitable for consumption. Disinfect reservoir with chlorine in accordance with AWWA standards. Take bacteriological samples and return to service when test results are in compliance.
Booster Stations	Close valves as required to isolate source of contamination. Repair and/or otherwise remove source of pollution. Flush previously contaminated section and test until free of contamination prior to resumption of use.
Transmission and Distribution System	Close valves as required to isolate the source of contamination. Repair and/or otherwise remove source of contamination. Flush previously contaminated section and test until free of contamination prior to resumption of use.

Water Main Breaks

Water main breaks may occur in the distribution system. Water main breaks can provide a source of contamination in the water system. Water mains should be disinfected during water main repairs to prevent bacteriological contamination. AWWA C651 provides guidance for disinfection of water mains. When repairing a water main break, the following guidelines can be used to reduce the potential for contamination:

1. Close valves to isolate the section of water main to be repaired.

2. Excavate to provide at least 18 inches of clearance around the pipe.

3. Keep water pumped out of the trench to prevent dirty water from entering the pipe.

4. Once the pipe is cut, inspect and remove any debris from the pipe by flushing.

5. Disinfect the pipe and any new pipe and fittings by swabbing with concentrated hypochlorite solution.

6. Following completion of the repair, flush the main to remove high concentrations of hypochlorite.

7. Open valves to bring the section of water main back on-line.

CONTINGENCY OPERATIONAL PLAN

A contingency operational plan is necessary for operation of the system when normal operating procedures are not appropriate. The following sections provide information regarding alternate modes of operation of the system facilities.

SOURCE OF SUPPLY

Because the City has no alternate source of water supply, in the event of a significant interruption or reduction in water supply from the Ranney Well the City of Kalama is prepared to implement the following water conservation measures:

- Limit outdoor water use for lawn sprinkling to alternating days
- Eliminate all lawn sprinkling
- Eliminate outdoor water use
- Restrict all water use by imposing mandatory water use reduction with a maximum water use per equivalent residential unit
- Restrict water use by commercial/industrial water customers

The City will notify the local radio stations and/or notify customers door to door and will mail a postcard type notice of water use restrictions to each water user.

STORAGE FACILITIES

Should the City's 2.0 MG reservoir need to be taken off line, the 1.0 MG reservoir could supply the system. If for some reason both the reservoirs need to be taken offline, the Drinking Water Treatment Facility can supply the system by bypassing the reservoirs.

If any small reservoir needed to be taken off line, the booster stations supplying those areas could be used to supply water to customers. Public Works personnel would need to manually control pumps, however, as the reservoir float control system would be inoperable.

BOOSTER STATIONS

Failure of pumps at any small booster station would require that customers in that pressure zone be supplied by the corresponding reservoir. Many of the small booster stations do not have pump redundancy, so failure of one pump could render the booster station inoperable. Water can be trucked to refill reservoirs as required should the booster station remain operable for an extended period of time.

TRANSMISSION FACILITIES

In the event of a transmission main failure along Spencer Creek Road, supply to many pressure zones would be cut off. The City's 2.0 MG and 1.0 MG reservoirs would need to supply the 430 Zone (and the small pressure zones) until repairs could be made to the Spencer Creek Road transmission main. Depending on the location of the failure, the Spencer Creek pressure zone may or may not be able to be supplied with water. The City's 285 Zone could still be supplied from the Kalama River Road transmission main.

A transmission main failure along Kalama River Road would have less impact on the system as a whole. The 285 Zone could continue to be supplied water via PRV stations in the downtown area.

CHAPTER 5

CROSS-CONNECTION CONTROL PROGRAM

INTRODUCTION

As required by WAC 246-290-490, Cross-Connection Control, utilities have the responsibility to protect customers from water contamination due to cross connections. A cross connection is any physical arrangement where the potable water supply is connected, directly or indirectly, to any liquid of unknown or unsafe quality that may contaminate the public water supply through backflow. The regulation also requires utilities to develop and implement a comprehensive program to control cross connections within the system. An acceptable cross-connection control program must address the following elements:

- Adoption of the appropriate ordinance, code, or rule-of-service for the purveyor to establish local authority to implement the cross-connection control program.

- Written procedures for implementing the cross-connection control program.

- Identification of staff positions delegated the responsibility for the organization and implementation of the cross-connection control program.

- Establishment of the qualifications necessary for the personnel working in the cross-connection control program. Detailed procedures for conducting surveys of new and existing facilities to identify all existing and potential cross connections that could result in contamination of the distribution system.

- Requirements that only approved backflow assemblies shall be installed at locations where cross connection protection is required.

- A procedure or system for testing all backflow prevention assemblies upon installation.

- An adequate record keeping system.

- Customer information and public education regarding the cross-connection control program.

CITY OF KALAMA CROSS-CONNECTION CONTROL PROGRAM

In May 1987, the City passed Ordinance No. 738 in order to protect the water supply from contamination by prohibiting cross connections, requiring backflow prevention devices, declaring prohibited cross connections to be unlawful, and adopting State Standards for cross-connection control regulation.

The City currently employs one person certified as cross-connection control specialists. The City keeps a database of cross-connection control devices and inspections on file in their computer network. The following records are included in these files:

- Date of inspection
- Results of inspection
- Recommended protection
- List of approved assemblies
- Test and maintenance reports
- List of certified testers
- Customer account number, billing address, service address, phone numbers, device history, and maintenance records

The City's cross-connection control program was implemented by identifying a priority list of services considered potentially hazardous to the water system in the event of backsiphonage within the distribution system. An inspection of the premises was conducted by City personnel to evaluate the existing hazard. The inspection established the level of potential hazard and the protection required. Recommendations were then prepared by the City as to what type of cross-connection control devices, if any, were required. A copy of the letter, together with a time frame for compliance, was sent to the customer. A City staff member resurveyed premises at the end of the scheduled time frame to verify compliance.

New and existing cross-connection control devices are catalogued and checked initially by City personnel or a representative of the City. An identification tag is attached to the device. It is the responsibility of the customer to ensure proper testing of the devices annually thereafter. Annual testing for the devices are performed by several Contractors and the results are recorded and included in the City's database. A condition for new service includes an evaluation by the Public Works staff of the need for a backflow device.

A copy of the City's cross-connection control program and Ordinance No. 738 is provided as Appendix E.

APPENDIX A

MAINTENANCE REPORTING FORMS

City of Kalama
PUBLIC WORKS DEPARTMENT
P.O. BOX 1007
Kalama, Washington 98625
(360) 673-3706 - (360) 673-4561
Fax (360) 673-4560

WORK ORDER

0531

Date Received: _____

Date Assigned: _____

Assigned To: _____

Customer Name _____

Address _____

Phone _____ Work Phone _____

REQUEST _____

DESCRIPTION OF WORK PERFORMED _____

☐ INCOMPLETE ☐ COMPLETE DATE COMPLETED _____

Employee Signature _____

CITY OF KALAMA

WATER SYSTEM
CUSTOMER COMPLAINT RECORD

Date of Complaint: _____

Time of Complaint: _____

Via:

Phone ☐

Mail ☐

Fax ☐

In-Person ☐

Other _____

Customer Name: _____

Customer Address: _____

_____

Customer Phone Number: _____

Nature of Complaint:

Pressure ☐

Taste ☐

Odor ☐

Color ☐

Supply ☐

Other _____

Complaint: _____

_____

Public Works Initial Response to Customer: _____

_____

Public Works Personnel Recording Complaint: _____

Action Taken to Respond to Complaint: _____

_____

_____

STORAGE INSPECTION REPORT

Elevated Tank/Reservoir Name or Location _____

		YES	NO	N/A
1.	Capacity: _____ Gallons			
2.	Ventilation provided			
3.	Ventilation screen ok?			
4.	Tank outlet through bottom			
5.	Tank inlet and outlet insulated			
6.	Overflow pipe flushed			
7.	Angle flap valve screen on overflow pipe ok?			
8.	Tank drain operated and flushed			
9.	Tank drain separate from inlet and outlet piping			
10.	Screen at discharge end of drain pipe ok?			
11.	Manhole cover			
	a. Lockable			
	b. Watertight			
	c. Overhanging			
12.	Exterior ladder(s) usable and access controlled			
13.	Interior ladder			
	a. Provided			
	b. Usable			
14.	Roof watertight			
15.	Steel tanks			
	a. Interior paint adequate			
	b. Exterior paint adequate			
16.	Liquid level controls checked			
17.	Low and high level alarm checked			
18.	Recent trespass or vandalism observed			
19.	Does drain/overflow discharge to storm system?			
20.	Does drain/overflow discharge to sewer?			
21.	Does drain/overflow discharge adequately?			

Other possible source of contamination: _____

_____

Improvements needed: _____

_____

Remarks: _____

_____

VALVE MAINTENANCE / INSPECTION REPORT

Valve #_____, Valve Size _____, Section _____/_____/4, Map #_____

Location:

Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location: Checked OK _____ or measured as follows:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Found: _____, # of turns: _____, Left: _____

Packing: OK _____, Leaking: _____

Stem: OK _____, Bent / Broken: _____

Nut: OK _____, Missing / Damaged: _____

Gears: OK _____, Faulty: _____

Lid: OK _____, Missing / Broken: _____, Replaced _____

Box: OK _____, Cold mixed *Yes / No* needed? *Yes / No*

Buried *Yes / No* _____, Protruding *Yes / No* _____"

Too Close to Operating Nut *Yes / No*

Other Problems / Work Needed: _____

_____

_____

Work / Repairs Completed:

_____ By: _____ Date ____/____/____

_____ By: _____ Date ____/____/____

_____ By: _____ Date ____/____/____

Inspection/Maintenance Completed by: _____ Date _____/_____/_____

Remarks on back of page _____ Yes _____ No

VALVE REPAIR REPORT

Valve #_____ Valve Size _____ Section _____ _____/4 Map #_____

Connecting Pipe #_____ to Pipe/Node #_____, Installed_____/_____

Type _____, Connecting ends _____ x _____, Make _____

Opens _____, # of turns _____, Depth to operate nut _____

Normally _____, Valve box cold-mixed? _____ needed? _____

General Location:

Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Valve/Site Map:

Last corrected ____/____/____ dBase enter ____/____/____ CAD Map ____/____/____

Remarks on back of page _____ Yes _____ No

HYDRANTS MAINTENANCE / INSPECTION REPORT

Hydrant #_____, Valve Size _____, Section _____/_____/4, Map #_____

Location:

Principle St:_____ _____ ft. _____ of center line

Intersecting St:_____ _____ ft. _____ of center line

Specific Location: Checked OK _____ or measured as follows:

_____ ft. _____ of _____

_____ ft. _____ of _____

_____ ft. _____ of _____

Caps Missing: _____, Replaced: _____, Greased:_____

Chains Missing: _____, Replaced: _____, Freed: _____

Paint: OK _____, Repaint: _____

Oper. Nut: OK _____, Greased: _____ Replaced: _____

Nozzles: OK _____, Caulked: _____ Replaced: _____

Valve & Seat: OK _____, Replaced: _____

Packing: OK _____, Tightened: _____ Replaced: _____

Drainage: OK _____, Corrected: _____

Flushed: _____ Minutes _____ Nozzle Open

Pressure: Static: _____ Residual: _____ Flow _____ gpm

Branch Valve: Condition: _____

Other Problems / Work Needed: _____

_____

_____

Work / Repairs Completed:

_____ By: _____ Date ____/____/____

_____ By: _____ Date ____/____/____

_____ By: _____ Date ____/____/____

Inspection/Maintenance Completed by: _____ Date _____/_____/_____

Remarks on back of page _____ Yes _____ No

MAIN REPAIR REPORT

Main #_____ Main Size _____ Section _____ _____/4 Map #_____

Node #_____ (Valve/Main #_____) to Node #_____ (Valve/Main #_____)

Date Installed _____/_____ Type _____ Manufacturer _____

Length of Main _____ ft. Number of Connections on Main _____

Valves to Isolate _____, _____, _____, _____, _____, _____, _____

Location:

_____ side of _____

From _____ St. to _____

Other Location Information:

_____

_____

Specific Location:

_____ ft. _____ of _____

_____ ft. _____ of _____

Site Map:

Last corrected _____/_____/_____ dBase enter _____/_____/_____ Map _____/_____/_____

Remarks on back of page _____ Yes _____ No

CITY OF KALAMA DWTF
SAMPLE LOG

Week Beginning: _____

	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	
	Measured	Indicated	Measured	Indicated	Measured	Indicated	Measured	Indicated	Measured	Indicated	Measured	Indicated	Measured	Indicated
Finished Water Fluoride														
Filtered Water Chlorine														
Combined Turbidity														
Filter #1 Turbidity														
Filter #2 Turbidity														
Raw Water Turbidity														
Finished Water pH														
Finished Water Temp.														
Finished Water Chlorine														
Raw Water pH														
Filtered Water pH														
Raw Water Iron														
Finished Water Iron														

Filtered Fluoride							
Bodyfeed added							
Precoat added							
Fluoride added							

CITY OF KALALMA DWTF
DAILY INSPECTION CHECKLIST

DATE: _____

BY: _____

Component	Daily Inspection Requirements	S	M	T	W	T	F	S	Comment
		Checked							
Instrumentation and Control	1. Check the position of control switches and status lights on the Plant Control Panel (PCP).								
	2. Review the displays of each instrument in the work room to verify that it is within proper limits.								
	3. Complete daily Sample Log in Work Room.								
	4. Review the HMI screens and alarm log.								
	5. Complete Department of Health Daily Reports.								
DE Filters	1. Check for proper operation and vibration of filter pumps.								
	2. Check for leaks in valves and piping.								
	3. Check position of control switches and status lights on the each Filter System Control Panel (FSCP).								
	4. Check filter vacuum level on vacuum gauge. If higher than 10 psi, initiate filter wash procedure.								
	5. Observe filter cake on each filter. If the filter cake is orange in color, increase DE body feed rate.								
Finished Water Pumps	1. Check for proper operation and vibration of filter pumps.								
	2. Check for leaks in valves and piping.								
	3. Check ammeters, position of control switches, and status lights on the Finished Water Pump Control Panel (FWCP).								
	4. Check status of Port Zone flow and pressure on FWPC.								

Component	Daily Inspection Requirements	Checked							Comments
Sodium Hypochlorite Feed System	1. Check for proper operation of sodium hypochlorite pumps.								
	2. Check for leaks in valves and piping.								
	3. Check sodium hypochlorite tank level. If less than 2 feet remains in the tank, arrange for delivery of another load.								
Sodium Hydroxide Feed System	1. Check for proper operation of sodium hydroxide pumps.								
	2. Check for leaks in valves and piping.								
	3. Check sodium hydroxide tank level. If less than 2 feet remains in the tank, arrange for delivery of another load.								
Sodium Fluoride Feed System	1. Check for proper operation of sodium fluoride pumps.								
	2. Check for leaks in valves and piping.								
	3. Check sodium fluoride tank level. If the sodium fluoride is below the fill level, add additional sodium fluoride.								
DE Body Feed System	1. Check for proper operation of the DE body feed pumps.								
	2. Check for leaks in valves and piping.								
	3. Check position of control switches, and status lights on the DE Feed Control Panel (DECP).								
	4. Check the DE Body Feed tank level, If less than 1 foot remains, prepare another batch of DE body feed.								
Raw Water Pumps	1. Check for proper operation and vibration of raw water pumps.								
	2. Check for leaks in valves and piping.								
	3. Check ammeters, position of control switches, and status lights on the Raney Well Control Panel (RWCP).								
Backwash Basin	1. Check water level and solids level in basin. If the solids level is up to the bottom flange of the telescoping valve in either chamber arrange for solids removal from the basin.								

2004 **Water Treatment Plant Monthly Report**

DATE	[illegible] treated in 1000 gals	Total Hours of Operation		Filter Washwater Total, in 1000 gals	Chemicals used					dity NTU Raw	Finished Turbidity 4 Hour sample, NTU						Temp. C	pH		Iron mg/L	
		Filter 1	Filter 2		Pounds			Gallons			1st	2nd	3rd	4th	5th	6th	Fin	Raw	Fin	Raw	Fin
					DE Pre-coat	DE Body feed	Sodium Fluoride	4.1% Sodium Hypochlorite	25% Sodium Hydroxide												
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
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WATER TREATMENT PLANT GENERAL PERMIT
MONTHLY MONITORING REPORT

GROUP 1 FACILITIES

NPDES Permit No:	WAG 64 1023	Report for Month of:	Jun-03
Facility Name:	City of Kalama DWTF	County:	Cowlitz
Receiving Water:	Kalama River		
Contact Name & Phone:	Carl McCrary (360) 673-3706		

The monitoring period is from the first day of each month through the last day of each month (beginning with the coverage date of the permit) and the monitoring report must be received by Ecology no later than the 15th of the following month. Monitoring data must be reported on this form and submitted every month.

Monthly Monitoring:

Parameter	Units	Limit (AVG)	Minimum	Average	Maximum	# Samples	Limit (MAX)
Settable Solids	ml/L	1avg	0.01	0.01	0.01	1	
Total Residual Chlorine	mg/L	0.3	0.03	0.04	0.05	1	
pH (within a range of 6-9)	SU	6 to 9	7.64	7.74	7.83	1	

Quarterly Monitoring: (Collect in March/June/September/December: report in April/July/October/January)

Parameter		Units	Average	Maximum	#Samples	
Peak Flow		cfs				
Total Flow		gpd				

Quarterly Monitoring: report in following month (September 2000/December 2000/March 2001/June 2001/September 2001 December 2001/March 2002/June 2002;)

Parameter		Units	Average	Maximum	#Samples	
Turbidity		NTU				
Dissolved Oxygen		mg/L				
Temperature		oC				

Yearly Monitoring: report in following month (June 2001/ June 2002)

Parameter	Units	Measurement
Trihalomethane (total)	ug/L	*NOT REQUIRED*
trichloromethane	ug/L	*NOT REQUIRED*
dichlorobromomethane	ug/L	*NOT REQUIRED*
chlorodibromomethane	ug/L	*NOT REQUIRED*

*** NOT DETECTABLE**

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHERED AND EVALUATED THE INFORMATION SUBMITTED BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINES AND OR IMPRISONMENT

NAME/TITLE PRINCIPLE EXECUTIVE | NAME PRINCIPAL EXECUTIVE OFFICE | DATE:

Carl McCrary

TYYPED OR PRINTED | SIGNATURE | YEAR MO DAY

APPENDIX B

EXCERPTS FROM CITY SAFETY PROGRAM

City of Kalama

Incorporated 1890

Public Works
6300 Old Pacific Hwy. S.
P.O. Box 1007
Kalama, WA 98625
(360) 673-3706
FAX: (360) 673-3707

City Hall
320 N. First
P.O. Box 1007
Kalama, WA 98625
(360) 673-4561
FAX: (360) 673-4560
cityofkalama@kalama.com

Police
385 N. First
P.O. Box 297
Kalama, WA 98625
(360) 673-2165
FAX: (360) 673-2144

TO: ALL PUBLIC WORKS EMPLOYEES

DATE: MARCH 14, 1989 (Revised 08/09/2006)

FROM: CARL M. MCCRARY

SUBJECT: STANDARD EXCAVATION SAFETY PROCEDURES TO BE FOLLOWED AT ALL TIMES.

1. Inspect the work site before excavation for traffic flows, pedestrians, driveway blockage or any other hazards that may exist.
2. Notify the Utility Notification Center 48 hours before you dig to have underground utilities located.
3. Place proper caution signs, cones, flags, flagmen, etc. wherever necessary to protect traffic, pedestrians, and workers.
4. Hard hats will be worn on job site at all times.
5. All trenches over four feet deep will be shored, except when the one to one formula is observed on the slope of the trench sides.
6. Excavated materials will not be piled closer than two feet from the edge of the trench.
7. Trucks hauling excavated material away shall not approach any closer to the edge of the trench than the trench depth. Example: 5' deep trench – trucks no closer than 5' to the trench edge.
8. W.I.S.H.A. standards will be followed on all excavations.
9. All excavations left unattended will be properly barricaded to protect the public.
10. Caution will be observed by all personnel to protect the safety of the public as well as the workers.
11. Any unsafe conditions observed by workers will be reported to the lead man at the job site – it is his responsibility to make sure conditions are safe.

City of Kalama

Incorporated 1890

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Police
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Kalama, WA 98625
(360) 673-2165
FAX: (360) 673-2144

TO: ALL PUBLIC WORKS EMPLOYEES

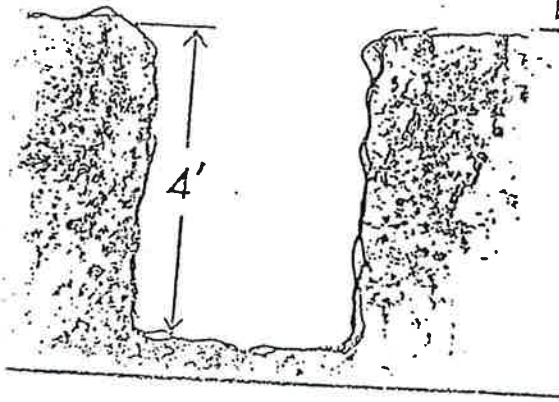
DATE: MARCH 14, 1989 (Revised 08/09/2006)

FROM: CARL M. MCCRARY

SUBJECT: STANDARD OPERATING PROCEDURES – WORKING IN STREET RIGHT OF WAYS

1. Bright colored clothing (rain gear) or a safety vest will be worn at all times.
2. The hard hat S.O.P. will be followed.
3. Proper warning signs will be position properly and used when necessary.
4. Flashers and beacons will be used at all times on all vehicles.
5. All W.I.S.H.A. regulations will be followed.
6. The lead worker (senior) on the job site is responsible to see that employees following these standard operating procedures.

KNOW THESE SHORING SPECS*



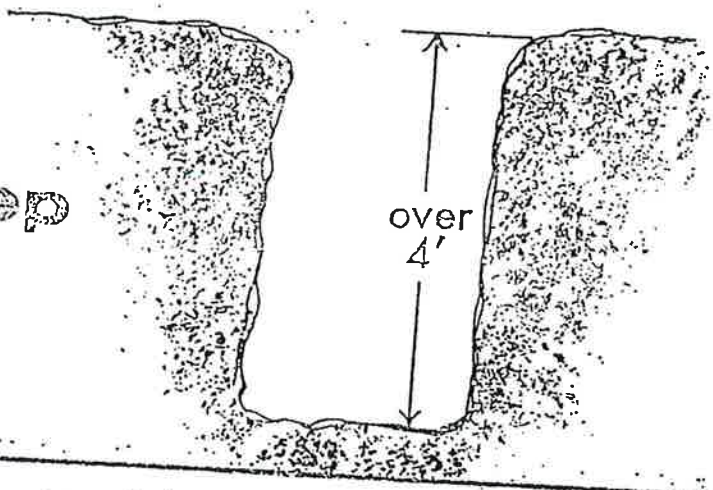
NO SHORING REQUIRED

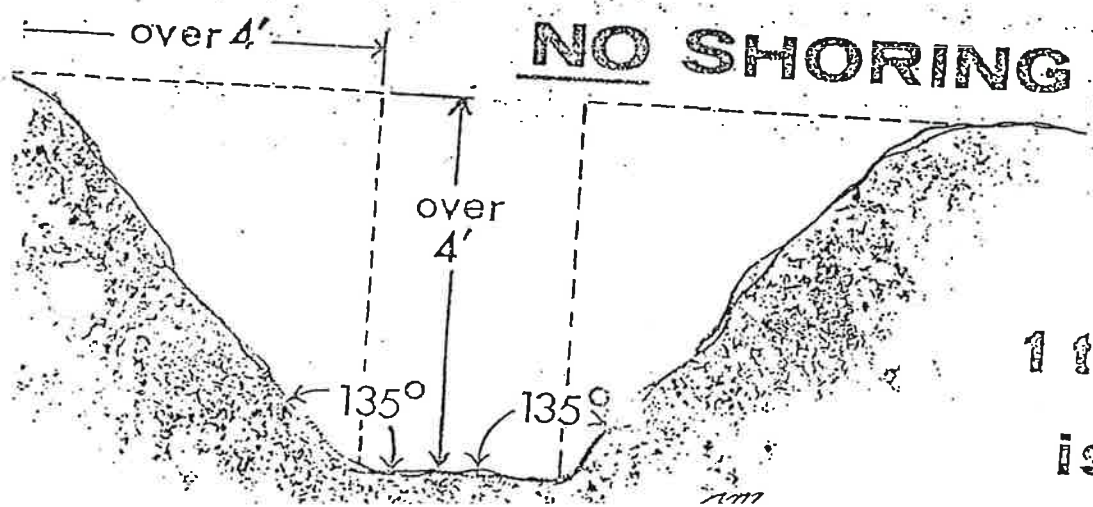
in excavations down to 4ft.

SHORING REQUIRED

in excavations more than 4ft. deep

(except in solid rock and compact shale)





NO SHORING REQUIRED

when 1 to 1 formula is observed

WISHA Regional Directive

W.R.D. 86-4

SUBJECT: Head Protection.

1. Purpose: This instruction clarifies and interprets WAC 296-155-205 as it relates to the requirements for head protection.

2. Background: There have been several requests to clarify the application of WAC 296-155-205 pertaining to head protection and when it shall be worn.

3. Application: Each employee on any construction site must be provided an individual hard hat which meets all requirements of WAC 296-155-205(1)(a) and (b). Each employee shall wear a hard hat whenever there is a potential exposure to danger of flying or falling objects to employees working in or occupying the area.

   All employees must have their individual hard hats on site and readily available at all times. An individual hard hat may be removed whenever there is no potential exposure. Examples may include but are not limited to:

   a. Equipment Operators when within an enclosed operator's cab;

   b. Employees within lunchrooms, offices, or other structures when there is no potential for falling or flying objects.

4. Action: WISHA Compliance Officers shall ensure that the interpretive guidelines given in this directive under the application section are adhered to when inspecting construction sites.

   The Department will not cite any employer for failure of an employee to wear a hard hat when the employee already has a readily available approved hard hat and no potential exposure to danger of falling or flying objects.

5. Effective Date: This WISHA Regional Directive shall become effective on June 9, 1986 and shall remain in effect until cancelled or superseded.

G. David Hutchins
Assistant Director
Industrial Safety and Health

WISHA Regional Directive

W.R.D. 86-5

SUBJECT: Foot Protection.

1. Purpose: To provide, clarify and interpret WAC 296-155-212 as it relates to requirements for foot protection to avoid and prevent foot injuries.

2. Background: There have been several requests to clarify the application of WAC 296-155-212 pertaining to foot protection and when it shall be worn.

3. Application: Substantial footwear, made of leather or other equally firm material, shall be worn by employees in any occupation in which there is a danger of injury to the feet through falling or moving objects, or from burning, scalding, cutting, penetration, or like hazards.

   Recently, new types of safety footwear have entered the market. There are models made of leather or other firm materials that have soft athletic-type soles which would protect employees from foot injuries. These types of shoes also provide soft and firm footing while working under specialty requirements or with specialty material. Footwear of this type may be purchased from safety and supply outlets.

   WAC 296-155-212(3) prohibits traditional tennis shoes. Shoes with canvas tops are not to be used. Soft or athletic-type soles with uppers of leather or other substantial material may be used where firm footing is desired and where there is minimal danger of injury to feet from falling or moving objects.

4. Action: WISHA compliance officers shall ensure that interpretive guidelines given this directive under the application section are adhered to when inspecting construction sites.

5. Effective Date: This WISHA Regional Directive shall become effective on June 9, 1986 and shall remain in effect until cancelled or superseded.

G. David Hutchins
Assistant Director
Industrial Safety and Health

WISHA Regional Directive

W.R.D. 86-3

SUBJECT: High Visibility Garments for Flaggers

1. Purpose: To provide information and guidance on the application of WAC 296-155-305(1)(d), high visibility garments for flaggers.

2. Background: WAC 296-155-305(1)(d) has been amended and now requires that a flagger shall wear "a yellow protective helmet". Subsequent to this change we have had many inquiries as to its applicability.

3. Application: Yellow is specified as the color for helmets; the issue is clearly one of high visibility. Many users have purchased helmets of other colors; some are reflectorized. The Department is not in receipt of a complaint that any of these other colors provide less visibility than the specified yellow color. Furthermore, the iridescent or reflectorized hard hats now available in several colors do provide "high visibility" in both day and night applications.

4. Action: The Department will not cite employers for flaggers wearing helmets other than yellow, provided that the high visibility criteria is maintained.

5. Effective Date: This WISHA Regional Directive shall become effective on June 9, 1986 and shall remain in effect until cancelled or superseded.

G. David Hutchins
Assistant Director
Industrial Safety and Health

INTRODUCTION

The information in this booklet was developed from the Manual on Uniform Traffic Control Devices (MUTCD) and the Washington State Safety Standards for Construction Work, WAC 295-155-305. These standards apply to all roads, streets and highways within Washington State.

This booklet is designed to help flaggers understand their duties. The principles are directed to the safe and effective movement of traffic through construction or maintenance zones, the safety of the work force performing these operations and the minimum delay to the motorist.

The high density of traffic, the speed at which it moves, and the changing work situations make the flagger's job very difficult and hazardous.

THE FLAGGER

Flaggers are responsible for the safety of the workers, motorists and themselves. Their job of controlling traffic can be one of the most important parts of an operation. Because of this tremendous responsibility and their contact with the public it is essential that only well qualified personnel be selected for this position.

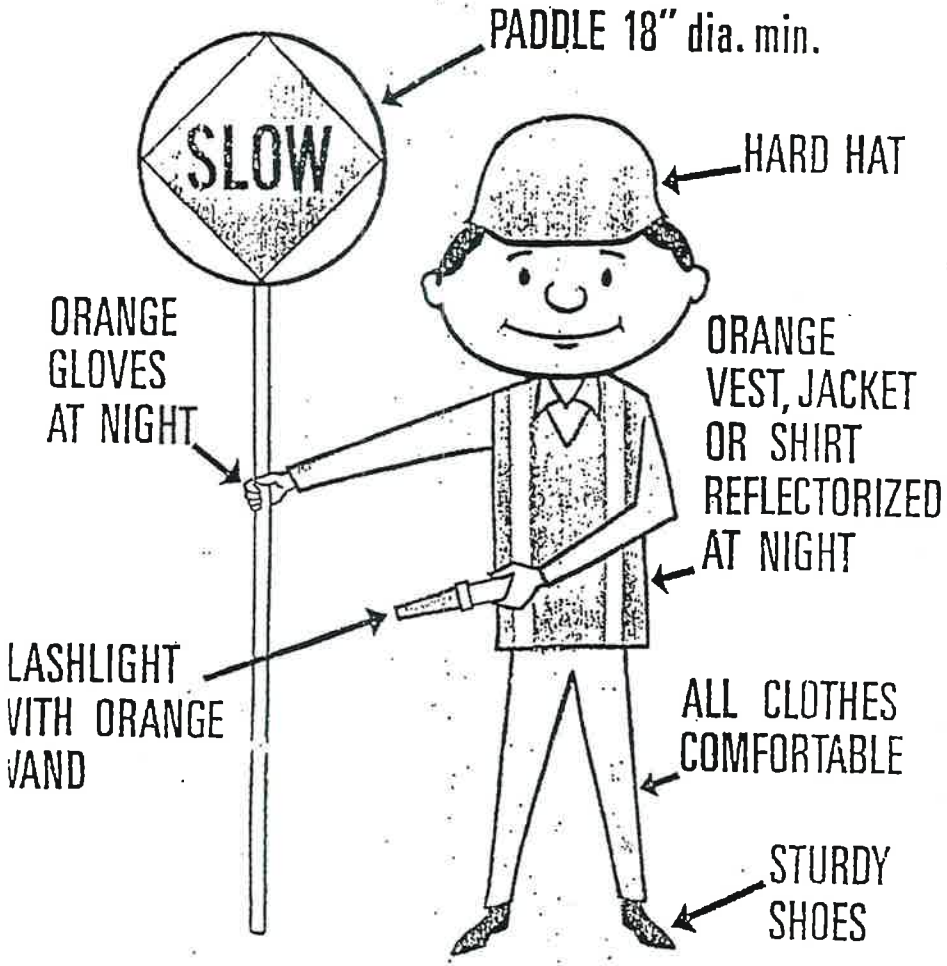
A flagger should possess the following minimum qualifications:

1. Average intelligence.
2. Good physical condition.
3. Mental alertness.
4. A courteous but firm attitude.
5. Neat appearance.
6. A sense of responsibility for the safety of the public, crew and themselves.

Remember the flagger has three basic functions:

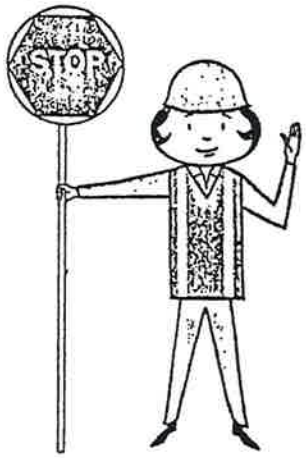
1. To guide traffic safely through the work area.
2. To protect the lives of fellow workers.
3. To be courteous at all times.

CLOTHING AND EQUIPMENT



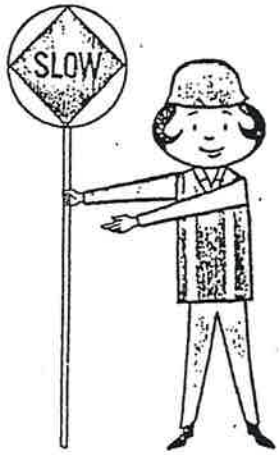
During warm weather flaggers should always wear shirts. Abbreviated clothing should never be worn.

BASIC SIGNALS



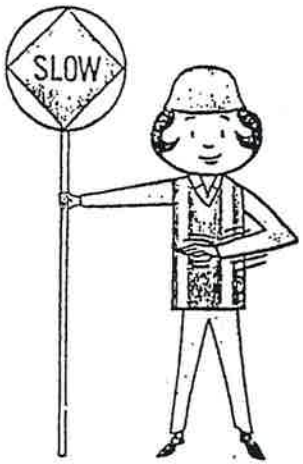
Stopping traffic:

1. Face the traffic.
2. Display the stop side of the paddle.
3. Extend the free arm with the palm raised toward approaching traffic.



Moving traffic:

1. Turn the paddle to the slow side.
2. Motion traffic through by slowly swinging your free arm across the front of the body at shoulder height.



Slowing traffic:

1. Display the slow side of the paddle.
2. Raise and lower your free arm at the elbow with palm down.

When traffic control is not necessary flaggers should position themselves on the shoulder of the road with the paddle turned parallel to the traffic flow.

The paddle is held in a stationary position away from the body with the arm extended horizontally. Keep the signals uniform and concise and look directly at the motorists. A sloppy signal could be confusing.

PERTINENT INFORMATION

Two Flaggers:

If two flaggers are used they must coordinate their efforts. One of them must be designated as the lead flagger. The other flagger will take signals and work off the leader's paddle. The designation of lead flagger will depend on the traffic flow, lane obstruction, type of weather and topography.

Three Flaggers:

When three flaggers are needed the lead flagger will be the person positioned in the middle and must be clearly visible to the other two flaggers. The lead flagger must have a good vantage point to observe the traffic and control its flow. The other two flaggers must display the same side of the paddle that they see the lead flagger using.

Radio Flagging:

Radio contact is one method that may be used when two flaggers do not have visual contact with each other, but, remember communication can be lost if radios fail or batteries wear out. If this should happen, the flagger must stop the traffic until the problem is solved.

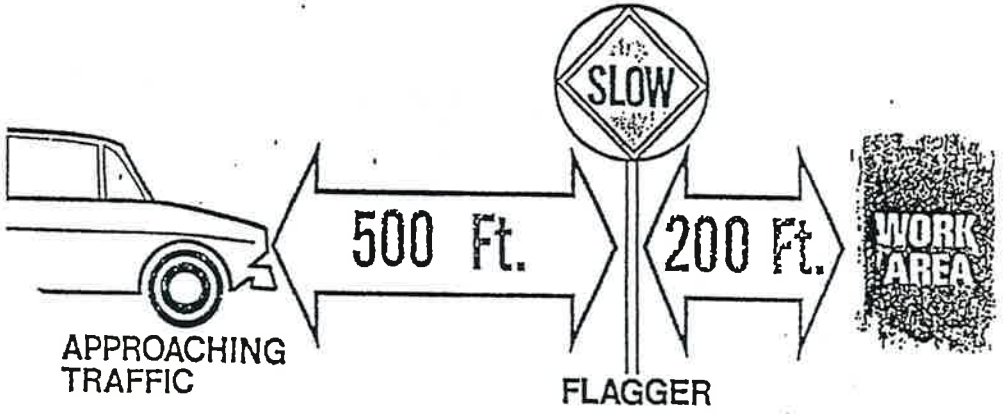
If you are ever in doubt concerning radio contact, stop the traffic.

Pilot Car:

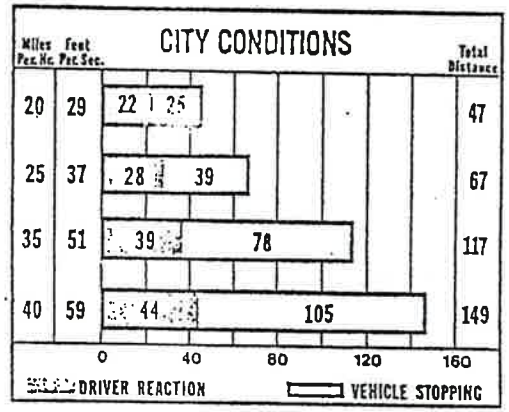
Pilot car use is the most effective where the route is particularly hazardous, so complicated or frequently altered that adequate signing is prevented. The pilot car is used to guide a line of vehicles through the construction or detour. This operation must be coordinated with the flagging operations. The vehicle selected for the pilot car must have the sign "Pilot Car" mounted on the rear.

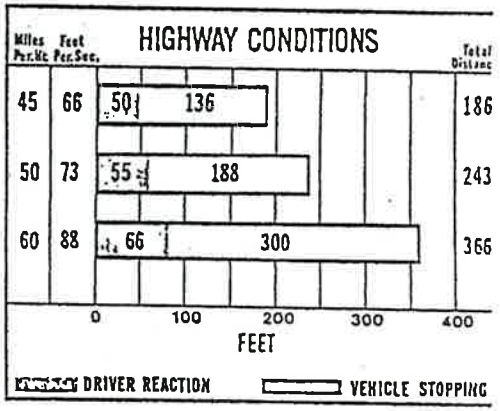
Baton System:

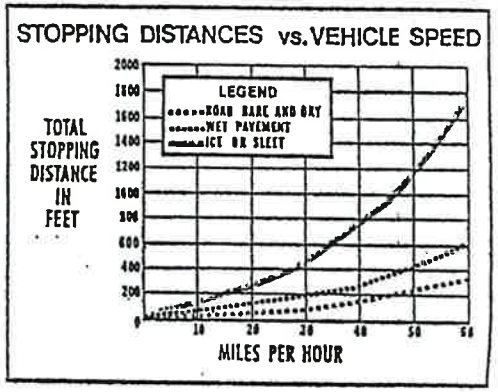
The baton system is effective when the route past the work area is well defined, non-hazardous and confined to a short stretch of road. The driver of the last vehicle is given a flag or baton and instructed to deliver it to the flagger at the other end. Upon receiving the baton the flagger knows it is safe to allow traffic to move in the other direction.



Placement of warning signs is related to approach speed, weather and physical condition of the site. The "Flagger Ahead" sign should be 1,000 feet in advance of the flagger. The flagger should be stationed 200 feet in front of the work site. In urban areas the distance will be less, depending on traffic congestion, sideroads and other conditions. A warning signal should be established between the crew and flagger for use in emergency. For instance the word "Traffic" may be shouted loudly.







RULES OF CONDUCT

1. Flaggers should be positioned on the shoulder of the road facing the traffic. At times it may be necessary to stand on the opposite side of the road to be effective. Never stand in the traffic lane.
2. Plan an escape route in case of an emergency.
3. Be clearly visible to approaching traffic at all times.
4. If possible, never stand in the shade or flag from inside a vehicle.
5. Stand alone, never permit a group of workers to congregate around you.
6. Choose a flagging position that will maintain color contrast between you, the background and the equipment.
7. Be alert and ready to respond to any emergency.
8. Acquaint yourself with the activities of the operation and be able to answer questions the motorists may ask.
9. Record the license number and description of any vehicle whose driver disobeys your instructions and threatens the safety of the work area.
10. Establish a warning signal between the crew and flagger for an emergency.
11. Never strike a motorist's vehicle with the paddle or other device.
12. Don't involve yourself in unnecessary conversation with workers, pedestrians or motorists.
13. Don't lean, sit or lay on a vehicle.
14. Don't do other work or watch the operation in addition to flagging.
15. Don't step out into, or turn your back on, the traffic.
16. Never leave your position until relieved by a qualified flagger.
17. Never leave the "Flagger Ahead" sign up when the flagger is no longer needed.

SIGNS

THREE CATEGORIES

Signs used in construction or maintenance generally fall into three categories:

Regulatory:

Regulatory signs enforce legal obligations on traffic to obey their instructions. Therefore, it is essential that their use is authorized by a public body or official having jurisdiction.

Regulatory signs are generally rectangular and have black letters or symbols on white background with a black border. If you must cover up or remove a Regulatory sign make certain the authority that placed it there is contacted.

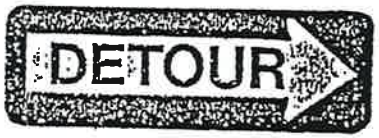
Warning:

Warning signs are used to notify drivers of specific hazards which they may encounter. These signs are generally diamond shaped and have black lettering or symbols on an orange background with a black border.

Guide:

Guidance or information signs are used to mark routes and tell of any temporary changes. They are used to show direction and name streets when used in conjunction with detour routing. They are also used to provide special information relating to the work being done.

These signs have black lettering on an orange background. Shown here are some of the more commonly used informational signs.

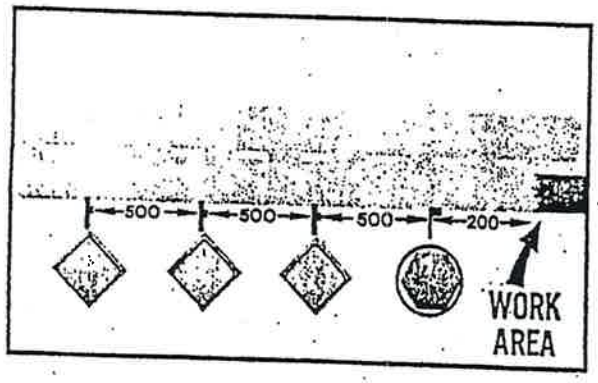


SIGN PLACEMENT

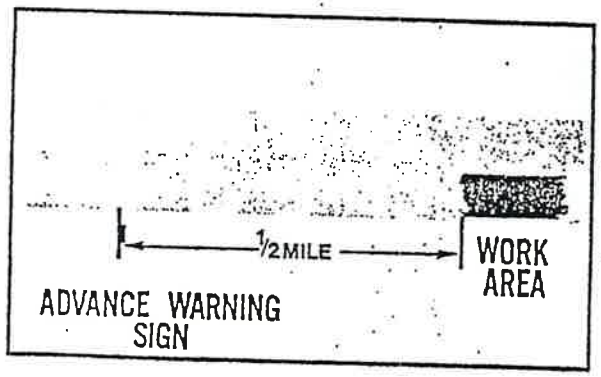
ırning signs must be placed to convey their messages effectively
1 give the driver adequate time to respond.

a general rule they are placed at right angles on the right-hand
e of the road.

en necessary warning signs shall be placed opposite each other
both sides of the road.

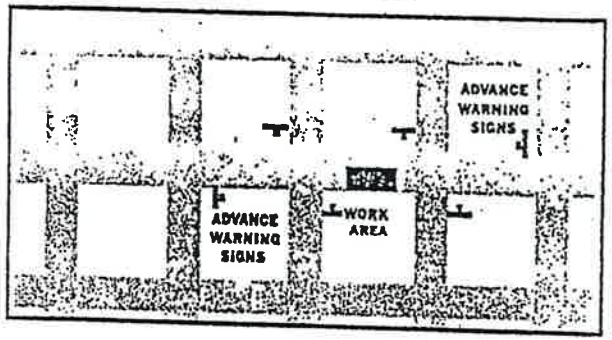


the open highway the advance warning sign should be placed
roximately 1,500 feet in advance of the condition to which they
calling attention. Additional warning signs should be placed at
foot intervals in the direction of the work area.

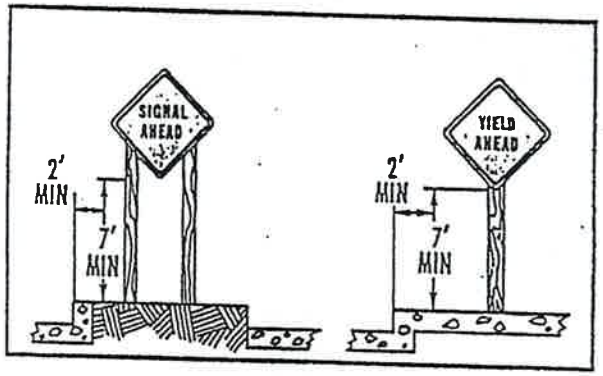


way signs should be placed at least one-half mile in advance of
work area. If the flagging situation is dangerous, additional
ing signs should be placed.

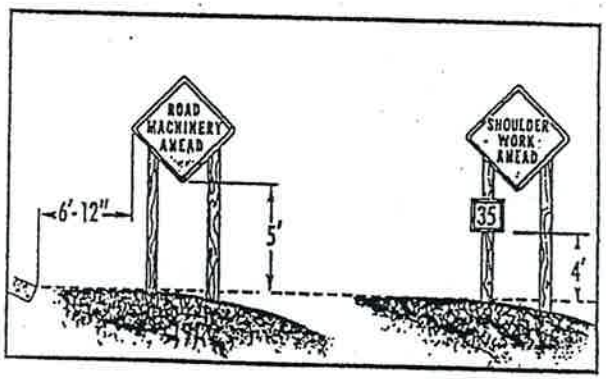
SIGN PLACEMENT



In the city the situation is more restrictive, so the warning signs should be placed out as far as possible.

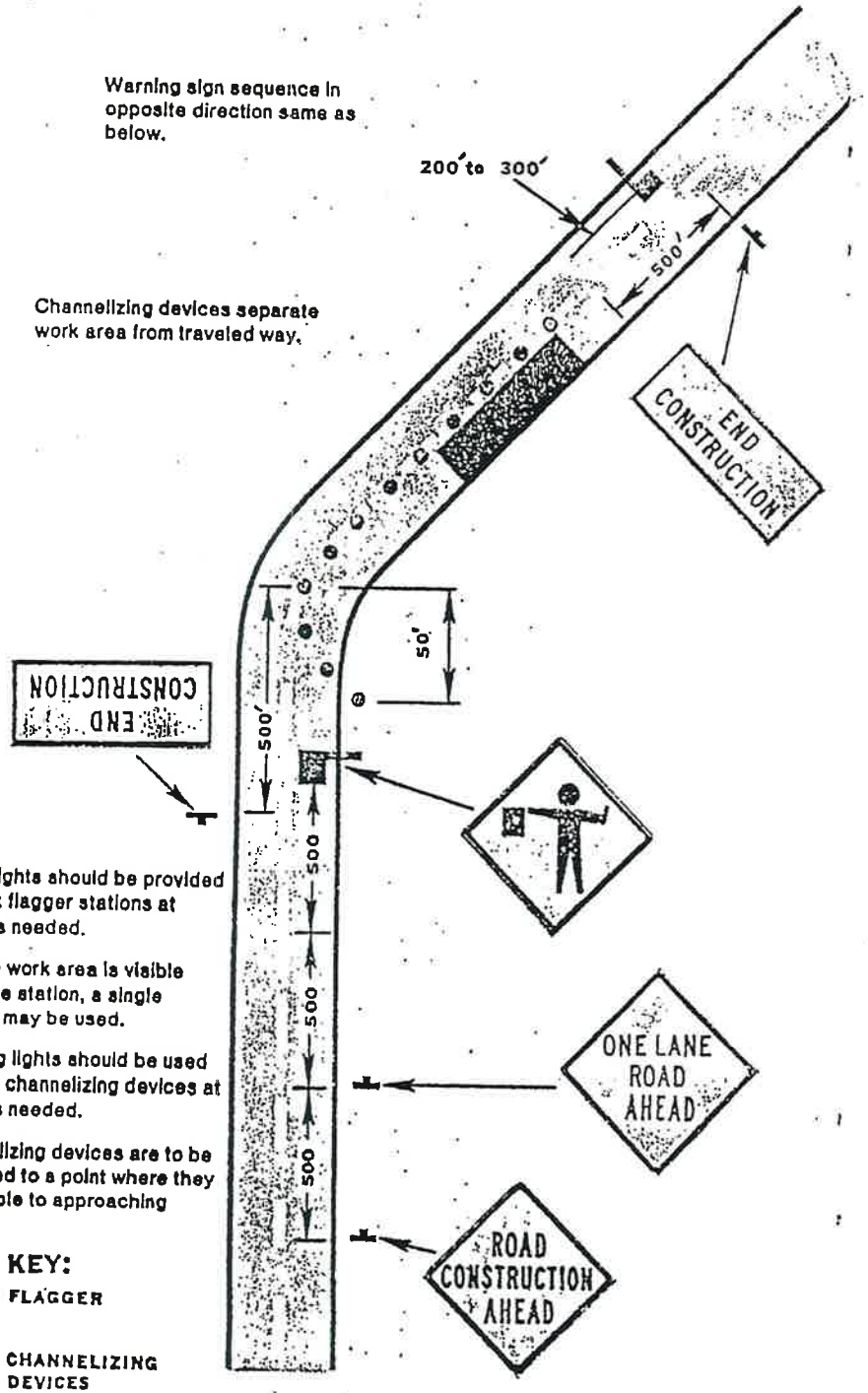


Signs in an urban district or located on a curb must be a minimum of two feet from the edge of the road surface and a minimum of 7 feet above the shoulder.



Signs may be mounted in several ways. In a rural district, road signs may be attached to a post or posts, they must be on the shoulder, 6 to 12 feet from the road with the bottom of the sign a minimum of 5 feet above the road grade. (Never attach a sign to a utility pole.)

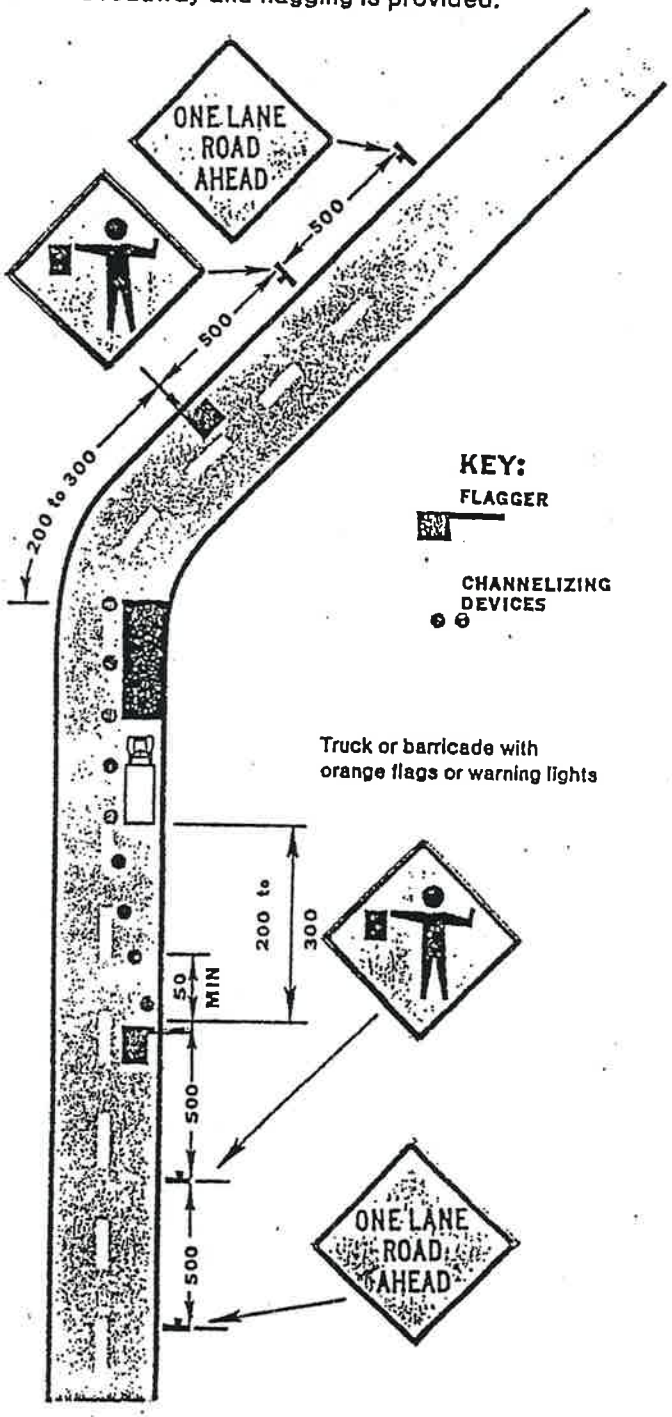
Typical applications of traffic control devices on 2-lane highway where one lane is closed and flagging is provided.



Note:

1. Flood lights should be provided to mark flagger stations at night as needed.
2. If entire work area is visible from one station, a single flagger may be used.
3. Warning lights should be used to mark channelizing devices at night as needed.
4. Channelizing devices are to be extended to a point where they are visible to approaching traffic.

Typical application — daytime maintenance operations of short duration on a 2-lane roadway and flagging is provided.



SIGN PLACEMENT

(from MUTCD)

Signs shall be placed in positions where they will convey their messages most effectively and placement must therefore be accommodated to highway design and alignment. Signs shall be placed so that the driver will have adequate time for response.

As a general rule signs shall be located on the right-hand side of the street or roadway. Where special emphasis is deemed necessary, dual installations may be made which consist of duplicate signs opposite each other on the left and right sides of the road.

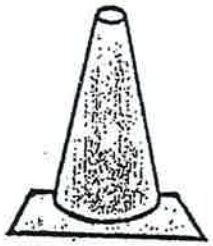
Within a construction or maintenance zone, however, it is often necessary and/or desirable to erect signs on portable supports placed within the roadway itself. It is also permissible to mount appropriate signs on barricades.

Standards for height and lateral clearance of roadside signs are shown on page 11. Signs mounted on barricades, or temporary supports, may be at lower heights but the bottom of the sign shall not be less than one foot above the pavement elevation.

Where open highway conditions prevail on the approach to the work site, warning signs should be placed approximately 1,500 feet in advance of the condition to which they call attention.

Where a series of advance warning signs are used, the warning sign nearest the work site should be placed approximately 500 feet from the point of restriction with the additional signs at 500 and 1,000 foot intervals. On expressway and limited access facilities, the advance warning distance should be increased to one-half mile or more. On city streets, where more restrictive conditions prevail, signs may be spaced closer together. Typical sequences and spacings of advance warning signs are shown on pages 18, 19 and 20.

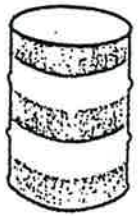
CHANNELIZING DEVICES



CONES

The most convenient and commonly used channeling device is the cone. They are generally orange in color and the minimum height shall be 18 inches.

Cones must be kept clean and bright. If they are used at night they must be reflectorized or equipped with a reflective stripe, collar, or lighting device.



DRUMS

Drums are another effective tool used for traffic control. They are an especially fast method of channeling and are used on long term construction projects. Appropriate advance warning signs shall be placed when drums are used.

Normally, drums are approximately 36 inches high and a minimum of 18 inches in diameter with at least two, four to eight inch, reflectorized, orange and white stripes around them. A single drum used at night should not only be reflectorized but have a flashing warning light. A steady burning light warns of a series of reflectorized drums. Drums should never be weighted beyond the point where they will damage a vehicle.

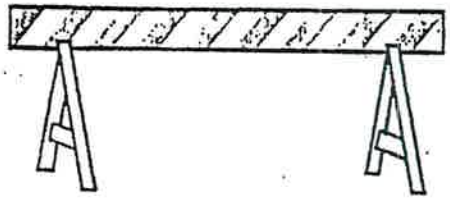
TUBULAR CONES

Tubular cones are another device used for channeling. They are frequently used in areas where traffic control must be adhered to on a continuing and long term basis. Posts are more difficult to set up and take down.

There are three types of barricades used to warn drivers of hazards near the roadway and guide them safely past. These barricades must conform to the specifications stated in the Manual on Uniform Traffic Control Devices. Barricade rails should be supported in a manner that will allow them to be seen and provide a stable support not easily blown over by wind or traffic.

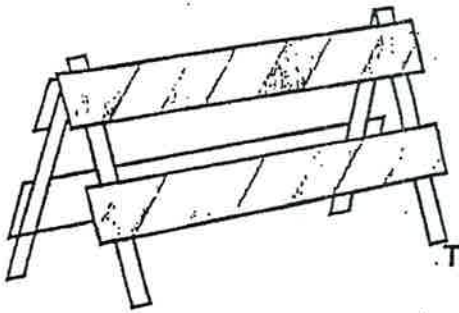
At night flashing warning lights are used with single barricades. Steady burning low intensity lights are used with a series of channeling barricades. These lights should be yellow.

TYPE I BARRICADE



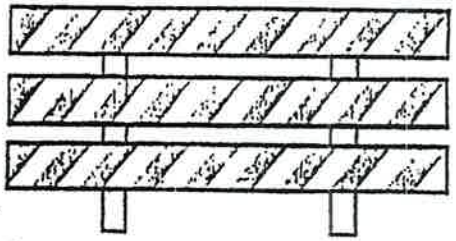
Type I barricades are normally used on conventional roads, urban streets, and arterials. They are usually six to eight feet in length. A convenient feature of Type I is the ability to set up and take down quickly.

TYPE II BARRICADE

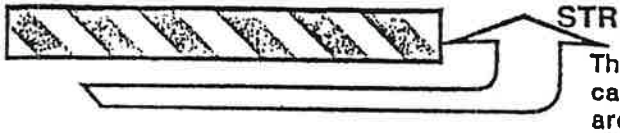


Type II barricades should be of an "A" frame structure with a hinge at the top to permit convenient folding and stacking. They have more reflective area and are intended for use on expressways, freeways and other high speed roads. This type is also normally used by utilities.

TYPE III BARRICADE



Type III barricades are used on construction projects when a road section is closed to traffic. They are a permanent structure as they will remain in an area for a relatively long time. Type III barricades should be at least five feet high and mounted on a base or post. They may extend completely across the roadway and shoulders, or curb to curb on construction projects.



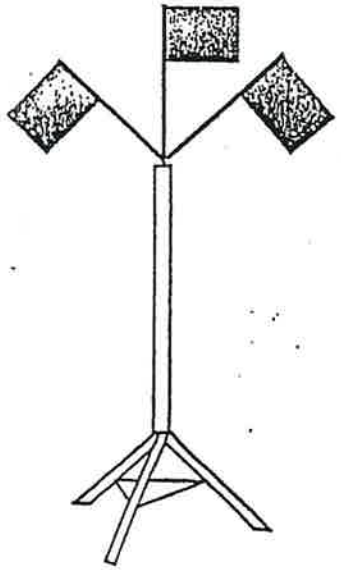
STRIPING

The markings on barricade rails and panels are alternate orange and white stripes sloping downward at a 45 degree angle. The downward slope of the stripes designates the direction the traffic is to move.

VERTICAL PANELS

Vertical panels are also used as channeling or warning devices. They may be used for traffic separation or shoulder barricading where space is at a minimum. They shall be reflectorized with orange and white stripes. The slope of the stripes directs the flow of traffic in the same manner as barricades. Back to back panels must be used for two directional traffic.

At night, individual flashing lights may be used on panels. A string of lights used for channeling must be steady burning.



HIGH LEVEL WARNING

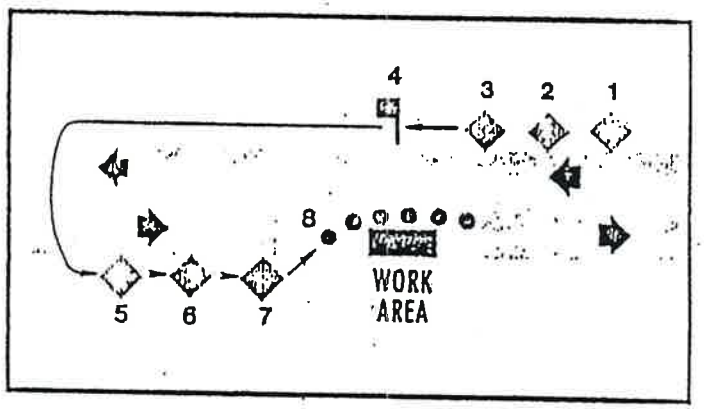
In urban dense traffic situations, three or more flags 16 inch square and orange in color are used to supplement traffic control as a high level warning device.

They can be seen over preceding vehicles and give advance warning to motorists.

These flags may be used with or without flashing warning lights.

Projects that commonly use this kind of traffic control are pavement repair, survey and utility and manhole work.

A SYSTEM FOR PLACEMENT OF TRAFFIC CONTROL DEVICES



During the placement of traffic control devices at the work site a dangerous condition exists for the workers and they must be protected.

A system, such as shown, for the placement of control devices should be established and followed. Each day, the last device set up should be the first taken down. Only signs that warn of hazards should remain when the job is not in progress.

Signs used at night must either reflect light or be illuminated.

At night, when visibility is sharply reduced, it may be necessary to supplement reflectorized signs and barriers for channeling with lighting devices. Three commonly used types of electric lights are: flood, flashing and low intensity yellow steady burning. Lighting units should be placed to illuminate the areas without glaring in the driver's eyes.

In order for a traffic control system to be effective certain practices should be observed. If the traffic control device is no longer needed it should be removed, covered or set aside.

Radio frequency signals may cause the premature firing of electric blasting caps. The public should be requested to turn off mobile radio transmitters. As a precautionary measure, a series of signs is recommended to remind operators of mobile radio equipment not to use their transmitters when in a blasting area.

CHANNELIZATION

Channeling provides maximum safety for the worker by the gradual change in the roadway. It reduces the width of the traffic lane on a controlled travel path past the work area.

Directing is the most important element of a traffic control system. It is used to alert drivers of hazards created by construction or maintenance activities.

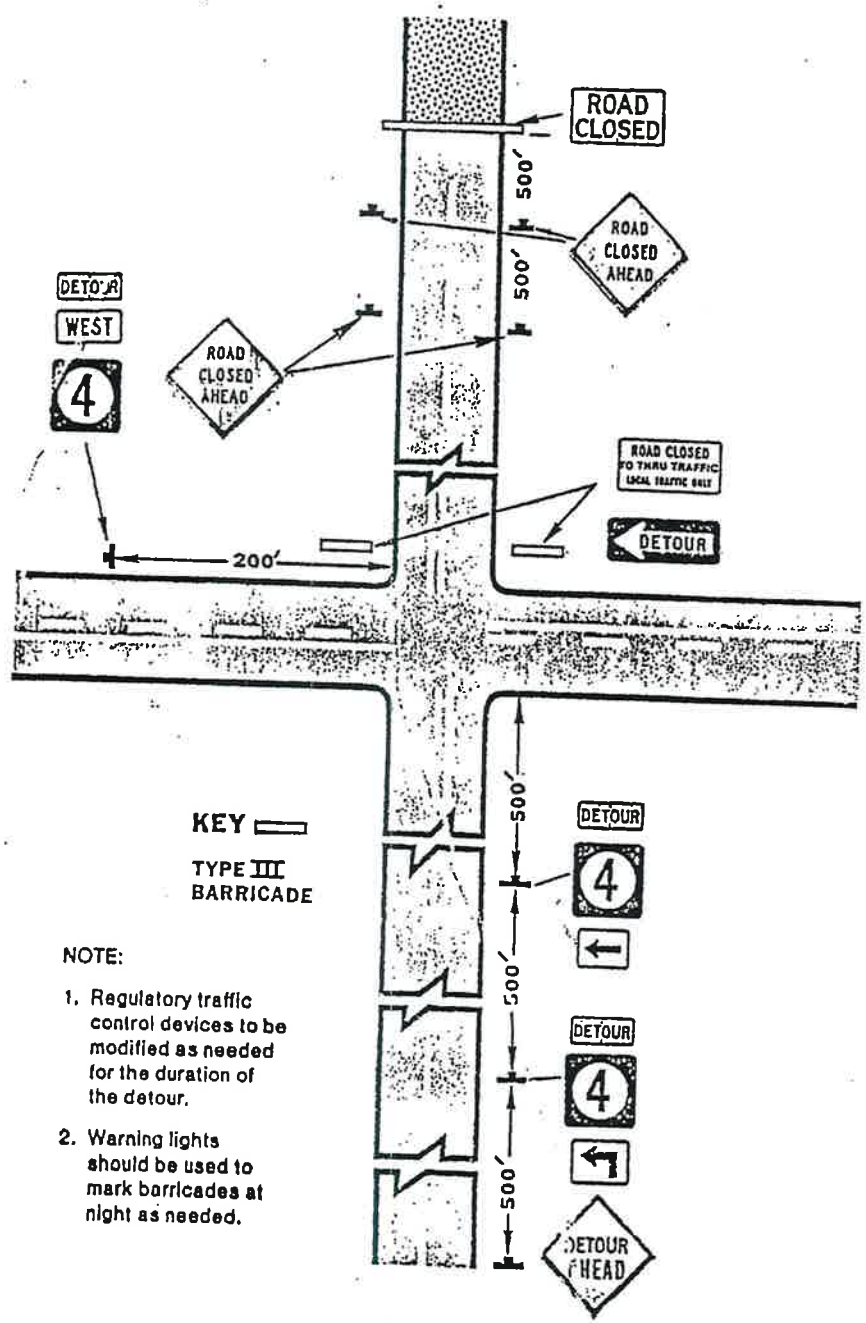
The minimum taper length for construction and maintenance of highways, expressways and roadways with a posted speed of 45 m.p.h. or greater should be: Speed times width of offset equals the taper length.

$$L = S \times W$$
$$660 = 12 \times 55$$

S = speed
W = width of offset
L = length of taper

The taper formula for speeds of 40 m.p.h. or less is found in Chapter VI of the MTCD.

Typical application — roadway closed beyond detour point.



NOTE:

1. Regulatory traffic control devices to be modified as needed for the duration of the detour.
2. Warning lights should be used to mark barricades at night as needed.

APPENDIX C

DEAD END WATER MAIN FLUSHING LOCATIONS

Kalama Public Works

Flush Dead-End Waterlines Monthly

1. 190 Cloverdale Road
2. 150 Modrow Road
3. 380 China Garden
4. Rainbow Park
5. O'Neil Road
6. Daves View @ Cloverdale and Marten's Bluff Road
7. 290 North 2nd Street
8. Tidewater Drive
9. Ring Road
10. 323 Taylor Road
11. 669 Modrow Road
12. North 5th Street and Council Crest
13. 474 Elevator Drive
14. 615 Geranium
15. Bannister Drive
16. 186 Nimmo Road
17. Parkland #9
18. Robb Road
19. 150 Woodale/Summit
20. Great Northern
21. Port Office
22. Gywnne Road
23. Jaeger Hawk
24. Norris Pit Road

APPENDIX D

CROSS-CONNECTION CONTROL ORDINANCE AND PROGRAM

ORDINANCE NO. 738

An Ordinance of the CITY OF KALAMA relating to the protection of the public water supply from actual or potential contamination,

The City Council of the CITY OF KALAMA do ordain as follows:

Section 1. Definitions. For the purpose of this Ordinance, certain words and terms shall be used, interpreted and defined as set forth in this section.

A. Backflow: The flow other than the intended direction of flow of any foreign liquids, gases or substances into the distribution system of the public drinking water system of KALAMA.

B. Backflow Prevention Device. A device manufactured and intended to counteract backpressure or prevent backsiphonage into the public drinking water supply system as approved by the Washington State Department of Social and Health Services for that purpose.

C. Contamination. The entry into, or the presence in, the public drinking water system of any substance or matter when present in drinking water above an acceptable level may adversely affect the health of the consumer and/or the aesthetic qualities of the water consumed.

D. Cross Connection. Any physical arrangement whereby public drinking water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device or vessel which contains or may ~~make~~ contain contaminated water, sewage or other waste or liquids of unknown or unsafe quality which may be

capable of imparting contamination to the public water supply system of KALAMA as a result of backflow.

Section 2. Cross Connections. No water service connection to any premises shall be installed or continued in use and no water service shall be provided by KALAMA unless KALAMA's water supply is protected by backflow prevention devices as may be required by this Ordinance or the Washington Administrative Code Chapter 248-54 or any superseding code section. The installation or maintenance of a cross connection which will endanger the water quality of the potable water supply of the CITY OF KALAMA shall be unlawful and is prohibited. Any such cross connection now existing or hereafter installed is hereby declared to be a public nuisance and the same shall be abated.

Section 3. The control or elimination of cross connections shall be in accordance with Washington Administration Code Chapter 248-54 or any superseding code section and the policies, procedures and criteria for determining appropriate levels of water system protection shall be in accordance with the latest addition of appropriate manuals of standard practice pertaining to cross connection control approved by the Secretary of the Washington Department of Social and Health Services or his authorized agent. The KALAMA Public Works Director shall have the authority to establish requirements more stringent than State regulations if he deems that existing conditions so dictate.

Section 4. Backflow Prevention Devices. Backflow Prevention Devices shall be installed where, in the judgment of the KALAMA Public Works Director, the nature and extent of the activities, or the materials stored on the premises receiving or to receive public water supply service, would present an immediate and dangerous hazard to health and/or be deleterious to the quality of the KALAMA public drinking water system should a

cross connection occur.

Section 5. Backflow Devices: Installation. Backflow prevention devices required by this Ordinace shall be installed at the meter, or at the property line of the premises when meters are not used, or at a location designated by the KALAMA Public Water Director. The device shall be located so as to be readily accessible for maintenance and testing and, furthermore, where no part of the device will be submerged. All such devices to be installed shall be a model approved by the KALAMA Public Works Directors and shall be installed under his supervision and with his approval. Backflow prevention devices installed pursuant to this Ordinance shall be inspected and tested annually, or more often if necessary, by a licensed tester at the customer's expense.

Section 6. Compliance. Water service to any premise receiving its water from the KALAMA public drinking water system shall be contingent upon compliance with all rules and regulations of the Washington State Department of Social and Health Services and the CITY OF KALAMA. Service shall be discontinued to any premises for failure to comply with the rules and regulations of the department or the City.

PASSED by the City Council and APPROVED by the Mayor this 20th day of ~~April~~ May, 1987.

CITY OF KALAMA

By: _____
Mayor

ATTEST:

_____
Clerk/Treasurer

APPROVED AS TO FORM

ALAN L. ENGSTROM, City Attorney

APPENDIX E

EMERGENCY RESPONSE PLAN, VULNERABILITY ASSESSMENT, SAMPLE BOIL WATER NOTICE

CREW INSTRUCTIONS

FACILITY

Distribution Line Break

EFFECT

Reduced water pressure to customers or water bubbling from ground.

PROCEDURE

1. Locate break on utility maps.
2. Isolate break by closing necessary gate valves.
3. Notify customers of outage.
4. If the break is major, monitor flow to system booster pumps. If flow is disrupted to the pump inlet shut down booster pump in electrical panels.
5. Call for utility locates.
6. Repair leak.
7. Take action necessary to remove air.
8. Slowly reopen gate valves.
9. Monitor water quality.

CREW INSTRUCTIONS

FACILITY

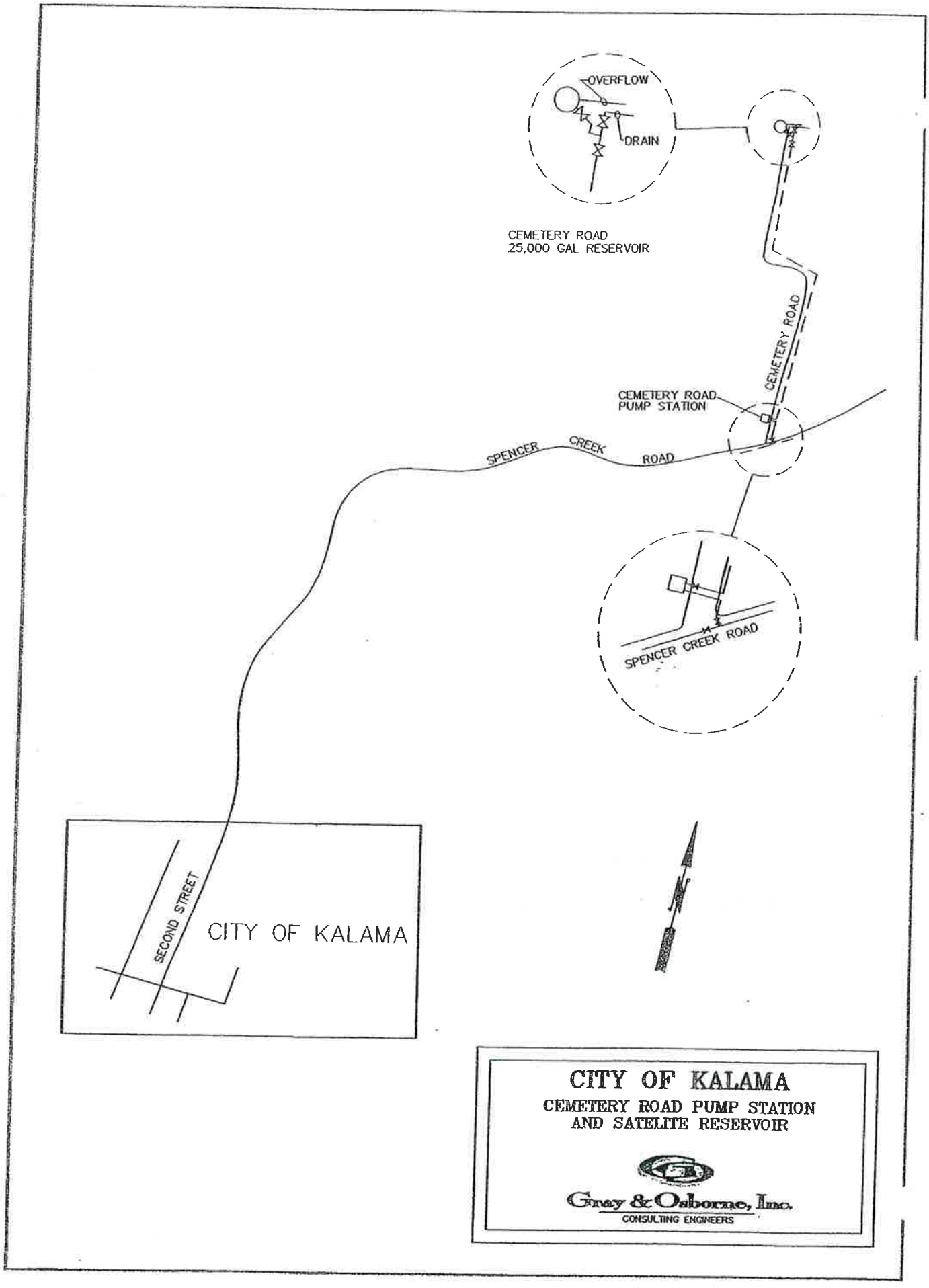
Cemetery Road Reservoir – Low Water Level

EFFECT

Low water pressure to Cemetery Road homes. This reservoir is wired to the Public Works alarm light panel.

PROCEDURE

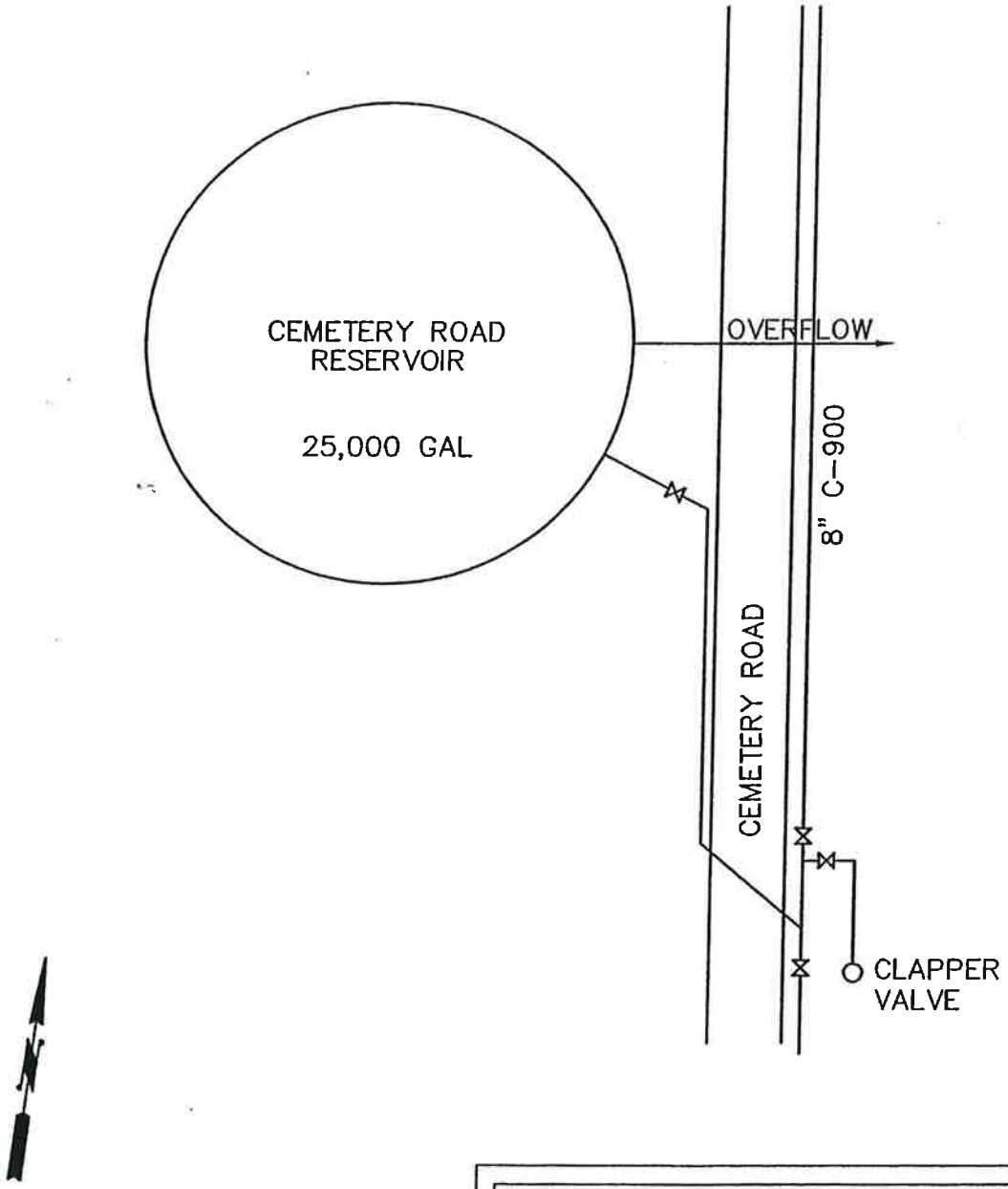
1. Check tank indicator to verify if level is low.
2. Check status of the pumps in pumphouse on Cemetery Road. It is located just north of the junction with Spencer Creek Road.
3. If the pump is running, check for water to the pump.
4. If the pump is receiving water and the reservoir level is dropping; check for a break in the line.
5. If the line is broken turn the pump controls to "off".
6. If the break is between the pump and the reservoir, close the valve adjacent to the reservoir.
7. Notify customers of a water outage.
8. Call for utility locates.
9. Repair the break.
10. Open customers' outside hose bibs to exhaust air.
11. Slowly open the reservoir isolation valve.
12. Turn the pumps to "auto" and close customers' hose bibs.
13. Evaluate the reservoir water quality to determine if the reservoir needs extra chlorine or flushing.
14. If the pump is not functioning call electrician.



CITY OF KALAMA

CEMETERY ROAD PUMP STATION AND SATELITE RESERVOIR

Gray & Osborne, Inc.
CONSULTING ENGINEERS



CITY OF KALAMA

CEMETERY ROAD RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CREW INSTRUCTIONS

FACILITY

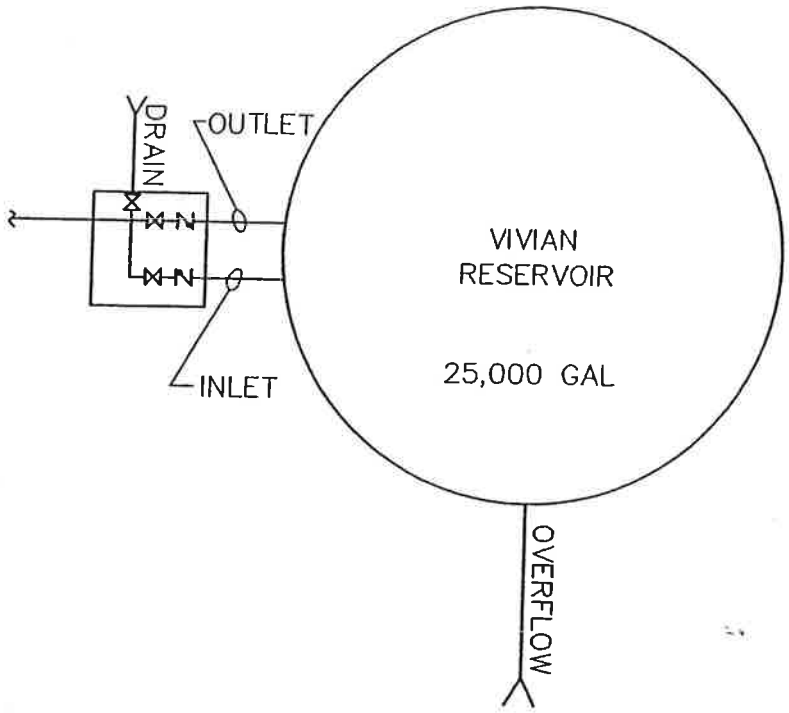
Vivian Road Reservoir – Low Water Level

EFFECT

Low water pressure to Vivian Road homes. This reservoir is wired to the Public Works alarm light panel.

PROCEDURE

1. Check tank indicator to verify if level is low.
2. Check status of pumps in pumphouse on the north side of Vivian Road.
3. If the pump is running, check for water to the pump.
4. If the pump is receiving water and the reservoir level is dropping; check for a break in the line.
5. If the line is broken turn the pump controls to "off".
6. If the break is between the pump and the reservoir, close the valve adjacent to the reservoir.
7. Notify customers of a water outage.
8. Call for utility locates.
9. Repair the break.
10. Open customers' outside hose bibs to exhaust air.
11. Slowly open the reservoir isolation valve.
12. Turn the pumps to "auto" and close customers' hose bibs.
13. Evaluate the reservoir water quality to determine if the reservoir needs extra chlorine or flushing.
14. If the pump is not functioning call electrician.



CITY OF KALAMA

VIVIAN ROAD RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CREW INSTRUCTIONS

FACILITY

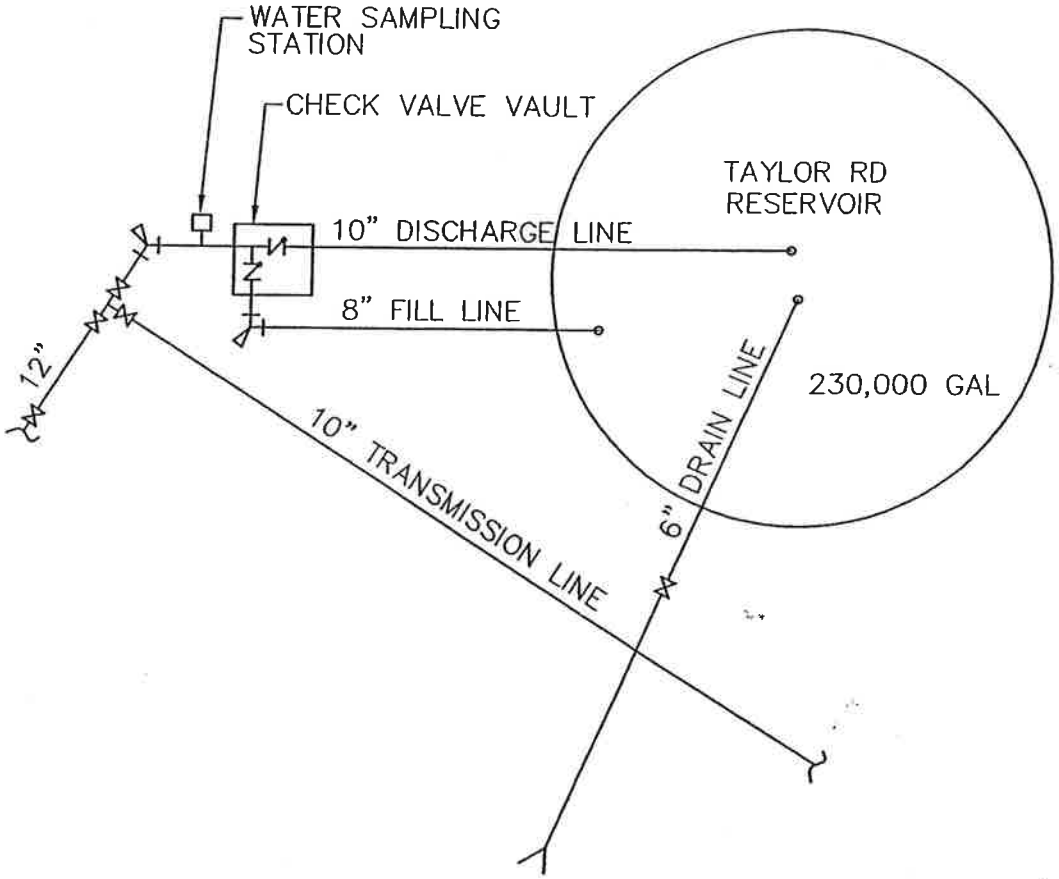
Taylor Road Reservoir – Low Water Level

EFFECT

Low water pressure to Taylor Road homes. This reservoir is wired to the Public Works alarm light panel and SCADA system.

PROCEDURE

1. Check tank indicator to verify if level is low.
2. Check status of pumps in pumphouse on the south side of the 1 MG Reservoir.
3. If the pump is running, check for water to the pump.
4. If the pump is receiving water and the reservoir level is dropping; check for a break in the line.
5. If the line is broken turn the pump controls to "off".
6. If the break is between the pump and the reservoir, close the valve adjacent to the reservoir.
7. Notify customers of a water outage.
8. Call for utility locates.
9. Repair the break.
10. Open customers' outside hose bibs to exhaust air.
11. Slowly open the reservoir isolation valve.
12. Turn the pumps to "auto" and close customers' hose bibs.
13. Evaluate the reservoir water quality to determine if the reservoir needs extra chlorine or flushing.
14. If the pump is not functioning call electrician.



CITY OF KALAMA

UPPER TAYLOR ROAD RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CREW INSTRUCTIONS

FACILITY

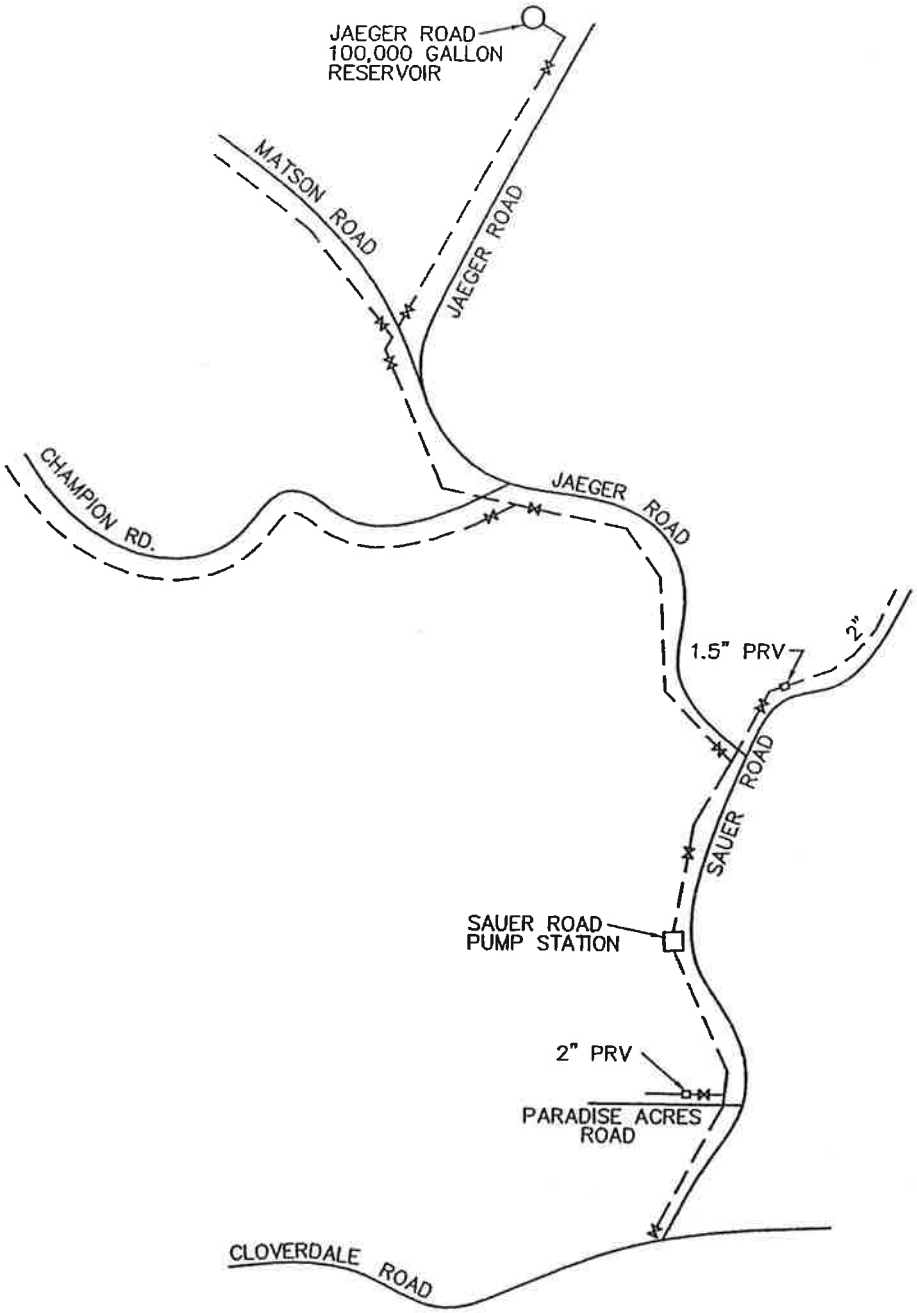
Jaeger Road Reservoir – Low Water Level

EFFECT

Alarm will light on alarm panel in Public Works office.

PROCDURE

1. Check to see if pump is operating – submersible pump is located below manhole on shoulder of Sauer Road, just above driveway to 208 Sauer Road.
2. If pump is operating, check for water to pump.
3. If pump is receiving water, check for waterline break.
4. If a break is located turn pump to "off" in panel beside manhole.
5. Isolate break with gate valves to save water in reservoir.
6. Shut off pump beside pump manhole.
7. Notify customers of outage.
8. Call for utility locates.
9. Repair break.
10. Open customer's outside hose bibs to exhaust air.
11. Slowly open upstream valve.
12. Slowly open down stream valve if any.
13. Turn pump to "Auto" and close customers hose bibs.
14. If pump is not functioning call electrician.
15. Monitor water quality.



CITY OF KALAMA

JAEGER ROAD PUMP STATIONS AND SATELITE RESERVOIRS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CREW INSTRUCTIONS

FACILITY

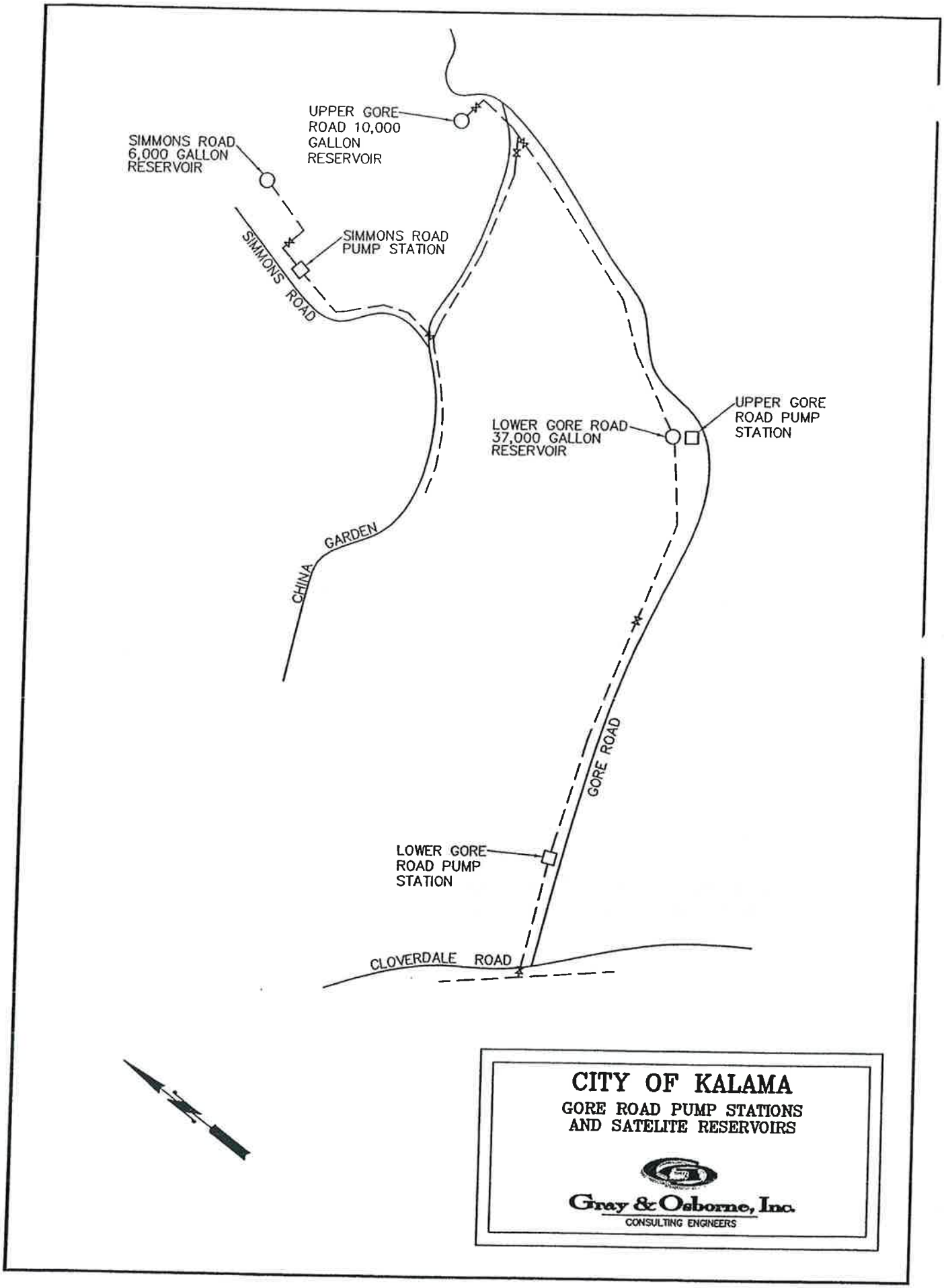
Gore Road Reservoir – Low Water Level

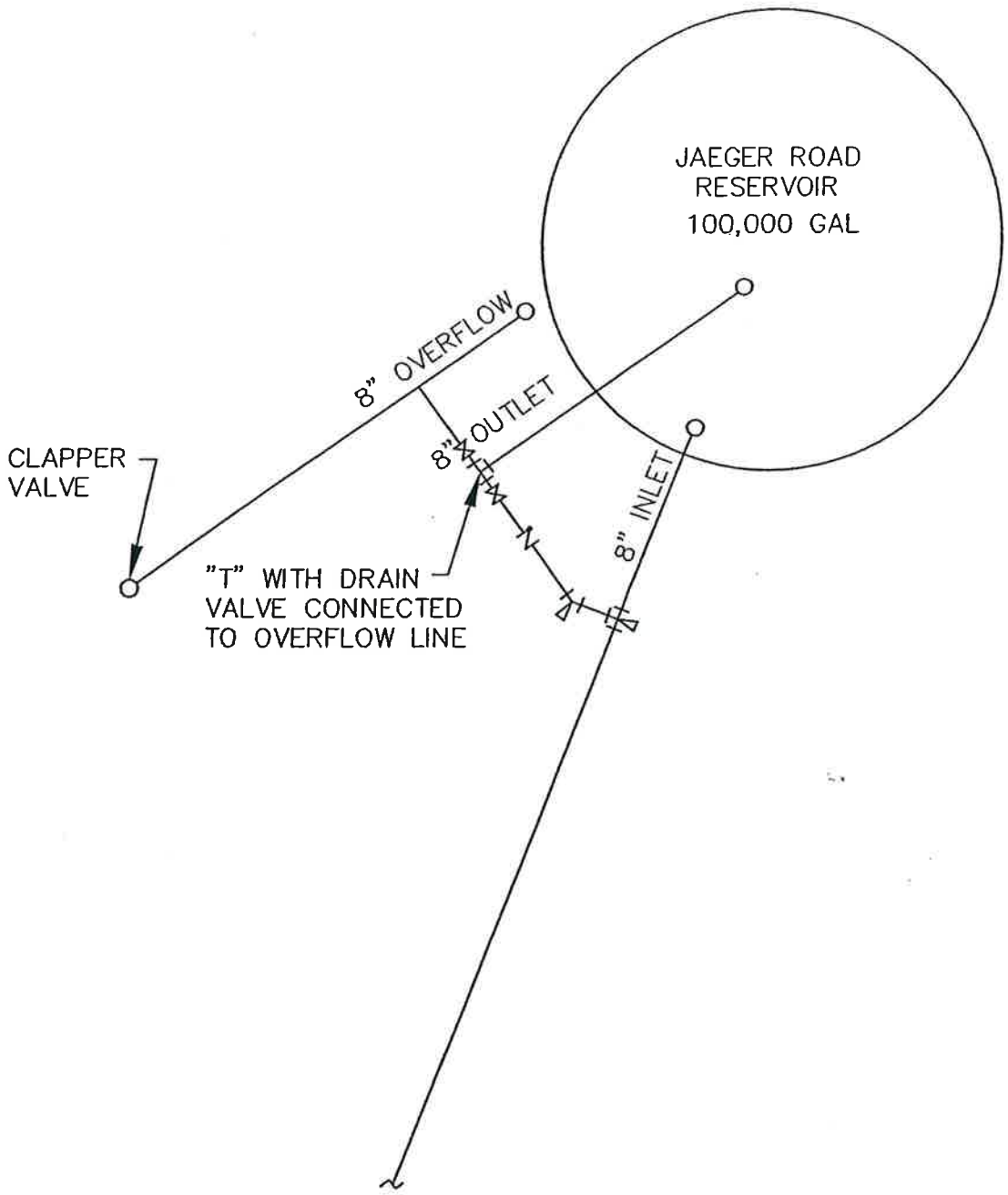
EFFECT

Alarm will light on alarm panel in Public Works office.

PROCDURE

1. Check to see if pump is operating – submersible pump is located below manhole on shoulder of Gore Road, across from 221 Gore Road.
2. If pump is operating, check for water to pump.
3. If pump is receiving water check for waterline break.
4. If a break is located turn pump to "off" in panel beside manhole.
5. Shut valve at junction of Gore – China Garden Roads.
6. Turn Simmons Road pump to "off" in Simmons Road pump house.
7. Notify customers of outage.
8. Call for utility locates.
9. Repair break.
10. Open customer's outside hose bibs to exhaust air.
11. Slowly open valve at Gore – China garden Road junction.
12. Turn pump to "Auto" and close customers hose bibs.
13. If pump is not functioning call electrician.
14. Monitor water quality.
15. Turn Simmons Road pump to "Auto".

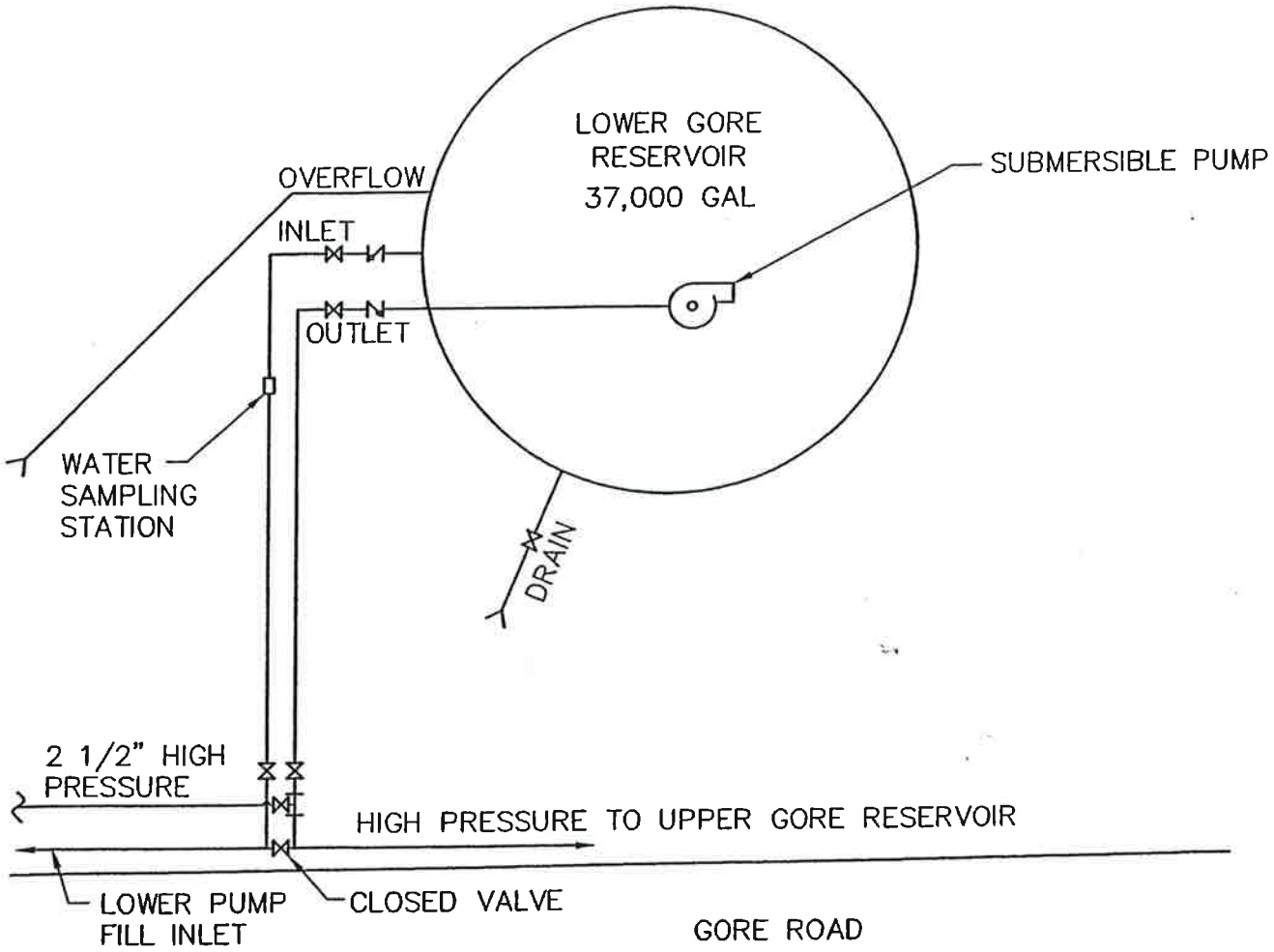

UPPER GORE ROAD 10,000 GALLON RESERVOIR
SIMMONS ROAD 6,000 GALLON RESERVOIR
SIMMONS ROAD PUMP STATION
SIMMONS ROAD
LOWER GORE ROAD 37,000 GALLON RESERVOIR
UPPER GORE ROAD PUMP STATION
CHINA GARDEN
GORE ROAD
LOWER GORE ROAD PUMP STATION
CLOVERDALE ROAD
CITY OF KALAMA
GORE ROAD PUMP STATIONS AND SATELITE RESERVOIRS
Gray & Osborne, Inc.
CONSULTING ENGINEERS



CITY OF KALAMA

JAEGER ROAD PIPE SCHEMATIC

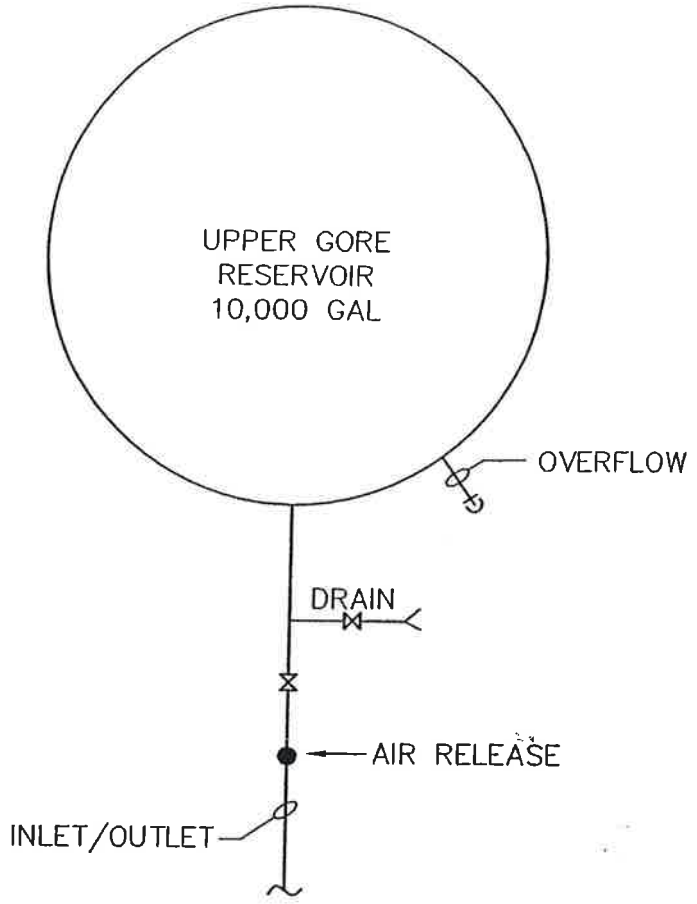
Gray & Osborne, Inc.
CONSULTING ENGINEERS



CITY OF KALAMA

LOWER GORE RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS



CHINA GARDEN ROAD

CITY OF KALAMA

UPPER GORE RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

ED CREW INSTRUCTIONS

FACILITY

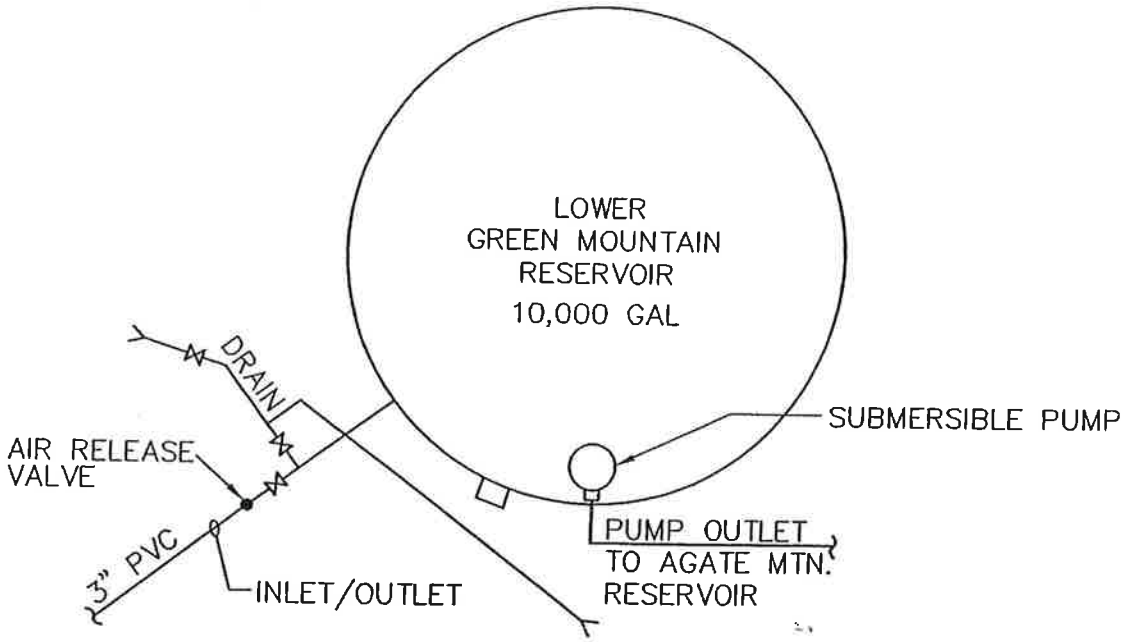
Lower Green Mountain Reservoir – Low Water Level

EFFECT

Alarm will light on alarm panel in Public Works Office. This reservoir and the Agate Mountain Reservoir are on the same alarm circuit.

PROCEDURE

1. Check tank indicator to verify if reservoir is low.
2. Check to verify if pump is operating – submersible pump is located below manhole between Cloverdale and Cloverdale Loop Roads.
3. If pump is running check for water to pump.
4. If pump is operating check for waterline break.
5. If break is located turn off pump at panel on pole beside manhole.
6. Close gate valves to isolate break.
7. Notify customers of outage.
8. Call for utility locates.
9. Repair break.
10. Open customer hose bibs to exhaust air.
11. Slowly open upstream gate valve.
12. Slowly open downstream gate valve.
13. Restart pump and close customer hose bibs.
14. Monitor water quality.
15. If pump is not operating call electrician.



CITY OF KALAMA

LOWER GREEN MOUNTAIN RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CREW INSTRUCTIONS

FACILITY

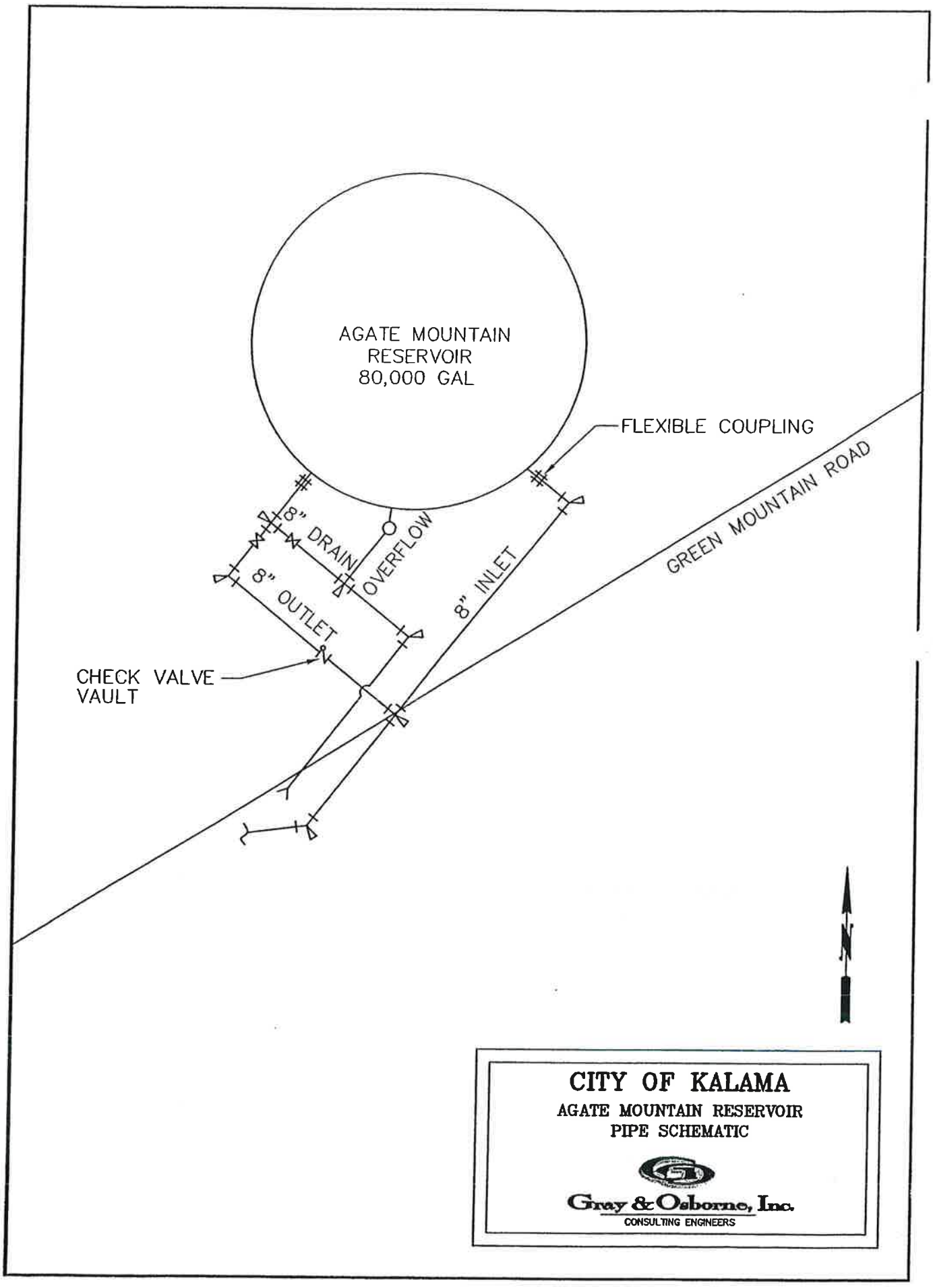
Agate Mountain Reservoir – Low Water Level

EFFECT

Alarm will light on alarm panel in Public Works Office. This reservoir and the Lower Green Mountain Reservoir are on the same alarm circuit.

PROCEDURE

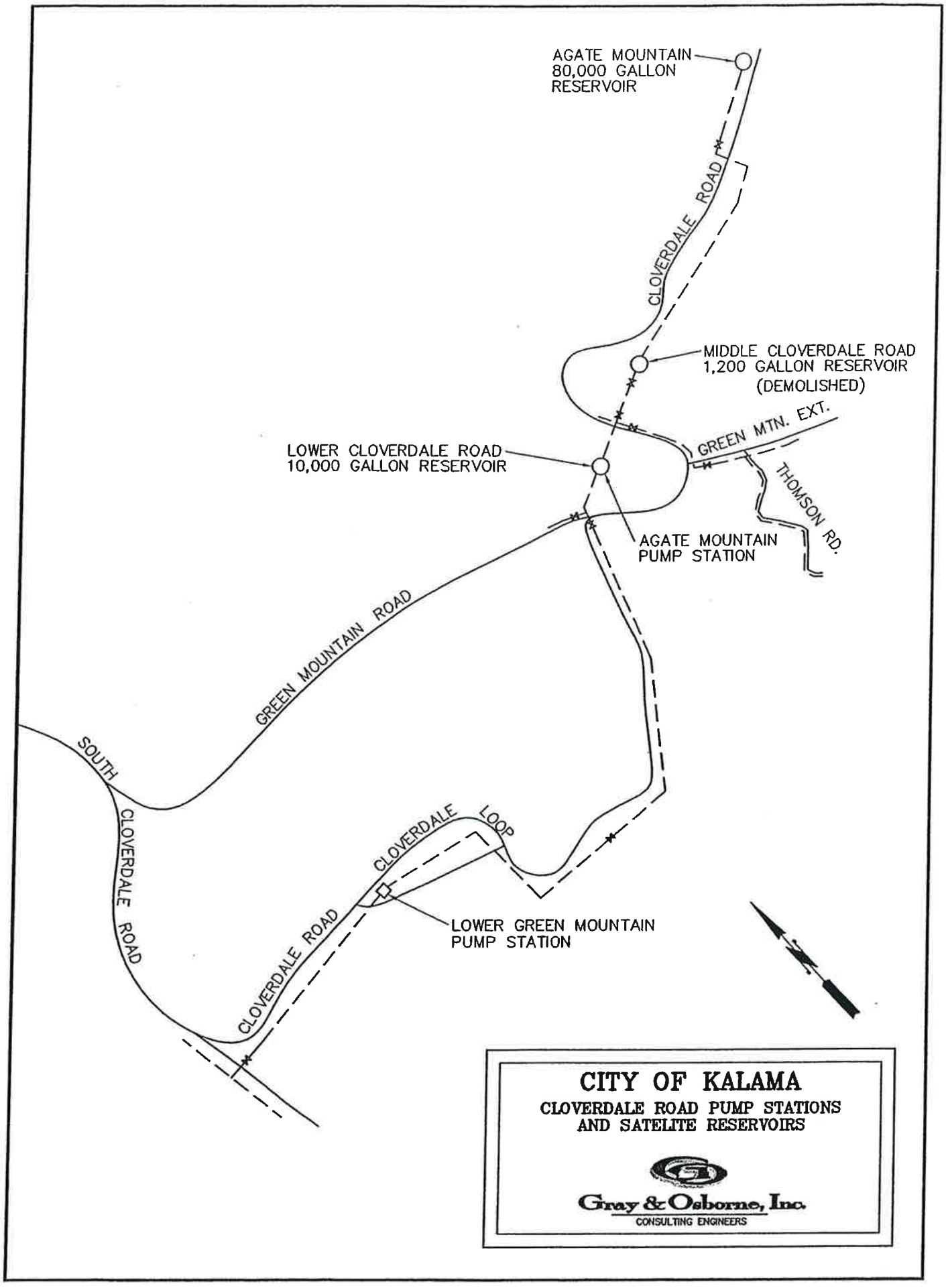
1. Check tank indicator to verify if level is low.
2. Check to verify if pump is operating – submersible pump is inside Lower Green Mountain Reservoir. PUD meter is on pole at approximately 2300 Green Mountain Road, beside road.
3. If pump is running check for water break.
4. If break is located. Turn off electricity at electrical box on the pole beside Green Mountain Road or on the side of Lower Green Mountain Reservoir.
5. Isolate break by turning off gate valves.
6. Notify customers of outage.
7. Call for utility locates.
8. Repair break.
9. Open customer hose bibs to expel air.
10. Slowly open upstream gate valve.
11. Slowly open downstream gate valve.
12. Restart pump and close customer gate valves.
13. Monitor water quality.
14. If pump is not operating call electrician.



CITY OF KALAMA

AGATE MOUNTAIN RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS


AGATE MOUNTAIN
80,000 GALLON
RESERVOIR
CLOVERDALE ROAD
MIDDLE CLOVERDALE ROAD
1,200 GALLON RESERVOIR
(DEMOLISHED)
GREEN MTN. EXT.
LOWER CLOVERDALE ROAD
10,000 GALLON RESERVOIR
THOMSON RD.
AGATE MOUNTAIN
PUMP STATION
GREEN MOUNTAIN ROAD
SOUTH
CLOVERDALE ROAD
CLOVERDALE
LOOP
CLOVERDALE ROAD
LOWER GREEN MOUNTAIN
PUMP STATION
CITY OF KALAMA
CLOVERDALE ROAD PUMP STATIONS
AND SATELITE RESERVOIRS
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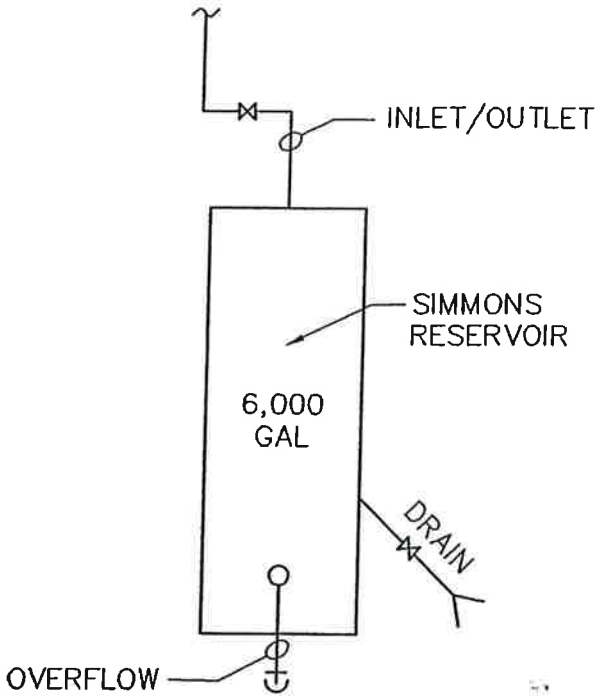


CITY OF KALAMA

SIMMONS ROAD RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS

CREW INSTRUCTIONS

FACILITY

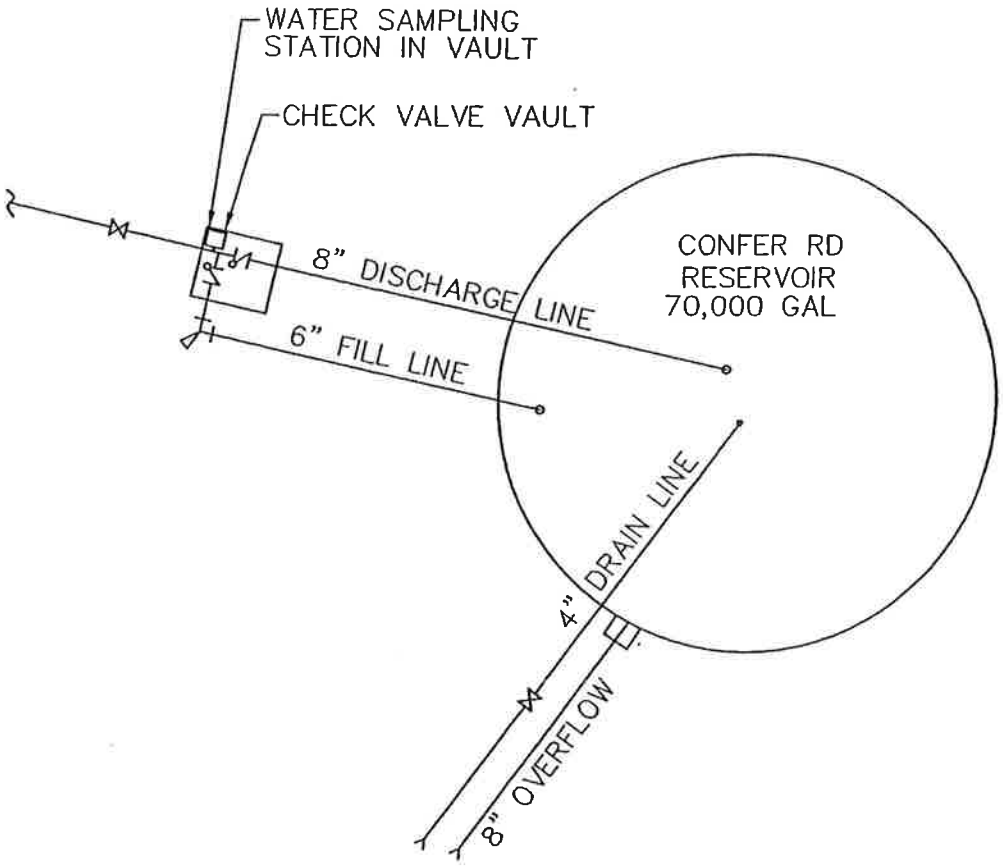
Confer Road Reservoir – Lower Water Level

EFFECT

Low water pressure Confer Road homes. This reservoir is wired to the Public Works alarm light panel and SCADA.

PROCEDURE

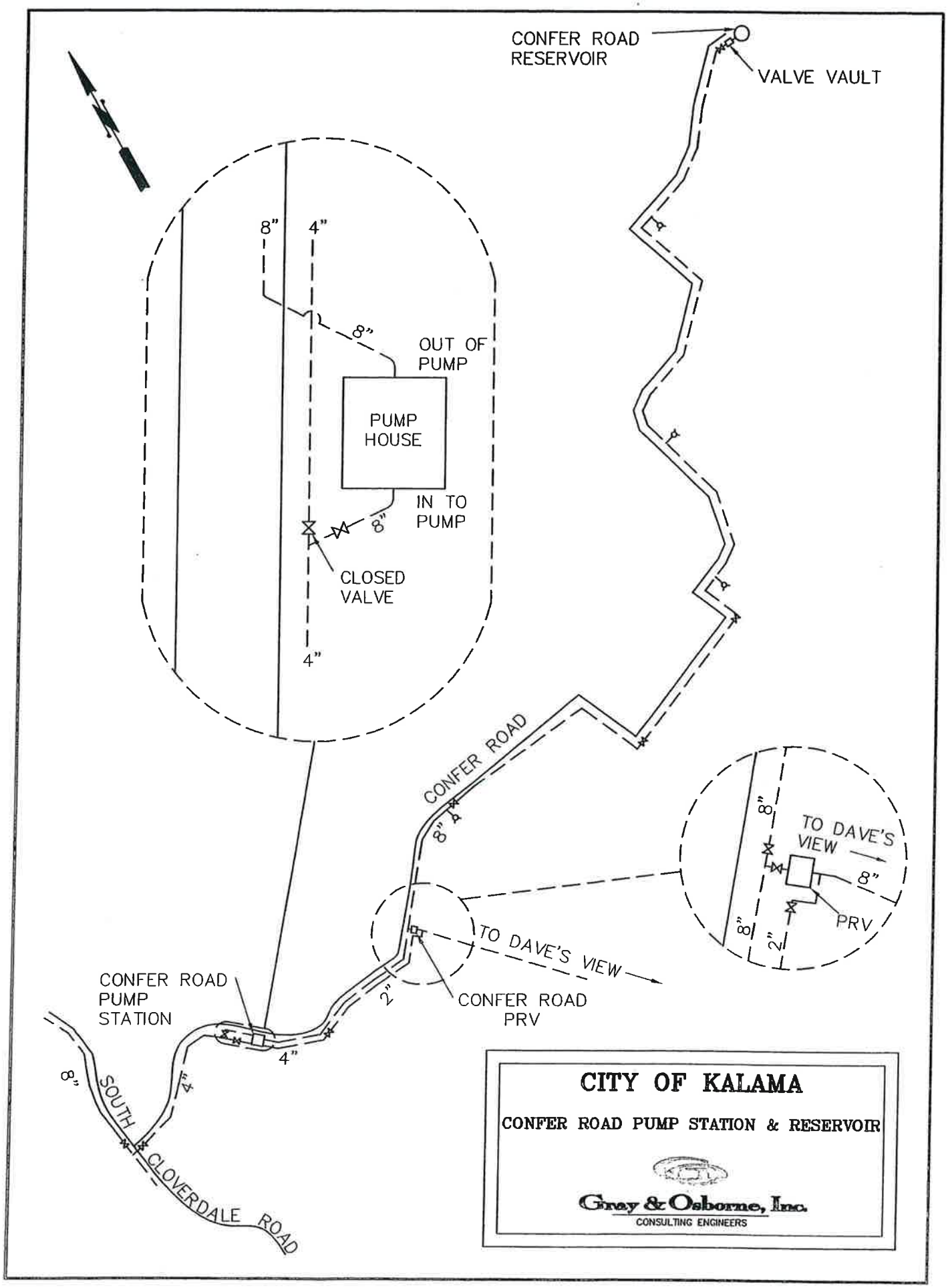
1. Check tank indicator to verify if level is low.
2. Check to verify if pump is operating in pumphouse on south side of Confer Road.
3. If pump is running check for water to pump.
4. If pump is operating check for waterline leak.
5. If break is located, turn pump switch in electrical panel in pump station to "off".
6. Close gate valves to conserve water in the reservoir.
7. Notify customers of outage.
8. Call utility locates.
9. Repair break.
10. Slowly open gate valve at the reservoir.
11. Restart pump – turn to "Auto". If pump does not start after one minute delay, push reset button on relay switch.
12. Monitor water quality.
13. If pump is not operating call electrician.



CITY OF KALAMA

EAST CONFER ROAD RESERVOIR
PIPE SCHEMATIC

Gray & Osborne, Inc.
CONSULTING ENGINEERS


CONFER ROAD RESERVOIR
VALVE VAULT
8"
4"
8"
OUT OF PUMP
PUMP HOUSE
IN TO PUMP
8"
CLOSED VALVE
4"
CONFER ROAD
8"
TO DAVE'S VIEW
8"
8"
PRV
2"
TO DAVE'S VIEW
CONFER ROAD PRV
2"
CONFER ROAD PUMP STATION
4"
8"
SOUTH
CLOVERDALE ROAD
CITY OF KALAMA
CONFER ROAD PUMP STATION & RESERVOIR
Gray & Osborne, Inc.
CONSULTING ENGINEERS

CITY OF KALAMA

VULNERABILITY ANALYSIS

KALAMA RANNEY WELL

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☒ Yes ☐ No

B) Does facility have an alternate operating mode? ☒ Yes ☐ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☐ Yes ☒ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☐ Yes ☒ No
4. Other effects to system? ☒ Yes ☐ No

Describe: Eventual loss of service to entire system

5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☒ Yes ☐ No

List: Satellite reservoirs.

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Daily
Frequency of Maintenance: As needed.

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☒ Yes ☐ No

D) Is facility protected against vandalism? ☐ Yes ☐ No

Describe: Fenced and Doors Locked.

E) Is facility protected against motor vehicle accident? ☒ Yes ☐ No

F) Does this facility require special protection from:

1. Flood	☐ Yes ☒ No
2. High Wind	☐ Yes ☒ No
3. Cold Weather	☐ Yes ☒ No
4. Hot Weather	☐ Yes ☒ No
5. Fire	☒ Yes ☐ No
6. Other	☐ Yes ☐ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? Any that disrupts power.

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes ☒ No
2. Low Pressure	☐ Yes ☒ No
3. High Pressure	☐ Yes ☒ No
4. Other _____	

J) Is facility dependent on other other system facilities? ☐ Yes ☒ No

List: _____

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes ☐ No
2. Status Reporting	☒ Yes ☐ No
3. Data Logging	☒ Yes ☐ No
4. Other: _____	

B) When control fails, does component:

1. Stop?	☐ Yes ☒ No
2. Remain in last command position?	☒ Yes ☐ No
3. Revert to local control?	☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes ☒ No
2. A special few?	☒ Yes ☐ No
3. One?	☐ Yes ☒ No
4. Outside construction?	☒ Yes ☐ No

CITY OF KALAMA

VULNERABILITY ANALYSIS

CEMETERY ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☐ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☐ Yes ☒ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: _____

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood ☐ Yes ☒ No
2. High Wind ☐ Yes ☒ No
3. Cold Weather ☒ Yes ☐ No
4. Hot Weather ☒ Yes ☐ No
5. Fire ☒ Yes ☐ No
6. Other ☐ Yes ☐ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water ☐ Yes ☒ No
2. Low Pressure ☒ Yes ☐ No
3. High Pressure ☐ Yes ☒ No
4. Other _____

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Transmission line pressure supplies water to pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control ☒ Yes ☐ No
2. Status Reporting ☒ Yes ☐ No
3. Data Logging ☐ Yes ☒ No
4. Other: _____

B) When control fails, does component:

1. Stop? ☒ Yes ☐ No
2. Remain in last command position? ☒ Yes ☐ No
3. Revert to local control? ☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel? ☐ Yes ☒ No
2. A special few? ☒ Yes ☐ No
3. One? ☐ Yes ☒ No
4. Outside construction? ☒ Yes ☐ No

CITY OF KALAMA
VULNERABILITY ANALYSIS

CONFER ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☒ Yes ☐ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☐ Yes ☒ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: In locked pump house.

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood	☐ Yes ☒ No
2. High Wind	☐ Yes ☒ No
3. Cold Weather	☐ Yes ☒ No
4. Hot Weather	☐ Yes ☒ No
5. Fire	☒ Yes ☐ No
6. Other	☐ Yes ☒ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes ☒ No
2. Low Pressure	☒ Yes ☐ No
3. High Pressure	☐ Yes ☒ No
4. Other _____	

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Distribution line pressure supplies water to pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes ☐ No
2. Status Reporting	☒ Yes ☐ No
3. Data Logging	☐ Yes ☒ No
4. Other: _____	

B) When control fails, does component:

1. Stop?	☒ Yes ☐ No
2. Remain in last command position?	☒ Yes ☐ No
3. Revert to local control?	☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes ☒ No
2. A special few?	☒ Yes ☐ No
3. One?	☐ Yes ☒ No
4. Outside construction?	☒ Yes ☐ No

CITY OF KALAMA

VULNERABILITY ANALYSIS

FIFTH STREET/TAYLOR ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe:
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List:

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: Pump is locked in pump house.

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood	☐ Yes ☒ No
2. High Wind	☐ Yes ☒ No
3. Cold Weather	☒ Yes ☐ No
4. Hot Weather	☒ Yes ☐ No
5. Fire	☒ Yes ☐ No
6. Other	☐ Yes ☒ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes ☒ No
2. Low Pressure	☒ Yes ☐ No
3. High Pressure	☐ Yes ☒ No
4. Other _____	

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Million gallon reservoir supplies water to pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes ☐ No
2. Status Reporting	☒ Yes ☐ No
3. Data Logging	☐ Yes ☒ No
4. Other: _____	

B) When control fails, does component:

1. Stop?	☒ Yes ☐ No
2. Remain in last command position?	☒ Yes ☐ No
3. Revert to local control?	☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes ☒ No
2. A special few?	☒ Yes ☐ No
3. One?	☐ Yes ☒ No
4. Outside construction?	☒ Yes ☐ No

CITY OF KALAMA
VULNERABILITY ANALYSIS

LOWER GORE ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☐ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No

Describe: Pump is in vault; electrical panel is locked.

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood	☐ Yes ☒ No
2. High Wind	☐ Yes ☒ No
3. Cold Weather	☐ Yes ☒ No
4. Hot Weather	☐ Yes ☒ No
5. Fire	☐ Yes ☒ No
6. Other	☐ Yes ☒ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes ☒ No
2. Low Pressure	☒ Yes ☐ No
3. High Pressure	☐ Yes ☒ No
4. Other _____	

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Distribution system pressures supplies to water to pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes ☐ No
2. Status Reporting	☒ Yes ☐ No
3. Data Logging	☐ Yes ☒ No
4. Other: _____	

B) When control fails, does component:

1. Stop?	☒ Yes ☐ No
2. Remain in last command position?	☒ Yes ☐ No
3. Revert to local control?	☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes ☒ No
2. A special few?	☒ Yes ☐ No
3. One?	☐ Yes ☒ No
4. Outside construction?	☒ Yes ☐ No

CITY OF KALAMA

VULNERABILITY ANALYSIS

SAUER ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: Pump submersed in manhole; electrical panel locked.

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood	☐ Yes ☒ No
2. High Wind	☐ Yes ☒ No
3. Cold Weather	☐ Yes ☒ No
4. Hot Weather	☐ Yes ☒ No
5. Fire	☐ Yes ☒ No
6. Other	☐ Yes ☐ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes ☒ No
2. Low Pressure	☒ Yes ☐ No
3. High Pressure	☐ Yes ☒ No
4. Other _____	

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Distribution system pressure supplies pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes ☐ No
2. Status Reporting	☒ Yes ☐ No
3. Data Logging	☐ Yes ☒ No
4. Other: _____	

B) When control fails, does component:

1. Stop?	☒ Yes ☐ No
2. Remain in last command position?	☒ Yes ☐ No
3. Revert to local control?	☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes ☒ No
2. A special few?	☒ Yes ☐ No
3. One?	☐ Yes ☒ No
4. Outside construction?	☒ Yes ☐ No

CITY OF KALAMA

VULNERABILITY ANALYSIS

SIMMONS ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: Pump house locked.

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood	☐ Yes	☒ No
2. High Wind	☐ Yes	☒ No
3. Cold Weather	☒ Yes	☐ No
4. Hot Weather	☐ Yes	☒ No
5. Fire	☒ Yes	☐ No
6. Other	☐ Yes	☐ No

***Requires tank heater be plugged into nearby residence.**

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes	☒ No
2. Low Pressure	☒ Yes	☐ No
3. High Pressure	☐ Yes	☒ No
4. Other _____		

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Gore Road pump and reservoir supply water to this pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes	☐ No
2. Status Reporting	☒ Yes	☐ No
3. Data Logging	☐ Yes	☒ No
4. Other: _____		

B) When control fails, does component:

1. Stop?	☒ Yes	☐ No
2. Remain in last command position?	☒ Yes	☐ No
3. Revert to local control?	☐ Yes	☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes	☒ No
2. A special few?	☒ Yes	☐ No
3. One?	☐ Yes	☒ No
4. Outside construction?	☒ Yes	☐ No

CITY OF KALAMA

VULNERABILITY ANALYSIS

UPPER GORE ROAD PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: Locked pump house.

E) Is facility protected against motor vehicle accident? ☐ Yes ☒ No

F) Does this facility require special protection from:

1. Flood	☐ Yes	☒ No
2. High Wind	☐ Yes	☒ No
3. Cold Weather	☒ Yes	☐ No
4. Hot Weather	☒ Yes	☐ No
5. Fire	☒ Yes	☐ No
6. Other	☐ Yes	☒ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes	☒ No
2. Low Pressure	☒ Yes	☐ No
3. High Pressure	☐ Yes	☒ No
4. Other _____		

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Pump is submersed in Lower Gore Road Reservoir. Water in tank supplies pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes	☐ No
2. Status Reporting	☒ Yes	☐ No
3. Data Logging	☐ Yes	☒ No
4. Other: _____		

B) When control fails, does component:

1. Stop?	☒ Yes	☐ No
2. Remain in last command position?	☒ Yes	☐ No
3. Revert to local control?	☐ Yes	☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes	☒ No
2. A special few?	☒ Yes	☐ No
3. One?	☐ Yes	☒ No
4. Outside construction?	☒ Yes	☐ No

CITY OF KALAMA
VULNERABILITY ANALYSIS

LOWER GREEN MOUNTAIN PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe: _____
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☐ Yes ☒ No
   List: _____

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No
   Describe: Electrical panel is locked.

E) Is facility protected against motor vehicle accident? ☒ Yes ☐ No

F) Does this facility require special protection from:

1. Flood ☐ Yes ☒ No
2. High Wind ☐ Yes ☒ No
3. Cold Weather ☐ Yes ☒ No
4. Hot Weather ☐ Yes ☒ No
5. Fire ☐ Yes ☒ No
6. Other ☐ Yes ☒ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☒ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water ☐ Yes ☒ No
2. Low Pressure ☒ Yes ☐ No
3. High Pressure ☐ Yes ☒ No
4. Other _____

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Distribution line pressure supplies pump.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control ☒ Yes ☐ No
2. Status Reporting ☒ Yes ☐ No
3. Data Logging ☐ Yes ☒ No
4. Other: _____

B) When control fails, does component:

1. Stop? ☒ Yes ☐ No
2. Remain in last command position? ☐ Yes ☒ No
3. Revert to local control? ☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel? ☐ Yes ☒ No
2. A special few? ☒ Yes ☐ No
3. One? ☐ Yes ☒ No
4. Outside construction? ☒ Yes ☐ No

CITY OF KALAMA
VULNERABILITY ANALYSIS

UPPER GREEN MOUNTAIN PUMPING STATION

Failure Detection

Is failure detectable by:

A) Telemetry system? ☒ Yes ☐ No

B) Routine inspection? ☒ Yes ☐ No

C) Service complaint? ☒ Yes ☐ No

System Impact

A) Is facility a source? ☐ Yes ☒ No

B) Does facility have an alternate operating mode? ☐ Yes ☒ No

C) If so, is alternate facility a full replacement? ☐ Yes ☒ No

D) Does failure cause:

1. Loss of service? ☒ Yes ☐ No
2. Loss of fire protection? ☐ Yes ☒ No
3. Low service pressure? ☒ Yes ☐ No
4. Other effects to system? ☐ Yes ☒ No
   Describe:
5. Damage to property? ☐ Yes ☒ No

E) Does failure cause loss of storage capacity? ☒ Yes ☐ No

F) Does failure degrade water quality? ☐ Yes ☒ No

G) Are other system facilities affected? ☒ Yes ☐ No

List: Decreased water to Agate Reservoir.

Facility Vulnerability

A) Is routine inspection and maintenance required? ☒ Yes ☐ No

Frequency of Inspection: Monthly
Frequency of Maintenance: Monthly

B) Does facility require electric power? ☒ Yes ☐ No

C) Auxiliary power available? ☐ Yes ☒ No

D) Is facility protected against vandalism? ☒ Yes ☐ No

Describe: Pump is inside concrete reservoir and electrical panel is locked.

E) Is facility protected against motor vehicle accident? ☒ Yes ☐ No

F) Does this facility require special protection from:

1. Flood	☐ Yes ☒ No
2. High Wind	☐ Yes ☒ No
3. Cold Weather	☐ Yes ☒ No
4. Hot Weather	☐ Yes ☒ No
5. Fire	☐ Yes ☒ No
6. Other	☐ Yes ☒ No

G) Under which disaster conditions listed on Worksheet 4 could this facility potentially fail? _____

H) Does normal operation depend upon chemicals? ☐ Yes ☐ No

If yes, list: _____

If yes, list means of transportation: _____

I) Is facility susceptible to other impacts?

1. Debris in Water	☐ Yes ☒ No
2. Low Pressure	☒ Yes ☐ No
3. High Pressure	☐ Yes ☒ No
4. Other _____	

J) Is facility dependent on other other system facilities? ☒ Yes ☐ No

List: Availible water in Lower Green Mountain Reservoir.

Facility – Supervisory Control Dependency

A) Is facility dependent on telemetry for:

1. Control	☒ Yes ☐ No
2. Status Reporting	☒ Yes ☐ No
3. Data Logging	☐ Yes ☒ No
4. Other: _____	

B) When control fails, does component:

1. Stop?	☒ Yes ☐ No
2. Remain in last command position?	☐ Yes ☒ No
3. Revert to local control?	☐ Yes ☒ No

Personnel

A) Can normal repair undertaken by:

1. All personnel?	☐ Yes ☒ No
2. A special few?	☒ Yes ☐ No
3. One?	☐ Yes ☒ No
4. Outside construction?	☒ Yes ☐ No

VULNERABILITY ANALYSIS - CHLORINATION

Normal Operation

Chlorine source: hypochlorite (liquid) X, 1 ton containers ____
100 lb. cylinders ____, 150 lb. cylinders ____

System feed: Liquid X, Gas ____

Feeders: 1. Location DWTF, Make LMI, Model N/A
2. Location ____, Make ____, Model ____

Dosage: 1.0 ppm

Consumption: 7 lbs/day

Normal stock of chlorine: ____ cylinders
____ 1 ton containers
800 gallon of hypochlorite

Supplies: Hypochlorite tank is in a self contained chemical room. It there is an emergency, CALL 911.

1. Emergency need call Univar Ph: (503) 222-1721

Other possible sources of supply in emergency: ____

Emergency Operation

Emergency repair kit location: ____ Ph: ____

Emergency chlorination equipment location ____

Emergency Type: Leak

Effect: Hazardous Environment
Action: Stop Leak

Areas affected by cylinder or container leak:
1. Chemical Room
2. ____
3. ____

VULNERABILITY ANALYSIS-SPILLS

	Yes	No	Contact	Possible Impacts	Sensitive System Areas	Material Characteristics: Nature	Name	Formula	Volumes Involved	Toxic Level
1. Major highways above intake		X								
2. Map showing major highways		X								
3. Topog map showing drainage		X								
4. List of all carriers		X								
5. List of major hazardous materials		X								
6. Phone #'s for all major carriers		X								
1. County roads above intake	X									
2. Map showing location	X									
3. Map showing topog	X									
4. List of carriers		X								
5. List of hazardous materials		X								
6. Phone #'s for all carriers		X								
1. Pipe lines crossing watershed	X									
2. Map showing location	X									
3. Map showing topog	X		Insert pipeline plan							
4. List of hazardous materials	X									
5. Phone #'s for contact	X									
1. Railroads cross watershed		X								
2. Map showing location		X								
3. Map showing topog		X								
4. List of railroad companies		X								
5. Location of clean-up crews		X								
6. Hazardous materials list		X								

	Yes	No	Contact	Possible Impacts	Sensitive System Areas	Material Characteristics				
						Nature	Name	Formula	Volumes Involved	Toxi Leve
E. 1. Waterborne carriers in watershed		X								
2. Map showing route										
3. List of hazardous materials										
4. List of contact persons										
5. List of clean-up crews										
6. Fixed storage in watershed										
7. Map showing location										
8. Topog map										
9. List of hazardous materials										
10. Contact list										

NOTICE TO WATER SYSTEM USERS

Fecal Coliform and E. Coli Maximum Contaminant Level (MCL) Exceeded Acute MCL Violation

The City of Kalama Water System, Identification Number 37550F, located in Cowlitz County submitted routine coliform drinking water samples to a certified laboratory during the month of _____. The test results indicate that at the time the sampling was conducted there was a contamination problem in the system.

The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of fecal coliform or E. Coli in water systems constitutes a serious health concern. Fecal coliform or E. Coli are generally not harmful themselves. Their presence in drinking water is serious however, because they are usually associated with sewage or animal wastes.

The presence of these bacteria in drinking water is generally a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possibly jaundice, and any associated headaches and fatigue.

These symptoms, however, are not just associated with disease causing organisms in drinking water. EPA has set an enforceable drinking water standard for fecal coliform and E. Coli to reduce the risk of these adverse health effects. Drinking water which meets this standard is usually associated with little or none of the risk and should be considered safe.

The problem has been under investigation and the following steps have been or are being taken at this time:

Insert current mitigation efforts

In order to ensure the safety of the City's water customers throughout the duration of this emergency, **IT IS RECOMMENDED THAT WATER USERS HEAT ALL TAP WATER INTENDED FOR HUMAN CONSUMPTION TO A ROLLING BOIL FOR TEN FULL MINUTES.** Drinking water may also be obtained through grocery and convenience stores throughout the City of Kalama and Cowlitz County. The City will notify water system customers when the tap water is again safe to drink.

The City Water Department is presently working to correct the problem. You may call _____ (24 hours/daily) with any further questions or concerns.

APPENDIX F

COLIFORM MONITORING PLAN

COLIFORM MONITORING REPORT

for

City of Kalama

September 18, 2013

DOH
Sandy Breuthingon
360-236-3044

Corrected 1-9-14
RS

Water quality monitoring report

11/20/13 - Approved
Sandra Buenteleyer
DOH - Office of Drinking Water - Southwest
Drinking water specialist

Coliform Monitoring Plan Template and Checklists
Coliform Monitoring Plan for: City of Kalama WWTP

A. System Information

Plan Date: 11-21-13

WATER System Name City of Kalama	**County** Cowlitz	**System I.D. Number** 37550F
Name of Plan Preparer Richard Smith	**Position** WTPO II / WWTPO III	**Daytime Phone #** (360) 673-4570
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	01 - Ranney Well	
Storage: List and Describe: 13 Reservoirs With total storage capacity of 2,523,000 gallons.		
Treatment: Source Number & Process	01 – Diatomaceous Earth Treatment	
Pressure Zones: Number and Name 17	17	
Population by Pressure Zone: The largest pressure zone is Fir and North 2nd St. which serve the majority of the area within the city limits and the Port District. The remaining 14 zones serve homes in the hills of the city and unincorporated Cowlitz County. **(See table 1-2)**		
Number of Routine Samples Required Monthly by Regulation: 5 winter 4 summer	**Number of Samples Sites Needed to Represent the Distribution System:** 18	
***Request DOH Approval of Triggered Source Monitoring Plan?**	Yes	

- If approval is requested a fee will be charged for the review.

TABLE 1-2

City of Kalama Pressure Reducing Valve Stations

PRV Station Location	Elevation (ft)	Pressure Zones	Size	Downstream Pressure (psi)
Fir and North 2nd St.	105	430 Zone to 285 Zone	2"	95
Elm and 1st St.	37	430 Zone to 285 Zone	8" and 4"	95
Elm and 2nd St.	70	430 Zone to 285 Zone	6"	93
Ashland	75	430 Zone to 285 Zone	6"	93
Vincent Rd.	215	430 Zone to 285 Zone	6"	30
Kilkelly Rd.	220	430 Zone to 285 Zone	2"	45
705 Taylor Rd.	180	430 Zone to 285 Zone	2"	45
Spencer Ck. Rd.	40	430 Zone to 330 Zone	6" and 2"	55
Vivian Rd.	240	595 Zone to 430 Zone	4"	30
Cemetery Rd.	440	584 Zone to 430 Zone	2.5"	30
Gwynne Rd.	650	830 Zone to 705 Zone	6"	54
Modrow Rd.	30	430 Zone to 285 Zone	6" and 12"	90
Waters Watch	450	830 Zone to 430 Zone	6" and 1.5"	72
North 5th St.	450	595 Zone to 430 Zone	6" and 2"	30
Dave's View 2	307	701 Zone to 430 Zone	6" and 2"	40
Dave's View 1	459	834 Zone to 701 Zone	6" and 2"	40
Stone Forest	170	430 Zone to 285 Zone	6" and 2"	75

B. Laboratory Information

Laboratory Name: ALS Environmental Services INC	**Office Phone #** (360) 577-7222
Address: 1317 13th Ave S, Kelso, WA 98626	**After Hours #** 269-5212
Hours of operation: 0800 to 5:00 pm / Saturday 8:00 to 12:00	
Contact Name: Chris Leaf	
Emergency Laboratory Name: Abby Lab LCC.	**Office Phone #** (360) 750-0055
Address: 2517 E Evergreen Blvd. Vancouver	**After Hours #**
Hours of Operation 9 – 5 Monday to Friday	
Contact Name: Tom Newman	

C. Wholesaling of Groundwater

	Yes	NO
We are a consecutive system and purchase groundwater from another water system.	☐	☒
If yes, Water System Name: NA Contact Name: NA Telephone Numbers: NA		
We sell groundwater to other public water systems.	☐	☒
If yes, Water System Name: NA Contact Name: NA Telephone Numbers: NA		
Water System Name: NA Contact Name: NA Telephone Numbers: NA		
Water System Name: NA Contact Name: NA Telephone Numbers: NA		
Water System Name: NA Contact Name: NA Telephone Numbers: NA		

D. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine** Sample Sites	Location/Address for **Repeat** Sample Sites	Sources for **Triggered Sample Sites****
X1. 357 Spencer Creek	**1-1. 401 Spencer Creek**	**S-**
Zone 330	**1-2. 305 Spencer Creek**	**S___**
	1-3. 106 Spencer Creek	**S___**
		S___
		S___
X2. 5355 Meeker Drive	**2-1. 5357 Meeker Drive**	**S-**
Zone 430	**2-2. 5353 Meeker Drive**	**S___**
	2-3. 5349 Meeker Drive	**S___**
		S___
		S___
X3. 320 N. First St.	**3-1. 270 N. First St.**	**S-**
Zone 430	**3-2. 385 N. First St.**	**S___**
	3-3. 454 N. First St.	**S___**
		S___
		S___

*Note: If you need more than three routine samples to cover the distribution system, attach additional sheets as needed.

**** When you collect the repeats, you must sample every source that was in use when the original routine sample was collected.**

Important Notes for Sample Collector:

E. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine** Sample Sites	Location/Address for **Repeat** Sample Sites	Sources for Triggered Sample Sites**
X4. 6315 Old Pacific Hwy.	4-1. 6310 Old Pacific Hwy.	S-
Zone 430	4-2. 6325 Old Pacific Hwy.	S___
	4-3. 6328 Old Pacific Hwy.	S___
		S___
		S___
~~X5. 206 Hendrickson Dr.~~	5-1. 049 Elm St.	S-
Zone 285	5-2. 254 Hendrickson Dr.	S___
King Wood lift station	5-3. 404 Hendrickson Dr.	S___
	206 Hendrickson Dr.	S___
		S___
X6. 440 N. Third St.	6-1. 402 N. Third St.	S-
Zone 430	6-2. 415 N. Third St.	S___
	6-3. 319 N. Third St.	S___
		S___
		S___
X7. 502 Cloverdale Rd.	7-1. 501 Cloverdale Rd.	S-
Zone 820	7-2. 607 Cloverdale Rd.	S___
	7-3. 529 Cloverdale Rd.	S___
		S___
		S___
X8. 230 Ring Rd.	8-1. 231 Ring Rd.	S-
Zone 430 (end)	8-2. 229 Ring Rd.	S___
	8-3. 233 Ring Rd.	S___
		S___
		S___
X9. 330 Cemetery Rd.	9-1. 107 Cemetery Rd.	S-
Zone 584	9-2. 434 Cemetery Rd.	S___
	9-3. 515 Cemetery Rd.	S___
		S___
		S___

F. Routine, Repeat, and Triggered Source Sample Locations*

Location/Address for **Routine** Sample Sites	Location/Address for **Repeat** Sample Sites	Sources for **Triggered Sample Sites****
X10. 756 Taylor Rd.	**10-1. 747 Taylor Rd.**	**S-**
Zone 830	**10-2. 770 Taylor Rd.**	**S___**
	10-3. 1020 Taylor Rd.	**S___**
		S___
		S___
X11. 113 Gwynne Rd.	**11-1. 226 Gwynne Rd.**	**S-**
Zone 703	**11-2. 111 Gwynne Rd.**	**S___**
	11-3. 105 Gwynne Rd.	**S___**
		S___
		S___
X12. 711 Gore Rd.	**12-1. 751 Gore Rd.**	**S-**
Zone 707	**12-2. 709 Gore Rd.**	**S___**
	12-3. 678 Gore Rd.	**S___**
		S___
		S___
X13. 299 Sauer Rd.	**13-1. 355 Sauer Rd.**	**S-**
Zone 703	**13-2. 295 Sauer Rd.**	**S___**
	13-3. 201 Sauer Rd.	**S___**
		S___
		S___
X14. 1920 Cloverdale Rd.	**14-1. 2041 Cloverdale Rd.**	**S-**
Zone 430	**14-2. 1909 Cloverdale Rd.**	**S___**
	14-3. 1836 Cloverdale Rd.	**S___**
		S___
		S___
X15. 336 Confer Rd.	**15-1. 502 Confer Rd.**	**S-**
Zone 834	**15-2. 340 Confer Rd.**	**S___**
	15-3. 303 Confer Rd.	**S___**
		S___
		S___

X16. 300 Vivian Rd.	**16-1. 282 Vivian Rd.**	**S-**
Zone 790	**16-2. 304 Vivian Rd.**	**S_____**
	16-3. 320 Vivian Rd.	**S_____**
		S_____
		S_____
X17. Columbia Terrace 18	**17-1. Columbia Terrace 25**	**S-**
Zone 430 (Mobil home park)	**17-2. Columbia Terrace 62**	**S_____**
	17-3. Columbia Terrace 98	**S_____**
		S_____
		S_____
X18. Cedar Springs 13	**18-1. Cedar Springs 9**	**S-**
Zone 430 (Mobil home park)	**18-2. Cedar Springs 6**	**S_____**
	18-3. Cedar Springs 14	**S_____**
		S_____
		S_____

5304 Meeker Dr.

5303 Meeker Drive
5220 Meeker Drive

6337 S OLD Pacific Hwy

6431 S Old Pacific Hwy
6333 S Old Pacific Hwy

E. Reduced Triggered Source Monitoring Justification (add sheets as needed):

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1. 357 Spencer Ck. X15. 336 Confer Rd. X7. 503 Cloverdale Rd. X13. 299 Sauer Rd. X12. 711 Gore Rd.	July	X15. 336 Confer Rd. X18. Cedar Springs 13 X13. 299 Sauer Rd. X12. 711 Gore Rd.
February	X2. 5355 Meeker Drive. X17. Columbia Terrace #18 X18. Cedar Springs #13 X5. 206 Hendrickson Dr. X6. 440 N. Third St. 153 Modrow Rd.	August	X7. 503 Cloverdale Rd. X14. 1920 Cloverdale Rd. (GM) X16. 304 Vivian Rd. X17. Columbia Terrace #18 153 Modrow Rd.
March	X3. 320 N. First St. X14. 1920 Cloverdale Rd. X16. 304 Vivian Rd. X9. 330 Cemetery Rd. X10. 756 Taylor Rd.	September	X1. 357 Spencer Ck. X8. 230 Ring Rd. X3. 320 N. First St. X6. 440 N. Third St. X2. 5355 Meeker Dr.
April	X15. 336 Confer Rd. X6. 440 N. Third St. X4. 6315 Old Pacific Hwy. X12. 711 Gore Rd. X13. 299 Sauer Rd. 153 Modrow Rd.	October	X15. 336 Confer Rd. X16. 304 Vivian Rd. X4. 6315 Old Pacific Hwy. X13. 299 Sauer Rd. X12. 711 Gore Rd.
May	X1. 357 Spencer Ck. X2. 5355 Meeker Drive. X7. 503 Cloverdale Rd. X1. 113 Gwynne Rd. X8. 230 Ring Rd. 153 Modrow Rd. 20 Locations (lead/copper)	November	X17. Columbia Terrace #18 X18. Cedar Springs #13 X14. 1920 Cloverdale Rd. (GM) X11. 113 Gwynne Rd. X5. 206 Hendrickson Dr. 153 Modrow Rd.
June	X6. 440 N. Third St. X9. 330 Cemetery Rd. X10. 756 Taylor Rd. X5. 206 Hendrickson Dr.	December	X3. 320 N. First St. X4. 6315 Old Pacific Hwy. X9. 330 Cemetery Rd. X10. 756 Taylor Rd. X8. 230 Ring Rd.

G. Five Routine Sample Locations – Month after an Unsatisfactory Sample

Location/Address for Routine Sample Site(s) Unsatisfactory the Previous Month	Location/Address for the five Routine Sample Sites
X1 June	1. 440 N. Third St.
	2. 330 Cemetery Rd.
	3. 756 Taylor Rd.
	4. 206 Hendrickson Dr.
	5. 6315 Old Pacific Hwy.
X2. July	1. 336 Confer Rd.
	2. Cedar Springs #13
	3. 299 Sauer Rd.
	4. 711 Gore Rd.
	5. 299 Sauer Rd.
X3. August	1. 503 Cloverdale Rd.
	2. 1920 Cloverdale Rd.
	3. 304 Vivian Rd.
	4. Columbia Terrace #18
	5. 230 Ring Rd

H. E. coli-Present Sample Response

Distribution System E. coli Response Checklist				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We inform staff members about activities within the distribution system that could affect water quality.	☒	☐	☐	☐
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	☒	☐	☐	☐
We can easily access and review documentation on water main breaks, construction & repair activities, low pressure and outage incidents.	☒	☐	☐	☐
Our Cross-Connection Control Program is up-to-date.	☒	☐	☐	☐
We test all cross-connection control devices annually as required, with easy access to the proper documentation.	☒	☐	☐	☐
We routinely inspect all treatment facilities for proper operation.	☒	☐	☐	☐
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	☒	☐	☐	☐
We can activate an emergency intertie with an adjacent water system in an emergency.	☐	☒	☐	☐
We have a map of our service area boundaries.	☒	☐	☐	☐
We have consumers who may not have access to bottled or boiled water.	☒	☐	☐	☐
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	☒	☐	☐	☐
We have identified the contact person at each day care, school, medical facility, food service, and other customers who may have difficulty responding to a Health Advisory.	☒	☐	☐	☐
We have messages prepared and translated into different languages to ensure our consumers will understand them.	☐	☒	☐	☐
We have the capacity to print and distribute the required number of notices in a short time period.	☒	☐	☐	☐
Policy Direction	**Yes**	**No**	**N/A**	**To Do List**
We have discussed the issue of E. coli-present sample results with our policy makers.	☒	☐	☐	☐
If we find E. coli in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	☐	☒	☐	☐
(Cont,)				

Distribution System E. coli Response Checklist				
Potential Public Notice Delivery Methods	**Yes**	**No**	**N/A**	**To Do List**
It is feasible to deliver a notice going door-to-door.	☒	☐	☐	☐
We have a list of all of our customers' addresses.	☒	☐	☐	☐
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	☒	☐	☐	☐
We have a list of customer email addresses.	☐	☒	☐	☐
We encourage our customers to remain in contact with us using social media.	☒	☐	☐	☐
W have an active website we can quickly update to include important messages.	☒	☐	☐	☐
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	☐	☒	☐	☐
We need a news release to supplement our public notification process.	☐	☒	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – All Sources				
Background Information	**Yes**	**No**	**N/A**	**To Do List**
We review our sanitary survey results and respond to any recommendations affecting the microbial quality of our water supply.	☒	☐	☐	☐
We address any significant deficiencies identified during a sanitary survey.	☒	☐	☐	☐
There are contaminant sources within our Wellhead Protection Area that could affect the microbial quality of our source water, and If yes, we can eliminate them.	☒	☐	☐	☐
We routinely inspect our well site(s)	☒	☐	☐	☐
We have a good raw water sample tap installed at each source.	☒	☐	☐	☐
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	☒	☐	☐	☐
(Cont.)				

E. coli-Present Triggered Source Sample Response Checklist – All Sources				
Public Notice	**Yes**	**No**	**N/A**	**To Do List**
We discussed the requirement for immediate public notice of an E. coli-present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	☐	☒	☐	☐
We discussed the requirement for immediate public notice of an E. coli-present source sample result with our wholesale customers and encouraged them to develop a response plan.	☐	☐	☒	☐
We have prepared templates and a communications plan that will help us quickly distribute our messages.	☒	☐	☐	☐

E. coli-Present Triggered Source Sample Response Checklist – Source S *				
Alternate Sources	**Yes**	**No**	**N/A**	**To Do List**
We can stop using this source and still provide reliable water services to our customers.	☐	☒	☐	☐
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	☐	☒	☐	☐
We can Provide bottled water to all or part of the distribution system for an indefinite period.	☒	☐	☐	☐
We can quickly replace our existing source of supply with a more protected new source.	☐	☒	☐	☐
Temporary Treatment	**Yes**	**No**	**N/A**	**To Do List**
This source is continuously chlorinated, and our existing facilities can provide 4-log virus treatment (CT = 6) before the first customer. If yes, at what concentration? 1.0 Mg/L	☒	☐	☐	☐
We can quickly introduce chlorine into the water system and take advantage of the existing contact time to provide 4-log virus treatment to a large portion of the distribution system.	☒	☐	☐	☐
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (operational storage) to increase the amount of time the water stays in the system before the first customer to achieve CT = 6.	☒	☐	☐	☐
We can alter the demand for drinking water (maximum day or peak hour) through conservation messages to increase the time the water is in the system prior to the first customer in order to achieve 4-log virus treatment with chlorine.	☒	☐	☐	☐

*NOTE: If your system has multiple sources, you may want to complete a separate checklist for each source.

Distribution System E. coli Response Plan

If we have E. coli in our distribution system we will immediately:

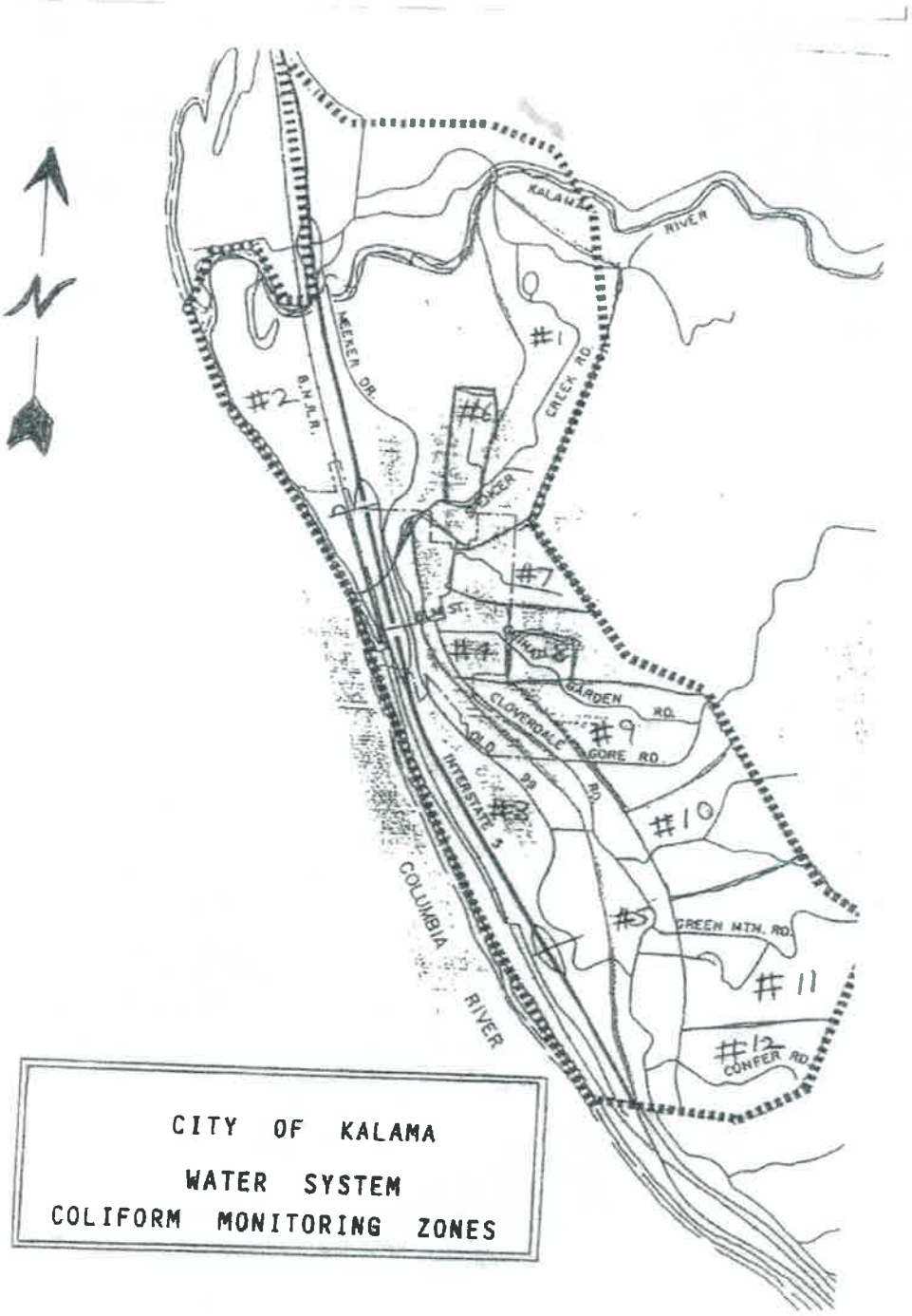
1. Call DOH.
2. Collect repeat and triggered source samples per Part D. Collect additional investigative samples as necessary.
3. Inspect our water system facilities, including treatment plants for proper operation.
4. Interview staff to determine whether anything unusual was happening in the water system services area, especially since the previous month's sample(s).
5. Review new construction activities, water main breaks, and pressure outages that may have occurred during the previous month.
6. Review Cross-Connection Control Program status.
7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6.

E. coli-Present Triggered Source Sample Response Plan – Source ____

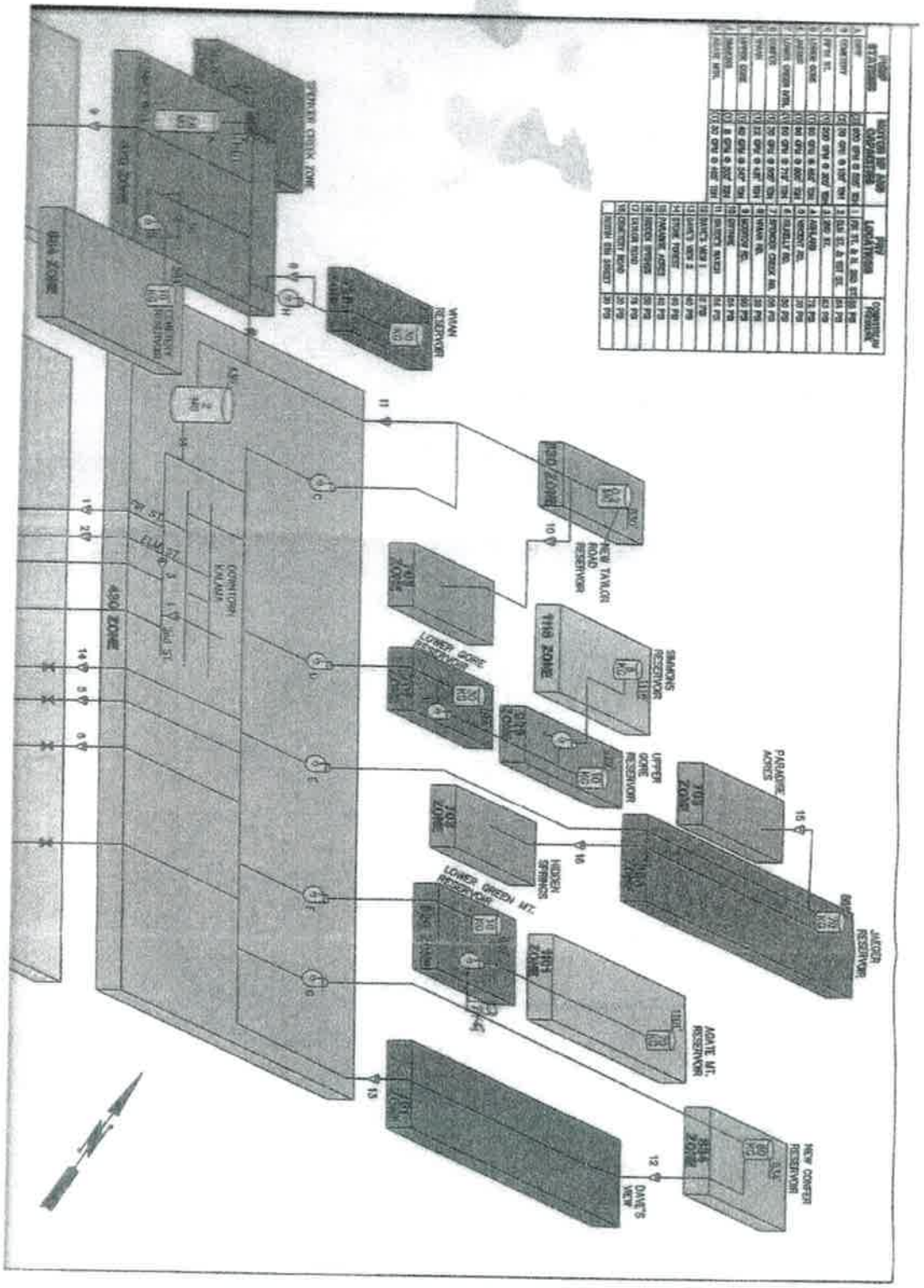
If we have E. coli in Source ___01___ water we will immediately:

1. Call DOH.
2. Distribute required notice.
3. Interview staff.
4. In concert with DOH, begin work on corrective action plan. Corrective action options: discontinue use of the contaminated source; provide 4-log virus treatment of the source.

I. System Map (A)



I. System Map (B)



Water Quality Monitoring Schedule

System: KALAMA, CITY OF
Contact: Kelly D Rasmussen

PWS ID: 37550 F
Group: A - Comm

Region: SOUTHWEST
County: COWLITZ

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Mar 2016	Apr 2016	May 2016	Jun 2016	Jul 2016	Aug 2016	Sep 2016	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017
Coliform Monitoring Population	5939	5939	5939	5339	5339	5339	5939	5939	5939	5939	5939	5939
Number of Routine Samples Required	7	7	7	6	6	6	7	7	7	7	7	7

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- Collect no less than 5 routine samples in the month following one or more unsatisfactory samples, in accordance with your system's Coliform Monitoring Plan.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*	*Last Sample Date*	*Next Sample Due*
Lead and Copper	20	Jan 2016 - Dec 2018	standard - 3 year	06/10/2015	Jun 2018
Asbestos	0	Jan 2011 - Dec 2019	waiver - 9 year	04/01/2008	Apr 2017
Total Trihalomethane (THM)	2	Jan 2016 - Dec 2016	reduced - 1 year	05/07/2015	***Oct 2016***
Halo-Acetic Acids (HAA5)	2	Jan 2016 - Dec 2016	reduced - 1 year	05/07/2015	***Oct 2016***

Notes on Distribution System Chemical Monitoring

For *Lead and Copper*:
- Collect samples from indoor faucets after the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours.
- Flush sample faucets with cold water the evening prior to collecting the sample.
- If your sampling frequency is annual or once every 3 years, collect samples between June 1 and September 30.

For *Asbestos:* Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.
Asbestos:

For *Disinfection Byproducts (HAA5 and THM):* Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the
- Washington State grants monitoring waivers for various test panels or analytes. Please note that we may
  We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- If "R&C" is listed in a monitoring requirement's frequency, the requirements are based on detections whic

Source S01 *Ranney Well Water Plant* *Ranney Infiltration Gallery* *Use - Permanen*

Test Panel/Analyte	*# Samples Required*	*Compliance Period*	*Frequency*
Nitrate	1	Jan 2016 - Dec 2016	standard - 1 year
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year
Arsenic	1	Jan 2014 - Dec 2016	standard - 3 year
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year
Pesticides	1	Jan 2014 - Dec 2022	waiver - 9 year
Soil Fumigants	0	Jan 2014 - Dec 2016	waiver - 3 year
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year

Call
Sophia
And ask About
Waivers & why
there is no date on Sour
"Next Sample Due"

05/05/2016

Other Information

Other Reporting Schedules	Due Date
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2016
Submit CCR certification form to ODW (Community systems only):	10/01/2016
Submit Water Use Efficiency report online to ODW (Community and other municipal water systems only):	07/01/2016
Send notices of lead and copper sample results to the customers sampled:	10 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	60 days after you notify customers

Special Notes

None

Southwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Sophia Petro: (360) 236-3046 or sophia.petro@doh.wa.gov
For questions regarding DBPs:	Sophia Petro: (360) 236-3046 or sophia.petro@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Sandy Brentlinger: (360) 236-3044 or sandy.brentlinger@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.